[Air]

[Water]

[Earth]

[Buderus]

Technical guide
Issue 12/2010

Logano S825L/S825L LN and Logano plus SB825L/SB825L LN

Conventional boiler/gas condensing boiler

Output range from
650 kW to 19200 kW

Heat is our element

Buderus

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1 Oil/gas special boilers

1.1 Types and output

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are special boilers for positive pressure combustion in accordance with the requirements of EN 303. They are constructed with reference to the guidelines of the relevant TRD 300. Buderus offers these boilers in the output range from 650 kW to 19200 kW.

The boilers are designed to produce low pressure hot water with no more than 110 °C (shutdown temperature of the high limit safety cut-out) for heating systems that correspond to the requirements of DIN-EN 12828. The permissible overall pressure must not exceed 6 bar (or 10 bar). For higher pressures, (13 bar or 16 bar), please contact your local Buderus sales office.

1.2 Overview of models

Logano **Logano plus**	**Unit**	**S825L** **Boiler size** **650 to 19200**	**S825L LN** **Boiler size** **750 to 17500**	**SB825L** **Boiler size** **1000 to 19200**	**SB825L LN** **Boiler size** **750 to 17500**
Condensing heat exchanger	–	–	–	yes	yes
Special features	–	–	Low combustion chamber volume load for minimum NO_X values	–	Low combustion chamber volume load for minimum NO_X values
Safety temperature	°C	≤ 110			
Safety pressure	bar	≤ 10			
Dimensions		→ page 14 f.	→ page 16 f.	→ page 20 f.	→ page 22 f.
Specification		→ page 18	→ page 19	→ page 24 f.	→ page 26 f.

Tab. 1 Overview of models Logano S825L/L LN and Logano plus SB825L/L LN

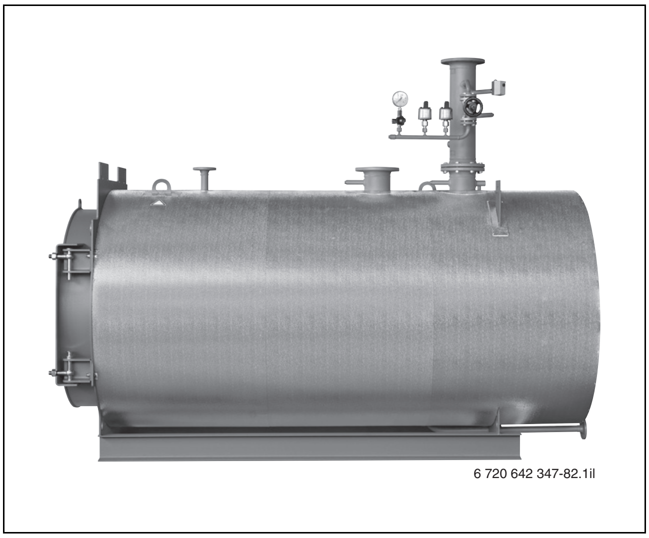

Fig. 1 Logano S825L/L LN

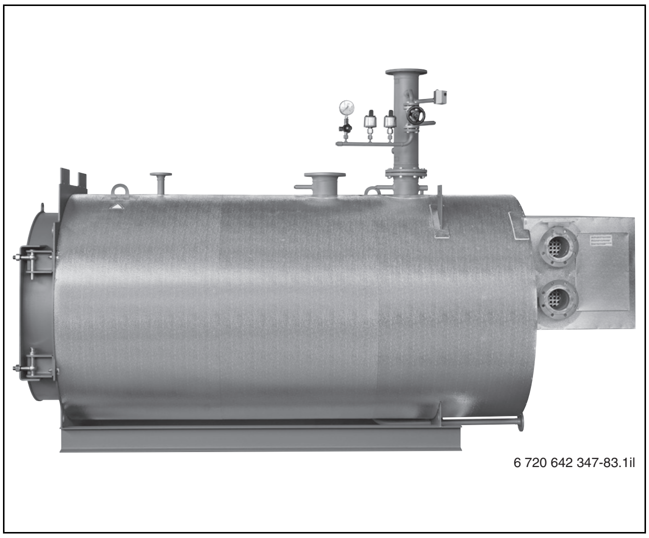

Fig. 2 Logano plus SB825L/L LN

1.3 Possible applications

The modular design and additional equipment mean the boiler can be used in any application. A suitable version is available for the requirements of any project.

The optimum application is in large-scale systems, e.g. hospitals, industrial plants, district heating centres, heating stations and commercial operations.

1.4 Benefits and features

- **3-pass principle**
  The 3-pass technology enables the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, to achieve outstanding combustion figures.
- **Optimised temperature characteristics**
  The boilers have a generously sized secondary heating surface in the second pass, designed as a double row. The inner hot gas reversing chamber, which is completely surrounded by water, enables very low temperatures in the front reversing area from the second to the third pass. This significantly reduces the thermal load of the door.
- **Compact construction**
  The symmetrical secondary heating surfaces, arranged in a circle around the combustion chamber, enable the compact construction of these boilers. This means they have a low weight and require only a small floor area for installation. The burner door can close on the r.h. or l.h. side.
- **Environmentally responsible with low emissions**
  The 3-pass design and water-cooled combustion chamber offer ideal conditions for operation with low emissions, especially in conjunction with the advanced burners that are matched to the boiler. Meeting the highest demands regarding low emissions, especially with oil combustion, is no problem for the Logano S825L LN and Logano plus SB825L LN conventional boiler types with their particularly large combustion chambers (→ Tab. 1, page 5).
- **Economic viability**
  Extremely high efficiency is possible, subject to the temperature of the heating medium and the boiler load. The radiation losses of the boiler are negligibly low and the full utilisation of the burner control range enables good efficiency at partial load.
- **Operational reliability**
  Due to the optimised design of the combustion chamber and the water guide system, the Logano S825L and S825L LN, as well as the Logano plus SB825L and SB825L LN, are very reliable and safe in operation. The low water content enables a short heat-up time and low minimum return temperature. This means the dew point range in the heat-up phase is quickly passed.
- **Even load distribution**
  For even load distribution, the boiler is equipped with a base frame of channel sections. If the floor of the boiler room is even, an additional boiler foundation is not required.
- **Simple maintenance**
  The front boiler door can be pivoted right out, and can be opened easily even when the burner is fitted. When the door is open, the combustion chamber and secondary heating surface are freely accessible, and can be cleaned quickly and easily. The reversing chamber is visible through the combustion chamber. As an option, an inspection port on the water side is available. This gives a better view of the heating surfaces. It means the heating surfaces can be viewed from the water chamber.
- **Matching system technology**
  Numerous matching accessories are available for all boilers, which enable optimisation of the entire system.

2 Basic principles

2.1 Basic principles of condensing technology

2.1.1 Net and gross calorific values

The net calorific value H_i (formerly H_u) specifies the amount of heat that can be obtained from one cubic metre of gas or one kilogram of fuel oil. With this reference figure, the products of combustion are present in a gaseous state.

Compared to the net calorific value H_i, the gross calorific value H_s (formerly H_o) also contains the condensation heat from the water vapour as additional energy.

2.1.2 Boiler efficiency above 100 %

The condensing boiler utilises not only the net calorific value H_i in order to produce heat, but also the gross calorific value H_s of a fuel.

For all efficiency calculations in German and European standards, the net calorific value H_i is always selected at 100 % as a reference figure, meaning that a boiler efficiency of over 100 % can result. This is the only way to be able to compare conventional boilers and condensing boilers.

Boiler efficiency can be raised by up to 15 % in comparison with conventional boilers. Compared with older systems, it is even possible to save up to 40 % energy.

When comparing the energy utilisation of conventional boilers and gas condensing boilers, an energy statement such as the example shown in Fig. 3 can result.

Condensation heat (latent heat)

- With natural gas, the proportion of condensation heat is 11 %, relative to the net calorific value H_i.
  This heat is unused in conventional boilers.
- By making use of the condensation in the water vapour, the gas condensing boiler enables considerable utilisation of this heat potential.

Flue gas loss (sensible heat)

- With the conventional boiler, the heat in the flue gas, which is at a relatively high temperature of 150 °C to 210 °C, escapes. This means an unused heat proportion of around 6 % to 9 % is lost.
- The dramatic reduction of the flue gas temperatures in gas condensing boilers to levels of up to 30 °C utilises the sensible proportion of heat in the hot gas and significantly lowers the flue gas loss.

Energy statement comparing conventional boilers and gas condensing boilers

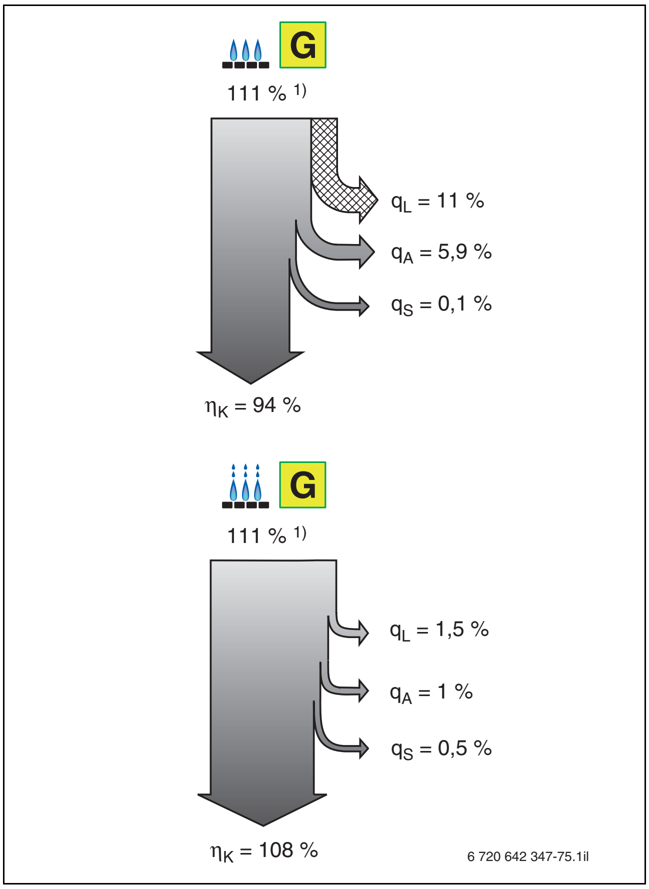

Fig. 3 Energy statement comparing conventional boilers and gas condensing boilers

G	Conventional boiler
G	Gas condensing boiler
η_K	Boiler efficiency
q_A	Flue gas losses (sensible heat)
q_L	Unused condensation heat (latent heat)
q_S	Radiation losses
1)	Relative to net calorific value H_i = 100 %

2.2 Making optimal use of condensing technology

2.2.1 Matching to the heating system

Gas condensing boilers can be installed in any heating system. However, the available proportion of condensation heat and the efficiency resulting from this type of operating mode depend on the design of the heating system.

To be able to use the condensation heat of the water vapour in the hot gas, the hot gas must be cooled to below the dew point. The utilisation rate of the condensation heat is therefore necessarily subject to the system design temperatures and the hours run in the condensation range. This is shown by the graphs in Fig. 4 and Fig. 5. The dew point temperature here is 50 °C.

Heating system 40/30 °C

In this system, the benefits of the performance capacity of condensing technology can be seen throughout the heating season. The low return temperatures are constantly below the dew point temperature, so condensation heat is always created (→ Fig. 4). This is achieved with low temperature panel heaters or underfloor heating systems, which are ideal for condensing boilers.

Targeted utilisation of the condensing effect is possible with a separately connected condensing heat exchanger (BWT).

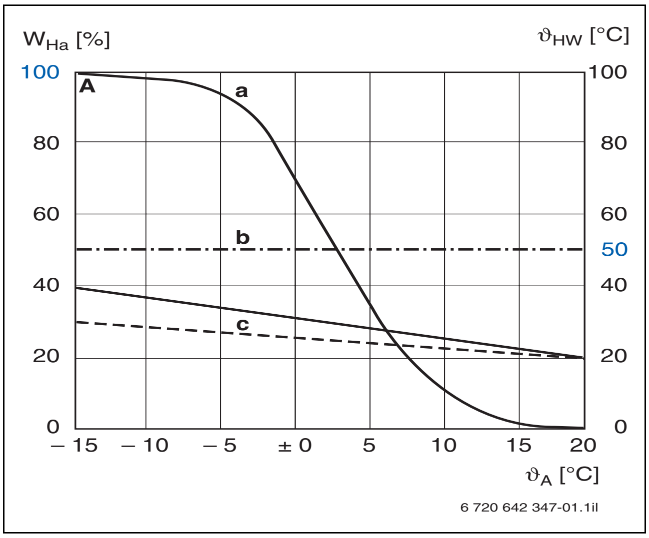

Fig. 4 Condensation heat utilisation at 40/30 °C

A Proportion of operation with condensation heat utilisation
a Annual heat load curve
b Dew point temperature curve
c System temperatures
ϑ_A Outside temperature
ϑ_{HW} Heating water temperature
W_{Ha} Annual heat load

Heating system 75/60 °C

Even with a design temperature of 75/60 °C, it is possible to make above average utilisation of the condensation heat for around 95 % of the annual heat load. This applies for outside temperatures of –7 °C to +20 °C (→ Fig. 5).

Due to the safety supplements in the former DIN 4701 from 1959, older heating systems designed with 90/70 °C are nowadays to all intents and purposes operated as systems with 75/60 °C. Even if these systems were run with system temperatures of 90/70 °C and modulating, weather-compensated heating circuit temperatures, they would still use the condensation heat for 80 % of the annual heating load.

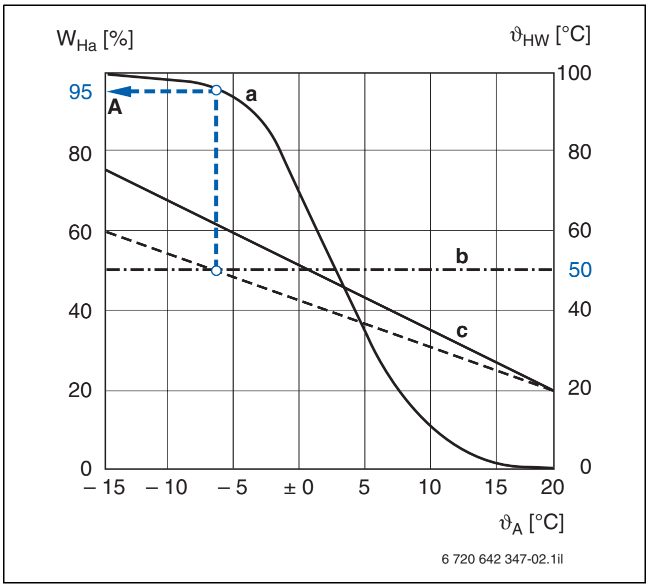

Fig. 5 Condensation heat utilisation at 75/60 °C

A Proportion of operation with condensation heat utilisation
a Annual heat load curve
b Dew point temperature curve
c System temperatures
ϑ_A Outside temperature
ϑ_{HW} Heating water temperature
W_{Ha} Annual heat load

2.2.2 High standard seasonal efficiency [to DIN]

The graphs in Fig. 4 and Fig. 5 show that the varying proportion of condensation heat utilisation has a direct influence on the energy efficiency of the gas condensing boiler.

The high standard seasonal efficiency [to DIN] of gas condensing boilers is based on the following influences:

- Achievement of high CO_2 levels. The higher the CO_2 level, the higher the dew point temperature of the hot gases.
- Lower system and return temperatures can be maintained. The lower the system and return temperatures, the higher the condensation rate and the lower the flue gas temperature.

The Logano S825L and S825L LN boilers, as well as the Logano plus SB825L and SB825L LN boilers, can be matched individually to the prevailing system characteristics and requirements, subject to the individual project. Enquire at your local Buderus sales office for project-specific parameters.

2.2.3 Sizing information

In new installations, every opportunity should be exploited to achieve optimum operation of the gas condensing boiler.

A high standard seasonal efficiency [to DIN] is achieved if the following criteria are satisfied:

- Limit the return temperature upstream of the condensing heat exchanger to a maximum of 50 °C, at least partially. In this connection, it is significant that the separate connections for the boiler and condensing heat exchanger mean a partial flow rate of 20 % with a low design temperature (e.g. 40/30 °C) is sufficient to achieve excellent condensing efficiency.
- Aim for a temperature spread between the flow and return of at least 20 K.
- Avoid facilities for raising the return temperature (e.g. 4-way mixers, bypass circuits, low loss headers, depressurised distributors, etc.).

For more detailed information on the hydraulic connection, see Chapter 9 on page 73 ff.

2.3 Economic viability considerations

2.3.1 Simplified comparison of conventional boilers and gas condensing boilers

Fuel costs

- Given
  - Building heat demand $\dot{Q}_N = 2000$ kW
  - Annual heating energy demand $\dot{Q}_A = 3400000$ kWh/a
  - System design temperatures:
    Ventilation $\vartheta_V/\vartheta_R = 90/70$ °C (proportion 20 %)
    Radiators $\vartheta_V/\vartheta_R = 75/60$ °C (proportion 50 %)
    Underfloor heating system $\vartheta_V/\vartheta_R = 40/30$ °C (proportion 30 %)
  - Fuel costs $K_B = 0.50$ Euro/m^3
  - Logano S825L-2500 conventional boiler, rated output 2000 kW, $\eta_N = 94{,}9$ %
  - Logano plus SB825L-2500 gas condensing boiler, rated output 2000 kW, $\eta_N = 102{,}3$ %

The efficiency levels η_N specified for the Logano plus SB825L-2500 gas condensing boiler apply if the underfloor heating system is connected separately to the condensing heat exchanger.

- Sought
  - Fuel consumption
  - Fuel costs
- Calculation

$$B_V = \frac{\dot{Q}_A}{\eta_N \times H_i}$$

Form. 1 Calculation of annual fuel consumption

B_V Annual fuel consumption in m^3/a
η_N Standard seasonal efficiency in %
H_i Net calorific value; here natural gas simplified with 10 kWh/m^3
$\dot{Q}_A$ Net heating energy demand in kWh/a

$$K_{Ba} = B_V \times K_B$$

Form. 2 Calculation of annual fuel costs

B_V Annual fuel consumption in m^3/a
K_B Fuel costs
K_{Ba} Annual fuel costs

- Result
  - Logano S825L, boiler size 2500:
    Fuel consumption $B_V = 358272$ m^3/a,
    Fuel costs $K_{Ba} = 179136$ Euro/a
  - Logano SB825L, boiler size 2500:
    Fuel consumption $B_V = 332356$ m^3/a,
    Fuel costs $K_{Ba} = 166178$ Euro/a

Heating with the gas condensing boiler results in savings of around 11601 Euro on fuel costs per year.

Investment costs

Scope of investment[1)]	Unit	Logano S825L, boiler size 2500	Logano plus SB825L, boiler size 2500
Sum of investment costs	**Euro**	**50000**	**63000**

Tab. 2 Investment costs for conventional boilers and gas condensing boilers (values rounded off)

1) Incl. accessories

The investment costs are based on the costs of a boiler system. This includes the costs of the boiler, boiler circuit control unit, pressure-jet burner and flue system, as well as the costs of the safety equipment and return temperature raising facility. The cost of the Logano plus SB825L gas condensing boiler additionally includes the neutralising system for the condensate. Costs for installation have not been taken into account.

Reflux of capital

Type of cost	Unit	Logano S825L, boiler size 2500	Logano plus SB825L, boiler size 2500
Investment costs	Euro	50000	63000
Costs linked to capital[1)]	Euro/a	5220	6577
Fuel costs	Euro/a	179136	166178
Total costs	**Euro/a**	**184356**	**172755**

Tab. 3 Total costs for conventional boilers and gas condensing boilers (values rounded off)

1) Annuity 9,44 %, interest 5 %, maintenance 1 %

In this example, the investment costs have been repaid due to the lower fuel costs after about one year. It is generally true that condensing technology pays for itself faster the greater the output and the higher the fuel costs. No subsidies have been taken into account in the calculations. With the Logano plus SB825L and SB825L LN, it is possible to integrate further condensing heat exchangers. This results in higher efficiency and therefore lower fuel costs.

3 Technical description

3.1 Logano S825L and S825L LN conventional boilers, and Logano plus SB825L and SB825L LN gas condensing boilers

3.1.1 Equipment overview

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are oil/gas special boilers for positive pressure combustion to EN 303. These boilers are designed to produce low pressure hot water with no more than 110 °C (shutdown temperature of the high limit safety cut-out) for heating systems that correspond to the demands of DIN-EN 12828. The permissible overall pressure must not exceed 6 bar (or 10 bar). For higher pressures, please contact your local Buderus sales office. The modular design of the boiler and additional equipment enables universal application.

Logano S825L “standardised” conventional boiler

- Round boiler casing made of textured aluminium sheeting
- Visible parts of the boiler primed in blue
- Thermal insulation (100 mm) and extremely well insulated burner door
- Boiler pressure body with connections for flow, return, safety valve and drain (all internal diameters are fixed)
- Bottom rear inspection aperture on flue gas collector
- Boiler base frame for even load distribution and easy transportation
- Foil packaging as splash guard included in standard delivery
- Control unit retainer included in standard delivery, arranged at the factory to fit on the r.h. side (can be fitted on the l.h. side on site)
- Large burner door closing on the l.h. side (can be changed to the r.h. side on site)
- Air-cooled combustion chamber sight glass
- Door lining designed to suit any type of burner (burner plates for connecting the burner can be ordered)
- As an option, also available as a unit version (with boiler and burner)

Logano S825L LN “standardised” conventional boiler

- Round boiler casing made of textured aluminium sheeting
- Visible parts of the boiler primed in blue
- Thermal insulation (100 mm) and extremely well insulated burner door
- Boiler pressure body with connections for flow, return, safety valve and drain
- Bottom rear inspection aperture on flue gas collector
- Boiler base frame for even load distribution and easy transportation
- Control unit retainer included in standard delivery, arranged at the factory to fit on the r.h. side (can be fitted on the l.h. side on site)
- Large burner door closing on the l.h. side (can be changed to the r.h. side on site)
- Air-cooled combustion chamber sight glass

Logano S825L and S825L LN conventional boilers

- Round boiler casing made of textured aluminium sheeting
- Visible parts of the boiler primed in blue
- Thermal insulation (100 mm) and extremely well insulated burner door
- Boiler pressure body with connections for flow, return, safety valve and drain
- As an option with inspection port on the water side
- Bottom rear inspection aperture on flue gas collector
- Boiler base frame for even load distribution and easy transportation
- Large burner door closing on the l.h. side (can be changed to the r.h. side if required)
- Air-cooled combustion chamber sight glass

Logano plus SB825L and SB825L LN gas condensing boilers

- Round boiler casing made of textured aluminium sheeting
- Visible parts of the boiler primed in blue
- Thermal insulation (100 mm) and extremely well insulated burner door
- Boiler pressure body with connections for flow, return, safety valve and drain
- As an option with inspection port on the water side
- Bottom rear inspection aperture on flue gas collector
- Boiler base frame for even load distribution and easy transportation
- Large burner door closing on the l.h. side (can be changed to the r.h. side if required)
- Air-cooled combustion chamber sight glass
- With condensing heat exchanger made of stainless steel with connections for the flow, return and condensate drain
- Water connections on either the l.h. or r.h. side

3.1.2 Function principle

Boiler technology

All Logano S825L and S825L LN conventional boilers, as well as Logano plus SB825L and SB825L LN gas condensing boilers, have a water guide element installed below the return connector. With this, the return water generates an injector effect through its velocity as it flows back, so hotter boiler water is added and mixes with the cooler return water. The targeted feed of the return water results in excellent flow across the entire boiler cross-section. Due to the flat temperature slope in the boiler block, the boiler overall provides an extremely even temperature distribution. The flow through the boiler results in condensation-free and safe heating operation with a minimum return temperature as low as 50 °C.

The boiler is built using the 3-pass design and the countercurrent heat exchanger principle. Together with an effective heating surface design, these are the prerequisites for low emissions and high energy efficiency. Subject to the system, the Logano S825L and S825L LN conventional boilers achieve very high standard seasonal efficiency [to DIN], which can be increased to up to 108 % with the Logano plus SB825L and SB825L LN gas condensing boilers.

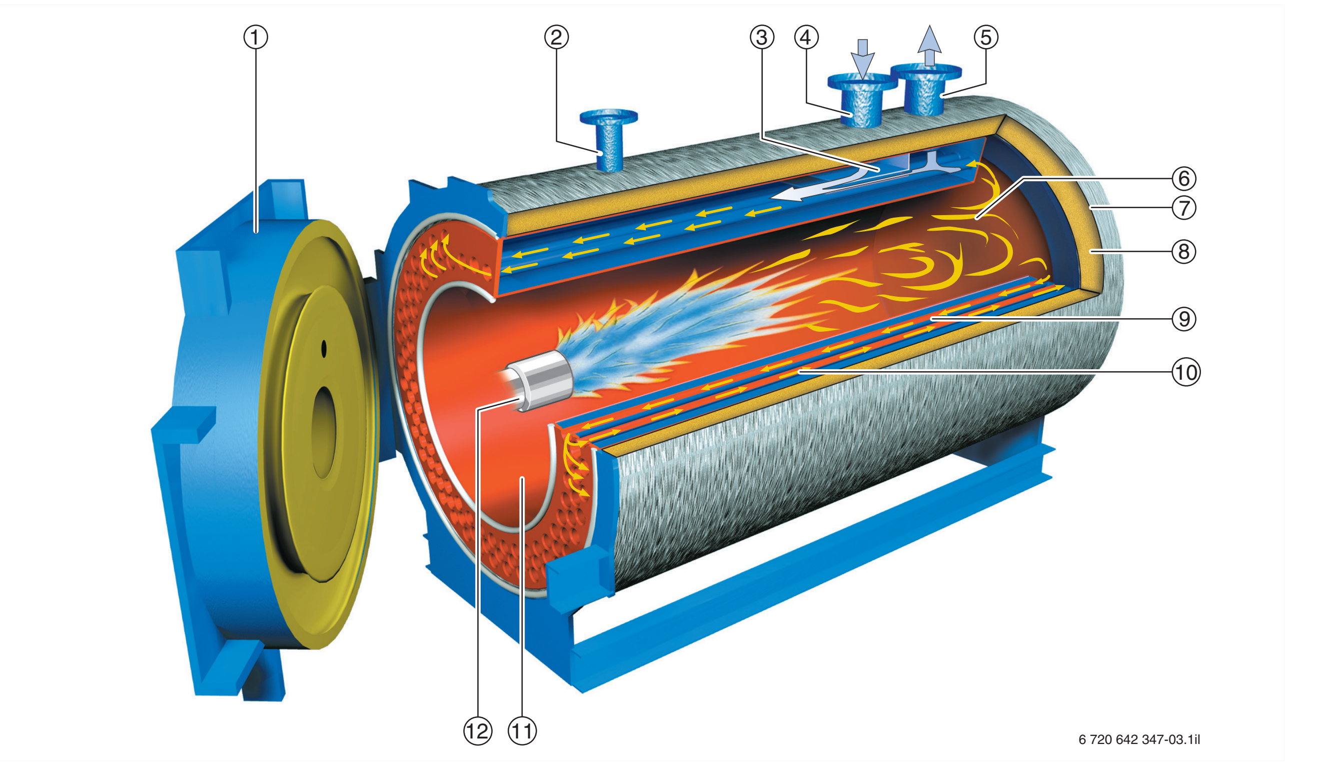

Fig. 6 Sectional view showing the function principle of the Logano S825L/L LN

1 Burner door
2 Safety flow (→ Fig. 72, page 100)
3 Water guide system
4 Return (→ Fig. 71, page 99 and Fig. 74, page 102)
5 Flow (→ Fig. 70, page 98)
6 Hot gas reversing chamber
7 Protective aluminium casing
8 High grade insulation without thermal bridges
9 First secondary heating surface (second pass) designed as a double row
10 Second secondary heating surface (third pass)
11 Combustion chamber (first pass)
12 Blast tube

Gas condensing technology

Compared with the Logano S825L and S825L LN conventional boilers, the Logano plus SB825L and SB825L LN gas condensing boilers have an additional condensing heat exchanger made of smooth stainless steel tubes. It is fitted in the chamber for the flue gas collector. The condensing heat exchanger is also designed for modular construction. This means the most suitably sized heat exchanger, or number thereof, for the project in question can be chosen on an individual basis.

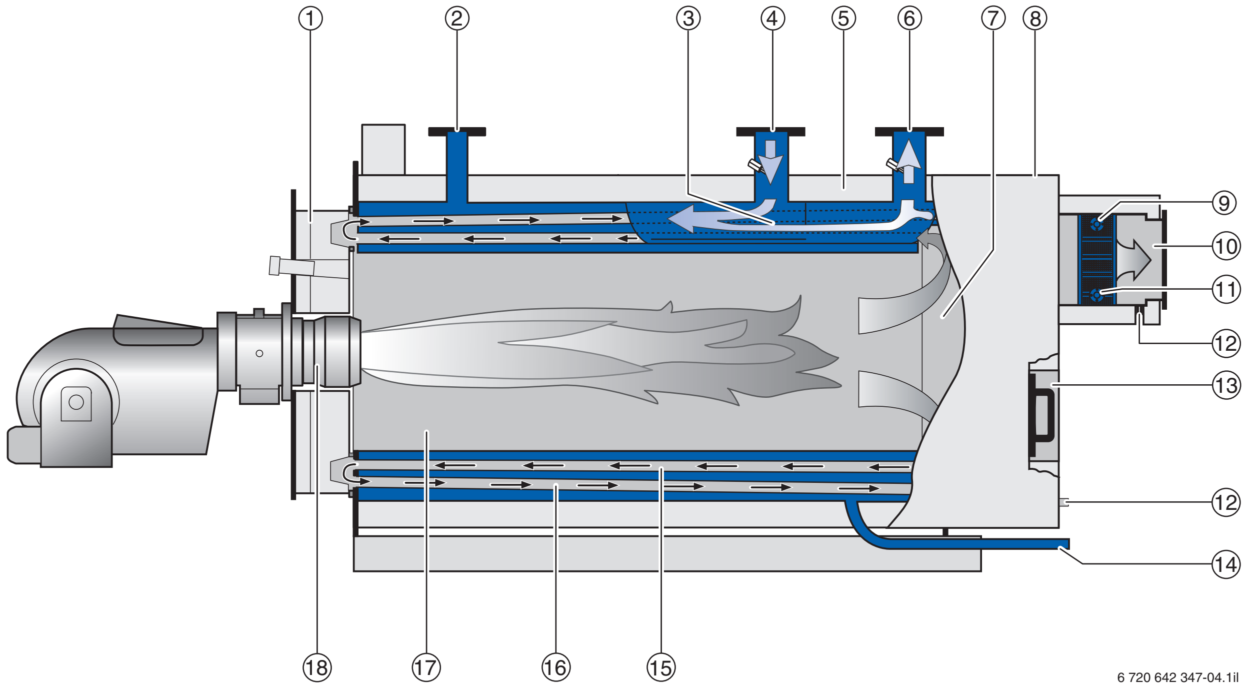

Fig. 7 Function principle of the Logano plus SB825L/L LN

1 Burner door
2 Safety flow (→ Fig. 72, page 100)
3 Water guide system
4 Return (→ Fig. 71, page 99 and Fig. 74, page 102)
5 High grade insulation without thermal bridges
6 Flow (→ Fig. 70, page 98)
7 Hot gas reversing chamber
8 Protective aluminium casing
9 Condensing heat exchanger flow
10 Condensing heat exchanger made of stainless steel
11 Condensing heat exchanger return
12 Condensate connector
13 Inspection aperture
14 Drain connection (→ Fig. 77, page 106)
15 First secondary heating surface (second pass) designed as a double row
16 Second secondary heating surface (third pass)
17 Combustion chamber (first pass)
18 Blast tube

Inspection aperture on the water side is optional.

3.2 Dimensions and specification of the Logano S825L and S825L LN conventional boilers

3.2.1 Dimensions Logano S825L, boiler sizes 650 to 5200

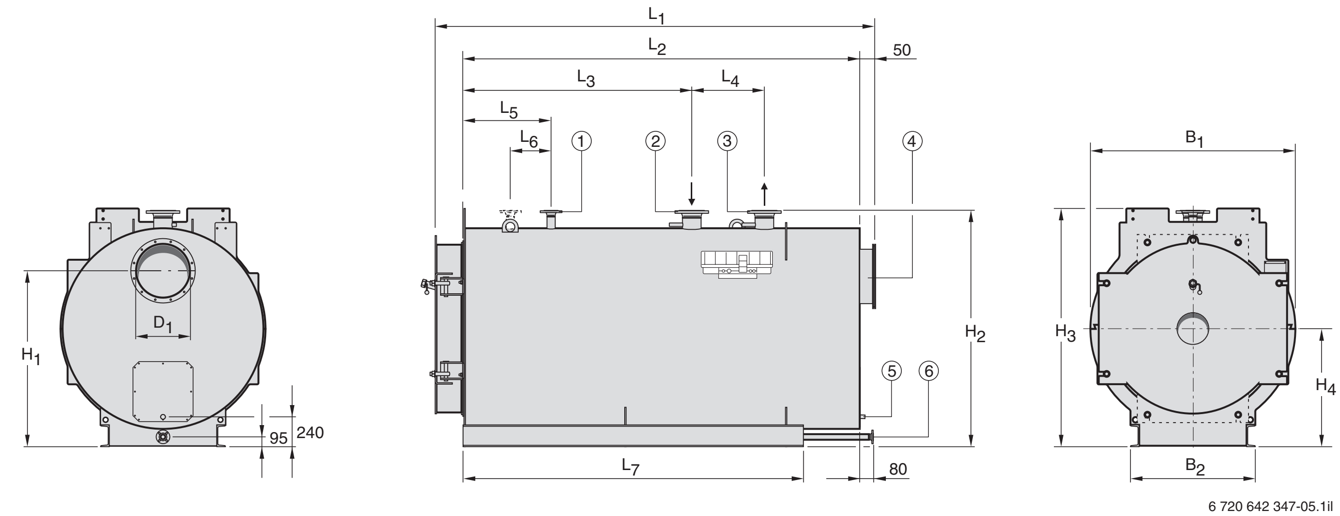

Fig. 8 Dimensions Logano S825L, boiler sizes 650 to 5200 (dim. in mm)

1 Flow safety line / safety valve
2 Return
3 Flow
4 Flue outlet
5 Flue gas condensate drainage system
6 Boiler drain

Boiler size		Unit	650	1000	1350	1900	2500	3050	3700	4200	5200
Length	L_1	mm	2290	2680	2950	3220	3675	3725	4075	4570	4700
	L_2	mm	2040	2425	2695	2960	3420	3465	3820	4250	4380
Max. length	L_{Ges}	mm	3347	3962	4232	4735	–	–	–	–	–
Unit version[1)]	L_B	mm	1057	1282	1282	1515	–	–	–	–	–
Height	H_2	mm	1450	1615	1715	1815	1865	1965	2015	2115	2200
	H_3	mm	1460	1615	1715	1815	1865	1965	2015	2115	2210
Width	B_1	mm	1174	1324	1424	1524	1574	1674	1724	1824	1924
Burner door	Depth	mm	190	190	190	190	190	190	190	257	257
	H_4	mm	725	800	850	900	925	975	1000	1050	1100
Base frame	L_7	mm	1750	2100	2350	2560	3060	3060	3410	3920	3920
	B_2	mm	710	910	910	930	1130	1130	1150	1260	1510
	Channel section	mm	120	120	120	160	160	160	200	220	220
Flue outlet	D_1	mm	→ Tab. 26, page 31								
	H_1	mm	1055	1180	1240	1340	1350	1415	1490	1500	1600
Flow and return flange		–	→ Tab. 22, page 30								
Flow safety line flange		–	→ Tab. 25, page 31								
Clearance	L_3	mm	1050	1390	1560	1710	2180	2150	2490	2870	2770
	L_4	mm	450	450	500	550	550	600	600	600	800
	L_5	mm	600	600	600	600	650	650	800	650	750
	L_6	mm	–	250	250	250	300	300	300	300	400
Boiler drain		–	DN25	DN25	DN32	DN32	DN32	DN32	DN32	DN32	DN32
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 4 Dimensions Logano S825L, boiler sizes 650 to 5200 (specification → Tab. 8, page 18)

1) Boilers with an output between 650 kW and 1900 kW are also available as unit versions (boiler + burner) or as standardised versions with fixed internal connection diameters (equipment overview → page 11). The permissible operating pressure is 6 bar.
L_{Ges} = approx. length of boiler + burner in the unit version; L_B = approx. length of the burner in the unit version

3.2.2 Dimensions Logano S825L, boiler sizes 6500 to 19200

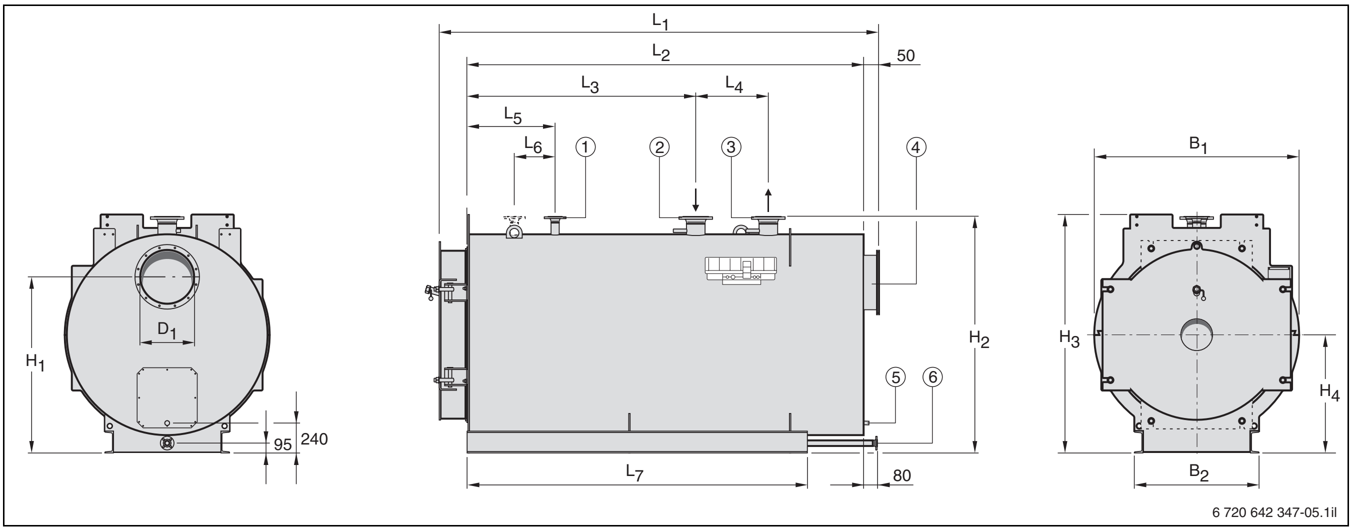

Fig. 9 Dimensions Logano S825L, boiler sizes 6500 to 19200 (dim. in mm)

1 Flow safety line / safety valve
2 Return
3 Flow
4 Flue outlet
5 Flue gas condensate drainage system
6 Boiler drain

Boiler size		**Unit**	**6500**	**7700**	**9300**	**11200**	**12600**	**14700**	**16400**	**19200**
Length	L_1	mm	5090	5320	5520	5980	6315	7050	7530	7980
	L_2	mm	4770	5000	5200	5655	5990	6725	7170	7620
Height	H_2	mm	2400	2550	2700	2850	3000	3200	3500	3700
	H_3	mm	2410	2560	2710	2900	3025	3270	3570	3770
Width	B_1	mm	2124	2274	2424	2574	2724	2924	3224	3424
Burner door	Depth	mm	257	257	257	259	259	259	294	294
	H_4	mm	1200	1275	1350	1425	1500	1600	1750	1850
Base frame	L_7	mm	4280	4480	4650	5050	5320	6000	6390	6790
	B_2	mm	1510	1520	1610	1630	1890	1890	2100	2100
	Channel section	mm	220	240	240	280	280	280	320	320
Flue outlet	D_1	mm	→ Tab. 26, page 31							
	H_1	mm	1750	1850	2000	2100	2200	2440	2600	2820
Flow and return flange		–	→ Tab. 22; page 30							
Flow safety line flange		–	→ Tab. 25, page 31							
Clearance	L_3	mm	3130	3100	3250	3430	3100	3780	3940	4340
	L_4	mm	800	1000	1000	1200	1800	1800	2000	2000
	L_5	mm	1000	1100	1100	1100	1100	1100	1200	1200
	L_6	mm	400	500	500	500	500	500	600	600
Boiler drain		–	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 5 Dimensions Logano S825L, boiler sizes 6500 to 19200 (specification → Tab. 9, page 18)

3.2.3 Dimensions Logano S825L LN, boiler sizes 750 to 3500

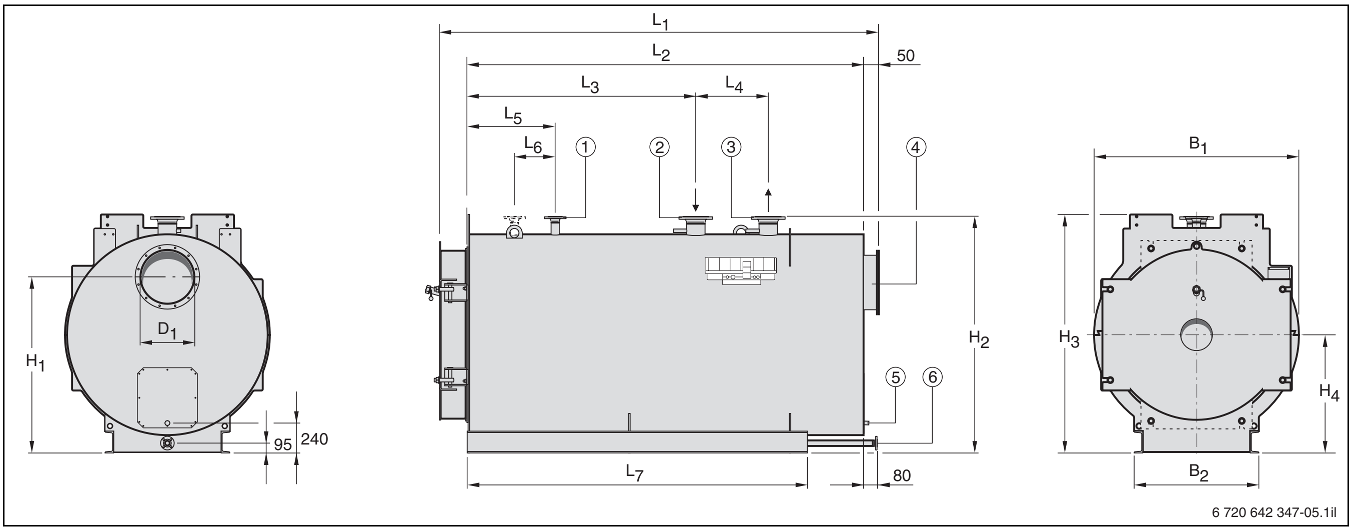

Fig. 10 Dimensions Logano S825L LN, boiler sizes 750 to 3500 (dim. in mm)

1 Flow safety line / safety valve
2 Return
3 Flow
4 Flue outlet
5 Flue gas condensate drainage system
6 Boiler drain

Boiler size[1)]		Unit	750	1000	1250	1500	2000	2500	3000	3500
Length	L_1	mm	2680	2950	3220	3675	3725	4075	4570	4700
	L_2	mm	2425	2695	2960	3420	3465	3820	4250	4380
Height	H_2	mm	1615	1715	1815	1865	1965	2015	2115	2215
	H_3	mm	1615	1715	1815	1865	1965	2015	2115	2215
Width	B_1	mm	1324	1424	1524	1574	1674	1724	1824	1924
Burner door	Depth	mm	190	190	190	190	190	190	257	257
	H_4	mm	800	850	900	925	975	1000	1050	1100
Base frame	L_7	mm	2100	2350	2560	3060	3060	3410	3920	3920
	B_2	mm	910	910	930	1130	1130	1150	1260	1510
	Channel section	mm	120	120	160	160	160	200	220	220
Flue outlet	D_1	mm	→ Tab. 26, page 31							
	H_1	mm	1180	1240	1340	1350	1415	1490	1500	1600
Flow and return flange		–	→ Tab. 22, page 30							
Flow safety line flange		–	→ Tab. 25, page 31							
Clearance	L_3	mm	1390	1560	1710	2180	2150	2490	2870	2770
	L_4	mm	450	500	550	550	600	600	600	800
	L_5	mm	600	600	600	650	650	800	650	750
	L_6	mm	–	–	–	–	–	–	–	–
Boiler drain		–	DN25	DN32	DN32	DN32	DN32	DN32	DN32	DN32
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 6 Dimensions Logano S825L LN, boiler sizes 750 to 3500 (specification → Tab. 10, page 19)

1) Boilers with an output between 750 kW and 1500 kW are also available as standardised versions (equipment overview → page 11).
The permissible operating pressure is 6 bar.

