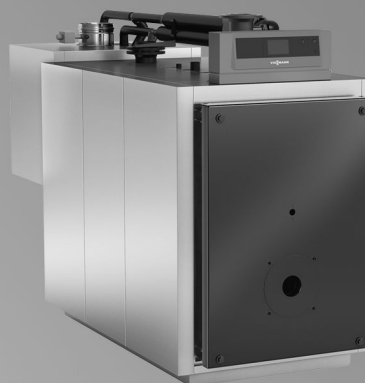


Technical guide



Vitoplex 200, SX2A



Vitoradial 300-T, VR3



Vitoplex 300, TX3A



Vitorond 200, VD2

Engineering and operating information for hot water boilers
up to 110 °C to EN 12828, up to 120 °C to EN 12953

VITOPLEX 200 Type SX2A

VITOPLEX 300 Type TX3A

VITORADIAL 300-T Type VR3

VITOROND 200 Type VD2

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Vitoplex 200, type SX2A, 90 to 560 kW

1.1 Product description

Vitoplex 200, 90 to 350 kW

In accordance with the Ecodesign Directive for Heating Appliances and Water Heaters (Dir. 2009/125/EC), Implementation Regulation VO (EU) No. 813/2013 and VO (EU) No. 814/2013, this boiler may not be sold and used within the EU for the purpose of generating space heating and domestic hot water. A sale is subject to the proviso of exclusive use for purposes not included in the regulations stated above.

Low temperature oil/gas boilers

For operation with modulating boiler water temperature

Permissible flow temperature (= safety temperature) up to 110 °C (up to 120 °C on request)

Permissible operating pressure 4 bar (0.4 MPa)

■ CE designation: CE-0085BQ0020

■ Economical and environmentally responsible thanks to modulating boiler water temperature

Standard seasonal efficiency [to DIN] for operation with fuel oil/natural gas: 89 % (H_s) [gross cv].

- Optional Vitotrans 300 stainless steel flue gas/water heat exchanger for higher standard seasonal efficiency [to DIN] through condensing technology
- Three-pass boiler with low combustion chamber loading for clean combustion with low emissions.
- Wide water galleries and large water capacity provide excellent natural circulation and reliable heat transfer.
- Long burner runtimes and less cycling, due to large water capacity, protect the environment.
- Boilers up to 300 kW don't require a low water indicator.
- Compact design for easy transport into boiler rooms and economical use of space – important for modernisation projects.
- Easy to use Vitotronic control unit with colour touchscreen.
- Integral WiFi for service interface.
- Economical and safe operation of the heating system through the Vitotronic control system with communication capability which, in conjunction with the Vitogate 300 (accessories), enables integration into a building management system.
- Vitocontrol control panel can be supplied on request.

1.2 Operating conditions with Vitotronic boiler control units and Therm-Control

		Requirements	
Operation with burner load		≥ 60 %	< 60 %
1.	Heating water flow rate	None	
2.	Boiler return temperature (minimum value)*1	None*2	
3.	Lower boiler water temperature	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 60 °C – Gas operation 65 °C
4.	2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5.	Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7.	Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

1.3 Operating conditions with Vitotronic boiler control units without Therm-Control

		Requirements		
Operation with burner load		< 40 %	> 40 % < 60 %	> 60 %
1.	Heating water flow rate	None	None	None
2.	Boiler return temperature (minimum value)	– Oil operation 55 °C – Gas operation 65 °C	– Oil operation 50 °C – Gas operation 60 °C	None
3.	Lower boiler water temperature	– Oil operation 60 °C – Gas operation 70 °C	– Oil operation 60 °C – Gas operation 65 °C	– Oil operation 50 °C – Gas operation 60 °C
4.	2-stage burner operation	No minimum load required	No minimum load required	Stage 1; 60 % of rated heating output
5.	Modulating burner operation	No minimum load required		Between 60 and 100 % of rated heating output
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down		
7.	Weekend setback	As per reduced mode		

Note

For water quality requirements, see page 41.

*1 For a corresponding sample application using the Therm-Control start-up system, see technical guide sample applications.

*2 No requirements only in conjunction with Therm-Control.

2.1 Product description

Low temperature oil/gas boilers

Three-pass boiler

For operation with modulating boiler water temperature

Permissible flow temperature (= safety temperature) up to 110 °C (up to 120 °C on request)

Permissible operating pressure 6 bar (0.6 MPa)

■ CE designation: CE-0085BQ0020

■ Economical and environmentally responsible thanks to modulating boiler water temperature

Standard seasonal efficiency [to DIN] for operation with fuel oil/ natural gas: 89 % (H_g) [gross cv].

■ Optional Vitotrans 300 stainless steel flue gas/water heat exchanger for higher standard seasonal efficiency [to DIN] through condensing technology

■ Three-pass boiler with low combustion chamber loading for clean combustion with low emissions.

■ Wide water galleries and large water capacity provide excellent natural circulation and reliable heat transfer.

■ Long burner runtimes and less cycling, due to large water capacity, protect the environment.

■ No low water indicator required for boilers up to 300 kW.

■ Compact design for easy transport into boiler rooms and economical use of space – important for modernisation projects.

■ Easy to use Vitotronic control unit with colour touchscreen.

■ Integral WiFi for service interface.

■ Economical and safe operation of the heating system through the Vitotronic control system with communication capability which, in conjunction with the Vitogate 300 (accessories), enables integration into a building management system.

■ Vitocontrol control panel can be supplied on request.

2.2 Operating conditions with Vitotronic boiler control units

		Requirements	
Operation with burner load		≥ 60 %	< 60 %
1.	Heating water flow rate	None	
2.	Boiler return temperature (minimum value)* ³	– Oil operation 40 °C – Gas operation 53 °C	– Oil operation 53 °C – Gas operation 58 °C
3.	Lower boiler water temperature	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 60 °C – Gas operation 65 °C
4.	2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5.	Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7.	Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

*³ For relevant sample applications, see technical guide sample applications.

3.1 Product description

Vitoplex 300, 90 to 300 kW

In accordance with the Ecodesign Directive for Heating Appliances and Water Heaters (Dir. 2009/125/EC), Implementing Regulation VO (EU) No. 813/2013 and VO (EU) No. 814/2013, this boiler may not be sold and used within the EU for the purpose of generating space heating and domestic hot water. A sale is subject to the proviso of exclusive use for purposes not included in the regulations stated above.

Low temperature oil/gas boilers

Three-pass boiler with multi layered convection heating surfaces

For operation with a modulating boiler water temperature

Permissible flow temperature (= safety temperature) up to 110 °C (up to 120 °C on request)

Permissible operating pressure 4 bar (0.4 MPa)

■ CE designation: CE-0085BT0478

■ Multi layered convection heating surfaces for high operational reliability and a long service life.

■ Standard seasonal efficiency [to DIN] for operation with fuel oil/natural gas: 90 % (H_s) [gross cv].

- Optional Vitotrans 300 stainless steel flue gas/water heat exchanger for higher standard seasonal efficiency [to DIN] through condensing technology.
- Three-pass boiler with low combustion chamber loading, resulting in clean combustion with low emissions.
- Wide water galleries and large water content provide excellent natural circulation and reliable heat transfer.
- The integral Therm-Control start-up system replaces the shunt pump or constant return temperature raising facility, saving installation time and costs.
- From 620 kW with walk-on boiler cover – for easier installation and maintenance.
- Easy to use Vitotronic control unit with colour touchscreen.
- Integral WiFi for service interface.
- The Vitotronic digital control system with communication capability ensures economical and safe operation of the heating system. Standardised LON BUS enables complete integration into building management systems.
- Vitocontrol control panel can be supplied on request.

3.2 Operating conditions with Vitotronic boiler control units and Therm-Control

		Requirements	
Operation with burner load		≥ 60 %	< 60 %
1.	Heating water flow rate	None	
2.	Boiler return temperature (minimum value)*1	None*2	
3.	Lower boiler water temperature	– Oil operation 40 °C – Gas operation 50 °C	– Oil operation 50 °C – Gas operation 60 °C
4.	2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5.	Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7.	Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

3.3 Operating conditions with Vitotronic boiler control units without Therm-Control

		Requirements		
Operation with burner load		< 40 %	> 40 % < 60 %	> 60 %
1.	Heating water flow rate	None	None	None
2.	Boiler return temperature (minimum value)*1	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 40 °C – Gas operation 50 °C	None
3.	Lower boiler water temperature	– Oil operation 55 °C – Gas operation 65 °C	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 40 °C – Gas operation 50 °C
4.	2-stage burner operation	No minimum load required	No minimum load required	Stage 1; 60 % of rated heating output
5.	Modulating burner operation	No minimum load required		Between 60 and 100 % of rated heating output
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down		
7.	Weekend setback	As per reduced mode		

Note

For water quality requirements, see page 41.

*1 For a corresponding sample application using the Therm-Control start-up system, see technical guide sample applications.

*2 No requirements only in conjunction with Therm-Control.

4.1 Product description

Low temperature oil/gas boilers

Three-pass boiler with multi layered convection heating surfaces

For operation with a modulating boiler water temperature

Permissible flow temperature (= safety temperature) up to 110 °C (up to 120 °C on request)

Permissible operating pressure 6 bar (0.6 MPa)

■ CE designation: CE-0085BT0478

■ Multi layered convection heating surfaces for high operational reliability and a long service life.

■ Standard seasonal efficiency [to DIN] for operation with fuel oil/ natural gas: 90 % (H_g) [gross cv].

■ Optional Vitotrans 300 stainless steel flue gas/water heat exchanger for higher standard seasonal efficiency [to DIN] through condensing technology.

■ Three-pass boiler with low combustion chamber loading, resulting in clean combustion with low emissions.

■ Wide water galleries and large water capacity provide excellent natural circulation and reliable heat transfer.

■ The integral Therm-Control start-up system replaces the shunt pump or constant return temperature raising, saving installation time and costs.

■ From 620 kW with walk-on boiler cover – for easier installation and maintenance.

■ Easy to use Vitotronic control unit with colour touchscreen.

■ Integral WiFi for service interface.

■ The Vitotronic digital control system with communication capability ensures economical and safe operation of the heating system. Standardised LON bus enables complete integration into building management systems.

■ Vitocontrol control panel can be supplied on request.

4.2 Operating conditions with Vitotronic boiler control units and Therm-Control

		Requirements	
Operation with burner load		≥ 60 %	< 60 %
1.	Heating water flow rate	None	
2.	Boiler return temperature (minimum value) ^{*1}	None ^{*2}	
3.	Lower boiler water temperature	– Oil operation 40 °C – Gas operation 50 °C	– Oil operation 50 °C – Gas operation 60 °C
4.	2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5.	Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7.	Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

4.3 Operating conditions with Vitotronic boiler control units without Therm-Control

		Requirements		
Operation with burner load		< 40 %	> 40 % < 60 %	> 60 %
1.	Heating water flow rate	None	None	None
2.	Boiler return temperature (minimum value)	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 45 °C – Gas operation 55 °C	None
3.	Lower boiler water temperature	– Oil operation 55 °C – Gas operation 65 °C	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 40 °C – Gas operation 50 °C
4.	2-stage burner operation	No minimum load required	No minimum load required	Stage 1; 60 % of rated heating output
5.	Modulating burner operation	No minimum load required		Between 60 and 100 % of rated heating output
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down		
7.	Weekend setback	As per reduced mode		

Note

For water quality requirements, see page 41.

^{*1} For a corresponding sample application using the Therm-Control start-up system, see technical guide sample applications.

^{*2} No requirements only in conjunction with Therm-Control.

5.1 Product description

Low temperature boiler with oil/gas condensing heat exchanger
Three-pass boiler with multi layered convection heating surfaces and
Inox-Radial spiral heat exchanger installed downstream.

For operation with modulating boiler water temperature.

Permissible flow temperature (= safety temperature) up to 110 °C

Permissible operating pressure 4 bar (0.4 MPa)

■ CE designation: CE-0035BU104

■ Standard seasonal efficiency [to DIN] for operation with fuel oil:
97 % (H_s) [gross cv].

■ Inox-Radial heat exchanger for condensing hot gases, matched to
the compact boiler.

■ Complete with heat exchanger pipework and pump, matched to
the respective heating output of the boiler.

■ Long burner runtimes and fewer cycle intervals, due to large water
content, protect the environment.

■ Economical and safe operation of the heating system through the
Vitotronic control system with communication capability which, in
conjunction with the Vitogate 300 (accessories), enables integra-
tion into a building management system.

■ Integral Therm-Control start-up system for easy hydraulic connec-
tion – no shunt pump or return temperature raising facility are
required.

■ No low water indicator required, saving additional costs.

■ Compact design for easy transportation and low build height –
important for modernisation projects.

■ Easy to use Vitotronic control unit with colour touchscreen.

■ Integral WiFi for service interface.

■ Vitocontrol control panel can be supplied on request.

5.2 Operating conditions with Vitotronic boiler control units and Therm-Control

Operation with burner load	Requirements	
	≥ 60 %	< 60 %
1. Heating water flow rate	None	
2. Boiler return temperature (mini- mum value)*1	None*2	
3. Lower boiler water temperature	– Oil operation 40 °C – Gas operation 50 °C	– Oil operation 50 °C – Gas operation 60 °C
4. 2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5. Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6. Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7. Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

*1 For a corresponding sample application using the Therm-Control start-up system, see technical guide sample applications.

*2 No requirements only in conjunction with Therm-Control.

6.1 Product description

Low temperature oil/gas boilers

Three-pass boiler in cast sectional design

For operation with modulating boiler water temperature

Permissible flow temperature (= safety temperature) up to 110 °C

Permissible operating pressure 6 bar (0.6 MPa)

■ CE designation: CE-0085AS0002

■ Economical and environmentally responsible due to modulating boiler water temperature.

Standard seasonal efficiency [to DIN] for operation with fuel oil/natural gas: 88 % (H_s) [gross cv].

■ Three-pass boiler for clean combustion with low emissions.

■ Eutectopex heating surface for high operational reliability and a long service life. The homogeneous structure of the special eutectic cast iron provides an even heat flux and prevents stress fractures.

■ Fastfix installation system for rapid and straightforward installation.

■ Easy handling even in tight spaces thanks to sectional design and low weight of individual sections.

■ Easy to use Vitotronic control unit with colour touchscreen.

■ Integral WiFi for service interface.

■ Fast and straightforward assembly of individual cast sections due to double groove system with resilient seals for permanent hot gas tightness.

■ The Vitotronic digital control system with communication capability ensures economical and safe operation of the heating system.

Standardised LON bus enables complete integration into building management systems.

■ Vitocontrol control panel can be supplied on request.

6.2 Operating conditions with Vitotronic boiler control units

		Requirements	
Operation with burner load		≥ 60 %	< 60 %
1.	Heating water flow rate	30 % at rated heating output	
2.	Boiler return temperature (minimum value)*3	– Oil operation 40 °C – Gas operation 53 °C	– Oil operation 53 °C – Gas operation 53 °C
3.	Lower boiler water temperature	– Oil operation 50 °C – Gas operation 60 °C	– Oil operation 60 °C – Gas operation 65 °C
4.	2-stage burner operation	Stage 1; 60 % of rated heating output	No minimum load required
5.	Modulating burner operation	Between 60 and 100 % of rated heating output	No minimum load required
6.	Reduced mode	Single boiler systems and lead boiler of multi boiler systems – Operation with lower boiler water temperature Lag boilers of multi boiler systems – Can be shut down	
7.	Weekend setback	As per reduced mode	

Note

For water quality requirements, see page 41.

*3 For relevant sample applications, see technical guide sample applications.

7.1 Accessories for heating circuits

Divicon heating circuit distributor

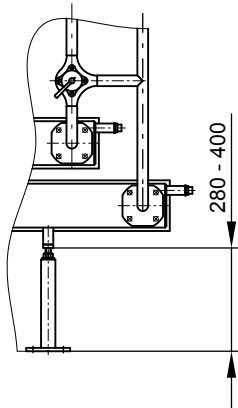
For boilers up to 335 kW

Specification

Design and function

- 1 to 4 heating circuits can be connected to the flow distributor and return collector.
- Free connections are closed with blank flanges (part of standard delivery).
- The flow distributor and return collector can optionally be positioned on the r.h. or the l.h. side of the boiler.
- Standard delivery includes thermal insulation for the Divicon heating circuit distributor.

Divicon heating circuit distributor, installed adjacent to the boiler



For

- Vitoplex 200, 90 to 270 kW
- Vitoplex 300, 90 to 300 kW
- Vitoradial 300-T, 101 to 335 kW
- Vitocrossal 200/300, 87 to 314 kW

The Divicon heating circuit distributor can also be sited near the boiler (as an alternative to wall mounting) by using separate adjustable feet and on-site pipe connections.

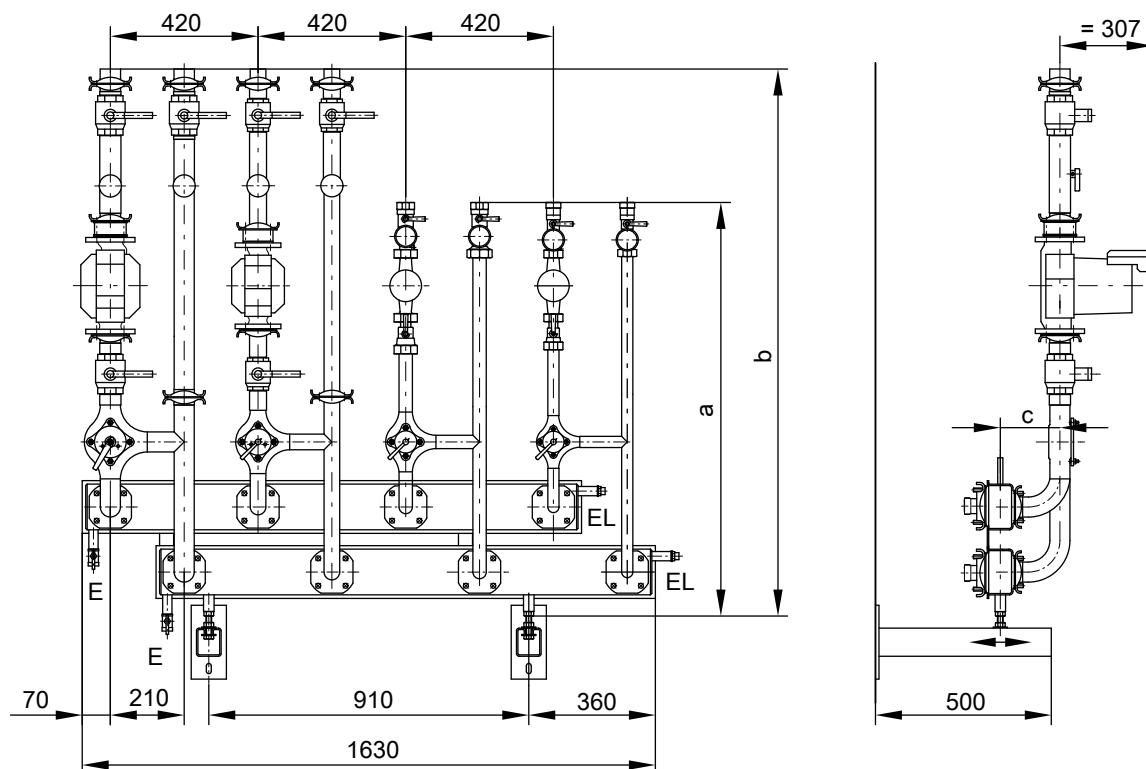
Installation accessories (cont.)

Divicon heating circuit distributor, wall mounted

For

- Vitoplex 200, 90 to 270 kW
- Vitoplex 300, 90 to 300 kW

- Vitoradial 300-T, 101 to 335 kW
- Vitocrossal 200/300, 87 to 314 kW



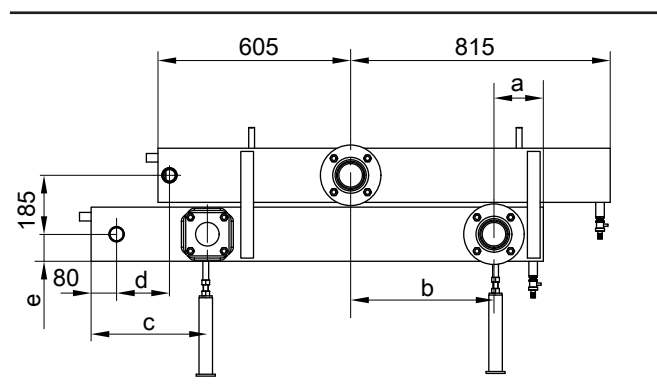
E Drain
EL Air vent valve

Dimensions

Rated boiler heating output

kW	90-201	235-335
a (DN 25 + DN 32)	1186	1196
b (DN 40 + DN 50)	1586	1606
c	170	173

Connections for boiler and an additional consumer (e.g. DHW cylinder)



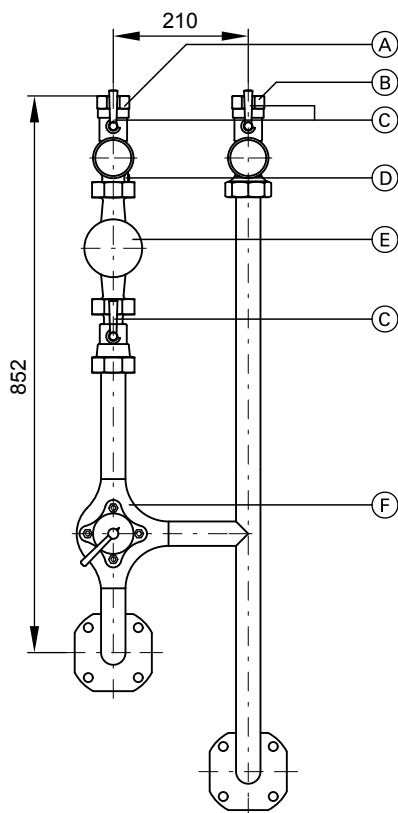
	DN 80	DN 65
a	155	205
b	450	400
c	365	415
d	166	210
e	85	75

2 pipe nipples G 1½ (male thread) at the back of the flow distributor and return collector.

Installation accessories (cont.)

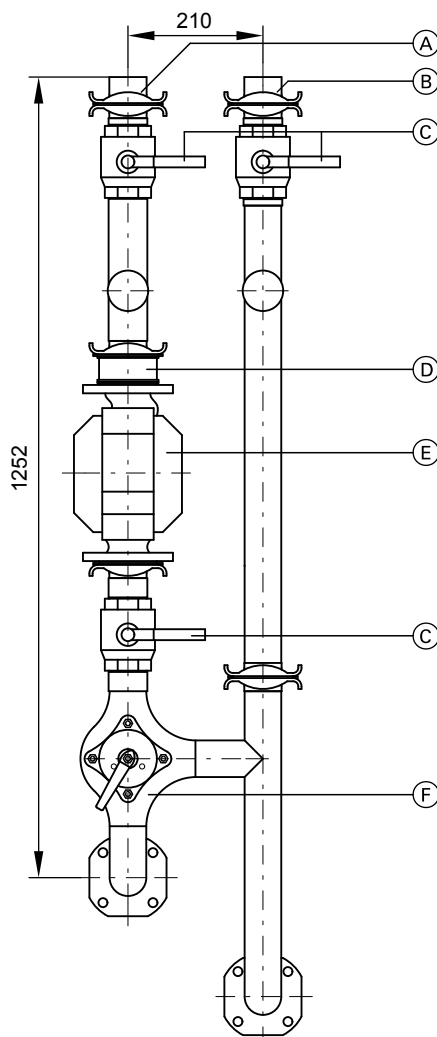
Heating circuit connections

Heating circuit connection DN 25 and DN 32 (shown with mixer)



- Ⓐ Heating flow
- Ⓑ Heating return
- Ⓒ Ball valve
- Ⓓ Check valve
- Ⓔ Circulation pump
- Ⓕ 3-way mixer

Heating circuit connection DN 40 and DN 50 (shown with mixer)



- Ⓐ Heating flow
- Ⓑ Heating return
- Ⓒ Ball valve
- Ⓓ Check valve
- Ⓔ Circulation pump
- Ⓕ 3-way mixer

Heating output which can be connected to the heating circuit connections at ($\Delta T = 20 \text{ K}$)

Heating circuit connection	kW
DN 25	40
DN 32	70
DN 40	140
DN 50	170

Wilo heating circuit pumps, differential pressure-dependent

Can be changed over from proportional pressure to constant pressure

Motor protection

Integral motor protection in terminal boxes for all differential pressure settings. Contact breaking capacity for central fault message 1 A, 250 V~.

5822426

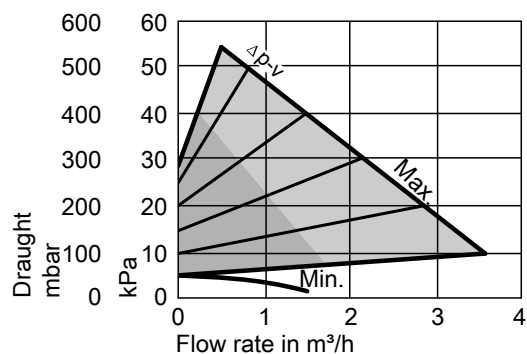
Installation accessories (cont.)

230 V~, 50 Hz

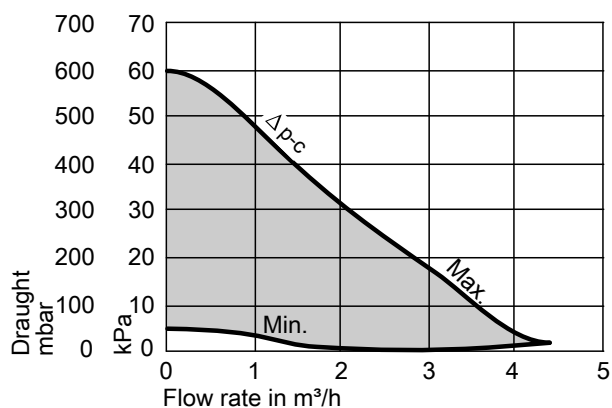
Heating circuit connection			DN	25	32	40	50
Pump type				Stratos PICO 25/1-6	Stratos PICO 30/1-6	Stratos 40/1-8	Stratos 50/1-8
Speed range			n min ⁻¹	1200-4230	1200-4230	1400-4800	1400-4800
Power consumption			P _i W	3-40	3-40	12-310	12-310
Current			I A	max. 0.35	max. 0.35	0.22-1.37	0.22-1.37

Head

Heating circuit pump DN 25 and DN 32



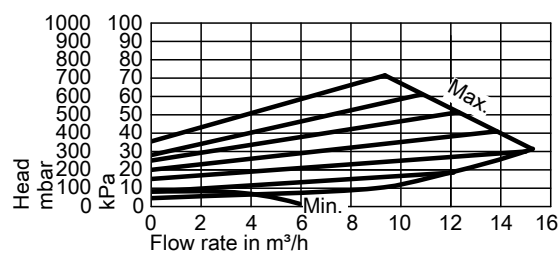
Proportional pressure



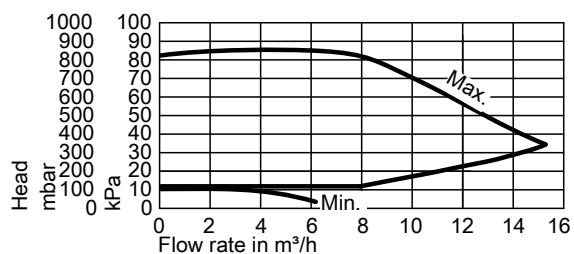
Constant pressure

Head

Heating circuit pump DN 40 and DN 50



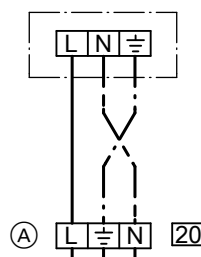
Proportional pressure



Constant pressure

Electrical connection

Heating circuit pump DN 25 and DN 32



(A) Connecting cable with plug-in connection

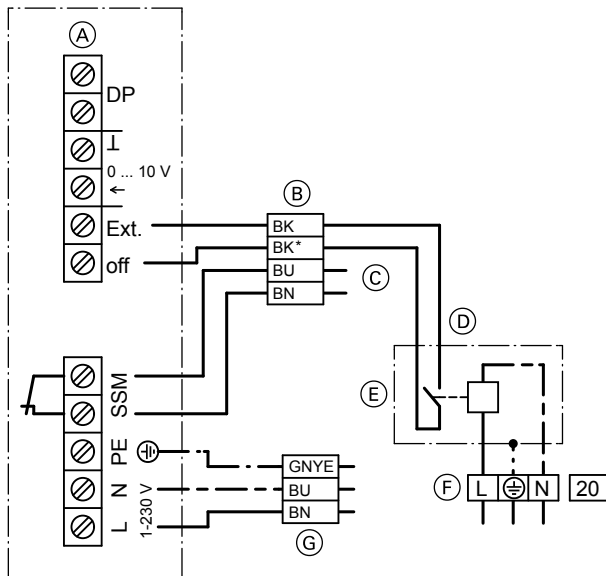
Installation accessories (cont.)

