VIESMANN

VITOCAL

2-stage heat pump
Brine/water heat pump, 84.9 to 222.2 kW

Technical guide

Heat pumps with electric drive for central heating and DHW heating in mono mode or dual mode heating systems

With weather-compensated Vitotronic 200 heat pump control unit

Up to 60 °C flow temperature at a brine inlet temperature of 5 °C

VITOCAL 300-G PRO

Type BW 302.D090 to BW 302.D230
2-stage brine/water heat pump
For utilisation of **geothermal** (brine/water direct) and **water** (water/water with intermediate circuit) as heat sources
Permissible operating pressure: Heating water 10 bar (1 MPa)

5837160 GB 12/2020

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1.1 Product description

Benefits

- 2-stage brine/water heat pump; 84.9 to 222.2 kW (with B0/W35 to EN 14511)
- Heat pump with electric drive for heating/cooling
- With electronic soft starter
- With Vitotronic 200 weather-compensated control unit, type WO1C
- With hermetically sealed scroll compressor and R410A refrigerant
- Flow temperature up to 60 °C
- With sound-optimised appliance design
- Compact and maintenance-friendly design

Delivered condition

- Complete compact heat pump (sound insulation is supplied separately)
- Integral heat pump control unit with outside temperature sensor
  The programming unit is supplied inside the heat pump and must be fitted and connected on site.
- Integral electronic soft starter for each compressor with phase monitoring
- Anti-vibration base frame
- The side panels are packed separately for fitting on site.

1.2 Specification

Specification, Vitocal 300-G Pro

Operation: Brine/water (B0/W35)

Type BW 302.		**D090**	**D110**	**D140**	**D180**	**D230**
Performance data to EN 14511						
Rated heating output	kW	84.9	108.7	135.3	174.9	222.2
Cooling capacity	kW	67.4	86.1	106.4	138.5	177.1
Power consumption	kW	18.63	24.20	31.08	38.91	48.28
Compressor rated current (total)	A	40.3	44.9	57.0	69.9	85.6
Coefficient of performance ε (COP)		4.55	4.49	4.35	4.49	4.60
Primary circuit (brine)						
Spread	K	3	3	3	3	3
Minimum frost protection/freezing point	°C	–16.1	–16.1	–16.1	–16.1	–16.1
Heat exchanger capacity (brine)	l	10.5	13.1	17.4	23.0	52.4
Nominal flow rate (recommended value for sizing)	m^3/h	20.5	26.2	32.4	42.1	53.8
Minimum flow rate	m^3/h	15.4	19.7	24.3	31.6	40.4
Pressure drop at nominal flow rate (total pressure drop at evaporator, including connection set)	kPa	29	31	30	34	30
Pressure drop at minimum flow rate	kPa	16	18	17	19	17
Secondary circuit (water)						
Spread	K	5	5	5	5	5
Heat exchanger capacity	l	15.2	19.2	23.2	28.3	53.6
Nominal flow rate (recommended value for sizing)	m^3/h	14.7	18.8	23.4	30.3	38.5
Minimum flow rate	m^3/h	7.3	9.4	11.7	15.1	19.2
Pressure drop at nominal flow rate (total pressure drop at condenser, including connections)	kPa	6	7	8	11	13
Pressure drop at minimum flow rate	kPa	1	2	2	3	3
Max. flow temperature from inlet of primary circuit B 0 °C	°C	55	55	55	55	55
Max. flow temperature from inlet of primary circuit B +5 °C	°C	60	60	60	60	60

Notes

Performance data to EN 14511 corresponds to a temperature spread of 3 K with 0 °C at brine inlet and –3 °C.at brine outlet.

A reduced flow rate results in lower heat pump output (this also applies in partial load operation).

The specifications in the datasheets and the product description describe purely physical characteristics. Additional assurances or guarantees require a separate contractual agreement.

Parameters need to be matched in conjunction with an ice store or the "external demand" function. Viessmann must be consulted.

The specified pressure drop refers only to the integral heat exchangers in the heat pump and connection set.

Setting the frost protection too high (too much antifreeze) results in a reduced heating output.

Failure to achieve the minimum frost protection may lead to damage and therefore a malfunction of the heat pump.

Failure to achieve the minimum flow rate may lead to damage and therefore a malfunction of the heat pump.

Vitocal 300-G Pro, type BW 302.D (cont.)

Operation: Water/water with brine intermediate circuit (W10/W35) at brine inlet temperature in heat pump +8 °C (B8)

Type BW 302.		D090	D110	D140	D180	D230
Compressor performance data (water with brine intermediate circuit)						
Rated heating output	kW	107.2	139.8	175.0	227.0	283.0
Cooling capacity	kW	89.6	116.8	146.0	189.6	235.0
Power consumption	kW	18.66	24.20	30.50	38.90	50.20
Compressor rated current (total)	A	41.0	45.6	57.9	71.3	89.8
Coefficient of performance ε (COP)		5.74	5.78	5.74	5.84	5.64
Primary circuit (brine intermediate circuit)						
Spread	K	3	3	3	3	3
Minimum frost protection/freezing point	°C	–9.0	–9.0	–9.0	–9.0	–9.0
Nominal flow rate (recommended value for sizing)	m^3/h	26.4	34.5	43.1	56.0	69.4
Minimum flow rate	m^3/h	19.8	25.9	32.3	42.0	52.0
Pressure drop at nominal flow rate (total pressure drop at evaporator, including connection set)	kPa	39	44	44	50	44
Pressure drop at minimum flow rate	kPa	22	25	25	28	25
Secondary circuit (water)						
Spread	K	5	5	5	5	5
Nominal flow rate (recommended value for sizing)	m^3/h	18.6	24.2	30.3	39.3	49.0
Minimum flow rate	m^3/h	9.3	12.1	15.2	19.7	24.5
Pressure drop at nominal flow rate (total pressure drop at condenser, including connection set)	kPa	9	11	13	18	20
Pressure drop at minimum flow rate	kPa	2	3	3	4	5
Max. flow temperature at primary inlet B +8 °C	°C	60	60	60	60	60

Notes

Compressor performance data corresponds to a temperature spread of 3 K with 8 °C at brine inlet and 5 °C at brine outlet.

A reduced flow rate results in lower heat pump output (this also applies in partial load operation).

The specifications in the datasheets and the product description describe purely physical characteristics. Additional assurances or guarantees require a separate contractual agreement.

The specified pressure drop refers only to the integral heat exchangers in the heat pump and connection set.

Setting the frost protection too high (too much antifreeze) results in a reduced heating output.

Failure to achieve the minimum frost protection may lead to damage and therefore a malfunction of the heat pump.

Failure to achieve the minimum flow rate may lead to damage and therefore a malfunction of the heat pump.

Operation as water/water application with brine intermediate circuit: If the brine temperature of the intermediate circuit is reduced from 8 °C to 6 °C, the output and efficiency of the heat pump are reduced by approx. 5 %.

Operation: Brine/water and water/water

Type BW 302.		D090	D110	D140	D180	D230
Electrical values, heat pump						
Rated voltage		3/N/PE 400 V/50 Hz				
Starting system		Soft start				
Starting current per compressor	A	87	113	136	155	204
Total starting current (per stage)	A	127	159	197	230	294
Max. total operating current	A	71	83	106	135	164
Max. total power consumption (B20/W60)	kW	30.69	40.57	50.05	66.19	81.88
Cos ϕ compressor for B0/W35		0.65	0.76	0.75	0.78	0.79
Cos ϕ compressor at max. output (B20/W60)		0.76	0.88	0.88	0.87	0.87
Internal protection per compressor (3/N/PE)	A	32	40	63	80	100
Internal protection for pumps and valves (3/N/PE)	A	16	16	16	16	16
Max. permissible power cable protection on site	A	80	100	125	160	200
IP rating		IP 20	IP 20	IP 20	IP 20	IP 20

Vitocal 300-G Pro, type BW 302.D (cont.)