3.2.4 Dimensions Logano S825L LN, boiler sizes 4250 to 17500

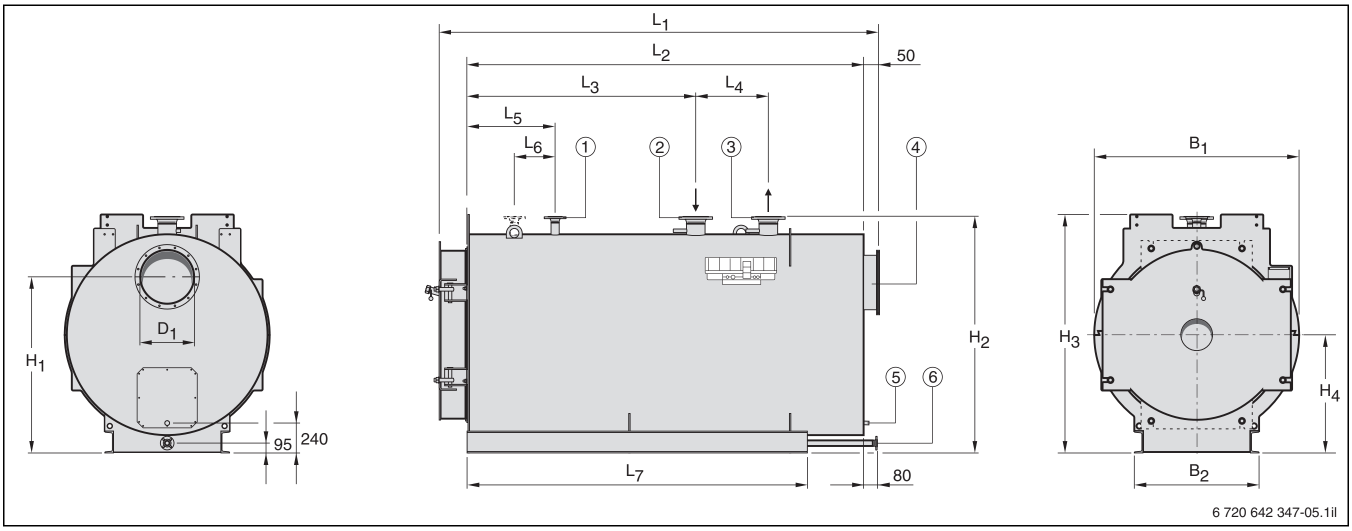

Fig. 11 Dimensions Logano S825L LN, boiler sizes 4250 to 17500 (dim. in mm)

1 Flow safety line / safety valve
2 Return
3 Flow
4 Flue outlet
5 Flue gas condensate drainage system
6 Boiler drain

Boiler size		Unit	4250	5250	6000	8000	10000	12000	14000	17500
Length	L_1	mm	5090	5320	5520	5980	6315	7050	7530	7980
	L_2	mm	4770	5000	5200	5655	5990	6725	7170	7620
Height	H_2	mm	2415	2550	2700	2850	3000	3200	3500	3700
	H_3	mm	2415	2560	2710	2900	3025	3270	3570	3770
Width	B_1	mm	2124	2274	2424	2574	2724	2924	3224	3424
Burner door	Depth	mm	257	257	257	259	259	259	294	294
	H_4	mm	1200	1275	1350	1425	1500	1600	1750	1850
Base frame	L_7	mm	4280	4480	4650	5050	5320	6000	6390	6790
	B_2	mm	1510	1520	1610	1630	1890	1890	2100	2100
	Channel section	mm	220	240	240	280	280	280	320	320
Flue outlet	D_1	mm	→ Tab. 26, page 31							
	H_1	mm	1750	1850	2000	2100	2200	2440	2600	2820
Flow and return flange		–	→ Tab. 22, page 30							
Flow safety line flange		–	→ Tab. 25, page 31							
Clearance	L_3	mm	3130	3100	3250	3430	3100	3780	3940	4340
	L_4	mm	800	1000	1000	1200	1800	1800	2000	2000
	L_5	mm	1000	1100	1100	1100	1100	1100	1200	1200
	L_6	mm	–	–	500	500	500	500	600	600
Boiler drain		–	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 7 Dimensions Logano S825L LN, boiler sizes 4250 to 17500 (specification → Tab. 11, page 19)

3.2.5 Specification Logano S825L, boiler sizes 650 to 5200

Boiler size[1]		Unit	650	1000	1350	1900	2500	3050	3700	4200	5200
Max. rated output		kW	650	1000	1350	1900	2500	3050	3700	4200	5200
Shipping weight	6 bar	kg	1700	2100	2600	3100	3900	4400	5300	6800	7600
	10 bar	kg	–	2100	2800	3300	4300	4900	5700	7100	8100
Operating weight[2]	6 bar	kg	2800	3140	3970	4790	5840	6670	7870	10140	11390
	10 bar	kg	–	3130	4160	4990	6210	7140	9260	10430	11880
Boiler water capacity	6 bar	l	660	1040	1370	1690	1940	2270	2570	3340	3790
	10 bar	l	–	1030	1360	1690	1910	2240	2560	3330	3780
Gas capacity		l	710	1090	1400	1980	2580	3050	3670	4610	5440
Flue gas temperature		°C	→ Fig. 30, page 42								
Required draught		Pa	0								
Pressure drop on the hot gas side		mbar	→ Fig. 19, page 35								
Permiss. flow temperature[3]		°C	110								
Permiss. operating pressure		bar	6 or 10[4]								
CE designation		–	CE 0085 BO 0396								

Tab. 8 Specification Logano S825L, boiler sizes 650 to 5200 (dim. → Fig. 8, page 14)

1) Boilers with an output between 650 kW and 1900 kW are also available as unit versions (boiler + burner) or as standardised versions with fixed internal connection diameters (equipment overview → page 11). The permissible operating pressure is 6 bar

2) The operating weight is the sum of the boiler weight and 100 % of the water filling it (excl. the weight of the burner and pipework)

3) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)

4) Higher pressures on request

3.2.6 Specification Logano S825L, boiler sizes 6500 to 19200

Boiler size		Unit	6500	7700	9300	11200	12600	14700	16400	19200
Max. rated output		kW	6500	7700	9300	11200	12600	14700	16400	19200
Shipping weight	6 bar	kg	9500	11600	13300	17000	19300	23500	30400	35500
	10 bar	kg	10300	12100	14400	17600	20300	25300	32100	38400
Operating weight[1]	6 bar	kg	14970	18160	21260	26900	31130	39150	52480	62520
	10 bar	kg	15770	18950	22280	27480	32110	40810	54150	65230
Boiler water capacity	6 bar	l	5470	6560	7960	9900	11830	15650	22080	27020
	10 bar	l	5470	6550	7880	9880	11810	15510	22050	26830
Gas capacity		l	7013	8910	10550	13040	15620	20410	25270	31760
Flue gas temperature		°C	→ Fig. 30, page 42							
Required draught		Pa	0							
Pressure drop on the hot gas side		mbar	→ Fig. 19, page 35							
Permiss. flow temperature[2]		°C	110							
Permiss. operating pressure		bar	6 or 10[3]							
CE designation		–	CE 0085 BO 0396							

Tab. 9 Specification Logano S825L, boiler sizes 6500 to 19200 (dim. → Fig. 9, page 15)

1) The operating weight is the sum of the boiler weight and 100 % of the water filling it (excl. the weight of the burner and pipework)

2) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)

3) Higher pressures on request

3.2.7 Specification Logano S825L LN, boiler sizes 750 to 3500

Boiler size[1]		Unit	750	1000	1250	1500	2000	2500	3000	3500
Max. rated output		kW	750	1000	1250	1500	2000	2500	3000	3500
Shipping weight	6 bar	kg	2000	2400	2900	3500	4000	4900	6300	7000
	10 bar	kg	2000	2600	3000	3800	4500	5300	6600	7500
Operating weight[2]	6 bar	kg	3090	3850	4720	5750	6500	7730	9960	11210
	10 bar	kg	3090	4050	4810	5990	6970	8120	10250	11700
Boiler water capacity	6 bar	l	1090	1450	1820	2250	2500	2380	3360	4210
	10 bar	l	1090	1450	1810	2190	2470	2820	3650	4200
Gas capacity		l	1400	1400	1980	2580	3050	3670	4610	5440
Flue gas temperature		°C	→ Fig. 31, page 43							
Required draught		Pa	0							
Pressure drop on the hot gas side		mbar	→ Fig. 20, page 35							
Permiss. flow temperature[3]		°C	110							
Permiss. operating pressure		bar	6 or 10[4]							
CE designation		–	CE 0085 BO 0396							

Tab. 10 Specification Logano S825L LN, boiler sizes 750 to 3500 (dim. → Fig. 10, page 16)

1) Boilers with an output between 750 kW and 1500 kW are also available as standardised versions (equipment overview → page 11). The permissible operating pressure is 6 bar
2) The operating weight is the sum of the boiler weight and 100 % of the water filling it (excl. the weight of the burner and pipework)
3) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79
4) Higher pressures on request

3.2.8 Specification Logano S825L LN, boiler sizes 4250 to 17500

Boiler size		Unit	4250	5250	6000	8000	10000	12000	14000	17500
Max. rated output		kW	4250	5250	6000	8000	10000	12000	14000	17500
Shipping weight	6 bar	kg	8400	10500	12000	15800	18600	22700	29200	34300
	10 bar	kg	9300	11000	13000	16200	19400	24300	30700	37200
Operating weight[1]	6 bar	kg	14610	17890	21010	26770	31170	39320	52630	62460
	10 bar	kg	15500	18380	21930	27150	31950	40790	54090	65090
Boiler water capacity	6 bar	l	6210	7390	9010	10970	12570	16620	23430	28160
	10 bar	l	6200	7380	8930	10950	12550	16490	23390	27890
Gas capacity		l	7130	8910	10550	13040	15620	20410	25270	31760
Flue gas temperature		°C	→ Fig. 31, page 43							
Required draught		Pa	0							
Pressure drop on the hot gas side		mbar	→ Fig. 20, page 35							
Permiss. flow temperature[2]		°C	110							
Permiss. operating pressure		bar	6 or 10[3]							
CE designation		–	CE 0085 BO 0396							

Tab. 11 Specification Logano S825L LN, boiler sizes 4250 to 17500 (dim. → Fig. 11, page 17)

1) The operating weight is the sum of the boiler weight and 100 % of the water filling it (excl. the weight of the burner and pipework)
2) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)
3) Higher pressures on request

3.3 Dimensions and specification of the Logano plus SB825L and SB825L LN gas condensing boilers

3.3.1 Dimensions Logano plus SB825L, boiler sizes 1000 to 5200

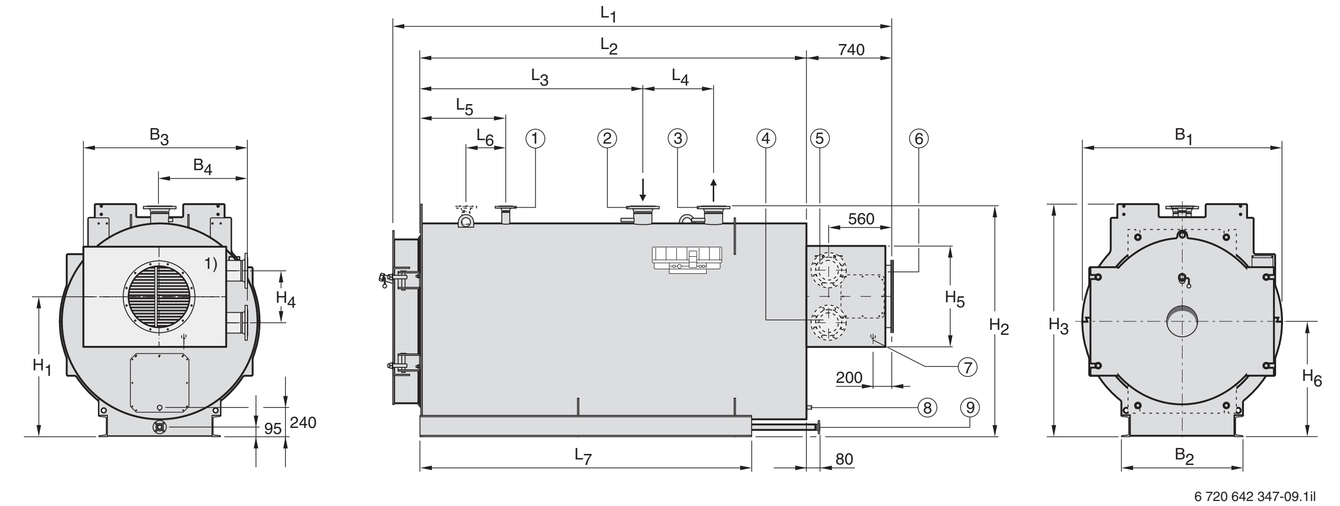

Fig. 12 Dimensions Logano plus SB825L, boiler sizes 1000 to 5200 (dim. in mm)

1 Flow safety line
2 Return
3 Flow
4 BWT return (R_{WT})
5 BWT flow (V_{WT})
6 Flue outlet
7 BWT condensate outlet (AKO)
8 Flue gas condensate drainage system
9 Boiler drain
1) BWT connections (also possible on the r.h. side)

Boiler size		Unit	1000	1350	1900	2500	3050	3700	4200	5200
Length	L_1 1)	mm	3420	3690	3960	4415	4465	4815	5310	5440
	L_2	mm	2425	2695	2960	3420	3465	3820	4250	4380
Height	H_2	mm	1615	1715	1815	1865	1965	2015	2115	2200
	H_3	mm	1615	1715	1815	1865	1965	2015	2115	2210
Width	B_1	mm	1324	1424	1524	1574	1674	1724	1824	1924
Burner door	Depth	mm	190	190	190	190	190	190	257	257
	H_6	mm	800	850	900	925	975	1000	1050	1100
Base frame	L_7	mm	2100	2350	2560	3060	3060	3410	3920	3920
	B_2	mm	910	910	930	1130	1130	1150	1260	1510
	Channel section	mm	120	120	160	160	160	200	220	220
BWT	H_1	mm	1060	1050	1150	1205	1215	1240	1260	1330
	H_4	mm	251	326	326	401	422	447	497	572
	H_5	mm	593	668	693	768	818	843	893	968
	B_3	mm	1004	1094	1154	1254	1344	1384	1454	1564
	B_4	mm	580	625	655	705	725	745	780	835
Flange flow/return BWT	V_{WT}/R_{WT}	–	→ Tab. 28, page 32							
BWT condensate outlet	AKO	–	→ Tab. 28, page 32							
Flue outlet		–	→ Tab. 26, page 31							
Flange flow and return		–	→ Tab. 22, page 30							
Flange flow safety line		–	→ Tab. 25, page 31							
Clearance	L_3	mm	1390	1560	1710	2180	2150	2490	2870	2770
	L_4	mm	450	500	550	550	600	600	600	800
	L_5	mm	600	600	600	650	650	800	650	750
	L_6	mm	–	–	–	–	–	–	–	–
Boiler drain		–	DN25	DN32	DN32	DN32	DN32	DN32	DN32	DN32
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 12 Dimensions Logano plus SB825L, boiler sizes 1000 to 5200 (specification → Tab. 16, page 24)

1) Standard version with a condensing heat exchanger (BWT); for each additional BWT, the length L_1 increases by 300 mm.

3.3.2 Dimensions Logano plus SB825L, boiler sizes 6500 to 19200

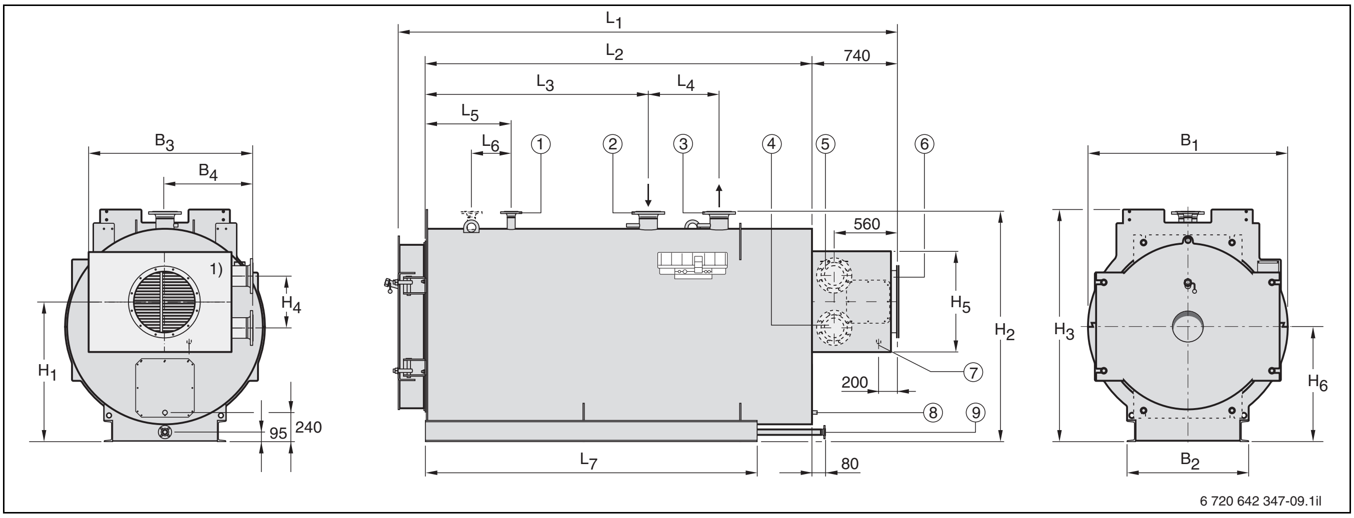

Fig. 13 Dimensions Logano plus SB825L, boiler sizes 6500 to 19200 (dim. in mm)

1 Flow safety line
2 Return
3 Flow
4 BWT return (R_{WT})
5 BWT flow (V_{WT})
6 Flue outlet
7 BWT condensate outlet (AKO)
8 Flue gas condensate drainage system
9 Boiler drain
1) BWT connections (also possible on the r.h. side)

Boiler size		Unit	6500	7700	9300	11200	12600	14700	16400	19200
Length	L_1 1)	mm	5830	6060	6260	6720	7055	7790	8270	8720
	L_2	mm	4770	5000	5200	5655	5990	6725	7170	7620
Height	H_2	mm	2400	2550	2700	2850	3000	3200	3500	3700
	H_3	mm	2410	2560	2710	2900	3025	3270	3570	3770
Width	B_1	mm	2124	2274	2424	2574	2724	2924	3224	3424
Burner door	Depth	mm	257	257	257	259	259	259	294	294
	H_6	mm	1200	1275	1350	1425	1500	1600	1750	1850
Base frame	L_7	mm	4280	4480	4650	5050	5320	6000	6390	6790
	B_2	mm	1510	1520	1610	1630	1890	1890	2100	2100
	Channel section	mm	220	240	240	280	280	280	320	320
BWT	H_1	mm	1360	1495	1550	1705	1750	1900	2030	2150
	H_4	mm	697	797	872	897	997	1097	1197	1297
	H_5	mm	1093	1193	1268	1293	1393	1493	1593	1693
	B_3	mm	1754	1804	2004	2054	2204	2354	2504	2654
	B_4	mm	930	955	1055	1080	1155	1230	1305	1380
Flange flow/return BWT	V_{WT}/R_{WT}	–	→ Tab. 28, page 32							
BWT condensate outlet	AKO	–	→ Tab. 28, page 32							
Flue outlet		–	→ Tab. 26, page 31							
Flange flow and return		–	→ Tab. 22, page 30							
Flange flow safety line		–	→ Tab. 25, page 31							
Clearance	L_3	mm	3130	3100	3250	3430	3100	3780	3940	4340
	L_4	mm	800	1000	1000	1200	1800	1800	2000	2000
	L_5	mm	1000	1100	1100	1100	1100	1100	1200	1200
	L_6	mm	400	500	500	500	500	500	600	600
Boiler drain		–	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 13 Dimensions Logano plus SB825L, boiler sizes 6500 to 19200 (specification → Tab. 17, page 25)

1) Standard version with a condensing heat exchanger (BWT); for each additional BWT, the length L_1 increases by 300 mm.

3.3.3 Dimensions Logano plus SB825L LN, boiler sizes 750 to 3500

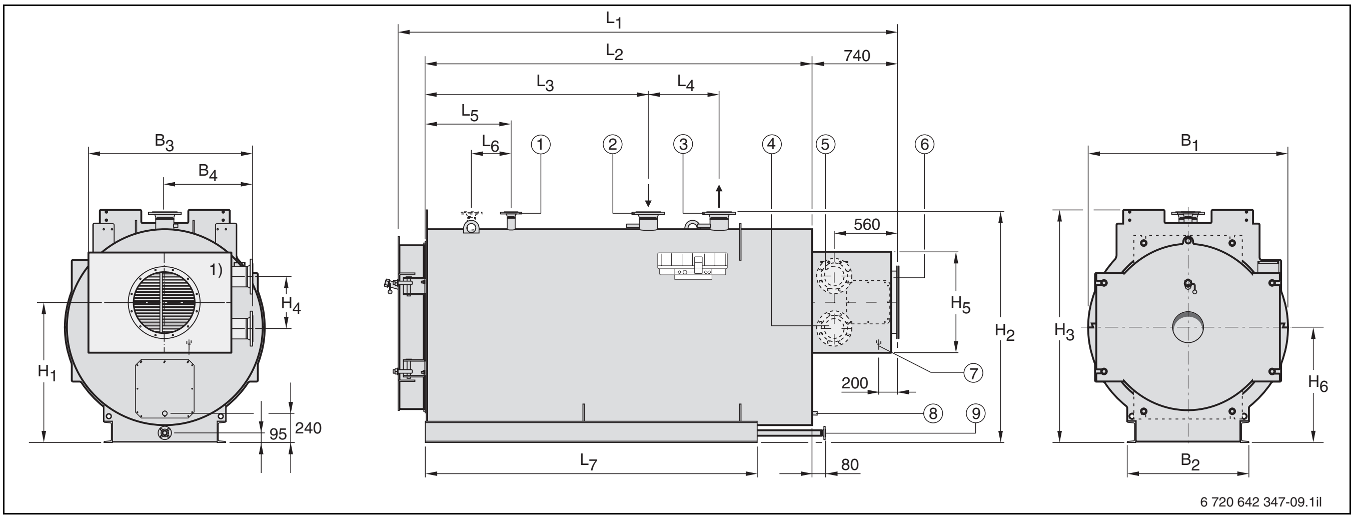

Fig. 14 Dimensions Logano plus SB825L LN, boiler sizes 750 to 3500 (dim. in mm)

1 Flow safety line
2 Return
3 Flow
4 BWT return (R_{WT})
5 BWT flow (V_{WT})
6 Flue outlet
7 BWT condensate outlet (AKO)
8 Flue gas condensate drainage system
9 Boiler drain
1) BWT connections (also possible on the r.h. side)

Boiler size		Unit	750	1000	1250	1500	2000	2500	3000	3500
Length	L_1 [1]	mm	3420	3690	3960	4415	4465	4815	5310	5440
	L_2	mm	2425	2695	2960	3420	3465	3820	4250	4380
Height	H_2	mm	1615	1715	1815	1865	1965	2015	2115	2215
	H_3	mm	1615	1715	1815	1865	1965	2015	2115	2215
Width	B_1	mm	1324	1424	1524	1574	1674	1724	1824	1924
Burner door	Depth	mm	190	190	190	190	190	190	257	257
	H_6	mm	800	850	900	925	975	1000	1050	1100
Base frame	L_7	mm	2100	2350	2560	3060	3060	3410	3920	3920
	B_2	mm	910	910	930	1130	1130	1150	1260	1510
	Channel section	mm	120	120	160	160	160	200	220	220
BWT	H_1	mm	1060	1050	1150	1205	1215	1240	1260	1330
	H_4	mm	227	251	251	326	326	401	422	447
	H_5	mm	543	593	593	668	693	768	818	843
	B_3	mm	914	1004	1004	1094	1154	1254	1344	1384
	B_4	mm	535	580	580	625	655	705	725	745
Flange flow/return BWT	V_{WT}/R_{WT}	–	→ Tab. 29, page 32							
BWT condensate outlet	AKO	–	→ Tab. 29, page 32							
Flue outlet		–	→ Tab. 26, page 31							
Flange flow and return		–	→ Tab. 22, page 30							
Flange flow safety line		–	→ Tab. 25, page 31							
Clearance	L_3	mm	1390	1560	1710	2180	2150	2490	2870	2770
	L_4	mm	450	500	550	550	600	600	600	800
	L_5	mm	600	600	600	650	650	800	650	750
	L_6	mm	–	–	–	–	–	–	–	–
Boiler drain		–	DN25	DN32	DN32	DN32	DN32	DN32	DN32	DN32
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 14 Dimensions Logano plus SB825L LN, boiler sizes 750 to 3500 (specification → Tab. 18, page 26)

1) Standard version with a condensing heat exchanger (BWT); for each additional BWT, the length L_1 increases by 300 mm.

3.3.4 Dimensions Logano plus SB825L LN, boiler sizes 4250 to 17500

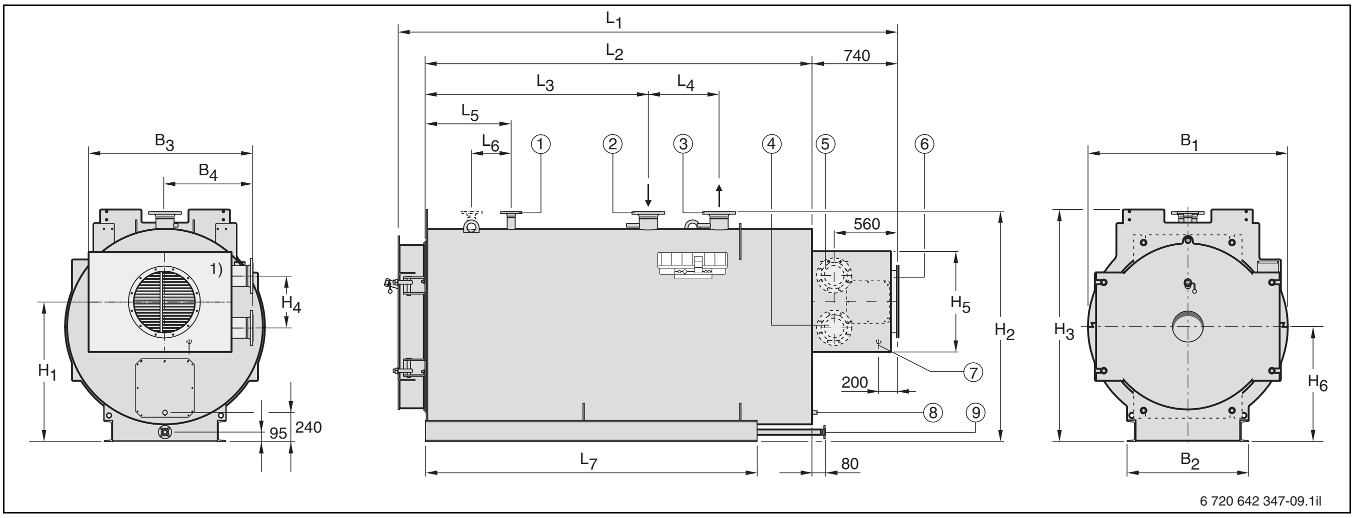

Fig. 15 Dimensions Logano plus SB825L LN, boiler sizes 4250 to 17500 (dim. in mm)

- **1** Flow safety line
- **2** Return
- **3** Flow
- **4** BWT return (R_{WT})
- **5** BWT flow (V_{WT})
- **6** Flue outlet
- **7** BWT condensate outlet (AKO)
- **8** Flue gas condensate drainage system
- **9** Boiler drain
- **1)** BWT connections (also possible on the r.h. side)

Boiler size		Unit	4250	5250	6000	8000	10000	12000	14000	17500
Length	L_1 1)	mm	5830	6060	6260	6720	7055	7790	8270	8720
	L_2	mm	4770	5000	5200	5655	5990	6725	7170	7620
Height	H_2	mm	2415	2550	2700	2850	3000	3200	3500	3700
	H_3	mm	2415	2560	2710	2900	3025	3270	3570	3770
Width	B_1	mm	2124	2274	2424	2574	2724	2924	3224	3424
Burner door	Depth	mm	257	257	257	259	259	259	294	294
	H_6	mm	1200	1275	1350	1425	1500	1600	1750	1850
Base frame	L_7	mm	4280	4480	4650	5050	5320	6000	6390	6790
	B_2	mm	1510	1520	1610	1630	1890	1890	2100	2100
	Channel section	mm	220	240	240	280	280	280	320	320
BWT	H_1	mm	1360	1495	1550	1705	1750	1900	2030	2150
	H_4	mm	497	572	697	797	872	897	997	1197
	H_5	mm	893	968	1093	1193	1268	1293	1393	1593
	B_3	mm	1454	1564	1754	1804	2004	2054	2204	2504
	B_4	mm	780	835	930	955	1055	1080	1155	1305
Flange flow/return BWT	V_{WT}/R_{WT}	–	→ Tab. 29, page 32							
BWT condensate outlet	AKO	–	→ Tab. 29, page 32							
Flue outlet		–	→ Tab. 26, page 31							
Flange flow and return		–	→ Tab. 22, page 30							
Flange flow safety line		–	→ Tag. 25, page 31							
Clearance	L_3	mm	3130	3100	3250	3430	3100	3780	3940	4340
	L_4	mm	800	1000	1000	1200	1800	1800	2000	2000
	L_5	mm	1000	1100	1100	1100	1100	1100	1200	1200
	L_6	mm	–	–	500	500	500	500	600	600
Boiler drain		–	DN50	DN50	DN50	DN50	DN50	DN50	DN50	DN50
Flue gas condensate drainage system		inch	R¾	R¾	R¾	R¾	R¾	R¾	R¾	R¾

Tab. 15 Dimensions Logano plus SB825L LN, boiler sizes 4250 to 17500 (specification → Tab. 19, page 27)

1) Standard version with a condensing heat exchanger (BWT); for each additional BWT, the length L_1 increases by 300 mm.

3.3.5 Specification Logano plus SB825L, boiler sizes 1000 to 5200

Boiler size		Unit	1000	1350	1900	2500	3050	3700	4200	5200
Max. rated boiler output		kW	1000	1350	1900	2500	3050	3700	4200	5200
Rated output BWT	at 30 °C1)	kW	83.1	103.6	161.2	205.3	255.6	286.2	327.3	412.9
	at 60 °C1)	kW	37.8	42.3	76.0	93.1	119.4	120.8	142.4	183.7
Shipping weight	6 bar	kg	2240	2760	3290	4120	4640	5560	7100	7940
	10 bar	kg	2240	2960	3490	4520	5140	5960	7400	8440
Operating weight2)	6 bar	kg	3300	4160	5010	6100	6960	8180	10500	11800
	10 bar	kg	3290	4350	5210	6470	7430	8570	10790	12290
Boiler water capacity	6 bar	l	1040	1370	1690	1940	2270	2570	3340	3790
	10 bar	l	1030	1360	1690	1910	2240	2560	3330	3780
Gas capacity		l	1240	1610	2210	2930	3360	4080	5010	5940
Flue gas temperature3)	at 30 °C1)	°C	104	95	113	109	113	108	109	111
	at 60 °C1)	°C	123	113	131	127	132	125	126	128
Required draught		Pa	0 (50)4)							
Max. flow rate via BWT3)	at 30 °C1)	m_N^3/h	39.6	53.8	75.1	99.1	120.7	147.4	160.7	160.7
	at 60 °C1)	m_N^3/h	42.1	57.2	79.8	105.3	128.2	156.5	162.7	162.7
Pressure drop on the water side BWT	at 30 °C1)	mbar	210	128	166	161	158	168	200	200
	at 60 °C1)	mbar	231	141	183	177	174	185	200	200
Pressure drop on hot gas side boiler + BWT		mbar	6.74	7.45	9.79	9.03	11.09	14.25	11.84	14.69
Permiss. flow temperature5))		°C	110							
Permiss. operating pressure		bar	6 or 106)							
CE designation		–	CE 0085 BO 0397							

Tab. 16 Specification Logano plus SB825L, boiler sizes 1000 to 5200 (dim. → Fig. 12, page 20)

1) Water inlet temperature into the condensing heat exchanger (BWT)

2) The operating weight is the sum of the boiler weight, the weight of the condensing heat exchanger, and 100 % of the water filling it (excl. the weight of the burner and pipework)

3) Relative to the maximum boiler load, other boiler loads → Fig. 32, page 43; boiler reference temperatures 80/60 °C

4) The available pressure depends on the burner

5) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)

6) Higher pressures on request

i Other specifications and designs of condensing heat exchangers available on request.

3.3.6 Specification Logano plus SB825L, boiler sizes 6500 to 19200

Boiler size		Unit	6500	7700	9300	11200	12600	14700	16400	19200
Max. rated boiler output		kW	6500	7700	9300	11200	12600	14700	16400	19200
Rated output BWT	at 30 °C[1] at 60 °C[1]	kW kW	542.8 260.7	608.5 276.7	717.7 322.2	844.5 377.1	914.7 393.4	1097.7 503.7	1114.9 455.5	1293.5 555.6
Shipping weight	6 bar 10 bar	kg kg	9830 10730	12080 12580	13660 14860	17390 18090	19650 20750	24120 25820	30920 32620	36240 39140
Operating weight[2]	6 bar 10 bar	kg kg	15390 16290	18740 19230	21740 22860	27420 28100	31630 32710	39950 41510	53200 54870	63490 66200
Boiler water capacity	6 bar 10 bar	l l	5470 5470	6560 6550	7900 7880	9900 9880	11830 11810	15650 15510	22080 22050	27020 26830
Gas capacity		l	7770	9600	11480	14100	17180	22230	27640	34460
Flue gas temperature[3]	at 30 °C[1] at 60 °C[1]	°C °C	114 132	109 127	107 124	110 127	105 122	109 126	98 115	111 125
Required draught		Pa	0 (50)[4]							
Max. flow rate via BWT[3]	at 30 °C[1] at 60 °C[1]	m_N^3/h m_N^3/h	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7
Pressure drop on the water side BWT	at 30 °C[1] at 60 °C[1]	mbar mbar	200 200	200 200	200 200	200 200	200 200	200 200	200 200	200 200
Pressure drop on hot gas side boiler + BWT		mbar	13.43	13.73	14.78	16.39	17.32	16.47	13.6	13.33
Permiss. flow temperature[5]		°C	110							
Permiss. operating pressure		bar	6 or 10[6]							
CE designation		–	CE 0085 BO 0397							

Tab. 17 Specification Logano plus SB825L, boiler sizes 6500 to 19200 (dim. → Fig. 13, page 21)

1) Water inlet temperature into the condensing heat exchanger (BWT)
2) The operating weight is the sum of the boiler weight, the weight of the condensing heat exchanger, and 100 % of the water filling it (excl. the weight of the burner and pipework)
3) Relative to the maximum boiler load, other boiler loads → Fig. 32, page 43; boiler reference temperatures 80/60 °C
4) The available pressure depends on the burner
5) Safety limit of the high limit safety cut-out (STB); maximum possible operating flow temperature (→ Tab. 50, page 79)
6) Higher pressures on request

i Other specifications and designs of condensing heat exchangers available on request.

3.3.7 Specification Logano plus SB825L LN, boiler sizes 750 to 3500

Boiler size		Unit	750	1000	1250	1500	2000	2500	3000	3500
Max. rated boiler output		kW	750	1000	1250	1500	2000	2500	3000	3500
Rated output BWT	at 30 °C1) at 60 °C1)	kW kW	59.4 25.3	74.3 28.6	97.7 41.3	116.4 48.4	156.7 66.5	185.9 73.0	228.4 93.4	264.5 107.5
Shipping weight	6 bar 10 bar	kg kg	2110 2110	2540 2740	3040 3140	3560 3960	4190 4690	5020 5420	6540 6840	7260 7830
Operating weight2)	6 bar 10 bar	kg kg	3220 3220	4010 4210	4880 4970	5840 6180	6720 7190	7890 8280	10250 10540	11520 12070
Boiler water capacity	6 bar 10 bar	l l	1090 1090	1450 1450	1820 1810	2250 2190	2500 2470	2830 2820	3660 3650	4210 4200
Gas capacity		l	1240	1610	2210	2930	3360	4080	5010	5940
Flue gas temperature3)	at 30 °C1) at 60 °C1)	°C °C	100 119	92 110	105 123	99 118	105 123	97 115	101 119	103 120
Required draught		Pa	0 (50)4)							
Max. flow rate via BWT3)	at 30 °C1) at 60 °C1)	m_N^3/h m_N^3/h	28.1 28.5	40.0 42.5	43.2 43.7	58.3 28.5	79.6 83.4	99.9 106.1	119.7 127.1	139.7 148.4
Pressure drop on the water side BWT	at 30 °C1) at 60 °C1)	mbar mbar	200 200	214 236	250 250	150 150	187 200	164 180	156 171	151 166
Pressure drop on hot gas side boiler + BWT		mbar	5.76	6.57	7.17	6.52	8.24	10.07	9.39	11.19
Permiss. flow temperature5)		°C	110							
Permiss. operating pressure		bar	6 or 106)							
CE designation		–	CE 0085 BO 0397							

Tab. 18 Specification Logano plus SB825L LN, boiler sizes 750 to 3500 (dim. → Fig. 14, page 22)

1) Water inlet temperature into the condensing heat exchanger (BWT)
2) The operating weight is the sum of the boiler weight, the weight of the condensing heat exchanger, and 100 % of the water filling it (excl. the weight of the burner and pipework)
3) Relative to the maximum boiler load, other boiler loads → Fig. 32, page 43; boiler reference temperatures 80/60 °C
4) The available pressure depends on the burner
5) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)
6) Higher pressures on request

i Other specifications and designs of condensing heat exchangers available on request.

3.3.8 Specification Logano plus SB825L LN, boiler sizes 4250 to 17500

Boiler size		Unit	4250	5250	6000	8000	10000	12000	14000	17500
Max. rated boiler output		kW	4250	5250	6000	8000	10000	12000	14000	17500
Rated output BWT	at 30 °C[1)] at 60 °C[1)]	kW kW	337.3 148.3	397.9 165.9	449.8 185.3	593.5 248.2	712.4 287.5	867.5 369.3	937.6 362.9	1221.2 528.2
Shipping weight	6 bar 10 bar	kg kg	8700 9600	10840 11340	12330 13330	16180 16580	18960 19760	23150 24650	29610 31010	34920 37920
Operating weight[2)]	6 bar 10 bar	kg kg	14970 15860	18300 18790	21430 22350	27250 27630	31650 32430	39900 41270	53190 54550	63280 66010
Boiler water capacity	6 bar 10 bar	l l	6200 6200	7390 7380	9010 8930	10970 10950	12570 12550	16620 16490	23430 23390	28160 27890
Gas capacity		l	7770	9600	11480	14100	17180	22230	27640	34460
Flue gas temperature[3)]	at 30 °C[1)] at 60 °C[1)]	°C °C	110 128	106 123	99 116	104 121	101 118	108 125	100 116	104 121
Required draught		Pa	0 (50)[4)]							
Max. flow rate via BWT[3)]	at 30 °C[1)] at 60 °C[1)]	m_N^3/h m_N^3/h	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7	160.7 162.7
Pressure drop on the water side BWT	at 30 °C[1)] at 60 °C[1)]	mbar mbar	200 200	200 200	200 200	200 200	200 200	200 200	200 200	200 200
Pressure drop on hot gas side boiler + BWT		mbar	11.51	11.45	10.98	12.98	14.53	14.78	13.74	13.18
Permiss. flow temperature[5)]		°C	110							
Permiss. operating pressure		bar	6 or 10[6)]							
CE designation		–	CE 0085 BO 0397							

Tab. 19 Specification Logano plus SB825L LN, boiler sizes 4250 to 17500 (dim. → Fig. 15, page 23)

1) Water inlet temperature into the condensing heat exchanger (BWT)
2) The operating weight is the sum of the boiler weight, the weight of the condensing heat exchanger, and 100 % of the water filling it (excl. the weight of the burner and pipework)
3) Relative to the maximum boiler load, other boiler loads → Fig. 32, page 43; boiler reference temperatures 80/60 °C
4) The available pressure depends on the burner
5) Safety limit of the high limit safety cut-out (STB); Maximum possible operating flow temperature (→ Tab. 50, page 79)
6) Higher pressures on request

i Other specifications and designs of condensing heat exchangers available on request.

3.4 Flue gas heat exchanger ECO 6 SA (stand-alone)

3.4.1 Function principle

In the flue gas heat exchanger, heat is recovered from the hotter boiler flue gas by channelling cooler mains return water through the heat exchanger pipe to reduce the flue gas temperature. The energy gained in this way gives a higher boiler efficiency and therefore lower fuel consumption and lower flue gas emissions.

With the fuels gas and low sulphur fuel oil, aim for as low a water inlet temperature as possible at the flue gas heat exchanger. This deliberately creates operation with condensate (flue gas condensation), so that even higher efficiency can be achieved.

If the flue gas heat exchanger is operated with fuel oil (not low sulphur quality), ensure a corresponding minimum water inlet temperature at the flue gas heat exchanger of 60 °C to protect it from corrosion on the flue gas side. With oil operation, an optional control on the water side can be used to raise the water inlet temperature at the flue gas heat exchanger to the required minimum level by mixing in pre-heated water. With oil operation, for flue gas heat exchangers with an integral flue gas bypass, if the water inlet temperature cannot be raised to the minimum level, the entire flue gas flow from the boiler bypasses the flue gas heat exchanger, using the flue gas control valve. A flue gas temperature controller is available as an option for an additional charge.

3.4.2 Specification flue gas heat exchanger ECO 6 SA

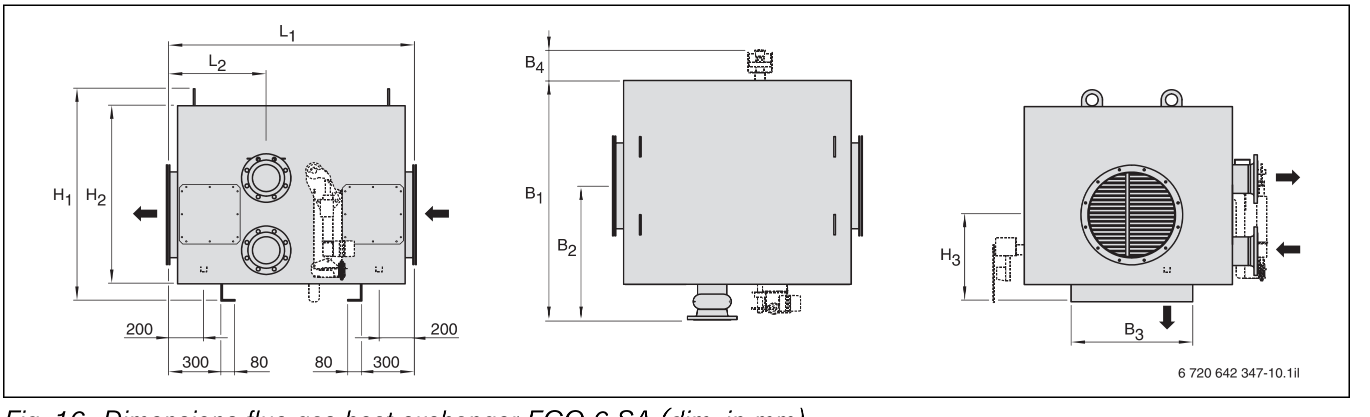

Fig. 16 Dimensions flue gas heat exchanger ECO 6 SA (dim. in mm)

Type		Unit	5	7	9	11	13	15	17	19	21
Can be used up to max. rated boiler output		kW	750	1250	1500	2000	2500	3050	3700	4250	5250
Max. output with natural gas H $\vartheta_R = 30$ °C		kW	59.5	74.5	102.8	147.6	186.4	251.1	268.3	328.5	393.8
Max. output with natural gas H $\vartheta_R = 60$ °C		kW	25.4	41.2	48.4	66.5	111.4	119.4	121.0	148.4	166.0
Flow rate on the water side 1)		m^3/h	28.5	42.5	58.9	83.4	106.1	127.1	156.5	162.7	162.7
Pressure drop on the water side 1)		mbar	200	250	150	200	180	174	185	190	200
Pressure drop on the hot gas side 1)		mbar	0.81	1.24	0.98	1.32	1.24	1.37	1.75	1.71	1.75
Width	B_1 2)	mm	914	1004	1094	1154	1254	1294	1334	1404	1514
	B_2 2)	mm	531	576	621	651	701	721	741	776	831
	B_3	mm	400	500	500	600	750	750	750	750	900
	B_4	mm	0	0	0	0	0	0	0	0	0
Length	L_1 3)	mm	1120	1120	1120	1120	1120	1120	1120	1520	1520
	L_2 3)	mm	260	260	260	260	260	260	260	460	460
Height	H_1	mm	949	899	874	899	974	1024	1049	1099	1174
	H_2	mm	549	599	674	699	774	824	849	899	974
	H_3	mm	572	497	434	447	484	509	522	547	584
Drainage system connection		inch	R1	R1	R1	R1	R1	R1	R1	R1	R1
Shipping weight	1 bundle	kg	130	160	190	220	260	290	310	370	420
Water capacity per bundle		l	15	20	26	29	37	42	46	52	64

Tab. 20 Dimensions and specification flue gas heat exchanger ECO 6 SA

1) Hydraulic connection to the secondary circuit (partial flow)

2) For heat exchangers having a water inlet/water outlet with an internal diameter of DN150, the dimensions increase by 50 mm.

3) If the heat exchanger is designed to have several bundle elements, the dimensions increase by 300 mm per bundle.

Type		Unit	23	25	27	29	31	33	35	37
Can be used up to max. rated boiler output		kW	6500	8000	10000	12000	14000	14700	17500	19200
Max. output with natural gas H $\vartheta_R = 30$ °C		kW	450.1	568.1	712.9	868.5	938.0	1098.8	1222.1	1294.5
Max. output with natural gas H $\vartheta_R = 60$ °C		kW	260.9	277.0	322.1	377.7	394.0	503.7	528.2	555.6
Flow rate on the water side 1)		m^3/h	162.7							
Pressure drop on the water side 1)		mbar	200							
Pressure drop on the hot gas side 1)		mbar	1.41	1.67	1.74	2.21	2.17	1.67	1.78	1.62
Width	B_1 2)	mm	1704	1745	1954	2004	2154	2304	2454	2604
	B_2 2)	mm	926	951	1051	1076	1151	1226	1301	1376
	B_3	mm	1100	1100	1350	1350	1550	1700	1700	2000
	B_4	mm	0	0	0	250	250	250	250	250
Length	L_1 3)	mm	1520	1520	1520	1520	1920	1920	1920	1920
	L_2 3)	mm	460	460	460	460	660	660	660	660
Height	H_1	mm	1299	1399	1474	1499	1599	1699	1799	1899
	H_2	mm	1099	1199	1274	1299	1399	1499	1599	1699
	H_3	mm	647	697	734	747	797	847	897	947
Drainage system connection		inch	R1	R1	R1½	R1½	R1½	R1½	R1½	R1½
Shipping weight	1 bundle	kg	530	600	700	740	890	1020	1140	1290
Water capacity per bundle		l	85	98	119	125	148	173	200	228

Tab. 21 Dimensions and specification flue gas heat exchanger ECO 6 SA

1) Hydraulic connection to the secondary circuit (partial flow)

2) For heat exchangers having a water inlet/water outlet with an internal diameter of DN150, the dimensions increase by 50 mm.

3) If the heat exchanger is designed to have several bundle elements, the dimensions increase by 300 mm per bundle.

These dimensions are designed for 100 mm thick insulation. The water inlet and outlet connections can be made on the r.h. or l.h. side.
Pipe thread to DIN 2999.

Dimensions given with ± 1 % tolerance;
weights given with ± 3 % tolerance

3.5 Connections

3.5.1 Flow and return

At design spread and rated output				Suggested internal diameter[1]
ΔT = 15 K [kW]	ΔT = 20 K [kW]	ΔT = 30 K [kW]	ΔT = 40 K [kW]	
> 175 ≤ 275	> 235 ≤ 367	> 352 ≤ 550	> 470 ≤ 734	DN50
> 275 ≤ 465	> 367 ≤ 620	> 550 ≤ 931	> 734 ≤ 1241	DN65
> 465 ≤ 705	> 620 ≤ 940	> 931 ≤ 1410	> 1241 ≤ 1881	DN80
> 705 ≤ 1102	> 940 ≤ 1469	> 1410 ≤ 2204	> 1881 ≤ 2938	DN100
> 1102 ≤ 1722	> 1469 ≤ 2296	> 2204 ≤ 3444	> 2938 ≤ 4592	DN125
> 1722 ≤ 2479	> 2296 ≤ 3306	> 3444 ≤ 4959	> 4592 ≤ 6612	DN150
> 2479 ≤ 4408	> 3306 ≤ 5877	> 4959 ≤ 8816	> 6612 ≤ 11755	DN200
> 4408 ≤ 6887	> 5877 ≤ 9183	> 8816 ≤ 13775	> 11755 ≤ 18367	DN250
> 6887 ≤ 9918	> 9183 ≤ 13224	> 13775 ≤ 19200	> 18367 ≤ 19200	DN300
> 9918 ≤ 13500	> 13224 ≤ 18000	–	–	DN350
> 13500 ≤ 17633	> 18000 ≤ 19200	–	–	DN400

Tab. 22 Internal diameters of flow and return connections subject to design spread and rated output

1) Flanged connections designed as PN16 to DIN 2633; the internal diameters given should be taken as suggestions but can be determined individually.