Electrical connection

Heating circuit pump DN 40 and DN 50

Colour coding to DIN IEC 60757

BK	Black
BK*	Black wire with imprint
BN	Brown
BU	Blue
GNYE	Green/yellow



- (A) Terminals in the pump
- (B) 4-core cable for starting/stopping the pump and for pump fault message
- (C) Central fault message facility
- (D) External starting/stopping of the pump
- (E) Connection via the contactor in the control panel or contactor relay, part no. 7814681
- (F) Plug [20] for connection to the Vitotronic
- (G) 3-core cable for power supply to the pump

Grundfos heating circuit pumps, differential pressure-dependent

(Adjustable from proportional pressure to constant pressure)

Motor protection

The motor and the electrical equipment are protected against thermal overload. No external motor protection is required.

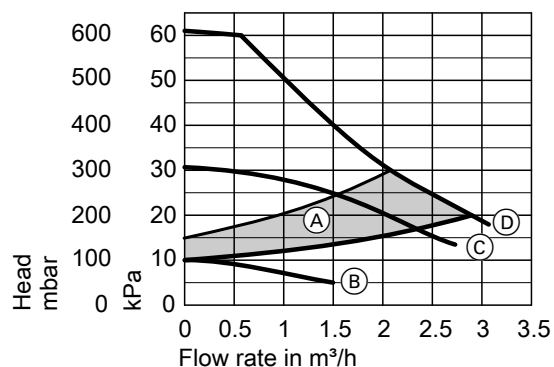
230 V~, 50 Hz

Heating circuit connection		DN	25	32	40	50
Pump type			Alpha 2 25-60	Alpha 2 32-60	MAGNA UPE 40-120	MAGNA UPE 50-60
Speed range		n min ⁻¹	—	—	900-3580	680-1970
Power consumption		P ₁ W	5-45	5-45	25-445	32-335
Current		I A	0.05-0.38	0.05-0.38	0.16-2.0	0.2-1.51

Installation accessories (cont.)

Head

Heating circuit pump DN 25 and DN 32



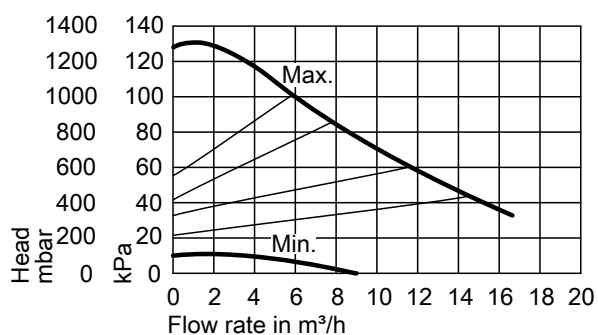
(A) Operating range in differential pressure-dependent mode

Operation in stages

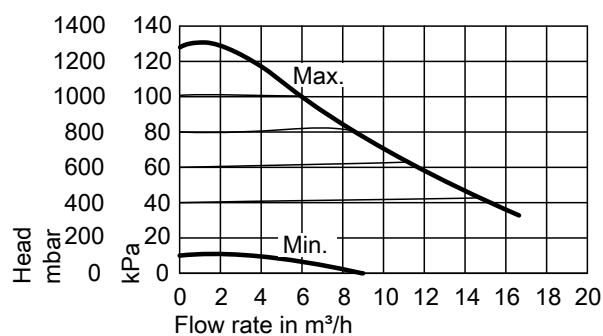
- (B) Stage 1
- (C) Stage 2
- (D) Stage 3

Head

Heating circuit pump DN 40



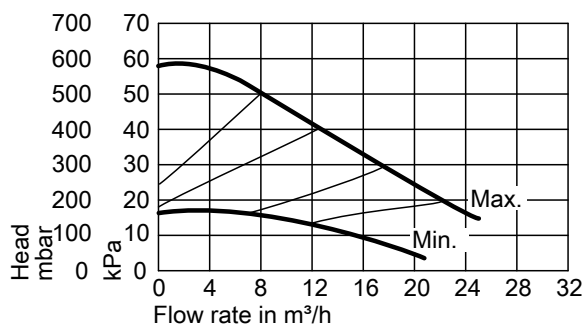
Proportional pressure



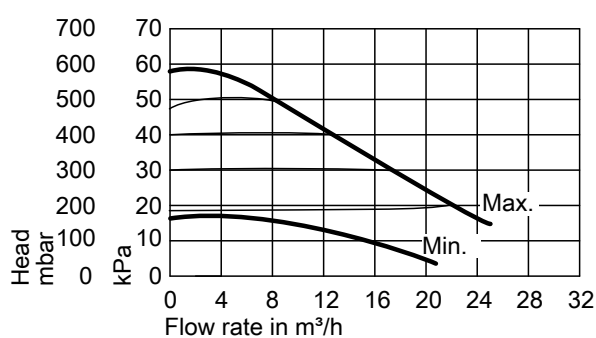
Constant pressure

Head

Heating circuit pump DN 50



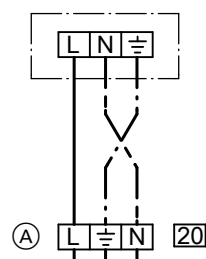
Proportional pressure



Constant pressure

Electrical connection

Heating circuit pump DN 25 and DN 32



(A) Connecting cable with plug-in connection

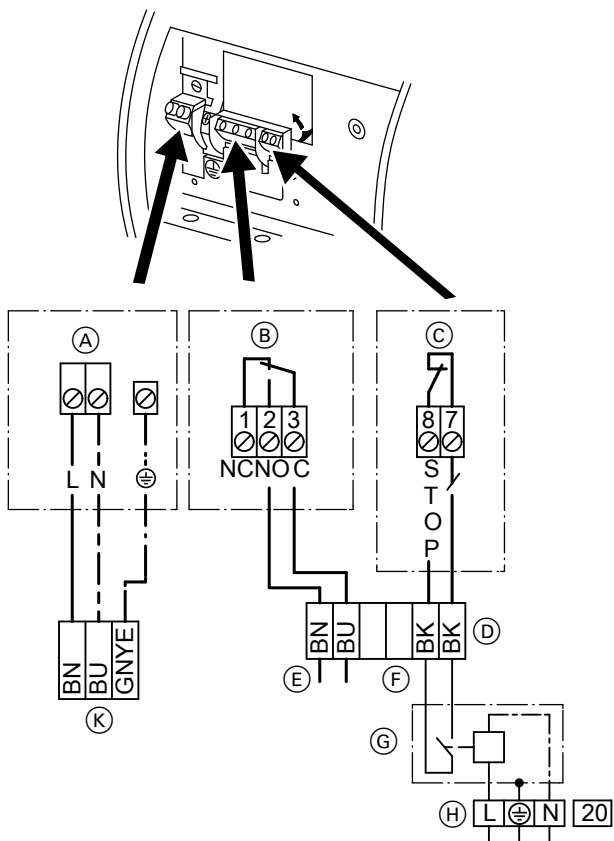
Installation accessories (cont.)

Electrical connection

Heating circuit pump DN 40 and DN 50

Colour coding to DIN IEC 60757

BK	Black
BK*	Black wire with imprint
BN	Brown
BU	Blue
GNYE	Green/yellow



- (A) Power supply
- (B) Signal output
- (C) ON/OFF
- (D) Cable for starting/stopping the pump and for pump fault message (4-core)
- (E) Central fault message facility
- (F) External starting/stopping of the pump
- (G) Connection via the contactor in the control panel or contactor relay, part no. 7814681
- (H) Plug [20] for connection to the Vitotronic
- (K) 3-core cable for power supply to the pump

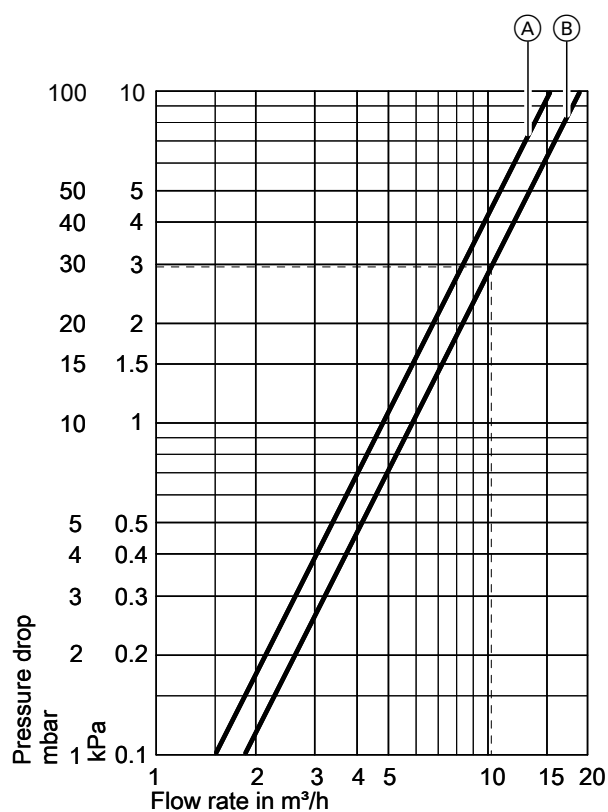
Residual head

Residual head of the heating circuits

Deduct the pressure drop of the mixer and the boiler circuit (boiler, pipework, flow distributor and return collector) from the pump head. Take the total water volume of all heating circuits into account in the boiler circuit.

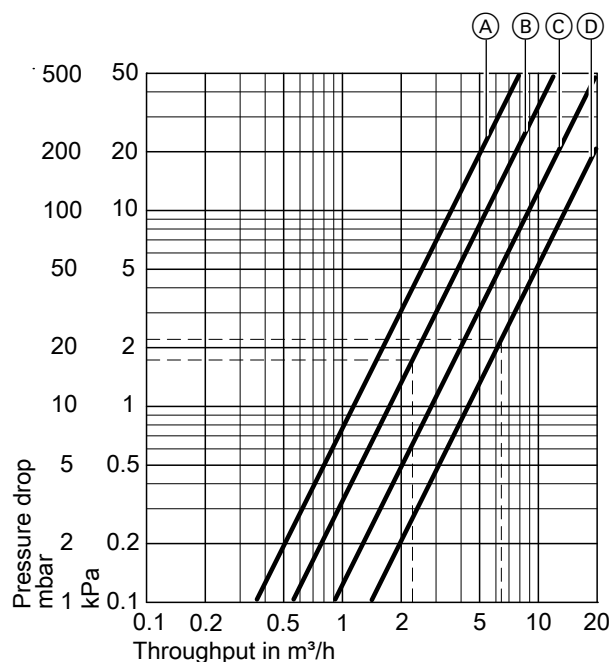
Boiler circuit pressure drop

(Boiler + pipework + flow distributor and return collector + heating circuit connection except mixer)



- (A) DN 65: Vitoplex 200/300, 90 to 200 kW
(B) DN 80: Vitoplex 200/300, 235 to 300 kW

Mixer pressure drop



- (A) DN 25
(B) DN 32
(C) DN 40
(D) DN 50

Note

For the pressure drop of the pipework between the boiler and distributor, 6 bends (90°) and 5 m pipe length are factored in. If significantly different lengths and fittings are used on-site, calculate and factor in the additional pressure drop levels.

Example for calculating the residual head

Heating system with Divicon heating circuit distributor DN 80

Heating circuit	Heating circuit connection	Heating output	Flow rate
1	DN 25, without mixer	35 kW	1.5 m³/h
2	DN 32, with mixer	60 kW	2.5 m³/h
3	DN 50, with mixer	150 kW	6.5 m³/h
			Total flow rate
			10.5 m³/h

Boiler circuit pressure drop

Boiler + pipework + flow distributor and return collector + heating circuit connection (except mixer) (see diagram) = 30 mbar (3 kPa)

Mixer pressure drop

(See diagram)

Mixer	DN	32	50
Pressure drop	mbar	18	22
	kPa	1.8	2.2

Total pressure drop of boiler circuit and heating circuit connection

Heating circuit 1: 30 mbar (3 kPa)

Heating circuit 2: 30 mbar (3 kPa) + 18 mbar (1.8 kPa) = 48 mbar (4.8 kPa)

Heating circuit 3: 30 mbar (3 kPa) + 22 mbar (2.2 kPa) = 52 mbar (5.2 kPa)

Installation accessories (cont.)

Residual head of the individual heating circuits

With Wilo circulation pump

Heating circuit		1	2	3
Head of the circulation pump (adjustable)	mbar kPa	100 to 400 10 to 40	100 to 280 10 to 28	100 to 760 10 to 76
Pressure drop, boiler circuit + heating circuit connection	mbar kPa	30 3	48 4.8	52 5.2
Residual head (adjustable)	mbar kPa	70 to 370 7 to 37	52 to 232 5.2 to 23.2	48 to 708 4.8 to 70.8

With Grundfos circulation pump

Heating circuit		1	2	3
Head of the circulation pump (adjustable)	mbar kPa	100 to 400 10 to 40	100 to 260 10 to 26	150 to 520 15 to 52
Pressure drop, boiler circuit + heating circuit connection	mbar kPa	30 3	48 4.8	52 5.2
Residual head (adjustable)	mbar kPa	70 to 370 7 to 37	52 to 212 5.2 to 21.2	98 to 468 9.8 to 46.8

Vitocontrol control panel

(On request)

Control panel for regulating the heating system in conjunction with a Divicon heating circuit distributor

All components required for closed-loop and open-loop control and for monitoring the heating system are installed in the control panel.

The system is designed to allow further equipment to be installed alongside the control unit for 1 to 4 boilers; e.g. Vitotronic 300-K (type MW1S), Vitotronic 200-H (type HK1S or HK3S), pump controllers, measuring devices, time switches, etc.

Design information

8.1 Delivery, handling and siting

Delivery

We deliver to site on a vehicle with crane facility and will unload the equipment, provided there are no exceptional complications.

Boilers with a shipping weight in excess of 10 t require a special crane on site for unloading.

Handling and siting

The boiler and flue gas/water heat exchanger are equipped with a sufficient number of lifting eyes, to which lifting gear may be attached. The base rails running along the length of the appliance facilitate handling.

Viessmann experts can undertake the handling and siting on prepared foundations upon request (chargeable option).

The boilers are mounted on base rails running along the length of the boiler body. They can be positioned on a concrete base without special foundations. Observe the max. installed burner height.

However, to facilitate the cleaning of the installation room it is advisable to position the boiler on a plinth.

For recommended minimum clearances to walls for installation and maintenance work, see the datasheet of the relevant boiler.

Anti-vibration boiler supports may be used if structure-borne noise attenuation measures are required. With the Vitoplex up to 560 kW and Vitoradial 300-T up to 263 kW there is also the option to insert adjustable anti-vibration feet into the base rails.

Installation location

General installation room requirements

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

In rooms where air contamination through **halogenated hydrocarbons** can occur, install the boiler and the Vitotrans 300 flue gas/water heat exchanger only if adequate measures can be taken to provide a supply of uncontaminated combustion air.

Damage due to failure to observe the information is excluded from our warranty.

If in doubt, please consult us.

Requirements of the Muster-Feuerungsverordnung [Sample Combustion Ordinance - Germany]

The installation room must meet the standards laid down by the "Muster Feuerungsverordnung". Observe the building regulations and combustion equipment ordinances of the relevant country of installation.

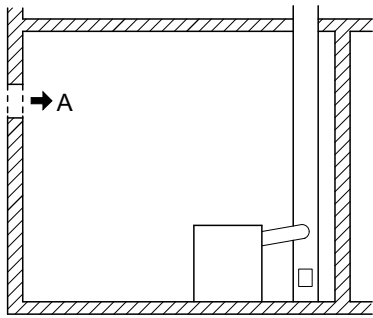
Combustion air supply

For open flue combustion equipment > 35 kW, the combustion air supply is deemed to have been verified if the equipment is located in areas that provide a suitable vent or pipe leading outdoors.

At 35 kW rated heating output, the cross-section of the aperture must be at least 150 cm². For every kilowatt rated heating output in excess of 35 kW, the aperture must be 2 cm² larger than stated above.

Design information (cont.)

Pipes must be sized to provide equivalent flow rates. The required cross-section may be split between no more than 2 apertures or pipes.



$$A = 150 \text{ cm}^2 + 2 \text{ cm}^2/\text{kW} \times (\Sigma \dot{Q}_n - 50 \text{ kW})$$

$\Sigma \dot{Q}_n$ Sum of all rated heating outputs in kW

Use safety measures to ensure that the combustion equipment can only be operated when the aperture is open. In general, never close or obstruct combustion air apertures and lines. The required cross-section must not be constricted by any closure or grille.

Emergency stop switch

It must be possible to switch off the burner, fuel supply equipment and combustion equipment control units at any time by means of an emergency stop switch located outside the installation room.

Load-bearing boiler cover

From 620 kW the Vitoplex is supplied with a fitted load-bearing boiler cover.

8.2 Sizing the system

Flow temperatures

To minimise distribution losses we recommend sizing the heat distribution system and the DHW heating in line with a maximum flow temperature of 70 °C.

Safety temperatures

Viessmann boilers comply with EN 303 and DIN 4702, and all are CE-designated. They are suitable for installation in sealed unvented heating systems to EN 12828.

Provide a sign next to the emergency stop switch with the inscription "EMERGENCY STOP SWITCH - Combustion".

Safety precautions

For gas combustion equipment installed in rooms, fuel lines **must** be equipped with the following safety equipment immediately upstream of the gas combustion equipment:

- In the event of an external thermal load in excess of 100 °C, the fuel supply must automatically shut off.
- Up to a temperature of 650 °C and over a period of at least 30 min, no more than 30 l/h (measured as air flow rate) must be able to flow through or out of the fuel line.

Keep combustion equipment away from combustible materials and fitted furniture or provide screening. Temperatures may not exceed 85 °C when the combustion equipment is delivering the rated heating output. Alternatively, maintain a minimum clearance of 40 cm.

Heating on board ships

Some special conditions must be observed if boilers are used to heat accommodation on board ships:

- On ships, the integrated products are subjected to substantial loads.
- Observe any special requirements specified by insurance underwriters – ship classification companies.
- The boilers cannot be used for every kind of application.

To clarify details, please contact our sales consultant.

On boilers supplied with a boiler control unit, the max. boiler water temperature is limited to 85 °C. The flow temperature may be increased by adjusting the temperature controller.

- Permissible flow temperatures (= safety temperatures):
Up to 110 °C
To EN 12953: up to 120 °C

Note

At flow temperatures up to 120 °C, the boiler requires an individual test certification and has to be tested annually.

- Maximum possible flow temperature:
Approx. 15 K below the safety temperature
- High limit safety cut-out of the boiler control unit:
Delivered condition 110 °C
Can be changed to 100 °C

Selection of rated heating output

Select boilers according to the required heat load. The efficiency of low temperature and condensing boilers is stable across the boiler load range.

Therefore, the heating output for low temperature boilers, condensing boilers and multi boiler systems may be higher than the calculated heat load of the building in question.

Requirements regarding heat load

Weather-compensated control units meet the requirements of EN 12831 regarding heat load calculation. To reduce the heat-up load, the night setback is reduced when outside temperatures are low. To shorten the heat-up time after a setback phase the flow temperature is raised for a limited time.

Pump controlled pressure maintaining systems

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

Boiler output in kW	Diaphragm expansion vessel Capacity in litres
Up to 300	50
Up to 500	80
Up to 1000	140
Up to 2000	300
Up to 5000	800
Up to 10000	1600

This reduces the frequency and level of pressure fluctuations. This in turn contributes significantly to improved operational reliability and a longer service life of the system components.

Failure to observe these recommendations may result in damage to the boiler or to other system components.

Only use pump controlled pressure maintaining systems which are sealed unvented to prevent corrosion and are protected against oxygen ingress into the heating water. Otherwise damage to the system through oxygen corrosion can result.

Pump controlled pressure maintaining systems with atmospheric deaeration through cyclical pressure release activate a central post-ventilation of the heating system. However, they do not provide oxygen removal in the sense of corrosion protection as described in VDI 2035 Part 2.

8.3 Water connection

Heating connections

Existing systems

Flush the existing heating system thoroughly to remove dirt and sludge. Do this before connecting the boiler to the system. Otherwise, dirt and sludge residues may be deposited in the boiler and could lead to local overheating, noise and corrosion. Boiler damage caused by such deposits is excluded from our warranty. Install dirt traps where necessary.

Connections on the heating water side

Connect all heat consumers and heating circuits to the boiler flow and boiler return connectors. Never make any connections to the safety flow or to other connections.

We recommend the installation of shut-off valves in the heating flow and heating return lines. This means that subsequent maintenance work on the boiler or heating circuits will not require the water to be drained from the entire system.

Heating circuits

For heating systems with plastic pipes, we recommend the use of impermeable pipes to prevent the diffusion of oxygen through the pipe walls. In heating systems with plastic pipes that are permeable to oxygen (DIN 4726), provide system separation. We supply a separate heat exchanger for this purpose.

Underfloor heating systems and heating circuits with a very large water content should also be connected via mixers if low temperature and ultra-low temperature boilers are used. They are controlled via the Vitotronic 300 (type GW2B), the Vitotronic 300-K or with separate control units, e.g. the Vitotronic 200-H.

Straightforward installation

For safety temperatures up to 110 °C, Vitoplex boilers do not require a costly and hard-to-install intermediate flow piece for mounting safety equipment.

All connections required for the various pieces of equipment, e.g. for water level or pressure limiters, are provided on the boiler.

Boiler circuit and shunt pumps

The following boilers do not require boiler circuit pumps for forced circulation

- Vitoplex boilers
- Vitoradial 300-T

The following boilers do not require a return temperature raising facility

- Vitoplex 300 from 90 to 2000 kW
- Vitoplex 200 from 90 to 560 kW with Therm-Control
- Vitoradial 300-T

For more detailed information, see the sample applications.

For those boilers or application scenarios where return temperature raising is required, the use of a shunt pump has proven beneficial. Due to their large water content and low internal pressure drop, Vitoplex boilers only require one pump for raising the return temperature (shunt pump). Size the pump for approx. 30 % of the total pump rate.

The shunt pump will only be activated when the actual temperature falls below the minimum return temperature.

Resulting benefits are:

- Smaller pump, i.e. lower investment outlay
- Lower power consumption of the pump
- The shunt pump runs for shorter periods
- Reduced electricity bills

Design information (cont.)

Required safety equipment

ADG	Sealed expansion vessel ^{*4}
AV1	Shut-off valve
AV2	Shut-off valve with protection against unintentional closing, e.g. cap valve
E	Drain
EST	Flash trap
MA	Pressure gauge
SDB1	Safety pressure limiter max.
SDB2	Safety pressure limiter min. Above 300 kW: Safety pressure limiter max.
SIV	Safety valve
SL	Safety expansion line
STB	High limit safety cut-out
STB2	High limit safety cut-out ^{*5}
TH	Thermometer
TR	Temperature controller
WB	Water level limiter/minimum pressure limiter

Extended key

HK	Heating circuit
HKP	Heating circuit pump
HR	Heating water return
HV	Heating water flow

In the diagram safety equipment to EN 12828, the replacement set for the flash trap is shown with an additional high limit safety cut-out (STB) and safety pressure limiter (SDB1).

General information

Note

The stated heating output limits refer to a system temperature of 80/60 °C.

Low water indicator

EN 12828 specifies that boilers > 300 kW must be equipped with a low water indicator. In the event of water shortage due to a leak in the heating system and simultaneous burner operation, the burner is automatically switched off. The switch-off occurs before the boiler and flue system reach impermissible high temperatures. This must be verified by testing.

Note

With boilers from Viessmann, the low water indicator is replaced by a minimum pressure limiter.

Maximum pressure limiter

A maximum pressure limiter is required for each boiler in a system if the rated heating output of the boiler is greater than 300 kW.

Safety valve

Equip the boilers with a type-tested safety valve to EN 12828.

Shutting off the line between the boiler and the safety valve must not be possible. No pumps, fittings or constrictions may be present in the connection lines.

Install the safety valves in an accessible area on the heat generator or in the flow line in the immediate vicinity of the boiler. There must be no shut-off facility between the boiler and the safety valve. The cross-section of the supply line must not be smaller than the inlet cross-section of the safety valve. The pressure drop in the connection line must not exceed 3 % of the test pressure of the safety valve.

Flash trap

For boilers above 300 kW, install a flash trap with discharge pipe and drain line near the safety valve. The discharge pipe must lead outdoors. Any extracted steam must not endanger anyone.

The discharge pipe on the safety valve must be designed to prevent the possibility of pressure increases. Arrange the outlet point of the drain line so that any water expelled by the safety valve can be safely and visibly and drained off.

This alternative measure only applies up to 300 kW - see EN 12828, 4.6.2.3. The flash trap and discharge pipe are not required if a second high limit safety cut-out and a second maximum pressure limiter are installed.

Air pressure switch

In accordance with EN 303 and EN 676, boilers with third party burners must be equipped with a type-tested air pressure switch.

- An adjustable, interlocking pressure switch is connected to the control unit safety chain, in series, to the max. and min. pressure switches, high limit safety cut-out, etc., and to an additional pressure measuring connector for "combustion chamber pressure".

^{*4} Illustrative example for pressure maintenance

^{*5} The TRD stipulates that 2 high limit safety cut-outs are required for 72 h operation without supervision. In accordance with EN12953-6, only 1 high limit safety cut-out is required.

Design information (cont.)

Selection table for safety accessories

The following table lists the control equipment required for sealed unvented heating systems.

MCB/fuse protection as per EN 12828 and EN 12953

Rated boiler heating output	Boiler		
	≤ 300 kW	> 300 kW	
Safety equipment as per	EN 12828	EN 12828	EN 12953
Safety temperature 1 high limit safety cut-out incl. in standard delivery of boiler control unit	≤ 110 °C x*6	≤ 110 °C x*6	> 110 °C x*7
Temperature controller Standard delivery of the boiler control unit	x	x	x
Boiler thermometer Standard delivery of the boiler control unit	x	x	1 x flow, 1 x return
Pressure gauge *8 Pressure gauge (accessories) or as part of the fitting assembly with accessories or the safety equipment block	x	x	x
Fill and sampling valve	—	x	x
Safety valve Or as part of the safety equipment block (accessories).	x	x	x
Low water indicator *8 According to EN 12828, the low water indicator can be replaced by a minimum pressure limiter.	x*9	x	x
Maximum pressure limiter *8	—	x	x
Flash trap According to EN 12828, a flash trap is not required, if a 2nd high limit temperature cut-out device and a 2nd safety pressure limiter (maximum pressure limiter) are additionally installed. (Components are available as "flash trap alternative measure" in accessories).	—	x	x

Note

If operated with a safety temperature > 110 °C the boiler must be supervised in accordance with the Operational Safety Ordinance [Germany]. Components with a safety function must have fail-safe operation, as well as redundancy, heterogeneity and self-monitoring. Accessories for a safety temperature of 120 °C are available. For further information, see EN 12953.

8.5 Fuels

Vitoplex, Vitorond and Vitoradial are suitable for combustion with the following fuels:

■ Fuel oil EL to DIN 51603

All commercially available EL-type fuel oils can be used. Also for fuel oil DIN 51603-6 EL A Bio 10: Low sulphur fuel oil EL with up to 10 % bio-components (FAME).

■ Natural gas, town gas and LPG according to DVGW Code of Practice G 260/I and II [Germany] and local regulations.

■ Biogas and sewer gas*10:

Operation with biogas/sewer gas is possible. **Special operating conditions** apply, as these gases contain sulphur compounds (the composition of which can fluctuate considerably) and other corrosive gases.

- The gas must be free from halogenated chlorinated hydrocarbons.
- The minimum return temperature must be higher than 65 °C in all operating conditions. This requires an effective return temperature raising facility to be installed.
- Minimum boiler water temperature 75 °C (use the appropriate boiler coding card in the Vitotronic).
- Maintain the boiler in constant standby mode and avoid night or weekend shutdowns.

