

SH60

Floor Standing Gas Condensing Boiler

Planner Documentation



Working towards
a cleaner future

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Gas condensing boiler SH60

Models and output

Application possibilities

Value propositions

Technical description

Models and output

The floor standing gas condensing boiler SH60 is available in 7 types within an output range from 142 until 539 kW.

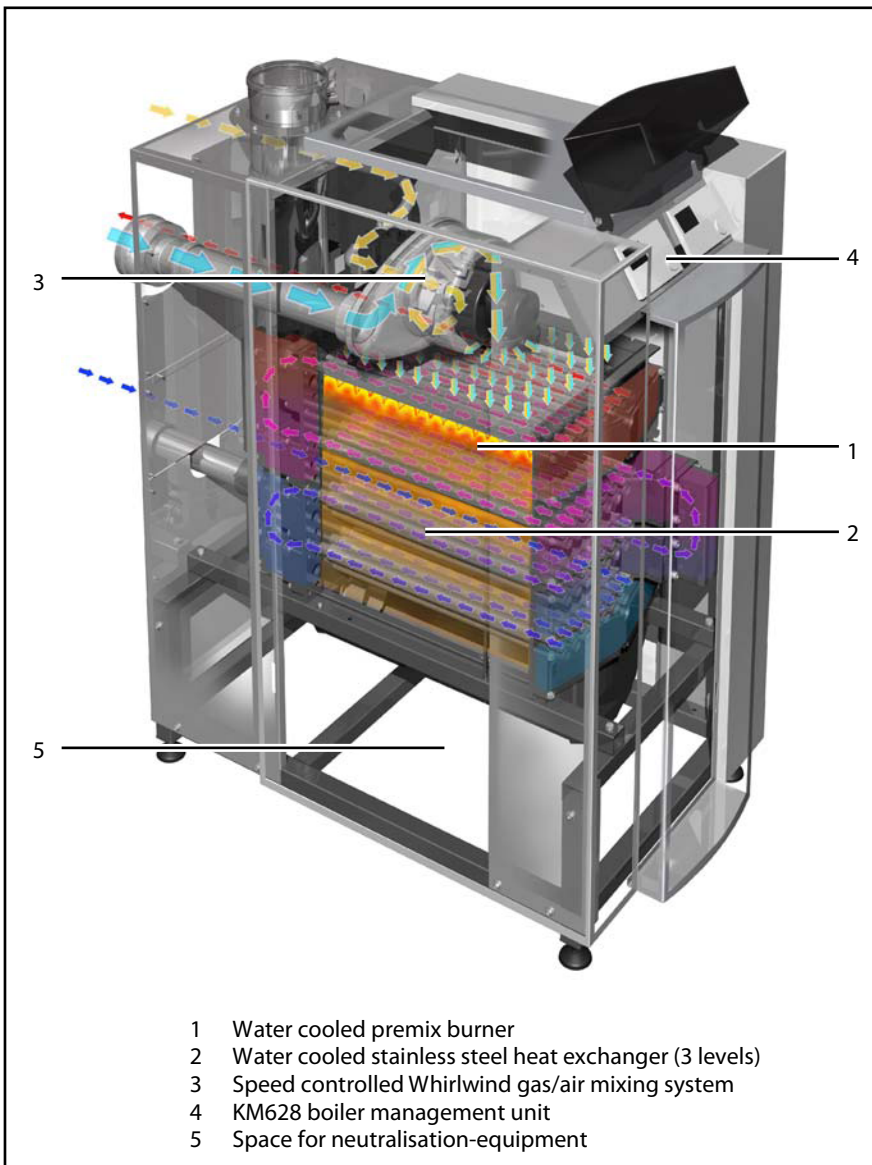
Application possibilities

The gas condensing boiler SH60 is applicable for all central heating systems built according to EN12828. In cascade applications (max. 8 boilers with KKM8 cascade manager) the SH60 can cover installations up to 4300kW.

Preferred applications are central heating and sanitary hot water production in multi-family buildings, municipal and industrial buildings.

Value propositions

- Unique reliability
proven technology with exceptional high quality
- Highest system flexibility
easy planning and Plug & Play installation with pre-assembled system kits
- Easy maintenance
boiler design optimised for easy access on servicing
- Unequalled lifetime high efficiency
corrosion resistant stainless steel heat exchanger
- Environmental friendly
lowest emission values



Description

The SH60 is a fully modulating boiler. The control unit of the boiler adapts the modulation ratio automatically to the heat demand requested by the system. This is done by controlling the speed of the fan. As a result, the Whirlwind mixing system will adapt the gas ratio to the chosen fan speed, in order to maintain the best possible combustion figures and therewith the best efficiency. The flue gases created by the combustion are transported downwards through the boiler and leave at the back side into the chimney connection.

The return water from the system enters the boiler in the lower section, where is the lowest flue gas temperature in the boiler. In this section condensation takes place. The water is being transported upwards through the boiler, in order to leave the boiler at the top (burner) section. The cross flow working principle (water up, flue gas down) ensures the most efficient combustion results.

Technical Description

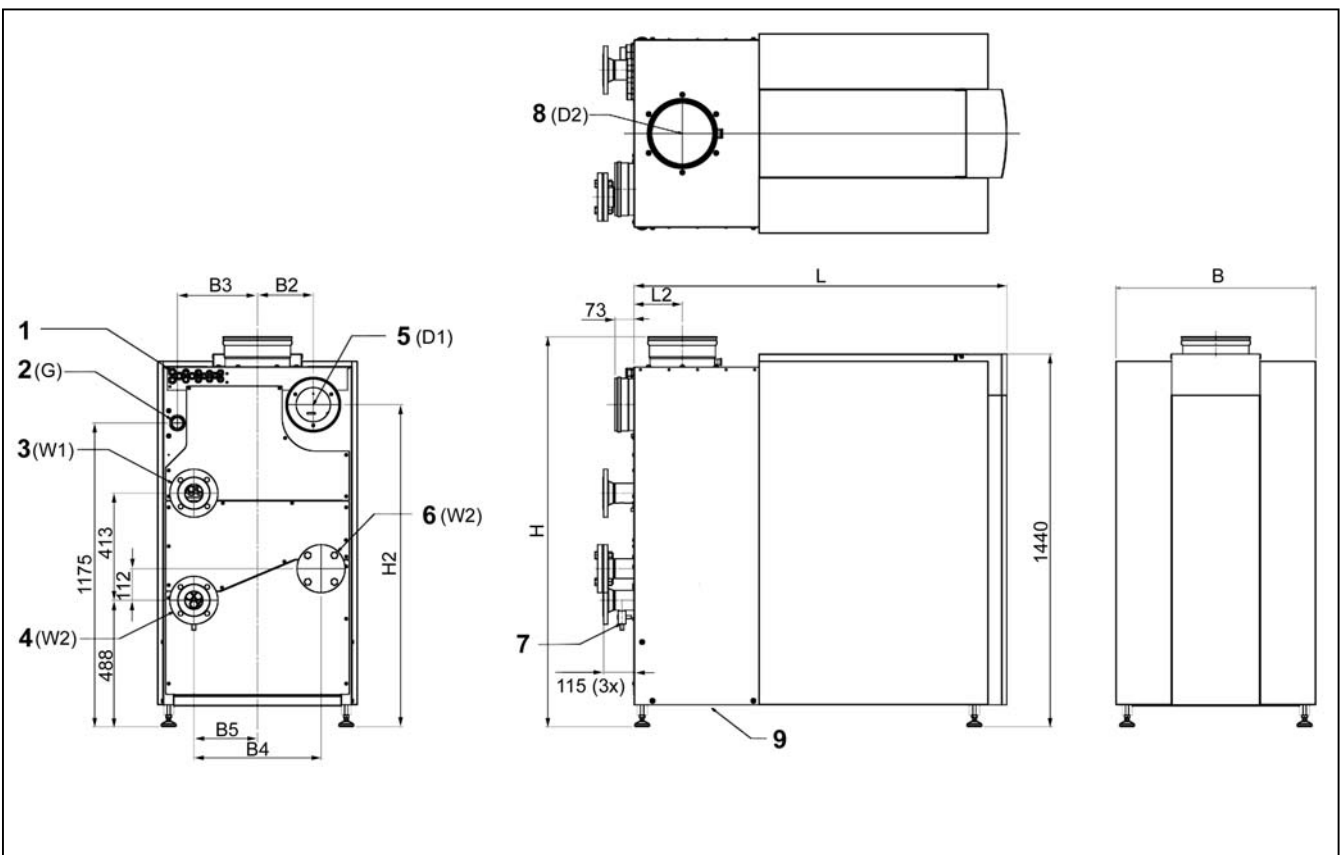
Technical data

		SH61	SH62	SH63	SH64	SH65	SH66	SH67	
Nominal heat output at 80-60°C max/min*	kW	142.1/23.3	190.1/39.5	237.2/39.5	285.2/39.5	380.2/76.6	475.3/76.6	539.0/76.6	
Nominal heat output at 75-60°C max/min*	kW	142.2/23.5	190.3/39.5	237.4/39.5	285.5/39.5	380.6/76.6	475.8/76.6	539.6/76.6	
Nominal heat output at 40/30°C max/min*	kW	150.7/26.7	201.6/45.2	251.4/45.1	302.3/45.2	403.1/87.7	503.9/87.7	571.5/87.7	
Nominal heat input Hi max/min*	kW	145.0/24.5	194.0/41.5	242.0/41.5	291.0/41.5	388.0/80.5	485.0/80.5	550.0/80.5	
Efficiency at 80/60°C	%	98.0							
Efficiency at 40/30°C	%	103.9							
Annual efficiency (NNG 75/60°C)	%	106.8							
Annual efficiency (NNG 40/30°C)	%	110.4							
Standstill losses (T _{water} = 70°C)	%	0.21	0.18	0.17	0.16	0.15	0.14	0.13	
Max. condensate flow	l/h	11	15	19	22	30	37	42	
Gas consumption H-gas max/min (10,9 kWh/m ³)	m ³ /h	13.3/2.3	17.8/3.8	22.2/3.8	26.7/3.8	35.6/7.4	44.5/7.4	50.5/7.4	
Gas consumption L-gas max/min (8,34 kWh/m ³)	m ³ /h	17.4/2.9	23.2/5.0	29.0/5.0	34.9/5.0	46.5/9.7	58.2/9.7	66.0/9.7	
Gas consumption LL-gas max/min (8,34 kWh/m ³)	m ³ /h	17.4/2.9	23.2/5.8	29.0/5.8	34.9/5.8	46.5/11.2	58.2/11.2	66.0/11.2	
Gas consumption LPG. max/min (12,8 kWh/kg)	kg/h	11.3/1.9	15.2/3.2	18.9/3.2	22.7/3.2	30.3/6.3	37.9/6.3	43.0/6.3	
Gas pressure H-gas	mbar	20							
Gas pressure L/LL-gas	mbar	25							
Gas pressure LPG	mbar	30/50							
Maximum gas pressure	mbar	100							
Flue gas temperature at 80/60°C max/min	°C	78/61							
Flue gas temperature at 40/30°C max/min	°C	56/30							
Flue gas quantity max/min*	m ³ /h	238/40	318/69	397/69	477/69	636/134	795/134	901/134	
CO ₂ level natural gas H/E/L/LL max/min	%	10.2/9.4							
CO ₂ level liquid gas P max/min	%	11.9/10.0							
NOx level max/min	mg/kW h	35/15							
CO level max/min	mg/kW h	14/8							
Max. permissible flue resistance max/min	Pa	160/10	160/10	200/10	200/10	200/10	250/10	250/10	
Water volume	l	27	31	35	61	68	75	82	
Water pressure max/min	bar	8/1							
Max. water temperature (High limit thermostat)	°C	100							
Maximum temperature setpoint	°C	90							
Nominal water flow at dT=20K	m ³ /h	6.1	8.1	10.2	12.2	16.3	20.4	23.1	
Hydraulic resistance at nominal water flow	kPa	10	18	28	15	27	42	55	
Electrical connection	V	230/400							
Frequency	Hz	50							
Mains connection fuse	A	10							
IP class	-	IP 20							
Power consumption boiler max/min (excl. pump)	W	158/43	200/35	230/35	260/35	470/61	650/61	770/61	
Power consumption 3-step pump (optional)	W	170/90	190/120	380/210	380/210	530/300	720/380	1150/600	
Power consumption speed controlled pump (opt)	W	180/10	180/10	435/25	435/25	450/25	800/35	800/35	
Power consumption bypass pump (optional)	W	55/35	85/65	170/90	170/90	190/120	460/225	470/280	
Weight (empty)	kg	295	345	400	465	535	590	650	
Noise level at 1 meter distance	dB (A)	59							
Ionisation current minimum	µA	6							
PH value condensate	-	3.2							
CE certification code	-	CE-0063BS 3840							
Water connections	-	R 2"			DN65 PN16				
Gas connection	-	R3/4"	R1"	R1"	R1"	R1.1/2"	R1.1/2"	R1.1/2"	
Flue gas connection	mm	150	150	200	200	250	250	250	
Air intake connection (for room sealed use)	mm	130	150	150	150	200	200	200	
Condensate connection	mm	22	22	22	22	22	22	22	

* min load on gasses H/L/LPG. For type R602-R607 on gasses LL-Gas min value is 15% higher.

Technical description

Dimensions



Dimensions		SH61	SH62	SH63	SH64	SH65	SH66	SH67
L	mm	1105	1260	1470	1220	1435	1585	1735
L2	mm	127.5	127.5	137.5	137.5	187.5	187.5	187.5
H	mm	1480	1480	1500	1500	1500	1500	1500
H2	mm	1120	1130	1130	1150	1245	1245	1245
B	mm	670	670	670	770	770	770	770
B2	mm	225	235	235	235	215	215	215
B3	mm	260	260	260	310	310	310	310
B4	mm	260	260	260	490	490	490	490
B5	mm	130	130	130	245	245	245	245
D1	mm (Diam.)	130	150	150	150	200	200	200
D2	mm (Diam.)	150	150	200	200	250	250	250
W1	R" / DN	R2"	R2"	R2"	DN65 PN16			
W2	R" / DN	R2"	R2"	R2"	DN65 PN16			
G	R	R 3/4"	R 1"	R 1"	R 1"	R 1 1/2"		

- 1 Electrical connections
- 2 Gas supply
- 3 Water supply
- 4 Water return (Cold)
- 5 Air Intake
- 6 Water 2nd return (Hot)
- 7 Boiler water drain valve 1/2"
- 8 Flue gas Outlet
- 9 Condensate drain flexible hose 25mm diam.

Technical description

Declaration of conformity

Declaration of Conformity

Rendamax BV, Hamstraat 76, 6465 AG Kerkrade (NL),
declares that the product

R600

is in conformity with the following standards:

EN 298
EN 50165
EN 55014-1 / -2
EN 60 335-2

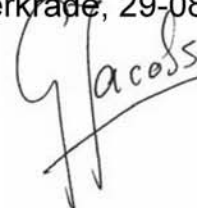
and in accordance with the guidelines of directives:

92 / 42 / EEC (boiler efficiency directive)
90 / 396 / EEC (gas appliance directive)
73 / 23 / EEC (low voltage directive)
89 / 336 / EEC (EMC directive)

This product is designated with CE nr.:

CE – 0063BS3840

Kerkrade, 29-08-2007



ing. G.A.A. Jacobs
Plant Manager

Technical description

Extent of delivery

Boiler transport

Boiler installation

Standard boiler

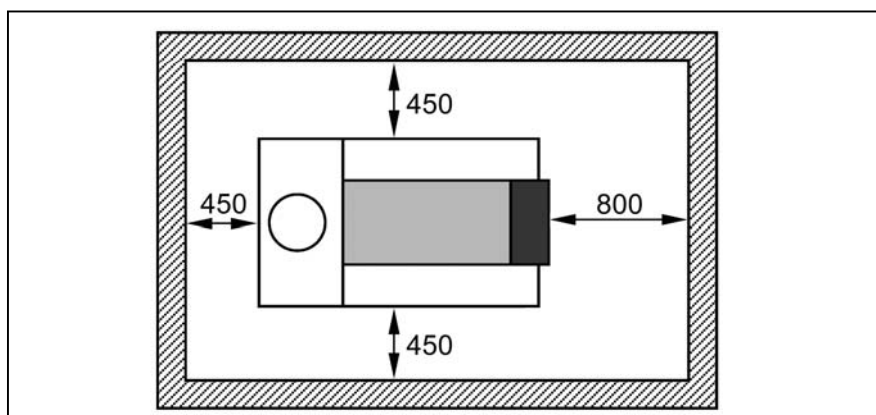
A boiler delivery package contains the following components:

Component	Pcs.	Package
Boiler fully assembled and tested	1	Mounted on wooden blocks with wooden border, sealed in PE foil
Adjustable feet	4	Mounted on frame of the boiler
Syphon for condensate connection	1	Cardboard box on top of heatexchanger (under casing)
Conversion kit for natural gas L and propane incl. instruction	1	Cardboard box on top of heatexchanger (under casing)
Operation and Installation manual	1	Map attached to back panel of the boiler
Spare parts list	1	Map attached to back panel of the boiler
Wiring diagram	1	Map attached to back panel of the boiler
Integrated additional system controller , incl. all necessary sensors and sockets (optional)	1	Integrated in electronic switchboard of the boiler. Sensors and sockets in cardboard box on top of the heatexchanger (under casing).

Boiler transport

Whenever necessary, the boiler can be dismantled into smaller parts for easier transport inside the building. The table below shows the main dismantled parts with their weight and dimensions.

Component		R601	R602	R603	R604	R605	R606	R607
Burner/1st heat exchanger assembly	Weight [kg]	86	100	112	135	158	181	198
	Length [mm]	735	885	1035	735	885	1035	1185
	Width [mm]	400	400	400	680	680	680	680
	Height [mm]	321	321	321	321	321	321	321
2nd/3rd heat exchanger assembly	Weight [kg]	90	103	116	150	170	198	219
	Length [mm]	735	885	1035	735	885	1035	1185
	Width [mm]	400	400	400	680	680	680	680
	Height [mm]	244	244	244	244	244	244	244
Condensate receptacle	Weight [kg]	7	9	10	11	12	13	15
	Length [mm]	589	739	889	589	739	889	1039
	Width [mm]	385	385	385	665	665	665	665
	Height [mm]	225	225	225	225	225	225	225
Frame	Weight [kg]	15	16	17	17	18	19	21
	Length [mm]	990	1140	1350	1100	1320	1470	1620
	Width [mm]	624	624	624	724	724	724	724
	Height [mm]	335	335	335	335	335	335	335
Front U-frame with electronic board	Weight [kg]	11	11	11	12	12	12	12
	Length [mm]	628	628	628	728	728	728	728
	Width [mm]	1304	1304	1304	1304	1304	1304	1304
	Height [mm]	202	202	202	202	202	202	202



Boiler installation

The boiler should be positioned in a frost-proof boiler room. If the boiler room is on the roof, the boiler itself may never be the highest point of the installation.