Type BW 302.		D090	D110	D140	D180	D230
Refrigerant circuit						
Number of refrigerant circuits		1	1	1	1	1
Number of compressors		2	2	2	2	2
Compressor type		Hermetically sealed scroll compressor				
Refrigerant		R410A	R410A	R410A	R410A	R410A
Refrigerant charge (standard value), see type plate	kg	10.5	13.0	17.0	22.0	42.3
Global warming potential (GWP)*1		2088	2088	2088	2088	2088
CO_2 equivalent	t	22.0	27.2	35.6	46.0	88.5
Permissible operating pressure, high pressure side	bar	45	45	45	45	45
	MPa	4.5	4.5	4.5	4.5	4.5
Permissible operating pressure, low pressure side	bar	18	18	18	18	18
	MPa	1.8	1.8	1.8	1.8	1.8
Oil in compressor						
Type		Emkarate RL32 3MAF				
Oil volume	l	8.5	11.4	15.6	14.6	14.6
Connections						
Primary circuit from evaporator (Victaulic)		3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)	3" (DN 80)
Primary circuit from connection set (flange)		DN 80/PN 10	DN 80/PN 10	DN 80/PN 10	DN 80/PN 10	DN 80/PN 10
Secondary circuit from condenser (Victaulic)		2½" (DN 65)	2½" (DN 65)	2½" (DN 65)	2½" (DN 65)	2½" (DN 65)
Secondary circuit from connection set (flange)		DN 65/PN 10	DN 65/PN 10	DN 65/PN 10	DN 65/PN 10	DN 65/PN 10
Permissible operating pressure*2						
Primary circuit	bar	10	10	10	10	10
	MPa	0.1	0.1	0.1	0.1	0.1
Secondary circuit	bar	10	10	10	10	10
	MPa	0.1	0.1	0.1	0.1	0.1
Dimensions						
Total length	mm	1383	1383	1972	1972	1972
Total width	mm	911	911	911	911	911
Handling width without side panels (transport dimensions)	mm	850	850	850	850	850
Total height	mm	1650	1650	1650	1650	1650
Total weight	kg	680	860	1150	1250	1425
Sound power level (measured with reference to EN 12102/ EN ISO 9614-1)						
Weighted total sound power level at B0/W35 at rated heating output	dB(A)	57	63	63	65	69
Weighted total sound power level at B0/W55 at rated heating output	dB(A)	59	65	65	67	71
Energy efficiency class as per Commission Regulation (EU) No 813/2013 for heating (average climatic conditions)						
Low temperature application (W35)		A+++	A+++	A+++	A+++	A+++
Medium temperature application (W55)		A++	A++	A++	A++	A++
Heating performance data as per Commission Regulation (EU) No 813/2013 (average climatic conditions)						
Low temperature application (W35)						
– Energy efficiency ηS	%	194	191	193	192	196
– Seasonal coefficient of performance (SCOP)		5.04	4.97	5.03	5.01	5.11
Medium temperature application (W55)						
– Energy efficiency ηS	%	140	138	143	137	142
– Seasonal coefficient of performance (SCOP)		3.70	3.66	3.78	3.64	3.75
Heating performance data as per Commission Regulation (EU) No 813/2013 (cooler climatic conditions)						
Low temperature application (W35)						
– Energy efficiency ηS	%	201	198	194	200	204
– Seasonal coefficient of performance (SCOP)		5.23	5.15	5.04	5.21	5.30
Medium temperature application (W55)						
– Energy efficiency ηS	%	146	144	142	144	148
– Seasonal coefficient of performance (SCOP)		3.86	3.81	3.75	3.79	3.90

*1 *Based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*

*2 *At operating pressures higher than 10 bar (1 MPa), observe the permissible operating pressure for the accessories.*

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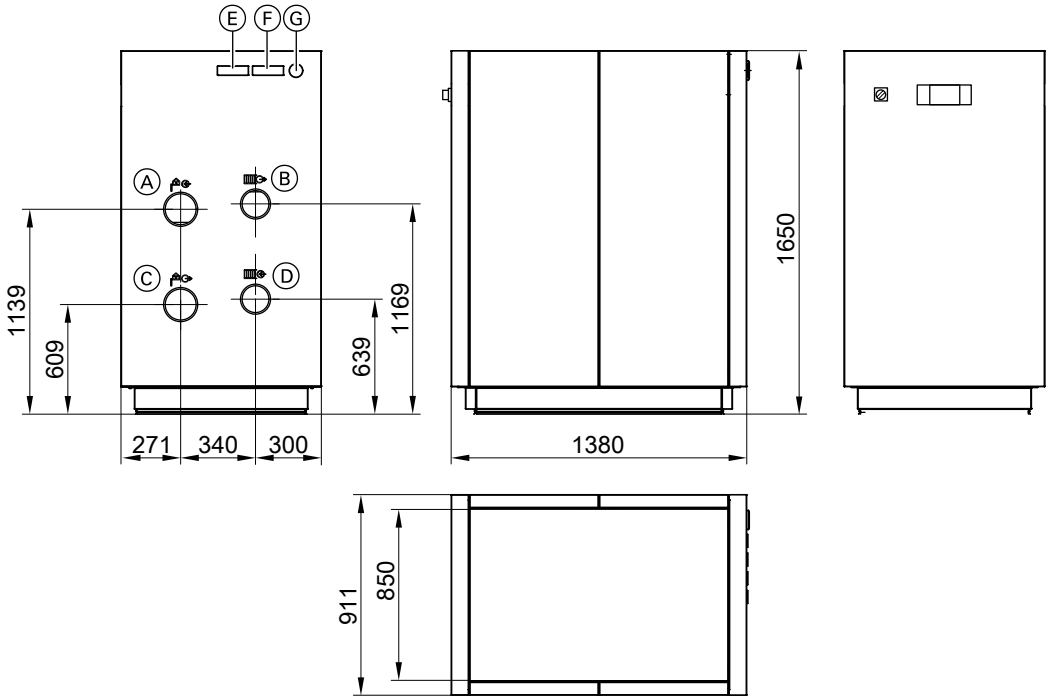
Note
The specifications in the datasheets and the product description describe purely physical characteristics. Additional assurances or guarantees require a separate contractual agreement.

Information on refrigerant
The EC safety datasheet for the refrigerant used can be obtained from the Technical Services department of Viessmann Werke.

Dimensions, types BW 302.D090 and BW 302.D110

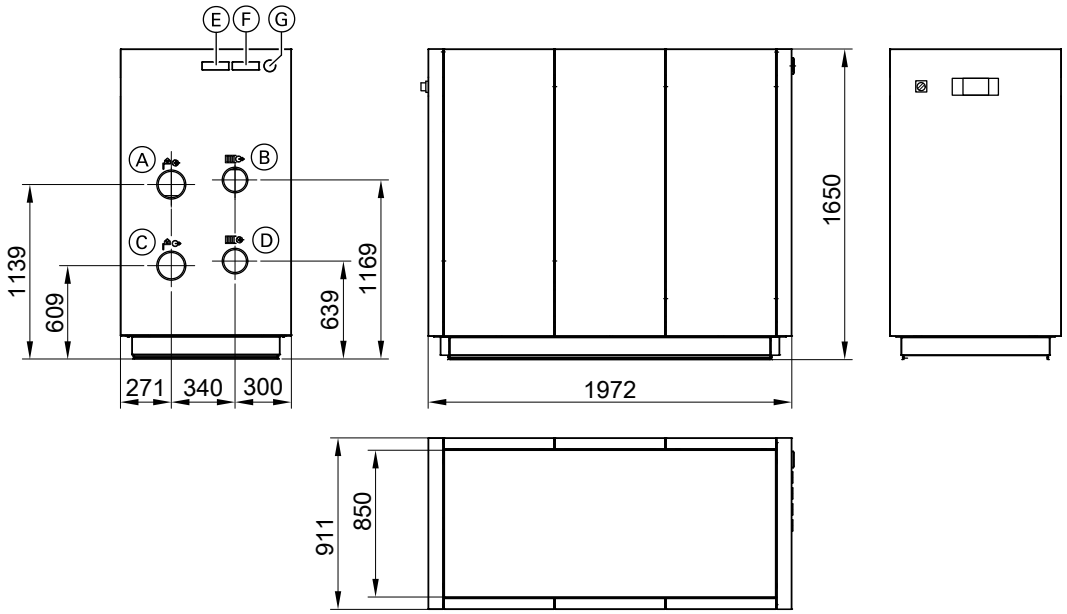


Ⓐ Primary circuit flow (inlet):
Victaulic 3" (DN 80)
Ⓑ Secondary circuit flow (outlet):
Victaulic 2½" (DN 65)
Ⓒ Primary circuit return (outlet):
Victaulic 3" (DN 80)
Ⓓ Secondary circuit return (inlet):
Victaulic 2½" (DN 65)
Ⓔ Low voltage < 50 V
Ⓕ Power supply 230 V/50 Hz
Ⓖ Power supply 400 V/50 Hz

Note
The width of the heat pump is given with and without side panels. The dimensions without side panels are the transport dimensions for handling.

Vitocal 300-G Pro, type BW 302.D (cont.)

