VIESMANN

VITOPLEX 100

Standard oil/gas fired boiler
110 to 620 kW

Datasheet

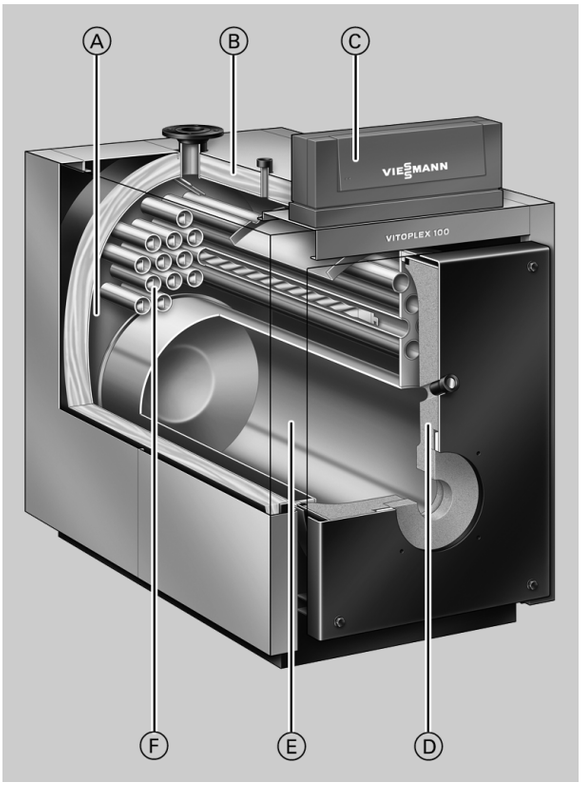
Part numbers and prices: see pricelist

VITOPLEX 100 Type PV1

Standard oil/gas fired boiler
For operation with a constant boiler water temperature.

Benefits at a glance

- Oil/gas fired two-pass boiler with up to 110 °C flow temperature with proven Viessmann quality.
- Standard efficiency: 86 % (H_s)/92 % (H_i).
- Thermostatic Vitotronic 100 control unit for single boiler systems.
- Extendable to a multi-boiler system with the Vitotronic control system.
- No minimum heating water flow rate required.
- High reliability and operational safety through the use of high-quality materials and a modern welding process.



Ⓐ Wide water galleries and large water content ensure excellent natural circulation and easy hydraulic connection

Ⓑ Highly effective thermal insulation

Ⓒ Vitotronic control unit – intelligent, easy to install, operate and maintain

Ⓓ Thermal insulation

Ⓔ Combustion chamber

Ⓕ Second hot gas flue

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Specification - Vitoplex 100

Specification

Rated output range	**from kW**	**110**	**151**	**201**	**251**	**311**	**401**	**501**
	to kW	**150**	**200**	**250**	**310**	**400**	**500**	**620**
Rated thermal load range	from kW	121	166	221	276	342	441	551
	to kW	165	220	275	341	440	550	682
Product ID		CE-0085 BP 0365						
Permissible flow temperature (= safety temperature)	°C	110						
Permiss. operating pressure	bar	5						
Hot gas pressure drop	Pa	60	120	130	230	250	230	310
	mbar	0.6	1.2	1.3	2.3	2.5	2.3	3.1
Boiler body dimensions								
Length (dimension r)*1	mm	1245	1385	1385	1565	1730	1730	1830
Width (dimension e)	mm	650	650	730	730	800	800	865
Height (incl. connectors) (dimension l)	mm	1120	1120	1195	1195	1365	1365	1420
Total dimensions								
Total length (dimension s)	mm	1350	1490	1490	1670	1840	1840	1940
Total width (dimension f)	mm	800	800	880	880	950	950	1015
Total height (dimension b)	mm	1290	1290	1360	1360	1530	1530	1585
Maintenance height (control unit) (dimension a)	mm	1460	1460	1530	1530	1700	1700	1760
Height of anti-vibration boiler supports (loaded)	mm	37	37	37	37	37	37	37
Foundations								
Length	mm	1000	1100	1100	1300	1400	1400	1500
Width	mm	800	800	900	900	950	950	1050
Combustion chamber diameter	mm	460	460	500	500	585	585	640
Combustion chamber length	mm	865	1005	1005	1185	1305	1305	1405
Weight boiler body	kg	370	415	475	525	730	785	940
Total weight Boiler with thermal insulation and boiler control unit	kg	415	460	525	580	790	845	1005
Content boiler water	litres	200	230	280	340	490	460	535
Boiler connections								
Boiler flow and return	PN 6 DN	65	65	65	65	100	100	100
Safety connection (safety valve)	R (male thread)	1¼"	1¼"	1¼"	1¼"	1½"	1½"	1½"
Drain	R (male thread)	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"
Flue gas parameters*2								
Temperature (at boiler water temperature 75 °C)								
– at rated output	°C	215	215	215	215	215	215	215
– at partial load	°C	140	140	140	140	140	140	140
Mass flow rate for fuel oil EL and natural gas								
– at rated output	kg/h	230	307	384	476	614	767	951
– at partial load	kg/h	138	184	171	286	369	460	571
Required draught	Pa/mbar	0	0	0	0	0	0	0
Flue gas connection	Ø mm	180	180	200	200	250	250	250
Standard efficiency at heating system temp. 75/60 °C	%	86 (H_s)/92 (H_i)						
Standby loss $q_{B,70}$	%	0.45		0.40		0.35	0.30	0.25

Note

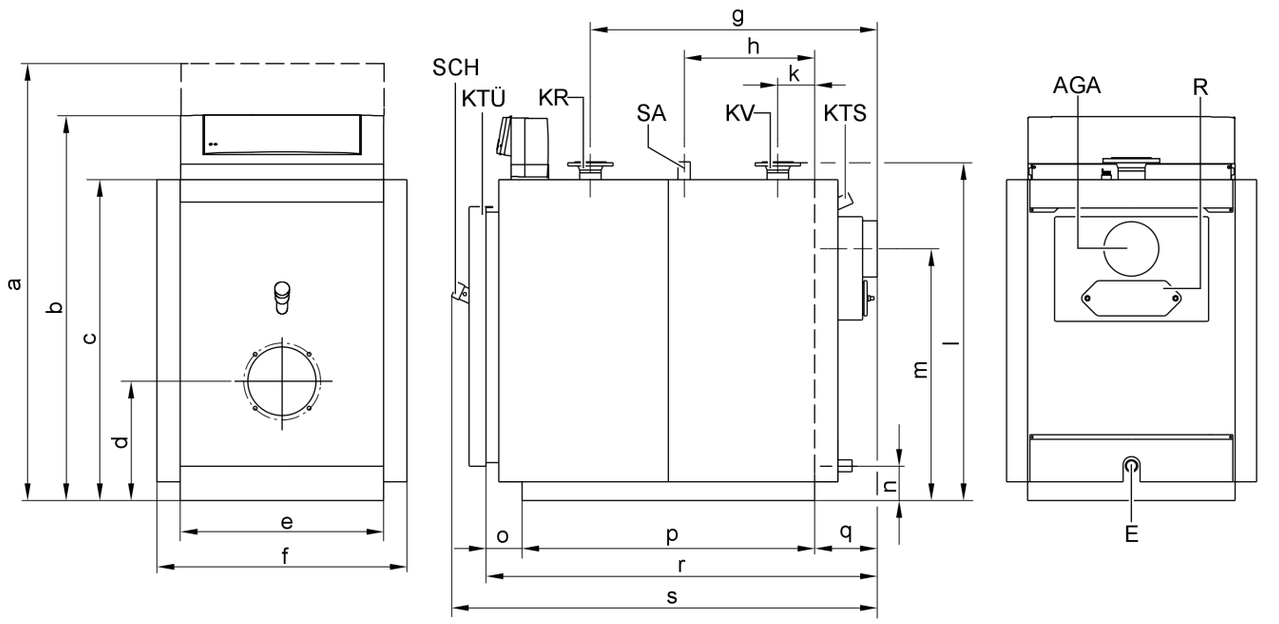
For the specification of Viessmann modular components, see the separate datasheets.

*1 Boiler door removed.

*2 Values for calculating the size of the flue system to EN 13384 relative to 13 % CO_2 for fuel oil EL and 10 % CO_2 for natural gas. Flue gas temperatures measured as gross values at 20 °C combustion air temperature.
The details for partial load refer to 60 % of rated output. Calculate the flue gas mass flow rate accordingly when the partial load differs from that stated above (subject to the burner mode).

Specification - Vitoplex 100 (cont.)

Dimensions



AGA Flue gas connection
E Drain
KR Boiler return
KTS Boiler water temperature sensor
KTÜ Boiler door
KV Boiler flow
R Cleaning aperture
SA Safety connection (safety valve)
SCH Inspection aperture

Dimensions

Rated output range	**from kW**	**110**	**151**	**201**	**251**	**311**	**401**	**501**
	to kW	**150**	**200**	**250**	**310**	**400**	**500**	**620**
a	mm	1460	1460	1530	1530	1700	1700	1760
b	mm	1290	1290	1360	1360	1530	1530	1585
c	mm	1058	1058	1130	1130	1300	1300	1356
d	mm	400	400	420	420	465	465	495
e	mm	650	650	730	730	800	800	865
f	mm	800	800	880	880	950	950	1015
g	mm	670	810	810	976	1051	1051	1152
h	mm	410	480	480	563	611	611	662
k	mm	150	150	150	150	171	171	172
l	mm	1120	1120	1195	1195	1365	1365	1420
m	mm	833	833	886	886	1017	1017	1058
n	mm	123	123	122	122	124	124	125
o	mm	110	110	110	110	130	130	130
p (length of the base rails)	mm	931	1071	1071	1251	1375	1375	1476
q	mm	203	203	203	203	224	224	224
r (transport dimension)	mm	1245	1385	1385	1565	1730	1730	1830
s	mm	1350	1490	1490	1670	1840	1840	1940

Dimension a: Height with control unit in maintenance position.
Dim. d: Observe the installation height of the burner.
Dimension r: Boiler door removed.

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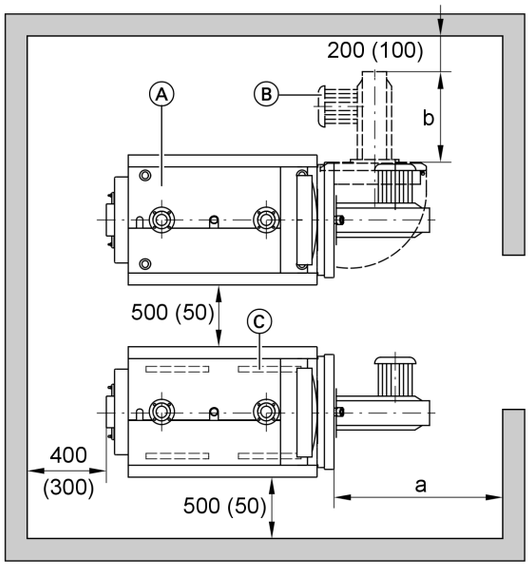
Specification - Vitoplex 100 (cont.)

Positioning



To enable convenient installation and maintenance, observe the stated clearance dimensions; maintain the minimum clearances where space is tight (dimensions in brackets). In the delivered condition, the boiler door opens to the left. You can reposition the hinge bolts so that the door can open to the right.

Ⓐ Boiler
Ⓑ Burner
Ⓒ Anti-vibration boiler supports

Rated output range	**from kW** **to kW**	**110** **150**	**151** **200**	**201** **250**	**251** **310**	**311** **400**	**401** **500**	**501** **620**
a	mm	1100			1250	1500		
b	mm	Burner length (installed)						

Dimension a: Maintain this space in front of the boiler to enable the withdrawal of the turbulators or for cleaning the hot gas flues.

Positioning

- Avoid air contamination by halogenated hydrocarbons (e.g. as in sprays, paints, solvents and cleaning agents)
- Avoid very dusty conditions
- Avoid high levels of humidity
- Protect against frost and ensure good ventilation

Otherwise, the system may suffer faults and damage.
In rooms where air contamination through **halogenated hydrocarbons** may occur, install the boiler only if adequate measures can be taken to provide a supply of uncontaminated combustion air.

Burner installation

The burner fixing hole circle, burner fixing holes and blast tube aperture meet the requirements of EN 303-1.
The burner may be installed directly on the hinged boiler door. Alternative burner plates can be used (see boiler accessories), if the burner dimensions do not comply with the dimensions listed in EN 303-1.

Burner plates may be factory-fitted on request (chargeable option). For this purpose, please state the burner make and type when ordering.
The blast tube must protrude through the thermal insulation on the boiler door. Maintain the minimum blast tube length of 140 mm. Verify the correct function if a burner with a shorter blast tube is to be used.

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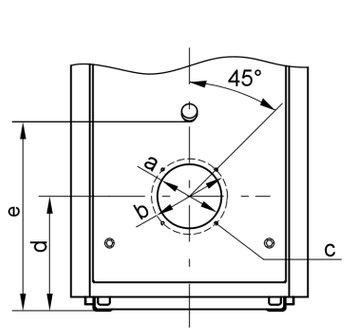
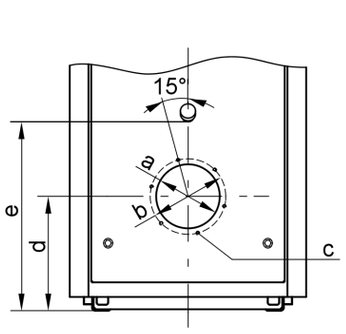
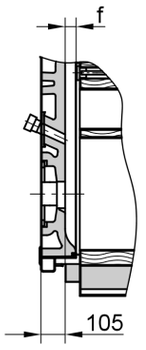
Specification - Vitoplex 100 (cont.)



110 -500 kW



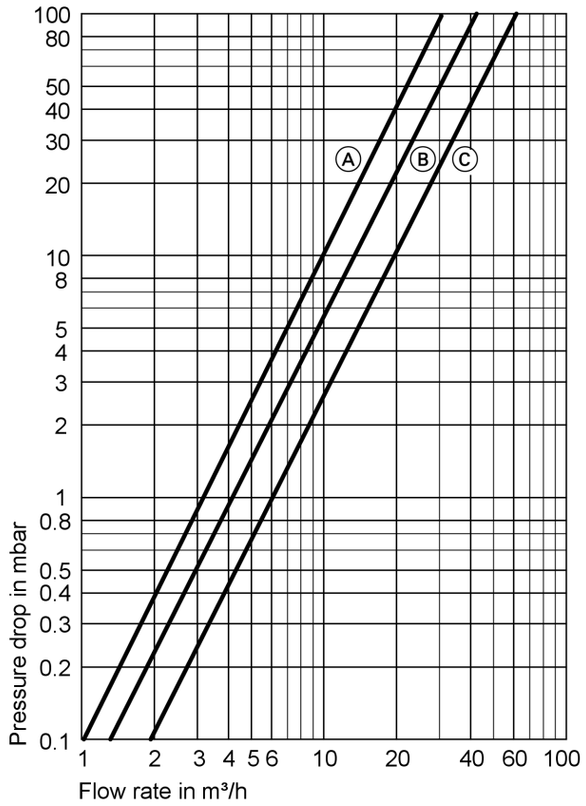
620 kW



Rated output range	from kW to kW	110 150	151 200	201 250	251 310	311 400	401 500	501 620
a	Ø mm	240	240	240	290	290	290	350
b	Ø mm	270	270	270	330	330	330	400
c	Number/thread	4/M 10	4/M 10	4/M 10	4/M 12	4/M 12	4/M 12	6/M 12
d	mm	400	400	420	420	465	465	495
e	mm	655	655	690	690	775	775	795
f	mm	46	46	46	46	71	71	71

Pressure drop on the heating water side

Vitoplex 100 is only suitable for fully pumped hot water heating systems.



Ⓐ Rated output 110 to 250 kW
Ⓑ Rated output 251 to 310 kW
Ⓒ Rated output 311 to 620 kW

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Delivered condition - Vitoplex 100

Boiler body with fitted boiler door and clean-out cover.
Sight glass closure, flame tube gasket and turbulator extractors are supplied inside the combustion chamber.

