[Air]

[Water]

[Earth]

[Buderus]

Technical guide
Issue 2010/09

Logamax plus GB162

Gas condensing boiler

Output range from 2.7 kW to 100 kW

Heat is our element

Buderus

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1 Gas condensing boilers GB162 and GB162-25 T40S

1.1 Benefits and application areas Logamax plus GB162

1.1.1 Features Logamax plus GB162

Benefits	Key features
Preferred application area	• Detached houses, two-family homes and apartment buildings • Low energy houses • Commercial and industrial facilities
Preferred installation site	• In cellars or on individual floors • Below the roof
Output	• Versions with eight output sizes: 15 kW, 25 kW, 35 kW, 45 kW, 50 kW, 65 kW, 80 kW and 100 kW • Output modulating between 17 % and 100 %
Heat exchanger	• ALUplus heat exchanger with high quality condensing heating surface with plasma polymerisation for a longer service life and lower maintenance
Emissions	• Low noise and clean combustion
Standard seasonal efficiency [to DIN]	• Up to 110,5 %
Economic viability	• Low power consumption through high efficiency pumps up to 50 kW • Only 5.4 W power consumption in standby mode
Optimum energy utilisation and minimised total running costs with ETA-plus system	• Modulating burner with rated output from 17 % to 100 % results in long runtimes and is ideal matched to the central heating and DHW heating demand • Condensing operation all year round possible through a highly effective heat exchanger
Hydraulics with FLOW-plus system	• Affordable and simply hydraulics without overflow valve as no minimum flow rate is required • Maximum utilisation of condensing technology and quiet operation through the differential pressure or output-dependent operation of the modulating high efficiency pump
Easy and convenient operation	• Control function matched to the respective system hydraulics • All control unit functions can be adjusted in just a few easy steps
Quick installation, commissioning and maintenance	• Reduced installation and service effort with extensive connection accessories and flue kits, safety valve (4 bar) available as an option • Simplified commissioning and service through the service menu of the RC35 programming unit; minimum clearances to the side are not required • Plenty of room and clear layout for easy and affordable maintenance and service
Equipment (standard equipment level)	• Modulating high efficiency pump, safety valve (3 bar), 3-way valve with stepper motor (up to 35 kW), FDS system (Flow Detection System), pressure sensor, boiler flue connection, digital pressure gauge, automatic air vent valve • GB162-45 and GB162-50: modulating high efficiency pump available as an accessory (boiler supplied without pump)
DHW heating	• Combination with separate DHW cylinders Logalux S135 RW, S160 RW, S120, SU160 W, SU200 W and SU300 W (not applicable to GB162-65/80/100)
Burner	• Highly premixing ceramic linear radiant burner for the cleanest combustion

Table 1 Benefits and key features Logamax plus GB162

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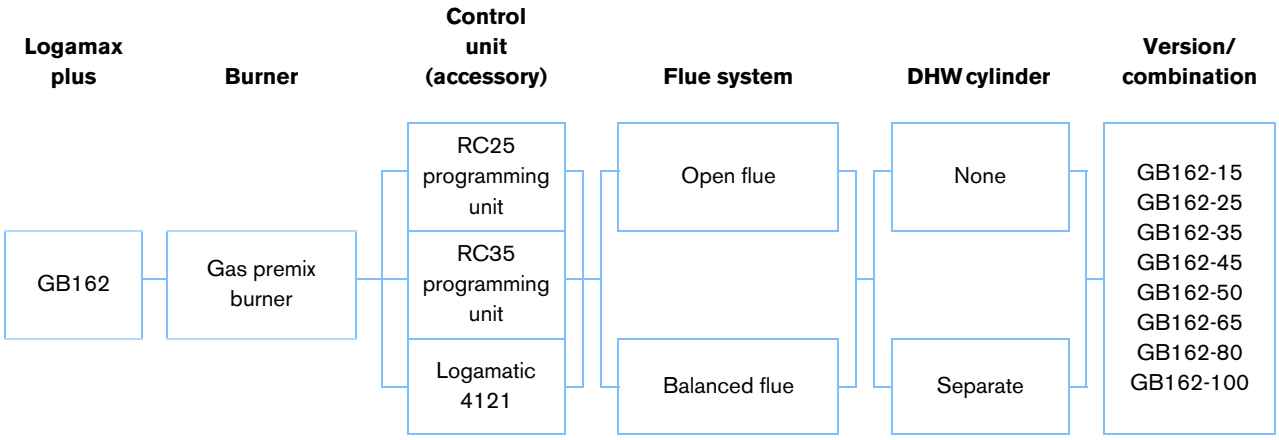
1.1.2 Logamax plus GB162 selection aid



1.2 Benefits and application areas Logamax plus GB162-25 T40S

1.2.1 Features Logamax plus GB162-25 T40S

Benefits	Key features
Preferred application area	• Detached and terraced houses (low energy houses) • Buildings with low heat demand • Floors and living areas
Preferred installation site	• In cellars or on individual floors • Below the roof
Output	• Version with output (25 kW) as storage combi boiler with attached DHW cylinder: stratification cylinder with 40 l capacity • Modulating output from 15 % to 100 % in DHW mode
Heat exchanger	• ALUplus heat exchanger with high quality condensing heating surface with plasma polymerisation for a longer service life and lower maintenance
Emissions	• Clean combustion
Standard seasonal efficiency [to DIN]	• Up to 110,5 %
Economic viability	• Low power consumption through high efficiency pump • Only 5.4 W power consumption in standby mode
Hydraulics with FLOW-plus system	• Affordable and simply hydraulics without overflow valve as no minimum flow rate is required • Maximum utilisation of condensing technology and quiet operation through the differential pressure or output-dependent operation of the modulating high efficiency pump
Easy installation	• Storage combi boiler supplied as split version
Quick installation, commissioning and maintenance	• Storage combi boiler comprising a gas condensing boiler and DHW cylinder • Reduced installation and service effort with extensive connection accessories and flue kits, safety valve (4 bar) available as an option • Plenty of room and clear layout for easy and affordable maintenance and service • Simplified commissioning and service through the service menu of the RC35 programming unit; minimum clearances to the side are not required

Table 2 Benefits and key features Logamax plus GB162-25 T40S

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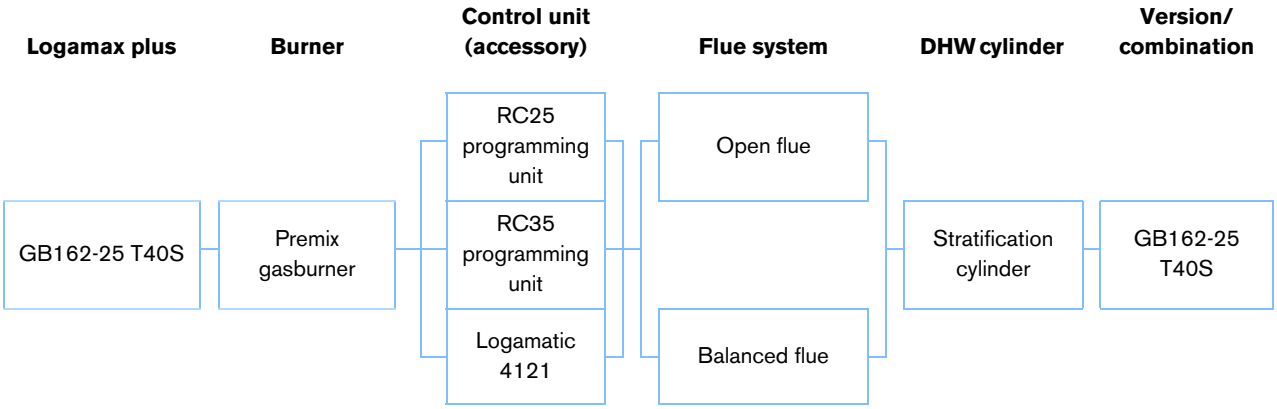
Benefits	Key features
Equipment (complete equipment level)	• Modulating high efficiency pump, safety valve (3 bar), 3-way valve with stepper motor, boiler-cylinder connection lines, FDS system (Flow Detection System), stratification cylinder with 40 l capacity and plate heat exchanger with 33 kW, stratification primary pump, water flow sensor, boiler flue connection, automatic air vent valve
DHW heating	• Integral DHW heating via stratification cylinder with high DHW convenience and utilisation of condensing technology in DHW mode • Optional on-site DHW circulation connection • Booster function for DHW 25 kW appliance with 33 kW DHW output
Burner	• Highly premixing ceramic linear radiant burner for the cleanest combustion

Table 2 Benefits and key features Logamax plus GB162-25 T40S

1.2.2 Logamax plus GB162-25 T40S selection aid



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1.3 Overview of boiler types Logamax plus GB162

Fig. 1 Overview of boiler types

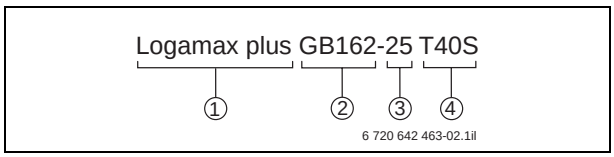

Fig. 2 Type key

1 Umbrella name
2 Series
3 Output in kW
4 Integral DHW heating with attached 40 l stratification cylinder

Logamax plus	Rated output	Equipped at the factory for		LPG conversion kit
		Natural gas E (H)	Natural gas LL (L)	
	[kW]	Product no.	Product no.	Product no.
GB162-15	15	7 746 901 116	7 746 901 118	7 746 901 161
GB162-25	25	7 746 901 117	7 746 901 119	7 746 901 162
GB162-25 T40S	25 (33)[1)]	7 746 901 120	7 746 901 121	7 746 901 162
GB162-35	35	7 746 901 088	7 746 901 086	7 746 901 163
GB162-45	45	7 746 901 089	7 746 901 087	7 746 901 164
GB162-50	50	7 746 901 076	7 746 901 777	7 746 900 509
GB162-65	65	7 106 096	7 106 098	7 746 900 509
GB162-80	80	7 106 100	7 106 102	7 746 900 197
GB162-100	100	7 106 104	7 106 106	7 746 900 197

Table 3 Logamax plus GB162 output sizes

1) In DHW mode

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2 Technical description

2.1 Equipment level of the gas condensing boilers

2.1.1 Equipment overview Logamax plus GB162-15, GB162-25, GB162-35 and GB162-45

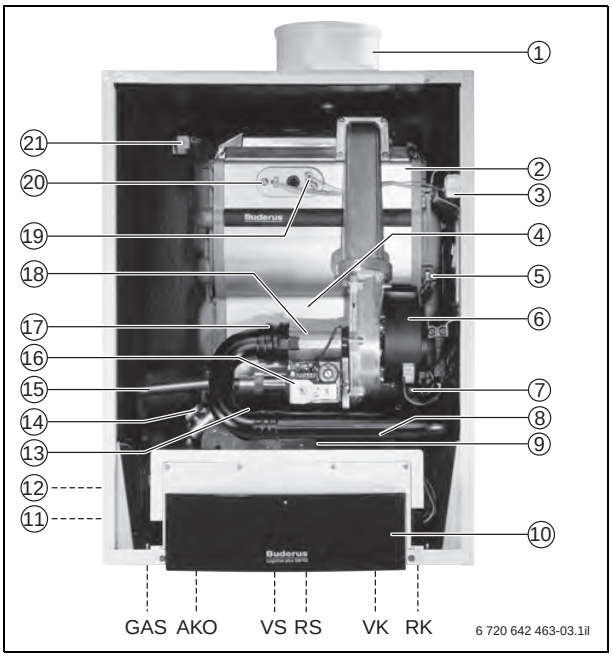

Fig. 3 Selected components and assemblies of the Logamax plus GB162-15/25/35/45 (connections not visible → fig. 6 and fig. 7, page 13)

AKO Condensate outlet (not visible)
GAS Gas connection (not visible)
RK Boiler return (not visible)
VK Boiler flow (not visible)
RS DHW cylinder return (not visible)
VS DHW cylinder flow (not visible)
1 Boiler flue connection (flue outlet)
2 Ceramic linear radiant burner
3 Boiler ID module
4 ALUplus heat exchanger
5 Safety temperature sensor
6 Fan
7 Return temperature sensor
8 Pressure sensor
9 Modulating high efficiency pump,efficiency category A (available as an accessory for the GB162-45)
10 Slot B, for example for RC35 programming unit
11 Siphon (not visible)
12 3-way diverter valve (not visible) up to 35 kW
13 Condensate pan
14 Flow temperature sensor
15 Gas line
16 Gas valve
17 Air intake pipe
18 Venturi nozzle
19 Ionisation electrode
20 Incandescent ignition electrode
21 Automatic air vent valve

The wall mounted Logamax plus GB162-15/25/35/45 gas condensing boilers have been tested in compliance with the Gas Appliances Directive 90/396/EEC. The requirements of standards EN 483 and EN 677 were taken into consideration. The Logamax plus GB162-15/25/35/45 gas condensing boilers can be operated with natural gas and LPG in accordance with appliance category II_{2ELL3P}.

Boiler block, burner and heat exchanger

- Internal sealed combustion chamber
- Ceramic premix gas burner
- ALUplus heat exchanger with high quality condensing heating surface with plasma polymerisation for:
  - Compact dimensions, yet high output
  - Long service life through improved resistance
  - Permanently high efficiency, as contamination is prevented
  - Low maintenance operation with quick and simple maintenance
  - Optimised flow technology within the heat exchanger pipes through new internal pattern
- KombiVENT gas:air unit comprising a fan, gas valve, gas nozzle and venturi nozzle
- Flame monitoring system
- 120 V incandescent ignition

Hydraulic components GB162-15/25/35

- Heating circuit pump, efficiency category A
  - Bosch OEM high efficiency pump with Q_V label, differential pressure and output-dependent control
- Digital pressure gauge on the Logamatic BC10 base controller
- Automatic air vent valve
- Safety valve (response pressure 3 bar)
  - 4 bar option available
- Integral 3-way diverter valve
- Siphon
- Connection fittings for flow and return, as well as cylinder flow and return

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Hydraulic components GB162-45

- Gas condensing boiler supplied without integral heating circuit pump; with sleeve socket
- Optional heating circuit pumps are as follows:
  - Pump in efficiency category A (optional integration into the appliance):
    Grundfos high efficiency pump UPM 15-70 2W, differential pressure and output-dependent control
  - External pump: only Δp-controlled
    Wilo Stratos 25/1-8 **or** Grundfos Magna 25-60
- Safety valve (response pressure 4 bar)

Control components

- Universal burner control unit UBA3.5
- Logamatic BC10 base controller

2.1.2 Equipment overview Logamax plus GB162-25 T40S

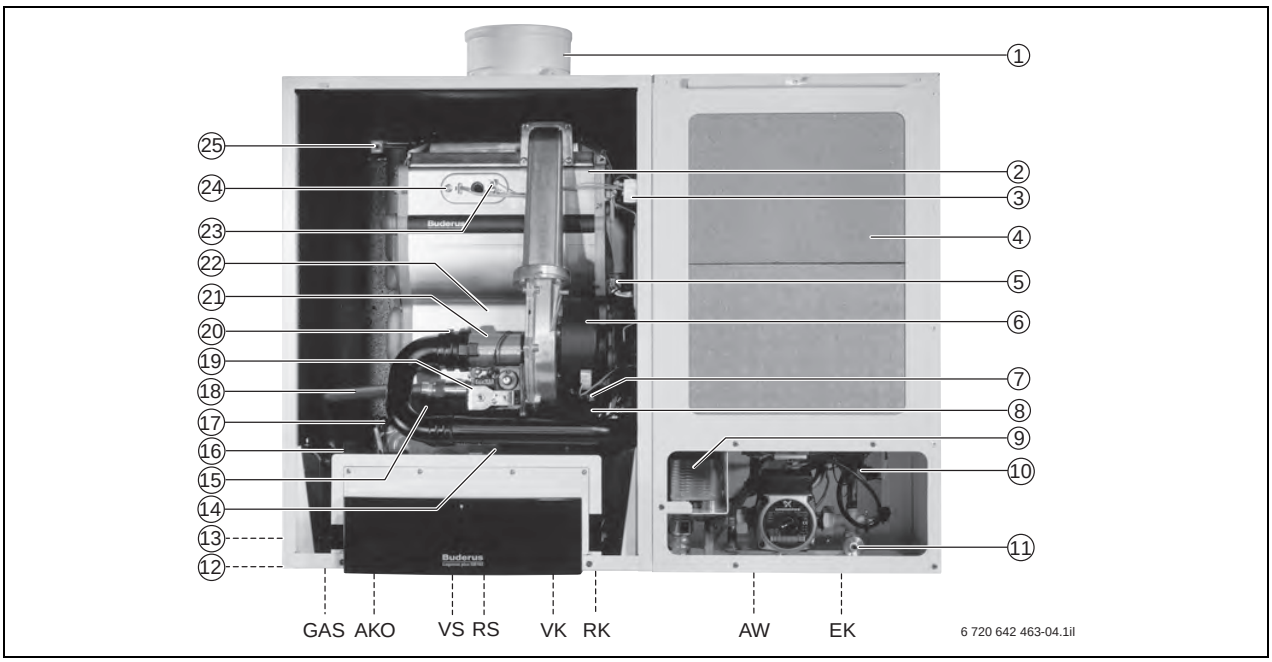

Fig. 4 Selected components and assemblies of the Logamax plus GB162-25 T40S (connections not visible → fig. 8, page 13)

AKO Condensate outlet (not visible)
AW DHW outlet (not visible)
EK Cold water inlet (not visible)
GAS Gas connection (not visible)
RK Boiler return (not visible)
VK Boiler flow (not visible)
RS DHW cylinder return (not visible)
VS DHW cylinder flow (not visible)
1 Boiler flue connection (flue outlet)
2 Ceramic linear radiant burner
3 Boiler ID module
4 Stratification cylinder
5 Safety temperature sensor
6 Fan
7 Pressure sensor
8 Return temperature sensor
9 Plate heat exchanger
10 Cold water inlet sensor
11 Drain tap
12 Siphon (not visible)
13 3-way diverter valve (not visible)
14 Modulating high efficiency pump, efficiency category A
15 Condensate pan
16 Safety valve
17 Flow temperature sensor
18 Gas line
19 Gas valve
20 Air intake pipe
21 Venturi nozzle
22 ALUplus heat exchanger
23 Ionisation electrode
24 Incandescent ignition electrode
25 Automatic air vent valve

The wall mounted Logamax plus GB162-25 T40S gas condensing boiler has been tested in compliance with the Gas Appliances Directive 90/396/EEC. The requirements of standards EN 483 and EN 677 were taken into consideration. The Logamax plus GB162-25 T40S is operated with natural gas and LPG in accordance with appliance category II_{2ELL3P}.

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Boiler block, burner and heat exchanger

- Internal sealed combustion chamber
- Stainless steel premix burner
- ALUplus heat exchanger with high quality condensing heating surface with plasma polymerisation for:
  - Compact dimensions, yet high output
  - Long service life through improved resistance
  - Permanently high efficiency, as contamination is prevented
  - Low maintenance operation with quick and simple maintenance
  - Optimised flow technology within the heat exchanger pipes through new internal pattern
- KombiVENT gas:air unit comprising a fan, gas valve, gas nozzle and venturi nozzle
- Flame monitoring system
- 120 V incandescent ignition

Hydraulic components

- Heating circuit pump, efficiency category A
  - Bosch OEM high efficiency pump with Q_V label, differential pressure and output-dependent control
- Digital pressure gauge on the Logamatic BC10 base controller
- Automatic air vent valve
- Safety valve (response pressure 3 bar)
  - 4 bar option available
- Integral 3-way diverter valve
- Boiler-cylinder connection lines

DHW heating

- Integral, indirectly heated DHW cylinder as stratification version according to DIN 4753-3 with 40 l capacity, in stainless steel
- Stainless steel DHW pipework with no copper
- Copper-soldered stainless steel plate heat exchanger with 33 kW constant output
- Water flow sensor to record the amount of water

Control components

- Universal burner control unit UBA3.5
- Logamatic BC10 base controller

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2.1.3 Equipment overview Logamax plus GB162-50, GB162-65, GB162-80 and GB162-100

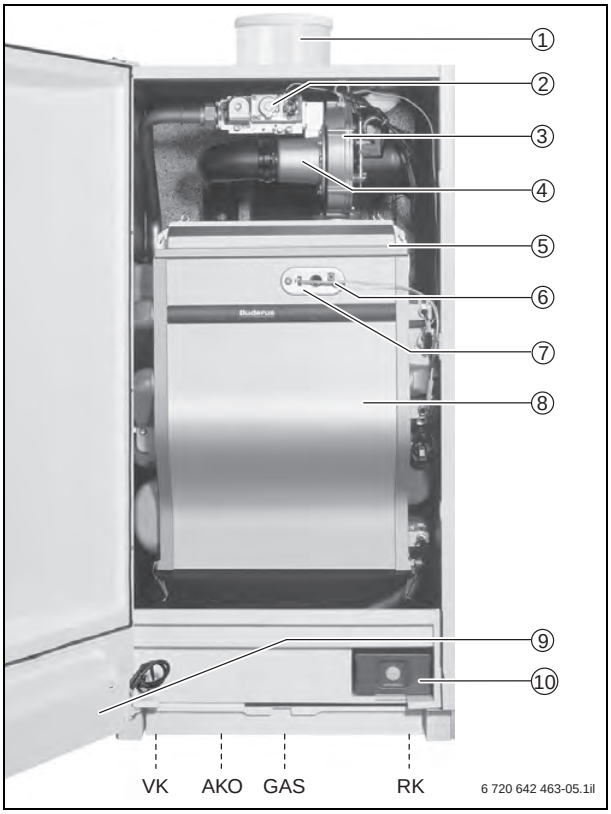

Fig. 5 Key components and assemblies Logamax plus GB162-50/65/80/100 (connections not visible → fig. 9, page 14)

AKO Condensate outlet (not visible)
GAS Gas connection (not visible)
RK Boiler return (not visible)
VK Boiler flow (not visible)
1 Boiler flue connection (flue outlet)
2 Gas valve
3 Fan
4 Venturi nozzle
5 Ceramic linear radiant burner
6 Ionisation electrode
7 Incandescent ignition electrode
8 ALUplus heat exchanger
9 Slot, for example for RC35 programming unit (in the door)
10 Universal burner control unit UBA3.5

The wall mounted Logamax plus GB162-50/65/80/100 gas condensing boilers have been tested in compliance with the Gas Appliances Directive 90/396/EEC. The requirements of standards EN 483 and EN 677 were taken into consideration. The Logamax plus GB162-50/65/80/100 gas condensing boilers can be operated with natural gas II_{2ELL}.

Boiler block, burner and heat exchanger

- Internal sealed combustion chamber
- Ceramic premix gas burner
- ALUplus heat exchanger with high quality condensing heating surface with plasma polymerisation for:
  - Compact dimensions, yet high output
  - Long service life through improved resistance
  - Permanently high efficiency, as contamination is prevented
  - Low maintenance operation with quick and simple maintenance
  - Optimised flow technology within the heat exchanger pipes through new internal pattern
- KombiVENT gas:air unit comprising a fan, gas valve, gas nozzle and venturi nozzle
- Flame monitoring system
- 120 V incandescent ignition

Hydraulic components

- Pump connection assembly for direct connection to the boiler including:
  - Modulating pump UPER 25-80
  - Safety valve (3 bar) (4 bar available as an accessory), gas tap, shut-off valves
  - Check valve, pressure gauge, connection for external diaphragm expansion vessel (MAG), drain & fill valve (FE), insulation
- Possible external pumps are as follows:
  - Grundfos UPM 25-70 high efficiency pump, output-dependent control for GB162-50
  - Grundfos Magna 25-60 high efficiency pump Δp-controlled for GB162-50/65
  - Wilo Stratos 25/1-8 high efficiency pump with output-dependent control for GB162-50/65/80/100
  - Grundfos UPER 25-80 pump with output-dependent control for GB162-50/65/80/100
- Safety valve (response pressure 4 bar) - optional replacement for the pump connection assembly
- Siphon (not part of the standard boiler delivery)

Control components

- Universal burner control unit UBA3.5
- Logamatic BC10 base controller

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2.2 Gas condensing boiler function principle

2.2.1 Heat exchanger and gas burner unit

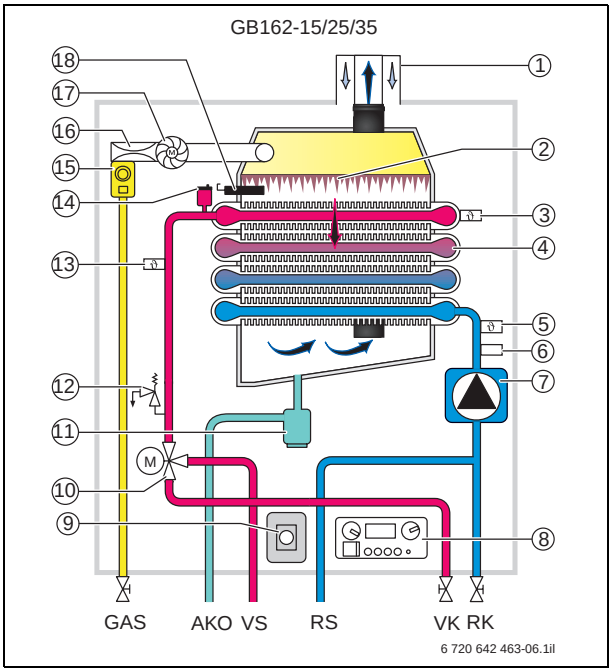

Fig. 6 Function scheme Logamax plus GB162-15/25/35 (key → page 14)

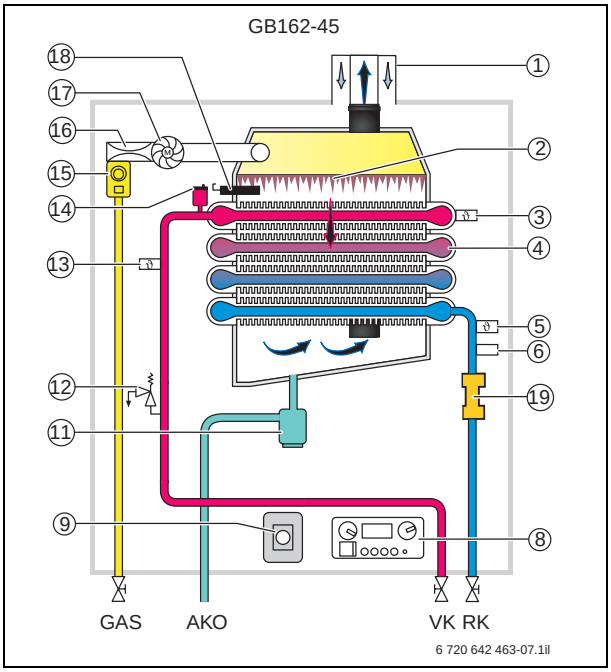

Fig. 7 Function scheme Logamax plus GB162-45 (key → page 14)

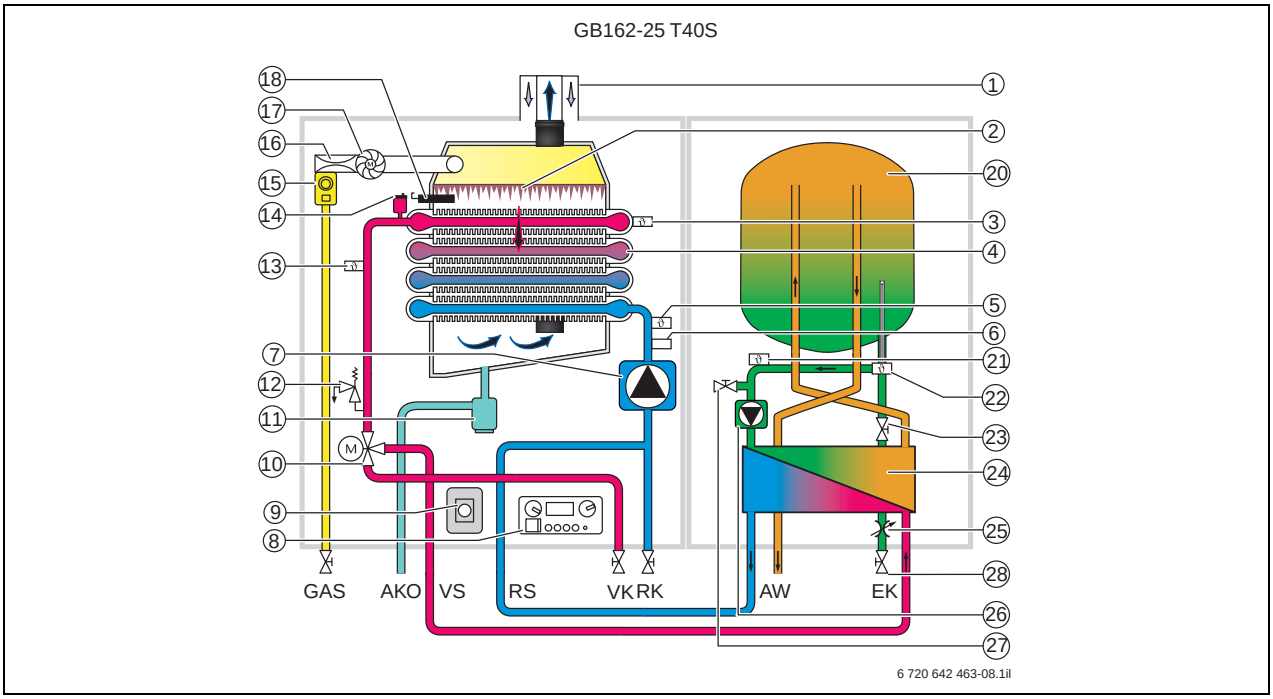

Fig. 8 Function scheme Logamax plus GB162-25 T40S (key → page 14)

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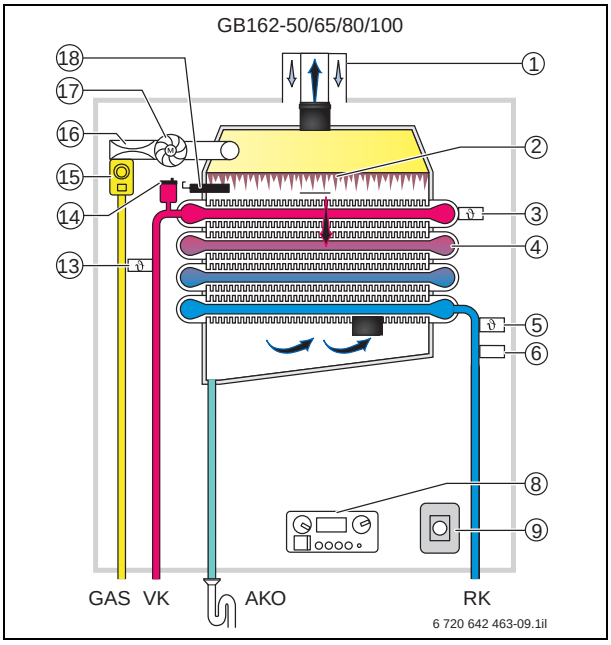

Fig. 9 Function scheme Logamax plus GB162-50/65/80/100

Key to fig. 6 to fig. 9:

AKO Condensate outlet
AW DHW outlet
EK Cold water inlet
GAS Gas connection
RK Boiler return
VK Boiler flow
RS DHW cylinder return
VS DHW cylinder flow
1 Boiler flue connection (flue outlet)
2 Ceramic linear radiant burner
3 Safety temperature sensor
4 ALUplus heat exchanger
5 Return temperature sensor
6 Pressure sensor
7 Modulating high efficiency pump, efficiency category A
8 Logamatic BC10 base controller
9 Universal burner control unit UBA3.5
10 3-way diverter valve
11 Siphon
12 Safety valve
13 Flow temperature sensor
14 Automatic air vent valve
15 Gas valve
16 Venturi nozzle
17 Fan
18 Incandescent ignition and monitoring electrode
19 Sleeve socket for pump installation (UPM 15-70 2W (accessory) may be integrated)
20 Stratification cylinder (40 l capacity)
21 Cold water inlet sensor
22 DHW temperature sensor
23 Water flow limiter
24 Plate heat exchanger
25 Water flow sensor
26 Cylinder primary pump
27 Drain & fill valve
28 Water flow limiter, adjustable

ETA-plus system in the Logamax plus GB162

The ETA-plus system of the Logamax plus GB162 gas condensing boilers minimises the overall running costs through optimum energy utilisation.

Part of the ETA-plus system is a highly effective lamellar tube heat exchanger with ALUplus technology. It features an extremely large surface area enabling optimum heat transfer (→ fig. 6 to fig. 9, pos. 4).

This concept, which has been proven in millions of applications, has the following effects:

- Year-round utilisation of condensing energy because of the extreme cooling of the flue gases
- A maximum standard seasonal efficiency [to DIN] of up to 110,5 %

In addition, the Logamax plus GB162 gas condensing boilers are equipped with a fully pre-mixing ceramic linear radiant burner that modulates its output between 17 % and 100 %. It is fitted as a downdraught burner above the lamellar tubes (→ fig. 6 to fig. 9, pos. 2).

The ETA-plus system is rounded off with a modulating differential pressure-dependent high efficiency pump in appliances up to 45 kW (pump for GB162-45 available as an accessory). This enables simple system hydraulics without minimum flow rates to be achieved (→ chapter 6).

Hydraulics Logamax plus GB162-50/65/80/100

The Logamax plus GB162-50/65/80/100 gas condensing boilers are supplied without integral pumps. They may be combined with the pump connection assembly (accessory). The pump connection assembly is equipped with an output-dependent UPER 25-80 pump. For the GB162-50, an output-dependent UPM 25-70 high efficiency pump is available as an accessory. Furthermore, these appliances can be combined on site with third party differential pressure-dependent pumps. These should be operated with the setting Δp-v (variable).

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2.2.2 Burner ignition and flame monitoring

Burner ignition

In contrast to conventional boilers with electric spark ignition or a pilot flame, the Logamax plus GB162 gas condensing boilers operate with an incandescent ignition electrode (→ fig. 6 to fig. 9, pos 18).

This offers the following benefits:

- Optimum ignition of the gas:air mixture
- Quiet ignition even with low calorific gas
- No cycling noise as with conventional ignition systems

Flame monitoring system

Should the burner fail to ignite or the flame go out, the universal burner control unit UBA3.5 (→ fig. 6 to fig. 9, pos. 9) receives no flame signal from the ionisation 'electrode (→ fig. 6 to fig. 9, pos. 18). The UBA3.5 then immediately interrupts the gas supply to the gas valve, switches the burner off and issues a fault message.

2.2.3 Heating circuit pump and hydraulics

FLOW-plus system for the Logamax plus GB162

With the FLOW-plus system, condensing technology can be utilised to optimum effect in systems with Logamax plus GB162 gas condensing boilers. The system can operate quietly.

Simple and affordable system hydraulics without overflow valve as no minimum flow rate is required.

The Logamax plus GB162-15/25/35 and GB162-25 T40S feature an integral modulating high efficiency pump. It can be adjusted to suit the specific system, i.e. it can operate with differential pressure-dependent (standard setting) or output-dependent control. This enables a maximum utilisation of the condensing effect at any time. The automatic pump control enables an optimum adjustment of the gas condensing boiler to suit the respective system hydraulics.

The Logamax plus GB162-50/65/80/100 is supplied without an integral pump. The pump can be selected subject to system hydraulics. The available pump for the pump connection assembly operates with output-dependent control. It enables the utilisation of condensing technology in conjunction with a low loss header. In addition, an external high efficiency UPM 25-70 pump with output-dependent control is available as an accessory for the GB162-50. Standard differential pressure-dependent pumps can be used as external pumps (→ page 94 ff.). The external pumps are set to Δp-v (variable). This enables variable residual heads for a heating circuit connected directly downstream.

Hydraulics Logamax plus GB162-45

Logamax plus GB162-45 is supplied without an integral pump. A high efficiency UPM 15-70 2W pump (accessory) can be fitted inside the boiler. The control functions differential pressure-dependent and output-dependent control are available.

2.2.4 Combustion air supply and flue gas routing

The fan (→ fig. 6 to fig. 9, pos. 17) draws in the combustion air required for the combustion process. The positive combustion air pressure transports the flue gas created during combustion into the flue system.

Should the fan fail or if the path for the ventilation air or flue gas is blocked, the gas supply will be throttled or shut off completely by the gas:air control. If the gas flame goes out, the Logamax plus gas condensing boiler will be shut down by the integral flame monitor, and the universal burner control unit UBA3.5 issues a fault message.

For information regarding the operating and fault messages at the Logamatic BC10 base controller, see pages 34 f.

2.2.5 Gas:air control

KombiVENT gas:air unit

For the Logamax plus GB162 gas condensing boilers, the KombiVENT gas:air unit comprises a fan, a gas valve and the venturi nozzle (→ fig. 6 to fig. 9, pos. 15 to pos. 17). It is mounted directly on the burner. Subject to the fan speed and the resulting air flow rate, a specific negative pressure is created inside the venturi nozzle. The required gas volume is metered through this negative pressure. The gas and combustion air are fully mixed inside the fan.

The result of the gas:air control is a constantly high CO_2 content in the flue gas across the entire modulation range.

Control sequence

Subject to the outside temperature and the heating curve, the controller calculates a set flow temperature. This is transferred to the UBA3.5 burner control unit and compared with the actual flow temperature captured by the flow temperature sensor. If this results in a difference, the so-called control deviation, the output is adjusted by means of the modulating burner.

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2.3 Dimensions and specification of the gas condensing boilers

2.3.1 Logamax plus GB162-15, GB162-25, GB162-35 and GB162-45

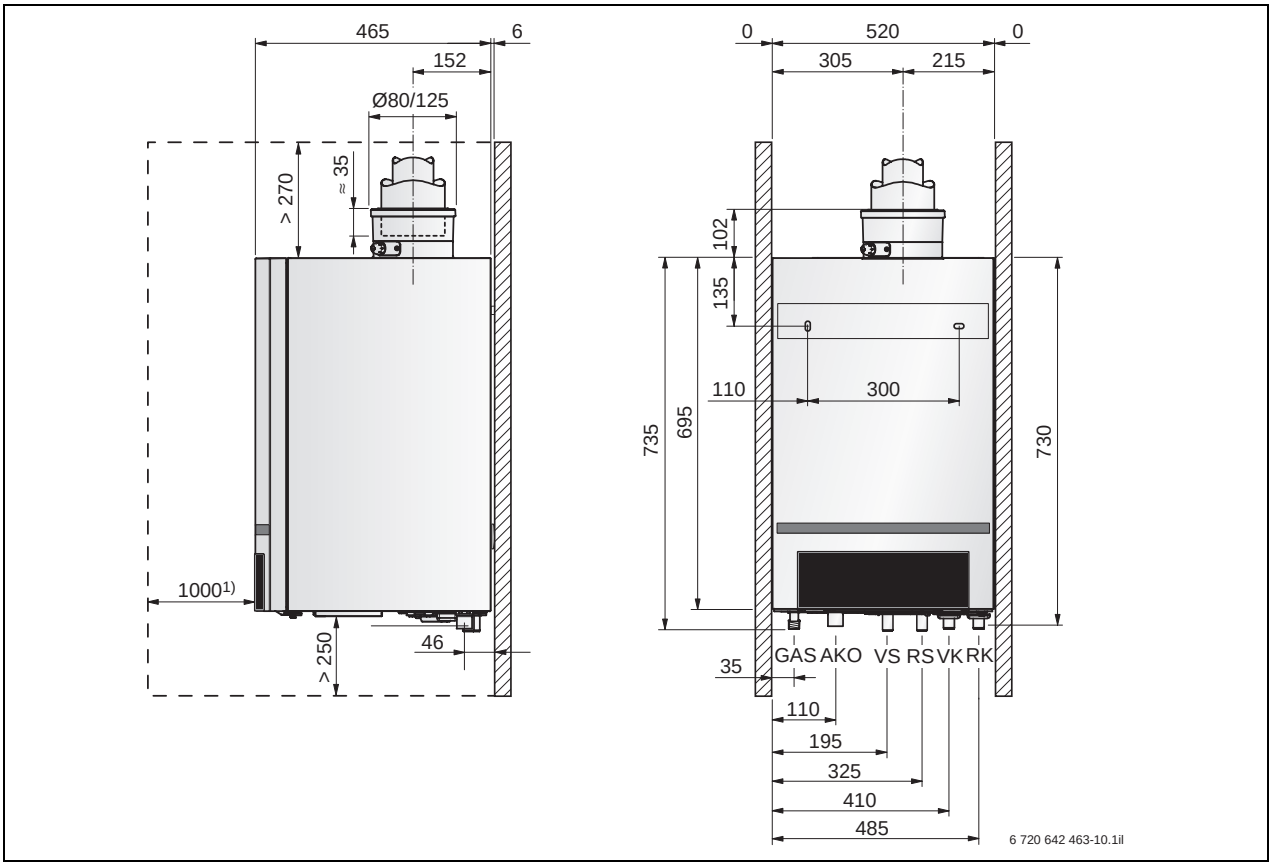

Fig. 10 Dimensions and connections Logamax plus GB162-15/25/35/45 (dim. in mm)

AKO Condensate outlet Ø 30
GAS Gas connection R½
RK Boiler return Ø 28 (connection, compression fitting R1)
RS DHW cylinder return (connection fitting R¾)
VK Boiler flow Ø 28 (Connection, compression fitting R1)
VS DHW cylinder flow (connection fitting R¾)
1) Service dimension, integrated into the control panel, may be 0 mm.

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Logamax plus Boiler size		Unit	GB162-15 15	GB162-25 25	GB162-35 35	GB162-45 45
Output/standard seasonal efficiency [to DIN]						
Rated output at system temperature	80/60 °C	kW	2.7–14.0	4.8–23.9	5.8–32.7	9.6–42.5
	50/30 °C	kW	3.1–15.2	5.3–24.9	6.5–35.0	10.4–44.9
Rated output		kW	2.8–14.4	5.0–23.9	6.1–33.5	9.7–43.5
Standard seasonal efficiency (to DIN 4702-8) at system temperature	75/60 °C	%	107.6	106.6	106.5	106.0
	40/30 °C	%	110.5			
Gas connection						
Gas type category Germany		–	II_{2ELL3P}			
Gas type category Austria/Switzerland		–	II_{2H3P}			
Gas supply pressure Natural gas LL Natural gas E LPG 3P		 mbar mbar mbar	 20 20 50			
Gas supply values at 15 °C and 1013 mbar Natural gas LL[1] with 8.1 kWh/m³ Natural gas E[2] with 9.5 kWh/m³ LPG 3P with 24.5 kWh/m³	 Propane Propane	 m³/h m³/h m³/h kg³/h	 1.78 1.52 0.59 1.13	 2.95 2.52 0.96 1.87	 4.14 3.53 1.37 2.62	 5.37 4.58 1.78 3.39
Wobbe index range (relative to 15 °C and 1013 mbar) Natural gas LL Natural gas E LPG 3P		 kWh/m³ kWh/m³ kWh/m³	 9.5–12.4 11.3–15.2 20.2–21.3			
Heating						
Maximum flow temperature (adjustable)		°C	85			
Standby heat loss at 70 °C flow temperature		%	1.6	1.0	0.68	0.53
Permissible operating pressure, boiler		bar	3 (4)[3]			4
Water content, heat exchanger		l	2.5		3.5	
Pump run-on time, adjustable at the Logamatic BC10 base controller		min h	1–60 24			

Table 4 Specification Logamax plus GB162-15/25/35/45

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Logamax plus		Unit	GB162-15	GB162-25	GB162-35	GB162-45
Boiler size			**15**	**25**	**35**	**45**
Flue gas connection						
Flue gas connection to EN 483		–	B_{23P} / B_{23} / B_{33} / C_{13x} / C_{33x} / C_{43x} / C_{53x} / C_{93x}			
Flue gas category for LAS at system temperature 40/30 °C		–	G_{61}			G_{51}
Flue gas mass flow rate[4] at full load 100 %		g/s	6.6	10.7	15.1	20.3
Flue gas temperature[4)5)] at system temperature (full load)	80/60 °C	°C	63	65	67	69
	50/30 °C	°C	42	46	48	49
CO_2 content at full load[4]		%	9.2		9.0	9.3
Standard emissions factor	CO	mg/kWh	≤ 15			20
	NO_X	mg/kWh	≤ 20			33
Available draught		Pa	85	60	95	140
Power supply						
Supply voltage		V	230			
Frequency		Hz	50			
IP rating			IP X4 D (X0 D for B_{23P}, B_{23}, B_{33})			
Power consumption	at partial load	W	28	37	51	20 (53[6)])
	at full load	W	58	70	95	75 (145[6)])
Other						
Amount of condensate at system temperature 40/30 °C (natural gas E)		l/h	1.6	2.7	3.8	4.8
pH value of the condensate			≈ 4.1			
Weight		kg	45		48	45
Noise emissions[7)]	at partial load	dB(A)	24	26	26	28
	at full load	dB(A)	35		38	40
CE designation		–	CE 0063 BR 3441			

Table 4 Specification Logamax plus GB162-15/25/35/45

1) Test gas G25 for natural gas L
2) Test gas G20 for natural gas H
3) 4 bar safety valve available as accessory
4) Factor for sizing the flue system to DIN-EN 13384-1
5) Captured at the flue connector
6) With integral heating circuit pump UPM 15-70
7) Measured in a sound-proof room at a distance of 1 m from the boiler (with concentric flue system)

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2.3.2 Logamax plus GB162-25 T40S

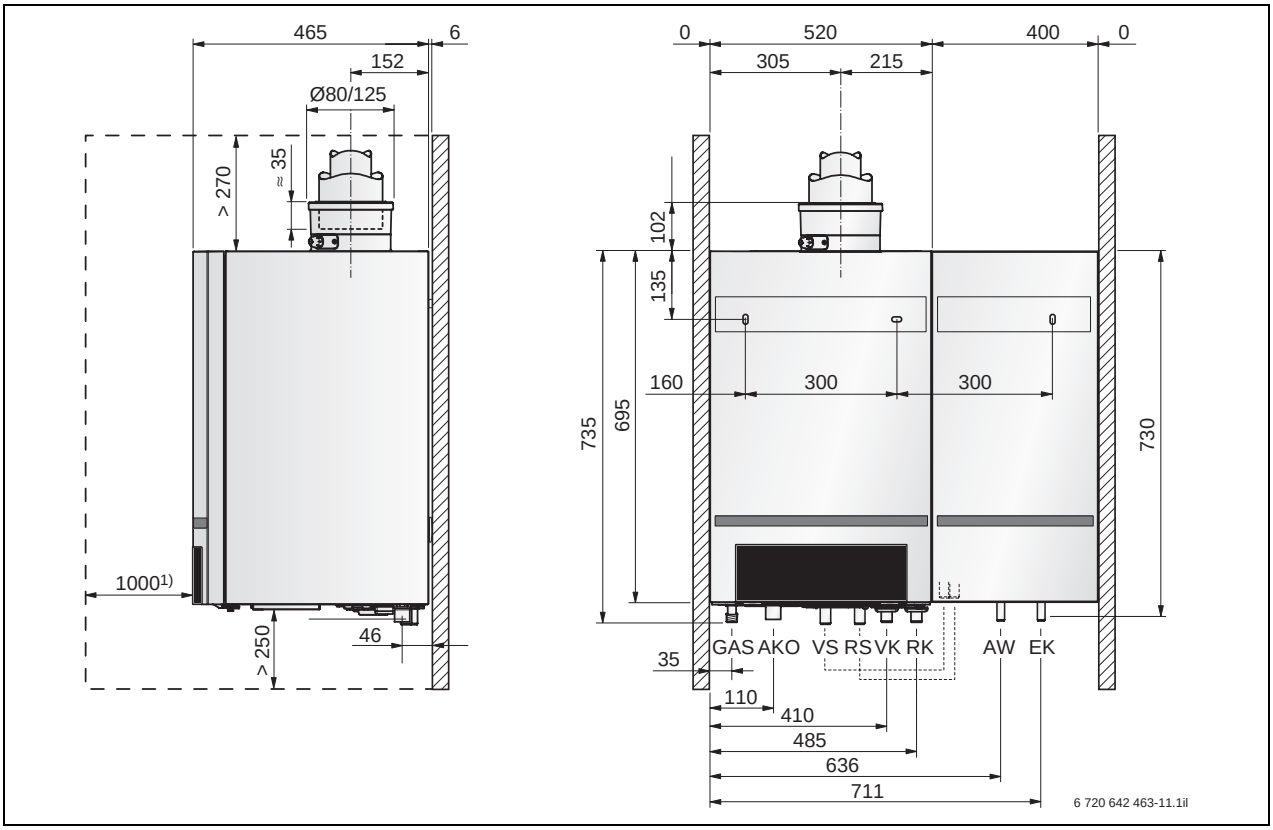

Fig. 11 Dimensions and connections Logamax plus GB162-25 T40S (dim. in mm)

AKO Condensate outlet Ø 30
AW DHW outlet Ø 15 (connection, compression fitting R½)
EK Cold water inlet Ø 15 (connection, compression fitting R½)
GAS Gas connection R½
RK Boiler return Ø 28 (connection, compression fitting R1)
RS DHW cylinder return
VK Boiler flow Ø 28 (Connection, compression fitting R1)
VS DHW cylinder flow
1) Service dimension, integrated into the control panel, may be 0 mm.

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Logamax plus		Unit	GB162-25 T40S
Boiler size			**25**
Output/standard seasonal efficiency [to DIN]			
Rated output for system temperature	80/60 °C	kW	4.8–23.4 (33.0)[1)]
	50/30 °C	kW	5.3–24.9
Rated output		kW	5.0–23.9
Standard seasonal efficiency (to DIN 4702-8) at system temperature	75/60 °C	%	106.6
	40/30 °C	%	110.5
Gas connection			
Gas type category Germany		–	II_{2ELL3P}
Gas type category Austria/Switzerland		–	II_{2H3P}
Gas supply pressure			
Natural gas LL		mbar	20
Natural gas E		mbar	20
LPG 3P		mbar	50
Gas supply values at 15 °C and 1013 mbar			
Natural gas LL[2)] with 8.1 kWh/m³		m³/h	2.95 (4.14)[1)]
Natural gas E[3)] with 9.5 kWh/m³		m³/h	2.52 (3.53)[1)]
LPG 3P with 24.5 kWh/m³	Propane	m³/h	0.96 (1.37)[1)]
	Propane	kg³/h	1.87 (2.62)[1)]
Wobbe index range (relative to 15 °C and 1013 mbar)			
Natural gas LL		kWh/m³	9.5–12.4
Natural gas E		kWh/m³	11.3–15.2
LPG 3P		kWh/m³	20.2–21.3
Heating			
Maximum flow temperature (adjustable)		°C	85
Standby heat loss at 70 °C flow temperature		%	1.2
Permissible operating pressure, boiler		bar	3 (4)[4)]
Water content, heat exchanger		l	2.5
Pump run-on time adjustable, at the Logamatic BC10 base controller		min h	1–60 24
Flue gas connection			
Flue gas connection to EN 483		–	B_{23P} / B_{23} / B_{33} / C_{13x} / C_{33x} / C_{43x} / C_{53x} / C_{93x}
Flue gas category for LAS at system temperature 40/30 °C		–	G_{61} (G_{51})[1)]
Flue gas mass flow rate[5)] full load 100 %		g/s	10.7 (15.1)[1)]
Flue gas temperature[5)6)] at system temperature (full load)	80/60 °C	°C	65 (75)[1)]
	50/30 °C	°C	46
CO_2 content at full load[5)]		%	9.2

Table 5 Specification Logamax plus GB162-25 T40S

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Logamax plus		Unit	GB162-25 T40S
Boiler size			**25**
Standard emissions factor	CO	mg/kWh	≤ 15
	NO_X	mg/kWh	≤ 20
Available draught		Pa	60
DHW cylinder			
Max. operating pressure			
Heating water side DHW side		bar bar	4 10
Max. operating temperature			
Heating water side DHW side		°C °C	110 95
Performance factor	N_L	–	1.6
Constant DHW output at 80/45/10 °C		l/h	825
Power supply			
Supply voltage		V	230
Frequency		Hz	50
IP rating		–	IP X4 D (X0 D for B_{23P}, B_{23}, B_{33})
Power consumption	at partial load	W	37
	at full load	W	70 (109)[1)]
Other			
Amount of condensate at system temperature 40/30 °C (natural gas E)		l/h	2.7
pH value of the condensate		–	≈ 4.1
Weight	Total Boiler Cylinder	kg kg kg	70 47 23
Noise emissions[7)]	at partial load	dB(A)	26
	at full load	dB(A)	35
	for DHW	dB(A)	41
CE designation		–	CE 0063 BR 3441

Table 5 Specification Logamax plus GB162-25 T40S

1) For DHW mode
2) Test gas G25 for natural gas L
3) Test gas G20 for natural gas H
4) 4 bar safety valve available as accessory
5) Factor for sizing the flue system to DIN-EN 13384-1 at
6) Captured at the flue connector
7) Measured in a sound-proof room at a distance of 1 m from the boiler (with concentric flue system)

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2.3.3 Logamax plus GB162-50, GB162-65, GB162-80 and GB162-100

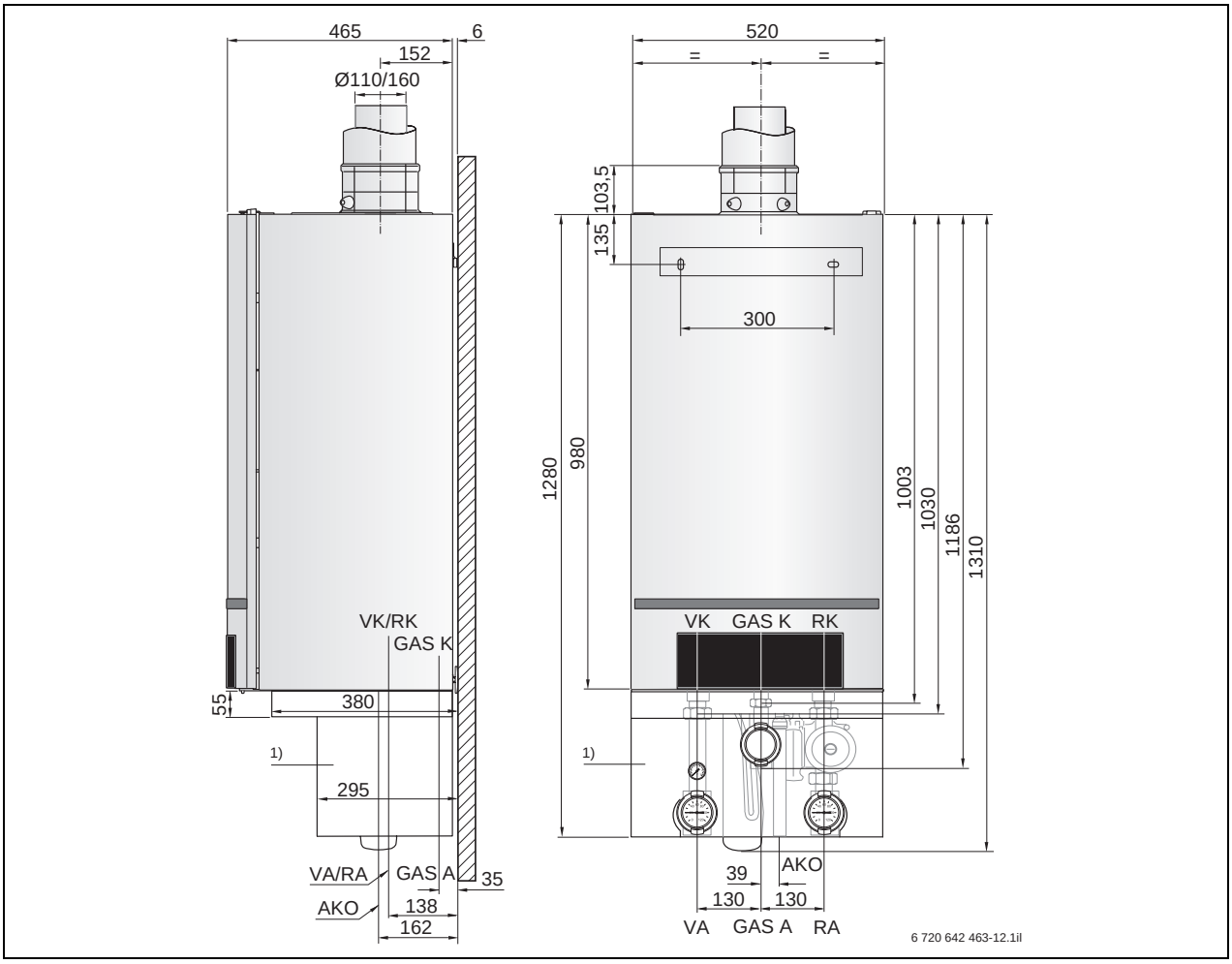

Fig. 12 Dimensions and connections Logamax plus GB162-50/65/80/100 (dim. in mm)

AKO Condensate outlet; external diameter, fem. connection 24 mm
GAS A Gas connection, connection set G1 (fem.)
GAS K Gas connection, boiler G1 (fem.)
RA Return connection set G1½ (male)
RK Boiler return G1½ (fem.)
VA Flow connection set G1½ (male)
VK Boiler flowG1½ (fem.)
1) Pump connection assembly MAG connection G¾ (male)

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Logamax plus Boiler size		Unit	GB162-50 50	GB162-65 65	GB162-80 80	GB162-100 100
Output/standard seasonal efficiency [to DIN]						
Rated output at system temperature	80/60 °C	kW	14.2–46.6	14.2–60.5	18.9–80.0	19.0–94.5
	50/30 °C	kW	15.6–49.9	15.6–65.0	20.8–84.5	20.5–99.5
Rated output		kW	14.6–47.5	14.6–62.0	19.3–82.0	19.3–96.5
Standard seasonal efficiency (to DIN 4702-8) at system temperature	75/60 °C	%	106			
	40/30 °C	%	110			
Gas connection						
Gas type category Germany		–	II_{2ELL3P}	II_{2ELL3P}		
Gas type category Austria/Switzerland		–	II_{2ELL3P}	II_{2H3P}		
Gas supply pressure Natural gas LL Natural gas E LPG 3P		 mbar mbar mbar	 20 20 50			
Gas supply values at 15 °C and 1013 mbar Natural gas LL[1] with 8.1 kWh/m³ Natural gas E[2] with 9.5 kWh/m³ LPG 3P with 24.5 kWh/m³	 Propane Propane	 m³/h m³/h m³/h kg³/h	 5.87 5.00 1.94 3.71	 7.66 6.53 2.53 4.84	 10.49 8.95 3.35 6.40	 12.35 10.53 3.94 7.53
Wobbe index range (relative to 15 °C and 1013 mbar) Natural gas LL Natural gas E LPG 3P		 kWh/m³ kWh/m³ kWh/m³	 9.5–12.4 11.3–15.2 20.2–21.3			
Heating						
Maximum flow temperature (adjustable)		°C	85			
Standby heat loss at 70 °C flow temperature		%	0.05	0.05	0.05	0.06
Permissible operating pressure, boiler		bar	3[3]			
Water content, heat exchanger		l	5			
Pump run-on time, adjustable at the Logamatic BC10 base controller		min h	1–60 24			

Table 6 Specification Logamax plus GB162-50/65/80/100

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Logamax plus		Unit	GB162-50	GB162-65	GB162-80	GB162-100
Boiler size			**50**	**65**	**80**	**100**
Flue gas connection						
Flue gas connection to EN 483		–	B_{23P} / B_{23} / B_{33} / C_{13x} / C_{33x} / C_{43x} / C_{53x} / C_{93x}			
Flue gas category for LAS at system temperature 40/30 °C		–	G_{61}			
Flue gas mass flow rate[4] at full load 100 %		g/s	21.6	27.9	35.3	44.9
Flue gas temperature[4)5)] at system temperature (full load)	80/60 °C	°C	57	64	67	76
	50/30 °C	°C	43	42	48	51
CO_2 content at full load[4]		%	9.3/9.2	9.4/9.3	9.2/9.2	9.2/9.1
Standard emissions factor	CO	mg/kWh	≤ 15	8 (≤ 15)[6]	15	23
	NO_X	mg/kWh	≤ 20	28 (≤ 20)[6]	37	39
Available draught		Pa	85	120	139	220
Power supply						
Supply voltage		V	230			
Frequency		Hz	50			
IP rating		–	IP X4 D (X0 D for B_{23P}, B_{23}, B_{33})			
Power consumption[7] (without connection set)	at partial load	W	20	21	30	28
	at full load	W	45	99	97	147
Power consumption Pump UPER	at partial load	W	12	145	170	170
	at full load	W	70	70	70	70
Other						
Amount of condensate at system temperature 40/30 °C (natural gas E)		l/h	5.3	6.8	9.0	10.8
pH value of the condensate		–	≈ 4.1			
Weight		kg	70			
Noise emissions[8]	at full load	dB(A)	< 46	46	47.1	52.1
CE designation		–	CE 0063 BP 3663			

Table 6 Specification Logamax plus GB162-50/65/80/100

1) Test gas G25 for natural gas L
2) Test gas G20 for natural gas H
3) 4 bar safety valve available as an accessory for pump assembly
4) Factor for sizing the flue system to DIN-EN 13384-1
5) Captured at the flue connector
6) When the output is limited to 50 kW
7) Excluding pump
8) Measured in a sound-proof room at a distance of 1 m from the boiler (with concentric flue system)

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2.4 Dimensions and specification of DHW cylinders

2.4.1 Logalux S135 RW and S160 RW DHW cylinders

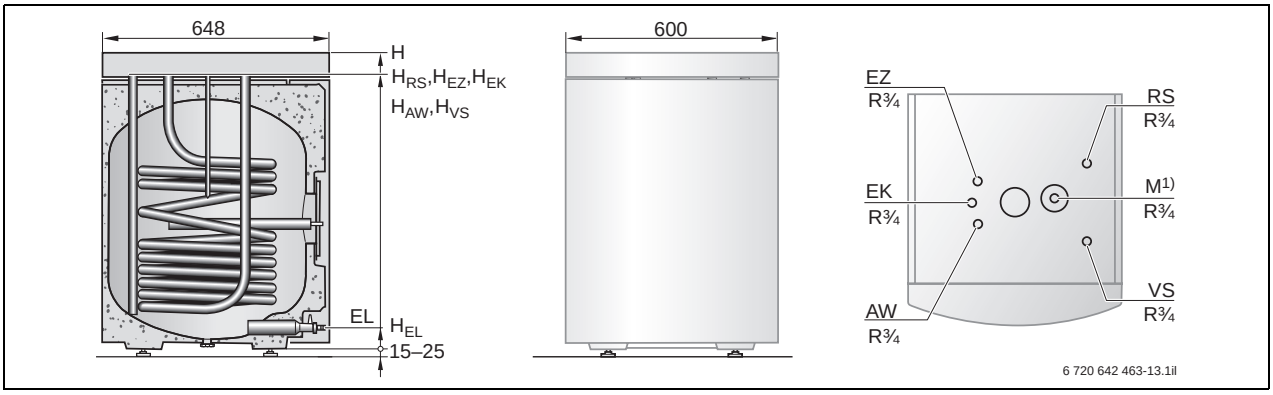

Fig. 13 Dimensions and connections Logalux S135 RW and S160 RW (dim. in mm)

EL Drain tap
1) Sensor well for DHW temperature sensor

Logalux DHW cylinder		Unit	S135 RW	S160 RW
Internal indirect coil				
Water content of the smooth tube internal indirect coil		l	5.5	
Max. operating temperature, heating water side		°C	110	
Max. operating pressure, heating water side		bar	6	
Constant DHW output at 80/45/10 °C[1)]				
with GB162-15 / GB162-25		l/h	329 / 516	329 / 526
with GB162-35 / GB162-45		l/h	516 / 516	565 / 565
Performance factor to DIN 4708				
with GB162-15 / GB162-25	N_L	–	1.4 / 1.4	1.9 / 1.9
with GB162-35 / GB162-45	N_L		1.4 / 1.4	2.0 / 1.9
Cylinder capacity				
Cylinder capacity		l	135	160
Max. operating temperature, DHW side		°C	95	
Max. operating pressure, DHW side		bar	10	
Dimensions				
Height[2)]	H	mm	837	947
Height, cylinder flow	H_{VS}	mm	774	884
Height, cylinder return	H_{RS}	mm	774	884
Height, cold water inlet	H_{EK}	mm	774	884
Height, DHW circulation inlet	H_{EZ}	mm	774	884
Height, DHW outlet	H_{AW}	mm	774	884
Height, drain	H_{EL}	mm	60	60
Other				
Standby energy loss[3)] (24 h) to DIN 4753-8		kWh/d	1.79	1.97
Net weight[4)]		kg	92	102
Product no.		–	5 231 035	5 231 045

Table 7 Specification Logalux S135 RW and S160 RW combined with Logamax plus GB162

1) Heating water flow temperature/DHW outlet temperature/cold water inlet temperature
2) Height including cylinder cover (accessory), excl. adjustable feet
3) At cylinder temperature 65 °C and room temperature 20 °C
4) Weight including packaging approx. 5 % greater

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2.4.2 Logalux S120 W, SU160 W, SU200 W and SU300 W DHW cylinders

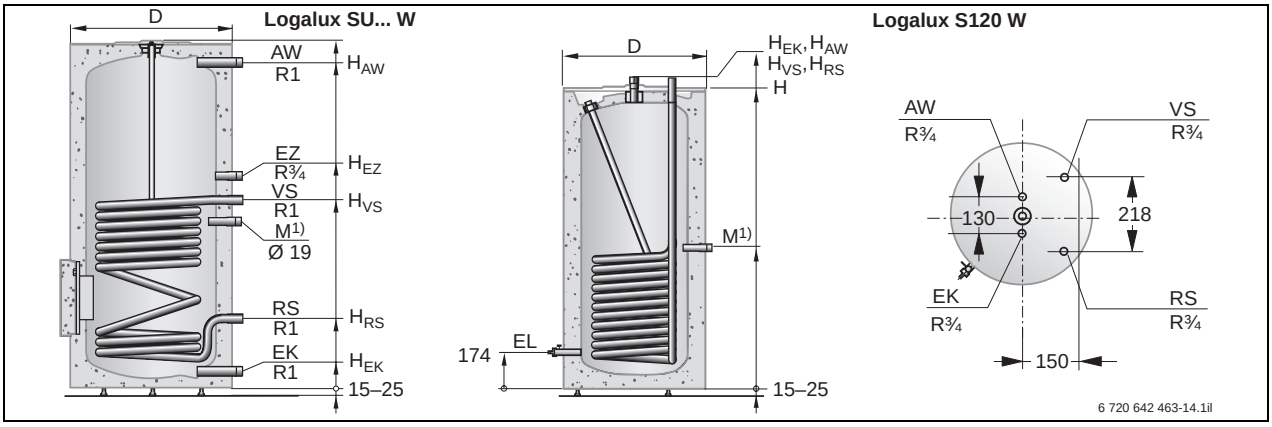

Fig. 14 Dimensions and connections Logalux S120 W and SU... W (dim. in mm)

EL Drain tap
1) Sensor well for DHW temperature sensor

Logalux DHW cylinder		Unit	S120 W	SU160 W	SU200 W	SU300 W
Internal indirect coil						
Water content of the smooth tube internal indirect coil		l	5	4.5		8
Max. operating temperature, heating water side		°C	110	160		
Max. operating pressure, heating water side		bar	6	16		
Constant DHW output at 80/45/10 °C[1]						
with GB162-15 / GB162-25		l/h	329 / 526	329 / 526	329 / 526	– / 526
with GB162-35 / GB162-45		l/h	526 / 590	526 / 541	526 / 541	526 / 541
with GB162-50 / GB162-65		l/h	– / –	565 / 565	565 / 565	565 / 565
Performance factor to DIN 4708						
with GB162-15 / GB162-25	N_L	–	1.2 / 1.3	2.2 /2.3	3.6 / 4.0	7.1 / 8.7
with GB162-35 / GB162-45	N_L		1.4 / 1.4	2.3 / 2.4	4.0 / 4.1	8.9 / 9.5
with GB162-50 / GB162-65	N_L		– / –	2.4/ 2.4	4.1/ 4.1	9.5/ 9.5
Cylinder capacity						
Cylinder capacity		l	120	160	200	300
Max. operating temperature, DHW side		°C		95		
Max. operating pressure, DHW side		bar		10		
Dimensions						
Diameter	Ø D	mm	512	556	556	672
Height	H	mm	956	1188	1448	1465
Installation room height[2]		mm	1460	1718	2053	1845
Height, cylinder flow	H_{VS}	mm	975	644	644	682
Height, cylinder return	H_{RS}	mm	975	238	238	297
Cold water inlet	Ø EK	inch	R¾	R1	R1	R1¼
Height, cold water inlet	H_{EK}	mm	980	57	57	60
Height, DHW circulation inlet	H_{EZ}	mm	– [3)4)]	724	724	762
Height, DHW outlet	H_{AW}	mm	980	1111	1371	1326
Further details						
Standby energy loss[4] (24 h) to DIN 4753-8		kWh/d	1.68	1.8	2.0	2.1
Net weight[5]		kg	72	98	110	145
Certificate no. to Pressure Equipment Directive		–	Z-DDK-MUC-02-318302-11	P-DDK-MUC-02-318302-15		
Product no.		–	7747011 041	7 747 003 781	7 747 003 782	7 747 003 783

Table 8 Specifications Logalux S120 W and SU... W combined with Logamax plus GB162

1) Heating water flow temperature/DHW outlet temperature/cold water inlet temperature
2) Minimum room height for the replacement of the magnesium anode
3) For the Logalux S120 W, we recommend the connection of the DHW circulation line in the cold water inlet
4) At cylinder temperature 65 °C and room temperature 20 °C
5) Weight including packaging approx. 5 % greater

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2.5 Installed dimensions of the gas condensing boilers

2.5.1 Installed dimensions Logamax plus GB162-15, GB162-25 and GB162-35 with DHW cylinders Logalux S135 RW and S160 RW

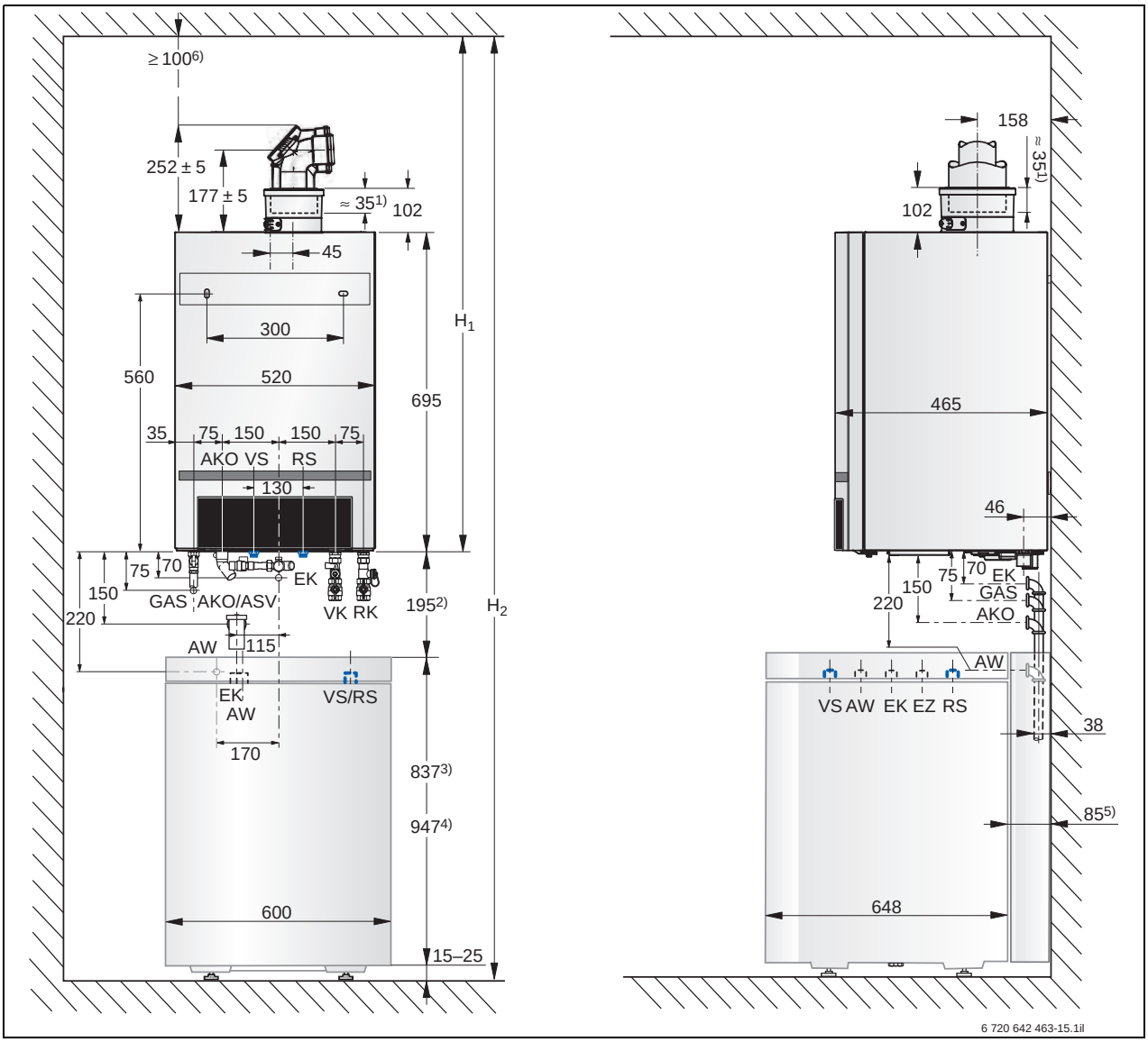

Fig. 15 Installed dimensions of the supply lines when using the accessory sets for installation on finished walls (accessory → page 87 ff.) and arrangement of the Logalux S135 RW or S160 RW DHW cylinder below the Logamax plus GB162-15/25/35 (dim. in mm)

AKO Condensate outlet
ASV Outlet, safety valve (siphon R1)
AW DHW outlet Rp½ (finished walls) or R¾ (DHW cylinder)
EK Cold water inlet Rp½ (finished walls or R¾ (DHW cylinder)
EZ DHW circulation inlet R¾ (DHW cylinder)
GAS Gas connection R½
RK Boiler return R1
RS DHW cylinder return G¾
VK Boiler flow R1
VS DHW cylinder flow G¾
1) Insertion depth
2) Clearance to the top edge of the cylinder cover
3) Logalux S135 RW
4) Logalux S160 RW
5) Optional decorative side cover (accessory → page 87)
6) Recommendation: 100 mm DVGW-TRGI 2008 [Germany] requires noclearances towards combustible building materials.