*6 In its delivered condition, the high limit safety cut-out (STB) of the Vitotronic is set to 110 °C and may need to be adjusted.

*7 In its delivered condition, the high limit safety cut-out (STB) of the Vitotronic is set to 120 °C and may need to be adjusted.

*8 When mounted on fitting assembly (accessories): with pressure gauge, lockable shut-off valve, drain and 2 connectors for safety pressure limiters

*9 For Vitocrossal condensing boilers a minimum pressure switch is mandatory.

*10 Not Vitoradial

Design information (cont.)

Night or weekend shutdowns are possible under the following conditions (e.g. peak load boiler):

- When a boiler demand is issued, the burner initially remains blocked.
 - To reduce flue gas condensation during start-up procedures, the boiler is flushed with the available heating water while the burner is blocked. For this, the existing hydraulic shut-off of the boiler is opened and the pump is switched on (for approx. 5 to 10 min).
 - The return temperature raising facility is subsequently activated and the burner is enabled.
 - A total shutdown must be followed by at least 2 hours of heating operation.
 - The service intervals may be reduced, due to the frequent impurity of biogas. Regularly clean and service the boiler.
 - Flue gas/water heat exchangers cannot be used.
- Alternative fuels on request.

8.6 Burners

Suitable burners

A maximum installation altitude of 250 m above sea level was assumed for the boiler / burner matching

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 be identified with the CE designation in accordance with the Gas Appliances Directive.

Unit burner

Vitoradial 300-T appliances are available with pressure-jet oil burners from ELCO and Weishaupt. Gas burner on site. Elco and Weishaupt pressure-jet oil and gas burners are available for the Vitoplex from 350 to 2000 kW and the Vitorond.

See pricelist.

Delivery by the burner manufacturers.

Application range

The boilers operate with positive pressure in the combustion chamber. Use a burner that is suitable for the relevant pressure drop on the hot gas side (see the datasheet for the boiler concerned).

When using Vitotrans 300 flue gas/water heat exchangers observe the additional pressure drop of these devices.

The material of the burner head must be suitable for operating temperatures of at least 500 °C.

Burner versions

Both multi stage or variable (modulating) burners may be used.

Burner installation

See details in the datasheets of the respective boiler.

Burner adjustment

Adjust the maximum burner oil or gas throughput so that the stated maximum boiler heating output will not be exceeded. Note that, for multi stage or modulating burners, the flue system must be suitable for the low flue gas temperatures which may arise during partial load operation.

Maintain the minimum rated heating output specified under the relevant operating conditions when using the boilers together with the Vitotronic control units.

8.7 Flue gas routing

Requirements in accordance with the Sample Combustion Ordinance [Germany]

Observe the specific Building Regulations and Fire Regulations in your country.

Recommendation

Consult your local flue gas inspector.

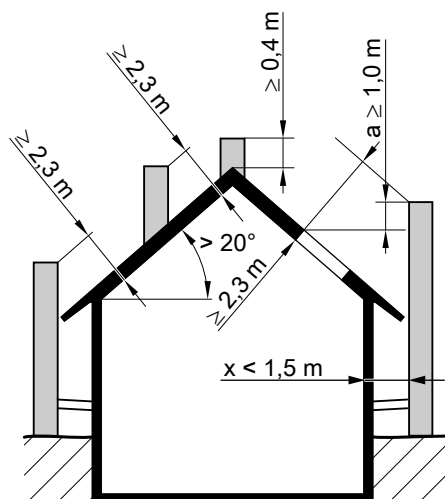
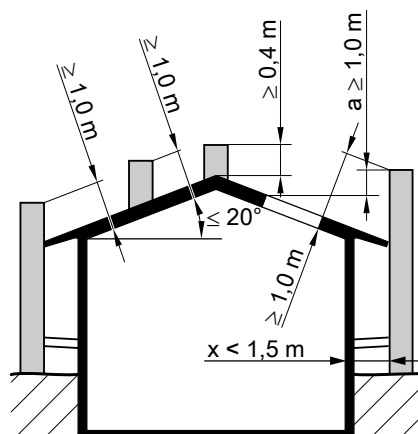
1. The flue system must be sized in accordance with the internal cross-section and height, and if required, also according to the thermal resistance and the internal surface to ensure that the flue gases will be expelled to the outside under all operating conditions and that no dangerous pressures can be created anywhere in the interior.
2. Flue gases from combustion equipment fired by liquid or gaseous fuels must be piped into chimney stacks or flue pipes.

3. For outlets from chimneys in combustion systems, the following conditions apply:

- For a roof pitch of up to 20° inclusive, terminals must project at least 40 cm above the roof ridge or be at least 1 m away from the roof surface.
- For a roof pitch in excess of 20°, terminals must project at least 40 cm above the roof ridge or have a horizontal clearance from the roof surface of at least 2.3 m.
- For combustion systems with a total heating output of up to **50 kW**, terminals must be at least 1 m higher than the edges of vents, windows or doors within a radius of 15 m; the radius increases by 2 m for every 50 kW begun, up to a maximum of 40 m.

Design information (cont.)

4. As an alternative to section 3, for combustion systems with a combustion heating output of 1 MW or more, the height of the outlet must be at least 3 m above the highest point of the roof ridge and at least 10 m above ground level.
With a roof slope in excess of 20°, relate the height of the boiler flue connection to a fictitious roof ridge, the height of which should be calculated on the assumption of a roof pitch of 20°.
5. In deviation from section 3, the flue gas from combustion systems with >10 MW should be drawn away by one or more chimneys, the height of which should be calculated according to the regulations of the TA-Luft [Germany] of 24 July 2002.
6. For combustion systems with a combustion heating output > 20 MW the following apply:
 - Observe the TA-Luft regulations [Germany]; obtain an emission assessment.
 - Check with the appropriate local authority regarding regional requirements.
 - Emission assessments will be provided by approved institutes.
7. Provide a sufficiently large and easily accessible test port in the flue duct.



When $x < 1.5$ m, then $a \geq 1.0$ m

Sizing the flue system to EN 13384

Calculating the cross-sections of the flue system is a basic and essential requirement for the correct function of any flue system.

Initial values:

- Flue gas temperature at the back end of the boiler or downstream of the flue gas/water heat exchanger 140 °C to 190 °C at an ambient temperature of 15 °C (see boiler or heat exchanger datasheet)
- The effective flue system height equals the height differential between the boiler outlet connector and the flue gas terminal.

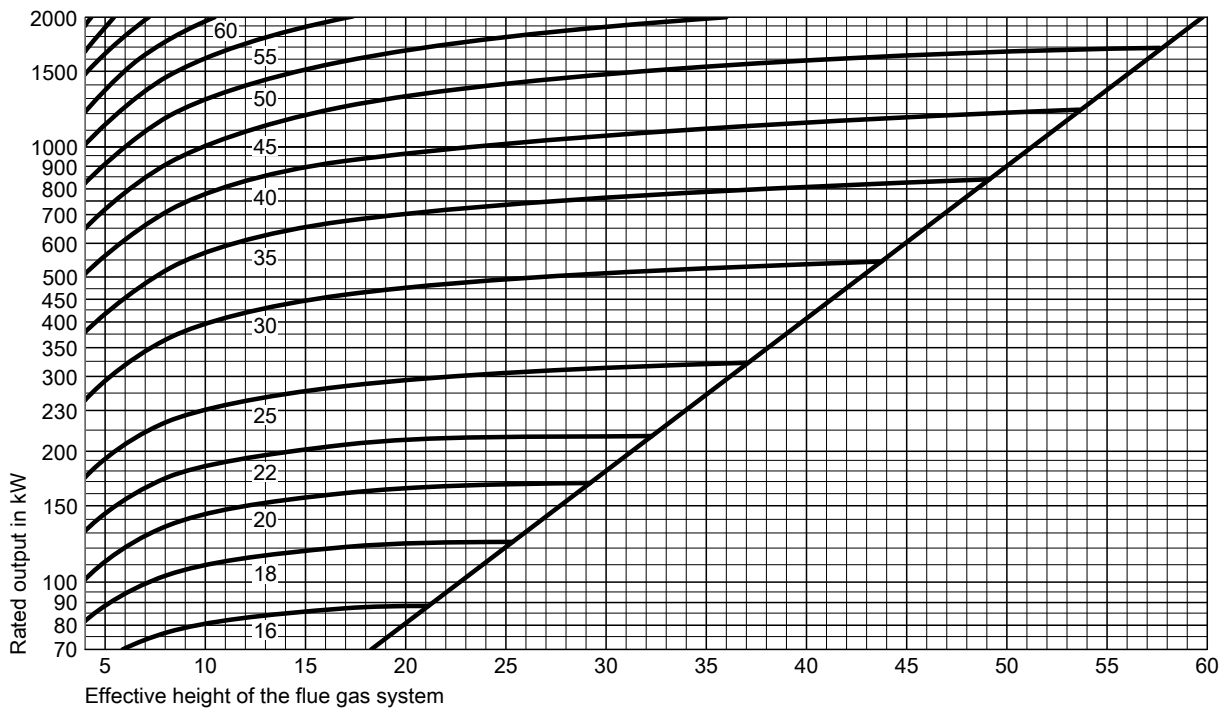
- Length of the connection piece up to ¼ of the effective flue system height, but not more than 7 m. The connection piece and the flue system should have the same cross-section.
- We recommend that flue gases enter the flue system at an angle of less than 45°.
- Plug-in flue systems are not recommended.

Chimney diagrams

Check when applying the following diagrams whether the parameters for calculating the flue gas temperature, length of connection piece and the drag coefficient have been maintained. In the case of more severe deviations, the technical departments of flue system manufacturers will calculate cross-sections which are accurately matched to each individual project.

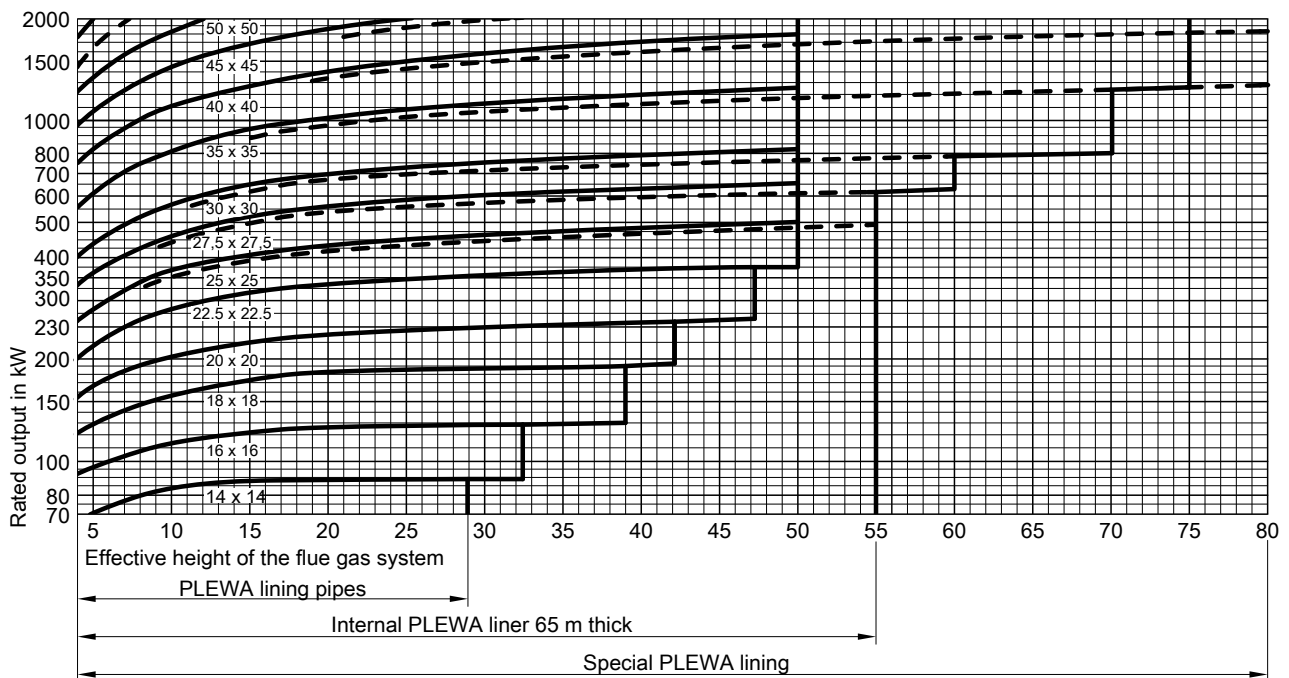
Design information (cont.)

Diagram for round cross-sections (Schiedel)



The diagram shown is also a valid representation for other manufacturers. The installer should check to what extent this diagram can be applied to the flue systems offered by alternative manufacturers.

Diagram for square cross-sections (Plewa)



The diagram shown is also a valid representation for other manufacturers. The installer should check to what extent this diagram can be applied to the flue systems offered by alternative manufacturers.

Design information (cont.)

Flue system for condensing boilers

The Vitoradial 300-T condensing boiler cools the flue gases, subject to the heating water return temperature, down into the condensing range. They then exit the system with a relative humidity of 100 %. Subject to system conditions, the flue gas temperature can reach up to 110 °C. Due to the low flue gas temperature and the resulting low updraught plus the additional condensation of the flue gases inside the flue system, it is necessary for the flue system manufacturer to provide calculations for the flue. The flue pipe must be made from suitable materials.

In addition, special requirements apply to the design and positioning of the flue system of condensing combustion systems.

When installing the Vitoradial 300-T in an attic, (type B33 to TRGI 2008), the flue gas can be routed out via a vertical roof outlet (short-stemmed chimney) (see stainless steel flue systems in the Vitoset pricelist).

Condensing boilers must be connected to tested and approved flue pipes. Flue pipes must have Building Regulations approval.

Flue gas temperature sensor

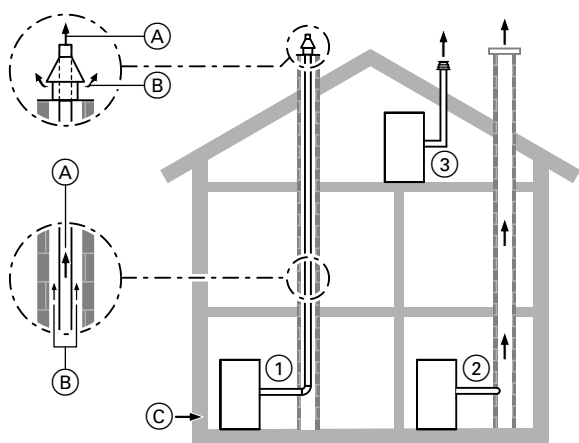
According to the "Guideline for flue pipe approval" point 3.12, only components which are approved parts of the flue pipe system may be connected to or be incorporated into flue pipes serving condensing boilers. Therefore, apertures for the installation of flue gas temperature sensors must form part of the manufacturer's system design and should be tested together with the flue pipe. **Subsequent drilling and fitting of third party components is not permitted.**

Vitoradial 300-T condensing boilers may also be connected to moisture-resistant chimneys. According to EN 13384, the chimney manufacturer must provide a calculated verification, giving due consideration to the flue gas values of the boiler (see specification in the respective datasheet).

The flue pipes must be raised above roof level inside an existing or a newly constructed chimney (casing without internal pipe). We recommend contacting a flue pipe manufacturer during the design stage due to the size and design of the chimney.

Flue system installation options for the Vitoradial 300-T

Open flue operation



- (A) Flue gas
- (B) Secondary ventilation
- (C) Supply air

Routing through a shaft (type B₂₃ to TRGI 2008)

The boiler ① draws combustion air from the installation room, and expels flue gas through the flue pipe via the roof (balanced flow).

Connection to a moisture-resistant chimney (MR chimney, type B₂₃ to TRGI 2008)

The boiler ② draws combustion air from the installation room and expels the flue gas through a moisture-resistant chimney via the roof.

Vertical outlet where no shaft is available (type B₂₃ to TRGI 2008)

The boiler ③ draws combustion air from the installation room (attic), and expels flue gas through the flue pipe via the roof.

Flue system for the Vitoradial 300-T

The flue gases are expelled from the flue system with positive pressure. The flue system meets the size requirements of the Vitoradial 300-T, is made from suitable materials, and is both tested & CE-designated.

Note

Use special FPM/FKM gasket sets when fitting PPs flue pipes for oil operation.

Replace the gaskets before installing the flue system. The boiler flue connections are already equipped with FPM/FKM gaskets.

Before commissioning the heating system, carry out a tightness test of the entire flue system (incl. boiler flue connection).

Certificate no. 0036 CPD 9184 001

Skoberne
Ostendstr. 1
64319 Pfungstadt

According to CE designation to EN 14471 the plastic flue pipe (PPs) can be used for flue gas temperatures of up to 120 °C (type B).

The plastic flue pipes are group B flue pipes (max. permissible flue gas temperature 120 °C). Inside buildings, flue pipes may only be routed in designated longitudinally ventilated ducts or channels which provide the minimum internal duct dimensions. They must meet the requirements for domestic chimney stacks to DIN 18160-1 (issue December 2001), sections 4.4 to 4.9 and have a fire resistance of 90 minutes (F90/L90).

At least one inspection port for checking and cleaning as well as for checking the pressure must be provided in the flue system.

If the flue pipe is inaccessible from the roof, a second inspection port must be provided in the attic behind the chimney cleaning hatch.

Safeguard the draining of the condensate from the flue pipe to the boiler with a fall of at least 3°.

The flue system must protrude clear of the roof.

Where the flue pipe is to be inserted into an existing chimney, seal any other connection apertures with appropriate materials. Clean the inside of the chimney.

Design information (cont.)

This does not apply to any cleaning or inspection apertures that are provided with chimney cleaning covers and that are identified with an appropriate test mark.

Note

Additional flue gas temperature protection is not required in conjunction with the Vitoradial 300-T. The flue gas high limit safety cut-out ensures that the max. permissible flue gas temperature of 120 °C (flue pipe type B) is not exceeded.

Subject to shaft size, install spacers every 2 to 5 m and at each profiled piece of the flue pipe (e.g. inspection piece or bend).

ZERTIFIKAT

0036 CPD 9184 001
Revision 1

Industrie Service

Gemäß der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 über die Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedsstaaten für Bauprodukte (Bauproduktenrichtlinie), ergänzt um die Richtlinie 93/68/EWG des Rates vom 22. Juli 1993 wird bestätigt, dass für die

**System-Abgasanlage mit einer Innenschale
aus starren und flexiblen Rohren und Formstücken aus PP**

Ausführungen

ohne Außenschale	
≤ DN 150	EN 14 471 T120 H1 O W 2 O20 I E L
≤ DN 150, schwarz	EN 14 471 T120 H1 O W 2 O20 E E L
DN 200	EN 14 471 T120 P1 O W 2 O20 I E L
mit Kunststoffaußenschale	
≤ DN 150	EN 14 471 T120 H1 O W 2 O00 I E L1
DN 200	EN 14 471 T120 P1 O W 2 O00 I E L1
mit metallischer Außenschale	
≤ DN 150	EN 14 471 T120 H1 O W 2 O00 E E L0
DN 200	EN 14 471 T120 P1 O W 2 O00 E E L0
flexibles Rohr mit mineralischen Schacht	EN 14 471 T120 P1 O W 2 O00 E E L0

hergestellt von

Skoberne GmbH
Ostendstraße 1
64319 Pfungstadt

in den Herstellwerken

Skoberne GmbH
Ostendstraße 1
64319 Pfungstadt

Arkema GmbH
Am Bahnhof
25630 Ehringhausen

- eine **erstmalige Typprüfung**, durchgeführt von TÜV SÜD Industrie Service GmbH, Berichte A 1614-00/06 und A 1614-01/08 sowie
- eine **werkseigene Produktionsüberwachung** vorliegen.

Die benannte Stelle TÜV SÜD Industrie Service GmbH hat die Erstprüfung des Werkes und der werkseigenen Produktionsüberwachung durchgeführt und führt weiterhin die ständige Überwachung, Beurteilung und Abnahme der werkseigenen Produktionsüberwachung durch.

Dieses Zertifikat bestätigt, dass alle Anforderungen für die Zertifizierung der werkseigenen Produktionsüberwachung entsprechend Anhang ZA der Norm

DIN EN 14 471: 2005-11

erfüllt werden.

Das Zertifikat wurde erstmalig am 2007-02-27 ausgestellt und ist gültig, solange die genannte Norm, die Herstellbedingungen und die werkseigene Produktionsüberwachung nicht wesentlich geändert sowie die Bedingungen des Zertifizierungsvertrags eingehalten werden. Die Gültigkeit des Zertifikats erlischt spätestens am 2012-02-26.

München, 2008-08-31

J. Steiglechner

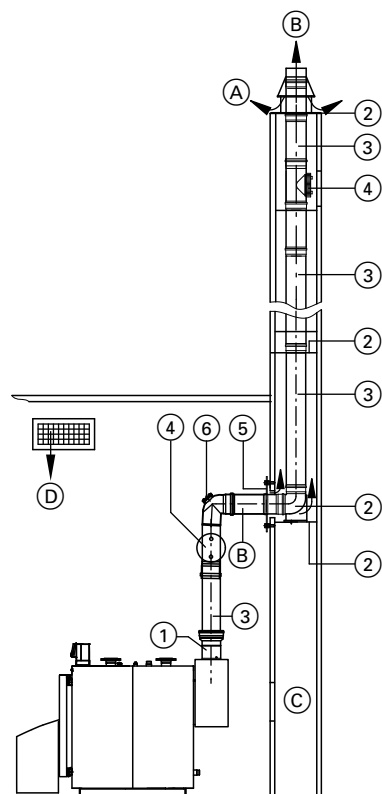
TÜV SÜD INDUSTRIE SERVICE GMBH, RIDLERSTRASSE 65, D-80339 MÜNCHEN

TUV®

Open flue operation with the Vitoradial 300-T

Open flue operation with the Vitoradial 300-T requires a flue pipe between the condensing boiler and the shaft, and another for routing the flue through the shaft (type B₂₃ to TRGI 2008, point 2.3.2).

For routing through shafts or channels with longitudinal ventilation that meet the requirements for domestic chimneys to DIN 18160-1, or with a fire rating of 90 min (F90/L90).



- (A) Secondary ventilation
- (B) Flue gas
- (C) Inspection port
- (D) Ventilation air/ventilation air aperture

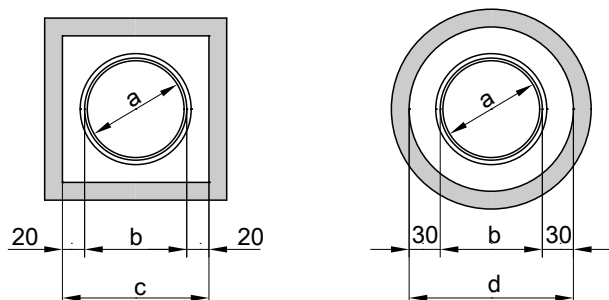
System size flue pipe Ø 150 and 200 mm.

Separately order a boiler flue connection for connection to the Vitoradial.

For system size diameter 150, 200 and 250 mm

- (1) **Boiler flue connection**
with FPM/FKM gasket
Pipe expansion
For expanding the cross-section from Ø 200 mm to Ø 250 mm (must also be ordered, instead of the boiler flue connection) "without gasket"
FPM/FKM gasket set
The fitted gasket must be replaced.
– Set with 2 pce
– Set with 5 pce
– Set with 10 pce
Silicone gasket set for oil operation, 5 pce (system size 250 mm only)
The fitted gasket must be replaced.
EPDM (FPM) gasket set for gas operation, 5 pce (system size 250 mm only)
The fitted gasket must be replaced.
- (2) **Standard shaft section**
Comprising:
– Support bend
– Support rail
– Shaft cover
– Spacers (3 pce)
Spacers (3 pce)
- (3) **Flue pipe**
Length: 2 m
Length: 1 m
Length: 0.5 m
- (4) **Inspection piece, straight**
- (5) **Ventilation bezel**
Bend
87° or 2 x 45°
Bend (for use in corbelled chimneys)
2 x 30° or 2 x 15°
- (6) **Inspection bend, 87°**

Minimum clearance for secondary ventilation between the internal cross-section of the shaft and the female connection



System size	External dimension (Ø mm)	Minimum internal shaft dimensions (mm)	
		c Rectangular mm	d Round Ø mm
150	184	224 x 224	244
200	227	267 x 267	287

Max. total length of the flue up to the boiler flue connection

Rated heating output	kW	101	129	157	201	263	335	425	545
Max. length									
– System size 150	m	30	30	30	—	—	—	—	—

Design information (cont.)

– System size 200	m	—	—	—	30	30	30	30	30
– System size 250	m	—	—	—	—	—	—	30	30

For vertical roof outlets with the Vitoradial 300-T installed in the attic

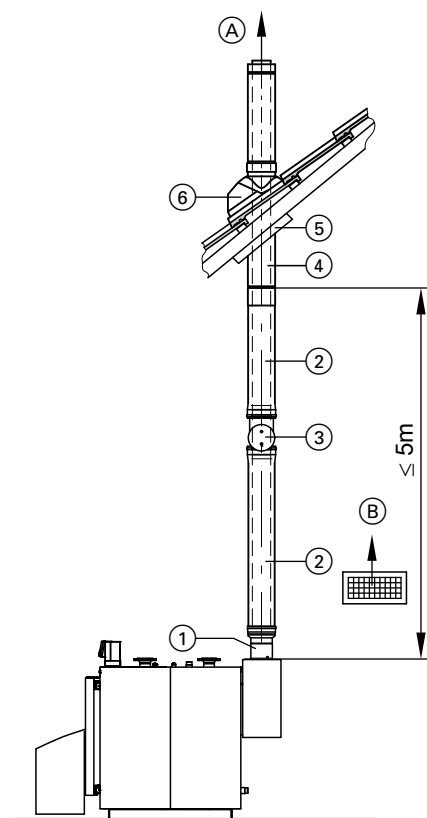
Only use the roof outlet if the ceiling of the installation room is also part of the roof structure. There is no need to maintain a minimum distance to combustible materials at the roof outlet.

Secondary ventilation ensures that the surface temperature around the roof outlet never exceeds 85 °C.

According to TRGI 2008, a minimum clearance of 100 mm must be maintained between the flue pipe (connection piece) and combustible materials.

Max. extended pipe length 6 m with the max. number of bends

- 87°, 2 pce
- 45°, 2 pce



- (A) Flue gas
(B) Ventilation air/ventilation air aperture

If the number of bends differs, either deduct or add 1 m for each 87° bend and 0.75 m for each 45° bends to the max. extended pipe length.

Install an inspection port for checking and cleaning the flue pipe inside the installation room.

Vertical flat roof outlet

Integrate the flat roof collar into the roof skin according to the flat roof guidelines (see page 39). Insert the roof outlet from above and push onto the flat roof collar.

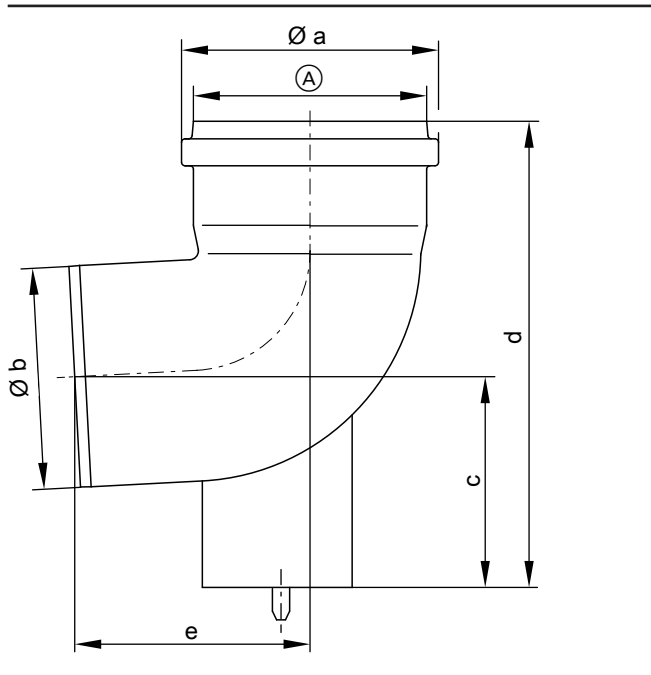
Note

Install the flue system free of load and torque stress. If the flue length is > 5 m, provide supports on site.