Logano S825L Logano plus SB825L Boiler size	Logano S825L LN Logano S825L LN (standardised) Logano plus SB825L LN Boiler size	Maximum possible internal diameters of flow and return connections
–	750	DN100
1000	–	DN100
1350	1000–1500	DN125
1900	2000	DN150
2500–4200	2500–4250	DN200
5200–7700	5250–6000	DN250
9300–12600	8000–12000	DN300
14700–16400	14000	DN350
19200	17500	DN400

Tab. 23 Internal diameters of flow and return connections subject to the boiler size; larger internal diameters available on request

Logano S825L Standardised boiler size	Fixed internal diameters of flow and return connections
650	DN80
1000	DN100
1350	DN125
1900	DN150

Tab. 24 Fixed internal diameters of flow and return connections for Logano S825L (standardised); subject to the boiler size

3.5.2 Flow safety line and safety valve connections

Maximum response pressure	Maximum boiler output with a safety valve from ARI, figure 903 with an internal diameter of the flow safety line of[1]									
	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150
[bar]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]
2.5	217	340	565	870	1360	2300	3480	5440	7120	9900
3.0	250	391	649	1000	1560	2640	4000	6250	8190	11400
4.0	312	488	810	1250	1950	3300	5000	7800	10200	14200
5.0	370	578	960	1480	2310	3900	5910	9240	12100	16900
6.0	426	666	1100	1700	2660	4500	6820	10600	14000	19400
8.0	536	837	1390	2140	3350	5660	8580	13400	17600	24500
10.0	643	1000	1670	2570	4010	6790	10300	16000	21100	29300

Tab. 25 Flow safety line and safety valve connections

1) Several connectors for flow safety line on request

3.5.3 Flue outlet connection

Rated output[1]	Flue outlet internal diameter[2)3)] D_1	Flue outlet D_1 (external)[3]
[kW]	–	[mm]
≤ 827	DN200	213
> 827 ≤ 1350	DN250	256
> 1350 ≤ 2050	DN315	322
> 2051 ≤ 3307	DN400	400
> 3308 ≤ 5167	DN500	503
> 5168 ≤ 8203	DN630	634
> 8204 ≤ 10403	DN710	711
> 10404 ≤ 13227	DN800	797
> 13228 ≤ 16712	DN900	894
> 16713 ≤ 19200	DN1000	1003

Tab. 26 Flue outlet connection subject to the rated output

1) Actual output (according to type plate)

2) Dimensions to EN 12220

3) Guide values; exact diameter is calculated for each specific project

Logano S825L Standardised boiler size	Fixed internal diameters of flue outlet
650	DN200
1000	DN315
1350	DN315
1900	DN400

Tab. 27 Fixed internal diameters of flue outlet for S825L (standardised); subject to the boiler size

3.5.4 Condensing heat exchanger connection for integral version (Logano plus SB825) and stand-alone version (ECO 6 SA)

Integrated into SB825L	Stand-alone ECO 6 SA	Condensing heat exchanger (BWT) connection		
		Flue inlet / flue outlet	Flow V_{WT} / return R_{WT}	Condensate outlet AKO
Boiler size	Type	[DN]	[DN]	[inch]
650	BG5	200	80	R1
1000	BG7	250 (315)	100	R1
1350	BG9	250	100	R1
1900	BG11	315	125	R1
2500	BG13	400	125	R1
3050	BG15	400	150	R1
3700	BG17	500	150	R1
4200	BG19	500	150	R1
5200	BG21	630	150	R1
6500	BG23	630	150	R1
7700	BG25	630	150	R1
9300	BG27	710	150	R1½
11200	BG29	800	150	R1½
12600	BG31	800	150	R1½
14700	BG33	900	150	R1½
16400	BG35	900	150	R1½
19200	BG37	1000	150	R1½

Tab. 28 Condensing heat exchanger connection for the Logano plus SB825L, subject to the rated output

Integrated into SB825L LN	Stand-alone ECO 6 SA	Condensing heat exchanger (BWT) connection		
		Flue inlet / flue outlet	Flow V_{WT} / return R_{WT}	Condensate outlet AKO
Boiler size	Type	[DN]	[DN]	[inch]
750	BG5	200	80	R1
1000	BG7	250	100	R1
1250	BG7	250	100	R1
1500	BG9	315	100	R1
2000	BG11	315	125	R1
2500	BG13	400	125	R1
3000	BG15	400	150	R1
3500	BG17	500	150	R1
4250	BG19	500	150	R1
5250	BG21	500	150	R1
6000	BG23	630	150	R1
8000	BG25	630	150	R1
10000	BG27	710	150	R1½
12000	BG29	800	150	R1½
14000	BG31	900	150	R1½
17500	BG35	1000	150	R1½

Tab. 29 Condensing heat exchanger connection for the Logano plus SB825L LN, subject to the rated output

3.5.5 Connector

All Logano S825L and S825L LN conventional boilers, as well as Logano plus SB825L and SB825L LN gas condensing boilers, are factory-fitted with suitable flow and return connectors. A temperature sensor and temperature controller can be connected to them.

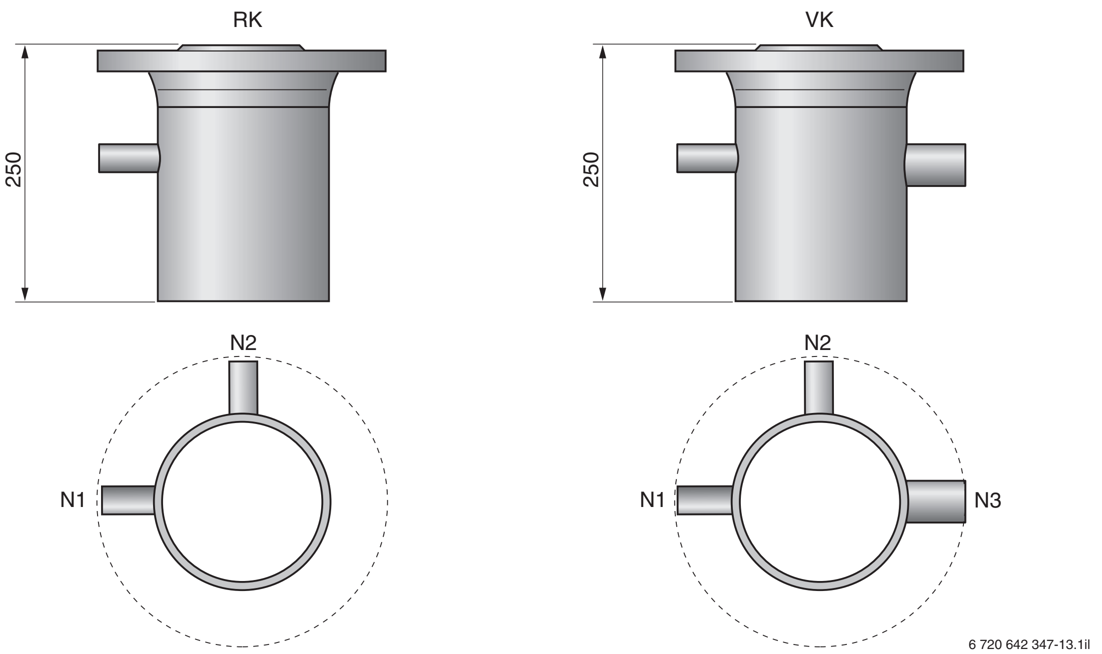

Fig. 17 Connectors for Logano S825L/L LN and Logano plus SB825L/L LN with test ports for safety equipment (dim. in mm; internal diameters → Tab. 22, page 30, Tab. 28, page 32 and Tab. 29, page 32)

N1 Female connections with cylindrical female thread R½ , 120 mm long (with connectors DN 32–150)
Female connections with cylindrical female thread R½ , 60 mm long (with connectors DN 200–400)

N2 Female connections with cylindrical female thread R½ , 60 mm long (with connectors DN 65–80)
Female connections with cylindrical female thread R½ , 75 mm long (with connectors DN 32–50)
Female connections with cylindrical female thread R½ , 40 mm long (with connectors DN 100–400)

N3 Female connections with cylindrical female thread R¾ , 75 mm long (with connectors DN 32–150)
Female connections with cylindrical female thread R¾ , 50 mm long (with connectors DN 200–400)

RK Return

VK Flow

3.6 Parameters

3.6.1 Pressure drop on the water side

The pressure drop on the water side is the pressure differential between the boiler flow and return connections. It depends on the boiler size (and the internal diameter of the connectors) and the heating water flow rate. The graph in Fig. 18 shows the pressure drop on the water side for the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers. For the pressure drop on the water side of the condensing heat exchangers in the Logano plus SB825L and SB825L LN gas condensing boilers, see pages 24 ff.

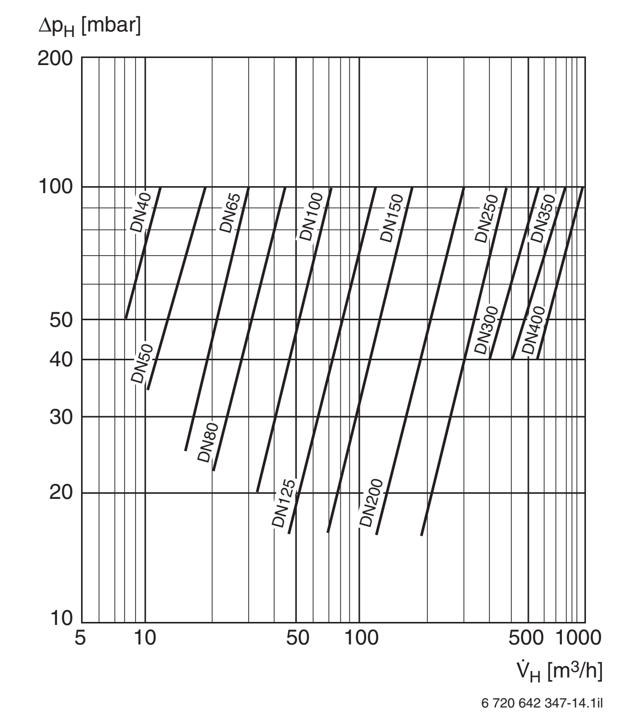

Fig. 18 Pressure drop on the water side for Logano S825L/L LN and Logano plus SB825L/L LN; (for internal diameters of flow and return connections → page 30)

Δp_H Pressure drop on heating water side
$\dot{V}_H$ Heating water flow rate

3.6.2 Pressure drop on the hot gas side

Logano S825L

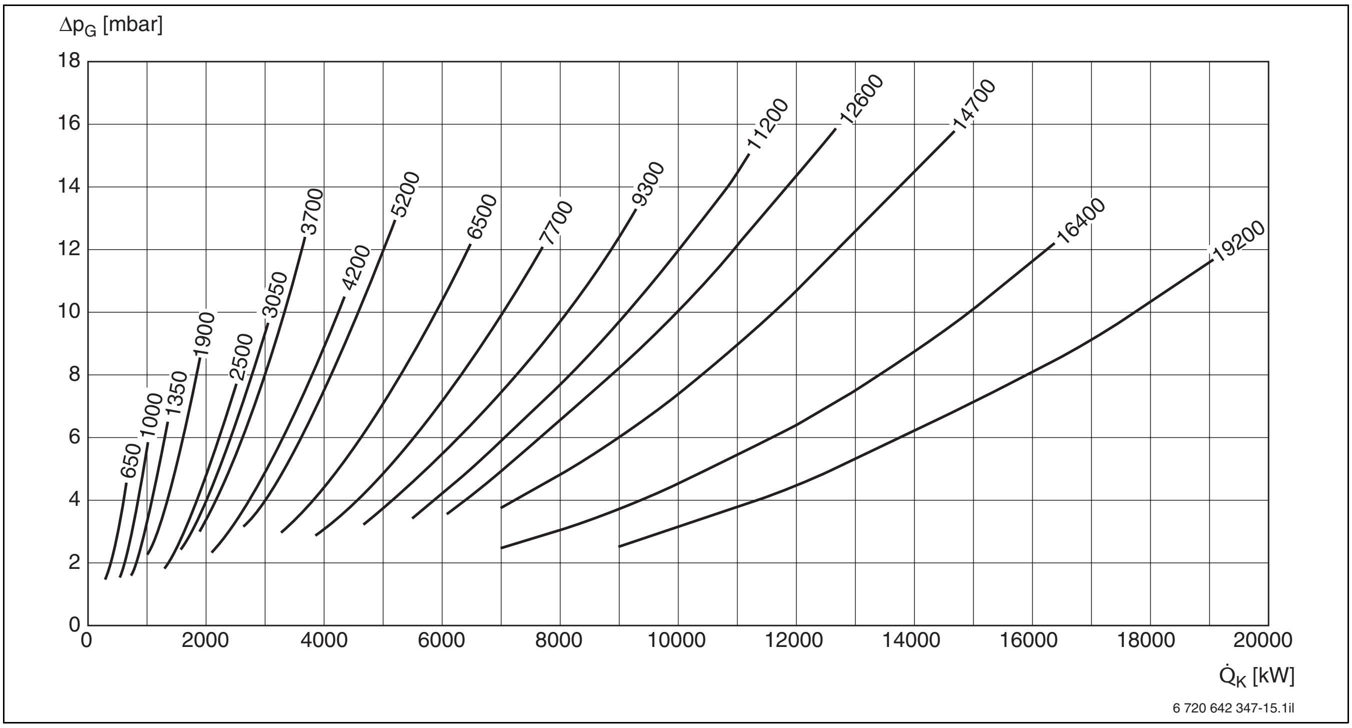

Fig. 19 Pressure drop on the hot gas side Logano S825L

Δp_G Pressure drop on the hot gas side
$\dot{Q}_K$ Rated output

Logano S825L LN

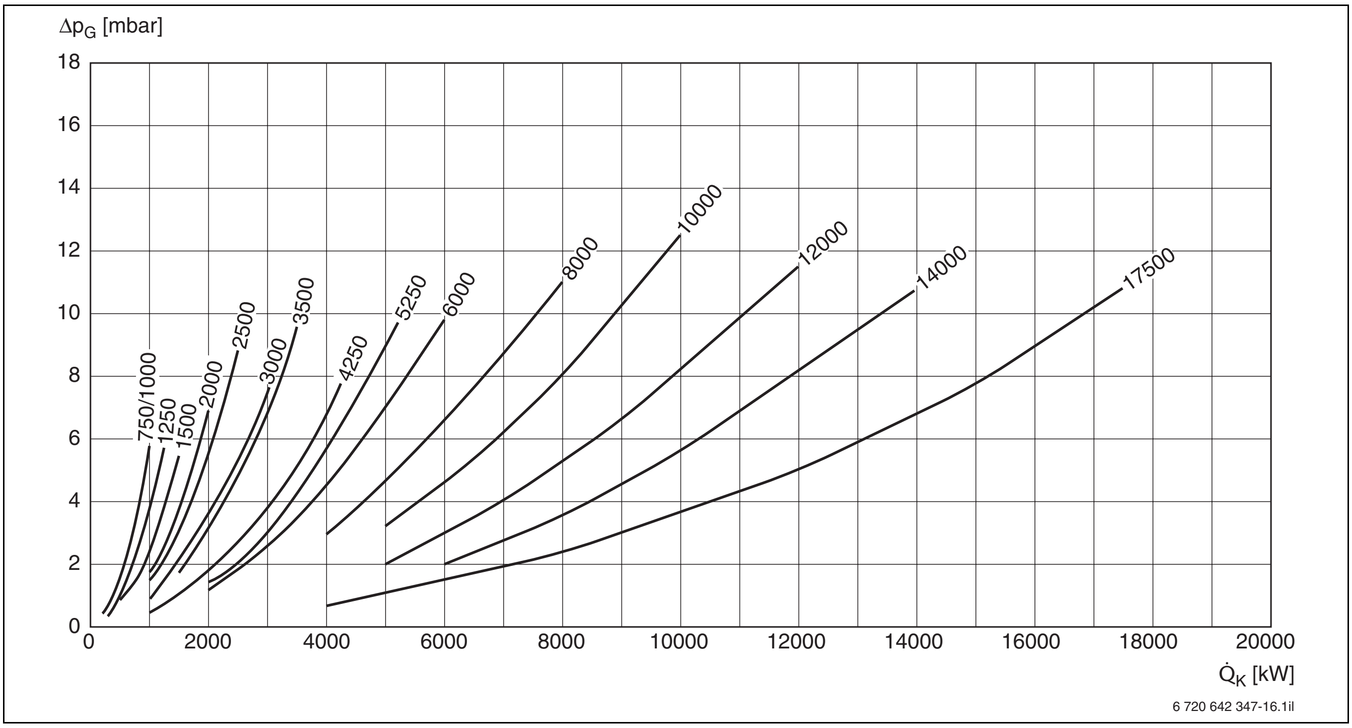

Fig. 20 Pressure drop on the hot gas side Logano S825L LN

Δp_G Pressure drop on the hot gas side
$\dot{Q}_K$ Rated output

Logano plus SB825L

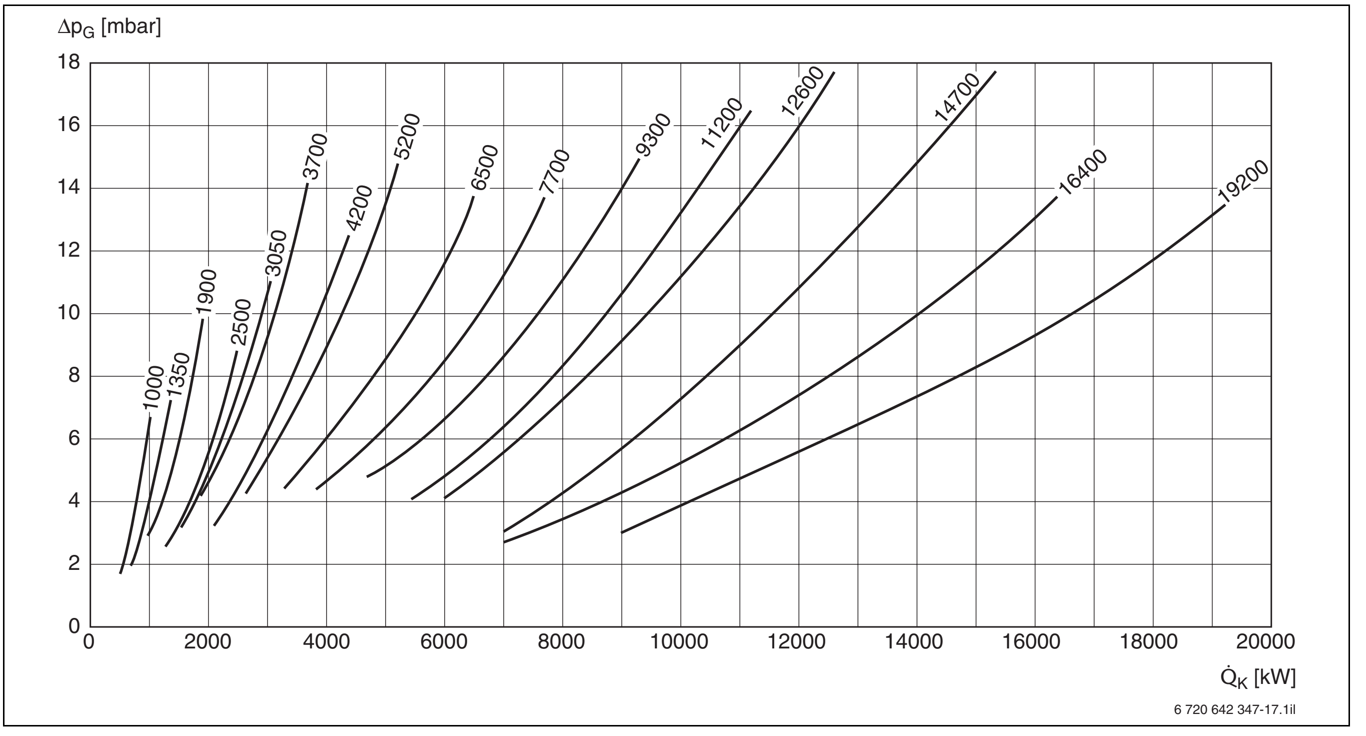

Fig. 21 Pressure drop on the hot gas side Logano plus SB825L

Logano plus SB825L LN

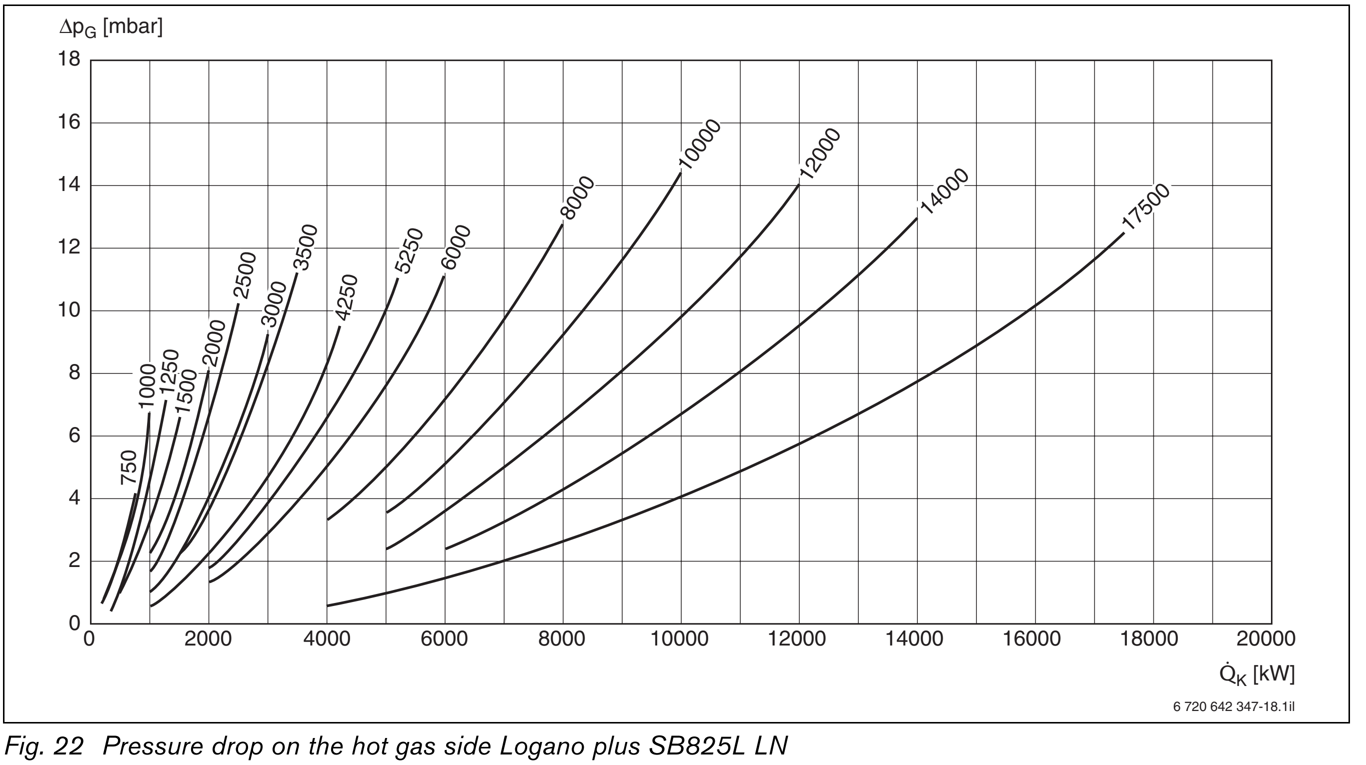

Fig. 22 Pressure drop on the hot gas side Logano plus SB825L LN

$\dot{Q}_K$ Rated output
Δp_G Pressure drop on the hot gas side

3.6.3 Combustion chamber volume load

To guarantee emissions values, some burner manufacturers define aspects such as a maximum combustion chamber volume load. Using the graphs in Fig. 23 and Fig. 24, the most suitable boiler size for a given combustion chamber volume load can be selected for the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers.

Logano S825L and Logano plus SB825L

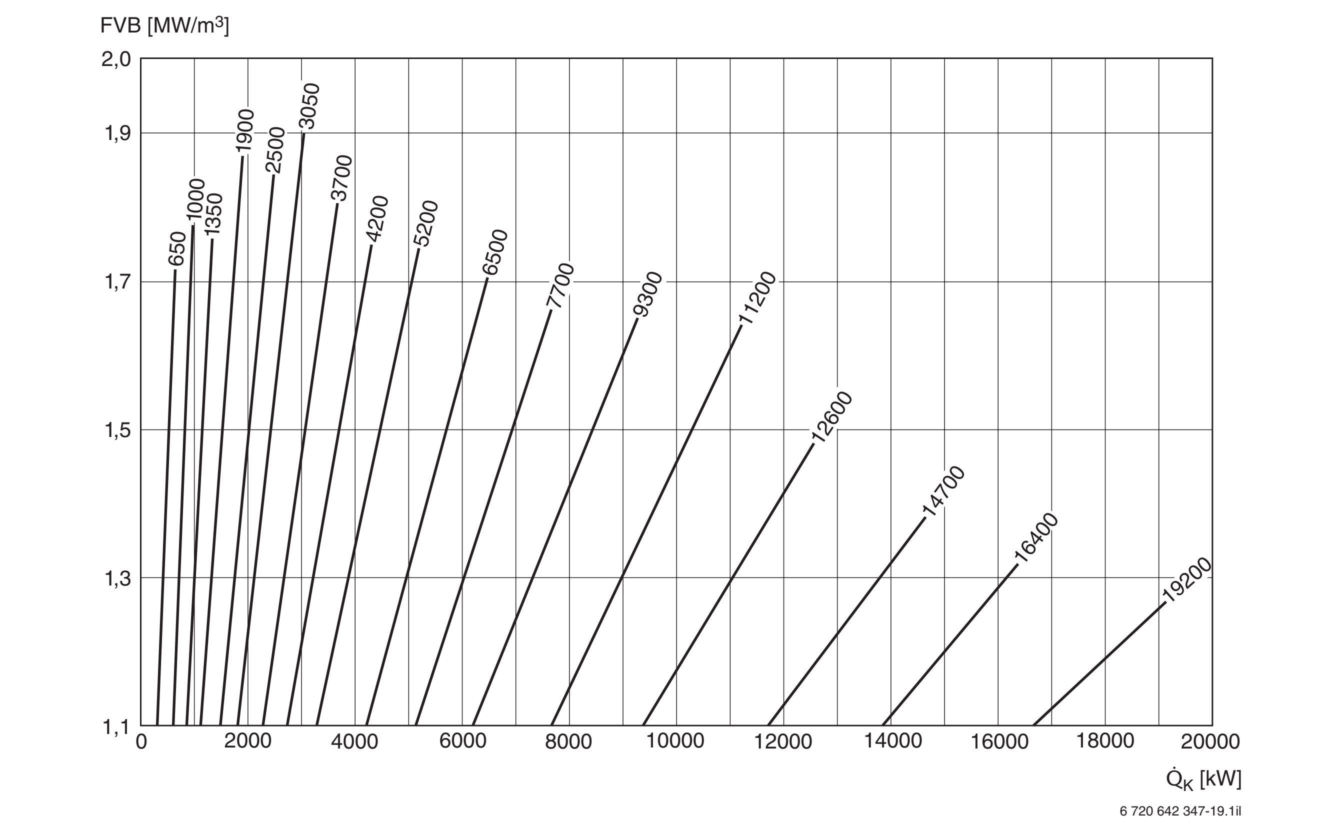

Fig. 23 Combustion chamber volume load Logano S825L and Logano plus SB825L, subject to the boiler output

FVB Combustion chamber volume load
$\dot{Q}_K$ Rated output

Logano S825L LN and Logano plus SB825L LN

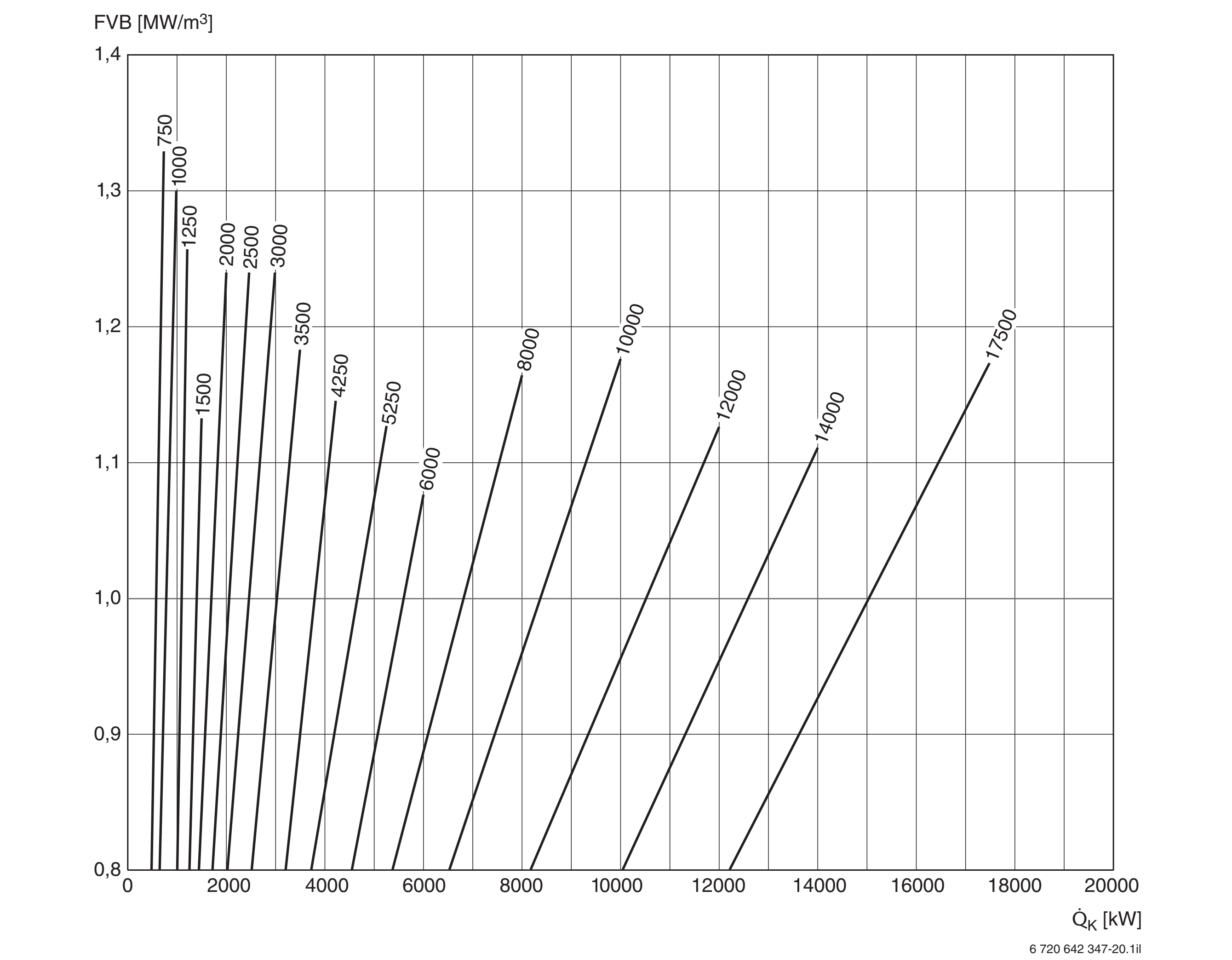

Fig. 24 Combustion chamber volume load Logano S825L LN and Logano plus SB825L LN, subject to the boiler output

FVB Combustion chamber volume load
$\dot{Q}_K$ Rated output

3.6.4 Boiler efficiency, standard seasonal efficiency [to DIN] and standby loss

Boiler efficiency and standard seasonal efficiency [to DIN]

The **boiler efficiency** denotes the ratio of generated output compared to combustion output, subject to the boiler load and system temperature.

$$\eta_K = \frac{Q}{Q_B}$$

ηK Boiler efficiency
Q Generated output in kW
Q_B Combustion output in kW

The graph in Fig. 25 (page 39) shows the boiler efficiency subject to the boiler load, to EN 303 relative to a system temperature of 80/60 °C (→ Fig. 30, page 42 and Fig. 31, page 43). Fig. 26 shows the boiler efficiency subject to the average boiler water temperature.

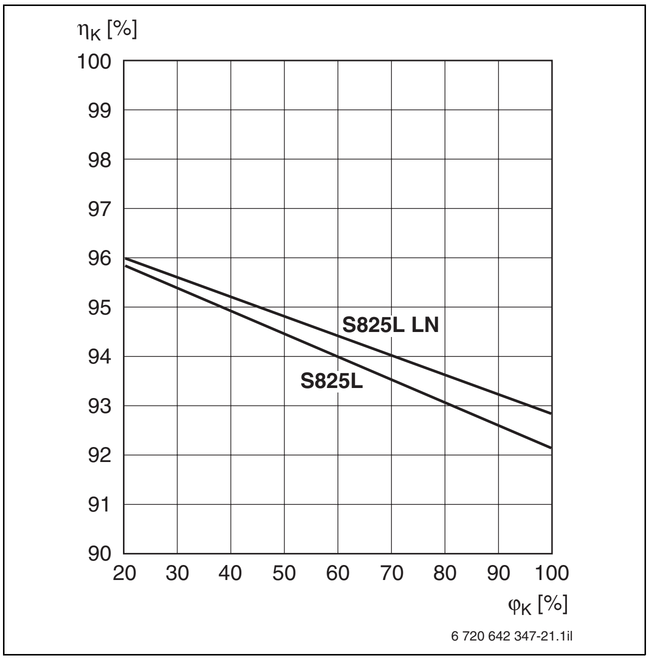

Fig. 25 Boiler efficiency Logano S825L/L LN subject to boiler load (averages for the series); system temperature 80/60 °C

η_K Boiler efficiency
φ_K Relative boiler load

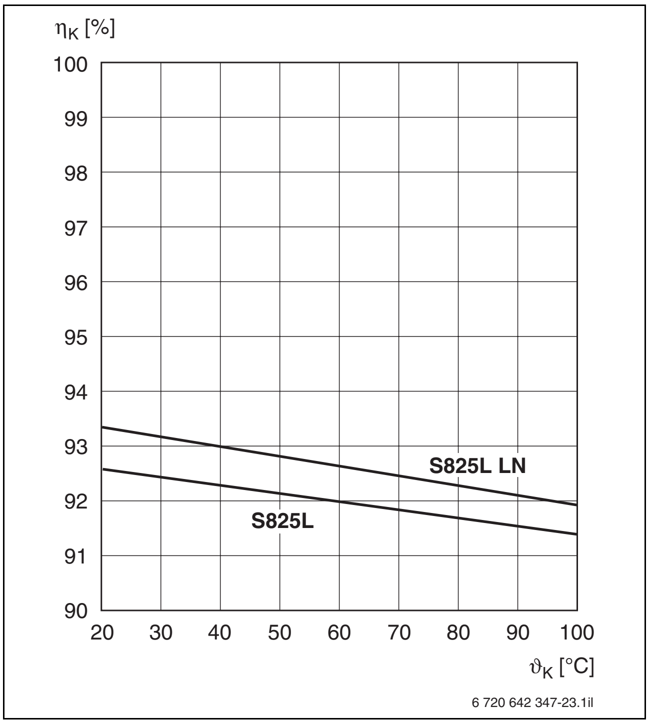

Fig. 26 Boiler efficiency Logano S825L/L LN subject to the average boiler water temperature (averages for the series)

η_K Boiler efficiency
ϑ_K Average boiler water temperature

The **standard seasonal efficiency** (to DIN 4702, part 8) is measured from the partial load efficiency levels at five fixed points in the relative boiler output ratings. The values measured for efficiency at partial load subject to the relative boiler output ratings should be entered accordingly. The standard seasonal efficiency [to DIN] for heating operation is calculated from the values derived in this way using the following equation:

$$\eta_N = \frac{5}{\sum_{i=1}^{5} \frac{1}{\eta_{\varphi i}}}$$

η_N Standard seasonal efficiency [to DIN]
φ_i Relative boiler output

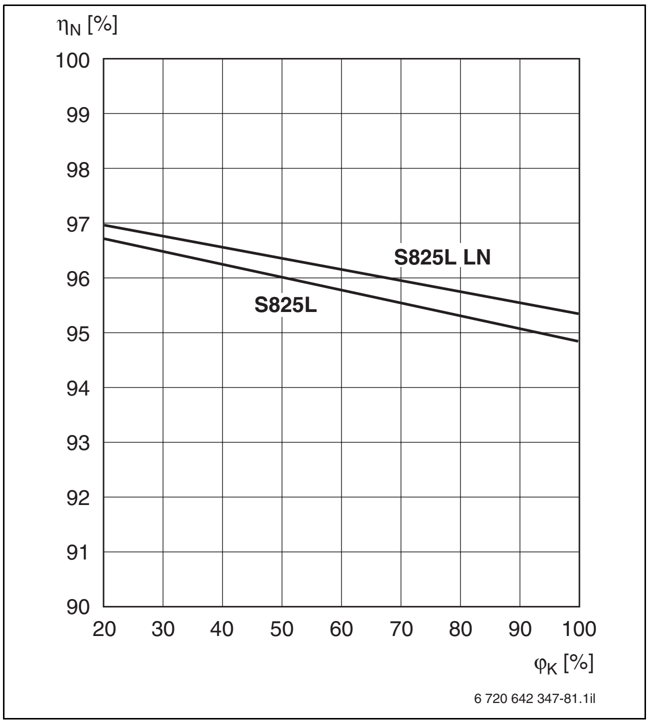

Fig. 27 Standard seasonal efficiency [to DIN] for Logano S825L/L LN, subject to the boiler load (averages for the series)

η_N Standard seasonal efficiency [to DIN]
φ_K Relative boiler load

For boiler efficiency and standard seasonal efficiency [to DIN] for the various sizes of Logano L825 L/L LN boiler, see also Tab. 30 on page 40.

Boiler type	Boiler size	Boiler efficiency η_K [1)2)]	Standard seasonal efficiency [to DIN] η_N [1)2)]
Logano S825L	650	92.2	94.9
	1000	91.8	94.9
	1350	92.9	95.6
	1900	91.4	94.8
	2500	91.7	95.0
	3050	91.3	94.8
	3700	92.3	95.4
	4200	92.0	95.2
	5200	91.9	95.2
	6500	91.3	94.9
	7700	92.0	95.2
	9300	92.2	95.4
	11200	92.2	95.4
	12600	92.7	95.6
	14700	92.2	95.4
	16400	93.4	96.0
	19200	92.8	95.7
Logano S825L LN	750	92.4	95.2
	1000	93.3	95.7
	1250	92.4	95.3
	1500	92.6	95.5
	2000	92.3	95.3
	2500	93.1	95.8
	3000	92.7	95.6
	3500	92.7	95.6
	4250	92.0	95.2
	5250	92.6	95.6
	6000	93.0	95.8
	8000	92.8	95.6
	10000	93.1	95.8
	12000	92.6	95.6
	14000	93.5	96.0
	17500	92.9	95.7

Tab. 30 Boiler efficiency and standard seasonal efficiency [to DIN] for Logano S825L/L LN

1) Relative to a system temperature of 80/60 °C. For other system temperatures, the boiler efficiency changes according to Fig. 26, page 39.

2) Relative to the maximum rated output; for reduced rated output levels, the boiler efficiency rises according to Fig. 25, page 39.

Standby loss

The **standby loss** is the proportion of combustion output required to maintain the specified boiler water temperature. The cause of this loss is the cooling down of the boiler through radiation and convection during the standby time (burner idle time).

Boiler type	Boiler size	Standby loss q_B [1)]	
		[kW]	% [2)]
Logano S825L / **Logano plus SB825L**	650	0.97	0.150
	1000	1.23	0.123
	1350	1.43	0.106
	1900	1.64	0.086
	2500	1.82	0.073
	3050	2.04	0.067
	3700	2.18	0.059
	4200	2.46	0.059
	5200	2.69	0.052
	6500	3.33	0.051
	7700	3.87	0.050
	9300	3.98	0.043
	11200	4.83	0.043
	12600	5.36	0.043
	14700	6.15	0.042
	16400	7.37	0.045
	19200	8.23	0.043
Logano S825L LN / **Logano plus SB825L LN**	750	1.04	0.139
	1000	1.14	0.114
	1250	1.24	0.099
	1500	1.36	0.091
	2000	1.56	0.078
	2500	1.68	0.067
	3000	1.88	0.063
	3500	2.10	0.060
	4250	2.40	0.056
	5250	2.82	0.054
	6000	3.04	0.051
	8000	3.86	0.048
	10000	4.60	0.046
	12000	5.42	0.045
	14000	7.20	0.051
	17500	7.52	0.043

Tab. 31 Standby loss Logano S825L/L LN and Logano plus SB825L/L LN

1) Relative to a system temperature of 80/60 °C

2) Relative to the maximum rated output

3.6.5 Rated output of the condensing heat exchanger

All details given below regarding the condensing heat exchanger (BWT) for the Logano plus SB825L and SB825L LN gas condensing boilers are based on a design with a pipe bundle element. The specification for a design with two pipe bundle elements can be obtained from your local Buderus sales office.

An approximate calculation of the rated output of the condensing heat exchanger can be made.

$$\dot{Q}_{BWT,\ real} \approx f_{\upsilon R} \times f_{\varphi K} \times \dot{Q}_{BWT,\ 30}$$

Form. 3 Calculation of the rated output of the condensing heat exchanger

$f_{\varphi K}$ Conversion factor → Fig. 28
$f_{\vartheta R}$ Conversion factor → Fig. 29
$\dot{Q}_{BWT,30}$ Rated output of the condensing heat exchanger (BWT) at a water inlet temperature of 30 °C (→ page 24 ff.)
$\dot{Q}_{BWT,real}$ Actual rated output BWT

Example

- Given
  - Logano plus SB825L-2500 gas condensing boiler
  - Rated output $\dot{Q}_K = 2300$ kW
  - Boiler load $\varphi_K = 2300$ kW/2500 kW = 92 %
  - Water inlet temperature into the BWT $\vartheta_{BWT} = 40$ °C
- Read off
  - Conversion factors $f_{\varphi K} = 0.9$ (→ Fig. 28) $f_{\vartheta R} = 0.825$ (→ Fig. 29)
  - Rated output of the BWT at 30 °C $\dot{Q}_{BWT,\ 30} = 212$ kW (→ Tab. 16, page 24)
- Result
  - Rated output of the BWT acc. to formula 3: $\dot{Q}_{BWT,\ real} \approx 0.9 \times 0.825 \times 212$ kW ≈ 157 kW
  - Total rated output $\dot{Q} \approx 2300$ kW + 157 kW ≈ 2457 kW

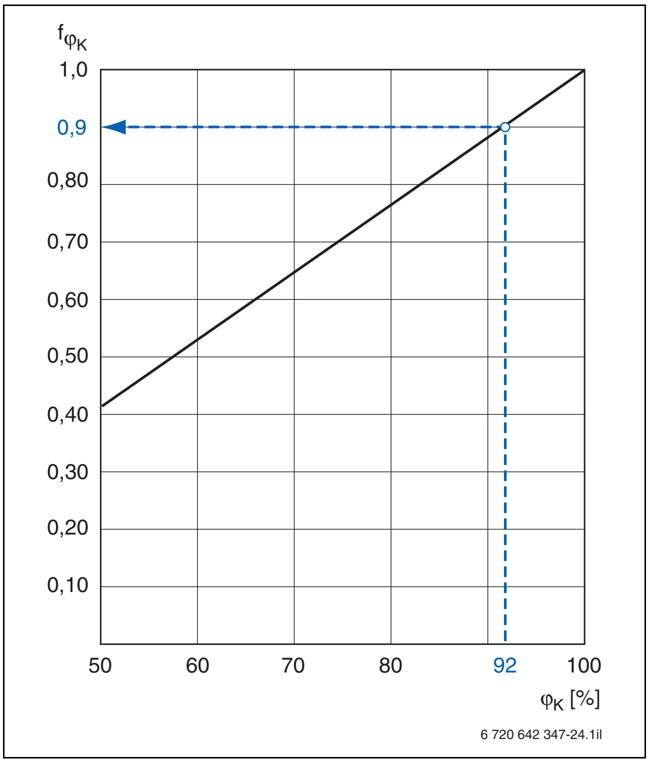

Fig. 28 Conversion factor for calculating the rated output of the condensing heat exchanger, relative to a 30 °C water inlet temperature

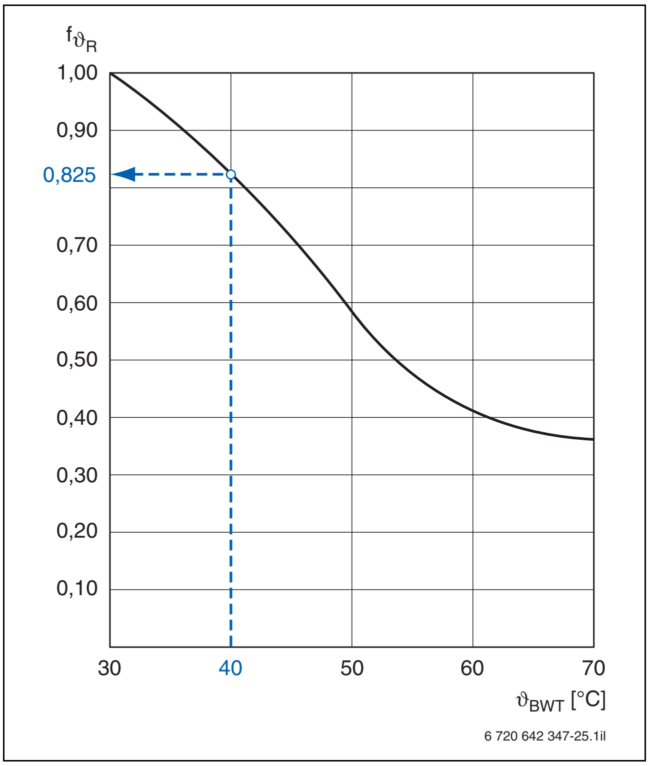

Fig. 29 Conversion factor for calculating the rated output at other inlet temperatures

3.6.6 Flue gas temperature

The flue gas temperature is the temperature measured inside the flue pipe, specifically at the boiler flue outlet. It depends on the boiler loads and the system temperature (→ Fig. 30 to Fig. 32). The minimum possible flue gas temperature should generally be used to calculate the chimney size. This will be approx. 7.5 K below the specified flue gas temperature, relative to an average boiler water temperature of 70 °C.

Change in the flue gas temperature

The flue gas temperature depends on the average boiler water temperature. The flue gas temperatures in the graphs in Fig. 30 to Fig. 32 are relative to a temperature pair of 80/60 °C in accordance with EN 303, i.e. the average boiler water temperature is 70 °C (for conversion to other temperature pairs → Tab. 32).