When positioning the boiler, please note the recommended minimum clearance in the picture. When the boiler is positioned with less free space, maintenance activities will be more difficult.

The (inter)national and local norms for the installation of heating systems should be respected at all times.

Norms and regulations

The R600 boiler is CE approved and applies to the following European standards:

- 92 / 42 / EEC
Boiler efficiency directive
- 90 / 396 / EEC
Gas appliance directive
- 73 / 23 / EEC
Low voltage directive
- 89 / 336 / EEC
EMC directive
- EN 656
Gas-fired central heating boilers – Type B boilers of nominal heat input exceeding 70 kW but not exceeding 300 kW
- EN 15420
Gas-fired central heating boilers - Type C boilers of nominal heat input exceeding 70 kW, but not exceeding 1000 kW
- EN 15417
Gas-fired central heating boilers - Specific requirements for condensing boilers with a nominal heat input greater than 70 kW but not exceeding 1000 kW
- EN 13836
Gas fired central heating boilers - Type B boilers of nominal heat input exceeding 300 kW, but not exceeding 1000 kW
- EN 15502-1
Gas-fired central heating boilers - Part 1: General requirements and tests
- EN 55014-1
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
- EN 55014-2
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity - Product family standard

- EN 61000-3-2
Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current 16 A per phase)
- EN 61000-3-3
Electromagnetic compatibility (EMC) - Part 3-3: Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current 16 A per phase and not subject to conditional connection
- EN 60335-1
Household and similar electrical appliances - Safety - Part 1: General requirements
- EN 50165
Household and similar electrical appliances - Safety - Part 2-102: Particular requirements for gas, oil and solid-fuel burning appliances having electrical connections

Additional national standards

Germany:

- RAL - UZ 61 / DIN 4702-8

Switzerland:

- SVGW

Netherlands:

- NOx staatsblad 344 (1994)
- GASKEUR BASIS
- GASKEUR SV
- GASKEUR HR107

Belgium:

- HR TOP

Norms and regulations

When installing and operating the boiler, all applicable norms (European and local) should be fulfilled:

- Local building regulations for installing combustion air and flue gas systems;
- Regulation for connecting the boiler to the electrical appliance;
- Regulations for connecting the boiler to the local gas network;
- Norms and regulations according to safety equipment for heating systems;
- Any additional local laws/regulations with regard to installing and operating heating systems.

An overview of the most important national norms can be found in the chapter „Norms“.

Norms and regulations

Maintenance

Fuel

Combustion air

Water quality

Maintenance

Regular maintenance is necessary to secure a safe and economical operation of the installation. For the R600, one annual maintenance visit is recommended. During this visit, the proper functioning of the complete heating system should be checked as well.

Fuel

The gas condensing boiler R600 is applicable for natural gases H, L and LL, and for LPG. Factory settings are always done for H-gas. For other types of natural gas, a correction can be made on the gas valve. For LPG, it's necessary to change the gas injector (included in delivery) before operating the boiler.

The R600 can work with gas pressures up to 100 mbar. In case of a gas pressure above 100 mbar, a pressure regulator should be fitted in the gas line.

The gas consumption and gas pressures of the different gases can be found in the chapter „Technical data“.

Combustion air

The gas condensing boiler R600 can be used in both non-roomsealed and roomsealed applications. The combustion air to the boiler shouldn't contain high concentrations of dust and/or halogen, as they can damage the heat exchanger surface. Especially in buildings, where chemicals are used, the combustion air facility should prevent these chemicals to enter the boiler.

The different room sealed connection possibilities the R600 is approved for, can be found in the chapter „Flue gas system“.

Water quality

The lifetime of the complete heating system is affected by the water quality. Additional costs for water treatment of an installation are always lower than repairing costs for damage created by poor water quality.

The following water quality levels must be respected at all times for warranty claiming. Damage to the boiler due to poor water quality will not be taken under warranty.

The system should be filled with water with a PH value between 8,0 and 9,5. The chloride value of the water should not exceed 50 mg/l. Entry of oxygen by diffusion should be prevented at all times. Damage to the heat exchanger because of oxygen diffusion will not be taken under warranty.

Boiler output [kW]	Max. sum of alkaline earths [mol/m ³]	Max. total hardness [d°H]
50 - 200	2.0	11.2
200 - 600	1.5	8.4

In installations with higher water volumes, it's necessary to respect the maximum filling and additional volumes with corresponding hardness values as stated in the german VDI2035 standard. In the table you can find the nominal values for filling and additional water for the R600 according to the the VDI2035.

Concentrate Ca(HCO ₃) ₂		Capacity of installation Q (kW)						
		150	200	250	300	400	500	600
mol/m ³	d°H	Maximum water (re)fill volume V _{max} [m ³]						
≤0.5	≤2.8	-	-	-	-	-	-	-
1.0	5.6	-	-	-	-	-	-	-
1.5	8.4	3	4	5	6	8	10	12
2.0	11.2	3	4	5	6	6.3	7.8	9.4
2.5	14.0	1.9	2.5	3.1	3.8	5.0	6.3	7.5
≥3.0	≥16.8	1.6	2.1	2.6	3.1	4.2	5.2	6.3

The table at the left gives an indication of the relation between the water quality and the maximum water filling volume during the lifetime of the boiler. Consult the original text of the VDI2035 for more detailed information.

Constant entry of oxygen in the installation should be avoided. The system water pressure should be higher than the atmospheric pressure in all parts of the installation. Underfloor heating components without oxygen diffusion barrier should never be used. When they're used anyway, a system separation (f.e. with plate heat exchanger) is compulsory.

Norms and regulations

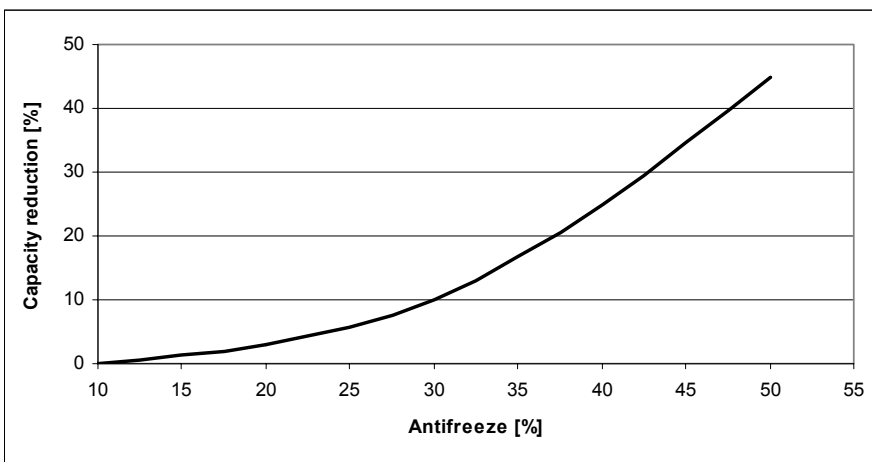
Noise protection Antifreeze

Noise protection

The gas condensing boiler R600 is equipped with a patented premix burner. The noise level of this very quiet premix burner is extremely low in comparison to conventional gas burners. Therefore no further measures have to be taken for noise protection in the boiler room.

The R600 is supplied with adjustable feet, which also prevent the transmission of vibration noise from the boiler into the building.

Noise created by system components (f.e. pumps) should be taken care of with external measures, in case of higher noise level requirements.



Antifreeze

The R600 can be used with the antifreeze type Shell Antifreeze Concentrate. The concentration of the antifreeze in the system affects the maximum capacity the boiler can work on. The relation between antifreeze concentration and capacity reduction of the boiler can be found in the graph.

Flue gas system

Requirements and regulations

Materials

Flue gas data

Requirements and regulations

Regulations for the construction of flue gas systems are very different for each country. It should be ensured that all national regulations with regard to flue gas systems are respected. The most important national norms can be found in the chapter „Norms“.

Pay attention to the following recommendations when dimensioning a flue gas system:

Only approved flue gas material may be used.

The flue gas system must be properly calculated to ensure a safe functioning of the system.

Flue gas system components should be removable for maintenance purposes.

Horizontal flue gas ways must be mounted under an angle of 3° minimum.

A separate condensate drain for the chimney is not necessary, as the condensate can enter the drain via the syphon connection of the boiler.

The R600 is certified for the flue gas systems B23 (and B23P for France) and C33, C53 and C63.

Materials

Exclusively materials, which are heat resistant and resistant to flue gases and aggressive condensate, may be used. Recommended materials are plastic (PPS, category T120) or stainless steel. Aluminium (only thick wall!) can also be used (in Germany only after consulting the chimney sweeper).

The R600 has an integrated high limit thermostat function for the flue gases.

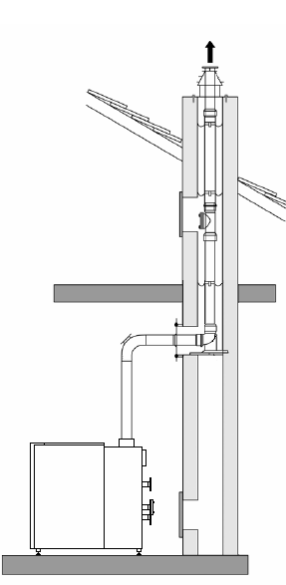
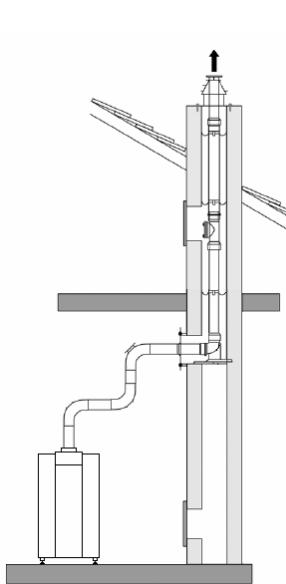
When the fluegas temperature exceeds 100°C, the burner is switched off. With this function, an additional (external) safety device is not necessary.

Flue gas data

Boiler type	Nominal heat output		Nominal heat input		Flue gas connection	CO ₂ level		Flue gas temperature		Flue gas quantity		Max. permissible flue resistance		
	kW		kW			mm	%		°C		kg/s		Pa	
	max	min	max	min			max	min	max	min	max	min	max	min
R601	142.1	23.3	145.0	24.5	150	10.2	9.4	78	30	0.070	0.013	160	10	
R602	190.1	39.5	194.0	41.5	150					0.093	0.022	160	10	
R603	237.2	39.5	242.0	41.5	200					0.116	0.022	200	10	
R604	285.2	39.5	291.0	41.5	200					0.140	0.022	200	10	
R605	380.2	76.6	388.0	80.5	250					0.186	0.043	200	10	
R606	475.3	76.6	485.0	80.5	250					0.233	0.043	250	10	
R607	539.0	76.6	550.0	80.5	250					0.264	0.043	250	10	

Flue gas system

Dimensioning

	VERSION 1 Calculation base: Total connection length in boiler room ≤ 1.5 m; 2x 87°-bend					
	Maximum permissible height (h) of flue gas system in m					
	Boiler type	Ø 110 [mm]	Ø 130 [mm]	Ø 150 [mm]	Ø 200 [mm]	Ø 250 [mm]
	R601	10	35	50		
	R602		17	34	50	
	R603			26	50	
	R604			16	50	
	R605				50	50
R606				39	50	
R607				29	50	
	VERSION 2 Calculation base: Total connection length in boiler room ≤ 3 m; 4x 87°-bend					
	Maximum permissible height (h) of flue gas system in m					
	Boiler type	Ø 110 [mm]	Ø 130 [mm]	Ø 150 [mm]	Ø 200 [mm]	Ø 250 [mm]
	R601	5	29	50		
	R602		11	27	50	
	R603			19	50	
	R604			9	50	
	R605				43	50
R606				31	50	
R607				20	50	

Dimensioning

When dimensioning a flue gas system, it's necessary to perform a calculation check of the flue gas system in order to verify if the chosen system is applicable.

The following table shows two examples of possible flue gas systems, including the maximum possible height of the system. These examples only give an indication of the possible heights, but they can not be used for official flue gas layout calculation. Each flue gas system must be calculated by an authorized company.

The maximum negative flue gas pressure, which doesn't affect the burner modulation ratio, is 30 Pa. Higher negative pressure will lead to limitation of the burner modulation ratio.

The maximum horizontal flue gas way is 20 m. With horizontal ways longer than 20 m, a faultless burner start in cold condition can not be guaranteed.

Neutralisation

General

Neutralisation systems

Standard neutralisation system (DN)

Neutralisation system with pump (HN)

General

Condensate, created by the R600, should be drained into the public draining system. The condensate PH is between 3.0 and 3.5. National and/or local regulations have to be checked, in order to find out whether the condensate should be neutralised before entering the public draining system.

The maximum amount of condensate for each boiler type can be found in the chapter „Technical data“.

Neutralisation systems

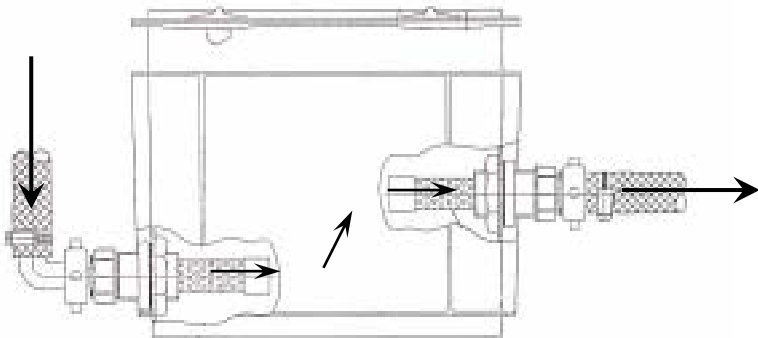
The neutralisation systems can be placed in the bottom section of the boiler. The delivery of the system contains the following components:

- Granulate for first filling
- Connection hoses for inlet and outlet connection
- Boiler connection adapter

For the neutralisation two different systems are available:

Standard neutralisation system (DN)

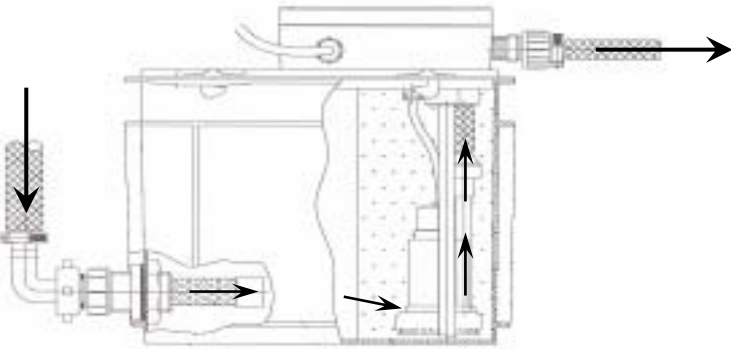
The standard neutralisation system is used, when the public draining connection is at lower level than the boiler syphon connection.



Type		DN2	DN3
Applicable for	[kW]	450	1500
Length	[mm]	420	640
Width	[mm]	300	400
Height	[mm]	240	240

Neutralisation system with pump (HN)

The neutralisation system with pump is used, when the public draining system is at higher level than the boiler syphon connection and the condensate needs to be transported to a higher level before draining is possible. The built-in pump of the neutralisation system takes care of the transport of the condensate.



Type		HN1.5	HN2.5
Applicable for	[kW]	280	540
Length	[mm]	410	640
Width	[mm]	300	400
Height	[mm]	290	240
Power consumption pump	[W]	40	150
Pump head	[m]	6	3

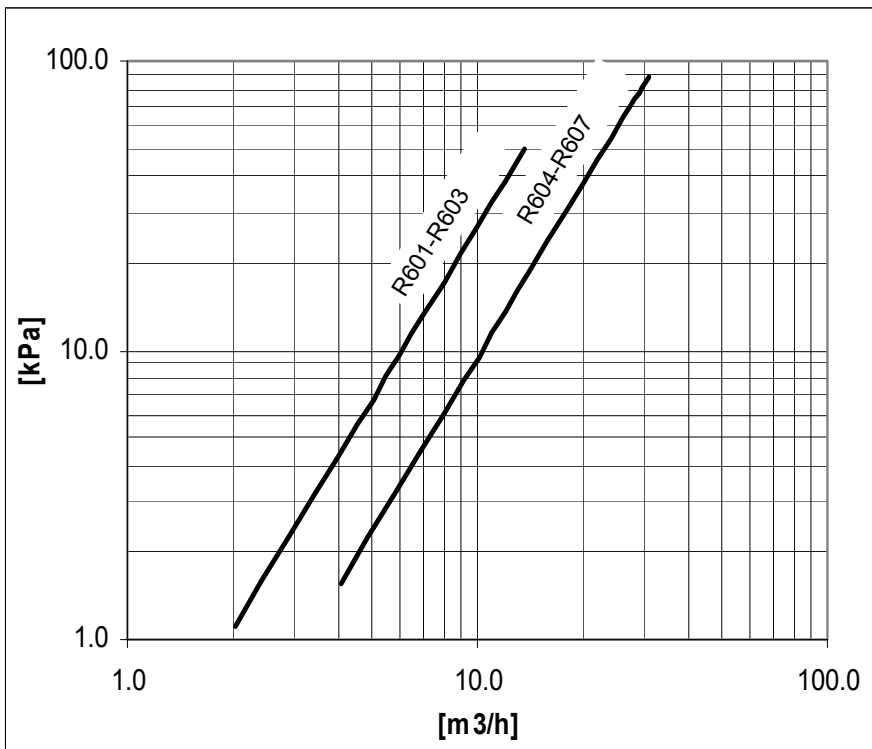
Hydraulic connection

Hydraulic resistance

ΔT-measurement

Δp-measurement

Water flow data



Hydraulic resistance

The hydraulic resistance depends on the flow rate through the boiler and the boiler type. In the graph the resistance for a specific flow rate can be found.

The R600 is able to control a speed controlled pump via a 0-10VDC signal. It makes the flow rate modulate in parallel with the burner load. The minimum flow rate, to which the pump is allowed to modulate with the burner load, is 30% of the nominal flow rate through the boiler.

The flow rate through the boiler can also be checked by calculation. This can be done with a ΔT as well as a Δp measurement.