①	Boiler flue connection (order separately) Pipe expansion For expanding the cross-section from Ø 200 mm to Ø 250 mm (must also be ordered, instead of the boiler flue connection) "without gasket" <hr/> FPM/FKM gasket set The fitted gasket must be replaced. – Set with 2 pce – Set with 5 pce – Set with 10 pce <hr/> Silicone gasket set for oil operation, 5 pce (system size 250 mm only) The fitted gasket must be replaced. <hr/> EPDM (FPM) gasket set for gas operation, 5 pce (system size 250 mm only) The fitted gasket must be replaced.
②	Flue pipe – 2 m long (2 pce = 4 m long) – 2 m long (1 pce) – 1 m long (1 pce) – 0.5 m long (1 pce)
③	Inspection piece , straight
④	Roof outlet Colour: Black, with fixing clamp
⑤	Universal cover plate Colour: Black
⑥	Universal roof tile (Colour: Black or terracotta) or Flat roof collar Bend 87° (1 pce) 45° (2 pce)

Individual components of the plastic flue system

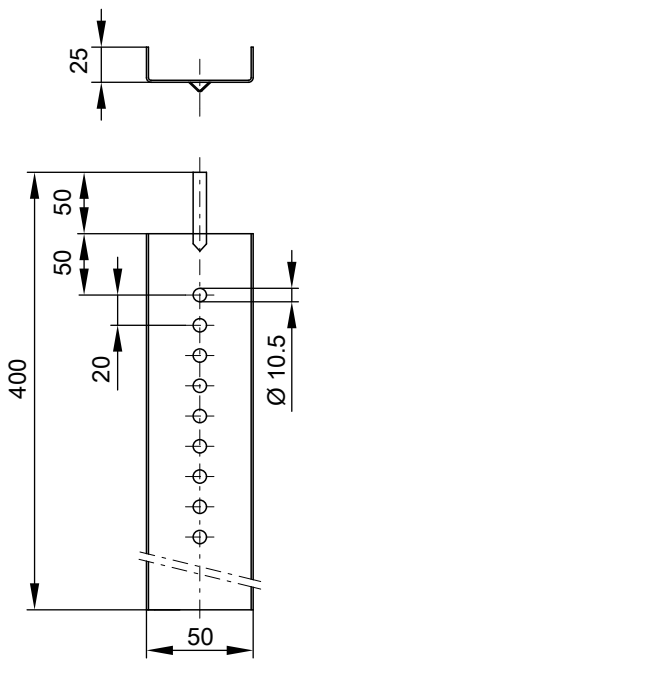
Support bend



Ⓐ System size 150 or 200

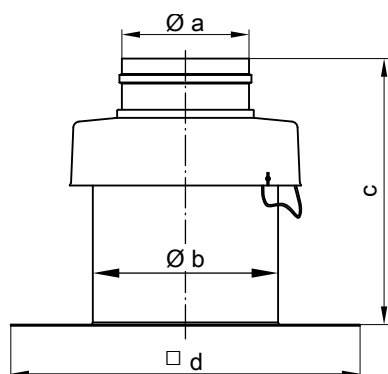
System size \varnothing mm	Dimension [mm]				
	a	b	c	d	e
150	184	160	137	296	163
200	227	200	153	490	310

Support rail



Design information (cont.)

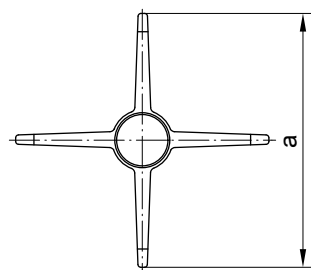
Shaft cover



System size Ø mm	Dimension [mm]			
	a	b	c	d
150	161	228	258	350
200	202	260	261	280

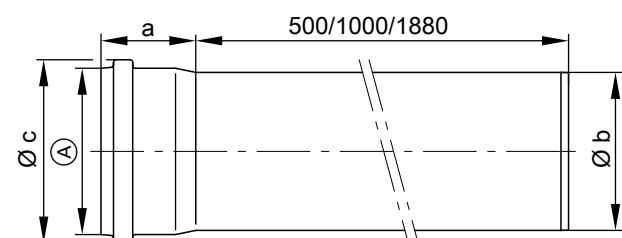
Standard delivery includes materials for securing the shaft cover to the cover panel.

Spacers (3 pce)



System size Ø mm	Dimension [mm]
	a
150	402
200	734

Pipe

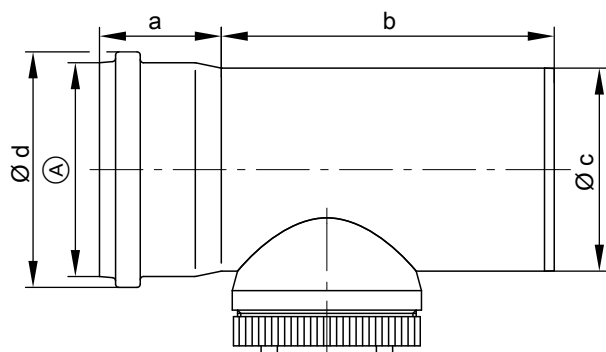


System size Ø mm	Dimension [mm]		
	a	b	c
150	83	160	184
200	122	200	227

Pipe, 2 m long (2 pce)
 Pipe, 2 m long (1 pce)
 Pipe, 1 m long (1 pce)
 Pipe, 0.5 m long (1 pce)
 The pipes may be shortened if required.

(A) System size 150 or 200

Plain inspection piece (straight)

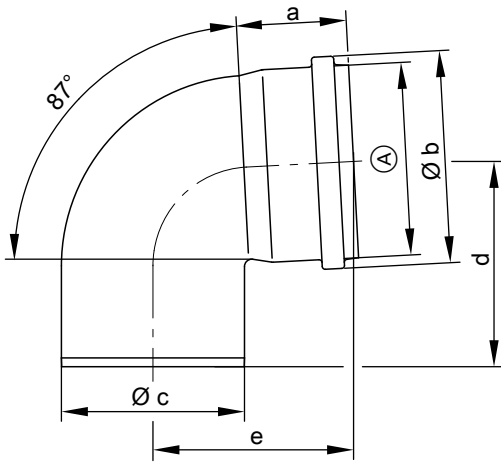


System size Ø mm	Dimension [mm]			
	a	b	c	d
150	83	225	160	184
200	122	300	200	227

(A) System size 150 or 200

Design information (cont.)

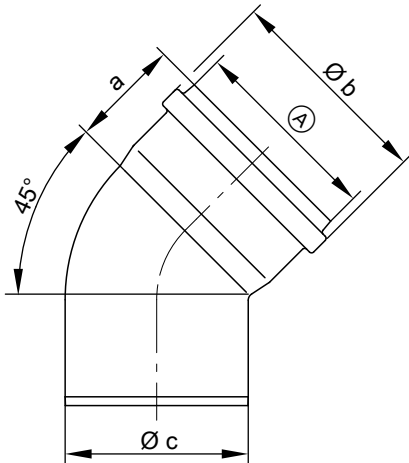
Plain bend (87°)



System size Ø mm	Dimension [mm]				
	a	b	c	d	e
150	83	184	160	170	170
200	122	227	200	350	310

(A) System size 150 or 200

Plain bend (45°)



System size Ø mm	Dimension [mm]		
	a	b	c
150	83	184	160
200	122	227	200

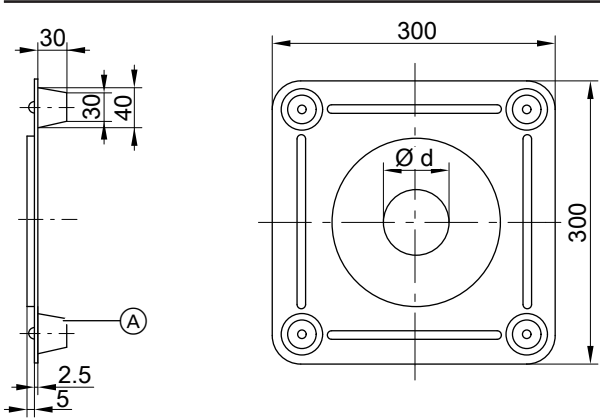
(A) System size 150 or 200

Plain bend (30°)

Plain bend (15°)

Design information (cont.)

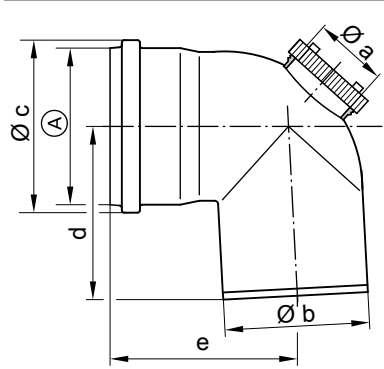
Ventilation bezel



(A) Spacer

System size Ø mm	Dimension [mm]
150	a 160
200	200

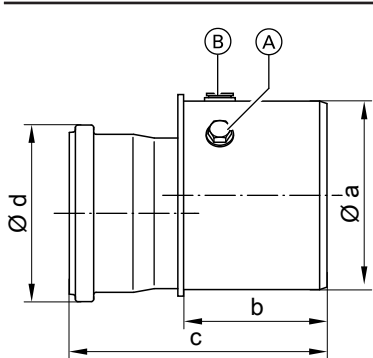
Inspection bend (87°)



(A) System size 150 or 200

System size Ø mm	Dimension [mm]				
	a	b	c	d	e
150	100	160	184	163	159
200	100	200	227	310	350

Boiler flue connection (order separately)

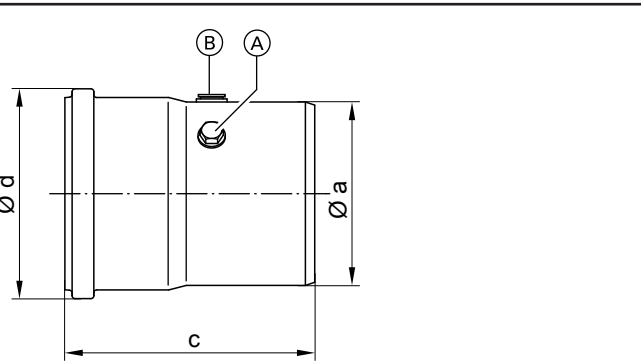


Boiler flue connection 200/150

- (A) Test port
- (B) Connection for an optional flue gas high limit safety cut-out

Boiler flue connection Ø mm	Dimension [mm]			
	a	b	c	d
200/150	200	150	270	184

Design information (cont.)

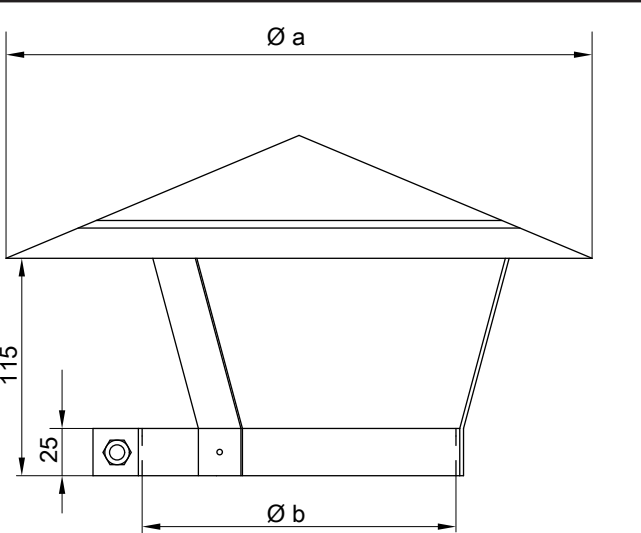


Boiler flue connection 200/200

- (A) Test port
- (B) Connection for an optional flue gas high limit safety cut-out

Boiler flue connection Ø mm	Dimension [mm]			
	a	b	c	d
200/200	200	—	270	227

Cowl, roof outlet

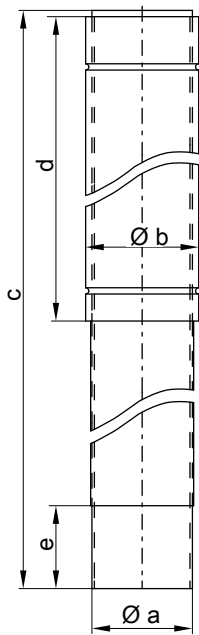


Cowl Ø mm	Dimension [mm]	
	a	b (clamping area)
150	310	170-180
200	410	225-235

Note
Only install if the flue pipe is used as a ventilation air pipe.

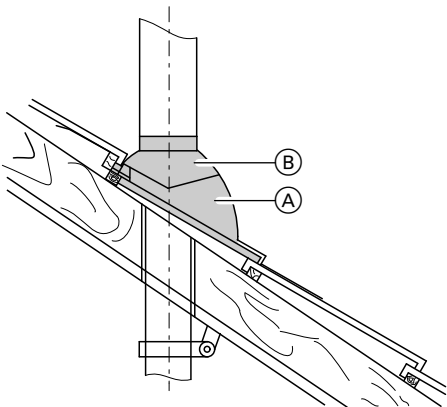
Design information (cont.)

Roof outlet



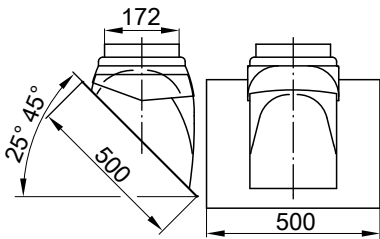
Roof out- let Ø mm	Dimension [mm]				
	a	b	c	d	e
150	160	180.4	1513	859	132
200	200	230.4	1500	834	128

Universal roof tile (suitable for 25 to 45° roof pitch)



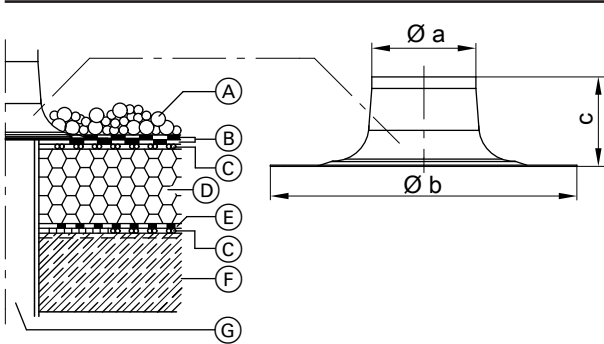
- (A) Universal roof tile
- (B) Pipe outlet for universal roof tile

Pipe outlet for universal roof tile



Design information (cont.)

Flat roof collar



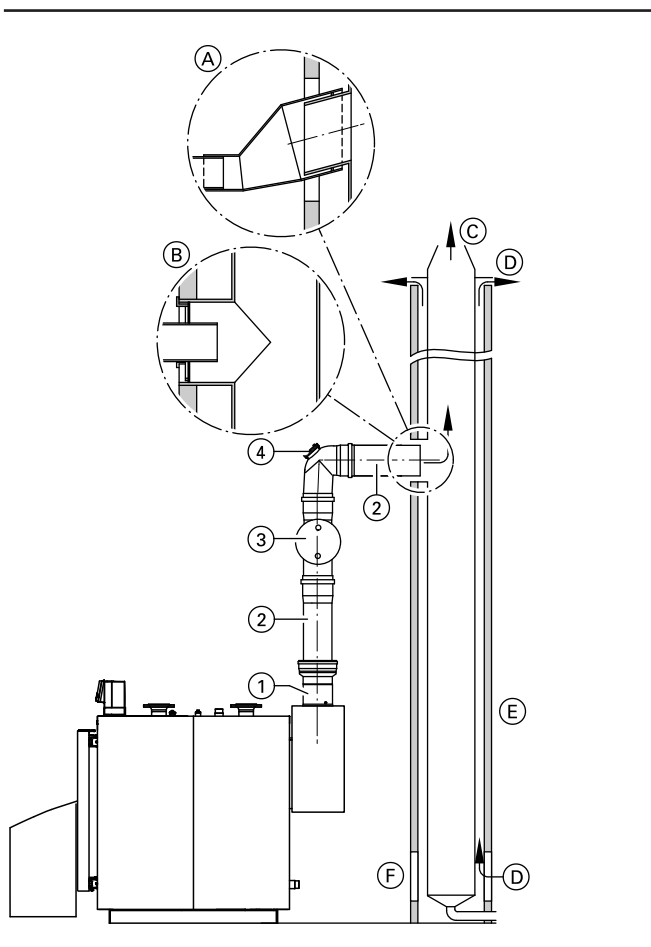
System size Ø mm	Dimension [mm]		
	a	b	c
100	170	470	250
150	170	450	254
200	220	500	254

Roof construction in line with the flat roof directive

- (A) Gravel ballast layer
- (B) Insulation layer
- (C) Aeration layer
- (D) Thermal insulation
- (E) Insulation
- (F) Ceiling
- (G) Roof outlet

Design information (cont.)

Connection with plastic flue pipe (PPs) to a moisture-resistant chimney (MR chimney, negative pressure)



①	Boiler flue connection
②	Flue pipe 2 m long 1 m long 0.5 m long
③	Inspection piece, straight or inspection bend ④
④	Inspection bend, 87° or straight inspection piece ③

- (A) Flue outlet adaptor by Schiedel
- (B) Plewa adaptor
- (C) Flue gas
- (D) Secondary ventilation
- (E) Moisture-resistant chimney
- (F) Inspection port

The Vitoradial 300-T condensing boilers may be connected to a moisture-resistant chimney, provided the chimney manufacturer can provide a calculated verification to EN 13384.

The connection piece must consist of a pressure sealed and moisture-resistant flue pipe that has been approved by the building inspectorate. Adaptors from the flue pipe to the MR chimney are available for example from Plewa individually on request, or from Schiedel by quoting reference "Schiedel flue outlet adaptor".

Addresses:

Plewa-Werke GmbH
D-54662 Speicher/Eifel

Schiedel GmbH & Co.
Hauptverwaltung
Lerchenstrasse 9
D-80995 Munich

8.8 Anti-vibration fittings

The burner/boiler systems, circulation pumps and other units used in heating systems generate noise. Noise is transferred from the installation room via the floor, ceiling and walls to neighbouring rooms and via the flue system as well as the ventilation air and extract air apertures to other rooms and to the outside.

There it may be perceived as a nuisance. To avoid this happening, additional protective measures may be required which should be considered at the design stage. Subsequent measures to reduce noise development frequently require extensive effort and expenditure.

Attenuating airborne noise

Frequently, modern burners are equipped with sound-absorbing hoods or noise-attenuated ventilation air inlet housings. Additional silencer hoods may be used where more stringent anti-noise measures are required. This measure may be implemented later with minimum effort.

Silencer hoods are offered for various levels of sound insulation and are designed and built in accordance with specific system conditions (boiler type, fuel supply, building characteristics).

Design information (cont.)

For larger systems it may be necessary to route the ventilation air through a sound-insulated channel, in order to avoid excess noise outside the building.

Flue gas silencers are only required where higher sound insulation measures are called for. The creation and propagation of flame noise, the interaction between the burner, boiler and the flue system as well as the operating mode (flue system with positive or negative pressure) are complex. It is therefore difficult to predict whether or not a flue gas silencer is required.

To assess the noise emission into the neighbourhood it is useful to consider the sound power level measured at the flue system outlet point. If flue gas silencers might be required, the sound power level should be taken into consideration already at the engineering stage. It is important to ensure there will be sufficient space for the flue gas silencer behind the boiler. The pressure drop of the flue gas silencer on the flue gas side is required for calculating the flue system in accordance with EN 13384.

Structure-borne noise attenuation

Anti-vibration supports for the boiler are an economical and effective measure to reduce vibrations. For this purpose we supply adjustable anti-vibration feet for insertion into the boiler base frame, and linear anti-vibration brackets made from stainless spring steel for high output boilers.

Consider the total operating weight of the boiler system when sizing such supports. Ensure the support surface is level when using linear anti-vibration brackets.

Effective structure-borne noise attenuation is particularly important when installing boilers in attics. Compensators may be used to acoustically separate the combustion equipment from the building.

These should be installed in the boiler flow, boiler return and safety pipes, as near to the boiler as possible. Also insulate any braces or brackets, if installed, against sound/vibration transmission to the building.

Detailed information for reducing noise emissions by combustion equipment in heating systems can be found in the Information Sheet No. 10 of the BDH (Bundesindustrieverband Deutschland Haus-, Energie- und Umwelttechnik e.V. [The Association of German domestic, energy and environmental industries]).

Noise attenuating accessories

Viessmann offers the following accessories for noise-attenuation in conjunction with boilers:

- Adjustable anti-vibration feet for boilers up to 560 kW
- Anti-vibration boiler supports for boilers from 300 kW

8.9 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 damage to your heating system.

Observing the following requirements is necessary to safeguard your warranty rights. The warranty excludes damage due to corrosion and scaling.

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

Heating systems with rated operating temperatures in excess of 100 °C (VDI 2035)

Prevent excessive scale build-up (calcium carbonate) on the heating surfaces. For heating systems with operating temperatures up to 100 °C, VDI guideline 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 guideline).

Total permissible hardness of the fill and top-up water

Total heating output kW	Specific system volume		
	< 20 l/kW	≥ 20 l/kW to < 50 l/kW	≥ 50 l/kW
≤ 50	≤ 3.0 mol/m ³ (16.8 °dH)	≤ 2.0 mol/m ³ (11.2 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 50 to ≤ 200	≤ 2.0 mol/m ³ (11.2 °dH)	≤ 1.5 mol/m ³ (8.4 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 200 to ≤ 600	≤ 1.5 mol/m ³ (8.4 °dH)	≤ 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)
> 600	< 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)	< 0.02 mol/m ³ (0.11 °dH)

The standard values assume the following:

- The volume of fill and top-up water will not exceed three times the water content of the heating system during its service life.
- The specific system volume is less than 20 l/kW heating 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 and top-up water in heating systems operating under the following conditions:

- The total of alkaline earths in the fill and top-up water exceeds the standard value.
- Higher fill and top-up water volumes are expected.
- The specific system volume is greater than 20 l/kW heating output. In multi boiler systems, apply the output of the smallest boiler.

When engineering the system, observe the following:

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

For systems with system boilers with a total heating output < 50 kW and total of alkaline earths in the fill and top-up water > 3.0 mol/m³, implement one of the following measures:

- Preferably soften the fill and top-up water.
- Install a filter or separating facility in the heating flow.

Design information (cont.)

Operating information:

- Commission the system step by step, starting with the lowest boiler output and a high heating water flow rate. This prevents a localised concentration of limescale deposits on the boiler heating surfaces.
- In multi boiler systems, start all boilers simultaneously to prevent the entire limescale 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 system prior to commissioning. This also applies to any subsequent filling, e.g. after repairs or after system expansion, and for all amounts of top-up water.
- Check, clean and activate filters, dirt traps and other blow-down or separating facilities in the heating water circuit more frequently after commissioning or new installations; later on do so subject to requirements in line with the water treatment applied (e.g. water softening).

The build-up of limescale deposits on the heating surfaces will be minimised if these instructions are observed.
Any limescale deposits that have formed because of a failure to observe the requirements to VDI Directive 2035 will in most cases already have caused a reduction in the service life of the installed heating equipment. Removing the limescale deposits is one option for restoring 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 excessive scale from forming again.

Heating systems with permissible flow temperatures in excess of 100 °C (VdTÜV MB 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 a low salt content if no boiler water is fed into the system for alkalisation.

Operation with saline water

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

		Low salt content		Saline
El. conductivity at 25 °C	µS/cm	10 to 30	> 30 to 100	> 100 to 1500
General requirements		Clear, no sediment	Clear, no sediment	Clear, no sediment
pH value at 25 °C		9 - 10	9 - 10.5	9 - 10.5
According to the Drinking Water Ordinance/ Drinking Water Treatment Ordinance [Germany]		≤ 9.5	≤ 9.5	≤ 9.5
Oxygen (O ₂)	mg/l	< 0.1	< 0.05	< 0.02
Values for constant operation may be significantly lower. If suitable inorganic corrosion inhibitors are used, the oxygen concentration in the circulating water may be up to 0.1 mg/litre.				
Alkaline earths (Ca + Mg)	mmol/litre	< 0.02	< 0.02	< 0.02
Phosphate (PO ₄)	mg/l	< 5	< 10	< 15
According to the Drinking Water Ordinance/ Drinking Water Treatment Ordinance [Germany]	mg/l	≤ 7	≤ 7	≤ 7
For Viessmann hot water boilers	mg/l	< 2.5	< 5	< 15
When using oxygen binders: Sodium sulphite (Na ₂ SO ₃)	mg/l	—	—	< 10
When using suitable products, observe the guidelines issued by the respective supplier.				

Using antifreeze in boilers

Viessmann boilers are designed and built for water as a heat transfer medium. To protect boiler systems from frost, it may be necessary to treat the boiler water or circulating water with antifreeze.

When doing so, observe the following:

- The properties of antifreeze and water are very different.
- The boiling point of pure, glycol-based antifreeze is approx. 170 °C.
- The temperature stability of the antifreeze must be sufficient for the particular application.
- Check the compatibility with sealing materials. If other sealing materials are used, take this into account when designing the system.
- Antifreeze developed especially for heating systems contains inhibitors and buffer substances for corrosion protection as well as glycol. Observe the manufacturer's instructions regarding minimum and maximum concentrations.

- In a water/antifreeze mixture, the specific thermal capacity of the heat transfer medium changes. Take this factor into account when selecting the boilers and system components, such as heat exchangers and pumps. Contact the antifreeze manufacturer to find out the relevant values for the specific thermal capacity. For an example calculation of the output change, see below.
- A system filled with antifreeze must be marked accordingly.
- The quality of the boiler and feedwater must meet the requirements of VDI guideline 2035.
- The systems must be designed as sealed unvented systems, as the antifreeze inhibitors decrease rapidly if airborne oxygen is allowed to enter.
- Diaphragm expansion vessels must comply with DIN 4807 [or local regulations].

Design information (cont.)

- Only use oxygen diffusion-resistant hoses or metal hoses for flexible connections.
- Never equip the system on the primary side with zinc-plated heat exchangers, containers or pipes. Zinc can be dissolved by glycol/water mixtures.

Note

The suitability of additives in heating water must generally be confirmed by the manufacturer/distributor of the product. If the manufacturer/distributor confirms that their additive is suitable for use in heating systems, it can be used in systems with Viessmann boilers. Viessmann accepts no warranty for damage or operating faults caused by unsuitable additives, incorrect doses or poor maintenance.

Target Maximum boiler output when using antifreeze

$\dot{Q}_{K \text{ glycol}}$

Given Boiler output
Antifreeze
Spec. thermal capacity
Mixing ratio Tyfocor/water

$\dot{Q}_K = 2 \text{ MW}$
Tyfocor
3.78 kJ/kgK at 80 °C
40/60

Calculation:

$$\dot{m} = \frac{\dot{Q}}{c \cdot \Delta t} = \frac{2000 \text{ kW kg K} \cdot 3600}{4.187 \text{ kWs} \cdot 20 \text{ K} \cdot 1 \text{ h}} = 86,000 \frac{\text{kg}}{\text{h}} \triangleq 86 \text{ t/h}$$

This results in the following:

$$\dot{V} \approx 86 \text{ m}^3/\text{h}$$

$$\dot{Q}_{K \text{ glycol}} = \dot{m} \cdot c \cdot \Delta t = 86,000 \frac{\text{kg}}{\text{h}} \cdot 3.78 \frac{\text{kJ}}{\text{h}} \cdot 20 \text{ K} \cdot \frac{1 \text{ h}}{3600 \text{ s}}$$

$$\dot{Q}_{K \text{ glycol}} = 1.8 \text{ MW}$$

Result:

When using 40 % of the antifreeze named above in the heating network, the boiler output is reduced by 10 %.
The specific thermal capacity is subject to the mixing ratio and temperature, therefore each system must be designed individually.

Prevention of damage through 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 the first fill and the 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:

- Through overflowing open expansion vessels
- Through negative pressure in the system
- Through gas-permeable components

Sealed unvented systems, e.g. 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.

Due to the different physical characteristics of glycol and water, the boiler may suffer a loss of output. Provided below is an example for calculating the change in output when operating the system with antifreeze.

The pre-charge pressure of the diaphragm expansion vessel should be checked at least during the annual service.

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 heat source, by the provision of a heat exchanger made of corrosion-resistant material.

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 9.0 and 10.5.

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 treatment to Viessmann industrial services or an appropriate specialist.

Further details can be found in VDI Directive 2035-2 and EN 14868.