Logamax plus GB162 with DHW cylinder	Minimum height	
	H_1 [mm]	H_2 [mm]
Logalux S135 RW	1047	2104
Logalux S160 RW	1047	2214

Table 9 Minimum room height

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2.5.2 Installed dimensions Logamax plus GB162-15, GB162-25 and GB162-35 with Logalux S120 W DHW cylinder

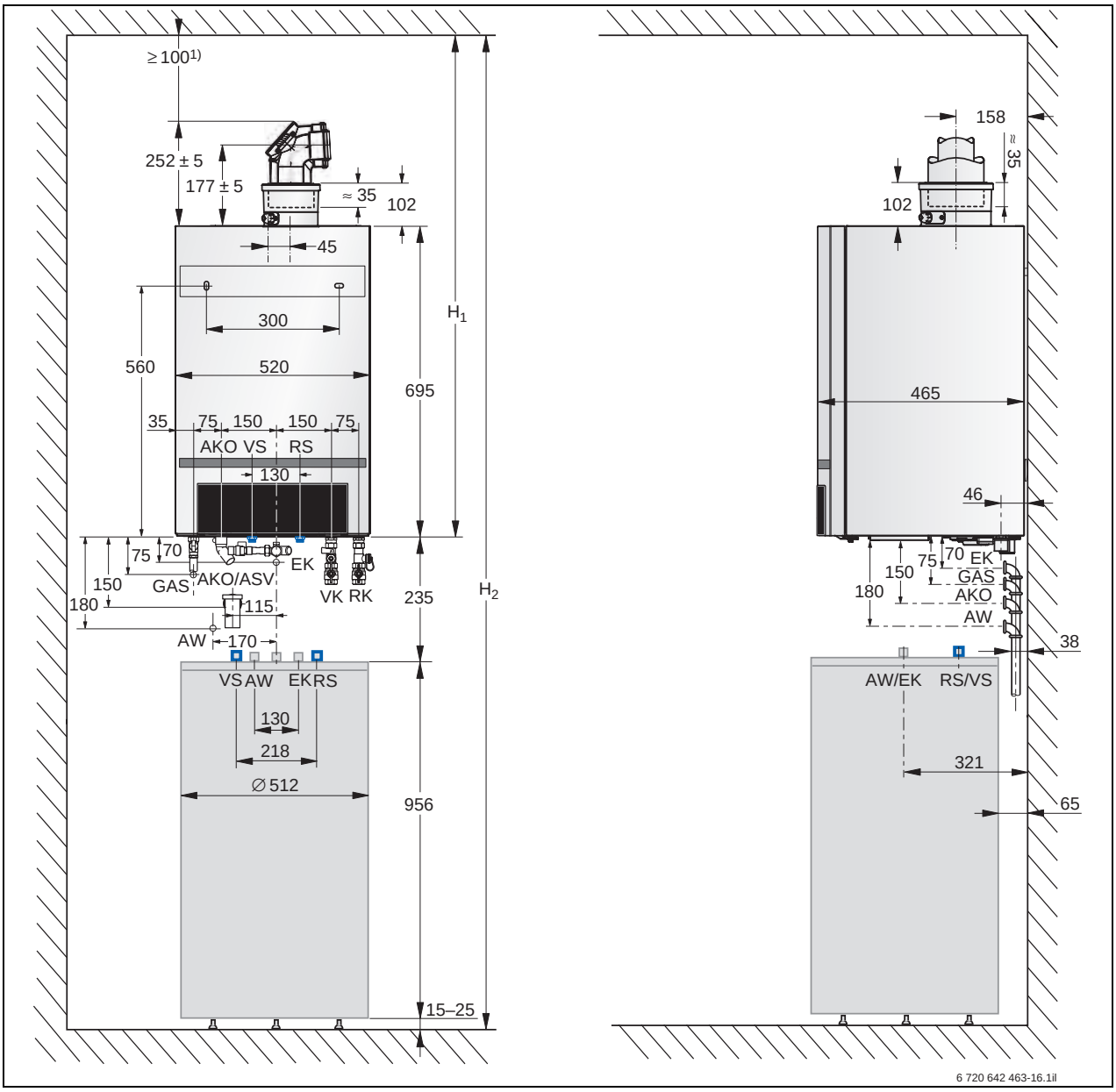

Fig. 16 Installed dimensions of the supply lines when using the accessory sets for installation on finished walls (accessory → page 87 ff.) and arrangement of the Logalux S120 W below the Logamax plus GB162-15/25/35 (dim. in mm)

AKO Condensate outlet
ASV Outlet, safety valve (siphon R1)
AW DHW outlet Rp½ (finished walls) or R¾ (DHW cylinder)
EK Cold water inlet Rp½ (finished walls or R¾ (DHW cylinder)
GAS Gas connection R½
RK Boiler return R1
RS DHW cylinder return G¾
VK Boiler flow R1
VS DHW cylinder flow G¾
1) Recommendation: 100 mm DVGW-TRGI 2008 [Germany] requires no clearances towards combustible building materials.

Logamax plus GB162 with DHW cylinder	Minimum height	
	H_1 [mm]	H_2 [mm]
Logalux S120 W	1047	2168

Table 10 Minimum room height

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2.5.3 Installed dimensions Logamax plus GB162-15, GB162-25 and GB162-35 with Logalux SU160 W, SU200 W and SU300 W DHW cylinder

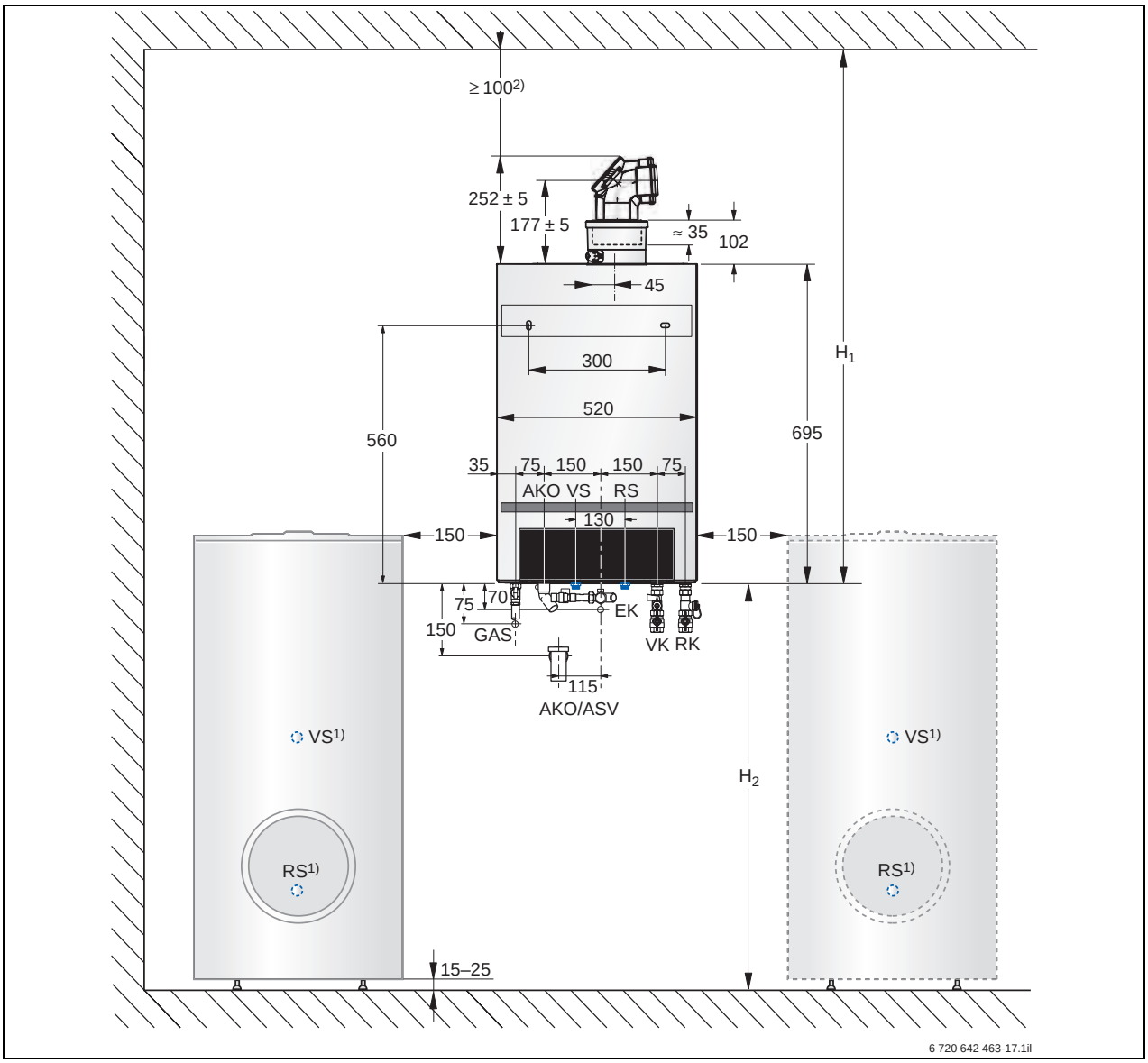

Fig. 17 Installed dimensions of the supply lines when using the accessory sets for installation on finished walls (accessory → page 87 ff.) and arrangement of the Logalux SU... W to the right or left adjacent to the Logamax plus GB162-15/25/35 (dim. in mm)

AKO Condensate outlet
ASV Outlet, safety valve (siphon R1)
EK Cold water inlet
GAS Gas connection R½
RK Boiler return R1
RS DHW cylinder return G¾ (boiler) or G1 (DHW cylinder)
VK Boiler flow R1
VS DHW cylinder flow G¾ (boiler) or G1 (DHW cylinder)
1) Connections at the back of the cylinder (→ fig. 14, page 26); required clearance for the cylinder connections at the back 100 mm
2) Recommendation: 100 mm DVGW-TRGI 2008 [Germany] requires no clearances towards combustible building materials.

Logamax plus GB162 with DHW cylinder	Minimum height		
	H_1	H_2	
		min.	max.
	[mm]	[mm]	[mm]
Logalux SU…W	1047	559	1154

Table 11 Minimum room height

Dimension H_2 takes account of the minimum and maximum length of the corrugated hoses from the connection accessories N-Flex (→ page 87).

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3 Regulations and operating conditions

3.1 Extracts from regulations

The Logamax plus GB162 gas condensing boilers comply with the standard regulations of the Gas Appliances Directive 90/396/EEC. The requirements of standards EN 483 and EN 677 were taken into consideration.

When installing and operating the system, observe the following:

- Technical building rules
- Legal requirements **and**
- Local regulations

Installation, gas and flue gas connections, commissioning, power supply as well as maintenance and repair work must only be carried out by authorised contractors.

Permits

The installation of a gas condensing boiler may need to be notified to and approved by the relevant gas supply utility.

Gas condensing boilers may only be operated with a flue system that has been designed for the specific appliance type and that has been approved according to relevant building regulations. If the gas condensing boiler is to be installed in a room designated for constant occupation, a flue system that has been approved for such locations must be allowed for.

Prior to the installation, the relevant flue gas inspector and the waste water authority may need to be notified. Regional approvals with regard to the flue system and the introduction of condensate into the public sewer system may be required.

Maintenance

According to paragraph 10 of the Energy Savings Order (EnEV) [Germany], the system must be correctly operated, maintained and repaired.

We recommend system users enter into a maintenance contract with their local heating contractor covering an annual inspection and any required maintenance. Regular inspection and maintenance are pre-requisites for reliable and economical operation.

3.2 Operating requirements

The operating conditions in table 12 are part of the **warranty conditions** for the Logamax plus GB162 gas condensing boilers.

These conditions are assured with a suitable hydraulic circuit and boiler control (hydraulic connection → fig. 46 and fig. 47, page 53).

Logamax plus		Operating conditions (warranty conditions)					
	Max. flow temperature	Minimumboiler water flow rate	Minimumboiler water temperature	Operating interruption (total boiler shutdown)	Heating circuit control with mixer[1)]	Minimum return temperature	Other
GB162	May reach 85 °C at full output	No requirements					To transfer the full appliance output at full load, ΔT must be < 25 K

Table 12 Operating conditions Logamax plus GB162

1) Heating circuit control with mixer improves the control characteristics; particularly recommended for systems with several heating circuits

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4 Heating control

4.1 Aims of the Logamatic EMS control system

The Logamatic control system was specifically developed for the control requirements of advanced heating systems in detached houses and two-family homes.

The fundamental aims of this new control concept are as follows:

- The optimum utilisation of fossil energy and electric power
- The use of identical control components for wall mounted and floorstanding boilers **and**
- Standardised operation

Maintenance and service are further priorities.
The components of the Logamatic control system are partially designed to monitor themselves and to issue messages automatically in the case of faults or irregularities. Service functions that are integrated into the programming unit as standard facilitate commissioning, maintenance and troubleshooting.

A service tool for connection to a laptop is available and enables extensive service tasks.

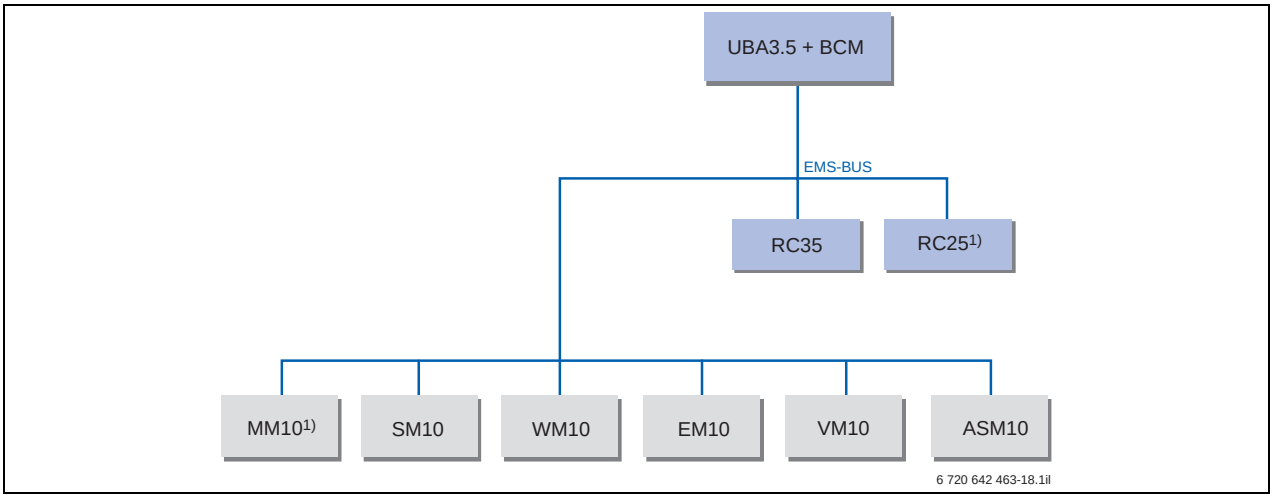

Fig. 18 Overview of the Logamatic control system

ASM10 Connection module
BCM Burner control module
EM10 0-10 V fault message module
MM10 Mixer module
RC25 Programming unit
RC35 Programming unit
SM10 Solar module
UBA3.5 Universal burner control unit
VM10 Control module
WM10 Low loss header module
1) Number can be selected in accordance with the system configuration

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4.2 Logamatic EMS control concept

At the core of the Logamatic EMS control system is the digital universal burner unit UBA3.5, that not only controls and monitors the burner but also takes care of the safety functions of the gas condensing boiler. Several standard control functions are already taken care of via the communication path to the Logamatic BC10 base controller (→ page 34 f.).

The EMS-BUS provides a second communication path. Control components and modules without boiler-specific functions are connected to this BUS via a 2-core cable (→ fig. 18). These components include the RC35 and RC25 programming units, as well as the function modules (mixer, low loss header and solar module).

Up to two modules can be integrated into the Logamax plus GB162 gas condensing boilers. Additional modules can be mounted on the wall in a separate enclosure.

Activating, adjusting and setting the parameters for the function modules of the Logamatic EMS control system will always require an RC35 programming unit (→ page 37).

The Logamatic EMS control system enables room temperature-dependent and weather-compensated control.

The Logamatic EMS control system is tailored for standard systems and offers a fixed range of functions (system examples → page 67 to page 84). This range of functions cannot and must not be exceeded.

4.3 Types of controls

4.3.1 Room temperature-dependent control

With room temperature-dependent control, the heating system or the heating circuit is regulated subject to the temperature in a reference room. For this method of control, the RC25 or RC35 programming units are suitable; these have an integral room temperature sensor. For this reason, the RC25 and RC35 programming units are installed in the reference room to provide room temperature-dependent control (→ fig. 19).

An external room temperature sensor can also be connected to the RC35 programming unit if it cannot be installed in the reference room in a position that would be both favourable to capturing the room temperature and still be in a convenient position for the user.

Position of the room temperature sensor

Install the room temperature sensor inside the reference room in such a way that negative influences are avoided:

- **Not** on an outside wall
- **Not** close to windows or doors
- **Not** near to thermal bridges
- **Not** in “dead spots”
- **Not** above radiators
- **Not** in direct sunlight
- **Not** in the path of direct heat radiation from electrical appliances or similar

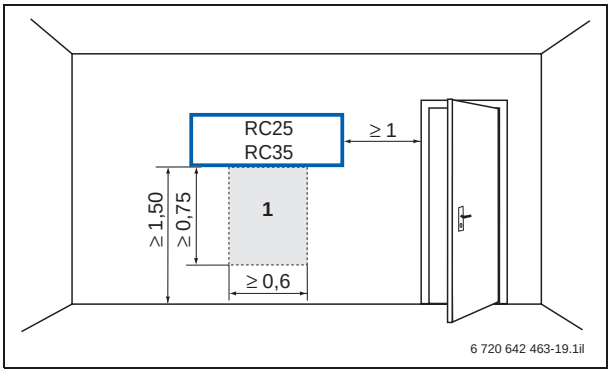

Fig. 19 Position of the RC25 or RC35 programming units or the external room temperature sensor in the reference room (dim. in m)

1 Required clearance below the RC25 or RC35

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4.3.2 Weather-compensated control

With weather-compensated control, the heating system is regulated subject to the outside temperature.

This method of control requires an RC35 programming unit. The RC35 programming unit can be installed in the gas condensing boiler and is supplied, if required, with the necessary outside temperature sensor.

Position of the outside temperature sensor

Install the outside temperature sensor so that it captures the outside temperature without extraneous influences (→ fig. 20). Therefore always install it on the north side of the building.

For optimum temperature capture, avoid the following temperature sensor positions:

- **Never** above windows, doors or vents
- **Never** underneath awnings, balconies or below the roof

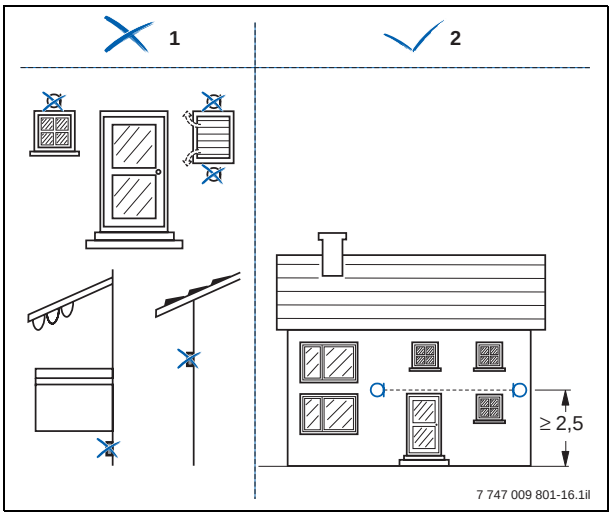

Fig. 20 Arrangement of the outside temperature sensor (dim. in mm)

1 Incorrect arrangement
2 Correct arrangement

4.3.3 Weather-compensated control with room temperature hook-up

The weather-compensated control with room temperature hook-up combines the benefits of both previously mentioned kinds of control.

This method of control requires the installation of the RC35 programming unit or that of an external room temperature sensor or an additional RC25 programming unit inside reference room (→ fig. 19).

4.3.4 External room temperature sensor

If the installation of the programming unit in the most favourable location from a control point of view is undesirable for visual reasons, or if the installation there would be inconvenient for users, an external room temperature sensor can be provided instead for external installation (only with the RC35 programming unit).

The integral room temperature sensor will be disabled if a separate room temperature sensor is connected to the RC35 programming unit.

The external room temperature sensor must be mounted in a room that represents typical domestic heating habits. It must not be exposed to a direct source of heat or cold.

The lead of the external room temperature sensor must not exceed 50 m. As a lead for the temperature sensor, a YR 2 × 0.8 mm diameter lead can be used.

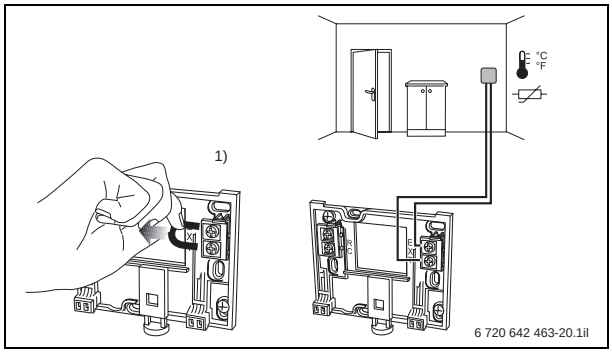

Fig. 21 Installation of an external room temperature sensor

1) Remove jumper and connect the external room sensor

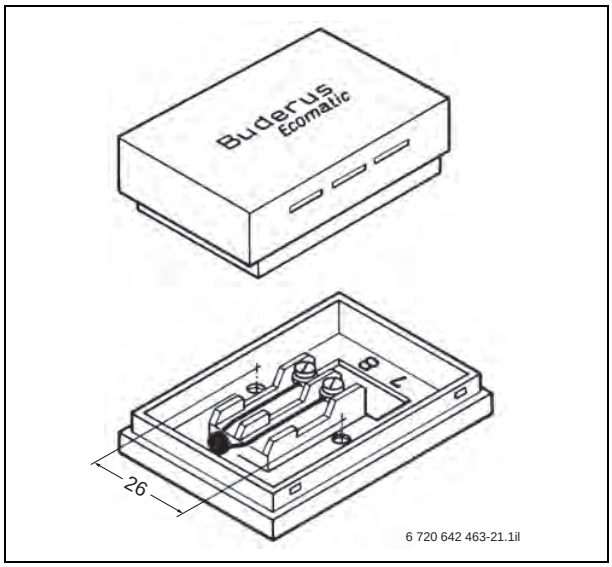

Fig. 22 Separate room temperature sensor for external installation as an alternative to the integral room temperature sensor of the RC35 programming unit (dim. in mm)

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4.4 Boiler and control components in the Logamatic EMS control system

4.4.1 Universal burner control unit UBA3.5

The digital universal burner control unit UBA3.5 is integrated into the gas condensing boiler and has no independent displays or controls. However, it contains the BCM burner control module that delivers the boiler-specific technical combustion information and includes an LED that signals the standby condition.

As the central intelligence of the control system, it monitors all electrical and electronic components of the gas condensing boiler and matches all boiler components perfectly to each other.

Control functions of the UBA3.5 as part of the overall system

- Monitoring and control of all combustion process functions
- Control of the boiler water temperature to a value required by the connected components
- Control of DHW heating with thermal disinfection and control of a DHW circulation pump
  - This function is enabled via the Logamatic BC10 base controller or via the RC25 or RC35 programming unit.
  - In conjunction with the RC35 programming unit, an individual time function for DHW heating is feasible.
  - In connection with a 3-way diverter valve, DHW heating generally takes priority over heating mode.

4.4.2 Logamatic BC10 base controller

The Logamatic BC10 base controller functions as a standard programming unit for most heat sources equipped with the Logamatic EMS control system. It is therefore part of the standard equipment of the Logamax plus GB162 gas condensing boilers.

The Logamatic BC10 contains all elements required for the standard operation of the heating system with a Logamatic EMS. In addition, the Logamatic BC10 base controller offers a slot for the RC35 programming unit, which makes further convenient control functions available (→ fig. 23, pos. 2).

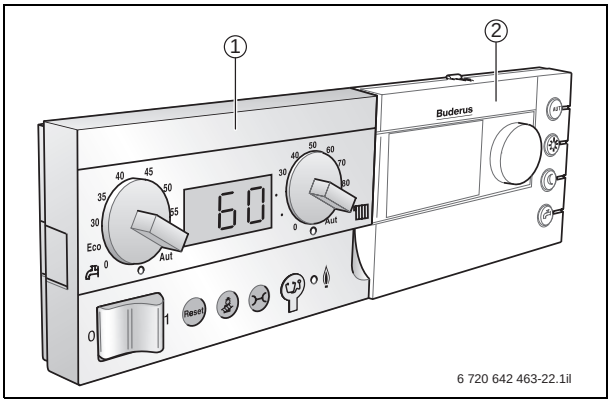

Fig. 23 Logamatic BC10 base controller with clipped-in RC35 programming unit

1 Logamatic BC10 base controller (→ page 35)
2 RC35 programming unit (→ page 37)

At the back of the Logamatic BC10 base controller, the output of the gas condensing boiler can be limited to 11 kW or 50 kW (for the GB162-65) by removing a jumper (→ fig. 24, pos. 3). In the delivered condition, the jumper is plugged in; i.e. the boiler output is not especially limited.

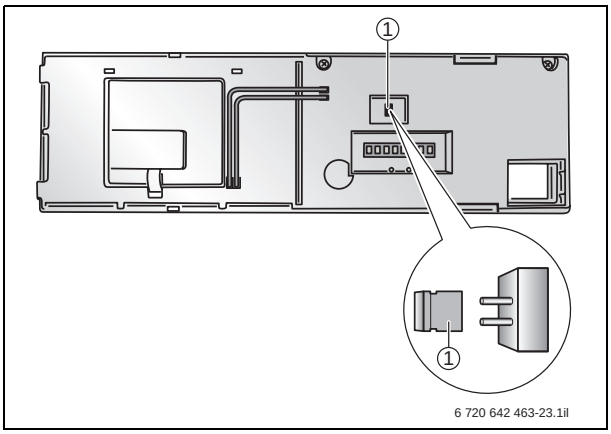

Fig. 24 Back of the Logamatic BC10 base controller with jumper for limiting the output to 11 kW or 50 kW (for the GB162-65)

1 Jumper

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Functions and controls on the Logamatic BC10 base controller

- Starting and shutting down the gas condensing boiler and all connected modules via an ON/OFF switch (→ fig. 25, pos. 1)
- LED showing “DHW heating” (→ fig. 25, pos. 2)
- DHW temperature setting (→ fig. 25, pos. 3)
  - At position “0”, the set DHW temperature is set to 15 °C.
  - If the rotary selector is set to between 30 °C and 60 °C, a set DHW temperature is limited by this rotary selector.
  - In the “Aut” setting, the DHW temperature is selected via the RC35 programming unit.
- LCD to display status and fault diagnosis (→ fig. 25, pos. 4)
  - Display of boiler water temperature, system pressure (filling mode) and possibly a fault code
- LED “DHW and CH heat demand” (→ fig. 25, pos. 5)
- Limitation of the boiler water temperature to a maximum level (→ fig. 25, pos. 6)
- LED “Burner operation” (→ fig. 25, pos. 8)
- Connection socket for diagnostic plug for connecting a laptop (→ fig. 25, pos. 9)
- “Show status” key for switching the display between various functions (→ fig. 25, pos. 10)
- “Emissions test” key for flue gas test and manual mode (→ fig. 25, pos. 11)
- “Reset” button for resetting the burner in the event of lockout faults (→ fig. 25, pos. 12)
- Emergency operation
- Limiting the output of the gas condensing boiler and setting system parameters via the software

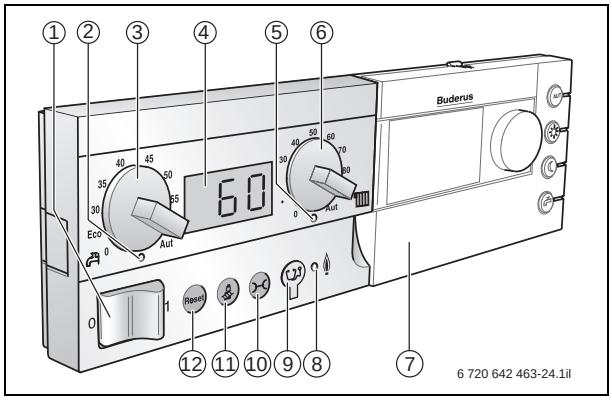

Fig. 25 Displays/indicators and controls on the Logamatic BC10 base controller

1 ON/OFF key
2 LED “DHW heating”
3 Rotary selector for setting the DHW temperature
4 LCD to show status, pressure and fault diagnosis
5 LED “DHW and CH heat demand”
6 Rotary selector for limiting the maximum boiler water temperature
7 RC35 programming unit (optional instead of the fascia)
8 LED “Burner operation (ON/OFF)”
9 Connection socket for diagnostic plug
10 “Status display” key
11 “Emissions test” key for flue gas test and manual mode
12 “Reset” button

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4.4.3 RC25 programming unit

The RC25 (→ fig. 26) programming unit is connected to the Logamatic EMS and supplied with power via a 2-core BUS cable. It may be used either as a programming unit or as a remote control. A wall mounting bracket for mounting the RC25 programming unit inside the living area is part of the standard delivery.

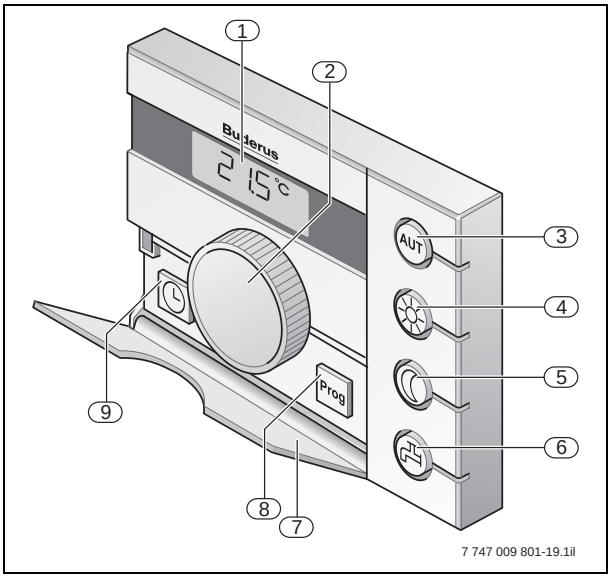

Fig. 26 Displays and controls of the RC25 programming unit

1 LCD for showing the selected values and temperatures (permanent display: actual room temperature)
2 Rotary selector for adjusting values that are shown on the display after pressing a key or for switching between the service level menus
3 Operating mode selector key with LED for automatic heating mode in accordance with a time switch
4 Operating mode selector key with LED for standard heating mode (day mode - “Constant heating”)
5 Operating mode selector key with LED for setback heating mode (night mode “Constant setback”)
6 Key with LED for activating once only DHW heating or for selecting the DHW temperature
7 Flap to cover the second control level
8 Key for selecting the heating program
9 Key for adjusting the time and the day of the week

A system with room temperature-dependent control of a heating circuit without mixer directly downstream can only be achieved with the RC25 programming unit. A room temperature sensor is integrated into the RC25. In addition, the RC25 programming unit can regulate a DHW circuit with thermal disinfection and DHW circulation pump, as well as a 7-day time switch with standard programs.

If the RC25 programming unit acts as a remote control, then the RC35 programming unit takes over control of the heating circuits and the gas condensing boiler in the Logamatic EMS control system. In that case, the RC25 programming unit supplies the necessary information from the room and regarding the operating mode.

In both applications, the LCD shows the captured room temperature (→ fig. 26, pos. 1). The LCD also shows the time and the day of the week.

Selector keys (→ fig. 26, pos. 3 to pos. 5) enable the selection of the heating modes “Automatic, Constant heating ”and“ Constant setback”. The integral LED signals the current operating mode.

The functions of the RC25 programming unit are accessible at two operating levels that are called up in accordance with the simple and proven “Push & Turn” operating concept. Where required, a calibration function for adjusting the displayed room temperature is available at the service level. This is activated by means of a button recessed in the side of the unit.
Heating contractors can set various system parameters at the service level, e.g. activating DHW heating with permanent switching of the DHW circulation pump or the definition of the thermal disinfection function.

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4.4.4 RC35 programming unit

The RC35 programming unit (→ fig. 27) is connected to the Logamatic EMS control system and supplied with power via a 2-core BUS cable. The RC35 programming unit can either be clipped into the Logamatic BC10 base controller on the boiler, or fitted on a wall mounting bracket inside the living space. Installed in the living space, the programming unit RC35 is also suitable as a convenient room temperature controller.

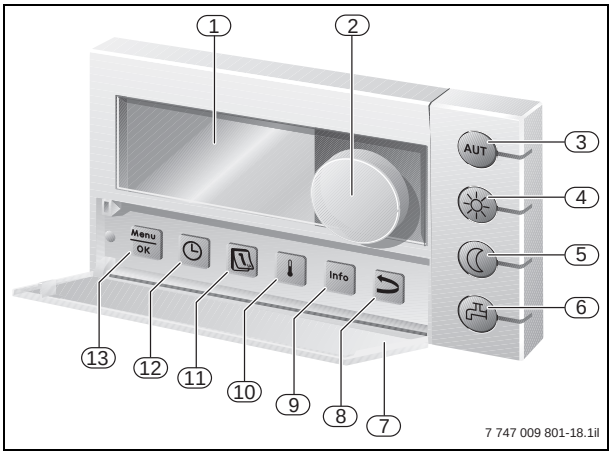

Fig. 27 Displays and controls of the RC35 programming unit

1 LCD for showing the selected values and temperatures (permanent display: actual room temperature)
2 Rotary selector for adjusting values that are shown on the display after pressing a key or for switching between the service level menus
3 Operating mode selector key with LED for automatic heating mode in accordance with a time switch (automatic changeover between day and night room temperature)
4 Operating mode selector key with LED for standard heating mode (day mode - “Constant heating”) summer mode interruption
5 Operating mode selector key with LED for setback heating mode (night mode “Constant setback”)
6 Key with LED for activating once only DHW heating or for selecting the DHW temperature
7 Flap to cover the second control level
8 Key for changing menus or control levels
9 Key for info menu (scanning values)
10 Key for adjusting the room temperature
11 Key for adjusting the day of the week
12 Key for adjusting the time
13 Key for the control menu

With the RC35 programming unit in its standard version, one heating circuit without mixer can be controlled in the operating modes room temperature-dependent, weather-compensated or weather-compensated with room temperature hook-up. For room temperature-dependent control or for room temperature hook-up, install the RC35 programming unit in the reference room. If the reference room is not the location where the RC35 programming unit is installed, an external room temperature sensor can be connected at the wall mounting base.

The RC35 programming unit is equipped with a programmable 6-channel digital time switch with eight standard programs for the graphic display of the switching cycles and the outside temperature (with integral “Weather station”). Individual programs can also be created for each heating circuit in conjunction with the Logamatic EMS control system and/or the WM10 and MM10 modules. An individual time channel is available for DHW heating incl. control of a DHW circulation pump. The standard functions also include thermal disinfection, which can be adjusted as required, and once only DHW heating. All important information regarding the heating system, including fault messages, room temperature, time and days of the week can be captured with the RC35 programming unit and displayed “in plain text” on the backlit LCD with graphic capabilities (→ Fig, 27, pos. 1).

Selector keys (→ fig. 27, pos. 3 to pos. 5) enable the selection of the heating modes “Automatic, Constant heating ”and“ Constant setback”. The integral LED signals the current operating mode.

The RC35 programming unit regulates the low loss header and one heating circuit without mixer directly downstream, in conjunction with the WM10 low loss header module, three further heating circuits in conjunction with the MM10 mixer modules, plus the solar DHW heating in conjunction with the SM10 solar module (system example → page 73).

The RC35 programming unit also includes some special functions, e.g. a “Holiday function” for the entire system or, in conjunction with the WM10 and MM10 modules, for each individual heating circuit.

In addition, extensive service functions can be utilised, e.g. “Monitor function”, “Function test”, “LCD test”, “Fault monitoring”, “Fault message” “Scanning the heating curve”.

The functions of the RC35 programming unit are accessible at several levels that are called up in accordance with the simple and proven “Push & Turn” concept. For the end user, two control levels are available, divided into standard functions and extended functions. At the service level, contractors can make adjustments, e.g. for the heating circuits or DHW heating.

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4.5 Function modules for extending the functions of the Logamatic EMS control system

4.5.1 Modules for the gas condensing boilers

The available modules can be installed in two different ways:

- Installation option inside the gas condensing boiler
  - Up to two modules can be integrated in each Logamax plus GB162 boiler.
- Installation option on the wall outside the gas condensing boiler
  - All delivered modules are equipped with a BUS cable, mains plug and a wall mounting enclosure (including rawl plugs and screws). This enables easy installation outside the boiler.

Quick installation sets for heating circuits without integral modules

The following quick installation sets for heating circuits are available, including high efficiency pump in efficiency category A:

- **Quick installation sets for heating circuits without mixer**
  - HS 25/4 E plus with 4 m pump
  - HS 25/6 E plus with 6 m pump
  - HS 32 E plus
- **Quick installation sets for heating circuits with mixer**
  - HSM 15 E plus
  - HSM 20 E plus
  - HSM 25 E plus
  - HSM 32 E plus

Quick installation sets for heating circuits with integral modules

All white quick installation sets for heating circuits are also available with an integral EMS module.

- Sets without mixer with WM10 low loss header module
- Sets with mixer with MM10 mixer module

The modules are prewired at the factory. For commissioning, the modules must be connected to a 230 V power supply.

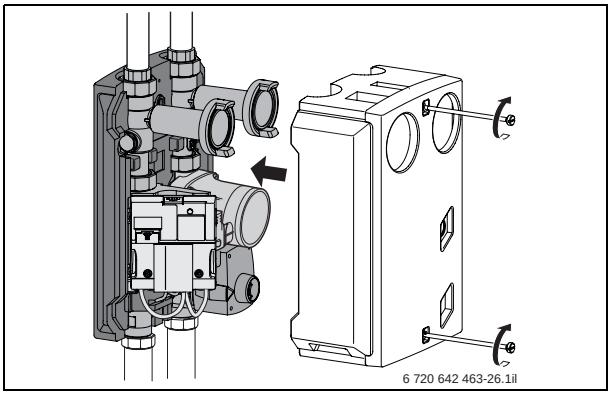

Fig. 28 Quick installation set for heating circuit with high efficiency pump, efficiency category A (with integral EMS module)

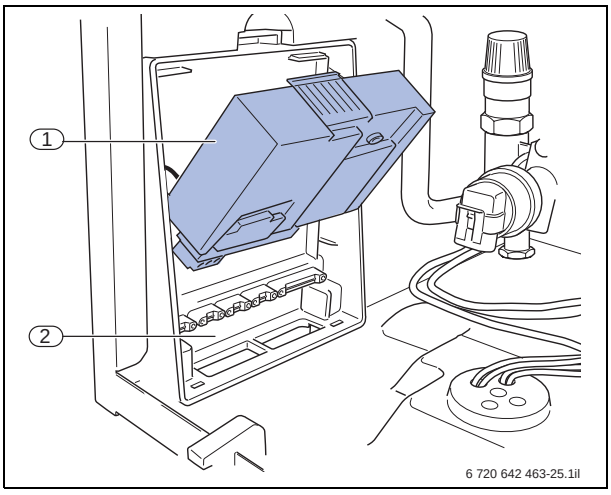

Fig. 29 Function modules: Optional installation in the wall mounted gas condensing boiler

1 Base module
2 Slot

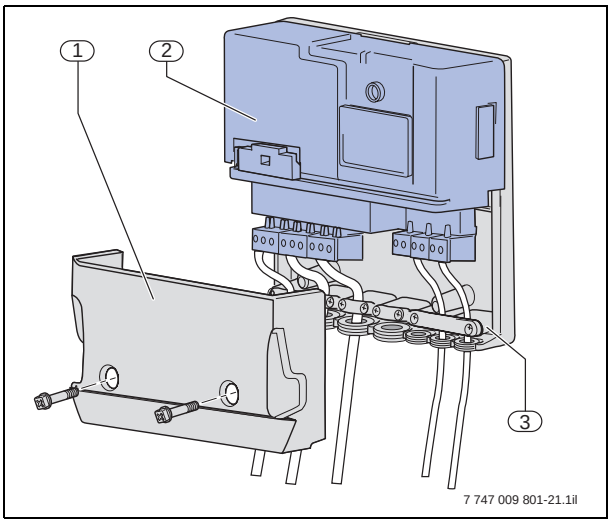

Fig. 30 Function module for wall mounting

1 Terminal cover
2 Base module
3 Wall mounting bracket with strain relief for connecting cables

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4.5.2 ASM10 connection module

For an EMS-BUS with several subscribers, e.g. MM10 mixer module or RC25 programming unit, the ASM10 connection module is an extension to which six BUS subscribers can be connected. It is used in the Logamatic EMS control system and is installed either in the gas condensing boiler or in the control system; alternatively it can be wall mounted.

The module also features the following:

- 1 EMS-BUS input and 5 EMS-BUS outputs
- Encoded and colour-coded connection plugs
- Internal communication via EMS databus
- Wall mounting enclosure into which the EMS system module is clipped
- Strain relief for all connecting cables
- Terminal cover
- Module IP rating inside the wall mounting enclosure: IP 40
- Including installation materials
- Number of modules per system subject to demand

4.5.3 MM10 mixer module

The MM10 mixer module extends the Logamatic EMS control system by heating circuits with mixer. Up to three modules can be used with the RC35 programming unit. It can only be used if the gas condensing boiler is hydraulically separated by means of a low loss header in connection with the WM10 low loss header module plus one heating circuit distributor for two heating circuits (system examples → page 70 f.). For heating circuits 2, 3 and 4, the heating systems “Radiator”, “Convector” or “Underfloor” can be selected at the service level of the RC35 programming unit. These circuits can be operated in weather-compensated or in room temperature-dependent mode. The “Screed drying” function can also be regulated if “Underfloor” has been selected for the heating circuits. In addition, these heating circuits can be operated purely under room control.

A programming unit is required in the reference room if a heating circuit is regulated in room temperature-dependent mode (→ fig. 19, page 32). It may be directly connected to the MM10 mixer module. In this case, the RC35 or RC25 programming unit acts as a remote control.

4.5.4 SM10 solar module

The SM10 solar module enables the integration of solar DHW heating into the Logamatic EMS control system (system example → page 73).

The SM10 solar module not only offers a temperature differential control, it also includes a function that enables the control of the solar circuit pump to deliver a variable flow rate. This High-Flow/Low-Flow operation enables demand-optimised DHW heating. When the system is still cold, the system initially produces DHW quickly from the solar yield for “optimum convenience.” When sufficient hot water is available, the system switches over to “yield optimisation”.

In addition, the SM10 solar module includes a function to optimise reheating. This clearly highlights the intelligent linking of gas condensing boiler and solar control unit. This control function suppresses reheating by the gas condensing boiler, subject to the heat input capacity of the DHW cylinder if the solar yield is adequate. This allows an optimisation of the solar yield and up to 10 % primary energy can be saved.

To enable solar DHW heating, select the heating circuit “Solar thermal system” at the service level of the RC35 programming unit.

The thermal disinfection function is automatically disabled at the RC35 programming unit when utilising dual mode DHW or thermosiphon cylinders.

4.5.5 VM10 control module for external solenoid valve

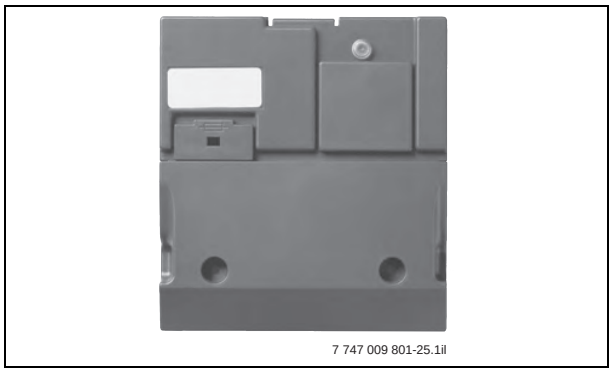

Fig. 31 VM10 control module

When combined with the Logamax plus GB162 gas condensing boiler, the VM10 control module regulates the switching and the power supply of an external solenoid valve for the operation of subterranean appliances with LPG.

When the boiler receive a heat demand, the external solenoid valve is opened two seconds ahead of the gas valve of the gas condensing boiler.

The external solenoid valve remains closed when there is no heat demand for the gas condensing boiler. The external solenoid valve remains closed if the appliance has developed a fault.

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4.5.6 WM10 low loss header module

The WM10 low loss header module regulates the hydraulic separation between the boiler and the consumer circuits. This hydraulic separation can be achieved with a low loss header or via a heat exchanger. In addition, the WM10 low loss header module can actuate the secondary pump for the heating circuit without mixer (heating circuit 1) (system examples → page 70 f.). Furthermore, the WM10 low loss header module offers the option of heating DHW via a cylinder primary pump. When actuating a cylinder primary pump, heating operation with one heating circuit with mixer is possible parallel to DHW heating (system example → page 71).

In systems with Logamax plus GB162 gas condensing boilers, hydraulic separation is generally required if two heating circuits are to be connected with individual pumps.

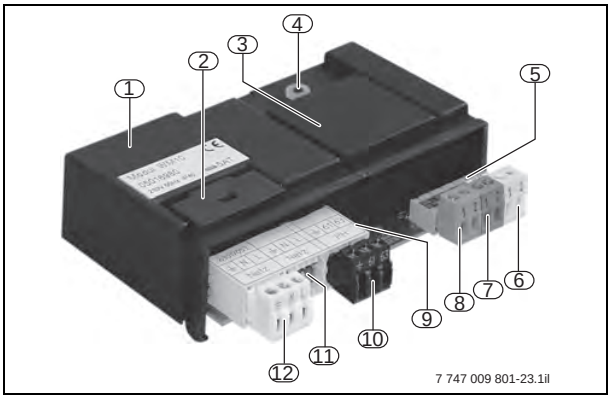

Fig. 32 WM10 low loss header module (base module)

1 Base module
2 Appliance fuse
3 Access to the spare fuse
4 LED operating and fault displays/indications
5 Plug-in strip for control voltage
6 Plugs for additional components in the Logamatic EMS via EMS-BUS
7 Plug for the RC… programming unit
8 Plug for the flow temperature sensor (here temperature sensor for low loss header)
9 Plug-in strip for mains voltage
10 Plug for heating circuit pump
11 Slot for the power supply of additional function modules (mains output)
12 Plug for mains power 230 V AC, 50 Hz

4.5.7 Logamatic Easycom telecontrol modem

In the form of the Logamatic Easycom, Buderus offers an affordable telecontrol modem for remote monitoring and setting of parameters in small and medium-sized heating systems. It is available as the EM modular version including parameter software and cable.

The following are the essential features of the telecontrol modem:

- May be connected to any control unit of the Logamatic 4000 or EMS families; BUS-enabled for the subscribers of a BUS system; with an additional potential-free message input
- Connection via an analogue telephone connection or, with an adaptor, via an ISDN system; highdata transfer speed (56 kBit/s)
- Complete remote scanning and setting of parameters of the connected system via PC software Logamatic ECO-SOFT with operating mode changeover via telephone (holiday home function)
- Remote monitoring of the connected system with automatic fault message to any three recipients; possible recipients are fax, mobile phones (SMS via D1, D2 or E-Plus), PC call centres (with ECO-MASTERSOFT PC software) or email addresses
- Prepared for firmware updates via software download

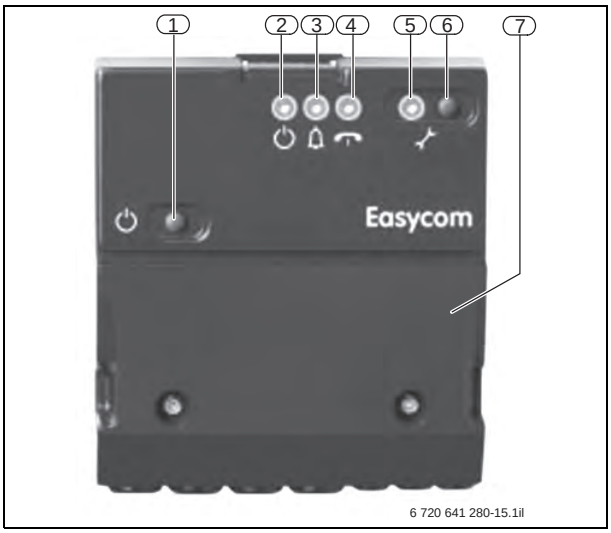

Fig. 33 Logamatic Easycom telecontrol modem (EM module version)

1 ON/OFF key
2 Standby display
3 “Message” display
4 “Telephone line busy” display
5 “Service” display
6 “Service” or “Restart” key
7 Terminal cover for EM module version

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4.5.8 EM10 fault message module

The EM10 fault message module can be used as an interface between the gas condensing boiler and, for example, building management systems.
A 0–10 V DC signal enables control via the flow temperature or the output (→ fig. 34).

Combined with the Logamax plus GB162, the EM10 fault message module provides two standard functions:

- Output of a fault indication with a 230 V signal (with potential) (buzzer, signal lamp, max. 1 A) and a floating contact for LV signals.
  A fault indication is generated by one of the following causes:
  - The gas condensing boiler has suffered a lockout fault
  - The water pressure in the system is too low
  - Communication with the gas condensing boiler has been interrupted for longer than five minutes
  - Switching the gas condensing boiler with an external 0-10 V DC signal. A flow temperature is specified for the gas condensing boiler via the 0–10 V DC signal (graph → fig. 34).

Only one of the two fundamental functions can be used.

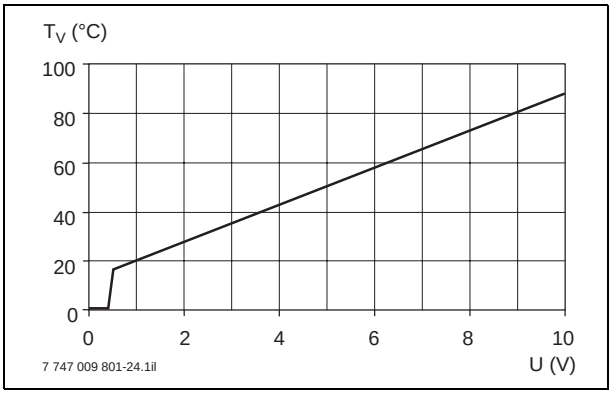

Fig. 34 Curve, EM10 fault message module (set values)

T_V Flow temperature
U Input voltage

Control via the flow temperature

The EM10 module transmits the 0–10 V signal from the building management system to a set flow temperature. This is a linear ratio (→ tab. 13).

Input voltage [V]	Set flow temperature (gas condensing boiler) [°C]	State of the gas condensing boiler
0	0	OFF
0.5	0	OFF
0.6	± 15	ON
5	± 50	ON
10	± 90	ON/maximum

Table 13 Control via the flow temperature

Control via the output

The EM10 module transmits the 0–10 V signal from the building management system to a set output. This is a linear ratio (→ tab. 14).

Input voltage [V]	Set output (gas condensing boiler) [°C]	State of the gas condensing boiler
0	0	OFF
0.5	0	OFF
0.6	± 6	Low load[1)]
5	± 50	Partial load
10	± 100	Full load

Table 14 Control via the output

1) The output at low load depends on the appliance type. If the low load of the appliance is, for example, 20 % and the control signal 1 V (= 10 %), then the set output is lower than the low load. In that case, the appliance will deliver 10 % at low load through an ON/OFF cycle. In this example, the appliance enters constant operation from a set value of 2 V.

The set temperature control function via 0–10V it only appropriate **in single boiler systems**.
This function can only be used for set temperature control in multi boiler systems with the Logamatic 4000 and the FM458 module.

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4.6 Selection aid for possible equipment 'levels with components of the Logamatic EMS control system

Control components and their functions	Logamax plus		
	GB162-15/25/35/45	GB162-25 T40S	GB162-50/65/80/100
Boiler components			
Universal burner control unit UBA3.5	●	●	●
Logamatic BC10 base controller	●	●	●
RC25 programming unit			
As room temperature-dependent control	❑	❑	❑
As a remote control in conjunction with the RC35 programming unit[1)]	❑	❑	❑
RC35 programming unit			
As weather-compensated control	❑	❑	❑
As room temperature-dependent control[2)]	❑	❑	❑
Connection of an external room temperature sensor	❑	❑	❑
As remote control[2)]	❑	❑	❑
Cylinder connection set AS-E[3)]	❑	●[4)]	❑
Function modules			
WM10[4)] low loss header module	❑[5)]	❑	❑
MM10 mixer module[6)]	❑[5)]	❑	❑
SM10 solar module[7)]	❑[5)]	❑	❑
Logamatic Easycom telecontrol modem	❑[8)]	❑[8)]	❑[8)]
Control system extension options			
Solar controller for second consumer (central heating backup) can be integrated	–	–	–
External interlocking (floating contact)	●	●	●
External heat demand (floating contact)	●	●	●
External heat demand 0-10 V (EM10 fault message module)	❑	❑	❑
Central fault message (EM10 fault message module)	❑	❑	❑
Remote monitoring	❑	❑	❑
Remote configuration	❑	❑	❑
Second solenoid valve, e.g. for LPG (VM10 control module)	❑	❑	❑

Table 15 Selection aid for the possible equipment 'levels of the Logamax plus GB162 with components of the Logamatic EMS control system

1) As a remote control for heating circuit 1, if the RC35 programming unit is installed inside the appliance or as a remote control for heating circuit 2.

2) Only one RC35 programming unit per system: If the RC35 programming unit is installed in the appliance or a second heating circuit is planned, then an additional RC25 programming unit per heating circuit as a remote control is required.

3) AS-E includes DHW temperature sensors for DHW heating with plug and dummy segments.

4) Factory-connected integral DHW cylinder

5) Up to two modules per appliance can be integrated.

6) In conjunction with the RC35 programming unit, three function modules can be used in each system.

7) Function module for solar thermal systems for one consumer (solar DHW heating with yield optimisation).

8) The modules can only be installed outside the appliance.

● Basic equipment
❑ Optional
– Not possible

The WM10 low loss header module and the SM10 solar module can only be used once per control unit.
Up to three MM10 mixer modules per control unit can be used.

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4.7 Logamatic 4121 and 4122 control units

Logamatic 4121 control unit

The Logamatic 4121 control unit is part of the modular Logamatic 4000 control system. In its standard version, it includes the CM431 controller module, the MEC2 programming unit and the ZM424 central module.

- Logamatic 4121 (product no. 7 747 011 916)

The following components can be controlled:

- One gas condensing boiler with modulating burner operation (in conjunction with the universal burner control unit UBA3.5 or UBA1.5)
- One heating circuit with actuator
- Selection function (only one function can be selected)
  - A second heating circuit without actuator and DHW temperature control via a cylinder primary pump incl. switching the DHW circulation pump via the Logamatic 4000
    or
  - A second heating circuit with actuator and DHW temperature control via EMS (with 3-way diverter valve) or cylinder primary pump and DHW circulation pump

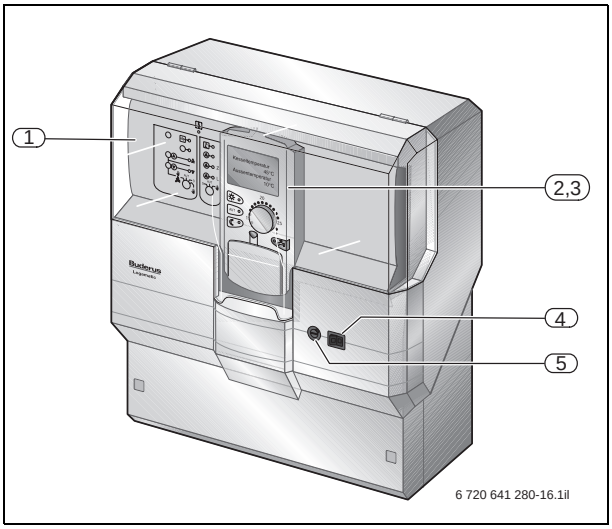

Fig. 35 Logamatic 4121 control unit with standard equipment level

1 ZM424 central module
2 CM431 controller 'module
3 MEC2 programming unit
4 Control unit ON/OFF switch
5 Fuse

Logamatic 4122 control unit

In its standard version, the Logamatic 4122 control unit includes only the CM431 controller module and the MEC2 programming unit (→ fig. 36). It does not contain any functions of its own. The functionality of the control unit is dictated by the various modules (→ tab. 16).

- Logamatic 4122 with MEC2 (product no. 7 747 011 918)
- Logamatic 4122 with display (product no. 7 747 011 912)

Alternative applications are as follows:

- Logamatic 4122 combined with the function modules FM441, FM442, FM443, FM444, FM445, FM446 and FM448 to extend the control functions (up to 56 heating circuits)
- Logamatic 4122 combined with the FM456 KSE2 or FM457 KSE4 function modules to regulate up to eight gas condensing boilers in a cascade

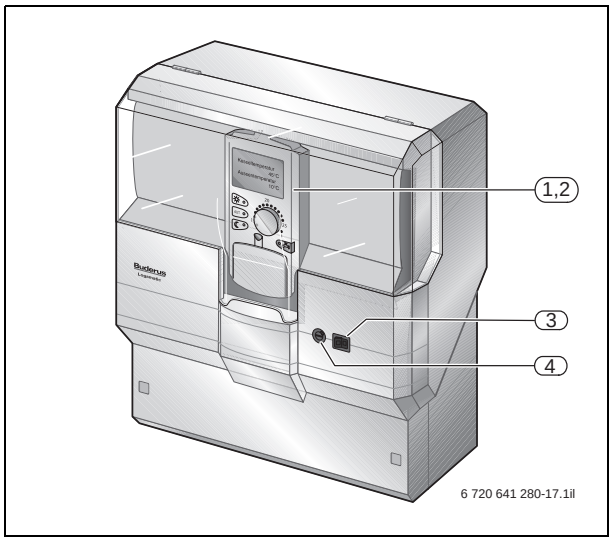

Fig. 36 Logamatic 4122 control unit in standard form as a version with MEC2 programming unit; as an option available with a display

1 CM431 controller 'module
2 MEC2 programming unit
3 Control unit ON/OFF switch
4 Fuse

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Control options, Logamatic 4122 control unit

Control unit	Slots	Optional function modules	Control options
Logamatic 4121 (master 'device)	1	ZM424 (standard equipment level)	Heating circuits 1 and 2, DHW heating, gas condensing boiler
	1	FM442	Heating circuits 3 and 4
		FM443	Solar thermal system with one or two consumers
		FM444	Module for connecting an alternative heat source or buffer cylinder
		FM445[1)]	DHW heating via the cylinder primary system with external heat exchanger
		FM446	EIB interface (European Installation BUS)
		FM448	Central fault message
		FM456 KSE2 (FM457 KSE4)	Cascade module for gas condensing boilers 2 to 3 (2 to 5)
Logamatic 4122 (extension for master 'device)	2	FM441	1 additional heating circuit, DHW heating
		FM442	2 additional heating circuits (up to 56 heating circuits with 14 Logamatic 4122 substations)
		FM443	Solar thermal system with one or two consumers
		FM445 (alternative to the FM441)	DHW heating via the cylinder primary system with external heat exchanger
		FM446	EIB interface (European Installation BUS)
		FM448	Central fault message
Logamatic 4122 (master 'device)	1	FM456 KSE2 (FM457 KSE4)	Cascade module for gas condensing boilers 1 to 2 (1 to 4)
	1	FM456 KSE2 (FM457 KSE4)	Cascade module for gas condensing boilers 5 to 6 (5 to 8)
		FM441	Heating circuit 1, DHW heating
		FM442	Heating circuits 1 and 2
		FM443	Solar thermal system with one or two consumers
		FM445 (alternative to the FM441)	DHW heating via the cylinder primary system with external heat exchanger
		FM446	EIB interface (European Installation BUS)
		FM448	Central fault message

Table 16 Control and extension options for the Logamatic 4121 and 4122 control units

1) When using the FM445 function module, DHW heating through the ZM424 central module will be disabled.

The modules of the Logamatic EMS cannot be controlled via the Logamatic 4000 control system.

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Function modules FM456 KSE2 and FM457 KSE4

In conjunction with the Logamatic 4121 and 4122 control units, these function modules can control a cascade comprising from two to eight Buderus gas condensing boilers with UBA1.5 and/or UBA3.5 (EMS) (automatic recognition).

The following functions are available:

- Fully modulating operation of all appliances
- Serial operation of two or four appliances in a cascade
- Fixed or intelligent boiler sequence changeover
- Automatic load limiting in summer mode

In each Logamatic 4122 control unit, up to two FM456 function modules for controlling four gas condensing boilers or two FM457 function modules for controlling up to eight gas condensing boilers can be used.

Communication-enabled MEC2 programming unit

All important parameters of the Logamatic 4121 and 4122 control units are managed by the digital MEC2 programming unit (→ fig. 37). The control concept is based on the easy and proven “Push & Turn” principle. For this, the user prompts prevent contradictory settings of parameters, thereby largely preventing faults during commissioning. All available information can be displayed in “plain text”. One room temperature sensor and a radio clock receiver are integrated as standard.

The MEC2 programming unit can be located either at the control unit, in an online set at the boiler casing or with the room installation set in the living space. A simple 2-core cable connects the room installation set wall mounting bracket with the Logamatic 4121 or 4122 control unit.

If the MEC2 programming unit with the room installation set functions as a remote control in the living space, use a boiler display inside the control unit in its place. In that case, this operating display shows the system flow.

- Room installation set with wall mounting bracket and boiler display (product no. 5 720 812)

For further details, see the technical guide concerning the “modular Logamatic 4000 control system”.

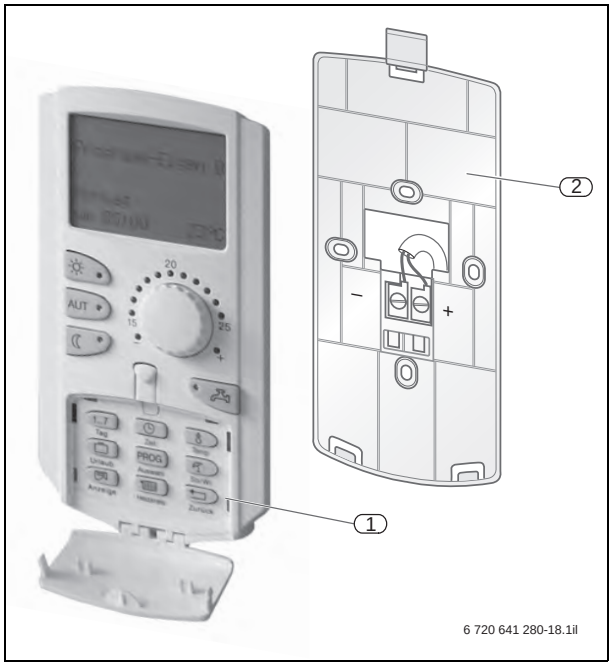

Fig. 37 MEC2 programming unit with integral room temperature sensor and wall mounting bracket

1 MEC2 programming unit including integral room temperature sensor and radio clock receiver
2 Wall mounting bracket for the MEC2 programming unit

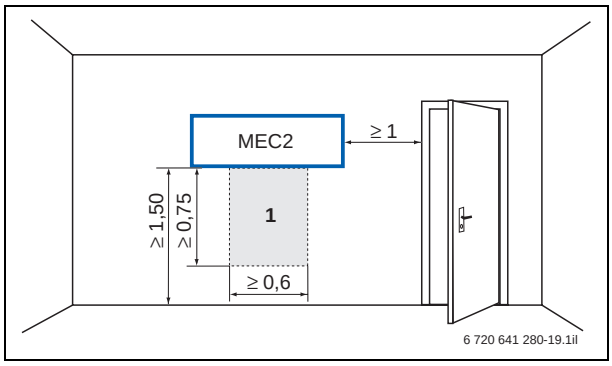

Fig. 38 Position of the wall mounting bracket for the MEC2 programming unit in the reference room (dim. in mm)

1 Required clearance below the MEC2

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5 DHW heating

5.1 Decision-making aids to assist in selecting DHW heating

Gas condensing boilers have very high efficiency. Therefore, heating DHW with the Logamax plus GB162 is recommended, both from an energetic and an ecological viewpoint. It is suitable for combining with separate DHW cylinders (selection aid → page 50).

When planning heating systems and making a decision regarding DHW heating, various factors should be taken into account, such as the following:

- Simultaneous use of different draw-off points
- DHW demand and convenience
- Line length (with or without DHW circulation line)
- Availability of space
- Costs
- Replacement of system components

Planning criteria	Possible versions	Logamax plus	
		GB162-15/25/35/45 GB162-50/65/80/100 With separate DHW cylinder	GB162-25 T40S Storage combi boiler
Use of the draw-off points	Only one main draw-off point	●	+
	Several main draw-off points, but not simultaneously	+	+
	Several main draw-off points simultaneously	+	+
DHW demand	Single person household (central DHW heating for oneresidential unit)	●	+
	Four-person household (central DHW heating for oneresidential unit or one detached house)	+	+
	Many users (central DHW heating for an apartment building)	+	–
Line length	Up to eight metres line length (without DHW circulation line)	+	+
	In excess of eight metres line length (with DHW circulation line)	+	Not possible
Availability of space	Low	–/●[1)]	+
	Adequate	+	+
Costs	Affordable choice	●	+
Replacement	Combi boiler installed	+	+
	Cylinder installed	+	–

Table 17 Decision-making aids for the selection of integral or separate DHW heating

1) In the case of adequate room height, recommended with the Logalux S120 W DHW cylinder (below)

\+ Recommended
● Limited recommendation
– Not recommended

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5.2 Application limit, stratification cylinder for the Logamax plus GB162-25 T40S

At a total hardness of the potable water of 15° dH to 20° dH, we recommend that the cylinder temperature is set to ≤ 55 °C. As an alternative, a water treatment system can also be used.