Water flow data								
		R601	R602	R603	R604	R605	R606	R607
Nominal flow rate	m ³ /h	6,1	8,1	10,2	12,2	16,3	20,4	23,1
ΔT at nominal flow rate	K	20						
Δp at nominal flow rate	kPa	10	18	28	15	27	42	55

ΔT-measurement

Check the temperature difference over the boiler (ΔT flow-return) when the boiler is running on 100% load. The nominal ΔT is 20K and must be at least between 15K and 25K for secure boiler operation. An indication of the actual flow rate can be found with the following calculation (see table below for nominal data):

$$q_{\text{actual}} = (\Delta T_{\text{nominal}} / \Delta T_{\text{measured}}) * q_{\text{nominal}} \text{ [m}^3/\text{h]}$$

Δp-measurement

Check the pressure difference over the boiler (Δp flow-return) when the boiler pump is running (burner on is not required). The nominal Δp for each boiler type can be found in the table below, actual Δp must be within: $0.35 * \Delta p_{\text{nom}} \leq \Delta p \leq 1.75 * \Delta p_{\text{nom}}$. An indication of the actual flow rate can be found with the following calculation (see table below for nominal data):

$$q_{\text{actual}} = \sqrt{(\Delta p_{\text{measured}} / \Delta p_{\text{nominal}})} * q_{\text{nominal}} \text{ [m}^3/\text{h]}$$

Hydraulic connection

Hydraulic connection into a system

Standard

Bypass

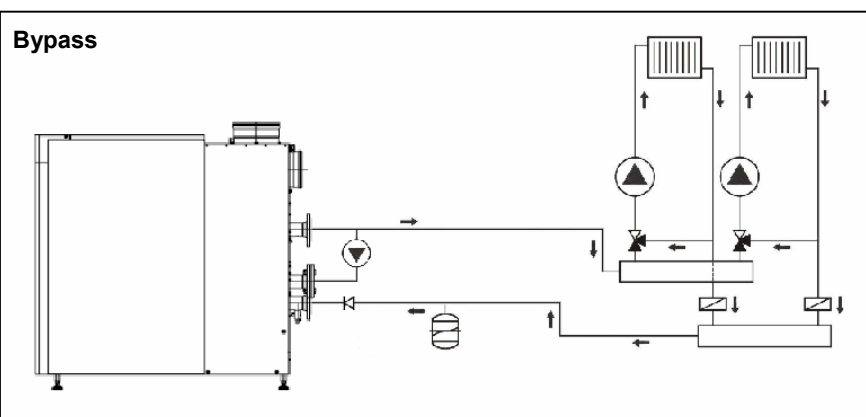
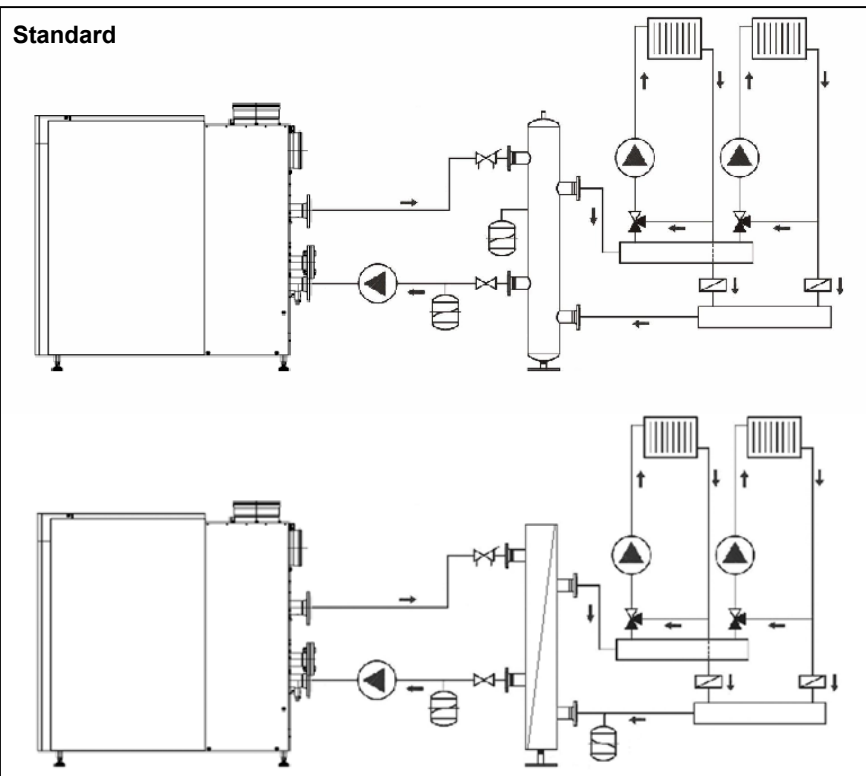
Hydraulic connection into a system

The R600 must be connected in such a way, that a minimum flow rate of 30% of the nominal flow rate can be ensured at all times, independent from the flow rate in the secondary system. This can be achieved by using one of the following 3 possibilities:

- Standard, with low loss header or plate heat exchanger
- Bypass, with integrated minimum flow rate by Bypass pump*
- Split System, with 2 return connections for best possible efficiency (warm and cold return)

* only applicable in single boiler installations

Details to the 3 possibilities mentioned above, can be found in the next sections.



Standard

This is the most common way to connect the boiler to the system. By using a low loss header or plate heat exchanger a minimum flow rate can be ensured at all times, independent from the flow rate in the secondary system. The boiler pump is available as a standard 3-step or a speed controlled version. The speed controlled pump modulates the flow rate in the primary system in parallel with the burner load. This ensures the lowest possible return temperature to the boiler for high efficiency usage.

Details of the available pump kits can be found in the chapter „Accessories“.

Bypass

In single boiler installations, the R600 can also be used without low loss header or plate heat exchanger. For this solution a bypass kit is available as accessory to the standard boiler. The bypass is connected between the flow connection and the second return connection of the boiler.

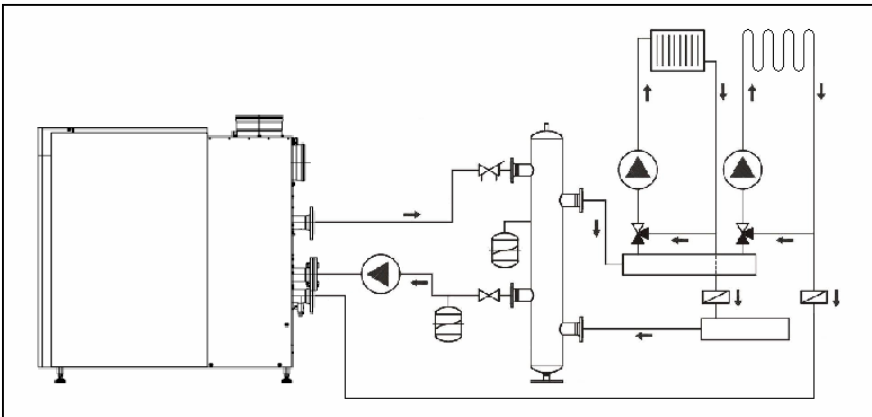
The performance of the bypass pump is very low when the system flow rate is high. As soon as the system flow rate decreases, the bypass pump performance increases to ensure a minimum flow rate through the boiler.

The bypass pump does not transport the water from the boiler into the system. The system pump should overcome the boiler resistance at nominal flow rate to transport the water from the boiler into the system and vice versa.

Details of the available pump kits can be found in the chapter „Accessories“.

Hydraulic connection

Split System



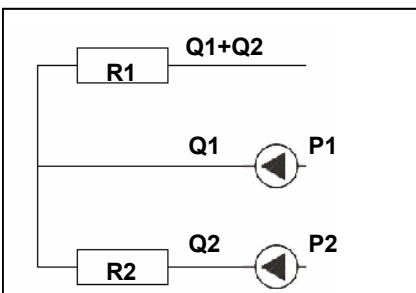
Split System

The split system boiler enables the connection of two returns with different water temperatures. By evasing the low loss header the cold return water enters the condenser of the boiler directly, without mixing with the high temperature return water (f.e. from an air heater circuit). This hydraulic separation increases the efficiency of the system.

The primary boiler pump, controlled by the boiler management unit, ensures a minimum water flow through the boiler except for the bottom heat exchanger (condenser). The system pump of the low temperature circuit must be dimensioned in such a way, that it can overcome the boiler resistance.

The nominal flow rate in the (warm) boiler circuit must be minimum 50% of the total nominal flow rate through the boiler.

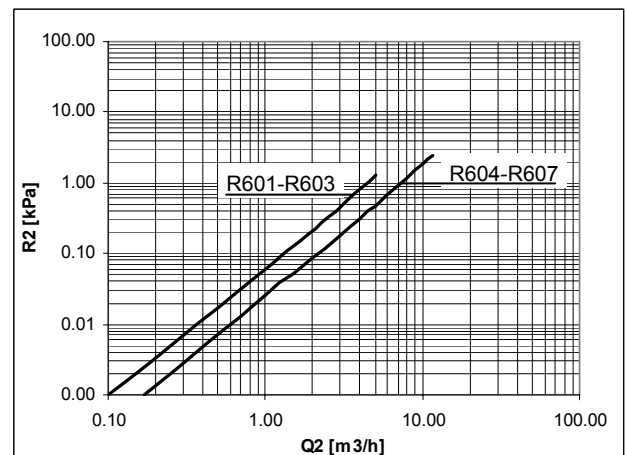
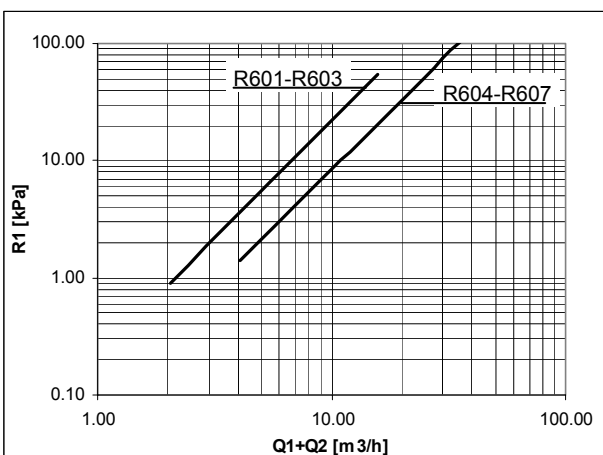
The following data can be used for the dimensioning of the pumps in a split system.



	Min. and max. flow rate Q1-Q2			
	$Q_{2,min}$ [m ³ /h]	$Q_{2,max}$ [m ³ /h]	$(Q_1+Q_2)_{min}$ [m ³ /h]	$(Q_1+Q_2)_{max}$ [m ³ /h]
R601	0	3.0	4.9	8.1
R602		4.0	6.5	10.8
R603		5.1	8.2	13.6
R604		6.1	9.8	16.3
R605		8.1	13.0	21.7
R606		10.2	16.3	27.2
R607		11.5	18.5	30.8

Necessary head pump P2: $R_{P2} = R_{2at\ Q2} + R_{1at\ (Q1+Q2)} + R_{System}$

Necessary head pump P1: $R_{1at\ (Q1+Q2)}$



Controls

Basic controls and connections Control by building management system Boiler enable signal Temperature or capacity setpoint

Basic controls and connections

The standard version of the R600 is equipped with a KM628-R600 boiler management unit. This controller controls both the burner safety operation and the temperature regulation of the boiler. The KM628-R600 includes the following functions:

- Electronic high limit thermostat
- Electronic flue gas temperature limiter
- Primary boiler pump control (via relay)
- Primary sanitary hot water pump control (via relay)
- Interlock input
- Lockout input
- OK/Alarm output signal
- Boiler enable signal
- 0-10VDC temperature or capacity setpoint (programmable)
- 0-10VDC capacity feedback or 10V contact for external gas valve (programmable)
- Temperature control central heating via PID controller
- Temperature control sanitary hot water (hot water priority)

When additional control of secondary heating zones or cascade systems are required, the R600 can be extended with different additional controls. Explanation of these controls can be found in the next sections.

Control by building management system

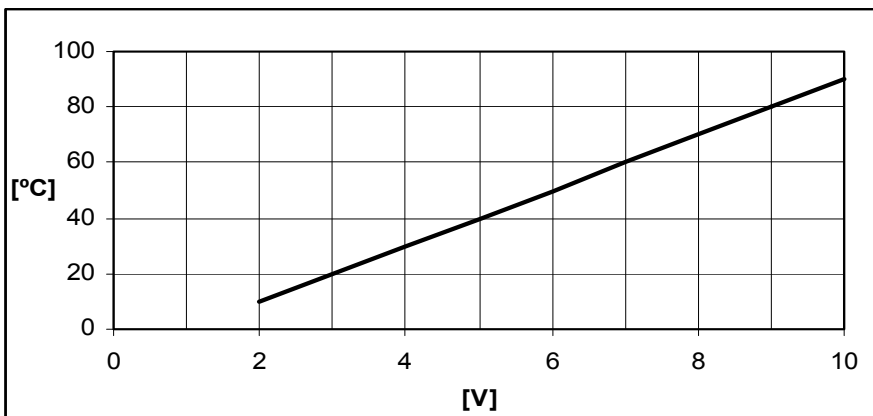
The R600 can be connected to a building management system. This can be done by using (one of) the following connections:

Boiler enable signal, terminals 22-23 (230V)

The boiler enable signal is provided with a jumper from the factory. When connecting a (voltage free!!!) external signal, the jumper must be removed.

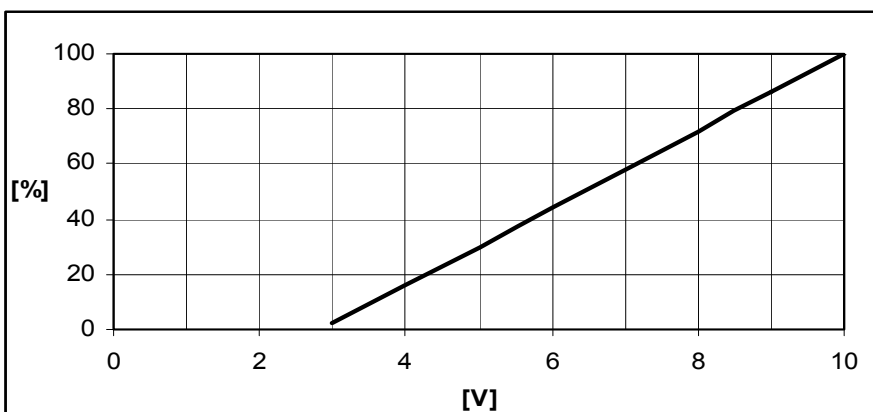
Temperature or capacity setpoint, terminals 117-118 (0-10VDC)

The R600 can be controlled via a temperature or capacity setpoint. The following graphs show the signal values for both possibilities.



Temperature setpoint

A signal below 2V will not be recognised by the boiler controller. In case of a signal below 2V, the controller will control the boiler temperature based on the internal setpoint programmed at parameter P1.



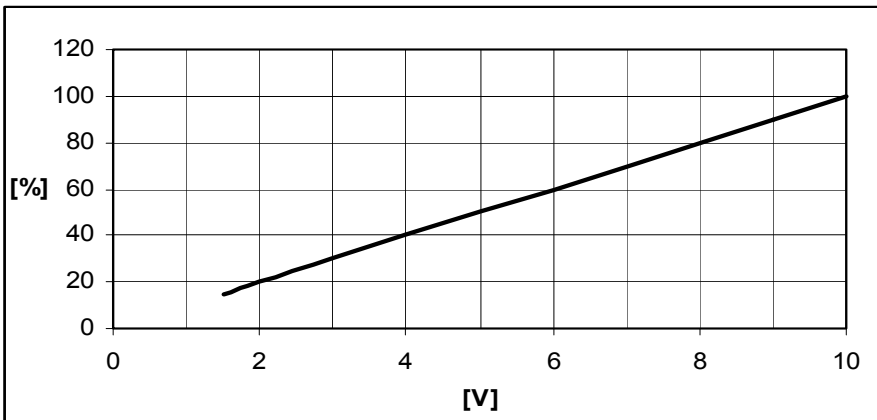
Capacity setpoint

The burner will be started when a signal of minimum 3V is recognised. The burner will be switched off, when the signal drops below 2.9V.

When controlling the boiler via a capacity setpoint, it's highly recommended to control the primary boiler pump with the internal pump control of the KM628 boiler controller. The minimum flow rate through the boiler must be respected at all times. The nominal ΔT is 20K and should be at least within 15K-25K at full load to secure a safe boiler operation.

Controls

Capacity feedback signal OK/Alarm output signal Weather compensated controller BM8



Capacity feedback signal, terminals 111-112 (0-10VDC)

This signal is available at the mentioned terminals, when the burner is active. The following graph shows the value of the signal.

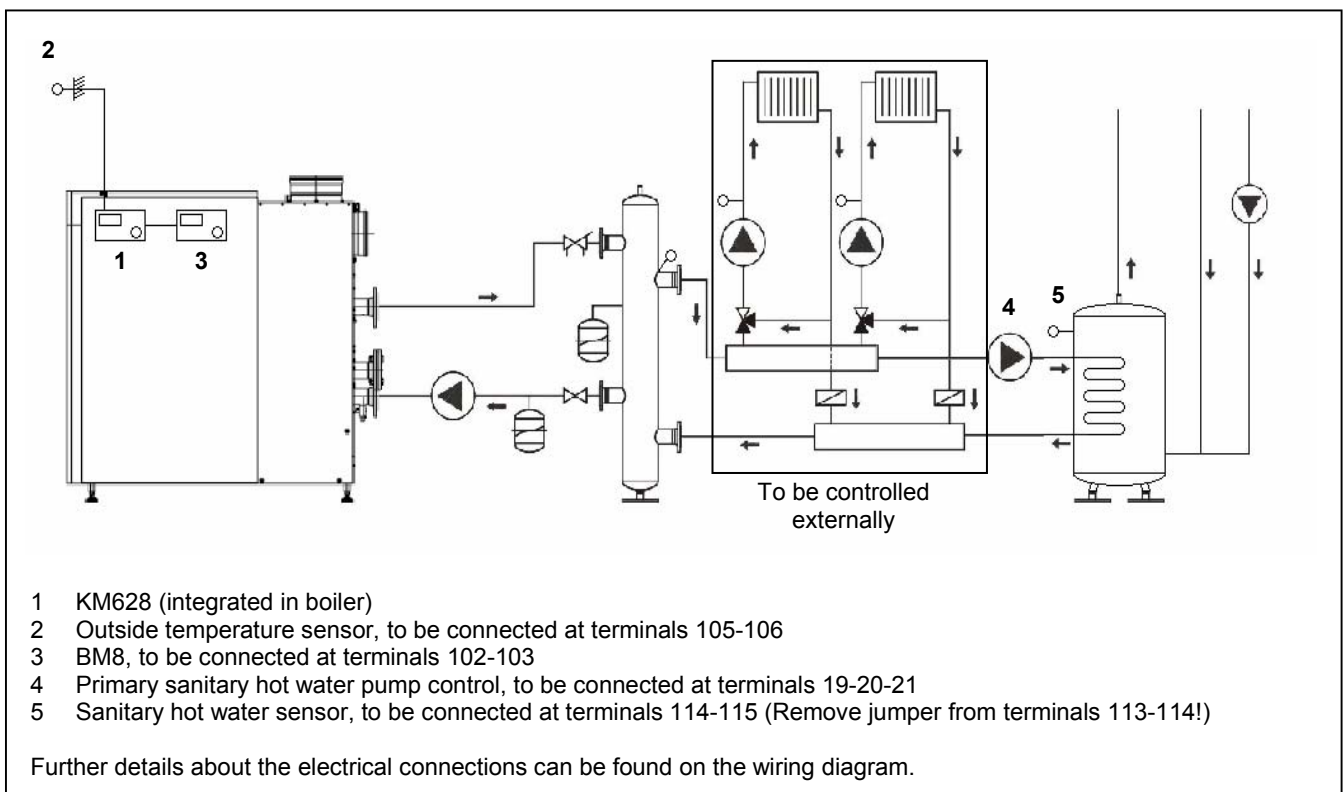
OK/Alarm output signal, terminals 25-26-27 (volt free)

At terminal 25 (COM), a desired voltage of maximum 230V, 1A can be connected. The boiler will transfer the signal, depending on the boiler situation, either to terminal 27 (OK) or terminal 26 (Alarm).