1 Carton with thermal insulation
1 Carton containing the boiler control unit and 1 bag with technical documentation

Control unit versions

For single boiler systems:

- without Vitocontrol control panel
  Vitotronic 100 (type GC3)
  thermostatic control unit for operation with a constant boiler water temperature.
  Vitotronic 100 (type GC1)
  for operation with a constant boiler water temperature or for weather-compensated operation in conjunction with a control panel (see below) or an external control unit.
- with Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** (accessories)
  and
  Vitocontrol control panel with the **Vitotronic 300-K** (type MW1S) for weather-compensated mode and mixer control for a max. of 2 heating circuits with mixer and additional Vitotronic 200-H, type HK1S or HK3S for 1 or up to 3 heating circuits with mixer
  or
  Control panel with external control unit (on site)

For multi-boiler system (up to 4 boilers):

- without Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** in conjunction with the **Vitotronic 300-K** (type MW1)
  for modulating boiler water temperature (one boiler is supplied with the standard controls for a multi-boiler system)
  and
  Vitotronic 100 (type GC1) and **LON module** for modulating boiler water temperature for every additional boiler in a multi-boiler system
- with Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** (accessories) for modulating boiler water temperature for every boiler in a multi-boiler system
  and
  Vitocontrol control panel with the **Vitotronic 300-K** (type MW1S) for multi-boiler system, weather-compensated mode and mixer control for a max. of 2 heating circuits with mixer and additional Vitotronic 200-H, type HK1S or HK3S for 1 or up to 3 heating circuits with mixer
  or
  Control panel with external control unit (on site)

Boiler accessories

Flue gas heat exchanger

For the Vitoplex 100, it is recommended to condense the flue gas through the downstream connection of a stainless steel heat exchanger, to create a condensing boiler.
Further details on page 8.

Additional accessories

See pricelist and "Boiler accessories" datasheet.

Operating conditions with Vitotronic boiler control units

For water quality requirements, see page 10.

		Requirements
1.	Heating water flow rate	None
2.	Boiler return temperature (minimum value)	Oil and gas operation 65 °C
3.	Lower boiler water temperature	75 °C
4.	Two-stage burner operation	None
5.	Modulating burner operation	None
6.	Reduced mode	Not possible
7.	Weekend setback	Not possible

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Specification - Vitotrans 300 flue gas/water heat exchanger

Specification

Rated boiler output	**kW**	**150-200*1**	**250-310 *1**	**400-620**
Matching Vitotrans 300				
– Gas operation	Part no.	Z005 597	Z005 598	Z005 599
– Oil operation	Part no.	Z005 600	Z005 601	Z005 602
Rated output range of the Vitotrans 300*2				
– Gas operation	from kW	11.8	21.3	30.3
	to kW	19.0	33.3	54.0
– Oil operation	from kW	8.2	14.6	20.8
	to kW	13.0	22.7	37.0
Product ID Vitotrans 300 in conjunction with a boiler as a condensing unit		CE-0085 BQ 0419		
Permissible flow temperature (= safety temperature)	°C	110		
Permissible operating pressure	bar	4	4	6
Hot gas pressure drop*3	Pa	85	100	105
	mbar	0.85	1.00	1.05
Flue gas mass flow rate	from kg/h	213	383	546
	to kg/h	341	596	951
Total dimensions				
Total length (dimension h), incl. mating flanges	mm	780	860	995
Total width (dimension b)	mm	745	820	910
Total height (dimension c)	mm	1150	1165	1350
Transport dimensions				
Length excl. mating flanges	mm	775	855	965
Width (dimension a)	mm	760	840	930
Height (dimension d)	mm	1100	1175	1300
Heat exchanger **weight**	kg	119	144	234
Total weight Heat exchanger with thermal insulation	kg	150	188	284
Capacity				
Heating water	litres	97	134	181
Flue gas	m^3	0.096	0.133	0.223
Connections				
Heating water flow and return	DN	50	50	65
Condensate drain	R	½"	½"	½"
Flue gas connection				
– to the boiler	NW	200	200	250
– to the flue system	NW	200	200	250

*1 *In conjunction with a Vitotrans 300, the operating pressure of the heating system must not exceed 4 bar.*

*2 *Output of the Vitotrans 300 for a flue gas cooling for gas fired operation of 200/65 °C, for oil fired operation of 200/70 °C and a heating water temperature rise in the Vitotrans 300 of 40 °C to 42.5 °C.*
For conversion to other temperatures, see page 10.

*3 *Hot gas pressure drop at rated output. The burner must be able to overcome the hot gas pressure drop of the boiler, the Vitotrans 300 and the flue pipe. Viessmann Vitoflame 100 burners are unsuitable for use with Vitotrans 300.*

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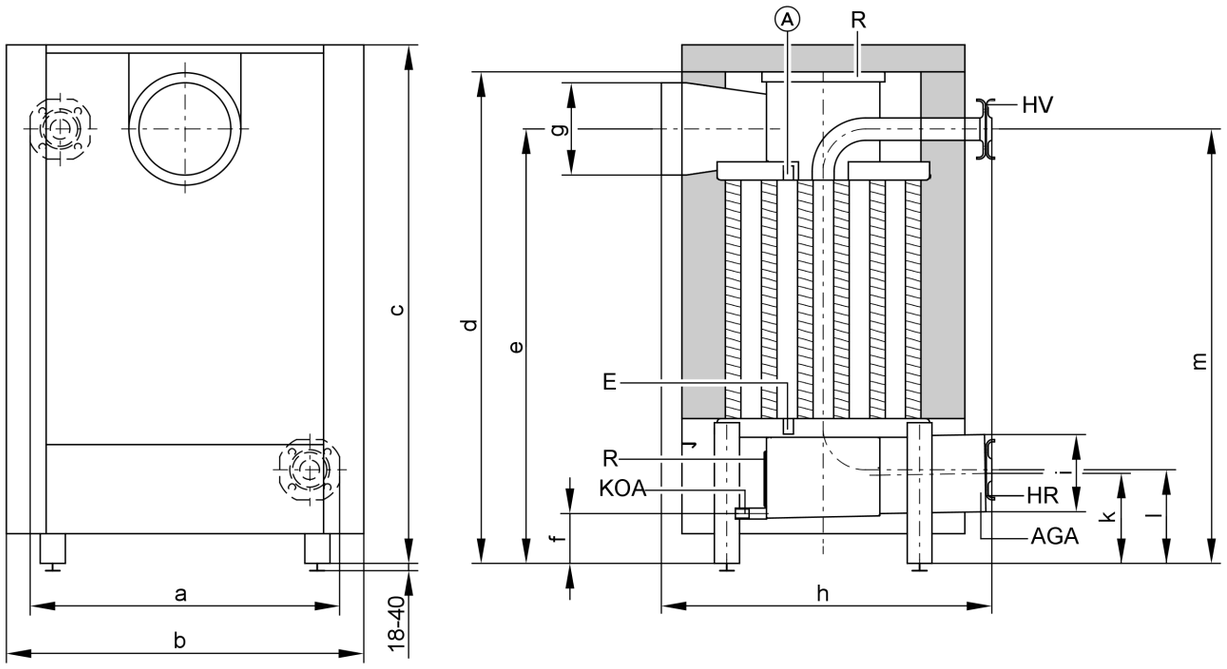
Specification - Vitotrans 300 flue gas/water heat exchanger (cont.)

Dimensions



Ⓐ Additional fem. connection R ½"
AGA Flue gas connection
E Drain R ½"
HR Heating water return (inlet)
HV Heating water flow (outlet)
KOA Condensate drain R ½"
R Cleaning aperture

Dimensions

Part no.		Z005 597 Z005 600	Z005 598 Z005 601	Z005 599 Z005 602
a	mm	760	840	930
b	mm	745	820	910
c	mm	1150	1165	1350
d	mm	1100	1175	1300
e	mm	907	960	1080
f	mm	119	80	150
g	Internal ∅ mm	201	201	251
h	mm	780	860	995
i	Internal ∅ mm	201	201	251
k	mm	223	184	284
l	mm	227	198	285
m	mm	954	963	1130

Delivered condition

Heat exchanger body with fitted flue gas header. Mating flanges are fitted to all the connectors.
1 carton with thermal insulation

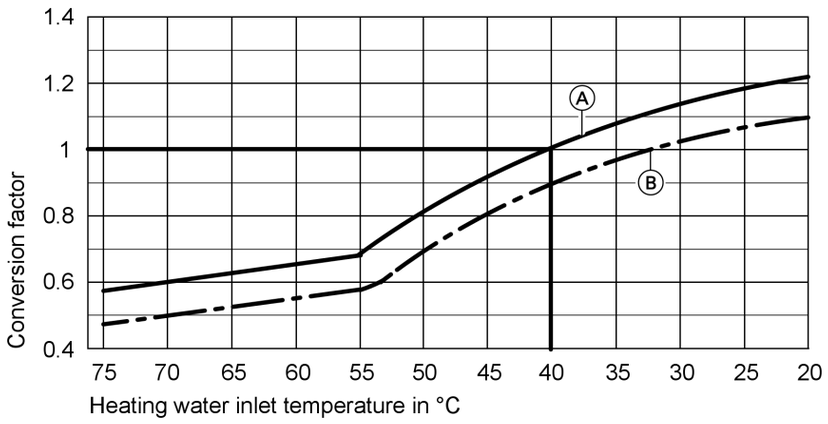
Connection on the flue gas side

The height difference between the flue gas connectors of the boiler and those of the flue gas/water heat exchanger should be equated through a transition piece (on-site provision).

Specification - Vitotrans 300 flue gas/water heat exchanger (cont.)

Output data

Vitotrans 300 for gas fired operation



Ⓐ Flue gas inlet temperature 200 °C
Ⓑ Flue gas inlet temperature 180 °C

Conversion of the output data
The output data of the Vitotrans 300 flue gas/water heat exchanger refers to a flue gas inlet temperature of 200 °C and a heating water inlet temperature into the heat exchanger of 40 °C.

For different conditions the heat output can be calculated by multiplication of the given rated output with the conversion factor established from the diagram.

Standard values for water quality

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water.
In any event, the cost of a water treatment facility is less than the cost of repairing defects on your heating system.
Maintaining the following requirements is necessary to safeguard your warranty rights. The manufacturer's warranty excludes damage due to corrosion and scaling.

The following is a summary of essential water qualities.
A mobile water softening system can be hired from Viessmann for filling and commissioning.

Heating systems with rated operating temperatures up to 100 ºC (VDI 2035)

Prevent excessive scale build-up (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, the VDI Directive 2035 Sheet 1 "Prevention of heating system damage – scaling in DHW and hot water heating systems" applies [in Germany] together with the following standard values (see also the full explanations in the original Directive):

Total output in kW	Total alkaline earths mol/m³	Total hardness in °dH
> 50 to ≤ 200	≤ 2.0	≤ 11.2
> 200 to ≤ 600	≤ 1.5	≤ 8.4
> 600	< 0.02	< 0.11

The standard values assume the following:
- The volume of fill and top-up water of the heating system during its service life will not exceed three times the water content of the heating system.
- The specific system volume is less than 20 l/kW output. In multi-boiler systems, apply the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 Sheet 2 have been implemented.

Soften the fill & top-up water in heating systems operating under the following conditions:
- The total of alkaline earths in the fill & top-up water exceeds the standard value.
- Higher fill & top-up water volumes are expected.
- The specific system volume is more than 20 l/kW output. In multi-boiler systems, apply the output of the smallest boiler.

When engineering the system, observe the following:
- Install shut-off valves in different sections. This prevents the need for draining the entire heating water in case of repairs or system expansion.

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Standard values for water quality (cont.)

- In systems > 50 kW, install a water meter to record the volume of the fill & top-up water. Enter the volume of water and the water hardness into the boiler service instructions.
- For systems with a specific system volume in excess of 20 l/kW output (apply the output of the smallest boiler in multi-boiler systems), apply the requirements of the next higher category of total output (in accordance with the table). In case of severe excess (> 50 l/kW), soften down to the total of alkaline earths ≤ 0.02 mol/m^3.

Operating information:

- Take the system into use step by step, starting with the lowest boiler output and at a high heating water flow rate. This prevents localised concentration of lime deposits on the boiler heating surfaces.
- In multi-boiler systems, start all boilers simultaneously to prevent the entire lime deposit settling in the heat transfer area of just one boiler.
- During expansion or repair work, only drain the necessary sections.
- Where water treatment is required, treat even the first fill of the heating systems prior to commissioning. This also applies to any subsequent filling, e.g. when adding top-up water or after a repair or after system expansion.
- Filters, dirt traps and other blow-down or separating facilities in the heating water circuit must be checked, cleaned and activated more frequently after commissioning or new installations, later on subject to the water treatment applied (e.g. water softening).

The build-up of lime deposits on the heating surfaces will be minimised if these instructions are observed.
Any lime deposits that have formed because the requirements to VDI Guideline 2035 have not been observed will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the lime deposits is one option to restore the operational viability. This measure must be carried out by a specialist. Inspect the heating system for possible damage prior to returning it into use. It is essential that the faulty operating parameters are corrected to prevent renewed formation of excessive scale deposits.

Heating systems with permissible flow temperatures in excess of 100 ºC (VdTÜV DS 1466)

Operation with circulating water with low salt content
Only use water with a low salt content as fill or top-up water, such as desalinated water, permeate or condensate.
Systems using mixed condensate generally create water with low salt content if no boiler water is fed into the system for putrefaction by alkalies.

Operation with water containing salt
Where possible, use water with a low salt content that is at least free from alkaline earths (softened) as fill or top-up water.

		Low salt content		With salt content
El. conductivity at 25 °C	µS/cm	10 to 30	> 30 to 100	> 100 to 1 500
General requirements		clear, without sediments	clear, without sediments	clear, without sediments
pH value at 25 ºC according to the potable water order/potable water treatment order		9 - 10 ≤ 9.5	9 - 10.5 ≤ 9.5	9 - 10.5 ≤ 9.5
Oxygen (O_2) (values for constant operation are generally significantly lower)	mg/litre	< 0.1	< 0.05	< 0.02*1
Alkaline earths (Ca + Mg)	mmol/litre	< 0.02	< 0.02	< 0.02
Phosphate (PO_4) according to the potable water order/potable water treatment order For Viessmann hot water boilers	mg/litre mg/litre mg/litre	< 5 ≤ 7 < 2.5	< 10 ≤ 7 < 5	< 15 ≤ 7 < 15
When using oxygen binders: Sodium sulphite (Na_2SO_3) (When using other suitable products, observe the respective guidelines issued by the respective supplier.)	mg/litre	–	–	< 10

Prevention of damage due to corrosion on the water side

The corrosion resistance of ferrous materials on the heating water side of heating systems and boilers depends on the absence of oxygen in the heating water.
The oxygen introduced into the heating system with both the first fill and with top-up water reacts with the system materials without causing damage.
The characteristic blackening of the water after some time in use indicates that free oxygen is no longer present.
The technical rules and in particular VDI Directive 2035-2 therefore recommend that heating systems are designed and operated so that a constant ingress of oxygen into the heating water is prevented.

Opportunities for oxygen ingress during the operation:

- Via open vented expansion vessels with flow through
- Through negative pressure in the system
- Through gas-permeable components

Sealed systems, e.g. those equipped with a diaphragm expansion vessel, offer good protection against the ingress of airborne oxygen into the system, if correctly sized and operating at the correct pressure.
At every part of the heating system, even at the suction side of the pump and under all operating conditions, the system pressure should be above ambient atmospheric pressure.
The inlet pressure of the diaphragm expansion vessel should be checked at least during the annual service.

*1 *The oxygen concentration in the re-circulated water may be up to 0.1mg/litre, if suitable inorganic corrosion inhibitors are used.*

Standard values for water quality (cont.)

The use of permeable components, e.g. plastic pipes that are permeable to gas in underfloor heating systems, should be avoided. Provide system separation if such components are nevertheless used. This must separate the water flowing through the plastic pipes from other heating circuits, e.g. from the boiler, by the provision of a corrosion-resistant heat exchanger.
No further anti-corrosion measures are required for sealed hot water heating systems subject to the above points being observed.
However, take additional precautions where there is a risk of oxygen ingress, for example by adding oxygen binder sodium sulphite (5 - 10 mg/litre into the excess). The heating water should have a pH value between 8.2 and 9.5.

Different conditions apply to systems that contain aluminium components.
Where chemicals are used as part of the corrosion protection, we recommend that the manufacturer of the chemicals issues a certificate of suitability of the additives with regard to the boiler materials and the materials of the other heating equipment components.
We recommend you refer questions of water quality/treatment to an appropriate specialist.
Further details can be found in the VDI Directive 2035-2 and in EN 14868.