8.10 Vitotrans 300 flue gas/water heat exchanger

Downstream installation of a Vitotrans 300 flue gas/water heat exchanger for increased efficiency

Installing a Vitotrans 300 flue gas/water heat exchanger downstream of a boiler will result in a significant increase in efficiency. By condensing the flue gases inside the heat exchanger, the boiler turns into a condensing boiler, as required by the Efficiency Directive 92/42/EEC.

- In gas boilers, efficiency is increased by up to 12 %.
- When using fuel oil EL, efficiency is raised by up to 6 % due to the lower water content and the lower dew point compared to gas.

When using dual fuel burners (oil/gas) in conjunction with flue gas/water heat exchangers for gas boilers, note that oil operation is only permissible for covering peak loads and for emergency mode (up to 6 weeks per heating season).

The Vitotrans 300 flue gas/water heat exchangers are designed to enable retrofitting into existing systems.

Vitotrans 300 for oil operation

For constant or prolonged operation with fuel oil EL, Vitotrans 300 flue gas/water heat exchangers are available with those parts that come into contact with flue gases made from high-grade stainless steel 1.4539.

Specification

See the datasheet for the relevant boiler.

Vitotrans 300 with Vitoplex boilers

Energy savings can be made by using a Vitotrans 300 flue gas/water heat exchanger in conjunction with Vitoplex boilers.

The increase in efficiency and therefore the energy savings compared to systems without flue gas/water heat exchangers are significantly influenced by the return temperature of the return water flowing through the heat exchanger.

Return temperatures are determined by the sizing of the system. They decrease with increasing outside temperature. For heating systems with design temperatures 75/60 °C and 40/30 °C, the course of the return temperature in relation to the outside temperature is shown in the chart on page 45.

The increased efficiency achievable through the downstream flue gas/water heat exchanger when operating with gas is shown in the following table, at various heating system temperatures. The basis for the possible increases in efficiency is the modulating course of the return temperature as well as the outside temperature. The various increases in efficiency result from the different flue gas temperatures produced by the upstream boiler.

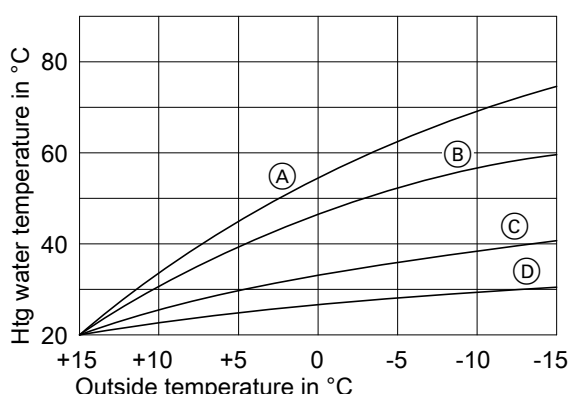
Heating system design temperature	Increase in efficiency by using a Vitotrans 300 with Vitoplex 300	Increase in efficiency by using a Vitotrans 300 with Vitoplex 200
90/70 °C	6.0 %	7.0 %
75/60 °C	9.0 %	10.0 %
60/50 °C	10.0 %	11.0 %
40/30 °C	11.5 %	12.5 %

The overall efficiency of the condensing unit, comprising the gas boiler and the Vitotrans 300 flue gas/water heat exchanger, results from adding together the boiler efficiency and the increase in efficiency resulting from the heat exchanger, which has been calculated for the respective system temperature.

Example:

Efficiency Vitoplex 300 = 96 %

Efficiency increase with Vitotrans 300 at 75/60 °C = 9 %, resulting in an overall condensing unit efficiency of 96 % + 9 % = 105 %.



- (A) Flow temperature for heating system 75/60 °C
- (B) Return temperature for heating system 75/60 °C

- (C) Flow temperature for heating system 40/30 °C
- (D) Return temperature for heating system 40/30 °C

Calculation of possible energy savings (B_E)

- Annual heat load Q_a of a boiler system with $\dot{Q}_k = 500$ kW and 1650 full utilisation hours (b_a) per annum:

$$\begin{aligned} Q_a &= b_a \cdot \dot{Q}_k = 1650 \text{ h/a} \cdot 500 \text{ kW} \\ &= 825000 \text{ kWh/a} \end{aligned}$$

- Annual consumption B_N of natural gas LL (net calorific value $H_u = 8.83$ kWh/m³) when using a Vitoplex 300 low temperature boiler with a standard seasonal efficiency [to DIN] of $\eta_N = 96$ %:

$$\begin{aligned} B_N &= \frac{Q_a}{\eta_N \cdot H_u} = \frac{825000 \text{ kWh/a}}{0.96 \cdot 8.83 \text{ kWh/m}^3} \\ &= 97320 \text{ m}^3/\text{a} \end{aligned}$$

- Increase in efficiency η_{AWT} resulting from the downstream installation of a Vitotrans 300 flue gas/water heat exchanger. The design temperature of the heating system routed via the heat exchanger is 75/60 °C.

$$\eta_{AWT} = 9 \text{ % (according to the table on page 44)}$$

$$\eta_{\text{tot}} = \eta_N + \eta_{AWT} = 96 \text{ %} + 9 \text{ %} = 105 \text{ %}$$

- Annual consumption B_B of natural gas LL (net calorific value $H_u = 8.83$ kWh/m³) when using a Vitoplex 300 with Vitotrans 300 flue gas/water heat exchanger downstream:

$$\begin{aligned} B_B &= \frac{Q_a}{\eta_{\text{ges}} \cdot H_u} = \frac{825000 \text{ kWh/a}}{1.05 \cdot 8.83 \text{ kWh/m}^3} \\ &= 88980 \text{ m}^3/\text{a} \end{aligned}$$

- Saving in natural gas LL in m³/a:

$$\begin{aligned} B_E &= B_N - B_B = 97320 \text{ m}^3/\text{a} - 88980 \text{ m}^3/\text{a} \\ &= 8340 \text{ m}^3/\text{a} \end{aligned}$$

- Saving in percent:

$$\frac{8340 \cdot 100}{97320} = 8.5\%$$

Using a downstream Vitotrans 300 flue gas/water heat exchanger can achieve fuel savings of around 8.5 %. Substantially higher savings are realised when modernising an out-dated boiler system with low efficiency rates.

Hydraulic connection

The entire heating water flow rate, relative to the rated boiler heating output and a minimum temperature differential of 20 K, can be routed through the Vitotrans 300 flue gas/water heat exchanger.

Sometimes only part of the flow is routed via the Vitotrans 300, e.g. in order to use a heating circuit with low return temperatures. In such cases, the nominal flow rate should be selected so that the temperature spread in the Vitotrans 300 relative to the upper output is no greater than 10 K.

Condensate and neutralisation

Neutralising systems

Matching neutralising systems are available for **condensing units** comprising Viessmann Vitoplex boilers and Viessmann **Vitotrans 300** flue gas/water heat exchangers installed downstream, as well as for the Vitoradial 300-T:

- Granulate neutralising system with optional condensate lifting system and a maximum neutralising performance of 70 l/h or 210 l/h for gas boilers
- Granulate neutralising system with active charcoal filter, optional condensate lifting system and a maximum neutralising performance of 12.8 l/h or 35 l/h for oil boilers
- Liquid neutralising system with lifting pump and a maximum neutralising performance of 420 l/h for gas or oil boilers

For specifications regarding neutralising systems and accessories, see the datasheet "Boiler accessories".

Positioning the neutralising system

If the entire heating system is installed at the same level, the condensate in the boiler, the flue gas/water heat exchanger or in the flue system backs up to the level of the inlet connection to the neutralising system.

If the condensate is to drain off completely, position the neutralising system accordingly lower.

8.11 Intended use

The appliance is only intended to be installed and operated in sealed unvented heating systems that comply with EN 12828, with due attention paid to the associated installation, service and operating instructions as well as the details in the datasheet. It is only designed for the heating up of heating water.

Commercial or industrial usage for a purpose other than the heating up of heating water shall be deemed inappropriate.

Intended use presupposes that a fixed installation in conjunction with permissible components designed for this purpose has been carried out.

Every other use will be deemed to be inappropriate. Any resulting losses are excluded from the manufacturer's liability.

Any usage beyond this must be approved by the manufacturer for the individual case.

Intended use also includes the adherence to maintenance and inspection intervals.

Control units

9.1 Overview of boiler control units and control panels

(See pricelist for allocation to the boilers)

A specifically matched boiler control unit is part of the standard delivery of the Viessmann boilers Vitoplex 200 and 300 and the Vitorond 200. This control unit has been specially developed for energy saving and environmentally responsible operation. The temperature sensors precisely correspond to the boiler characteristics.

Boiler protection is safeguarded by the following:

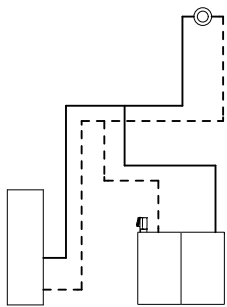
- Therm-Control (only Vitoplex 200 to 560 kW, Vitoplex 300 and Vitoradial 300-T)
- Controlling a shunt pump, boiler circuit pump or distribution pump
- Flow rate reduction in the heating circuits
- Constant return temperature control

Vitotronic control panels with, for example, weather-compensated Vitotronic 200-H (type HK1B or HK3B) control units for 1 or up to 3 heating circuits with mixer can be supplied. The following control units are available for these condensing boilers.

Note on cascade control with CHP unit or other heat generators
Vitotronic 200-M control unit for multi mode heating systems, for weather-compensated cascade control of boilers with a Vitotronic 100 control unit and a Vitobloc 200 CHP unit or other heat generators on request.

Single boiler systems

Vitotronic 100, type CC1E



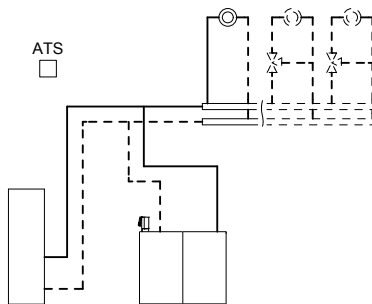
Top-mounted boiler control unit:

- For operation with a constant boiler water temperature
- For 2-stage or modulating burners
- Colour touchscreen with plain text and graphic display
- With cylinder temperature controller
- Control of a cylinder loading system with mixer assembly possible (only as an alternative to the control of a constant return temperature raising facility with a regulated 3-way mixing valve)
- With boiler protection function specific to boiler version
- With energy cockpit, integral diagnostic system and additional functions
- Capable of communicating via LON (LON communication module is an accessory)
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1

- For weather-compensated operation in conjunction with a Vitotronic control panel and integral Vitotronic 200-H heating circuit control unit
- For weather-compensated operation in conjunction with an external control unit

According to the Energy Saving Ordinance [Germany], a weather-compensated or room temperature-dependent control unit with time program for reduced mode must be installed downstream.

Vitotronic 200, type CO1E



Control units (cont.)

Weather-compensated, top-mounted boiler control unit:

- For one heating circuit without mixer and up to 2 heating circuits with mixer (a further 32 Vitotronic 200-H heating circuit control units can be connected via LON).

Required accessories:

- Extension for 2nd and 3rd heating circuits
- Mixer extension kit for **each** heating circuit with mixer
- For 2-stage or modulating burners
- Colour touchscreen with plain text and graphic display
- With cylinder temperature controller
- Control of a cylinder loading system with mixer assembly possible (only as an alternative to the control of a constant return temperature raising facility with a regulated 3-way mixing valve)

- With boiler protection function specific to boiler version
- With energy cockpit, integral diagnostic system and additional functions
- Capable of communicating via LON (LON communication module is an accessory)
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1

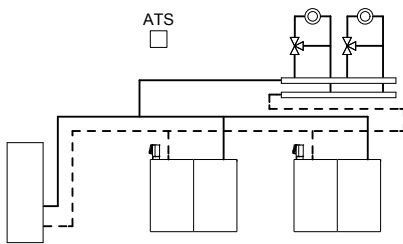
Multi boiler systems

One boiler in a multi boiler system must be equipped with a Vitotronic 300, type CM1E. Every other boiler must be equipped with a Vitotronic 100, type CC1E.

The LON communication module must be fitted into the Vitotronic 100 (accessories).

In multi boiler systems with external control unit, the load-dependent burner and boiler control as well as the cylinder temperature control must be implemented by the higher ranking (external) control unit.

Vitotronic 300, type CM1E and Vitotronic 100, type CC1E



Vitotronic 300, type CM1E

- Weather-compensated, top-mounted boiler and heating circuit control unit with cascade function
- Control of the boiler water temperature of a boiler in a multi boiler system
- With boiler sequence strategy
- For up to 2 heating circuits with mixers (a further 32 Vitotronic 200-H heating circuit control units can be connected via LON).

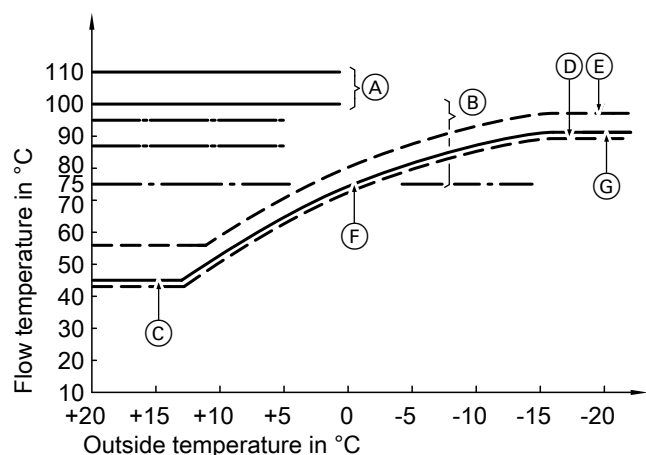
A mixer extension kit (accessories) is required for **each** heating circuit with mixer.

- With cylinder temperature controller or
Control of a cylinder loading system with mixer assembly (only possible as an alternative to the control of a constant return temperature raising facility with a regulated 3-way mixing valve)
- With energy cockpit, integral diagnostic system and additional functions
- Colour touchscreen with plain text and graphic display
- Capable of communicating via LON
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1

Vitotronic 100, type CC1E:

- Top-mounted boiler control unit for each additional boiler in a multi boiler system
- For 2-stage or modulating burners
- With boiler protection functions subject to system version
- With energy cockpit, integral diagnostic system and additional functions
- Colour touchscreen with plain text and graphic display
- Capable of communicating via LON (LON communication module is an accessory)
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1

Switching points



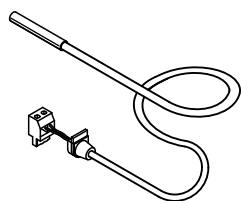
- Ⓐ Setting options for the high limit safety cut-out of the Vitotronic boiler control unit (delivered condition 110 °C)
- Ⓑ Setting options for the temperature controller of the Vitotronic boiler control unit (delivered condition 95 °C)
- Ⓒ Lower boiler water temperature (see operating conditions, pages 5 to 10)
- Ⓓ Burner start points
- Ⓔ Burner stop points
- Ⓕ Selected heating curve
- Ⓖ Set maximum boiler water temperature

9.2 Components in the delivered condition

Allocation to control unit types

Vitotronic	100	200	300
Type	CC1E	CO1E	CM1E
Components			
Boiler water temperature sensor	X	X	X
Immersion temperature sensor	X	X	X
Outside temperature sensor		X	X
Contact temperature sensor (see accessories for description)			X
LON communication module (see accessories for description)			X
Note For Vitotronic 100, type CC1E only in multi boiler systems			

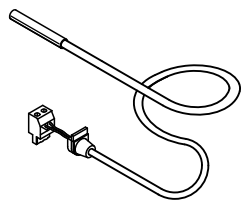
Boiler water temperature sensor



Specification

Cable length	3.7 m, fully wired
IP rating	IP 32 to EN 60529, ensure through design/installation.
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– Operation	0 to +130 °C
– Storage and transport	–20 to +70 °C

Cylinder temperature sensor



Specification

Lead length	5.8 m, fully wired
IP rating	IP 32 to EN 60529; ensure through design/installation.
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– Operation	0 to +90 °C
– Storage and transport	–20 to +70 °C

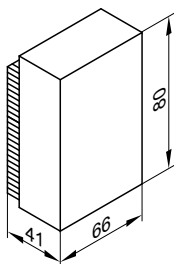
Outside temperature sensor

Installation location

- North or north-west facing wall of the building
- 2 to 2.5 m above the ground; for multi storey buildings in the upper half of the second floor

Connection

- 2-core lead, length up to 35 m with a cross-section of 1.5 mm² (copper)
- Never route this cable immediately next to 230/400 V cables.



Specification

IP rating	IP 43 to EN 60529; ensure through design/installation.
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature during operation, storage and transport	-40 to +70 °C

9.3 Vitotronic 100, type CC1E

Specification

Layout

The control unit comprises a standard unit, electronics modules and a programming unit.

Standard unit:

- ON/OFF switch
- Test key
- WiFi service interface
- Temperature controller
 - TR 1168
 - or
 - TR 1107
- High limit safety cut-out
 - STB 1169
 - or
 - STB 1154
- Plug connection chamber:
 - Connection of external equipment via system plugs
 - Connection of three-phase consumers via additional contactors

Programming unit

- Easy operation thanks to:
 - Colour touchscreen with large font and high contrast
 - Context-sensitive help
- User prompts via plain text and graphic display
- Settings:
 - Boiler water temperature
 - DHW temperature (only in single boiler systems)
 - Operating program
 - Parameters
 - Actuator test
 - Test mode

Displays:

- Boiler water temperature
- DHW temperature (only in single boiler systems)
- Operating data
- Diagnostic details
- Energy cockpit
- Maintenance and fault messages

Available languages:

- German
- Bulgarian
- Czech
- Danish
- English
- Spanish
- Estonian
- French
- Croatian
- Italian
- Latvian
- Lithuanian
- Hungarian
- Dutch
- Polish
- Russian
- Romanian
- Slovenian
- Finnish
- Swedish
- Turkish
- Slovak
- Ukrainian
- Portuguese

Functions

- Control of the boiler water temperature (= system flow temperature) to the specified value
- Electronic maximum boiler water temperature limiting
- Pump anti-seizing protection
- Integral diagnostic system
- Flue gas temperature monitoring in connection with flue gas temperature sensor
- Service indicator

- Optional connection of an external fault message facility
- Emissions test mode
- With boiler protection function subject to boiler/system version:
 - Therm-Control start-up control
 - Flow rate reduction for downstream heating circuits
 - Control of a shunt pump
 - Control of a constant return temperature raising facility with regulated 3-way mixing valve (only as an alternative to the control of a cylinder loading system with mixer assembly)
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1
- Service, commissioning and diagnostics via WiFi interface

Single boiler systems:

- Adaptive cylinder temperature control with priority control (heating circuit pump off)
- Auxiliary function for DHW heating (short-term heating to a higher temperature)
- Control of solar DHW heating and central heating backup in conjunction with solar control module, type SM1
- Control of a cylinder loading system with mixer assembly (only as an alternative to control of a constant return temperature raising facility with regulated 3-way mixing valve)
- Functions via external contacts:
 - External demand with minimum set boiler water temperature
 - External changeover, stepped / modulating burner
 - External demand, burner stage 1
 - External demand, burner stage 2
- Additional functions via EA1 extension (accessories):
 - External demand by specifying a set boiler water temperature or output via 0 to 10 V input
 - 3 digital inputs for the following functions:
 - External blocking
 - External blocking with fault message input
 - Fault message input
 - External demand
- Additional functions via AM1 extension (accessories):
 - Control of up to 2 circulation pumps, if output $\boxed{20}$ A1 at the control unit is already assigned:
 - Circulation pump for flue gas/water heat exchanger
 - Circulation pump for neutralising system
 - Circulation pump for cylinder heating

Multi boiler systems (1 boiler with Vitotronic 300, type CM1E):

- Functions via external contacts:
 - External blocking
 - Externally starting a boiler as the last one in the boiler sequence
 - External changeover, stepped / modulating burner
- Additional functions via AM1 extension (accessories):
 - Control of up to 2 circulation pumps, if output $\boxed{20}$ A1 at the control unit is already assigned:
 - Circulation pump for flue gas/water heat exchanger
 - Circulation pump for neutralising system

Multi boiler systems with third party control unit:

- Functions via external contacts:
 - Boiler enable/butterfly valve control
 - External demand, burner stage 1
 - External demand, burner stage 2
 - External changeover, stepped / modulating burner
- Additional functions via EA1 extension (accessories):
 - External demand by specifying a set boiler water temperature or output and boiler enable via 0 to 10 V input

Note

An EA1 extension must be connected to **every** Vitotronic 100.

- Additional functions via AM1 extension (accessories):
 - Control of up to 2 circulation pumps, if output $\boxed{20}$ A1 at the control unit is already assigned:
 - Circulation pump for flue gas/water heat exchanger
 - Circulation pump for neutralising system

Control characteristics

- Boiler water temperature control for operation with multi stage burner via a 2-point controller with hysteresis
- Boiler water temperature control for operation with modulating burner via a PI controller
- For applications that are controlled via output 52:
 - Constant PI characteristics with 3-point output

Controller setting ranges

- Temperature controller for limiting the boiler water temperature:
 - 95 °C, adjustable to 100, 110 °C
- Setting the high limit safety cut-out:
 - 110 °C, adjustable to 100 °C
- Maximum limit for boiler water temperature:
 - Lower switching point subject to boiler/coding card
 - Upper switching point subject to temperature controller setting
- Setting range of the set DHW temperature:
 - 10 to 60 °C, adjustable to between 10 and 95 °C

Coding card

For matching to the boiler (supplied with the boiler).

Setting the operating programs

Frost protection monitoring for the boiler and DHW cylinder is enabled in all operating programs.

The following operating programs can be selected:

- Single boiler systems:
 - Heating and DHW
 - Only DHW
 - Standby mode
- Multi boiler systems:
 - Heating
 - Standby mode

Summer mode (only in single boiler systems)

("Only DHW")

The burner starts only when the DHW cylinder needs reheating (controlled by the cylinder temperature controller).

The lower boiler water temperature for each boiler is maintained as required.

Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	12 A~
Power consumption	16 W
Protection class	I
IP rating	IP 20D to EN 60529; ensure through design/installation.
Function type	Type 1B to EN 60730-1

Control units (cont.)

Permissible ambient temperature – Operation	0 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +60 °C

Rated relay output breaking capacity

Plug	Component	Rated breaking capacity
[20] A1	One of the following circulation pumps: – Primary cylinder loading pump for cylinder loading system – Circulation pump for flue gas/ water heat exchanger or Switching output for flow rate reduction (Therm-Control)	4(2) A, 230 V~
[21]	One of the following circulation pumps: – Circulation pump for cylinder heating – Secondary cylinder loading pump for cylinder loading system	4(2) A, 230 V~

Plug	Component	Rated breaking capacity
[29]	One of the following circulation pumps: – Shunt pump – Boiler circuit pump – Boiler circuit pump with butterfly valve function	4(2) A, 230 V~
[41]	Burner stage 1	6(3) A, 230 V~
[50]	Central fault message facility	4(2) A, 230 V~
[52] A1	One of the following functions: – Motorised butterfly valve – Mixing valve for return temperature control – Mixing valve, heat exchanger set	0.2 (0.1) A, 230 V~
[90]	One of the following functions: – Burner stage 2 – Modulating burner	1(0.5) A, 230 V~ 0.2(0.1) A, 230 V~
Total		Max. 12 A, 230 V~

Delivered condition

- Control unit
- Boiler water temperature sensor
- Packed separately:
Programming unit

Heating system with DHW cylinder

Order separately only in connection with single boiler systems:

- Cylinder temperature sensor and circulation pump with check valve for regulating the cylinder temperature
or
- Vitotrans 222 cylinder loading system with mixer assembly and cylinder temperature sensor

LON communication module

For communication with other control units and with Vitagate or Vitocom, the LON communication module is a required accessory.

9.4 Vitotronic 200, type CO1E

Specification

Layout

The control unit comprises a standard unit, electronics modules and a programming unit.

Standard unit:

- ON/OFF switch
- Test key
- WiFi service interface
- Temperature controller
TR 1168
or
TR 1107
- High limit safety cut-out
STB 1169
or
STB 1154
- Plug connection chamber:
 - Connection of external equipment via system plugs
 - Connection of three-phase consumers via additional contactors

Programming unit

- Easy operation thanks to:
 - Colour touchscreen with large font and high contrast
 - Context-sensitive help
- User prompts via plain text and graphic display
- Settings:
 - Set room temperatures
 - DHW temperature
 - Operating program
 - Time programs for central heating, DHW heating and DHW circulation pump
 - Economy mode
 - Comfort mode
 - Holiday program
 - Heating curves
 - Parameters
 - Actuator tests
 - Test mode

- Displays:
 - Boiler water temperature
 - DHW temperature
 - Operating data
 - Diagnostic details
 - Energy cockpit
 - Maintenance and fault messages
- Available languages:
 - German
 - Bulgarian
 - Czech
 - Danish
 - English
 - Spanish
 - Estonian
 - French
 - Croatian
 - Italian
 - Latvian
 - Lithuanian
 - Hungarian
 - Dutch
 - Polish
 - Russian
 - Romanian
 - Slovenian
 - Finnish
 - Swedish
 - Turkish
 - Slovak
 - Ukrainian
 - Portuguese

Functions

- Weather-compensated control of the boiler water temperature (= system flow temperature) and flow temperature of the heating circuit with mixer
- Control of one heating circuit without mixer and 2 heating circuits with mixer
- Electronic maximum and minimum limitation of the flow temperature in heating circuits with mixer
- Demand-dependent heating circuit pump and burner shutdown (not for burners on boilers with a lower boiler water temperature limit)
- Adjustment of a variable heating limit
- Pump anti-seizing protection
- Integral diagnostic system
- Flue gas temperature monitoring in connection with flue gas temperature sensor
- Service indicator
- Emissions test mode
- Adaptive cylinder temperature control with priority control (heating circuit pump off)
- Auxiliary function for DHW heating (short-term heating to a higher temperature)
- Control of solar DHW heating and central heating backup plus graphic illustration of the solar yield in conjunction with solar control module type SM1
- Control of a cylinder loading system with mixer assembly (only as an alternative to control of a constant return temperature raising facility with regulated 3-way mixing valve)
- Optional connection of an external fault message facility
- Screed drying program for the heating circuits with mixer
- With boiler protection functions subject to boiler version:
 - Therm-Control start-up control
 - Flow rate reduction for downstream heating circuits
 - Control of a shunt pump
 - Control of a constant return temperature raising facility with regulated 3-way mixing valve (only as an alternative to the control of a cylinder loading system with mixer assembly)

- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1
- Service, commissioning and diagnostics via WiFi interface
- Functions via external contacts:
 - External operating program changeover
 - External blocking
 - External Mixer CLOSE/Mixer OPEN
 - External demand with minimum set boiler water temperature
 - External changeover, stepped / modulating burner
- Additional functions via EA1 extension (accessories):
 - External demand by specifying a set boiler water temperature or output via 0 to 10 V input
 - Switching a feed pump to a substation in conjunction with a Vitotronic 200-H or
Signalling of reduced mode (reduction of the heating circuit pump speed) via potential-free output
 - 3 digital inputs for the following functions:
 - External blocking with fault message input
 - Fault message input
 - Brief operation of the DHW circulation pump
 - External demand
- Additional functions via AM1 extension (accessories):
 - Control of up to 2 circulation pumps, if output 20A1 at the control unit is already assigned:
 - Circulation pump for flue gas/water heat exchanger
 - Circulation pump for neutralising system
 - Heating circuit pump
 - Circulation pump for cylinder heating
 - DHW circulation pump

The requirements of EN 12831 for calculating the heat load are met. To reduce the heat-up output, the reduced room temperature is raised when outside temperatures are low. To shorten the heat-up time after a setback phase the flow temperature of the heating circuits with mixers is raised for a limited time. According to the Energy Saving Ordinance [Germany], the temperature in each room must be individually controlled, e.g. by means of thermostatic valves.

Control characteristics

- Boiler water temperature control for operation with multi stage burner via a 2-point controller with hysteresis
- Boiler water temperature control for operation with modulating burner via a PI controller
- For applications that are controlled via output 52:
 - Constant PI characteristics with 3-point output

Controller setting ranges

- Temperature controller for limiting the boiler water temperature:
 - 95 °C, adjustable to 100, 110 °C
- Setting the high limit safety cut-out:
 - 110 °C, adjustable to 100 °C
- Maximum limit for boiler water temperature:
 - Lower switching point subject to boiler/coding card
 - Upper switching point subject to temperature controller setting
- Setting range of the set DHW temperature:
 - 10 to 60 °C, adjustable to between 10 and 95 °C
- Heating curve setting range:
 - Slope: 0.2 to 3.5
 - Level: -13 to 40 K
 - Maximum limit for the flow temperature of the heating circuits with mixer: 10 to 127 °C
 - Minimum limit for the flow temperature of the heating circuits with mixer: 1 to 127 °C
- Differential temperature for heating circuits with mixer: 0 to 40K

Coding card

For matching to the boiler (supplied with the boiler).