Weather compensated controller BM8

The R600 can be extended with a BM8 controller for weather compensated operation. Additional to the weather compensation, the BM8 also provides clock programs for central heating and sanitary hot water operation. The BM8 can not control secondary heating zones!

The BM8 can be integrated in the control panel of the boiler, but can also be used as a room unit (with integrated room sensor for room temperature optimisation). The maximum length of the communication cable between boiler and BM8 is 100m (consult BM8 documentation for further details).



Controls

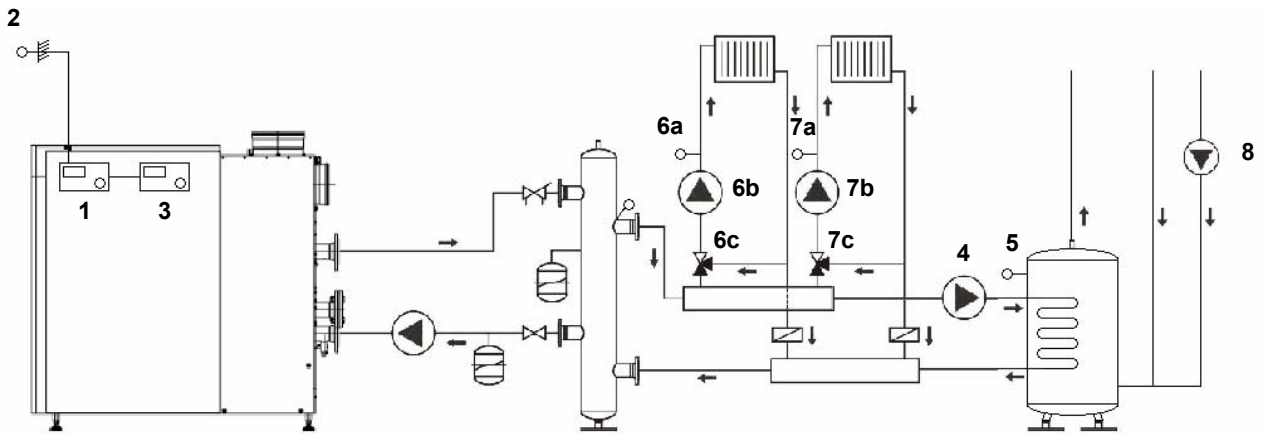
Heating zone controller E8

Heating zone controller E8

The R600 can be extended with an E8 controller for extended control of two heating zones and sanitary hot water operation. The E8 combines weather compensated operation with control of two heating zones and the control of a secondary hot water circulation pump.

For room temperature optimisation of each heating zone, an additional roomunit BM8 can be connected via bus connection. The values for the specific heating zone can then be displayed and changed on the room unit.

In case of heating systems with more than two heating zones, an additional kit with E8 in a wall hung box is available. These kits can be used in a modular way up to a maximum of 15 heating zones.



- 1 KM628 (integrated in boiler)
- 2 Outside temperature sensor, to be connected at terminals 105-106
- 3 E8 (integrated in boiler)
- 4 Primary sanitary hot water pump control, to be connected at terminals 19-20-21
- 5 Sanitary hot water sensor, to be connected at terminals 114-115 (Remove jumper from terminals 113-114!)
- 6 Heating zone 1
 - a Temperature sensor, to be connected at terminals 125-126
 - b Pump, to be connected at terminals 50-51-53
 - c Mixing valve, to be connected at terminals 55-56-57
- 7 Heating zone 2
 - a Temperature sensor, to be connected at terminals 127-128
 - b Pump, to be connected at terminals 51-52-53
 - c Mixing valve, to be connected at terminals 59-60-61
- 8 Sanitary hot water circulation pump, to be connected at terminals 63-64-65

Further details about the electrical connections can be found on the wiring diagram.

Controls

Cascade manager KKM8

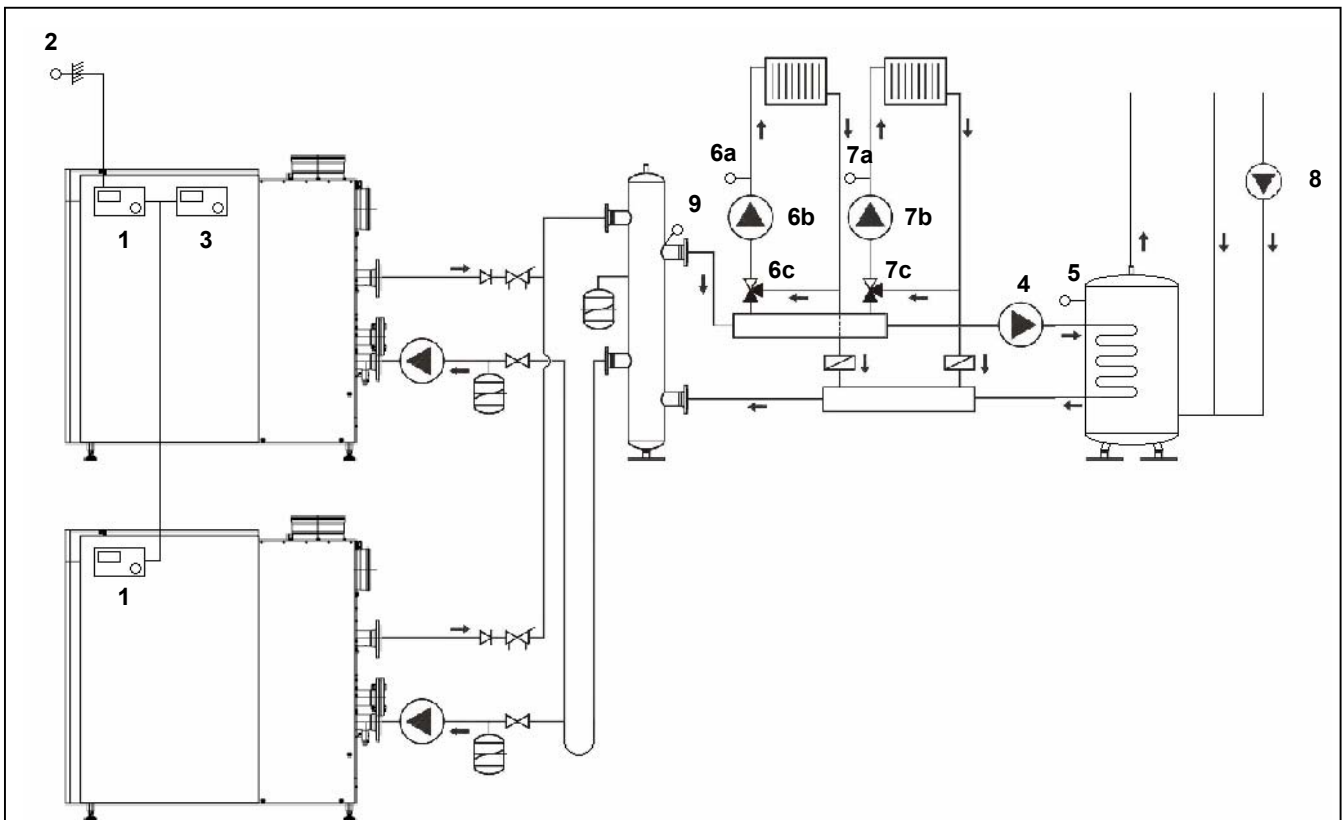
Cascade manager KKM8

The R600 can be equipped with a KKM8 cascade manager for cascade control of up to 8 boilers, in combination with weather compensated control of two heating zones and sanitary hot water production. The KKM8 combines all functions of the E8 with an intelligent cascade control, which allows free programming of boiler sequence after certain hours of operation.

The KKM8 can also be used for cascade control only, without using the possibility to control secondary heating zones. An external temperature setpoint 0-10VDC can be connected directly to the KKM8, the value of the signal can be programmed into the KKM8.

For room temperature optimisation of each heating zone, an additional roomunit BM8 can be connected via bus connection. The values for the specific heating zone can then be displayed and changed on the room unit.

In case of heating systems with more than two heating zones, an additional kit with E8 in a wall hung box is available. These kits can be used in a modular way up to a maximum of 15 heating zones.

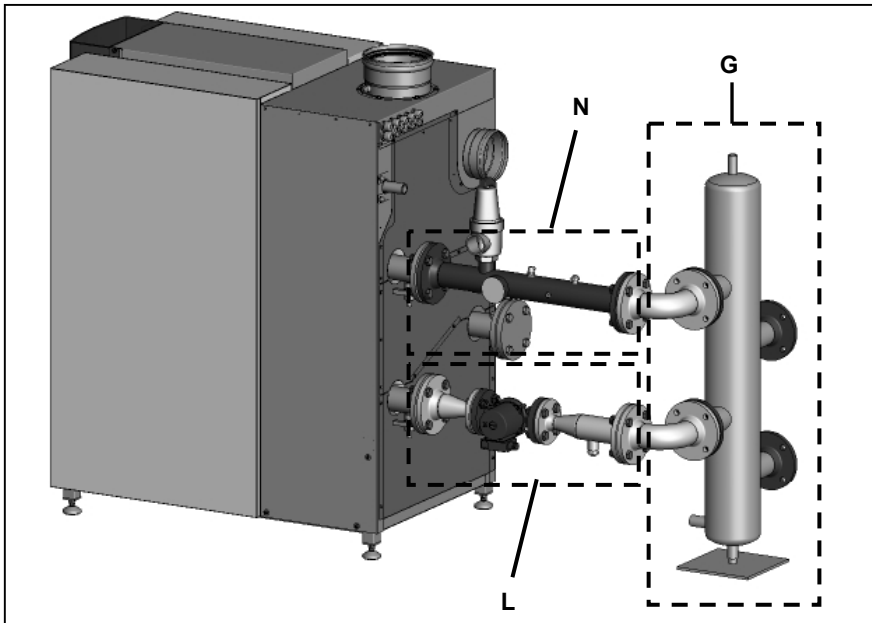


- 1 KM628 (2x) (integrated in boiler) Bus connection between boiler to be connected at terminals 102-103
- 2 Outside temperature sensor, to be connected at terminals 130-131
- 3 KKM8 (integrated in boiler)
- 4 Primary sanitary hot water pump control, to be connected at terminals 53-54-55
- 5 Sanitary hot water sensor, to be connected at terminals 135-136
- 6 Heating zone 1
 - a Temperature sensor, to be connected at terminals 125-126
 - b Pump, to be connected at terminals 50-51-53
 - c Mixing valve, to be connected at terminals 55-56-57
- 7 Heating zone 2
 - a Temperature sensor, to be connected at terminals 127-128
 - b Pump, to be connected at terminals 51-52-53
 - c Mixing valve, to be connected at terminals 59-60-61
- 8 Sanitary hot water circulation pump, to be connected at terminals 63-64-65
- 9 Header sensor, to be connected at terminals 132-133

Further details about the electrical connections can be found on the wiring diagram.

Accessories

System selection Selection table



The accessory kits are built in a modular way. From the selection table, several kits can be combined, resulting in a suitable system solution (see also the example above).

The R600 can be supplied from the factory in 3 versions:

- Standard boiler with KM628 boiler management unit
- Boiler with additional E8 weather compensated controller for two heating zones
- Boiler with additional KKM8 cascade manager for cascading up to 8 boilers including weather compensated control of two heating zones.

Additional to the above mentioned boiler versions, a wide variation of accessory kits is available. The accessory kits are specially designed for the R600 and are very easy to combine with the boiler to create a complete system solution.

System selection

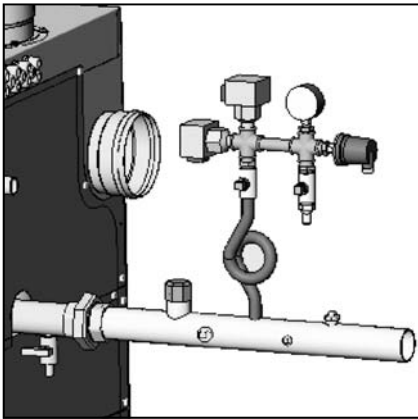
The plug & play accessory kits enable a very easy selection and assembly of a complete system solution. As the kits can be combined very easily, a wide variation of solutions can be made by just picking the right kits from the selection table. The accessory kits are pre-assembled and can be mounted to the boiler very quickly.

Selection table		Artikel-Nr.						
Nr.	Option:	R601	R602	R603	R604	R605	R606	R607
A	2x max. Water pressure switch + 1x external high limit thermostat	12082892			12083563			
B	1x max. gas pressure switch	12082903						
C	1x external high limit thermostat*	12082914			12083574			
D	1x gas valve leakage tester**	x	12082925					
E	Bypass (pump + connection kit)	12082936		12082947	12088238		12082958	
F	1x wiring for room fan and external gas valve	12082969						
G	1x plate heat exchanger + connection kit (R601-R603 = dT10K, R604-R607 = dT15K)	12082980	12082991		12083002		12088249	
	1x plate heat exchanger + connection kit (dT20K)	12082980			12083002		12083013	
H	1x header + connection kit (R601-R603 = dT10K, R604-R607 = dT15K)	12083024			12083035			
	1x duo-header (dT15K)	12083046			12083057			
I	1x BM8 + connection kit	12083068						
K	1x extension E8 + wall hung box + connection kit	12083079						
L	Pump (3-step) + connection kit (R601-604 = 230V, R605-607 = 400V)	12083090		12083101	12083585	12083112		12083123
M	Speed controlled pump + connection kit 230V	12083134		12083145	12083596	12083156	12083167	
N	Safety valve 3bar TÜV + manometer + de-aerator	12083178			12083189			
O	Safety valve 4bar TÜV + manometer + de-aerator	12083200			12083211			
P	Safety valve 5bar TÜV + manometer + de-aerator	12083222			12083233			
Q	Safety valve 6bar TÜV + manometer + de-aerator	12083244			12083255			
R	Gas filter + connection kit	12086104		12086115		12086126		
S	LOGON B							

* not in combination with kit A ** kit F automatically included

Accessories

Plug & play kits



Kit A: 2x max. Water pressure switch + 1x external high limit thermostat

The kit includes a connection piece, which can be connected the flow connection of the boiler. For multiple assembly variations a 90° bend is included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

The connection piece is pre-assembled with the following components:

- 2x maximum water pressure switch
- 1x manometer
- 1x high limit thermostat

All components are electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.

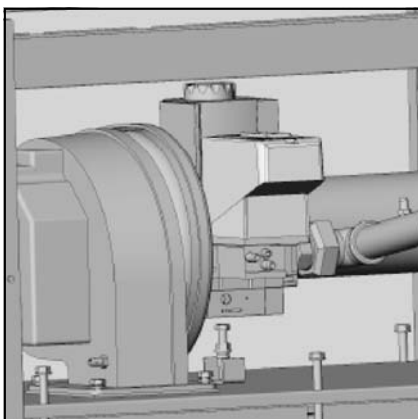
Kit B: max. gas pressure switch

The kit includes a gas pressure switch, which can be connected directly to the gas line inside the boiler. The gas pressure switch is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.

Kit C: external high limit thermostat

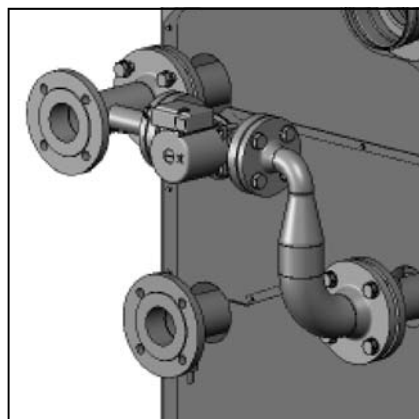
The kit includes a connection piece, which can be connected the flow connection of the boiler. For multiple assembly variations a 90° bend is included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

The high limit thermostat connection plunge is pre-assembled on the connection piece. The high limit thermostat is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.



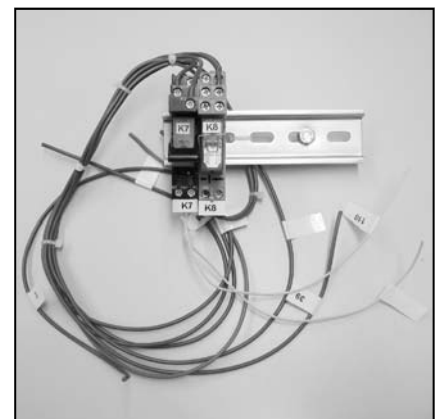
Kit D: gas valve leakage tester

The kit includes a gas valve leakage tester, which can be connected directly to the gas valve in the boiler. The gas valve leakage tester is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.



Kit E: bypass

The kit includes a bypass pump including connection material. The kit is to be connected between the flow and 2nd return connection of the boiler. The bypass pump is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.