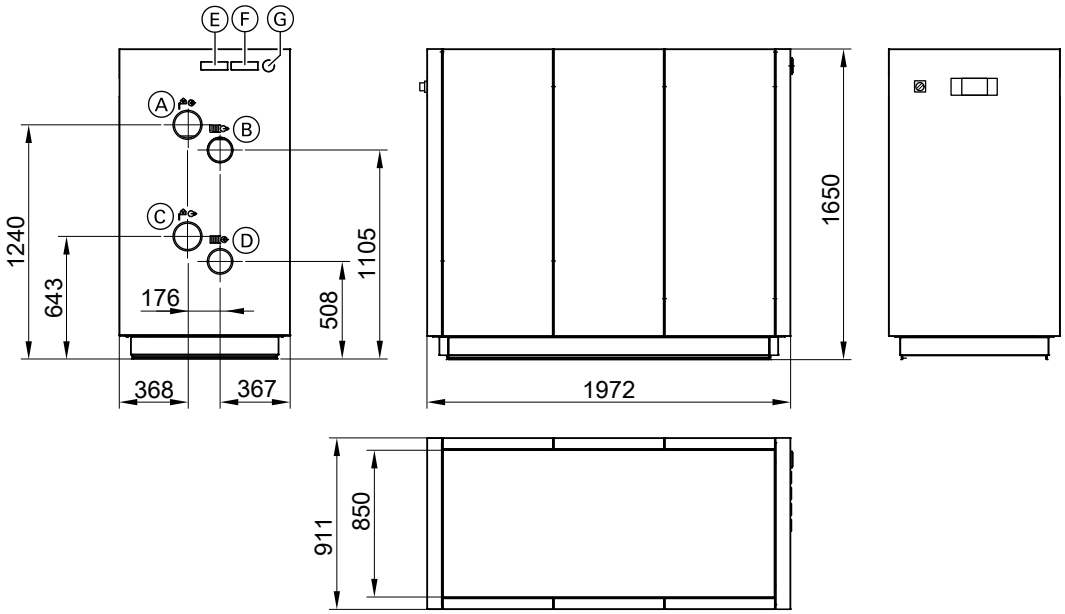
Dimensions, types BW 302.D140 and BW 302.D180



Ⓐ Primary circuit flow (inlet):
Victaulic 3" (DN 80)
Ⓑ Secondary circuit flow (outlet):
Victaulic 2½" (DN 65)
Ⓒ Primary circuit return (outlet):
Victaulic 3" (DN 80)
Ⓓ Secondary circuit return (inlet):
Victaulic 2½" (DN 65)
Ⓔ Low voltage < 50 V
Ⓕ Power supply 230 V/50 Hz
Ⓖ Power supply 400 V/50 Hz

Note
The width of the heat pump is given with and without side panels. The dimensions without side panels are the transport dimensions for handling.

Dimensions, type BW 302.D230



Ⓐ Primary circuit flow (inlet): Victaulic 3" (DN 80)
Ⓑ Secondary circuit flow (outlet): Victaulic 2½" (DN 65)
Ⓒ Primary circuit return (outlet): Victaulic 3" (DN 80)
Ⓓ Secondary circuit return (inlet): Victaulic 2½" (DN 65)
Ⓔ Low voltage < 50 V
Ⓕ Power supply 230 V/50 Hz
Ⓖ Power supply 400 V/50 Hz

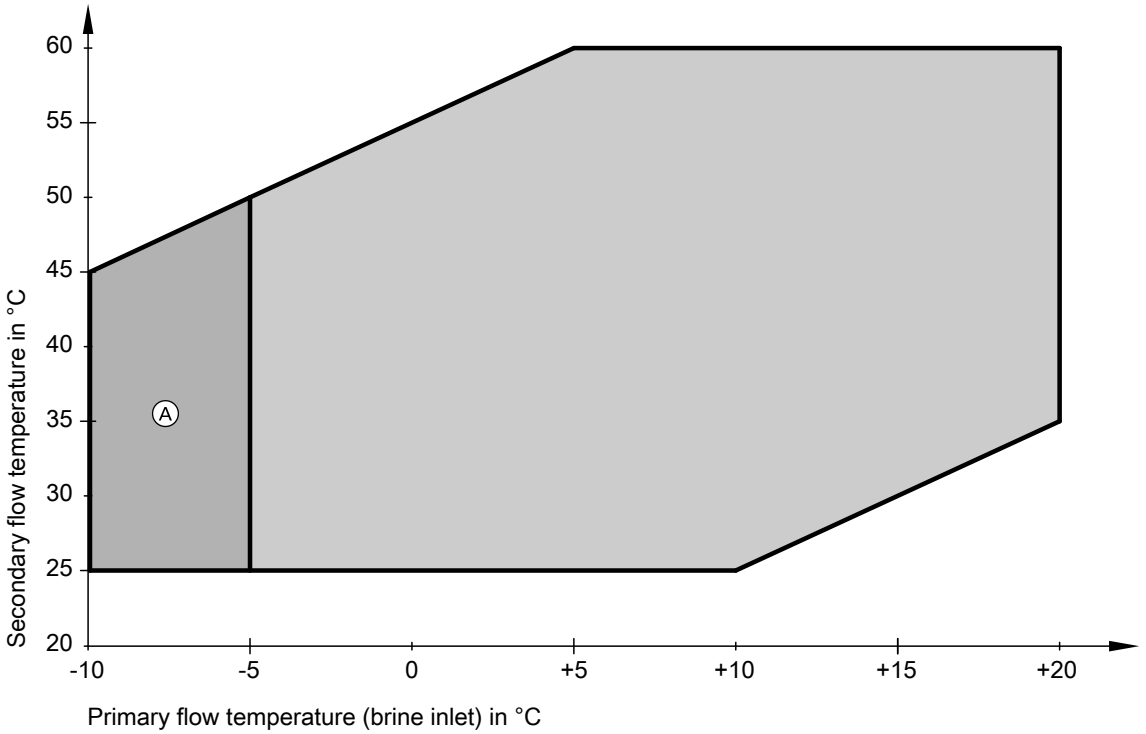
Note
The width of the heat pump is given with and without side panels. The dimensions without side panels are the transport dimensions for handling.

Application limits with reference to EN 14511

Standard operating points:
- Secondary side spread: 5 K or 8 K for B0/W55
- Primary side spread: 3 K

Remaining operating points at fixed flow rate corresponding to the relevant nominal flow rate (see table in chapter "Curves").

Vitocal 300-G Pro, type BW 302.D (cont.)

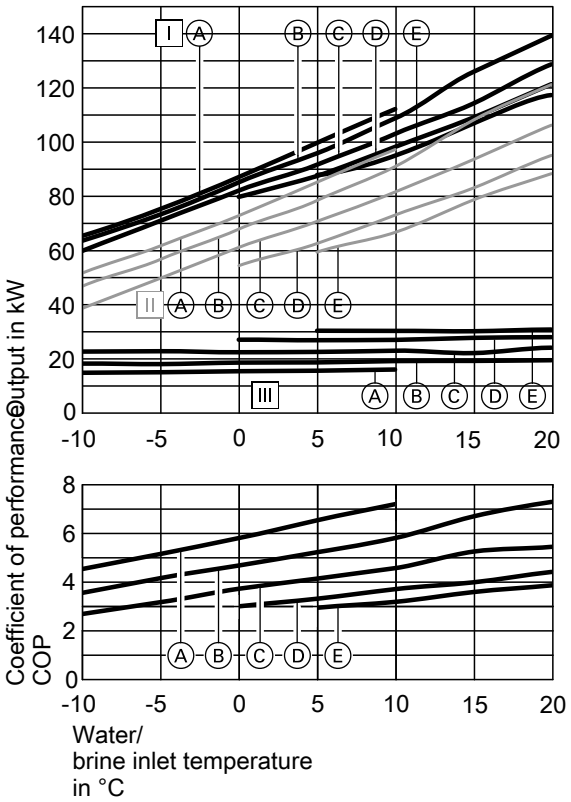


Ⓐ Ice store

Vitocal 300-G Pro, type BW 302.D (cont.)

Curves, type BW 302.D090

Performance data



[III] Power consumption
Ⓐ T_{HF} = 25 °C
Ⓑ T_{HF} = 35 °C
Ⓒ T_{HF} = 45 °C
Ⓓ T_{HF} = 55 °C
Ⓔ T_{HF} = 60 °C
T_{HF} Flow temperature, heating circuit

[I] Heating output
[II] Cooling capacity

Operating point	**W**	**°C**						
	B	**°C**	**25**					
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	65.1	75.3	86.9	99.5	112.1	--	--
Cooling capacity		kW	51.2	61.2	72.4	84.8	97.0	--	--
Power consumption		kW	14.88	15.09	15.43	15.69	16.03	--	--
Coefficient of performance ε (COP)			4.37	4.99	5.63	6.34	6.99	--	--

Operating point	**W**	**°C**						
	B	**°C**	**35**					
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	63.3	73.1	84.9	95.7	108.7	125.9	139.3
Cooling capacity		kW	46.2	56.2	67.4	78.0	90.6	107.8	121.0
Power consumption		kW	18.28	18.09	18.63	18.79	19.19	19.25	19.55
Coefficient of performance ε (COP)			3.46	4.04	4.55	5.09	5.66	6.54	7.12

Operating point	**W**	**°C**						
	B	**°C**	**45**					
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	59.4	70.6	81.8	91.4	102.8	114.0	128.6
Cooling capacity		kW	38.0	49.2	60.6	70.2	81.2	93.2	106.0
Power consumption		kW	22.68	22.73	22.43	22.53	22.93	22.13	24.03
Coefficient of performance ε (COP)			2.62	3.11	3.65	4.06	4.49	5.15	5.35

Vitocal 300-G Pro, type BW 302.D (cont.)