From an overall hardness level of 21°dH upwards, a dislodging of scale inside the plate heat exchanger must be expected. We recommend either the use of a cylinder with internal indirect coils or, as an alternative, the use of a water treatment system.

5.3 DHW heating with the cylinder primary system (LAP, LSP) with FM445 function module combined with the Logamax plus GB162

The use of the Logamax plus GB162 gas condensing boilers for DHW heating with cylinder primary system requires the FM445 function module. The primary system must be connected downstream of a low loss header.

The speed control of the PS1 primary circuit pump or the control of an SK actuator for the primary circuit can be implemented as normal via the FM445 function module.

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5.4 Separate DHW heating via a 3-way diverter valve for the Logamax plus GB162-45, GB162-50, GB162-65, GB162-80 and GB162-100

DHW priority circuit

The universal burner control unit UBA3.5 of the Logamax plus GB162 gas condensing boilers features a DHW priority circuit. This actuates a 3-way diverter valve.

This way, the heating circuit pump operates alternately as heating circuit pump or cylinder primary pump. The 3-way diverter valve is fitted on-site, outside the boiler.

Dimensions and specification of the external 3-way diverter valves

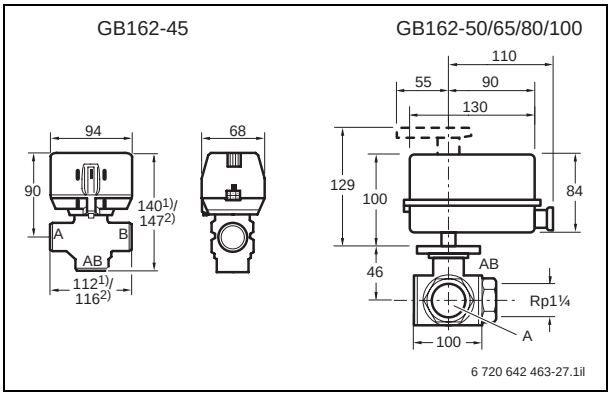

Fig. 39 Dimensions of the external 3-way diverter valves for the Logamax plus GB162-45 and GB162-50/65/80/100

A (VS) Cylinder flow (DHW)
B (VK) Heating circuit flow
AB (VK) Boiler flow
1) Dimensions for 1 inch male thread
2) Dimensions for 22 mm compression fitting

When fitting the valve, ensure the correct position is maintained. The motor must not hang down.

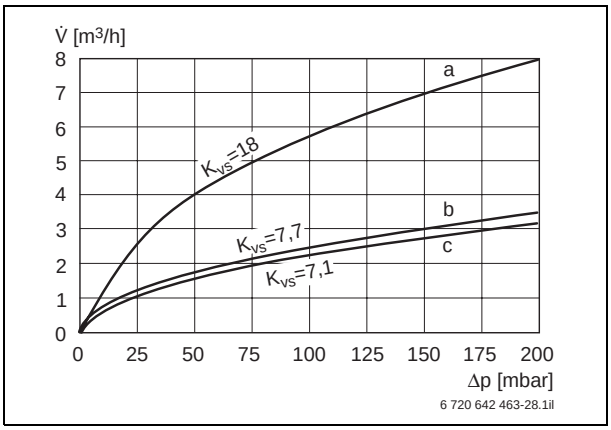

Fig. 40 Flow rate curve of the external 3-way diverter valves

a Flow rate curve Taconova, 32 mm/1¼ "
b Flow rate curve Honeywell type VC8010, 28 mm/1"
c Flow rate curve Honeywell type VC8010, 22 mm/¾ "
Δp Pressure drop
KVS Flow capacity of the valve (in m^3/h)
V̇ Flow rate

Logamax plus	Unit	GB162-45	GB162-50/65	GB162-80/100
3-way diverter valve	mm/inch	Honeywell VC8010; 28/R1	Taconova; 32/R1¼	Taconova; 32/R1¼
Pump[1)]		UPM 15-70 2W (alternatively Wilo Stratos 25/1-8)	Magna 25-60 on site	Magna 25-100 on site
Residual head for the heating circuit at ΔT = 20 K	mbar	150	250	150
Voltage	V	24	24	24
Frequency	Hz	50–60	50	50
Power consumption	W	6	3.5	3.5
Length of the connecting cable	m	3	3	3
Water connections	mm/inch	28/R1	32/R1¼	32/R1¼
Differential pressure	bar	4	10	10
Static pressure	bar	20	10	10
K_{VS} value	m^3/h	7.7	18	18
Permissible ambient temperature	°C	0–65	–10–55	–10–55
Medium temperature	°C	1–95	–15–95	–15–95

Table 18 Specification of the external 3-way diverter valves

1) Controlled via boiler

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DHW heating via pump assembly with integral 3-way diverter valve for the Logamax plus GB162-50 and GB162-65

The 3-way diverter valve can only be fitted to the l.h. side of the pump connection assembly. The pump connection assembly with 3-way valve kit is only suitable for Logamax plus GB162-50 and GB162-65, and cannot be used for boiler sizes 80 kW and 100 kW, as the amount of water transported by the integral pump is insufficient.

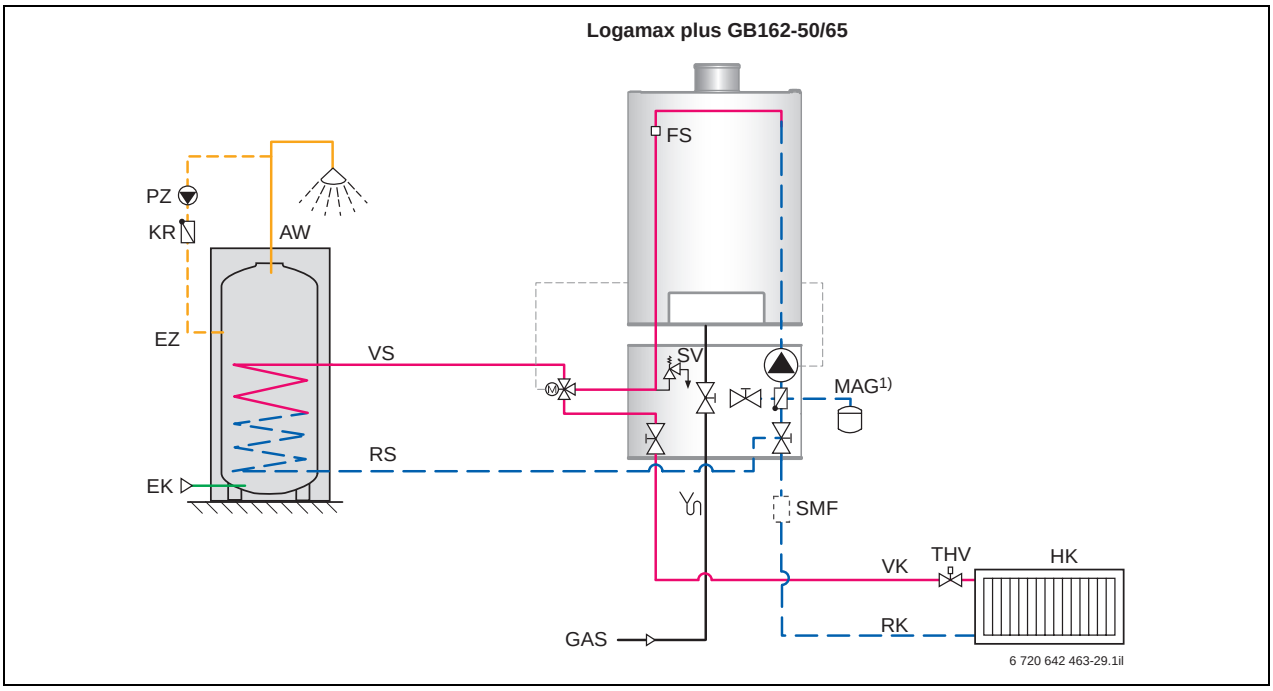

Fig. 41 Logamax plus GB162-50/65 with pump connection assembly and 3-way valve kit

AW DHW outlet
EK Cold water inlet
EZ DHW circulation inlet
FS Safety temperature sensor
GAS Gas connection
HK Heating circuit
KR Check valve
MAG Diaphragm expansion vessel
PZ DHW circulation pump
RK Boiler return
RS DHW cylinder return
SMF Dirt filter
SV Safety valve
THV Thermostatic valve
VK Boiler flow
VS DHW cylinder flow
1) On site

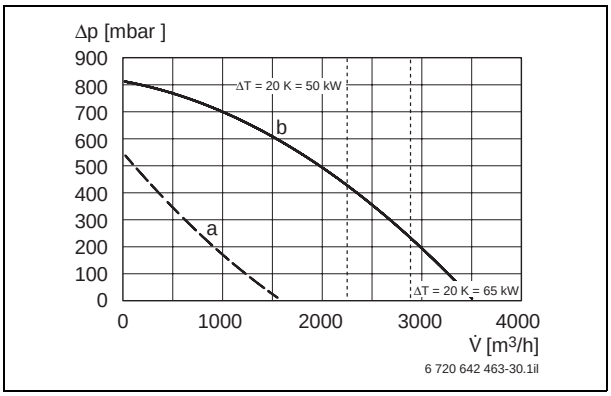

Fig. 42 Residual head GB162-50/65 with pump assembly and integral 3-way diverter valve

a Low load
b Full load
Δp Pressure drop
V̇ Flow rate

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5.5 Selection of a suitable DHW cylinder for detached houses and two-family homes as well as apartments

The size of the required DHW cylinder depends on the DHW demand.

The following DHW cylinders may be combined with the GB162:

Draw-off point	Bath tub 140 l ❶ 10 l/min (10 min)	Bath tub 160 l 14 l/min (10 min)	Economy shower 8 l/min (6 min)	Standard shower 10 l/min (8 min)	Standard shower 12 l/min (8 min)	Basin, Washstand 6 l/min (3 min)
Bath tub 140 l 10 l/min (10 min)	S135 RW S120 W	not recommended (→ ≥ 25 kW)	S135 RW	S135 RW	S160 RW SU160 W	S120 W S135 RW
Bath tub 160 l 14 l/min (10 min)	S160 RW SU160 W	S135 RW S120 W	S160 RW SU160 W	S160 RW SU160 W	S160 RW SU160 W	S135 RW
Economy shower 6 l/min (8 min)	S135 RW	S135 RW	S120 W S135 RW	S135 RW	S135 RW	S120 W S135 RW
Standard shower 10 l/min (8 min)	S135 RW	S160 RW SU160 W	S120 W S135 RW	S120 W S135 RW	S135 RW	–
Standard shower 12 l/min (9 min) ❷	❸ S160 RW SU160 W	S160 RW SU160 W	S135 RW	S135 RW	S120 W S135 RW	S135 RW
Basin, Washst and 3 l/min (6 min)	S120 W S135 RW	S135 RW	S120 W S135 RW	S135 RW	S135 RW	S120 W S135 RW

Table 19 Selection of a suitable DHW cylinder

	Suitable for ≥ 25 kW boiler output
	Suitable for ≥ 15 kW boiler output
	Suitable for both boiler output ranges
	Recommendation according to example

Table 20 Explanation of the colour coding in table 19

Example

For the simultaneous use of a bath tub ❶ and a standard shower ❷ with a gas condensing boiler with a maximum output of 25 kW, the Logalux S160 RW or SU160 W DHW cylinders ❸ are recommended.

Condition: DHW cylinder is heated to 60 °C.

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5.6 DHW circulation line for DHW cylinder

Any DHW circulation line is a heat consumer. Lines that are long, poorly routed or inadequately insulated can lead to substantial heat losses. Therefore, DHW lines should be kept short if DHW circulation lines are not installed.

However, from a DHW line length of approx. eight metres, the connection of a DHW circulation line is recommended.

Where DHW circulation cannot be avoided, observe the following rules:

- The DHW circulation connection can be installed in the cold water inlet of the Logalux S120 W DHW cylinders. In connection with the Logamax plus GB162, the connection piece for PZ DHW circulation pumps can be fitted to the safety assembly of the S-Flex connection set for the sanitary side. Install the pipework in conjunction with the Logamax plus GB162 on site (→ fig. 43).
- Minimise the amount of circulating water. This requires a pressure drop calculation for the lines or a sizing of the pump. Temperature differentials from 5 K between the DHW outlet and the DHW circulation inlet must be reduced.
- The EnEV specifies that conventional time switches or other automatic facilities for switching off the DHW circulation pump must be provided. The RC35 programming unit within the Energy Management System (EMS) provides its own time channel for DHW heating. Consequently, the DHW circulation pump can also be programmed for different operating modes.

It is generally adequate if the DHW circulation pump is operated for approx. five minutes in the morning, midday and in the evening.

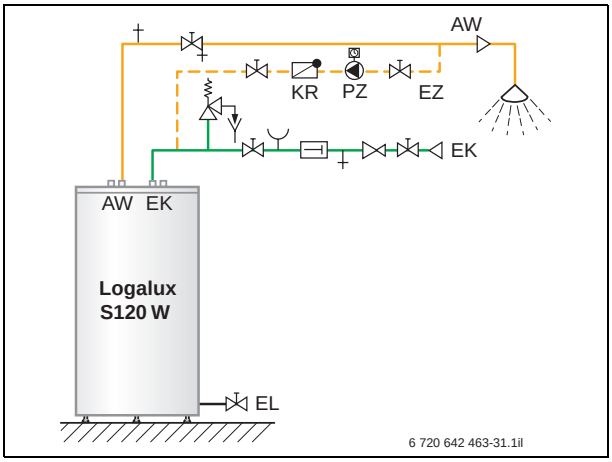

Fig. 43 Version of a DHW circulation line for the Logalux S120 W DHW cylinder

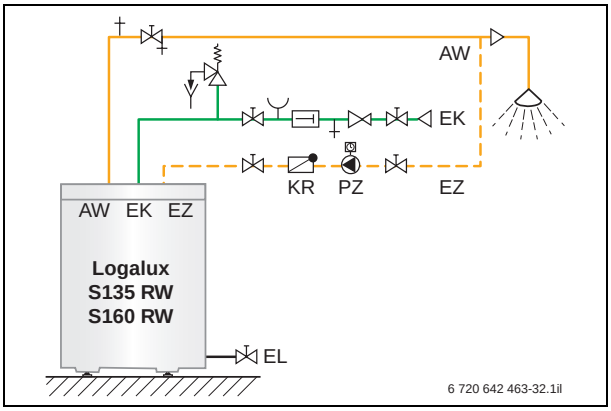

Fig. 44 Version of a DHW circulation line for the Logalux S135 RW and S160 RW DHW cylinders

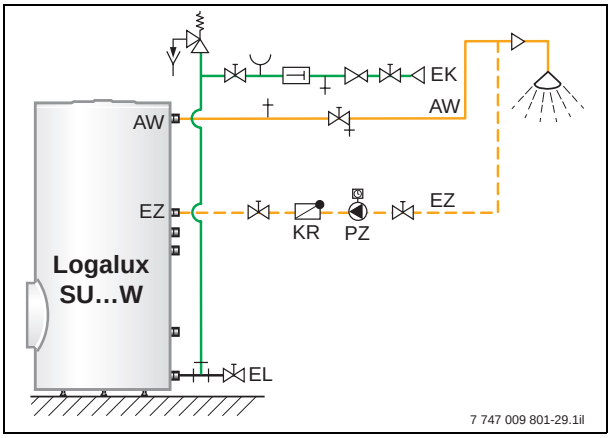

Fig. 45 Version of a DHW circulation line for the Logalux SU... W DHW cylinders

Key to fig. 43 to fig. 45:

AW DHW outlet
EK Cold water inlet to DIN 1988-2
EZ DHW circulation inlet
KR Check valve
PZ DHW circulation pump

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6 System examples

6.1 Information regarding all system examples

The system examples in this chapter provide information regarding the standard systems that are feasible with the Logamatic EMS control system.

The practical implementation is subject to currently applicable technical rules. Install safety equipment in accordance with local regulations.

The circuit diagrams are only schematic illustrations and provide a non-binding indication of possible hydraulic circuits.

List of abbreviations

Abbr.	Explanation
AW	DHW outlet
BC10	Base controller
EK	Cold water inlet
EZ	DHW circulation inlet
FA	Outside temperature sensor (standard delivery of the RC35 programming unit for weather-compensated control)
FAG	Flue gas temperature sensor
FB/FW	DHW temperature sensor
FEK	Cold water temperature sensor
FK	Flow temperature sensor
FP	Buffer cylinder temperature sensor
FPO	Buffer cylinder top temperature sensor
FPU	Buffer cylinder bottom temperature sensor
FR	Return temperature sensor
FS	Safety temperature sensor
FSK	Collector temperature sensor
FSS	Cylinder temperature sensor
FV	Flow temperature sensor
FW/FB	DHW temperature sensor
GAS	Gas connection
G-KS	“Short circuit" line
HK	Heating circuit
HKV	Heating circuit distributor
HS...	Heating circuit quick installation set
FE	Drain & fill valve
KR	Check valve
MAG	Diaphragm expansion vessel
MM10	Mixer module
PH	Heating circuit pump (secondary pump)
PK	Boiler circulation pump
PP	Heat source pump
PS	Cylinder primary pump
PSS	Solar circuit pump
PZ	DHW circulation pump
RC..	Programming unit
RDD	Differential pressure controller
RH	Heating system return
RK	Boiler return
RS	DHW cylinder return

Table 21 Overview of frequently used abbreviations

Abbr.	Explanation
SA	Branch control and shut-off valve
SH	Heating circuit actuator (3-way mixer)
SM10	Solar module
SMF	Dirt filter
SPB	Actuator, heat supply
SU	3-way diverter valve
SV	Safety valve
THV	Thermostatic valve
TW	Domestic hot water
TWH	Temperature limiter - underfloor heating circuit
ÜS	Surge protector
ÜV	Overflow valve
VH	Heating circuit flow
VK	Boiler flow
VS	DHW cylinder flow
WH	Low loss header
WM10	Low loss header module
WS	Water flow sensor
WT	Heat exchanger for system separation
WWM	Thermostatic DHW mixer
ZV	Zone valve

Table 21 Overview of frequently used abbreviations

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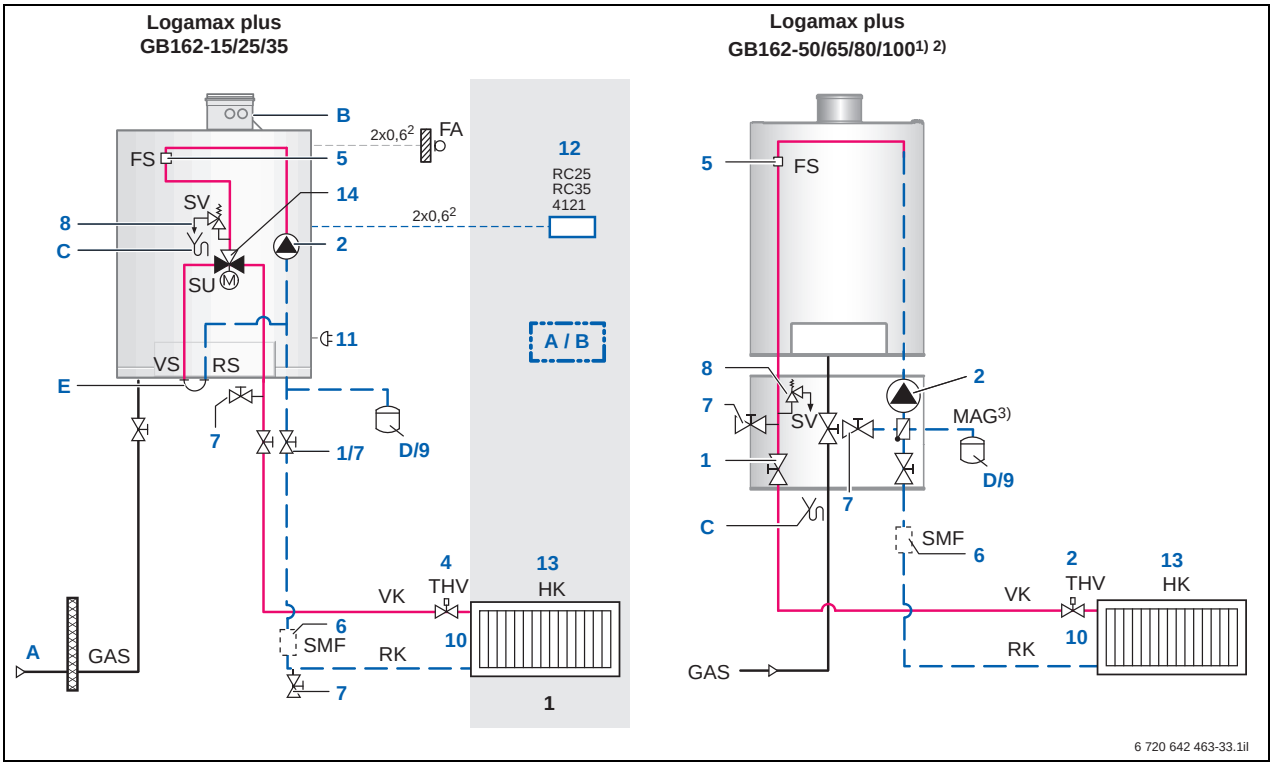

Fig. 46 Sample circuit diagram for the hydraulics and control of all systems that include the Logamax plus GB162 (design information → tab. 22, page 54)

1 Reference room
1) With pump connection assembly
2) The boiler does not include a safety valve
3) On site

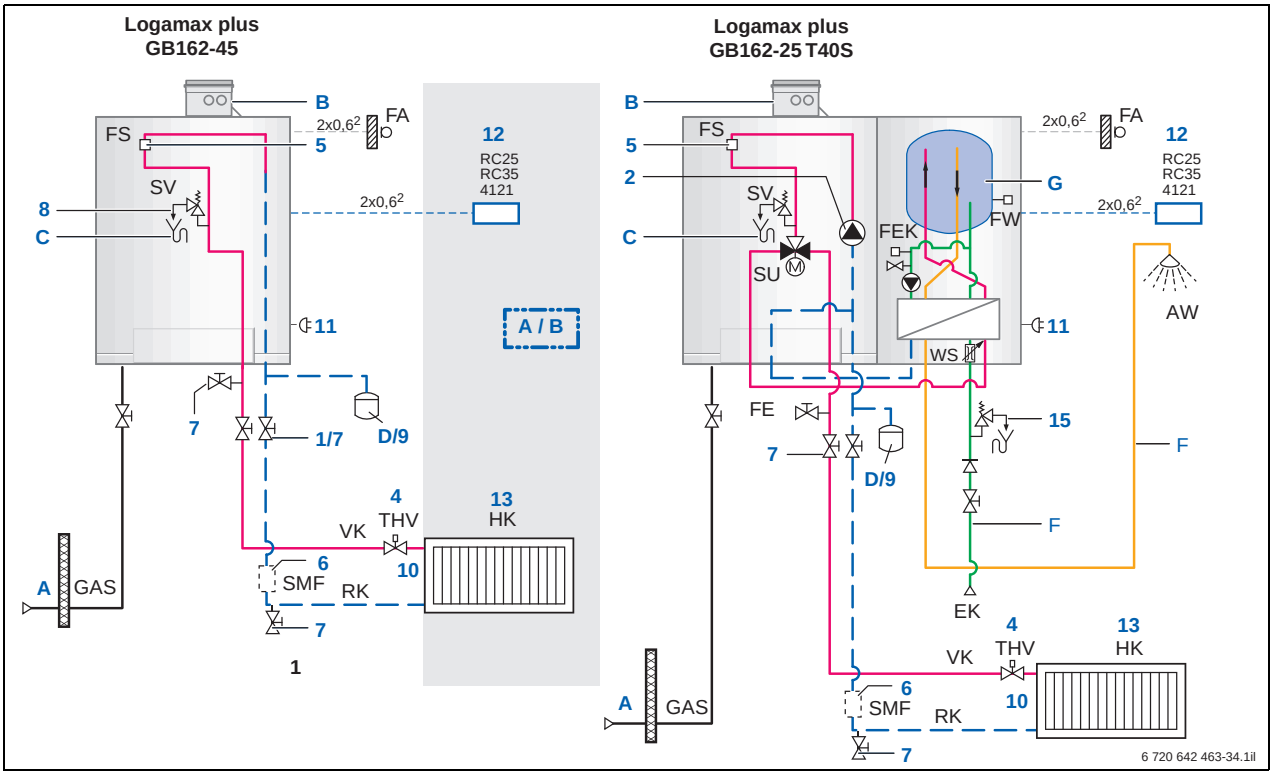

Fig. 47 Hydraulics Logamax plus GB162-45 and GB162-25 T40S (design information → tab. 22, page 54)

1 Reference room

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Pos.	General design information on hydraulics and control	Further information
A	Observe all building regulations applicable to installation rooms (DVGW-TRGI 2008 [Germany]). Make the gas connection in line with the technical rules applicable to gas installations. Take any DHW booster heating functions of the appliances into account when sizing the gas flow limiter. The gas connection must only be made by authorised gas fitters. In addition, the installation of a gas filter in the gas line is also recommended.	Page 30 Page 109 f.
B	Operation in occupied rooms is possible with a balanced flue system or, under certain conditions, with the concentric open flue system GA-X (DVGW-TRGI 2008 [Germany]).	Page 109 f. Page 111 f.
C	When draining condensate, observe all relevant local waste water ordinances. Frequently installations follow the ATV-DVWK A251 [Germany].	Page 85
D	Only operate the Logamax plus GB162 gas condensing boiler in sealed unvented heating systems. Convert open vented systems in accordance with DIN-EN 12828.	Page 30 Page 56 f.
S	A “short-circuit” line between the DHW cylinder flow and the DHW cylinder return is required if no separate DHW cylinder is connected to the Logamax plus GB162-15/25/35 gas condensing boilers.	Page 71 Page 87 f.
F	To prevent corrosion damage, never use zinc-plated/galvanised connection lines or fittings in the DHW outlet. Implement the installation in accordance with DIN 1988 and DIN 4753 (as well as DIN-EN 1717) [or local regulations]. Observe any orders concerning potable water. A copper-soldered stainless steel plate heat exchanger is part of the Logamax plus GB162-25 T40S. When connecting the Logamax plus GB162-25 T40S to plastic cold water or DHW lines, observe the methods of connection with other materials recommended by the manufacturer of the plastic pipe.	–
G	A stainless steel stratification cylinder with 40 l capacity is integrated into the Logamax plus GB162-25 T40S.	–
1	An extensive range of accessories is available for all Logamax plus GB162 gas condensing boilers. There are suitable pipe assemblies to connect the Logamax plus GB162 gas condensing boilers with the Logalux S135 RW, S160 RW, Logalux S120 W as well as the Logalux SU160 W to SU300 W DHW cylinders.	Pages 87 ff.
2	Observe the pump curve for checking the residual head. The Logamax plus GB162-45/50/65/80/100 appliances are supplied without internal heating circuit pumps. A UPM 15-70 2W (GB162-45) pump, or the pump connection assembly (GB162-50/65/80/100) with UPER 25-80, is available for delivery from the factory. These pumps can be operated in output-dependent mode and, up to 45 kW also in Δp = constant mode. Furthermore, standard differential pressure-dependent pumps can be used outside the appliance. The maximum possible amount of water via the appliance is as follows: 45 kW = 2500 l/h; 50/65/80/100 kW = 5700 l/h This must be safeguarded via a line balancing valve.	Page 60 f.
3	The Logamax plus GB162 can be operated without a minimum flow rate, making an overflow valve superfluous.	Page 58
4	For room temperature-dependent or weather-compensated control with room temperature hook-up, install a room temperature sensor in the reference room of the residential unit. The room temperature sensor is integrated in the RC35 and RC25 programming units. Open all thermostatically controlled radiator valves fully in the reference room.	Page 32 Page 36 Page 37
5	A low water indicator is not required when installing the Logamax plus GB162 gas condensing boiler as an attic heating centre. The function of a thermostatically controlled low water indicator is safeguarded with a minimum pressure switch inside the appliance and is verified by type testing.	Page 9 ff.
6	A dirt trap is not required if a new system is thoroughly flushed prior to commissioning, and oxygen corrosion (loose particles) can be prevented. Older systems must always be flushed; the installation of a dirt trap is also highly recommended.	Page 56
7	A boiler drain & fill valve (FE) is included in the heating circuit connection set (accessory). In addition we recommend providing a drain facility at the lowest point of the system.	Pages 87 ff.

Table 22 Information regarding the sample circuit diagrams (→ fig. 46 and fig. 47, page 53) for all systems that include the Logamax plus GB162

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Pos.	General design information on hydraulics and control	Further information
8	Provide the discharge pipes from safety valves in accordance with DIN-EN 12828 so that any expelled heating water can be drained off safely. This requirement is met, because with the Logamax plus GB162-15/25/35/45 gas condensing boilers, the discharge pipe of the integral safety valve terminates in the appliance siphon. For the Logamax plus GB162-50/65/80/100 appliances, the safety valve is part of the pump assembly. Where no pump assembly is used, provide appliance protection on site. The required drain outlet with siphon is available as a connection accessory.	Page 22 f. Pages 27 ff. Pages 87 ff.
9	Check the sizing of the diaphragm expansion vessel in accordance with DIN 4807-2 and DIN-EN 12828. Install a suitably sized expansion vessel on site.	Page 65 f.
10	The maximum transferable output of the Logamax plus GB162 with an underfloor heating system directly downstream is limited. When transferring greater outputs, allow for a low loss header with flow temperature sensor. Underfloor heating systems with pipes that are permeable to oxygen require system separation. Weather-compensated control is recommended in conjunction with underfloor heating systems due to the inertia during heat-up.	Page 58 Pages 70 ff. Pages 73 f.
11	For open flue operation of the Logamax plus GB162 gas condensing boiler, the IP rating is IP 40. For balanced flue operation of the Logamax plus GB162, the IP rating is IP X4 D. The Logamax plus GB162 is equipped with a plug-in strip that includes a suitable plug for the power cable. A further connection is provided in the cable harness that provides an output for supplying power to a function module of the Logamatic EMS control system, which can be sited inside the gas condensing boiler. A pre-assembled terminal and a matching slot for the mains output is part of every function module; this is suitable for supplying an additional function module inside the appliance with mains power. The connection from the mains output to the wall mounted function module or within the relevant pipe assembly must be provided on site. The mains supply must be 230 V AC, 50 Hz. Install an isolator in the power cable (MCB 10 A, type B with at least 3 mm contact separation). The power supply must only be made by an authorised electrician. For electrical installations, observe all relevant local and national regulations plus those specified by your local power supply utility.	Pages 39 ff. Pages 70 ff.
12	Alongside standard operation via the Logamatic BC10 base controller, the Logamatic EMS control system requires an RC25 or RC35 programming unit. The flexibility of the Logamatic EMS control system enables the arrangement of the RC35 programming unit either on the wall in the living space or in the gas condensing boiler itself. If the RC35 programming unit is clipped into the appliance, an additional RC25 programming unit can be used as a remote control. Only one RC35 programming unit can be used per system. It can be allocated to any heating circuit. As a remote control for another heating circuit (only feasible with the RC35 programming unit in conjunction with the MM10 mixer module and WM10 low loss header module), a further RC25 programming unit can be installed in the living space of the second heating circuit. One RC25 programming unit can be used per heating circuit, i.e. not more than two per system.	Page 31 Pages 34 ff. Page 42 Pages 70 ff.
13	The RC35 programming unit can control further control components in conjunction with the additional function modules. The flexibility of the Logamatic EMS control system enables the installation of the function modules either in the appliance itself (two slots) or on the wall near the relevant pipe assembly. For more complex hydraulic systems, use the Logamatic 4121 control unit. Primarily, this applies to the following: • Systems with more than one heating circuit with mixer • Systems with solar central heating backup • Systems with a primary system • Cascade systems	Page 31 Pages 37 ff. Pages 70 ff.
14	The Logamax plus GB162-45/50/65/80/100 appliances are equipped with an integral 3-way diverter valve. The 3-way diverter valve is available as an accessory and must be installed on site.	–
15	Protect the 40 l stratification cylinder of the GB162-25 T40S in accordance with DIN 1988/EN 1717. The cylinder has a maximum operating pressure of 10 bar. The safety assembly that is available from the factory is equipped with an 8 bar safety valve, a cold water shut-off valve and a non-return valve.	–

Table 22 Information regarding the sample circuit diagrams (→ fig. 46 and fig. 47, page 53) for all systems that include the Logamax plus GB162

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6.2 Important hydraulic system components

6.2.1 Heating water

Heating water of poor quality encourages the formation of sludge and corrosion. This can lead to incorrect functions and can damage the heat exchanger. Therefore, heavily contaminated heating systems should be flushed through thoroughly with tap water prior to filling.

To prevent damage through scale build-up, the fill water may require treating, subject to the level of fill water hardness, system volume and the overall system output.

Total boiler output [kW]	Sum of alkaline earths/total hardness of the fill and top-up water [°dh]	Max. amount of fill and top-up water V_{max} [m^3]
$\dot{Q} < 50$	Requirements according to fig. 48	Requirements according to fig. 48
$\dot{Q} \geq 50$	Requirements according to fig. 48 and fig. 49	Requirements according to fig. 48 and fig. 49

Table 23 Table for aluminium heat exchangers

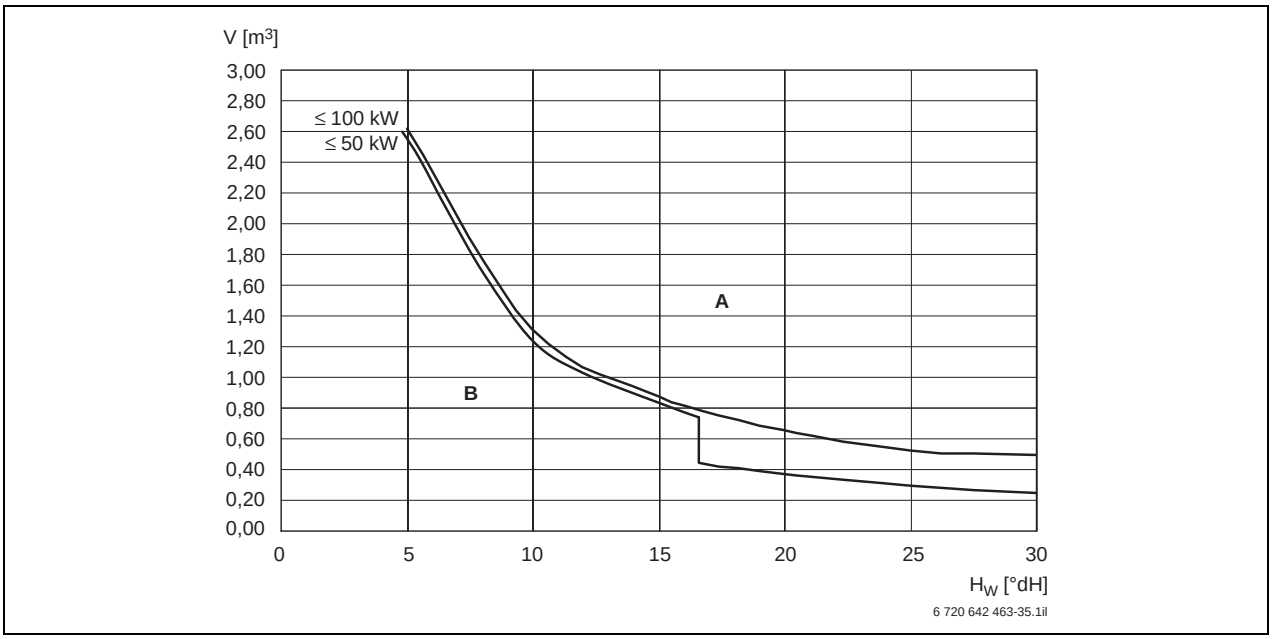

Fig. 48 Water treatment limits for single boiler systems ≤ 50 kW and ≤ 100 kW

A Above the curves, use fully desalinated fill water with a conductivity of ≤ 10 µS/cm
B Below the curves, fill with untreated tap water that meets the requirements of the Drinking Water Ordinance [Germany]
H_W Water hardness
V Water volume over the service life of the boiler

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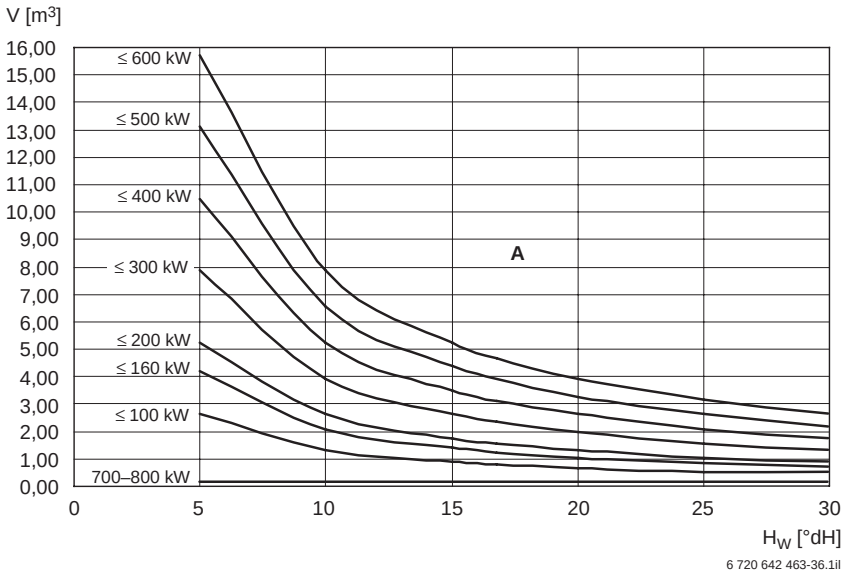

Fig. 49 Water treatment limits for multi boiler systems

A Above these curves, use fully desalinated fill water with ≤ 10 µS/cm conductivity; below these curves, untreated water in accordance with the Drinking Water Ordinance [Germany] can be used.
From 600 kW upwards, generally use only fully desalinated fill water.
H_W Water hardness
V Water volume over the service life of the boiler

The current guideline VDI 2035“ Prevention of damage in hot water heating systems” (as of 12/2005) aims to simplify the application and accommodate the trend towards more compact appliances with higher heat transfer rates. The diagram in fig. 48 and fig. 49 enables the permissible amount of fill and top-up water to be checked that can be filled during the service life of the boiler without special treatment, subject to the hardness (°dH) and the respective boiler output. Special water treatment measures are required if the water volume lies above the respective limit curve on the graph.

Suitable measures are as follows:

- Use fully desalinated fill water with a conductivity of ≤ 10 µS/cm. No requirements are made of the pH value of the fill water. After filling the system, a low-salt operation results with a conductivity of generally 50 - 100 µS/cm.
- System separation by means of a heat exchanger; only fill the boiler circuit with untreated water (no chemicals, no softening).

To prevent the ingress of oxygen into the heating water, size the diaphragm expansion vessel correctly (→ page 65 f.).

When installing pipes that are permeable to oxygen, e.g. in underfloor heating systems, allow for system separation by means of a heat exchanger (→ fig. 51, page 59).

When modernising existing systems, protect the gas condensing boiler against sludge build-up from the existing heating system. For this purpose, the installation of a dirt trap into the common return line is strongly recommended. A dirt trap is not required if a new system is thoroughly flushed prior to filling, and loose particles as a result of oxygen corrosion can be prevented.

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6.2.2 Hydraulics for maximum utilisation of the condensing effect

FLOW-plus system for the Logamax plus GB162

The Logamax plus GB162 gas condensing boiler is equipped with a FLOW-plus system. It requires no minimum flow rate enabling easy hydraulics without an overflow valve.

The Logamax plus GB162-15/25/35 features an integral high efficiency pump. A high efficiency pump is available as an accessory for the Logamax plus GB162-45, and can be installed inside the boiler.

The pumps for the Logamax plus GB162 gas condensing boilers up to 45 kW can be operated under differential pressure or output-dependent control. Differential pressure-dependent control is recommended for systems with heating circuits directly downstream. For systems where the heating circuits are connected via a low loss header we recommend that the heating circuit pump is controlled subject to output. The control methods for the pump can be selected at the RC35 programming unit (→ tab. 25, page 64).

The output-dependent control of the pump when using a low loss header enables the system to be used with maximum utilisation of the condensing effect.

A pump assembly with pump featuring output-dependent control is available for the Logamax plus GB162-50/65/80/100. If an external pump is used on site (e.g. Wilo Stratos 25/1-8 or Grundfos Magna 25-100), operation Δp = constant is also feasible for heating circuits directly downstream.

6.2.3 Underfloor heating system

Underfloor heating systems are the ideal combination for Logamax plus GB162 gas condensing boilers on account of their low design temperatures.
We recommend weather-compensated operation combined with separate, flow rate-dependent room temperature control because of the heat-up inertia.
The Logamatic EMS control system with RC35 programming unit is suitable for this.

A temperature limiter (TWH) is required to protect the underfloor heating system. Connect this at the terminal strip for electrical connections designated EV (external interlock) using a floating contact. The contact thermostat AT 90 can be used as a temperature limiter: product no. 80 155 200.

Combined with the RC35 programming unit, screed drying with a heating circuit directly downstream is also possible.

1. Underfloor heating system directly downstream

An underfloor heating system directly downstream is only feasible with pipes that are impermeable to oxygen in accordance with DIN 4726. This is to prevent damage to the heat exchanger as a result of oxygen corrosion.
The maximum transferable output of the Logamax plus GB162 with underfloor heating system directly downstream is limited (→ tab. 24 and page 70).

Logamax plus	Maximum transferable output at 10 K temperature differential	
	150 mbar residual head [kW]	200 mbar residual head [kW]
GB162-15	10.0	7.5
GB162-25	16.2	13.9
GB162-25 T40S	16.2	13.9
GB162-35	16.9	15.1
GB162-45[1)]	21.5	20.7
GB162-50 with UPM 15-70	23.2	25.0
GB162-50[1)]	40.7	38.4
GB162-65[1)]	40.7	38.4
GB162-80[1)]	40.7	38.4
GB162-100[1)]	40.7	38.4

Table 24 Maximum transferable output of the Logamax plus GB162 with underfloor heating system directly downstream

1) With pump assembly – use a low loss header if the amount of water transported by the internal pump or by the pump assembly is inadequate.

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2. Underfloor heating system not directly downstream

Where a higher output is to be transferred, an underfloor heating system **not** directly downstream is required. This circuit requires a low loss header with flow temperature sensor and a secondary pump for the heating circuit (→ fig. 50).

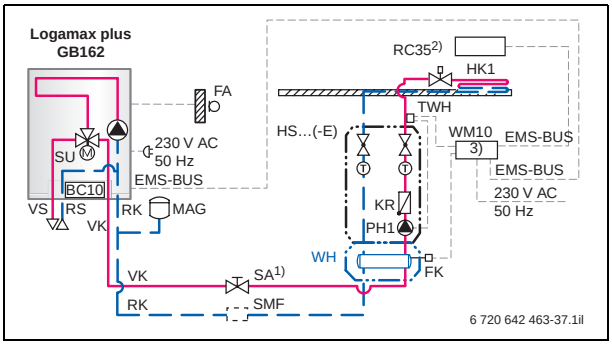

Fig. 50 Example of an underfloor heating system not directly downstream (index of abbreviations → page 52)

1) Safety shut-off valve recommended (not required when using with the GB162-50/65/80/100 and the pump assembly)
2) Additional RC25 programming unit feasible as a remote control if the RC35 programming unit has been clipped **into the gas condensing boiler**
3) WM10 low loss header module may, alternatively, be plugged **into the gas condensing boiler**

3. Underfloor heating system with system separation

Provide system separation for underfloor heating systems with pipes that **are** permeable to oxygen. The underfloor heating circuit must be protected separately, downstream of the heat exchanger, by means of a diaphragm expansion vessel, safety valve and temperature limiter (→ fig. 51). Size the heat exchanger in accordance with the selected system temperatures. The pressure drop on the primary side (boiler circuit) must be less than the residual head of the heating circuit pump integrated into the Logamax plus GB162.

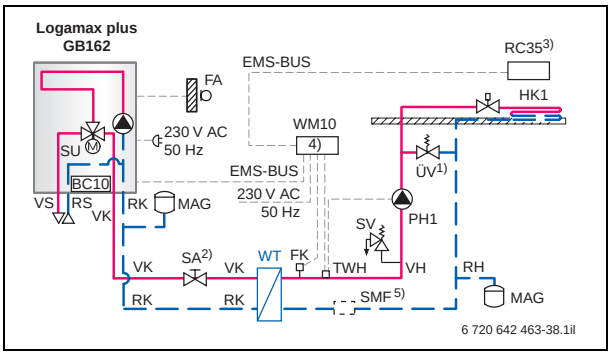

Fig. 51 Example of an underfloor heating system with system separation via a heat exchanger with pipes that are permeable to oxygen (index of abbreviations → page 52)

1) Overflow valve not required for variable speed pumps
2) Safety shut-off valve recommended (not required when using with the GB162-50/65/80/100 and the pump assembly)
3) Additional RC25 programming unit feasible as a remote control if the RC35 programming unit has been clipped **into the gas condensing boiler**
4) WM10 low loss header module may, alternatively, be plugged **into the gas condensing boiler**
5) SMF recommended

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6.2.4 Heating circuit pumps for the Logamax plus GB162

Residual head Logamax plus GB162-15/25/35/45 and GB162-25 T40S

The residual head of the internal heating circuit pump results from the differential between the pump pressure and the pressure drop of the heat exchanger inside the gas condensing boiler. It characterises the maximum pressure that can be overcome by the heating circuit pump in the heating circuit (available pump pressure).

The internal (integral) heating circuit pump of the Logamax plus GB162 gas condensing boilers is adequately sized for typical applications. The available residual head can be checked in the graphs in fig. 52 to fig. 54. In these graphs, the 3-way diverter valve that is integrated into the gas condensing boiler has been taken into consideration.

A high efficiency pump is available as an accessory for the Logamax plus GB162-45 and can be installed inside the boiler (→ fig. 55).

Logamax plus GB162-15

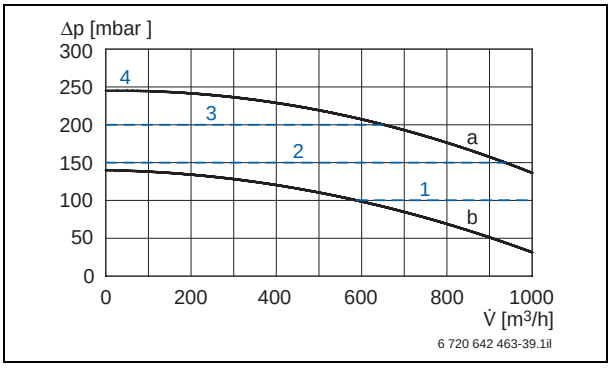

Fig. 52 Residual head GB162-15

a Maximum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
b Minimum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
Δp Residual head
V̇ Flow rate
1 to 4 Residual head for differential pressure-dependent operation with setting 1 to 4 at the RC35 programming unit (→ tab. 25, page 64)

Logamax plus GB162-25 and GB162-25 T40S

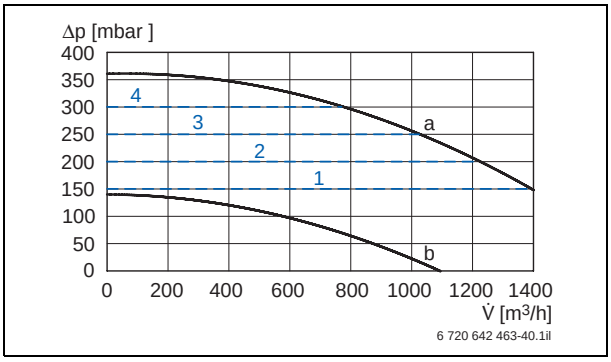

Fig. 53 Residual head GB162-25 and GB162-25 T40S

a Maximum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
b Minimum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
Δp Residual head
V̇ Flow rate
1 to 4 Residual head for differential pressure-dependent operation with setting 1 to 4 at the RC35 programming unit (→ tab. 25, page 64)

Logamax plus GB162-35

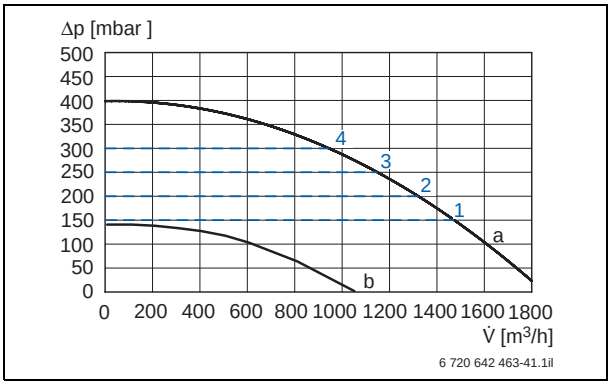

Fig. 54 Residual head GB162-35

a Maximum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
b Minimum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
Δp Residual head
V̇ Flow rate
1 to 4 Residual head for differential pressure-dependent operation with setting 1 to 4 at the RC35 programming unit (→ tab. 25, page 64)

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Logamax plus GB162-45

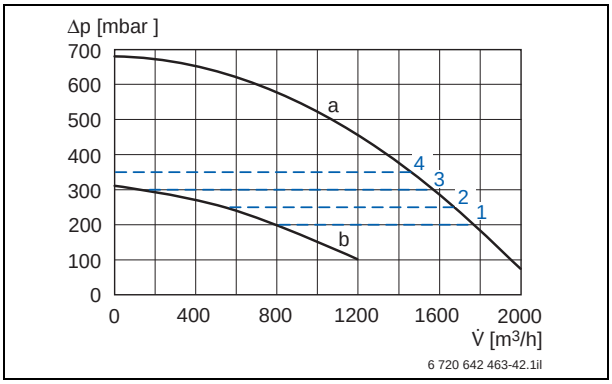

Fig. 55 Residual head GB162-45 with integral pump UPM 15-70 2W

a Maximum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
b Minimum modulation in output-dependent operation with setting 0 at the RC35 programming unit (→ tab. 25, page 64)
Δp Residual head
V̇ Flow rate
1 to 4 Residual head for differential pressure-dependent operation with setting 1 to 4 at the RC35 programming unit (→ tab. 25, page 64)

Pump modulation Logamax plus GB162-15/25/35/45 and GB162-25 T40S

The RC35 programming unit of the Energy Management System (EMS) enables the heating circuit pump of the Logamax plus GB162 up to 45 kW to be adjusted in line with the system, so that it can be operated with different residual heads Δp = constant or output-dependent (→ fig. 52 to fig. 55).

Heating circuit pump

If, in the case of a narrow temperature spread (e.g. 40/30 °C underfloor heating system), the residual head of the integral heating circuit pump is insufficient to overcome the system pressure drop downstream, install a second diverter pump externally. For this, use a low loss header to provide hydraulic separation.

Residual head Logamax plus GB162-45 and GB162-50/65/80/100 without integral heating circuit pump

Logamax plus GB162-45 and GB162-50/65/80/100 are supplied from the factory without integral heating circuit pumps. This enables a flexible hydraulic connection.

A connection with a heating circuit pump or pump assembly integrated into the appliance is recommended for the following applications:

- When using a low loss header (e.g. with several heating circuits, cascades or high system flow rates); in this case, the pump should operate under output-dependent control
- With a separate 3-way diverter valve for the GB162-45 and DHW heating as priority
- With a pump assembly directly downstream and 3-way valve kit as well as DHW heating as priority for the GB162-50/65
- Where there are additional demands for very quiet operation, the use of differential pressure regulators for each line with a setting of 100 mbar to 150 mbar is recommended

For a heating circuit directly downstream, the differential pressure-dependent heating circuit pumps recommended by Buderus can be used. Set the pump to Δp-v (variable). The recommended settings facilitate quiet operation and maximum flow rate. The curves are shown on the graphs in fig. 56 to fig. 63.

The maximum permissible flow rate for the various boilers is as follows:

- GB162-45 = 2500 l/h
- GB162-50/65/80/100 = 5700 l/h

A line balancing valve may be required to limit the flow rate.

Logamax plus GB162-45

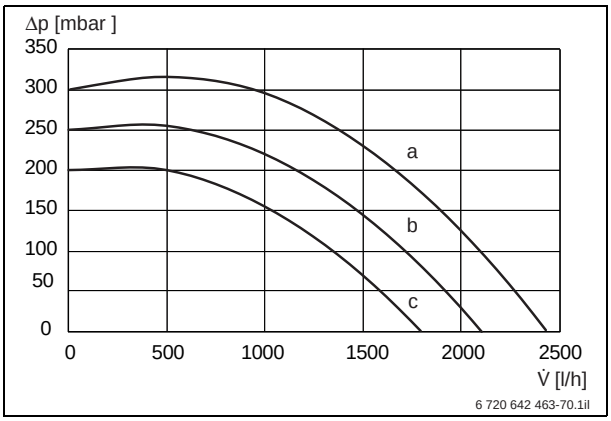

Fig. 56 Residual head GB162-45 for pump Wilo Stratos 25/1-8

a Resulting pump pressure 6 m
b Resulting pump pressure 5 m
c Resulting pump pressure 4 m
Δp Residual head
V̇ Flow rate

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Logamax plus GB162-50

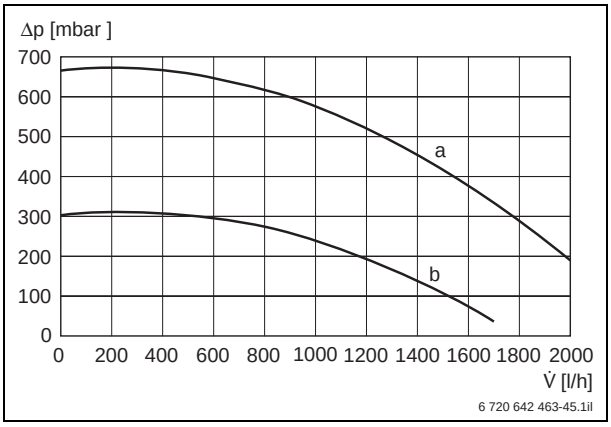

Fig. 57 Residual head GB162-50 with external pump UPM 25-70

a Full load
b Partial load
Δp Residual head
V̇ Flow rate

Logamax plus GB162-50/65

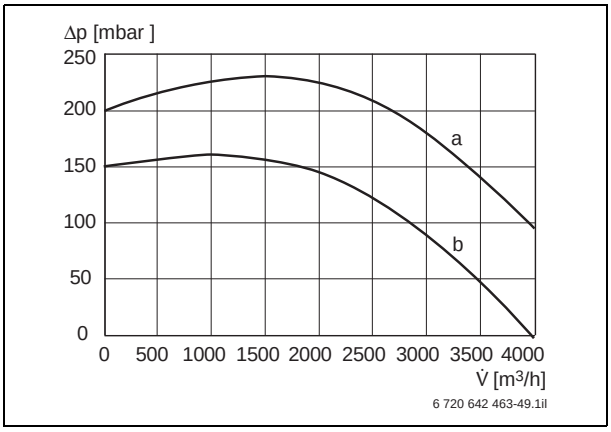

Fig. 58 Residual head GB162-50/65 with external pump Magna 25-60

a Resulting pump pressure 4 m
b Resulting pump pressure 3 m
Δp Residual head
V̇ Flow rate

Logamax plus GB162-50/65/80/100

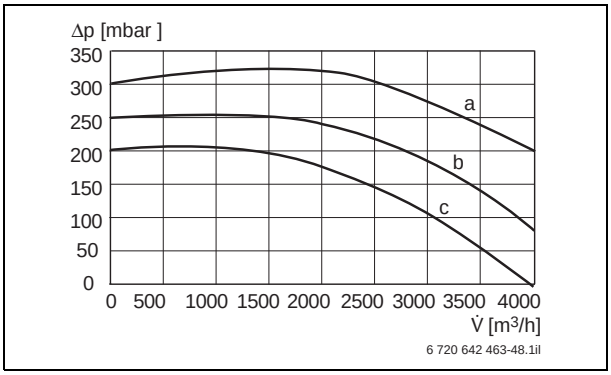

Fig. 59 Residual head GB162-50/65/80/100 with external pump Magna 25-100

a Resulting pump pressure 6 m
b Resulting pump pressure 5 m
c Resulting pump pressure 4 m
Δp Residual head
V̇ Flow rate

Logamax plus GB162-50/65/80/100

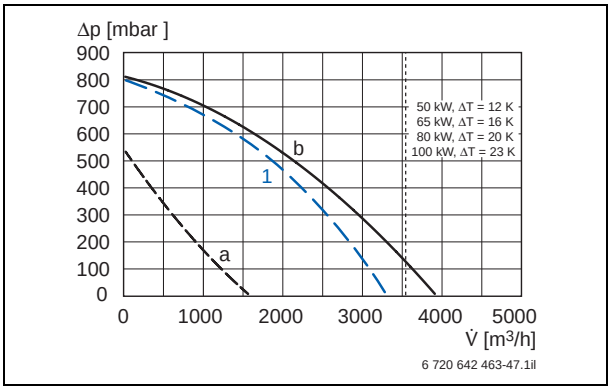

Fig. 60 Residual head GB162-50/65/80/100 downstream of the connection set with check valve

a Low load
b Full load
Δp Residual head
V̇ Flow rate
1 GB162-65 with pump assembly incl. 3-way diverter valve

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Logamax plus GB162-50/65/80/100

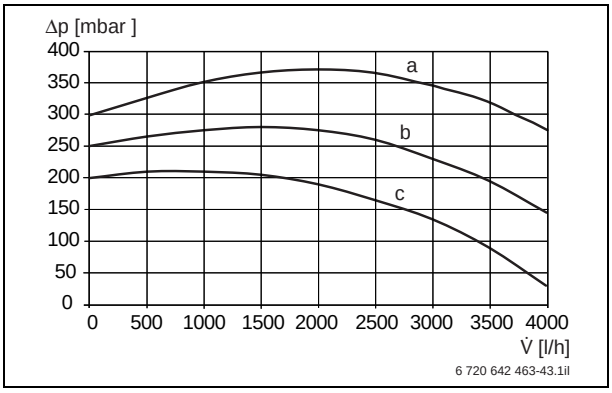

Fig. 61 Residual head GB162-50/65/80/100 with external pump Wilo Stratos 25/1-8

a Resulting pump pressure 6 m
b Resulting pump pressure 5 m
c Resulting pump pressure 4 m
Δp Residual head
V̇ Flow rate

Heat exchanger pressure drop

Logamax plus GB162-45

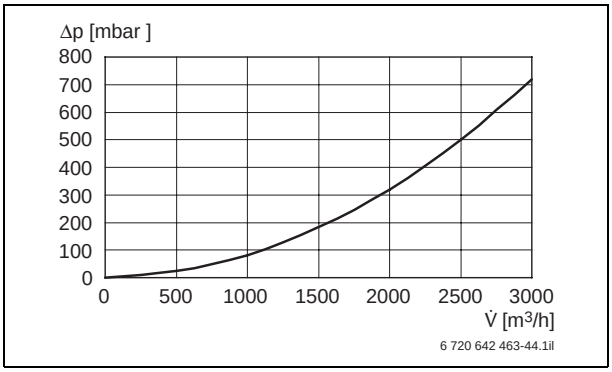

Fig. 62 Pressure drop curve GB162-45 of the heat exchanger

Δp Pressure drop
V̇ Flow rate

Logamax plus GB162-50/65/80/100

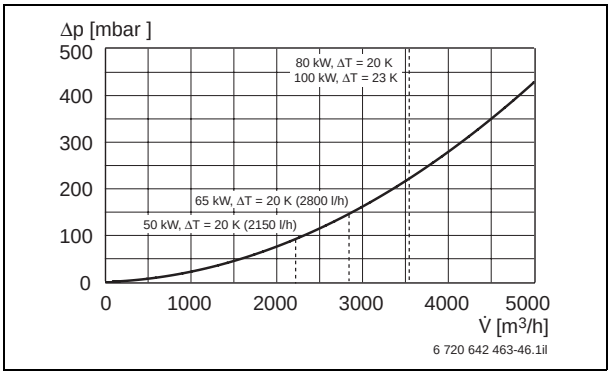

Fig. 63 Pressure drop curve GB162-50/65/80/100 of the heat exchanger

Δp Pressure drop
V̇ Flow rate

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Pump modulation setting for different applications

Application	Recommended setting at the RC35 programming unit	Type of control	Residual head for Logamax plus			
			GB162-15 [mbar]	GB162-25 GB162-25 T40S [mbar]	GB162-35 [mbar]	GB162-45 [mbar]
One directly connected heating circuit, differential pressure may be selected for the specific system	4	Δp = constant	240	300	300	350
	3	Δp = constant	200	250	250	300
	2	**Δp = constant**	**150**	**200**	**200**	**250**
	1	Δp = constant	100	150	150	200
Heating circuit connected via low loss header or system separation with heat exchanger	0	Output control between maximum and minimum modulation	Output-dependent → fig. 52, page 60	Output-dependent → fig. 53, page 60	Output-dependent → fig. 54, page 60	Output-dependent → fig. 55, page 61

Table 25 Setting options for pump modulation via the RC35 programming unit for different applications (standard settings on blue background)

Anti-seizing control

Independent of the operation of the internal heating circuit pump in the Logamax plus GB162 gas condensing boilers, the UBA3.5 starts a pump test run if the heating circuit control unit has not issued a heat demand for 24 h. This prevents the heating circuit pump from seizing.

Additional external heating circuit pump

Particularly with low system design temperatures, such as 40/30 °C in underfloor heating systems, the internal heating circuit pump of the Logamax plus GB162 gas condensing boilers may prove inadequate. In this case allow for a circuit via a low loss header with secondary pump (→ fig. 63).

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6.2.5 Diaphragm expansion vessel

In accordance with DIN-EN 12828, hot water heating systems must be equipped with a diaphragm expansion vessel (MAG). The equipment options with a diaphragm expansion vessel for the operation of the Logamax plus GB162 gas condensing boilers are outlined in table 26.

Diaphragm expansion vessel parameters[1)]	Unit	Logamax plus GB162
Nominal volume	l	On-site sizing
Minimum pre-charge pressure	bar	1
Safety valve response pressure	bar	3 (4)[2)]

Table 26 General conditions for diaphragm expansion vessels

1) Install the expansion vessel on site

2) 4-bar safety valve available as accessory

Estimated checking of an integral diaphragm expansion vessel or selection of a separate one

1. MAG pre-charge pressure

$$p_0 = p_{st}$$

Form. 1 MAG pre-charge pressure (at least 0.5 bar)

p_0 MAG pre-charge pressure in bar
p_{st} Static pressure of the heating system in bar (subject to building height)

2. Fill pressure

$$p_a = p_0 + 0{,}5 \text{ bar}$$

Form. 2 Fill pressure (at least 1.0 bar)

p_a Fill pressure in bar
p_0 MAG pre-charge pressure in bar

3. System volume

Subject to various heating system parameters, the system volume can be checked in fig. 64.

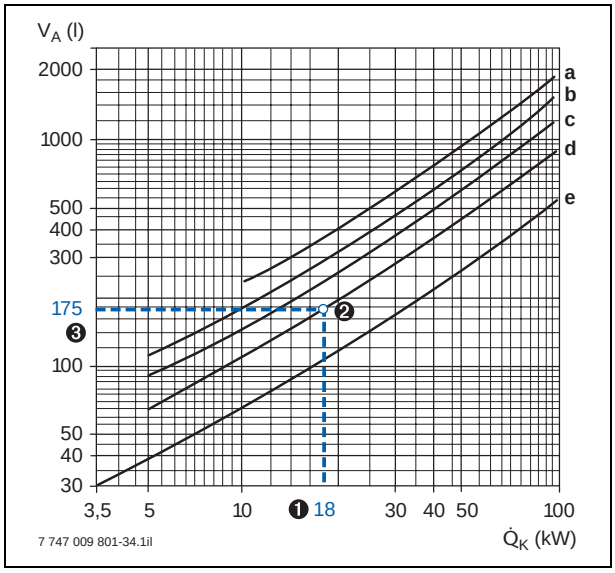

Fig. 64 Standard values for the average water content of heating systems (acc. to ZVH guideline 12.02 [Germany])

a Underfloor heating system
b Steel radiators to DIN 4703
c Cast radiators to DIN 4703
d Panel radiators
e Convector heaters
$\dot{Q}_K$ Rated system output
V_A Average total system water content

Example 1

Given

- ❶ System output $\dot{Q}_K$ = 18 kW
- ❷ Panel radiators

Checked

- ❸ Total system water content = 175 l (→ fig. 64, curve d)

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4. Maximum permissible system volume

Subject to the maximum flow temperature ϑ_V to be determined and the MAG p_0 pre-charge pressure calculated in accordance with formula 1, the maximum permissible system volume for various MAG can be identified in the following table.

The system volume checked in accordance with point ❸ from fig. 64 must be less than the maximum permissible system volume ❹. Select a larger diaphragm expansion vessel if that is not the case.

Example 2

Given

- ❶ Flow temperature (→ tab. 27): $\vartheta_V = 50$ °C
- ❷ MAG pre-charge pressure (→ tab. 27): $p_0 = 1.00$ bar
- ❸ System volume (→ fig. 64): $V_A = 175$ l

Checked

- ❹ A MAG with 18 l capacity is required (→ tab. 27), as the system volume ❸ determined in accordance with fig. 64 is less than the maximum permissible system volume.

Flow temperature ϑ_V [°C]	Pre-charge pressure p_0 [bar]	Diaphragm expansion vessel				
		18 l Prod. no. 8 043 204 0	25 l Prod. no. 8 043 204 2	35 l Prod. no. 8 043 044	50 l Prod. no. 8 0432 046	80 l Prod. no. 8 0432 048
		Maximum permissible system volume V_A				
		[l]	[l]	[l]	[l]	[l]
90	0.75	216	300	420	600	960
	1.00	190	265	370	525	850
	1.25	159	220	309	441	705
	1.50	127	176	247	352	563
80	0.75	260	361	506	722	1155
	1.00	230	319	446	638	1020
	1.25	191	266	372	532	851
	1.50	153	213	298	426	681
70	0.75	319	443	620	886	1417
	1.00	282	391	547	782	1251
	1.25	235	326	456	652	1043
	1.50	188	261	365	522	835
60	0.75	403	560	783	1120	1792
	1.00	355	494	691	988	1580
	1.25	296	411	576	822	1315
	1.50	237	329	461	658	1052
50❶	0.75	524	727	1018	1454	2326
	❷1.00	❹462	642	898	1284	2054
	1.25	385	535	749	1070	1712
	1.50	308	428	599	856	1369
40	0.75	699	971	1360	1942	3107
	1.00	617	857	1200	1714	2742
	1.25	514	714	1000	1428	2284
	1.50	411	571	800	1142	1827

Table 27 Maximum permissible system volume subject to the flow temperature and the required MAG pre-charge pressure

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6.3 Hydraulic boiler schemes for appliances with integral 3-way diverter valve

6.3.1 System example for a single boiler system, Logamax plus GB162-15/25/35 with RC25 or RC35 programming unit for one heating circuit with separate DHW heating

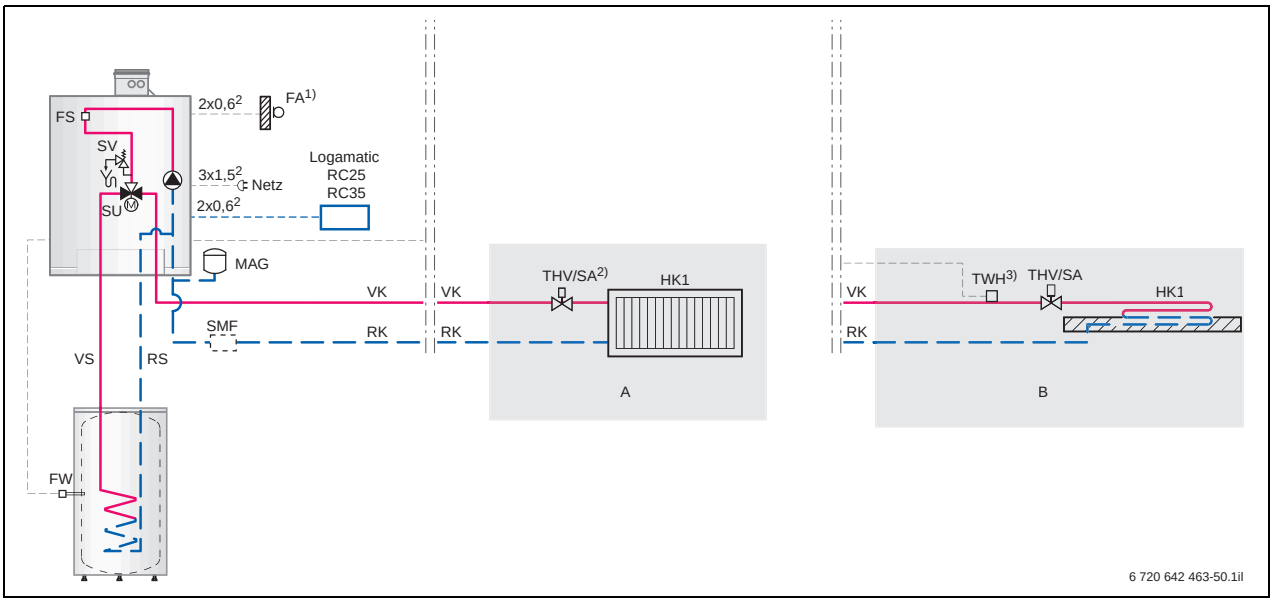

Fig. 65 Circuit diagram for the system example (index of abbreviations → page 52)

A Heating circuit without mixer; radiators

B Heating circuit without mixer; underfloor heating system directly downstream (transferable output → tab. 24, page 58): with this hydraulic circuit, observe the system pressure drop and residual head of the integral pump.

1) If the system is regulated via the RC35 programming unit in weather-compensated mode

2) It is recommended to balance the system hydraulically via the thermostatic radiator valves which can be preset

3) Connection of the temperature limiter in the Logamax plus GB162

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Logamax plus with modulating operation and separate DHW heating
- Room temperature-dependent control as standard application in conjunction with the RC25 or RC35 programming unit. The FA auxiliary module for the RC35 programming unit also enables weather-compensated control.
- The modulating operation of the Logamax plus GB162 is regulated by the universal burner control unit UBA3.5. The UBA3.5 also regulates the DHW priority for the separate DHW cylinder via the integral 3-way diverter valve. A time profile can be selected in connection with the RC35 programming unit for heating operation in constant standby mode for DHW heating (24 hour mode). Alternatively, DHW heating can be linked to the times selected for heating operation. It is then only possible during the periods selected for heating or standby mode.