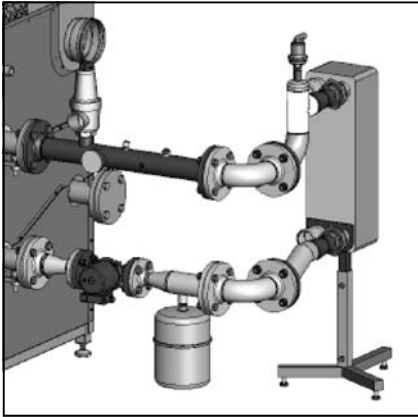


Kit F: wiring for room fan and external gas valve

The kit contains the electrical wiring for connecting an external gas valve and/or a room fan. The electrical kit can be easily mounted into the electrical panel of the boiler and be connected to the main terminals. Consult the wiring diagram for more details.

Accessories

Plug & play kits

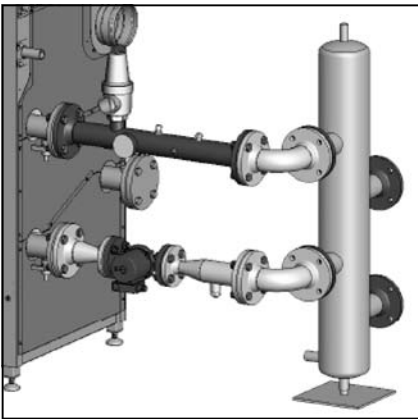


Data secondary circuit plate heat exchanger						
Typ	ΔT=10K		ΔT=15K		ΔT=20K	
	[m ³ /h]	[kPa]	[m ³ /h]	[kPa]	[m ³ /h]	[kPa]
R601	12.2	30.4	-	-	6.1	8.1
R602	16.2	28.8	-	-	8.1	14.0
R603	20.4	44.0	-	-	10.2	21.5
R604	-	-	16.3	28.8	12.2	16.6
R605	-	-	21.7	48.7	16.3	28.9
R606	-	-	27.2	15.6	20.4	14.3
R607	-	-	30.8	19.7	23.1	18.0

Kit G: plate heat exchanger + connection kit

The kit contains a plate heat exchanger including connection material, automatic de-aerator and expansion vessel. For multiple assembly variations two 90° bends are included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

The following data can be used for the dimensioning of the secondary system.



Kit H: low loss header + connection kit

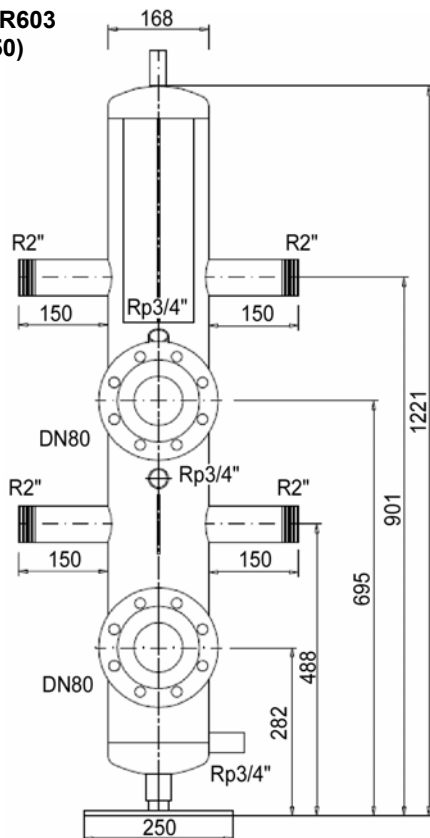
Mono header

The kit contains a low loss header including connection material, automatic de-aerator, plunge (for header sensor) and fill/drain valve on the bottom connection. For multiple assembly variations two 90° bends are included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

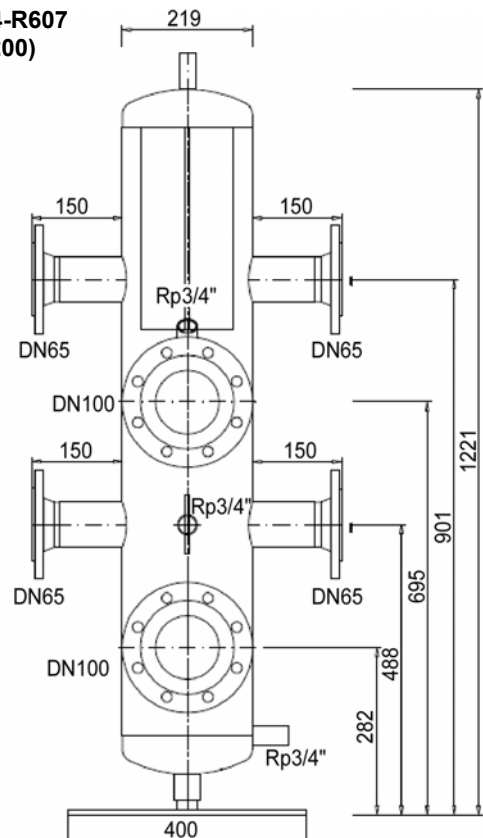
Duo header

The kit contains a duo header including automatic de-aerator, plunge (for header sensor) and fill/drain valve on the bottom connection. The duo header kit doesn't contain connection material, because of the wide variation of positioning possibilities. The connections have to be made on site.

R601-R603
(DN150)

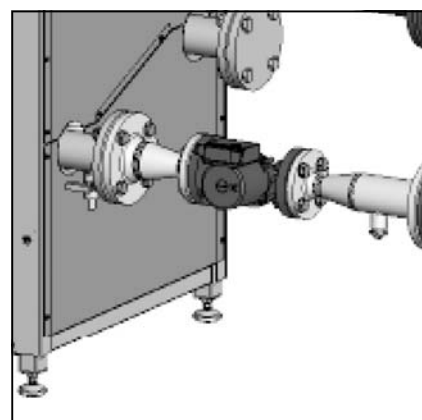


R604-R607
(DN200)



Accessories

Plug & play kits



Kit I: BM8

The kit contains a BM8 weather compensated controller including connection material, outside temperature sensor and a sanitary hot water sensor with plunge.

The BM8 can easily be mounted in the control panel of the boiler. The electrical connections for the controller and the sensors can be made directly on the terminals inside the electrical panel.

Kit K: E8 extended heating zone control

The kit contains a E8 weather compensated heating zone controller including wall hung box, outside temperature sensor, 2 heating zone sensors and a sanitary hot water sensor with plunge. This controller can be used for control of two additional heating zones, when an E8 or KKM8 is already integrated in the boiler. The controller can be connected directly to the bus connection terminals in the boiler. The system can be extended up to 15 heating zones.

Kit L: pump 3-step

The kit includes a 3-step pump including connection material with connection possibility for an expansion vessel. For multiple assembly variations a 90° bend is included, to enable a connection possibility to the right or the left. (see also section “connection possibilities”).

The following table shows the hydraulic data of the boiler and the boiler pump.

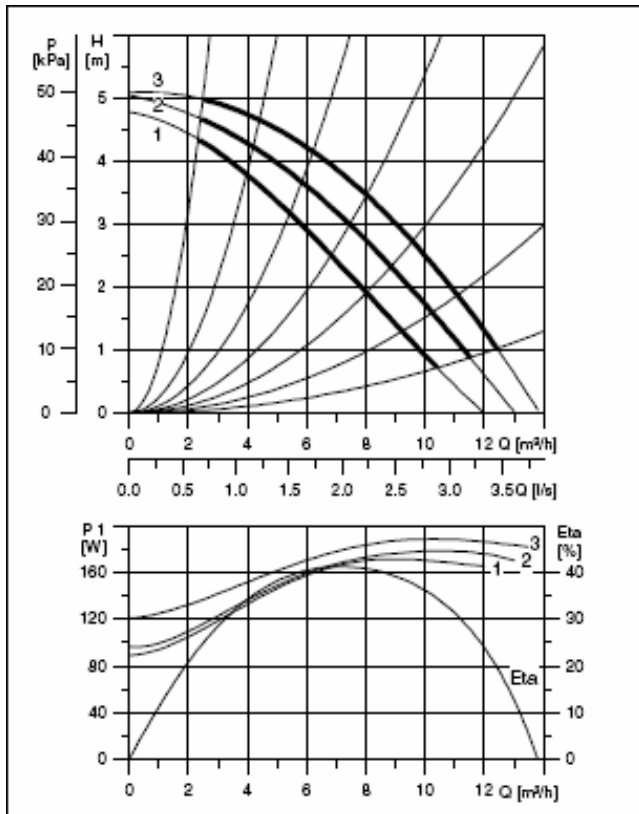
The pump is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.

Boiler type	ΔT 20 K		Pump data					
	Nominal flow rate Q_{nenn}	Boiler resistance	Pump type Grundfos	Pump setting	Pump head at Q_{nenn}	Available head for system at Q_{nenn}	Voltage	Power consumption max/min
	m ³ /h	kPa			kPa	kPa	V	W
R601	6.1	10	UPS32-60F	1	28	18	230	170/90
R602	8.1	18	UPS32-60F	3	34	16	230	190/120
R603	10.2	28	UPS32-120F	3	56	28	230	380/210
R604	12.2	15	UPS32-120F	3	39	24	230	380/210
R605	16.3	27	UPS50-120F	2	45	18	400	530/300
R606	20.4	42	UPS50-120F	3	58	16	400	720/380
R607	23.1	55	UPS65-120F	3	86	31	400	1150/600

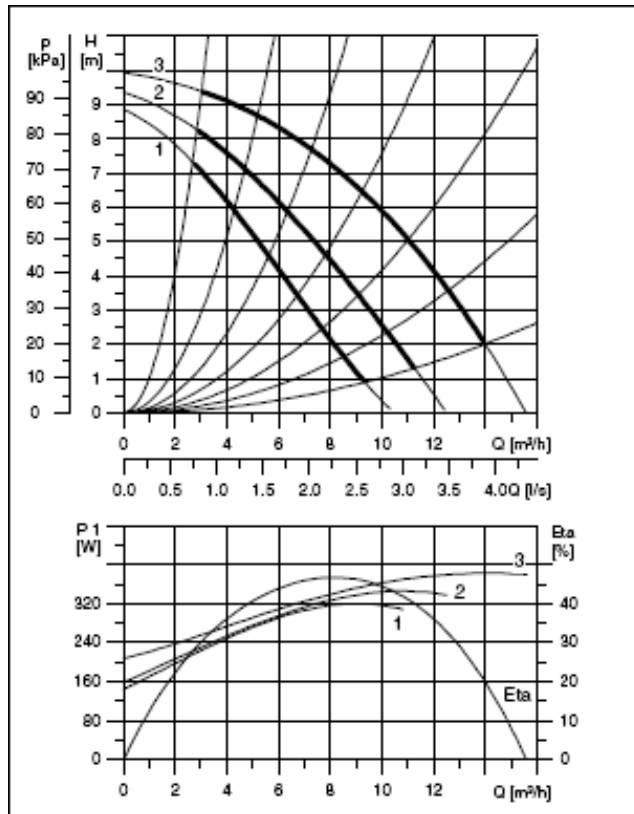
Accessories

Plug & play kits

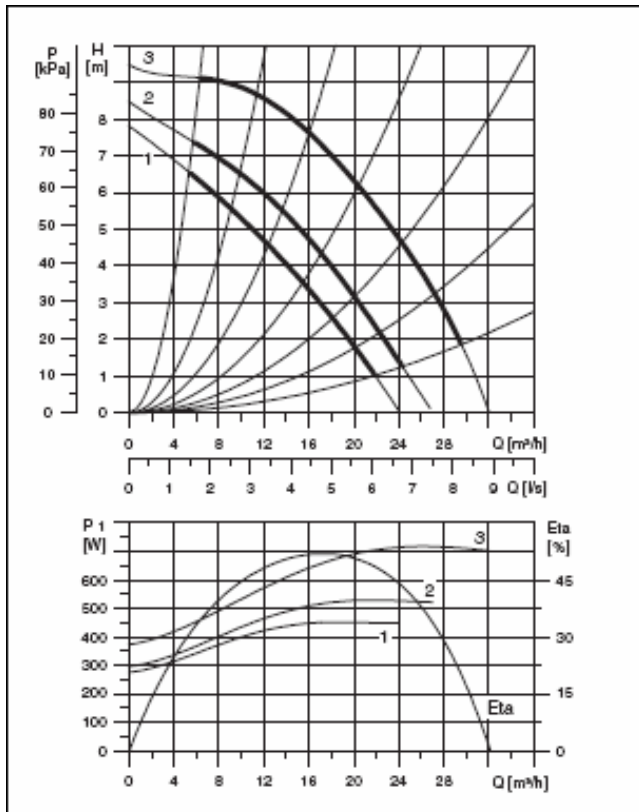
UPS32-60F



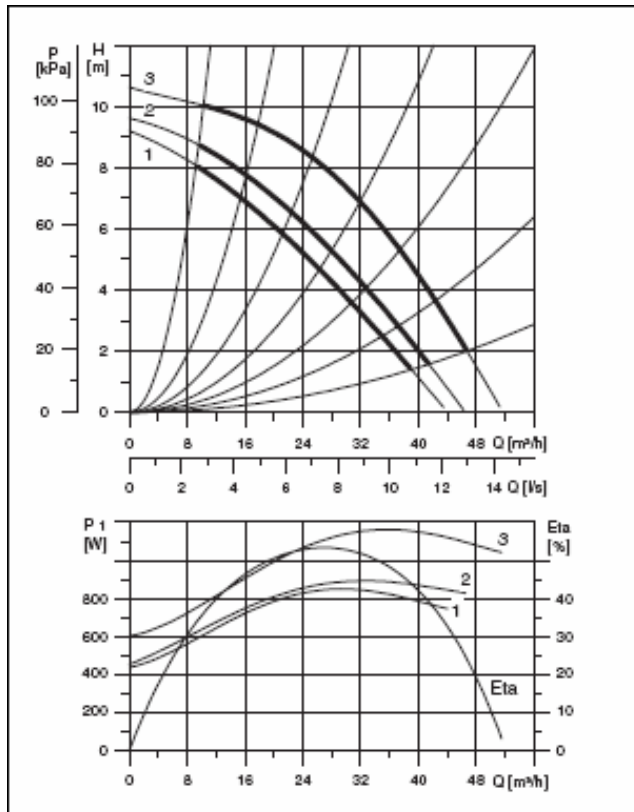
UPS32-120F



UPS50-120F

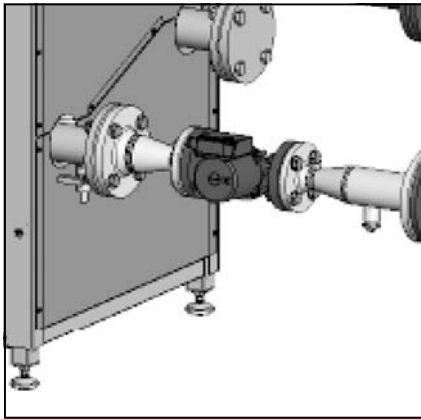


UPS65-120F



Accessories

Plug & play kits



Kit M: speed controlled pump

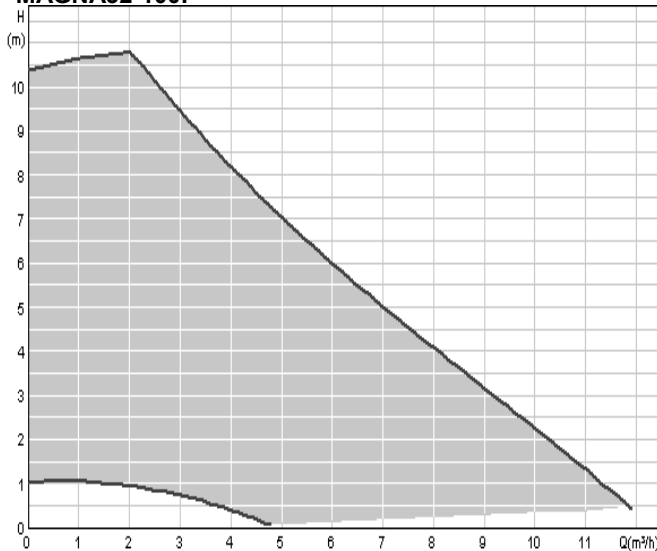
The kit includes a speed controlled pump including connection material with connection possibility for an expansion vessel. For multiple assembly variations a 90° bend is included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

The following table shows the hydraulic data of the boiler and the boiler pump.

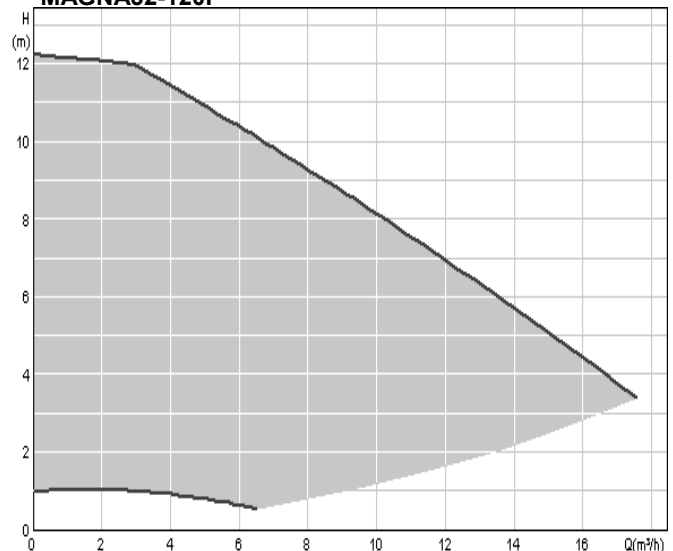
The pump is electrically wired, and can be connected directly to the terminals in the boiler. Consult the wiring diagram for more details.