Design information

Installation of a suitable burner

The burner must be suitable for the respective rated output and the pressure drop on the hot gas side of the boiler (see burner manufacturer's specification).
The material of the burner head must be suitable for operating temperatures of at least 500 ºC.

Pressure-jet oil burner
The burner must be tested and designated to EN 267.

Pressure-jet gas burner
The burner must be tested to EN 676 and CE-designated in accordance with Directive 90/396/EEC.

Burner adjustment
Adjust the oil or gas throughput of the burner to the rated boiler output.

Permissible flow temperatures

Hot water boilers for permissible flow temperatures (= safety temperatures)
- Up to 110 °C
  CE designation:
  CE-0085 in accordance with the Gas Equipment Directive

Pump controlled pressure systems

In heating systems with automatic pressure maintaining systems, and in particular pump controlled systems, with integral degassing, we recommend the installation of a diaphragm expansion vessel (DEV) as individual boiler protection.

Boiler output in kW	Diaphragm expansion vessel capacity in litre
up to 300	50
up to 500	80
up to 1000	140

This reduces the frequency and level of pressure fluctuations. This contributes considerably to improved operational reliability and a longer service life of the system components.
Damage to the boiler or to other system components may result if these recommendations are not followed.
Also ensure that only corrosion-technically sealed PDH systems are used, which are protected against oxygen ingress into the heating water. Otherwise damage to the system through oxygen corrosion can result.
PDH systems with atmospheric degassing through cyclical pressure release create a central post-ventilation of the heating system, but represent no oxygen removal in the sense of corrosion protection to VDI 2035 sheet 2.

System example 1: Single boiler system with shunt pump for raising the return temperature

Applications
Heating systems where control thermostat T1 ④ can control downstream heating circuits.

Main components
Single boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC3)
- Shunt pump

Function description
Operation with a constant boiler water temperature.
In the delivered condition, the control thermostat of the Vitotronic 100 (type GC3) is set to 75 °C. Burner stage 2 switches ON or OFF 5 K below burner stage 1.

Return temperature raising facility
Control thermostat T2 ③ starts shunt pump BP ⑤ if the actual temperature falls below the required minimum return temperature. The volume flow must be reduced by at least 50% via control thermostat T1 ④ if the minimum return temperature is not achieved even though the return temperature is raised.
Size shunt pump BP ⑤ to approx. 30% of the total boiler throughput.

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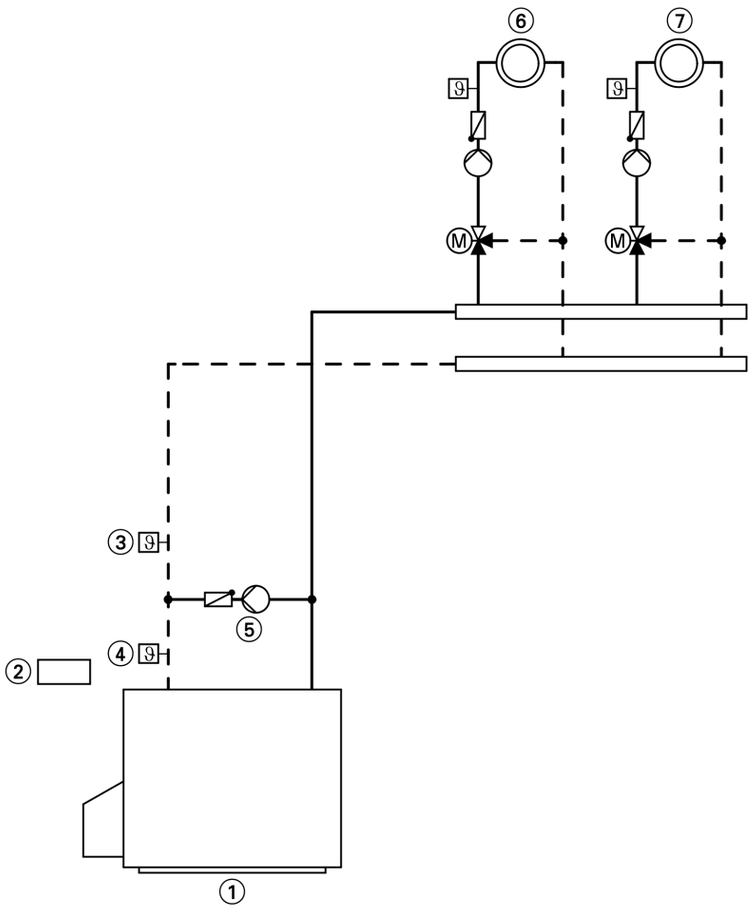
Design information (cont.)

Hydraulic installation diagram



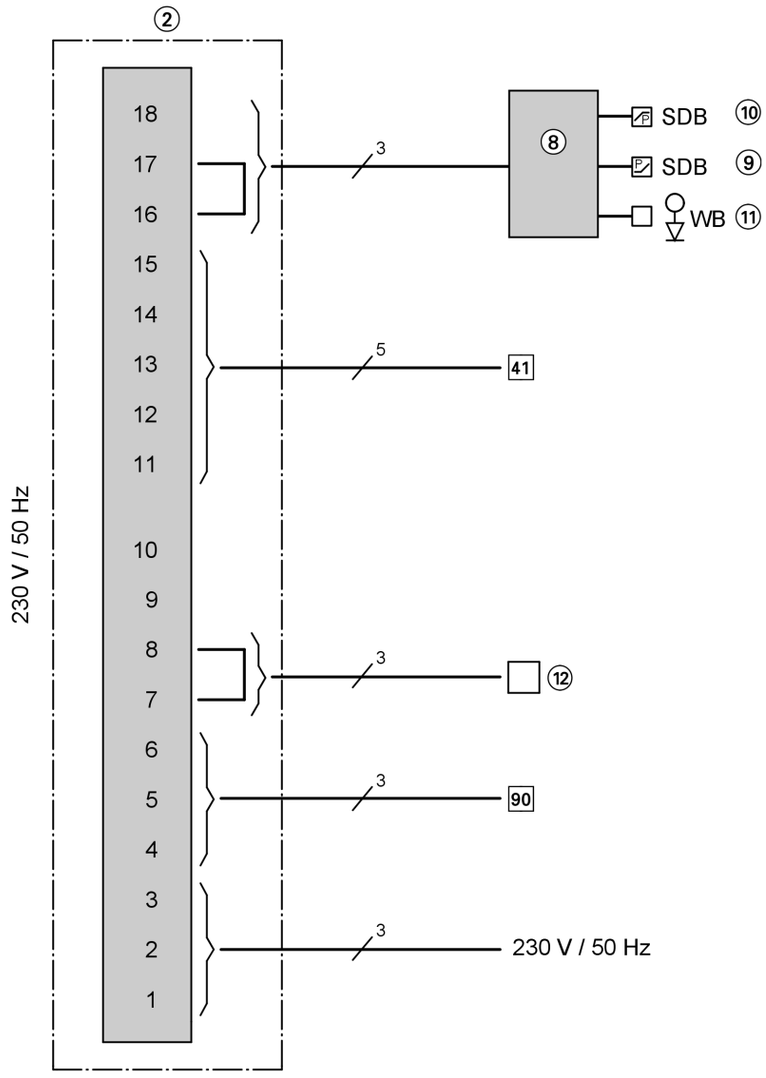
Equipment required

(for standard systems – equipment with additional system modules, see the technical datasheet folder)

Pos.	Description	Part no.
①	**Boiler**	as per Viessmann pricelist
②	Vitotronic 100 (type GC3)	as per Viessmann pricelist
③	Control thermostat T2	
	– Immersion control thermostat (with 200 mm long sensor well)	Z001 887
	or	
	– Immersion control thermostat (with 150 mm long sensor well)	Z001 888
④	Control thermostat T1	
	– Immersion control thermostat (with 200 mm long sensor well)	Z001 887
	or	
	– Immersion control thermostat (with 150 mm long sensor well)	Z001 888
⑤	Shunt pump BP	on-site
⑥	**Heating circuit I**	on-site
⑦	**Heating circuit II**	on-site
	Accessories	
⑧	Junction box for external safety equipment	on-site
⑨	Minimum pressure limiter SDB	7224 458
⑩	Maximum pressure limiter SDB	7224 450
⑪	Water level limiter (low water indicator) WB	9529 050
⑫	Switching contact to enable the burner	on-site

Design information (cont.)

Electrical installation diagram



System example 2: Single boiler system with shunt pump for raising the return temperature

Applications
Heating systems where control thermostat T1 ④ can control downstream heating circuits.

Main components
Single boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC1) with the Vitocontrol control panel and integral weather-compensated Vitotronic 200-H (type HK1S/HK3S) control unit **or** Vitotronic 100 (type GC1) and external weather-compensated control unit
- Shunt pump

Function description
Operation with a constant boiler water temperature.
Burner stage 2 is switched ON subject to load.

Return temperature raising facility
Control thermostat T2 ③ starts shunt pump BP ⑤ if the actual temperature falls below the required minimum return temperature. The flow rate must be reduced by at least 50% via control thermostat T1 ④ if the minimum return temperature is not achieved even if the return temperature is raised.
Size shunt pump BP ⑤ to approx. 30% of the total boiler throughput.

DHW heating
The DHW is heated up when the actual temperature falls below the DHW temperature selected at cylinder temperature sensor ⑧. The boiler water temperature is raised to the set cylinder temperature + 20 K and circulation pump for cylinder heating ⑨ is started, if the boiler water temperature lies 7 K above the actual water temperature in the cylinder.

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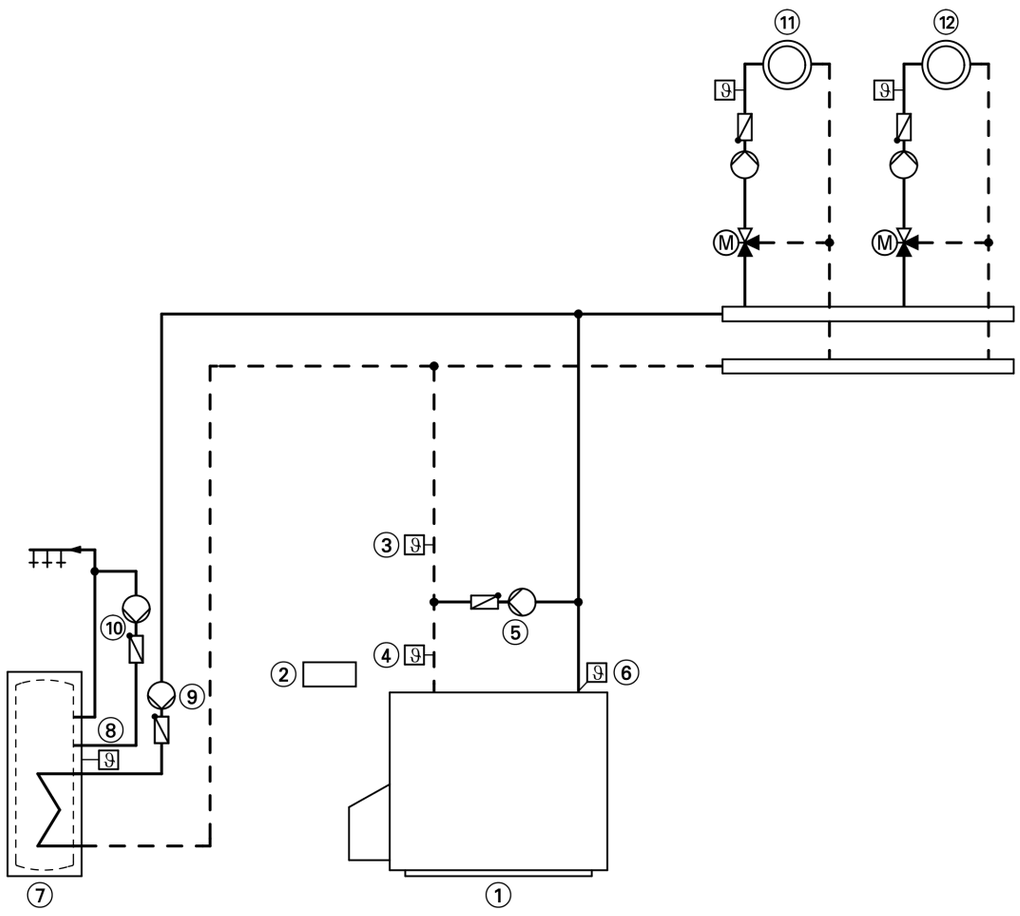
Design information (cont.)

Heating operation
The flow temperature in heating circuits ⑪ and ⑫ can be operated, depending on the control unit used, in modulating mode subject to the outside temperature.

Hydraulic installation diagram



Equipment required

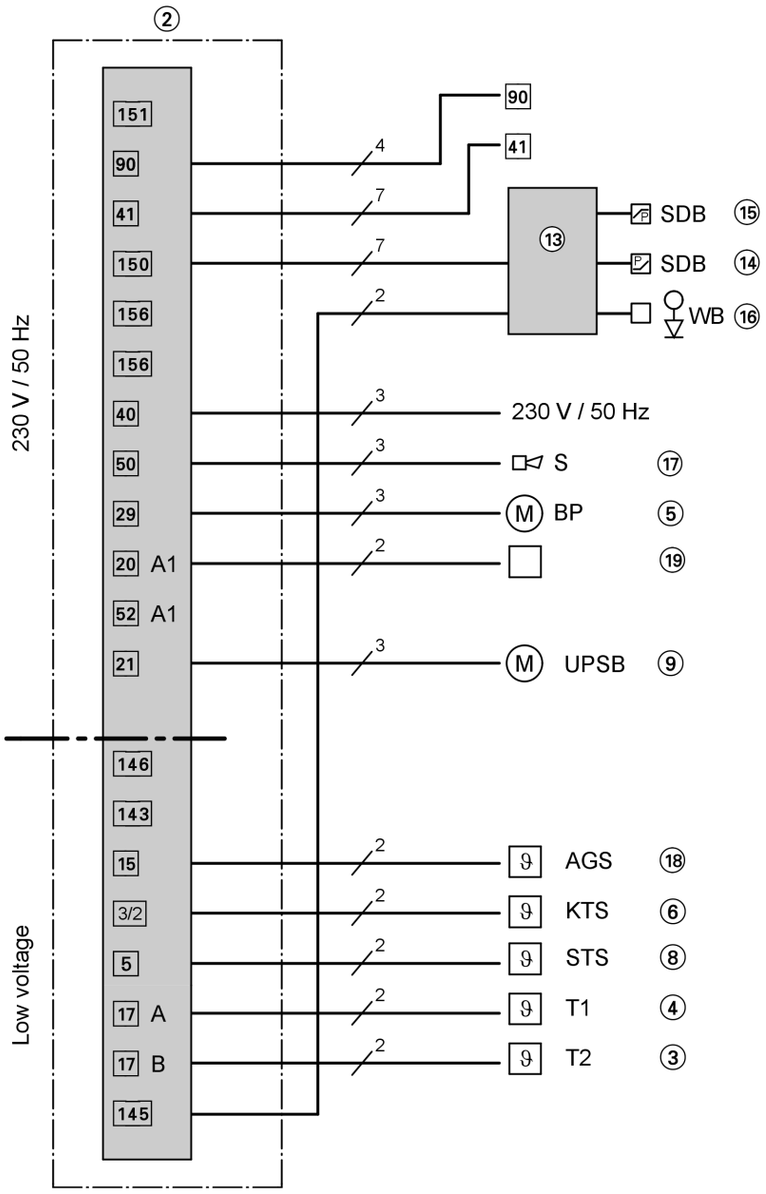
(for standard systems – equipment with additional system modules, see the technical datasheet folder)

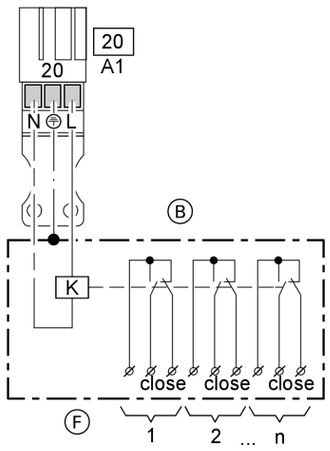
Pos.	Description	Part no.
①	**Boiler**	as per Viessmann pricelist
②	Vitotronic	Standard delivery of boiler, pos. 1
③	Temperature sensor T2	
	– Contact temperature sensor (part of the standard delivery with return temperature raising)	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
④	Temperature sensor T1	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑤	Shunt pump BP	on-site
⑥	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2
⑦	**DHW cylinder**	as per Viessmann pricelist
⑧	Cylinder temperature sensor STS	7450 633
⑨	Circulation pump for cylinder heating UPSB	as per Viessmann pricelist
⑩	DHW circulation pump ZP (additionally with on-site time switch)	on-site
⑪	**Heating circuit I**	on-site

Design information (cont.)