Operating point	W	°C	55						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	79.4	87.2	98.0	108.8	121.2
Cooling capacity		kW	--	--	53.9	62.1	72.7	82.7	94.9
Power consumption		kW	--	--	26.91	26.71	26.81	27.61	27.81
Coefficient of performance ε (COP)			--	--	2.95	3.27	3.66	3.94	4.36

Operating point	W	°C	60						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	--	87.6	94.8	106.6	117.2
Cooling capacity		kW	--	--	--	58.9	66.3	78.3	88.1
Power consumption		kW	--	--	--	30.31	30.21	30.11	30.69
Coefficient of performance ε (COP)			--	--	--	2.89	3.14	3.54	3.82

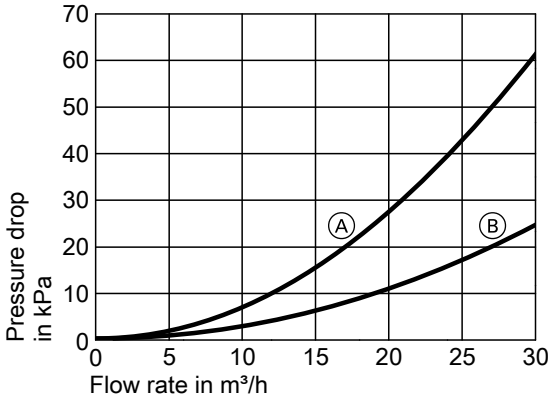
Notes

Performance characteristics were determined under the following conditions:

- *New appliances with clean plate heat exchangers*
- *Primary circuit (brine) with Tyfocor GE heat transfer medium (frost protection down to at least –16.1 °C)*
- *Secondary circuit with water*

The specifications in the datasheets and the product description describe purely physical characteristics.
Additional assurances or guarantees require a separate contractual agreement.

Pressure drop



Ⓐ Primary circuit
Ⓑ Secondary circuit

Operating point	°C	B0/W35		B0/W45		B0/W55	
		Primary circuit	Secondary circuit	Primary circuit	Secondary circuit	Primary circuit	Secondary circuit
Nominal flow rate	m³/h	20.5	14.7	18.5	14.2	16.4	8.7
Pressure drop at nominal flow rate	kPa	29	6	24	5	19	2

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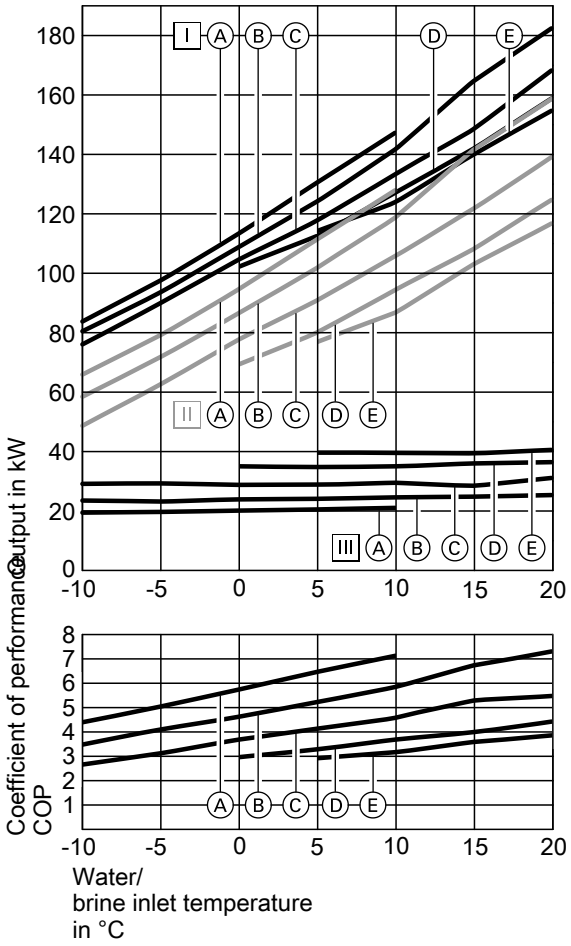
Vitocal 300-G Pro, type BW 302.D (cont.)

Curves, type BW 302.D110

Performance data



[III] Power consumption
Ⓐ T_{HF} = 25 °C
Ⓑ T_{HF} = 35 °C
Ⓒ T_{HF} = 45 °C
Ⓓ T_{HF} = 55 °C
Ⓔ T_{HF} = 60 °C
T_{HF} Flow temperature, heating circuit

[I] Heating output
[II] Cooling capacity

Operating point	**W**	**°C**				**25**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	83.7	97.5	113.3	130.5	147.3	--	--
Cooling capacity		kW	65.3	78.7	94.1	110.9	127.5	--	--
Power consumption		kW	19.75	20.00	20.40	20.80	21.30	--	--
Coefficient of performance ε (COP)			4.24	4.87	5.55	6.27	6.91	--	--

Operating point	**W**	**°C**				**35**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	80.3	93.5	108.7	124.1	141.7	164.7	182.5
Cooling capacity		kW	57.9	71.3	86.1	101.3	118.3	141.1	158.3
Power consumption		kW	23.85	23.50	24.20	24.40	24.90	25.10	25.60
Coefficient of performance ε (COP)			3.37	3.98	4.49	5.09	5.69	6.56	7.13

Operating point	**W**	**°C**				**45**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	75.9	89.9	104.5	117.7	133.3	148.5	168.3
Cooling capacity		kW	48.2	62.2	77.2	90.4	105.4	121.4	138.8
Power consumption		kW	29.30	29.45	28.95	29.05	29.65	28.65	31.25
Coefficient of performance ε (COP)			2.59	3.05	3.61	4.05	4.49	5.18	5.38

Vitocal 300-G Pro, type BW 302.D (cont.)

Operating point	W	°C	55						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	102.0	112.4	127.0	141.8	158.8
Cooling capacity		kW	--	--	68.8	79.6	94.0	107.8	124.4
Power consumption		kW	--	--	35.00	34.80	35.00	36.00	36.40
Coefficient of performance ε (COP)			--	--	2.92	3.23	3.63	3.94	4.36

Operating point	W	°C	60						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	--	114.0	123.8	139.8	154.6
Cooling capacity		kW	--	--	--	76.4	86.4	102.6	116.4
Power consumption		kW	--	--	--	39.70	39.60	39.50	40.57
Coefficient of performance ε (COP)			--	--	--	2.87	3.13	3.54	3.81

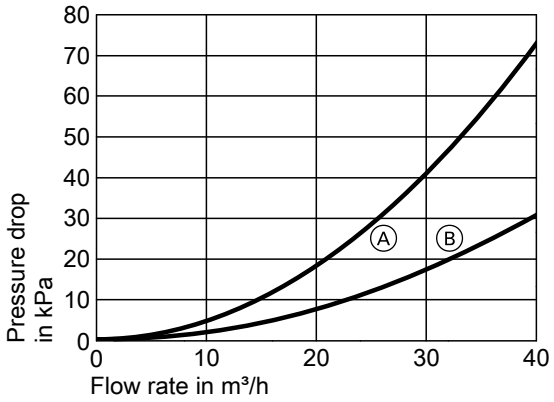
Notes

Performance characteristics were determined under the following conditions:

- *New appliances with clean plate heat exchangers*
- *Primary circuit (brine) with Tyfocor GE heat transfer medium (frost protection down to at least –16.1 °C)*
- *Secondary circuit with water*

The specifications in the datasheets and the product description describe purely physical characteristics.
Additional assurances or guarantees require a separate contractual agreement.