Boiler type	ΔT 20 K		Pump data				
	Nominal flow rate Q_{nenn}	Boiler resistance	Pump type Grundfos	Pump head at Q_{nenn}	Available head for system at Q_{nenn}	Voltage	Power consumption max/min
	m^3/h	kPa		kPa	kPa	V	W
R601	6.1	10	MAGNA 32-100F	58	48	230	180/10
R602	8.1	18	MAGNA 32-100F	40	22	230	180/10
R603	10.2	28	MAGNA 32-120F	78	50	230	435/25
R604	12.2	15	MAGNA 32-120F	68	53	230	435/25
R605	16.3	27	MAGNA 40-120F	50	23	230	450/25
R606	20.4	42	MAGNA 50-120F	82	40	230	800/35
R607	23.1	55	MAGNA 50-120F	68	13	230	800/35

MAGNA32-100F



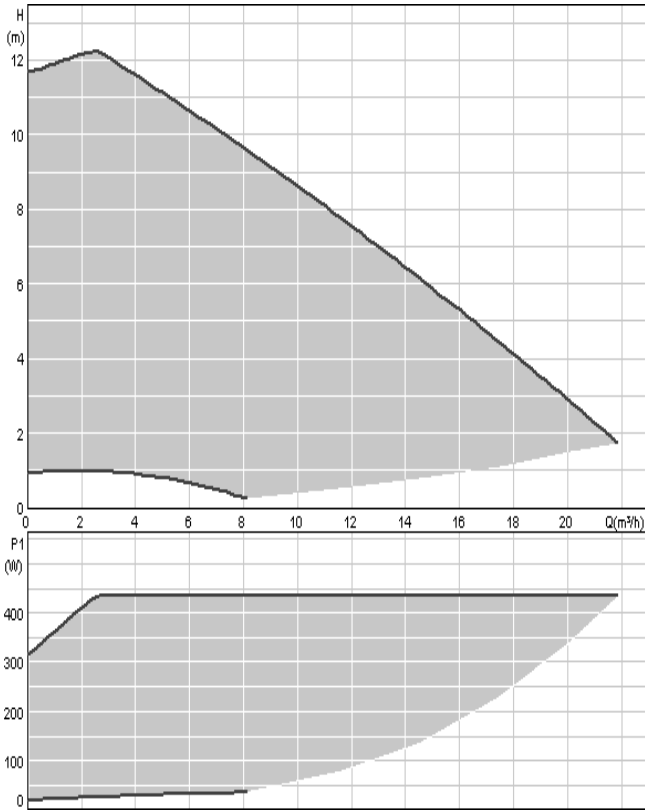
MAGNA32-120F



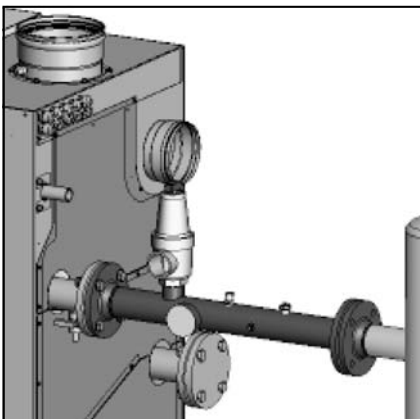
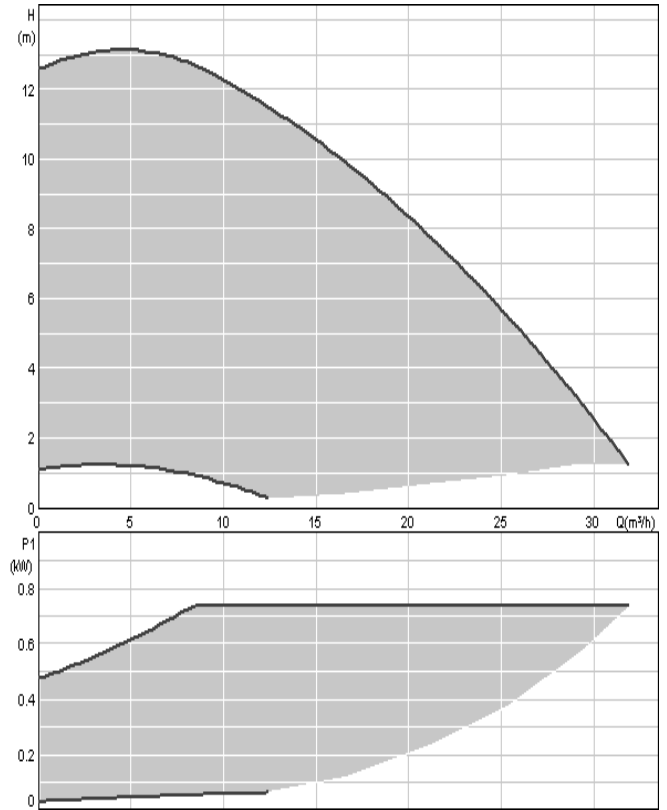
Accessories

Plug & play kits

MAGNA40-100F



MAGNA50-120F



Kit N/O/P/Q: safety valve (3-4-5-6 bar) TÜV + manometer + de-aerator

The kit includes a connection piece, which can be connected the flow connection of the boiler. For multiple assembly variations a 90° bend is included, to enable a connection possibility to the right or the left. (see also section "connection possibilities").

The connection piece is pre-assembled with the following components:

- 1x safety valve (3-4-5-6 bar) TÜV
- 1x manometer
- 1x de-aerator

The connection piece has an additional connection for kit A, in order to combine both kits on one piece.

Kit R: gasfilter

The kit contains a gas filter, which can be mounted directly on the gas connection of the boiler.

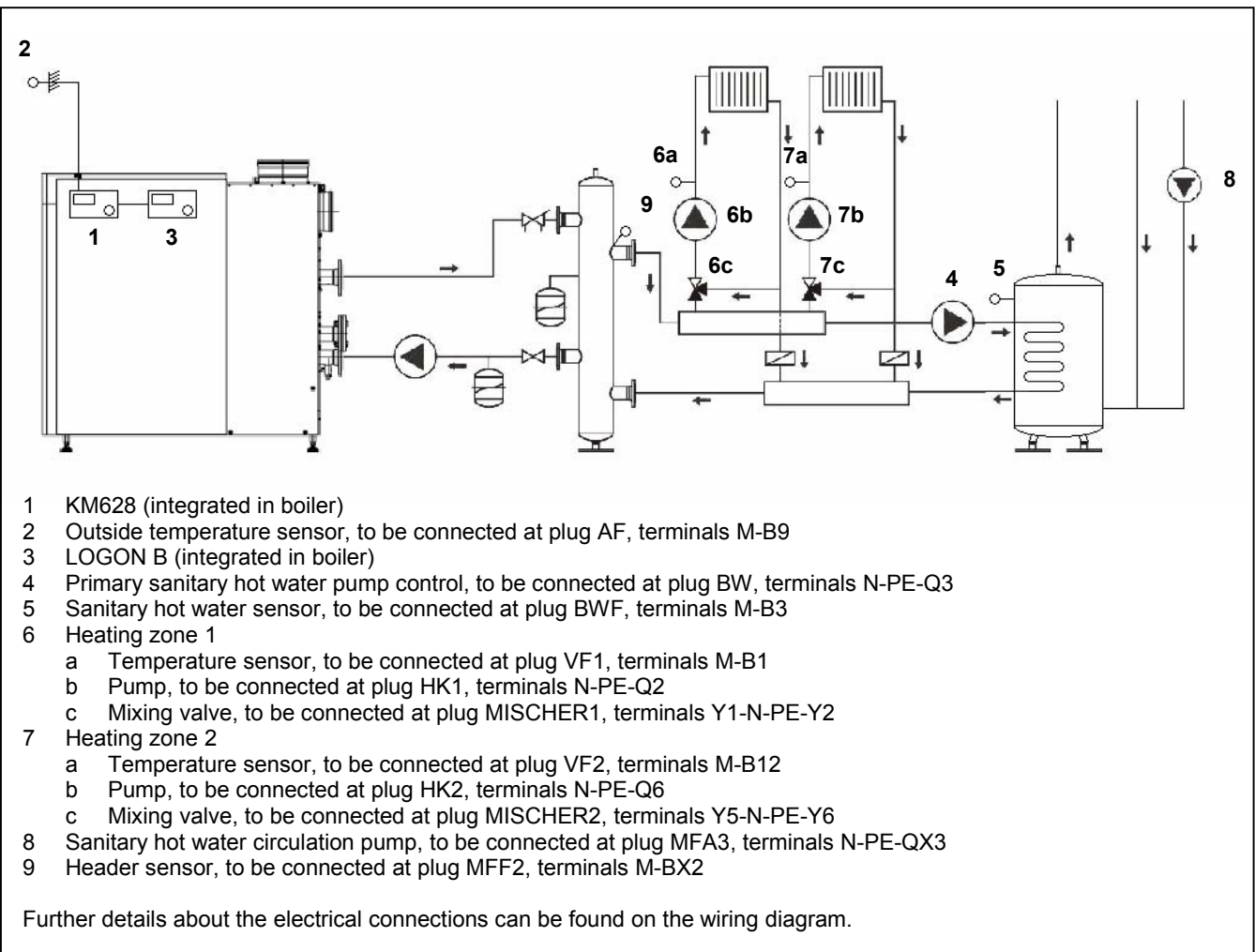
Accessories

Plug & play kits

Set S: LOGON B

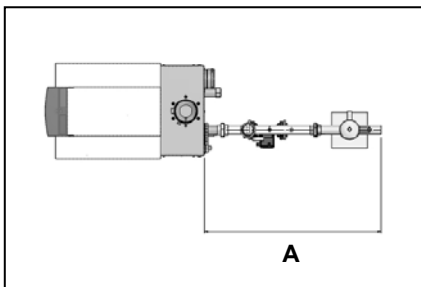
The R600 can be extended with a LOGON B controller for extended control of two heating zones and sanitary hot water operation. The LOGON B combines weather compensated operation with control of two heating zones and the control of a secondary hot water circulation pump.

The kit contains a LOGON B weather compensated controller including connection material for assembly into the control panel of a R600 (standard version) and an outside temperature sensor.

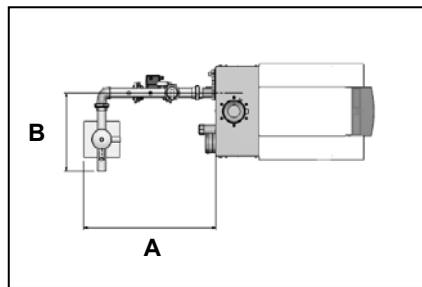


Connection possibilities

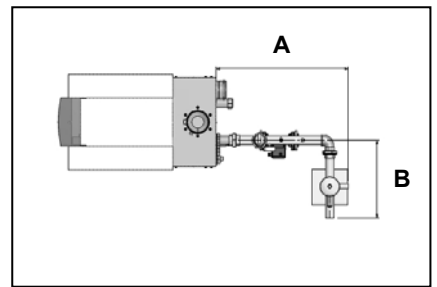
Low loss header



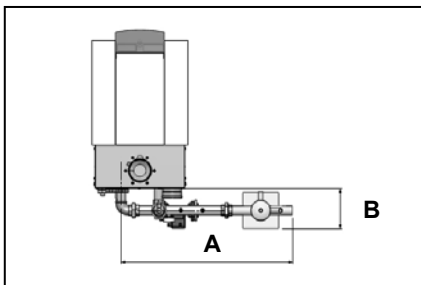
Boiler type	A
	mm
R601-R603	1233
R604-R605	1299
R606-R607	1299



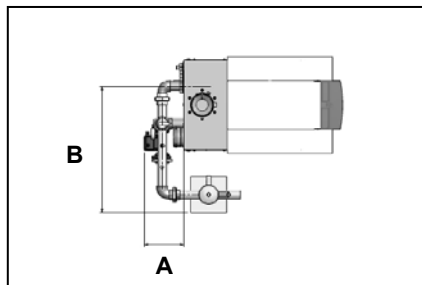
Boiler type	A	B
	mm	mm
R601-R603	923	545
R604-R605	1096	611
R606-R607	1096	611



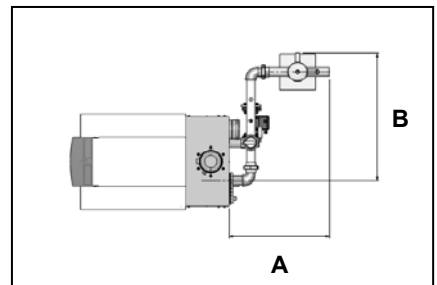
Boiler type	A	B
	mm	mm
R601-R603	928	545
R604-R605	1119	611
R606-R607	1119	611



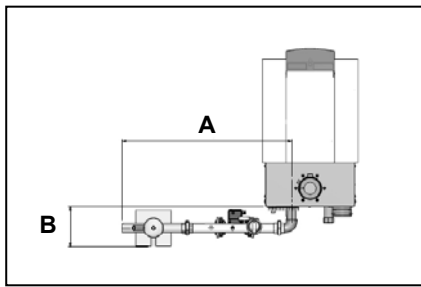
Boiler type	A	B
	mm	mm
R601-R603	1191	277
R604-R605	1320	388
R606-R607	1320	388



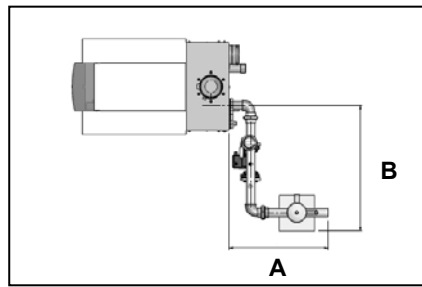
Boiler type	A	B
	mm	mm
R601-R603	277	881
R604-R605	388	1119
R606-R607	388	1119



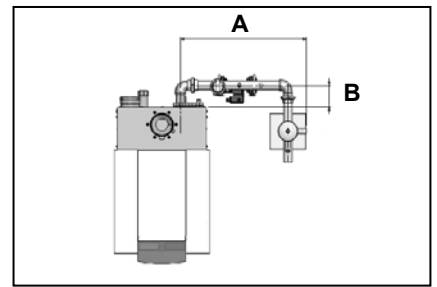
Boiler type	A	B
	mm	mm
R601-R603	697	886
R604-R605	873	1138
R606-R607	873	1138



Boiler type	A	B
	mm	mm
R601-R603	1191	282
R604-R605	1320	406
R606-R607	1320	406



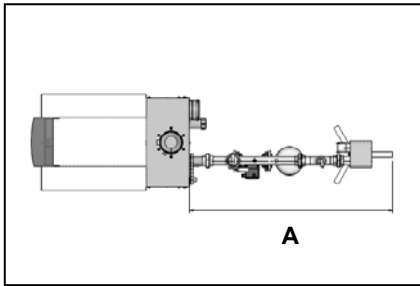
Boiler type	A	B
	mm	mm
R601-R603	697	881
R604-R605	873	1119
R606-R607	873	1119



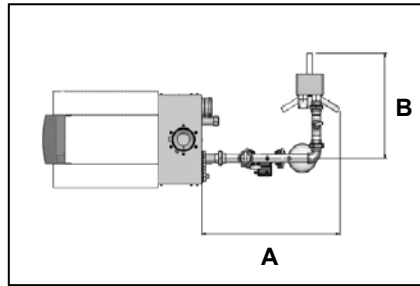
Boiler type	A	B
	mm	mm
R601-R603	886	152
R604-R605	1119	262
R606-R607	1119	262

Connection possibilities

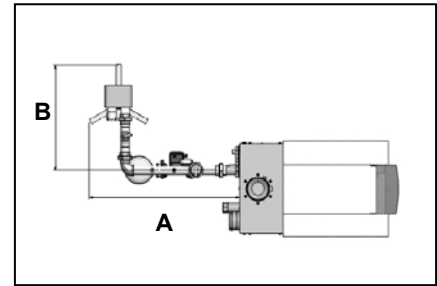
Plate heat exchanger



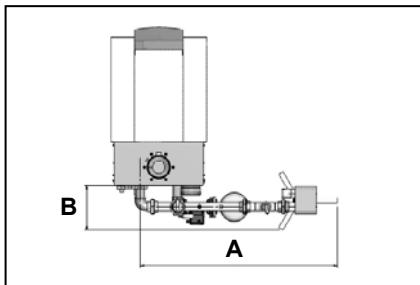
Boiler type	A
	mm
R601-R603	1421
R604-R605	1667
R606-R607	1542



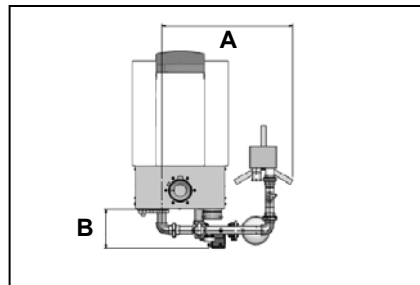
Boiler type	A	B
	mm	mm
R601-R603	960	735
R604-R605	1133	981
R606-R607	1073	856



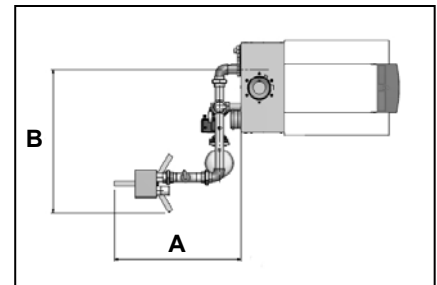
Boiler type	A	B
	mm	mm
R601-R603	1047	735
R604-R605	1222	981
R606-R607	1278	857



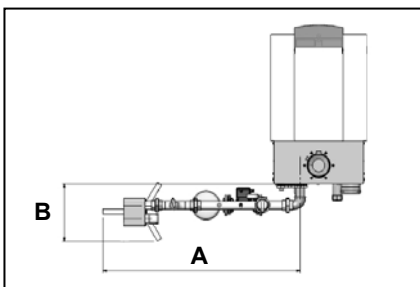
Boiler type	A	B
	mm	mm
R601-R603	1379	314
R604-R605	1690	424
R606-R607	1566	362



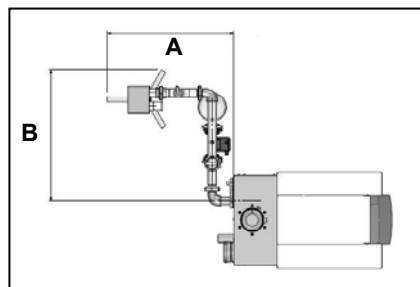
Boiler type	A	B
	mm	mm
R601-R603	918	278
R604-R605	1156	388
R606-R607	1094	388



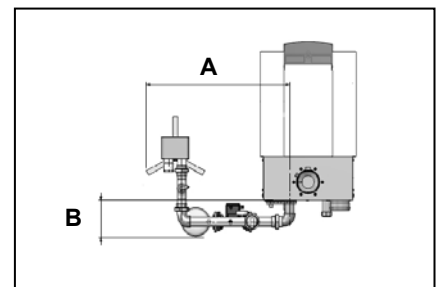
Boiler type	A	B
	mm	mm
R601-R603	887	1005
R604-R605	1243	1243
R606-R607	1119	1299