Pos.	Description	Part no.
⑫	**Heating circuit II**	on-site
	Accessories	
⑬	Plug-in adaptor for external safety equipment	7143 526
⑭	Minimum pressure limiter SDB	7224 458
⑮	Maximum pressure limiter SDB	7224 450
⑯	Water level limiter (low water indicator) WB	9529 050
⑰	Central fault messaging system S	on-site
⑱	Flue gas temperature sensor AGS	7450 630
⑲	Contactor relay	7814 681

Electrical installation diagram





20 A1 Closing the mixers
Ⓑ Contactor relay (⑲), part no. 7814 681
Ⓕ Downstream heating circuit control unit, contact closed: Signal for "Close mixer".

System example 3: Multi-boiler system with one shunt pump for every boiler for raising the return temperature

Applications
Heating systems with distributor installed close to the boiler. The boiler water flow rate will be reduced via the motorised butterfly valves.

Main components
Multi-boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC1) for each heating circuit in a multi-boiler system and Vitotronic 300-K (type MW1) once in multi-boiler systems **or** Vitotronic 100 (type GC1) for every boiler in a multi-boiler system with the Vitocontrol control panel and integral weather-compensated control unit Vitotronic 300-K (type MW1S) **or** an external weather-compensated cascade control unit with cylinder thermostat
- Vitotronic 200-H
- Shunt pumps

Function description
Control thermostat T2 ⑥/⑬ starts shunt pump BP ⑨/⑯ if the actual temperature falls below the required minimum return temperature. If the minimum return temperature is still not reached, the flow rate will be proportionally reduced via temperature sensor T1 ⑦/⑭, via the butterfly valve or the heating circuit control units.

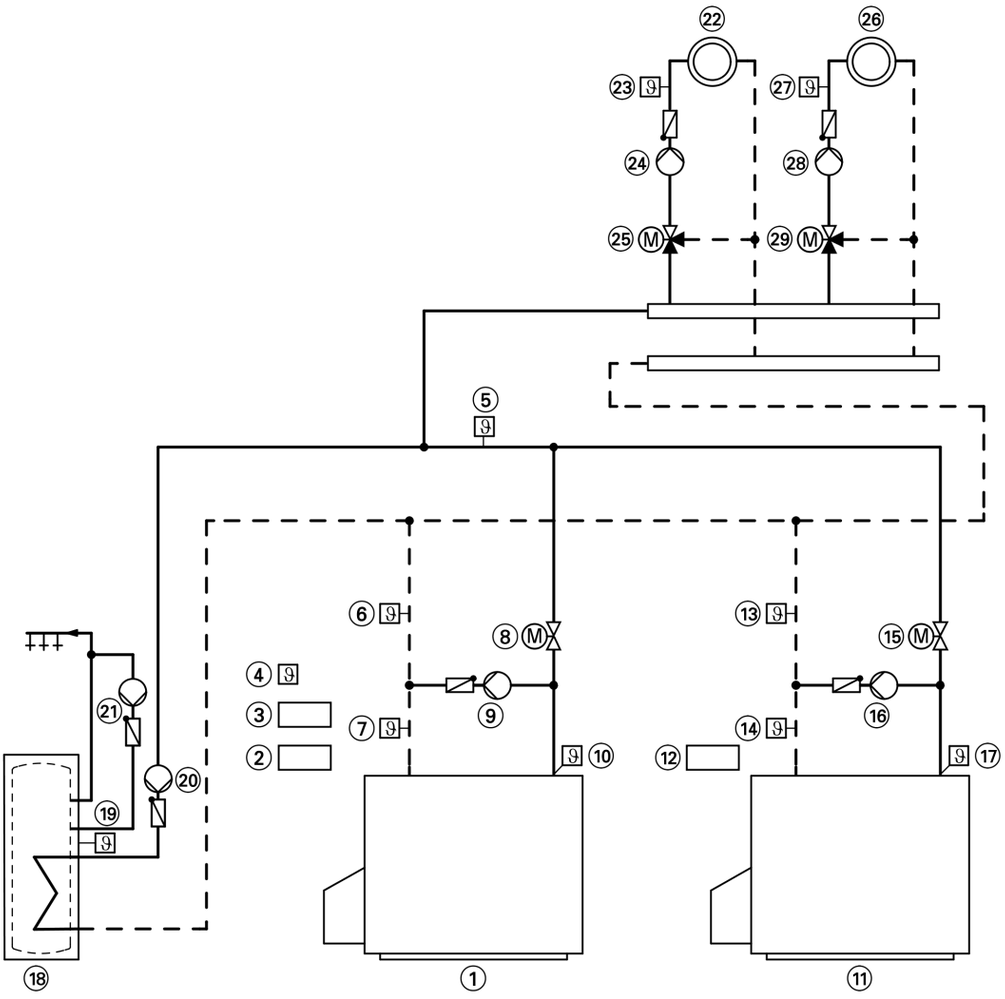
No additional protective measures are required on-site.
Size shunt pump BP ⑨ and ⑯ to approx. 30% of the total boiler throughput.

DHW heating
The DHW is heated up when the actual temperature falls below the DHW temperature selected at cylinder temperature sensor ⑲, subject to cylinder heating being enabled by the time switch. The flow temperature is raised to the set cylinder temperature + 20 K and circulation pump for cylinder heating ⑳ is started, if the boiler water temperature lies 7 K above the actual water temperature in the cylinder.
If the heating circuits are regulated via the Vitotronic 300-K ③, then the heating circuit pumps M2 ㉔ and M3 ㉘ are switched OFF in case of absolute priority, and mixers M2 ㉕ and M3 ㉙ are closed.

Heating operation
The flow temperature of heating circuits ㉒ and ㉖ can be operated, depending on the control unit used, in modulating mode subject to the outside temperature. The boiler water temperature is controlled 8 K higher than the set flow temperature of the heating circuits.

Design information (cont.)

Hydraulic installation diagram



Equipment required

(for standard systems – equipment with additional system modules, see the technical datasheet folder)

Pos.	Description	Part no.
①	**Boiler I**	as per Viessmann pricelist
②	Vitotronic 100	Standard delivery of boiler, pos. 1
③	Vitotronic 300-K	as per Viessmann pricelist
④	Outside temperature sensor ATS	Standard delivery, control unit, pos. 3
⑤	Flow temperature sensor, common heating flow	
	– Contact temperature sensor	Standard delivery, control unit,
	or	pos. 3
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑥	Temperature sensor T2	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑦	Temperature sensor T1	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑧	Motorised butterfly valve (runtime should be 120 s)	as per Vitoset pricelist
⑨	Shunt pump BP	on-site
⑩	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2

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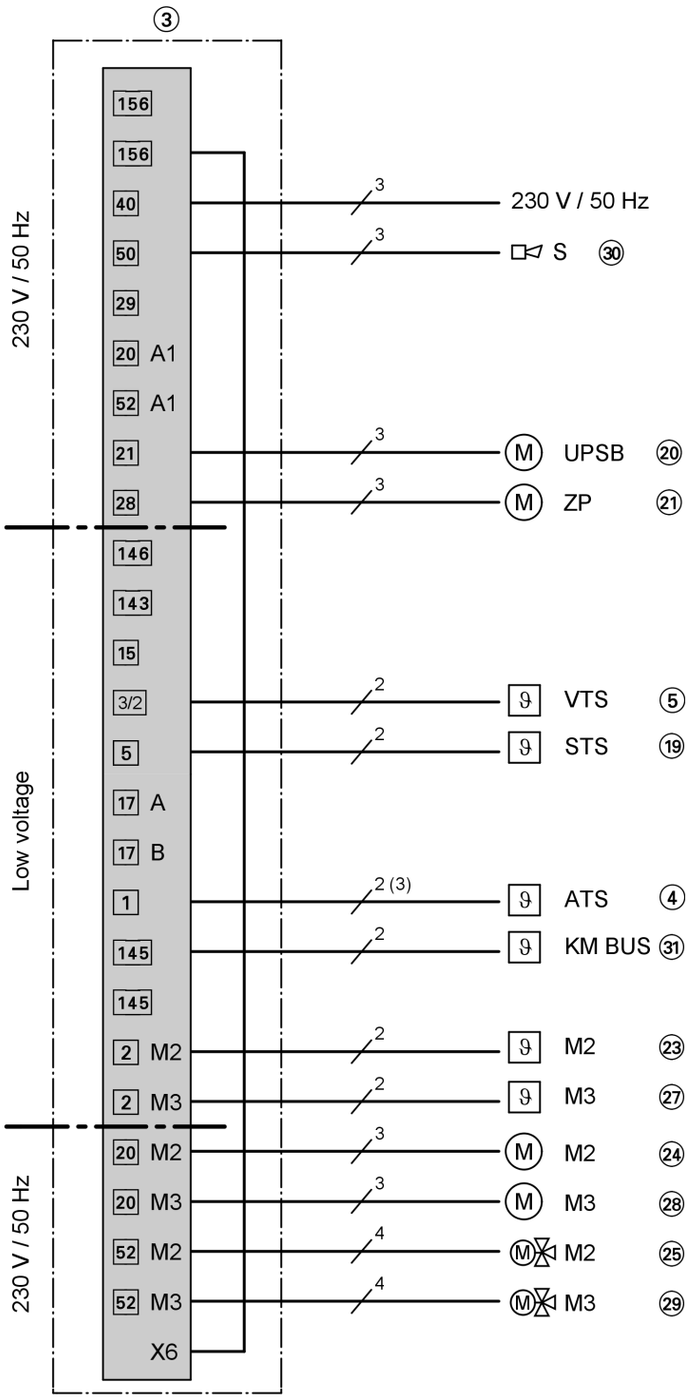
Design information (cont.)

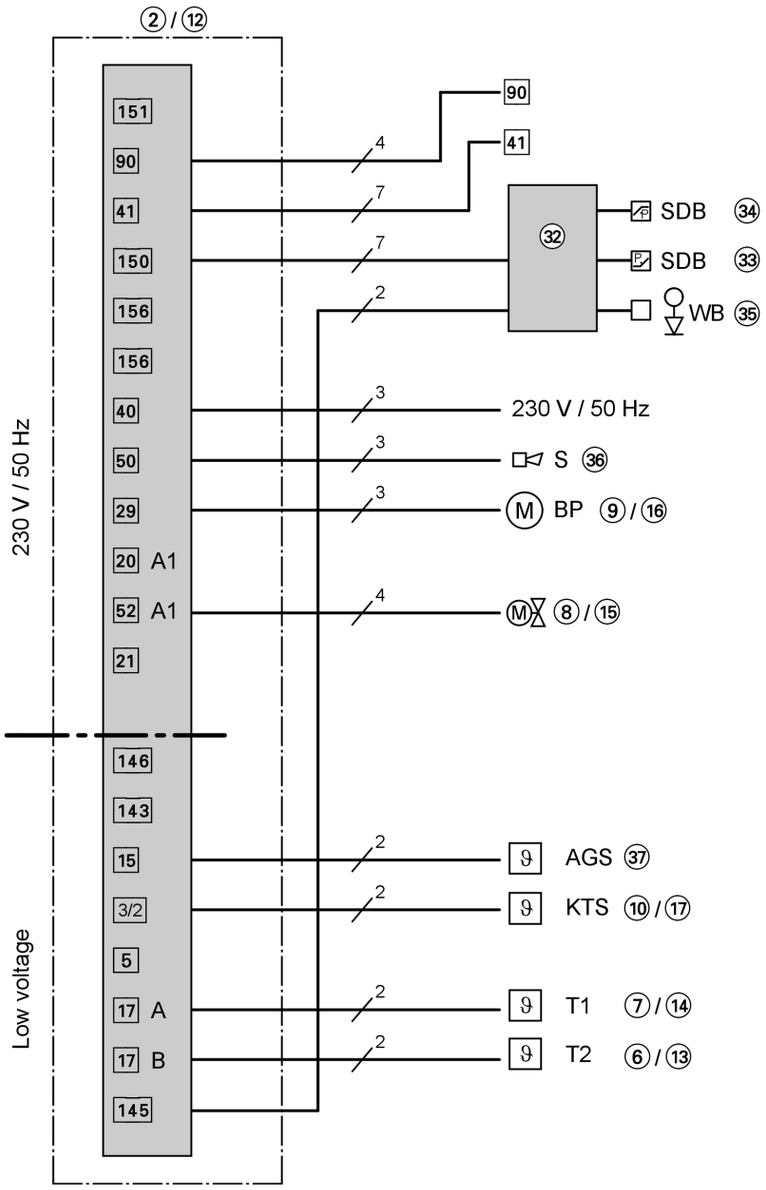
Pos.	Description	Part no.
⑪	**Boiler II**	as per Viessmann pricelist
⑫	Vitotronic 100	Standard delivery of boiler, pos. 1
⑬	Temperature sensor T2	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑭	Temperature sensor T1	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑮	Motorised butterfly valve	as per Vitoset pricelist
⑯	Shunt pump	on-site
⑰	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2
⑱	**DHW cylinder**	as per Viessmann pricelist
⑲	Cylinder temperature sensor STS	Standard delivery, control unit, pos. 3
⑳	Circulation pump for cylinder heating UPSB	as per Viessmann pricelist
㉑	DHW circulation pump ZP	on-site
㉒	**Heating circuit I**	on-site
㉓	Flow temperature sensor M2	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉔	Heating circuit pump M2	on-site
㉕	Mixer with motor M2	as per Viessmann pricelist
	– Extension kit for one heating circuit with mixer in conjunction with the Vitotronic 300-K and Vitotronic 200-H with flow temperature sensor and mixer motor DN 20-50, R½"-R1¼"	7450 650
	or	
	– Mixer motor for flanged mixer and plug-in connector	as per Viessmann pricelist
	and	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉖	**Heating circuit II**	on-site
㉗	Flow temperature sensor M3	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉘	Heating circuit pump M3	on-site
㉙	Mixer with motor M3	as per Viessmann pricelist
	– Extension kit for one heating circuit with mixer in conjunction with the Vitotronic 300-K and Vitotronic 200-H with flow temperature sensor and mixer motor DN 20-50, R½"-R1¼"	7450 650
	or	
	– Mixer motor for flanged mixer and plug-in connector	as per Viessmann pricelist
	and	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
	Accessories	
㉚	Central fault messaging system S	on-site
㉛	Vitotrol 200/300 (KM BUS)	7450 017 / 7179 060
㉜	Plug-in adaptor for external safety equipment	7143 526
㉝	Minimum pressure limiter SDB	7224 458
㉞	Maximum pressure limiter SDB	7224 450
㉟	Water level limiter (low water indicator) WB	9529 050
㊱	Central fault messaging system S	on-site
㊲	Flue gas temperature sensor AGS	7450 630

Design information (cont.)

Electrical installation diagram



Design information (cont.)