Pressure drop

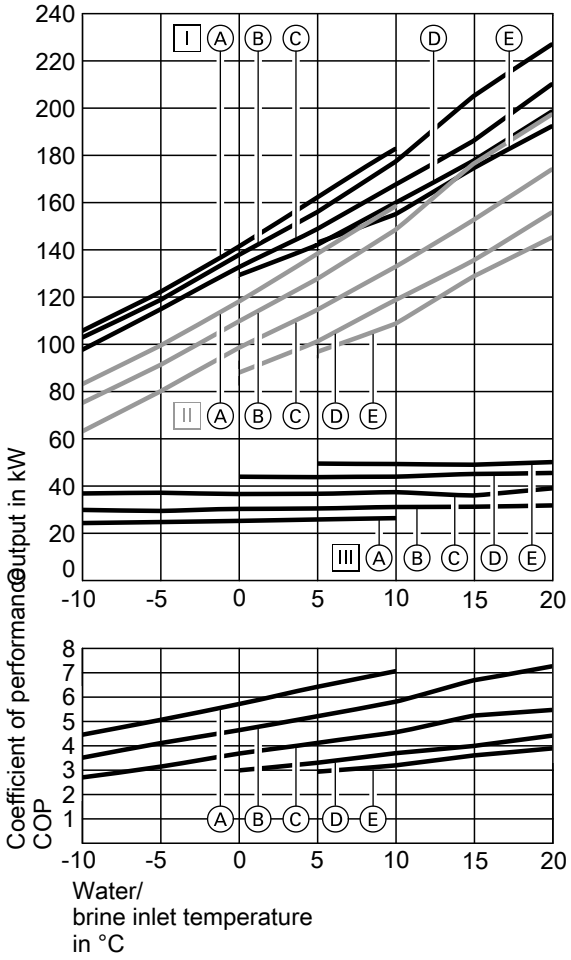


Ⓐ Primary circuit
Ⓑ Secondary circuit

Operating point	°C	B0/W35		B0/W45		B0/W55	
		Primary circuit	Secondary circuit	Primary circuit	Secondary circuit	Primary circuit	Secondary circuit
Nominal flow rate	m^3/h	26.2	18.8	23.5	18.1	20.9	11.1
Pressure drop at nominal flow rate	kPa	31	7	26	6	21	2

Curves, type BW 302.D140

Performance data



[I] Heating output
[II] Cooling capacity
[III] Power consumption
Ⓐ T_{HF} = 25 °C
Ⓑ T_{HF} = 35 °C
Ⓒ T_{HF} = 45 °C
Ⓓ T_{HF} = 55 °C
Ⓔ T_{HF} = 60 °C
T_{HF} Flow temperature, heating circuit

Operating point	**W**	**°C**						
	B	**°C**	**25**						
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	103.1	119.7	138.9	159.7	180.3	--	--
Cooling capacity		kW	79.8	96.2	114.8	135.0	155.2	--	--
Power consumption		kW	25.13	25.48	26.08	26.58	27.18	--	--
Coefficient of performance ε (COP)			4.10	4.70	5.33	6.01	6.63	--	--

Operating point	**W**	**°C**						
	B	**°C**	**35**						
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	100.3	116.3	135.3	153.5	174.9	202.7	224.7
Cooling capacity		kW	71.8	88.0	106.4	124.4	145.2	173.2	194.2
Power consumption		kW	30.73	30.28	31.08	31.28	31.88	31.98	32.58
Coefficient of performance ε (COP)			3.26	3.84	4.35	4.91	5.49	6.34	6.90

Operating point	**W**	**°C**						
	B	**°C**	**45**						
			–10	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	95.0	112.2	130.0	146.2	165.0	183.6	207.6
Cooling capacity		kW	60.5	77.5	95.9	111.9	130.3	150.1	171.5
Power consumption		kW	37.40	37.65	37.15	37.25	37.85	36.55	39.45
Coefficient of performance ε (COP)			2.54	2.98	3.50	3.93	4.36	5.02	5.26

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Vitocal 300-G Pro, type BW 302.D (cont.)

Operating point	W	°C	55						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	125.4	138.2	156.0	174.0	194.8
Cooling capacity		kW	--	--	83.6	96.8	114.4	131.2	151.6
Power consumption		kW	--	--	43.99	43.79	43.99	45.19	45.59
Coefficient of performance ε (COP)			--	--	2.85	3.16	3.55	3.85	4.27

Operating point	W	°C	60						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	--	139.2	151.2	170.8	188.7
Cooling capacity		kW	--	--	--	92.4	104.4	124.4	140.8
Power consumption		kW	--	--	--	49.59	49.39	49.19	50.61
Coefficient of performance ε (COP)			--	--	--	2.81	3.06	3.47	3.73

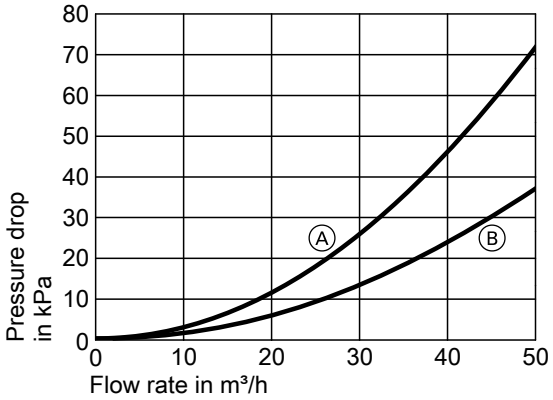
Notes

Performance characteristics were determined under the following conditions:

- *New appliances with clean plate heat exchangers*
- *Primary circuit (brine) with Tyfocor GE heat transfer medium (frost protection down to at least –16.1 °C)*
- *Secondary circuit with water*

The specifications in the datasheets and the product description describe purely physical characteristics.
Additional assurances or guarantees require a separate contractual agreement.

Pressure drop



Ⓐ Primary circuit
Ⓑ Secondary circuit

Operating point	°C	B0/W35		B0/W45		B0/W55	
		Primary circuit	Secondary circuit	Primary circuit	Secondary circuit	Primary circuit	Secondary circuit
Nominal flow rate	m³/h	32.4	23.4	29.2	22.6	25.4	13.7
Pressure drop at nominal flow rate	kPa	30	8	25	7	19	3

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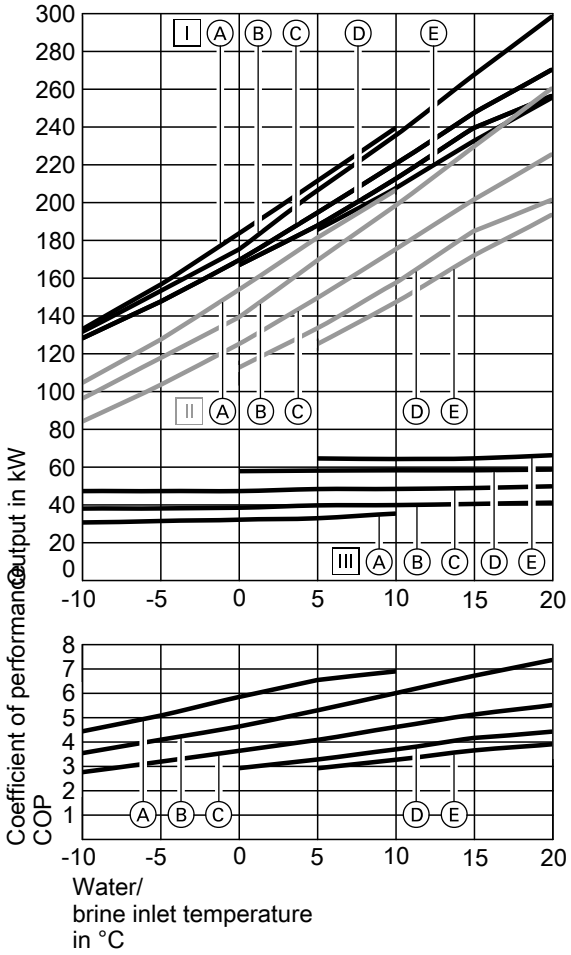
Curves, type BW 302.D180

Performance data



[I] Heating output
[II] Cooling capacity
[III] Power consumption
Ⓐ T_{HF} = 25 °C
Ⓑ T_{HF} = 35 °C
Ⓒ T_{HF} = 45 °C
Ⓓ T_{HF} = 55 °C
Ⓔ T_{HF} = 60 °C
T_{HF} Flow temperature, heating circuit

Operating point	**W**	**°C**				**25**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	132.7	156.3	183.3	211.1	239.1	--	--
Cooling capacity		kW	103.9	126.7	153.1	180.5	205.7	--	--
Power consumption		kW	31.06	31.81	32.41	33.31	35.71	--	--
Coefficient of performance ε (COP)			4.27	4.91	5.66	6.34	6.70	--	--

Operating point	**W**	**°C**				**35**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	131.3	152.9	174.9	206.1	235.1	267.1	298.1
Cooling capacity		kW	95.5	116.9	138.5	168.5	197.5	228.7	259.7
Power consumption		kW	38.36	38.51	38.91	40.01	40.21	40.81	41.51
Coefficient of performance ε (COP)			3.42	3.97	4.50	5.15	5.85	6.55	7.18

Operating point	**W**	**°C**				**45**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	127.9	147.3	169.1	194.1	220.1	247.1	270.1
Cooling capacity		kW	83.2	102.6	124.2	148.4	174.2	200.6	224.6
Power consumption		kW	47.59	47.34	47.54	48.54	48.74	49.14	49.94
Coefficient of performance ε (COP)			2.69	3.11	3.56	4.00	4.52	5.03	5.41

Vitocal 300-G Pro, type BW 302.D (cont.)