Average boiler water temperature [°C]	Change in the flue gas temperature [K]
60	–7.5
70	0
80	7.5
90	15
100	22.5

Tab. 32 Change in the flue gas temperature subject to the average boiler water temperature

Example

- Given
  - Logano S825L-6500 conventional boiler
  - Rated output $\dot{Q}_K = 6000$ kW
  - System temperatures 100/80 °C
- Read off
  - Change of 15 K in the flue gas temperature (→ Tab. 32)
  - Flue gas temperature read off $\vartheta_A = 198$ °C (→ Fig. 30)
- Result
  - Flue gas temperature at full boiler load = 198 °C + 15 K = 213 °C

Logano S825L

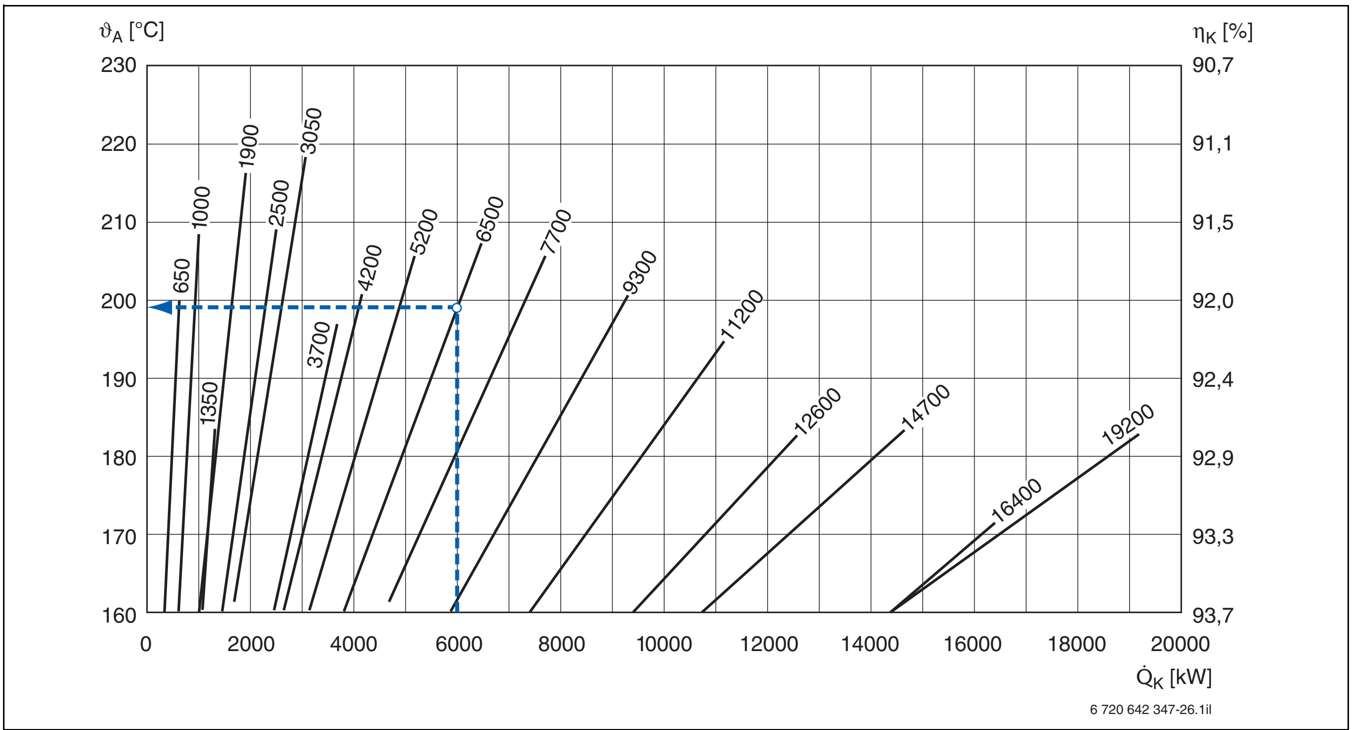

Fig. 30 Logano S825L flue gas temperatures subject to the boiler load

η_K Boiler efficiency
ϑ_A Flue gas temperature
φ_K Boiler load
$\dot{Q}_K$ Rated output

Logano S825L LN

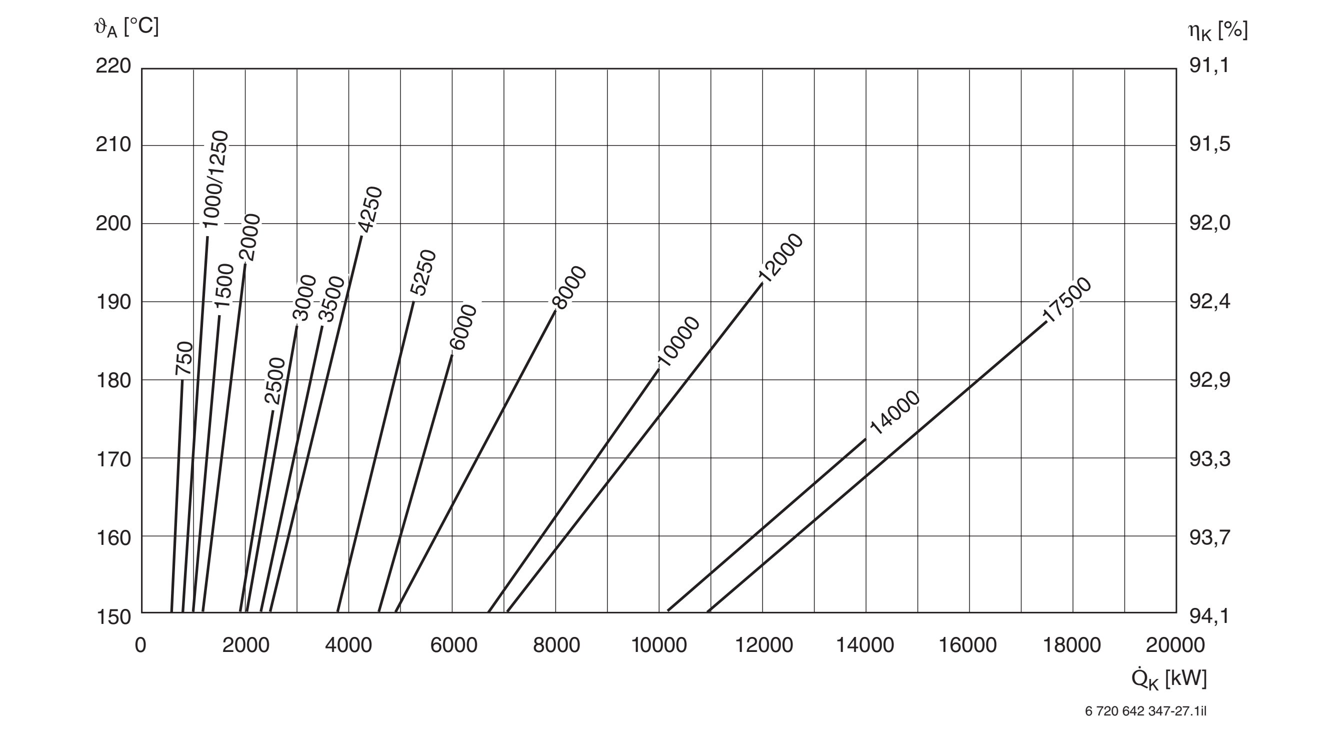

Fig. 31 Logano S825L LN flue gas temperatures subject to the boiler load

η_K Boiler efficiency
ϑ_A Flue gas temperature
$\dot{Q}_K$ Rated output

Logano plus SB825L and SB825L LN

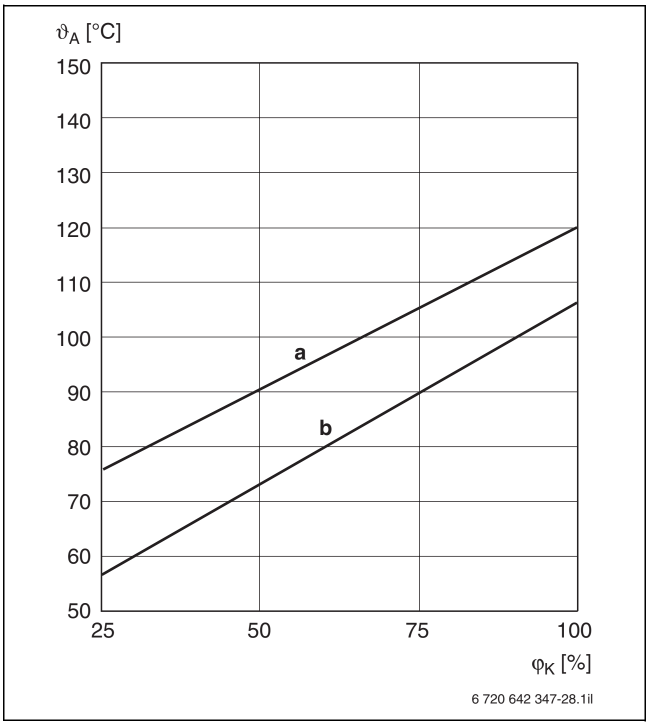

Fig. 32 Logano plus SB825L/L LN flue gas temperatures subject to the boiler load and the water inlet temperature into the condensing heat exchanger (averages for the series)

a Water inlet temperature into the condensing heat exchanger of 60 °C
b Water inlet temperature into the condensing heat exchanger of 30 °C
ϑ_A Flue gas temperature
φ_K Boiler load

4 Burners

4.1 General requirements

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, can be operated with any tested pressure-jet oil or gas burner. The pressure-jet oil burners must be type-tested in accordance with the requirements of DIN-EN 267; the pressure-jet gas burners in accordance with DIN-EN 676. Observe the requirements for oil and gas combustion equipment, as well as the applicable guidelines and regulations.

When combining a boiler with a burner, check whether the burner manufacturer's requirements with regard to the combustion chamber geometry are fulfilled for the selected boiler.

4.2 Information on burner selection

The burner must reliably overcome the pressure drop on the hot gas side of the boiler (→ page 35 f.). With gas combustion, ensure that the local gas network can provide the required supply pressure for the burner.

If ordering a Logano S825L, S825L LN or S825L LN (standardised) conventional boiler, or a Logano plus SB825L or SB825L LN gas condensing boiler, please specify the required burner type.

The burner fixing equipment and door lining are prepared for the relevant burner at the factory.

With boiler version S825L “standardised”, the door lining is designed for any type of burner. A range of adaptor plates are available for fixing the required burner (→ latest Buderus catalogue).

Fill the gap between the door lining and blast tube with fireproof, flexible material.

The burner door must be able to be opened and pivoted out unimpeded. In the case of oil combustion, size the oil hoses and cables accordingly.

In the case of gas combustion, provide a gas line compensator in the longitudinal direction of the boiler. With this, the gas train can be separated at this point when the door is opened, and the door can be pivoted out together with the burner.

The burner head is equipped subject to the burner manufacturer's stipulations. The blast tube should protrude into the combustion chamber. Observe the burner manufacturer's installation instructions.

i To select the optimum boiler/burner combination, please contact your local Buderus sales office.

4.3 Matched pressure-jet burners

Optimum combustion requires the boiler and burner to be individually matched. Together with suitable burners, the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are suitable for systems where lower emissions are required.

i To select the optimum burner, please contact your local Buderus sales office. Guaranteed emissions levels can be obtained from the burner supplier or sales offices of Buderus-Heiztechnik GmbH.

4.4 Combustion details for the Logano S825L and S825L LN conventional boilers

4.4.1 Combustion details for the Logano S825L, boiler sizes 650 to 5200

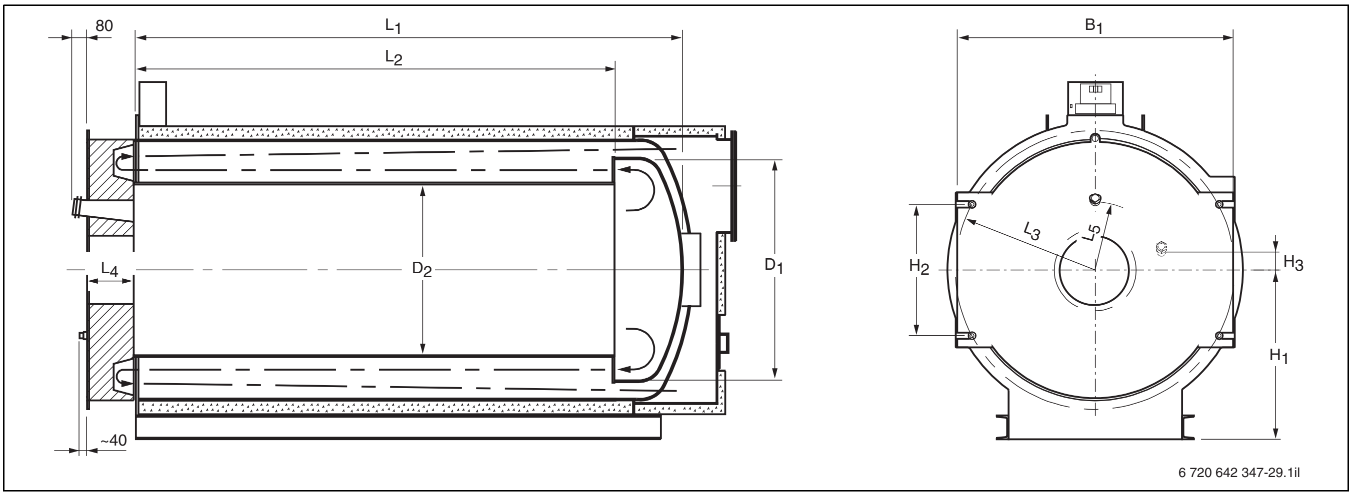

Fig. 33 Combustion chamber dimensions Logano S825L, boiler sizes 650 to 5200 (dim. in mm)

Boiler size1)			Unit	650	1000	1350	1900	2500	3050	3700	4200	5200
Hot gas volume2)												
Combustion chamber			m^3	0.45	0.68	0.89	1.21	1.58	1.90	2.37	2.86	3.46
Boiler			m^3	0.71	1.09	1.40	1.98	2.58	3.05	3.67	4.61	5.44
Combustion chamber		D_1	mm	788	888	988	1086	1136	1236	1284	1384	1482
	6 bar	D_2	mm	534	604	664	734	780	850	905	936	1016
	6 bar	L_1	mm	1821	2201	2470	2668	3148	3195	3552	3986	4105
	6 bar	L_2	mm	1570	1930	2180	2378	2850	2878	3235	3650	3750
	10 bar	D_2	mm	–	604	660	730	780	846	901	932	1012
	10 bar	L_1	mm	–	2201	2465	2668	3144	3189	3547	3983	4105
	10 bar	L_2	mm	–	1930	2180	2378	2850	2878	3235	3650	3750
Front hot gas reversing chamber		L_3	mm	535	625	685	745	775	835	860	900	960
		L_4	mm	190	190	190	190	190	190	190	257	257
		L_5	mm	225	260	290	325	350	385	412	430	470
		H_1	mm	725	800	850	900	925	975	1000	1050	1100
		H_2	mm	460	560	620	685	720	785	815	795	855
		$H_3$3)	mm	–	–	–	–	–	–	–	111	122
		B_1	mm	1050	1200	1300	1400	1450	1550	1600	1700	1800
Maximum door load from the burner			kNm	4	5	5	5	5	5	5	6	6

Tab. 33 Combustion details for the Logano S825L, boiler sizes 650 to 5200

1) Boilers with an output between 650 kW and 1900 kW are also available as unit versions (boiler + burner) or as standardised versions with fixed internal connection diameters (equipment overview → page 11). The permissible operating pressure is 6 bar.

2) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

3) From boiler size 4200, the flame inspection port is located on the side.

4.4.2 Combustion details Logano S825L, boiler sizes 6500 to 19200

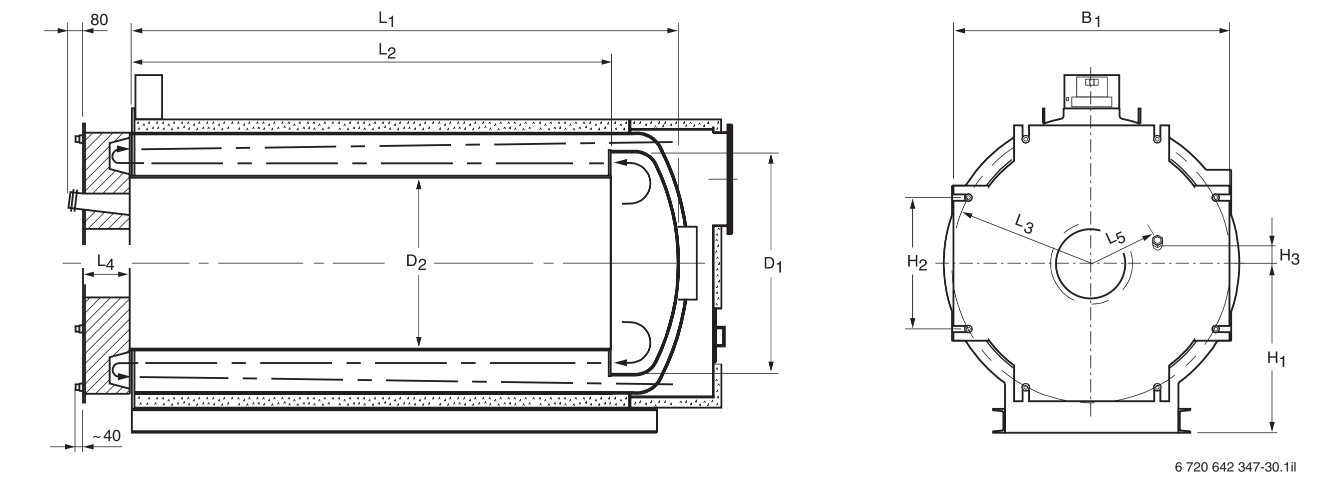

Fig. 34 Combustion chamber dimensions Logano S825L, boiler sizes 6500 to 19200 (dim. in mm)

Boiler size			Unit	6500	7700	9300	11200	12600	14700	16400	19200
Hot gas volume[1]											
Combustion chamber			m^3	4.42	5.50	6.48	7.92	9.73	12.32	14.52	17.50
Boiler			m^3	7.13	8.91	10.55	13.04	15.62	20.41	25.27	31.76
Combustion chamber		D_1	mm	1632	1780	1880	1978	2128	2326	2474	2672
	6 bar	D_2	mm	1096	1182	1272	1347	1457	1534	1614	1710
	6 bar	L_1	mm	4483	4712	4911	5359	5658	6399	6829	7263
	6 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
	10 bar	D_2	mm	1087	1177	1267	1344	1450	1530	1606	1704
	10 bar	L_1	mm	4481	4710	4910	5356	5653	6397	6824	7259
	10 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
Front hot gas reversing chamber		L_3	mm	1075	1165	1250	1340	1425	1540	1715	1830
		L_4	mm	257	257	257	259	259	259	294	294
		L_5	mm	510	560	600	640	695	735	775	825
		H_1	mm	1200	1275	1350	1425	1500	1600	1750	1850
		H_2	mm	975	1065	1150	1250	1330	1450	1630	1745
		H_3	mm	132	145	155	166	180	190	201	214
		B_1	mm	2000	2150	2300	2450	2600	2800	3100	3300
Maximum door load from the burner			kNm	6	6	6	6	5	4	3	3

Tab. 34 Combustion details Logano S825L, boiler sizes 6500 to 19200

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

4.4.3 Combustion details for the Logano S825L LN, boiler sizes 750 to 3500

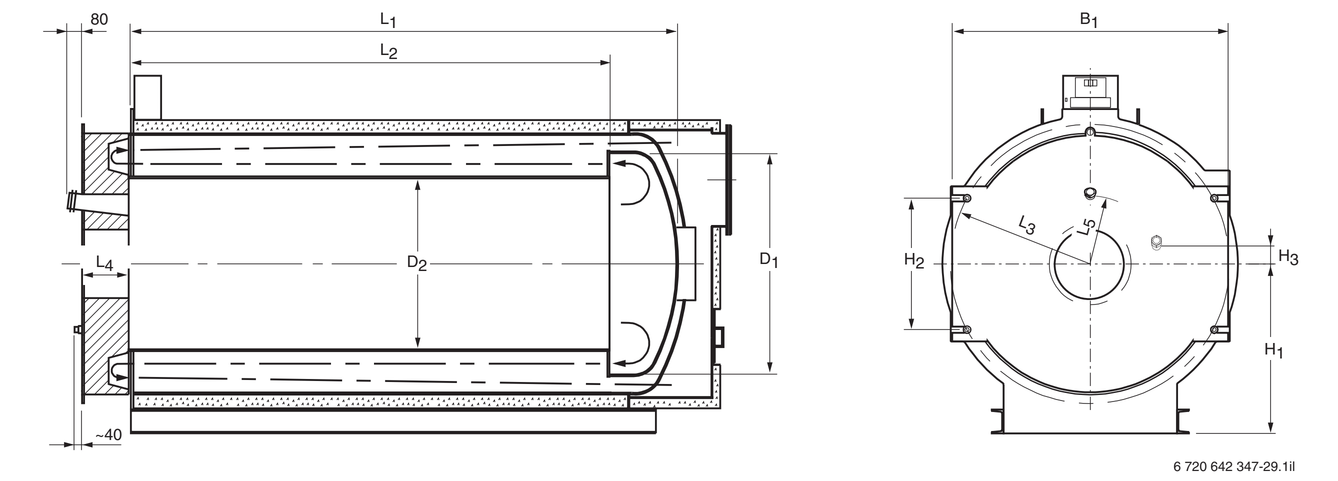

Fig. 35 Combustion chamber dimensions Logano S825L LN, boiler sizes 750 to 3500 (dim. in mm)

Boiler size[1]			Unit	750	1000	1250	1500	2000	2500	3000	3500
Hot gas volume[2]											
Combustion chamber			m^3	0.68	0.89	1.21	1.58	1.90	2.37	2.86	3.46
Boiler			m^3	1.09	1.40	1.98	2.58	3.05	3.67	4.61	5.44
		D_1	mm	888	988	1086	1136	1236	1284	1384	1482
	6 bar	D_2	mm	604	664	734	780	850	905	936	1016
	6 bar	L_1	mm	2201	2470	2668	3148	3195	3552	3986	4105
Combustion chamber	6 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
	10 bar	D_2	mm	604	660	730	780	846	901	932	1012
	10 bar	L_1	mm	2201	2465	2668	3144	3189	3547	3983	4105
	10 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
		L_3	mm	625	685	745	775	835	860	900	960
		L_4	mm	190	190	190	190	190	190	257	257
		L_5	mm	260	290	325	350	385	412	430	470
Front hot gas reversing chamber		H_1	mm	800	850	900	925	975	1000	1050	1100
		H_2	mm	560	620	685	720	785	815	795	855
		H_3[3]	mm	–	–	–	–	–	–	111	122
		B_1	mm	1200	1300	1400	1450	1550	1600	1700	1800
Maximum door load from the burner			kNm	5	5	5	5	5	5	6	6

Tab. 35 Combustion details for the Logano S825L LN, boiler sizes 750 to 3500

1) Boilers with an output between 750 kW and 1500 kW are also available as standardised versions (equipment overview → page 11). The permissible operating pressure is 6 bar.

2) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

3) From boiler size 3000, the flame inspection port is located on the side.

4.4.4 Combustion details for the Logano S825L LN, boiler sizes 4250 to 17500

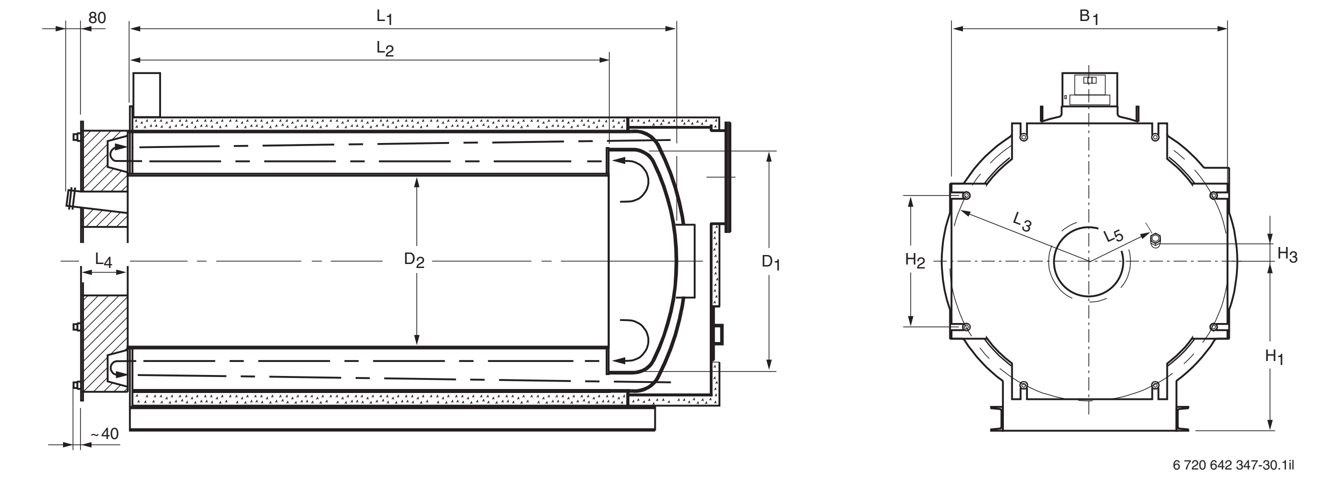

Fig. 36 Combustion chamber dimensions Logano S825L LN, boiler sizes 4250 to 17500 (dim. in mm)

Boiler size			Unit	4250	5250	6000	8000	10000	12000	14000	17500
Hot gas volume[1]											
Combustion chamber			m^3	4.42	5.50	6.48	7.92	9.73	12.32	14.52	17.50
Boiler			m^3	7.13	8.91	10.55	13.04	15.62	20.41	25.27	31.76
Combustion chamber		D_1	mm	1632	1780	1880	1978	2128	2326	2474	2672
	6 bar	D_2	mm	1096	1182	1272	1347	1457	1534	1614	1710
	6 bar	L_1	mm	4483	4712	4911	5359	5658	6399	6829	7263
	6 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
	10 bar	D_2	mm	1087	1177	1267	1344	1450	1530	1606	1704
	10 bar	L_1	mm	4481	4710	4910	5356	5653	6397	6824	7259
	10 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
Front hot gas reversing chamber		L_3	mm	1075	1165	1250	1340	1425	1540	1715	1830
		L_4	mm	257	257	257	259	259	259	294	294
		L_5	mm	510	560	600	640	695	735	775	825
		H_1	mm	1200	1275	1350	1425	1500	1600	1750	1850
		H_2	mm	975	1065	1150	1250	1330	1450	1630	1745
		H_3	mm	132	145	155	166	180	190	201	214
		B_1	mm	2000	2150	2300	2450	2600	2800	3100	3300
Maximum door load from the burner			kNm	6	6	6	6	5	4	3	3

Tab. 36 Combustion details for the Logano S825L LN, boiler sizes 4250 to 17500

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

4.5 Combustion details for the Logano plus SB825L and SB825L LN gas condensing boilers

4.5.1 Combustion details for the Logano plus SB825L, boiler sizes 1000 to 5200

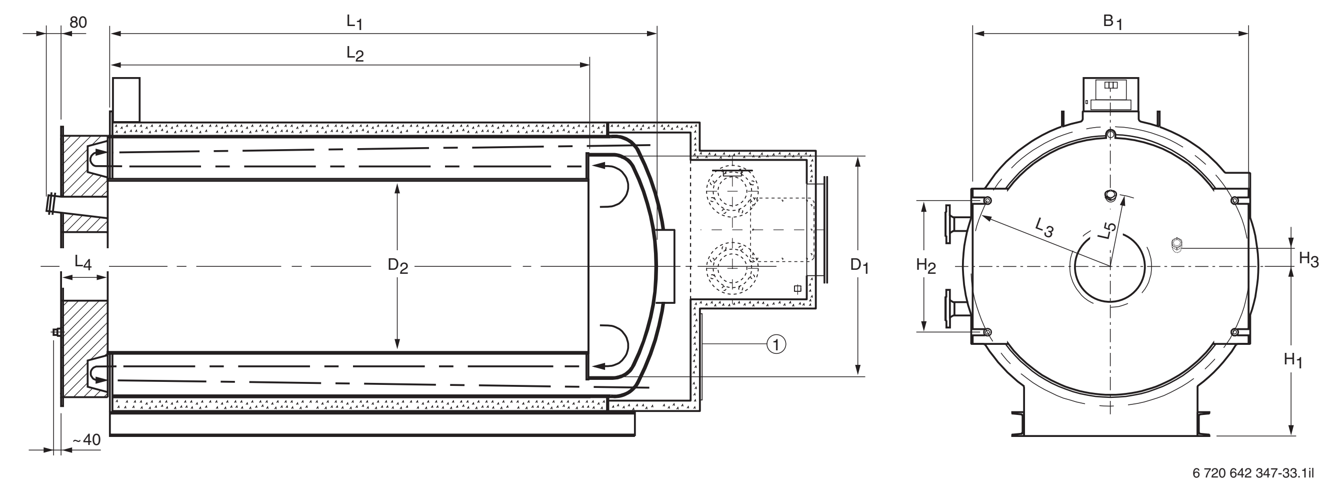

Fig. 37 Combustion chamber dimensions Logano plus SB825L, boiler sizes 1000 to 5200 (dim. in mm)

1 Inspection aperture on the hot gas side

Boiler size			Unit	1000	1350	1900	2500	3050	3700	4200	5200
Hot gas volume[1)]											
Combustion chamber			m^3	0.68	0.89	1.21	1.58	1.90	2.37	2.86	3.46
Boiler			m^3	1.24	1.61	2.21	2.93	3.36	4.08	5.01	5.94
Combustion chamber		D_1	mm	888	988	1086	1136	1236	1284	1384	1482
	6 bar	D_2	mm	604	664	734	780	850	905	936	1016
	6 bar	L_1	mm	2201	2470	2668	3148	3195	3552	3986	4105
	6 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
	10 bar	D_2	mm	604	660	730	780	846	901	932	1012
	10 bar	L_1	mm	2201	2465	2668	3144	3189	3547	3983	4105
	10 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
Front hot gas reversing chamber		L_3	mm	625	685	745	775	835	860	900	960
		L_4	mm	190	190	190	190	190	190	257	257
		L_5	mm	260	290	325	350	385	412	430	470
		H_1	mm	800	850	900	925	975	1000	1050	1100
		H_2	mm	560	620	685	720	785	815	795	855
		H_3[2)]	mm	–	–	–	–	–	–	111	122
		B_1	mm	1200	1300	1400	1450	1550	1600	1700	1800
Maximum door load from the burner			kNm	5	5	5	5	5	5	6	6

Tab. 37 Combustion details for the Logano plus SB825L, boiler sizes 1000 to 5200

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

2) From boiler size 4200, the flame inspection port is located on the side.

4.5.2 Combustion details for the Logano plus SB825L, boiler sizes 6500 to 19200

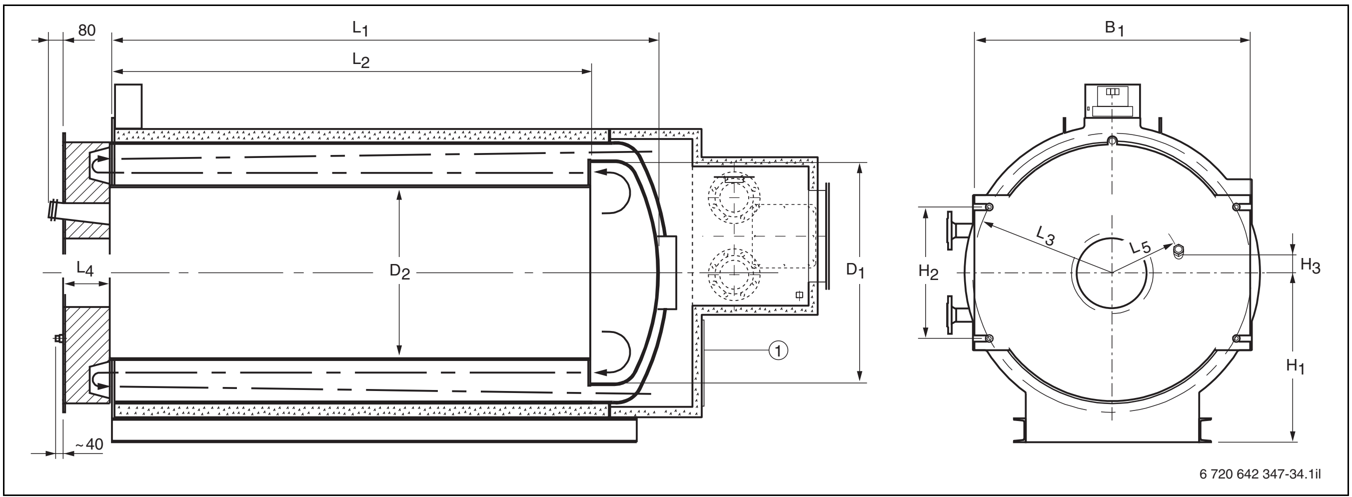

Fig. 38 Combustion chamber dimensions Logano plus SB825L, boiler sizes 6500 to 19200 (dim. in mm)

1 Inspection aperture on the hot gas side

Boiler size			Unit	6500	7700	9300	11200	12600	14700	16400	19200
Hot gas volume[1)]											
Combustion chamber			m^3	4.42	5.50	6.48	7.92	9.73	12.32	14.52	17.50
Boiler			m^3	7.77	9.60	11.48	14.10	17.18	22.23	27.64	34.46
Combustion chamber		D_1	mm	1632	1780	1880	1978	2128	2326	2474	2672
	6 bar	D_2	mm	1096	1182	1272	1347	1457	1534	1614	1710
	6 bar	L_1	mm	4483	4712	4911	5359	5658	6399	6829	7263
	6 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
	10 bar	D_2	mm	1087	1177	1267	1344	1450	1530	1606	1704
	10 bar	L_1	mm	4481	4710	4910	5356	5653	6397	6824	7259
	10 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
Front hot gas reversing chamber		L_3	mm	1075	1165	1250	1340	1425	1540	1715	1830
		L_4	mm	257	257	257	259	259	259	294	294
		L_5	mm	510	560	600	640	695	735	775	825
		H_1	mm	1200	1275	1350	1425	1500	1600	1750	1850
		H_2	mm	975	1065	1150	1250	1330	1450	1630	1745
		H_3	mm	132	145	155	166	180	190	201	214
		B_1	mm	2000	2150	2300	2450	2600	2800	3100	3300
Maximum door load from the burner			kNm	6	6	6	6	5	4	3	3

Tab. 38 Combustion details for the Logano plus SB825L, boiler sizes 6500 to 19200

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

4.5.3 Combustion details for the Logano plus SB825L LN, boiler sizes 750 to 3500

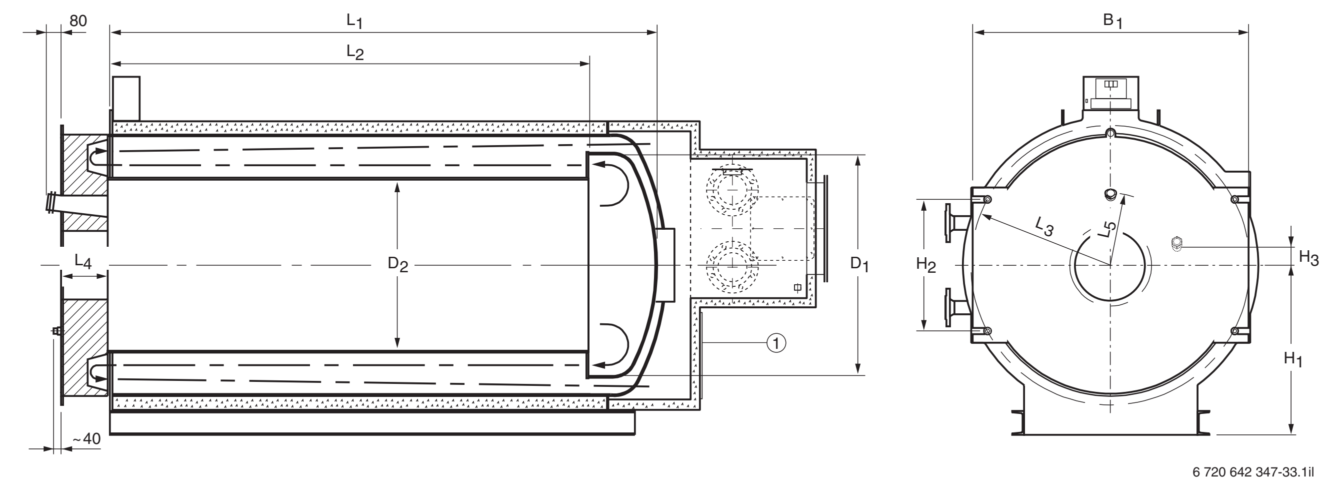

Fig. 39 Combustion chamber dimensions Logano plus SB825L LN, boiler sizes 750 to 3500 (dim. in mm)

1 Inspection aperture on the hot gas side

Boiler size			Unit	750	1000	1250	1500	2000	2500	3000	3500
Hot gas volume[1]											
Combustion chamber			m³	0.68	0.89	1.21	1.58	1.90	2.37	2.86	3.46
Boiler			m³	1.24	1.61	2.21	2.93	3.36	4.08	5.01	5.94
Combustion chamber		D_1	mm	888	988	1086	1136	1236	1284	1384	1482
	6 bar	D_2	mm	604	664	734	780	850	905	936	1016
	6 bar	L_1	mm	2201	2470	2668	3148	3195	3552	3986	4105
	6 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
	10 bar	D_2	mm	604	660	730	780	846	901	932	1012
	10 bar	L_1	mm	2201	2465	2668	3144	3189	3547	3983	4105
	10 bar	L_2	mm	1930	2180	2378	2850	2878	3235	3650	3750
Front hot gas reversing chamber		L_3	mm	625	685	745	775	835	860	900	960
		L_4	mm	190	190	190	190	190	190	257	257
		L_5	mm	260	290	325	350	385	412	430	470
		H_1	mm	800	850	900	925	975	1000	1050	1100
		H_2	mm	560	620	685	720	785	815	795	855
		H_3[2]	mm	–	–	–	–	–	–	111	122
		B_1	mm	1200	1300	1400	1450	1550	1600	1700	1800
Maximum door load from the burner			kNm	5	5	5	5	5	5	6	6

Tab. 39 Combustion details for the Logano plus SB825L LN, boiler sizes 750 to 3500

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

2) From boiler size 3000, the flame inspection port is located on the side.

4.5.4 Combustion details for the Logano plus SB825L LN, boiler sizes 4250 to 17500

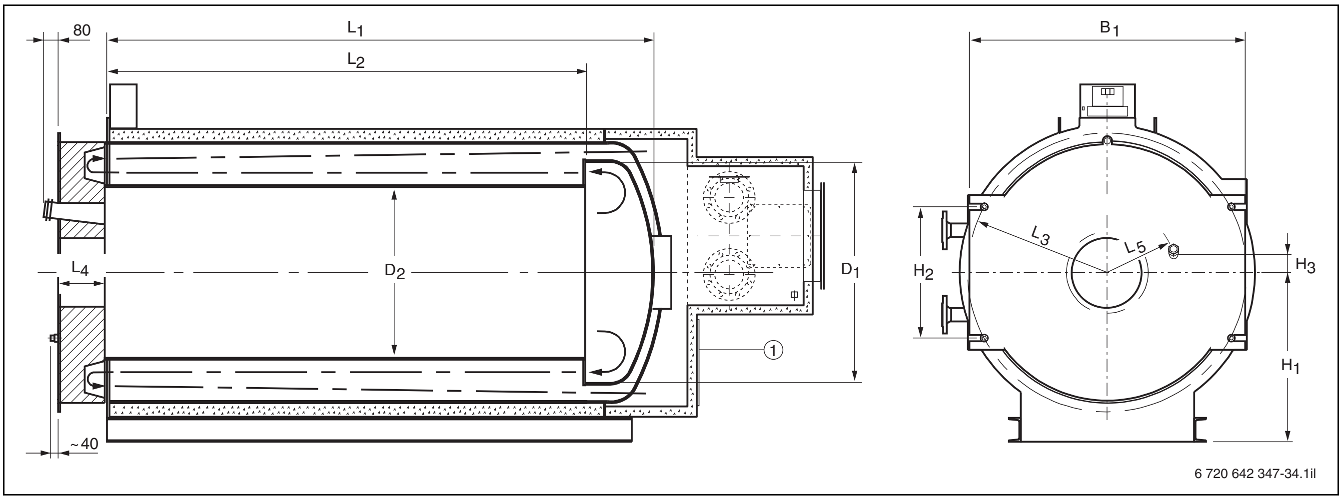

Fig. 40 Combustion chamber dimensions Logano plus SB825L LN, boiler sizes 4250 to 17500 (dim. in mm)

1 Inspection aperture on the hot gas side

Boiler size			Unit	4250	5250	6000	8000	10000	12000	14000	17500
Hot gas volume[1)]											
Combustion chamber			m^3	4.42	5.50	6.48	7.92	9.73	12.32	14.52	17.50
Boiler			m^3	7.77	9.60	11.48	14.10	17.18	22.23	27.64	34.46
Combustion chamber		D_1	mm	1632	1780	1880	1978	2128	2326	2474	2672
	6 bar	D_2	mm	1096	1182	1272	1347	1457	1534	1614	1710
	6 bar	L_1	mm	4483	4712	4911	5359	5658	6399	6829	7263
	6 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
	10 bar	D_2	mm	1087	1177	1267	1344	1450	1530	1606	1704
	10 bar	L_1	mm	4481	4710	4910	5356	5653	6397	6824	7259
	10 bar	L_2	mm	4100	4300	4500	4930	5200	5900	6300	6700
Front hot gas reversing chamber		L_3	mm	1075	1165	1250	1340	1425	1540	1715	1830
		L_4	mm	257	257	257	259	259	259	294	294
		L_5	mm	510	560	600	640	695	735	775	825
		H_1	mm	1200	1275	1350	1425	1500	1600	1750	1850
		H_2	mm	975	1065	1150	1250	1330	1450	1630	1745
		H_3	mm	132	145	155	166	180	190	201	214
		B_1	mm	2000	2150	2300	2450	2600	2800	3100	3300
Maximum door load from the burner			kNm	6	6	6	6	5	4	3	3

Tab. 40 Combustion details for the Logano plus SB825L LN, boiler sizes 4250 to 17500

1) To determine the pre-purge time: The hot gas volume is the sum of the flame tube volume (first pass) and the inner hot gas reversing chamber volume. The hot gas volume of the boiler is the sum of the hot gas volume of the combustion chamber, the volume of the secondary heating surface and the volume of the flue gas collector.

5 Regulations and operating conditions

5.1 Extracts from the regulations

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are built in accordance with EN 303 and with reference to the relevant TRD 300. They are approved for an operating pressure of 6 bar or 10 bar and for heating systems compliant with the requirements of DIN-EN 12828.

Observe the following regarding creation and operation of the system:

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

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

Notification and permit obligations

Subject to the Building Regulations of each country, boiler systems may require notification to or approval from appropriate authorities. Observe country-specific requirements.

Maintenance

We recommend having the system serviced regularly, inspected at least every six months and cleaned as required. As part of this, it should be checked that the entire system is working properly.

We recommend system operators take out a maintenance and inspection contract with the heating contractor or burner manufacturer. Regular maintenance is a prerequisite for reliable and economical operation. In general, burner manufacturers only furnish the warranty if a maintenance and inspection contract has been concluded.

Emissions regulations

Observe country-specific emissions regulations.

5.2 German Immissions Act (BImSchG)

5.2.1 Table extracted from the 1st BImSchV "Smal and medium-sized combustion systems"

Combustion equipment is to be operated in such a way that the limits specified in the 1st BImSchV and the TA Luft are not exceeded.

Fuels	Natural gas, LPG, hydrogen gas, gases from the public mains supply	Sewer gas, biogas, coke oven gas, marsh gas, furnace gas, refinery gas, synthetic gas	Fuel oil EL, vegetable oil, vegetable methyl ester, methanol, ethanol	Heavy oil
Combustion output of the $Q_{FA\ system}$	< 20 MW	< 10 MW	< 20 MW	
Flue via chimney	Derived conditions acc. to 1st BImSchV para. 18 for $Q_{FA} \geq 1$ MW			
Soot indicator	–	–	RZ ≤ 1	
Nitrogen oxides NO_X at rated boiler output[1)2)] $Q_K < 120$ kW $120\ kW \leq Q_K < 400$ kW $400\ kW \leq Q_K < 10000$ kW	 60 mg/m^3_n 80 mg/m^3_n 120 mg/m^3_n	 60 mg/m^3_n 80 mg/m^3_n 120 mg/m^3_n	 110 mg/m^3_n 120 mg/m^3_n 185 mg/m^3_n	
With dual combustion, if oil operation is ≤ 300 h/a, the following NO_X limit applies	–	–	250 mg/m^3_n	Not permissible
Nitrogen oxides NO_X in steam boilers	Keep to a minimum, no fixed stipulations, "latest available technology"			
Efficiency at rated boiler output[2)] $Q_K > 400$ kW	≥ 94 %			
Flue gas losses $4\ kW \leq Q_{FA} \leq 25$ kW $25\ kW < Q_{FA}\ \ 50$ kW $Q_{FA} > 50$ kW	 11 % 10 % 9 %			
Repeat tests as per para. 15	Newer systems[3)]: every 3 years; older systems[4)]: every 2 years			
Emissions monitored by	Flue gas inspector			

Emissions specifications for individual combustion output ≥ 10 MW < 20 MW

Fuels	Natural gas, LPG, gases from the public mains supply	Hydrogen gas	Fuel oil EL, vegetable oil, vegetable methyl ester, methanol, ethanol
Combustion output from individual combustion Q_{FE}	≥ 10 < 20 MW		
Flue via chimney	Derived conditions acc. to TA Luft		
Carbon monoxide CO[5)]	80 mg/m^3_n		
Nitrogen oxide NO_X at boiler operating temperature[4)6)] < 110 °C (< 0.5 bar) ≥ 110 °C ≤ 210 °C (≥ 0.5 bar ≤ 18 bar) > 210 °C (> 18 bar)	 100 mg/m^3_n 110 mg/m^3_n 150 mg/m^3_n	 200 mg/m^3_n 200 mg/m^3_n 200 mg/m^3_n	 180 mg/m^3_n 200 mg/m^3_n 250 mg/m^3_n
With dual combustion, if oil operation is ≤ 300 h/a, the following NO_X limit applies for all boiler temperatures	–	–	250 mg/m^3_n
Repeat test acc. to para. 18(1)–(3)	–	–	Flue gas opacity
First test acc. to para. 18(4)[7)]	No sooner than 3 months and no later than 6 months after commissioning		

1) Emissions calculation to EN 267

2) Boiler definition: heat carrier water; used for heating buildings and rooms

3) Systems that were commissioned or that underwent major modifications (boiler replacement or fuel conversion) 12 years ago or less

4) Systems that were commissioned or that underwent major modifications (boiler replacement or fuel conversion) more than 12 years ago

5) CO and NO_X levels relative to 3 % O_2 content. Half hour average acc. to para. 11(1). Three individual tests (low/medium and full) are to be carried out in acc. with para. 18(4). With fuel oil EL, the NO_X levels are relative to a nitrogen content of 140 mg/kg in acc. with para.11(1).