Special design information

- If no DHW cylinder is being connected, bridge the connections for cylinder flow and return by means of the “short circuit” line G-KS (accessory).
- Generally, DHW heating takes priority (via the 3-way diverter valve either cylinder heating or heating mode).

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6.3.2 System example for a single boiler system, Logamax plus GB162-25 T40S with RC25 or RC35 programming unit for one heating circuit with integral DHW heating

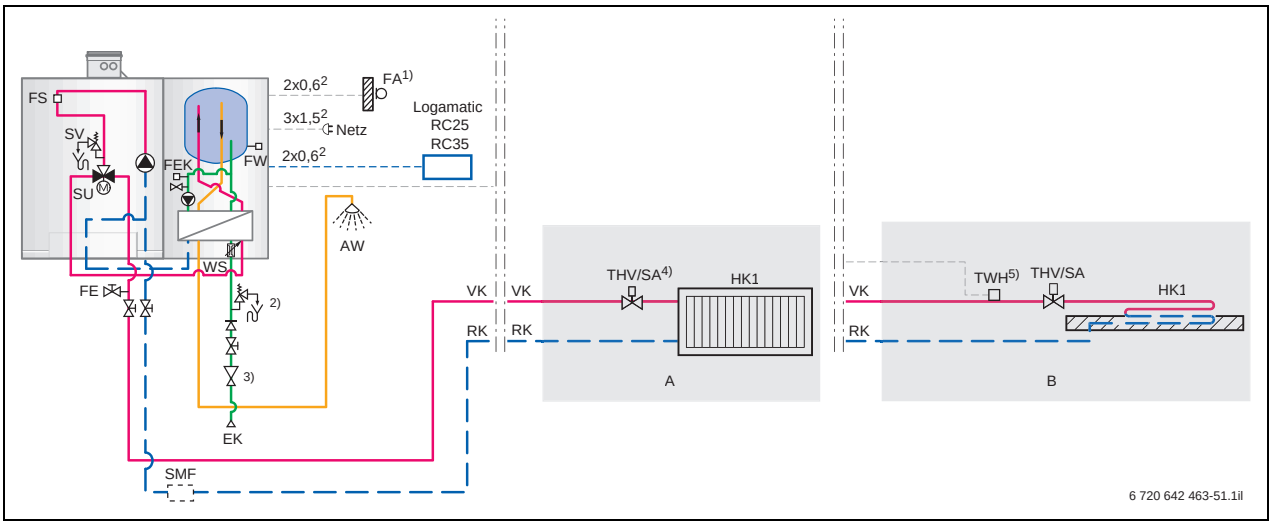

Fig. 66 Circuit diagram for the system example (index of abbreviations → page 52)

A Heating circuit without mixer; radiators

B Heating circuit without mixer; underfloor heating system directly downstream (transferable output → tab. 24, page 58): with this hydraulic circuit, observe the system pressure drop and residual head of the integral pump.

1) If the system is regulated via the RC35 programming unit in weather-compensated mode

2) Safety valve 8-10 bar

3) Pressure reducer may be required

4) It is recommended to balance the system hydraulically via the thermostatic radiator valves which can be preset

5) Connection of the temperature limiter in the Logamax plus GB162

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Logamax plus with modulating operation and integral stratification cylinder
- Room temperature-dependent control as standard application in conjunction with the RC25 or RC35 programming unit. The FA auxiliary module for the RC35 programming unit also enables weather-compensated control.
- The modulating operation of the Logamax plus GB162 is regulated by the universal burner control unit UBA3.5. The UBA3.5 also regulates the DHW priority for the stratification cylinder via the integral 3-way diverter valve. A time profile can be selected in connection with the RC35 programming unit for heating operation in constant standby mode for DHW heating (24 hour mode). Alternatively, DHW heating can be linked to the times selected for heating operation. It is then only possible during the periods selected for heating or standby mode.
- An individual time channel is feasible for DHW heating in combination with the RC35.

Special design information

- DHW heating via stratification cylinder, performance factor $N_L = 1.5$.
- Stainless steel DHW cylinder with 40 l capacity.
- The function of a DHW circulation pump is not supported by the appliance software.
- Maximum drinking water hardness 21 °dH.
- Copper-soldered plate heat exchanger inside the stratification cylinder.

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6.3.3 System example for single boiler system, Logamax plus GB162-15/25 and GB162-25 T40S with RC35 programming unit for one heating circuit without mixer and one heating circuit with mixer with the same time channel (as option with system separation)

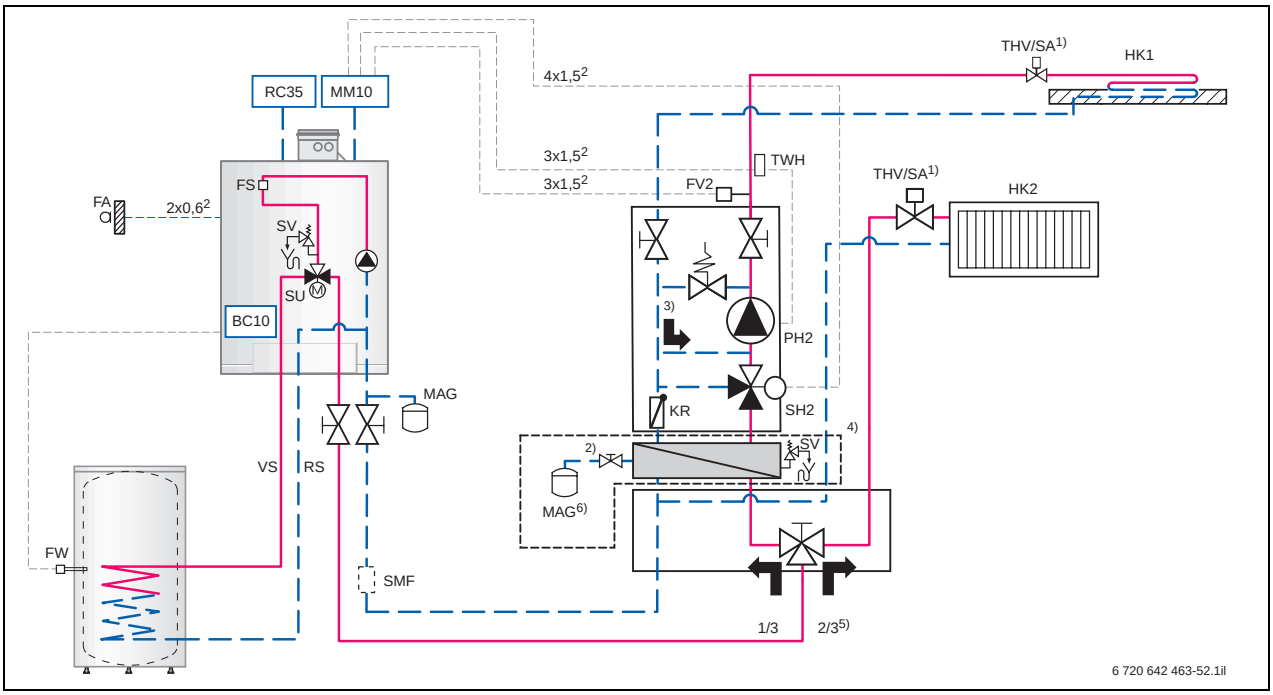

Fig. 67 Circuit diagram for the system example (index of abbreviations → page 52)

1) It is recommended to balance the system hydraulically via the thermostatic radiator valves (zone valves), which can be preset
2) Maximum output 8 kW at ΔT = 10 K when using the system separation set
3) Opened at the factory for isolating the pumps
4) Alternatively system separation is possible
5) Preset at the factory
6) On site

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- When combined with the Logamatic EMS the hydraulics are suitable for the Logamax plus GB162-15/25.
- The output of the underfloor heating circuit is limited to 50 % of the appliance output.
- At the factory, the distribution valve is set to 1/3 of the water volume to the underfloor heating system and 2/3 to the radiator heating system. Generally (maximum 50 % underfloor heating; underfloor heating 40/30 °C; radiators 70/50 °C), these systems will not require further balancing.
- DHW heating with this kind of hydraulic scheme can only be heated via a 3-way diverter valve.
- An individual time channel is feasible for DHW heating in combination with the RC35.

Special design information

- Only the RC35 programming unit and the MM10 mixer module will be required.
- Enable the mixer circuit for the underfloor heating system (HK2).
- Also enable the radiator heating circuit without mixer (HK1).
- Ensure that the same time channel is set for the heating circuit without mixer as for the heating circuit with mixer.
- The fully wired AT90 for the Logamatic 4000 is used as a temperature limiter for the underfloor heating system (prod. no 8 015 520 0).
- Uncheck DHW at the BC10 base controller if no DHW cylinder is used.
- With system separation, an underfloor heating system of up to 8 kW can be operated with ΔT = 10 K.

It is not possible to use only the heating circuit with mixer. The time window for the heating circuit without mixer must be the same or longer than that of the circuit with mixer.

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6.3.4 System example for the Logamax plus GB162-15/25 with low loss header, one heating circuit without mixer, one underfloor heating circuit with mixer and separate DHW heating via 3-way diverter valve

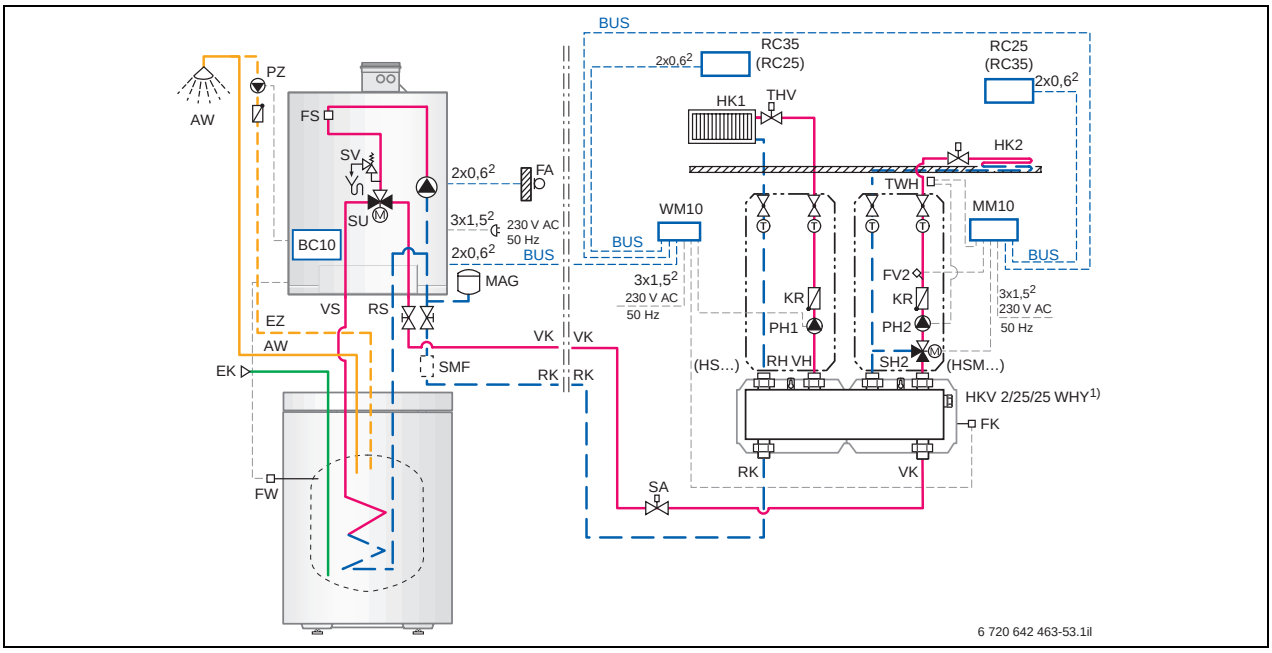

Fig. 68 Circuit diagram for the system example (index of abbreviations → page 52)

1) Distributor with integral low loss header, up to 2000 l/h

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Control of the low loss header (separation) and one heating circuit without mixer (HK1) via WM10 low loss header module.
- Control of one underfloor heating circuit with mixer (HK2) via MM10 mixer module.
- Both heating circuits can be controlled in weather-compensated mode, room temperature-dependent mode or weather-compensated mode with room temperature hook-up.
- Output-dependent operation of the heating circuit pump; adjustment at the RC35 programming unit (setting 0).
- Separate DHW heating with the Logamax plus GB162 via a 3-way diverter valve on the primary side of the hydraulic separation.

Special design information

- Optional DHW heating via an individual time channel including actuating a DHW circulation pump and thermal disinfection.
- Generally, DHW heating takes priority (via the 3-way diverter valve either cylinder heating or heating mode) because of the selection of the DHW output at the RC35 programming unit.
- An individual time channel is feasible for DHW heating in combination with the RC35.
- Size the flow and return lines to the low loss header for maximum boiler output.
- The distributor with integral low loss header is suitable for up to 2000 l/h. Using this distributor above 25 kW would therefore be inappropriate.

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6.3.5 System example for the Logamax plus GB162-15/25/35 with low loss header, one heating circuit without mixer, one underfloor heating circuit with mixer and DHW heating via cylinder primary pump (maximum equipment level with the RC35 and RC25 programming units)

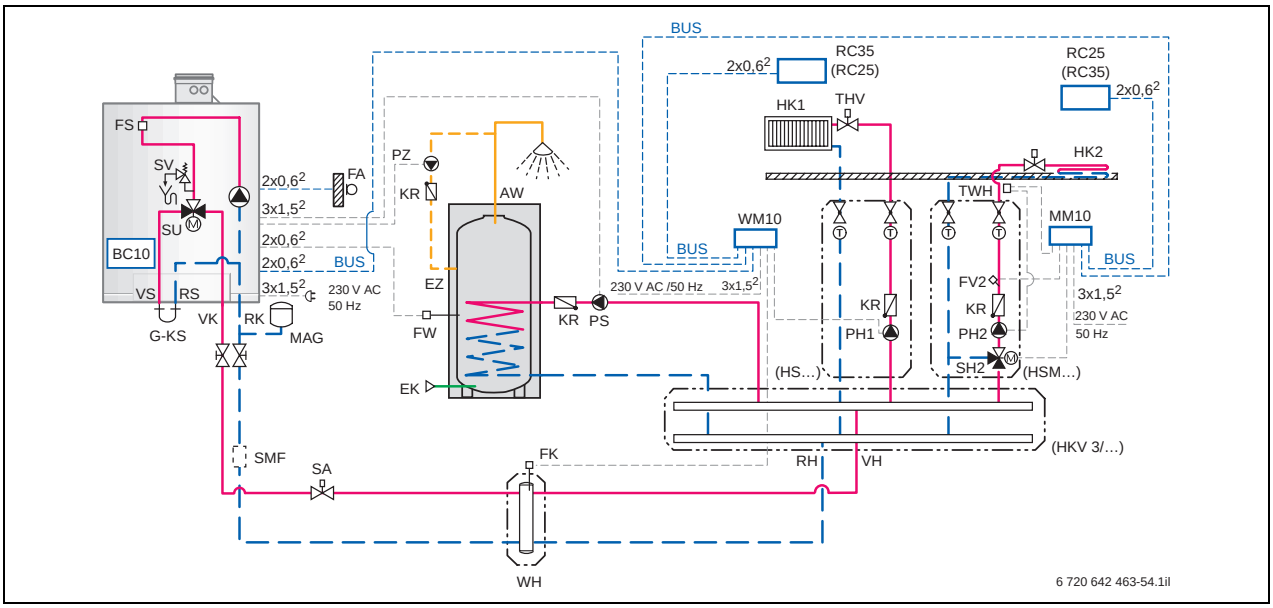

Fig. 69 Circuit diagram for the system example (index of abbreviations → page 52)

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Control of the low loss header (separation) and one heating circuit without mixer (HK1) via WM10 low loss header module.
- Control of one underfloor heating circuit with mixer (HK2) via MM10 mixer module.
- Control of DHW heating via the cylinder primary pump function.
- Heating circuit can be controlled in weather-compensated mode, room temperature-dependent mode or weather-compensated mode with room temperature hook-up.
- Output-dependent operation of the boiler pump; adjustment at the RC35 programming unit (setting 0).
- Separate DHW heating with the Logamax plus via cylinder primary pump on the secondary side of the hydraulic separation; connection of the cylinder primary pump to the terminal strip of the Logamax plus (terminal marking PS).

Special design information

- DHW heating via the cylinder primary pump enables parallel operation (simultaneous cylinder heating and heating mode) or DHW priority (either cylinder heating or heating mode); to be adjusted at the RC35 programming unit.
- Optional DHW via an individual time channel including actuating a DHW circulation pump and thermal disinfection.
- An individual time channel is feasible for DHW heating in combination with the RC35.
- Size the flow and return lines to the low loss header for maximum boiler output.
- Determine the size of the low loss header in accordance with the maximum permissible system flow rates.
- In combination with a low loss header, the integral pump in the GB162 must be controlled subject to output (setting 0 at the RC35 programming unit).

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6.3.6 System example for the Logamax plus GB162-15/25/35 with one heating circuit without mixer directly downstream, solar DHW heating and DHW reheating via 3-way diverter valve

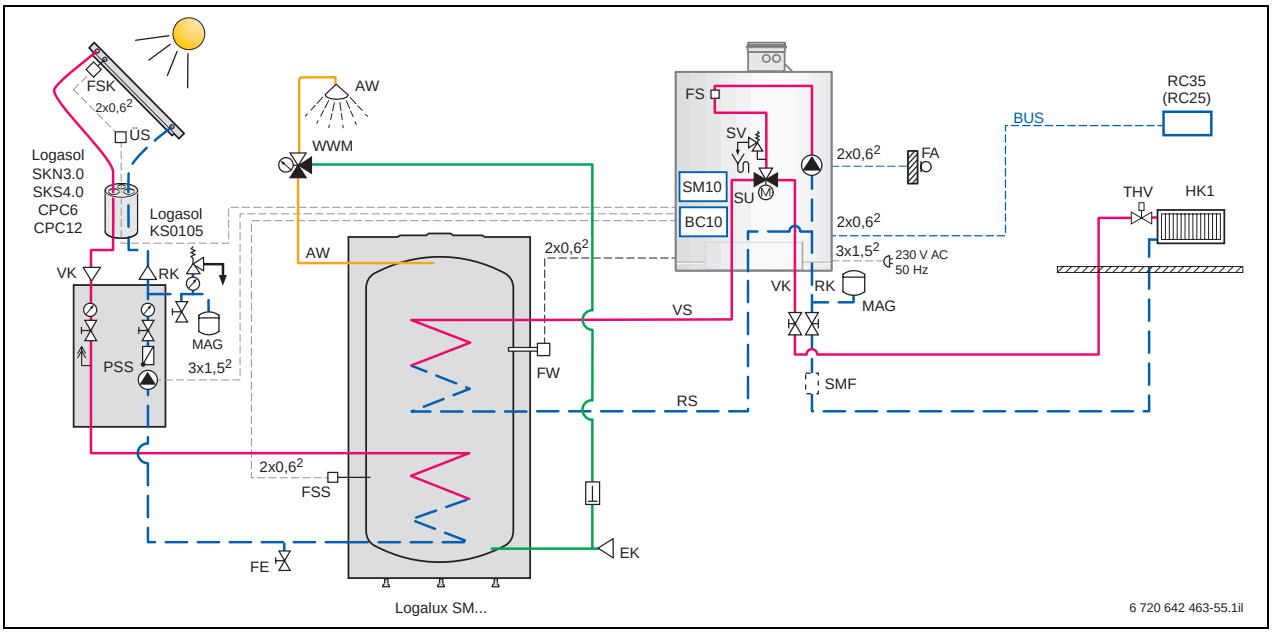

Fig. 70 Circuit diagram for the system example (index of abbreviations → page 52)

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Differential pressure-regulated operation of the boiler pump in the Logamax plus GB162.
- Control of solar DHW heating with dual mode DHW cylinder via SM10 solar module; for this, the thermal disinfection function is automatically disabled at the RC35 programming unit.
- DHW reheating via the integral 3-way diverter valve of the Logamax plus.

Special design information

- The SM10 function module is mounted either inside the GB162 gas condensing boiler or inside the solar station. The solar station can be delivered from the factory with an integral SM10 solar module.
- The intelligent linking of the gas condensing boiler and solar control unit with the SM10 solar module results in optimum solar yields and saves reheating energy.
- DHW heating is, as an option, possible via an individual time channel with actuation of a DHW circulation pump.
- Generally, DHW heating takes priority (via the 3-way diverter valve either cylinder heating or heating mode) because of the selection of the DHW output at the RC35 programming unit.
- An individual time channel is feasible for DHW heating in combination with the RC35.
- Where required, adjust the setting of the differential pressure-dependent pump inside the Logamax plus GB162 subject to the relevant system (→ tab. 25, page 64).
- Standard setting for pump modulation Δp = constant
  - 150 mbar (Logamax plus GB162-15)
  - 200 mbar (Logamax plus GB162-25/35)

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6.3.7 System example for the Logamax plus GB162-15/25/35 with solar central heating backup and one heating circuit with mixer

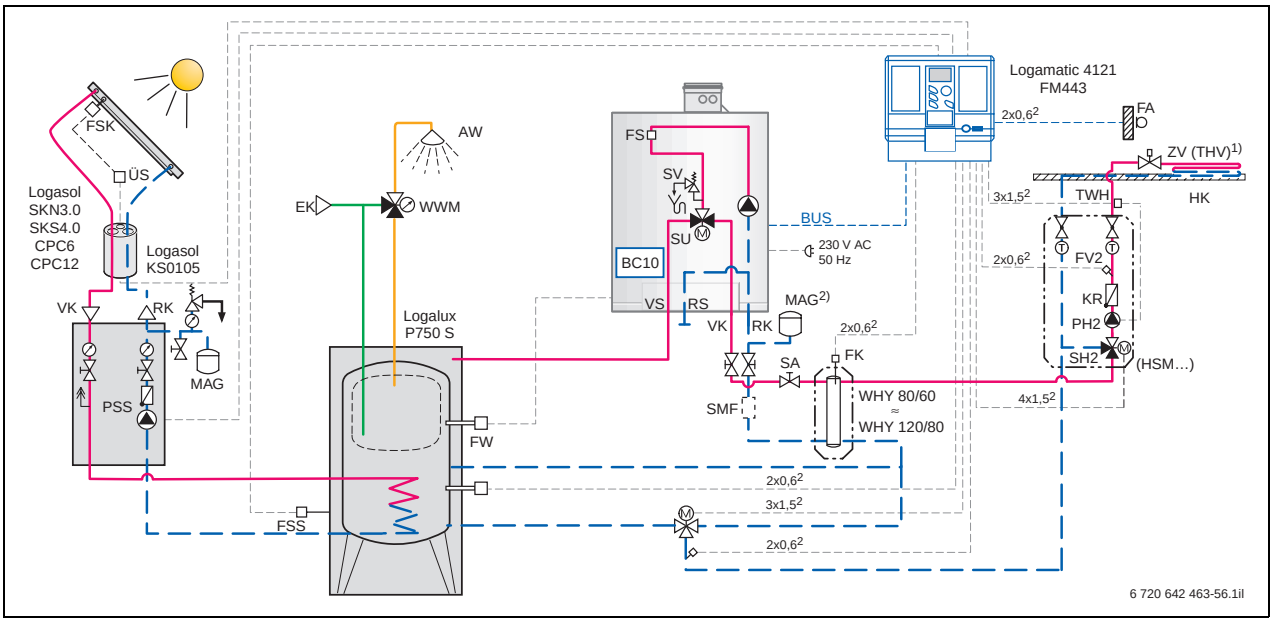

Fig. 71 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) On site

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Central heating backup via buffer cylinder with solar DHW heating.
- DHW reheating via integral 3-way diverter valve with priority operation.
- Control of solar DHW heating via FM443 solar module.
- External heat recognition via boiler sensor of the Logamatic 4121 control unit. If sufficient external heat is available in the buffer cylinder, the internal pump and the appliance burner will stop.
- The heating circuits are regulated via the 3-way mixer.

Special design information

- In conjunction with a low loss header, the pump inside the appliance must be controlled subject to output (setting 0).
- The buffer cylinder will also be used for central heating via the solar module and the HZG-Set if the buffer cylinder temperature is higher than the return temperature.
- The Logamatic 4121 enables an individual time channel for DHW heating.
- Installing a Taco setter upstream of the low loss header is recommended.
- The low loss header “across” is unsuitable for this hydraulic layout. Use the low loss headers WHY 80/60 or WHY 120/80.
- The DHW temperature sensor FW is connected at the terminal strip. The Logamatic 4121 control unit enables two heating circuits with mixer.

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6.3.8 System example for the Logamax plus GB162-15/25/35/45 with Logamatic 4121, solid fuel boiler and one heating circuit with mixer

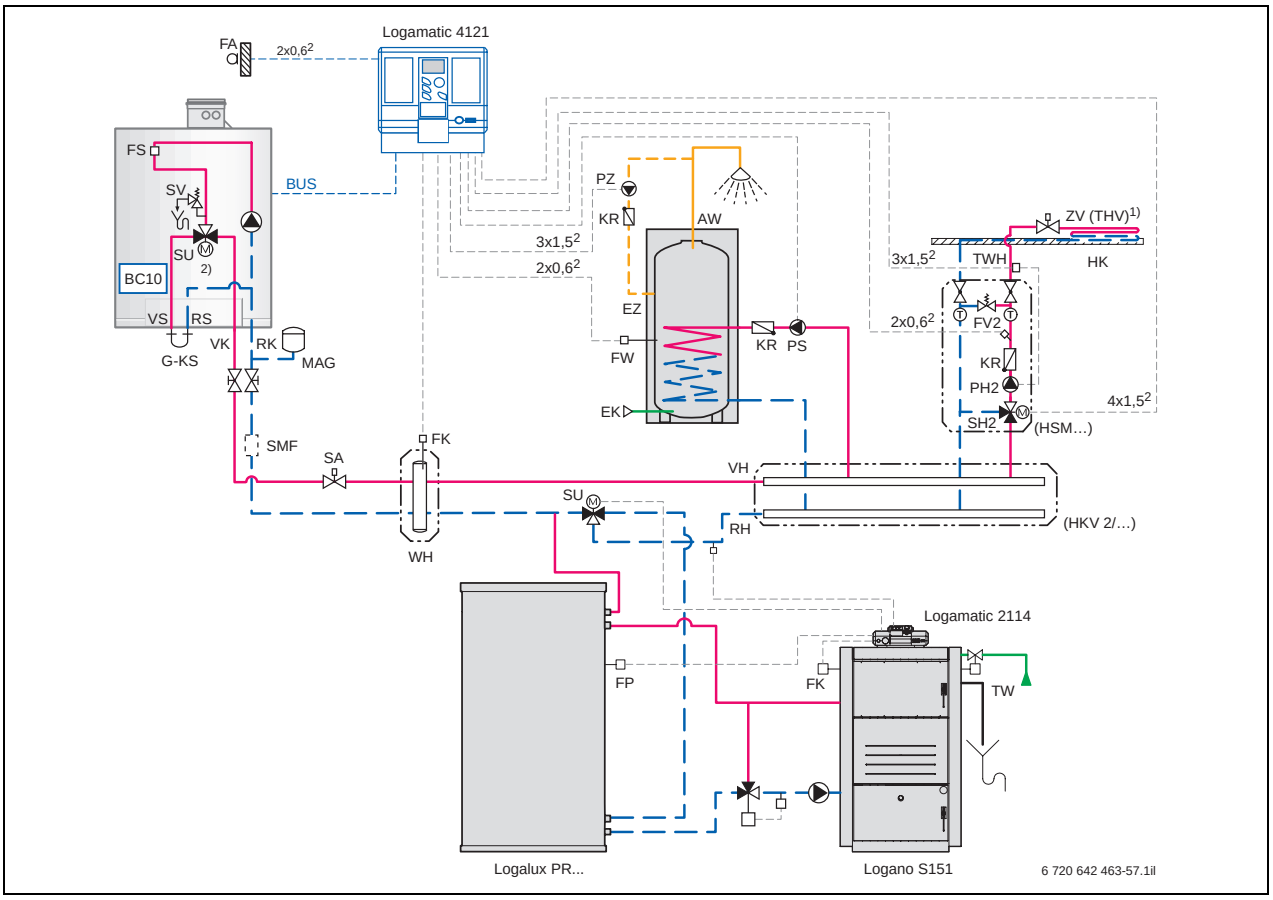

Fig. 72 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) No 3-way diverter valve integrated in the GB162-45

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Hydraulics with one heating circuit with mixer, DHW via cylinder primary pump and connection of a solid fuel boiler with buffer cylinder.
- Control via the Logamatic 4000 and Logamatic 2114 control units.
- Recognition of external heat via the temperature sensor in the low loss header.
- An individual time channel is available for DHW.
- The Logamatic 2114 control unit switches the SU diverter valve.

Special design information

- The “short circuit” line G-KS is required for boilers up to 35 kW.
- The return will be channelled via the buffer cylinder if the buffer cylinder temperature is higher than the return temperature.
- The return will be channelled directly to the low loss header if the buffer cylinder temperature is lower than the return temperature.
- The burner of the gas condensing boiler and the internal heating circuit pump will be switched off if the temperature captured by the temperature sensor of the low loss header FK is high enough on account of external heat.

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6.3.9 System example for the Logamax plus GB162-15/25/35 with solar DHW heating and central heating backup, solid fuel boiler and one heating circuit with mixer, buffer cylinder/Thermosiphon buffer cylinder and freshwater module

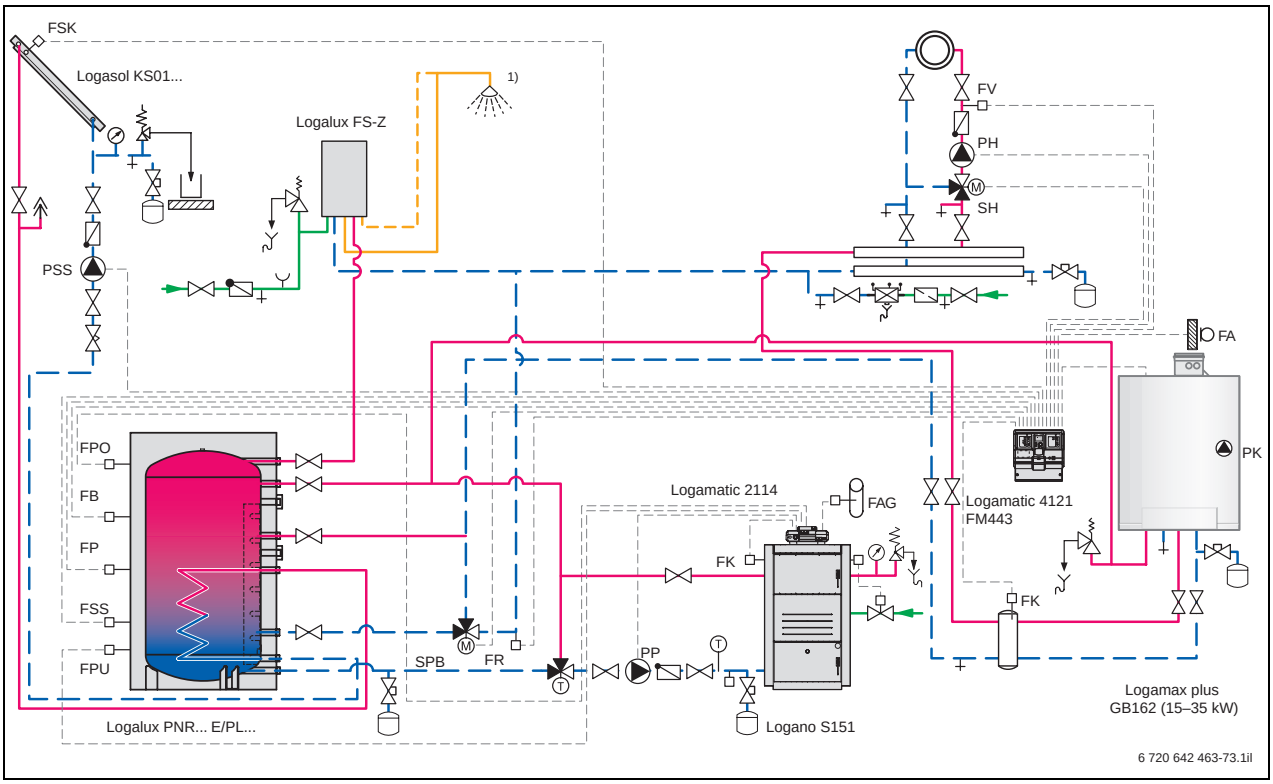

Fig. 73 Circuit diagram for the system example (index of abbreviations → page 52)

1) The freshwater module return should be connected directly to the cylinder (bottom) if there is no DHW circulation or the DHW circulation only runs for a short time.

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Hydraulic scheme with one heating circuit with mixer, external heat via solid fuel boiler and solar thermal system, DHW heating via freshwater module, DHW circulation possible via freshwater module.
- Control via the Logamatic 4000 control unit with FM443 solar module and Logamatic 2114 control unit.
- Recognition of external heat via the boiler temperature sensor in the low loss header.
- An individual time channel is available for DHW.
- The diverter valve for the utilisation of external heat is actuated by the FM443 solar module.

Special design information

- Close the cylinder return of the Logamax plus GB162 with a cap.
- The return will be channelled via the buffer cylinder if the buffer cylinder temperature is higher than the return temperature.
- The return will be channelled directly to the low loss header if the buffer cylinder temperature is lower than the return temperature.
- The burner of the gas condensing boiler and the internal heating circuit pump will be switched off if the temperature captured by the temperature sensor of the low loss header FK is high enough on account of external heat.
- If there is no external heat for DHW heating, the upper section of the buffer cylinder will be reheated by means of the DHW function of the boiler.

For further information, see the technical guide “Logasol Solar technology”.

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6.4 Hydraulic boiler schemes for appliances without 3-way diverter valve

6.4.1 System example for Logamax plus GB162-45 with internal pump, RC35 programming unit, 3-way diverter valve and direct heating circuit without mixer

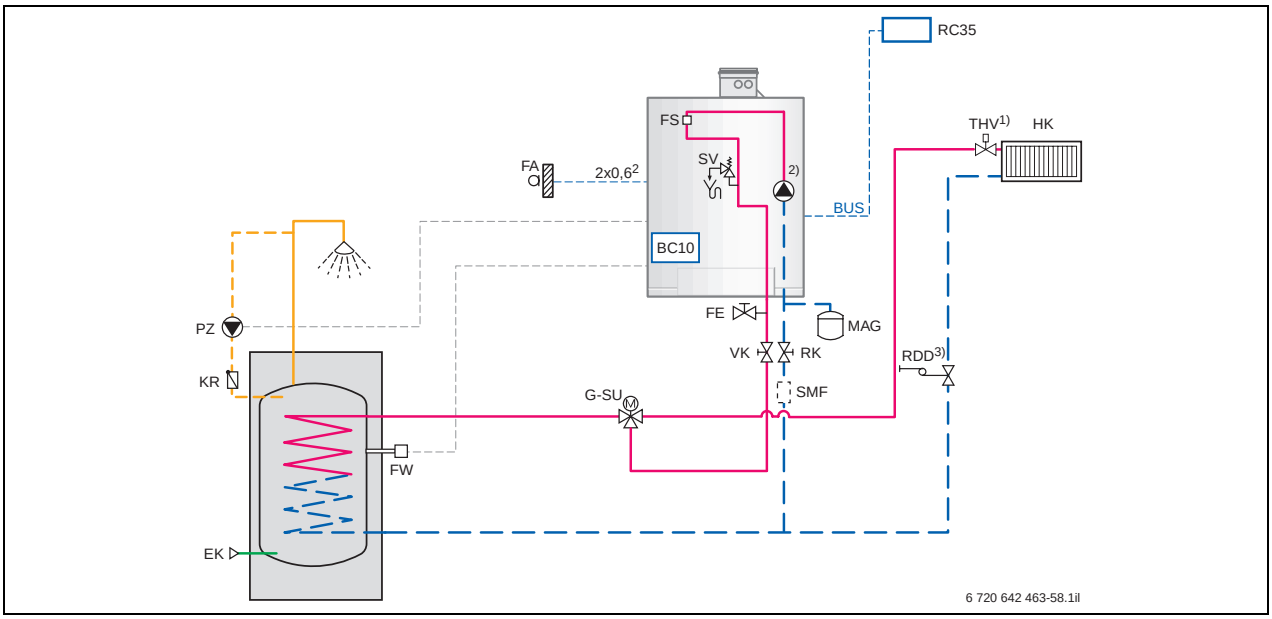

Fig. 74 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves recommended
2) Pump available as an accessory
3) Necessary where very quiet operation is required

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Hydraulics with heating circuit without mixer with direct supply via the heating circuit pump.
- DHW heating with priority via a separate 3-way diverter valve.
- Requires only the RC35 programming unit.
- An individual time channel is available for DHW.

Special design information

- Observe the pump curves of the individual appliances.
- The lowest Δp = constant setting of the internal pump for the Logamax plus GB162-45 is 200 mbar.
- Use a differential pressure controller where extremely quiet operation of radiator valves is required.
- The gas condensing boiler requires no minimum water circulation.
- For the Logamax plus GB162-45, order an internal heating circuit pump separately, as these appliances are delivered without a heating circuit pump.
- The DHW temperature sensor FW is connected at the terminal strip of the gas condensing boiler.

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6.4.2 System example for Logamax plus GB162-45 with low loss header, maximum version for the installation with EMS module inside the boiler and with RC35 or RC25 programming unit

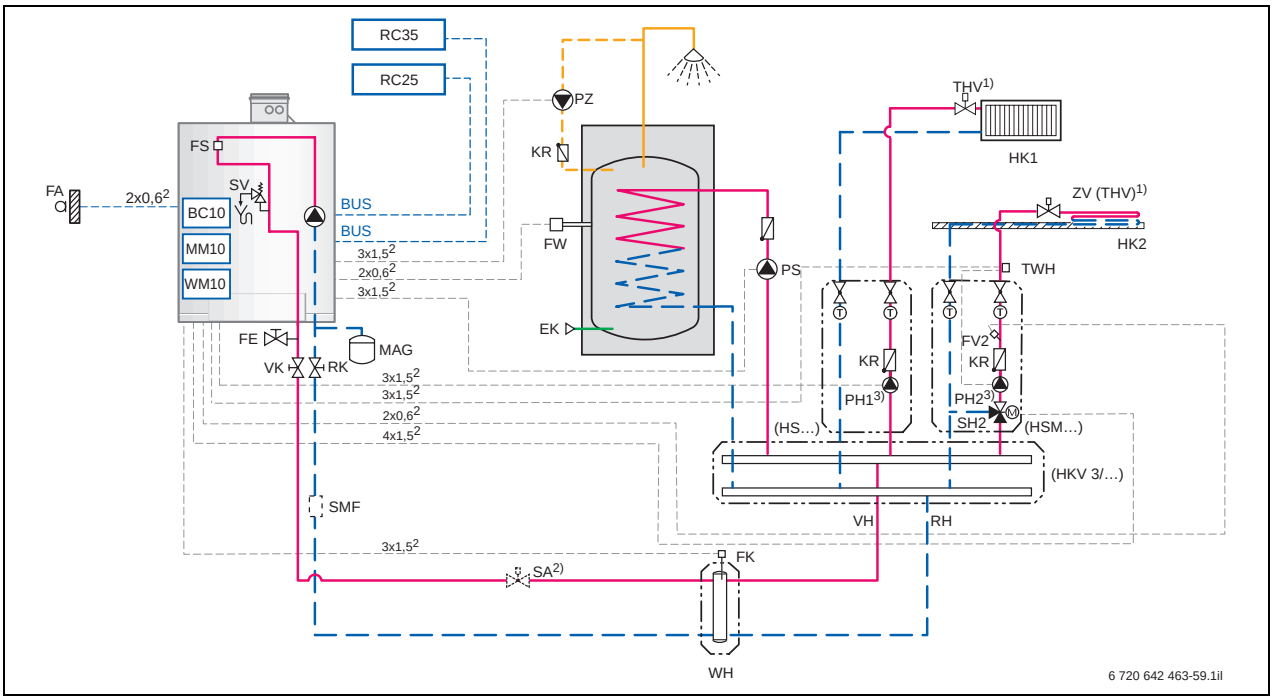

Fig. 75 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) Taco setter for balancing the maximum amount of water recommended - not required when using a pump connection assembly
3) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Maximum equipment level with the RC35 or RC25 programming unit, combined with a WM10 low loss header module and a MM10 mixer module, one heating circuit without control and one with mixer, plus cylinder primary and DHW circulation pump.
- Time-dependent actuation of the DHW circulation pump and cylinder primary pump possible via the RC35 programming unit.
- The RC35 programming unit can be installed either inside the gas condensing boiler or in a reference room.
- Optional DHW heating in parallel mode.

Special design information

- For the Logamax plus GB162-45 two modules may also be installed inside the appliance.
- In combination with a low loss header, the integral pump in the GB162 must be controlled subject to output (setting 0 at the RC35 programming unit).
- For the Logamax plus GB162-45, order the integral pump as an accessory.
- Installing a Taco setter upstream of the low loss header is recommended.

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6.4.3 System example for Logamax plus GB162-50/65 with DHW heating via a 3-way valve kit, RC35 programming unit and direct heating circuit without mixer

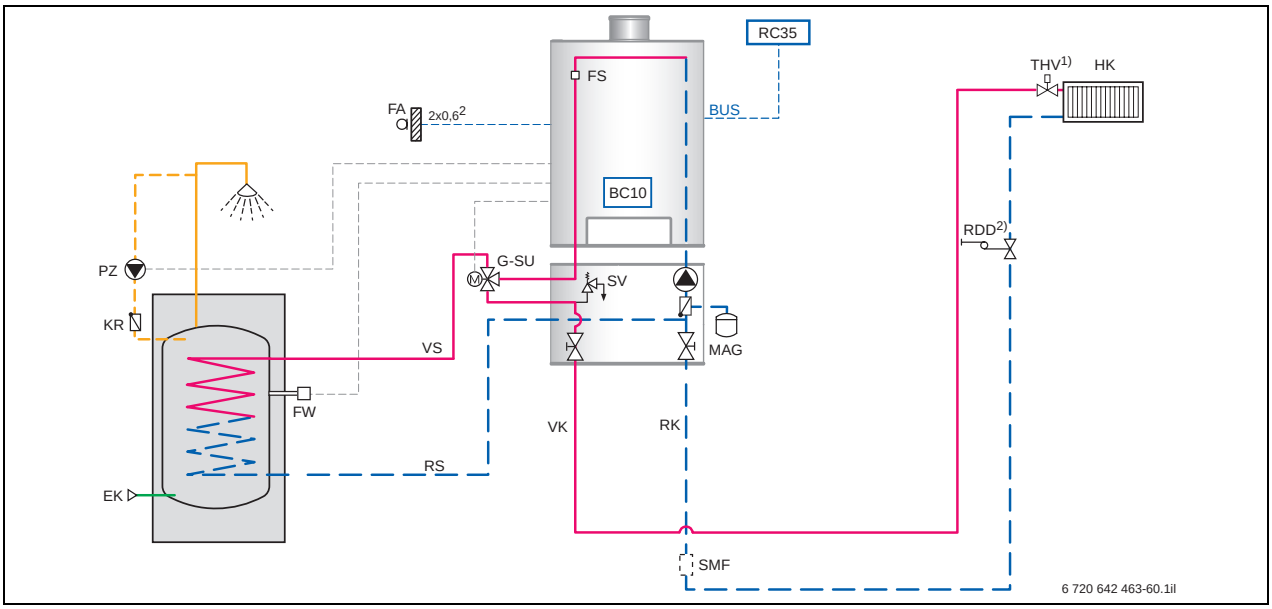

Fig. 76 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves recommended
2) Necessary where very quiet operation is required

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- This hydraulic scheme with pump connection assembly incl. 3-way valve kit is only suitable for the Logamax plus GB162-50/65.
- DHW heating priority via 3-way diverter valve.
- Output-dependent pump UPER 25-80 integrated in the pump connection assembly.
- An individual time channel is available for DHW via the RC35 programming unit.
- Available residual head of the pump connection assembly:
  - at 3000 l/h = 200 mbar
- ΔT of the appliances at 3000 l/h:
  - 50 kW = 14 K
  - 65 kW = 19 K

Special design information

- Observe the pump curves of the individual appliances.
- Use a differential pressure controller for each line where extremely quiet operation of radiator valves is required.
- The gas condensing boiler requires no minimum water circulation.
- The DHW temperature sensor FW is connected at the terminal strip of the gas condensing boiler.

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6.4.4 System example for the Logamax plus GB162-50/65/80/100 with DHW heating via a 3-way diverter valve, RC35 programming unit and direct heating circuit without mixer

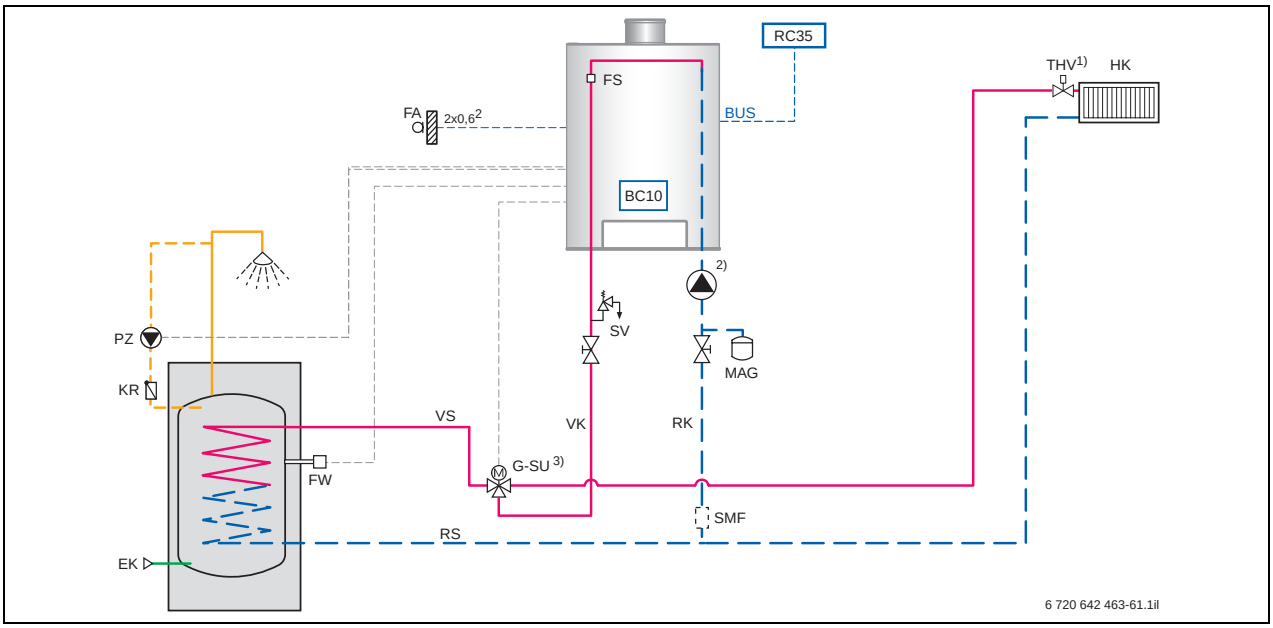

Fig. 77 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves recommended
2) External pump Wilo Stratos 25/1-8 available as an accessory, alternative options Grundfos Magna 25-60 or Magna 25-100
3) DN32, K_{VS} = 18 m^3/h

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- DHW heating with priority via an external 3-way diverter valve, DN32.
- An individual time channel is available for DHW.
- External pump for installation below the boiler:
  - Grundfos Magna 25-60 for GB162-50/65
  - Wilo Stratos 25/1-8 or Grundfos Magna 25-100 for GB162-50/65/80/100
- Available residual head (observe pump curve page 61 ff.):
  - at 2800 l/h = 180 mbar (GB162-50/65 with Grundfos Magna 25-60)
  - at 4000 l/h = 150 mbar to 200 mbar (GB162-65/80/100 with Wilo Stratos 25/1-8 or Grundfos Magna 25-100)
- Pressure drop for the 3-way diverter valve:
  - at 2800 l/h = 30 mbar
  - at 4000 l/h = 50 mbar
- ΔT of the appliances at 4000 l/h:
  - 50 kW = 11 K
  - 65 kW = 14 K
  - 80 kW = 18 K
  - 100 kW = 21 K
- ΔT of the appliances at 2800 l/h:
  - 50 kW = 15 K
  - 65 kW = 20 K

Special design information

- The DHW temperature sensor FW is connected at the terminal strip of the gas condensing boiler.
- Buderus cylinders from 400 l can be used. Observe the pressure drop of the indirect coils inside the cylinder.
- For cylinders smaller than 400 l, check the constant cylinder output at a reduced flow rate. The constant cylinder output at a reduced heating water flow rate should be at least 35 kW. Where this cannot be guaranteed, the boiler may frequently cycle.

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6.4.5 System example for the Logamax plus GB162-65/80/100 with low loss header and RC35 programming unit, one heating circuit without mixer, two heating circuits with mixers and DHW heating via a cylinder primary pump

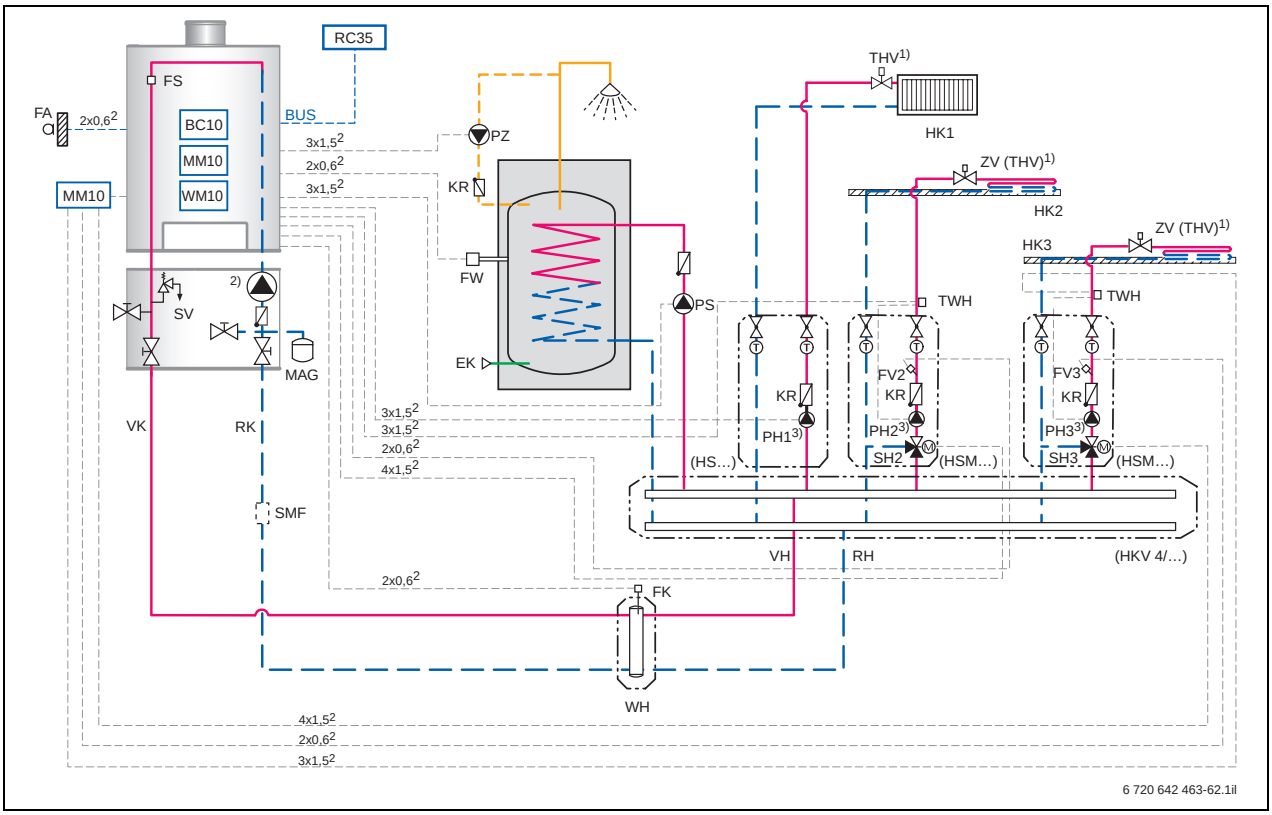

Fig. 78 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) Pump and safety valve integrated in the pump connection assembly (→ fig. 46, page 53)
3) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- RC35 programming unit, combined with a WM10 low loss header module and two MM10 mixer modules, one heating circuit without control and one with mixer, plus cylinder primary and DHW circulation pump.
- Time-dependent actuation of the DHW circulation pump and cylinder primary pump possible via the RC35 programming unit.
- The RC35 programming unit can be installed either inside the gas condensing boiler or in a reference room.
- Optional DHW heating in parallel mode.
- Up to three heating circuits with mixer and one heating circuit without mixer are feasible with the RC35 programming unit.
- An individual time channel is available for DHW.

Special design information

- For the Logamax plus GB162-65/80/100 two modules may also be installed inside the appliance.
- In combination with a low loss header, the integral pump in the pump connection assembly of the GB162 must be controlled subject to output (setting 0 at the RC35 programming unit).
- For the Logamax plus GB162-65/80/100, order the pump assembly as an accessory.

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6.4.6 System example for the Logamax plus GB162-45 and GB162-50/65/80/100 with Logamatic 4121, maximum standard equipment level with two heating circuits with mixer

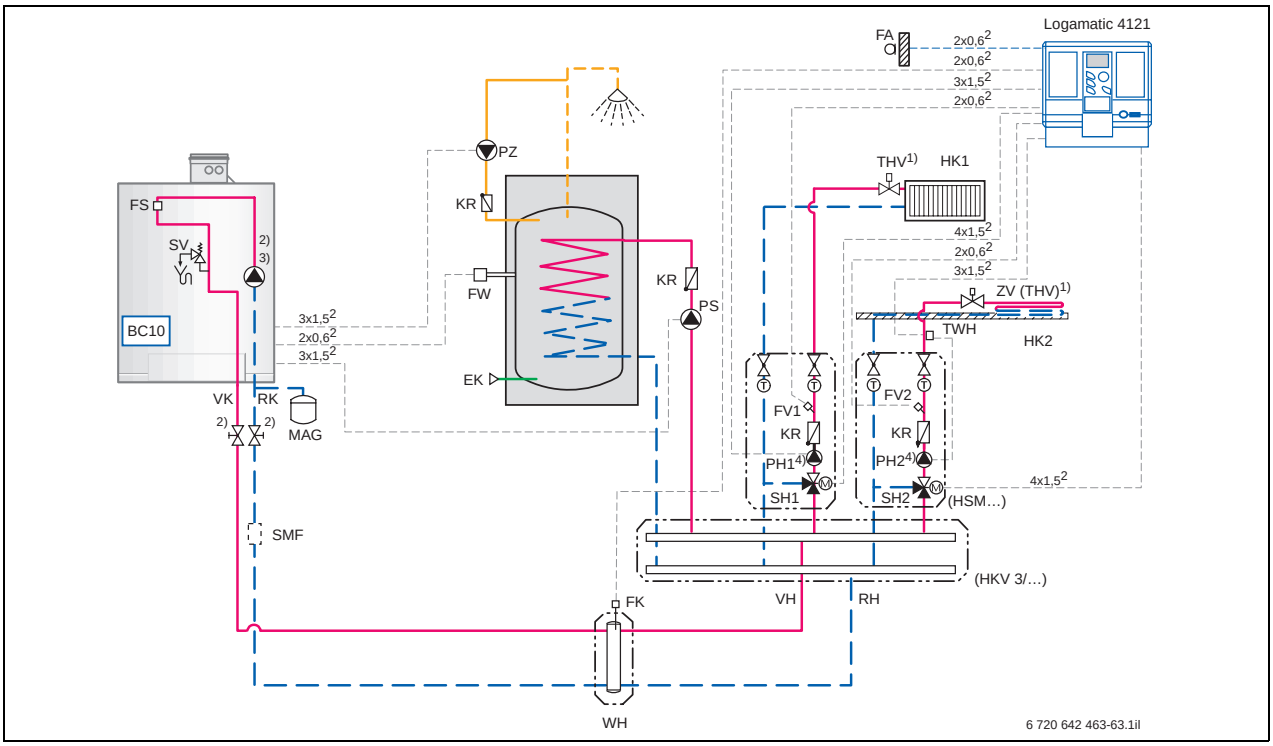

Fig. 79 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) For the GB162-65/80/100, pump and safety valve are integrated into the pump connection assembly (→ fig. 46, page 53) – Allow for a safety valve on site if the pump assembly is not used
3) For the GB162-50, a separate external pump UPM 15-70 with an external safety set can be used
4) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- Two heating circuits with mixer with separate time channels are feasible if the DHW temperature sensor is connected at the terminal strip of the gas condensing boiler.
- DHW heating via cylinder primary pump.
- Connection of a DHW circulation pump.
- Individual time channel for DHW.

Special design information

- The DHW temperature sensor and the cylinder primary pump are connected at the terminals inside the appliance and configured via the MEC2 programming unit.
- For the appliance, enable “Boiler with pump and low loss header” at the MEC2 programming unit.
- In combination with a low loss header, the integral pump in the Logamax plus GB162 must be controlled subject to output (setting 0).
- For the Logamax plus GB162-45, order the integral pump as an accessory.
- For the Logamax plus GB162-50, order an external high efficiency pump UPM 15-70 with safety set.

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6.4.7 System example for the Logamax plus GB162-50/65/80/100 in a 2-boiler cascade, one heating circuit with mixer and one without, DHW heating via cylinder primary pump and use of a pump assembly

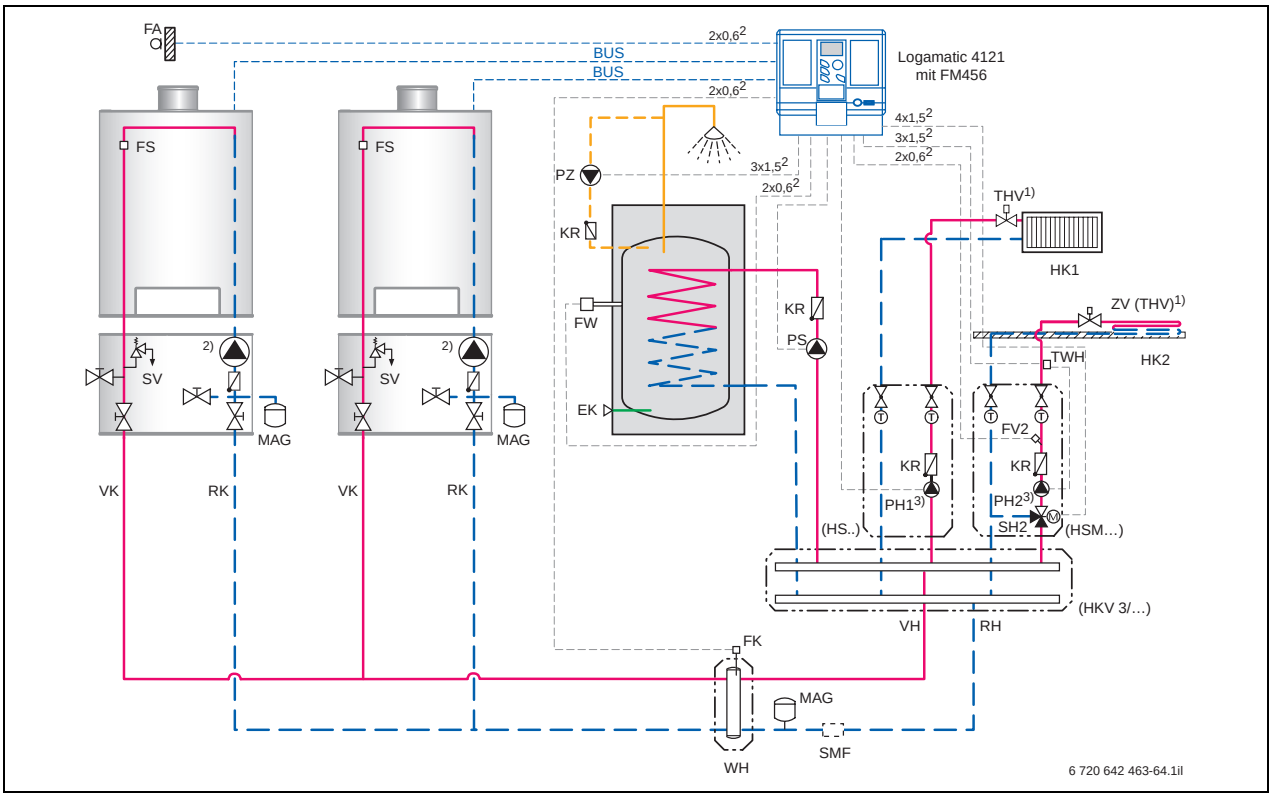

Fig. 80 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) Pump and safety valve are integrated into the pump connection assembly (→ fig. 46, page 53) – Allow for a safety valve on site if the pump assembly is not used
3) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- The Logamatic 4121 and FM456 (KSE2) module enable the control of up to three gas condensing boilers in a cascade.
- DHW heating can be given priority or can operate in parallel with its individual time channel.

Special design information

- The appliances used must have their own integral pump.
- If the appliances are equipped with modulating pumps, operate them in output-dependent mode.
- The components required to protect the boiler, e.g. safety valve and check valve, are already part of the pump assembly.
- Using the FM457 module instead of the FM456 module enables the control of up to five gas condensing boilers in a cascade. The boilers are controlled in sequence.
- Size the flow and return pipe to/from the low loss header for the maximum cascade output. Determine the size of the low loss header in accordance with the permissible flow rate (→ chapter 8).

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6.4.8 System example for the Logamax plus GB162-50/65/80/100 in a 2-boiler cascade, one heating circuit with mixer and one without, DHW heating via cylinder primary pump and use of a pump assembly

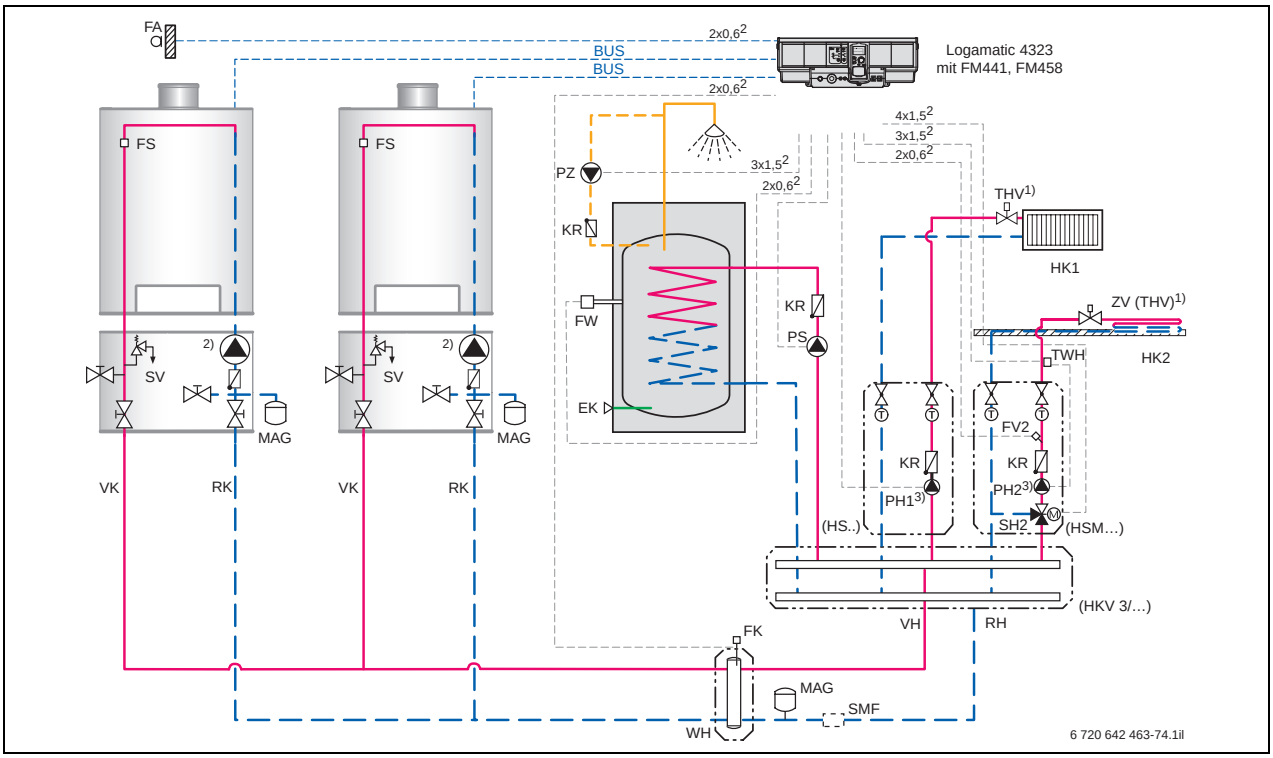

Fig. 81 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) Pump and safety valve are integrated into the pump connection assembly (→ fig. 46, page 53) – Allow for a safety valve on site if the pump assembly is not used
3) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- The Logamatic 4323 and the FM441 and FM458 modules enable the control of up to three gas condensing boilers in a cascade.
- DHW heating can be given priority or can operate in parallel with its individual time channel.

Special design information

- The appliances used must have their own integral pump.
- If the appliances are equipped with modulating pumps, operate them in output-dependent mode.
- The components required to protect the boiler, e.g. safety valve and check valve, are already part of the pump assembly.
- Size the flow and return pipe to/from the low loss header for the maximum cascade output. Determine the size of the low loss header in accordance with the permissible flow rate (→ chapter 8).
- Control unit Logamatic 4323 and the FM441 and FM458 modules offer the following control options:
  - One heating circuit with mixer via the standard control unit Logamatic 4323
  - With one FM458 module, cascades of up to four boilers can be controlled (max. eight boilers with two modules)
  - With one FM441 module, DHW heating and one heating circuit with mixer or one heating circuit without mixer are feasible
- The following controls for the gas condensing boilers are possible:
  - Parallel or serial boiler operation
  - Load restriction according to outside temperature, e.g. boiler 2 is blocked from an outside temperature of 10 °C
  - Optional combination of EMS wall mounted boilers with EMS floorstanding boilers
  - Cascades even with boilers of different output sizes (e.g. output split 60 %:40 %)

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6.4.9 System example for the Logamax plus GB162-50/65 and GB162-50/65/80/100 in a 2-boiler cascade with two heating circuits with mixer

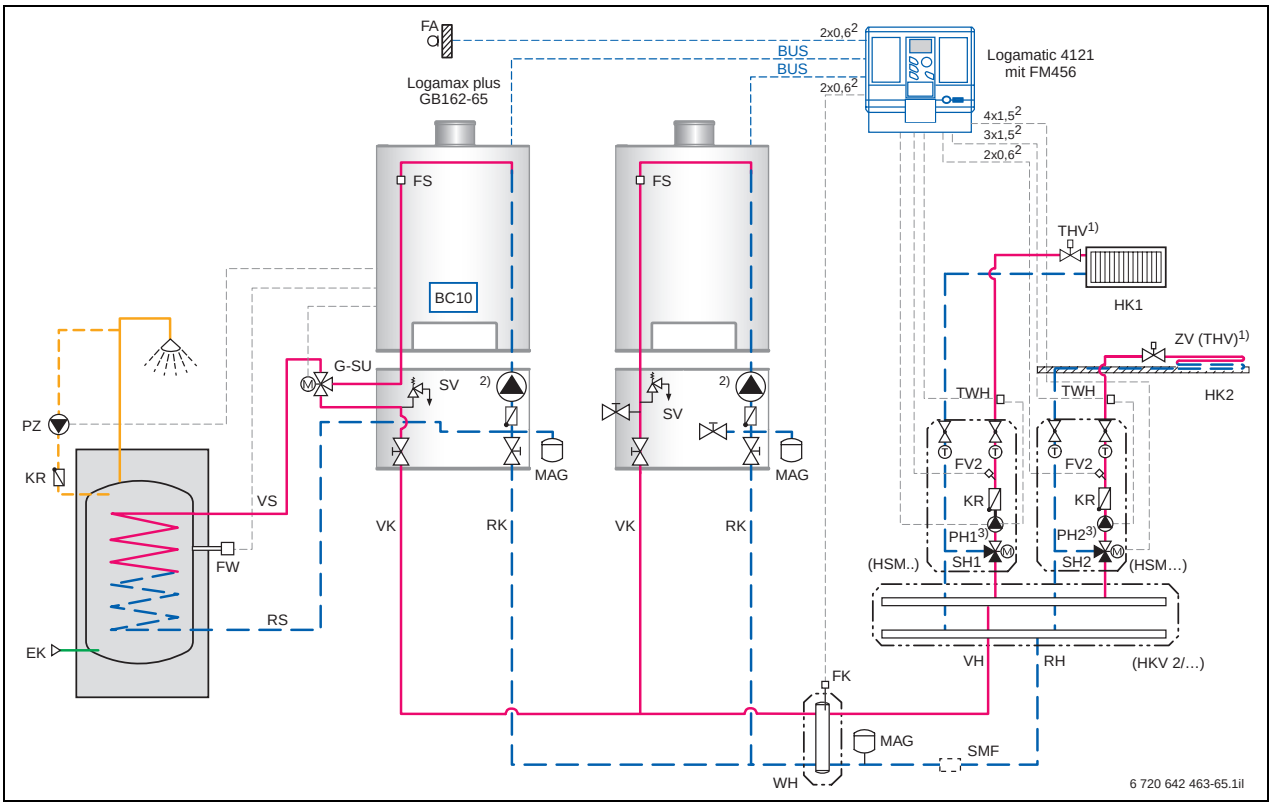

Fig. 82 Circuit diagram for the system example (index of abbreviations → page 52)

1) Hydraulic balancing at the thermostatic valves/zone valves recommended
2) Pump and safety valve are integrated into the pump connection assembly (→ fig. 46, page 53) – Allow for a safety valve on site if the pump assembly is not used
3) Differential pressure-dependent pump

The circuit diagram is only a schematic illustration.
Information regarding all system examples → page 52 ff.