Operating point	W	°C	55						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	166.4	187.2	212.0	239.0	256.0
Cooling capacity		kW	--	--	111.9	132.5	156.5	184.1	200.7
Power consumption		kW	--	--	57.83	58.03	58.23	58.23	58.63
Coefficient of performance ε (COP)			--	--	2.88	3.23	3.64	4.11	4.37

Operating point	W	°C	60						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	--	185.0	207.0	232.0	255.0
Cooling capacity		kW	--	--	--	124.1	146.3	171.1	192.7
Power consumption		kW	--	--	--	64.43	64.23	64.43	66.19
Coefficient of performance ε (COP)			--	--	--	2.87	3.22	3.60	3.85

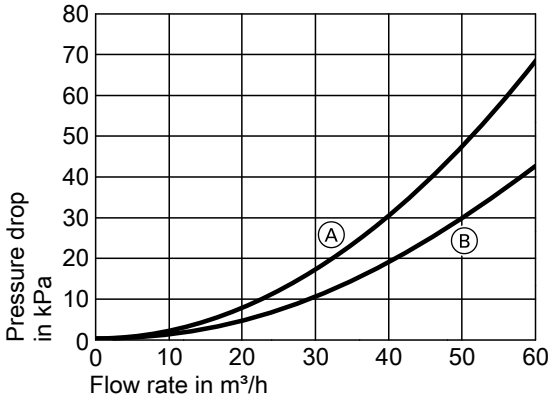
Notes

Performance characteristics were determined under the following conditions:

- *New appliances with clean plate heat exchangers*
- *Primary circuit (brine) with Tyfocor GE heat transfer medium (frost protection down to at least –16.1 °C)*
- *Secondary circuit with water*

The specifications in the datasheets and the product description describe purely physical characteristics.
Additional assurances or guarantees require a separate contractual agreement.

Pressure drop

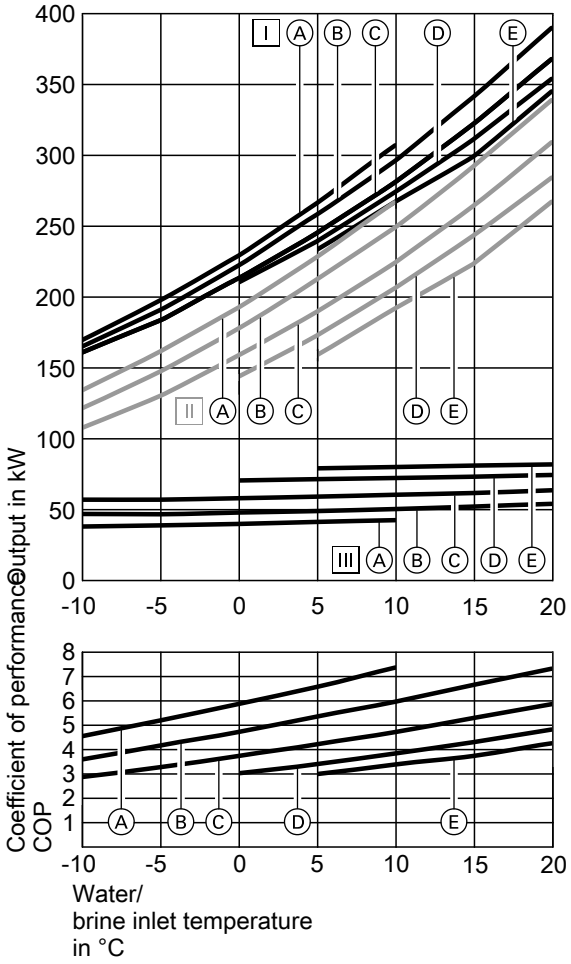


Ⓐ Primary circuit
Ⓑ Secondary circuit

Operating point	°C	B0/W35		B0/W45		B0/W55	
		Primary circuit	Secondary circuit	Primary circuit	Secondary circuit	Primary circuit	Secondary circuit
Nominal flow rate	m^3/h	42.1	30.3	37.8	29.4	34.1	18.1
Pressure drop at nominal flow rate	kPa	34	11	28	10	23	4

Curves, type BW 302.D230

Performance data



[III] Power consumption
Ⓐ T_{HF} = 25 °C
Ⓑ T_{HF} = 35 °C
Ⓒ T_{HF} = 45 °C
Ⓓ T_{HF} = 55 °C
Ⓔ T_{HF} = 60 °C
T_{HF} Flow temperature, heating circuit

[I] Heating output
[II] Cooling capacity

Operating point	**W**	**°C**				**25**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	169.4	197.6	229.2	266.2	307.2	--	--
Cooling capacity		kW	133.5	160.9	192.1	227.7	266.7	--	--
Power consumption		kW	38.53	39.28	40.28	41.68	42.88	--	--
Coefficient of performance ε (COP)			4.40	5.03	5.69	6.39	7.16	--	--

Operating point	**W**	**°C**				**35**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	165.0	190.8	222.2	258.2	296.2	341.2	390.2
Cooling capacity		kW	120.7	146.7	177.1	211.7	248.7	291.7	338.7
Power consumption		kW	47.33	47.08	48.28	49.48	50.88	52.48	54.48
Coefficient of performance ε (COP)			3.49	4.05	4.60	5.22	5.82	6.50	7.16

Operating point	**W**	**°C**				**45**		
	B	**°C**	**–10**	**–5**	**0**	**5**	**10**	**15**	**20**
Heating output		kW	160.8	183.4	213.2	245.2	281.2	322.2	368.2
Cooling capacity		kW	106.9	129.5	158.1	188.9	223.7	263.7	308.7
Power consumption		kW	57.32	57.27	58.27	59.27	60.67	61.87	63.87
Coefficient of performance ε (COP)			2.80	3.20	3.66	4.14	4.63	5.21	5.76

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Vitocal 300-G Pro, type BW 302.D (cont.)

Operating point	W	°C	55						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	210.1	239.1	274.1	311.1	354.1
Cooling capacity		kW	--	--	143.1	172.1	205.7	242.7	283.7
Power consumption		kW	--	--	70.50	71.30	72.30	73.10	74.30
Coefficient of performance ε (COP)			--	--	2.98	3.35	3.79	4.26	4.76

Operating point	W	°C	60						
	B	°C	–10	–5	0	5	10	15	20
Heating output		kW	--	--	--	233.1	267.1	299.1	345.1
Cooling capacity		kW	--	--	--	158.1	191.3	222.7	266.7
Power consumption		kW	--	--	--	79.10	79.90	80.90	81.88
Coefficient of performance ε (COP)			--	--	--	2.95	3.34	3.70	4.21

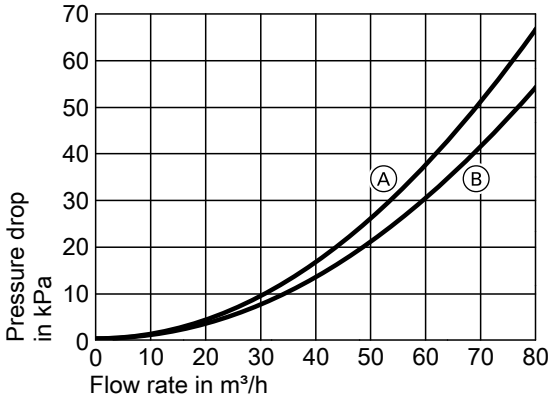
Notes

Performance characteristics were determined under the following conditions:

- *New appliances with clean plate heat exchangers*
- *Primary circuit (brine) with Tyfocor GE heat transfer medium (frost protection down to at least –16.1 °C)*
- *Secondary circuit with water*

The specifications in the datasheets and the product description describe purely physical characteristics.
Additional assurances or guarantees require a separate contractual agreement.