Tested quality

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VIESMANN

VITOPLEX 100

Standard oil/gas fired boiler
621 to 2000 kW

Datasheet

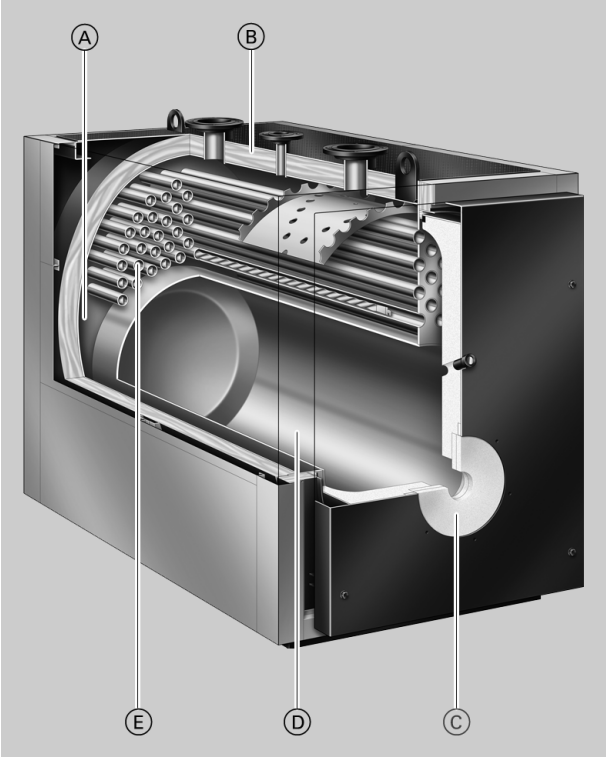
Part numbers and prices: see pricelist

VITOPLEX 100 Type PV1

Standard oil/gas fired boiler
for operation with a constant boiler water temperature

Benefits at a glance

- Oil/gas fired two-pass boiler up to 2000 kW with proven Viessmann quality.
- A large water content and wide water galleries make a minimum heating water flow rate superfluous, resulting in a simplified hydraulic integration.
- A boiler circuit pump is not required.
- Thermostatic Vitotronic 100 control unit for single boiler systems.
- Extendable with the Vitotronic control units, even as multi-boiler system.



Ⓐ Wider water galleries and a large water content

Ⓑ Highly effective thermal insulation

Ⓒ Burner connection to EN 303-1

Ⓓ Combustion chamber

Ⓔ Hot gas flues

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Specification - Vitoplex 100

Specification

Rated output range	**from kW** **to kW**	**621** **780**	**781** **950**	**951** **1120**	**1121** **1350**	**1351** **1700**	**1701** **2000**
Rated thermal load range	from kW to kW	682 857	858 1044	1045 1231	1232 1484	1485 1868	1869 2198
Product ID		CE-0085 BP 0365					
Permissible flow temperature (= safety temperature)	°C	110					
Permissible operating pressure	bar	6					
Hot gas pressure drop	Pa mbar	350 3.5	500 5.0	300 3.0	400 4.0	450 4.5	600 6.0
Boiler body dimensions							
Length (dimension o)*1	mm	1970	2070	2320	2520	2665	2825
Width (dimension d)	mm	1085	1085	1180	1180	1280	1280
Height (dimension l)	mm	1690	1690	1920	1920	2020	2020
Total dimensions							
Total length (dimension p)	mm	2115	2215	2465	2665	2850	3010
Total width (dimension e)	mm	1280	1280	1375	1375	1480	1480
Total width (dimension f) with boiler control unit	mm	1460	1460	1550	1550	1655	1655
Total height (dimension l)	mm	1690	1690	1920	1920	2020	2020
Height of anti-vibration boiler supports (loaded)	mm	37	37	37	37	37	37
Foundations							
Length	mm	1600	1700	1900	2100	2250	2400
Width	mm	1250	1250	1350	1350	1450	1450
Combustion chamber diameter	mm	780	780	840	840	950	950
Combustion chamber length	mm	1470	1570	1800	2000	2110	2270
Weight boiler body	kg	1390	1470	2140	2390	2780	3020
Total weight Boiler with thermal insulation and boiler control unit	kg	1490	1575	2260	2525	2920	3170
Content boiler water	litres	866	998	1296	1324	1665	1767
Boiler connections							
Boiler flow and return	PN 6 DN	100	100	125	125	150	150
Safety connection (safety valve)	PN 16 DN	50	50	65	65	65	65
Drain	R (male thread)	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"
Flue gas parameters*2							
Temperature (at boiler water temperature 75 °C)							
– at rated output	°C	215	215	215	215	215	215
– at partial load	°C	140	140	140	140	140	140
Mass flow rate for fuel oil EL and natural gas							
– at rated output	kg/h	1200	1460	1720	2070	2610	3070
– at partial load	kg/h	720	876	1032	1242	1566	1842
Required draught	Pa/mbar	0	0	0	0	0	0
Flue gas connection	Ø mm	300	300	350	350	400	400
Gas content Combustion chamber and hot gas flues	m^3	0.97	1.03	1.50	1.65	2.20	2.35
Standard efficiency (for operation with fuel oil) at heating system temp. 75/60 °C	%	92					
Standby loss $q_{B,70}$	%	0.15	0.13	0.13	0.12	0.12	0.11

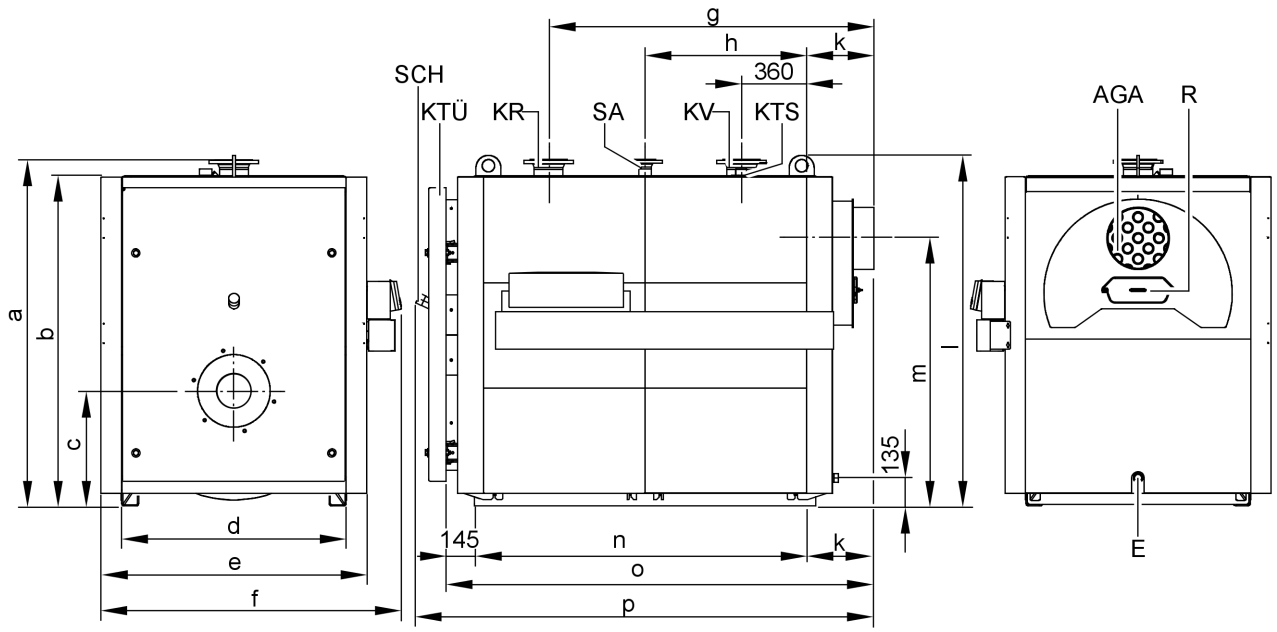
Note
For the specification of Viessmann modular components, see the separate datasheets.

*1 *Boiler door removed.*

*2 *Values for calculating the size of the flue system to EN 13384 relative to 13 % CO_2 for fuel oil EL and 10 % CO_2 for natural gas. Flue gas temperatures measured as gross values at 20 °C combustion air temperature.*
The details for partial load refer to 60 % of rated output. Calculate the flue gas mass flow rate accordingly when the partial load differs from that stated above (subject to the burner mode).

Specification - Vitoplex 100 (cont.)

Dimensions



AGA Flue gas connection
E Drain
KR Boiler return
KTS Boiler water temperature sensor
KTÜ Boiler door
KV Boiler flow
R Cleaning aperture
SA Safety connection (safety valve)
SCH Inspection aperture

Dimensions

Rated output range	**from kW**	**621**	**781**	**951**	**1121**	**1351**	**1701**
	to kW	**780**	**950**	**1120**	**1350**	**1700**	**2000**
a (height incl. connectors)	mm	1670	1670	1900	1900	2000	2000
b	mm	1590	1590	1815	1815	1915	1915
c	mm	555	555	580	580	625	625
d	mm	1085	1085	1180	1180	1280	1280
e	mm	1280	1280	1375	1375	1480	1480
f	mm	1460	1460	1550	1550	1655	1655
g	mm	1470	1570	1820	2020	2160	2320
h	mm	775	825	940	1040	1100	1180
k	mm	280	280	300	300	320	320
l (height incl. lifting eyes)	mm	1690	1690	1920	1920	2020	2020
m	mm	1290	1290	1480	1480	1600	1600
n (length of the base rails)	mm	1545	1645	1875	2075	2200	2360
o (transport dimension)	mm	1970	2070	2320	2520	2665	2825
p	mm	2115	2215	2465	2665	2850	3010

Dim. c: Observe the installation height of the burner.
Dimension o: Boiler door removed.

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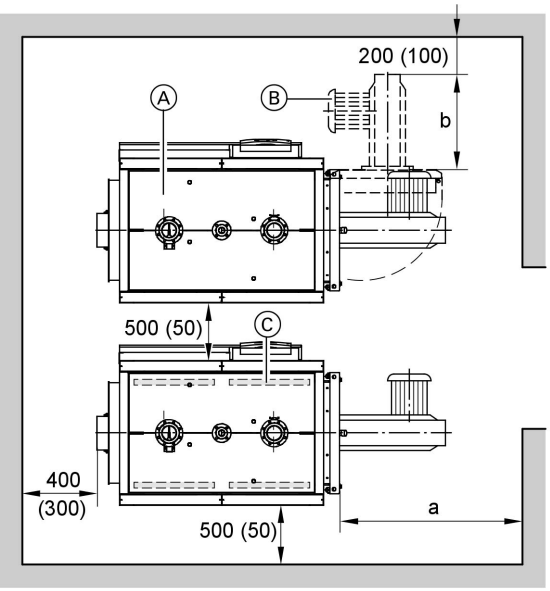
Positioning



To enable convenient installation and maintenance, observe the stated clearance dimensions; maintain the minimum clearances where space is tight (dimensions in brackets). In the delivered condition, the boiler door opens to the left. You can reposition the hinge bolts so that the door can open to the right.

Ⓐ Boiler
Ⓑ Burner
Ⓒ Anti-vibration boiler supports

Rated output range	**from kW** **to kW**	**621** **780**	**781** **950**	**951** **1120**	**1121** **1350**	**1351** **1700**	**1701** **2000**
a	mm	1700		2000	2150		2450
b	mm	Burner length (installed)					

Dimension a: Maintain this space in front of the boiler to enable the withdrawal of the turbulators or for cleaning the hot gas flues.

Positioning

- Avoid air contamination by halogenated hydrocarbons (e.g. as in sprays, paints, solvents and cleaning agents)
- Avoid very dusty conditions
- Avoid high levels of humidity
- Protect against frost and ensure good ventilation

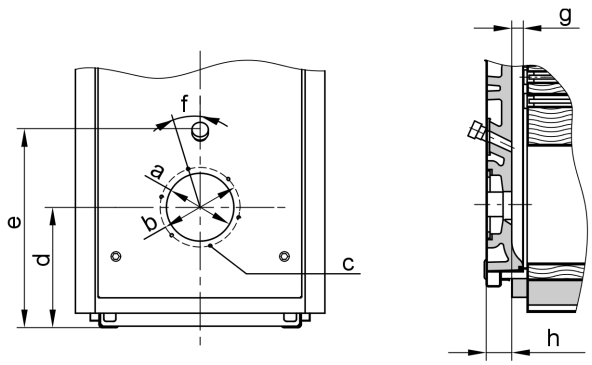
Otherwise, the system may suffer faults and damage.
In rooms where air contamination through **halogenated hydrocarbons** may occur, install the boiler only if adequate measures can be taken to provide a supply of uncontaminated combustion air.

Burner installation

The burner fixing hole circle, burner fixing holes and blast tube aperture meet the requirements of EN 303-1.
The burner may be installed directly on the hinged boiler door. Alternative burner plates can be used (see boiler accessories), if the burner dimensions differ from those listed in EN 303-1.

Burner plates may be factory-fitted on request (chargeable option). For this purpose, please state the burner make and type when ordering.
The blast tube must protrude through the thermal insulation on the boiler door. Maintain the minimum blast tube length of 140 mm. Verify the correct function if a burner with a shorter blast tube is to be used.

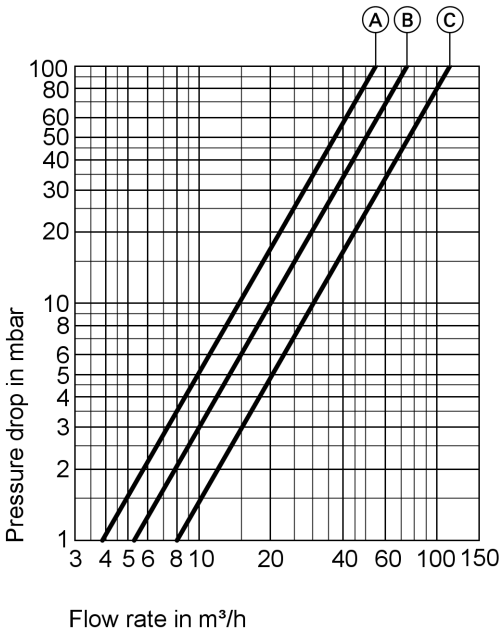
Specification - Vitoplex 100 (cont.)



Rated output range	from kW to kW	621 780	781 950	951 1120	1121 1350	1351 1700	1701 2000
a	Ø mm	350		400			
b	Ø mm	400		490			
c	Number/thread	6 x M 12					
d	mm	555		580		625	
e	mm	950		1045		1185	
f	°	15		30			
g	mm	100				140	
h	mm	120				120	

Pressure drop on the heating water side

Vitoplex 100 is only suitable for fully pumped hot water heating systems.



Ⓐ Rated output 621 to 950 kW
Ⓑ Rated output 951 to 1350 kW
Ⓒ Rated output 1351 to 2000 kW

Delivered condition - Vitoplex 100

Boiler body with fitted boiler door and clean-out cover.
Sight glass closure, flame tube gasket and turbulator extractors are supplied inside the combustion chamber.

1 Carton with thermal insulation
1 Carton containing the boiler control unit and 1 bag with technical documentation

Control unit versions

For single boiler systems:

- without Vitocontrol control panel
  Vitotronic 100 (type GC3)
  thermostatic control unit for operation with a constant boiler water temperature.
  Vitotronic 100 (type GC1)
  for operation with a constant boiler water temperature or for weather-compensated operation in conjunction with a control panel (see below) or an external control unit.
- with Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** (accessories)
  and
  Vitocontrol control panel with the **Vitotronic 300-K** (type MW1S) for weather-compensated mode and mixer control for a max. of 2 heating circuits with mixer and additional Vitotronic 200-H, type HK1S or HK3S for 1 or up to 3 heating circuits with mixer
  or
  Control panel with external control unit (on site)

For multi-boiler system (up to 4 boilers):

- without Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** in conjunction with the **Vitotronic 300-K** (type MW1)
  for modulating boiler water temperature (one boiler is supplied with the standard controls for a multi-boiler system)
  and
  Vitotronic 100 (type GC1) and **LON module** for modulating boiler water temperature for every additional boiler in a multi-boiler system
- with Vitocontrol control panel
  Vitotronic 100 (type GC1) and **LON module** (accessories) for modulating boiler water temperature for every boiler in a multi-boiler system
  and
  Vitocontrol control panel with the **Vitotronic 300-K** (type MW1S) for multi-boiler system, weather-compensated mode and mixer control for a max. of 2 heating circuits with mixer and additional Vitotronic 200-H, type HK1S or HK3S for 1 or up to 3 heating circuits with mixer
  or
  Control panel with external control unit (on site)

Boiler accessories

Flue gas heat exchanger

For the Vitoplex 100, it is recommended to condense the flue gas through the downstream connection of a stainless steel heat exchanger, to create a condensing boiler.
Further details on page 8.

Additional accessories

See pricelist and "Boiler accessories" datasheet.

Operating conditions with Vitotronic boiler control units

For water quality requirements, see page 10.