Brief description

- The Logamatic 4121 and FM456 module enable the control of up to four gas condensing boilers in a cascade.
- Cascade system with DHW heating via pump connection assembly with 3-way valve kit via boiler no. 1.
- Pump connection assembly incl. 3-way valve kit only suitable for the Logamax plus GB162-65. Consequently, only a GB162-65 boiler can be used for DHW heating.
- System particularly suitable for a high heat demand but a low DHW demand.

Special design information

- Optional control of two heating circuits without mixer.
- The DHW temperature sensor FW is connected at the terminal strip of boiler no. 1.
- Taco setters for every boiler are not required if the pump assembly is used.
- The boiler output is called for in series. The second boiler starts if the output of the first boiler is insufficient to achieve the set value.

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7 Condensate drain

7.1 Condensate drain

Route condensate from condensing boilers into the public sewer system in accordance with local regulations. It is crucial to determine whether the condensate must be neutralised prior to induction into the sewer system. This depends on the boiler output and the respective regulations of the local water authority (→ tab. 28). Code of Practice A 251 of the ATV applies [in Germany] to the calculation of the annual amount of condensate. This Code of Practice lists a specific amount of condensate as a guide value of 0.14 kg/kWh.

It is appropriate to check local regulations appertaining to draining condensate in good time prior to installation. The local water supply utility is the responsible body for questions concerning waste water.

Neutralisation obligation

Boiler output [kW]	Neutralisation
≤ 25	no[1)]
> 25 to ≤ 200	no[2)]
> 200	yes

Table 28 Neutralisation obligation for gas condensing boilers

1) Neutralisation of the condensate is required when draining the domestic waste water into a small treatment plant and for buildings and properties with waste pipes which do not meet the material requirements of the Code of Practice A 251 [Germany].

2) Neutralisation of the condensate is required for buildings where the requirement of adequate admixing (→ tab. 29) with domestic waste water (at a ratio of 1:25) is not met.

For small systems with less than 25 kW output, there is no obligation to neutralise (→ tab. 28) if the waste water does not flow into small treatment plants or if the drain lines meet the material requirements of the Code of Practice A 251 [Germany].

Materials for condensate hoses

According to the ATV datasheet A 251, the following are suitable materials for condensate hoses:

- Earthenware pipes (to DIN-EN 295-1)
- Rigid PVC pipes
- PVC pipes (polyethylene)
- PE-HD pipes (polypropylene)
- PP pipes
- ABS-ASA pipes
- Stainless steel pipes
- Borosilicate glass pipes

If an admixing of the condensate with domestic waste water in a ratio of at least 1:25 is assured (→ tab. 29), then the following may be used:

- Fibre cement pipe
- Cast iron or steel pipes to DIN 19522-1 and DIN 19530-1 and 19530-2

Copper pipes are unsuitable for draining condensate.

Adequate admixing

Adequate admixing of the condensate with domestic waste water is assured if the conditions in table 29 are met. The above details refer to 2000 hours of full utilisation in accordance with guideline VDI 2067 (maximum value).

Boiler load			
Boiler output [kW][2)]	Amount of condensate[1)] [m³/a]	Office and commercial buildings[1)] Number of employees	Residential building[1)] Number of residential units
25	7	≥ 10	≥ 1
50	14	≥ 20	≥ 2
100	28	≥ 40	≥ 4
150	42	≥ 60	≥ 6
200	56	≥ 80	≥ 8

Table 29 Conditions for adequate admixing of condensate with domestic waste water

1) Maximum values at a system temperature 40/30 °C and 2000 hours run

2) Combustion output

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7.1.1 Condensate drain from the condensing boiler and the flue

To ensure the condensate generated in the flue can drain via the gas condensing boiler, route the flue inside the installation room with a slight slope (≥ 3°, i.e. approx. 5 cm height differential per metre) towards the gas condensing boiler.

Observe the relevant regulations concerning waste lines from buildings and appropriate other local regulations. Ensure particularly that the drain line is ventilated in accordance with regulations and that it drains **freely** (→ fig. 83) into a drain outlet with a siphon, to prevent the stench trap being emptied and to prevent condensate from backing up into the appliance.

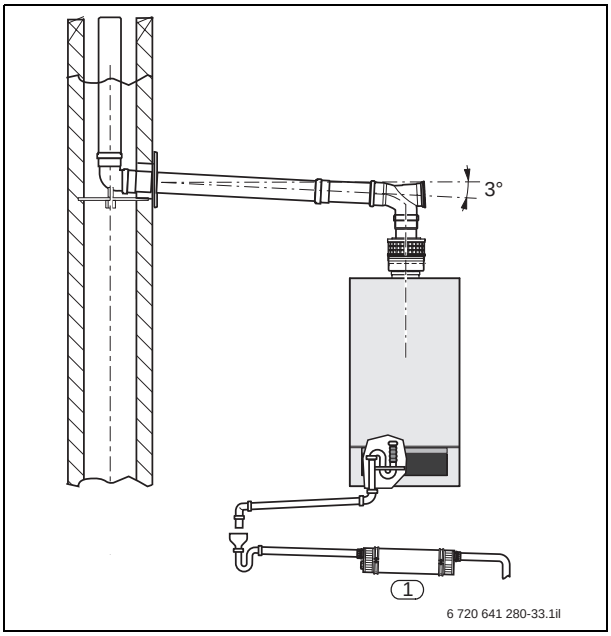

Fig. 83 Condensate hose from the gas condensing boiler and a flue via the neutralising system

1 Neutralising system

7.1.2 Condensate drain from a moisture-resistant chimney

Drain condensate in accordance with the details specified by the chimney manufacturer in the case of a moisture-resistant chimney (suitable for condensing boilers).

Via a stench trap with funnel, the condensate from the chimney can be routed into the building drain together with the condensate from the gas condensing boiler.

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8 Installation

8.1 Selection aid for connection accessories Logamax plus GB162-15, GB162-25, GB162-35 and GB162-25 T40S

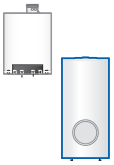
Connection accessories		Product no.	Logamax plus GB162-15/25/35, GB162-25 T40S				
			without cylinder	with Logalux DHW cylinder			with stratification cylinder
				S120 W below	S135 RW S160 RW below	SU160 W SU200 W SU300 W adjacent	
							
			Installation on finished walls				
Accessories; heating circuit and gas connection							
HKA – heating circuit connection set		63 015 978	●	●	●	●	●
GA-BS – Straight-through gas tap		7 095 367	●	●	●	●	●
G-TA – Drain outlet kit		7 099 089	●	●	●	●	●
G-KS – "Short circuit" line		7 107 800	●	–	–	–	–
MAG 18/25/35/50							
External MAG, white[1]	18 l	80 432 040	●/❑	●/❑	●/❑	●/❑	●/❑
	25 l	80 432 042	●/❑	●/❑	●/❑	●/❑	●/❑
	35 l	80 432 044	●/❑	●/❑	●/❑	●/❑	●/❑
	50 l	80 432 046	●/❑	●/❑	●/❑	●/❑	●/❑
Wall mounting bracket for MAG 18/25		8 114 300	●/❑	●/❑	●/❑	●/❑	●/❑
AAS Connection set for the MAG		5 354 810	●/❑	●/❑	●/❑	●/❑	●/❑
Accessories for external DHW cylinders							
AS E – Cylinder connection set		5 991 387	–	●	●	●	–
U-Flex GB162-S120 W		63 017 124	–	●	–	–	–
U-Flex GB162-S135 RW/S160 RW		63 016 495	–	–	●	–	–
N-Flex GB162-SU160 W/SU200 W/SU300 W		63 017 513	–	–	–	●	–
Decorative side cover[2]							
for Logalux S135 RW		63 043 861	–	–	❑	–	–
for Logalux S160 RW		63 043 862	–	–	❑	–	–
Accessories for the sanitary side of DHW cylinders							
S-Flex – Connection set GB162-S120 W/S135 RW/S160 RW		63 016 494	–	●	●	–	–
DHW circulation set GB162-S135 RW/S160 RW		63 017 515	–	–	❑	–	–
U-DM – Pressure reducer[3]		7 095 604	–	❑	❑	–	–
ZP – DHW circulation pump connection[4]		87 094 842	–	❑	❑	–	–
Safety assembly, cold water, 8 bar		7 746 900 421	–	–	–	–	●
Accessories; optional							
G-BL 135 – Decorative cover		7 746 900 350	❑	–	❑	–	–

Table 30 Selection aid for connection accessories Logamax plus GB162-15/25/35 and GB162-25 T40S

1) Determine the required diaphragm expansion vessel to suit the specific system

2) Installation on the side towards the back

3) For retrofitting in the S-Flex, if the building is not equipped with a pressure reducer

4) For retrofitting in the S-Flex

● Required
❑ Optional
– Cannot be used

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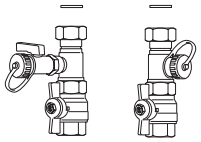
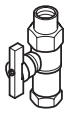
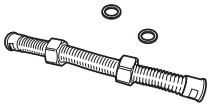
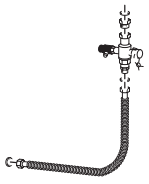
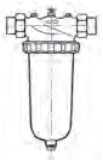
Connection accessories for the Logamax plus GB162-15/25/35 and GB162-25 T40S		
Designation		**Description**
Accessories; heating circuit and gas connection		
HKA Heating circuit connection set		• 2 service ball valves Rp1 • Tee with cap for connecting an external MAG • Tee with drain & fill valve • 2 fittings Rp1 • Installation on finished walls
GB-BS Straight-through gas tap		• R½ • Installation on finished walls • With integral fire protection
G-TA Drain outlet kit		• Siphon R1 complete with discharge pipe and bezel
G-KS “Short circuit” line		• Required during installation if no DHW cylinder is connected • “Short circuit” line with union nuts • Gaskets
MAG Expansion vessel		• Rated capacity 18 l, 25 l, 35 l and 50 l • Installation on site • Colour: white
Wall mounting bracket for MAG		• For MAG 18/25
Cap valve (Not required if the AAS connection set is used)		• PN10 • For MAG ¾ "
AAS Connection set for MAG		• Flexible stainless steel hose ¾ ", 1 m long • Cap valve for expansion vessel • Gaskets • Drain & fill valve • For MAG ¾ " or 1"
Dirt filter (heating system)		• For installation in the heating return • Filter unit 500 µm • With stainless steel mesh core • Rp1 flow rate < 3200 l/h • Rp1¼ flow rate < 5000 l/h

Table 31 Connection accessories Logamax plus GB162-15/25/35 and GB162-25 T40S (assignment → tab. 30; installed dimensions → page 27 to page 29)

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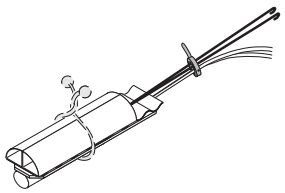
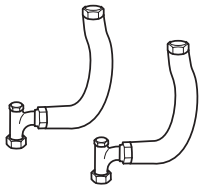
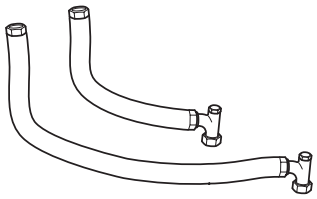
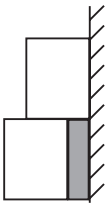
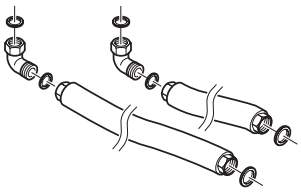
Connection accessories for the Logamax plus GB162-15/25/35 and GB162-25 T40S		
Designation		**Description**
Accessories for external DHW cylinders		
AS-E Cylinder connection set		• DHW temperature sensor Ø 6 mm for DHW heating, with plug for connection to the terminal strip inside the gas condensing boiler • Including ¼ -circle sensor segments (dummy segments) and tensioning spring (plastic spiral) for temperature sensor Ø 6 mm in conjunction with DHW cylinders larger than 120 l • Plug for cylinder primary pump and DHW circulation pump
For S120 W below		
U-Flex Pipework set for the heating circuit side		• For S120 W DHW cylinders below • Installation on finished walls • Flexible corrugated hose with thermal insulation and gaskets for DHW cylinder flow and return • Elbow fittings G¾ × G¾
For S135 RW and S160 RW below		
U-Flex Pipework set for the heating circuit side		• For S135 RW and S160 RW DHW cylinder below • Installation on finished walls • Flexible corrugated hose with thermal insulation and gaskets for DHW cylinder flow and return • Elbow fittings G¾ × G¾
Decorative side cover for S135 RW		• Installation on the side towards the back of the cylinder • Decorative cover to conceal pipework • Installation on finished walls
Decorative side cover for S160 RW		• Installation on the side towards the back of the cylinder • Decorative cover to conceal pipework • Installation on finished walls
For SU160 W, SU200 W and SU300 W adjacent		
N-FlexFlexible pipework set for the heating circuit side		• For DHW cylinders SU160 W, SU200 W and SU300 W, adjacent • Installation on finished walls • One short and one long flexible corrugated hose with thermal insulation, gaskets and fittings G1 × G¾ for DHW cylinder flow and return • Elbow fittings G1 × G1

Table 31 Connection accessories Logamax plus GB162-15/25/35 and GB162-25 T40S (assignment → tab. 30; installed dimensions → page 27 to page 29)

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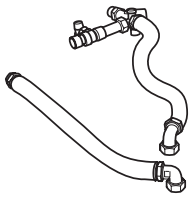
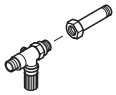
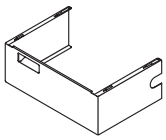
Connection accessories for the Logamax plus GB162-15/25/35 and GB162-25 T40S		
Designation		**Description**
DHW cylinder accessories for the sanitary side for S120 W, S135 RW and S160 RW		
S-Flex Flexible connection set for the sanitary side		• For DHW cylinders S120 W, S135 RW and S160 RW • Flexible corrugated hoses with thermal insulation and gaskets for cold water and DHW • Safety assembly with shut-off valve, non-return valve and 10 bar safety valve • Elbow fittings G¾ × Rp¾ for corrugated cold water and DHW hoses on the cylinder side • Threaded nipples for connecting the corrugated cold water and DHW hoses on the wall side (finished walls)
DHW circulation set S135 RW/S160 RW		• For the connection of a DHW circulation pump • In conjunction with S135 RW and S160 RW • Elbow fitting G¾ × Rp¾ • DHW circulation pipe • Gasket
U-DM Pressure reducer		• Retrofit in the S-Flex • Pressure reducer to 4 bar
ZP DHW circulation pump connection		• In conjunction with S120 W • For the connection of a DHW circulation pump • For retrofitting with S-Flex • Connection elbow fitting • Reducer • Gaskets
For GB162-25 T40S sanitary side		
Safety assembly, cold water, 8 bar		• Safety valve 8 bar • Non-return valve • Drain with 1 m hose • Optional cold water shut-off
Accessories; optional		
G-BL 135 Decorative cover		• To cover up the connections on the gas side and the water side when installing a DHW cylinder S135 RW or S160 RW below • Installation on finished walls • Colour: light grey
Safety valve 4 bar		• For installation inside the appliance • Conversion to 4 bar operating pressure

Table 31 Connection accessories Logamax plus GB162-15/25/35 and GB162-25 T40S (assignment → tab. 30; installed dimensions → page 27 to page 29)

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8.2 Selection aid for connection accessories Logamax plus GB162-45

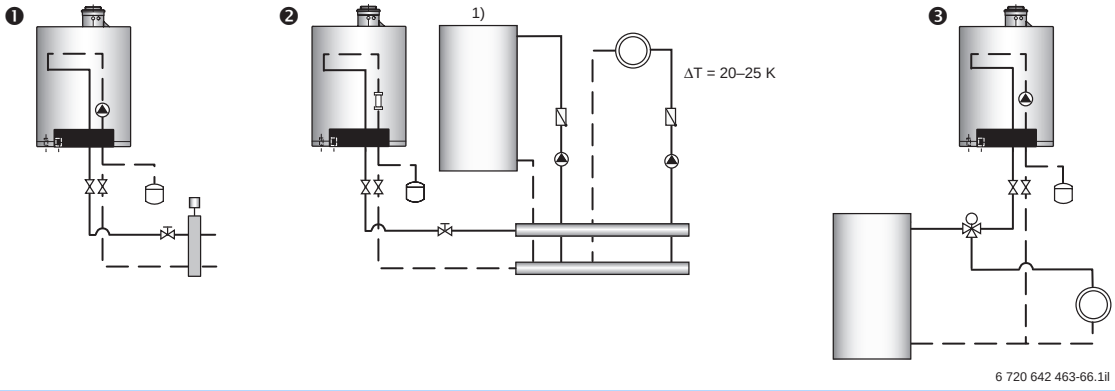
Connection accessories	Product no.	Logamax plus GB162-45					
		without cylinder	any cylinder location	without cylinder		any cylinder location	
Possible hydraulic connections		❶	❶	❷[1]	❸	❷[1]	❸
							
				Installation on finished walls			
Accessories, heating circuit pump inside the appliance							
Pump UPM 15-70 2W for installation inside the GB162-45	7 746 900 326	●	●	–	●	–	●
Accessories for the external differential pressure-dependent heating circuit pump (for one heating circuit directly downstream)							
Pump Wilo Stratos ECO 25/1-5[2]	8 295 535 4	–	–	●	❑[2]	–	❑[2]
Pump Wilo Stratos 25/-8[2]	7 747 213 536	–	–	❑[3]	❑[2]	❑[3]	❑[2]
Accessories, connection with a low loss header							
Low loss header 120/80	6 790 018 6	●	●	–	–	–	–
Accessories; heating circuit and gas connection							
HKA – heating circuit connection set	6 301 597 8	●	●	●	●	●	●
GA-BS – Straight-through gas tap	7 095 367	●	●	●	●	●	●
G-TA – Drain outlet kit	7 099 089	●	●	●	●	●	●
MAG 35/50 - External MAG, white[4] 35 l	8 043 204 4	●/❑	●/❑	●/❑	●/❑	●/❑	●/❑
MAG 35/50 - External MAG, white[4] 50 l	8 043 204 6	●/❑	●/❑	●/❑	●/❑	●/❑	●/❑
AAS Connection set for the MAG	5 354 810	❑	❑	❑	❑	❑	❑
Line balancing wheel, Taco setter up to 4200 l/h	8 394 086 0	❑	❑	●	–	●	–
Accessories, DHW - external cylinder primary pump							
Pump Logafix BU 25/6	8 055 006 4	–	❑[5]	–		●	–
Accessories, DHW – 3-way valve (can only be used in combination with the pump inside the appliance)							
G-SU 1", DN25 – 3-way valve, K_{VS} = 7.7 m^3/h	7 095 581	–	❑[5]	–		–	●
G-SU 1¼ ", DN32 – 3-way valve, K_{VS} = 18 m^3/h	7 095 583	–	❑[5][6]	–		–	❑[6]
Accessories for external DHW cylinders							
AS E – Cylinder connection set	5 991 387	–	●	–	●	●	

Table 32 Selection aid for connection accessories Logamax plus GB162-45

1) Cylinder primary pump sized for reduced flow rate
2) Alternative for UPM 15-70 2 W; installed outside the appliance
3) Alternative for Wilo Stratos ECO 25/1-5, installed outside the appliance
4) Determine the required diaphragm expansion vessel to suit the specific system
5) Either a cylinder primary pump or a 3-way valve may be used
6) Alternative for G-SU 1"

● Required
❑ Optional
– Cannot be used

❶ Internal pump, low loss header
❷ External pump, heating circuit directly downstream, DHW priority mode
❸ Internal pump, heating circuit directly downstream

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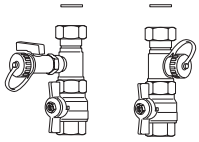
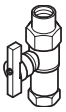
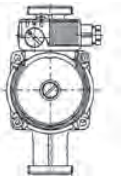
Connection accessories for the Logamax plus GB162-45		
Designation		**Description**
Accessories, heating circuit pump inside the appliance		
Pump UPM 15-70 2 W		• Pump efficiency category A • For installation inside the appliance • Modulating operation with output-dependent control or Δp = constant • Required in connection with a low loss header • May also be used for single boiler systems
Accessories for the external differential pressure-dependent pump (for one heating circuit directly downstream)		
Pump Wilo Stratos 25/1-8		• External heating circuit pump for one heating circuit directly downstream • Operating mode Δp-v (variable)
Accessories, heating and gas		
HKA Heating circuit connection set		• Two service ball valves Rp1 • Tee with cap for connecting an external MAG • Tee with drain & fill valve • Two fittings Rp1 • Installation on finished walls
GA-BS Straight-through gas tap		• R½ • Installation on finished walls • With integral fire safety valve
G-TA Drain outlet kit		• Siphon complete with discharge pipe and bezel
MAG Expansion vessel		• Nominal capacity 35 l and 50 l • Installation on site • Colour: white
Line balancing valve		• For limiting the maximum permissible flow rate with an external pump • DN32 • G1¼ (fem.) × G1¼ (fem.) • Setting range: 1200–4200 l/h
Accessories, DHW - external cylinder primary pump		
Pump Logafix BU 25/6		• Speed, 3-stage changeover

Table 33 Connection accessories Logamax plus GB162-45 (assignment → tab. 32)

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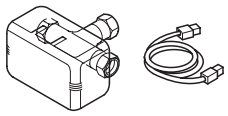
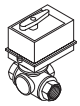
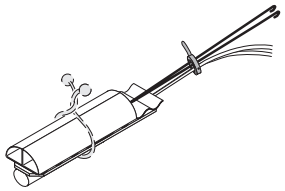
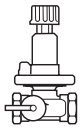
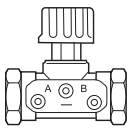
Connection accessories for the Logamax plus GB162-45		
Designation		**Description**
Accessories, DHW – 3-way valve (can only be used in combination with the pump inside the appliance)		
G-SU 1" 3-way valve		• Installation on finished walls • For versions without bezel, 1" fem. thread • 24 V AC control • K_{VS} = 7.7 m^3/h
G-SU 1¼ ", DN32 3-way valve		• Installation on finished walls • For versions without bezel, 1" • 24 V AC control • K_{VS} = 18 m^3/h
Accessories for external DHW cylinders		
AS-E Cylinder connection set		• DHW temperature sensor Ø 6 mm for DHW heating, with plug for connection to the terminal strip inside the gas condensing boiler • Including ¼ -circle sensor segments (dummy segments) and tensioning spring (plastic spiral) for temperature sensor Ø 6 mm in conjunction with DHW cylinders larger than 120 l • Plug for cylinder primary pump and DHW circulation pump
Accessories; optional		
Safety valve 4 bar		• For installation inside the appliance • Conversion to 4 bar operating pressure
Differential pressure controller ASV-PV (only in combination with ASV-M)		• For use in a single line • Setting range 0.05–0.25 bar • DN20, Rp¾ , up to 500 l/h • DN25, Rp1, up to 900 l/h
Line and measuring valve ASV-M (only in combination with ASV-PV)		• DN20, Rp¾ • DN25, Rp1
Dirt filter (heating system)		• For installation in the heating return • Filter unit 500 µm • With stainless steel mesh core • Rp1 – flow rate < 3200 l/h • Rp1¼ – flow rate < 5000 l/h

Table 33 Connection accessories Logamax plus GB162-45 (assignment → tab. 32)

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8.3 Selection aid for connection accessories Logamax plus GB162-50/65/80/100

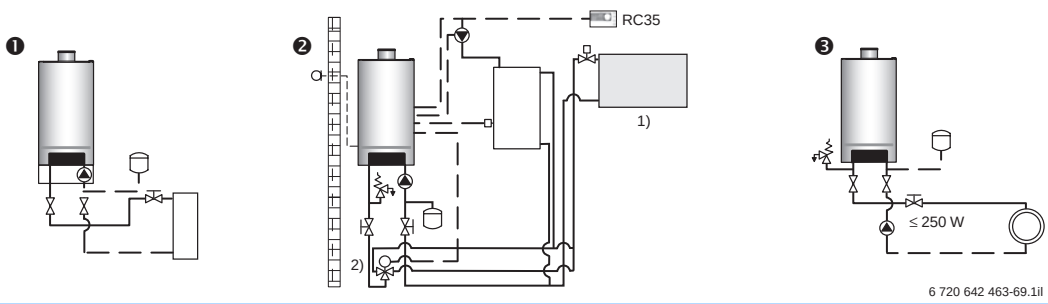
Connection accessories	Product no.	GB162-50/65/80/100			
		without cylinder	any cylinder location	without cylinder	DHW via 3-way valve
Possible hydraulic connections		❶	❶	❷[1) 2)]	❸
					
			Installation on finished walls		
Accessories, pump connection assembly					
Pump connection assembly GB162-50/65/80/100	7 114 040	●	●	–	–
Accessories, external differential pressure-dependent heating circuit pump (any installation location, max. 250 W)					
Pump Wilo Stratos 25/1-8	7 747 213 536	–	–	●[3)]	●[3)]
Pump Grundfos Magna 25-100	7 747 204 602	–	–	●[3)]	●[3)]
Grundfos Magna 25-60	7 747 204 601	–	–	●[4)]	●[4)]
Grundfos UPM 25-70	7 746 901 079	–	–	●[5)]	●[5)]
Accessories, connection with a low loss header					
Single unit with low loss header	7 114 060	●[6)]	●[6)]	–	–
Low loss header 120/80 up to 8000 l/h, alternative to the single unit	8 452 214	●[6)]	●[6)]	–	–
Insulation for low loss header 120/80	8 245 303 8	●[7)]	●[7)]	–	–
Accessories, heating and gas (any installation location)					
HKA DN32 – Heating circuit connection set	7 095 692	–	–	●	●
GA-BS – Straight-through gas tap	7 114 760	–	–	●	●
Safety assembly 3 bar	8 161 011 0	–	–	●	●
MAG 50/80 - External MAG, white[8)] 50 l	8 043 204 6	●	●	●	●
MAG 50/80 - External MAG, white[8)] 80 l	8 043 204 8	●	●	●	●
Accessories, DHW - external cylinder primary pump					
Pump Logafix BU 25/6	8 055 006 4	–	●	–	–
Accessories, DHW - 3-way valve					
G-SU 1¼ ", DN32 – 3-way valve, K_{VS} = 18 m^3/h	7 095 583	–	–	–	●
Accessories for external DWH cylinders					
AS E – Cylinder connection set	5 991 387	–	●	–	●
Accessories; optional					
Safety valve 4 bar	7 095 595	❑	❑	❑	❑
Accessories for neutralisation					
NE 0.1 – Neutralising system	6 303 589 9	❑	❑	❑	❑
NE 1.1 – Neutralising system with lifting pump	8 133 352	❑	❑	❑	❑

Table 34 Selection aid for connection accessories Logamax plus GB162-50/65/80/100

1) Available pump pressure for the heating circuit at 4000 l/h = 150–170 mbar
2) G-SU 1¼ ", pressure drop at 4000 l/h = 50 mbar, K_{VS} = 18 m^3/h
3) Select appropriate pump
4) Grundfos Magna 25-60, suitable only for GB162-50 and GB152-65
5) Grundfos UPM 25-70 suitable only for GB162-50
6) Only one header can be used
7) Only required when the Sinus 120/80 low loss header is used
8) Determine the required diaphragm expansion vessel to suit the specific system

● Required
❑ Optional
– Cannot be used

❶ Boiler with pump connection assembly and low loss header
❷ DHW heating via 3-way valve
❸ External pump, no DHW heating

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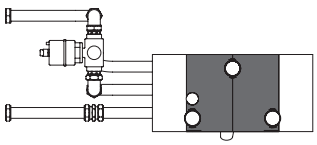
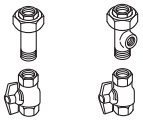
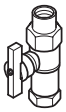
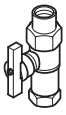
Connection accessories for the Logamax plus GB162-50/65/80/100		
Designation		**Description**
Accessories, pump connection assembly		
Pump connection assembly GB162-50/65/80/100		• For direct connection to the boiler • Including modulating pump UPER 25-80, 3 bar safety valve, gas tap, shut-off valves, check valve, pressure gauge, connection for an external diaphragm expansion vessel, drain & fill valve, insulation
Pump assembly with 3-way diverter valve for the GB162-50/65		• For direct connection to the boiler GB162-50/65 • Including modulating pump UPER 25-80, 3 bar safety valve, gas tap with thermal shut-off valve, shut-off valves, connection ¾ " for external diaphragm expansion valve, drain & fill valve, insulation, 3-way diverter valve $K_{VS} = 18\ m^3/h$
AS HKV 32 connection set		• For installation below the pump connection assembly, if no cascade unit is used
Accessories for the external differential pressure-dependent pump (for one heating circuit directly downstream, any installation location)		
Pump Wilo Stratos 25/1-8		• External differential pressure-dependent pump for one heating circuit directly downstream • Operating mode Δp-v (variable)
Pump Grundfos UPM 25-70 2W		• Pump efficiency category A for connection on site to the GB162-50 • Modulating operation with output-dependent control
Pump Grundfos Magna 25-60/25-100		• External heating circuit pump for one heating circuit directly downstream • Operating mode Δp-v (variable)
Accessories, heating and gas (any installation location)		
HKA DN32 Heating circuit connection set		• For installing the GB162-50/65/80/100 without bezel on finished walls • Two service ball valves • Tee connection for the installation of the expansion vessel • Two fittings Rp1
GA-BS Straight-through gas tap ¾ "		• R¾ • Installation on finished walls • With integral fire safety valve • For GB162-65
GA-BS Straight-through gas tap 1"		• R1 • Straight-through form • Installation on finished walls • With integral fire safety valve

Table 35 Connection accessories Logamax plus GB162-50/65/80/100 (assignment → tab. 34)

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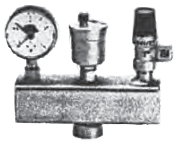
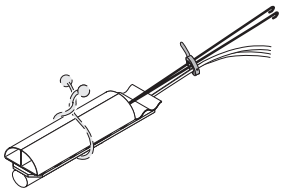
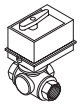
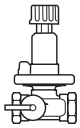
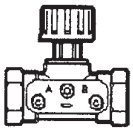
Connection accessories for the Logamax plus GB162-50/65/80/100		
Designation		**Description**
Safety assembly 3 bar (required, if the pump connection assembly is not used)		• Safety valve 3 bar • Pressure gauge • Automatic air vent valve • Insulation
MAG Expansion vessel		• Installation on site • Colour: white • 50 l, 1.5 bar pre-charge pressure, 6 bar maximum • 80 l, 1.5 bar pre-charge pressure, 6 bar maximum
Accessories, heating and gas (any installation location)		
Gas flow switch		• Connections, male/female threads • Pressure drop less than 0.5 mbar • Up to 16 m^3/h, DN50, 2" • Up to 10 m^3/h, DN40, 1½ "
Line balancing valve, Taco setter		• To balance the maximum amount of water via the boiler • G½ (fem.) × G½ (fem.) • Setting range: 1800–7200 l/h
Accessories for external DHW cylinders		
AS-E Cylinder connection set		• DHW temperature sensor Ø 6 mm • Plug for cylinder primary pump and DHW circulation pump • Including ¼ -circle dummy segments and tensioning spring for cylinders larger than 120 l
G-SU 1¼ ", DN32 3-way valve		• Installation on finished walls for the GB162-65 • For versions without bezel, 1" • 24 V AC control
Accessories; optional		
Safety valve 4 bar		• 4 bar safety pressure • Can only be used with the pump assembly; for installation in the pump connection assembly
Differential pressure controller ASV-PV (only in combination with ASV-M)		• For use in a single line • Setting range 0.05–0.25 bar • DN32, K_{VS} = 6.3; Rp1¼ • DN40, K_{VS} = 10; Rp1½
Line and measuring valve ASV-M (only in combination with ASV-PV)		• DN32, K_{VS} = 6.3; Rp1¼ • DN40, K_{VS} = 10; Rp1½

Table 35 Connection accessories Logamax plus GB162-50/65/80/100 (assignment → tab. 34)

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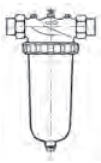
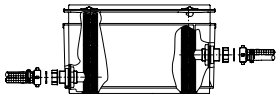
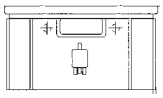
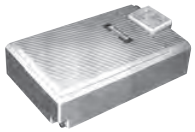
Connection accessories for the Logamax plus GB162-50/65/80/100		
Designation		**Description**
Dirt filter (heating system)		• For installation in the heating return • Filter unit 500 µm • Stainless steel mesh core • Up to 5000 l/h
Accessories for neutralisation		
NE 0.1 Neutralising system		• Comprising a plastic container with neutralising compartment • Including granulate
NE 1.1 Neutralising system		• Comprising a plastic container with neutralising compartment, dust area and level-controlled condensate pump with a head of approx. 2 m • Including granulate
NE 2.0 Neutralising system		• Self-monitoring, made from high grade plastic with neutralising compartment, dust area and level-controlled condensate pump with a head of approx. 2 m • Including granulate • With LEDs to indicate faults and top-up requirement • Optional signal transfer, e.g. to a DDC • DVGW-tested
Pressure increase module for NE 2.0		• To increase the head to approx. 4.5 m
Neutralising agent		• 10 kg bucket, sufficient for the NE 0.1, NE 1.1 and NE 2.0

Table 35 Connection accessories Logamax plus GB162-50/65/80/100 (assignment → tab. 34)

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8.4 Heating circuit quick installation systems

Quick installation system combinations complete with low loss header WHY... and heating circuit distributor

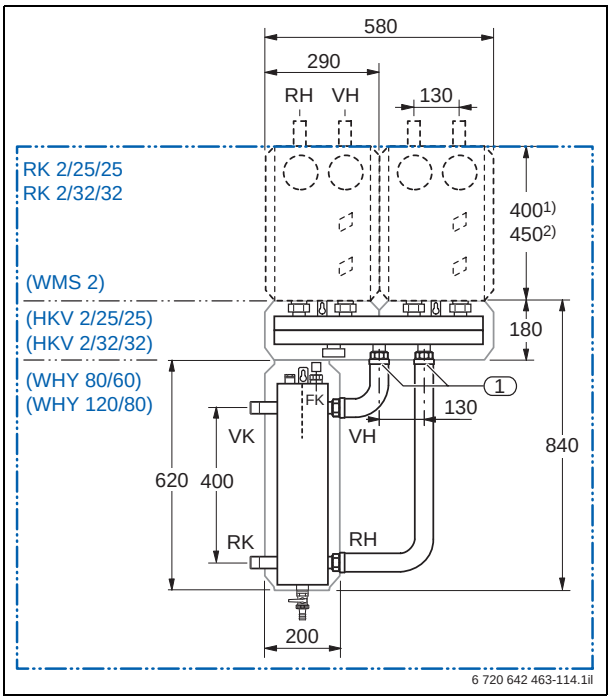

Fig. 84 Dimensions of the quick installation system combinations RK 2/25/25 and RK 2/32/32 for two heating circuits (dim. in mm)

FK Flow temperature sensor
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow
1 Connection pipes

1) Height of the heating circuit connection sets HSM 15, HSM 20, HSM 25 and HS 25
For the connection of a set DN25 to a distributor DN32, set ES0, product no. 67 900 475 is required.
2) Height of the heating circuit connection sets HSM 32 and HS 32

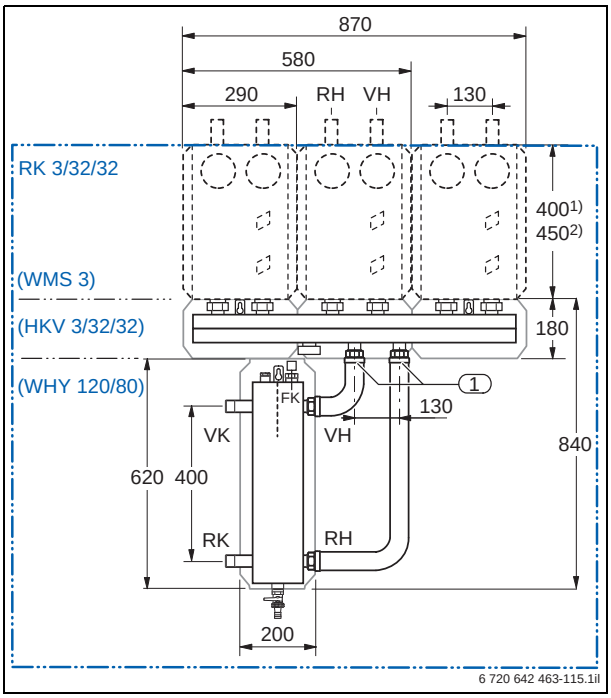

Fig. 85 Dimensions of the quick installation system combinations RK 3/32/32 for three heating circuits (dim. in mm)

FK Flow temperature sensor
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow
1 Connection pipes

1) Height of the heating circuit connection sets HSM 15, HSM 20, HSM 25 and HS 25
For the connection of a DN25 set to a DN32 distributor, set ES0, product no. 67 900 475 is required.
2) Height of the heating circuit connection sets HSM 32 and HS 32

System combination installation either to the right or left of the gas condensing boiler.

Connection diameter		
For heating circuit flow and return	Rp1	For HSM 15(-E), HSM 20(-E), HSM 25(-E) and HS 25(-E)
	Rp1¼	For HSM 32(-E) and HS 32(-E)
For the WHY 80/60 low loss header	R1	For boiler flow and return max. flow rate 2.5 m^3/h (→ tab. 38, page 100 ff.)
For the WHY 120/80 low loss header	R1½	For boiler flow and return max. flow rate 5.0 m^3/h (→ tab. 38, page 100 ff.)

Table 36

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Quick installation system combinations with low loss header across (DN25)

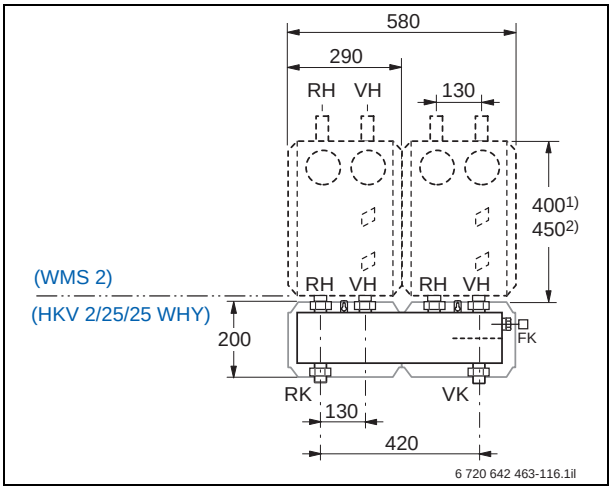

Fig. 86 Dimensions of the system combination heating circuit distributor with integral low loss header for two heating circuits (dim. in mm)

FK Flow temperature sensor
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow

1) Height of the heating circuit connection sets HSM 15(-E), HSM 20(-E), HSM 25(-E) and HS 25(-E)

2) Height of the heating circuit connection sets HSM 32(-E) and HS 32(-E)
For the connection of a DN32 set to a DN25 distributor set, ÜS1 adaptor set, product no. 63 012 309 is required.

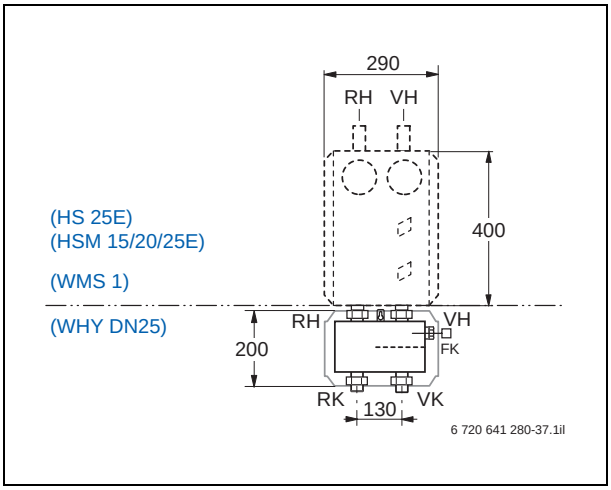

Fig. 87 Dimensions of system combinations with low loss header across for direct connection with a heating circuit connection set for one heating circuit (dim. in mm)

FK Flow temperature sensor
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow

System combination installation either to the right or left of the gas condensing boiler.

Connection diameter		
For heating circuit flow and return	Rp1	For HSM 20, HSM 25 and HS 25
	Rp1 ¼	For HSM 32(-E) and HS 32(-E)
For the WHY DN25 low loss header across and heating circuit distributor with HKV 2/25/25 WHY low loss header	R1	For boiler flow and return max. flow rate 2.0 m^3/h (→ tab. 38, page 100 ff.)

Table 37

Internal diameter, heating circuit quick installation system (example)

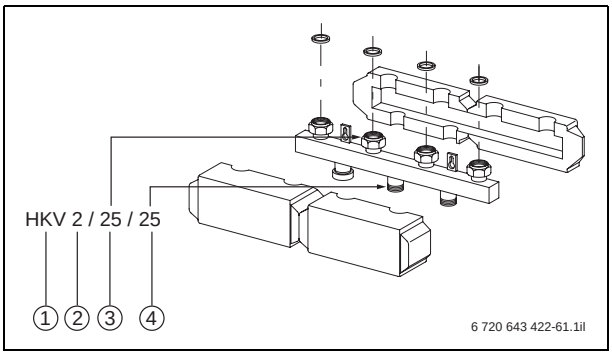

Fig. 88 Internal diameter, heating circuit quick installation set (example)

1 Heating circuit distributor
2 Number of heating circuit connection sets that can be used; here two pce
3 Top connection dim., here DN25
4 Bottom connection dim., here DN25

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Accessories for heating circuit quick installation systems

Accessories	Product no.	Logamax plus
Combinations		
HKV 2/25/25 WHY Quick installation combination	63 042 000	• Heating circuit distributor DN25 with integral low loss header, up to 2000 l/h • WMS 2 wall mounting bracket for heating circuit distributor • Including heating circuit distributor connection set
RK 2/25/25 across Quick installation combination	80 700 278	• Quick installation combination with low loss header, across, max. 2000 l/h • WMS 2 for HKV 2/25/25 • HKV 2/25/25, heating circuit distributor
RK 2/25/25 Heating circuit quick installation system	80 700 276	• Quick installation combination with low loss header, max. 2500 l/h, DN25 • Connection pipes from the low loss header to the distributor DN25 • HKV 2/25/25, heating circuit distributor • WMS 2 for HKV 2/25/25
RK 2/32/32 Heating circuit quick installation system[1)]	80 700 280	• Quick installation combination with low loss header, max. 5000 l/h • Connection pipes to the low loss header • HKV 2/32/32, heating circuit distributor • WMS 2 for HKV 2/32/32
RK 3/32/32 Heating circuit quick installation system[1)]	80 700 284	• Quick installation combination with low loss header, max. 5000 l/h • Connection pipes to the low loss header • HKV 3/32 • WMS 3 for HKV 3/32/32
Components for free combinations		
WHY 80/60 Low loss header	63 013 537	• Low loss header DN80/DN60 with black insulation • Including sensor well for cylindrical sensor, wall mounting bracket, drain valve, rawl plugs and screws • Maximum 2500 l/h • Connection dimension primary R1, secondary G1¼
WHY 120/80 Low loss header	67 900 186	• Low loss header DN120/DN80 with black insulation • Including sensor well for cylindrical sensor, wall mounting bracket, drain valve, rawl plugs and screws • Maximum 5000 l/h • Connection dimension primary R1½ , secondary G1½
Low loss header across	63 016 381	• Low loss header with insulation • Connection direct on the HKV 2/25/25 • Including sensor well for cylindrical sensors • Maximum 2000 l/h
AS HKV 25 connection set	5 354 210	• For on-site connection on the secondary side of the low loss header for WHY 80/60
AS HKV 32 connection set	5 584 552	• For on-site connection on the secondary side of the low loss header for WHY 120/80
Low loss header Sinus 80/120	82 452 214	• Low loss header Sinus DN80/DN120 to 8000 l/h • Material ST 37-2, ½ " fem. connections • No air vent valve, drain or temperature sensor
Insulation for low loss header Sinus 80/100	82 453 038	• For low loss header 80/120 comprising two semi-shells 40 mm • PUR foam
Sensor well ½ "	5 446 142	• R½ 100 mm long for Logamatic temperature sensor
Heating circuit distributor	5 024 880 5 024 871 5 024 870 5 024 872 5 024 882 5 024 884	• HKV 2/25/25 for 2 heating circuits • HKV 3/35/32 for 3 heating circuits • HKV 2/32/32 for 2 heating circuits[1)] • HKV 3/32/32 for 3 heating circuits[1)] • HKV 4/25/40 for 4 heating circuits[1)] • HKV 5/25/40 for 5 heating circuits[1)]

Table 38 Accessories

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Accessories	Product no.	Logamax plus
Wall mounting set	67 900 470	• WMS 1 for wall mounting an individual quick installation set
	67 900 471	• WMS 2 for HKV 2/32/32 + HKV 2/25/25
	67 900 472	• WMS 3 for HKV 3/32/32 + HKV 3/25
	63 014 540	• WMS 4/5 for HKV 4/25/40/HKV 5/25/40
Connection pipes	63 013 548	• From the low loss header 80/60 to heating circuit distributor HKV 2/25/25
	5 584 584	• From the low loss header 80/120 to heating circuit distributor HKV 2/32/32
	5 584 586	• From the low loss header 80/120 to heating circuit distributors HKV 3/32/32 and HKV 3/25
Contact thermostat AT 90	80 155 200	• For underfloor heating systems • Fully wired in conjunction with the Logamatic 4000
Heating circuit quick installation sets		
Quick installation set for heating circuit with high efficiency pump, efficiency category A, white	8 718 577 628	• HS 25/4 E plus, white • For 1 heating circuit without mixer, DN25, high efficiency pump, permanent magnet motor, 4 m pump
	7 747 009 405	• HS 25/6 E plus, white • For 1 heating circuit without mixer, DN25, high efficiency pump, permanent magnet motor, 6 m pump
	8 718 577 390	• HS 32 E plus, white • For 1 heating circuit without mixer, DN32, high efficiency pump, permanent magnet motor
	8 718 577 385	• HSM 15 E plus, white • For 1 heating circuit with mixer, DN15, high efficiency pump, permanent magnet motor
	7 747 010 369	• HSM 20 E plus, white • For 1 heating circuit with mixer, DN20, high efficiency pump, permanent magnet motor
	7 747 009 406	• HSM 25 E plus, white • For 1 heating circuit with mixer, DN25, high efficiency pump, permanent magnet motor
	8 718 577 393	• HSM 32 E plus, white • For 1 heating circuit with mixer, DN32, high efficiency pump, permanent magnet motor
Quick installation set for heating circuit with high efficiency pump, efficiency category A, EMS inside, white	8 718 577 629	• HS 25/4 E plus, white, EMS integral • For 1 heating circuit without mixer, DN25, high efficiency pump, permanent magnet motor, 4 m pump • WM10 low loss header module, integral
	8 718 577 388	• HS 25/6 E plus, white, EMS integral • For 1 heating circuit without mixer, DN25, high efficiency pump, permanent magnet motor, 6 m pump • WM10 low loss header module, integral
	8 718 577 392	• HS 32 E plus, white, EMS integral • For 1 heating circuit without mixer, DN32, high efficiency pump, permanent magnet motor • WM10 low loss header module, integral
	8 718 577 386	• HSM 15 E plus, white, EMS integral • For 1 heating circuit with mixer, DN15, high efficiency pump, permanent magnet motor • MM10 mixer module, integral
Quick installation set for heating circuit with high efficiency pump, efficiency category A, EMS inside, white	8 718 577 387	• HSM 20 E plus, white, EMS inside • For 1 heating circuit with mixer, DN20, high efficiency pump, permanent magnet motor • MM10 mixer module, integral
	8 718 577 389	• HSM 25 E plus, white, EMS inside • For 1 heating circuit with mixer DN25, high efficiency pump, permanent magnet motor • MM10 mixer module, integral
	8 718 577 395	• HSM 32 E plus, white, EMS inside • For 1 heating circuit with mixer DN32, high efficiency pump, permanent magnet motor • MM10 mixer module, integral

Table 38 Accessories

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Accessories	Product no.	Logamax plus
Connection set ES0	67 900 475	• ES0 for heating circuit connection set DN15/20/25 fitted on distributor DN32
Adaptor set ÜS1	63 012 350	• For connecting a heating circuit quick installation set DN32 to a distributor DN25
Adaptor set ÜS2	63 210 008	• For HKV 32 combined with HS 25, HSM 15/20/25 • Installed height 50 mm • For the same installed height of DN15/20/25 with DN32
Adaptor set ÜS3	63 034 128	• Adaptor set G1½ to G1¼
Adaptor set	5 024 886	• DN40 to DN32, with flat gaskets, G2 to G½
	5 024 888	• DN40 to DN32, conical, G2 to R1½ • For connecting distributors HKV 4/25/40 and HKV 5/25/40
Pipe assembly for heat meter	80 680 154 80 680 156	• For installation upstream of the heating circuit set, installed height approx. 200 mm • For standard heat meters made by Pollux and Deltamess • Installed length, heat meter – 110 mm, ¾ " – 130 mm, 1"
Pipe assembly for system separation	80 680 158	• For existing systems with pipes permeable to oxygen; black thermal insulation • For system separation, installed height approx. 200 mm, DN25 • Max. 15 kW with Grundfos Alpha 2, ΔT = 10 K • For installation below a heating circuit quick installation set DN15/DN20/DN25 • With safety valve 3 bar • With pressure gauge, fill & drain valve and air vent valve; stainless steel plate heat exchanger • Minimum clearance of 150 mm required on the r.h. side

Table 38 Accessories

1) Max. GB162-80

All EC pumps can be manually switched to operate in their various stages.

At ΔT = 20 K the following can be used:

HSM 15 E plus	K_{VS} = 2.5 m^3/h to 16 kW
HSM 20 E plus	K_{VS} = 6.3 m^3/h to 40 kW
HSM 25 E plus	K_{VS} = 8.0 m^3/h to 45 kW
HSM 32 E plus	K_{VS} = 18.0 m^3/h to 55 kW

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8.5 Heat exchanger recognition set for gas condensing boilers

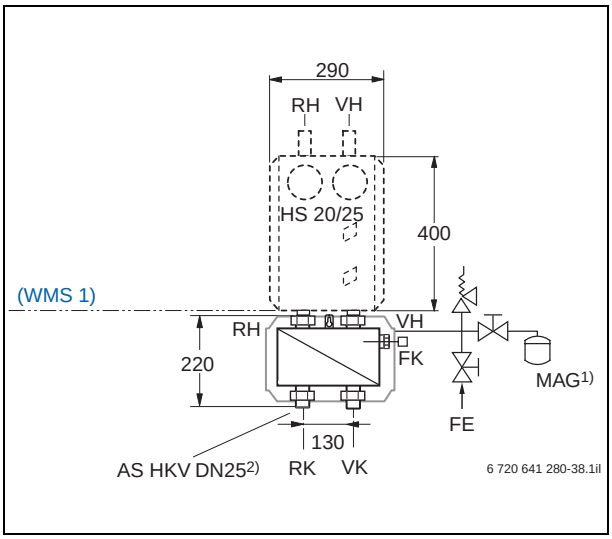

Fig. 89 Dimensions of heat exchanger recognition with integral heating circuit pump (dim. in mm)

FK Flow temperature sensor
FE Drain & fill valve
MAG Diaphragm expansion vessel
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow

1) Install the MAG on site
2) Adaptor from G1¼ to R1 (order as an accessory)

Use in underfloor heating systems with pipes permeable to oxygen or in systems where antifreeze is to be used in specific heating circuits.

The heating circuit downstream of the heat exchanger is protected by a safety set.

Size the MAG on site in accordance with DIN 4807 and DIN-EN 12828.

Maximum transfer capacity of the system separation for heating circuits with DT = 10 K and 200 mbar pressure drop:

HS 25/4 E plus	8.5 kW
HS 25/6 E plus	15 kW
HSM15 E plus	7 kW
HSM 20 E plus	15 kW
HSM 25 E plus	15 kW

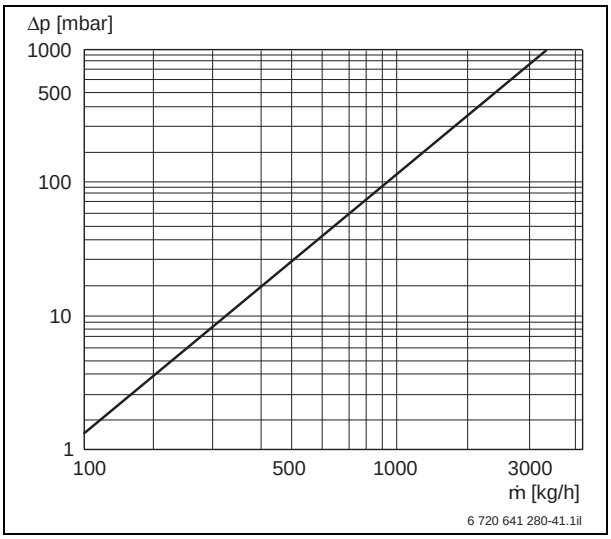

Fig. 90 Pressure drop curve of the heat exchanger

Δp Pressure drop
ṁ Mass flow

The pipe assembly for system separation comprises a copper-soldered stainless steel heat exchanger, a 2.5 bar safety valve, a pressure gauge, a drain & fill valve and a G¾ connection for the on-site diaphragm expansion vessel.

The insulation of the low loss header across is used as thermal insulation.

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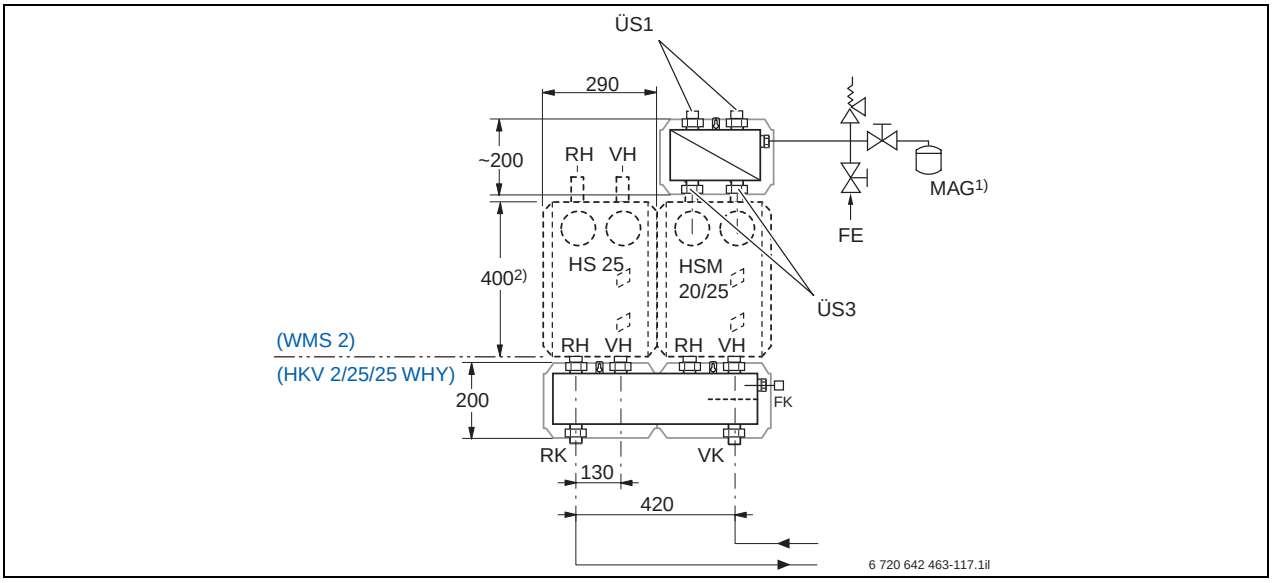

Fig. 91 Dimensions of the system separation set heating circuit distributor DN25 with integral low loss header for two heating circuits (dim. in mm)

FK Flow temperature sensor
FE Drain & fill valve
MAG Diaphragm expansion vessel
RH Non-return valve
RK Boiler return
ÜS1 Adaptor set G1¼ to G1½ (product no. 63 012 350), on-site pump
ÜS3 Adaptor set G1½ to G1¼ (product no. 63 034 128)
VH Heating circuit flow
VK Boiler flow
1) Install the MAG on site
2) Height of the heating circuit quick installation sets HSM 15(-E), HSM 20(-E), HSM 25(-E) and HS 25(-E)

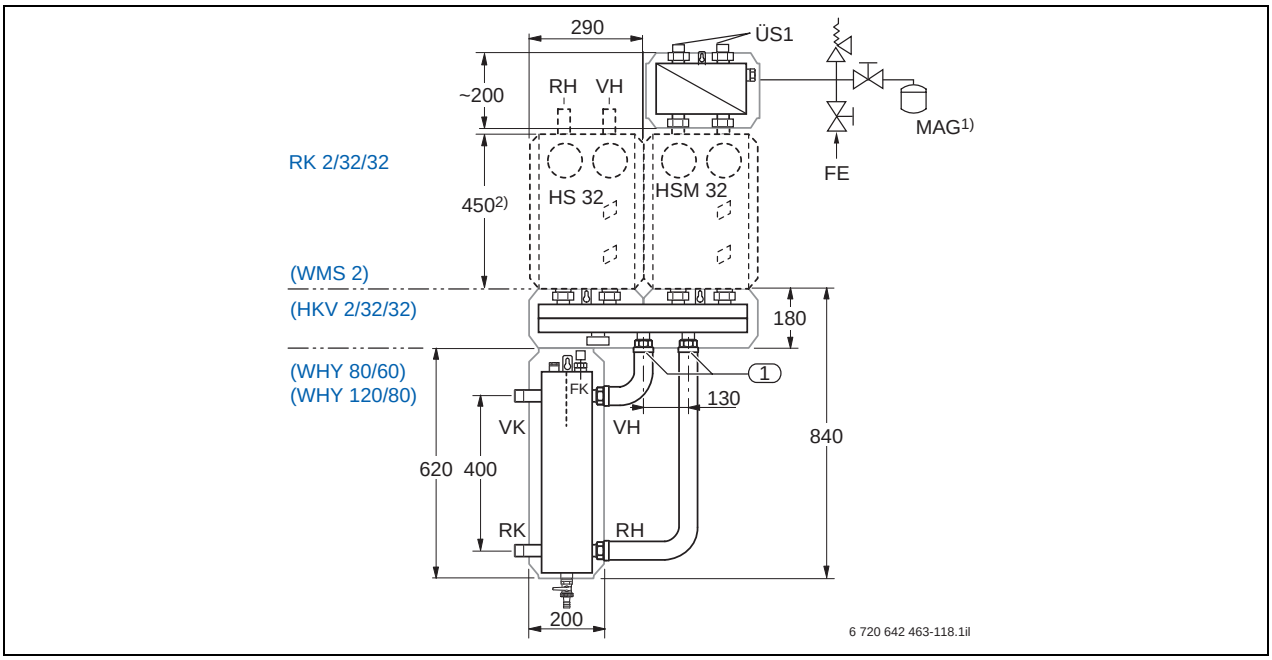

Fig. 92 Dimensions of the system separation set with components DN32 (dim. in mm)

FK Flow temperature sensor
FE Drain & fill valve
MAG Diaphragm expansion vessel
RH Non-return valve
RK Boiler return
ÜS1 Adaptor set G1¼ to G1½ (product no. 63 012 350), on-site pump
VH Heating circuit flow
VK Boiler flow
1 Connection pipes
1) Install the MAG on site
2) Height of the heating circuit quick installation sets HSM 32(-E) and HS 32(-E)

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8.6 Transferable output of the heating circuit quick installation sets

Set	K_{VS} [m^3/h]	Transferable output at ΔT = 20K and 200 mbar [kW]
HSM 15 E plus	2.5	16
HSM 20 E plus	6.3	40
HSM 25 E plus	8	45
HSM 32 E plus	18	55
HS 25/4 E plus	–	30
HS 25/6 E plus	–	50
HS 32 E plus	–	55

Table 39 Transferable output of the heating circuit quick installation sets

8.7 Heat meter set

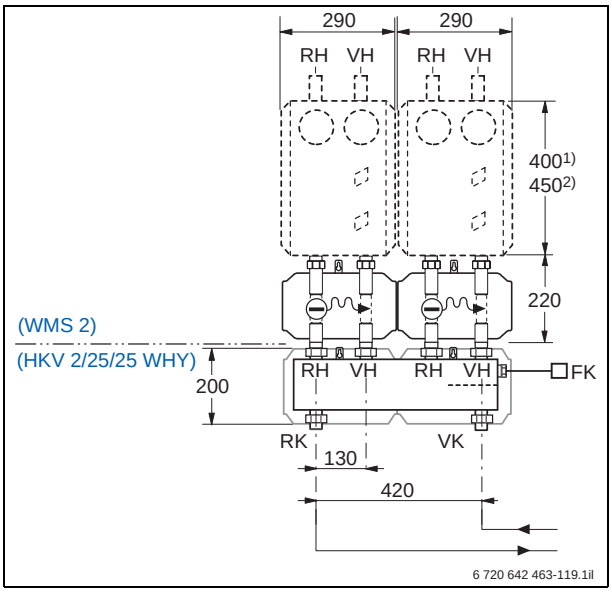

Fig. 93 Dimensions of the heat meter set (dim. in mm)

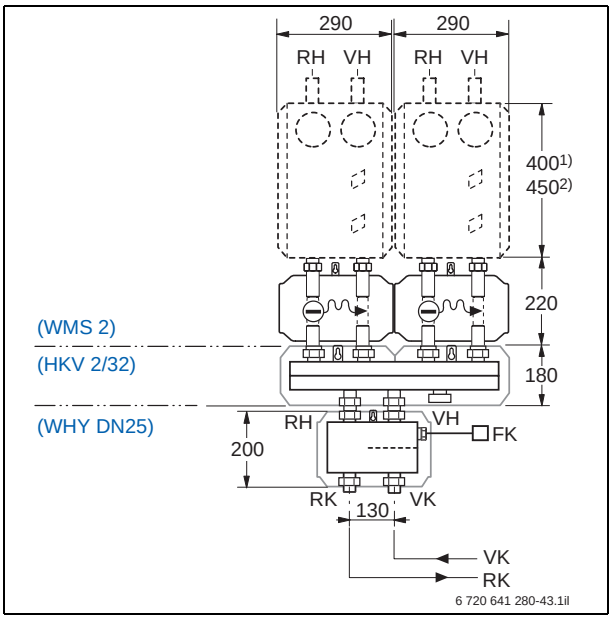

Fig. 94 Dimensions of the heat meter set with heating circuit distributor (dim. in mm)

Key to fig. 93 and fig. 94:

FK Flow temperature sensor
RH Non-return valve
RK Boiler return
VH Heating circuit flow
VK Boiler flow

1) Height of the heating circuit quick installation sets HSM 15, HSM 20, HSM 25 and HS 25
2) Height of the heating circuit quick installation sets HSM 32 and HS 32

The compact heat meters made by Pollux and by Deltamess can be used (→ current Buderus catalogue of heating accessories, chapter “Measuring and control technology”). Alternative heat meters cannot be used, as the insulation is matched to Pollux and Deltamess products. The heat meter is not part of the standard delivery of the set.

The heat meter set is available in two versions. One version for the heat meter of 110 mm length, ¾" flat gasket for the heat meter made by Pollux and Deltamess, and one for 130 mm length, 1" flat gasket. The set can be mounted immediately below a heating circuit quick installation set. The thermal insulation of the low loss header across is used as insulation, creating a harmonious design together with the heating quick installation set.

Combination	Required accessories	
	Requires ES 0 connection set (Product no. 6 7900 475)	Requires ÜS1 adaptor set (Product no. 6 3012 350)
Installation of the WMZ set on HKV DN25	–	–
Installation of the WMZ set on HKV DN32	yes	–
Installation of one HKS DN25 on the WMZ set	–	–
Installation of one HKS DN32 on the WMZ set	–	yes

Table 40 Accessories for different combinations

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8.8 Cascade units Logamax plus GB162-50, GB162-65, GB162-80 and GB162-100

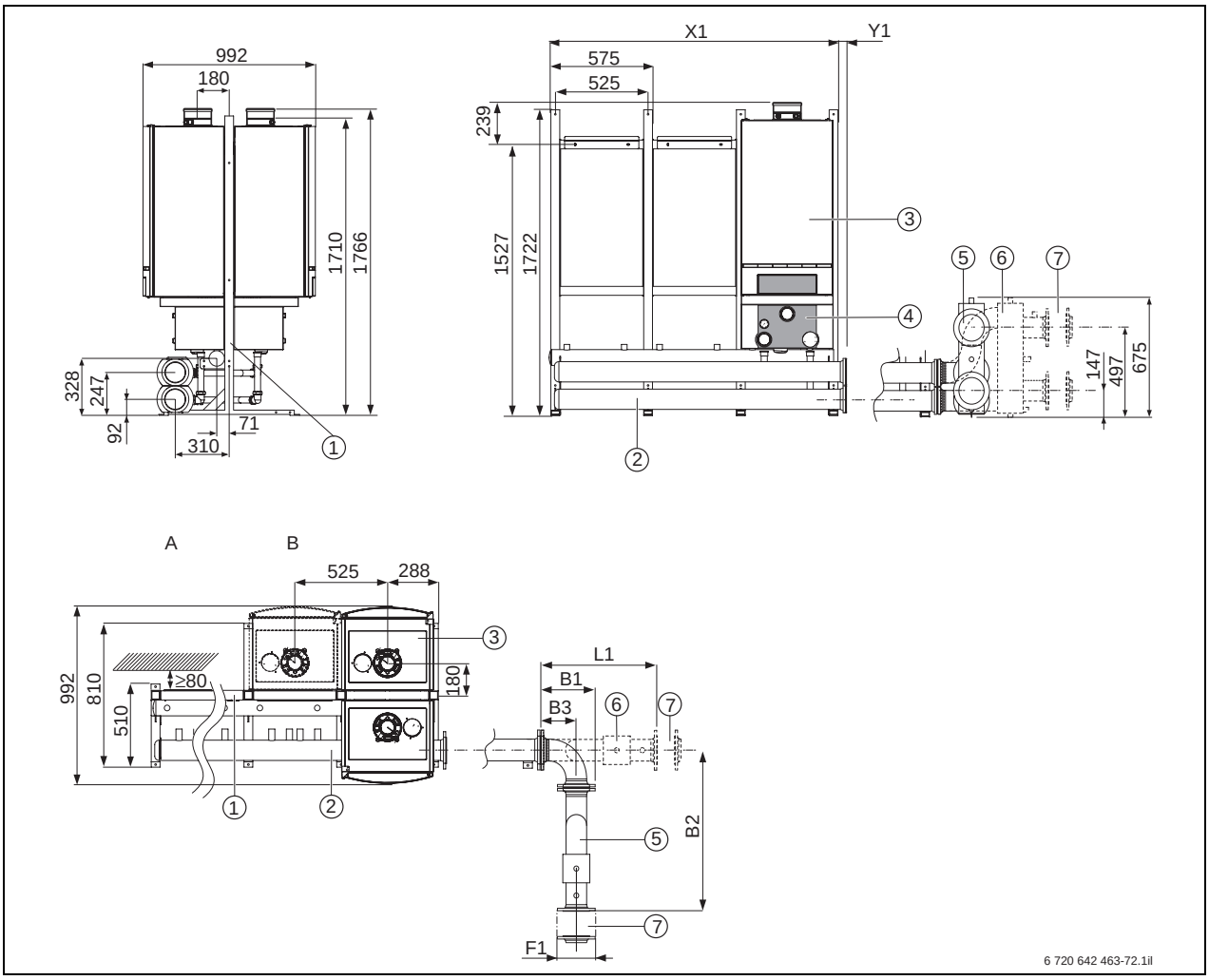

Fig. 95 Cascade unit dimensions (dim. in mm)

A In-line installation
B Installation at the back
1 Mounting support
2 Cascade header
3 GB162-50/65/80/100
4 Pump connection assembly (on-site connection of the MAG, connection ½ " part of the pump connection assembly)
5 Open distributor with bend set
6 Open distributor, straight
7 Flange (for welding) supplied

The supports for the cascade unit are secured to the floor.
The installation does not required a wall for support.

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Installation	Length X1 + Y1 [mm]	Width [mm]
TL2	1100 + 38 = 1138	575
TL3	1625 + 38 = 1663	575
TL4	2150 + 42 = 2192	575
TL5	2675 + 45 = 2720	575
TL6	3200 + 45 = 3245	575
TL7	3725 + 45 = 3770	575
TL8	4250 + 45 = 4295	575

Table 41 In-line installation (dimensional tolerance ± 5 %)

Installation	Length X1 + Y1 [mm]	Width [mm]
TL1/TR2	575 + 38 = 613	575/992
TR3	1100 + 42 = 1142	992
TR4	1100 + 42 = 1142	992
TR5	1625 + 45 = 1670	992
TR6	1625 + 45 = 1670	992
TR7	2150 + 45 = 2195	992
TR8	2150 + 45 = 2195	992

Table 42 Installation at the back (dimensional tolerance ± 5 %)

System	Low loss header [mm]	Header		Length [mm]	B1 [mm]	B2 [mm]	B3 [mm]	L1 [mm]	Flange dimension F1 Flange (for welding) C2631 37.2 [mm]	Gas/ welded connection [inch]
TL1, TL2, TL3, TR2	❑ 110	2½ "	straight	488	–	–	–	488	NW 65/76.1 PN6	R2
			right-angle	213	213	621	133	–		
TL4, TR3, TR4	❑ 150	3"	straight	571	–	–	–	571	NW 80/88.9 PN6	R2
			right-angle	252	252	728	157	–		
TL5	❑ 150	4"	straight	651	–	–	–	651	NW 100/114.3 PN6	2½ "
			right-angle	313	313	849	198	–		
TL6, TL7, TL8, TR5, TR6, TR7, TR8	❑ 150	4"	straight	651	–	–	–	651	NW 100/114.3 PN6	3"
			right-angle	313	313	849	198	–		

Table 43 Dimensions, open distributor

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9 Flue systems for open flue operation

9.1 General information for open flue operation

9.1.1 Regulations

In accordance with the [German] Technical Rules for Gas Installations DVGW-TRGI 2008, the contracted installer must seek the agreement of the responsible flue gas inspector prior to commencement of work on the flue system or notify the flue gas inspector of the installation in writing. In this connection, observe the relevant national and regional regulations. It is recommended to ask the flue gas inspector to confirm his participation in writing.