Time program

- Individual day and seven-day program, holiday program
 - Automatic summer/wintertime changeover
 - Automatic function for DHW heating and DHW circulation pump
 - Standard time phases for central heating, DHW heating and the DHW circulation pump are preset at the factory
 - Date and time need to be set.
 - Time phases are individually programmable; up to 4 time phases per day
- Shortest switching interval: 10 min
Power reserve: 14 days

Setting the operating programs

Frost protection monitoring (see frost protection function) for the heating system is enabled in all operating programs.

The following operating programs can be selected:

- Heating and DHW
- Only DHW
- Standby mode

Optional external operating program changeover.

Frost protection function

- The frost protection function is switched on if the outside temperature falls below approx. +1 °C, i.e. the heating circuit pumps are switched on and the boiler water is maintained at a lower temperature (see chapter "Operating conditions with Vitotronic boiler control units").
- "Standby mode":
The frost protection function is switched off if the outside temperature rises above approx. +3 °C, i.e. the heating circuit pumps and burner are switched off.
- "Heating and DHW"
The frost protection function is switched off when the outside temperature exceeds approx. +3 °C. This means the heating circuit pumps are switched off and any lower boiler water temperature that may be required for the relevant boiler is maintained (see chapter "Operating conditions with Vitotronic boiler control units").

Summer mode

("Only DHW")

The burner starts only when the DHW cylinder needs reheating (controlled by the cylinder temperature controller).

The lower boiler water temperature for each boiler is maintained as required.

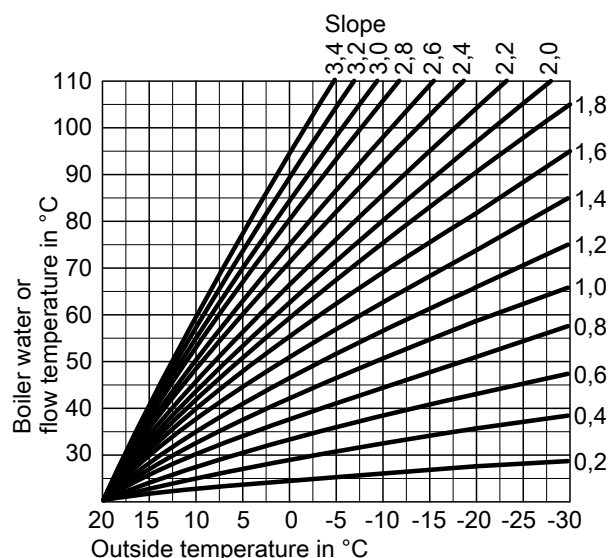
Heating curve setting (slope and level)

The Vitotronic controls the boiler water temperature (= system flow temperature) and the flow temperature of the heating circuits with mixer in weather-compensated mode. The boiler water temperature is automatically controlled to between 0 and 40 K above the highest currently required set flow temperature (delivered condition 8 K).

The flow temperature required to reach a specific room temperature depends on the heating system and the thermal insulation of the building to be heated.

Adjusting the heating curve matches the boiler water temperature and the flow temperature to these operating conditions.

The upper boiler water temperature is limited by the temperature controller and the electronic maximum limiter.



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	12 A~
Power consumption	16 W
Protection class	I
IP rating	IP 20D to EN 60529; ensure through design/installation.
Function type	Type 1B to EN 60730-1
Permissible ambient temperature – Operation	0 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +60 °C

Rated relay output breaking capacity

Plug	Component	Rated breaking capacity
20/A1	One of the following circulation pumps: – Heating circuit pump for heating circuit 1 without mixer – Primary cylinder loading pump for cylinder loading system – Circulation pump for flue gas/water heat exchanger or Switching output for flow rate reduction (Therm-Control)	4(2) A, 230 V~
20/M2/M3	Heating circuit pump	4(2) A, 230 V~
21	One of the following circulation pumps: – Circulation pump for cylinder heating – Secondary cylinder loading pump for cylinder loading system	4(2) A, 230 V~
28	DHW circulation pump	4(2) A, 230 V~
29	One of the following circulation pumps: – Shunt pump – Boiler circuit pump – Boiler circuit pump with butterfly valve function	4(2) A, 230 V~

Control units (cont.)

Plug	Component	Rated breaking capacity
41	Burner stage 1	6(3) A, 230 V~
50	Central fault message facility	4(2) A, 230 V~
52/A1	One of the following functions: – Mixing valve for return temperature control – Mixing valve, heat exchanger set	0.2 (0.1) A, 230 V~
52/M2/M3	Mixer motor, mixer extension kit	0.2 (0.1) A, 230 V~

Plug	Component	Rated breaking capacity
90	One of the following functions: – Burner stage 2 – Modulating burner	1(0.5) A, 230 V~ 0.2(0.1) A, 230 V~
Total		Max. 12 A, 230 V~

DHW circulation pump power supply

DHW circulation pumps with their own internal control unit must be connected to a separate power supply. Mains connection via the Vitotronic control unit or Vitotronic accessories is **not** permissible.

Delivered condition

- Control unit
- Outside temperature sensor
- Boiler water temperature sensor
- Packed separately:
Cylinder temperature sensor
Programming unit

Heating system with DHW cylinder

Order separately:

- Circulation pump with check valve for regulating the cylinder temperature
or
- Vitotrans 222 cylinder loading system with mixer assembly

Heating system with heating circuit with mixer

Required accessories:

- Extension for 2nd and 3rd heating circuits
- Mixer extension kit for **each** heating circuit with mixer

LON communication module

For communication with other control units and with Vitogate or Vitocom, the LON communication module is a required accessory.

9.5 Vitotronic 300, type CM1E

Specification

Layout

The control unit comprises a standard unit, electronics modules and a programming unit.

Standard unit:

- ON/OFF switch
- Test key
- WiFi service interface
- Temperature controller
TR 1168
or
TR 1107
- High limit safety cut-out
STB 1169
or
STB 1154
- Plug connection chamber:
 - Connection of external equipment via system plugs
 - Connection of three-phase consumers via additional contactors

Programming unit

- Easy operation thanks to:
 - Colour touchscreen with large font and high contrast
 - Context-sensitive help
- User prompts via plain text and graphic display

■ Settings:

- Boiler sequence
- Set room temperatures
- DHW temperature
- Operating program
- Time programs for central heating, DHW heating and DHW circulation pump
- Economy mode
- Comfort mode
- Holiday program
- Heating curves
- Parameters
- Actuator tests
- Test mode



- Displays:
 - Common flow temperature
 - DHW temperature
 - Operating data
 - Overview of the enabled boilers with current heating output
 - Diagnostic details
 - Energy cockpit
 - Maintenance and fault messages
- Available languages:
 - German
 - Bulgarian
 - Czech
 - Danish
 - English
 - Spanish
 - Estonian
 - French
 - Croatian
 - Italian
 - Latvian
 - Lithuanian
 - Hungarian
 - Dutch
 - Polish
 - Russian
 - Romanian
 - Slovenian
 - Finnish
 - Swedish
 - Turkish
 - Slovak
 - Ukrainian
 - Portuguese

Functions

- Weather-compensated control of the system flow temperature in a multi boiler system (cascade) comprising up to 7 additional boilers with Vitotronic 100, type CC1E, and of the flow temperature of 2 heating circuits with mixer
- Regulating the boiler water temperature of a boiler in the cascade
- Control of the 8 boilers in accordance with a freely selectable boiler sequence strategy
- Electronic maximum and minimum limitation of the flow temperature in heating circuits with mixer
- Demand-dependent heating circuit pump and burner shutdown (not for burners on boilers with a lower boiler water temperature limit)
- Adjustment of a variable heating limit
- Pump anti-seizing protection
- Integral diagnostic system
- Flue gas temperature monitoring in connection with flue gas temperature sensor
- Service indicator
- Adaptive cylinder temperature control with priority control (heating circuit pump off, mixer close)
- Auxiliary function for DHW heating (short-term heating to a higher temperature)
- Control of solar DHW heating and central heating backup plus graphic illustration of the solar yield in conjunction with solar control module type SM1
- Control of a cylinder loading system with mixer assembly (only as an alternative to control of a constant return temperature raising facility with regulated 3-way mixing valve)
- Optional connection of an external fault message facility
- Emissions test mode
- Screed drying program for the heating circuits with mixer

- With boiler protection functions subject to boiler version:
 - Therm-Control start-up control
 - Control of a shunt pump
 - Control of a constant return temperature raising facility with regulated 3-way mixing valve (only as an alternative to the control of a cylinder loading system with mixer assembly)
- Can be externally integrated into the building management system via Vitogate 300
- Remote monitoring/remote parameter setting possible via Vitocom 300, type LAN3 or Vitocom 100, type LAN1
- Service, commissioning and diagnostics via WiFi interface
- Functions via external contacts:
 - External blocking
 - Externally starting a boiler as the last one in the boiler sequence
 - External demand with minimum set flow temperature
 - External changeover, stepped / modulating burner
- Additional functions via EA1 extension (accessories):
 - External demand by specifying a common set flow temperature via 0 to 10 V input
 - Switching a feed pump to a substation in conjunction with a Vitotronic 200-H or
Signalling of reduced mode (reduction of the heating circuit pump speed) via potential-free output
 - 3 digital inputs for the following functions:
External operating program changeover, separate for heating circuits 1 to 3
External blocking with fault message input
Fault message input
Brief operation of the DHW circulation pump
External demand
- Additional functions via AM1 extension (accessories):
 - Control of up to 2 circulation pumps, if output $\overline{20}$ A1 at the control unit is already assigned:
Circulation pump for flue gas/water heat exchanger
Circulation pump for neutralising system
Heating circuit pump
DHW circulation pump
Circulation pump for cylinder heating
Distribution pump

The requirements of EN 12831 for calculating the heat load are met. To reduce the heat-up output, the reduced room temperature is raised when outside temperatures are low. To shorten the heat-up time after a setback phase the flow temperature is raised for a limited time.

According to the Energy Saving Ordinance [Germany], the temperature in each room must be individually controlled, e.g. by means of thermostatic valves.

Control characteristics

- Boiler water temperature control for operation with multi stage burner via a 2-point controller with hysteresis
- Boiler water temperature control for operation with modulating burner via a PI controller
- For applications that are controlled via output 52:
Constant PI characteristics with 3-point output

Controller setting ranges

- Temperature controller for limiting the boiler water temperature: 95 °C, adjustable to 100, 110 °C
- Setting the high limit safety cut-out: 110 °C, adjustable to 100 °C
- Maximum limit for boiler water temperature:
Lower switching point subject to boiler/coding card
Upper switching point subject to temperature controller setting
- Setting range of the set DHW temperature: 10 to 60 °C, adjustable to between 10 and 95 °C

Control units (cont.)

- Heating curve setting range:
 - Slope: 0.2 to 3.5
 - Level: -13 to 40 K
 - Maximum limit for the flow temperature of the heating circuits with mixer: 10 to 127 °C
 - Minimum limit for the flow temperature of the heating circuits with mixer: 1 to 127 °C
- Differential temperature for heating circuits with mixer: 0 to 40K

Coding card

For matching to the boiler (supplied with the boiler).

Time program

- Individual day and seven-day program, holiday program
 - Automatic summer/wintertime changeover
 - Automatic function for DHW heating and DHW circulation pump
 - Standard time phases for central heating, DHW heating and the DHW circulation pump are preset at the factory
 - Date and time need to be set.
 - Time phases are individually programmable; up to 4 time phases per day
- Shortest switching interval: 10 min
Power reserve: 14 days

Setting the operating programs

Frost protection monitoring (see frost protection function) for the heating system is enabled in all operating programs.

The following operating programs can be selected:

- Heating and DHW
- Only DHW
- Standby mode

External operating program changeover possible, for all heating circuits together or separately.

Frost protection function

- The frost protection function is switched on if the outside temperature falls below approx. +1 °C, i.e. the heating circuit pumps are switched on and the boiler water is maintained at a lower temperature (see chapter "Operating conditions with Vitotronic boiler control units").
- "Standby mode":
The frost protection function is switched off if the outside temperature rises above approx. +3 °C, i.e. the heating circuit pumps and burner are switched off.
- "Heating and DHW"
The frost protection function will stop when the outside temperature exceeds approx. +3 °C. This means the heating circuit pumps are switched off and the lower boiler water temperature for the relevant boiler is maintained if necessary (see chapter "Operating conditions with Vitotronic boiler control units").

Summer mode

("Only DHW")

The burner starts only when the DHW cylinder needs reheating (controlled by the cylinder temperature controller).

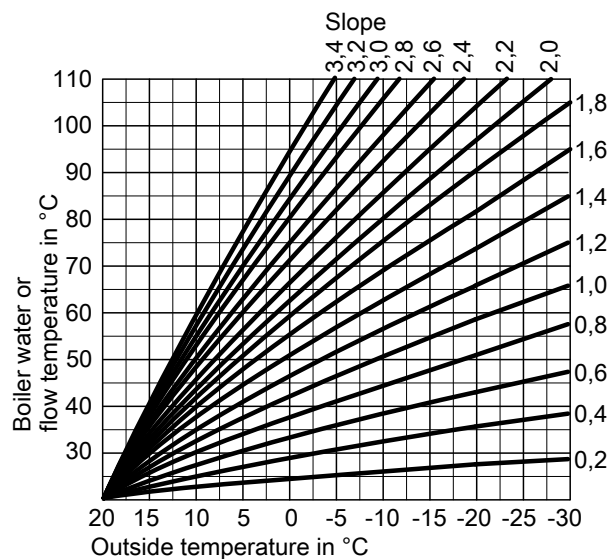
The lower boiler water temperature for each boiler is maintained as required.

Heating curve setting (slope and level)

The Vitotronic controls the boiler water temperature (= system flow temperature) and the flow temperature of the heating circuits with mixer in weather-compensated mode. The boiler water temperature is automatically controlled to between 0 and 40 K above the highest currently required set flow temperature (delivered condition 8 K). The flow temperature required to reach a specific room temperature depends on the heating system and the thermal insulation of the building to be heated.

Adjusting the heating curve matches the boiler water temperature and the flow temperature to these operating conditions.

The upper boiler water temperature is limited by the temperature controller and the electronic maximum limiter.



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	12 A~
Power consumption	16 W
Protection class	I
IP rating	IP 20D to EN 60529; ensure through design/installation.
Function type	Type 1B to EN 60730-1
Permissible ambient temperature – Operation	0 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	-20 to +60 °C

Rated relay output breaking capacity

Plug	Component	Rated breaking capacity
20 A1	One of the following circulation pumps: – Heating circuit pump for heating circuit 1 without mixer – Primary cylinder loading pump for cylinder loading system – Circulation pump for flue gas/water heat exchanger or Switching output for flow rate reduction (Therm-Control)	4(2) A, 230 V~
20 M2/M3	Heating circuit pump	4(2) A, 230 V~
21	One of the following circulation pumps: – Circulation pump for cylinder heating – Secondary cylinder loading pump for cylinder loading system	4(2) A, 230 V~
28	DHW circulation pump	4(2) A, 230 V~

Control units (cont.)

Plug	Component	Rated breaking capacity
29	One of the following circulation pumps: – Shunt pump – Boiler circuit pump – Boiler circuit pump with butterfly valve function – Distribution pump	4(2) A, 230 V~
41	Burner stage 1	6(3) A, 230 V~
50	Central fault message facility	4(2) A, 230 V~
52 A1	One of the following functions: – Motorised butterfly valve – Mixing valve for return temperature control – Mixing valve, heat exchanger set	0.2 (0.1) A, 230 V~

Plug	Component	Rated breaking capacity
52 M2/M3	Mixer motor, mixer extension kit	0.2 (0.1) A, 230 V~
90	One of the following functions: – Burner stage 2 – Modulating burner	1(0.5) A, 230 V~ 0.2(0.1) A, 230 V~
Total		Max. 12 A, 230 V~

DHW circulation pump power supply

DHW circulation pumps with their own internal control unit must be connected to a separate power supply. Mains connection via the Vitotronic control unit or Vitotronic accessories is **not** permissible.

Delivered condition

- Control unit
- Outside temperature sensor
- Boiler water temperature sensor
- Flow temperature sensor (contact temperature sensor)
- Packed separately:
 - Programming unit
 - LON communication module
 - Cylinder temperature sensor
 - Extension for heating circuits 2 and 3

Heating system with DHW cylinder

Order separately:

- Circulation pump with check valve for regulating the cylinder temperature
or
- Vitotrans 222 cylinder loading system with mixer assembly

Heating system with heating circuit with mixer

A mixer extension kit (accessories) is required for each heating circuit with mixer.

9.6 Control unit accessories

Allocation of accessories according to control unit type

Vitotronic Type	Single boiler system		Multi boiler system	
	100 CC1E	200 CO1E	100 CC1E	300 CM1E
Accessories				
Vitotrol 200-A		X		X
Vitotrol 300-A		X		X
Vitotrol 200-RF		X		X
Wireless base station		X		X
Wireless repeater		X		X
Room temperature sensor				X
Contact temperature sensor	X	X	X	X
Immersion temperature sensor	X	X	X	X
Sensor well	X	X	X	X
Cylinder temperature sensor (immersion temperature sensor)	X			
Flue gas temperature sensor	X	X	X	
Mixer extension kit				X
Mixer motor				X
Extension for 2nd and 3rd heating circuits		X		
Immersion thermostat				X
Contact thermostat				X
Wiring centre for external safety equipment	X	X	X	X
Contact relay	X	X	X	X
Mating plugs 41 and 90	X	X	X	
Solar control module, type SM1	X	X		X
AM1 extension	X	X	X	X
EA1 extension	X	X	X	X
LON cable	X	X	X	X
LON coupling	X	X	X	X
LON plug-in connector	X	X	X	X
LON socket	X	X	X	X
Terminator	X	X		
LON communication module	X	X		

Control units (cont.)

	Single boiler system		Multi boiler system	
	100	200	100	300
Type	CC1E	CO1E	CC1E	CM1E
Accessories				
Vitogate 300	X	X	X	X
Vitocom 300, type LAN3	X	X	X	X
Vitocom 100, type LAN1	X	X	X	

Information regarding Vitotrol 200-A and 300-A

A Vitotrol 200-A or Vitotrol 300-A can be used for each heating circuit within a heating system.

The Vitotrol 200-A can regulate one heating circuit; the Vitotrol 300-A up to 3 heating circuits.

Up to 3 remote control units can be connected to the control unit.

Note

Hardwired remote control units cannot be combined with the wireless base station.

Vitotrol 200-A

Part no. Z008341

KM BUS subscriber

■ Displays:

- Room temperature
- Outside temperature
- Operating condition

■ Settings:

- Set room temperature for standard mode (normal room temperature)

Note

The set room temperature for reduced mode (reduced room temperature) is set at the control unit.

- Operating program

■ Party and economy mode can be enabled via keys

■ Integral room temperature sensor for room temperature hook-up (only for one heating circuit with mixer)

Installation location:

■ Weather-compensated mode:

installation anywhere in the building

■ Room temperature hook-up:

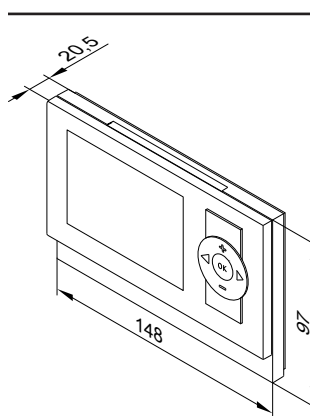
the integral room temperature sensor captures the actual room temperature and effects any necessary correction of the flow temperature.

The captured room temperature depends on the installation site:

- Main living room on an internal wall opposite radiators
- Not on shelves or in recesses
- Never in the immediate vicinity of doors or close to heat sources (e.g. direct insolation, fireplace, TV set, etc.).

Connection:

- 2-core lead, length max. 50 m (even if connecting several remote control units)
- Never route this cable immediately next to 230/400 V cables.
- LV plug as standard delivery



Specification

Power supply	Via KM BUS
Power consumption	0.2 W
Protection class	III
IP rating	IP 30 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Setting range of the set room temperature for standard mode	3 to 37 °C

Notes

- If the Vitotrol 200-A is to be used for room temperature hook-up, site the device in a main living room (lead room).
- Connect a maximum of 2 Vitotrol 200-A units to the control unit.

Vitotrol 300-A

Part no. Z008342

KM BUS subscriber

■ Displays:

- Room temperature
- Outside temperature
- Operating program
- Operating condition
- Graphic illustration of the solar energy yield in conjunction with the solar control module, type SM1

■ Settings:

Control units (cont.)

- Set room temperature for standard mode (normal room temperature) and reduced mode (reduced room temperature)
- Set DHW temperature
- Operating program, switching times for heating circuits, DHW heating and DHW circulation pump plus further settings via plain text menu on the display
- Party and economy mode can be enabled via the menu
- Integral room temperature sensor for room temperature hook-up (only for one heating circuit with mixer)

Installation location:

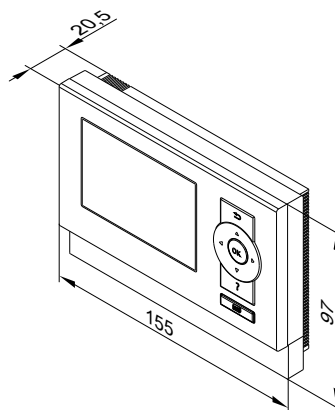
- Weather-compensated mode:
installation anywhere in the building
- Room temperature hook-up:
the integral room temperature sensor captures the actual room temperature and effects any necessary correction of the flow temperature.

The captured room temperature depends on the installation site:

- Main living room on an internal wall opposite radiators
- Not on shelves or in recesses
- Never in the immediate vicinity of doors or close to heat sources (e.g. direct insolation, fireplace, TV set, etc.).

Connection:

- 2-core lead, length max. 50 m (even if connecting several remote control units)
- Never route this cable immediately next to 230/400 V cables.
- LV plug as standard delivery



Specification

Power supply via KM BUS	
Power consumption	0.5 W
Protection class	III
IP rating	IP 30 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Setting range for set room temperature	3 to 37 °C

Information on Vitotrol 200-RF

Wireless remote control unit with integral wireless transmitter for operation with the wireless base station.

- A Vitotrol 200-RF can be used for each heating circuit in a heating system.
- The Vitotrol 200-RF can control one heating circuit.
- Up to 3 wireless remote control units can be connected to the control unit.

Note

The wireless remote control **cannot** be combined with hardwired remote control units.

Vitotrol 200-RF

Part no. Z011219

Wireless subscriber

- Displays:
 - Room temperature
 - Outside temperature
 - Operating condition
 - Wireless signal reception quality
- Settings:
 - Set room temperature for standard mode (normal room temperature)

Note

The set room temperature for reduced mode (reduced room temperature) is set at the control unit.

- Operating program
- Party and economy mode can be enabled via keys
- Integral room temperature sensor for room temperature hook-up (only for one heating circuit with mixer)

Installation location:

- Weather-compensated mode:
Installation anywhere in the building
- Room temperature hook-up:
The integral room temperature sensor captures the room temperature and effects any necessary correction of the flow temperature.

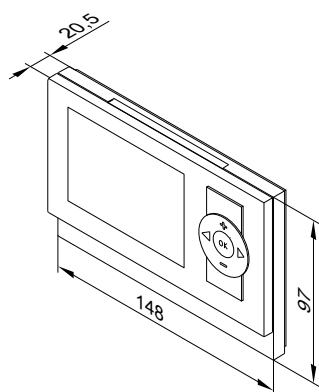
The captured room temperature depends on the installation site:

- Main living room on an internal wall opposite radiators
- Not on shelves or in recesses
- Never in the immediate vicinity of doors or close to heat sources (e.g. direct insolation, fireplace, TV set, etc.)

Note

Observe the "Wireless accessories" technical guide.

Control units (cont.)



Specification

Power supply	2 AA batteries 3 V
Radio frequency	868 MHz
Wireless range	See "Wireless accessories" technical guide
Protection class	III
IP rating	IP 30 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Setting range of the set room temperature for standard mode	3 to 37 °C

Wireless base station

Part no. Z011413

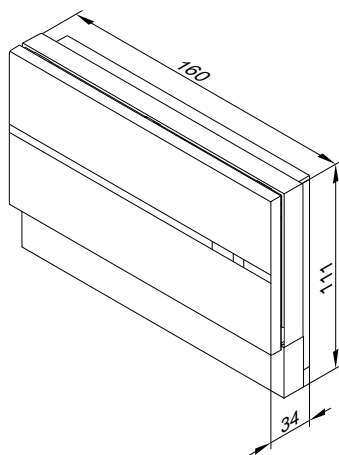
KM-BUS subscribers

For communication between the Vitotronic control unit and Vitotrol 200-RF wireless remote control.

For up to 3 wireless remote control units. Not in conjunction with a hardwired remote control unit.

Connection:

- 2-core lead, length up to 50 m (even when connecting several KM-BUS subscribers).
- Never route this cable immediately next to 230/400 V cables.



Specification

Power supply via KM-BUS

Power consumption	1 W
Radio frequency	868 MHz
Protection class	III
IP rating	IP 20 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C

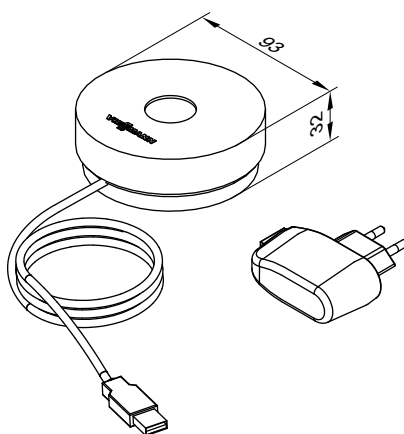
Wireless repeater

Part no. 7456538

Mains operated wireless repeater to increase the wireless range and for use in areas where wireless communication is difficult. Observe the "Wireless accessories" technical guide.

Do not use more than one wireless repeater per Vitotronic control unit.

- For preventing strongly diagonal angles of penetration of the radio signals through steel reinforced concrete ceilings/floors and/or multiple walls
- For circumventing large metallic objects situated between the wireless components.



Control units (cont.)

Specification

Power supply	230 V~ / 5 V $\overline{\text{---}}$ via plug-in power supply unit
Power consumption	0.25 W
Radio frequency	868 MHz
Lead length	1.1 m with plug
Safety category	II
IP rating	IP 20 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +55 °C
– Storage and transport	–20 to +75 °C

Room temperature sensor

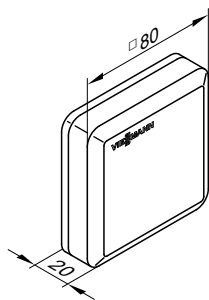
Part no. 7438537

Separate room temperature sensor as supplement to the Vitotrol 300A; to be used if the Vitotrol 300A cannot be installed inside the main living room or in a suitable position for temperature capture and adjustment.

Installation in the main living room on an internal wall opposite radiators. Never install inside shelving units, in recesses, or immediately by a door or heat source e.g. direct insolation, fireplace, TV set, etc. Connect the room temperature sensor to the Vitotrol 300A.

Connection:

- 2-core lead with a cross-section of 1.5 mm² (copper)
- Max. lead length from the remote control: 30 m
- Never route this cable immediately next to 230/400 V cables.



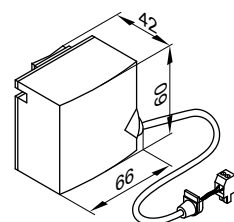
Specification

Protection class	III
IP rating	IP 30 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C

Contact temperature sensor

Part no. 7426463

To capture the temperature on a pipe



Secured with a tie.

Specification

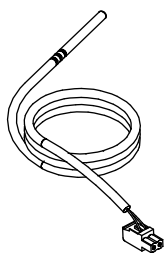
Lead length	5.8 m, fully wired
IP rating	IP 32D to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +120 °C
– Storage and transport	–20 to +70 °C

Immersion temperature sensor

Part no. 7544848

To capture the temperature in a sensor well

Control units (cont.)