6) The relevant saturated steam operating pressure levels are given in brackets

7) The tests must be carried out by a test body recognised by para. 26 of the BImSchG.

5.2.2 Information on flue gas tests pursuant to BImSchV/TA Luft

First tests or system tests following major modifications

In the case of systems that have not yet been tested, have not been tested successfully or have been modified since testing, we recommend conducting sample tests at least two months before the planned inspection date.

This procedure should enable any necessary action to be taken with regard to the combustion equipment in order to adhere to the specified emissions levels. A Buderus customer service engineer can be requested to perform these advance tests; based on the test results, this engineer will also be able to make suggestions on how to adhere to the legal levels.

Repeat tests on systems

In the case of systems on which a test has already been carried out in accordance with BImSchV/TA Luft, depending on the size and controllability of the combustion system, it is generally sufficient to make adjustments either on the day of the official test in the presence of the testing engineer, or for larger and more complex systems with several fuel types, one or two days before this test.

Preparing the system

For the tests to be conducted successfully, it is necessary to ensure sufficient load reduction, so that constant operation under steady conditions is possible. If this cannot be guaranteed, for example due to the weather in the case of heating systems, we recommend postponing the test until it can be carried out without interruption.

Fuels

The fuels to be burned must comply with the notice of approval and be available in the quality determined for the system. Since the level of nitrogen in light fuel oil has a significant effect on the formation of NO_x, the nitrogen content of light fuel oil must be known in order to assess the NO_x test levels. The fuel oil supplier may be able to provide this information for the relevant deliveries. To calculate this value precisely, take an oil sample (1 litre) from the tank in question at the time of the emissions test. A test lab can determine the nitrogen content of the fuel.

Cleaning the boiler

We recommend cleaning the boiler combustion chamber thoroughly at least one or two days before the test.

Conducting the test

A Buderus customer service engineer should be requested to conduct the test. If levels exceeding the limits are registered during the test, it may be possible to modify the combustion settings so that the test can be conducted again with success.

Support personnel should be available to assist.

A table and chair should be prepared in the boiler room for the testing engineer to complete the test reports.

5.3 Operating requirements

The operating conditions given in Tab. 41 are part of the **warranty conditions** for the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers.

These operating conditions are ensured through an appropriate hydraulic circuit and boiler circuit control (hydraulic connection → page 74).

Operating conditions for special applications are available on request.

The requirements of boiler water quality are also part of the warranty conditions (→ page 58).

5.3.1 Operating conditions

Boiler type		Operating conditions (warranty conditions)					
		Minimum flow rate [m³/h]	Minimum return temperature [°C]	Minimum boiler output [%]	Minimum boiler water temperature [°C]	Boiler water temperature if operation is interrupted[1] [°C]	Maximum design temperature spread [K]
Logano S825L S825L LN		–[2)3)]	50	10	70	70	15–50
Logano plus SB825L SB825L LN	Boiler	–[2)3)]	50	10	70	70	15–50
	Condensing heat exchanger[4]	–[5]	–[4]	–	–	–	–

Tab. 41 Operating conditions for the Logano S825L/L LN and Logano plus SB825L/L LN

1) The lag boiler in a multi boiler system can be shut down completely

2) Sizing the boiler circuit pump → page 79; minimum flow rate with burner in ON mode (→ Tab. 42 and Tab. 43)

3) With the burner in ON mode, the heat exchanger pump must also start

4) The condensing effect can only be utilised with gas combustion. With oil combustion (e.g. with a combi burner), maintain a return temperature of 60 °C

5) The maximum flow rate is limited. If the nominal flow rate of the system is higher, only a partial flow can be routed via the condensing heat exchanger. To make optimum use of the condensing effect, the partial flow rate must be at least 20 % of the nominal flow rate.

Logano S825L minimum flow rate

Boiler type	Boiler size	Minimum water flow rate[1] [m³/h]
Logano S825L	650	4.30
	1000	6.50
	1350	8.77
	1900	12.35
	2500	16.25
	3050	19.82
	3700	24.05
	4200	26.97
	5200	33.80
	6500	42.25
	7700	50.05
	9300	60.45
	11200	72.80
	12600	81.90
	14700	95.55
	16400	106.60
	19200	124.80

Tab. 42 Logano S825L minimum flow rate with the burner in ON mode

1) Pumps with a fault message output or flow limiters can be used for monitoring.

Logano S825L LN minimum flow rate

Boiler type	Boiler size	Minimum water flow rate[1] [m³/h]
Logano S825L LN	750	4.87
	1000	6.50
	1250	8.12
	1500	9.75
	2000	13.00
	2500	16.25
	3000	19.50
	3500	22.75
	4250	27.62
	5250	34.12
	6000	39.00
	8000	52.00
	10000	65.00
	12000	78.00
	14000	91.00
	17500	113.75

Tab. 43 Logano S825L LN minimum flow rate with the burner in ON mode

1) Pumps with a fault message output or flow limiters can be used for monitoring.

5.3.2 Fuel

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, can be operated with natural gas E, EL and LPG. The gas quality must comply with the requirements of the DVGW Code of Practice G 260. To be able to adjust the gas throughput install a gas meter that can be checked even in the lower load range of the burner.

Combustion with fuel oil EL to DIN 51603 is also possible. However, the Logano plus SB825L and SB825L LN gas condensing boilers must only be operated briefly with fuel oil and the conditions outlined below must be maintained.

Operating the Logano plus SB825L and SB825L LN gas condensing boilers with fuel oil EL

- Use a gas/oil combi burner.
- Maintain a minimum return temperature of 60 °C for the condensing heat exchanger.
- Only heat with oil for a maximum of four weeks per heating season.
- Clean the boiler and condensing heat exchanger carefully at least twice per year.

Route away the condensate that occurs in the flue pipe separately and neutralise it.

5.3.3 Corrosion protection in heating systems

Corrosion protection on the boiler water side

Corrosion in the heating system can be the result of poor water quality or air-borne oxygen in the system. Negative pressure allows oxygen to enter the heating system. Possible causes of oxygen ingress include leaks in the heating system, regions of negative pressure, an inadequately sized expansion vessel or plastic pipes with no oxygen barrier.

If the ingress of oxygen into the heating system cannot be prevented, we recommend separating the heating circuit by means of a heat exchanger.

Protecting the heating surfaces against corrosion

The combustion chamber and secondary heating surfaces can be damaged by heavy dust loads or halogen compounds in the combustion air. Halogen compounds are highly corrosive. They are contained, for example, in spray cans, thinners, cleaning & degreasing agents and in solvents. Design the combustion air supply so that, for example, no extract air is drawn in from chemical cleaners or paint shops.

Prevention of corrosion damage

Corrosion damage has occurred if the function of the heating system is impaired by corrosion. This may become apparent through blockages, boiling noises, poor circulation, rust perforations, reduced output or the formation of cracks. This usually only occurs if oxygen continually enters the heating water. In order to prevent this, design the heating system as a sealed system from a corrosion point of view. If the system is sealed from a corrosion point of view, the selection of materials used becomes less significant.

If the system cannot be sealed from a corrosion point of view, special corrosion protection measures must be provided by treating the heating water. Alongside the option of filling the heating system with desalinated water, the heating water can also have chemicals added to it. These chemicals either bind the free oxygen or form a corrosion-resistant coating on the surface of the material.

The pH value of the heating water should be between 8.2 and 9.5 (→ Tab. 44, page 59). If the heating system does not contain any aluminium components, we recommend adding chemicals (e.g. trisodium phosphate) to the heating water to alkalinise it.

Regular maintenance is required to give the heating system a long, damage-free service life. As well as checking the pressure, check the pH value of the heating water and adjust it if required. If corrosion protection agents are used, check the heating water in accordance with the manufacturer's instructions. Heating systems that have antifreeze in the heating water should also be checked in accordance with the manufacturer's instructions. The concentration of antifreeze in the heating water should not exceed 40 volume-percent.

5.3.4 Corrosion protection if system out of use for long periods

Airborne oxygen that enters the system causes corrosion in a cooled and depressurised boiler. Suitable preventive measures should therefore be taken. Suitable protective measures should be taken whenever a boiler has been idle for longer than three days. Buderus recommends the following options:

1. Preservation on the water side through pressure maintenance (any time period)

If one or more boilers in a boiler system are shut down and it is ensured that one boiler or at least the pressure maintaining system remains operational, no further preservation measures on the water side are required. Ensure that the boiler remains connected to the mains via the open flow shut-off device so that the mains pressure builds up. This prevents oxygen entering the boiler as a result of positive pressure.

As an alternative, the return shut-off device can also be opened. However, do not have both shut-off devices open at the same time as this can result in heat losses due to unwanted circulation.

2. Wet preservation on the water side for shutdowns of up to 3 months

The boiler is completely filled with water, an excess of oxygen binders is added and the boiler water content is circulated at defined intervals. For more information on wet preservation, please see the operating instructions "G012 Wet and dry preservation".

Carrying out preservation

Regular circulation is necessary to ensure the metered additive is evenly mixed with the boiler water. For this, install a pump that is connected to the outlet connection downstream of the outlet shut-off valve via a tee on the inlet side, and to the return between the boiler and return shut-off device on the pressure side. The additive can be topped up via the dosing station on the pressure side of the pump. After this, tightly seal all boiler valves to prevent the ingress of airborne oxygen during the idle time. To ensure the preservative solution is thoroughly mixed in, the water must be circulated 5 times every 3 days using the pump.
For more information, please see the operating instructions "G012 Wet and dry preservation".

3. Dry preservation on the water side for shutdowns of longer than 3 months

The system is fully drained, filled with a special drying agent, and then resealed. Compared to wet preservation, it takes around 1-2 days to prepare the system for operation. We recommend involving a Buderus service engineer.
For precise information on carrying out dry preservation, please see the operating instructions "G012 Wet and dry preservation".

5.3.5 Guidelines for water quality

Chemical additives in the heating water

If plastic pipes that are permeable to oxygen are installed in an underfloor heating system, the corrosion process can be prevented by adding chemical additives to the heating water. In this case, request certification from the manufacturer of the chemical additives as to the effectiveness and harmlessness to other system components and materials in the heating system.

> i Chemical additives that are not certified as harmless by the manufacturer must not be used.

Water treatment

Boiler operators must take account of the fact that there is no such thing as pure water as a heat transfer medium. For this reason, particular attention should be paid to the water quality. Constant monitoring of the water quality is an important factor in achieving economical and trouble-free operation of the heating system. Water treatment also makes a contribution to energy savings and to preserving the value of the entire system. It is an essential factor for increasing the economic viability, functional reliability, service life and, last but not least, the maintenance of the constant operational availability of the heating system.

Prevention of damage due to scaling

Scaling means that stubborn calcium carbonate deposits occur in the boiler. These deposits can cause local overheating and a limited formation of cracks in the boiler. The impaired heat transfer caused by scaling can lead to a significant drop in boiler output and to an increase in flue gas loss. Boiling noises may also occur under certain circumstances.

Minimum requirements of water analyses for designing a water treatment system → page 60.

> i For the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, adhere to the requirements of the latest VdTÜV Directive (VdTÜV 1466).

Low pressure hot water boilers with operating temperatures up to 110 °C

Subject to the total boiler output, the requirements of water quality from Tab. 44 are to be followed. If these requirements are not maintained, water treatment is necessary.

In systems with a total boiler output of above 100 kW, the volume of fill and top-up water should be measured. Furthermore, records should be kept when top-up water is added. The concentration of calcium hydrogen carbonate in the top-up water should also be noted.

Logano S825L and S825L LN Logano plus SB825L and SB825L LN		**Boilers in Group II**		
Water-chemical operating mode[1]		Low salt content	Low salt content	Saline
Electrical conductivity of the circulating water	µS/cm	10–30	> 30–100	> 100–1500
Fill and top-up water				
General requirements		Colourless, clear and free of undissolved substances		
pH value at 25 °C		8–10	8–10.5	8.5–10.5
Alkaline earths (total hardness)	mmol/l	< 0.02	< 0.02	< 0.02
	dH	< 0.1	< 0.1	< 0.1
Oxygen (O_2)	mg/l	< 0.1	< 0.1	< 0.1
Circulating water				
General requirements		Colourless, clear and free of undissolved substances		
pH value[2] at 25 °C		9–10	9–10.5	9.5–10.5
Acidic capacity $K_{S\,8.2}$[2] (p value)	mmol/l	–	0.1–0.5	0.5–5
Alkaline earths (total hardness)	mmol/l	< 0.02	< 0.02	< 0.02
	dH	< 0.1	< 0.1	< 0.1
Oxygen[3] (O_2)	mg/l	< 0.1	< 0.05	< 0.02
Phosphate[2][3] (PO_4)	mg/l	3–6	5–10	5–15
Electrical conductivity at 25 °C	µS/cm	10–30	> 30–100	> 100–1500
Diamide[3] (N_2H_4)	mg/l	0.2–1	0.2–2	0.3–3
Sodium sulphite[3] (Na_2SO_3)	mg/l	–	–	5–10

Tab. 44 Water quality requirements for Logano S825L/L LN and Logano plus SB825L/L LN

1) Systems with heavily branched pipework, i.e. in industrial and district heating systems, those with longer stagnation periods (even for parts of the heating network), those operating at strongly fluctuating pressures and temperatures as well as systems with components made from diverse materials, should ideally be operated with water of a low salt content.

2) For operation with a low salt content, adjust the pH value or the p value with trisodium phosphate. For saline operation, the alkalinity usually adjusts itself by the composition of the fill water. If this is not the case, adjust the pH value with trisodium phosphate and, if required, by adding sodium hydroxide. Never use ammonia. If copper components are installed in the hot water network, the pH value of the circulating water must not be above 9.5.

3) In constant heating mode, the limits are usually maintained automatically. If this is the case, oxygen binders are not obligatory. If the limits are exceeded, a range of physical and chemical processes are available. Typical chemical agents are diamide and sodium sulphite. Amines that form a film are not oxygen binders. Establish the application and type of oxygen binder for each specific system.

5.3.6 Minimum requirements of water analyses for designing a water treatment system

When enquiring about water treatment, as a minimum the information in sections 1 and 2.1 should be provided.
For a detailed design of a reverse osmosis system, a full analysis corresponding to section 2.2 is required no later than when the order is placed.

If a detailed water analysis with the specified parameters is available, the form does not need to be completely filled out again, as long as the information in section 1 is provided.

1. System details	
Project number/name	
Specification for performance of the water treatment (will be checked)	
Boiler type	
Steam output	
Average operating pressure	
Condensation rate	
Special features (e.g. sterile steam, existing treatment system, other on-site consumers, etc.)	

2. Details of untreated water analysis					
2.1 Minimum details for designing a softening system					
Total hardness	mmol/l		Electrical conductivity	µS/cm	
	Or °dH		Or salt content (TDS)	mg/l	
Or calcium Ca^{2+}	mg/l		Carbonate hardness	°dH	
And magnesium Mg^{2+}	mg/l		Or $K_{S4.3}$ figure	mmol/l	
Iron Fe total	mg/l		Or alkalinity	mmol/l	
Manganese Mn^{2+}	mg/l		Or HCO_3^-	mg/l	
Silicate SiO_2 or Si	mg/l				
Chloride Cl^-	mg/l				
2.2 Further details for designing/ordering a reverse osmosis system					
Cations			**Anions**		
Ca^{2+}	mg/l		SO_4^{2-}	mg/l	
Mg^{2+}	mg/l		Cl^-	mg/l	
K^+	mg/l		NO_3^-	mg/l	
Na^+	mg/l		HCO_3^-	mg/l	
Fe^{2+}	mg/l		F^-	mg/l	
Ba^{2+}	mg/l		CO_3^-	mg/l	
Sr^{2+}	mg/l		SiO_2^-	mg/l	
NH_4^+	mg/l		PO_4^-	mg/l	
			CO_2^-	mg/l	

6 Sound pressure level from noise in the boiler system

6.1 Sound emissions from the boiler system

The noise in the installation room caused by a boiler system and the noise transmitted to the surrounding area are subject to regional regulations which must be taken into account when designing a boiler system.

The overall sound emissions from a boiler system are influenced by a range of sources. The various noises include:

- Machine noise (e.g. burner, fan, pumps, drive motors for valves)
- Flow and combustion noises caused by hot flue gas created during combustion, which is routed by the boiler through the flue system to the chimney. From an acoustic point of view, the heat source itself is not a source of sound, but acts as a resonating body for noise that comes from the combustion reactions within the combustion chamber.

There can be a range of other sound sources (structure-borne noise due to rotational movement of machines, flow noises in valves etc.) which must also be taken into account.

6.2 Noise in the installation room

Individual sound pressure levels can be specified for machine noises that are the main cause of sound impact in the installation room. The individual sound pressure level of a machine can only be specified for “free field” conditions at a distance of 1 m (without any influence from other sound emitters). When calculating the overall sound pressure level in the installation room, take the reciprocal influence of the various sound sources and local conditions (e.g. sound absorption characteristics of the installation room wall) into account.

Machine noise can be reduced by encasing the machines, e.g. with a burner silencer hood or a silencer housing for the fan.

6.3 Noise at the chimney outlet

A significant proportion of the noise development in the combustion chamber is transmitted along the flue system to the chimney. This sound is emitted via the surface of the flue system as airborne noise and escapes at the chimney. The noise from a boiler system predominantly contains low frequency sound.

These sound emissions can be effectively reduced with a flue gas silencer. To design a flue gas silencer (to maintain the prescribed sound immissions levels), the frequency spectrum of the sound at the chimney outlet from the boiler system must be known.

The graph in Fig. 41 shows the average sound pressure level of a boiler system, measured at the chimney outlet at a distance of 1 m and an angle of 45°, with no flue gas silencer in the flue system. As the combustion system (e.g. due to the burner construction or the flow profile that occurs in the combustion chamber) and flue system (e.g. due to the numbers of bends, length and diameter of the flue) have a considerable influence on the values that occur, only averages can be given here for the sound pressure level. The sound levels calculated in the flue pipe, directly downstream of the boiler, are up to 15 % higher than the sound levels at the chimney head.

Giving the levels directly in the flue pipe and directly downstream of the boiler is not helpful as the influences mentioned above as well as sound reflection and resonance (e.g. standing waves) mean a correct calculation is not possible, or is very difficult to achieve. Furthermore, a flue gas silencer is designed for the boiler system using the sound levels that occur at the chimney head.

Due to the complexity of the subject of sound, we recommend involving an acoustician or sound expert to design the flue gas silencer.

If possible, the sound levels that actually occur in the boiler system should be calculated first. These values can be used to design a flue gas silencer which can be retrofitted to the boiler system. The pressure drop of the silencer (approx. 1 mbar to 3 mbar) should initially be taken into account when sizing the burner.

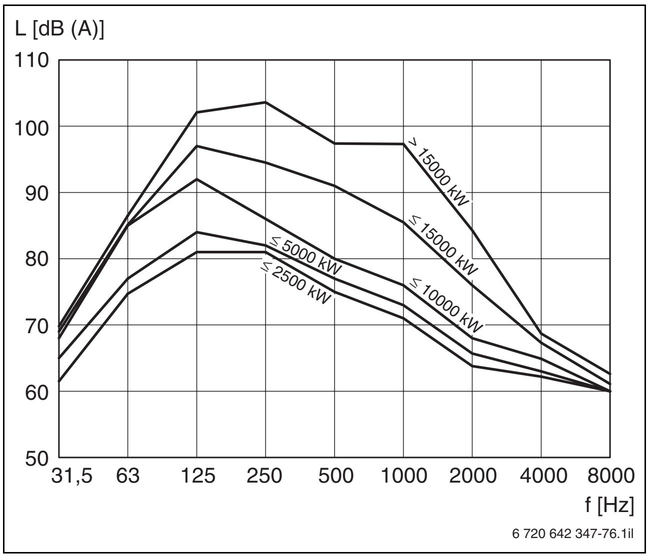

Fig. 41 Frequency analysis of noise at the chimney outlet, subject to the boiler output

f Frequency
L Sound pressure level

The following comments apply to the values specified:

- Sound pressure level measured in accordance with DIN-EN 60804, DIN-EN 60651 and DIN 45635
- Frequency assessment curve A to DIN-EN 60561
- Flue system routed with favourable flow characteristics
- Suitable anti-vibration mounts installed in the boiler system

The values specified are only a guide and approximate values. They depend on the fuel, burner manufacturer, burner construction and design of the entire flue system.

7 Heating controls

7.1 Control systems

A control unit is required to operate the Logano S825L and S825L LN conventional boilers, and the Logano plus SB825L and SB825L LN gas condensing boilers. Buderus Logamatic control systems are designed as modules. This enables the selection of well-matching and economical units for all applications and stages of development in the proposed heating system.

Depending on the requirements and structure of the heating system, the following options are available to control the boiler:

- Control units in the Logamatic 4212 series
- Control units in the Logamatic 43xx series
- DA... display and control units

A burner control panel may be required for the contactors controlled by the control unit. Alternatively, the contactors can be integrated into the Buderus control panel system.

> For more details on the Logamatic 4212, 4321 and 4322 control units, see the technical guide "Logamatic 4000 modular control system".

7.1.1 Logamatic 4212 control unit with ZM427 auxiliary module

Brief description of possible applications

The Logamatic 4212 analogue control unit is suitable for controlling a floorstanding oil or gas boiler with constant boiler water temperature, without operating conditions, or in conjunction with an overriding control system (e.g. DDC/GLT). The Logamatic 4212 analogue control unit can control single stage, 2-stage or modulating burners.

The ZM427 auxiliary module is only intended for use in the Logamatic 4212 analogue control unit, and is suitable for safeguarding boiler operating conditions in conventionally operated boilers. Only one can be fitted in each controller.

Boiler safety functions

By actuating a boiler circuit pump and a boiler circuit actuator (3-way mixer), the ZM427 auxiliary module safeguards the required boiler operating conditions for low temperature boilers with a minimum return temperature.

In conjunction with the appropriate plumbing configuration, compliance with the required boiler operating conditions is guaranteed. When the boiler circuit is in automatic mode, appropriate adjustments should be made on the ZM427 auxiliary module PCB (service level). The ZM427 can also be used to hydraulically shut off lag boilers in multi boiler systems, by actuating the boiler circuit actuator.

Burner control

The ZM427 auxiliary module controls single stage, 2-stage, modulating or 2 × single stage burners.

There are two ways to control the burner which can be adjusted via manual mode level:

- Direct, potential-free enabling of stages in an overriding control system (AUT), e.g. DDC/GLT **or**
- Enabling of all burner stages by the Logamatic control unit (hand or full load symbol), in which case burner modulation may also be manually adjustable

> According to the Energy Saving Ordinance (EnEV, para. 12), the Logamatic 4212 control unit must be operated in conjunction with an automatic device for weather-compensated or room temperature-dependent mode with time programs.

Return temperature control

With return temperature control mode, the boiler is operated with a fixed figure for the return temperature. This return temperature can be set on the PCB (service level) of the module with potentiometer P1 to 50–60 °C.

Return temperature control is constantly active:

- Via a separate boiler circuit actuator (3-way mixer) and with bypass pump (without hydraulic separation)
- Via a separate boiler circuit actuator (3-way mixer) with a boiler circuit pump (with hydraulic separation via low loss header)

When the burner starts, the boiler circuit pump PK is switched on. After the burner has shut down, the boiler circuit pump PK is stopped after a delay. This pump run-on time can be set with potentiometer P2 to between 30 and 60 minutes for the lead boiler or to 5 minutes (potentiometer limit) for the lag boiler in a multi boiler system. The boiler circuit actuator SR for the lag boiler closes.

7.1.2 Logamatic 4321 und 4322 control units

Brief description of possible applications

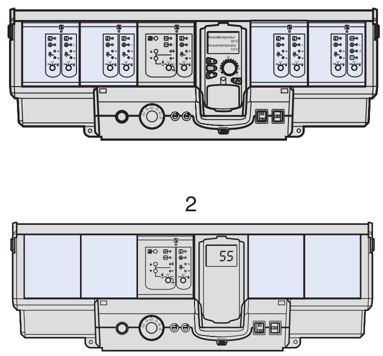

Fig. 42 Logamatic 4321 und 4322 control units

1 Logamatic 4321 (optional full equipment level); blue: additional equipment
2 Logamatic 4322 (standard equipment level); blue: slots for additional equipment

The Logamatic 4321 and 4322 digital control units can control a floorstanding Buderus oil or gas boiler with a single stage, 2-stage or modulating burner. They also support operation of dual-fuel burners. These control units may be extended with up to four function modules to provide an optimum match to an individual heating system. Multi boiler systems can be controlled with the FM458 strategy module in the Logamatic 4321 control unit.

Boiler safety functions

Low temperature boilers and gas condensing boilers with optional boiler protection functions can be adjusted at the service level of the MEC2 programming unit to safeguard the operating conditions.
The correct settings in conjunction with the appropriate plumbing configuration guarantee that the required boiler operating conditions are maintained.

Burner control

The central module in the control unit controls single stage, 2-stage or modulating burners subject to output. With dual-fuel burners, it can switch between oil and gas.

They are generally controlled via burner cable stage 1 and burner cable stage 2.
Alternatively the burner can be controlled via a 0-10 V signal, in which case the burner cable stage 2 is no longer required.

Multi boiler systems

Fitting the FM458 function module to the Logamatic 4321 control unit (maximum of two per system) enables up to eight boilers to be controlled according to a strategy. One Logamatic 4322 or Logamatic EMS control unit is required per lag boiler.

Special functions for single and multi stage boiler systems

- Separate boiler curve can be adjusted with third party control of the consumers
- Control of a boiler circuit pump for systems with depressurised headers or low-loss headers
- Output-dependent control of a boiler circuit pump via a 0-10 V signal in conjunction with modulating burners
- Application of a potential-free signal for an external fault message or for switching between gas and oil operation in the case of dual fuel burners

Special functions for multi stage boiler systems in conjunction with the FM458 strategy module

- Parallel or serial operation can be set
- Automatic sequence reversal, can be daily, by hours run, by outside temperature or via a floating contact
- Freely configurable load limit subject to the outside temperature or via a floating input
- Definable boiler sequences
- Lag boilers can be hydraulically shut off, taking account of automatic sequence reversal
- Adjustable boiler circuit pump run-on to utilise residual heat in the lag boilers
- 0-10 V input for external set value hook-up as set temperature value or output specification (heat demand) with third party heating circuit control units
- 0-10 V or 0-20 mA output for issuing an external set temperature value (heat demand) to an overriding control system (DDC/GLT)
- Indication of status of individual boilers
- Floating output for central fault message
- Floating input for hooking up an external heat meter
- Outside temperature sensor FA (only Logamatic 4321)
- Boiler water temperature sensor FK
- Additional temperature sensor FZ for low loss header or as return temperature sensor
- Burner cable stage 2

Boiler safety functions

Low temperature boilers

- If the minimum boiler water temperature is not reached, the boiler circuit pump, heating circuit pumps and cylinder primary pump are shut down and restarted with a switching differential when the boiler water temperature rises. This boiler protection function is designated “pump logic”. The switching threshold depends on the burner type and is preset at the factory.
- The following boiler protection functions are available to control the operating flow temperature:
  - Overriding control of the heating circuit actuators for single boiler systems:
    The heating circuit actuators are closed if the operating flow temperature is not reached, independent of the heat demand of the heating circuits. For this setting, all heating circuits must be fitted with an actuator and controlled by the Logamatic controller.
  - Control of a separate boiler circuit actuator:
    If the operating flow temperature of the boiler is not reached, the boiler circuit actuator (3-way mixer) is closed.
    This setting is advisable when supplying heat to externally controlled heating circuits or for heating circuits without actuators.
  - Relevant function of a third party control unit:
    Condition: During burner ON mode, an operating flow temperature of 50 °C must be reached within 10 minutes and maintained as the minimum temperature, e.g. by limiting the flow rate.

Low temperature boiler with minimum return temperature

- For this type of low temperature boiler, a fixed minimum return temperature is ensured at the factory. If this minimum return temperature (captured at the return temperature sensor FR or in multi boiler systems at the strategy return temperature sensor FRS), the flow rate is automatically reduced via actuators. To support this control function, the boiler circuit pump, heating circuit pumps and cylinder primary pumps are shut down if high load conditions suddenly occur.
  The following options are available to control the minimum return temperature:
  - Overriding control of the heating circuit actuators:
    The heating circuit actuators are closed if the minimum return temperature is not reached, independent of the heat demand of the heating circuits. For this setting, all heating circuits must be fitted with an actuator and controlled by the Logamatic controller.
  - Control of a separate boiler circuit actuator:
    If the minimum return temperature of the boiler (sensor FR) is not reached, the boiler circuit actuator (3-way mixer) is closed. This setting is advisable when supplying heat to externally controlled heating circuits or for heating circuits without actuator.

Gas condensing boiler

- If this boiler type is selected, there are no required boiler operating conditions to be maintained. No boiler safety functions are required.

7.1.3 Side control unit retainer

For the Logano S825L and S825L LN, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, in conjunction with Logamatic control units, the side control unit retainer is required as an accessory. With the S825L and S825L LN "standardised" versions, the control unit retainer is part of the standard delivery and is prefitted. It enables convenient operation of the Logamatic 4212, 4321 and 4322 control units at eye level. The side retainer can be fitted on the r.h. or l.h. side of the boiler block. Mount the control unit on an adaptor plate on the side control unit retainer (→ Fig. 43 and Fig. 44).

To install the Logamatic 4212, 4321 and 4322 control units, the following additional equipment will be required:

- Burner cable
- Sensor well

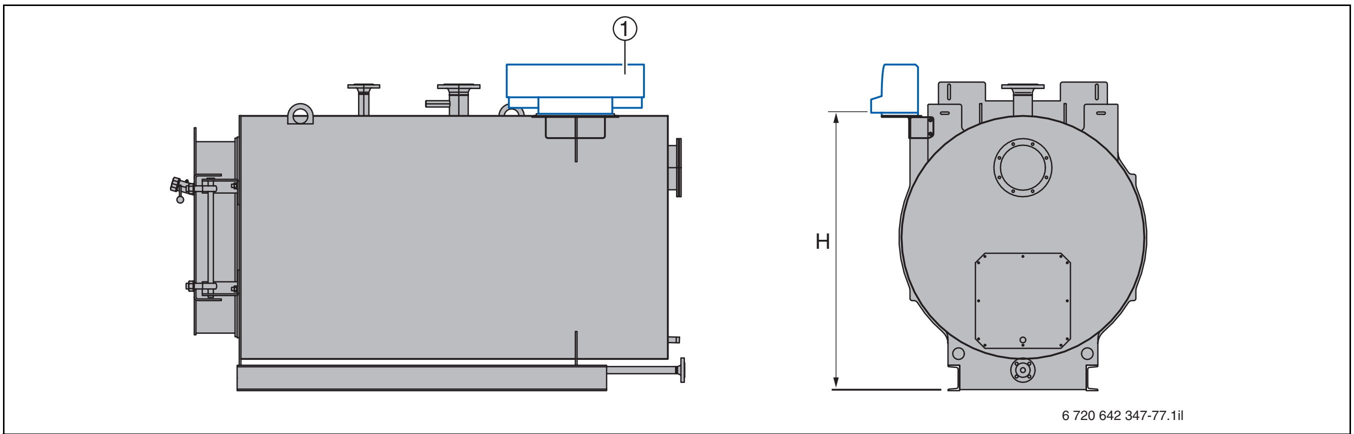

Fig. 43 Side control unit retainer Logano S825L/L LN (standardised) (6-bar version; dim. H → Tab. 45, page 67)

1 Side control unit retainer (part of standard delivery with S825L/L LN "standardised" version)

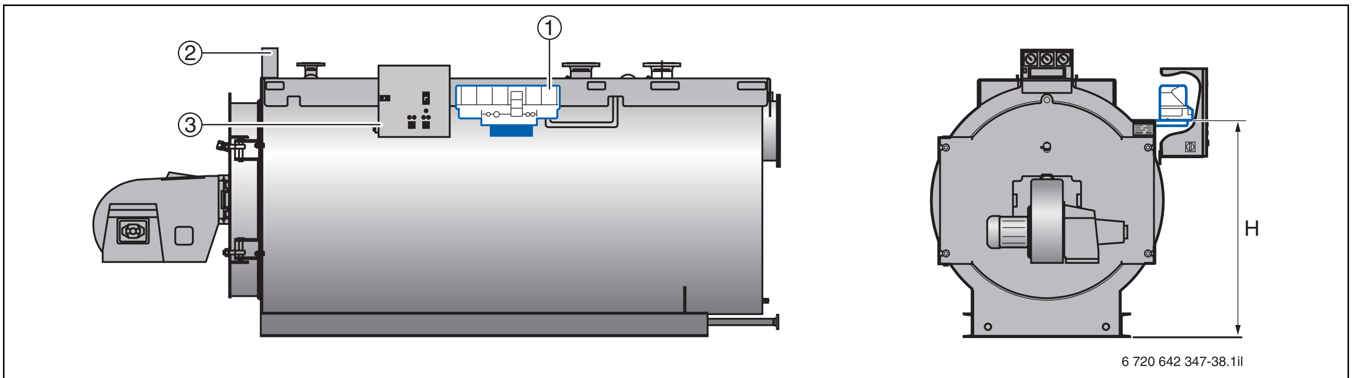

Fig. 44 Side control unit retainer Logano S825L/L LN and Logano plus SB825L/L LN (dim. H → Tab. 46, page 67)

1 Side control unit retainer
2 DA... display and control unit (→ Fig. 45, page 68)
3 Burner control panel

Logano S825L[1)]Boiler size	Logano S825L LN[1)] Boiler size	Side control unit retainer H[2)] (6-bar version) [mm]
650	–	1300
1000	750	1450
1350	1000	1550
1900	1250	1600
–	1500	1600

Tab. 45 Dimensions of the side control unit retainer Logano S825L/L LN, 6-bar version

1) Logano S825L/L LN “standardised version”

2) Bottom edge of control unit (H → Fig. 43, page 66)

Logano (plus) S(B)825L Boiler size	Logano (plus) S(B)825L LN Boiler size	Side control unit retainer H[1)] [mm]
1000	750	1350
1350	1000	1450
1900	1250	1500
2500	1500	1550
3050	2000	1600
3700	2500	1600
4200	3000	1600
5200	3500	1600
6500	4250	1600
7700	5250	1600
9300	6000	1600
11200	8000	1600
12600	10000	1600
14700	12000	1600
16400	14000	1600
19200	17500	1600

Tab. 46 Dimensions of the side control unit retainer Logano S825L/L LN and Logano plus SB825L/L LN

1) Bottom edge of control unit (H → Fig. 44, page 66)

7.1.4 DA... display and control units

With the standard equipment level of the DA... display and control units, the digital display shows the flow, return or flue gas temperature with an accuracy level of ± 2 K. LEDs indicate which temperature is currently being shown. The measured values can be passed on via three outputs for 4 to 20 mA. The keypad enables temperature limits to be set. If a limit is exceeded, the associated diode flashes and a signal is issued to one of the three floating outputs. The control unit with the standard equipment level (DA) is therefore an ideal supplement to the Logamatic control units.

The DAZ, DAM and DAD also enable constant control of the boiler. They can be used instead of the Logamatic 4212 control unit.

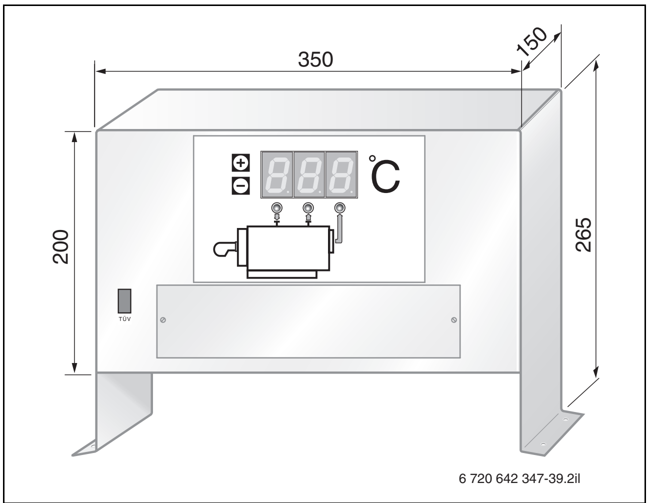

Fig. 45 DA... display and control units Logano S825L/L LN and Logano plus SB825L/L LN (dim. in mm)

Component	Type of instrument casing			
	DA	DAZ	DAM	DAD
Temperature display	+	+	+	+
Temperature limiter	–	+	+	+
Burner control (stages)	–	2	1)	3
High limit safety cut-out	–	+	+	+
Temperature controller	–	+	–	+
Stage II	–	+	–	+
Stage III	–	–	–	+

Tab. 47 Equipment level of the DA... display and control units

1) Excess temperature protection for modulating burner

\+ Available
\- Not available

7.1.5 Burner control panel

If the boiler has been equipped with a burner control panel by the burner supplier, a mounting plate can be fitted to the boiler at the factory. It is fitted on either the r.h. or l.h. side of the boiler or on the front door (→ Fig. 44, page 66).

7.1.6 Buderus control panel system Logamatic 4411

The Buderus control panel system Logamatic 4411 offers comprehensive control solutions for medium and large-scale systems that require system-specific controls. The control technology department of your local Buderus sales office will advise you on design and prepare the most suitable system solution for your individual project. This also applies to programmable logic control and building management systems.

For more detailed information, see the technical guide "Logamatic control panel systems 4411".

7.2 Logamatic telecontrol system

Below you will find a brief overview of the Logamatic telecontrol system. For further information, see the technical guide "Logamatic telecontrol system".

The Buderus telecontrol modem sends automatic notification of operating faults to any destination - by email, fax, SMS, etc. The service engineer can repair the system remotely using a convenient PC program. All parameters can be checked and modified via telecommunications channels.

If required, a visit to the site can be planned efficiently: What action is necessary, what spare parts are required, do specialists need to be brought in?

A telecontrol system from Buderus is ideal for many applications, e.g. in rented houses, apartment buildings without a caretaker, holiday homes, municipal facilities, hospitals or swimming pools. Remote monitoring is also the top choice for heat supply contracts or inspection and maintenance contracts.

Benefits

- High level of security due to 24-hour monitoring
- Fault displays in plain text; different message recipients can be combined
- Simple control options
- Operating mode changeover via telephone (holiday home function)
- Check and modify control unit parameters remotely
- Display control unit data and record faults
- Suitable for heat sources with Logamatic EMS or Logamatic 4000

7.2.1 Overview of the Logamatic telecontrol system

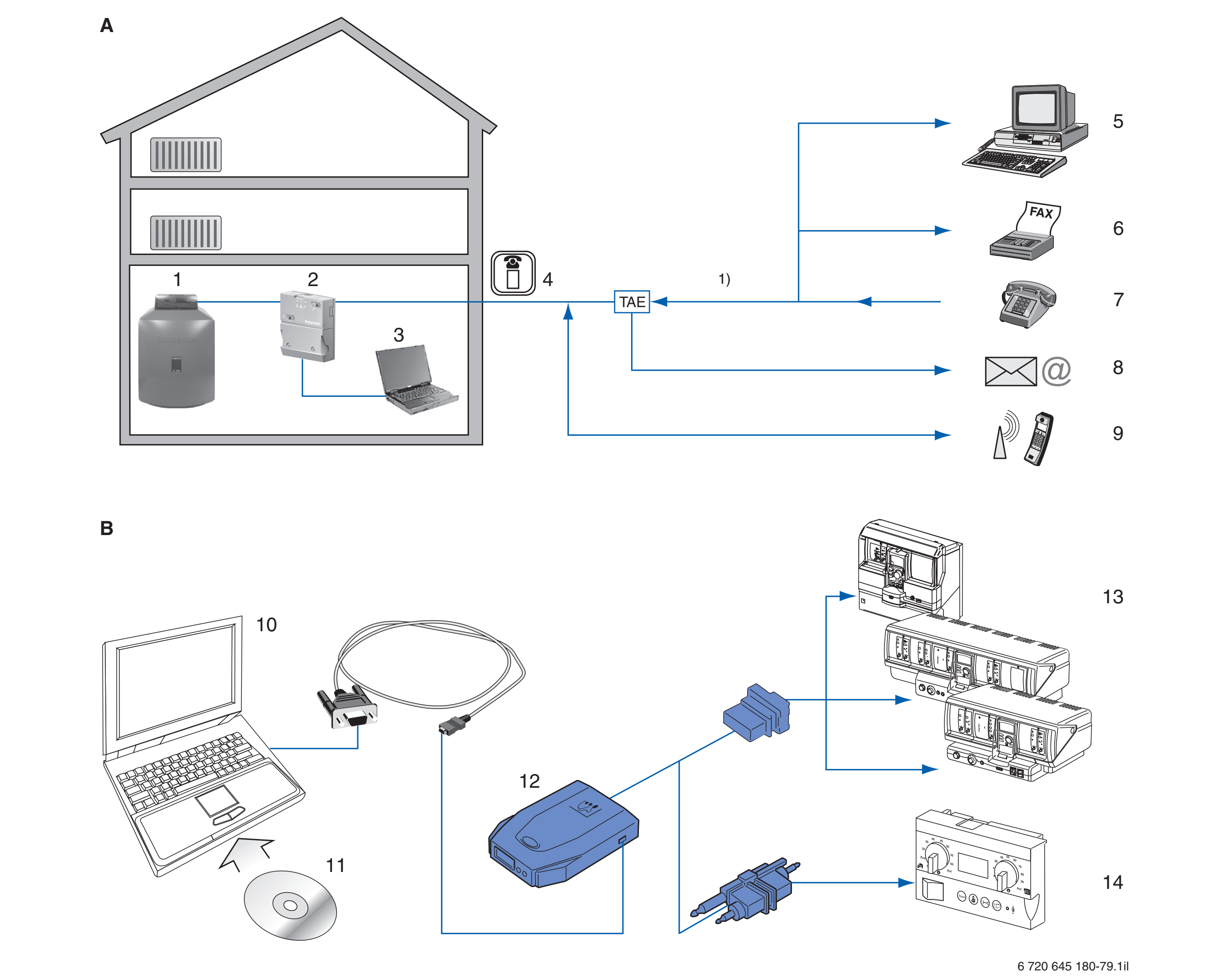

Fig. 46 Logamatic telecontrol system

- **A** Modem connection with control unit
- **B** Direct connection with control unit
- **1** Control unit
- **2** Telecontrol modem
- **3** Notebook (service on-site)
- **4** Analogue telephone connection
- **5** PC with software (ECO-SOFT 4000/EMS, ECO-MASTERSOFT)
- **6** Fax (group 3)
- **7** Telephone (DTMF telecontrol)
- **8** Email
- **9** SMS
- **10** PC with USB or RS232 interface (USB-RS232 converter cable available as accessory)
- **11** Logamatic ECO-SOFT 4000/EMS service software
- **12** Logamatic Service Key
- **13** Possibility for connection to digital control units in the Logamatic 4000 system
- **14** Possibility for connection to digital control units in the Logamatic EMS system (Logamatic BC10 base controller)

1) Communication, monitoring and service via telephone and modem

7.2.2 Telecontrol modem for optimum service connections

The Logamatic Easycom or Logamatic Easycom PRO telecontrol modems are at the heart of the Logamatic telecontrol system. They connect the control system to external devices and forward messages about operating faults or conditions to one or more different message recipients, depending on the time and day. For example, messages can be sent to email addresses, fax machines, mobile phones, PC control centres – wherever required.

Furthermore, via digital and analogue inputs, further devices for heating technology and building management can be hooked up, e.g. heat and gas meters, pressure switches or alarm systems. In the opposite direction, the telecontrol modem enables complete monitoring and configuration of the control system.

7.2.3 Logamatic Easycom

Benefits

- Reduced costs for smaller to medium-sized heating systems
- Compatible with all Logamatic control systems
- Monitoring and configuration of the entire heating system
- Up to three message recipients, including email addresses
- One digital input to monitor external components
- User friendly software, even for use on site

Fig. 47 Logamatic Easycom telecontrol modem

7.2.4 Logamatic Easycom PRO

Benefits

- Even for larger heating systems
- Compatible with third party control units and components
- Up to 16 different message recipients
- Memory for long term data recording
- Digital inputs for monitoring external components
- Meters can be hooked up to record consumption (gas, oil, heat, hours run)
- Can be extended with further modules
- Emergency power module for operation independent of mains power supply
- Operation also possible via mobile networks (GSM)

Fig. 48 Logamatic Easycom PRO telecontrol modem

7.2.5 Logamatic Service Key

Make the most of all the options for convenient and powerful control software - not just from the office, but also on site. The Logamatic Service Key is the mobile high performance connection from your computer to the heating system. Thanks to a variety of adaptors, it is easy to connect to Buderus products with Logamatic control systems. With a few clicks of the mouse, all operating data can be called up and the entire system can be configured.

Fig. 49 Logamatic Service Key

8 DHW heating

8.1 Systems for DHW heating

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, can be used for central DHW heating. They can be combined with any Buderus DHW cylinder. The Logalux cylinders are available as horizontal or vertical versions in different sizes with up to 6000 l capacity. Subject to application, they are equipped with an internal indirect coil or external heat exchanger.

The DHW cylinders can be used singly or in combination with other cylinders. With the primary store system, different cylinder sizes and different heat exchanger sets can be combined. This means system solutions are available for any demand and many applications.

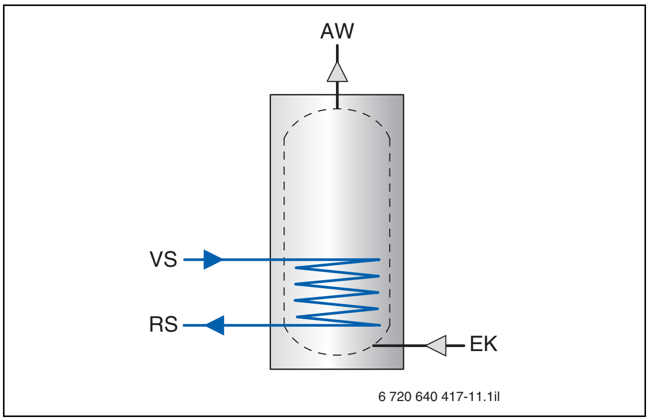

Fig. 50 DHW heating according to the cylinder principle with an internal indirect coil

AW DHW outlet
EK Cold water inlet
RS Cylinder return
VS Cylinder flow

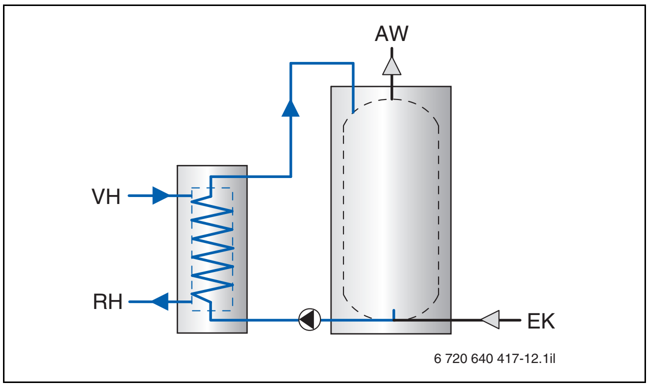

Fig. 51 DHW heating according to the primary store principle with an external heat exchanger

AW DHW outlet
EK Cold water inlet
RH Heating medium return (to the boiler)
VH Heating medium flow (from the boiler)

8.2 DHW temperature control

The DHW temperature is adjusted and controlled either by the Logamatic 4000 control system or by a special Buderus control unit for DHW heating. Both versions are matched to the heating circuit control unit and offer many application options.