Gas combustion equipment must be connected to the flue on the same floor where it is installed.

Important standards, ordinances, regulations and directives concerning the sizing and implementation of flue systems are as follows:

- EN 483
- EN 677
- DIN-EN 13384-1 and DIN-EN 13384-2
- DIN 18160-1 and DIN 18160-5
- Technical Rules for Gas InstallationsDVGW-TRGI 2008 [Germany]
- Landesbauordnung (LBO) [Germany]
- Muster-Feuerungsverordnung (MuFeuVO) [Germany]
- Feuerungsverordnung (FeuVO) of the relevant Federal State [Germany]

9.1.2 System certification

The flues of the Buderus sets GA, ÜB-Flex with GA, GA-X with GA-K, ÜB-Flex with GA-X and GA-K, the sets of the flue cascade, GA-X with LAS-K for the connection to a moisture-resistant flue system (LAS multiple connection) and GN are system-certified together with the Logamax plus GB162 gas condensing boiler for open flue operation.

The system certification complies with the Gas Appliances Directive 90/396/EEC as well as the EN 483 and EN 677 standards. Joint approval of the Buderus set with the appliance is documented by the corresponding CE designation. The CE designation is listed in the technical guide of the relevant gas condensing boiler. No additional CE approval of the flue system is required.

The limits of application of the Buderus sets for open flue operation of the Logamax plus GB162 have been finalised. Special determinations for the implementation of the respective flue or air/flue pipe, the maximum permissible overall flue length and the number of diversions within the flue line are summarised on pages 116 to 126.

A calculation of the flue system to DIN-EN 13384-1/2 is not required. The manufacturer of the moisture-resistant chimney or air/flue gas system must only calculate the size of the moisture-resistant chimney in connection with the Buderus GN and LAS-K sets.

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9.1.3 General requirements of the installation room

Observe all building regulations and the Technical Rules for Gas Installations applicable to installation rooms (DVGW-TRGI 2008 [Germany]). The installation room must be free from the risk of frost.

Combustion air must be free from excessive dust levels and from halogenated compounds or other aggressive substances. Otherwise there would be a risk of damage to the burner and the heat exchanger surfaces.

Halogenated compounds are highly corrosive. These are contained, for example, in spray cans, thinners, cleaning & degreasing agents and in solvents.

Easily inflammable and explosive materials or liquids must not be stored or used in the vicinity of the gas condensing boiler.

The maximum surface temperature of the gas condensing boiler and the flue is less than 85 °C. Therefore, minimum clearances towards combustible building materials need not be observed. The boiler can, for example, be installed on a wooden wall (→ DVGW-TRGI 2008, section 8.1.6).

The boiler can be installed without minimum side clearances. All maintenance can be carried out from the front.

Prohibited installation areas

Never install gas appliances in essential stairwells (e.g. escape routes), rooms with essential stairwells and exits to the outside, or essential hallways. This does not apply to building categories 1 and 2.

Gas appliances must also never be installed in any rooms or parts thereof that are subject to explosion protection.

The following rooms are not permissible for gas appliances category B:

- Bathrooms and WCs without outside windows that are ventilated via common ducts and channels without electric fan extraction.
- Rooms or apartments from which fans extract air.
  Exceptions
  – The installation areas feature adequate vents to the outside.
  – The flue gas is routed to the outside by fans via ventilation and flue systems in accordance with DVGW Code of Practice G 626 [Germany].
  – The measures specified in section 8.2.2.3 of the DVGW-TRGI 2008 are maintained.
- Rooms or utility areas where combustion equipment is installed (e.g. fireplaces) that can be correctly operated in open flue mode.
  Exceptions
  – The requirements in section 9.2.1, first paragraph of the DVGW-TRGI 2008 are met in individual cases.
  – The gas condensing boilers are located in rooms where their operational reliability cannot be put at risk from the operation of open fireplaces.
  – The open combustion equipment has its own combustion air supply.

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Installation room conditions

Gas appliances type B_{23P} (formerly B_{23}) must be installed in rooms that feature a vent leading to the outside of at least 150 cm^2 or two vents of 75 cm^2 each; alternatively lines towards the outside with cross-sections offering the equivalent flow rate.

An additional 2 cm^2 are required for every kilowatt in excess of 50 kW total rated output.

Logamax plus	Cross-section for a single vent [cm^2]	Cross-section for two vents [cm^2]
GB162-50	150	75
GB162-65	180	90
GB162-80	220	110
GB162-100	250	125

Table 44 Required cross-sections of the vents for the Logamax plus GB162-50/65/80/100

Wire mesh and grilles must not reduce the required cross-section.

Gas appliances type B_{33} (up to 35 kW) may be installed in rooms with or without a door to the outside or a window that can be opened, independent of the volume of the room, subject to an adequate supply of combustion air and correct flue gas routing being ensured (interconnected room air supply to DVGW-TRGI 2008, section 9.2.2 [Germany]).

Installation room for rated output ≤ 100 kW

No particular installation room is required for operating the Logamax plus GB162 gas condensing boilers with an overall rated output of up to 100 kW in open flue mode.

Not permissible in rooms occupied by people is the installation of the Logamax plus GB162 gas condensing boiler in conjunction with the **GA and GN sets** (appliance type B_{23P} – formerly B_{23}) according to DVGW-TRGI 2008 [Germany].

The installation room must be equipped with vents towards the outside with the following cross-sections:

- ≤ 50 kW: 1 × 150 cm^2 or 2 × 75 cm^2
- > 50 kW: The vents must be at least 150 cm^2 plus 2 cm^2 for every kilowatt above a total rated output in excess of 50 kW.
  Accordingly, the Logamax plus GB162-65 requires a combustion vent to the outside with a clear cross-section of 1 × 180 cm^2 or 2 × 90 cm^2.

Permissible in rooms occupied by people, however, is the installation of the Logamax plus GB162 gas condensing boiler up to 35 kW in conjunction with the **GA-X set** (appliance type B_{33}). The output of the specified gas condensing boilers lies below 35 kW, and no flue gases can enter the installation room with air/flue gas routing via the GA-X set, since the flue inside the installation room is surrounded by combustion air. However, an adequate supply of combustion air must be ensured in compliance with DVGW-TRGI 2008, section 9.2, via an interconnected combustion air supply.

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Installation room for rated output > 100 kW

In accordance with DVGW-TRGI 2008, gas combustion equipment with a total rated output in excess of 100 kW requires a specific installation room. Observe relevant national or regional combustion ordinances.

A vent of 150 cm^2 plus 2 cm^2 for every kilowatt in excess of a total rated output of 50 kW towards the outside must be provided in the installation room.

For open flue operation, the installation room must meet the following requirements:

- The installation room must not be used for other purposes, except the following:
  - For routing services into the building, including their shut-off, control and measuring facilities
  - For the installation of combustion equipment for liquid fuels, heat pumps, CHP modules or permanently fixed internal combustion engines
  - For the storage of fuels
- The installation room must not have any opening to other rooms except doorways.
- The doors to the installation room must be tight and self-closing.
- The installation room must be able to be vented.

For solid fuel combustion equipment the rated output must not exceed 50 kW. If that is the case, the structural requirements for boiler rooms must be met.

Install an emergency stop switch outside the installation room in accordance with DVGW-TRGI 2008, section 8.1.4.2 [or local regulations].

9.1.4 Air/flue gas line

Buderus sets

The flue that is part of the Buderus set is made from plastic. It is installed as a complete pipe system or as a connection piece between the gas condensing boiler and a moisture-resistant chimney.

The flue systems are categorised in accordance with DIN-EN 14471. The flue systems certified by Buderus as systems correspond to the following classification (→ fig. 96):

- System-certified flue systems 1
  Internally PP, externally steel, e.g. GA-K, GAF-K, DO
  - EN 14471 T120 H1 o W 2 O00 E D L0
- System-certified flue systems 2Internally PP, externally PP, e.g. DO-S
  - EN 14471 T120 H1 o W 2 O00 I D L1
- System-certified flue systems 3Single wall PP, e.g. GA, GN
  - Combined with the Logamax plus GB162, with flue gas temperatures < 85 °C,
    EN 14471 T120 H1 o W 2 O00 I D L applies
  - If the approval of the flue system with flue gas temperatures of 120 °C is utilised,
    EN 14471 T120 H1 o W 2 O20 I D L applies

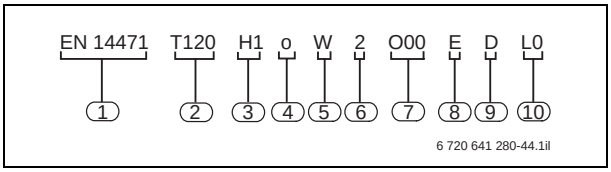

Fig. 96 Identification using system-certified flue system 1 as an example

1 Standard number
2 Temperature category
3 Pressure category
4 Soot fire resistance
5 Condensate resistance
6 Corrosion resistance
7 Clearance from combustible materials
8 Installation location
9 Fire resistance
10 Casing

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Explanation of the identification for Buderus

- Temperature category T120
  - Permissible flue gas temperature ≤ 120 °C
  - Test temperature 150 °C
- Pressure category H1
  - Leakage rate 0.006 $l \cdot s^{-1} \cdot m^{-2}$
  - Test pressure 5000 Pa high pressure flue systems
- Soot fire resistance category o
  - Flues that are not resistant to soot fires
- Condensate resistance category W
  - Flues for moist operation
- Corrosion resistance category 2
  - Fuel oil with a sulphur content up to 0,2 % (also applicable to gas)
- Clearance from combustible materials
  - The clearance of the outer casing of a flue system to combustible materials is designated Oxx. The value of xx is quoted in mm.
    Example: O50 corresponds to a clearance of 50 mm.
  - The clearance towards combustible materials applies when utilising the temperature category T120. If this is seen in conjunction with the boiler, then the maximum possible flue gas temperature of the boiler is decisive. If that lies below 85 °C, then no clearance is required. This must be specified in the manufacturer's documentation. When utilising single wall flues with the Logamax plus GB162, O00 applies.
- Installation location
  - Category I for the installation of the flue system or parts of the flue system inside a building
  - Category E for the installation of the flue system or parts of the flue system inside or outside a building
- Fire resistance category D (fire characteristics)
  - Not negligible contribution to a fire
- Casing categories
  - L0 for non-flammable casing
  - L1 for flammable casing
  - L for designs without casing

The flue system must be identified as system-certified following installation. For this purpose, an ID label is therefore supplied with each standard set (→ fig. 97).

Diesen Aufkleber an der Abgaseinführung als zusätzliche Kennzeichnung der Abgasanlage anbringen.

Buderus D – 35573 Wetzlar

Systemzertifizierte Abgasanlage für Buderus Gas-Brennwertkessel Logamax plus
sowie
Öl/Gas-Brennwertkessel Logano plus

Zulässige Installationsarten und Produktidentnummer siehe Kesseltypenschild. Zulässige maximale Baulängen und weitere Informationen entnehmen Sie bitte der Montageanleitung des Abgassystems oder der Planungsunterlage.

Die Produkte der Abgasanlage erfüllen ebenfalls die Anforderungen der EN14471 und können somit bei von der Systemzertifizierung abweichenden Installation gemäß nationaler Verwendungsregeln und den Produktvorgaben der CE-Zertifizierung 0036 CPD 9169 003 verwendet werden. Hierbei gilt:

Abgasleitung

- für Überdruck / Unterdruck
- für Brennstoffe Gas oder Heizöl EL
- maximal zulässige Abgastemperatur 120 °C
- Kennzeichnungsklassen:
  einwandig: EN14471 T120 H1 O W2 O20 I D L
  konzentrisch: EN14471 T120 H1 O W2 O00 E D L0

6 720 642 463-76.1il

Fig. 97 ID label for system certification

Combustion air supply

In open flue mode, the fan of the gas condensing boiler draws in the required combustion air from the installation room. A special ventilation air grille prevents the ingress of foreign bodies. It is part of the standard delivery of Buderus standard sets GA, GA-X and GN.

Condensate drain from the flue

To ensure the safe drainage of condensate, the flue must be installed with a 3° slope (5 cm/m) from the vertical section of the flue system towards the boiler. In the case of longer horizontal flue sections it may be necessary to support the horizontal section on site to ensure the correct slope towards the boiler. The condensate from the flue and from the flue gas header in the gas condensing boiler flows directly into the stench trap (siphon) of the gas condensing boiler.

Drain the condensate from the moisture-resistant flue system on site when connecting to a moisture-resistant flue system with the Buderus sets GN or GA-X with LAS-K (LAS multiple connection).

In flue cascades, the condensate flows from the vertical flue inside the shaft and the horizontal flue gas header via a special terminal piece with integral condensate drain, directly into a separate siphon that is part of the standard delivery of the Buderus standard set for flue cascades.

Route the condensate from the gas condensing boiler (the flue) and the moisture-resistant flue system correctly to the public sewer or neutralise it, if required. Special design information regarding condensate drainage → chapter 7.

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Shafts for flues

Shafts for flues must not be used for any other purpose.

Flues that bridge several floors must be arranged in their own shafts inside buildings.

Exceptions

- Flues in building categories 1 and 2, provided that the flue is not routed through more than one utility unit. Building categories 1 and 2 are those with a height to the top edge of the floor on the highest storey that could house an installation room of no more than 7 m on average above ground level, and with no more than two utility units of no more than 400 m^2 in total **or**
- Flues with a single connection inside the room where the combustion equipment is installed **or**
- Flues operated with negative pressure:
  - that offer a fire resistance of at least 90 minutes (ID L90 or higher) **and**
  - in building categories 1 and 2 that offer a fire resistance of at least 30 minutes (ID L30 and higher).

Several flues in a common shaft are only permissible if:

- the flues are made from non-combustible materials **or**
- the associated combustion equipment is installed on the same floor **or**
- a transfer of fire between floors is prevented through an automatic shut-off facility or other measures **or**
- the flue has received general Building Regulations approval.

These shafts must offer:

- a fire resistance of at least 90 minutes **and**
- in building categories 1 and 2, a fire resistance of at least 30 minutes.

Routing solar lines through existing shafts for flues

Deviating from para. 7 sect. 5 MFeuVO [Germany], retrospective routing of solar lines in existing flue shafts can be acceptable under the following conditions:

- The retrospective routing of solar lines in existing flue shafts is limited to building categories 1 and 2 (para. 2 sect. 3 sentence 1 no. 1 and 2 MBO) and to solar lines that transport water only.
- The heat transfer of solar lines and fittings should be limited by means of thermal insulation in accordance with the Energy Savings Order dated 16 November 2001, appendix 5, table 1 [Germany]. Alternatively, from a building regulations point of view, the minimum thickness of thermal insulation can also be halved. The insulating layers must be resistant to the maximum applicable temperatures inside the solar lines as well as to the temperature stresses resulting from the flue system.
- Safeguard the reliable operation of the combustion system through a calculation in accordance with DIN EN 13384-1: 2003 03.
- The inside wall of the shaft must be smooth and free from protrusions; all-round adequate secondary ventilation (annular gap) of the flue must still be ensured after the installation of the solar lines. Ensure the stability of the flue system as well as the permanent security of the solar lines and the sensor lead. Permanently prevent any contact between the flue and the thermally insulated solar lines.
- The clearance between the solar line (including thermal insulation) and flue line must be:
  - at least 2 cm for flues with circular cross-sections inside a rectangular shaft
  - at least 3 cm for flues with circular cross-sections inside a circular shaft **and**
  - at least 3 cm for flues with rectangular cross-sections inside a rectangular shaft.
- Using appropriate material, seal the remaining cross-sections in the shaft wall apertures through which the solar lines are routed.
- The solar lines including their thermal insulation must correspond to the requirements of the flue where their temperature resistance is concerned.

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9.1.5 Inspection apertures

According to DIN 18160-1 and DIN 18160-5, flue systems for open flue operation must be able to be inspected and cleaned easily and safely. For this, allow for inspection apertures (→ fig. 98 and fig. 99).

When arranging the inspection apertures, comply with the requirements of DIN 18160-5 as well as all locally applicable building regulations. For this we recommend contacting your local flue gas inspector [where appropriate].

Position of the lower inspection aperture

- When connecting the Logamax plus GB162 to a flue, allow for a lower inspection aperture:
  - In the vertical section of the flue, immediately above the flue diversion.
  - At the face of the straight horizontal flue section, no further than 1 m from the diversion into the vertical section, subject to there being no diversion in between (→ fig. 98, page 114) **or**
  - In the side of the horizontal section of the flue, no further than 30 cm from the diversion into the vertical section (→ fig. 99, pos. 4).
- When connecting the gas condensing boilers to a moisture-resistant flue system (LAS multiple connection), provide a lower inspection aperture below the lowest connection at the base of the vertical section of the moisture-resistant flue (LAS).
- Provide a floor area of at least 1 m × 1 m to DIN 18160-5 in front of the lower inspection aperture.

Position of the upper inspection aperture

- An upper inspection aperture is not required, if:
  - Theinternal diameter of the flue is ≤ DN200.
  - The lower inspection aperture at DN160 and DN200 is arranged in accordance with fig. 99, pos. 3.
  - The lower inspection aperture is located no further than 15 m from the terminal.
  - The vertical flue section is routed at an angle of no more than 30° (corbelled).
  - The lower inspection aperture is implemented in accordance with DIN 18160-1 and 18160-5 (→ fig. 98 and fig. 99).
- Upstream and downstream of every diversion in excess of 30°, an additional inspection bend is required.
- Provide a floor area of at least 0.5 m × 0.5 m to DIN 18160-5 in front of the upper inspection aperture.

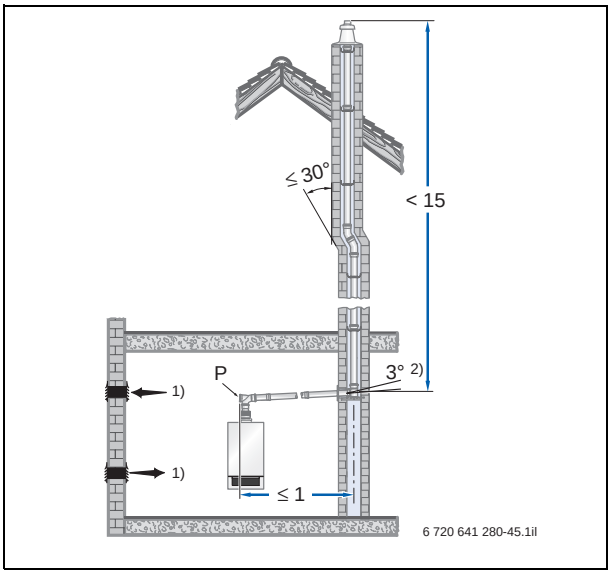

Fig. 98 Example with the inspection aperture (P) located in a horizontal flue without diversions in the installation room (dim. in m)

1) Vent to the outside (→ tab. 44, page 110)
2) 3° = 5 cm/m

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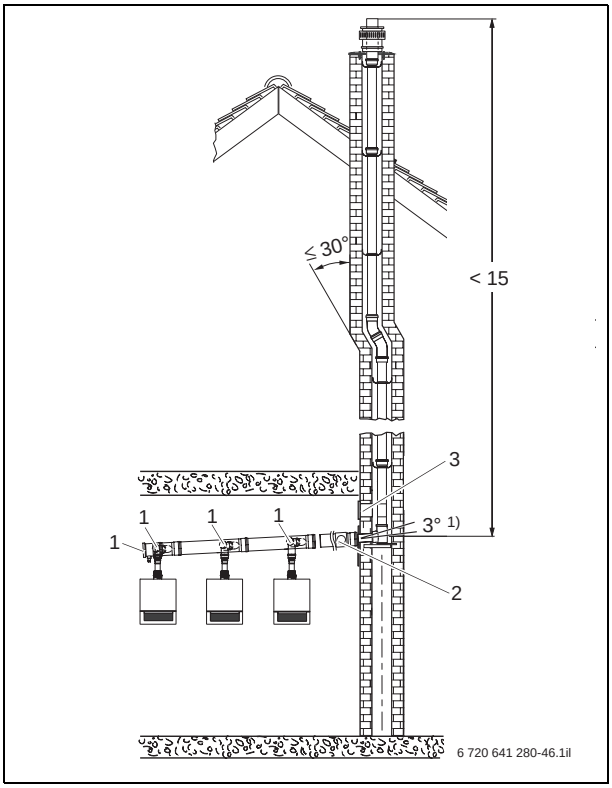

Fig. 99 Example with the inspection aperture located in a cascade (dim. in m)

1 Inspection aperture (part of the standard delivery)
2 Lower inspection aperture
3 Upper inspection aperture

1) 3° = 5 cm/m

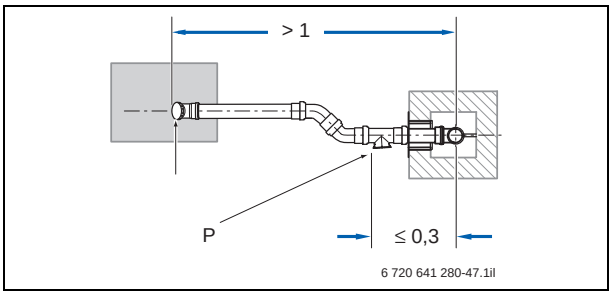

Fig. 100 Example with the inspection apertures (P) located in a horizontal flue with diversions in the installation room - top view (dim. in m)

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9.2 Flue gas routed through a flue inside a shaft with GA set and secondary ventilation for the Logamax plus GB162 up to 45 kW

Appliance type B_{23P} (formerly B_{23})

Observe the general information on page 108 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	50	L – 1.5
GB162-25	50	L – 1.5
GB162-25 T40S	50	L – 1.5
GB162-35	39	L – 1.5
GB162-45	31	L – 1.5

Table 45 Maximum permissible total flue length (→ fig. 102)

1) These lengths include the pipe diversions included in the standard set; horizontal length L = 2 m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

According to the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], the adequate supply of combustion air in the installation room requires vents towards the outside with a free cross-section of 1 × 150 cm^2 or 2 × 75 cm^2.

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for the secondary ventilation of the flue (→ fig. 101).

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 114 f.).

Shaft terminal in conjunction with combustion equipment for solid fuel

If the shaft cover of the GA set and the chimney terminal of combustion equipment for solid fuel are side by side, then the shaft cover must be made from non-combustible material. In such applications use the standard GA set with stainless steel shaft cover and terminal pipe (→ fig. 102).

If there is a risk of soot fire in the adjacent chimney, the plastic flue must be at least 50 mm away from the wall of the adjacent chimney (according to the state combustion order [Germany]). Where this cannot be ensured, design the flue using non-combustible materials (e.g. stainless steel → fig. 101) and route it inside the shaft used for the condensing boiler.

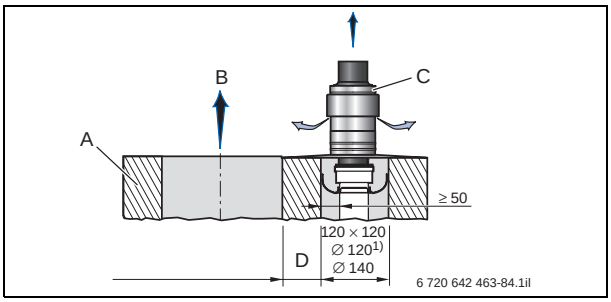

Fig. 101 Minimum dimensions of the shaft cross-section and the shaft terminal for the flue (dim. in mm)

A Chimney F 90
B Flue gas from the combustion equipment for solid fuel
C Stainless steel shaft cover
D Minimum wall thickness for chimney F90 (L90)
1) Required shaft cross-section with ≤ 1.5 mm surface finish

GA set

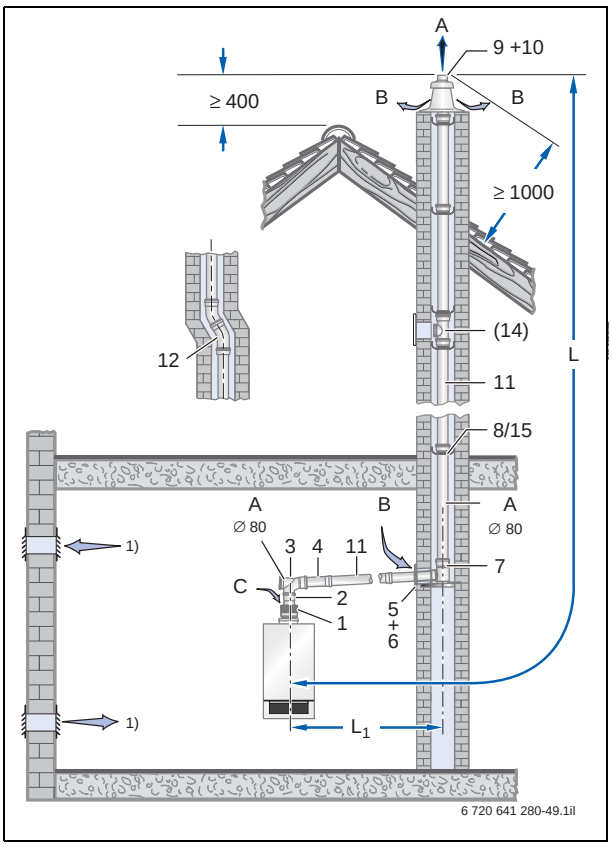

Fig. 102 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
1) Vent to the outside 1 × 150 cm^2 or 2 × 75 cm^2

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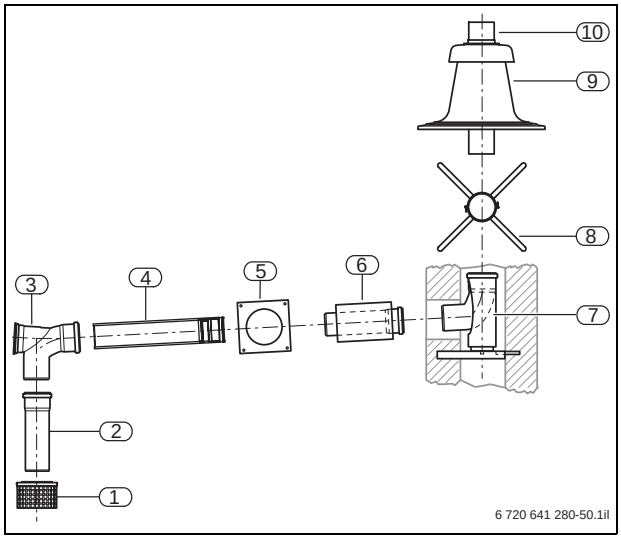

Fig. 103 Plastic components of the GA set

1 Ventilation air grille
2 Flue pipe, 250 mm long
3 Inspection bend
4 Flue pipe, 500 mm long
5 Fascia
6 Concentric wall outlet, Ø 80 mm, 500 mm long
Ø 125 mm, 300 mm long
7 87° bend including support and support rail
8 Spacer (6 pce)
9 Shaft cover
10 Terminal pipe without female connection, Ø 80 mm, 500 mm long

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Flue gas routed through a flue inside a shaft with GA set and secondary ventilation	Product no.	Details
Standard GA set for Logamax plus GB162 up to 45 kW		
GA, PP plastic, Ø 80 mmWith stainless steel shaft cover and terminal pipe[1)]	87 094 034 87 094 523	fig. 103
Optional equipment		
Flue pipe pack, Ø 80 mm: 4 pipes 2000 mm, 1 pipe 1000 mm, 2 pipes 500 mm long	77 190 036 69	fig. 102, pos. 11
Flue pipe, Ø 80 mm, 500 mm long, effective length 450 mm	77 190 015 25	
Flue pipe, Ø 80 mm, 1000 mm long, effective length 950 mm	77 190 015 26	
Flue pipe, Ø 80 mm, 2000 mm long, effective length 1950 mm	77 190 015 27	
87° bend	77 190 015 34	fig. 102, pos. 12
45° bend	77 190 015 35	
30° bend	77 190 018 51	
15° bend	77 190 018 50	
87° inspection bend	87 094 537	–
Pipe with inspection aperture	77 190 015 33	fig. 103, pos. 3
Spacer (4 pce)	87 094 614	fig. 102, pos. 15
Stainless steel shaft cover and terminal pipe[1)]	87 094 920	–
Adaptor plastic pipe DN80 to stainless steel for the use of stainless steel flue pipes DN80 by Raab	77 472 255 08	–
Adaptor plastic pipe DN80/125 to stainless steel for the use of stainless steel flue pipes DN80/125 by Raab	77 472 255 09	–

Table 46 Components of the GA set

1) Not in connection with ÜB-Flex

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9.3 Flue gas routed through a flue inside a shaft with GA set and secondary ventilation for the Logamax plus GB162-50, GB162-65, GB162-80 and GB162-100

Appliance type B_{23P} (formerly B_{23})

Observe the general information on page 108 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-50	50	L – 1.5
GB162-65	50	L – 1.5
GB162-80	35	L – 1.5
GB162-100	35	L – 1.5

Table 47 Maximum permissible total flue length (→ fig. 105)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

According to the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], the adequate supply of combustion air in the installation room requires vents towards the outside with specified cross-sections (→ tab. 44, page 110).

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for the secondary ventilation of the flue (→ fig. 101).

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 114 f.).

Shaft terminal in conjunction with combustion equipment for solid fuel

If the shaft cover of the GA set and the chimney terminal of combustion equipment for solid fuel are side by side, then the shaft cover must be made from non-combustible material.

In such cases, replace the standard shaft cover of the plastic flue with a stainless steel terminal pipe (→ fig. 101).

If there is a risk of soot fire in the adjacent chimney, the plastic flue must be at least 50 mm away from the wall of the adjacent chimney (according to the state combustion order [Germany]). Where this cannot be ensured, design the flue using non-combustible materials (e.g. stainless steel → fig. 101) and route it inside the shaft used for the condensing boiler.

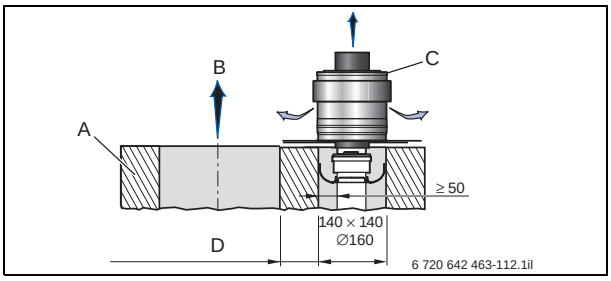

Fig. 104 Minimum dimensions of the shaft cross-section and the shaft terminal for the flue (dim. in mm)

A Chimney F 90
B Flue gas from the combustion equipment for solid fuel
C Stainless steel shaft cover
D Minimum wall thickness for chimney L90 (F90)

GA set

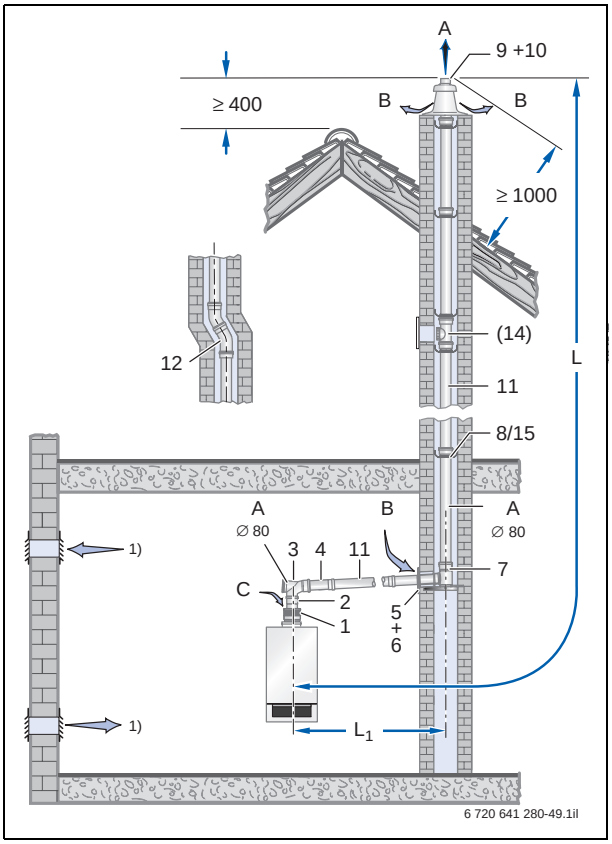

Fig. 105 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
1) Vent to the outside (→ tab. 44, page 110)

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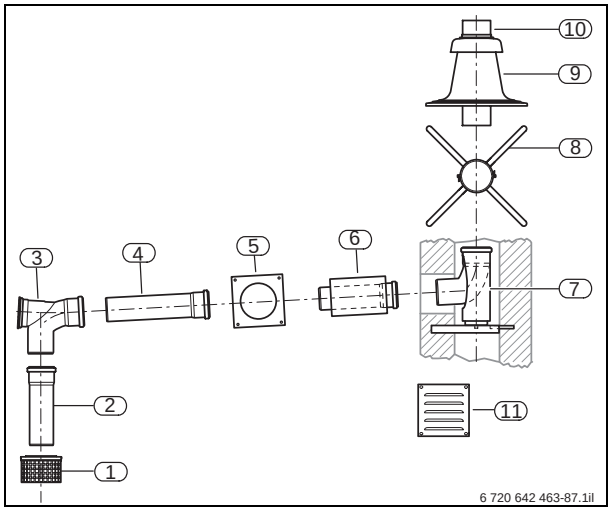

Fig. 106 Plastic components of the GA set

1 Ventilation air grille
2 Flue pipe, 250 mm long
3 Inspection bend
4 Flue pipe, 500 mm long
5 Fascia
6 Concentric wall outlet
7 87° bend including support and support rail
8 Spacer (6 pce)
9 Shaft cover
10 Terminal pipe without female connection, 500 mm long
11 Air grille

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Flue gas routed through a flue inside a shaft with GA set and secondary ventilation	Product no.	Details
Standard GA set for Logamax plus GB162-50/65/80/100		**DN110**
GA in PP plastic	87 094 062	fig. 106
Optional equipment		
Flue pipe, 500 mm long	87 090 400	fig. 105, pos. 12
Flue pipe, 1000 mm long	87 090 404	
Flue pipe, 2000 mm long	87 090 408	
87° bend	87 090 309	–
45° bend	87 090 305	
30° bend	87 090 300	
15° bend	87 090 296	
87° inspection bend	87 090 875	fig. 105, pos. 14
Pipe with inspection aperture	87 090 236	fig. 105, pos. 15
Flue pipe, 500 mm long	87 090 400	–
Flue pipe, 1000 mm long	87 090 404	
Flue pipe, 2000 mm long	87 090 408	
87° bend	87 090 308	–
45° bend	87 090 304	
30° bend	87 090 300	
15° bend	87 090 296	
Pipe with inspection aperture	87 090 240	–
Spacer (4 pce)	87 090 421	–
Stainless steel shaft cover and terminal pipe[1)]	87 090 150	–

Table 48 Components of the GA set

1) Not in connection with ÜB-Flex

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9.4 Concentric air/flue gas routing in open flue operation with GA-X set in conjunction with GA-K or LAS-K set (LAS multiple connection) for the Logamax plus GB162 up to 35 kW

Appliance type B_{33}

Observe the general information on page 108 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
Standard GA-X set in conjunction with GA-K		
GB162-15	50	$L_1+L_2-1.5$
GB162-25	33	$L_1+L_2-1.5$
GB162-25 T40S	33	$L_1+L_2-1.5$
GB162-35	25	$L_1+L_2-1.5$
Standard GA-X set in conjunction with LAS-K		
GB162-15	1.4[3)]	4)
GB162-25	1.4[3)]	
GB162-25 T40S	1.4[3)]	
GB162-35	1.4[3)]	

Table 49 Maximum permissible total flue length (→ fig. 107)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m
2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis
3) Greater lengths are also possible following a calculation by the LAS manufacturer
4) Values as supplied by the LAS chimney manufacturer

Adequate combustion air supply

When using the GA-X set, flue gas cannot enter the installation room as the flue is surrounded by combustion air inside the room. Therefore, this method of routing air/flue gas is permissible for occupied rooms, subject to the total output of the open flue combustion equipment not exceeding 35 kW, and an adequate interconnected combustion air supply in accordance with DVGW-TRGI 2008, section 5.5. Alternatively, the installation room requires vents towards the outside (→ fig. 107).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 114 f.).

When using the GA-X set in conjunction with the GA-K set, maintain minimum dimensions of shaft cross-section to ensure that the remaining cross-section is adequate for the secondary ventilation of the flue (→ fig. 142, page 150). For further requirements when using the GA-K set, → page 148 ff.

Air/flue gas system

GA-X and LAS-K sets enable multiple appliances to be connected to a single air/flue gas system. The manufacturer of the LAS will calculate the required cross-section. [In Germany] the connection of multiple appliances requires the permission of the flue gas inspector.

GA-X set in in conjunction with the GA-K set or LAS-K

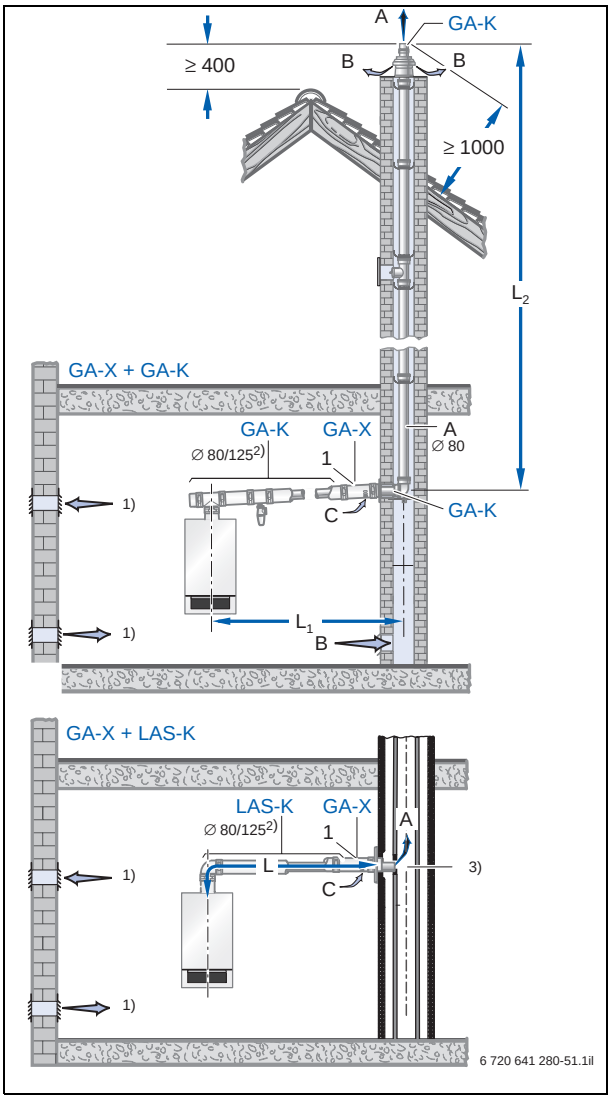

Fig. 107 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
1) Interconnected combustion air supply to TRGI or vent to the outside 1 × 150 cm^2 or 2 × 75 cm^2
2) Air/flue gas concentric
3) The manufacturer of the LAS will calculate and supply the required cross-section.

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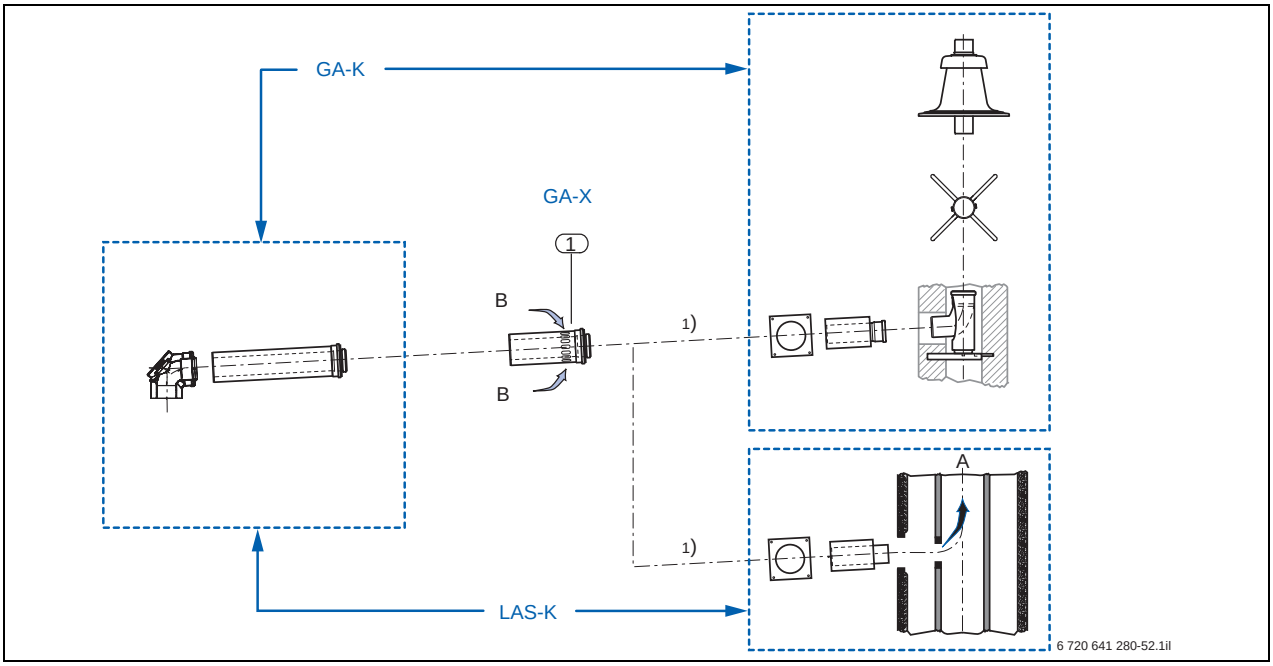

Fig. 108 Components of the standard GA-X set in plastic, in conjunction with the standard GA-K set (→ table 71, page 148) or LAS-K (→ tab. 81, page 158)

A Flue gas
B Ventilation air
1 Concentric pipe with ventilation air grille, gasket for the ventilation air pipe at the female connection
1) Alternative

Concentric air/flue gas routing in open flue operation with GA-X set	Product no.	Details
Standard GA-X set for Logamax plus GB162 up to 35 kW		
GA-X in PP plastic/zinc-plated steel (painted white), Ø 80/125 mm	87 094 528	fig. 108
For concentric air/flue gas routing via a flue with secondary ventilation in a shaft, the standard GA-X set is only permissible in conjunction with the standard GA-K set (GA-K in conjunction with GA-X only permissible up to 35 kW). **For combining the standard GA-Xset with standard GA-K set:** GA-K in PP plastic/zinc-plated steel (painted white), Ø 80/125 mmWith shaft cover and terminal pipe made from stainless steel[1)]	– 77 472 153 65 77 472 153 66	– fig. 141, page 149
Air grille	87 092 146	fig. 107
For concentric air/flue gas routing via a moisture-resistant flue system (multiple connection), the standard GA-X set is only permissible in conjunction with the LAS-K set (LAS-K in conjunction with GA-X only permissible up to 35 kW). **For combining the standard GA-X set with the standard LAS-K set:** LAS-K in PP plastic/zinc-plated steel (painted white), Ø 80/125 mm	– 77 472 153 70	– fig. 154, page 159
Optional equipment		
Components for the air/flue gas line inside the installation room and for flues in shafts with secondary ventilation: The additional equipment to supplement the standard GA-K set is listed for the Logamax plus GB162 up to 45 kW. However, the use of the GA-K set in conjunction with GA-X is only permissible, in accordance with the DVGW-TRGI 2008 [Germany], up to a total rated output of the open flue combustion equipment of up to 35 kW.	–	Table 72, page 149
Components for the air/flue gas line inside the installation room: The additional equipment to supplement the standard LAS-K set is listed for the Logamax plus GB162 up to 45 kW. However, the use of the LAS-K set in conjunction with GA-X is only permissible, in accordance with the DVGW-TRGI 2008 [Germany], up to a total rated output of the open flue combustion equipment of up to 35 kW.	–	Table 82, page 159

Table 50 Components of the GA-X set in conjunction with the GA-K set or LAS-K

1) Not in connection with ÜB-Flex

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9.5 Routing flue gas via flexible flues inside a shaft with ÜB-Flex set in conjunction with the GA set or with the GA-X and GA-K sets

For the Logamax plus GB162 the ÜB-Flex set is only permissible in conjunction with the GA set or the GA-X and GA-K sets. The (air)/flue gas line of the ÜB-Flex set in conjunction with the GA set (appliance type B_{23P} – formerly B_{23}) or the GA-X and GA-K sets (appliance type B_{33}) has been system-certified together with the Logamax plus GB162 (for ÜB-Flex with GA-X and GA-K only up to 35 kW), GB162-45 and GB162-50/65/80/100 (only GA in conjunction with ÜB-Flex).

Observe the general information on page 108 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	50	L – 1.5
GB162-25	33	L – 1.5
GB162-25 T40S	33	L – 1.5
GB162-35	24	L – 1.5
GB162-45	22	L – 1.5
GB162-50	50	L – 1.5
GB162-65	50	L – 1.5
GB162-80	35	L – 1.5
GB162-100	35	L – 1.5

Table 51 Maximum permissible total flue length (→ fig. 110)

1) These lengths include the pipe diversions included in the standard GA-K set; horizontal length L_1 = 2 m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

Subject to the selected combination, the design information appertaining to the GA set (→ page 116 and page118) or those appertaining to the GA-X set apply in conjunction with the GA-K set (→ page 120). Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for the secondary ventilation of the flue (→ fig. 109).

According to the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], the adequate supply of combustion air in the installation room requires vents towards the outside with specified cross-sections (→ tab. 44, page 110).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 114 f.).

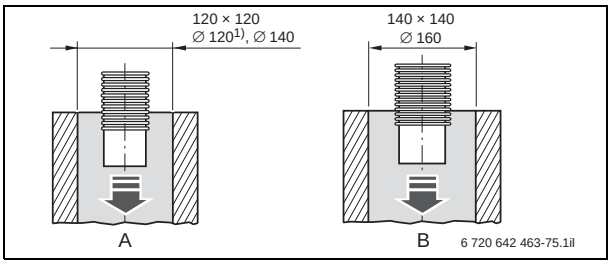

Fig. 109 Minimum dimensions of the shaft cross-section for the installation of the flexible flue (dim. in mm)

A Boilers up to 45 kW
B For boilers from 50 kW to 100 kW (45 kW for DN110)
1) Required shaft cross-section with system certification for ≤ 1.5 mm surface finish

ÜB-Flex set in conjunction with the GA set or the GA-X and GA-K sets

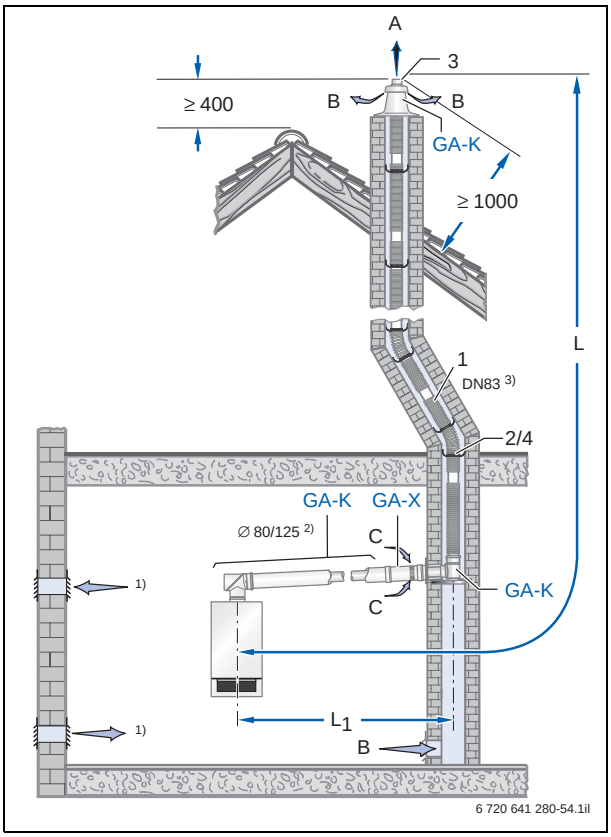

Fig. 110 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
1) Interconnected combustion air supply to TRGI or vent to the outside (→ tab. 44, page 110)
2) Air/flue gas concentric
3) Flexible flue pipe

Special installation room > 50 kW → page 111

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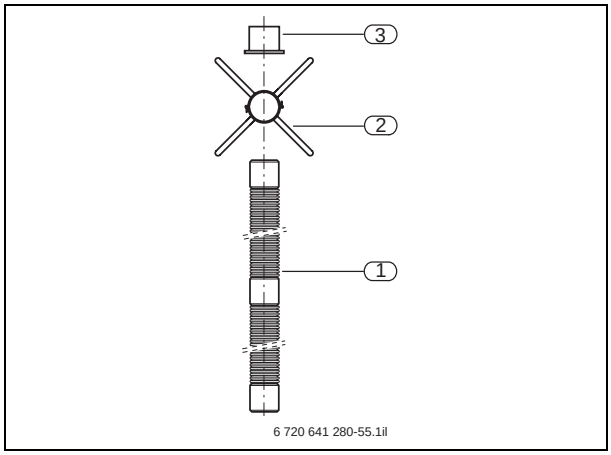

Fig. 111 Plastic components of the ÜB-Flex set, DN83

1 Flexible flue DN83, 12.5 m or 25 m long
2 Spacer for flexible flue, DN83, 8 pce (for 12.5 m) or 16 pce (for 25 m)
3 Spring ring for retainer, incl. terminal pipe

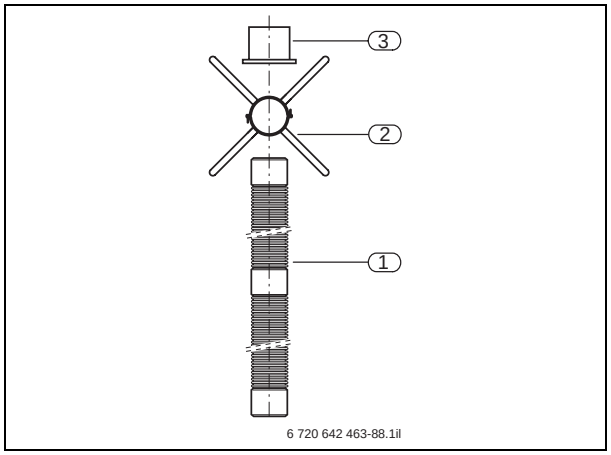

Fig. 112 Plastic components of the ÜB-Flex set, DN110

1 Flexible flue DN110, 15 m or 25 m long
2 Spacer for flexible flue, DN110, 8 pce (for 15 m) or 16 pce (for 25 m)
3 Spring ring for retainer, incl. terminal pipe

Routing flue gas via flexible flues inside a shaft with ÜB-Flex set in conjunction with the GA set or with the GA-X and GA-K sets	**Product no.**	**Product no.**	**Details**
Standard ÜB-Flex set for Logamax plus GB162	**DN83 up to 45 kW**	**DN110 from 50 kW**	
Standard ÜB-Flex set 12.5 m (15 m for DN110)With flexible plastic flue PP, 12.5 m long (15 m for DN110)	87 094 036	87 090 036	fig. 111 and fig. 112
Standard ÜB-Flex set 25 m With flexible plastic flue PP, 25 m long	87 094 038	87 090 038	fig. 111 and fig. 112
For operation of the Logamax plus GB162, the standard ÜB-Flex set is only permissible in conjunction with standard GA set. **To combine the ÜB-Flex set with the standard GA set:** GA in PP plastic	87 094 034	87 094 352	– Table 46, page 117
For operation of the Logamax plus GB162 **in occupied rooms** the standard ÜB-Flex set is only permissible in conjunction with the standard GA-X and GA-K sets. **To combine the ÜB-Flex set with the standard GA-K and GA-X sets**: GA-X in PP plastic/zinc-plated steel (painted white), Ø 80/125 mm GA-K in PP plastic/zinc-plated steel (painted white), Ø 80/125 mm	 87 094 528 77 472 153 65	 – –	– Table 50, page 121
Optional equipment	**DN83**	**DN110**	
Spacer for flexible flue, 4 pce	87 094 614	87 090 421	fig. 110, pos. 4
Union for two flexible flue pipes	87 094 668	87 094 724	–
Pipe with inspection aperture ÜB-Flex	87 094 676	87 094 728	–
Components for the flue inside the installation room (additional equipment to supplement the standard GA set for Logamax plus GB162)	Table 46, page 117	Table 48, page 119	–
Components for the air/flue gas line inside the installation room: The additional equipment to supplement the standard GA-K set is listed for the Logamax plus plus GB162 up to 45 kW. However, the use of the GA-K set in conjunction with GA-X is only permissible, in accordance with the DVGW-TRGI 2008 [Germany], up to a total rated output of the open flue combustion equipment of up to 35 kW.	Table 72, page 149 Table 50, page 121	–	–
Draw-in aid for easy installation of the flexible pipe	87 090 580	87 090 578	–

Table 52 Components of ÜB-Flex set in conjunction with the GA set or in conjunction with the GA-K and GA-X sets, but not in connection with a stainless steel shaft cover and terminal pipe

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9.6 Routing the flue gas via a moisture-resistant chimney with GN set

Appliance type B_{23} (formerly B_{23})

Observe the general information on page 108 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162	2	none

Table 53 Maximum permissible total flue length (→ fig. 113)

1) These lengths include the pipe diversions included in the standard set

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

According to the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], the adequate supply of combustion air in the installation room requires vents towards the outside with a free cross-section of 1 × 150 cm^2 or 2 × 75 cm^2 (up to 50 kW rated output). An additional 2 cm^2 are required for every kilowatt in excess of 50 kW total rated output (→ tab. 44, page 110).

Chimney connection

Even when connecting the Logamax plus GB162 to a moisture-resistant special chimney, only a flue approved together with the gas condensing boiler that is suitable for positive pressure (e.g. Buderus standard GN set) may be used as a connection piece. In Germany, the moisture-resistant chimney must be approved by the Deutsches Institut für Bautechnik (DIBt).

Sizing the moisture-resistant chimney

The sizing of the connection piece and the chimney must ensure that positive pressure in the gas-tight flue is reduced and consequently only negative pressure persists inside the moisture-resistant chimney (→ fig. 113). Only the relevant manufacturer should calculate and deliver the moisture-resistant chimney. The flue gas parameters must be known to enable the calculation to be carried out (→ tab. 54).

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 114 f.).

GN set

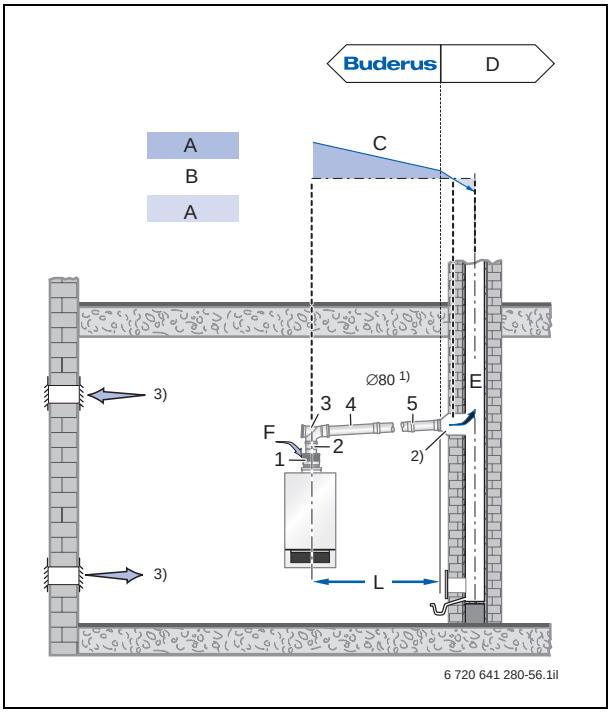

Fig. 113 Installation version (dim. in mm)

A Positive pressure
B Atmospheric pressure
C Reduction of positive pressure
D Chimney manufacturer
E Flue gas
F Ventilation air
1) Flue pipe
2) Connection piece supplied by the manufacturer of the moisture-resistant chimney
3) Vent to the outside (→ tab. 44, page 110)

Special installation room > 50 kW → page 111

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Logamax plus	Flue gas mass flow rate	Flue gas temperature, full load		CO_2 content	Available draught
	Full load	at 50/30 °C	at 80/60 °C	Full load G20/G25	max.
	[g/s]	[°C]	[°C]	[%]	[Pa]
GB162-15	6.6	42	63	9.2	85
GB162-25	10.7	46	65	9.2	60
GB162-25 T40S	10.7 (15.1[1)])	46	65 (75[1)])	9.2	60
GB162-35	15.1	48	67	9.0	95
GB162-45	20.3	49	69	9.3	140
GB162-50	21.6	43	60	9.3	85
GB162-65	27.9	42	64	9.4/9.3	120
GB162-80	35.3	48	67	9.3/9.2	139
GB162-100	44.9	51	76	9.4/9.2	220

Table 54 Flue gas parameters to size a moisture-resistant chimney in accordance with DIN-EN 13384-1

1) In DHW mode

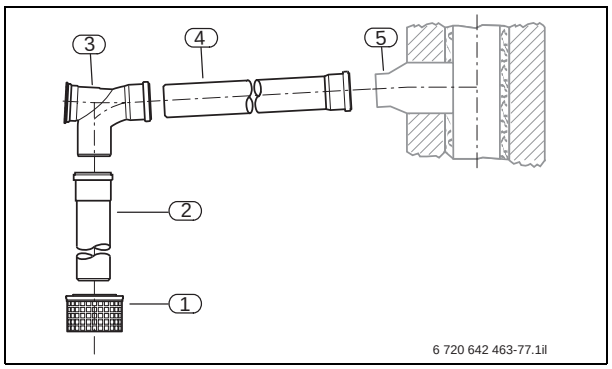

Fig. 114 Plastic components of the standard GN set

1 Ventilation air grille
2 Flue pipe
250 mm long for DN80
500 mm long for DN110
3 Inspection bend
4 Flue pipe, 1000 mm long
5 Connection piece -
Supplied by the manufacturer of the moisture-resistant chimney

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Routing the flue gas via a moisture-resistant chimney with GN set	Product no.	Product no.	Details
Standard GN set for Logamax plus	**DN80 up to 45 kW**	**DN110 up to 100 kW**	
GN in PP plastic	87 094 044	87 094 064	fig. 114
Optional equipment			
Flue pipe pack, 4 pipes 2000 mm, 1 pipe 1000 mm, 2 pipes 500 mm long	77 190 036 69	–	
Flue pipe, 500 mm long, effective length 450 mm	77 190 015 25	87 090 400	–
Flue pipe, 1000 mm long, effective length 950 mm	77 190 015 26	87 094 404	
Flue pipe, 2000 mm long, effective length 1950 mm	77 190 015 27	87 090 408	
87° bend	77 190 015 34	87 090 309	
45° bend	77 190 015 35	87 090 305	–
30° bend	77 190 018 51	87 090 300	
15° bend	77 190 018 50	87 090 296	
87° inspection bend	87 094 537	87 090 875	–
Pipe with inspection aperture	77 190 015 33	87 090 236	–

Table 55 Components of the GN set

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9.7 Flue gas routed through a flue gas header inside a shaft with flue cascade set

Appliance type B_{23P} (formerly B_{23})

Observe the general information on page 108 ff.

For cascades with Logamax plus GB162 gas condensing boilers, a special installation room is required for a rated output in excess of 100 kW, (according to the Muster-Feuerungsverordnung [Germany] (→ page 110).

Mode of operation

- Positive pressure operation when all gas condensing boilers operate at full load.
- Negative pressure operation as soon as one gas condensing boiler is shut down.

The negative pressure operation at partial load ensures that the flue gas cannot re-enter the room via the gas condensing boilers. This makes shut-off dampers unnecessary.

Adequate combustion air supply

According to the Technical Rules for Gas Installations [in Germany] DVGW-TRGI 2008, a vent of at least 150 cm^2 plus 2 cm^2 for every kilowatt in excess of a total rated output of 50 kW towards the outside must be provided in the installation room accommodating a cascade of Logamax plus GB162 gas condensing boilers. This cross-section can be split over two vents (→ tab. 44, page 110).

Maintain the minimum dimensions of the shaft cross-section to ensure that the remaining cross-section is adequate for the installation and the secondary ventilation of the flue (→ tab. 56).

Minimum shaft cross-section

Flue	Minimum shaft dimensions	
Ø	Cross-section, circular	Cross-section, rectangular
[mm]	[mm]	[mm × mm]
110	160	140 × 140
125	180	180 × 180
160	200	200 × 200
200	250	250 × 250
250	330	310 × 310
315	400	380 × 380

Table 56 Minimum shaft cross-section for the installation of the flue (→ fig. 101, page 116)

Sizing applies including the flue gas header downstream of the last appliance with a length of up to 2.5 m, the support bend in the standard shaft set and one additional 90° diversion.

In the case of several additional diversions, carry out a calculation according to DIN-EN13384-2.

If the combination of GB162 appliances varies from those in the sizing table (→ tab. 57) or there are combinations of different Logamax plus appliance types, carry out a calculation to DIN-EN 13384-2 when using a flue cascade.

Inspection apertures and condensate drain

Allow for inspection apertures in accordance with applicable regulations. A drain for condensate from the flue is always required. The required condensate drain with siphon is part of the Buderus flue cascade sets.

Flue cascade set

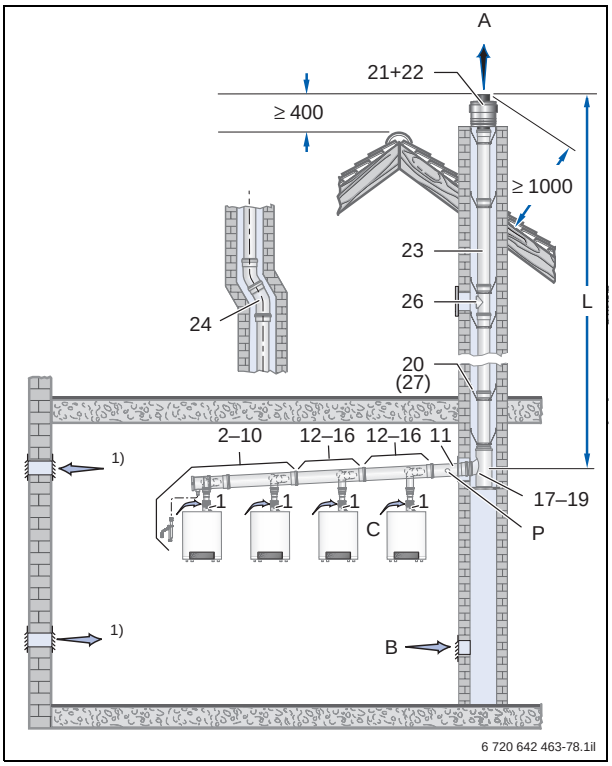

Fig. 115 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
P Inspection aperture
1) Vent to the outside: (→ tab. 44, page 110)

Special installation room > 100 → page 111

Maximum permissible length

Typical appliance combinations are collated in table 57.

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System-certified cascade combinations[1)]	Max. height of the vertical line L [m]	Required Ø of the flue [mm]
2-boiler cascade		
GB162-15	7–25	DN110
GB162-25	7–25	DN110
GB162-25 T40S	7–25	DN125
GB162-35	7–25	DN125
GB162-45	7–25	DN160
GB162-50	2–50	DN160
GB162-65	3–50	DN160
GB162-80	6.5–26/2–50	DN160/DN200
GB162-100	8–13/2–50	DN160/DN200
3-boiler cascade		
GB162-15	7–25	DN125
GB162-25	7–25	DN160
GB162-25 T40S	7–25	DN160
GB162-35	7–25	DN160
GB162-45	7–25	DN160
GB162-50	4–50	DN160
GB162-65	6–50	DN200
GB162-80	10–49/2–50	DN200/DN250
GB162-100	2.5–50	DN250
4-boiler cascade		
GB162-15	7–25	DN160
GB162-25	7–25	DN160
GB162-25 T40S	7–25	DN200
GB162-35	7–25	DN200
GB162-45	7–25	DN200
GB162-50	14–35/ 4–50	DN200/DN250
GB162-65	5–50	DN250
GB162-80	2.5–50	DN250
GB162-100	9–50/2.5–50	DN250/DN315

Table 57 Sizing flue cascades (→ fig. 115)

System-certified cascade combinations[1)]	Max. height of the vertical line L [m]	Required Ø of the flue [mm]
5-boiler cascade		
GB162-50	6–50	DN250
GB162-65	10–50	DN250
GB162-80	4–50	DN315
GB162-100	5–50/2.5–50	DN315/DN400
6-boiler cascade		
GB162-50	13–50/ 4–50	DN250/DN315
GB162-65	5–50	DN315
GB162-80	7–50/2.5–50	DN315/DN400
GB162-100	11–50/3–50	DN315/DN400
7-boiler cascade		
GB162-50	6–50	DN315
GB162-65	8–50	DN315
GB162-80	13–50/4–50	DN315/DN400
GB162-100	24–50/4–50	DN315/DN400
8-boiler cascade		
GB162-50	8–50	DN315
GB162-65	12–50	DN315
GB162-80	5–50	DN400
GB162-100	6–50	DN400

Table 57 Sizing flue cascades (→ fig. 115)

1) Sizing applies including the flue gas header downstream of the last appliance with a length L of up to 2.5 m, the support bend in the standard shaft set and one additional 90° diversion. Several additional diversions on request.

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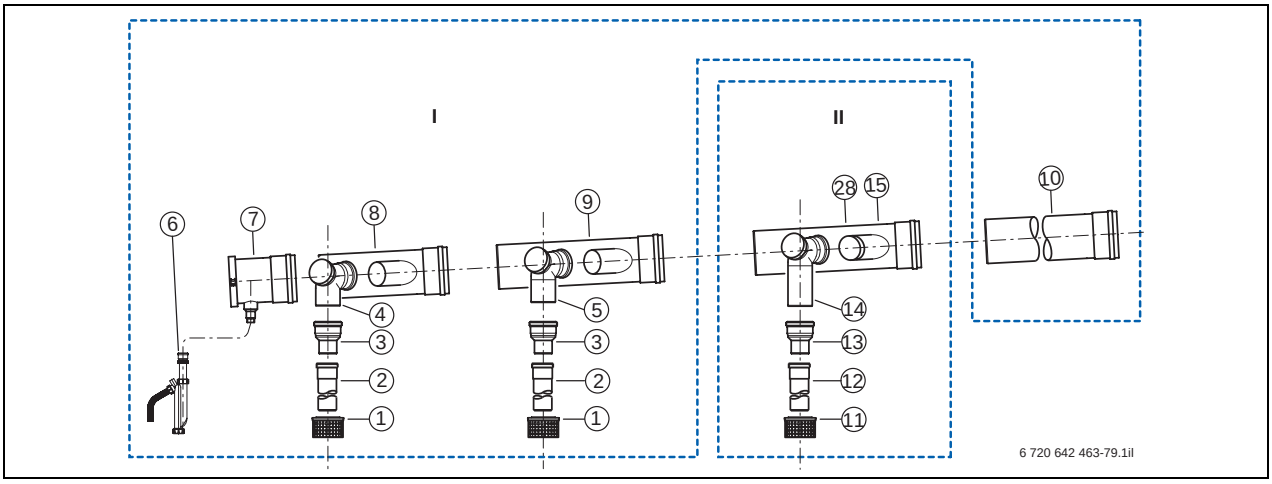

Fig. 116 Connection piece and components of the standard flue cascade set plus the plastic flue cascade extension set

I Standard set, flue cascade:

1 Ventilation air grille (2 pce)
2 Flue pipe Ø 80 mm, 250 mm long (2 pce)
Ø 110 GB162-50/65/80/100)
3 Expansion piece Ø 80/110 mm (2 pce) – not for the GB162-50/65/80/100
4 Inspection bend Ø 110 mm, 87°
5 Inspection bend with short push-in end Ø 110 mm, 87°
6 Siphon (long version)
7 End piece with condensate drain and threaded cover
8 Header, short with angled outlet
9 Header, long with angled outlet
10 Flue pipe, 500 mm long, plastic PP

II Extension set: Two sets are possible

11 Ventilation air grille
12 Flue pipe Ø 80 mm (Ø 110 GB162-50/65/80/100), 250 mm long
13 Expansion piece Ø 80/110 mm – not for the GB162-50/65/80/100
14 Inspection bend with long push-in end Ø 110 mm, 87°
15 Header, long with angled outlet
28 Dummy cover

Shaft set for flue cascade → fig. 117

Flue gas routed through a flue gas header inside a shaft with flue cascade set		Product no.	Details
Flue cascade standard set for two Logamax plus gas condensing boilers (plastic PP)			
2-boiler flue cascade GB162-15/25/35/45	Ø 110 mm	87 090 020	fig. 116
Length 1000 mm	Ø 125 mm	87 090 022	
Connection Ø 80 mm	Ø 160 mm	87 090 024	
	Ø 200 mm	87 090 026	
2-boiler flue cascade GB162-50/65/80/100 for cascade units	Ø 160 mm	87 090 009	
Length 1000 mm	Ø 200 mm	87 090 010	
Connection Ø 110 mm	Ø 250 mm	87 090 011	
	Ø 315 mm	87 090 012	
3-boiler/4-boiler flue cascade GB162-50/65/80/100 (installation at the back)	Ø 250 mm	87 090 028	
5-boiler/6-boiler flue cascade GB162-50/65/80/100 (installation at the back)	Ø 315 mm	7 747 202 159	
Dummy cover for 3-boiler and 5-boiler flue cascades	Ø 110 mm	7 747 202 158	
Flue cascade extension set for one additional Logamax plus gas condensing boiler (plastic PP)			
Flue cascade extension GB162-15/25/35/45	Ø 110 mm	87 090 060	fig. 116
Length 1000 mm	Ø 125 mm	87 090 062	
Connection Ø 80 mm	Ø 160 mm	87 090 064	
	Ø 200 mm	87 090 066	
Flue cascade extension GB162-50/65/80/100	Ø 200 mm	87 090 070	
Length 1000 mm	Ø 250 mm	87 090 071	
Connection Ø 110 mm	Ø 315 mm	87 090 072	
Shaft set for flue cascade			
Flue cascade shaft, plastic PP			fig. 117 and table 60, page 130 f.