Specification

Cable length	5.8 m, fully wired
IP rating	IP 32 to EN 60529; ensure through design/installation.
Sensor type	Viessmann NTC 10 kΩ, at 25 °C
Permissible ambient temperature	
– Operation	0 to +90 °C
– Storage and transport	–20 to +70 °C

Sensor well

For part no., see pricelist

For cylinder temperature sensor; with Viessmann DHW cylinders part of the standard delivery.

Flue gas temperature sensor

Part no. 7452531

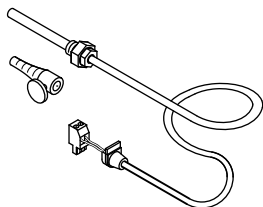
For flue gas temperature scanning, flue gas temperature monitoring and service display, if the set temperature has been exceeded. With threaded cone.

Installation on the flue pipe. The distance from the boiler must be approx. 1.5 times the flue pipe diameter, measured from the boiler back edge to the chimney.

- Condensing boilers with Viessmann balanced flue system:
Order the balanced flue pipe with connector for the flue gas temperature sensor separately.
- For condensing boilers with on-site flue pipe:
The aperture required for the flue pipe installation must be designed and approved on site. Install the flue gas temperature sensor into a stainless steel sensor well (on-site).

Specification

Cable length	3.5 m, fully wired
IP rating	IP 60 to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 20 kΩ, at 25 °C
Permissible ambient temperature	
– Operation	0 to +250 °C
– Storage and transport	–20 to +70 °C



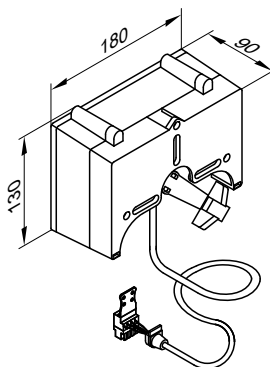
Mixer extension kit

Part no. 7441998

Components:

- Mixer motor with connecting cable (4.0 m long) for Viessmann mixer DN 20 to DN 50 and R 1½ to R 1¼ (not for flanged mixers) and plug
- Flow temperature sensor as contact temperature sensor with connecting cable (5.8 m long) and plug
- Plug for heating circuit pump

Mixer motor

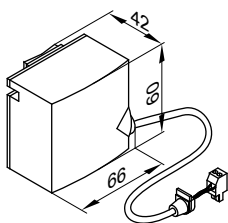


Control units (cont.)

Mixer motor specification

Rated voltage	230 V~
Rated frequency	50 Hz
Power consumption	4 W
Safety category	II
IP rating	IP 42 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Torque	3 Nm
Runtime for 90° ◀	120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

Specification, flow temperature sensor

IP rating	IP 32D to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +120 °C
– Storage and transport	–20 to +70 °C

Mixer motor for flanged mixers

- **Part no. 9522487**
DN 40 and DN 50, without system plug and connecting cable
- **Part no. Z004344**
DN 65 to DN 100, without system plug and connecting cable

For specification, see the "Heating mixers and mixer motors" data-sheet.

Extension for 2nd and 3rd heating circuits

Part no. 7164403

PCB for installation in the control unit.
For controlling 2 heating circuits with mixer.

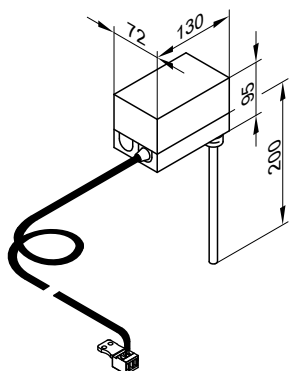
- With connections for mixer motors, flow temperature sensors (NTC 10 kΩ) and heating circuit pumps
- Plug for mixer motor and heating circuit pump for each heating circuit

Immersion thermostat

Part no. 7151728

May be used as a maximum temperature limiter for underfloor heating systems.

The temperature limiter is integrated into the heating flow. If the flow temperature is too high, the temperature limiter switches off the heating circuit pump.



Specification

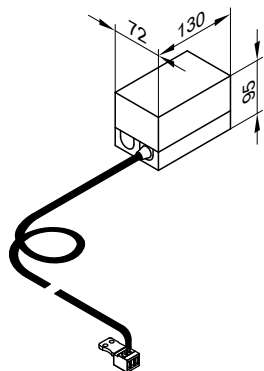
Cable length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	Max. 11 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	Inside the enclosure
Stainless steel sensor well (male thread)	R ½ x 200 mm
DIN reg. no.	DIN TR 1168

Contact thermostat

Part no. 7151729

May be used as a maximum temperature limiter for underfloor heating systems (only in conjunction with metal pipes).

The temperature limiter is integrated into the heating flow. If the flow temperature is too high, the temperature limiter switches off the heating circuit pump.



Specification

Lead length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	Max. 14 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	Inside the casing
DIN reg. no.	DIN TR 1168

Plug-in adaptor for external safety equipment

Part no. 7164404

KM-BUS subscribers

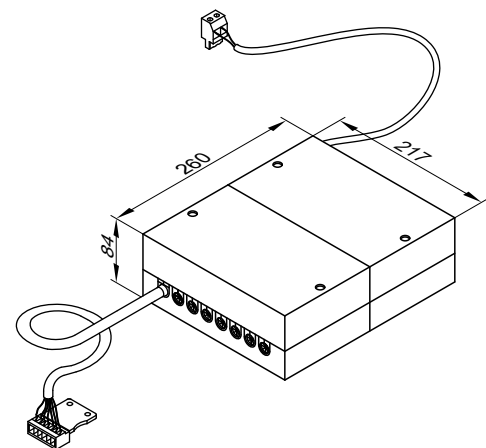
With cables/leads (3.0 m long) and plugs [145] and [150].

Up to 4 additional pieces of safety equipment may be connected, for example:

- Low water indicator
- Minimum pressure limiter
- Maximum pressure limiter
- Additional high limit safety cut-out

The plug-in adaptor enables the fault (plain text) to be displayed in the relevant control unit.

2 plug-in adaptors can be linked together via the KM-BUS and connected to the control unit. This makes it possible to connect 7 additional safety features.



Specification

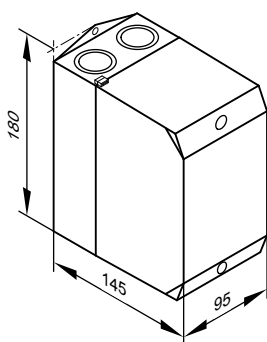
IP rating	IP 20D to EN 60529; ensure through design/installation.
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C

Contactor relay

Part no. 7814681

- Contactor in small enclosure
- With 4 N/C and 4 N/O contacts
- With terminal strips for earth conductors

Control units (cont.)



Specification

Coil voltage	230 V/50 Hz
Rated current (I_{th})	AC1 16 A
	AC3 9 A

Mating plugs 41 and 90

Part no. 7408790

Required for on-site burner without mating plug.

Solar control module, type SM1

Part no. Z014470

Specification

Functions

- Output statement and diagnostic system
- Operation and display via the Vitotronic control unit.
- Switching the solar circuit pump
- Heating of 2 consumers via a collector array
- 2nd temperature differential control
- Thermostat function for reheating or utilising excess heat
- Speed control for solar circuit pump via PWM input (make: Grundfos and Wilo)
- Suppression of DHW cylinder reheating by the heat generator subject to solar yield
- Heat-up of the solar preheating stage (with 400 l DHW cylinders or larger)
- Collector safety shutdown
- Electronic temperature limitation in the DHW cylinder
- Switching of an additional pump or valve via relay

To implement the following functions, also order immersion temperature sensor, part no. 7438702:

- For DHW circulation diversion in systems with 2 DHW cylinders
- For return changeover between the heat generator and the heating water buffer cylinder
- For return changeover between the heat generator and the primary heat store
- For heating additional consumers

Structure

The solar control module contains:

- PCB
- Terminals:
 - 4 sensors
 - Solar circuit pump
 - KM BUS
 - Power supply (on-site ON/OFF switch)
- PWM output for switching the solar circuit pump
- 1 relay for switching one pump or one valve

Collector temperature sensor

For connection inside the appliance

On-site extension of the connecting lead:

- 2-core lead, length up to 60 m with a cross-section of 1.5 mm² (copper)
- Never route this lead immediately next to 230/400 V cables.

Collector temperature sensor specification

Lead length	2.5 m
IP rating	IP 32 to EN 60529; ensure through design/installation.
Sensor type	Viessmann NTC 20 kΩ at 25 °C
Permissible ambient temperature	
– Operation	–20 to +200 °C
– Storage and transport	–20 to +70 °C

Cylinder temperature sensor

For connection inside the appliance

On-site extension of the connecting lead:

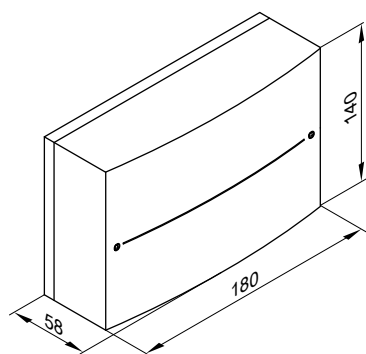
- 2-core lead, length up to 60 m with a cross-section of 1.5 mm² (copper)
- Never route this cable immediately next to 230/400 V cables.

Cylinder temperature sensor specification

Lead length	3.75 m
IP rating	IP 32 to EN 60529; ensure through design/installation.
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +90 °C
– Storage and transport	–20 to +70 °C

For systems with Viessmann DHW cylinders, the cylinder temperature sensor is installed in the threaded elbow in the heating water return (standard delivery or accessory for the relevant DHW cylinder).

Control units (cont.)



Protection class	I
IP rating	IP 20 to EN 60529; ensure through design/installation.
Function type	Type 1B to EN 60730-1
Permissible ambient temperature	
– Operation	0 to +40 °C, use in the living space or boiler room (standard ambient conditions)
– Storage and transport	–20 to +65 °C
Rated relay output breaking capacity	
– Semi-conductor relay 1	1 (1) A, 230 V~
– Relay 2	1 (1) A, 230 V~
– Total	Max. 2 A

Solar control module specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W

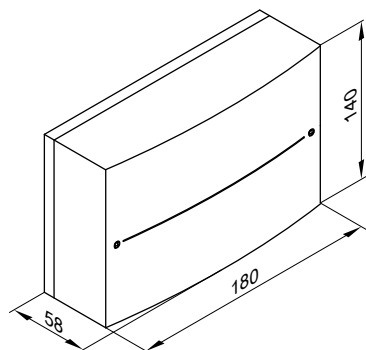
AM1 extension

Part no. 7452092

Only for the Vitoradial 300-T

Function extension in an enclosure for wall mounting. Up to 2 of the following pumps can be controlled (if installed in the heating system):

- Heating circuit pump for heating circuit without mixer
- Flue gas heat exchanger
- Neutralisation



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	4 A
Power consumption	4 W
Rated relay output breaking capacity	2(1) A, 250 V~ each, total max. 4 A~
Safety category	I
IP rating	IP 20 D to EN 60529, ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +65 °C

EA1 extension

Part no. 7452091

Function extension inside a casing, for wall mounting.

Using the inputs and outputs allows up to 5 functions to be implemented.

1 analogue input (0 to 10 V):

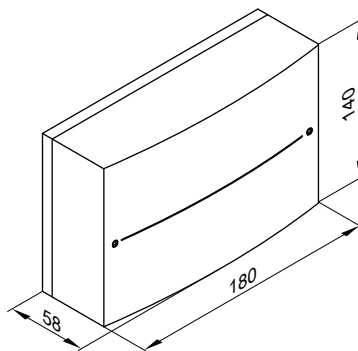
- Default set flow temperature, secondary circuit.

3 digital inputs:

- External changeover of the operating state.
- External demand and blocking.
- External demand for a minimum heating water temperature.

1 switching output:

- Swimming pool heating control.



Control units (cont.)

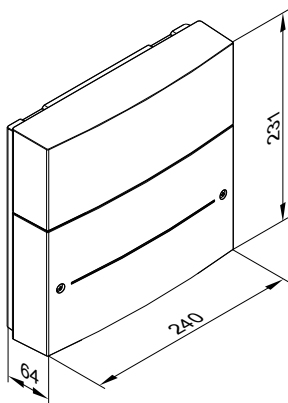
Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	4 W
Rated breaking capacity of the relay output	2(1) A, 230 V~
Safety category	I
IP rating	IP 20 D to EN 60529, ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +65 °C

Pump module PM1

Part no. Z016519

- Function extension inside enclosure for wall mounting
- For speed control of a boiler circuit pump



Functions

One of the following functions:

- Output-dependent speed control of a boiler circuit pump
- Target temperature control for flow temperature stabilisation

- Differential temperature control in single boiler systems for increased utilisation of condensing technology
- Target temperature control of a heating water buffer cylinder with temperature sensor
- Differential temperature control in multi boiler systems

Operation, configuration and diagnostics via the programming unit of the assigned boiler control unit

Layout

- 4 analogue inputs to connect the temperature sensors
- 1 analogue output 0 to 10 V to specify the pump speed
- 1 digital input to detect pump malfunctions
- 1 floating digital output to enable the boiler circuit pump

Standard delivery:

- Pump module PM1
- 2 temperature sensors NTC 10 kΩ

On-site requirements:

- Boiler circuit pump with control voltage 0 to 10 V

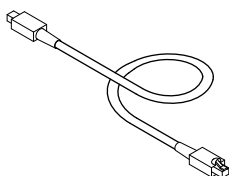
Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	2 W
Protection class	I
IP rating	IP 20D to EN 60529; ensure through design/installation.
Permissible ambient temperature	
– Operation	0 to +40 °C, use in the living space or boiler room (standard ambient conditions)
– Storage and transport	–20 to +60 °C
Rated relay output breaking capacity	
–	2(1) A, 230 V~
–	Floating enable contact: 1(0.5) A, 230 V~
0 to 10 V output	
– Rated breaking capacity	min. 3 kΩ
– Rated voltage	0 to 10 V
– Rated current	Max. 3.33 mA

LON connecting cable for data exchange between control units

Part no. 7143495

Cable length 7 m, fully wired (RJ 45).



Extension of the connecting cable

- Installation spacing 7 to 14 m:
 - 2 connecting cables (7.0 m long)
Part no. 7143495
 - 1 LON coupling RJ45
Part no. 7143496
- Installation spacing 14 to 900 m with plug-in connectors:
 - 2 LON plug-in connectors
Part no. 7199251
 - 2-core cable:
CAT5, screened
or
Solid conductor AWG 26-22/0.13 mm² to 0.32 mm²,
conductor AWG 26-22/0.14 mm² to 0.36 mm²
Ø 4.5 mm - 8 mm
on site
- Installation spacing 14 to 900 m with junction boxes:
 - 2 connecting cables (7.0 m long)
Part no. 7143495
 - 2-core cable:
CAT5, screened
or
Solid conductor AWG 26-22/0.13 mm² to 0.32 mm²,
conductor AWG 26-22/0.14 mm² to 0.36 mm²
Ø 4.5 mm to 8 mm
on site
 - 2 LON sockets RJ45, CAT6
Part no. 7171784

Terminator (2 pce)

Part no. 7143497

For terminating the LON BUS at the first and last control unit.

LON communication module

Part no. 7172173

PCB for integration into the control unit for LON data exchange.

For one heat pump, and in the lag heat pumps of heat pump cascades.

Connections:

- Heating circuit control unit Vitotronic 200-H
- Vitocom 200 and 300 communication interface

Vitocom 100, type LAN1

Part no.: See current pricelist

For remote control of a heating system via internet and IP networks (LAN) with DSL router

Compact device for wall mounting

For system operation with the **Vitotrol app** or **Vitodata 100**

Functions when operating with Vitotrol app:

- Remote control of up to 3 heating circuits in one heating system
- Setting of operating programs, set values and time programs
- Calling up system information
- Displaying messages on the Vitotrol app user interface

The Vitotrol app supports the following end devices:

- End devices with Apple iOS operating system
- End devices with Google Android operating system

Note

- For compatible versions, see App Store or Google Play
- For more information, see www.vitotrol-app.info.

Functions when operating with Vitodata 100:

For all heating circuits in a heating system:

■ Remote monitoring:

- Forwarding messages via email to terminal devices with email client function
- Forwarding messages via SMS to mobile phone/smartphone or fax (via chargeable internet service Vitodata 100 fault management)

■ Remote control:

Selecting operating programs, set values, time programs and heating curves

Note

For more information, see www.vitodata.info.

Configuration:

Configuration takes place automatically.

When the DHCP service is enabled, no adjustments have to be made on the DSL router.

Standard delivery:

- Vitocom 100, type LAN1 with LAN socket
- With or without LON communication module for installation in the Vitotronic control unit
- Connecting cables for LAN and communication module
- Power cable with plug-in power supply unit
- Vitodata 100 fault management for a duration of 3 years

Control units (cont.)

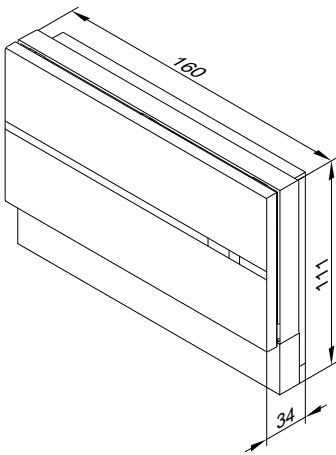
On-site requirements:

- The communication module must be installed in the control unit.
- Before commissioning, check the system requirements for communication via IP networks (LAN).
- Internet connection with flat rate data (**without** time or volume restrictions)
- DSL router with dynamic IP addressing (DHCP)

Note

For information on registering and using the Vitotrol app and Vitodata 100, see www.vitodata.info.

Specification



Power supply via plug-in power supply unit	230 V~/5 V $\overline{\text{=}}$
Rated current	250 mA
Power consumption	8 W
Protection class	II
IP rating	IP 30 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +55 °C Installation in living spaces or installation rooms (standard ambient conditions)
– Storage and transport	–20 to +85 °C

Vitocom 300, type LAN3

For part no., see the current pricelist

For remote monitoring, telecontrol and remote setting of heating systems via IP networks (LAN).

As an internet data transfer establishes a permanent connection ("always online"), access to the heating system is particularly fast.

For heating systems with one or more heat sources, with or without heating circuits downstream

For system operation with **Vitodata 300**

Functions when operating with Vitodata 300

For all heating circuits in a heating system:

■ Remote monitoring:

- Forwarding messages via SMS to mobile phone/smartphone, via email to end devices with email client functionality or via fax to fax machines
- Monitoring additional devices via the inputs and outputs of the Vitocom 300

■ Remote control:

- Selecting operating programs, set values, time programs and heating curves
- Recording trends via datalogger
- Recording energy consumption through integration of M-Bus heat meters

■ Remote setup:

- Configuring Vitocom 300 parameters
- Remote setup of Vitotronic control parameters via coding addresses

Note

- Alongside the data transfer telecommunication costs, usage charges have to be taken into account for Vitodata 300.
- For more information, see www.vitodata.info.

Configuration

- In the case of dynamic IP addressing (DHCP), the IP configuration of the Vitocom 300 occurs automatically.
No adjustments have to be made on the DSL router.
- Observe the network settings of the DSL router.
- The outputs and inputs of the Vitocom 300 and EM301 extension module are configured using the Vitodata 300 user interface.
- The Vitocom 300 is connected to the Vitotronic control unit via LON. The Vitocom 300 does not need to be configured for the LON.

Fault messages

Fault messages are reported to the Vitodata server. These messages are transmitted via the following communication services from the Vitodata server to the configured recipients:

- Fax
- SMS to mobile phones
- Email to PC/laptop

On-site requirements

- DSL router with free LAN socket and dynamic IP addressing (DHCP)
- Internet connection with flat rate data (**without** time or volume restrictions)
- LON communication module must be installed in the Vitotronic.

Note

For more information, see www.vitocom.info.

Control units (cont.)

Standard delivery

- Vitocom 300, type LAN3 with LAN socket
 - Mounting rail installation TS35 to EN 50022, 35 x 15 and 35 x 7.5
 - 2 digital inputs
 - 1 digital output
 - 1 relay output
 - 1 M-Bus interface
 - 1 EM interface
 - 2 LON connections
- LAN cable, RJ45, 2 m long
- Including or excluding LON communication module
- LON cable, RJ45 – RJ45, 7 m long, for data exchange between the Vitotronic control unit and the Vitocom 300
- Power supply unit for top-hat rail, mounting rail installation TS35 to EN 50022, 35 x 15 and 35 x 7.5
- Vitodata 100 fault management for a duration of 3 years

Note

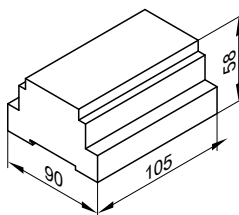
For standard delivery of packs with Vitocom, see pricelist.

Accessories

Accessories	Part no.
Wall mounting enclosure for installation of the Vitocom 300 and accessories if no control panel or electrical distribution panel is available. 2 rows: For Vitocom 300 and max. 1 EM301 extension module 3 rows: For Vitocom 300 and max. 2 EM301 extension module	7143434 7143435
EM301 extension module – Mounting rail installation TS35 to EN 50022, 35 x 15 and 35 x 7.5 – 8 analogue inputs: – 0 – 10 V _{DC} – 4 – 20 mA – Viessmann temperature sensors NTC 10 kΩ, NTC 20 kΩ, Ni500 or Pt500 – Pulse counter – 8 digital inputs: – For hooking up signals via floating contacts – 2-pole – Breaking capacity of the external contact 24 V _{AC} , 7 mA – With LED indicator – N/C or N/O contact – N/C or N/O alarm contact – Pulse counter – 2 digital outputs: – Floating relay contacts – 3-pole changeover contact – Max. 2 A, 230 V~ – With LED indicator Max. 3 x EM301 extension modules per Vitocom 300.	Z012117
Uninterrupted power supply module (UPS) Mounting rail installation TS35 to EN 50022, 35 x 15 and 35 x 7.5	7143432
Additional rechargeable power pack for UPS – Mounting rail installation TS35 to EN 50022, 35 x 15 and 35 x 7.5 – Recommended with 1 Vitocom 300 and 1 extension module where all inputs are allocated – Required with 1 or more Vitocom 300 and 2 extension modules	7143436

Accessories	Part no.
Connecting cable extension Installation spacing 7 to 14 m – 1 connecting cable (7 m long) and 1 LON coupling RJ45 Installation spacing 14 to 900 m with plug-in connector – 2 LON plug-in connectors RJ45 and 2-core cable, CAT5, screened, solid wire, AWG 26-22, 0.13 to 0.32 mm ² , external diameter 4.5 to 8 mm or 2-core cable, CAT5, screened, flexible cable, AWG 26-22, 0.14 to 0.36 mm ² , external diameter, 4.5 to 8 mm Installation spacing 14 to 900 m with socket – 2 connecting cables (7 m long) and 2 LON sockets RJ45, CAT6 2-core cable, CAT5, screened or JY(St) Y 2 x 2 x 0.8	7143495 and 7143496 7199251 and On site 7143495 and 7171784 On site

Vitocom 300 specification (standard delivery)

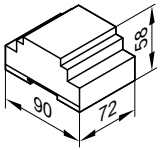


Specification, Vitocom 300

Rated voltage	24 V _{AC}
Rated current	710 mA
Rated output	17 W
Protection class	II to EN 61140
IP rating	IP 30 to EN 60529; ensure through design/installation
Function type	Type 1B to EN 60730-1
Permissible ambient temperature	
– Operation	0 to +50 °C Installation in living spaces or installation rooms (standard ambient conditions)
– Storage and transport	–20 to +85 °C
On-site connections:	
– 2 digital inputs DI1 and DI2	Floating contacts, contact breaking capacity 24 V _{AC} , 7 mA, for monitoring additional devices and third party systems, with LED indicator
– 1 digital output DO	Relay, contact breaking capacity 24 V _{AC} , max. 2 A, changeover contact
– 1 M-Bus interface	For connecting heat meters with M-Bus interface to EN 1434-3
– 1 EM interface	For connecting up to three EM301 extension modules, with LED indicator

Control units (cont.)

Specification, power supply unit (standard delivery):



Specification, power supply unit

Rated voltage	100 to 240 V~
Rated frequency	50/60 Hz
Rated current	0.8 to 0.4 A
Output voltage	24 V=
Max. output current	2 A
Protection class	II to EN 61140
IP rating	IP 20 to EN 60529; ensure through design/installation
Primary/secondary earth separation	SELV to EN 60950
Electrical safety	EN 60335
Permissible ambient temperature	
– Operation	–20 to +55 °C Installation in living spaces or installation rooms (standard ambient conditions)
– Storage and transport	–25 to +85 °C

Vitogate 300, type BN/MB

Part no. Z013294

The Gateway 300, type BN/MB is designed for hooking up Vitotronic control units with integral LON communication module (accessories) to BACnet or Modbus systems.

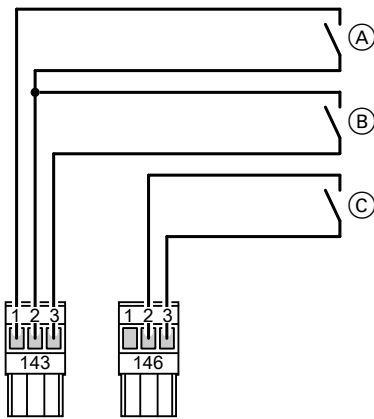
For specifications and accessories, see the "Data communication technical guide".

9.7 On-site connections

Connection of on-site control units to the Vitotronic 100, type CC1E, in single boiler systems

Control via contacts:

Operation with a 2-stage burner



- (A) Burner stage 1 "ON"
- (B) Burner stage 2 "ON"
- (C) External load-dependent starting

(A), (B) and (C) are floating contacts of the higher ranking control unit.

External burner start – burner stage 1

Contact at terminals "1" and "2" of plug 143

- Contact closed:
Burner stage 1 is switched ON.
The boiler water temperature is limited by the electronic maximum temperature limiter (see the Vitotronic 100 service instructions), if it is set below that of mechanical thermostat "Ü".
- Contact open:
Burner stage 1 is switched OFF.

External burner start – burner stages 1 and 2

Contact at terminals "2" and "3" of plug 143

- Contact closed:
Both burner stages are switched on.
The boiler water temperature is limited by the electronic maximum temperature limiter, if that is set below that of mechanical temperature controller "Ü".
Burner stage 2 is switched off 2 K sooner.
- Contact open:
Burner stages 1 and 2 are switched off.

External load-dependent starting

The boiler burner is started up, subject to load, when the floating contact across terminals "2" and "3" at plug-in connector 146 closes. The boiler will be constantly operated at the set temperature. The boiler water temperature is limited via the maximum set boiler water temperature or via the mechanical temperature controller. The set value is adjusted via code "9b".

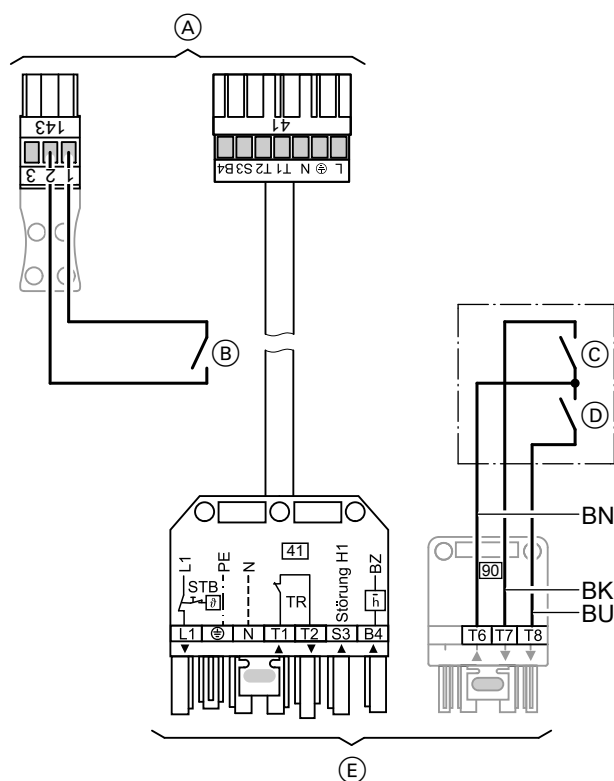
Settings at the Vitotronic 100

- Code "01:1" (delivered condition)
- The cylinder temperature control is activated if the cylinder temperature sensor is connected.
- The high limit safety cut-out settings and other settings depend on the system equipment level along with safety equipment to EN 12828 or EN 12953.