More detailed information on this can be found in the technical guides “Sizing and selecting DHW cylinders” and “Logamatic 4000 modular control system”.

9 System examples

9.1 Information regarding all system examples

The system examples in this chapter show options for the hydraulic connection of the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers. In addition, the examples show important control and electrical connections for the relevant application.

Detailed information regarding the number, controls, equipment level and design of further heating circuits, as well as the installation of DHW cylinders and other consumers, can be found in the relevant technical guides.

Information regarding further options for system layout and engineering aids are available from Buderus technical consultants. Specialists at your local sales office can create a control panel layout tailored to your needs. In this way, Buderus offers an entire matching concept right through to commissioning the heating system.

The diagrams and associated design information for the system examples with the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, offer non-binding information regarding a possible hydraulic connection. No claim is made as to their completeness.

Each system example is a non-binding recommendation for a certain version of the heating system. The practical implementation is subject to currently applicable technical rules.

List of abbreviations

Abbr.	Explanation
BR / BRII	Burner (stage I / stage II)
DDC	Direct Digital Control (overriding control unit)
GLT	Building management control (overriding control unit)
FK	Boiler water temperature sensor
FR	Return temperature sensor
FRS	Strategy return temperature sensor
FV	Flow temperature sensor
FVS	Strategy flow temperature sensor
FZ	Additional sensor for the return temperature
HK	Heating circuit
HB	High temperature heating circuit
KR	Check valve
LT	Low temperature heating circuit
PH	Heating circuit pump
PK	Boiler circuit pump
PWT	Heat exchanger pump
RK	Boiler return
RWT	Condensing heat exchanger return
SH	Heating circuit actuator (3-way mixer)
SR	Actuator for return temperature raising facility
SRWT	Actuator for return temperature raising facility, condensing heat exchanger
THV	Thermostatic valve
VK	Boiler flow
VR	Return distributor
VV	Flow distributor
VWT	Condensing heat exchanger flow
WH	Low loss header (hydraulic balancing line)

Tab. 48 Summary of frequently used abbreviations

9.1.1 Hydraulic connection

Heating circuit pumps

Size pumps in central heating systems in accordance with current technical rules.

Temperature sensor

A strategy flow temperature sensor (FVS) should be positioned as close as possible to the boiler system. This stipulation does not apply if hydraulic balancing has been provided via a low loss header. Long distances between the boiler system and the strategy flow temperature sensor have a negative effect on the control characteristics, especially in the case of boilers with modulating burners.

The temperature sensors for return temperature raising should be designed as immersion sensors.

Dirt traps

Deposits in the heating system can lead to local overheating, noise and corrosion. Any resulting boiler damage falls outside the warranty obligations.

To remove dirt and sludge, flush an existing heating system thoroughly prior to installing and commissioning a boiler. In addition, we recommend the installation of dirt traps or a blow-down facility.

Dirt traps retain contaminants and thereby prevent operating faults in control devices, pipework and boilers. Fit these near the lowest point of the heating system in an easily accessible position. Clean the dirt traps every time the heating system is serviced.

i The function of a dirt trap can be fulfilled by a hydraulic balancing line (low loss header) (→ page 82).

9.1.2 Control

The operating temperatures should be controlled with a Buderus Logamatic control unit in weather-compensated mode. It is also possible to control individual heating circuits in room temperature-dependent mode (with a room temperature sensor in a reference room). For this, the actuators and heating circuit pumps are constantly actuated by the Logamatic control unit. The number and version of heating circuits that can be controlled depend on the control unit.

The Logamatic control system can also actuate the burners, whether they are 2-stage or modulating pressure-jet burners. Different types of burners can also be combined in multi burner systems.

The electrical connection of 3-phase burners and 3-phase pumps must be made on site. The Logamatic control unit provides control (230 V).

For more detailed information, see the technical guides to the control units.

9.1.3 DHW heating

If the DHW temperature is controlled with a Logamatic control unit and it is designed accordingly, special functions are possible, such as the actuation of a DHW circulation pump or thermal disinfection to prevent the growth of legionella.

i For more detailed information on this subject, see the technical guide “Sizing and selecting DHW cylinders”.

9.1.4 Pipework schemes

Temperature maintaining: Version with return temperature maintaining RTH

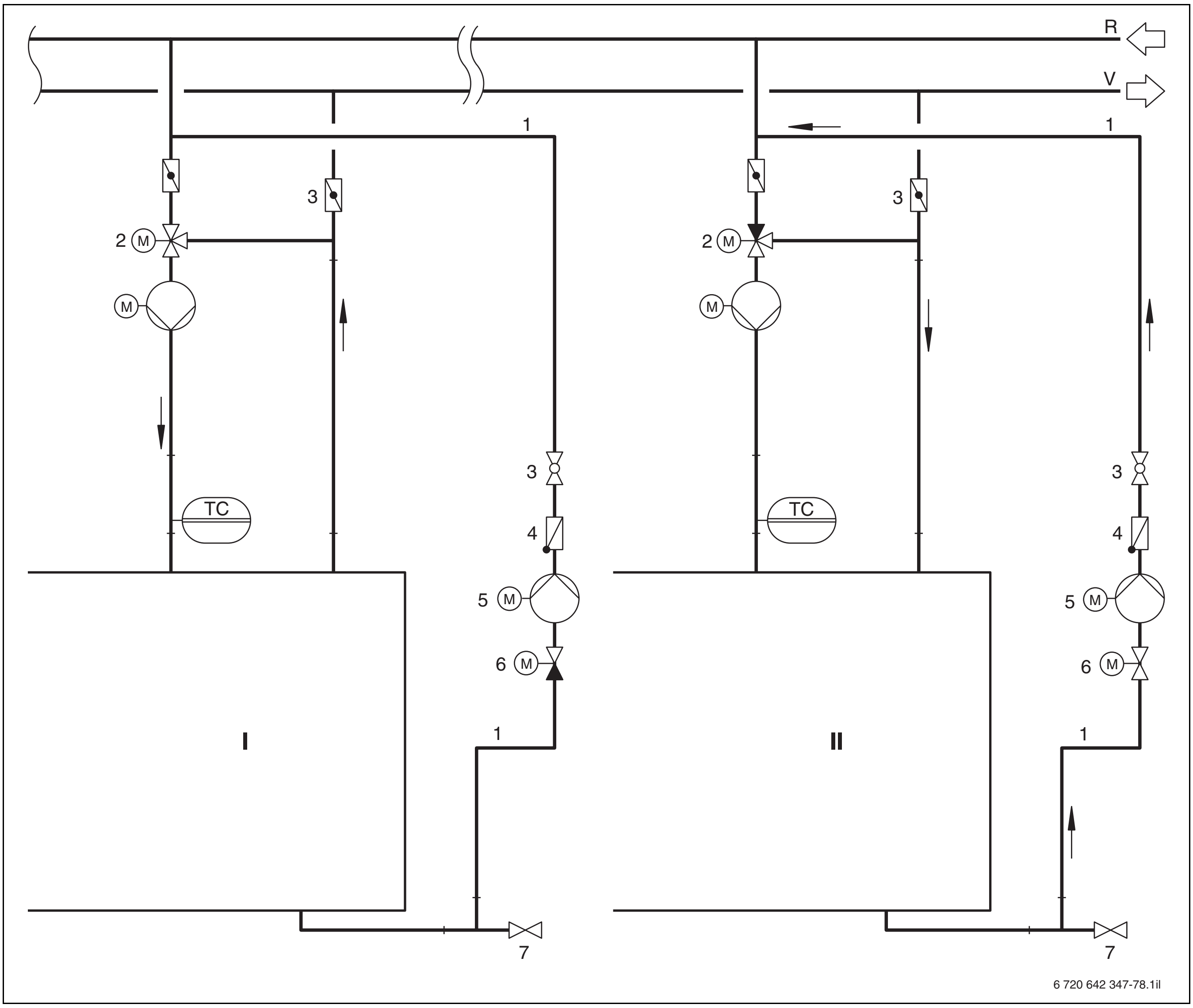

Fig. 52 Return temperature maintaining RTH

I Boiler mode
II Temperature maintaining mode
R Return
V Flow
1 Temperature maintaining line
2 3-way valve (motorised)
3 Shut-off valve
4 Check valve
5 Temperature maintaining pump
6 Shut-off valve (motorised)
7 Drainage shut-off valve

In temperature maintaining mode, the shut-off valve in the flow is open and the 3-way valve in the return is closed.

In boiler mode, the temperature maintaining pump is stopped and the shut-off valve on the inlet side is closed.

Temperature maintaining: Version with return temperature raising RTA

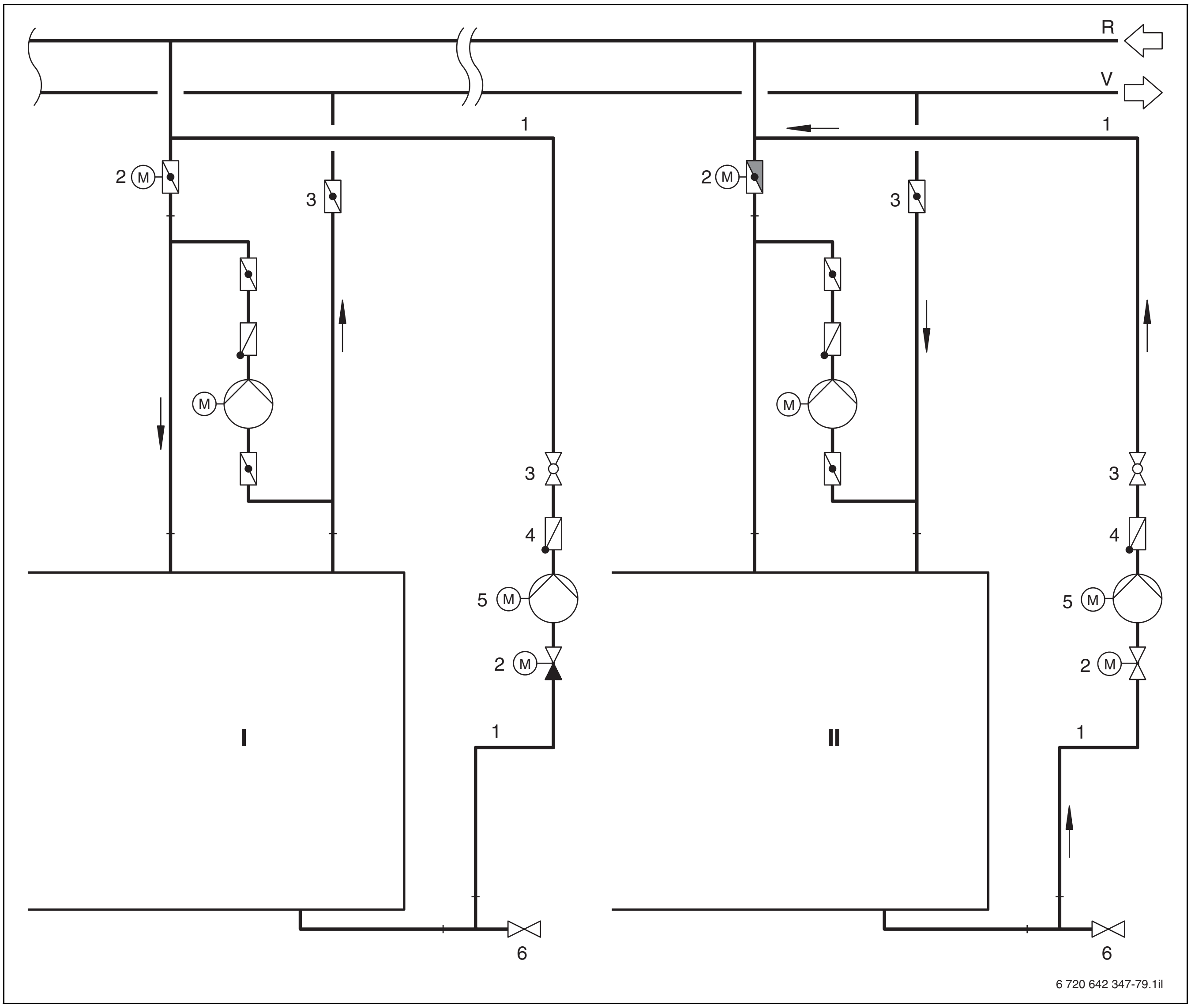

Fig. 53 Return temperature raising RTA

I Boiler mode
II Temperature maintaining mode
R Return
V Flow
1 Temperature maintaining line
2 Shut-off valve (motorised)
3 Shut-off valve
4 Check valve
5 Temperature maintaining pump
6 Drainage shut-off valve

In temperature maintaining mode, the shut-off valve in the flow is open and the 3-way valve in the return is closed.

In boiler mode, the temperature maintaining pump is stopped and the shut-off valve on the inlet side is closed.

Temperature maintaining: mains pressure ≤ 10 bar; DHW temperature ≤ 110 °C

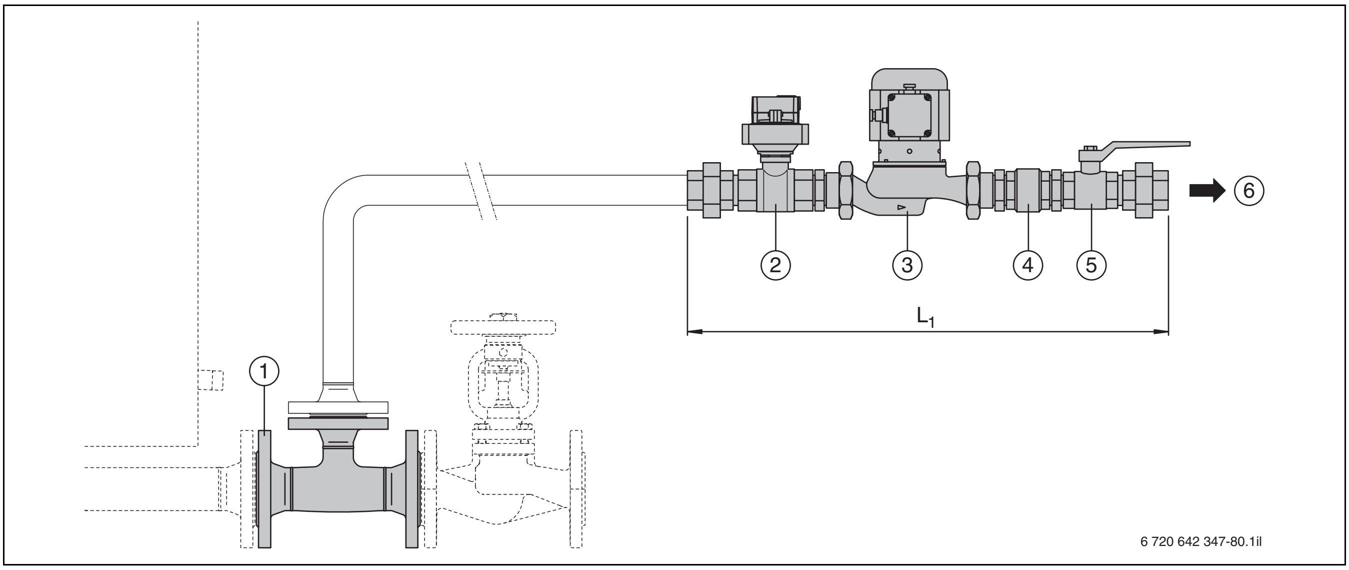

Fig. 54 Temperature maintaining

1 Tee in drainage shut-off valve
2 Shut-off valve (motorised)
3 Temperature maintaining pump
4 Check valve
5 Shut-off valve
6 Temperature maintaining line

Temperature maintaining	Can be used up to boiler output	Motorised output of temperature maintaining pump	Internal diameter					Length	Shipping weight
			1 1)	2 2)	3 2)	4 2)	5 2)	L_1	
Type	[kW]	[kW]	–	–	–	–	–	[mm]	[kg]
WH 1	1000	0.06	DN25/20	DN20	DN40	DN20	DN20	579	8
WH 2	5200	0.07	DN32/25	DN25	DN40	DN25	DN25	631	10
WH 3	12600	0.19	DN50/32	DN32	DN50	DN32	DN32	676	16
WH 4	19200	0.40	DN50/40	DN40	DN50	DN40	DN40	721	20

Tab. 49 Specification for temperature maintaining in the Logano S825L/L LN and Logano plus SB825L/L LN

1) Internal diameter for flanges to DIN 2633, DIN 2634 and DIN 2635

2) Pipe thread to DIN 2999

Dimensions given with ± 1 % tolerance;
Transport weights given with ± 3 % tolerance.

9.2 Safety equipment to DIN-EN 12828

9.2.1 Requirements

No claim is made as to the completeness of the diagrams or the corresponding design information for the system examples. Each system example is a non-binding recommendation for certain versions of the heating system. The practical implementation is subject to currently applicable technical rules. Safety equipment shall be installed in accordance with local regulations.

DIN EN 12828 determines the safety equipment level.

The schematic illustration in Fig. 55 can be referred to as an engineering aid.

9.2.2 Layout of safety components to DIN-EN 12828

Boiler > 300 kW; operating temperature ≤ 105 °C; shutdown temperature (STB) ≤ 110 °C – direct heating

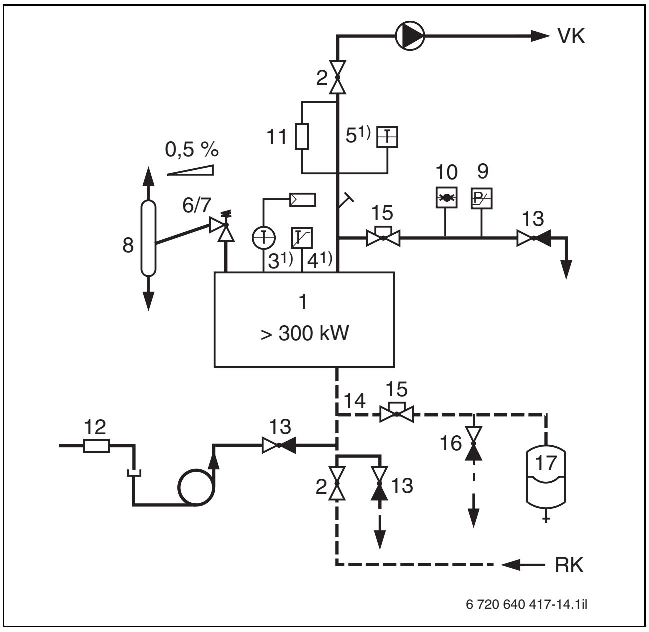

Fig. 55 Safety equipment to DIN-EN 12828 with direct heating

RK Return
VK Flow
1 Heat source
2 Shut-off valve, flow/return
3 Temperature controller (TR)
4 High limit safety cut-out (STB)
5 Temperature capturing facility
6 Diaphragm safety valve MSV 2.5 bar/3.0 bar
7 Lift spring safety valve HFS ≥ 2.5 bar
8 Flash trap (ET); not required if a high limit safety cut-out with a limit ≤ 110 °C and a maximum pressure limiter are additionally provided for each boiler
9 Maximum pressure limiter
10 Pressure gauge
11 Low water indicator (WMS) or a minimum pressure limiter
12 Non-return valve
13 Boiler drain & fill valve (KFE)
14 Expansion line
15 Shut-off valve – protected against unintentional closure, e.g. by sealed cap valve
16 Drain upstream of diaphragm expansion vessel
17 Diaphragm expansion vessel (DIN-EN 13831)

1) The maximum achievable flow temperature in combination with Logamatic control units is approx. 18 K below the shutdown temperature (high limit safety cut-out)

9.2.3 Safety equipment for the condensing heat exchanger

The condensing heat exchanger requires an additional safety valve with pressure gauge and venting facility if a shut-off device is installed between the boiler and condensing heat exchanger. If the heat exchanger is connected to the boiler without a shut-off device, there is no need for additional safety equipment.

9.2.4 Maximum operating flow temperatures

In combination with the various control units, the boilers can reach different, maximum possible operating flow temperatures (maximum adjustable value of the controller). When these temperatures are reached, the burner is shut down by the controller. The (re)start temperature is higher by the specific hysteresis. In general, this results in the maximum achievable average operating flow temperatures, according to Tab. 50.

The boiler water temperature must be at least 70 °C. It can be modulating or kept constant.

Control unit	Maximum adjustable value of the controller [°C]	Maximum achievable flow temperature at STB 110 °C [°C]
Logamatic 4212	105/95	92
Logamatic 4321/4322[1)]	105/95	92
DAZ/DAM/DAD	110/100	100

Tab. 50 Achievable temperatures subject to control unit

1) Applies only for boiler circuit control; heating circuits can be operated up to a maximum of 90 °C

9.3 Sizing and installation information

9.3.1 Boiler circuit pump in the bypass as shunt pump

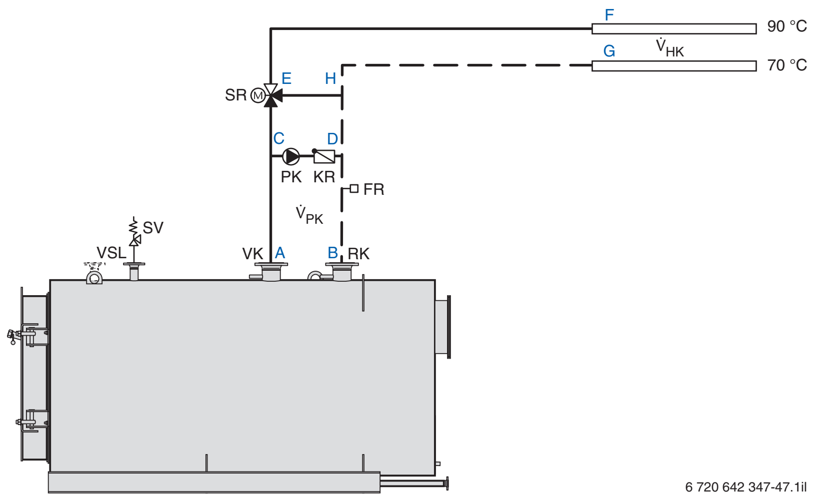

Fig. 56 Example of a hydraulic circuit for a single boiler system with boiler circuit pump in the bypass for Logano S825L/L LN or Logano plus SB825L/L LN

FR Return temperature sensor
KR Check valve
PK Boiler circuit pump
RK Boiler return
SR Actuator for return temperature raising facility
SV Safety valve
VK Boiler flow
VSL Safety flow

Flow rate of the boiler circuit pump $\dot{V}_{PK}$

The boiler circuit pump, also known as a shunt pump, is required to control the return temperature (flow past the sensor). The control characteristics can also be optimised using the boiler circuit pump. This makes it possible to minimise switching during the heat-up phase. This results in lower emissions.

$$\dot{V}_{PK} = \frac{\dot{Q}_K}{\Delta\upsilon_K \times c}$$

Form. 4 Calculating the flow rate of the boiler circuit pump

c Specific heat capacity
$c = 1.16 \times 10^{-3}$ kWh/(l × K) = 1/860 kWh/(l × K)
$\Delta\vartheta_K$ Temperature differential for sizing the boiler circuit pump 30 to 50 K (30 K for optimised heat-up characteristics)
$\dot{Q}_K$ Rated output in kW
$\dot{V}_{PK}$ Flow rate of the boiler circuit pump in l/h

Flow rate of the heating circuits $\dot{V}_{HK}$

$$\dot{V}_{HK} = \frac{\dot{Q}_{HK}}{(\vartheta_V - \vartheta_R) \times c}$$

Form. 5 Calculating the flow rate of the heating circuits

c Specific heat capacity
$c = 1.16 \times 10^{-3}$ kWh/(l × K) = 1/860 kWh/(l × K)
ϑ_R/ϑ_V Return/flow temperature of the heating circuits in °C
$\dot{Q}_{HK}$ Heat demand of the heating circuits in kW
$\dot{V}_{HK}$ Flow rate of the heating circuits in l/h

Total boiler flow rate $\dot{V}_{Kges}$

The head of the boiler circuit pump is the result of:

- The pressure drop of the boiler at the selected flow rate $\dot{V}_{PK}$
- The pressure drop in the pipework **and**
- All individual pressure drop levels in the boiler circuit (path: A–C–D–B, → Fig. 56)

Due to the pump and system curves, the total flow rate via the boiler cannot be calculated simply by adding up the individual flow rates. However, as an initial estimate, the simple addition is adequate for a rough calculation.

Base the sizing of the pipework in the boiler circuit on a flow velocity of 1 m/s to 2.3 m/s.

$$\dot{V}_{Kges} \leq \dot{V}_{PK} + \dot{V}_{HK}$$

Form. 6 Calculating the total flow rate of the boiler

$\dot{V}_{HK}$ Flow rate of the heating circuits in l/h
$\dot{V}_{Kges}$ Maximum total flow rate through the boiler in l/h (estimate)
$\dot{V}_{PK}$ Flow rate of the boiler circuit pump in l/h

Example

Given

- Rated output $\dot{Q}_K = 2500$ kW
- Heating system flow temperature $\vartheta_V = 90$ °C
- Heating system return temperature $\vartheta_R = 70$ °C
- Temperature differential (selected) $\Delta\vartheta_K = 50$ K

Result

- $\dot{V}_{PK} = 43000$ l/h (path: C–D, → Fig. 56)
- $\dot{V}_{HK} = 107500$ l/h
(paths: C–F, D–G und E–H, → Fig. 56)
- $\dot{V}_{Kges} \approx 150500$ l/h
(paths: A–C und B–D, → Fig. 56)

9.3.2 Boiler circuit pump as primary circuit pump

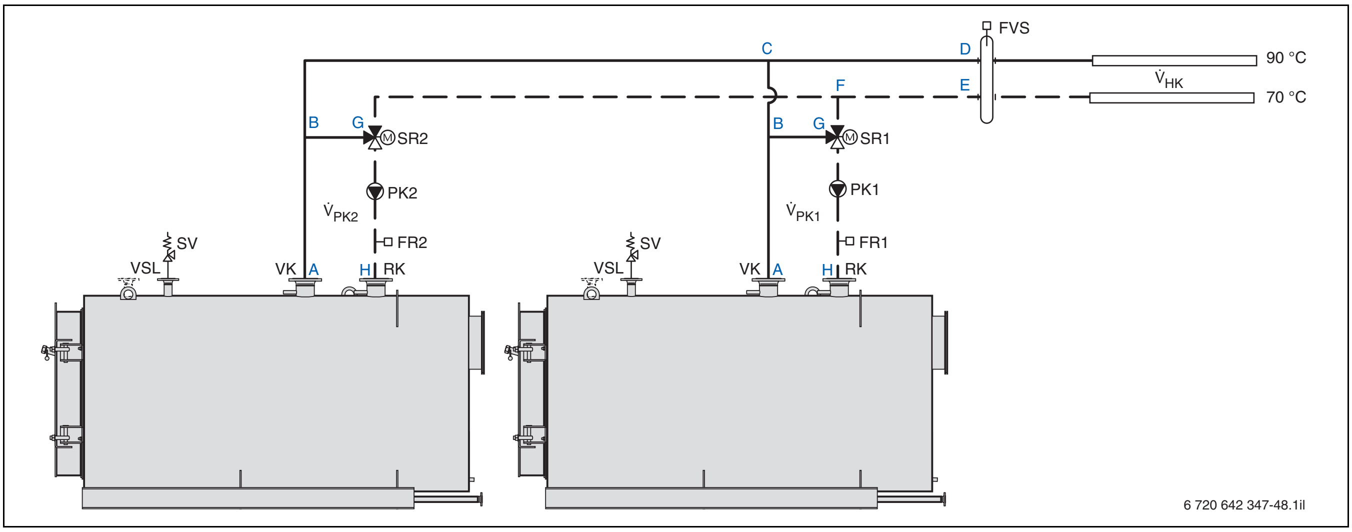

Fig. 57 Example of a hydraulic circuit for a 2-boiler system with boiler circuit pump as primary circuit pump for Logano S825L/L LN or Logano plus SB825L/L LN

FVS Strategy flow temperature sensor
FR Return temperature sensor
PK Boiler circuit pump
RK Boiler return
SR Actuator for return temperature raising facility
SV Safety valve
VK Boiler flow
VSL Safety flow

Flow rate of the boiler circuit pump $\dot{V}_{PK}$

In systems with primary circuit pumps (e.g. with hydraulic balancing lines or depressurised distributors), we recommend installing the boiler circuit pump in the boiler return.

$$\dot{V}_{Kges,\,1} = \dot{V}_{HK} \times (1{,}0...1{,}2)$$

Form. 7 Formula with sizing factor for estimating the flow rate of the boiler circuit pump in a single boiler system

$\dot{V}_{HK}$ Flow rate of the heating circuits in l/h
$\dot{V}_{Kges}$ Total boiler circuit flow rate in l/h

$$\dot{V}_{Kges,\,1} = \dot{V}_{HK} \times (1{,}2...1{,}5)$$

Form. 8 Formula with sizing factor for estimating the flow rate of the boiler circuit pump in a 2-boiler system

$\dot{V}_{HK}$ Flow rate of the heating circuits in l/h
$\dot{V}_{Kges}$ Total boiler circuit flow rate in l/h

In 2-boiler systems, distribute the pump rates of the boiler circuit pumps according to the boiler outputs. If several heating circuits are constantly operated with high flow temperatures and the maximum flow rate, the flow rate of every boiler circuit pump should correspond to the flow rate of the heating circuit pumps. For systems with gas condensing boilers, there are special requirements to be followed, e.g. maintaining as low a return temperature as possible. The pump rate of the boiler circuit pump may then need to be matched to the pump rate of the heating circuits.

Sizing the 3-way valve

Size the 3-way valve for the flow rate that has been calculated. When doing so, observe the pressure drop when the valve is fully open, as the control quality is influenced by the proportional pressure drop.

Head of the primary circuit pump

The head of the boiler circuit pump is the result of:

- The pressure drop of the boiler at the selected flow rate $\dot{V}_{PK}$
- The pressure drop in the pipework **and**
- All individual pressure drop levels in the boiler circuit (path: A–D–E–H, → Fig. 57)

Example

Given

- Heat demand of the heating circuits $\Sigma\dot{Q}_{HK} = 4000$ kW
- Heating system flow temperature $\vartheta_V = 90$ °C
- Heating system return temperature $\vartheta_R = 70$ °C
- Total flow rate with selected sizing factor (→ formula 8) $\dot{V}_{Kges} = \dot{V}_{HK} \times 1.3$

Result

- $\dot{V}_{HK} = 172000$ l/h (→ formula 5)
- $\dot{V}_{Kges} = 223600$ l/h (paths: C–D and E–F, → Fig. 57)

Divide the total flow rate calculated for the boiler circuit side according to the rated outputs (here 50/50 %):

- $\dot{V}_{PK} = 111800$ l/h (paths: A–C, B–G and F–H, → Fig. 57)

9.3.3 Hydraulic balancing line

A hydraulic balancing line (low loss header) is used to hydraulically separate the boiler circuit and the heating circuits.

Installing a hydraulic balancing line has many advantages:

- Trouble-free sizing of the boiler circuit pump and actuators
- Prevention of mutual influence of the heating water flow rates in the heat source and heat consumer circuits
- Heat sources and heat consumers are only supplied with the allocated water flow rates
- Can be used in single and multi boiler systems, independently of the heating circuit control system
- Actuators on both sides of the hydraulic balancing line work best when correctly sized
- The hydraulic balancing line can also be used as a sludge trap if sized accordingly (→ page 74)
- Divided into primary and secondary sides if there is a large pressure drop on the water side and long distances between the boiler and heating circuits

Sizing the low loss header

Correct sizing is very important if the hydraulic balancing line is to function correctly. To ensure good separation with the simultaneous function as a blow-down facility, size the line in such a way that there is virtually no pressure drop between the flow and return. With the nominal water volume, flow velocities of 0.1 m/s to 0.2 m/s can be expected. This makes simultaneous usage as a blow-down facility possible. In order that the heating circuit flow temperature can be captured, provide a sensor well, 200 mm to 300 mm long, in the upper area of the hydraulic balancing line on the heating circuit side.

$$D = \sqrt{\frac{\dot{V}_{Kges}}{v} \times \frac{1}{2827}}$$

Form. 9 Formula for sizing the low loss header

D Diameter of the hydraulic balancing line in m
$\dot{V}_{Kges}$ Total boiler circuit flow rate in m^3/h
v Total boiler circuit flow rate in m/s

Example

Given

- Total flow rate $\dot{V}_{Kges} = 223.6\ m^3/h$
- Flow velocity (assumed) $v = 0.2$ m/s

Result

- Diameter of the hydraulic balancing line $D \approx 0.63$ m

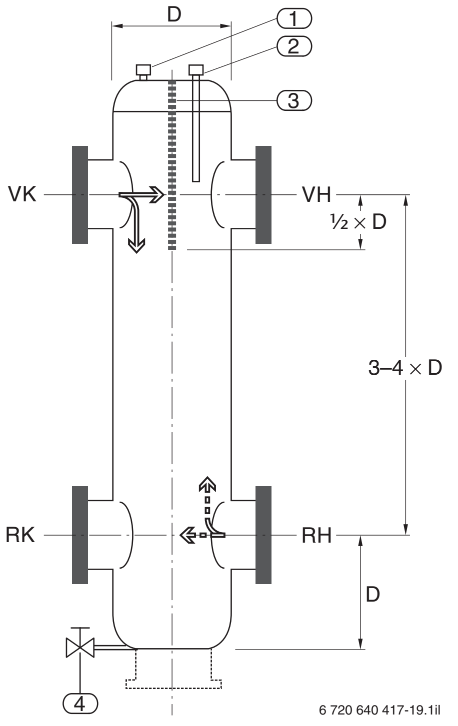

Fig. 58 Schematic diagram of a hydraulic balancing line

RH Heating circuit return
RK Boiler return
VH Heating circuit flow
VK Boiler flow
1 Female connection for an air vent valve
2 Female connection for a sensor well ½ "
3 Perforated partition
4 Quick-acting valve

9.4 Single boiler system with Logano S825L and S825L LN boiler: Logamatic boiler and heating circuit control unit

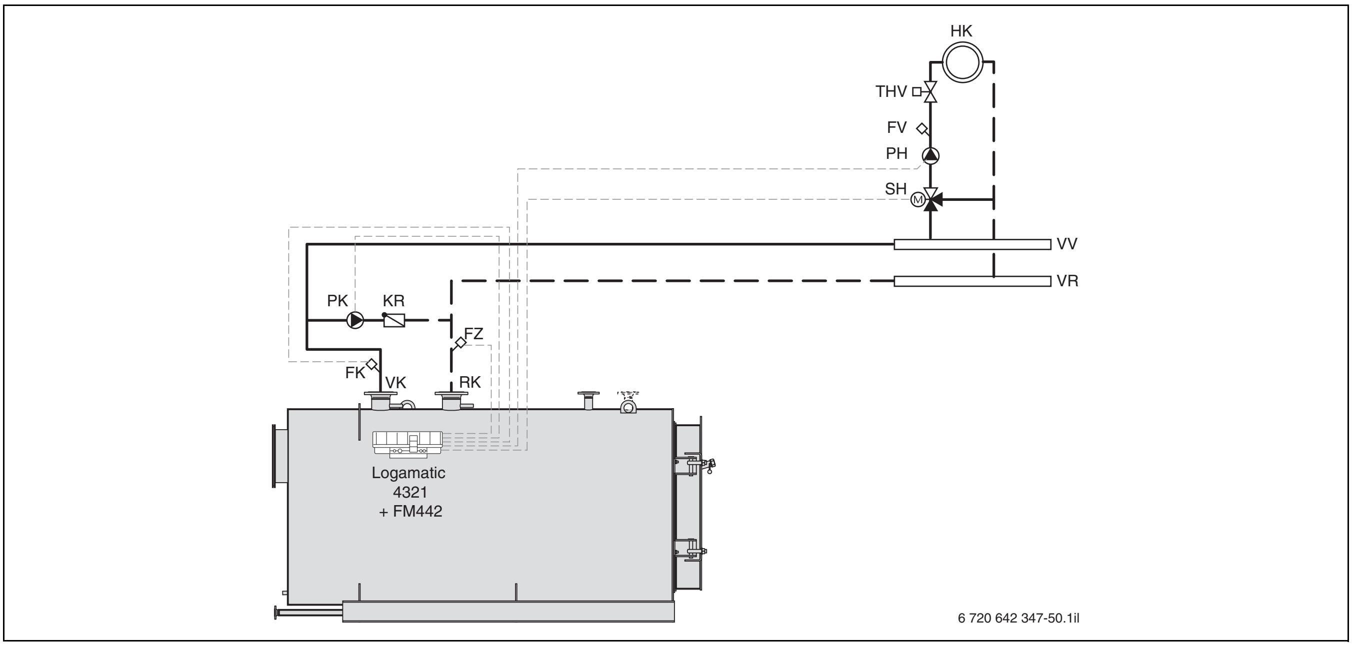

Fig. 59 System example for Logano S825L/L LN with Logamatic boiler and heating circuit control unit (List of abbreviations → page 73)

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano S825L and S825L LN conventional boilers
- Logamatic boiler **and** heating circuit control unit

Brief description of the system

- Control of the minimum return temperature by overriding the heating circuit actuators
- 2-stage or modulating burner mode
- Simple layout

Function description

The heating circuits are controlled via the heating circuit modules. The boiler circuit pump provides hot flow water to the boiler return. This increases the boiler return temperature. To raise the return temperature, the heating circuit actuators are regulated with overriding control. The heating water flow rate to the boiler is restricted until the set value for return temperature control has been reached by mixing in flow water. Once the set value for the return temperature has been reached, heating circuit control is re-enabled.

Special design information

- If a check valve is installed, the boiler circuit pump run-on time should be five minutes. If no check valve is installed, set a run-on time of 60 minutes.
- In conjunction with the Logamatic control units, the maximum possible flow temperature of a heating circuit with mixer is 90 °C.

9.5 Single boiler system with Logano S825L and S825L LN boiler: Logamatic boiler and heating circuit control unit with hydraulic separation

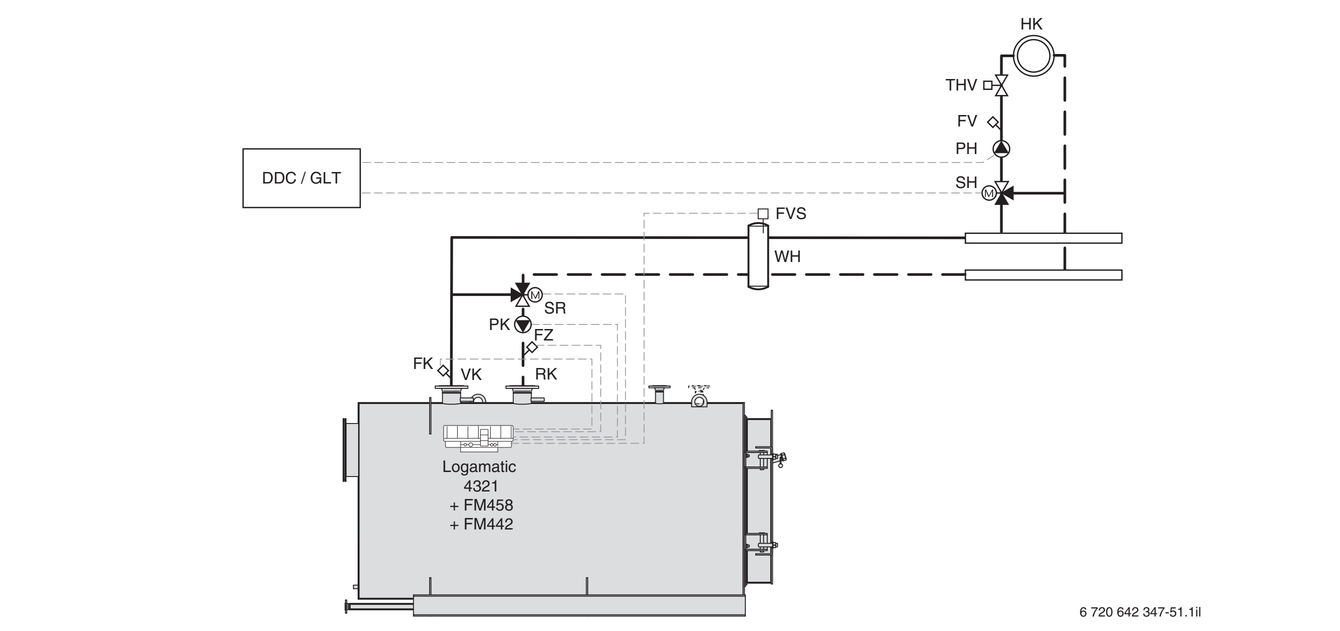

Fig. 60 System example for Logano S825L/L LN with Logamatic boiler and heating circuit control unit and hydraulic separation (List of abbreviations → page 73)

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano S825L and S825L LN conventional boilers
- Logamatic boiler **and** heating circuit control unit
- Hydraulic separation
- System structure in this form if a feed pump is required, e.g. through sizing the heating circuit pumps, or if several distributor stations are required, or if the distributor stations are installed far apart

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump
- 2-stage or modulating burner mode
- Automatic or weather-compensated load limitation
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

The 3-way valve is actuated to control the return temperature. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted by actuating the 3-way valve. If the return temperature rises above the set value, the 3-way valve is reopened and the flow rate to the heating circuit increases.

Special design information

- Size the boiler circuit pump for the maximum calculated flow rate and the pressure drop in the boiler circuit. Switch it to constant mode or set a run-on time of 60 minutes.
- Allow for a low loss header or a distributor with bypass and non-return valve.
- In conjunction with the Logamatic control units, the maximum possible flow temperature of a heating circuit with mixer is 90 °C.

9.6 Single boiler system with Logano S825L and S825L LN boiler: Logamatic boiler circuit control unit

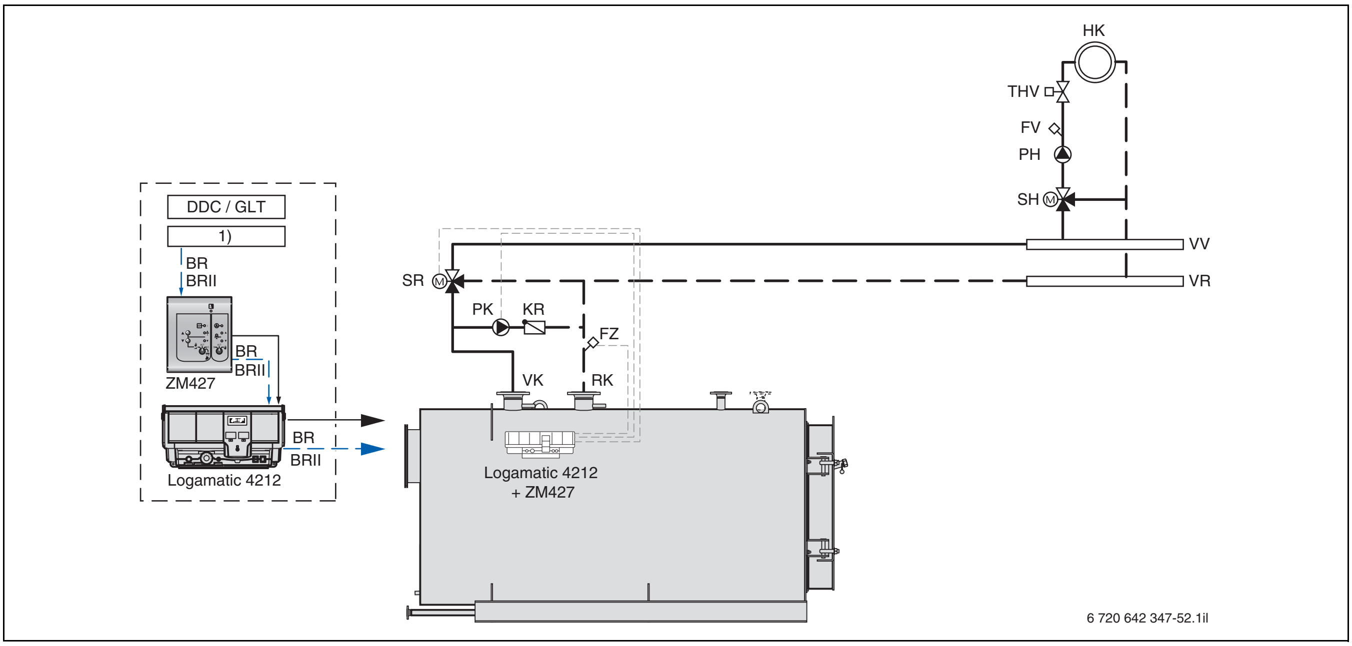

Fig. 61 System example for Logano S825L/L LN with Logamatic boiler circuit control unit (List of abbreviations → page 73)

1) Enabling (potential-free)
→ Burner stage I
→ Burner stage II or modulation

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano S825L and S825L LN conventional boilers
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump as a shunt pump
- 2-stage or modulating burner mode
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

To control the return temperature, the 3-way valve is actuated, as is the boiler circuit pump which is installed in the bypass line to the boiler. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted and the bypass from the heating return to the heating flow is opened. The heating circuit flow rate remains almost constant even during this operating phase. The boiler circuit pump safeguards the optimum flow rate in the boiler circuit.

Special design information

- If a check valve is installed, the boiler circuit pump run-on time should be five minutes. If no check valve is installed, set a run-on time of 60 minutes.