Table 58 Components of the flue cascade set (cont. → tab. 60, page 130 f.)

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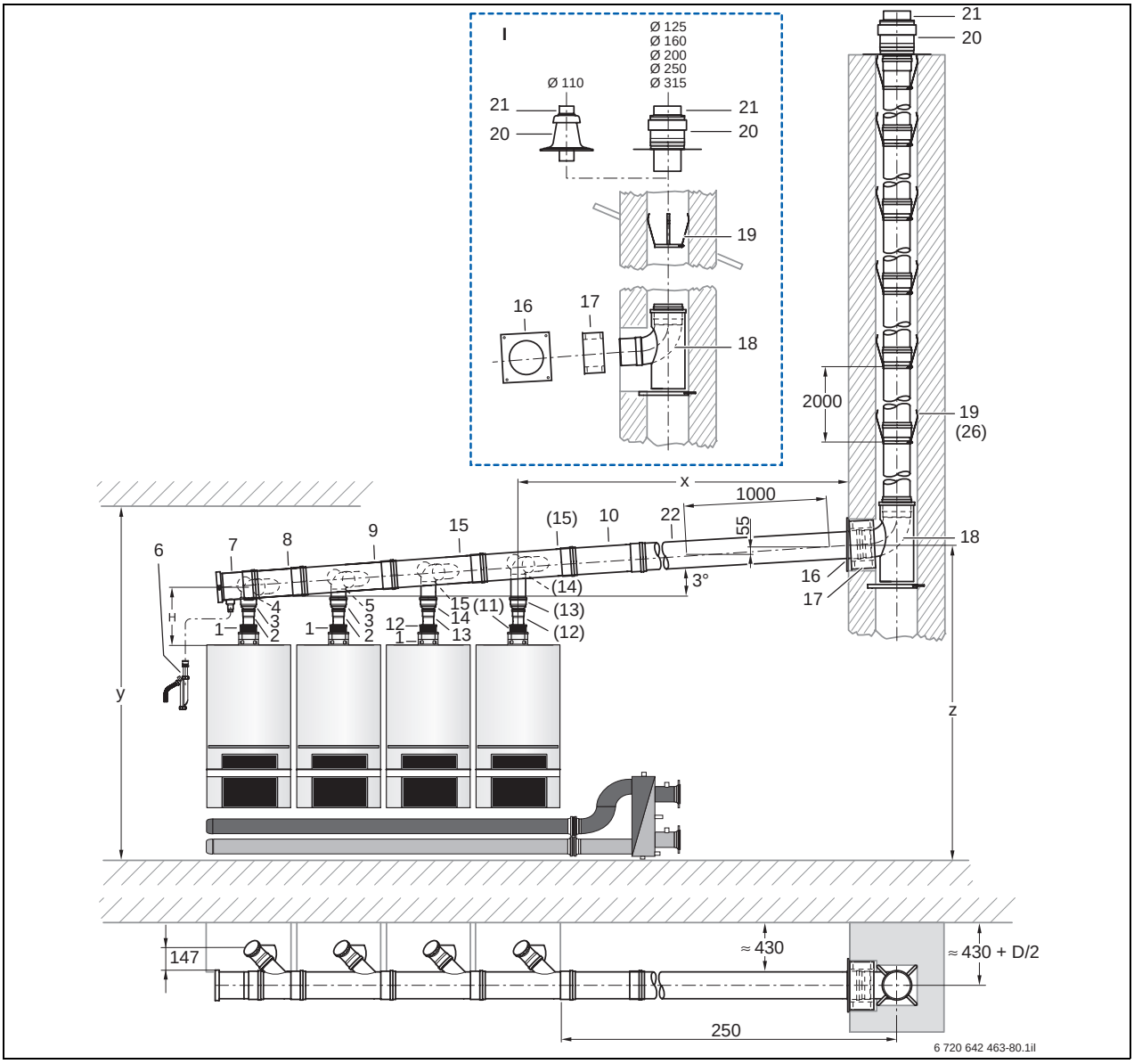

Fig. 117 Plastic components of the flue cascade shaft set with Logamax plus GB162 plus one example of a 4-boiler cascade with Logamax plus GB162-50/65/80/100 gas condensing boilers (dim. in mm)

I Shaft set for flue cascade:

16 Fascia
17 Concentric wall outlet
18 87° bend including support and support rail
19 Spacer (6 pce)
20 Plastic shaft cover (for Ø 110 mm) or stainless steel (for Ø 125 mm, Ø 160 mm, Ø 200 mm, Ø 250 mm, Ø 315 mm)
21 Terminal pipe, black PP plastic, 500 mm long
x Clearance between the last boiler and the chimney
y Minimum room height
z Flue, centre
H Height (≈ 465 mm GB162-50/65/80/100, at least 365 mm)

Standard set: → fig. 116, pos. 1 to 10
Extension set: → fig. 116, pos. 11 to 28

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Installation	Max. number of boilers	Minimum room height y[1] and flue centre z[2]									
		DN160		DN200		DN250		DN315		DN400	
		y [mm]	z [mm]	y [mm]	z [mm]	y [mm]	z [mm]	y [mm]	z [mm]	y [mm]	z [mm]
TL1/TR2	**2**	2220	2132	2240	2132	–	–	–	–	–	–
TL2/TR3/TR4	**2/3/4**	2246	2160	2266	2160	2291	2160	–	–	–	–
TL3/TR5/TR6	**3/5/6**	–	–	2293	2187	2318	2187	2350	2187	2393	2187
TL4/TR7/TR8	**4/7/8**	–	–	–	–	2344	2215	2376	2215	2419	2215
TL5	**5**	–	–	–	–	2370	2242	2403	2242	2445	2242
TL6	**6**	–	–	–	–	–	–	2429	2270	2471	2270
TL7	**7**	–	–	–	–	–	–	2455	2297	2498	2297
TL8	**8**	–	–	–	–	–	–	2481	2325	2524	2325

Table 59 Minimum room height for in-line installation TL and installation at the back TR (→ fig. 117, page 129)

1) Clearance between the last boiler and the chimney x = 2 m

2) Dimension for the flue slope: 5 cm/m

– Not recommended for technical reasons

Flue gas routed through a flue gas header inside a shaft with flue cascade set		Product no.	Details
Flue cascade shaft set with Logamax plus gas condensing boilers (plastic PP)			
Shaft set for flue cascade GB162	Ø 110 mm	87 090 080	fig. 117
	Ø 125 mm	87 090 082	
	Ø 160 mm	87 090 084	
	Ø 200 mm	87 090 086	
	Ø 250 mm	87 090 088	
	Ø 315 mm	87 090 089	
Optional equipment			
PP plastic pipe incl. fem. connection and gasket, Ø 110 mm	250 mm	87 090 399	fig. 117, pos. 22
	500 mm	87 090 400	
	1000 mm	87 090 404	
	2000 mm	87 090 408	
PP plastic pipe incl. fem. connection and gasket, Ø 125 mm	250 mm	87 090 390	
	500 mm	87 090 391	
	1000 mm	87 090 392	
	2000 mm	87 090 393	
PP plastic pipe incl. fem. connection and gasket, Ø 160 mm	250 mm	87 090 394	
	500 mm	87 090 395	
	1000 mm	87 090 396	
	2000 mm	87 090 397	
PP plastic pipe incl. fem. connection and gasket, Ø 200 mm	250 mm	87 090 409	
	500 mm	87 090 410	
	1000 mm	87 090 411	
	2000 mm	87 090 412	
PP plastic pipe incl. fem. connection and gasket, Ø 250 mm	250 mm	87 090 416	
	500 mm	87 090 417	
	1000 mm	87 090 418	
	2000 mm	87 090 419	

Table 60 Components of the flue cascade set (cont. from tab. 58, page 128)

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Flue gas routed through a flue gas header inside a shaft with flue cascade set		Product no.	Details
PP plastic pipe incl. fem. connection and gasket, Ø 315 mm	500 mm	87 090 042	fig. 117, pos. 22
	1000 mm	87 090 044	
	2000 mm	87 090 046	
PP plastic bend, Ø 110 mm	87°	87 090 308	–
	45°	87 090 304	
	30°	87 090 300	
	15°	87 090 296	
PP plastic bend, Ø 125 mm	87°	87 090 313	
	45°	87 090 312	
	30°	87 090 311	
	15°	87 090 310	
PP plastic bend, Ø 160 mm	87°	87 090 318	
	45°	87 090 317	
	30°	87 090 316	
	15°	87 090 315	
PP plastic bend, Ø 200 mm	90°	87 090 322	
	45°	87 090 321	
	30°	87 090 320	
PP plastic bend, Ø 250 mm	90°	87 090 326	
	45°	87 090 325	
	30°	87 090 324	
PP plastic bend, Ø 315 mm	90°	87 090 330	
	45°	87 090 329	
	30°	87 090 328	
PP plastic inspection bend	Ø 110 mm, 87°	87 090 880	–
	Ø 125 mm, 87°	87 090 882	
	Ø 160 mm, 87°	87 090 884	
	Ø 200 mm, 90°	87 090 886	
	Ø 250 mm, 90°	87 090 887	
	Ø 315 mm, 90°	87 090 888	
PP plastic inspection bend	Ø 110 mm	87 090 240	–
	Ø 125 mm	87 090 682	
	Ø 160 mm	87 090 684	
	Ø 200 mm	87 090 686	
	Ø 250 mm	87 090 688	
	Ø 315 mm	87 090 690	
PP plastic spacer (at least 1 pce per 2 m)	Ø 110 mm	87 090 422	–
	Ø 125 mm	87 090 424	
	Ø 160 mm	87 090 426	
Stainless steel spacer (at least 1 pce per 2 m)	Ø 160 mm	87 090 425	
	Ø 200 mm	87 090 427	
	Ø 250 mm	87 090 428	
	Ø 315 mm	87 090 429	
Pipe clip as installation aid	Ø 110 mm	87 090 830	–
	Ø 125 mm	87 090 832	
	Ø 160 mm	87 090 834	
	Ø 200 mm	87 090 836	
	Ø 250 mm	87 090 837	
	Ø 315 mm	87 090 838	
Dummy cover DN110 to seal an unused connection in the flue cascade, e.g. TR3/TR5 if the TR4 or TR6 set is used.	Ø 110 mm	7 747 202 158	–

Table 60 Components of the flue cascade set (cont. from tab. 58, page 128)

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10 Flue systems for balanced flue operation

10.1 General information for balanced flue operation

10.1.1 Regulations

In accordance with the [German] Technical Rules for Gas Installations DVGW-TRGI 2008, the contracted installer must seek the agreement of the responsible flue gas inspector prior to commencement of work on the flue system or notify the flue gas inspector of the installation in writing. In this connection, observe the relevant national and regional regulations. It is recommended to ask the flue gas inspector to confirm his participation in writing.

Gas combustion equipment must be connected to the flue on the same floor where it is installed.

Important standards, ordinances, regulations and directives concerning the sizing and implementation of flue systems are as follows:

- EN 483
- EN 677
- DIN-EN 13384-1 and DIN-EN 13384-2
- DIN 18160-1 and DIN 18160-5
- Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany]
- Landesbauordnung (LBO) [Germany]
- Muster-Feuerungsverordnung (MuFeuVO) [Germany]
- Feuerungsverordnung (FeuVO) of the relevant Federal State [Germany]

10.1.2 System certification

The air/flue gas lines of the Buderus sets DO, DO-S, GA-K, ÜB-Flex with GA-K, GAF-K, GAL-K and LAS-K have been system-certified together with the Logamax plus GB162 for **balanced** flue operation.

The system certification complies with the Gas Appliances Directive 90/396/EEC as well as the EN 483 and EN 677 standards. Joint approval of the Buderus set with the appliance is documented by the corresponding CE designation. The CE designation is listed in the technical documentation of the respective Logamax plus GB162 gas condensing boiler. No additional CE approval of the flue system is required.

The limits of application of the Buderus sets for **balanced** flue operation of the Logamax plus GB162 gas condensing boilers have been finalised. Special determinations for the implementation of the respective air/flue gas line, the maximum permissible overall flue length and the number of diversions within the flue line are summarised on pages 138 to 159.

A calculation of the flue system to DIN-EN 13384-1 is not required. The LAS manufacturer must only calculate the size of an air/flue gas system in connection with the Buderus set LAS-K in accordance with the system configuration.

10.1.3 General requirements of the installation room

Observe all building regulations and the Technical Rules for Gas Installations applicable to installation rooms (DVGW-TRGI 2008 [Germany]). The installation room must be free from the risk of frost.

Combustion air must be free from excessive dust levels and from halogenated compounds or other corrosive substances. Otherwise there would be a risk of damage to the burner and the heat exchanger surfaces.

Halogenated compounds are highly corrosive. These are contained, for example, in spray cans, thinners, cleaning & degreasing agents and in solvents.

Easily inflammable and explosive materials or liquids must not be stored or used in the vicinity of the gas condensing boiler.

The maximum surface temperature of the gas condensing boiler and the flue is less than 85 °C. Therefore, minimum clearances towards combustible building materials need not be observed. The boiler can, for example, be installed on a wooden wall (→ DVGW-TRGI 2008, section 8.1.6).

The boiler can be installed without minimum side clearances. All maintenance can be carried out from the front.

Prohibited installation areas

Never install gas appliances in essential stairwells (e.g. escape routes), rooms with essential stairwells and exits to the outside, or essential hallways. This does not apply to building categories 1 and 2.

Gas appliances must also never be installed in any rooms or parts thereof that are subject to explosion protection.

The Logamax plus gas condensing boilers for balanced flue operation may also be installed in garages. Provide adequate protection of the gas condensing boilers against mechanical damage, e.g. by means of a hoop or deflector.

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Installation room for rated output ≤ 100 kW

No particular installation room is required for operating the Logamax plus GB162 gas condensing boilers with rated output of up to 100 kW in **balanced** flue mode. Additional measures for supplying combustion air are not required. Furthermore, no requirements regarding the size of the installation room are required since the flue systems of these gas condensing boilers comply with the designation “X” = higher tightness.

For balanced flue operation up to 100 kW, the Logamax plus gas condensing boilers can also be installed in **rooms occupied by people**.

Installation room for rated output > 100 kW

In accordance with DVGW-TRGI 2008, gas combustion equipment with a total rated output in excess of 100 kW requires a specific installation room. Observe relevant national or regional combustion ordinances.

For balanced flue operation, the installation room must meet the following requirements:

- The installation room must not be used for other purposes, except the following:
  - For routing services into the building, including their shut-off, control and measuring facilities
  - For the installation of combustion equipment for liquid fuels, heat pumps, CHP modules or permanently fixed internal combustion engines
  - For the storage of fuels
- The installation room must not have any opening to other rooms except doorways.
- The doors to the installation room must be tight and self-closing.
- The installation room must be able to be vented.

Install an emergency stop switch outside the installation room in accordance with DVGW-TRGI 2008, section 8.1.4.2 [or local regulations]. The burners of the gas condensing boilers must be able to be switched off at any time by means of an emergency stop switch.

10.1.4 Air/flue gas line

Buderus sets

In **balanced** flue operation, the fan draws in the required combustion air from the outside into the gas condensing boiler. The air/flue gas line of the Buderus sets is a concentric pipe or a pipe-in-pipe system made of plastic/steel.

The outer concentric pipe supplies the combustion air. With components for internal rooms, it is made from zinc-plated steel, painted white. For components used externally, it is made from zinc-plated steel painted white, black or red or made from stainless steel. The inner pipe is a plastic flue pipe. The roof outlet of the DO set is completely made from plastic and is black or terracotta in colour on the outside.

The concentric air/flue gas line is installed as a complete pipework system or as connection piece between the gas condensing boiler and a concentric air/flue gas system.

The flue systems are categorised in accordance with DIN-EN 14471. The flue systems certified by Buderus correspond to the following classification (→ fig. 118):

- System-certified flue systems 1
  Internally PP, externally steel, e.g. GA-K, GAF-K, DO
  - EN 14471 T120 H1 o W 2 O00 E D L0
- System-certified flue systems 2
  Internally PP, externally PP, e.g. DO-S
  - EN 14471 T120 H1 o W 2 O00 I D L1
- System-certified flue systems 3
  Single wall PP, e.g. GA, GN
  - Combined with the Logamax plus GB162, with flue gas temperatures < 85 °C, EN 14471 T120 H1 o W 2 O00 I D L applies
  - If the approval of the flue system with flue gas temperatures of 120 °C is utilised, EN 14471 T120 H1 o W 2 O20 I D L applies

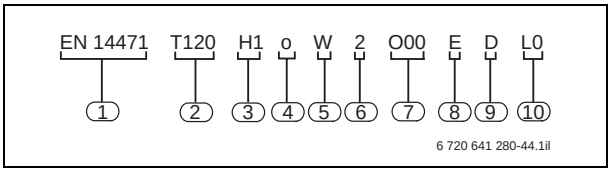

Fig. 118 Identification using system-certified flue system 1 as an example

1 Standard number
2 Temperature category
3 Pressure category
4 Soot fire resistance
5 Condensate resistance
6 Corrosion resistance
7 Clearance from combustible materials
8 Installation location
9 Fire resistance
10 Casing

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Explanation of the identification for Buderus

- Temperature category T120
  - Permissible flue gas temperature ≤ 120 °C
  - Test temperature 150 °C
- Pressure category H1
  - Leakage rate 0.006 $l \cdot s^{-1} \cdot m^{-2}$
  - Test pressure 5000 Pa high pressure flue systems
- Soot fire resistance category o
  - Flues that are not resistant to soot fires
- Condensate resistance category W
  - Flues for moist operation
- Corrosion resistance category 2
  - Fuel oil with a sulphur content up to 0,2 %(also applicable to gas)
- Clearance from combustible materials
  - The clearance of the outer casing of a flue system to combustible materials is designated Oxx. The value of xx is quoted in mm.
    Example: O50 corresponds to a clearance of 50 mm.
  - The clearance towards combustible materials applies when utilising the temperature category T120. If this is seen in conjunction with the boiler, then the maximum possible flue gas temperature of the boiler is decisive. If that lies below 85 °C, then no clearance is required. This must be specified in the manufacturer's documentation. When utilising single wall flues with the Logamax plus GB162, O00 applies.
- Installation location
  - Category I for the installation of the flue system or parts of the flue system inside a building
  - Category E for the installation of the flue system or parts of the flue system inside or outside a building
- Fire resistance category D (fire characteristics)
  - Not negligible contribution to a fire
- Casing categories
  - L0 for non-flammable casing
  - L1 for flammable casing
  - L for designs without casing

The flue system must be identified as system-certified following installation. For this purpose, an ID label is supplied with each standard set to provide system certification (→ fig. 119).

Diesen Aufkleber an der Abgaseinführung als zusätzliche Kennzeichnung der Abgasanlage anbringen.

Buderus D – 35573 Wetzlar

Systemzertifizierte Abgasanlage für Buderus Gas-Brennwertkessel Logamax plus
sowie
Öl/Gas-Brennwertkessel Logano plus

Zulässige Installationsarten und Produktidentnummer siehe Kesseltypenschild. Zulässige maximale Baulängen und weitere Informationen entnehmen Sie bitte der Montageanleitung des Abgassystems oder der Planungsunterlage.

Die Produkte der Abgasanlage erfüllen ebenfalls die Anforderungen der EN14471 und können somit bei von der Systemzertifizierung abweichenden Installation gemäß nationaler Verwendungsregeln und den Produktvorgaben der CE-Zertifizierung 0036 CPD 9169 003 verwendet werden. Hierbei gilt:

Abgasleitung

- für Überdruck / Unterdruck
- für Brennstoffe Gas oder Heizöl EL
- maximal zulässige Abgastemperatur 120 °C
- Kennzeichnungsklassen:
  einwandig: EN14471 T120 H1 O W2 O20 I D L
  konzentrisch: EN14471 T120 H1 O W2 O00 E D L0

6 720 642 463-76.1il

Fig. 119 ID label for system certification

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Existing chimney shaft

Generally, a chimney sweep should clean the chimney prior to installing a flue system with the Buderus GA-K or ÜB-Flex set in conjunction with GA-K if one or more of the following applies:

- The combustion air is drawn in via an existing chimney shaft to which oil or solid fuel combustion equipment has been connected **or**
- Dust loads due to unstable chimney pointing must be expected.

If dust loads continue to be a risk factor or deposits from oil or solid fuel combustion equipment are still present, use the DO-S or GAL-K sets instead of the GA-K or ÜB-Flex sets in conjunction with GA-K.

Air/flue gas system

The concentric air/flue gas line of the Buderus LAS-K set is installed as a connection pipe between the gas condensing boiler and the air/flue gas system (LAS). The fan of the gas condensing boiler generates positive pressure inside the inner pipe of the connection piece to the LAS. Negative pressure is created in the flue shaft of the LAS through thermal updraught.

Condensate drain from the flue

To ensure the safe drainage of condensate, the flue must be installed with a 3° slope (5 cm/m) from the vertical section of the flue system towards the boiler. In the case of longer horizontal flue sections it may be necessary to support the horizontal section on site to ensure the correct slope towards the boiler. The condensate from the flue and from the flue gas header in the gas condensing boiler flows directly into the stench trap (siphon) of the gas condensing boiler.

Drain the condensate from the moisture-resistant flue on site when connecting to a moisture-resistant flue with the Buderus LAS-K sets (LAS multiple connection).

Route the condensate from the gas condensing boiler (the flue) and the moisture-resistant flue system correctly to the public sewer or neutralise it, if required. Special design information regarding condensate drainage → chapter 7.

Shafts for flues

Shafts for flues must not be used for any other purpose.

Flues that bridge several floors must be arranged in their own shafts inside buildings.

Exceptions

- Flues in building categories 1 and 2, provided that the flue is not routed through more than one utility unit. Building categories 1 and 2 are those with a height to the top edge of the floor on the highest storey that could house an installation room of no more than 7 m on average above ground level, and with no more than two utility units of no more than 400 m^2 in total **or**
- Flues with a single connection inside the room where the combustion equipment is installed **or**
- Flues operated with negative pressure:
  - that offer a fire resistance of at least 90 minutes (ID L90 or higher) **and**
  - in building categories 1 and 2 that offer a fire resistance of at least 30 minutes (ID L30 and higher).

Several flues in a common shaft are only permissible if:

- the flues are made from non-combustible materials **or**
- the associated combustion equipment is installed on the same floor **or**
- a transfer of fire between floors is prevented through an automatic shut-off facility or other measures **or**
- the flue has received general Building Regulations approval.

These shafts must offer:

- a fire resistance of at least 90 minutes **and**
- in building categories 1 and 2, a fire resistance of at least 30 minutes.

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Routing solar lines through existing shafts for flues

Deviating from para. 7 sect. 5 MFeuVO [Germany], retrospective routing of solar lines in existing flue shafts can be acceptable under the following conditions:

- The retrospective routing of solar lines in existing flue shafts is limited to building categories 1 and 2 (para. 2 sect. 3 sentence 1 no. 1 and 2 MBO) and to solar lines that transport water only.
- The heat transfer of solar lines and fittings should be limited by means of thermal insulation in accordance with the Energy Savings Order dated 16 November 2001, appendix 5, table 1 [Germany]. Alternatively, from a building regulations point of view, the minimum thickness of thermal insulation can also be halved. The insulating layers must be resistant to the maximum applicable temperatures inside the solar lines as well as to the temperature stresses resulting from the flue system.
- Safeguard the reliable operation of the combustion system through a calculation in accordance with DIN EN 13384-1: 2003 03.
- The inside wall of the shaft must be smooth and free from protrusions; all-round adequate secondary ventilation (annular gap) of the flue must still be ensured after the installation of the solar lines. Ensure the stability of the flue system as well as the permanent security of the solar lines and the sensor lead. Permanently prevent any contact between the flue and the thermally insulated solar lines.
- The clearance between the solar line (including thermal insulation) and flue line must be:
  - at least 2 cm for flues with circular cross-sections inside a rectangular shaft
  - at least 3 cm for flues with circular cross-sections inside a circular shaft **and**
  - at least 3 cm for flues with rectangular cross-sections inside a rectangular shaft.
- Using appropriate material, seal the remaining cross-sections in the shaft wall apertures through which the solar lines are routed.
- The solar lines including their thermal insulation must correspond to the requirements of the flue where their temperature resistance is concerned.

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10.1.5 Inspection apertures

According to DIN 18160-1 and DIN 18160-5, flue systems for **balanced** flue operation must be able to be inspected and cleaned easily and safely. For this, allow for inspection apertures (→ fig. 120 and fig. 100).

When arranging the inspection apertures, comply with the requirements of DIN 18160-5 as well as all locally applicable building regulations. For this we recommend contacting your local flue gas inspector [where appropriate].

Inspection apertures for DO and LAS-K sets

Where installation space is available, provide an inspection aperture. Where installation space is inadequate, the inspection aperture can be omitted on flues with a length of less than 4 m subject to consultation with the flue gas inspector. In such cases, the test ports on the boiler flue connection are adequate. The suitability of the flue for its purpose can be verified by taking test measurements. Using the test ports at the boiler flue connection, an endoscope can be used for a visual check.

If there are no inspection apertures, the flue would need to be dismantled for necessary cleaning involving a lot more effort.

Position of the lower inspection aperture

- When connecting a Logamax plus GB162 gas condensing boiler to a flue, allow for a lower inspection aperture:
  - In the vertical section of the flue, immediately above the flue diversion.
  - At the face of the straight horizontal section of the flue, no further than 1 m from the diversion into the vertical section, subject to there being no diversion in between (→ fig. 120), **or**
  - In the side of the horizontal section of the flue, no further than 30 cm from the diversion into the vertical section (→ fig. 100).
- When connecting the gas condensing boilers to a moisture-resistant flue system (LAS multiple connection), provide a lower inspection aperture below the lowest connection at the base of the vertical section of the moisture-resistant flue (LAS).
- Provide a floor area of at least 1 m × 1 m to DIN 18160-5 in front of the lower inspection aperture.

Position of the upper inspection aperture

- An upper inspection aperture is not required in flues, if:
  - The lower inspection aperture is located no further than 15 m from the terminal.
  - The vertical flue section is routed at an angle of no more than 30° (corbelled).
  - The lower inspection aperture is implemented in accordance with DIN 18160-1 and DIN 18160-5 (→ fig. 120 and fig. 100).
- Upstream and downstream of every diversion in excess of 30°, an additional inspection bend is required.
- Provide a floor area of at least 0.5 m × 0.5 m to DIN 18160-5 in front of the upper inspection aperture.

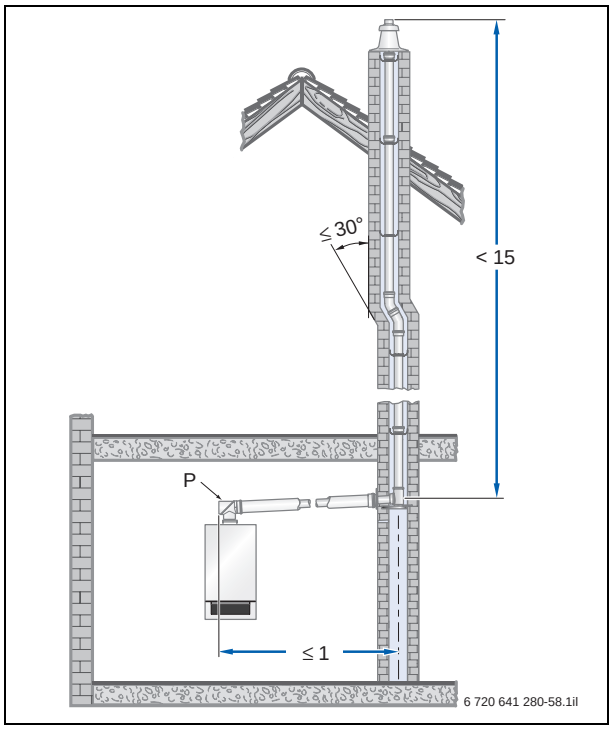

Fig. 120 Example with the inspection aperture (P) located in a flue without diversions in the installation room (dim. in m)

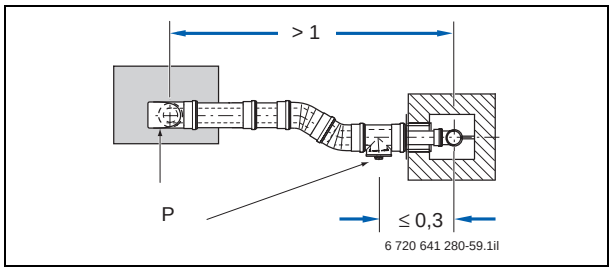

Fig. 121 Example with the inspection apertures (P) located in a flue with diversions in the installation room - top view (dim. in m)

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10.2 Vertical, concentric air/flue gas routing above the roof with the DO set (DN80/125) for Logamax plus GB162 up to 50 kW

Appliance type C_{33x}

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L [m]	Reduction of the total length for each additional pipe diversion[1] [m]
GB162-15	11	none
GB162-25	19	L – 1.5
GB162-25 T40S	19	L – 1.5
GB162-35	14	L – 1.5
GB162-45	11	L – 1.5
GB162-50	6	L – 1.5

Table 61 Maximum permissible total flue length (→ fig. 122)

1) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Air/flue gas line inside a shaft or inside a protective pipe

In accordance with the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], floors may be bridged if the air/flue gas line complies with the criteria described here.

If only the roof structure lies above the installation room, then encase the air/flue gas line between the upper edge of the ceiling inside the installation room and the roof skin. For this, a non-combustible rigid material or a protective metal pipe (→ fig. 122) will suffice. If a level of fire resistance has been specified for the ceiling, then the same applies to the casing.

When bridging floors, allow for a shaft with fire resistance category L 30 (F 30) or L 90 (F 90) for the air/flue gas line outside the installation room up to the roof skin - except building categories 1 and 2 with only one utility unit (→ “Flue shafts” page 135 and fig. 122). For this, use only approved shaft structures (by Promat, for example).

Minimum clearances and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137). On the roof, maintain minimum clearances towards windows (→ fig. 125).

DO set

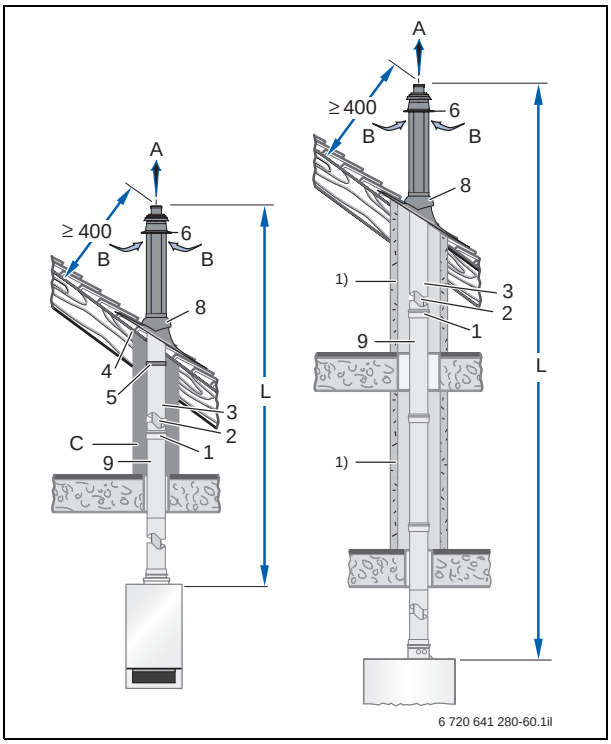

Fig. 122 Installation versions (dim. in mm)

A Flue gas
B Ventilation air
C Protective cover
1) Shaft L 30 (F 30) or L 90 (F 90)

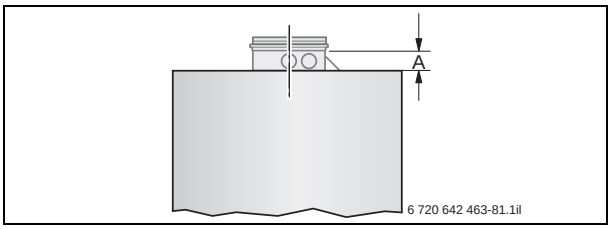

Fig. 123 Installation dimensions of the concentric boiler flue connection (dim. A → tab. 62)

Logamax plus	Dimension A [mm]
GB162-15/25/35/45	≈ 70
GB162-50	≈ 85

Table 62 Installation dimensions of the concentric boiler flue connection (→ fig. 123)

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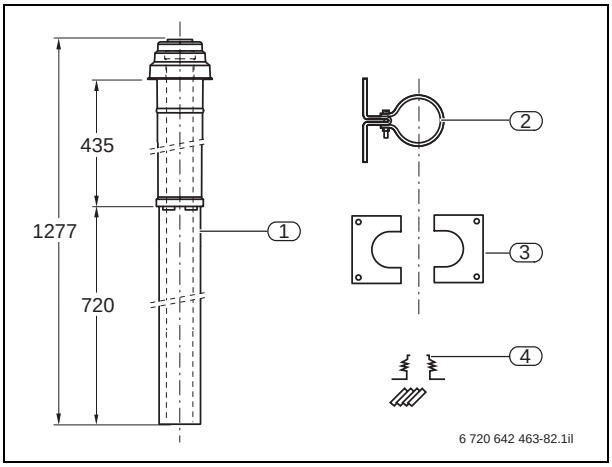

Fig. 124 Plastic components of the standard DO set (dim. in mm)

1 Roof outlet DN80/125
2 Rafter clip, zinc-plated steel
3 Fascia, in 3 parts
4 Pipe collar (accessory for tying in a vapour barrier)

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

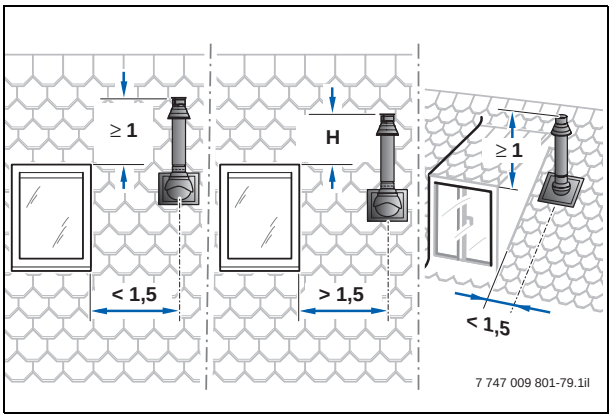

Fig. 125 Minimum clearances towards windows with the DO set (dim. in m) (examples in accordance with the Muster-Feuerungsverordnung [Germany]; regulations → page 132)

H No special clearance required

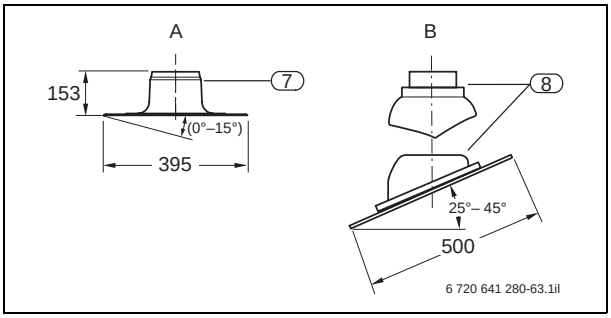

Fig. 126 Universal roof tile and adhesive flat roof flange as additional equipment for the standard DO set (must be ordered separately); (dim. in mm)

A For flat roof
B For pitched roof
7 Adhesive flat roof flange
8 Universal roof tile

Tiles for alternative roof slopes available on request.

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Vertical, concentric air/flue gas routing above the roof with the DO set		Product no.	Details
Standard DO set for the Logamax plus GB162 up to 50 kW			
DO with plastic roof outlet PP/PE, steel inside, painted white, Ø 80/125 mm	black exterior terracotta exterior	77 190 036 60 77 190 036 61	fig. 124
Optional equipment			
Adhesive flat roof flange, Ø 125 mm, not adjustable		77 190 008 38	fig. 126, pos. 7
Adhesive flat roof flange, Ø 125 mm, pitch adjustable from 0° to 15°		87 094 912	
Adhesive flat roof flange, Ø 125 mm, 250 mm high, not adjustable		87 094 904	
Universal roof tile, Ø 125 mm Pitch adjustable from 5° to 25° Pitch adjustable from 25° to 45° Pitch adjustable from 35° to 55°	 black terracotta black terracotta black terracotta	 77 472 048 12 77 472 048 11 77 190 028 57 77 190 028 55 77 472 048 14 77 472 048 13	fig. 126, pos. 8
Concentric sliding fitting/installation aid DN80/125 with long fem. connection, max. effective length 250 mm, only for vertical installation		87 094 950	–
Concentric pipe, 500 mm long, effective length 450 mm		77 190 027 63	fig. 122, pos. 9
Concentric pipe, 1000 mm long, effective length 950 mm		77 190 027 64	
Concentric pipe, 2000 mm long, effective length 1950 mm		77 190 027 65	
Concentric 87° inspection bend		77 190 027 66	–
Concentric 45° inspection bend		77 190 027 67	
Concentric 30° inspection bend		77 190 027 68	
Concentric 15° inspection bend		87 094 580	
Concentric tee		77 190 033 82	–
Concentric pipe with inspection aperture		77 190 027 60	–
Pipe collar, DN100 to DN130, for tying the roof outlet into the vapour barrier		77 472 045 34	–
Adaptor, boiler flue connection GB162-50 to DN80/125		77 469 004 15	–
Jacket extension 500 mm for DO, external, without internal pipe	black terracotta	77 190 020 42 77 190 020 41	–

Table 63 Components of the DO set for boilers up to 50 kW

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10.3 Vertical, concentric air/flue gas routing above the roof with the DO set (DN110/160) for Logamax plus GB162-45, GB162-50, GB162-65, GB162-80 and GB162-100

Appliance type C_{33x}

The Logamax plus GB162-50/65/80/100 requires a specific installation room, according to Muster-Feuerungsverordnung [Germany], if the output has not been restricted to 50 kW (→ page 132).

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L [m]	Reduction of the total length for each additional pipe diversion[1)] [m]
GB162-45	26.5	L – 1.5
GB162-50	25	L – 1.5
GB162-65	23	L – 1.5
GB162-80	14	L – 1.5
GB162-100	15.5	L – 1.5

Table 64 Maximum permissible total flue length (→ fig. 127)

1) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Air/flue gas line inside a shaft or inside a protective pipe

In accordance with the Technical Rules for Gas Installations DVGW-TRGI 2008 [Germany], floors may be bridged if the air/flue gas line complies with the criteria described here.

If only the roof structure lies above the installation room, then encase the air/flue gas line between the upper edge of the ceiling inside the installation room and the roof skin. A non-combustible rigid material or a protective metal pipe will be suitable for the casing. If a level of fire resistance has been specified for the ceiling, then the same applies to the casing.

When bridging floors, allow for a shaft with fire resistance category L 30 (F 30) or L 90 (F 90) for the air/flue gas line outside the installation room up to the roof skin (→ fig. 127). For this, use only approved shaft structures (by Promat, for example).

Minimum clearances and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137). On the roof, maintain minimum clearances towards windows (→ fig. 129).

DO set

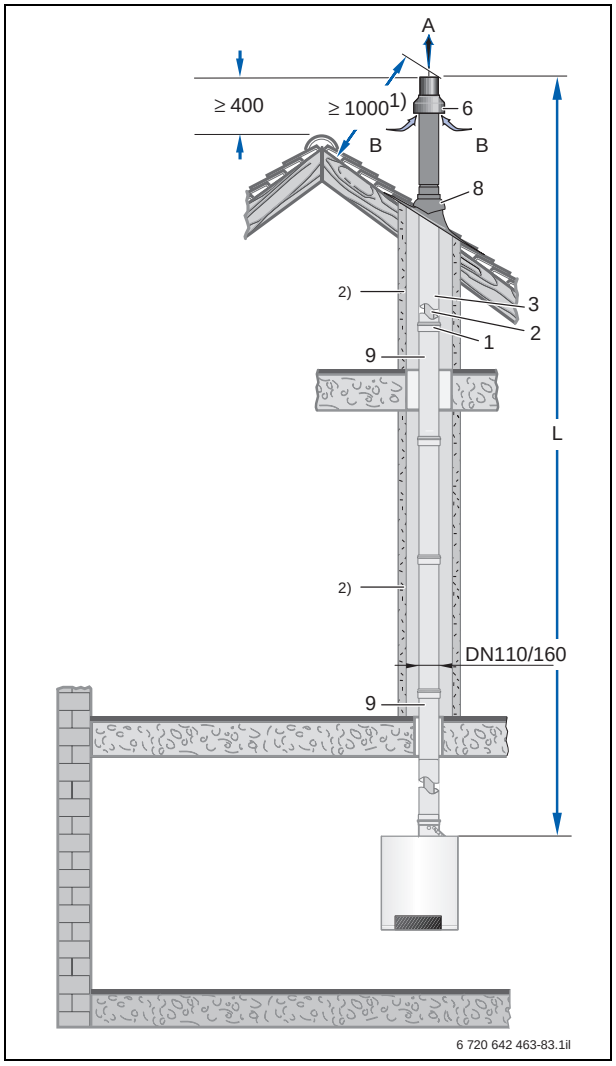

Fig. 127 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) 400 mm sufficient if the output is restricted to 50 kW
2) Shaft L 30 (F 30) or L 90 (F 90)

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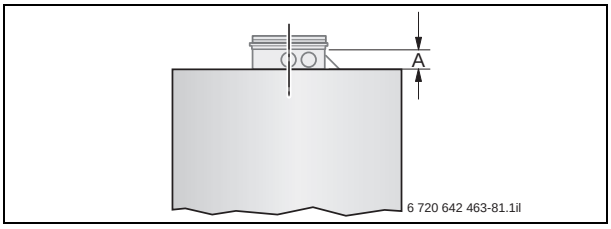

Fig. 128 Installed dimensions of the concentric boiler flue connection (dim. A → tab. 65)

Logamax plus	Dimension A [mm]
GB162-45	≈ 70
GB162-50/65/80/100	≈ 85

Table 65 Installed dimensions of the concentric boiler flue connection (→ fig. 128)

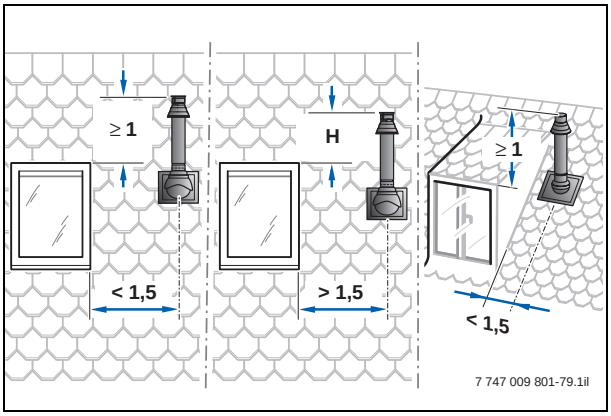

Fig. 129 Minimum clearances towards windows with the DO set (dim. in m) (examples in accordance with the Muster-Feuerungsverordnung [Germany]; regulations → page 132)

H No special clearance required

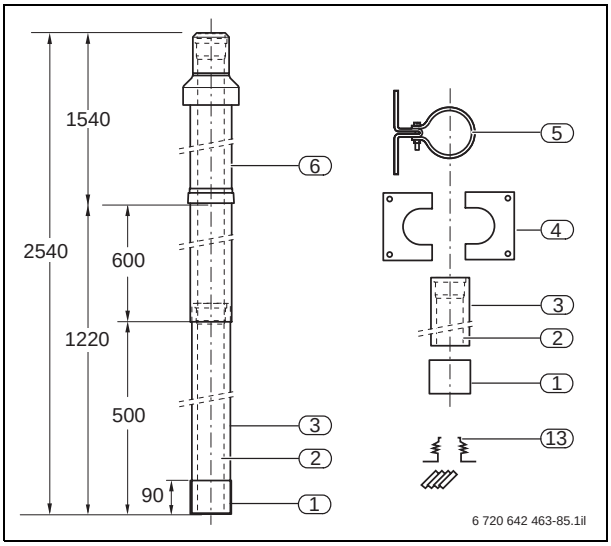

Fig. 130 Plastic components of the standard DO set (dim. in mm)

1 Pipe without fem. connection
2 Flue pipe
3 Slider
4 Fascia, in 2 parts
5 Rafter clip, zinc-plated steel
6 Concentric roof outlet (the large DO roof outlet is also available with the same dimensions as DN80/125 for 15 to 45 kW.
Product no.: black: 87 094 336; terracotta: 87 094 340)
13 Spiral tube collar

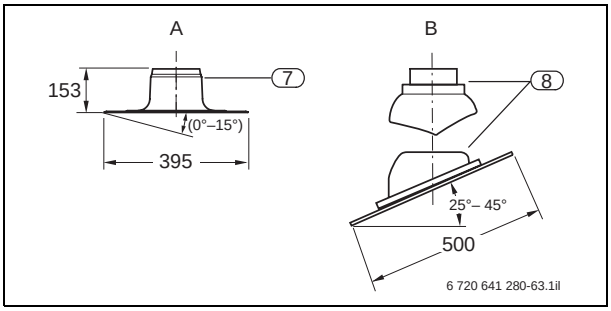

Fig. 131 Universal roof tile and adhesive flat roof flange as additional equipment for the standard DO set (order separately; dim. in mm)

A For flat roof
B For pitched roof
7 Adhesive flat roof flange
8 Universal roof tile

Tiles for alternative roof slopes available on request.

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Vertical, concentric air/flue gas routing above the roof with the DO set		Product no.	Details
Standard DO set for Logamax plus from 45 kW		**DN110/160**	
DO with plastic roof outlet PP/PE, 1 m above the roof	black terracotta	87 094 050 87 094 052	fig. 130
Optional equipment			
Adhesive flat roof flange, not adjustable		87 090 920	fig. 131, pos. 7
Adhesive flat roof flange, pitch adjustable from 0° to 15°		77 472 153 73	
Universal roof tile, pitch adjustable from 25° to 45°, incl. cowl	black terracotta	87 090 900 87 090 902	fig. 131, pos. 8
Concentric pipe, 500 mm long		87 090 370	fig. 127, pos. 9
Concentric pipe, 1000 mm long		87 090 372	
Concentric pipe, 2000 mm long		–	
Concentric 87° inspection bend		87 090 284	–
Concentric 45° inspection bend		87 090 282	
Concentric 30° inspection bend		87 090 281	
Concentric 15° inspection bend		87 090 280	
Concentric tee		87 090 220	–
Concentric pipe with inspection aperture		87 090 210	–
Pipe collar, DN150 to DN170, for tying the roof outlet into the vapour barrier		77 472 085 70	fig. 130, pos. 13
Concentric expansion piece, from DN80/125 to DN110/160		87 090 868	–

Table 66 Components of the DO set for boilers from 45 kW

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10.4 Air/flue gas routing via concentric pipe through a shaft with DO-S set for the Logamax plusGB162 up to 45 kW

Appliance type C_{33x}

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	10	none
GB162-25	16	L – 1.5
GB162-25 T40S	16	L – 1.5
GB162-35	12	L – 1.5
GB162-45	10	L – 1.5

Table 67 Maximum permissible total flue length (→ fig. 133)

1) These lengths include the pipe diversions included in the standard set; horizontal length L_1 up to 2 m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

The DO-S set is ideally suited for the modernisation of older buildings, if the combustion air **cannot** be drawn in via the existing chimney shaft (→ page 133). An adequate supply of combustion air is assured via the concentric air/flue gas line.

Air/flue gas line inside a shaft

For the vertical, concentric air/flue gas line, a shaft of fire resistance category L 30 (F 30) or L 90 (F 90) would be suitable. The minimum dimensions for the shaft cross-section are required for the installation of the air/flue gas line (→ fig. 132).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

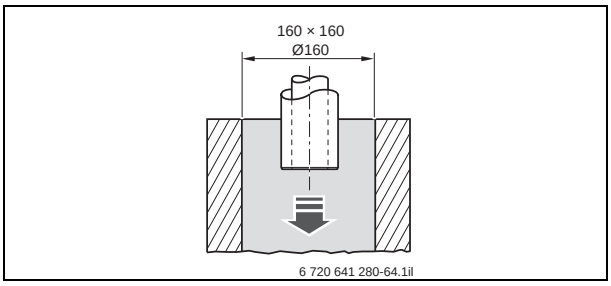

Fig. 132 Minimum dimensions of the shaft cross-section for the installation of the air/flue gas line (dim. in mm)

DO-S set

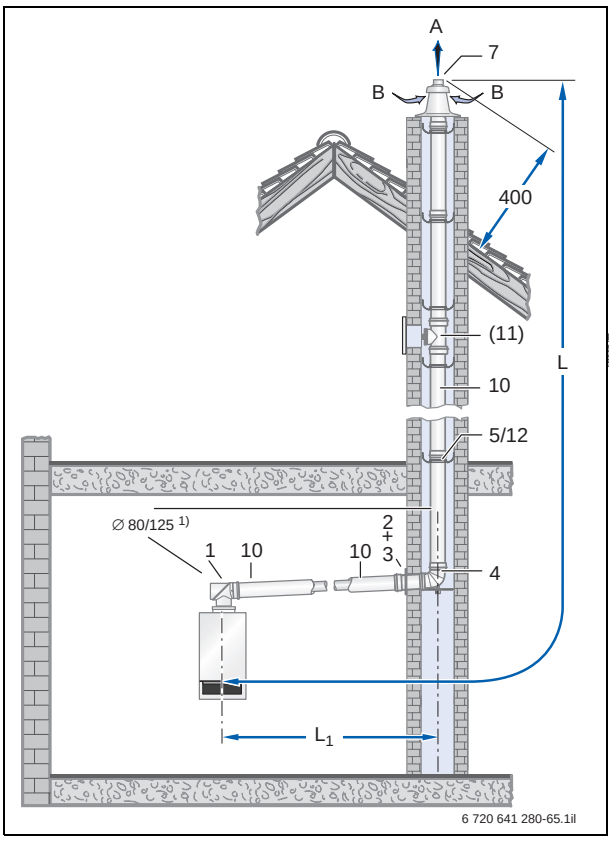

Fig. 133 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) Air/flue gas concentric

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Version 1 – Shaft terminates above the roof

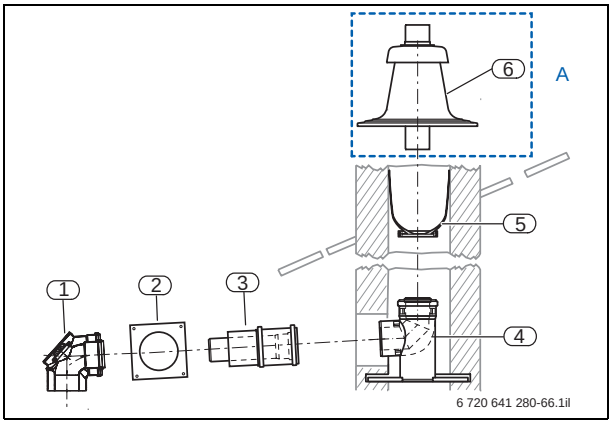

Fig. 134 Plastic components of the standard DO-S set

A Additional equipment required
1 Concentric inspection bend
2 Fascia
3 Concentric wall outlet with female connection
4 Concentric support bend, including support rail
5 Spacer, Ø 125 mm (6 pce)

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Version 2 – Shaft terminates inside the roof skin

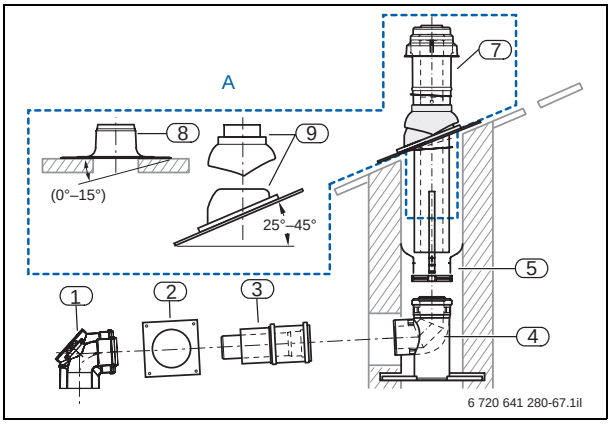

Fig. 135 Plastic components of the standard DO-S set

A Additional equipment required
1 Concentric inspection bend
2 Fascia
3 Concentric wall outlet with female connection
4 Concentric support bend, including support rail
5 Spacer, Ø 125 mm (6 pce)

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Air/flue gas routing via concentric pipe through a shaft with DO-S set	Product no.	Details
Standard DO-S set for Logamax plus GB162 up to 45 kW		
DO-S in PP plastic/zinc-plated steel, painted white, Ø 80/125 mm	77 472 153 68	fig. 134 and fig. 135
The standard DO-S set as version 1 can only be used with the following additional equipment:		fig. 134, pos. 6
Shaft cover with terminal pipe without female connection, Ø 80 mm, 500 mm long	87 092 056	
The standard DO-S set as version 2 can only be used with the standard DO set for concentric air/flue gas routing above pitched roofs and with the following additional equipment:		fig. 135, pos. 7
DO in PP/PE plastic and steel, painted white, Ø 80/125 mm		
externally black	77 190 036 60	
externally terracotta	77 190 036 61	
Optional equipment		
Adhesive flat roof flange, Ø 125 mm, not adjustable	77 190 008 38	fig. 135, pos. 8
Adhesive flat roof flange, Ø 125 mm, pitch adjustable from 0° to 15°	87 094 912	
Universal roof tile, black coated, Ø 125 mm, pitch adjustable from 25° to 45°	77 190 028 57	fig. 135, pos. 9
Universal roof tile, terracotta coated, Ø 125 mm, pitch adjustable from 25° to 45°	77 190 028 55	
Additional equipment for air/flue gas line inside the installation room		
Concentric components of the additional equipment for standard GA-K set	–	Table 70, page 147
Additional equipment for air/flue gas line inside a shaft[1)]		
Spacer, Ø 125 mm (4 pce)	87 094 618	–
Concentric pipe with inspection aperture, Ø 80/125 mm, white	77 190 027 60	fig. 133, pos. 11
Concentric 30° bend, Ø 80/125 mm	77 190 027 68	–
Concentric 15° bend, Ø 80/125 mm	87 094 580	
Concentric pipe, Ø 80/125 mm, 500 mm long, effective length 450 mm	77 190 027 63	–
Concentric pipe, Ø 80/125 mm, 1000 mm long, effective length 950 mm	77 190 027 64	
Concentric pipe, Ø 80/125 mm, 2000 mm long, effective length 1950 mm	77 190 027 65	

Table 68 Components of the DO-S set

1) Always order flue pipe, spacer and ventilation air pipe as an air/flue gas line inside a shaft as a complete unit (pos. 10)

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10.5 Concentric air/flue gas routing through a flue and shaft with GA-K set (DN80/125) for the Logamax plus GB162 up to 45 kW

Appliance type C_{93x} (formerly C_{33x})

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L[1] [m]			Reduction of the total length for each additional pipe diversion[2] [m]
	DN80/125			
	Ø 120	Ø 140	❑120	
GB162-15	10	10	10	none
GB162-25	15	17	17	L – 1.5
GB162-25 T40S	15	17	17	L – 1.5
GB162-35	11	19	16	L – 1.5
GB162-45	9	15	13	L – 1.5
	horizontal DN80/125, vertical DN110			
	Ø 160		❑150	
GB162-45	27		27	L – 1.5

Table 69 Maximum permissible total flue length (→ fig. 137)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

The GA-K set is ideally suited for the modernisation of older buildings, if combustion air can be drawn in via the existing chimney shaft (→ page 133). Have the shaft cleaned by a chimney sweep prior to installing the flue.

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for drawing in the combustion air (→ fig. 136). The secondary ventilation aperture in the shaft must be omitted.

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

Shaft terminal in conjunction with combustion equipment for solid fuel

If the shaft cover of the GA-K set and the chimney terminal of combustion equipment for solid fuel are side by side, then ensure that the flue gas from the combustion equipment for solid fuel cannot be drawn in.

In this case, increase the height of the chimney terminal for such combustion equipment. In addition, use the standard GA-K set with stainless steel shaft cover and terminal pipe (→ fig. 136).

If there is a risk of soot fire in the adjacent chimney, the plastic flue must be at least 50 mm away from the wall of the adjacent chimney (according to the state combustion order [Germany]). Where this cannot be ensured, design the flue using non-combustible materials (e.g. stainless steel → fig. 136) and route it inside the shaft used for the condensing boiler.

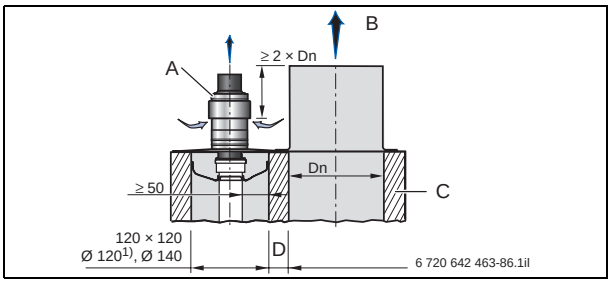

Fig. 136 Minimum dimensions of the shaft cross-section and the shaft terminal for the flue (dim. in mm)

A Stainless steel shaft cover
B Flue gas from the combustion equipment for solid fuel
C Chimney F 90
D Minimum wall thickness for chimney F 90 (L90)
1) Required shaft cross-section with system certification for ≤ 1.5 mm surface finish

GA-K set

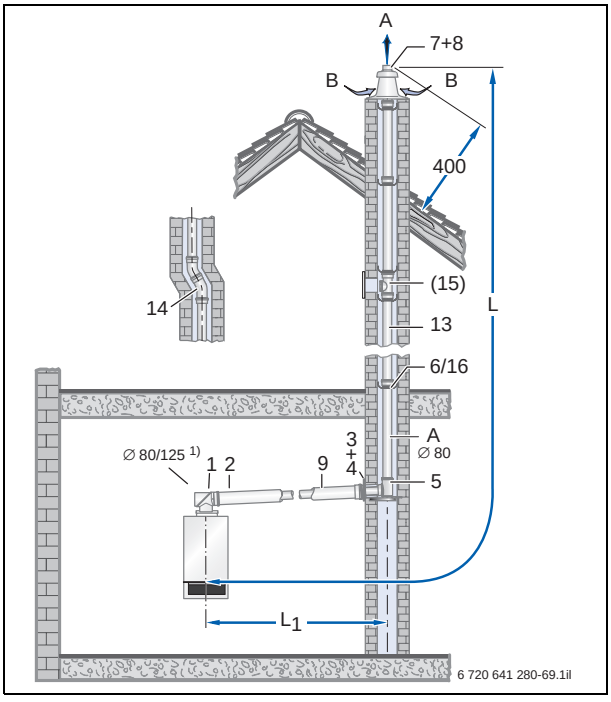

Fig. 137 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) Air/flue gas concentric

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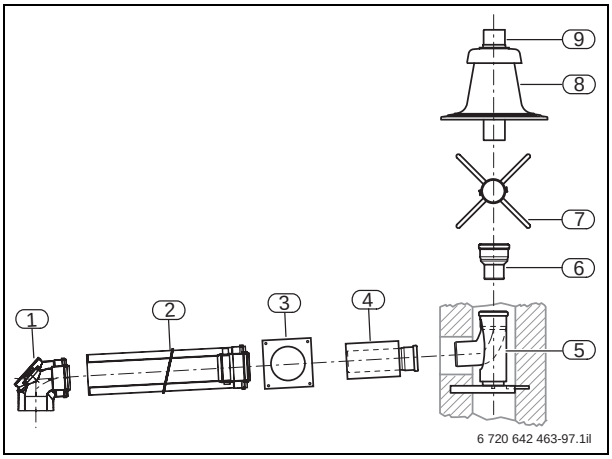

Fig. 138 Plastic components of the standard GA-K set

1 Concentric inspection bend
2 Concentric pipe, 500 mm long
3 Fascia
4 Concentric wall outlet,
Ø 80 mm, 500 mm long; Ø 125 mm, 300 mm long
5 87° bend including support and support rail
6 Expansion Ø 80/110 mm (if used for GB162-45 inside shaft DN110)
7 Spacer (6 pce)
8 Shaft cover
9 Terminal pipe without female connection, Ø 80 mm, 500 mm long

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Concentric air/flue gas routing through a flue and shaft with GA-K set	Product no.		Details
Standard GA-K set for Logamax plus GB162 up to 45 kW	**DN80 and DN80/125**	**DN110**	
GA-K in PP plastic/zinc-plated steel (painted white), with stainless steel shaft cover and terminal pipe[1)]	77 472 153 65 77 472 153 66	87 094 344 –	fig. 138
Optional equipment			
Concentric pipe, 500 mm long, effective length 450 mm	77 190 027 63	77 190 027 63	–
Concentric pipe, 1000 mm long, effective length 950 mm	77 190 027 64	77 190 027 64	
Concentric pipe, 2000 mm long, effective length 1950 mm	77 190 027 65	77 190 027 65	
Concentric 87° inspection bend	77 190 027 66	77 190 027 66	–
Concentric 45° inspection bend	77 472 213 80	77 472 213 80	
Concentric 30° inspection bend	77 190 027 68	77 190 027 68	
Concentric 15° inspection bend	87 094 580	87 094 580	
Concentric 87° inspection tee	77 190 033 82	77 190 033 82	–
Concentric pipe with inspection aperture	77 190 027 60	77 190 027 60	fig. 137, pos. 15
Flue pipe pack, Ø 80 mm: 4 pipes 2000 mm, 1 pipe 1000 mm, 2 pipes 500 mm long	77 190 036 69	–	fig. 137, pos. 14
Flue pipe, 500 mm long, effective length 450 mm	77 190 015 25	87 090 400	
Flue pipe, 1000 mm long, effective length 950 mm	77 190 015 26	87 090 404	
Flue pipe, 2000 mm long, effective length 1950 mm	77 190 015 27	87 090 408	
87° bend	77 190 015 34	87 090 309	–
45° bend	77 190 015 35	87 090 305	
30° bend	77 190 018 51	87 090 300	
15° bend	77 190 018 50	87 090 296	
Pipe with inspection aperture	77 190 015 33	87 090 236	fig. 137, pos. 16
Spacer (4 pce)	87 094 614	87 090 421	–
Stainless steel shaft cover with terminal pipe[1)]	87 094 920	87 090 150	–
Adaptor plastic pipe DN80 to stainless steel for the use of stainless steel flues pipes DN80 by Raab	77 472 255 08	–	–
Adaptor plastic pipe DN80/125 to stainless steel for the use of stainless steel flue pipes DN80/125 by Raab	77 472 255 09	–	–

Table 70 Components of the GA-K set

1) Not in connection with ÜB-Flex

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10.6 Concentric air/flue gas routing through a flue and shaft with GA-K set (DN110/160) for the Logamax plus GB162 from 50 kW

Appliance type C_{93x} (formerly C_{33x})

Observe the general information on page 132 ff.

Type	Shaft dimensions [mm]	Maximum permissible total length L[1] [m]			
		GB162-50	GB162-65	GB162-80	GB162-100
GA-K shaft	❑ 140, Ø 160	14	14.5	9	8.5
	❑ 150, Ø 170	24	22.5	12	14
	❑ 160, Ø 180	25	31	17.5	20.5
	❑ 170 (140 × 200), Ø 190	25	35	22.5	26
	❑ 180, Ø 200	25	35	26	30
	❑ 200, Ø 230	25	35	30.5	35.5

Table 71 Maximum permissible total flue length (→ fig. 140)

1) These lengths include the pipe diversions included in the standard set; horizontal length L_1 = 2 m. Reduce the total length by 1.5 m for every additional pipe diversion and every tee.

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

Adequate combustion air supply

The GA-K set is ideally suited for the modernisation of older buildings, if combustion air can be drawn in via the existing chimney shaft (→ page 133). Have the shaft cleaned by a chimney sweep prior to installing the flue.

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for drawing in the combustion air (→ fig. 139). The secondary ventilation aperture in the shaft must be omitted.

Shaft terminal in conjunction with combustion equipment for solid fuel

If the shaft cover of the GA-K set and the chimney terminal of combustion equipment for solid fuel are side by side, then ensure that the flue gas from the combustion equipment for solid fuel cannot be drawn in.

In this case, increase the height of the chimney terminal for such combustion equipment. In addition, use the standard GA-K set with stainless steel shaft cover and terminal pipe (→ fig. 139).

If there is a risk of soot fire in the adjacent chimney, the plastic flue must be at least 50 mm away from the wall of the adjacent chimney (according to the state combustion order [Germany]). Where this cannot be ensured, design the flue using non-combustible materials (e.g. stainless steel → fig. 139) and route it inside the shaft used for the condensing boiler.

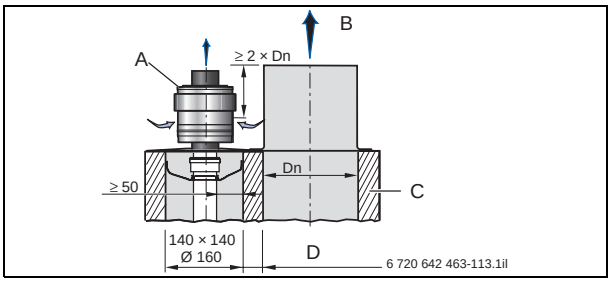

Fig. 139 Minimum dimensions of the shaft cross-section and the shaft terminal for the flue (dim. in mm)

A Stainless steel shaft cover
B Flue gas from the combustion equipment for solid fuel
C Chimney F 90
D Minimum clearances for chimney F 90

GA-K set

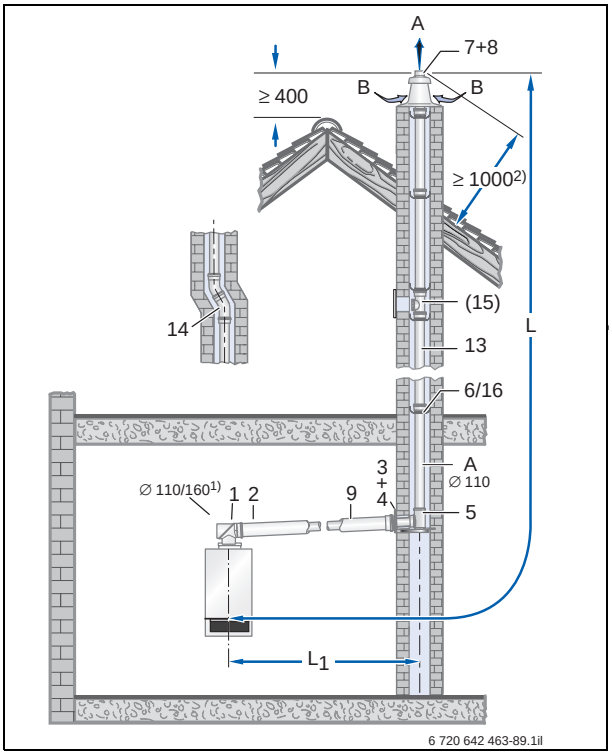

Fig. 140 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) Flue gas/ventilation air, concentric
2) 400 mm sufficient if the output is restricted to 50 kW

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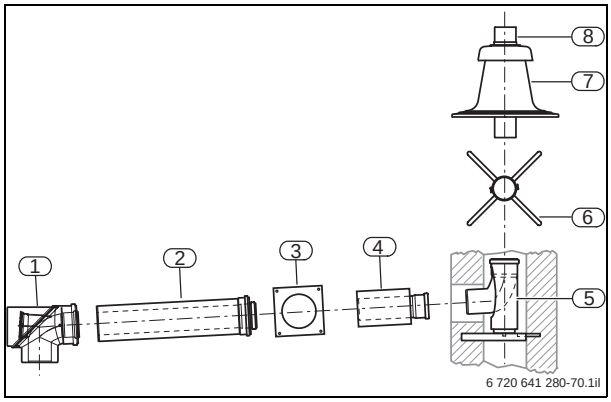

Fig. 141 Plastic components of the standard GA-K set

1 Concentric inspection bend
2 Concentric pipe, 500 mm long
3 Fascia
4 Concentric wall outlet,
Ø 80 mm, 500 mm long,
Ø 125 mm, 300 mm long
5 87° bend including support and support rail
6 Spacer (6 pce)
7 Shaft cover
8 Terminal pipe without female connection,
Ø 80 mm, 500 mm long

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Concentric air/flue gas routing through a flue and shaft with GA-K set	Product no.	Details
Standard GA-K set for Logamax plus GB162 from 50 kW	**DN110/160**	
GA-K in PP plastic/zinc-plated steel (painted white), with stainless steel shaft cover and terminal pipe[1)]	87 094 054	fig. 141
Optional equipment		
Concentric pipe, 500 mm long	87 090 370	fig. 140, pos. 9
Concentric pipe, 1000 mm long	87 090 372	
Concentric pipe, 2000 mm long	–	
Concentric 87° inspection bend	87 090 284	–
Concentric 45° inspection bend	87 090 282	
Concentric 30° inspection bend	87 090 281	
Concentric 15° inspection bend	87 090 280	
Concentric 87° tee	87 090 220	–
Concentric pipe with inspection aperture	87 090 210	–
Additional equipment, shaft		
Flue pipe, 500 mm long	87 090 400	fig. 140, pos. 13
Flue pipe, 1000 mm long	87 090 404	
Flue pipe, 2000 mm long	87 090 408	
87° bend	87 090 309	–
45° bend	87 090 305	
30° bend	87 090 300	
15° bend	87 090 296	
Pipe with inspection aperture	87 090 236	fig. 140, pos. 15
Spacer (4 pce)	87 090 421	fig. 140, pos. 16
Stainless steel shaft cover with terminal pipe[1)]	87 090 150	–

Table 72 Components of the GA-K set

1) Not in connection with ÜB-Flex

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10.7 Concentric air/flue gas routing through a flexible flue and shaft with ÜB-Flex set in conjunction with the GA-K set

For the Logamax plus GB162 the ÜB-Flex set is only permissible in conjunction with the GA-K (→ fig. 143).

Appliance type C_{93x} (formerly C_{33x})

Observe the general information on page 132 ff. as well as the specific information regarding the standard GA-K set (→ page 146 and page 148).