Pressure drop



Ⓐ Primary circuit
Ⓑ Secondary circuit

Operating point	°C	B0/W35		B0/W45		B0/W55	
		Primary circuit	Secondary circuit	Primary circuit	Secondary circuit	Primary circuit	Secondary circuit
Nominal flow rate	m^3/h	53.8	38.5	48.1	37.0	43.5	22.9
Pressure drop at nominal flow rate	kPa	30	13	24	11	20	4

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2.1 Overview of installation accessories

Accessories	Part no.	Vitocal 300-G Pro, type BW 302.D				
		090	110	140	180	230
Primary and secondary circuit: See page 25 onwards.						
Connection set Connection set for connecting the heat pump to the primary and secondary circuits – 2 Victaulic couplings 3" – 2 Victaulic couplings 2½" – 2 adaptors with 2½" flange DN 65/PN 10, 220 mm long – 2 adaptors with 3" flange DN 80/PN 10, 300 mm long – Without sound insulation	ZK03790	X	X	X	X	X
Basic sound insulation Sound-absorbing expansion joints – 2 expansion joints with flange connection on both sides DN 65/PN 10, 100 mm long – 2 expansion joints with flange connection on both sides DN 80/PN 10, 100 mm long – Pressure rating up to 10 bar (1 MPa), max. 100 °C	ZK03793	X	X	X	X	X
Optimised sound insulation Sound-absorbing expansion joints – 2 expansion joints with flange connection on both sides DN 65/PN 10, 100 mm long – 2 expansion joints with flange connection on both sides DN 80/PN 10, 100 mm long – Pressure rating up to 10 bar (1 MPa), max. 100 °C	ZK03793	2	2	2	2	2
Heat transfer medium (brine)						
– Heat transfer medium "Tyfocor GE" 30 l	ZK05914	X	X	X	X	X
– Heat transfer medium "Tyfocor GE" 200 l	ZK05915	X	X	X	X	X
Pressure switch	ZK04684	X	X	X	X	X
Primary pumps, design H ≥ 3 m, frost protection 30 %, constant speed setting						
High efficiency circulation pumps*3	On site					
Standard circulation pumps	On site					
Heating circuit (secondary circuit): See page 25 onwards.						
Safety equipment block	7143783	X	X	X	X	X
Secondary pumps, design H ≥ 3 m, constant speed setting						
High efficiency circulation pumps*3	On site					
Well circuit						
High performance plate heat exchanger (separating heat exchanger):						
– Plate heat exchanger, system separation 13 x 58 with drip pan	ZK05302	X				
– Plate heat exchanger, system separation 13 x 74 with drip pan	ZK05303		X			
– Plate heat exchanger, system separation 13 x 90 with drip pan	ZK05304			X		
– Plate heat exchanger, system separation 26 x 61 with drip pan	ZK05305				X	
– Plate heat exchanger, system separation 26 x 77 with drip pan	ZK05306					X
Flow switch set:						
– SR5906	Z011176	X	X	X	X	X
Frost stat	7179164	X	X	X	X	X
Swimming pool						
High performance plate heat exchanger (for B0/W35):						
– Plate heat exchanger for pool 13 x 30	ZK05320	X				
– Plate heat exchanger for pool 13 x 40	ZK05321		X			
– Plate heat exchanger for pool 13 x 54	ZK05322			X		
– Plate heat exchanger for pool 26 x 28	ZK05324				X	
– Plate heat exchanger for pool 26 x 36	ZK05327					X
High performance plate heat exchanger (for B8/W35):						
– Plate heat exchanger for pool 13 x 40	ZK05321	X				
– Plate heat exchanger for pool 13 x 54	ZK05322		X			
– Plate heat exchanger for pool 26 x 30	ZK05323			X		
– Plate heat exchanger for pool 26 x 38	ZK05325				X	
– Plate heat exchanger for pool 26 x 48	ZK05326					X
Valves and actuators (swimming pool)						
3-way valve with flange	On site					

Note

The table does not replace the need for specialist design and engineering on site. All components must be checked for suitability, particularly in respect of flow loss and pressure drop.

*3 On-site sizing

Installation accessories (cont.)

Accessories	Part no.	Vitocal 300-G Pro, type BW 302.D				
		090	110	140	180	230
DHW heating with cylinder loading system						
High performance plate heat exchanger:						
– DHW plate heat exchanger 120 x 50 with adjustable foot	ZK05309	X				
– DHW plate heat exchanger 120 x 70 with adjustable foot	ZK05310		X			
– DHW plate heat exchanger 120 x 80 with adjustable foot	ZK05311			X		
– DHW plate heat exchanger 120 x 90 with adjustable foot	ZK05312				X	
– DHW plate heat exchanger 120 x 120 with adjustable foot	ZK05313					X
Cylinder loading pump, bronze version	On site					
Valves, dampers and drives (DHW heating)						
2-way shut-off valve with threaded connection	On site					
2-way motorised damper, heating water buffer cylinder outlet	On site					
Damper and drive set PN 16	ZK03002					
– Damper and drive set						
– 2-way damper DN 65, Kvs 180						
– Servomotor GR24A-5						
Damper and drive set PN 16	ZK03003					
– Damper and drive set						
– 2-way damper DN 80, Kvs 300						
– Servomotor DR24A-5						
Damper and drive set PN 16	ZK03004					
– Damper and drive set						
– 2-way damper DN 100, Kvs 580						
– Servomotor DR24A-5						
Cooling, natural cooling						
High performance plate heat exchanger						
– NC plate heat exchanger 60 x 84 with adjustable foot	ZK05328	X				
– NC plate heat exchanger 60 x 108 with adjustable foot	ZK05329		X			
– NC plate heat exchanger 60 x 152 with adjustable foot	ZK05330			X		
– NC plate heat exchanger 60 x 184 with adjustable foot	ZK05331				X	X
Frost stat	7179164	X	X	X	X	X
Contact humidistat						
– Contact humidistat 24 V	7181418	X	X	X	X	X
– Contact humidistat 230 V	7452646	X	X	X	X	X
Sensors						
– Contact temperature sensor	7426463	X	X	X	X	X
– Immersion temperature sensor	7438702	X	X	X	X	X
– Room temperature sensor	7438537	X	X	X	X	X
Threaded sensor well						
– Length 50 mm	7511394	X	X	X	X	X
– Length 100 mm	ZK03843	X	X	X	X	X
– Length 150 mm	ZK03844	X	X	X	X	X
– Length 200 mm	7549713	X	X	X	X	X
– Length 250 mm	ZK03845	X	X	X	X	X
– Length 450 mm	7511395	X	X	X	X	X
Natural cooling extension kit	7179172	X	X	X	X	X
NC control panel	7459376	X	X	X	X	X
Dampers and drives (cooling)*3						
2-way motorised damper, heating water buffer cylinder outlet	On site					
Damper and drive set PN 16	ZK03002					
– Damper and drive set						
– 2-way damper DN 65, Kvs 180						
– Servomotor GR24A-5						
Damper and drive set PN 16	ZK03003					
– Damper and drive set						
– 2-way damper DN 80, Kvs 300						
– Servomotor DR24A-5						
Damper and drive set PN 16	ZK03004					
– Damper and drive set						
– 2-way damper DN 100, Kvs 580						
– Servomotor DR24A-5						

Note

The table does not replace the need for specialist design and engineering on site. All components must be checked for suitability, particularly in respect of flow loss and pressure drop.

*3 *On-site sizing*

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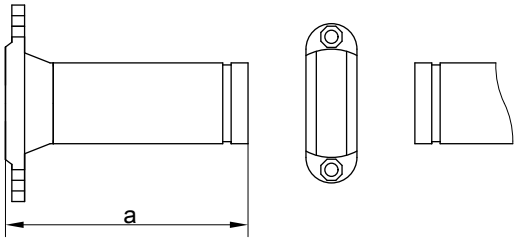
2.2 Hydraulic connection accessories (primary and secondary circuits)

Application: See page 43.

Connection set

Part no. ZK03790
To connect **one** heat pump to the primary and secondary circuits
- 2 Victaulic couplings 3"
- 2 Victaulic couplings 2½"
- 2 adaptors with 2½" flange DN 65/PN 10, 220 mm long
- 2 adaptors with 3" flange DN 80/PN 10, 300 mm long
- Without sound insulation

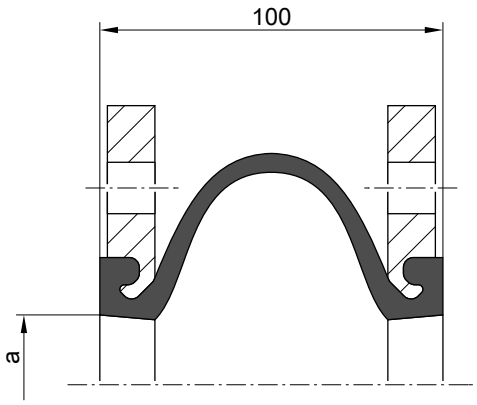


2 each in 2½" (a = 220) and 3" (a = 300)

Sound-absorbing expansion joints

Part no. ZK03793
- 2 expansion joints with flange connection on both sides DN 65/PN 10, 100 mm long
- 2 expansion joints with flange connection on both sides DN 80/PN 10, 100 mm long
- Pressure rating up to 10 bar (1 MPa), max. 100 °C