9.7 Single boiler system with Logano S825L and S825L LN boiler: Logamatic boiler circuit control unit with hydraulic separation

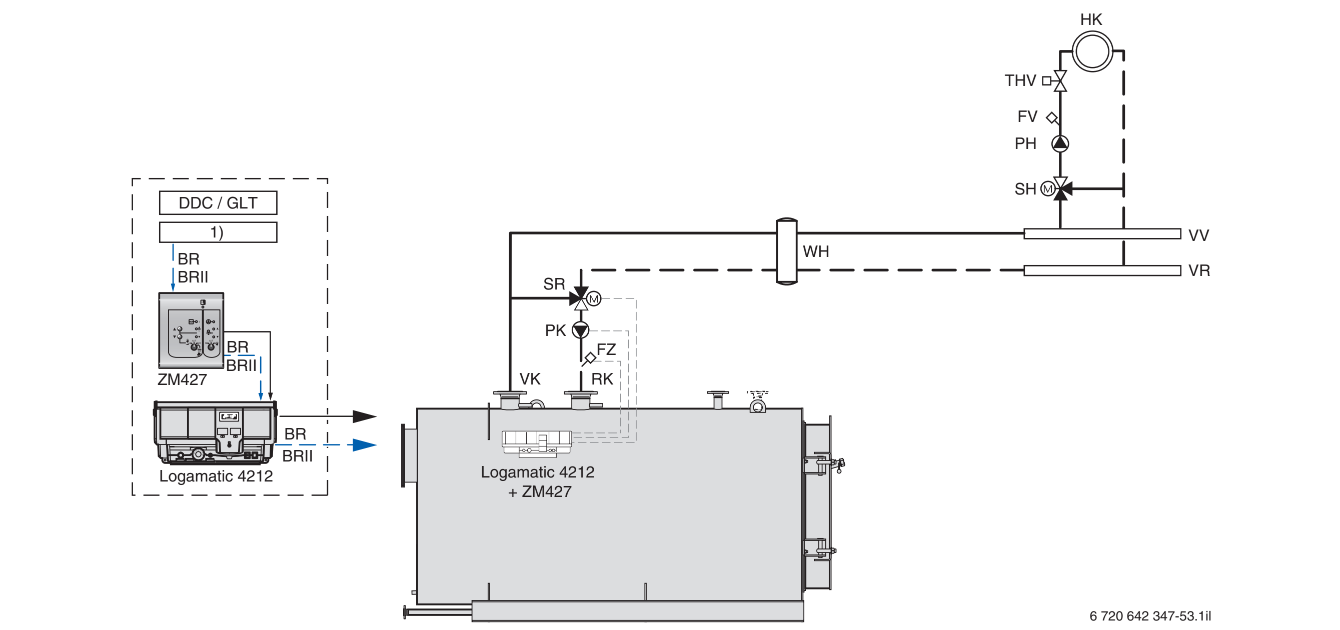

Fig. 62 System example for Logano S825L/L LN with Logamatic boiler circuit control unit and hydraulic separation (List of abbreviations → page 73)

1) Enabling (potential-free)
→ Burner stage I
→ Burner stage II or modulation

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano S825L and S825L LN conventional boilers
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages
- Hydraulic separation
- System structure in this form if a feed pump is required, e.g. through sizing the heating circuit pumps, or if several distributor stations are required, or if the distributor stations are installed far apart

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump as a primary circuit pump
- 2-stage or modulating burner mode
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

The 3-way valve is actuated to control the return temperature. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted by actuating the 3-way valve. If the return temperature rises above the set value, the 3-way valve is reopened and the flow rate to the heating circuit increases.

Special design information

- Allow for a low loss header.
- Switch the boiler circuit pump to constant mode or set a run-on time of 60 minutes.

9.8 2-boiler system with two Logano S825L and S825L LN boilers: Logamatic boiler circuit control unit with hydraulic separation

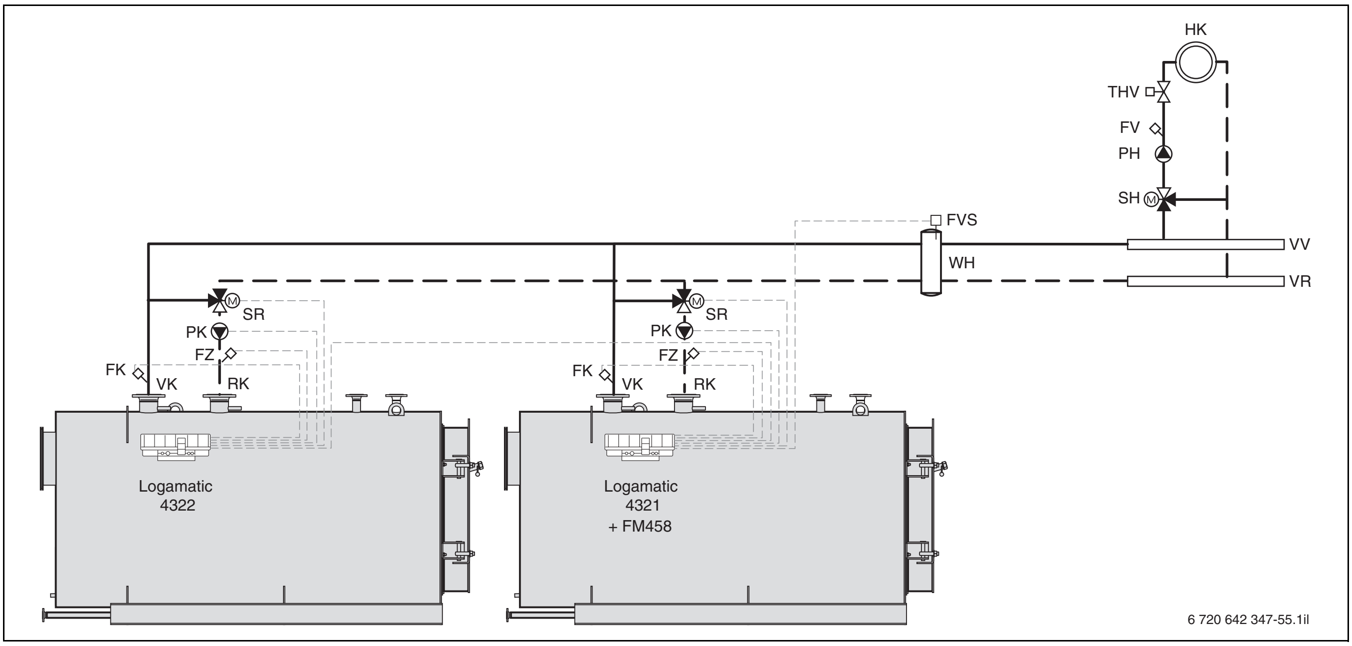

Fig. 63 System example for a 2-boiler system with two Logano S825L/L LNs and Logamatic boiler circuit control unit with hydraulic separation (List of abbreviations → page 73)

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano S825L and S825L LN conventional boilers
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages
- Hydraulic separation

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump
- Either serial or parallel operating mode
- 2-stage or modulating burner mode
- Boiler sequence can be reversed
- Hydraulic shut-off of the lag boiler with time delay
- Automatic or weather-compensated load limitation
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

The 3-way valve is actuated to control the return temperature. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted by actuating the 3-way valve. If the return temperature rises above the set value, the 3-way valve is reopened and the flow rate to the heating circuit increases. Any boilers not in operation are hydraulically shut off.

Special design information

- Allow for a low loss header.
- The boiler circuit pump run-on time after burner shutdown should be five minutes for the lag boiler, and 30-60 minutes for the lead boiler.
- We recommend distributing the total output between the boilers so each has 50 % (maximum 60/40 %).
- This scheme can also be used if a third boiler is connected.

9.9 Single boiler system with Logano plus SB825L and SB825L LN gas condensing boiler: Logamatic boiler circuit control unit

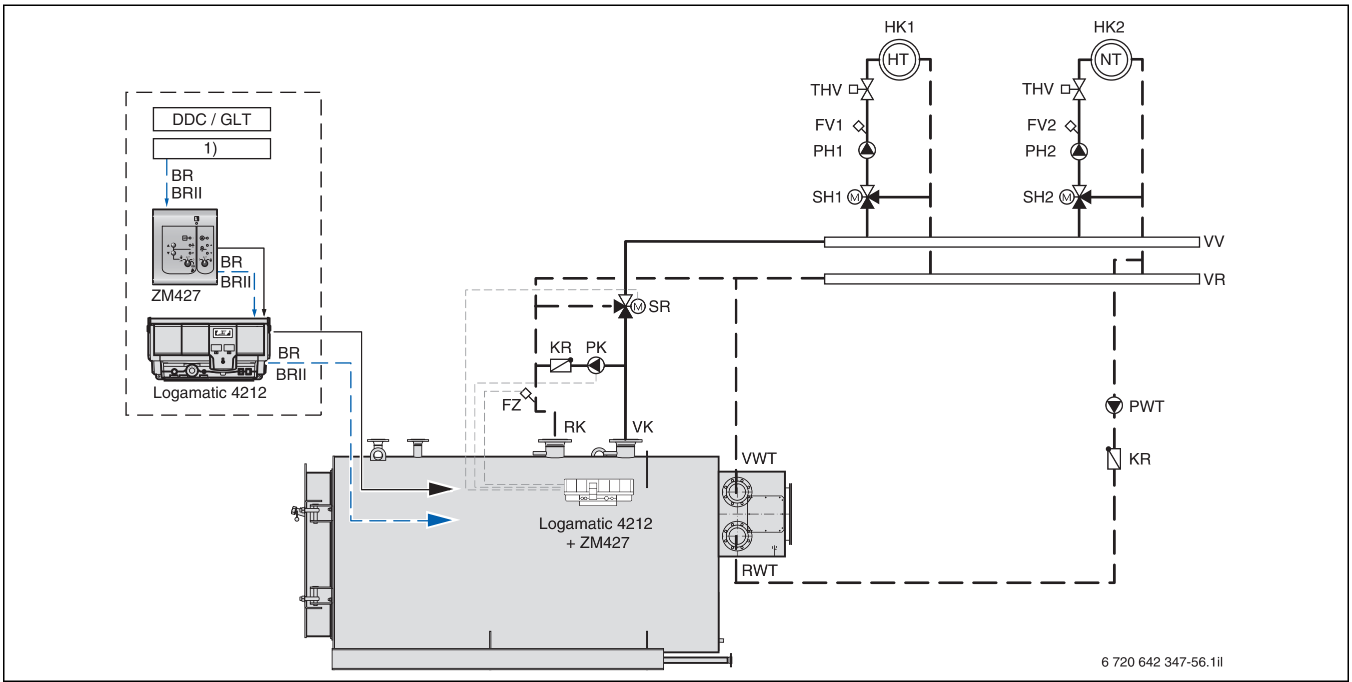

Fig. 64 System example for Logano plus SB825L/L LN with Logamatic boiler circuit control unit (List of abbreviations → page 73)

1) Enabling (potential-free)
→ Burner stage I
→ Burner stage II or modulation

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano plus SB825L and SB825L LN gas condensing boilers with gas combustion
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages
- Partial flow of the condensing heat exchanger (BWT)

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump
- 2-stage or modulating burner mode
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

To control the return temperature, the 3-way valve is actuated, as is the boiler circuit pump which is installed in the bypass line to the boiler. If the return temperature at the return temperature sensor falls below the set value, the heating water flow rate to the boiler return is constantly restricted and the bypass from the heating return to the heating flow is opened.

The heating circuit flow rate remains almost constant even during this operating phase. The boiler circuit pump safeguards the optimum flow rate in the boiler circuit. Targeted utilisation of the condensing effect is possible with the condensing heat exchanger connected separately to the low temperature heating circuit.

Special design information

- If a check valve is installed, the boiler circuit pump run-on time should be five minutes. If no check valve is installed, set a run-on time of 60 minutes.
- The condensing heat exchanger pump should be actuated in parallel to the burner. Match the delivery head to the pressure drop of the condensing heat exchanger and the connection pipework.
- The flow rate via the condensing heat exchanger must be more than 20 % of the total flow rate and must not exceed the maximum flow rate give in Chapters 3.3.5 to 3.3.8.
- If there are shut-off valves between the boiler and condensing heat exchanger, an additional safety valve and pressure gauge are required at the condensing heat exchanger.
- Protect the condensing heat exchanger with an on-site safety temperature limiter or high limit safety cut-out.

9.10 Single boiler system with Logano plus SB825L and SB825L LN gas condensing boiler: Logamatic boiler circuit control unit with hydraulic separation

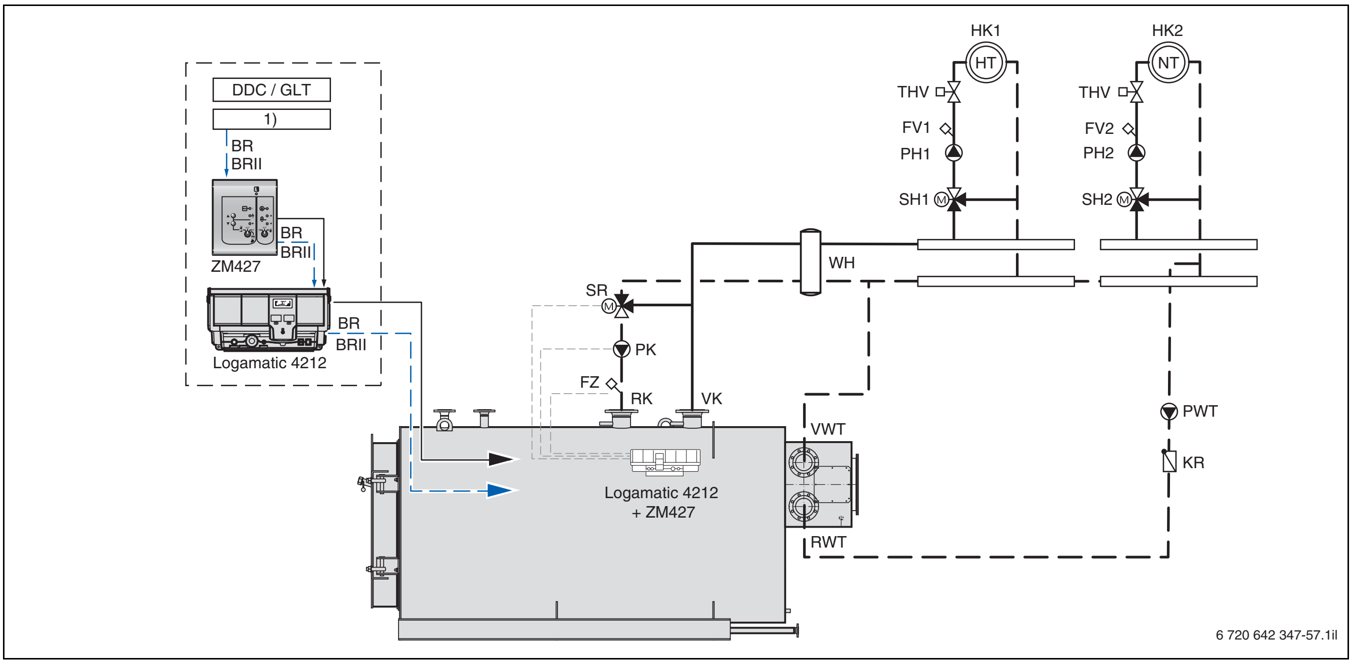

Fig. 65 System example for Logano plus SB825L/L LN with Logamatic boiler circuit control unit and hydraulic separation (List of abbreviations → page 73)

1) Enabling (potential-free)
→ Burner stage I
→ Burner stage II or modulation

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano plus SB825L and SB825L LN gas condensing boilers with gas combustion
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages
- System structure in this form if a feed pump is required, e.g. through sizing the heating circuit pumps, or if several distributor stations are required, or if the distributor stations are installed far apart

Brief description of the system

- Minimum return temperature controlled via a separate actuator in the boiler circuit and a boiler circuit pump as a primary circuit pump
- 2-stage or modulating burner mode
- Heating circuit control with Logamatic control unit or on-site control unit

Function description

The 3-way valve is actuated to control the return temperature. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted by actuating the 3-way valve.
If the return temperature rises above the set value, the 3-way valve is reopened and the flow rate to the heating circuit increases. Targeted utilisation of the condensing effect is possible with the condensing heat exchanger (BWT) connected separately to the low temperature heating circuit.

Special design information

- If shut-off valves are installed between the boiler and condensing heat exchanger, an additional safety valve and pressure gauge are required at the condensing heat exchanger.
- Allow for a low loss header.
- Switch the boiler circuit pump to constant mode or set a run-on time of 60 minutes.
- The condensing heat exchanger pump should be actuated in parallel to the burner. Match the delivery head to the pressure drop of the condensing heat exchanger and the connection pipework.
- The flow rate via the condensing heat exchanger must be more than 20 % of the total flow rate and must not exceed the maximum flow rate give in Chapters 3.3.5 to 3.3.8.
- Protect the condensing heat exchanger with an on-site safety temperature limiter or high limit safety cut-out.

9.11 2-boiler system with Logano S825L and S825L LN conventional boiler and Logano plus SB825L and SB825L LN gas condensing boiler: Logamatic boiler circuit control unit with hydraulic separation

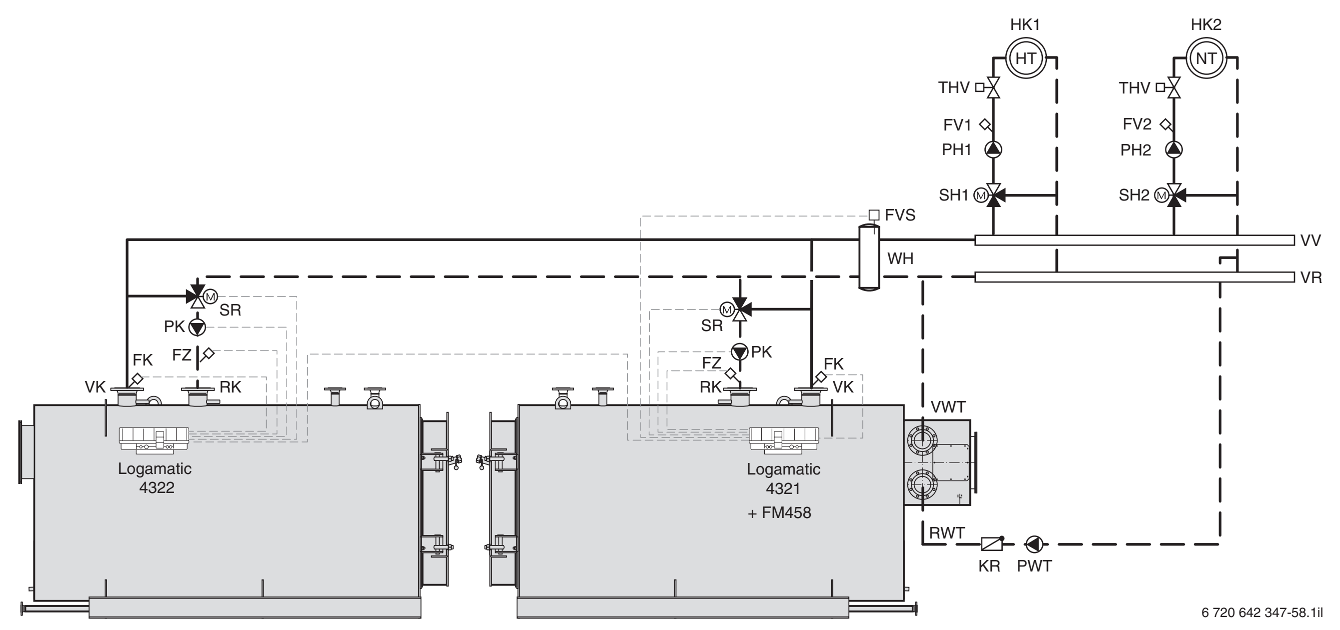

Fig. 66 System example of a 2-boiler system with Logano S825L/L LN and Logano plus SB825L/L LN; Logamatic boiler circuit control unit with hydraulic separation (List of abbreviations → page 73)

> **i** The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano plus SB825L and SB825L LN gas condensing boilers and Logano S825L and S825L LN conventional boilers with gas combustion
- Logamatic boiler circuit control unit
  - Maintaining the operating conditions
  - Enabling of burner stages
- Hydraulic separation

Brief description of the system

- Lead boiler is the gas condensing boiler
- 2-stage or modulating burner mode
- Boiler sequence can be reversed, but is not recommended
- Hydraulic shut-off of the lag boiler with time delay
- Automatic or weather-compensated load limitation

Function description

The 3-way valve is actuated to control the return temperature. The return temperature sensor measures the boiler return temperature. If this falls below the set value, the heating water flow rate to the boiler return is constantly restricted by actuating the 3-way valve. If the return temperature rises above the set value, the 3-way valve is reopened and the flow rate to the heating circuit increases.

Any boilers not in operation are hydraulically shut off. Targeted utilisation of the condensing effect is possible with the condensing heat exchanger (BWT) connected separately to the low temperature heating circuit.

Special design information

- The boiler circuit pump run-on times are set to 30-60 minutes for the lead boiler and five minutes for the lag boiler.
- We recommend distributing the total output between the boilers so each has 50 % (maximum 60/40 %).
- The condensing heat exchanger pump should be actuated in parallel to the burner. Match the delivery head to the pressure drop of the condensing heat exchanger and the connection pipework.
- The flow rate via the condensing heat exchanger must be more than 20 % of the total boiler flow rate and must not exceed the maximum flow rate give in Chapters 3.3.5 to 3.3.8.
- If there are shut-off valves between the boiler and condensing heat exchanger, an additional safety valve and pressure gauge are required at the condensing heat exchanger.
- Protect the condensing heat exchanger with an on-site safety temperature limiter or high limit safety cut-out.
- This scheme can also be used if a third boiler is connected.

9.12 Logano plus SB825L and SB825L LN gas condensing boiler: dual fuel combustion with condensing heat exchanger

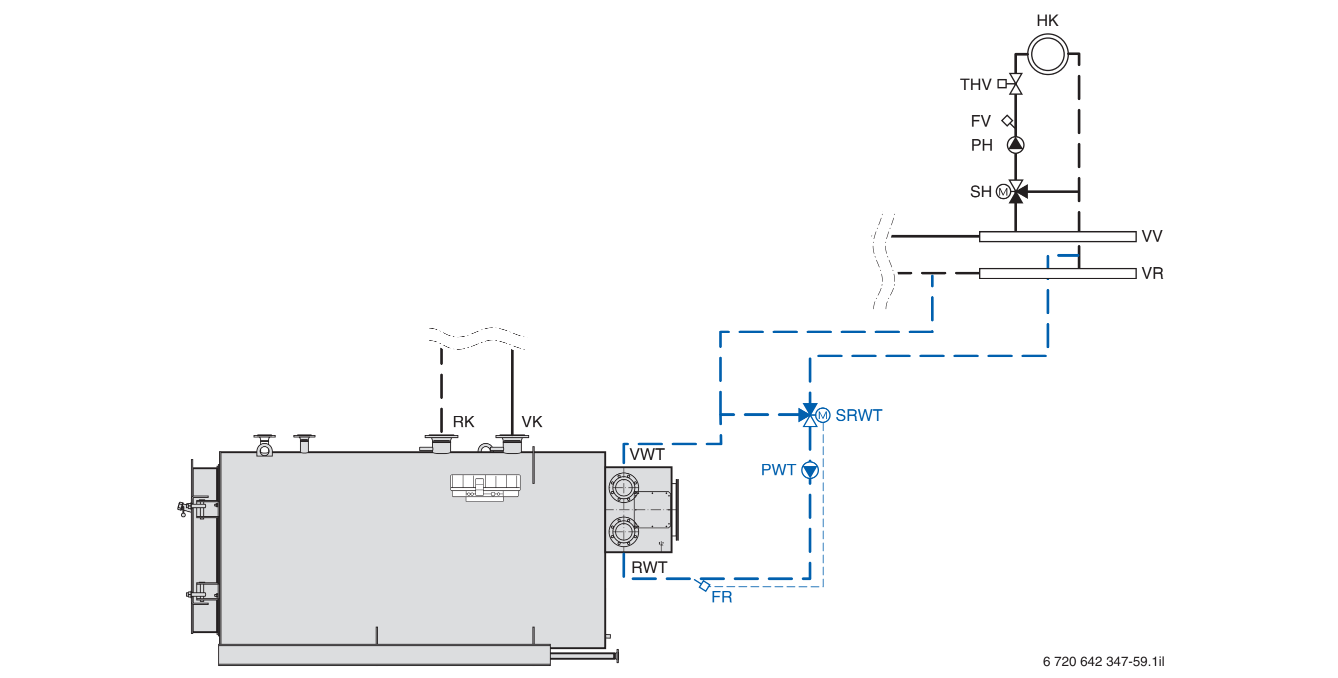

Fig. 67 Installation of the condensing heat exchanger in the Logano plus SB825L/L LN with dual fuel combustion (List of abbreviations → page 73)

The circuit diagram is only a schematic illustration. Information regarding all system examples → page 73 ff.

Application area

- Logano plus SB825L and SB825L LN gas condensing boilers
- Oil/gas combi burners
- Systems with a gas cut-off contract

Brief description of the system

- Combustion with gas, for brief periods with oil
- The operating conditions of the condensing heat exchanger (BWT) are safeguarded with oil combustion by a separate actuator in conjunction with a return temperature controller

Function description

With gas combustion, the additional return actuator SRWT is fully opened in the connection pipework of the condensing heat exchanger on the water side. After changing to oil combustion, the return temperature control with 3-point output is enabled via a temperature controller. If the temperature falls below the minimum return temperature of 60 °C, the mixer closes. The cold return water cannot enter the condensing heat exchanger. If the temperature in this circuit rises above 60 °C, the mixer enables the system return.

Special design information

- If the actuator SRWT is installed between the boiler and condensing heat exchanger, an additional safety valve and pressure gauge are required at the condensing heat exchanger.
- Control of the actuator SRWT should be arranged on site or in conjunction with a control panel.
- Size the pump for the condensing heat exchanger according to its pressure drop and the pressure drop in the circuit.
- Route away the condensate that occurs in the flue system with oil combustion separately and neutralise it (→ page 112 f.).
- Special operating conditions must be observed with oil combustion. Your local Buderus sales office will advise you on suitable return temperature controllers.
- The condensing heat exchanger pump is actuated in parallel to the burner.
- The flow rate via the condensing heat exchanger must be more than 20 % of the total flow rate and must not exceed the maximum flow rate give in Chapters 3.3.5 to 3.3.8.

10 Installation

10.1 Transport and handling

10.1.1 Delivery method and transport options

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are delivered in a transport unit.

Transport

To transport the boiler block with a crane, only use the two lifting eyes. These are fitted at the top of the boiler pressure body, at the front and back.

The boiler block can be transported on level ground on its base frame, e.g. on rollers.

Standard delivery

- Logano S825L and S825L LN conventional boilers
  - Boiler block with thermal insulation
  - Burner door
  - Welded flue gas collector
  - Mating flange on the flue gas side (not in the “standardised” boiler version)
  - Fireproof filling material (commonly called tamping clay)
  - Technical documentation
  - Also part of the standard delivery for standardised boiler versions:
    – Control unit retainer
    for Logano S825L/L LN “standardised”)
    – Foil packaging
    for Logano S825L “standardised”)
- Logano plus SB825L and SB825L LN gas condensing boilers
  - Boiler block with thermal insulation
  - Burner door
  - Welded flue gas collector with condensing flue gas heat exchanger
  - Fireproof filling material (commonly called tamping clay)
  - Technical documentation

10.1.2 Handling dimensions

For handling the boiler, it is essential to size the entrance to the installation room slightly larger than the boiler dimensions. See Tab. 51 for the minimum handling dimensions. If the minimum dimensions cannot be achieved, please contact your local Buderus sales office.

Logano S825L Logano plus SB825L Boiler size	Logano S825L LN Logano plus SB825L LN Boiler size	Entrance			
		Logano S825L and S825L LN		Logano plus SB825L and SB825L LN	
		Minimum width [mm]	Minimum height [mm]	Minimum width [mm]	Minimum height [mm]
650	–	1350	1850	1500	1865
1000	750	1500	2000	1650	2015
1350	1000	1600	2100	1755	2115
1900	1250	1700	2200	1855	2215
2500	1500	1750	2250	1910	2265
3050	2000	1850	2350	1995	2365
3700	2500	1900	2400	2060	2415
4200	3000	2000	2500	2155	2515
5200	3500	2100	2600	2250	2615
6500	4250	2300	2800	2435	2800
7700	5250	2450	2950	2605	2950
9300	6000	2600	3100	2750	3100
11200	8000	2750	3300	2905	3250
12600	10000	2900	3400	3045	3400
14700	12000	3100	3650	3240	3600
16400	14000	3400	3950	3555	3900
19200	17500	3600	4150	3750	4100

Tab. 51 Minimum handling dimensions of Logano S825L/L LN and Logano plus SB825L/L LN

10.2 Design of installation rooms and combustion air supply

10.2.1 Installation room

Fundamental requirements

The following fundamental requirements of the installation room must be fulfilled:

- Only install the boiler system in a room that complies with relevant local regulations.
- Keep the installation room clean and free of dust and dripping water. The inside temperature must be between 5 °C and 40 °C.
- Entry to the boiler installation room must be forbidden to unauthorised personnel by noticeable, permanent signs.
- Depending on the boiler parameters (water content, pressure, output) and national regulations, less stringent installation or monitoring conditions may apply.
- Ensure sound insulation measures comply with local regulations.
- Install the control panels in such a way that no vibrations or shaking of the system components can be transmitted to the control panels. Install in areas where the control panels will be protected from impermissible heat radiation and ensure safe accessibility even in potentially dangerous circumstances.
- Free access to inspection apertures on boilers and system components must be ensured.

Requirements of the building

The following requirements of the building must be fulfilled:

- The installation location must be constructed in such a way that vibrations as a result of operation cannot cause any damage to buildings or adjacent systems.
- The static of the building structure must be taken into account for all fixings.
- Every boiler installation room must have a continuous or nearly continuous, free external wall or ceiling area of at least 1/10 the floor area (or as per local regulations), that will yield much more easily than the other surrounding walls if overpressure occurs in the boiler installation room.
- Design the entrance to the boiler installation room according to the dimensions of the individual components.
- Provide suitable lifting gear in the boiler installation room to move heavy equipment.
- The internal height and width of all walk-on surfaces must be sufficient. Access to the system must be ensured in line with local regulations. If the internal height of the installation room is lower than required for structural reasons, determine the minimum height together with the local responsible authorities.
- Suitable and designated escape routes must be available.
- The boiler installation room, especially around the valves and safety equipment, as well as the escape routes, must be illuminated.
- System components that are to be operated must be easily accessible and there must be enough space to open doors (including inspection apertures).

10.2.2 Combustion air supply

The design of installation rooms and the installation of boilers must comply with the relevant national regulations.

Fundamental requirements

- Combustion air apertures and lines must never be closed or covered unless there is special safety equipment that ensures the combustion equipment can only be operated if the flow cross-section is unobstructed.
- The required cross-section must not be restricted by a closure or grille.
- An adequate supply of combustion air must be verified.
- The ventilation air supply to the combustion equipment should come from the boiler installation room to compensate for outside temperature fluctuations. The maximum temperature fluctuation must not exceed 30 K.
- Combustion air temperature:
  - Minimum: + 5 °C or as specified by burner manufacturer
  - Maximum: + 40 °C or as specified by burner manufacturer

Arrangement of ventilation and extract air apertures

- Ideally, ventilation air apertures are arranged near the back of the boiler. If this is not possible for structural reasons, install air baffles or sheet metal channels inside the boiler installation room to deflect the inlet air.
- When designing the ventilation air apertures, the arrangement of frost-sensitive system components must also be taken into account (e.g. water treatment) if they cannot be installed in the direct path of the ventilation air.
- Furthermore, install the ventilation air apertures in the boiler installation room in such a way that the ventilation air does not flow over boiler doors or reversing chambers (to prevent condensation).
- Extract air apertures should also be provided.
- Ventilation air apertures should be fitted 500 mm above the boiler room floor; extract air apertures should be fitted at the highest point of the installation room. Ensure cross venting.

Sizing ventilation and extract air apertures

- Size ventilation and extract air apertures to obtain a pressure of ± 0 mbar in the boiler installation room.
- If the combustion air is routed via air inlet channels to the burner, ensure an optimised flow path and adequate sizing with regard to the pressure drop.
- The side ratio of the aperture must not be more than 1:2.
- Extract air cross-sections correspond to 60 % of the ventilation air cross-sections.

The calculation formulae below are a **non-binding recommendation.** It is essential that the system installer seeks the agreement of the responsible approval or building regulations body. Take into account additional consumers of ventilation air (e.g. compressors) when sizing.

For outputs ...	... the following calculation applies for the free ventilation air cross-section[1)]
≤ 2000 kW	$A = 300 + [(Q - 50) \times 2.5]$
> 2000, ≤ 20000 kW	$A = 5175 + [(Q - 2000) \times 1.75]$
> 20000 kW	$A = 36675 + [(Q - 2000) \times 0.88]$

Tab. 52 Calculating free ventilation air cross-sections

1) A = free cross-section (net) in cm^2, Q = output in kW

10.3 Installed dimensions

10.3.1 Installation room dimensions for the Logano S825L and S825L LN conventional boilers

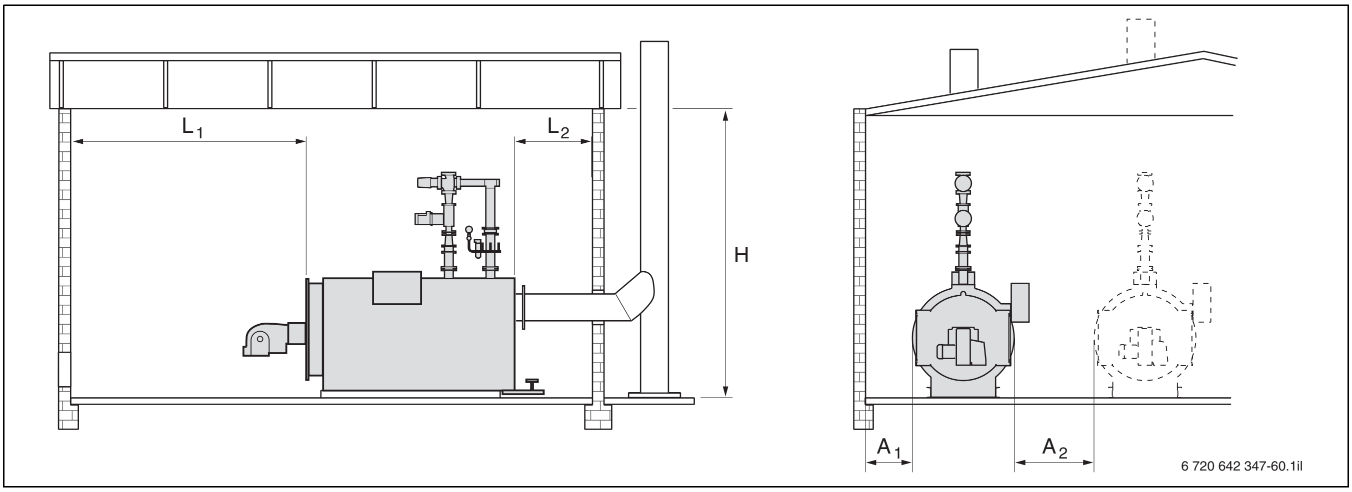

Fig. 68 Installation room dimensions Logano S825L/L LN

Allow extra space for sound insulation measures. Maintain the specified wall clearances to facilitate installation, service and maintenance work. If it is not possible to keep to the recommended clearances, consult your local Buderus sales office to ensure the functional reliability of the system can be ensured.

Logano S825L Boiler size	Logano S825L LN Boiler size	Installation room dimensions[1]				
		Length		Height	Side clearance[2]	
		L_1 [mm]	L_2 [mm]	H [mm]	A_1 [mm]	A_2 [mm]
650	–	2100	1000	3300	500	1200
1000	750	2500	1000	3500	500	1300
1350	1000	2750	1000	3800	500	1300
1900	1250	3000	1000	4100	500	1300
2500	1500	3500	1000	4100	500	1300
3050	2000	3500	1000	4400	500	1500
3700	2500	3850	1000	4400	500	1500
4200	3000	4250	1000	4600	500	1550
5200	3500	4400	1000	5100	500	1650
6500	4250	4800	1000	5600	500	1800
7700	5250	5000	1000	on request	500	1800
9300	6000	5200	1000	on request	500	on request
11200	8000	5650	1000	on request	500	on request
12600	10000	5950	1000	on request	500	on request
14700	12000	6700	1000	on request	500	on request
16400	14000	7150	1000	on request	500	on request
19200	17500	7600	1000	on request	500	on request

Tab. 53 Installation room dimensions Logano S825L/L LN (dim. of the boiler foundation → Tab. 63, page 105)

1) The values given are a guide. They may differ subject to the individual system.

2) Subject to the burner; the values given are a guide. The burner door can pivot either to the right or left.

10.3.2 Installation room dimensions for the Logano plus SB825L and SB825L LN gas condensing boilers

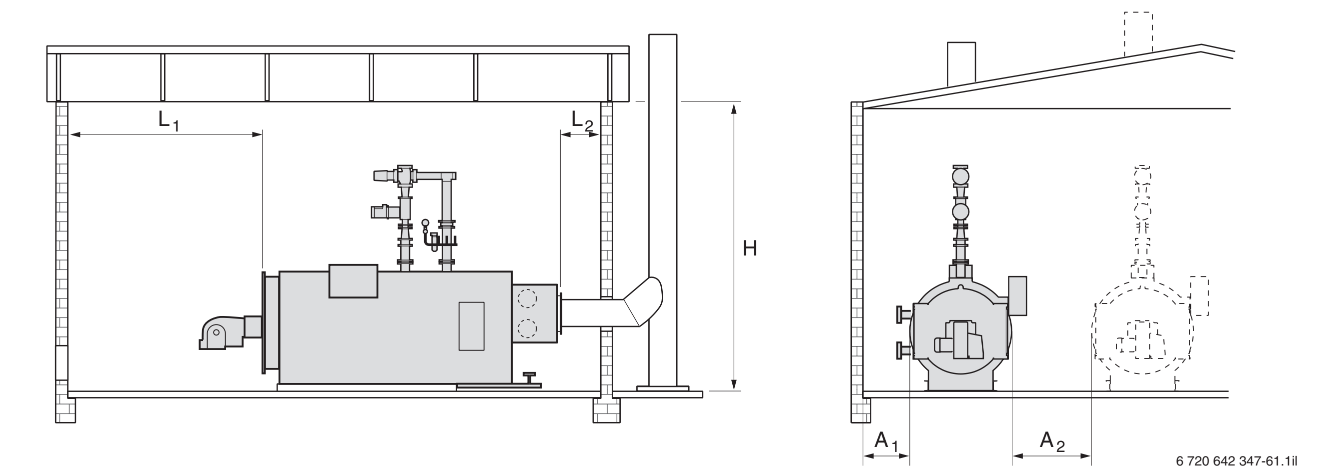

Fig. 69 Installation room dimensions Logano plus SB825L/L LN

Allow extra space for sound insulation measures. Maintain the specified wall clearances to facilitate installation, service and maintenance work. If it is not possible to keep to the recommended clearances, consult your local Buderus sales office to ensure the functional reliability of the system can be ensured.

Logano plus SB825L Boiler size	Logano plus SB825L LN Boiler size	Installation room dimensions1)				
		Length2)		Height	Side clearance3)	
		L_1 [mm]	L_2 [mm]	H [mm]	A_1 [mm]	A_2 [mm]
1000	750	2700	500	3500	700	1300
1350	1000	2950	500	3800	700	1300
1900	1250	3200	500	4100	800	1300
2500	1500	3700	500	4100	900	1300
3050	2000	3700	500	4400	900	1500
3700	2500	4050	500	4400	950	1500
4200	3000	4450	500	4600	950	1550
5200	3500	4600	500	5100	950	1650
6500	4250	5000	500	5600	950	1800
7700	5250	5200	500	on request	1000	1800
9300	6000	5450	500	on request	1000	on request
11200	8000	5900	500	on request	1000	on request
12600	10000	6200	500	on request	1000	on request
14700	12000	6950	500	on request	1000	on request
16400	14000	7400	500	on request	1050	on request
19200	17500	7850	500	on request	1050	on request

Tab. 54 Installation room dimensions Logano plus SB825L/L LN (dim. of the boiler foundation → Tab. 63, page 105)

1) The values given are a guide. They may differ subject to the individual system.

2) Length L_1 relative to a condensing heat exchanger with a tube bundle element; with a condensing heat exchanger with two tube bundle elements, the length increases by 300 mm.

3) Subject to the burner; the values given are a guide. The burner door can pivot either to the right or left.

10.4 Additional safety equipment to DIN-EN 12828

10.4.1 Safety equipment

Safety equipment version	High limit safety cut-out (STB) with shutdown temperature ≤ 110 °C Heat source > 300 kW
Safety equipment assembly, standard equipment level	Required
Set with STB and maximum pressure limiter	Required 1)
Minimum pressure limiter	Alternative to low water indicator

Tab. 55 Safety equipment versions for Logano S825L/L LN and Logano plus SB825L/L LN

1) As an alternative to a flash trap, the set with STB and maximum pressure limiter can be used

Safety component	Make	Component designation
Low water indicator	Sasserath SYR 0933.20.011 1)	TÜV HWB-96-190
Maximum pressure limiter	Sauter DSH 143 F 001 2) / DSH 146 F001 3)	TÜV SDB-00-331
Minimum pressure limiter	Sauter DSL 143 F 001 4) / DSL 152 F001 5)	TÜV SDBF-00-330
High limit safety cut-out	Sauter RAK 13.4040 6)	STB 1006 98

Tab. 56 Approval designation of safety components Logano S825L/L LN and Logano plus SB825L/L LN

1) As an alternative, a minimum pressure limiter can be used
2) Setting range 0.5 bar to 6 bar
3) Setting range 1 bar to 10 bar
4) Setting range 0 bar to 6 bar
5) Setting range 6 bar to 16 bar
6) Setting range 95 °C to 120 °C

10.4.2 Boiler safety equipment assembly to DIN-EN 12828

An intermediate flow piece and valve distributor are required to install the safety equipment.

Versions flange PN16 to DIN 2633:

- DN32/40/50/65/80/100/125/150/200/250/300/350

The safety equipment assembly for "standardised" boiler versions consists of:

- Intermediate flow piece
- Shut-off valve
- Valve distributor
- Minimum pressure limiter
- Pressure gauge
- Pressure gauge shut-off valve with test connection

The safety equipment assembly in the standard equipment level consists of:

- Intermediate flow piece
- Shut-off valve
- Valve distributor
- Minimum pressure limiter or low water indicator
- Pressure gauge
- Pressure gauge shut-off valve with test connection
- Maximum pressure limiter

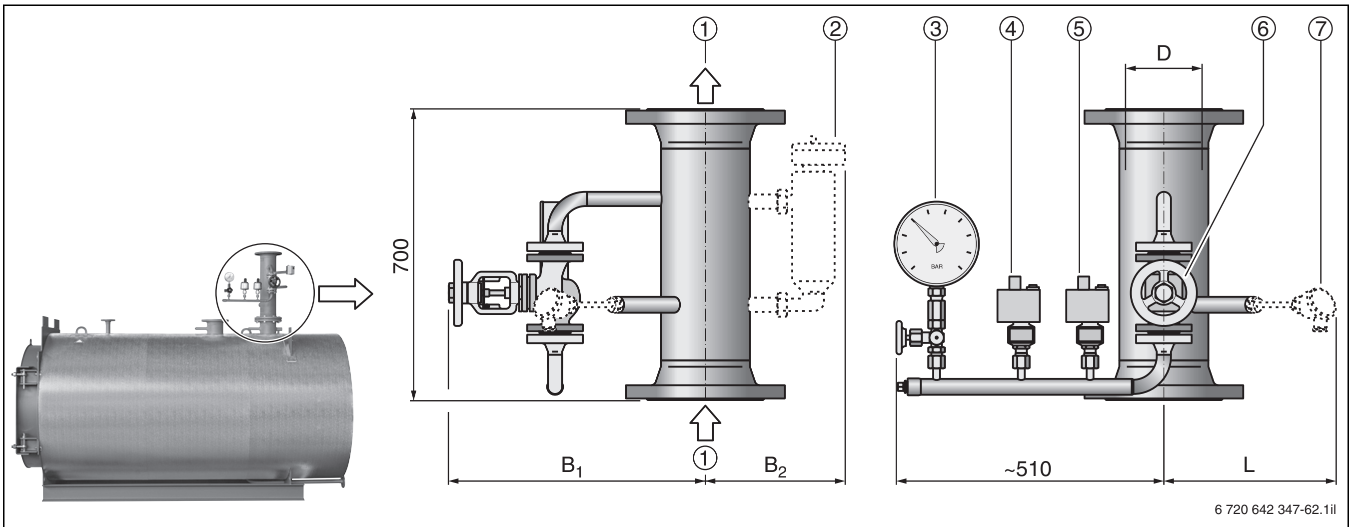

Fig. 70 Boiler safety equipment assembly for Logano S825L/L LN and Logano plus SB825L/L LN (intermediate flow piece with valve distributor and valves; dim. in mm)

1 Flow
2 Level limiter (designed as low water indicator, optional)
3 Pressure indicator (with test function)
4 Maximum pressure limiter
5 Level limiter (designed as minimum pressure switch)
6 Shut-off valve DN20
7 Temperature sensor (variable output control, optional)

Intermediate flow piece Type	Internal diameter[1)] D	Dimensions Length L [mm]	Width B_1 [mm]	B_2 [mm]	Volume [l]	Shipping weight [kg]
VZ 50	DN50	300	450	225	3.8	25
VZ 65	DN65	300	450	225	3.3	24
VZ 80	DN80	300	450	225	4.3	27
VZ 100	DN100	310	460	240	6.3	33
VZ 125	DN125	320	475	250	9.3	38
VZ 150	DN150	330	490	265	13.8	44
VZ 200	DN200	345	515	290	23.3	59
VZ 250	DN250	365	540	320	38.0	77
VZ 300	DN300	385	565	345	53.0	94
VZ 350	DN350	395	580	360	62.0	130
VZ 400	DN400	415	610	385	83.0	141

Tab. 57 Specification of the intermediate flow piece for Logano S825L/L LN and Logano plus SB825L/L LN

1) Design of the flange connections: PN16 to DIN 2633 (≤ 16 bar, ≤ 120 °C)

10.4.3 Intermediate return piece

An intermediate return piece can be provided for installing the safety expansion line and for height compensation of the intermediate flow piece (→ Tab. 57, page 98).
A further temperature sensor can be connected to this.

A fully functioning intermediate return piece is already integrated into the return temperature raising set (→ page 102).

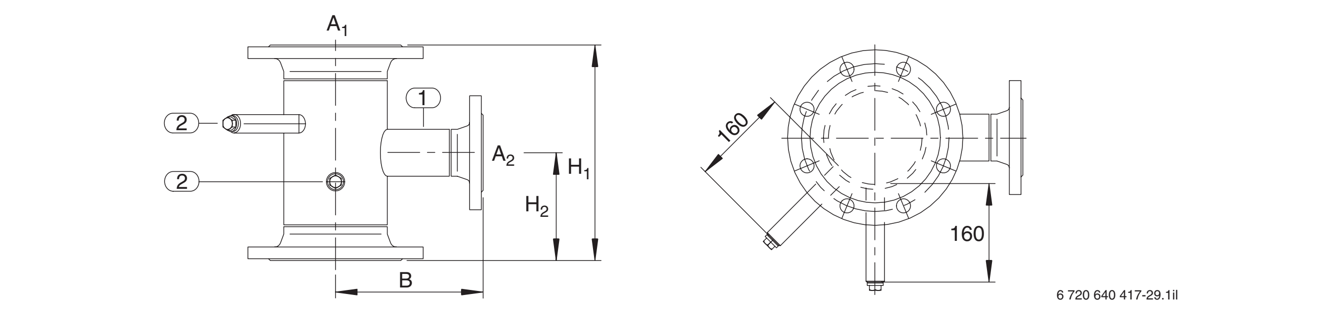

Fig. 71 Intermediate return piece for Logano S825L/L LN and Logano plus SB825L/L LN (dim. in mm)

1 Flange connection for expansion line
2 Thermometer or temperature sensor connection

Intermediate return piece Type	Internal diameter A_1 1)	Internal diameter A_2 2)	Dimensions Height H_1 [mm]	Dimensions Height H_2 [mm]	Dimensions Width B [mm]	Volume [l]	Shipping weight PN16 [kg]	Shipping weight PN25 [kg]	Shipping weight PN40 [kg]
RZ 50	DN50	DN25	350	175	125	1	–	–	10
RZ 65	DN65	DN32	350	175	135	2	12	–	13
RZ 80	DN80	DN40	350	175	145	3	13	–	15
RZ 100	DN100	DN50	350	175	160	4	18	–	21
RZ 125	DN125	DN65	350	175	225	5	24	–	30
RZ 150	DN150	DN65	350	175	240	7	32	–	40
RZ 200	DN200	DN80	400	200	270	13	48	58	66
RZ 250	DN250	DN100	450	225	305	23	67	83	101
RZ 300	DN300	DN125	500	250	335	37	92	110	142
RZ 350	DN350	DN150	550	275	405	50	125	156	192
RZ 400	DN400	DN150	550	275	430	65	147	189	251
RZ 500	DN500	DN200	650	325	500	123	228	278	331

Tab. 58 Specification of the intermediate return piece for the Logano S825L/L LN and Logano plus SB825L/L LN

1) Internal diameter for flanges to DIN 2633/2634/2635

2) Internal diameter for flanges to DIN 2633/2635

Dimensions given with ± 1 % tolerance;
Transport weights given with ± 4 % tolerance.