Boiler type	A	B
	mm	mm
R601-R603	1379	401
R604-R605	1690	511
R606-R607	1566	567



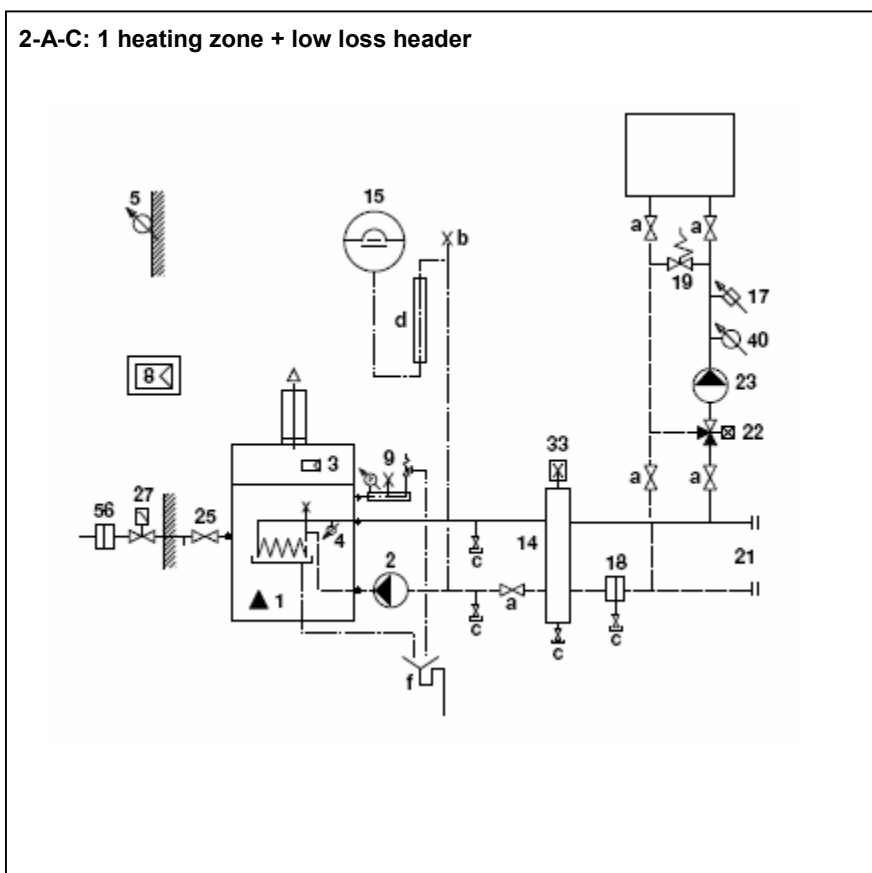
Boiler type	A	B
	mm	mm
R601-R603	887	918
R604-R605	1243	1156
R606-R607	1119	1094



Boiler type	A	B
	mm	mm
R601-R603	1005	252
R604-R605	1243	362
R606-R607	1299	361

Installation examples

2-A-C: 1 heating zone + low loss header



Description

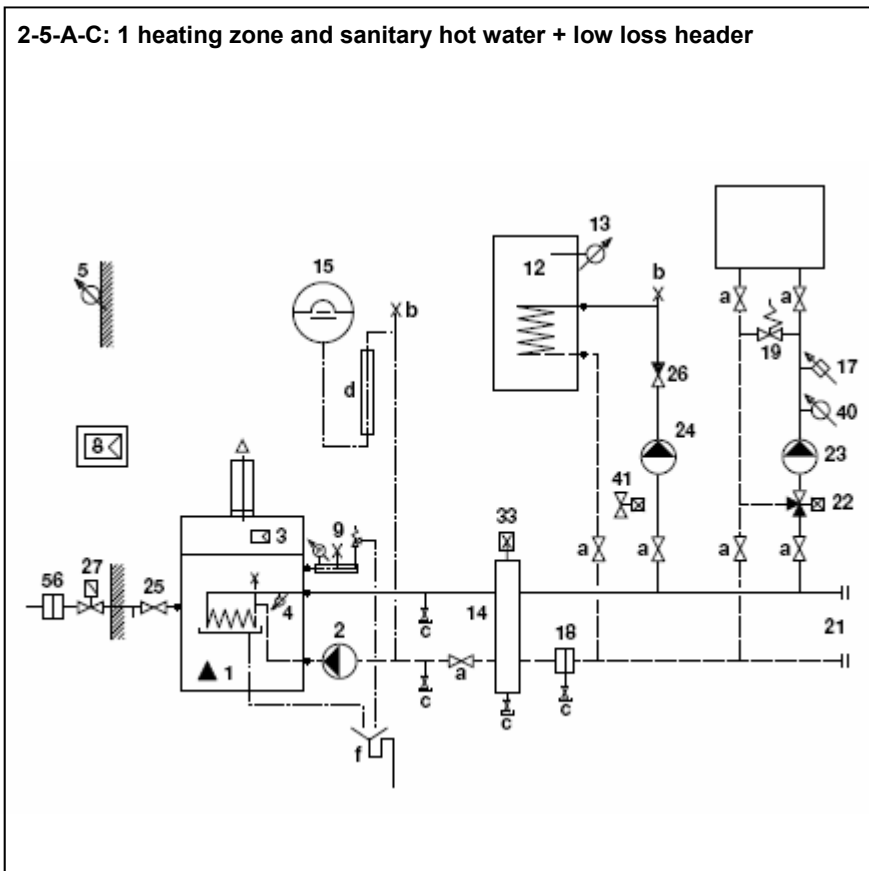
- R600 with low loss header
- Weather compensated control (E8 or LOGON B)
- 1 mixed heating zone

Tips

- Complete accessory kits with low loss header are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

2-5-A-C: 1 heating zone and sanitary hot water + low loss header



Description

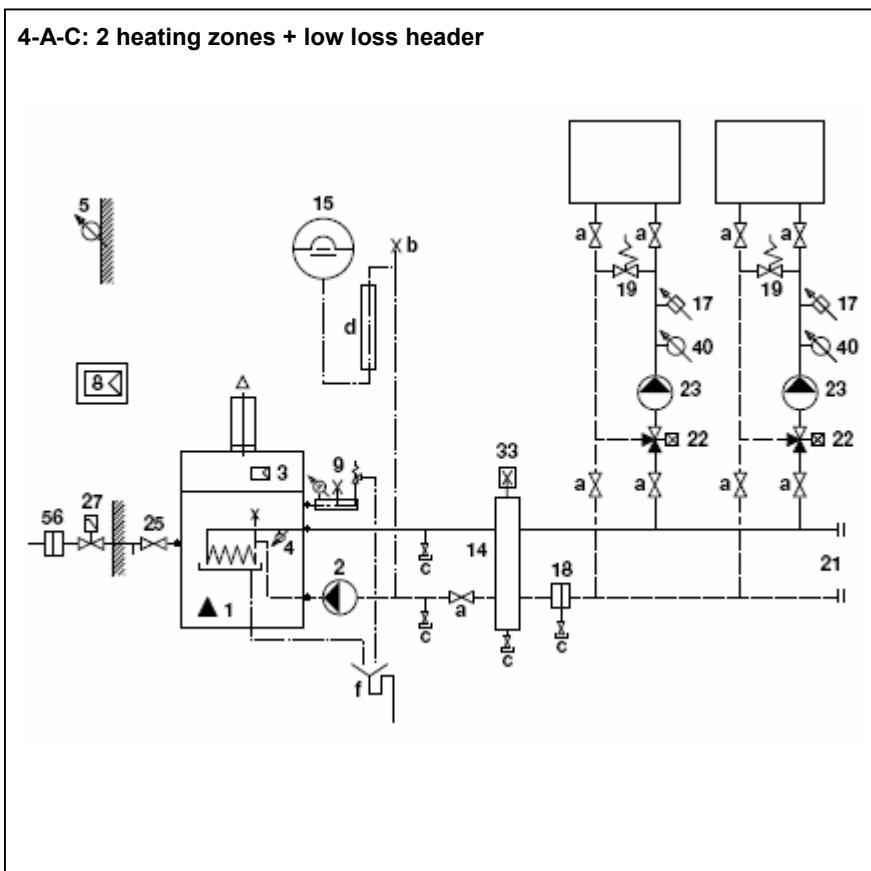
- R600 with low loss header
- Weather compensated control (E8 or LOGON B)
- 1 mixed heating zone
- Sanitary hot water

Tips

- Complete accessory kits with low loss header are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than $20K$, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

4-A-C: 2 heating zones + low loss header



Description

- R600 with low loss header
- Weather compensated control (E8 or LOGON B)
- 2 mixed heating zones

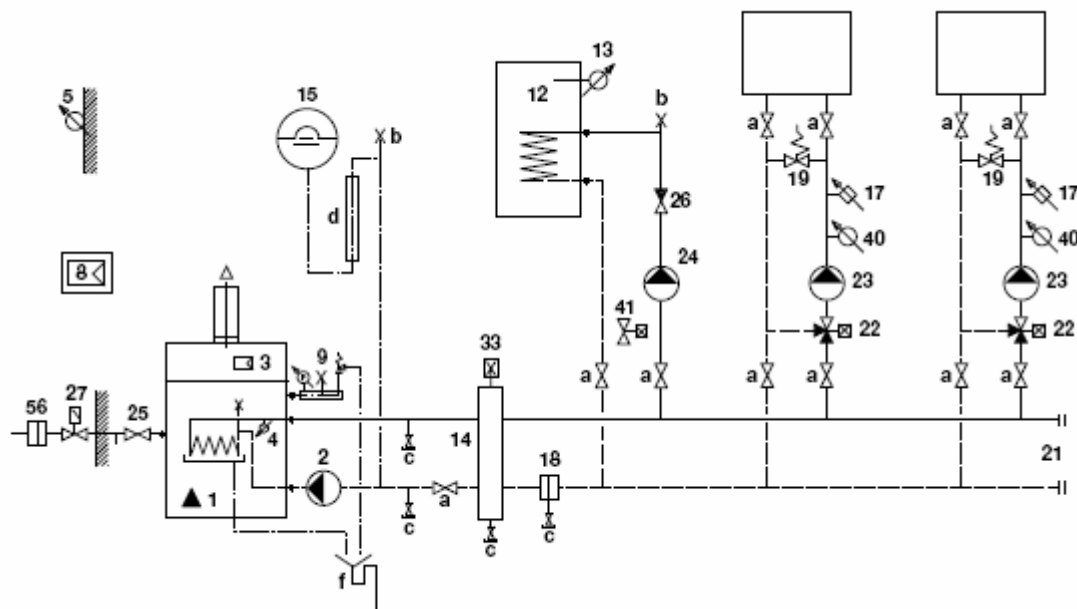
Tips

- Complete accessory kits with low loss header are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

4-5-A-C: 2 heating zones and sanitary hot water + low loss header

4-5-A-C: 2 heating zones and sanitary hot water + low loss header



Description

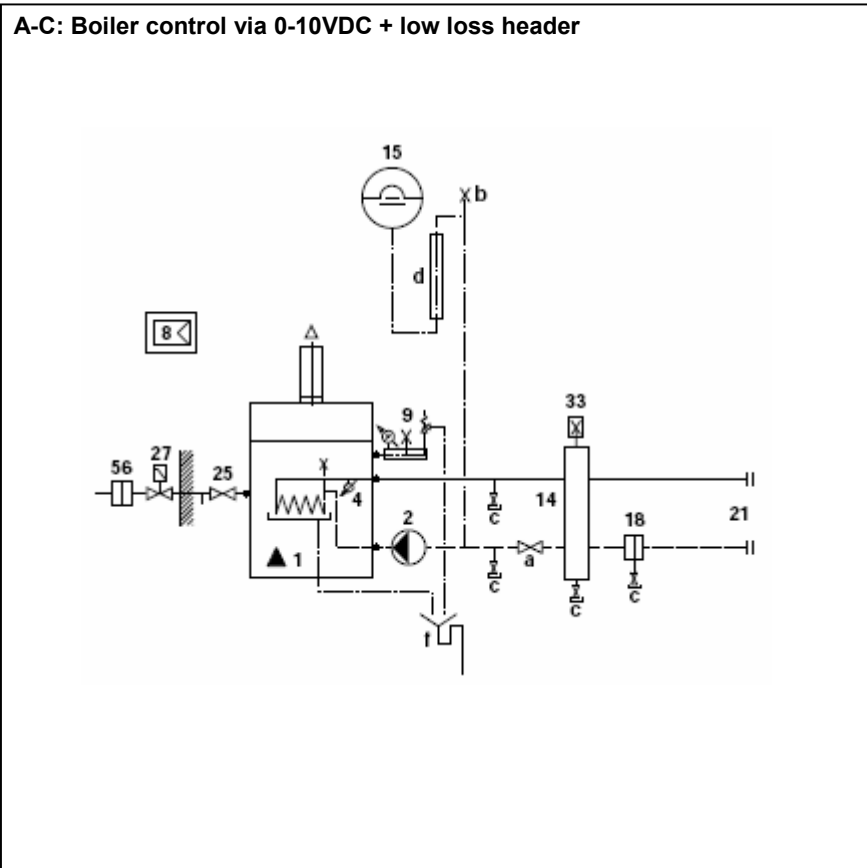
- R600 with low loss header
- Weather compensated control (E8 or LOGON B)
- 2 mixed heating zones
- Sanitary hot water

Tips

- Complete accessory kits with low loss header are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

A-C: Boiler control via 0-10VDC + low loss header



Description

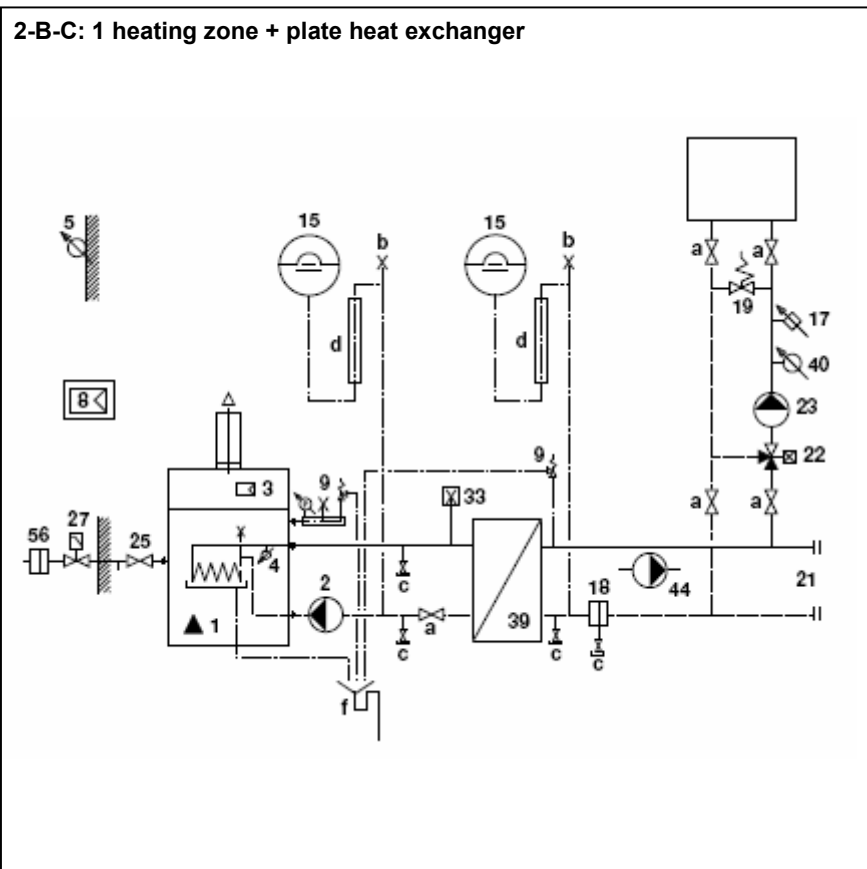
- R600 with low loss header

Tips

- Complete accessory kits with low loss header are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

2-B-C: 1 heating zone + plate heat exchanger



Description

- R600 with plate heat exchanger
- Weather compensated control (E8 or LOGON B)
- 1 mixed heating zone

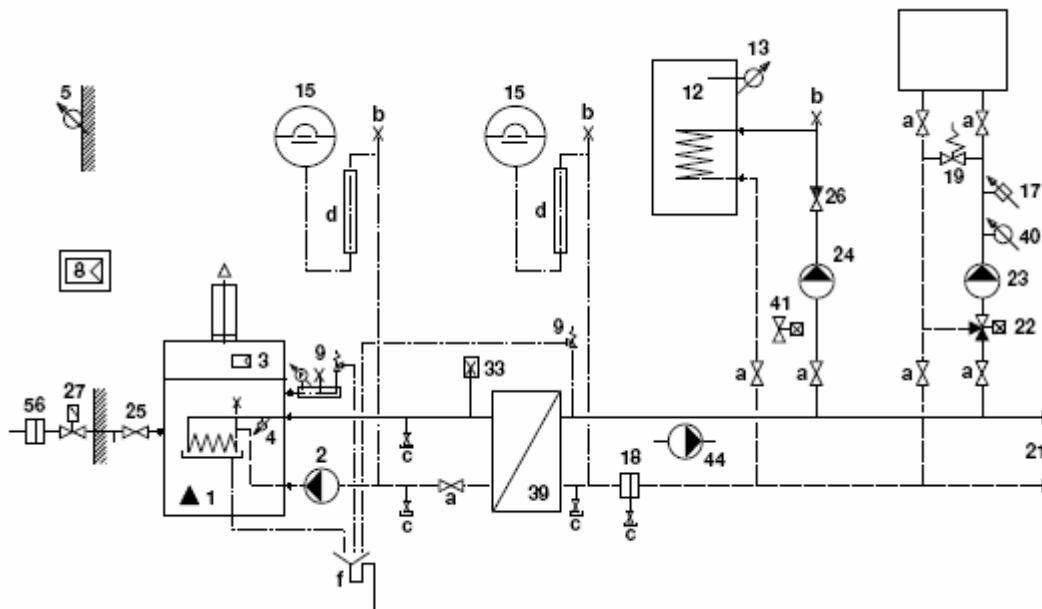
Tips

- Complete accessory kits with plate heat exchanger are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature of the plate heat exchanger will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The plate heat exchanger should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

2-5-B-C: 2 heating zones and sanitary hot water + plate heat exchanger

2-5-B-C: 2 heating zones and sanitary hot water + plate heat exchanger



Description

- R600 with plate heat exchanger
- Weather compensated control (E8 or LOGON B)
- 1 mixed heating zone
- Sanitary hot water