		Requirements
1.	Heating water flow rate	None
2.	Boiler return temperature (minimum value)	Oil and gas operation 65 °C
3.	Lower boiler water temperature	75 □
4.	Two-stage burner operation	None
5.	Modulating burner operation	None
6.	Reduced mode	Not possible
7.	Weekend setback	Not possible

Specification - Vitotrans 300 flue gas/water heat exchanger

Specification

Rated boiler output	**kW**	**780**	**950**	**1120**	**1350**	**1700**	**2000**
Matching Vitotrans 300							
– Gas operation	Part no.		Z005 603			Z005 604	
– Oil operation	Part no.		Z005 605			Z005 606	
Rated output of the Vitotrans 300*1							
– Gas operation	kW	74	90	106	128	161	184
– Oil operation	kW	50	62	73	88	111	130
Product ID Vitotrans 300 in conjunction with a boiler as a condensing unit				CE-0085 BQ 0418			
Permissible flow temperature (= safety temperature)	°C			110			
Permissible operating pressure	bar			6			
Hot gas pressure drop*2	Pa	70	100	130	100	150	200
	mbar	0.7	1.0	1.3	1.0	1.5	2.0
Flue gas mass flow rate	kg/h	900	1225	1525	1910	2390	2980
Total dimensions							
Total length (dimension d)	mm		965			1095	
Total width incl. mating flanges	mm		1075			1225	
Total height (dimension g)	mm		2200			2535	
Transport dimensions							
Length (dimension d)	mm		965			1095	
Width (dimension k), excl. mating flanges	mm		970			1115	
Height (dimension a)	mm		2030			2370	
Total weight Heat exchanger with thermal insulation	kg		415			655	
Capacity							
Heating water	litres		275			380	
Flue gas	m^3		0.389			0.683	
Connections							
Heating water flow and return	PN 16 DN		100			125	
Condensate drain	R		½"			½"	
Flue gas connection	NW		300			400	

*1 *Output of the Vitotrans 300 for a flue gas cooling for gas fired operation of 200/65 °C, for oil fired operation of 200/70 °C and a heating water temperature rise in the Vitotrans 300 of 40 °C to 42.5 °C.*
For conversion to other temperatures, see page 10.

*2 *Hot gas pressure drop at rated output. The burner must be able to overcome the hot gas pressure drop of the boiler, the Vitotrans 300 and the flue pipe.*

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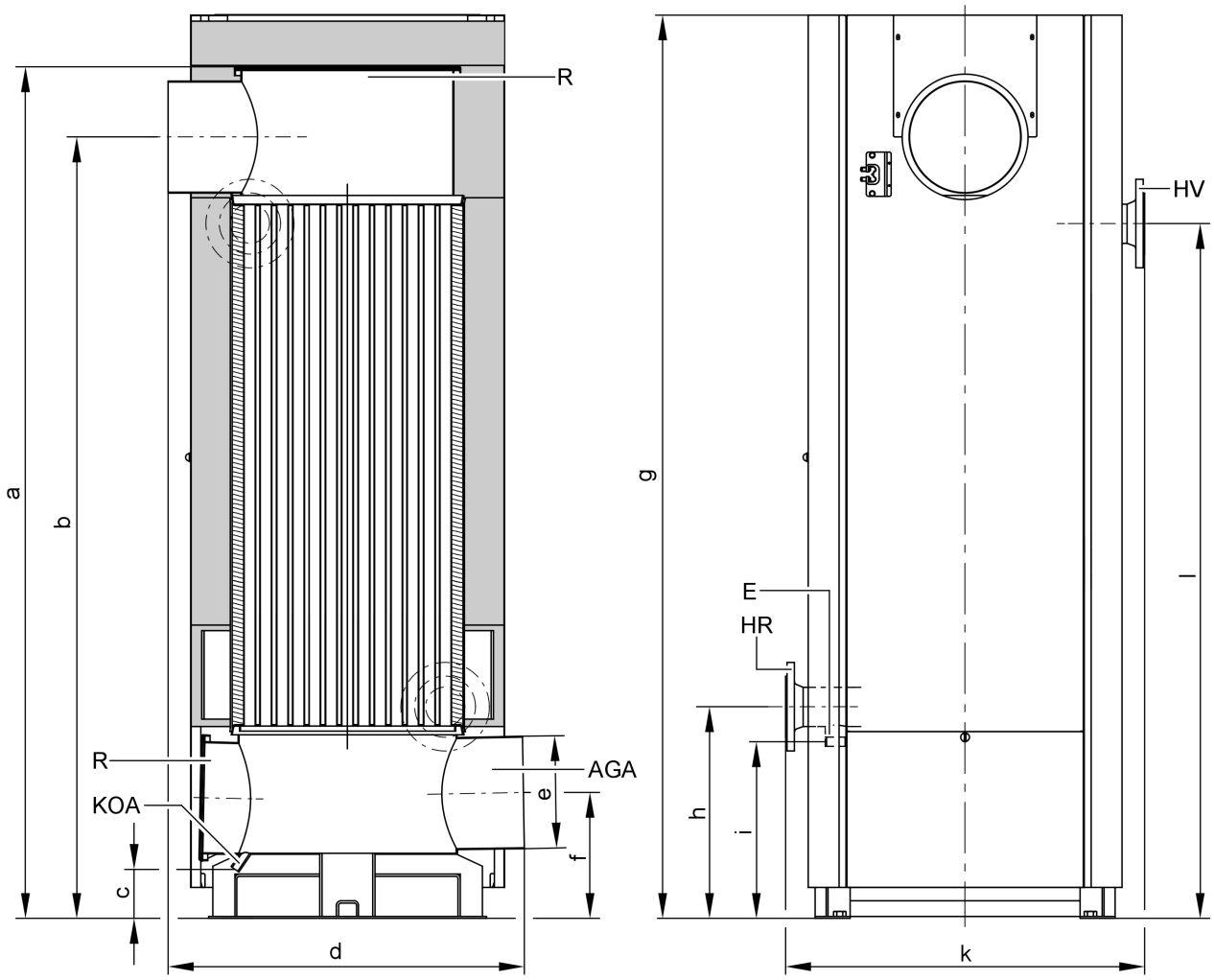
Specification - Vitotrans 300 flue gas/water heat exchanger (cont.)

Dimensions



AGA Flue gas connection
E Drain connectors
HR Heating water return (inlet)
HV Heating water flow (outlet)
KOA Condensate drain
R Cleaning aperture

Dimensions

Part no.		Z005 603 Z005 605	Z005 604 Z005 606
a	mm	2030	2370
b	mm	1845	2132
c	mm	89	154
d	mm	965	1095
e	Internal ∅ mm	301	401
f	mm	312	492
g	mm	2200	2535
h	mm	542	721
i	mm	441	609
k	mm	970	1115
l	mm	1612	1838

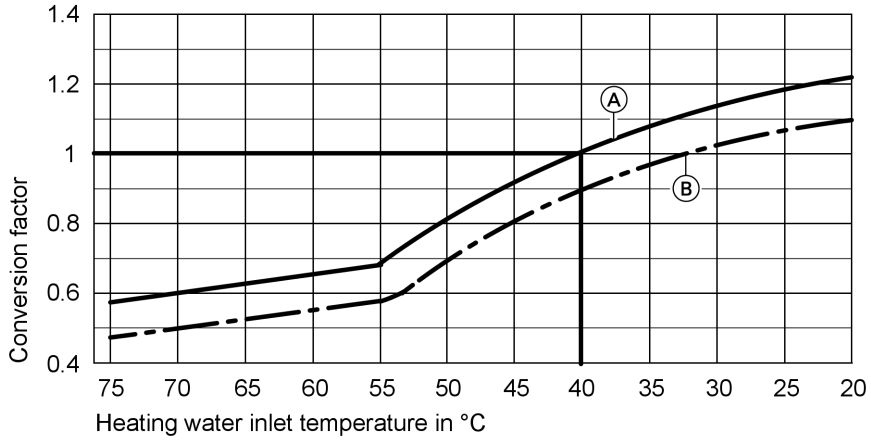
Delivered condition

Heat exchanger body with fitted flue gas header and integral feet.
Mating flanges and screws are fitted to the connector.
1 carton with thermal insulation for the flue gas/water heat exchanger

Specification - Vitotrans 300 flue gas/water heat exchanger (cont.)

Output data

Vitotrans 300 for gas fired operation



Ⓐ Flue gas inlet temperature 200 °C
Ⓑ Flue gas inlet temperature 180 °C

Conversion of the output data
The output data of the Vitotrans 300 flue gas/water heat exchanger refers to a flue gas inlet temperature of 200 °C and a heating water inlet temperature into the heat exchanger of 40 °C.

For different conditions the heat output can be calculated by multiplication of the given rated output with the conversion factor established from the diagram.

Standard values for water quality

The service life of any boiler as well as that of the complete heating system is influenced by the quality of the water.
In any event, the cost of a water treatment facility is less than the cost of repairing defects on your heating system.
Maintaining the following requirements is necessary to safeguard your warranty rights. The manufacturer's warranty excludes damage due to corrosion and scaling.

The following is a summary of essential water qualities.
A mobile water softening system can be hired from Viessmann for filling and commissioning.

Heating systems with rated operating temperatures up to 100 ºC (VDI 2035)

Prevent excessive scale build-up (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, the VDI Directive 2035 Sheet 1 "Prevention of heating system damage – scaling in DHW and hot water heating systems" applies [in Germany] together with the following standard values (see also the full explanations in the original Directive):

Total output in kW	Total alkaline earths mol/m³	Total hardness in °dH
> 600	< 0.02	< 0.11

The standard values assume the following:
- The volume of fill and top-up water of the heating system during its service life will not exceed three times the water content of the heating system.
- The specific system volume is less than 20 l/kW output. In multi-boiler systems, apply the output of the smallest boiler.
- All measures to prevent corrosion on the water side in accordance with VDI 2035 Sheet 2 have been implemented.

Soften the fill & top-up water in heating systems operating under the following conditions:
- The total of alkaline earths in the fill & top-up water exceeds the standard value.
- Higher fill & top-up water volumes are expected.
- The specific system volume is less than 20 l/kW output. In multi-boiler systems, apply the output of the smallest boiler.

When engineering the system, observe the following:
- Install shut-off valves in different sections. This prevents the need for draining the entire heating water in case of repairs or system expansion.
- In systems > 50 kW, install a water meter to record the volume of the fill & top-up water. Enter the volume of water and the water hardness into the boiler service instructions.
- For systems with a specific system volume in excess of 20 l/kW output (apply the output of the smallest boiler in multi-boiler systems), apply the requirements of the next higher category of total output (in accordance with the table). In case of severe excess (> 50 l/kW), soften down to the total of alkaline earths ≤ 0.02 mol/m³.

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Standard values for water quality (cont.)

Operating information:
- Take the system into use step by step, starting with the lowest boiler output and at a high heating water flow rate. This prevents localised concentration of lime deposits on the boiler heating surfaces.
- In multi-boiler systems, start all boilers simultaneously to prevent the entire lime deposit settling in the heat transfer area of just one boiler.
- During expansion or repair work, only drain the necessary sections.
- Where water treatment is required, treat even the first fill of the heating systems prior to commissioning. This also applies to any subsequent filling, e.g. when adding top-up water or after a repair or after system expansion.
- Filters, dirt traps and other blow-down or separating facilities in the heating water circuit must be checked, cleaned and activated more frequently after commissioning or new installations, later on subject to the water treatment applied (e.g. water softening).

The build-up of lime deposits on the heating surfaces will be minimised if these instructions are observed.
Any lime deposits that have formed because the requirements to VDI Guideline 2035 have not been observed will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the lime deposits is one option to restore the operational viability. This measure must be carried out by a specialist. Inspect the heating system for possible damage prior to returning it into use. It is essential that the faulty operating parameters are corrected to prevent renewed formation of excessive scale deposits.

Heating systems with permissible flow temperatures in excess of 100 ºC (VdTÜV DS 1466)

Operation with circulating water with low salt content
Only use water with a low salt content as fill or top-up water, such as desalinated water, permeate or condensate.
Systems using mixed condensate generally create water with low salt content if no boiler water is fed into the system for putrefaction by alkalies.

Operation with water containing salt
Where possible, use water with a low salt content that is at least free from alkaline earths (softened) as fill or top-up water.

		Low salt content		**With salt content**
El. conductivity at 25 °C	µS/cm	10 to 30	> 30 to 100	> 100 to 1 500
General requirements		clear, without sediments	clear, without sediments	clear, without sediments
pH value at 25 ºC according to the potable water order/potable water treatment order		9 - 10 ≤ 9.5	9 - 10.5 ≤ 9.5	9 - 10.5 ≤ 9.5
Oxygen (O_2) (values for constant operation are generally significantly lower)	mg/litre	< 0.1	< 0.05	< 0.02*1
Alkaline earths (Ca + Mg)	mmol/litre	< 0.02	< 0.02	< 0.02
Phosphate (PO_4) according to the potable water order/potable water treatment order For Viessmann hot water boilers	mg/litre mg/litre mg/litre	< 5 ≤ 7 < 2.5	< 10 ≤ 7 < 5	< 15 ≤ 7 < 15
When using oxygen binders: Sodium sulphite (Na_2SO_3) (When using other suitable products, observe the respective guidelines issued by the respective supplier.)	mg/litre	–	–	< 10

Prevention of damage due to corrosion on the water side

The corrosion resistance of ferrous materials on the heating water side of heating systems and boilers depends on the absence of oxygen in the heating water.
The oxygen introduced into the heating system with both the first fill and with top-up water reacts with the system materials without causing damage.
The characteristic blackening of the water after some time in use indicates that free oxygen is no longer present.
The technical rules and in particular VDI Directive 2035-2 therefore recommend that heating systems are designed and operated so that a constant ingress of oxygen into the heating water is prevented.

Opportunities for oxygen ingress during the operation:
- Via open vented expansion vessels with flow through
- Through negative pressure in the system
- Through gas-permeable components

Sealed systems, e.g. those equipped with a diaphragm expansion vessel, offer good protection against the ingress of airborne oxygen into the system, if correctly sized and operating at the correct pressure.
At every part of the heating system, even at the suction side of the pump and under all operating conditions, the system pressure should be above ambient atmospheric pressure.
The inlet pressure of the diaphragm expansion vessel should be checked at least during the annual service.

*1 *The oxygen concentration in the re-circulated water may be up to 0.1mg/litre, if suitable inorganic corrosion inhibitors are used.*

Standard values for water quality (cont.)

The use of permeable components, e.g. plastic pipes that are permeable to gas in underfloor heating systems, should be avoided. Provide system separation if such components are nevertheless used. This must separate the water flowing through the plastic pipes from other heating circuits, e.g. from the boiler, by the provision of a corrosion-resistant heat exchanger.
No further anti-corrosion measures are required for sealed hot water heating systems subject to the above points being observed.
However, take additional precautions where there is a risk of oxygen ingress, for example by adding oxygen binder sodium sulphite (5 - 10 mg/litre into the excess). The heating water should have a pH value between 8.2 and 9.5.

Different conditions apply to systems that contain aluminium components.
Where chemicals are used as part of the corrosion protection, we recommend that the manufacturer of the chemicals issues a certificate of suitability of the additives with regard to the boiler materials and the materials of the other heating equipment components.
We recommend you refer questions of water quality/treatment to an appropriate specialist.
Further details can be found in the VDI Directive 2035-2 and in EN 14868.

Design information

Installation of a suitable burner

The burner must be suitable for the respective rated output and the pressure drop on the hot gas side of the boiler (see burner manufacturer's specification).
The material of the burner head must be suitable for operating temperatures of at least 500 ºC.

Pressure-jet oil burner
The burner must be tested and designated to EN 267.

Pressure-jet gas burner
The burner must be tested to EN 676 and CE-designated in accordance with Directive 90/396/EEC.

Burner adjustment
Adjust the oil or gas throughput of the burner to the rated boiler output.

Permissible flow temperatures

Hot water boilers for permissible flow temperatures (= safety temperatures)
- Up to 110 °C
  CE designation:
  CE-0085 in accordance with the Gas Equipment Directive

Pump controlled pressure systems

In heating systems with automatic pressure maintaining systems, and in particular pump controlled systems, with integral degassing, we recommend the installation of a diaphragm expansion vessel (DEV) as individual boiler protection.

Boiler output in kW	Diaphragm expansion vessel capacity in litre
up to 1000	140
up to 2000	300

This reduces the frequency and level of pressure fluctuations. This contributes considerably to improved operational reliability and a longer service life of the system components.
Damage to the boiler or to other system components may result if these recommendations are not followed.
Also ensure that only corrosion-technically sealed PDH systems are used, which are protected against oxygen ingress into the heating water. Otherwise damage to the system through oxygen corrosion can result.
PDH systems with atmospheric degassing through cyclical pressure release create a central post-ventilation of the heating system, but represent no oxygen removal in the sense of corrosion protection to VDI 2035 sheet 2.