10.4.4 Safety valve to DIN-EN 12828

The safety valve from ARI, Figure 903, can be fitted directly to the boiler connector VSL (→ Fig. 8, page 14). The internal connector diameter of the boiler is matched to the required internal diameter of the safety valve during manufacture. For the outlet side of the safety valve, suitable mating flanges are available as accessories.

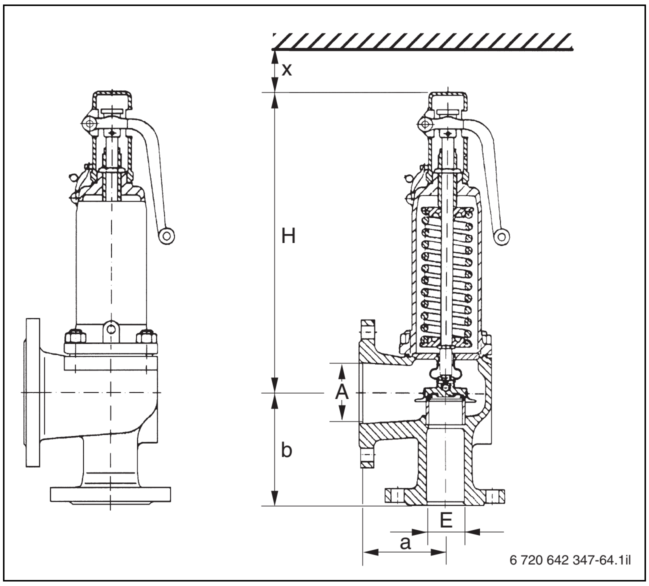

Fig. 72 Safety valve for heating systems with Logano S825L/L LN and Logano plus SB825L/L LN

- **A** Outlet
- **a** Leg length
- **b** Leg height
- **E** Inlet
- **H** Height
- **x** Clearance above

ARI safety valve, Figure 903		Unit	Internal diameter, valve size[1]							
			DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150
Internal diameter outlet[1]	A	–	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250
Maximum response pressure	–	bar	10	10	10	10	10	10	10	10
Leg length	a	mm	110	115	120	140	160	180	200	225
Leg height	b	mm	115	140	150	170	195	220	250	285
Height	H	mm	330	390	435	545	610	690	845	890
Clearance above	x	mm	200	250	300	350	400	500	500	500

Tab. 59 Specification and dimensions of the safety valve for Logano S825L/L LN and Logano plus SB825L/L LN

1) Version of the flange connections: PN16 to DIN 2633

ARI safety valve,	Internal diameter, valve size[1]							
Figure 903	DN32	DN40	DN50	DN65	DN80	DN100	DN125	DN150
Maximum response pressure	Can be used at a boiler output of up to							
[bar]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]
2.5	565	870	1360	2300	3480	5440	7120	9900
3.0	649	1000	1560	2640	4000	6250	8190	11400
4.0	810	1250	1950	3300	5000	7800	10200	14200
5.0	960	1480	2310	3900	5910	9240	12100	16900
6.0	1100	1700	2660	4500	6820	10600	14000	19400
8.0	1390	2140	3350	5660	8580	13400	17600	24500
10.0	1670	2570	4010	6790	10300	16000	21100	29300

Tab. 60 Output of the safety valve for Logano S825L/L LN and Logano plus SB825L/L LN

1) Version of the flange connections: PN16 to DIN 2633

10.4.5 Flash trap to DIN-EN 12828

In accordance with DIN-EN 12828, flash traps are to be provided for boilers with a rated output > 300 kW. It is not necessary to install a flash trap in heating systems. This applies as long as an additional high limit safety cut-out and an additional maximum pressure limiter are installed. Install flash traps in the discharge pipe from the safety valves. These separate the steam and the water phases. Install a water drain line at the lowest point of the flash trap. This enables escaping heating water to be routed away safely and visibly. Route the discharge pipe for steam to the outside at the highest point of the flash trap.

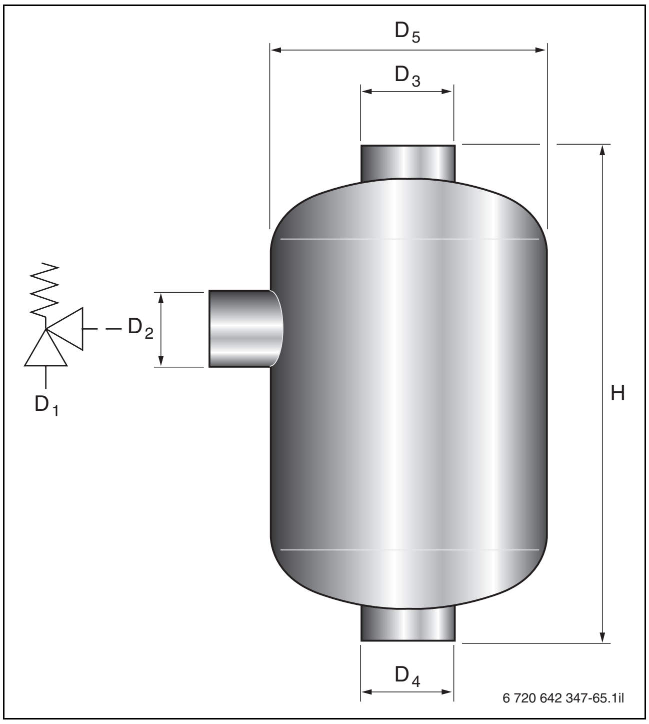

Fig. 73 Flash trap for Logano S825L/L LN and Logano plus SB825L/L LN

D_{1-5} Diameter
H Height

Safety valve	Flash trap Type	Dimensions – Diameter D_1	D_2	D_3	D_4	D_5 [mm]	Height H [mm]	Discharge pressure [bar]	Weight [kg]	Line between safety valve and flash trap – Length [m]	Number of bends	Discharge pipe – Length [m]	Number of bends
DN25/40	et 40	DN25	DN40	DN50	DN50	165	346	≤ 5	2.0	≤ 5	≤ 2	≤ 10	≤ 3
	et 50	DN32	DN50	DN65	DN65	165	346	> 5≤ 10	2.2				
DN32/50	et 50	DN32	DN50	DN65	DN65	165	346	≤ 5	2.2				
	et 65	DN40	DN65	DN80	DN80	283	440	> 5≤ 10	6.8				
DN40/65	et 65	DN40	DN65	DN80	DN80	283	440	≤ 5	6.8				
	et 80	DN50	DN80	DN100	DN100	283	440	> 5≤ 10	7.2				
DN50/80	et 80	DN50	DN80	DN100	DN100	283	440	≤ 5	7.2				
	et 100	DN65	DN100	DN125	DN125	391	616	> 5≤ 10	14.2				
DN65/100	et 100	DN65	DN100	DN125	DN125	391	616	≤ 5	14.2				
	et 125	DN80	DN125	DN150	DN150	450	776	> 5≤ 10	19.5				
DN80/125	et 125	DN80	DN125	DN150	DN150	450	776	≤ 5	19.5				
	et 150	DN100	DN150	DN200	DN200	500	896	> 5≤ 10	28.0				
DN100/150	et 150	DN100	DN150	DN200	DN200	500	896	≤ 5	28.0				

Tab. 61 Selection table for a flash trap for Logano S825L/L LN and Logano plus SB825L/L LN for installation downstream of the safety valves with the identification letters D/G/H

10.4.6 Return temperature raising set

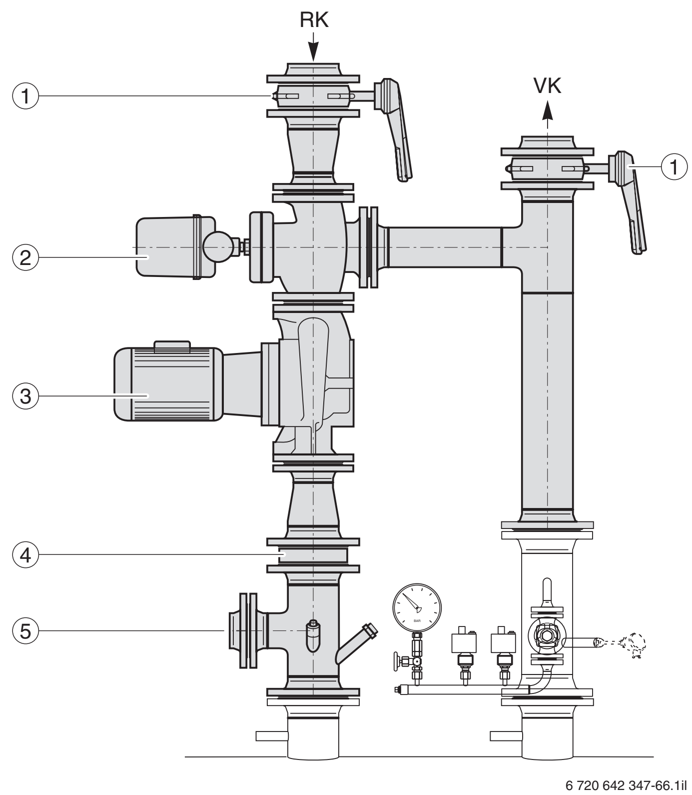

Fig. 74 Standard delivery of the return temperature raising set (coloured grey) for Logano S825L/L LN and Logano plus SB825L/L LN

RK Return
VK Flow
1 Shut-off damper with notched lever
2 3-way valve with actuator
3 Pump
4 Non-return valve or check valve
5 Connection for pressure maintaining device

The return temperature raising set, available as an accessory, can be used to maintain a required minimum return temperature. It can be installed in heating systems that have either a low loss header or a low-pressure distributor (system examples → Fig. 62 to Fig. 65, page 86 ff.).

The set is delivered fully fitted which considerably reduces the time required to complete the boiler system. The boiler system can therefore be completed simply and easily with the set.

- The intermediate return piece (→ Fig. 71, page 99) is integrated ready for operation and can therefore not be used in addition.
- Other versions of the return temperature raising set (e.g. with bypass pump, horizontal connection layout etc.) are available on request.
- When planning the system, ensure the set matches the system-specific conditions.
- Dimensions and specification of the return temperature raising set are available on request.

10.5 Additional devices for sound insulation

10.5.1 Requirements

The necessity and scope of measures for sound insulation are based on the sound level and the noise disturbance this causes. Buderus offers three sound insulation devices that are specially matched to the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers. They can be supplemented with additional on-site sound insulation measures.

On-site measures include fixing the pipework to attenuate structure-borne noise, compensators in the connection lines and flexible connections with the building. The devices for sound insulation require extra space, which should be factored in at the planning stage.

The use of sound insulation measures depends on the purpose of the building and the requirements made of adjacent rooms and the surrounding area.

10.5.2 Flue gas silencer

A large proportion of the noise caused by combustion can be transferred via the flue system to the building. Specially adapted flue gas silencers can significantly reduce the sound level.

10.5.3 Burner silencer hood

The airborne noise created by the burner during operation can be attenuated with a burner silencer hood.

When designing the installation room, allow extra space to remove the silencer hood.

Buderus offers burner silencer hoods matched to the relevant project. The space required, dimensions and attenuation values are available on request from your local Buderus sales office.

10.5.4 Boiler mounts to attenuate structure-borne noise

Boiler mounts to attenuate structure-borne noise can be used to prevent the transmission of structure-borne noise to the foundation and the building. For the Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, they are made of 12 mm thick polyurethane (PUR). To achieve the required attenuation, the boiler installation surface must be perfectly even (foundation dimensions → page 105).

When designing boiler mounts to attenuate structure-borne noise, bear in mind that the installation height of the boiler and therefore the position of the pipework connections can vary. To compensate for the spring deflection of the boiler mounts and to minimise sound transmission via the water connections, we also recommend installing pipe compensators in the heating water lines.

The boiler mounts to attenuate structure-borne noise must be designed for the boiler in question.

The vibration dampers are no longer positioned right under the supports. Instead, the vibration dampers are positioned as strips, as they work best with a certain spring compression. Sound insulating strips are therefore supplied for the specific order. One exception is the "standardised" boiler version in which the sound insulating strips have a fixed size (→ Tab. 62).

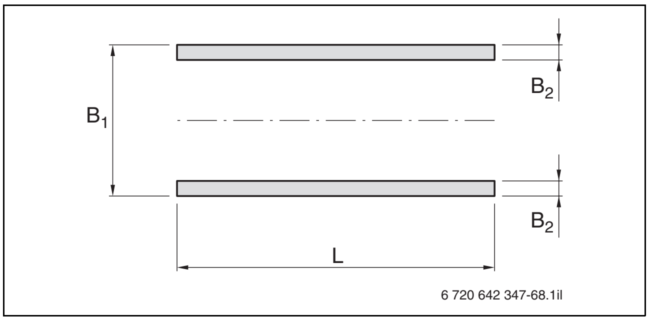

Fig. 75 Boiler mounts to attenuate structure-borne noise for the Logano S825L "standardised"

Logano S825L "standardised"	Dimensions			Max. possible operating weight
	Length	Width		
	L	B_1	B_2	
Boiler size	[mm]	[mm]	[mm]	[t]
650	1750	710	55	5.8
1000	2100	910	55	6.9
1350	2350	910	55	7.8
1900	2560	930	65	10.0

Tab. 62 Dimensions of the boiler mounts to attenuate structure-borne noise for the Logano S825L "standardised"

10.5.5 Boiler foundation

The Logano S825L and S825L LN conventional boilers, as well as the Logano plus SB825L and SB825L LN gas condensing boilers, are equipped with robust base supports consisting of channel sections for even load distribution. If a foundation is planned, it should not go as far as the side walls of the boiler room because of this sound insulation.

If suitable boiler mounts are planned for sound insulation (→ page 104), ensure the foundation is level to within ± 1 mm. This guarantees an even load on the boiler mounts.

The following requirements of the foundation must be met:

- Ensure that the floor of the installation area is perfectly even (tolerance with reference to DIN 18202) and has sufficient load-bearing capacity.
- Cover any floor channels and provide drainage facilities.
- When calculating the load-bearing capacity of the foundation, take account of the maximum operating weight of the components concerned. When determining the operating weight, take account of additional components (e.g. control panel, burner, silencer, flue pipes etc.) and include their weight. The operating weight is the weight of the components when filled.
- Measure the operating weight of the boiler at the front and back feet of the foundation. Please note that the back boiler foot (seen from the burner side) is designed as a fixed point on the longitudinal support. The front boiler foot is designed as a movable bearing, i.e. the boiler expands towards the front when heating up.
- Every component must be levelled.
- If separation is required between the installation space and the system for sound insulation, place sound insulating strips below before installing the system.
- If the boiler or system components are installed on a support base, use suitable spring systems as supports and to absorb operational vibrations.

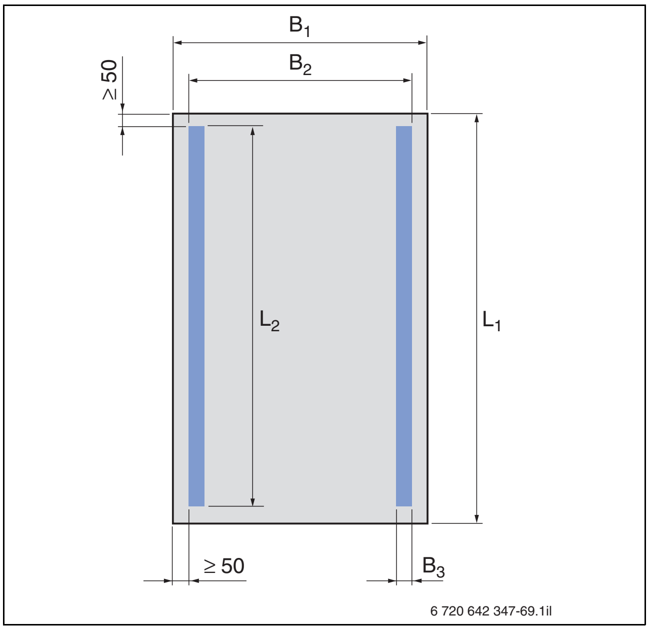

Fig. 76 Boiler foundation for Logano S825L/L LN and Logano plus SB825L/L LN

Logano S825L Logano plus SB825L Boiler size	Logano S825L LN Logano plus SB825L LN Boiler size	Foundation Length L_1 [mm]	Foundation Width B_1 [mm]	Base frame Length L_2 [mm]	Base frame Width B_2 [mm]	Channel section Height H [mm]	Channel section Width B_3 [mm]
650	–	1850	810	1750	710	120	55
1000	750	2200	1010	2100	910	120	55
1350	1000	2450	1010	2350	910	120	55
1900	1250	2660	1030	2560	930	160	65
2500	1500	3130	1230	3030	1130	160	65
3050	2000	3160	1250	3060	1150	200	75
3700	2500	3510	1250	3410	1150	200	75
4200	3000	3920	1350	3820	1250	200	75
5200	3500	4020	1610	3920	1510	220	80
6500	4250	4380	1610	4280	1510	220	80
7700	5250	4580	1620	4480	1520	240	85
9300	6000	4750	1710	4650	1610	240	85
11200	8000	5150	1730	5050	1630	280	95
12600	10000	5420	1990	5320	1890	280	95
14700	12000	6100	1990	6000	1890	280	95
16400	14000	6490	2200	6390	2100	320	100
19200	17500	6890	2200	6790	2100	320	100

Tab. 63 Dimensions of the boiler foundation for Logano S825L/L LN and Logano plus SB825L/L LN

10.6 Additional accessories

10.6.1 Drain connection and blow-down valve assembly

To enable the boiler to be drained quickly and, if required, the boiler sludge to be removed, we recommend a drain connection as shown in Fig. 77.

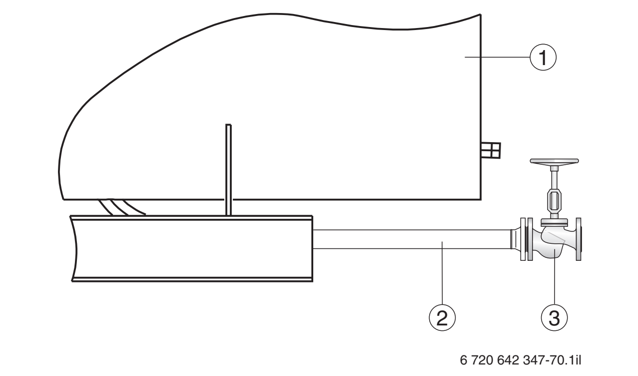

Fig. 77 Design of the drain connection for Logano S825L/L LN and Logano plus SB825L/L LN

1 Logano S825L/L LN or Logano plus SB825L/L LN
2 Boiler drain
3 Drain valve

10.6.2 Walk-on boiler cover

As additional equipment, Buderus offers a walk-on boiler cover. Also available with this are a ladder and safety rail with toe board. The walk-on boiler cover is already fitted when the boiler is delivered. The safety rail and ladder are to be fitted on site. The ladder can be mounted on the l.h. or r.h. side of the boiler. Please specify which side when ordering the walk-on boiler cover. In the case of gas combustion, the ladder should be fitted opposite the gas train.

Fig. 78 Walk-on boiler cover

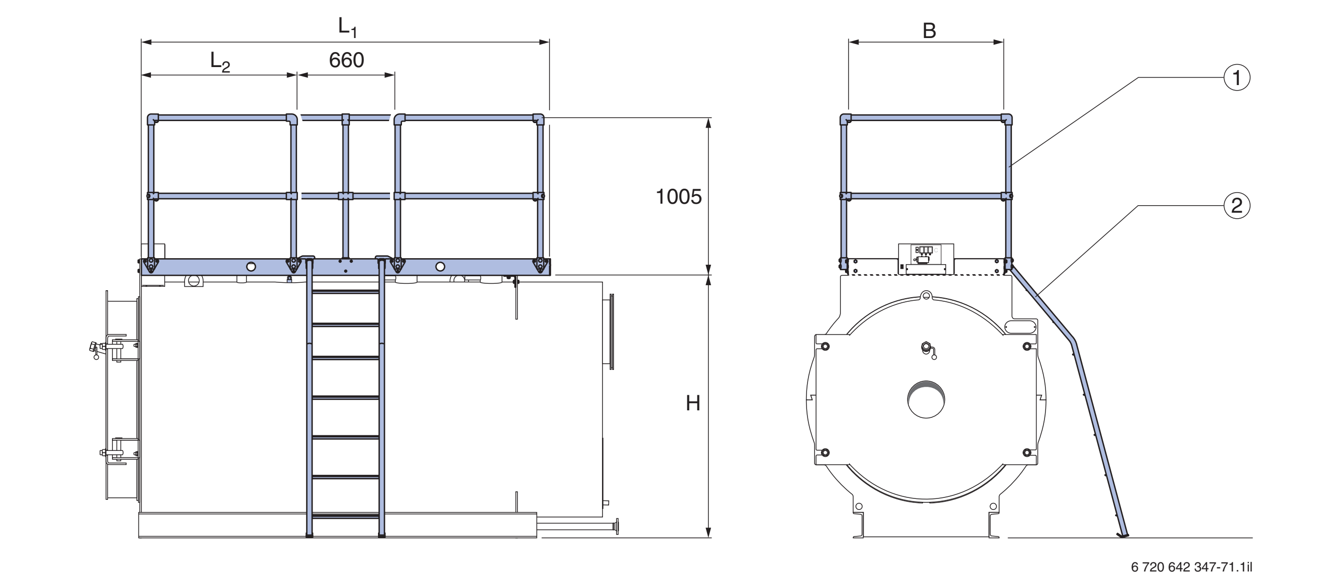

Fig. 79 Dimensions of the walk-on boiler cover for Logano S825L/L LN and Logano plus SB825L/L LN; rail and ladder are optional (dim. in mm)

1 Rail (optional)
2 Ladder on either the l.h. or r.h. side (optional)

Logano S825L Logano plus SB825L	Logano S825L LN Logano plus SB825L LN	Dimensions				Weight[1]
		Length		Width	Height	
Boiler size	Boiler size	L_1 [mm]	L_2 [mm]	B [mm]	H [mm]	[kg]
1000	750	2150	745	900	1505	155
1350	1000	2400	870	900	1605	165
1900	1250	2600	970	1000	1705	195
2500	1500	3100	1220	1100	1755	235
3050	2000	3100	1220	1100	1855	235
3700	2500	3450	1395	1100	1905	255
4200	3000	3800	1570	1200	2005	305
5200	3500	3950	1645	1200	2105	315
6500	4250	4300	1820	1400	2305	405
7700	5250	4500	1910	1400	2455	420
9300	6000	4800	2070	1600	2605	490
11200	8000	5100	2220	1800	2755	590
12600	10000	5400	2370	1800	2905	610
14700	12000	6100	2720	1800	3105	680
16400	14000	6600	2970	2000	3405	900
19200	17500	7000	3170	2000	3605	980

Tab. 64 Specification of the walk-on boiler cover for Logano S825L/L LN and Logano plus SB825L/L LN

1) Including rail and ladder

11 Flue system

11.1 Requirements

11.1.1 General information

As a basis for calculation and for sizing the flue system, please refer to EN 13384. The following formulae can be used to calculate the flue gas mass flow rates.

With oil combustion (CO_2 content 13,5 %):

$$\dot{m}_{Abg,\,Öl} = \dot{Q}_F \times \frac{4{,}104\ \text{kg}}{10000\ \text{kWs}}$$

Form. 10 Calculation of the flue gas mass flow rate with oil combustion

$\dot{m}_{Abg,\,Öl}$ Flue gas mass flow rate with oil combustion in kg/s
$\dot{Q}_F$ Combustion output in kW

With gas combustion (CO_2 content 10,5 %):

$$\dot{m}_{Abg,\,Gas} = \dot{Q}_F \times \frac{4{,}082\ \text{kg}}{10000\ \text{kWs}}$$

Form. 11 Calculation of the flue gas mass flow rate with gas combustion

$\dot{m}_{Abg,\,Gas}$ Flue gas mass flow rate with gas combustion in kg/s
$\dot{Q}_F$ Combustion output in kW

See the following pages for clear tables with the required parameters for the Logano S825L and S825L LN series, as well as the Logano plus SB825L and SB825L LN.

The combustion output is the result of the selected rated output and the associated efficiency (→ page 38).

$$\dot{Q}_F = \frac{\dot{Q}_N}{\eta_K} \times 100\ \%$$

Form. 12 Calculation of the combustion output

η_K Boiler efficiency in %
$\dot{Q}_F$ Combustion output in kW
$\dot{Q}_N$ Rated output in kW

The requirements of the flue system and flue gas routing can be derived from the results of the calculations.

11.1.2 Special information for flue systems with gas condensing boilers

A correctly sized flue system is essential for the function and operation of the gas condensing boiler. Only flue pipes approved according to Building Regulations are permissible. When selecting the flue system, also consider the requirements in the approval document.

If positive pressure is to be expected within the flue system and if the flue system is routed through frequently used rooms, the entire flue must be installed in a duct with secondary ventilation. Observe country-specific requirements.

11.1.3 Material requirements for flue systems with gas condensing boilers

The material of the flue pipe must be heat-resistant with regard to the flue temperature that will occur, moisture-resistant and resistant to acidic condensate. Among other materials, stainless steel flues or other moisture-resistant chimneys are suitable.

Flues are categorised into groups depending on their maximum flue gas temperature (80 °C, 120 °C, 160 °C and 200 °C). With gas condensing boilers, the flue gas temperature can be below 40 °C, independent of the maximum flue gas temperature. Moisture-resistant chimneys must therefore also be suitable for temperatures below 40 °C. A suitable flue must be approved by the “Deutsches Institut für Bautechnik” in Berlin.

With moisture-resistant chimneys, the draught must not be more than 0 Pa at the chimney inlet.

11.2 Parameters for sizing flue systems

Boiler type	Average boiler water temperature in °C			
	60	70	80	90
	Maximum flue gas temperature (at rated output)			
	[°C]	[°C]	[°C]	[°C]
Logano S825L	217	224	232	239
Logano S825L LN	200	207	215	222
Logano plus SB825L	107	114	121	129
Logano plus SB825L LN[1)]	103	110	117	125

Tab. 65 Maximum flue gas temperature at rated output subject to the average boiler water temperature

1) At 30 °C water inlet temperature to the condensing heat exchanger

11.2.1 Logano S825L and S825L LN conventional boilers

Logano	Boiler size	Output[1)]	Combustion output	Flue outlet[2)]	Required draught	Min. flue gas temperature	Gas as fuel	
							CO_2 content	Flue gas mass flow rate
		[kW]	[kW]	[mm]	[Pa]	[°C]	[%]	[kg/s]
S825L	650	650	707		0	200	10.5	0.2808
	1000	1000	1084	250	0	209	10.5	0.4325
	1350	1350	1453	250	0	184	10.5	0.5767
	1900	1900	2083	315	0	209	10.5	0.8267
	2500	2500	2726	400	0	212	10.5	1.0819
	3050	3050	3340	400	0	221	10.5	1.3258
	3700	3700	4011	500	0	199	10.5	1.5917
	4200	4200	4509	500	0	193	10.5	1.7897
	5200	5200	5661	500	0	209	10.5	2.2472
	6500	6500	7128	630	0	224	10.5	2.8294
	7700	7700	8382	630	0	209	10.5	3.3275
	9300	9300	10096	800	0	203	10.5	4.0078
	11200	11200	12163	800	0	204	10.5	4.8281
	12600	12600	13607	800	0	193	10.5	5.4017
	14700	14700	15965	1000	0	204	10.5	6.3375
	16400	16400	17587	1000	0	178	10.5	6.9811
	19200	19200	20720	1000	0	191	10.5	8.2247
S825L LN	750	750	812	200	0	195	10.5	0.3228
	1000	1000	1070	250	0	175	10.5	0.4255
	1250	1250	1354	250	0	198	10.5	0.5375
	1500	1500	1619	315	0	191	10.5	0.6427
	2000	2000	2167	315	0	199	10.5	0.8602
	2500	2500	2686	400	0	181	10.5	1.0661
	3000	3000	3236	400	0	190	10.5	1.2847
	3500	3500	3776	400	0	190	10.5	1.4988
	4250	4250	4624	500	0	207	10.5	1.8355
	5250	5250	5676	500	0	195	10.5	2.2530
	6000	6000	6462	630	0	187	10.5	2.5650
	8000	8000	8635	630	0	191	10.5	3.4275
	10000	10000	10749	800	0	183	10.5	4.2669
	12000	12000	12973	800	0	195	10.5	5.1497
	14000	14000	14989	800	0	175	10.5	5.9500
	17500	17500	18869	1000	0	189	10.5	7.4900

Tab. 66 Parameters of the Logano S825L/L LN conventional boilers

1) Parameters for the (highest) rated output

2) For a lower rated output, reduce the internal diameter of the flue outlet accordingly

11.2.2 Logano plus SB825L and SB825L LN gas condensing boilers

System temperature 80/60 °C, inlet temperature to the condensing heat exchanger 30 °C

Logano plus	Boiler size	Output	Combustion output	Flue outlet[1]	Available draught[2]	Min. flue gas temperature	Gas as fuel	
							CO_2 content	Flue gas mass flow rate
		[kW]	[kW]	[mm]	[Pa]	[°C]	[%]	[kg/s]
SB825L	1000	1000	1077	250	3)	104	10.5	0.3947
	1350	1350	1441	250	3)	95	10.5	0.5305
	1900	1900	2057	315	3)	113	10.5	0.7527
	2500	2500	2696	400	3)	109	10.5	0.9886
	3050	3050	3301	400	3)	113	10.5	1.2086
	3700	3700	3971	400	3)	108	10.5	1.4627
	4200	4200	4462	500	3)	109	10.5	1.6416
	5200	5200	5601	500	3)	111	10.5	2.0594
	6500	6500	7042	630	3)	114	10.5	2.5800
	7700	7700	8294	630	3)	109	10.5	3.0511
	9300	9300	9997	630	3)	107	10.5	3.6833
	11200	11200	12044	800	3)	110	10.5	4.4458
	12600	12600	13490	800	3)	105	10.5	4.9916
	14700	14700	15812	800	3)	109	10.5	5.8408
	16400	16400	17459	1000	3)	98	10.5	6.4877
	19200	19200	20554	1000	3)	111	10.5	7.6458
SB825L LN	750	750	804	200	3)	100	10.5	0.2955
	1000	1000	1063	200	3)	92	10.5	0.3927
	1250	1250	1342	250	3)	105	10.5	0.4936
	1500	1500	1604	250	3)	99	10.5	0.5908
	2000	2000	2146	315	3)	105	10.5	0.7897
	2500	2500	2664	400	3)	97	10.5	0.9836
	3000	3000	3207	400	3)	101	10.5	1.1827
	3500	3500	3742	400	3)	103	10.5	1.3805
	4250	4250	4575	500	3)	110	10.5	1.6825
	5250	5250	5624	500	3)	106	10.5	2.0747
	6000	6000	6407	500	3)	99	10.5	2.3644
	8000	8000	8559	630	3)	104	10.5	3.1619
	10000	10000	10664	800	3)	101	10.5	3.9502
	12000	12000	12860	800	3)	108	10.5	4.7602
	14000	14000	14885	800	3)	100	10.5	5.5363
	17500	17500	18715	1000	3)	104	10.5	6.9444

Tab. 67 Parameters of the Logano SB825L/L LN gas condensing boilers

1) For a lower rated output, reduce the internal diameter of the flue outlet accordingly

2) With gas condensing boilers with free burner allocation, consider the specified positive pressure at the boiler end when selecting the burner, as well as considering the hot gas pressure drop. Varying positive pressure available on request.
For flue systems and chimneys only approved for negative pressure operation, the maximum draught at the inlet to the flue system must not be above 0 Pa.

3) Subject to burner

System temperature 80/60 °C, inlet temperature to the condensing heat exchanger 60 °C

Logano plus	Boiler size	Output	Combustion output	Flue outlet[1]	Available draught[2]	Min. flue gas temperature	Gas as fuel	
							CO_2 content	Flue gas mass flow rate
		[kW]	[kW]	[mm]	[Pa]	[°C]	[%]	[kg/s]
SB825L	1000	1000	1084	250	[3]	123	10.5	0.4152
	1350	1350	1446	250	[3]	113	10.5	0.5577
	1900	1900	2070	315	[3]	132	10.5	0.7913
	2500	2500	2711	400	[3]	127	10.5	1.0392
	3050	3050	3320	400	[3]	132	10.5	1.2705
	3700	3700	3992	500	[3]	125	10.5	1.5366
	4200	4200	4487	500	[3]	126	10.5	1.7247
	5200	5200	5577	500	[3]	128	10.5	2.1630
	6500	6500	7084	630	[3]	132	10.5	2.7086
	7700	7700	8340	630	[3]	127	10.5	3.2005
	9300	9300	10049	800	[3]	124	10.5	3.8611
	11200	11200	12106	800	[3]	127	10.5	4.6558
	12600	12600	13553	800	[3]	122	10.5	5.2238
	14700	14700	15890	1000	[3]	126	10.5	6.1075
	16400	16400	17532	1000	[3]	115	10.5	6.7783
	19200	19200	20644	1000	[3]	125	10.5	7.9741
SB825L LN	750	750	808	200	[3]	119	10.5	0.3108
	1000	1000	1069	250	[3]	110	10.5	0.4127
	1250	1250	1348	250	[3]	123	10.5	0.5188
	1500	1500	1612	315	[3]	118	10.5	0.6211
	2000	2000	2158	315	[3]	123	10.5	0.8300
	2500	2500	2677	400	[3]	115	10.5	1.0336
	3000	3000	3223	400	[3]	119	10.5	1.2427
	3500	3500	3762	400	[3]	120	10.5	1.4505
	4250	4250	4601	500	[3]	128	10.5	1.7675
	5250	5250	5653	500	[3]	123	10.5	2.1780
	6000	6000	6437	630	[3]	116	10.5	2.4819
	8000	8000	8601	630	[3]	121	10.5	3.3155
	10000	10000	10712	800	[3]	118	10.5	4.1383
	12000	12000	12921	800	[3]	125	10.5	4.9827
	14000	14000	14947	800	[3]	116	10.5	5.7888
	17500	17500	18798	1000	[3]	121	10.5	7.2522

Tab. 68 Parameters of the Logano SB825L/L LN gas condensing boilers

1) For a lower rated output, reduce the internal diameter of the flue outlet accordingly

2) With gas condensing boilers with free burner allocation, consider the specified positive pressure at the boiler end when selecting the burner, as well as considering the hot gas pressure drop. Varying positive pressure available on request.
For flue systems and chimneys only approved for negative pressure operation, the maximum draught at the inlet to the flue system must not be above 0 Pa.

3) Subject to burner

12 Condensate drainage

12.1 Condensate

12.1.1 Creation

When fuels containing hydrogen are burned, water vapour condenses in the condensing heat exchanger and flue system. The volume of condensate created per kilowatt hour is determined by the ratio of carbon to hydrogen in the fuel. The volume of condensate depends on the return temperature, the amount of excess air during combustion and the loading of the heat source.

12.1.2 Condensate disposal

Route the condensate from the condensing boiler into the public sewer system in accordance with local waste water regulations. As the rated output levels of the Logano plus SB825L and SB825L LN gas condensing boilers are above 200 kW, check whether the condensate needs neutralising before disposal. With dual fuel combustion, ensure the neutralising system is suitable for oil combustion.

To calculate the precise volume of condensate created per year, use the following formula:

$$\dot{V}_K = \dot{Q}_F \times m_K \times b_{VH}$$

Form. 13 Calculation of the annual condensate volume

b_{VH} Hours of full utilisation (to VDI 2067) in h/a
m_K Specific condensate volume in kg/kWh (assumed density ρ = 1 kg/l)
$\dot{Q}_F$ Combustion output of the heat source in kW
$\dot{V}_K$ Condensate volume in l/a

> i It is advisable to find out about local regulations regarding condensate disposal prior to installation.

12.2 Neutralising system NE 2.0

12.2.1 Siting

In the case of gas combustion, the neutralising system NE 2.0 can be used. It should be installed between the condensate outlet from the gas condensing boiler and the connection to the public sewer system. Site the neutralising system behind or adjacent to the gas condensing boiler. To enable the condensate to drain freely, install the neutralising system at the same height as the boiler. As an alternative, it can also be installed at a lower height.

> i Design the condensate hose in accordance with country-specific requirements using suitable materials, e.g. PP plastic.

Dimensions and connections	Unit	Neutralising system NE 2.0 1)
Width	mm	545
Depth	mm	840
Height	mm	275
Inlet	–	DN40/DN20 2)
Outlet	–	DN20
Drain	–	DN20

Tab. 69 Dimensions and connections of the neutralising system NE 2.0

1) Weight in operation approx. 60 kg
2) Option for hose connection

12.2.2 Equipment level

The neutralising system NE 2.0 consists of a rectangular plastic casing with separate chambers for the neutralising agent and the neutralised condensate, a level-controlled condensate pump and an integral electronic control unit.

The level-controlled condensate pump has a head of approx. 2 m. If required, the head can be increased to approx. 4.5 m with a pressure raising module.

The integral electronic control unit has functions for monitoring and service:

- Burner safety shutdown in conjunction with Logamatic control units from Buderus
- Overflow protection
- Display for changing the neutralising granulate
- Display of the operating status
- Forwarding fault signals (e.g. to the Logamatic telecontrol system)

12.2.3 Neutralising agent

Fill the neutralising system NE 2.0 with 17.5 kg neutralising granulate. The pH value of the condensate is raised from 6.5 to 10 through its contact with the neutralising agent. With this pH value, the neutralised condensate can be routed into the domestic sewer system. The volume of condensate affects how long the granulate filling will last. The used neutralising granulate needs replacing when the pH value of the neutralised condensate drops below 6.5. Refill with granulate when the signal lamp illuminates.

12.2.4 Pump output graph

The graph in Fig. 80 shows the head of the neutralising system NE 2.0 subject to the pump rate. If the pressure raising module is used for the neutralising system NE 2.0, the heads are added together, as two pumps with the same characteristics are connected downstream of one another. When calculating the actual pump head, take the pipework pressure drop on the pressure side into consideration.

The limited start duration of the condensate pump means the neutralising system NE 2.0 can be used for maximum condensate volumes of approx. 200 litres per hour.

For larger condensate volumes, two neutralising systems NE 2.0 can be connected in parallel. For systems with a higher output and therefore larger condensate volumes, or for systems with dual fuel combustion, Buderus offers a further range of neutralising systems. For such cases, please contact your local Buderus sales office.

Example

For a Logano plus SB825L gas condensing boiler, boiler size 3050 (DHW inlet temperature into the condensing heat exchanger 30 °C), approx. 200 litres of condensate are created per hour of heating operation. A neutralising system NE 2.0 is sufficient for this.

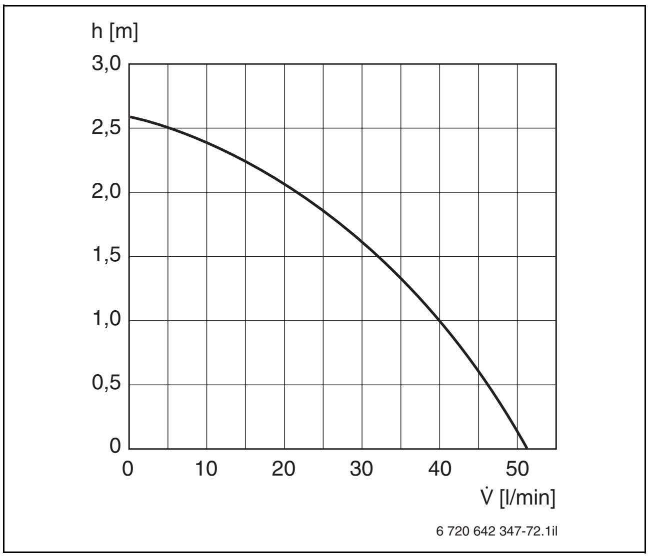

Fig. 80 Pump output graph for the neutralising system NE 2.0

h Delivery head
$\dot{V}$ Pump rate

13 Selection aids

13.1 Boiler selection

Select the most suitable boiler type and boiler size depending on the requirements of the intended project.

Project-specific requirements may include:

- Favourable price/performance ratio
- High economic viability
- High emissions targets

Use the boiler selection questionnaire to help you choose a Logano S825L and S825L LN or a Logano plus SB825L and SB825L LN. Specific requirements of the planned project can be clearly set out here.

A completed sample questionnaire is shown in Fig. 81. A template for copying can be found on page 116.

13.2 Boiler selection questionnaire

Subject to the required values ❶, the specifications for the Logano S825L and S825L LN conventional boilers (→ page 14 ff.) or the Logano plus SB825L and SB825L LN gas condensing boilers (→ page 20 ff.) are used to determine a suitable boiler size ❷ for the relevant value. The largest boiler size calculated determines the boiler type to be used for all stated requirements.

The following example from 'Musterhaus Müller' shows that, according to the stated requirements ❶, either the Logano S825L-3050 conventional boiler with a burner from company A ❸ or a Logano S825L-2500 with a burner from company B ❹ is suitable. According to the stated requirements, the Logano S825L-2500 conventional boiler with a burner from company B should be used.

Fragebogen zur Kesselauswahl für Logano S825L und S825L LN sowie Logano plus SB825L und SB825L LN

Buderus

Projekt: Musterhaus Müller
Datum: 01. Juni 2010 Bearbeiter: R. Meier

Objektdaten:

			❶ Geforderte Werte	❷ Einzusetzende Kesselgröße
Nennleistung		kW	1800	Logano S825L-1900
Brennstoff	Heizöl EL	kWh/kg		
	Erdgas	kWh/m³	9,0	
Kombifeuerung mit Heizöl El und Erdgas			☐ ja ☒ nein	
Betriebstemperaturen		°C	100/70	Logano S825L-1900
Betriebsdruck		bar	9	Logano S825L-1900/10
Sonstiges				

Emissionen und Umweltschutz:

Einzuhaltende Anforderungen

1. BImSchV ☒		TA Luft ☐
Abgasverlust	% 9	½ TA Luft ☐
LRV ☐		Regionale Richtlinie ☒

		Geforderte Werte
NO_X	mg/m³	80
CO	mg/m³	
SO_X	mg/m³	
Staub	mg/m³	
O_2-Gehalt (Bezugswert)	Vol-%	3
Sonstiges		

Wirtschaftlichkeit:

		❶ Geforderte Werte	Einzusetzende Kesselgröße – Wert
Maximale Abgastemperatur	°C	190	Logano S825L-2500 – 191 °C
Abgasverlust	%	~ 7,5 (13,5 % CO_2)	Logano S825L-2500 – 191 °C
Wirkungsgrad	%		
Normnutzungsgrad	%		
Sonstiges			

Brennwert-Wärmetauscher (nur bei Gasfeuerung) bei einer Wassereintrittstemperatur von °C 35

			❷
Leistung	kW	~ zusätzlich > 150	Logano plus SB825L-1900 – 160 kW
Maximale Abgastemperatur	°C		
Sonstiges		alternativ anbieten	

Brennerdaten:

		Fabrikat A	Fabrikat B	Bei Fabrikat A	Bei Fabrikat B
		A	B		
		❶ Geforderte Werte		❷ Einzusetzende Kesselgröße	
Feuerraumlänge	mm	2480	2230	Logano S825L-1900	1900
Feuerraumdurchmesser	mm	804	666	Logano S825L-3050 ❸	1900
Feuerraum-Volumenbelastung	MW/m³	≤ 1,5	≤ 1,5	Logano S825L-2500 ❹	2500
Sonstiges					

Die größte eingetragene Kesselgröße bestimmt den für die gestellten Anforderungen einzusetzenden Kesseltyp und die Kesselgröße.

Fig. 81 Completed sample boiler selection questionnaire (template for copying → page 116)

Fragebogen zur Kesselauswahl für Logano S825L und S825L LN sowie Logano plus SB825L und SB825L LN

Projekt: ______ **Buderus**

Datum: ______ Bearbeiter: ______

Objektdaten:

			Geforderte Werte	Einzusetzende Kesselgröße
Nennleistung		kW		
Brennstoff	Heizöl EL	kWh/kg		
	Erdgas	kWh/m³		
Kombifeuerung mit Heizöl El und Erdgas			☐ ja ☐ nein	
Betriebstemperaturen		°C		
Betriebsdruck		bar		
Sonstiges				

Emissionen und Umweltschutz:

Einzuhaltende Anforderungen

1. BImSchV ☐		TA Luft ☐
Abgasverlust	% ☐	½ TA Luft ☐
LRV ☐		Regionale Richtlinie ☐

		Geforderte Werte
NO_X	mg/m³	
CO	mg/m³	
SO_X	mg/m³	
Staub	mg/m³	
O_2-Gehalt (Bezugswert)	Vol-%	
Sonstiges		

Wirtschaftlichkeit:

		Geforderte Werte	Einzusetzende Kesselgröße – Wert
Maximale Abgastemperatur	°C		
Abgasverlust	%		
Wirkungsgrad	%		
Normnutzungsgrad	%		
Sonstiges			

Brennwert-Wärmetauscher (nur bei Gasfeuerung) bei einer Wassereintrittstemperatur von °C ☐

Leistung	kW		
Maximale Abgastemperatur	°C		
Sonstiges			

Brennerdaten:

		Fabrikat A	Fabrikat B	Bei Fabrikat A	Bei Fabrikat B
		Geforderte Werte		Einzusetzende Kesselgröße	
Feuerraumlänge	mm				
Feuerraumdurchmesser	mm				
Feuerraum-Volumenbelastung	MW/m³				
Sonstiges					

Die größte eingetragene Kesselgröße bestimmt den für die gestellten Anforderungen einzusetzenden Kesseltyp und die Kesselgröße.

Fig. 82 Template for copying the boiler selection questionnaire

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Notes

6 720 646 844 (12/2010)
Subject to technical modifications.

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