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
	horizontal **DN80/125**, vertical DN83	
GB162-15	11 (11)[3)]	none
GB162-25	19 (15)[3)]	L – 1.5
GB162-25 T40S	19 (15)[3)]	L – 1.5
GB162-35	16 (12)[3)]	L – 1.5
GB162-45	13 (9)[3)]	L – 1.5
	horizontal DN110/160, vertical DN110	
GB162-50	25[4)]	L – 1.5
GB162-65	22.7[4)]	L – 1.5
GB162-80	20.5[4)]	L – 1.5
GB162-100	24[4)]	L – 1.5
	horizontal DN80/125, vertical DN110	
GB162-45	28	L – 1.5

Table 73 Maximum permissible total length of the flue with ÜB-Flex set in conjunction with the GA-K set (→ fig. 143)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m
2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis
3) Permissible total length for Ø 120 mm shaft with ≤ 1.5 mm surface finish
4) For 170 mm x 170 mm (140 mm x 200 mm) shaft. Lengths for alternative shaft dimensions → tab. 71, page 148

Adequate combustion air supply

The ÜB-Flex set in conjunction with the GA-K set is ideally suited for the modernisation of older buildings with an offset shaft, if the combustion air can be drawn in via the existing chimney shaft (→ page 133). Have the shaft cleaned by a chimney sweep prior to installing the flue.

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for drawing in the combustion air (→ fig. 142). The secondary ventilation aperture in the shaft must be omitted.

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

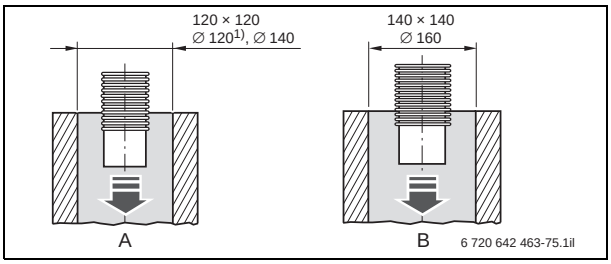

Fig. 142 Minimum dimensions of the shaft cross-section for the installation of the flexible flue (dim. in mm)

A Boilers up to 45 kW
B From boiler size 50 kW
1) Required shaft cross-section with system certification for ≤ 1.5 mm surface finish

ÜB-Flex set in conjunction with the GA-K set

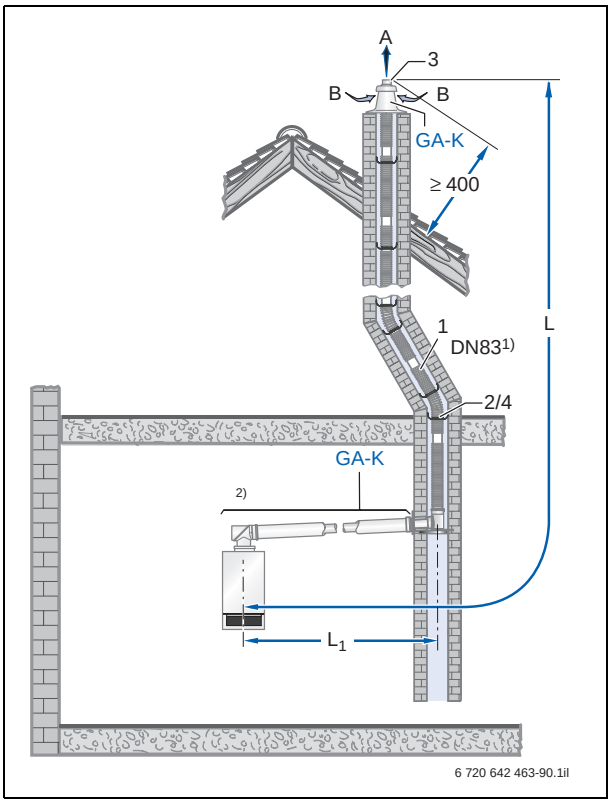

Fig. 143 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) Flexible flue pipe
2) Air/flue gas concentric

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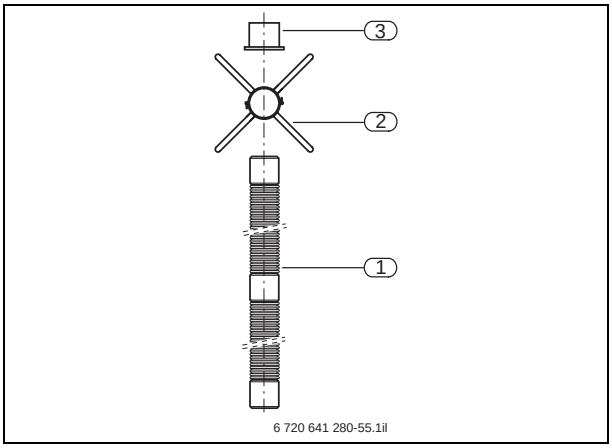

Fig. 144 Plastic components of the standard ÜB-Flex set, DN83 for Logamax plus GB162 up to 45 kW

1 Flexible flue DN83, 12.5 m or 25 m long
2 Spacer for flexible flue, DN83, 8 pce (for 12.5 m) or 16 pce (for 25 m)
3 Spring ring for retainer, incl. terminal pipe

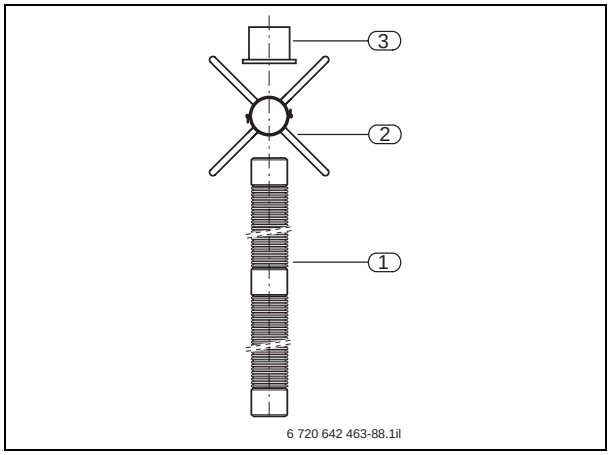

Fig. 145 Plastic components of the standard ÜB-Flex set, DN110 for Logamax plus GB162 from 50 kW

1 Flexible flue DN110, 15 m or 25 m long
2 Spacer for flexible flue, DN110, 8 pce (for 15 m) or 16 pce (for 25 m)
3 Spring ring for retainer, incl. terminal pipe

Concentric air/flue gas routing through a flexible flue and shaft with the ÜB-Flex and GA-K sets	**Product no.**		**Details**
Standard ÜB-Flex set for Logamax plus GB162	**DN83 (up to 45 kW)**	**DN110 (from 50 kW)**	
Standard ÜB-Flex set 12.5 m (15 m for DN110)With flexible plastic flue PP, 12.5 m long (15 m for DN110)	87 094 036	87 090 036	fig. 144 and fig. 145
Standard ÜB-Flex set 25 m With flexible plastic flue PP, 25 m long	87 094 038	87 090 038	fig. 144 and fig. 145
Balanced flue operation with the standard ÜB-Flex set only permissible in conjunction with standard GA-K set. **To combine the standard ÜB-Flex set with standard GA-K set:** GA-K PP plastic/zinc-plated steel (painted white), Ø 80/125 mm	77 472 153 65	87 094 344	fig. 138, page 147 and fig. 141, page 149
Optional equipment			
Spacer for flexible flue (4 pce)	87 094 614	87 090 421	fig. 143, pos. 4
Union for two flexible flue pipes	87 094 668	87 094 724	–
Pipe with inspection aperture ÜB-Flex	87 094 676	87 094 728	–
Components for the flue inside the installation room (additional equipment to the standard GA-K set for the Logamax plus GB162)	–	–	Table 70, page 147 and table 72, page 149

Table 74 Components of the ÜB-Flex set in conjunction with the GA-K set for, but not in connection with stainless steel shaft cover and terminal pipe

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10.8 Concentric air/flue gas routing on an exterior wall with GAF-K set for the Logamax plus GB162 up to 45 kW

Appliance type C_{53x}

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	21	none
GB162-25	34	L – 1.5
GB162-25 T40S	34	L – 1.5
GB162-35	37	L – 1.5
GB162-45	27	L – 1.5

Table 75 Maximum permissible total flue length (→ fig. 146)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

The GAF-K set is ideally suited for the modernisation of older buildings, if the combustion air **cannot** be drawn in via the existing chimney shaft.

To be able to draw in the combustion air at the height of the wall outlet, the ventilation air tee must be located at least 30 cm above ground level. Subject to the relevant geography, the height of snow deposits must also be taken into account. In any case, air must be drawn in at a level above the height of snow deposits that can be expected. Where this condition cannot be met, the combustion air can alternatively be drawn in via a concentric ventilation air connector that must be installed in the air/flue gas line on the wall (→ fig. 147, alternative ventilation air).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

The flue on the external wall must be at least 20 cm away from windows. Provide wall mounting brackets every 2 m.

Roof outlet

The air/flue gas line on an external wall can be routed through the eaves (→ fig. 146). This requires the concentric roof outlet and either an adhesive flat roof flange or a universal roof tile with rain cap as auxiliary equipment (→ fig. 147, roof outlet).

GAF-K set

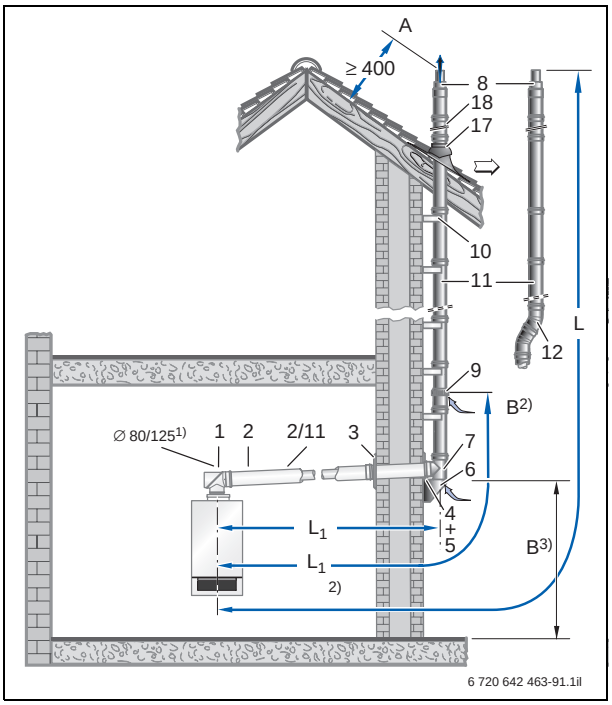

Fig. 146 Installation version with the GAF-K set (dim. in mm)

A Flue gas
B Ventilation air
1) Air/flue gas concentric
2) Alternative
3) At ≥ 30 cm (observe the height of snow deposits!)

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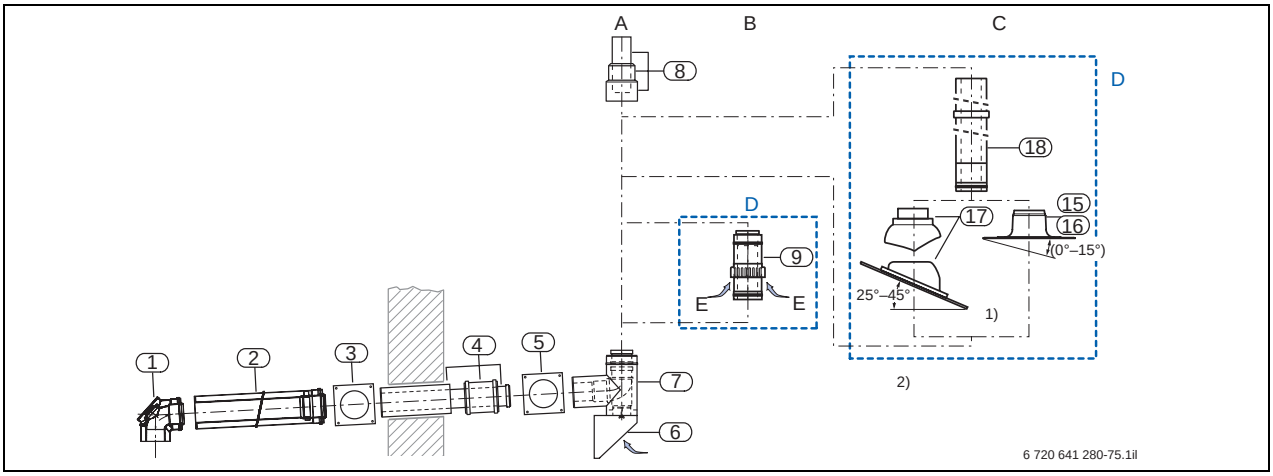

Fig. 147 Plastic components of the standard GAF-K set

A Standard
B Ventilation air alternative
C Roof outlet (→ fig. 146)
D Optional equipment
E Ventilation air
1 Concentric inspection bend
2 Concentric pipe, 500 mm long
3 Fascia, painted white
4 Concentric wall outlet, including twin fem. connection,
Ø 80 mm, 500 mm long,
Ø 125 mm, 400 mm long
5 Fascia, stainless steel
6 External wall panel
7 Ventilation air tee for wall panel
8 Terminal piece; clip for terminal; terminal pipe without female connection, Ø 80 mm, 250 mm long
9 Ventilation air connector (the alternative ventilation air connector includes a seal that enables the standard ventilation air aperture in the external wall panel to be sealed off. Observe the maximum permissible length up to the ventilation air inlet.)
1) Alternative
2) Tiles for alternative roof slopes available on request

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Concentric air/flue gas routing on an external wall with GAF-K set	Product no.		Details
Standard GAF-K set for the Logamax plus GB162 up to 45 kW	**Plastic**		
GAF-K in plastic PP/zinc-plated steel (painted white) inside the installation room and plastic PP/stainless steel on the external wall, Ø 80/125 mm	77 472 153 69		fig. 147
Optional equipment	**Plastic/steel, white**	**Plastic/stainless steel**	
Concentric ventilation air connector, stainless steel, Ø 125 mm	–	87 094 664	fig. 147, pos. 9
Wall mounting bracket, stainless steel, Ø 125 mm, wall clearance 40 to 65 mm	–	87 094 626	fig. 146, pos. 10
Wall mounting bracket extension; overall clearance 150 to 230 mm	–	87 094 710	
External wall panel extension; overall wall clearance 150 to 230 mm	–	87 094 712	
Concentric pipe, 500 mm long, effective length 450 mm	77 190 027 63	87 094 628	fig. 146, pos. 11
Concentric pipe, 1000 mm long, effective length 950 mm	77 190 027 64	87 094 632	
Concentric pipe, 2000 mm long, effective length 1950 mm	77 190 027 65	87 094 636	
Concentric 87° inspection bend	77 190 027 66	87 094 644	fig. 146, pos. 12
Concentric 45° inspection bend	77 472 213 80	87 094 648	
Concentric 30° inspection bend	77 190 027 68	87 094 652	
Concentric 15° inspection bend	87 094 580	87 094 656	
Concentric 87° inspection tee	77 190 033 82	–	–
Concentric pipe with inspection aperture	77 190 027 60	87 094 640	–
Additional equipment required for roof outlet on an external wall			
Adhesive flat roof flange, Ø 125 mm, not adjustable	–	87 094 910	fig. 147, pos. 15
Adhesive flat roof flange, Ø 125 mm, pitch adjustable from 0° to 15°	–	87 094 912	fig. 147, pos. 16
Roof tile, black coated, Ø 125 mm, pitch adjustable from 25° to 45°	–	87 094 852	fig. 147, pos. 17
Roof tile, terracotta coated, Ø 125 mm, pitch adjustable from 25° to 45°	–	87 094 850	
Concentric roof outlet, stainless steel, without terminal piece	–	87 094 660	fig. 147, pos. 18

Table 76 Plastic components of the standard GAF-K set

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10.9 Concentric air/flue gas routing on an exterior wall with GAF-K set for the Logamax plus GB162 from 50 kW

Appliance type C_{53x}

Observe the general information on page 132 ff. The Logamax plus GB162-50/65/80/100 requires a specific installation room, according to Muster-Feuerungsverordnung [Germany], if the output has not been restricted to 50 kW (→ page 132).

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-50	50	L – 1.5
GB162-65	50	L – 1.5
GB162-80	35	L – 1.5
GB162-100	35	L – 1.5

Table 77 Maximum permissible total flue length (→ fig. 148)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

The GAF-K set is ideally suited for the modernisation of older buildings, if the combustion air **cannot** be drawn in via the existing chimney shaft.

To be able to draw in the combustion air at the height of the wall outlet, the ventilation air tee must be located at least 30 cm above ground level. Subject to the relevant geography, the height of snow deposits must also be taken into account. In any case, air must be drawn in at a level above the height of snow deposits that can be expected. Where this condition cannot be met, the combustion air can alternatively be drawn in via a concentric ventilation air connector that must be installed in the air/flue gas line on the wall (→ fig. 149, alternative ventilation air).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137). The flue on the exterior wall must be at least 20 cm away from windows. Provide wall spacers every 2 m.

Roof outlet

The air/flue gas line on an external wall can be routed through the eaves (→ fig. 148). This requires the concentric roof outlet and either an adhesive flat roof flange or a universal roof tile with cowl as additional equipment (→ fig. 149, roof outlet).

GAF-K set

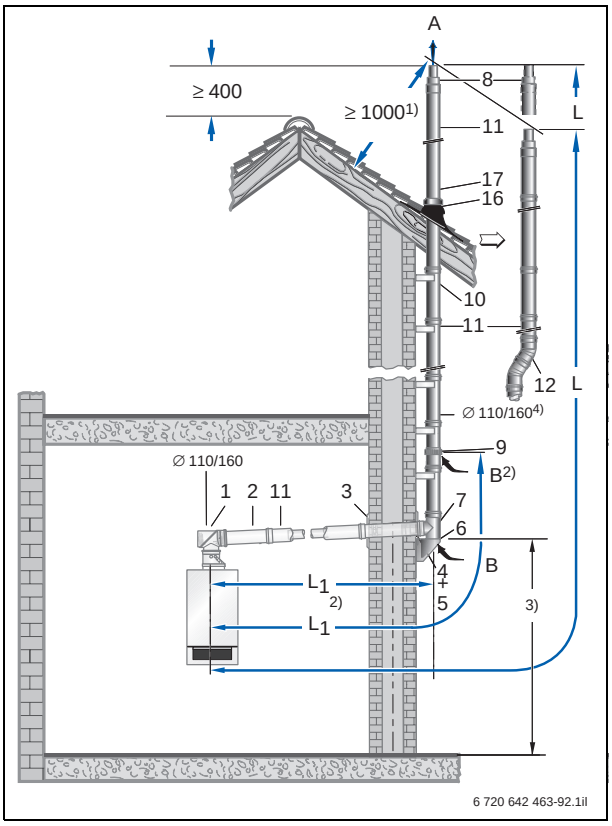

Fig. 148 Installation version (dim. in mm)

A Flue gas
B Ventilation air
1) 400 mm sufficient if the output is restricted to 50 kW
2) Alternative
3) Ventilation air: ≥ at 30 cm (observe the height of snow deposits!)
4) Stainless steel

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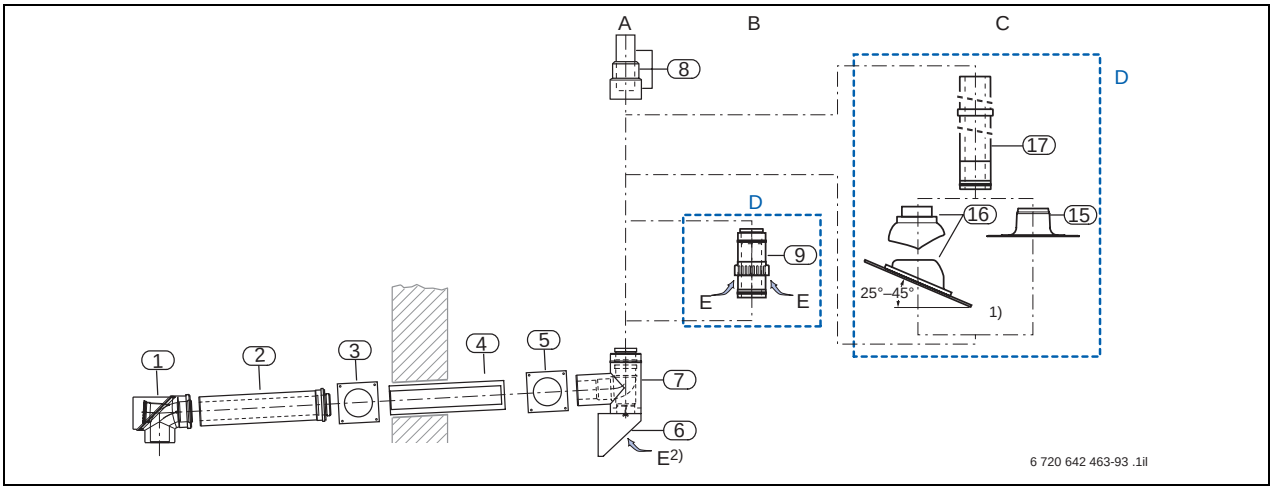

Fig. 149 Plastic components of the standard GAF-K set

A Standard
B Ventilation air alternative
C Roof outlet (→ fig. 148)
D Optional equipment
E Ventilation air
1 Concentric tee with inspection aperture
2 Concentric pipe, 500 mm long
3 Fascia, painted white
4 Concentric wall outlet, 300 mm long
5 Fascia, stainless steel
6 External wall panel
7 Ventilation air tee for wall panel
8 Terminal piece; clip for terminal; terminal pipe without female connection, Ø 110 mm, 250 mm long
9 Ventilation air connector (the alternative ventilation air connector includes a seal that enables the standard ventilation air aperture in the external wall panel to be sealed off. Observe the maximum permissible length up to the ventilation air inlet.)
1) Alternative
2) Standard

The following are also part of the standard delivery:
- One tube Centrocerin
- System certification label

Concentric air/flue gas routing on an exterior wall with GAF-K set	**Product no.**		**Details**
Standard GAF-K set for the Logamax plus GB162 from 50 kW	**internal and external DN110/160**		
GAF-K in plastic PP/zinc-plated steel (painted white) inside the installation room and plastic PP/stainless steel on the exterior	87 094 056		fig. 149
Optional equipment	**internal DN110/160**	**external DN110/160**	
Concentric ventilation air connector, stainless steel	–	87 092 206	fig. 148, pos. 9
Wall mounting bracket, stainless steel, wall clearance 40 to 65 mm	–	87 090 430	fig. 148, pos. 10
Wall mounting bracket extension; overall clearance 180 to 270 mm	–	87 094 714	
External wall panel extension; overall clearance 180 to 270 mm	–	87 094 716	
Concentric pipe, 500 mm long	87 090 370	87 090 380	fig. 148, pos. 11
Concentric pipe, 1000 mm long	87 090 372	87 090 384	
Concentric pipe, 2000 mm long	–	87 090 388	
Concentric 87° inspection bend	87 090 284	87 090 352	fig. 148, pos. 12
Concentric 45° inspection bend	87 090 282	87 090 348	
Concentric 30° inspection bend	87 090 281	87 090 344	
Concentric 15° inspection bend	87 090 280	87 090 340	
Concentric 87° tee	87 090 220	–	–
Concentric pipe with inspection aperture	87 090 210	87 090 244	–
Additional equipment required for roof outlet			
Adhesive flat roof flange, Ø 160 mm	–	–	fig. 149, pos. 15
Universal roof tile, Ø 160 mm, black	–	–	fig. 149, pos. 16
Universal roof tile, Ø 160 mm, terracotta	–	87 090 900	
Universal roof tile, Ø 160 mm, incl. cowl, black	–	87 090 902	
Universal roof tile, Ø 160 mm, incl. cowl, terracotta			
Roof outlet, without terminal piece	–	87 090 460	fig. 149, pos. 17

Table 78 Components of the GAF-K set

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10.10 Concentric air/flue gas routing via a separate combustion air line inside the installation room and via a flue with secondary ventilation in a shaft with GAL-K set

For the Logamax plus GB162 the Buderus GAL-K set is only permissible in conjunction with the GA-K set (→ fig. 151).

Appliance type C_{53x}

Observe the general information on page 132 ff. as well as the specific information regarding the standard GA-K set (→ page 146 and page 148).

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	50	none
GB162-25	48	L – 1.5
GB162-25 T40S	48	L – 1.5
GB162-35	36	L – 1.5
GB162-45	27	L – 1.5
GB162-50	50	L – 1.5
GB162-65	50	L – 1.5
GB162-80	35	L – 1.5
GB162-100	35	L – 1.5

Table 79 Maximum permissible total flue length (→ fig. 151)

1) These lengths include the pipe diversions included in the standard set; horizontal length $L_1 = 2$ m, $L_2 = 5$ m

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Adequate combustion air supply

The GAL-K set is ideally suited for the modernisation of older buildings, if the combustion air **cannot** be drawn in via the existing chimney shaft (→ page 133). The adequate supply of combustion air from the outside is safeguarded by the separate ventilation air line in the installation room.

The ventilation air aperture and the terminal of the flue shaft must be arranged on the same side of the building (identical pressure range).

Maintain the minimum dimensions of the shaft cross-section to ensure that the free cross-section is adequate for the secondary ventilation of the flue (→ fig. 150).

Minimum dimensions and inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

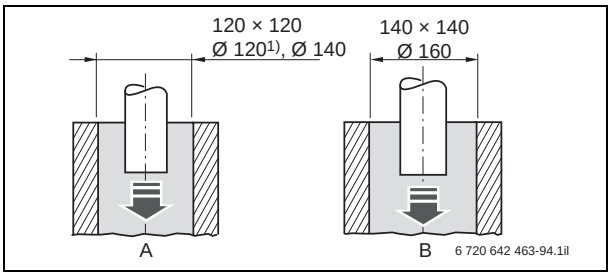

Fig. 150 Minimum dimensions of the shaft cross-section for the installation of the flue (dim. in mm)

A Boilers up to 45 kW
B For boiler size ≥ 50 kW
1) Required shaft cross-section with system certification for ≤ 1.5 mm surface finish

GAL-K set in conjunction with the GA-K set

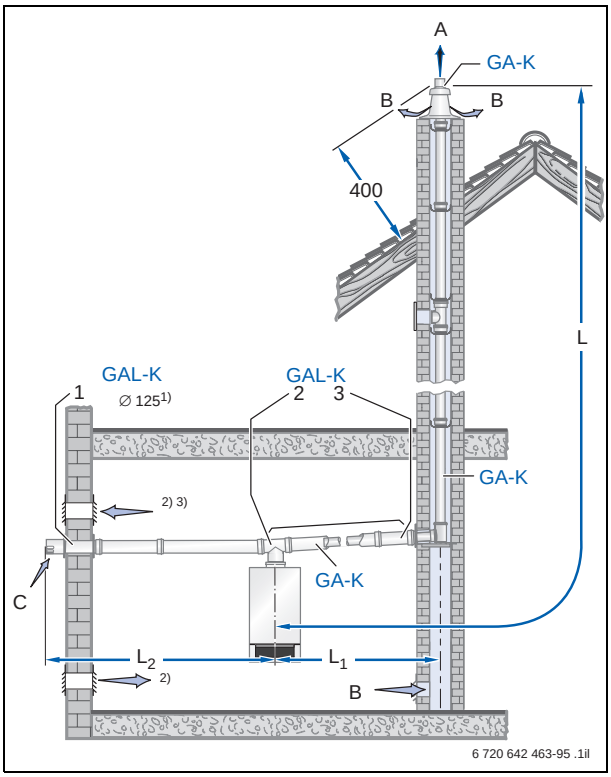

Fig. 151 Installation version (dim. in mm)

A Flue gas
B Secondary ventilation
C Ventilation air
1) Ventilation air pipe
2) For boilers > 35 kW vents or vent to the outside (→ tab. 44, page 110)
3) For boilers ≤ 35 kW, an interconnected ventilation air supply in accordance with DVGW-TRGI 2008 [Germany] is feasible for the secondary ventilation supply

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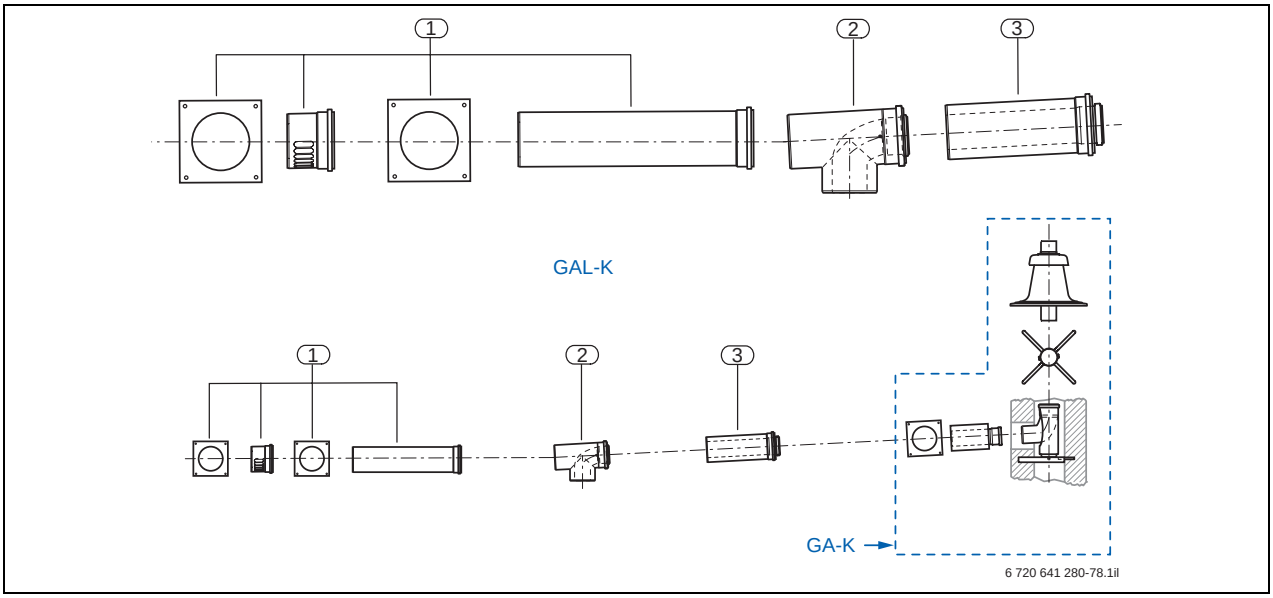

Fig. 152 Plastic components of the standard GAL-K set

1 Fascia; cover with vent; ventilation air pipe, 500 mm long; fascia
2 Concentric tee with inspection aperture
3 Concentric pipe with gasket for the ventilation air pipe at the female connection, 250 mm long

Concentric air/flue gas routing via a separate combustion air line inside the installation room and via a flue with secondary ventilation in a shaft with GAL-K set	**Product no.**	**Details**
Standard GAL-K set for the Logamax plus GB162 in PP plastic/zinc-plated steel (painted white)		
GAL-K, Ø 80/125 mm for GB162 (up to 45 kW) GAL-K, Ø 100/160 mm for GB162 (from 50 kW)	87 094 459 87 094 058	fig. 152
For the operation of the Logamax plus GB162, the GAL-K extension set is only permissible in conjunction with standard GA-K set. **To combine the GAL-K extension set with the standard GA-K set (PP plastic/zinc-plated steel (painted white)):** GA-K Ø 80/125 mm for GB162 (up to 45 kW) GA-K Ø 80/125 mm for GB162 (up to 45 kW), with stainless steel shaft cover and terminal pipe[1)] GA-K Ø 110/160 mm for GB162-50/65/80/100	 77 472 153 65 77 472 153 66 87 094 054	 fig. 138, page 147 and fig. 141, page 149
Additional equipment, ventilation air GAL-K, Ø 80/125 mm		
Ventilation air pipe, painted white, DN125, 1000 mm long	87 092 202	–
Ventilation air pipe, painted white, DN125, 500 mm long	87 092 024	
Inspection tee for ventilation air, steel, painted white, DN125 (may be converted to straight-through version)	87 092 002	
Cover for inspection tee (required for inspection tee)	87 092 006	
Additional equipment, ventilation air GA-K, Ø 110/160 mm		
When ordering please note that the external pipe of the concentric pipes can be used as a ventilation air pipe.		Page 148 f.

Table 80 Components of the GAL-K set in in conjunction with the GA-K set

1) Not in connection with ÜB-Flex

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10.11 Concentric air/flue gas routing via an air/flue gas system with LAS-K set

Appliance type C_{43x}

Observe the general information on page 132 ff.

Logamax plus	Maximum permissible total length L[1)] [m]	Reduction of the total length for each additional pipe diversion[2)] [m]
GB162-15	1.4	none
GB162-25	1.4	none
GB162-25 T40S	1.4	none
GB162-35	1.4	none
GB162-45	1.4	none
GB162-50	1.4	none
GB162-65	1.4	none
GB162-80	1.4	none
GB162-100	1.4	none

Table 81 Maximum permissible total flue length (→ fig. 153)

1) The length includes the pipe diversions included in the standard set; greater lengths may be possible, subject to a calculation by the manufacturer of the LAS

2) Up to three reductions for additional bends or inspection bends can be taken into consideration; more than three must be checked on an individual basis

Connection to the air/flue gas system

When connecting the Logamax plus GB162 gas condensing boilers directly to a chimney, a facing wall of at least 11.5 mm is required (→ fig. 153).

Each manufacturer may specify different connections for linking the concentric air/flue gas line to the LAS chimney.

The GB162 are suitable for connection to an air/flue gas system operating with negative pressure.
The manufacturer will size the air/flue gas system.

A general building regulations approval from the Institut für Bautechnik (DIBt) [Germany] must be granted for the air/flue gas system.

For further information, see the DVGW Code of Practice G 636 “Gas appliances for connection to an air/flue gas system operating with negative pressure (standardised procedure).”

Inspection apertures

Allow for inspection apertures in accordance with regulations (→ page 137).

LAS-K set

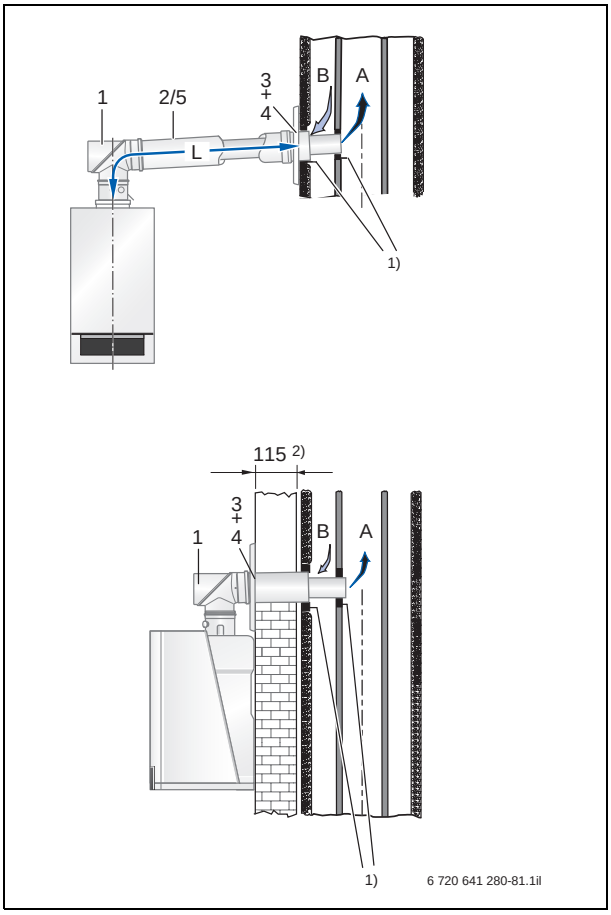

Fig. 153 Installation versions (dim. in mm)

A Flue gas
B Ventilation air
1) Seal supplied by the manufacturer of the LAS
2) Facing wall for LAS-K only for installation directly to the LAS with connection at the back

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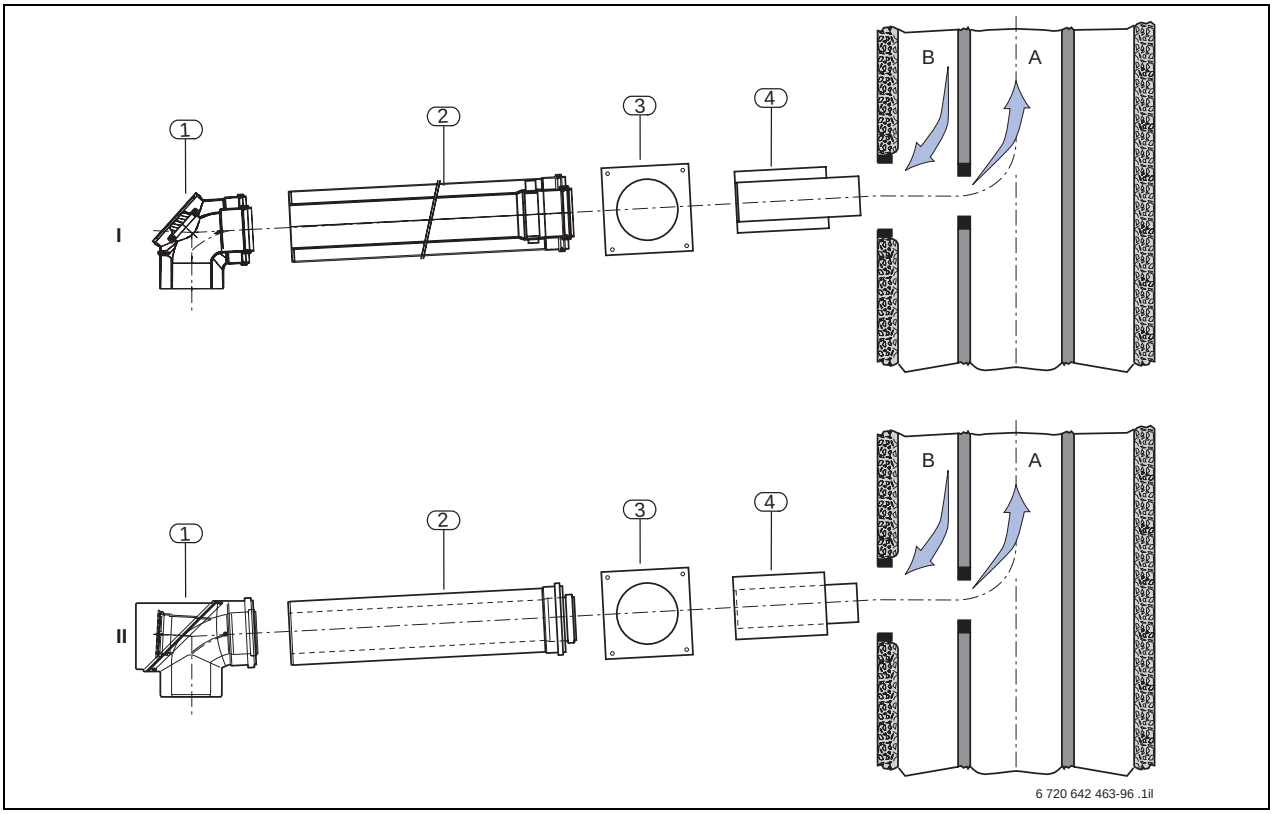

Fig. 154 Plastic components of the standard LAS-K set

I DN80/125
II DN110/160
A Flue gas
B Ventilation air

1 Concentric inspection bend
2 Concentric pipe, 500 mm long
3 Fascia
4 Concentric wall outlet
(Ø 80 mm, 500 mm long; Ø 125 mm, 300 mm long

Concentric air/flue gas routing via an air/flue gas system	Product no.		Details
Standard LAS-K set for Logamax plus GB162 gas condensing boilers, PP plastic/zinc-plated steel (painted white)	**DN80/125 (up to 45 kW)**	**DN110/160 (from 50 kW)**	
LAS-K in PP plastic/zinc-plated steel (painted white)	7747215370	87 094 060	fig. 154
Optional equipment			
Concentric pipe, 500 mm long	77 190 027 63	87 090 370	fig. 153, pos. 5
Concentric pipe, 1000 mm long	77 190 027 64	87 090 372	
Concentric 87° inspection bend	77 190 027 66	87 090 284	–
Concentric 45° inspection bend	77 192 213 80	87 090 282	
Concentric 30° inspection bend	77 190 027 68	87 090 281	
Concentric 15° inspection bend	87 094 580	87 090 280	
Concentric 87° inspection tee	77 190 033 82	87 090 220	–
Concentric pipe with inspection aperture	77 190 037 60	87 090 210	–

Table 82 Components of the LAS-K set

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11 Individual components for flue systems

11.1 Dimensions of selected individual components

11.1.1 Components for individual appliances, internal diameter Ø 80 mm or Ø 110 mm

Seal

- Lip seal

Product numbers

- For the relevant sets in chapters 9 and 10 for the selected flue system

Inspection bend, long

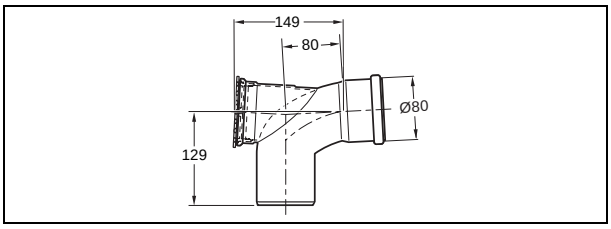

Fig. 155 Inspection bend, long (dim. in mm)

Pipe with inspection aperture

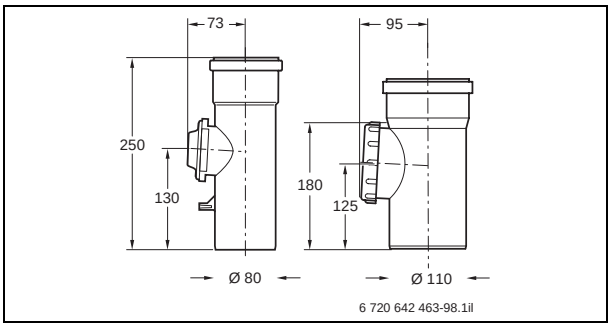

Fig. 156 Pipe with inspection aperture (dim. in mm)

Bend

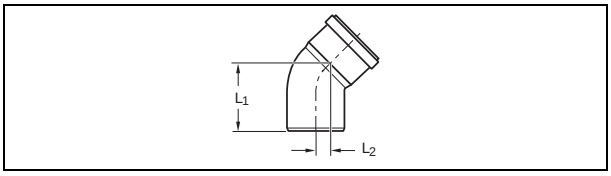

Fig. 157 Bend

Ø [mm]	α	L_1 [mm]	L_2 [mm]
80	87°	112.9	59.9
	45°	100.9	20
	30°	94.3	10.5
	15°	84.9	2.3
110	87°	118	60
	45°	105	20
	30°	96	10.5
	15°	83	3.5

Table 83 Bend dimensions

Offset dimensions, bend

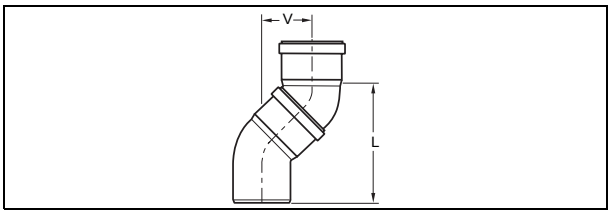

Fig. 158 Offset dimensions, bend

Ø [mm]	Bend	V [mm]	L [mm]
80	2 × 87°	174.8	179.2
	2 × 45°	77.2	186.4
	2 × 30°	48.5	181.1
	2 × 15°	22.1	167.5
110	2 × 87°	175	183
	2 × 45°	80	194
	2 × 30°	50	185
	2 × 15°	22	164

Table 84 Offset dimensions, bend

Flue pipe

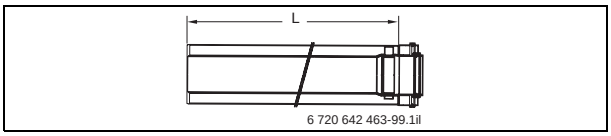

Fig. 159 Flue pipe Ø 80

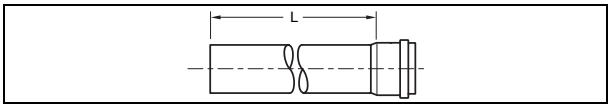

Fig. 160 Flue pipe Ø 110

Ø [mm]	L [mm]
80	450, 950, 1950
110	500, 1000, 2000

Table 85 Flue pipe dimensions

Shaft cover for Logamax plus GB162-15/25/35/45 and GB162-25 T40S

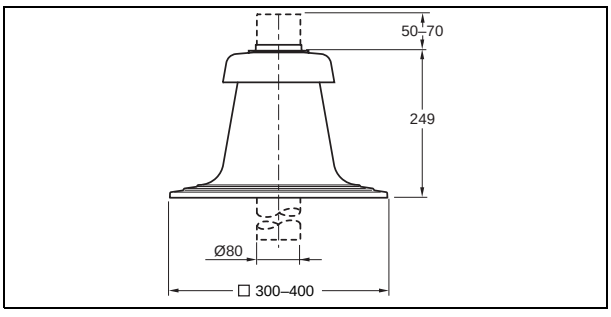

Fig. 161 Shaft cover (dim. in mm)

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Spacer for flue inside a shaft

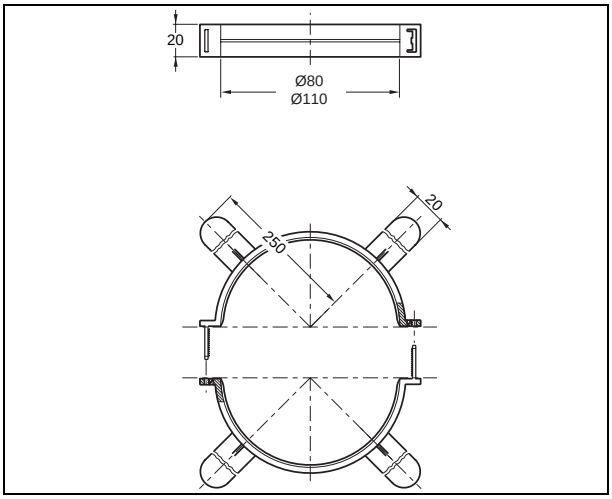

Fig. 162 Spacer for flue inside a shaft (dim. in mm)

Shaft cover for Logamax plus GB162-50/65/80/100

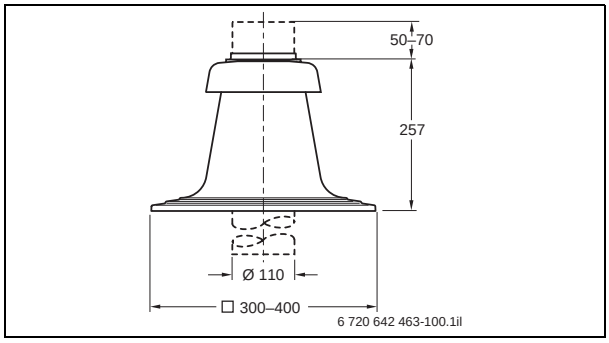

Fig. 163 Shaft cover (dim. in mm)

Chimney connection (part of the standard GA set)

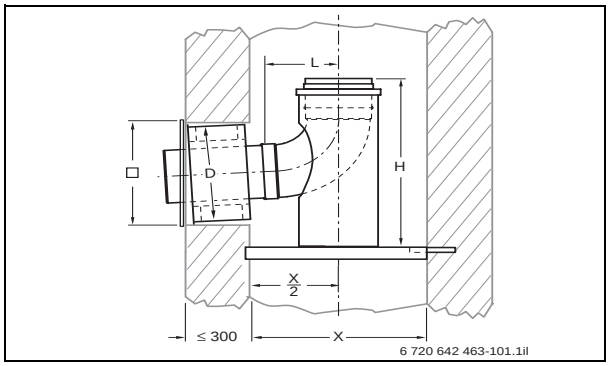

Fig. 164 Chimney connection (dim. in mm)

Ø [mm]	D [mm]	L [mm]	H [mm]	□ [mm]	X [mm]
80	125	125	244	200	≤ 300
110	160	118	267	230	≤ 300

Table 86 Chimney connection dimensions

Ventilation air grille (part of the standard GA-X set)

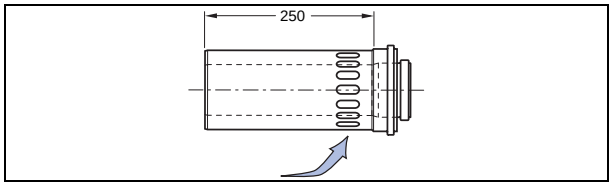

Fig. 165 Ventilation air grille (dim. in mm)

11.1.2 Components for individual appliances, internal diameter Ø 125 mm or Ø 160 mm

Slope

- adjustable from 0° to 15°

Seal

- Lip seal

Product numbers

- For the relevant sets in chapters 9 and 10 for the selected flue system

Adhesive flat roof flange

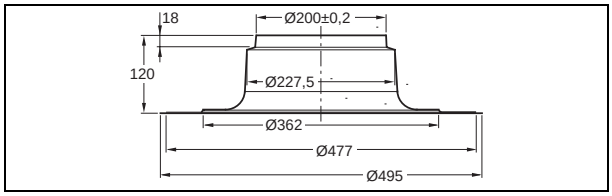

Fig. 166 Adhesive flat roof flange (dim. in mm)

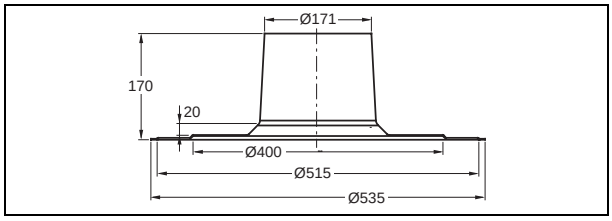

Fig. 167 Adhesive flat roof flange (dim. in mm)

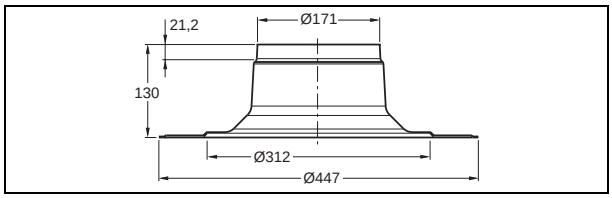

Fig. 168 Adhesive flat roof flange (dim. in mm)

Adhesive flat roof flange, adjustable from 0° to 15°

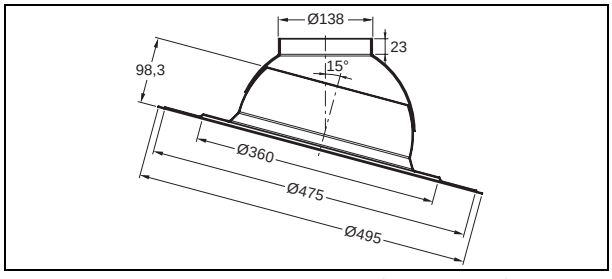

Fig. 169 Adhesive flat roof flange (dim. in mm)

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11.1.3 Air/flue gas lines for individual appliances, internal diameter Ø 80/125 mm or Ø 110/160 mm

Seal

- Lip seal

Product numbers

- For the relevant sets in chapters 9 and 10 for the selected flue system

Concentric inspection bend/tee

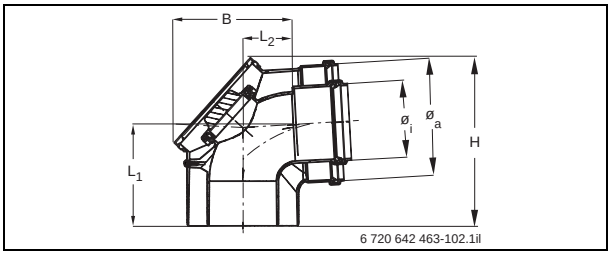

Fig. 170 Concentric inspection bend Ø 80/125 (dim. → tab. 87)

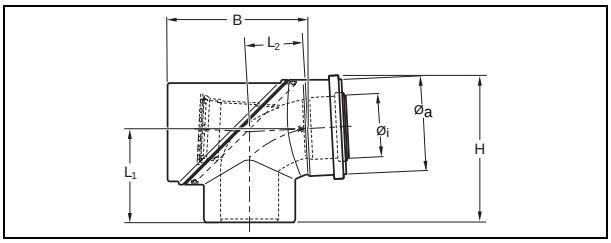

Fig. 171 Concentric inspection tee Ø 110/160 (dim. → tab. 87)

Ø i/Ø a [mm]	L_1 [mm]	L_2 [mm]	B [mm]	H [mm]
80/125	110	70	140	190
110/160	168	111	230	254

Table 87 Concentric inspection bend/tee dimensions

Concentric sliding piece/installation aid

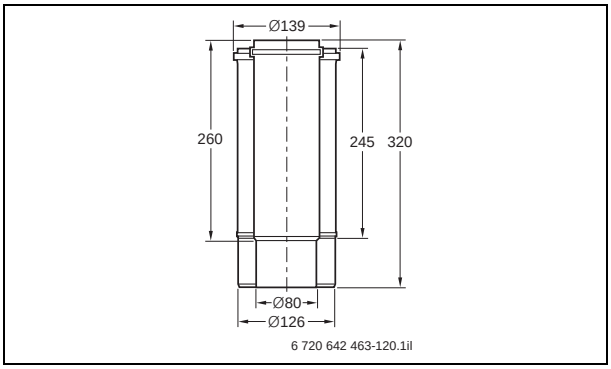

Fig. 172 Concentric sliding piece (dim. in mm)

Concentric pipe with inspection aperture

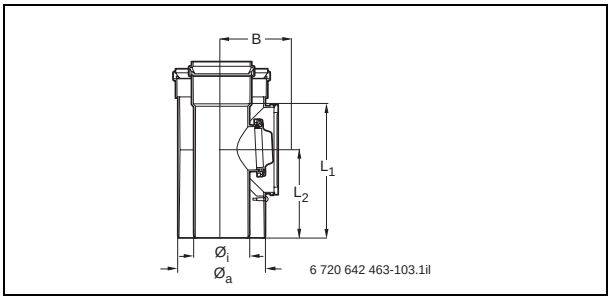

Fig. 173 Concentric pipe with inspection aperture Ø 80/125 (dim. → tab. 88)

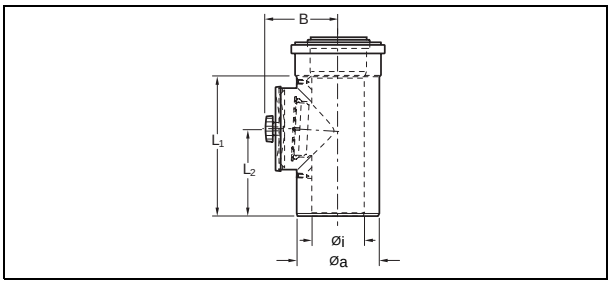

Fig. 174 Concentric pipe with inspection aperture Ø 110/160 (dim. → tab. 88)

Ø i/Ø a [mm]	L_1 [mm]	L_2 [mm]	B [mm]
80/125	190	125	80
110/160	254	154	130

Table 88 Dimensions, concentric pipe with inspection aperture

Concentric pipe with inspection aperture, stainless steel (for GAF-K set)

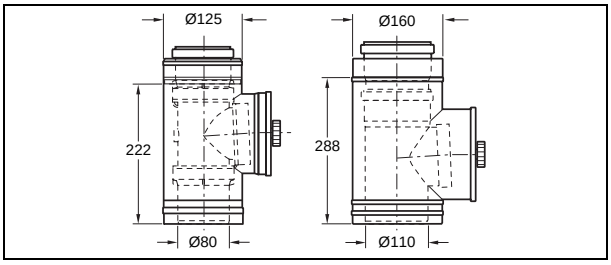

Fig. 175 Concentric pipe with inspection aperture (dim. in mm)

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Concentric bend

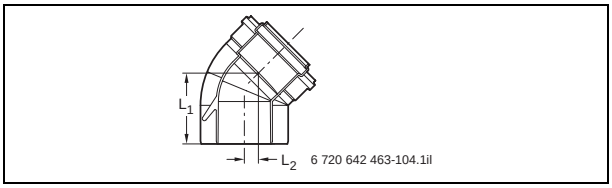

Fig. 176 Concentric bend Ø 80/125 (dim.→ tab. 89)

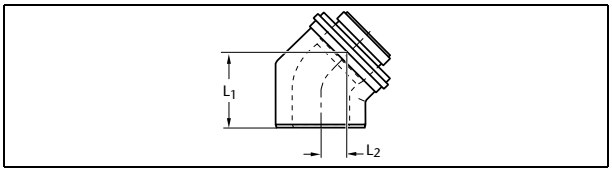

Fig. 177 Concentric bend Ø 110/160 (dim.→ tab. 89)

Ø [mm]	α	L_1 [mm]	L_2 [mm]
80/125	**87°**	112.9	59.9
	45°	100.9	20
	30°	93.6	9.8
	15°	76	3.5
110/160	**87°**	170	113
	45°	171	58
	30°	96	10.5
	15°	83	3.5

Table 89 Dimensions, concentric bend

Offset dimensions, concentric bend

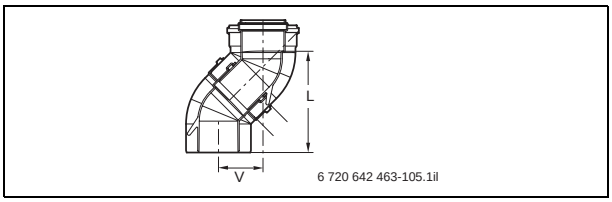

Fig. 178 Offset dimensions, concentric bend Ø 80/125 (dim.→ tab. 90)

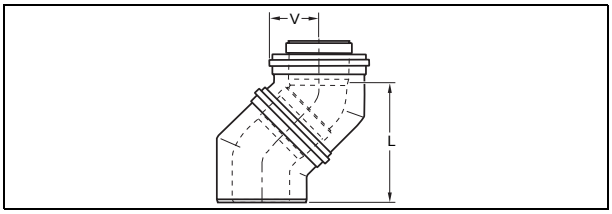

Fig. 179 Offset dimensions, concentric bend Ø 110/160 (dim.→ tab. 90)

Ø [mm]	Bend	V [mm]	L [mm]
80/125	**2 × 87°**	179.8	179.4
	2 × 45°	85.7	194.9
	2 × 30°	54.1	189.9
	2 × 15°	20	151
110/160	**2 × 87°**	282	282
	2 × 45°	138	333
	2 × 30°	50	185
	2 × 15°	22	164

Table 90 Offset dimensions, twin bend

Concentric chimney connection (part of the standard GA-K set)

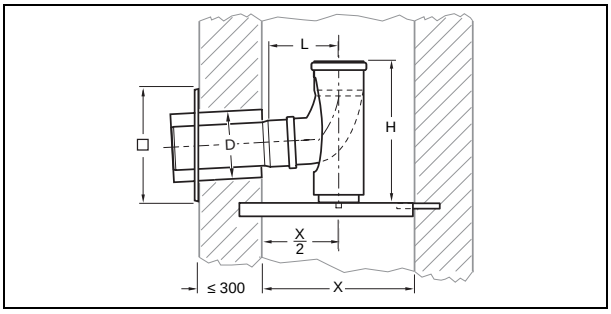

Fig. 180 Concentric chimney connection (dim. in mm)

Ø [mm]	D [mm]	L [mm]	H [mm]	□ [mm]	X [mm]
80	125	125	244	200	≤ 300

Table 91 Concentric chimney connection dimensions

Concentric ventilation air tee, stainless steel (part of the standard GAF-K set)

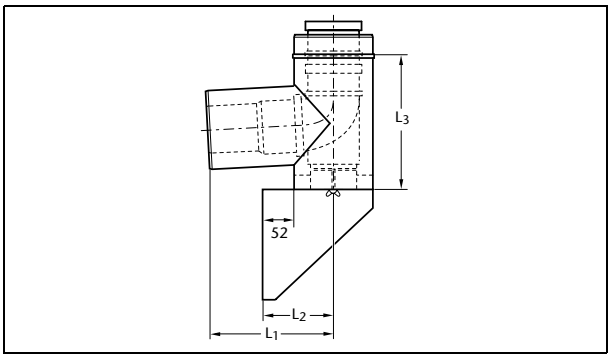

Fig. 181 Concentric ventilation air tee (dim.→ tab. 92)

Ø [mm]	L_1 [mm]	L_2 [mm]	L_3 [mm]
80/125	237	115	229
110/160	263	132	288

Table 92 Concentric ventilation air tee dimensions

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Concentric ventilation air connector, stainless steel (for GAF-K set)

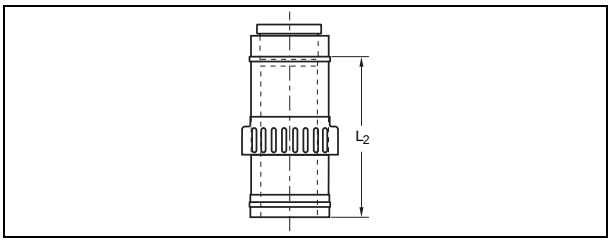

Fig. 182 Concentric ventilation air connector

Ø [mm]	L_2 [mm]
80/125	250
110/160	250

Table 93 Concentric ventilation air connector dimensions

Roof outlet with terminal piece, stainless steel (for GAF-K set)

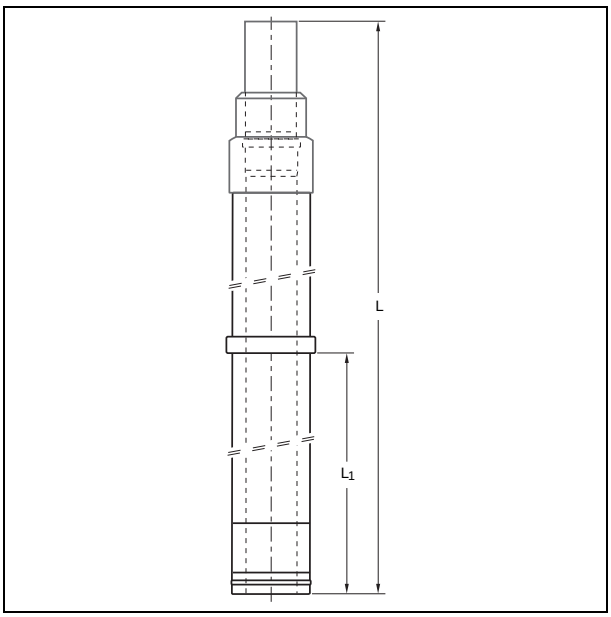

Fig. 183 Roof outlet with terminal piece

Ø [mm]	L [mm]	L_1 [mm]
80/125	1250	650
110/160	1750	650

Table 94 Roof outlet with terminal piece dimensions

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11.1.4 Components for headers, internal diameter Ø 110 mm to Ø 315 mm

Seal

- Lip seal

Product numbers

- For the relevant sets in chapters 9 and 10 for the selected flue system;
  components of the flue cascade set → tab. 58, page 128 and tab. 60, page 130

Inspection bend

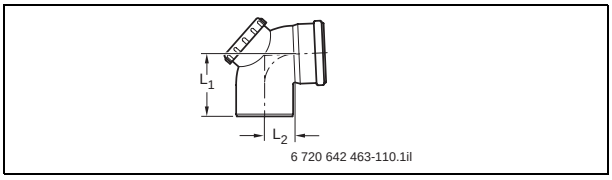

Fig. 184 Inspection bend

Ø [mm]	α	L_1 [mm]	L_2 [mm]
110	**87°**	118	60
125	**87°**	138	71
160	**87°**	162	83
200	**90°**	356	242
250	**90°**	399	287
315	**90°**	653	364

Table 95 Dimensions, inspection bend

Pipe with inspection aperture

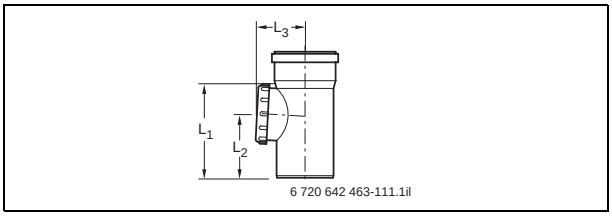

Fig. 185 Pipe with inspection aperture

Ø [mm]	L_1 [mm]	L_2 [mm]	L_3 [mm]
110	254	148	85
125	189	133	107
160	215	160	130
200	500	368	174
250	500	336	205
315	670	503	230

Table 96 Dimensions, pipe with inspection aperture

Bend

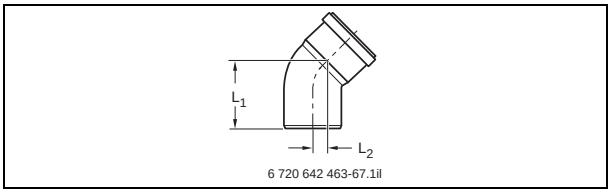

Fig. 186 Bend

Ø [mm]	α	L_1 [mm]	L_2 [mm]
110	**87°**	118	60
	45°	105	20
	30°	96	10.5
	15°	83	3.5
125	**87°**	138	70
	45°	122	23
	30°	110	12
	15°	95	3.5
160	**87°**	160	88
	45°	139	30
	30°	124	15
	15°	105	5
200	**90°**	355	242
	45°	332	96
	30°	299	53
	15°	256	21
250	**90°**	399	287
	45°	364	108
	30°	320	58
315	**90°**	653	364
	45°	599	139
	30°	544	75

Table 97 Bend dimensions

Shaft cover

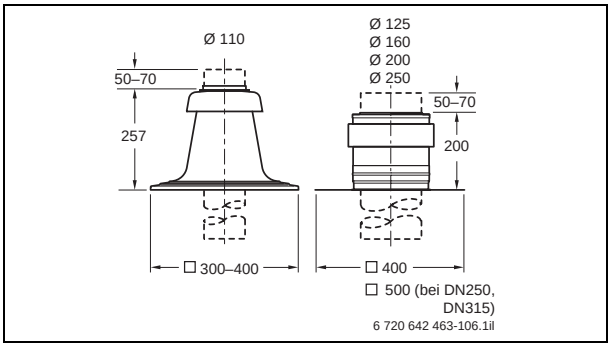

Fig. 187 Shaft cover (dim. in mm)

Spacer for flue inside a shaft

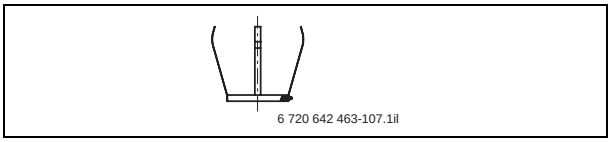

Fig. 188 Spacer

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Chimney connection

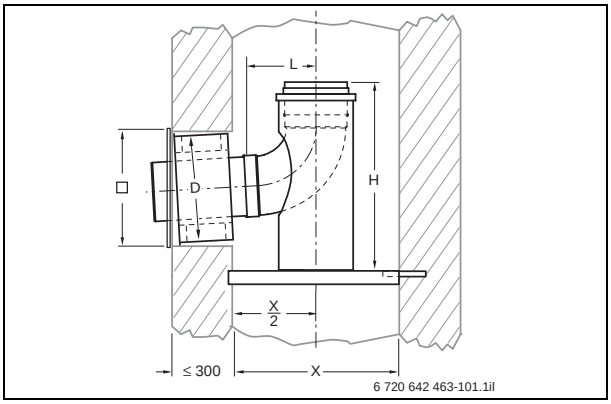

Fig. 189 Chimney connection (dim. in mm)

Ø [mm]	D [mm]	L [mm]	H [mm]	□ [mm]	X [mm]
110	160	118	267	230	≤ 300
125	185	134	316	260	≤ 300
160	225	164	313	300	≤ 300
200	300	360	565	380	≤ 320
250	350	399	–	480	-[1]
315	400	633	1141	480	≤ 630

Table 98 Chimney connection dimensions

1) Supported with pipe

Flue gas header

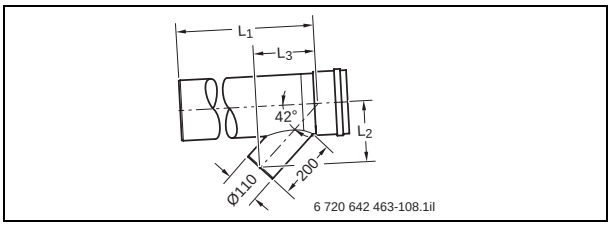

Fig. 190 Flue gas header (dim. in mm)

Ø [mm]	Type	L_1 [mm]	L_2 [mm]	L_3 [mm]
110	short	301	148	201
125	short	301	156	203
160	short	301	173	204
200	short	301	193	206
250	short	301	215	209
315	short	670	250	211
110	long	1060	148	201
125	long	1060	156	203
160	long	1060	173	204
200	long	1060	193	206
250	long	1060	219	209
315	long	1060	250	211

Table 99 Dimensions, flue gas header

End piece with condensate drain

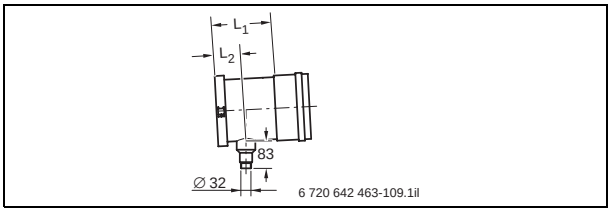

Fig. 191 End piece with condensate drain (dim. in mm)

Ø [mm]	L_1 [mm]	L_2 [mm]
110	188	70
125	195	88
160	210	87
200	207	95
250	340	95
315	152.5	92

Table 100 Dimensions, end piece with condensate drain

Offset dimensions

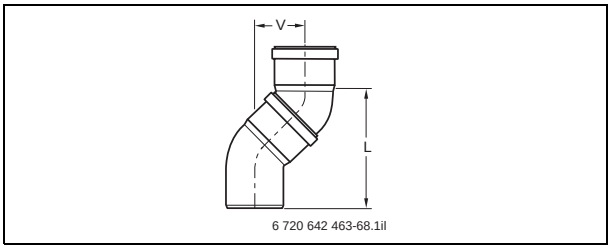

Fig. 192 Offset dimensions

Ø [mm]	Bend	V [mm]	L [mm]
110	**2 × 87°**	175805022	183
	2 × 45°		194
	2 × 30°		185
	2 × 15°		164
125	**2 × 87°**	204	215
	2 × 45°	93	223
	2 × 30°	56	211
	2 × 15°	25	188
160	**2 × 87°**	245	258
	2 × 45°	106	257
	2 × 30°	70	261
	2 × 15°	32	241
200	**2 × 90°**	606	606
	2 × 45°	263	635
	2 × 30°	157	584
	2 × 15°	70	509
250	**2 × 90°**	686	671
	2 × 45°	289	698
	2 × 30°	168	627
315	**2 × 90°**	997	1051
	2 × 45°	464	1121
	2 × 30°	282	1053

Table 101 Offset dimensions

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