System example 1: Single boiler system with shunt pump for raising the return temperature

Applications
Heating systems where control thermostat T1 ④ can control downstream heating circuits.

Main components
Single boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC3)
- Shunt pump

Function description
Operation with a constant boiler water temperature.
In the delivered condition, the control thermostat of the Vitotronic 100 (type GC1) is set to 75 °C. Burner stage 2 switches ON or OFF 5 K below burner stage 1.

Return temperature raising facility
Control thermostat T2 ③ starts shunt pump BP ⑤ if the actual temperature falls below the required minimum return temperature.
The volume flow must be reduced by at least 50% via control thermostat T1 ④ if the minimum return temperature is not achieved even if the return temperature is raised.
Size shunt pump BP ⑤ to approx. 30% of the total boiler throughput.

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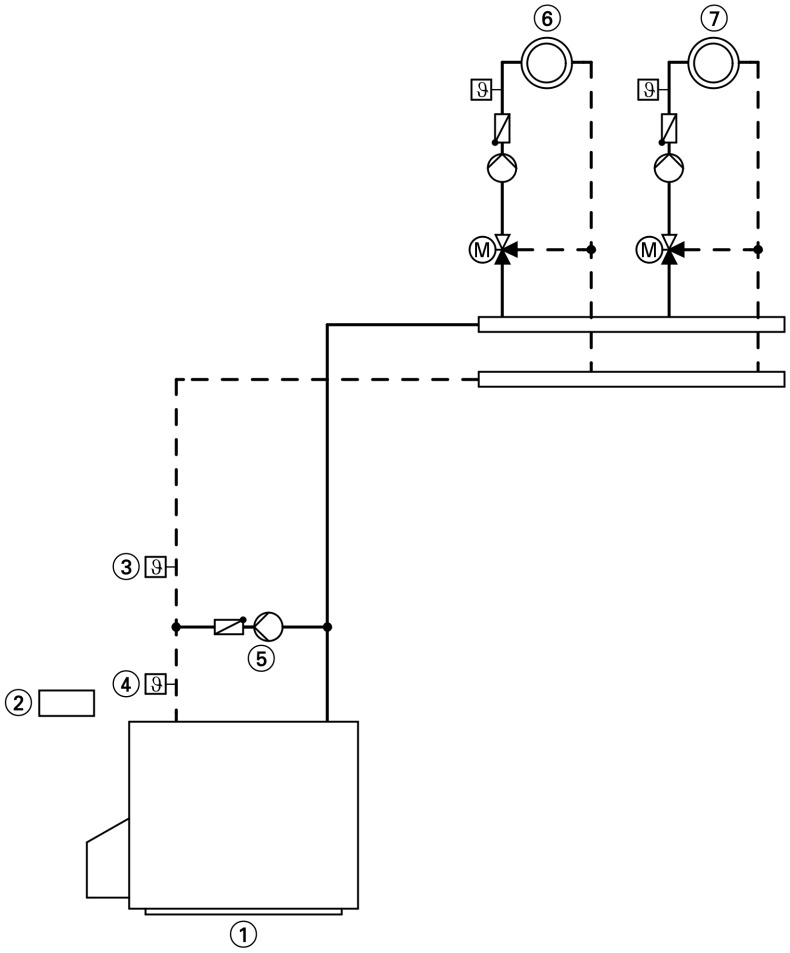
Design information (cont.)

Hydraulic installation diagram



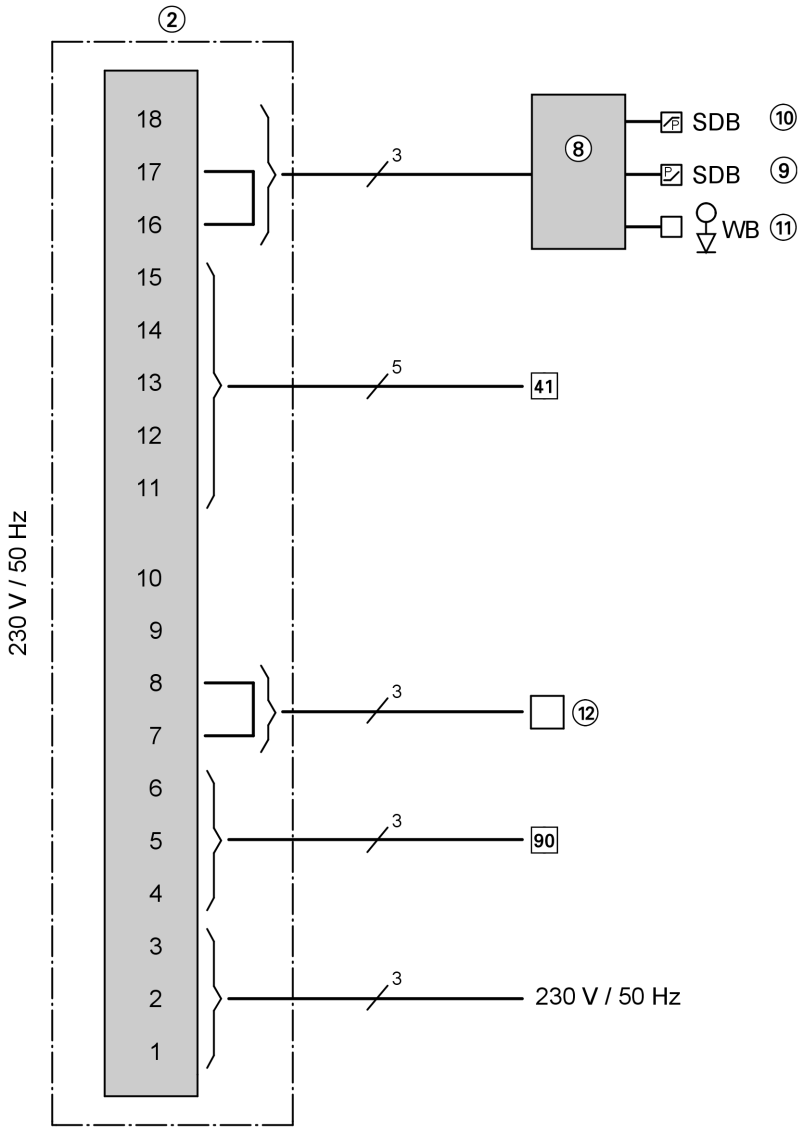
Equipment required

(for standard systems – equipment with additional system modules, see the technical datasheet folder)

Pos.	Description	Part no.
①	**Boiler**	as per Viessmann pricelist
②	Vitotronic 100 (type GC3)	as per Viessmann pricelist
③	Control thermostat T2	
	– Immersion control thermostat (with 200 mm long sensor well)	Z001 887
	or	
	– Immersion control thermostat (with 150 mm long sensor well)	Z001 888
④	Control thermostat T1	
	– Immersion control thermostat (with 200 mm long sensor well)	Z001 887
	or	
	– Immersion control thermostat (with 150 mm long sensor well)	Z001 888
⑤	Shunt pump BP	on-site
⑥	**Heating circuit I**	on-site
⑦	**Heating circuit II**	on-site
	Accessories	
⑧	Junction box for external safety equipment	on-site
⑨	Minimum pressure limiter SDB	7224 458
⑩	Maximum pressure limiter SDB	7224 450
⑪	Water level limiter (low water indicator) WB	9529 050
⑫	Switching contact to enable the burner	on-site

Design information (cont.)

Electrical installation diagram



System example 2: Single boiler system with shunt pump for raising the return temperature

Applications
Heating systems where control thermostat T1 ④ can control downstream heating circuits.

Main components
Single boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC1) with the Vitocontrol control panel and integral weather-compensated Vitotronic 200-H (type HK1S/ HK3S) control unit **or** Vitotronic 100 (type GC1) and external weather-compensated control unit
- Shunt pump

Function description
Operation with a constant boiler water temperature.
Burner stage 2 is switched ON subject to load.

Return temperature raising facility
Control thermostat T2 ③ starts shunt pump BP ⑤ if the actual temperature falls below the required minimum return temperature. The flow rate must be reduced by at least 50% via control thermostat T1 ④ if the minimum return temperature is not achieved even if the return temperature is raised.
Size shunt pump BP ⑤ to approx. 30% of the total boiler throughput.

DHW heating
The DHW is heated up when the actual temperature falls below the DHW temperature selected at cylinder temperature sensor ⑧. The boiler water temperature is raised to the set cylinder temperature + 20 K and circulation pump for cylinder heating ⑨ is started, if the boiler water temperature lies 7 K above the actual water temperature in the cylinder.

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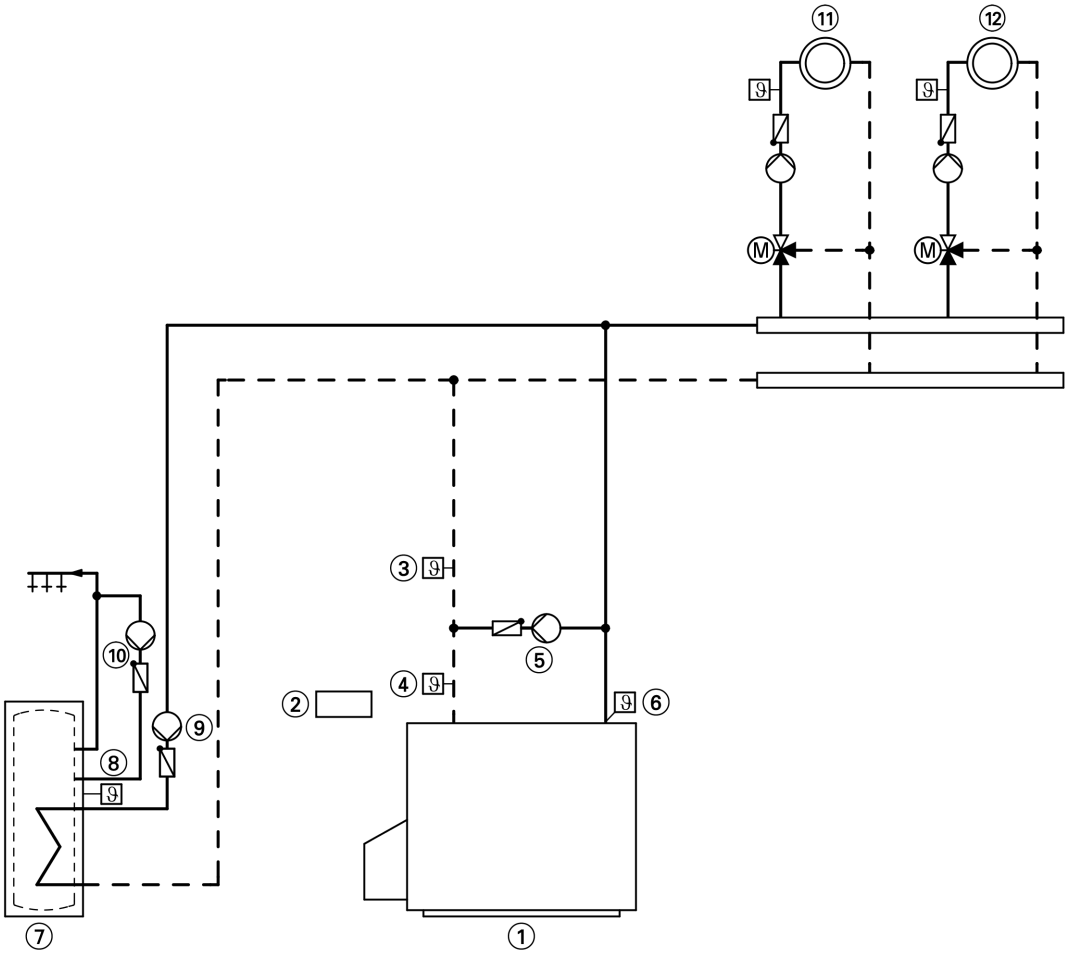
Design information (cont.)

Heating operation
The flow temperature in heating circuits ⑪ and ⑫ can be operated, depending on the control unit used, in modulating mode subject to the outside temperature.

Hydraulic installation diagram



Equipment required

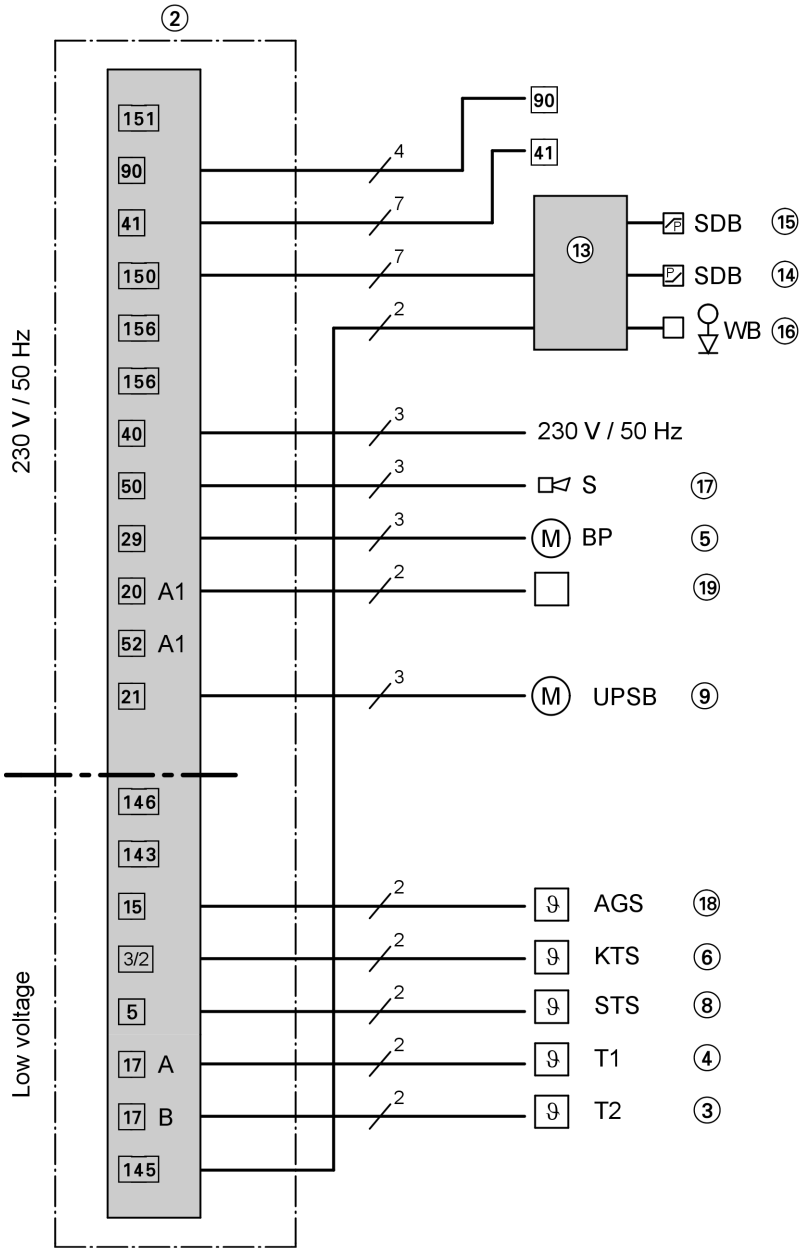
(for standard systems – equipment with additional system modules, see the technical datasheet folder)

Pos.	Description	Part no.
①	**Boiler**	as per Viessmann pricelist
②	Vitotronic	Standard delivery of boiler, pos. 1
③	Temperature sensor T2	
	– Contact temperature sensor (part of the standard delivery with return temperature raising)	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
④	Temperature sensor T1	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑤	Shunt pump BP	on-site
⑥	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2
⑦	**DHW cylinder**	as per Viessmann pricelist
⑧	Cylinder temperature sensor STS	7450 633
⑨	Circulation pump for cylinder heating UPSB	as per Viessmann pricelist
⑩	DHW circulation pump ZP (additionally with on-site time switch)	on-site
⑪	**Heating circuit I**	on-site

Design information (cont.)