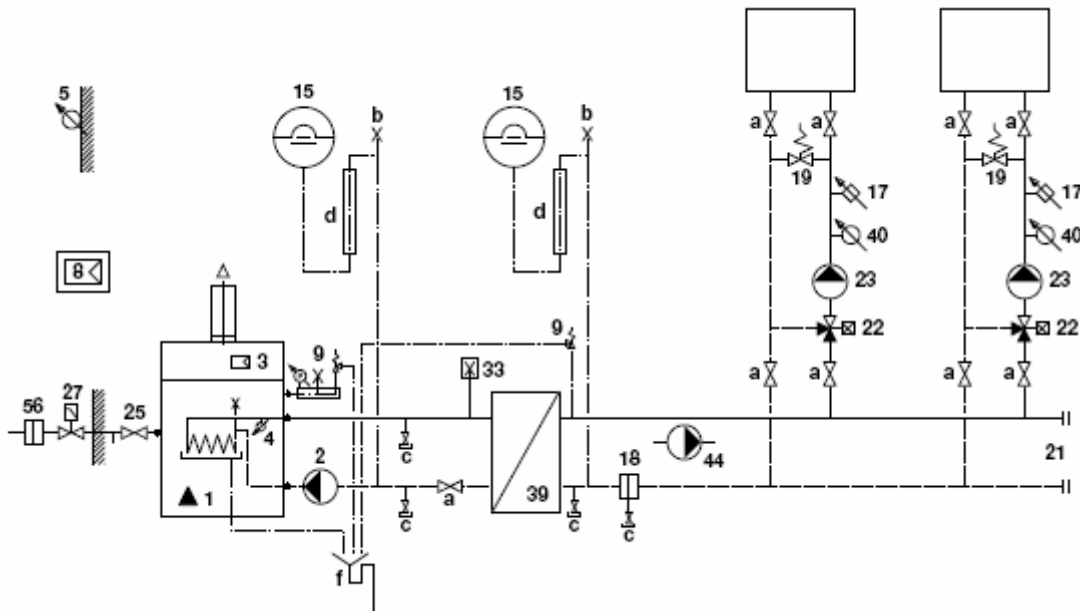
Tips

- Complete accessory kits with plate heat exchanger are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature of the plate heat exchanger will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The plate heat exchanger should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

4-B-C: 2 heating zones + plate heat exchanger

4-B-C: 2 heating zones + plate heat exchanger



Description

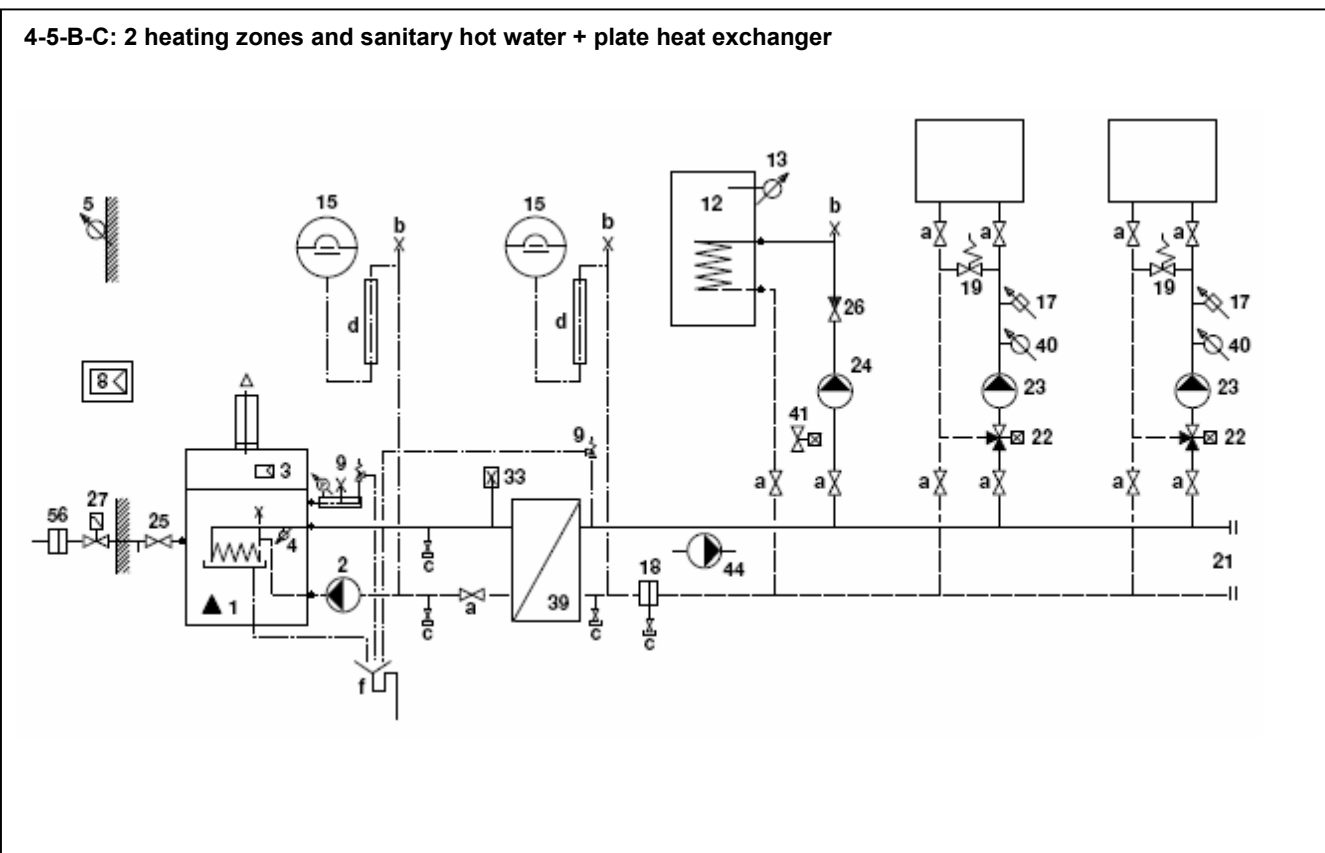
- R600 with plate heat exchanger
- Weather compensated control (E8 or LOGON B)
- 2 mixed heating zones

Tips

- Complete accessory kits with plate heat exchanger are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature of the plate heat exchanger will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The plate heat exchanger should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

4-5-B-C: 2 heating zones and sanitary hot water + plate heat exchanger



Description

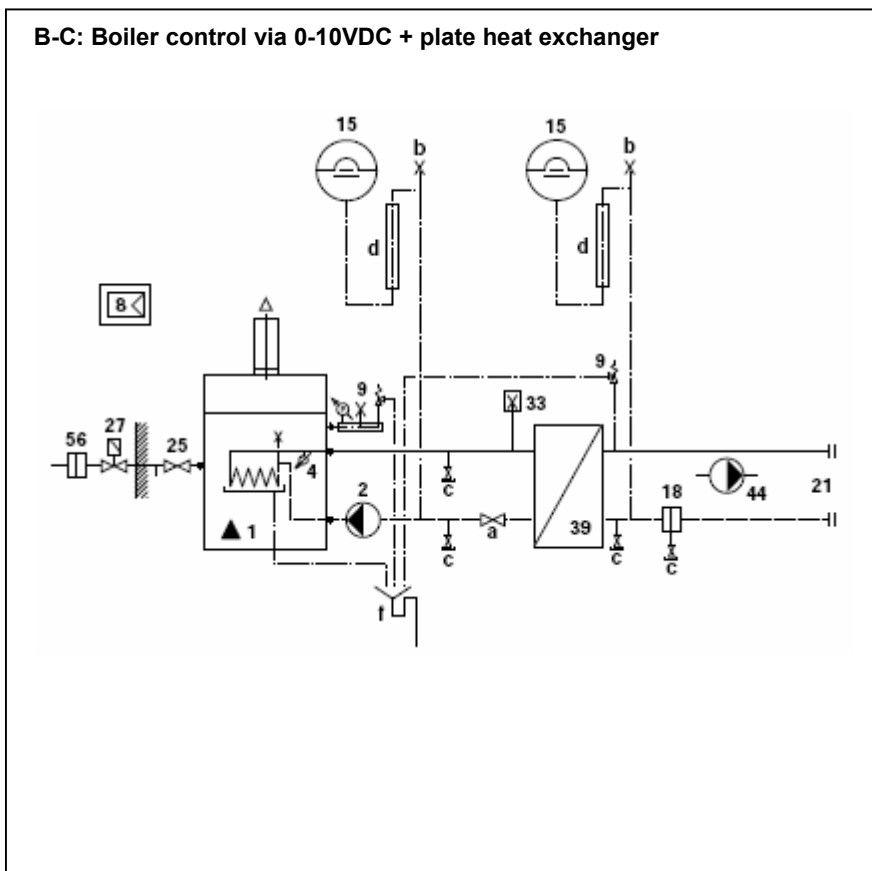
- R600 with plate heat exchanger
- Weather compensated control (E8 or LOGON B)
- 2 mixed heating zones
- Sanitary hot water

Tips

- Complete accessory kits with plate heat exchanger are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than $20K$, the flow temperature of the plate heat exchanger will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The plate heat exchanger should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

B-C: Boiler control via 0-10VDC + plate heat exchanger



Description

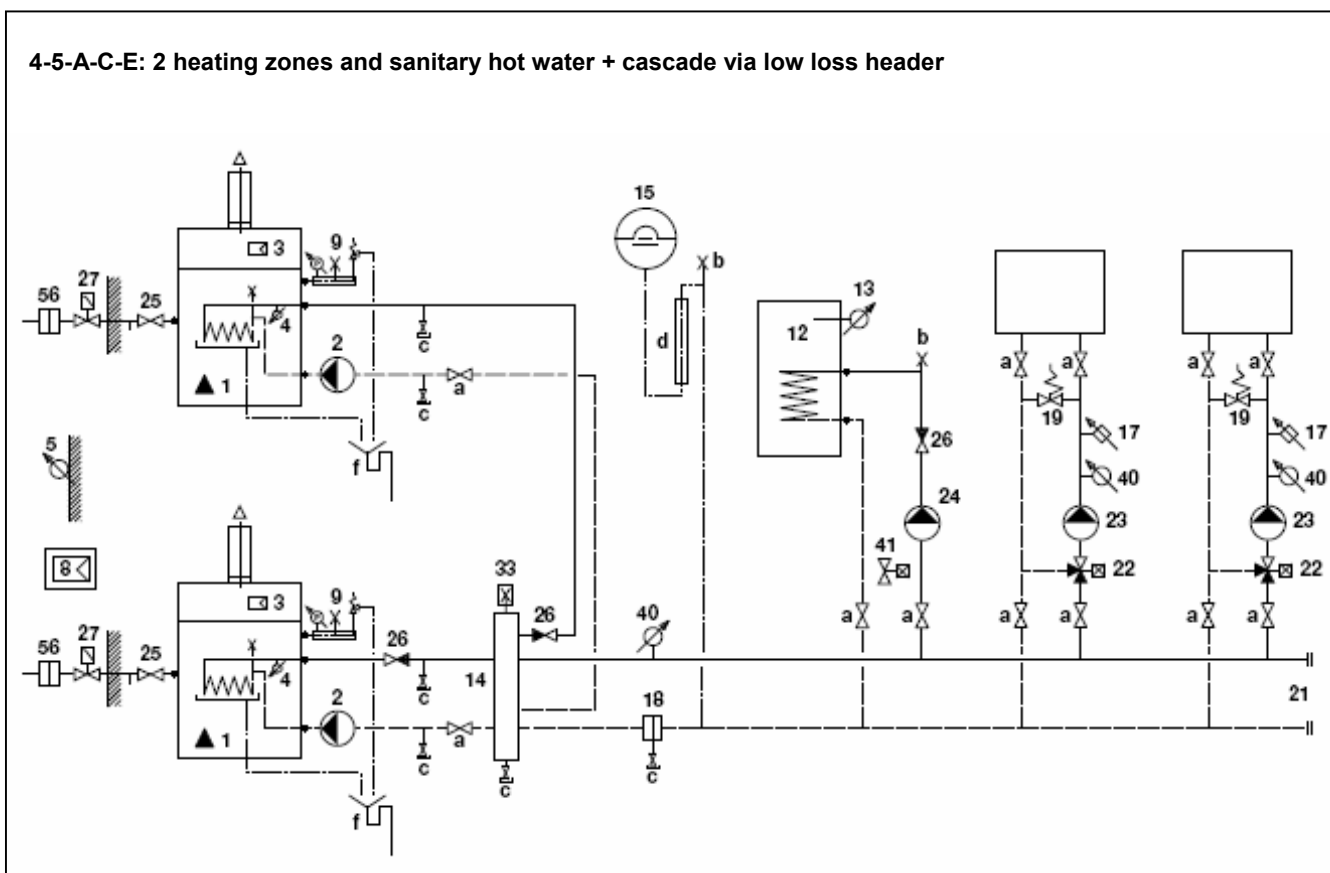
- R600 with plate heat exchanger

Tips

- Complete accessory kits with plate heat exchanger are available for $\Delta T=10-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than 20K, the flow temperature of the plate heat exchanger will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The plate heat exchanger should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

4-5-A-C-E: 2 heating zones and sanitary hot water + cascade via low loss header



Description

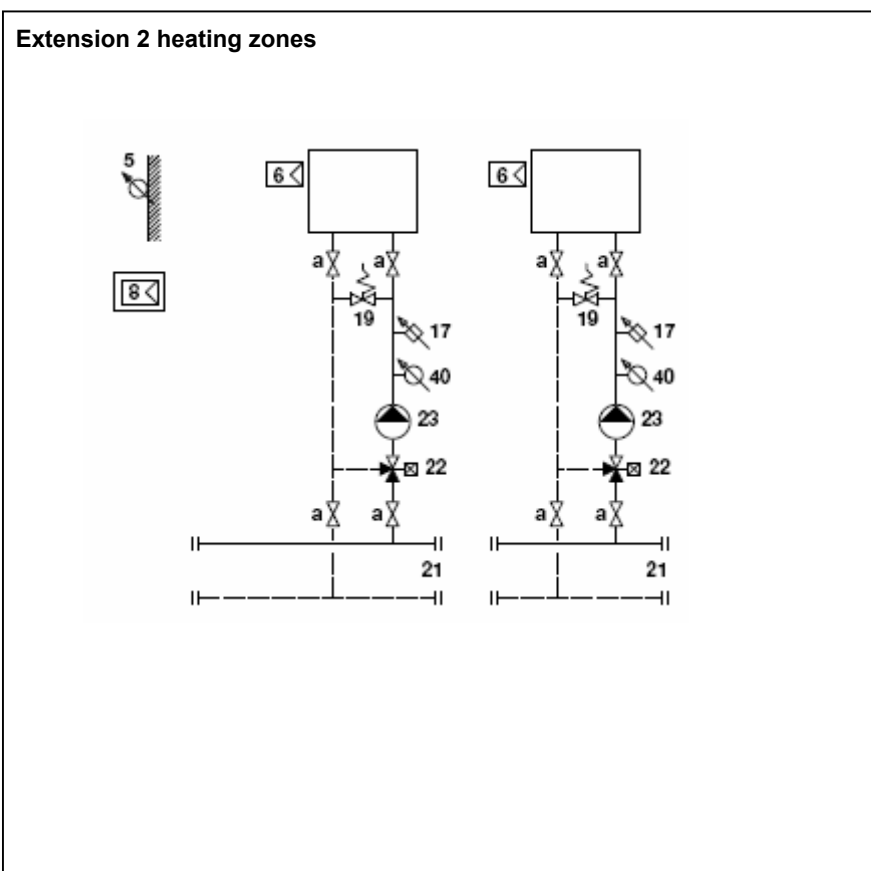
- 2x R600 with low loss header
- Cascade control + weather compensation (KCM8)
- 2 mixed heating zones
- Sanitary hot water

Tips

- Low loss duo headers are available for $\Delta T=15-20K$ (see chapter „Accessories“).
- The primary circuit should be designed for $\Delta T=20K$, this guarantees a high boiler efficiency.
- When the secondary circuit is designed for a ΔT smaller than $20K$, the flow temperature in the header will be lower than the flow temperature of the boiler. This should be taken in consideration during the design stage.
- The header should be positioned close to the boiler, to avoid a negative influence on the temperature control quality.
- In case of a boiler room installed on the roof, the boiler may never be hydraulically connected at the highest point of the installation.

Installation examples

Extension 2 heating zones



Description

- Weather compensated controller with wall hung box (E8 or LOGON B)
- Extension of 2 heating zones

Tips

- The extension controller should always be used in combination with an integrated controller (E8/KKM8/LOGON B).
- With the extension controller 2 additional heating zones can be controlled.
- The heating zone control can be extended up to 15 heating zones.

Norms

Germany:

- DIN EN 483
- DIN EN 677
- DIN EN 13384-1
- DIN EN 13384-2
- DIN EN 12828
- DIN 18160-1
- DIN 18160-5
- DIN VDE 0100
- DIN VDE 0116
- DVGW-Arbeitsblatt G260/1-2
- Feuerungsverordnung (FeuVO) des jeweiligen Bundeslandes
- Landesbauverordnung (LBO)
- Muster-Feuerungsverordnung (MuFeuVO)
- Technische Regeln für Gas-Installationen DVGW-TRGI 86/96
- VDI2035

Netherlands:

- NEN 2757-2 (2006)
- NEN 3028 (2004)
- NEN 1010
- Bouwbesluit (2006)
- SCIOS (voor onderhoud)

Austria:

- ÖNORM H 5152: Brennwert-Feuerungsanlagen, Planungshilfen
- ÖNORM M 7443: Gasgeräte mit atm.Brenner Teil 1, 3, 5, 7
- ÖNORM M7457: Gasgeräte mit mechanisch unterstütztem Vormischbrenner
- ÖNORM M 5195-1: Heizwassernorm

ÖVGW Richtlinien:

- G1 Techn. Richtlinie für die Errichtung von Niederdruck-Gasanlagen
- G2 Techn. Richtlinie für die Errichtung von Flüssiggasanlagen
- G41 Gasbrennwert-Feuerungsstätten, Aufstellung und Anschluss
- G4 Heizraumrichtlinie

Der R600 ist zugelassen nach Artikel 15a B-VG und gemäß Feuerungsanlagenverordnung VO (FAV 97)
Die örtlichen Bauordnungen sind zu beachten.

Switzerland:

- PROCAL
- SVGW – Gasleitsätze G1/G2
- EKAS – Form, 1942
- BAFU
- VKF
- Wasserbehandlung laut Richtlinie SWKI Nr. 97-1

Italy:

Sicurezza degli impianti

- Legge 5 marzo 1990 n. 46
- D.P.R. 6/12/91 n. 447
- D.M. 20/2/92
- D.M. 1 dicembre 1975
- I.S.P.E.S.L. (ex A.N.C.C.)
- Norma UNI 8065
- Norma Uni 9615

Sicurezza imiego gas

- Norma prEN 656
- Legge 6 dicembre 1971 n.1083
- D.M. 23/11/72
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