High limit safety cut-out	110 °C	100 °C
Temperature controller	100 °C	87 °C
Coding address "06" for electronic maximum temperature limiter (Vitotronic 100)	95 °C	85 °C
Maximum temperature of the on-site control unit	90 °C	80 °C

Control units (cont.)

Operation with a modulating burner



- (A) Plug to the control unit
- (B) Burner stage 1 (base load) "On"
- (C) Reducing burner output (modulation controller)
- (D) Increasing burner output (modulation controller)
- (E) Plug to the burner

Colour coding in accordance with DIN IEC 60757

BK Black
BN Brown
BU Blue

External burner start – burner stage 1

Contact at terminals "1" and "2" of plug 143

■ Contact closed:

Burner stage 1 is switched ON.

The boiler water temperature is limited by the electronic maximum temperature limiter (see the Vitotronic 100 service instructions), if it is set below that of mechanical thermostat "①".

■ Contact open:

Burner stage 1 is switched OFF.

Modulating burner connection:

■ Burner stage 1 ④1 of the Vitotronic 100

■ Plug 90 from the Vitotronic 100 via modulation controller (on-site) to plug 90 on the burner.

Settings at the Vitotronic 100

■ Code "01:1" (delivered condition)

■ The cylinder temperature control is activated if the cylinder temperature sensor is connected.

■ The high limit safety cut-out settings and other settings depend on the system equipment level and the safety equipment to EN 12828 or EN 12953.

High limit safety cut-out	110 °C	100 °C
Temperature controller	100 °C	87 °C
Coding address "06" for electronic maximum temperature limiter (Vitotronic 100)	95 °C	85 °C
Maximum temperature of the on-site control unit	90 °C	80 °C

Connection of on-site control units to the EA1 extension in single boiler systems

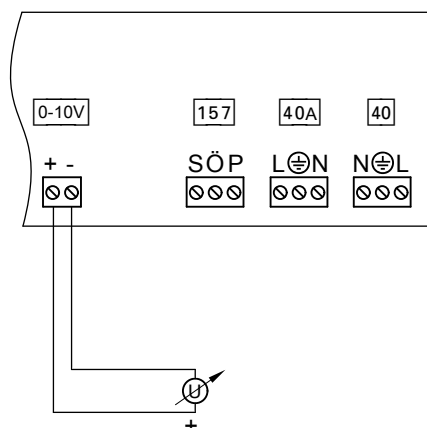
Control via 0 – 10 V input:

External demand via 0 – 10 V input

Connection to the 0 – 10 V input on the EA1 extension.

In conjunction with a 2-stage or modulating burner.

Parameter "01:1" for single boiler system (delivered condition).



The 0 - 10 V hook-up provides an additional set boiler water temperature:

0 - 1 V is taken as "No specification for set boiler water temperature".

1 V \triangleq Set value 10 °C

10 V \triangleq Set value 100 °C

The set value range can be changed in parameter 1E:

1 V \triangleq Set value 30 °C

10 V \triangleq Set value 120 °C

Note

Ensure galvanic separation between the negative pole and the earth conductor of the on-site voltage source.

Digital data inputs DE1 to DE3

Functions:

- External blocking
- External blocking with fault message input
- Fault message input

The hooked-up contacts must correspond to protection class II.

Control units (cont.)

Input function assignment

The functions of the inputs are selected via parameters on the boiler control unit:

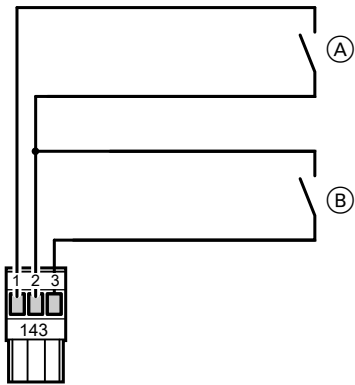
- DE1: Parameter "5d"
- DE2: Parameter "5E"
- DE3: Parameter "5F"

Set flow temperature for external demand

- The set flow temperature can be selected in parameter 9b.

Auxiliary functions for single boiler systems with a Vitotronic 200, type CO1E

Plug 143



- (A) External heating program changeover/mixer "OPEN"
- (B) External blocking/mixer "CLOSE"

(A) and (B) are floating contacts.

External operating program changeover/mixer "OPEN"

Closing contact (A) can change the manually selected operating program or open the connected mixers.

In parameter "9A", the external function mixer "OPEN" can be allocated to the individual heating circuits.

In parameter "91", the external operating program changeover can be allocated to the heating circuits.

Heating programs

Symbol	Meaning
☐	Central heating OFF and DHW OFF
☐	Central heating OFF and DHW ON
☐ ☐	Central heating ON and DHW ON

Subject to the setting of parameter "d5", the system can be changed from all 3 manually adjustable operating programs ☐, ☐, ☐ ☐ (contact open), either to ☐ or ☐ ☐ (contact closed).

External blocking/mixer "CLOSE"

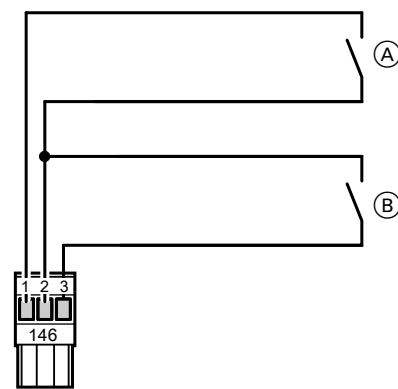
Closing contact (B) causes the burner to shut down or the mixer to be closed.

Parameter "99" is used to select which heating circuits are affected by the function external blocking or mixer "CLOSE".

Note

The frost protection of the relevant boiler or heating circuit is no longer effective during the controlled shutdown or when the mixer "CLOSES". The lower boiler water temperature or flow temperature will no longer be maintained.

Plug 146



- (A) External changeover of stepped/modulating burners
- (B) External demand

(A) and (B) are floating contacts.

External demand

Closing contact (B) starts the burner of the boiler depending on load. The boiler water temperature is limited via the maximum set boiler water temperature or via the mechanical temperature controller. The set value is selected in coding address "9b".

External changeover of multi stage/modulating burners

- Contact (A) open:
Modulating operation
 - Contact (A) closed:
Two-stage operation
- Set coding address "02" accordingly.

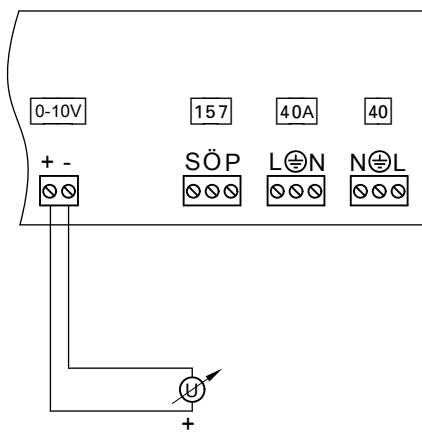
Auxiliary functions for single boiler systems with a Vitotronic 200, type CO1E via EA1 extension

Connection of on-site control units for weather-compensated mode to the extension EA1

External demand via 0 – 10 V input

Connection to the 0 – 10 V input on the extension EA1.

In conjunction with a 2-stage or modulating burner.



The 0 - 10 V hook-up provides an additional set boiler water temperature:

0 - 1 V is taken as "no default for set boiler water temperature".

1 V \triangleq Set value 10 °C

10 V \triangleq Set value 100 °C

The set default range can be changed in code 1E:

1 V \triangleq Set value 30 °C

10 V \triangleq Set value 120 °C

Note

Ensure DC separation between the negative pole and the earth conductor of the on-site voltage source.

Digital data inputs DE1 to DE3

Functions:

- External changeover of the operating status, separate for heating circuits 1 to 3
- External blocking with fault message input
- Fault message input
- Brief operation of the DHW circulation pump

The hooked-up contacts must correspond to safety category II.

Input function assignment

The functions of the inputs are selected via the codes on the boiler control unit:

- DE1: Parameter "5d"
- DE2: Parameter "5E"
- DE3: Parameter "5F"

Set flow temperature for external demand

- The set flow temperature can be selected with code 9b.

Output 157

Connections:

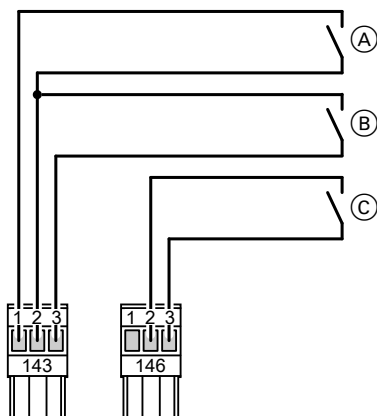
- Switching a feed pump to a substation
- Signalling reduced mode for a heating circuit

Function assignment

Select the function of output 157 via coding address "5C".

Auxiliary functions for multi boiler systems with Vitotronic 300, type CM1E and Vitotronic 100, type CC1E via LON

Plugs 143 and 146 to Vitotronic 300-K



(A) External operating program changeover/mixer "OPEN"

(B) External blocking/mixer "CLOSE"

(C) External demand

(A), (B) and (C) are floating contacts.

External operating program changeover/mixer "OPEN"

Closing contact (A) can change the manually selected operating program or open the connected mixers.

In coding address "9A", the external function mixer "OPEN" can be allocated to the individual heating circuits.

In coding address "91", the external operating program changeover can be allocated to the heating circuits.

Operating programs

Symbol	Meaning
☐	Central heating OFF and DHW OFF
☐	Central heating OFF and DHW ON
☐	Central heating ON and DHW ON

Subject to the setting of coding address "d5", the system can be changed from all 3 manually selectable operating programs ☐, ☐, ☐ (contact open), either to ☐ or ☐ (contact closed).

External blocking/mixer "CLOSE"

Closing contact (B) causes the burner to perform a controlled shut-down or the mixer to be closed.

In coding address "99" you select which heating circuits are affected by the function external blocking or mixer "CLOSE".

Note

The frost protection of the relevant boiler or heating circuit is no longer effective during the controlled shutdown or on mixer "CLOSE".

The lower boiler water temperature or flow temperature will no longer be maintained.

External demand

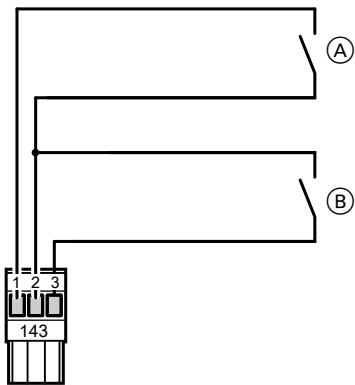
Closing contact (C) starts the burner of the boiler(s) subject to load.

The boiler water temperature is limited via the maximum set boiler water temperature or via the mechanical temperature controller.

The set value is selected in coding address "9b".

Control units (cont.)

Plug 143 on Vitotronic 100, type CC1E



- (A) Block the boiler.
(B) Start boiler last in the boiler sequence.

(A) and (B) are floating contacts.

Boiler blocking

- Contact (A) closed:
The boiler is blocked and will be removed from the boiler sequence. This means the butterfly valve or the 3-way mixing valve for constant return temperature control is closed, and the shunt pump or boiler circuit pump are switched off. The heat demand has to be met by the other boilers.

Note

The heating system is **not** protected against frost if all boilers are blocked or there are no other boilers available.

- Contact (A) open:
The boiler is reinstated into the current boiler sequence.

Start boiler as the last one in the boiler sequence

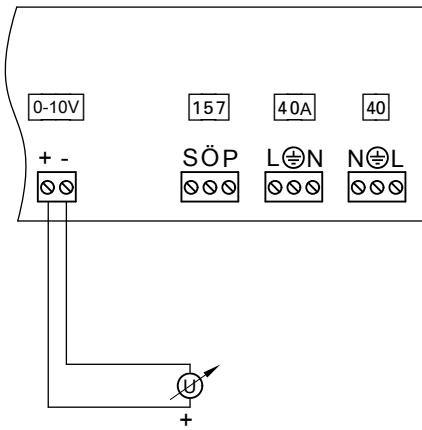
- Contact (B) closed:
The boiler is started as the last one in the boiler sequence. The heat demand of the heating system is met by the other boilers. This boiler starts if the output of the other boilers is insufficient.
- Contact (B) open:
The boiler is reinstated into the current boiler sequence.

Connection of on-site control units to EA1 extension in multi boiler systems with on-site cascade control unit

Control via 0 – 10 V input:

External demand via 0 – 10 V input

Connection to the 0 – 10 V input at **EA1 extension** on each Vitotronic 100 (accessories).
In conjunction with 2-stage or modulating burners.
Set code "01:3".



Note

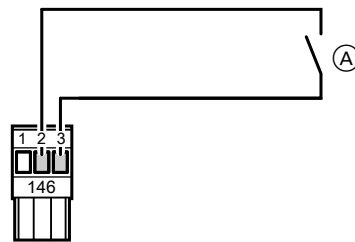
Only for low temperature boilers:
On the lead boiler the voltage must be **higher than 1 V**.

Note

Ensure DC separation between the negative pole and the earth conductor of the on-site voltage source.

Boiler enabling with an additional enable contact

0 - 1 V \triangleq "No default set boiler water temperature"
1 V \triangleq Set value 10 °C
10 V \triangleq Set value 100 °C



- (A) Boiler enabling
(floating contact)

Note

This contact must **always** be closed on the lead boiler.

Contact	Closed	Open
(A)	Boiler enabled; held at minimum temperature. The butterfly valve opens.	The butterfly valve is closed after approx. 5 min. External burner start not possible.

Digital data inputs DE1 to DE3

Functions:

- External blocking
- External blocking with fault message input
- Fault message input

The hooked-up contacts must correspond to safety category II.

Boiler enabling without an additional enable contact

0 to 1 V

- Boiler blocked
- Butterfly valve closed
- Boiler circuit pump or shunt pump off

1 to 10 V

- Default temperature for boiler
1 V \triangleq Set value 10 °C
10 V \triangleq Set value 100 °C
- Boiler enabled; held at minimum temperature.
- Butterfly valve open
- Boiler circuit pump or shunt pump enabled

Control units (cont.)

Input function assignment

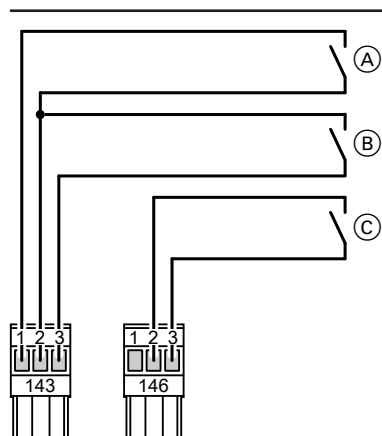
The functions of the inputs are selected via the codes on the boiler control unit:

- DE1: Coding address "5d"
- DE2: Coding address "5E"
- DE3: Coding address "5F"

Boiler sequence control with on-site cascade control unit — Connections to the Vitotronic 100, type CC1E

Control via contacts:

Operation with a 2-stage burner



- (A) Burner stage 1 "ON"
- (B) Burner stage 2 "ON"
- (C) Boiler enabling
Butterfly valve "OPEN" or "CLOSE"

(A), (B) and (C) are floating contacts of the higher ranking control unit.

The connections on plugs 143 and 146 are required when connecting an external control unit. The cylinder temperature and the load-dependent cascade control must be controlled by an external control unit.

Note

An boiler enable contact is essential for multi boiler systems. This contact **must** always be closed on the lead boiler.

External burner start – burner stage 1

Contact at terminals "1" and "2" of plug 143

- Contact closed:
Burner stage 1 is switched on.
Burner stage 2 is switched on only for maintaining the minimum temperature.
The boiler water temperature is limited by an electronic maximum temperature limiter (see Vitotronic 100 service instructions), subject to it being set below the mechanical temperature controller "C".
- Contact open:
Burner stage 1 is switched off.

External burner start – burner stages 1 and 2

Contact at terminals "2" and "3" of plug 143

- Contact closed:
Both burner stages are switched on.
The boiler water temperature is limited by the electronic maximum temperature limiter, if that is set below that of mechanical temperature controller "C".
Burner stage 2 is switched off 2 K sooner.
- Contact open:
Burner stages 1 and 2 are switched off.

Enable boiler, butterfly valve

Contact at terminals "2" and "3" of plug 146

- Contact closed:
Initially, the preheat function for lag boilers is activated.
After the preheat function has expired, the minimum boiler water temperature is maintained. The burner stages can be externally switched.
- Contact open:
The butterfly valve is closed after approx. 5 min.
Burner stages cannot be switched on externally; a minimum temperature will not be maintained.

Settings at the Vitotronic 100

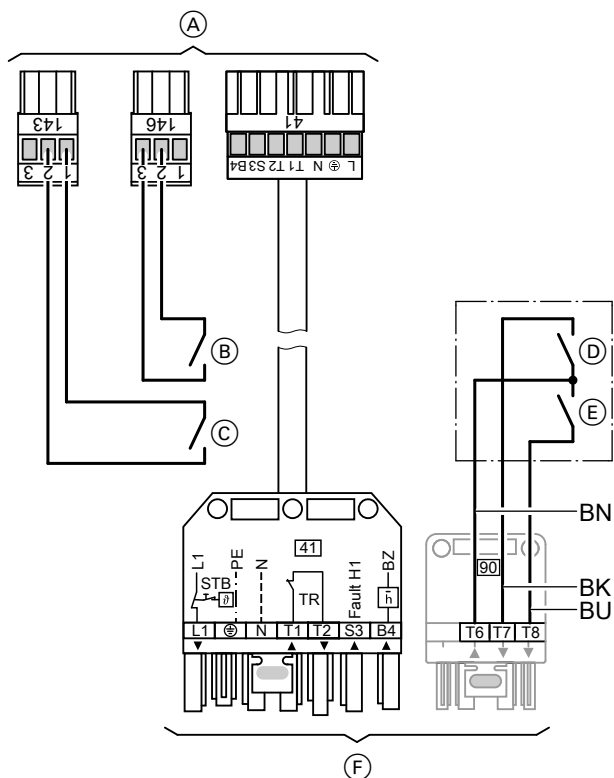
Parameter "01:3".

The high limit safety cut-out settings and other settings depend on the system equipment level and the safety equipment to EN 12828 or EN 12953.

High limit safety cut-out	110 °C	100 °C
Temperature controller	100 °C	87 °C
Parameter "06" for electronic maximum temperature limiter (Vitotronic 100)	95 °C	85 °C
Maximum temperature of the on-site control unit	90 °C	80 °C

Control units (cont.)

Operation with a modulating burner



- (A) Plug to the control unit
 (B) Boiler enabling; butterfly valve open or closed
 (C) Burner stage 1 (base load) "On"
 (D) Reducing burner output (modulation controller)
 (E) Increasing burner output (modulation controller)
 (F) Plug to the burner

Colour coding in accordance with DIN IEC 60757

BK Black
 BN Brown
 BU Blue

The connections on plugs 143 and 146 are required when connecting an external control unit. The cylinder temperature and the load-dependent cascade control must be controlled by an external control unit.

Note

An boiler enable contact is essential for multi boiler systems. This contact **must** always be closed on the lead boiler.

External burner start – burner stage 1

Contact at terminals "1" and "2" of plug 143

- Contact closed:
 Burner stage 1 is switched ON.
 The boiler water temperature is limited by the electronic maximum temperature limiter (see the Vitotronic 100 service instructions), if it is set below that of mechanical thermostat "0".
- Contact open:
 Burner stage 1 is switched OFF.

External burner start – burner stages 1 and 2

Contact at terminals "2" and "3" of plug 143

- Contact closed:
 Both burner stages are switched on.
 The boiler water temperature is limited by the electronic maximum temperature limiter, if that is set below that of mechanical temperature controller "0".
 Burner stage 2 is switched off 2 K sooner.
- Contact open:
 Burner stages 1 and 2 are switched off.

Modulating burner connection:

- Burner stage 1 41 of the Vitotronic 100
- Plug 90 from the Vitotronic 100 via modulation controller (on-site) to plug 90 on the burner.

Enable boiler, butterfly valve

Contact at terminals "2" and "3" of plug 146

- Contact closed:
 The burner stages can be externally switched.
- Contact open:
 The butterfly valve is closed after approx. 5 min.
 Burner stages cannot be started externally.

Settings at the Vitotronic 100

Parameter "01:3".

The high limit safety cut-out settings and other settings depend on the system equipment level and the safety equipment to EN 12828 or EN 12953.

High limit safety cut-out	110 °C	100 °C
Temperature controller	100 °C	87 °C
Parameter "06" for electronic maximum temperature limiter (Vitotronic 100)	95 °C	85 °C
Maximum temperature of the on-site control unit	90 °C	80 °C

Appendix

10.1 Important safety regulations and requirements

Duty of notification and required permits

According to the German Immissions Act (BImSchG)

According to paragraph 4ff of the German Immissions Act in conjunction with the 4th BImSchV, a permit is required for combustion equipment with the following combustion output and for the use of the following fuels (see point 8):

- Solid or liquid fuels (except fuel oil EL) with a combustion output from 1 MW
- Fuel oil EL and gaseous fuels with a combustion output from 20 MW

Permit requirement and testing to the Operational Safety Ordinance (BetrSichV) [Germany]

Extract from the Health and Safety at Work Act (BetrSichV) [Germany] paragraphs 13 to 15

Paragraph 13 Permit requirement

- (1) The assembly, installation and operation of assemblies with fired or otherwise heated pressure vessels at risk of overheating, which are used to generate steam or hot water with temperatures in excess of 110 °C, and which must be categorised in accordance with appendix II, diagram 5 of the Directive 97/23/EC as category IV (see declaration of conformity in the product documentation of the Viessmann boiler), require a permit from the appropriate local authority.
- (2) Apply for permits in writing. The permit is deemed to have been granted if the relevant authority has not objected to the system installation within a period of 3 months.

Paragraph 14 Inspection prior to commissioning

- (1) The user must ensure that a system requiring supervision (all pressure equipment to 97/23/EC) is tested by an approved inspection body for compliant status.
- (3) Tests in accordance with (1) can be carried out by an authorised person on pressure equipment and assemblies that are to be classified in accordance with Directive 97/23/EC and diagram 5 as category I or II.

Paragraph 15 Recurring tests

- (8) For pressure equipment and assemblies that are classified in accordance with Directive 97/23/EC and diagram 5 as category III, implement the following tests, subject to the product of maximum permissible pressure P_s and the crucial volume V being greater than 1000 bar (100 MPa) · l or if they are classified as category IV:
 - External inspection no later than 12 months after commissioning
 - Internal inspection no later than 3 years after commissioning (water pressure test possible as an alternative. For max. test pressure, see type plate)
 - Strength test no later than 9 years after commissioning.

General information on low pressure hot water boilers with safety temperatures of up to 110/120 °C

The pressure equipment (hot water boiler) has been built in accordance with TRD 702 and should be equipped in line with these Technical Regulations. Observe the operating conditions in these Technical Regulations. Depending on type, the boiler meets the following standards regarding the stated rated heating output and technical requirements:

■ DIN 4702 or EN 303

(See details on the type plate and in the enclosed documentation). During installation and commissioning of this boiler, observe all local Building Regulations and regulations concerning combustion systems, as well as the following Standards, Regulations and Directives:

- **DIN 18160-1:** Chimneys - Part 1: Design and performance
- **DIN 1988:** Drinking water supply systems; general (DVGW code of practice)
- **DIN 4753:** Water heaters and water heating installations for potable water and for service water
- **EN 12828:** Heating systems in buildings – Design of hot water heating systems
- **EN 13384:** Chimneys – Thermal and fluid dynamic calculation methods
- **Also observe EN 12953** in the case of:
 - Low pressure hot water boilers with safety temperatures > 110 to 120 °C
- **EN 12953-1:** Shell boilers – General
- **EN 12953-6:** Shell boilers – Requirements for equipment for the boiler

- **EN 12953-7:** Shell boilers – Requirements for firing systems for liquid and gaseous fuels for the boiler
- **EN 12953-8:** Shell boilers – Requirements for safeguards against excessive pressure
- **EN 12953-10:** Shell boilers – Requirements for feedwater and boiler water quality

Use of oil combustion

- **DIN 4755:** Oil firing installations
- **DIN 4787-1:** Atomising oil burners (in excess of 100 kg/h throughput).
- **DIN 51603-1:** Liquid fuels; fuel oil EL, minimum requirements
- **EN 230:** Specification for monobloc oil burners – Safety, control and regulation devices and safety times
- **EN 267:** Pressure-jet oil burner

Use of gas combustion

- **EN 298:** Automatic gas burner control systems for gas burners and gas burning appliances with or without fans
- **EN 676:** Forced draught burners for gaseous fuels
- **DVGW Code of Practice G 260/I and II:** Technical rules for gas quality
- **DVGW-TRGI 2008:** Technical rules for gas installations
- **TRF 1996:** Technical rules for LPG

Gas installation

The gas installation should be carried out by a registered installer in accordance with the technical connection requirements stipulated by the gas supply utility. Operate the system in accordance with the above conditions.

Pipe connections

All pipe connections to the boiler should be made free of load and torque stress.

Appendix (cont.)

Electrical installation

Carry out the electrical connection and installation in accordance with VDE regulations (DIN VDE 0100 and DIN VDE 0116) and the technical connection requirements laid down by your electricity supply company.

- **DIN VDE 0100:** Installation of HV systems with rated voltages up to 1000 V.
- **DIN VDE 0116:** Electrical equipment for combustion systems.

Operating instructions

According to EN 12828 section 5 and EN 12170/12171, the system installer must provide operating instructions for the whole system.

Flue system

Only flue pipes that are approved by the building inspectorate or that are CE-designated may be used with condensing systems.

Energy Saving Ordinance (EnEV)

- **Paragraph 11 (2),** oil and gas combustion systems ≤ 400 kW: Compulsory for low temperature or condensing boilers with CE designation that, according to the Declaration of Conformity, are identified as low temperature or condensing boilers (in accordance with Directive 92/42/EEC), for buildings, whose annual primary energy demand is not limited in accordance with EnEV paragraph 3 (1).

German Immissions Order (BImSchV)

Combustion systems must be operated in such a way that the limits stated in the 1st BImSchV of 26/01/2010 or the TA Luft – for systems listed in the 4th BImSchV of 11/08/2009 – are not exceeded. The 1st BImSchV applies to oil and gas combustion systems for heating buildings or rooms with water as a heat transfer medium.

- **1st BImSchV, paragraph 6**

- Section 3, oil and gas combustion systems
- Oil and gas combustion systems > 400 kW for heating buildings or rooms:
The manufacturer must certify that the efficiency is ≥ 94 % (determined in accordance with EN 303-5, issue 6/1999).
 - The requirements of section 3 are deemed to have been met for boilers > 1 MW if the boiler efficiency is $\eta_K \geq 94$ % (calculated to DIN 4702-2).
 - The nitrogen oxide content of the flue gas in oil and combustion systems:

For fuel oil EL:

Rated heating output in kW	Emissions in mg/kWh
≤ 120	110
$> 120 \leq 400$	120
> 400	185

For natural gas:

Rated heating output in kW	Emissions in mg/kWh
≤ 120	60
$> 120 \leq 400$	80
> 400	120

- **1st BImSchV, paragraph 11a**

Oil and gas combustion systems from 10 MW to 20 MW: Single combustion systems with a combustion output between 10 and < 20 MW may only be operated, if the emission values in the following table (as average values over half an hour) are not exceeded:

	Fuel oil EL	Natural gas	With alternative gases	Operating temperature
CO	≤ 80 mg/m ³ flue gas	≤ 80 mg/m ³ flue gas		
NO _x	≤ 180 mg/m ³ flue gas ≤ 200 mg/m ³ flue gas	≤ 100 mg/m ³ flue gas ≤ 110 mg/m ³ flue gas	≤ 200 mg/m ³ flue gas	< 110 °C 110 °C to ≤ 210 °C Irrespective of the operating temperature

Checks as part of the building inspectorate approval process

As part of the Building Regulations approval process, condensing combustion equipment is tested by the flue gas inspector [where applicable] for adherence to Building Regulations and any generally recognised technical rules.

The State Building Regulations, their implementation orders and the combustion equipment orders, as well as the general building approvals and permits of the higher supervisory authority, in individual cases, are part of the Building Regulations requirements.

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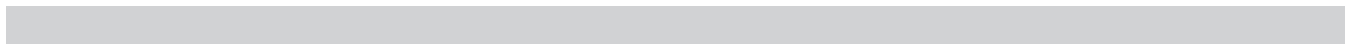
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Subject to technical modifications.

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