Pos.	Description	Part no.
⑫	**Heating circuit II**	on-site
	Accessories	
⑬	Plug-in adaptor for external safety equipment	7143 526
⑭	Minimum pressure limiter SDB	7224 458
⑮	Maximum pressure limiter SDB	7224 450
⑯	Water level limiter (low water indicator) WB	9529 050
⑰	Central fault messaging system S	on-site
⑱	Flue gas temperature sensor AGS	7450 630
⑲	Contactor relay	7814 681

Electrical installation diagram



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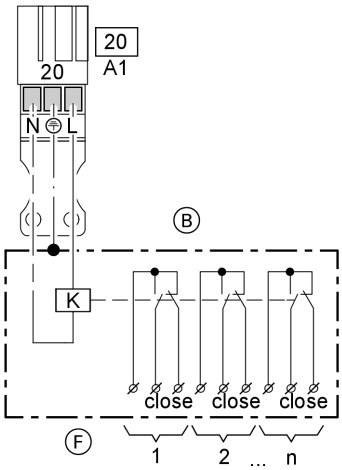


20 A1 Closing the mixers
Ⓑ Contactor relay (⑲), part no. 7814 681
Ⓕ Downstream heating circuit control unit, contact closed: Signal for "Close mixer".

System example 3: Multi-boiler system with one shunt pump for every boiler for raising the return temperature

Applications
Heating systems with distributor installed close to the boiler. The boiler water flow rate will be reduced via the motorised butterfly valves.

Main components
Multi-boiler system with:
- Vitoplex 100
- Vitotronic 100 (type GC1) for each heating circuit in a multi-boiler system and Vitotronic 300-K (type MW1) once in multi-boiler systems **or** Vitotronic 100 (type GC1) for every boiler in a multi-boiler system with the Vitocontrol control panel and integral weather-compensated control unit Vitotronic 300-K (type MW1S) **or** an external weather-compensated cascade control unit with cylinder thermostat
- Vitotronic 200-H
- Shunt pumps

Function description
Control thermostat T2 ⑥/⑬ starts shunt pump BP ⑨/⑯ if the actual temperature falls below the required minimum return temperature. If the minimum return temperature is still not reached, the flow rate will be proportionally reduced via temperature sensor T1 ⑦/⑭, via the butterfly valve or the heating circuit control units.

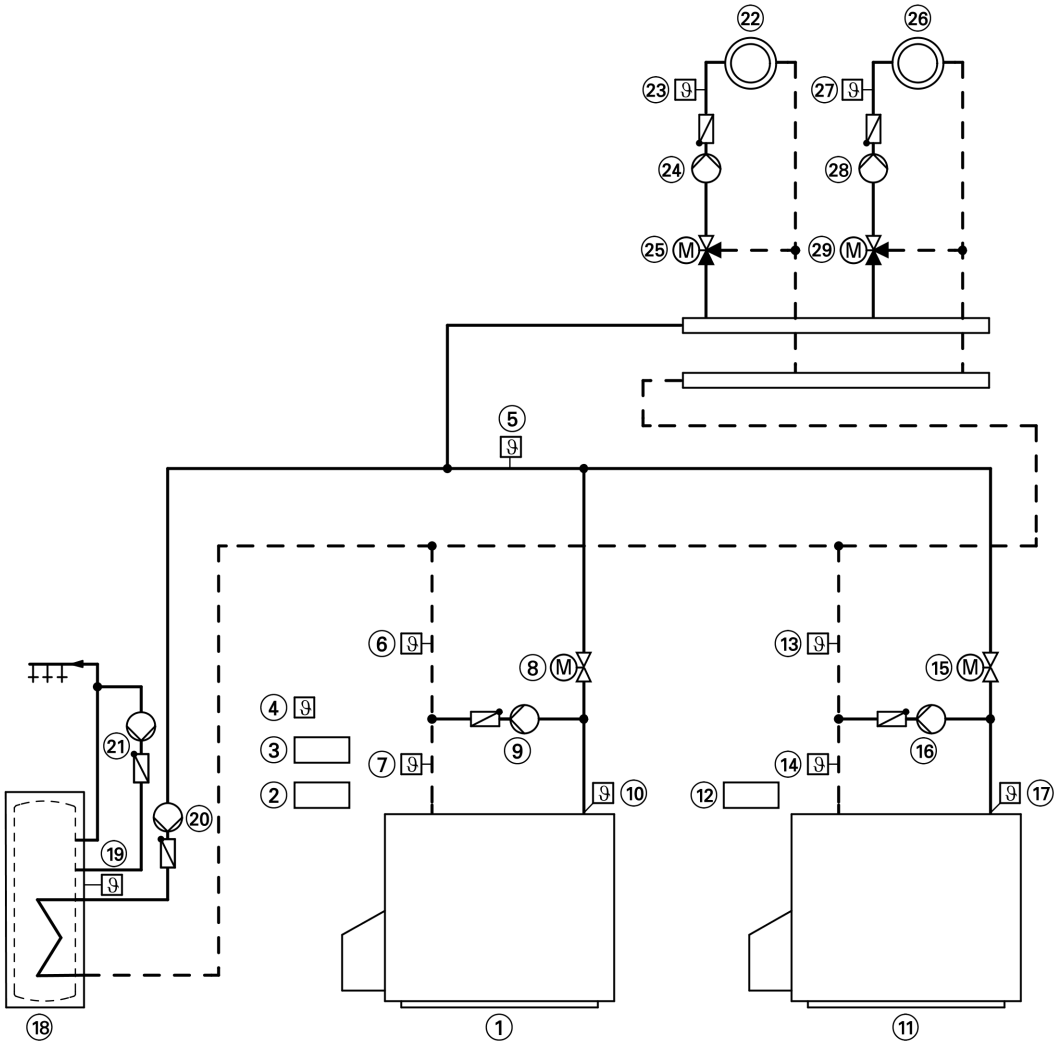
No additional protective measures are required on-site.
Size shunt pump BP ⑨ and ⑯ to approx. 30% of the total boiler throughput.

DHW heating
The DHW is heated up when the actual temperature falls below the DHW temperature selected at cylinder temperature sensor ⑲, subject to cylinder heating being enabled by the time switch. The flow temperature is raised to the set cylinder temperature + 20 K and circulation pump for cylinder heating ⑳ is started, if the boiler water temperature lies 7 K above the actual water temperature in the cylinder.
If the heating circuits are regulated via the Vitotronic 300-K ③, then the heating circuit pumps M2 ㉔ and M3 ㉘ are switched OFF in case of absolute priority, and mixers M2 ㉕ and M3 ㉙ are closed.

Heating operation
The flow temperature of heating circuits ㉒ and ㉖ can be operated, depending on the control unit used, in modulating mode subject to the outside temperature. The boiler water temperature is controlled 8 K higher than the set flow temperature.

Design information (cont.)

Hydraulic installation diagram



Equipment required

(for standard systems – equipment with additional system modules, see the technical datasheet folder)

Pos.	Description	Part no.
①	**Boiler I**	as per Viessmann pricelist
②	Vitotronic 100	Standard delivery of boiler, pos. 1
③	Vitotronic 300-K	as per Viessmann pricelist
④	Outside temperature sensor ATS	Standard delivery, control unit, pos. 3
⑤	Flow temperature sensor, common heating flow	
	– Contact temperature sensor or	Standard delivery, control unit, pos. 3
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑥	Temperature sensor T2	as per Viessmann pricelist
	– Contact temperature sensor or	7183 288
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑦	Temperature sensor T1	as per Viessmann pricelist
	– Contact temperature sensor or	7183 288
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑧	Motorised butterfly valve (runtime should be 120 s)	as per Vitoset pricelist
⑨	Shunt pump BP	on-site
⑩	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2

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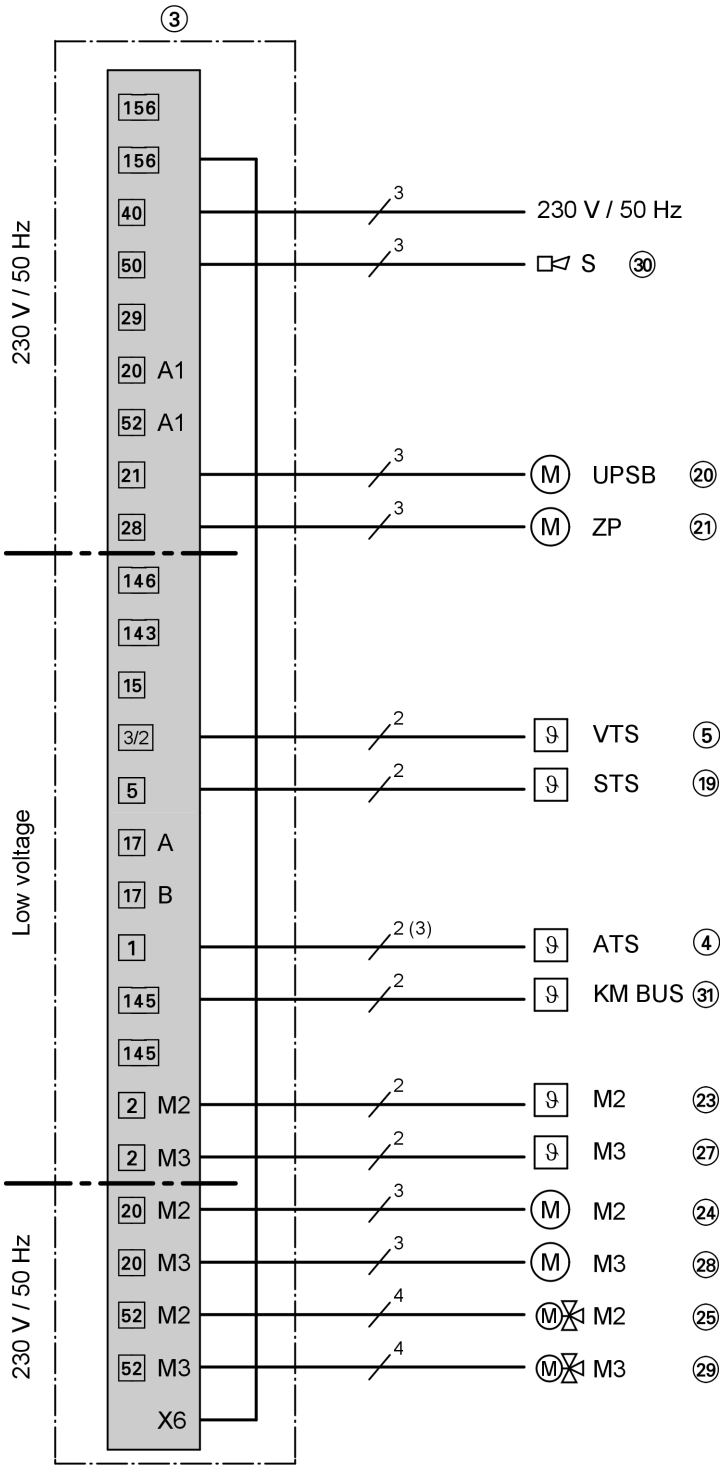
Design information (cont.)

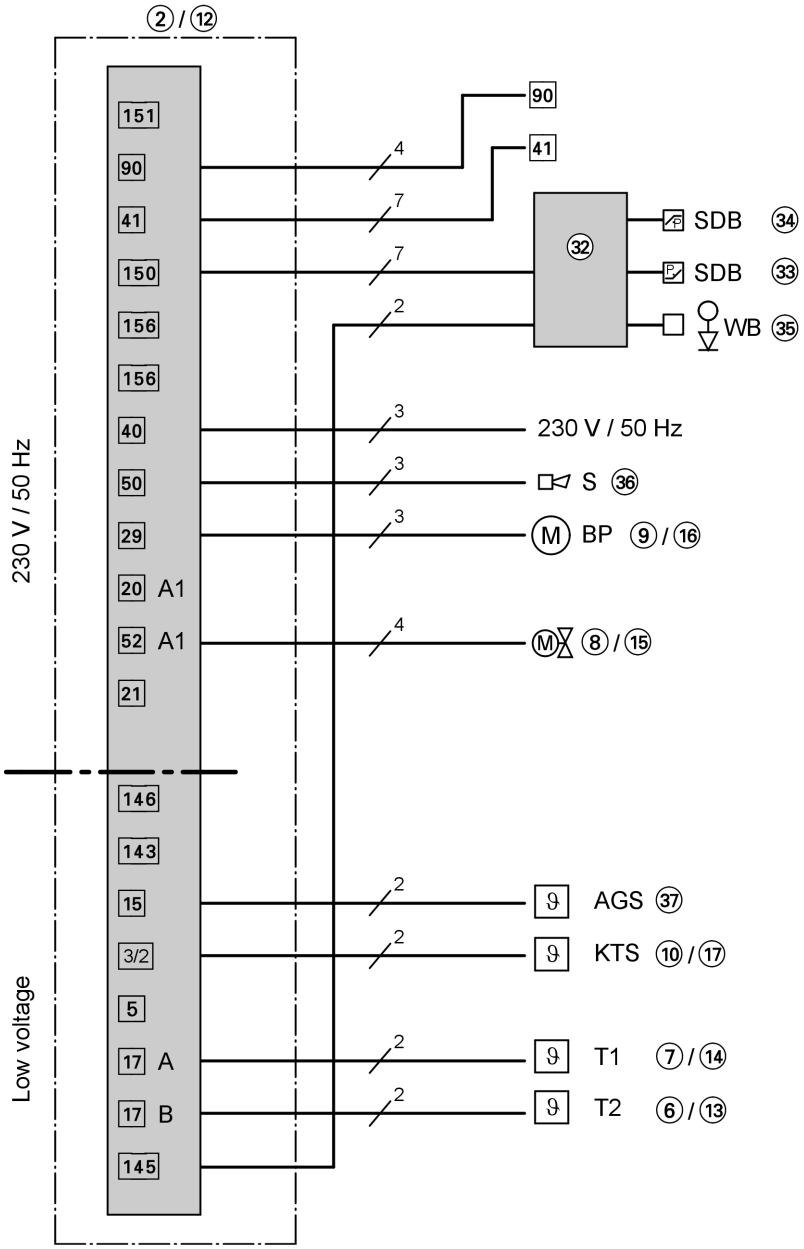
Pos.	Description	Part no.
⑪	**Boiler II**	as per Viessmann pricelist
⑫	Vitotronic 100	Standard delivery of boiler, pos. 1
⑬	Temperature sensor T2	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑭	Temperature sensor T1	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
⑮	Motorised butterfly valve	as per Vitoset pricelist
⑯	Shunt pump	on-site
⑰	Boiler water temperature sensor KTS	Standard delivery of Vitotronic, pos. 2
⑱	**DHW cylinder**	as per Viessmann pricelist
⑲	Cylinder temperature sensor STS	Standard delivery, control unit, pos. 3
⑳	Circulation pump for cylinder heating UPSB	as per Viessmann pricelist
㉑	DHW circulation pump ZP	on-site
㉒	**Heating circuit I**	on-site
㉓	Flow temperature sensor M2	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉔	Heating circuit pump M2	on-site
㉕	Mixer with motor M2	as per Viessmann pricelist
	– Extension kit for one heating circuit with mixer in conjunction with the Vitotronic 300-K and Vitotronic 200-H with flow temperature sensor and mixer motor DN 20-50, R½"-R1¼"	7450 650
	or	
	– Mixer motor for flanged mixer and plug-in connector	as per Viessmann pricelist
	and	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉖	**Heating circuit II**	on-site
㉗	Flow temperature sensor M3	as per Viessmann pricelist
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
㉘	Heating circuit pump M3	on-site
㉙	Mixer with motor M3	as per Viessmann pricelist
	– Extension kit for one heating circuit with mixer in conjunction with the Vitotronic 300-K and Vitotronic 200-H with flow temperature sensor and mixer motor DN 20-50, R½"-R1¼"	7450 650
	or	
	– Mixer motor for flanged mixer and plug-in connector	as per Viessmann pricelist
	and	
	– Contact temperature sensor	7183 288
	or	
	– Immersion temperature sensor (incl. sensor well)	7450 641
	Accessories	
㉚	Central fault messaging system S	on-site
㉛	Vitotrol 200/300 (KM BUS)	7450 017 / 7179 060
㉜	Plug-in adaptor for external safety equipment	7143 526
㉝	Minimum pressure limiter SDB	7224 458
㉞	Maximum pressure limiter SDB	7224 450
㉟	Water level limiter (low water indicator) WB	9529 050
㊱	Central fault messaging system S	on-site
㊲	Flue gas temperature sensor AGS	7450 630

Design information (cont.)

Electrical installation diagram



Design information (cont.)



Tested quality

CE designation according to current EC Directives.

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