Note
1 set is needed for basic sound insulation.
2 sets are needed for optimised sound insulation.
See page 44.



a DN 65 and DN 80

2.3 Brine circuit (primary circuit)

Heat transfer medium Tyfocor GE

- 30 l in a disposable container
  Part no. ZK05914
- 200 l in a disposable container
  Part no. ZK05915

Green ready-mixed Tyfocor GE 30 % by vol. for primary circuit (brine)

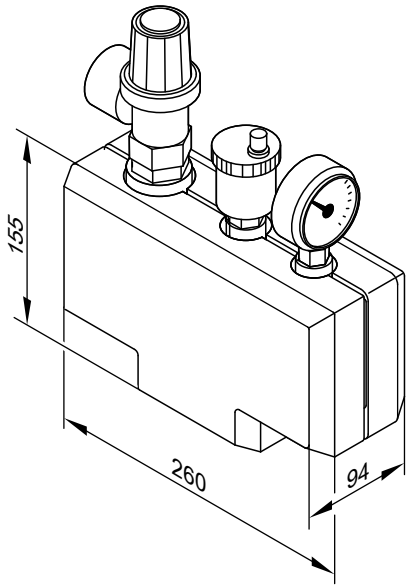
Minimum frost protection (freezing point) of –16.1 °C
Based on ethylene glycol with corrosion inhibitors
Not suitable for use with air as heat source
Not suitable for solar thermal systems

2.4 Heating circuit (secondary circuit)

Safety equipment block

Part no. 7143783

Components:
- Safety valve R 1, discharge pressure 3 bar (0.3 MPa)
- Pressure gauge
- Quick-action air vent valve G ⅜, 12 bar (1.2 MPa)
- Thermal insulation
- Up to 200 kW



2.5 Cooling

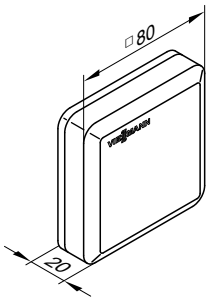
Sensors

See page 74 onwards.
- Contact temperature sensor
- Immersion temperature sensor
- Sensor wells

Room temperature sensor for separate cooling circuit

Part no. 7438537
Install in the room to be cooled on an internal wall, opposite radiators/heat sinks. Never install inside shelving units, in recesses, or immediately adjacent to a door or heat source (e.g. direct sunlight, fireplace, TV set etc.).
Connect the room temperature sensor to the control unit.

Connection:
- 2-core lead with a cross-section of 1.5 mm² (copper)
- Lead length from the remote control up to 30 m
- Never route this lead 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

Frost stat

Part no. 7179164
Frost protection safety switch.

Contact humidistat 24 V

Part no. 7181418
- Dew point contact switch
- To prevent the formation of condensate when cooling via a heating circuit

Contact humidistat 230 V

Part no. 7452646
- For capturing the dew point
- To prevent the formation of condensate

Natural cooling extension kit

Part no. 7179172
- PCB for processing signals and controlling the natural cooling function
- Connection plug
- Installation accessories

NC control panel

Part no. 7459376
Wall mounted control panel for switching the natural cooling function in conjunction with the Vitocal 300-G Pro. With integral heating circuit extension for KM-BUS mixer function.

Outputs
- Primary cooling circuit pump 230/400 V/50 Hz
- Secondary cooling circuit pump 230/400 V/50 Hz
- 3-way mixer ON/OFF/N 230 V/50 Hz
- 3-way diverter valve 230 V/50 Hz
- 2-way motorised valve 230 V/50 Hz

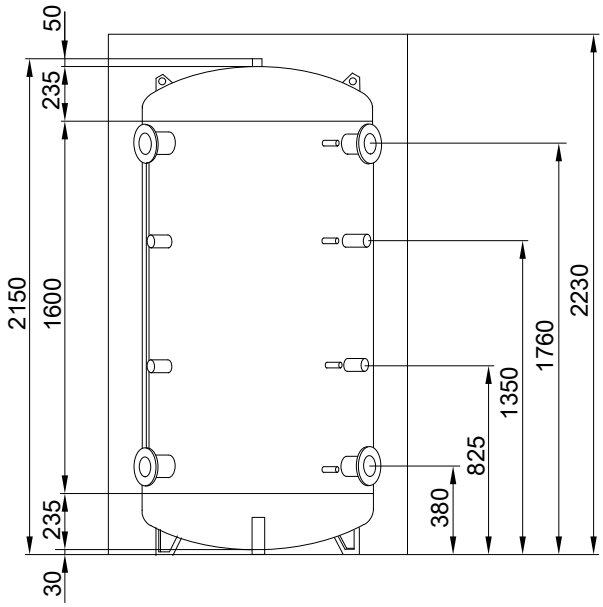
Inputs
- Power supply 3 x 400 V/50 Hz
- NC enable load capacity 230 V/50 Hz/6 A
- Frost stat in standard delivery
- Dew point switch in standard delivery
- KM-BUS, 2-wire

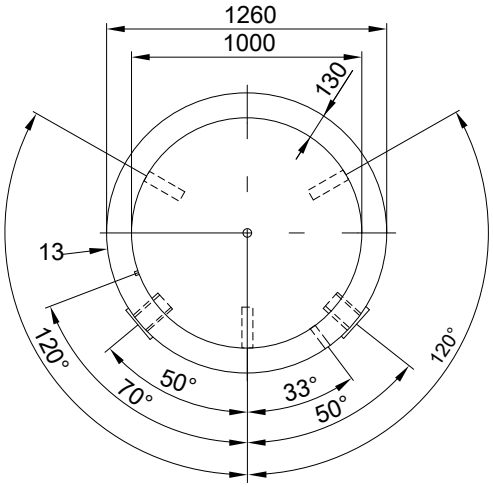
Dimensions, control panel
- L/W/D 600/500/200 mm

2.6 Heating water buffer cylinder

Heating water buffer cylinder 1500 l

Part no. ZK02266





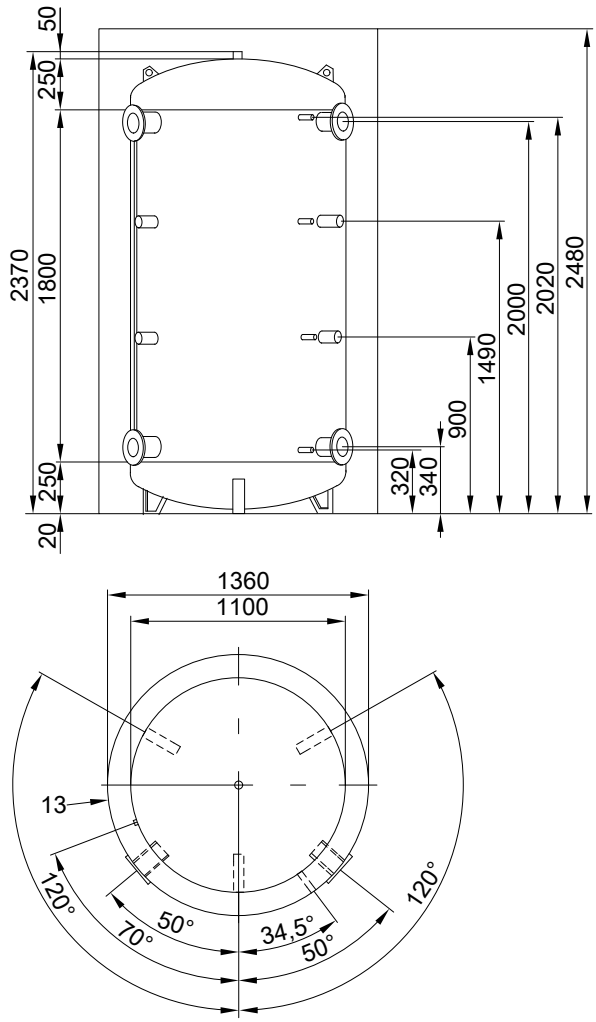
Specification

Type		Probe PSM 1500
Capacity	l	1500
Material		S 235 JR
Inner coating		Untreated
Outer coating		Rust protection
Operating pressure, heating		
Operating pressure, water	bar	3
	MPa	0.3
Test pressure	bar	4.5
	MPa	0.45
Max. operating temperature	°C	95
Connections		4 x DN 80 4 x 1½ fem. (DN 40)
Sensor connections		4 x ½ fem. (DN 15)
Cool-down losses per day	kWh	4.993
Thermal insulation		
Part no.		ZK02270
Insulation thickness	mm	130
Material		Fleece and skai jacket, silver

Note
Order sensor wells separately, see Viessmann pricelist.

Heating water buffer cylinder 2000 l

Part no. ZK02267



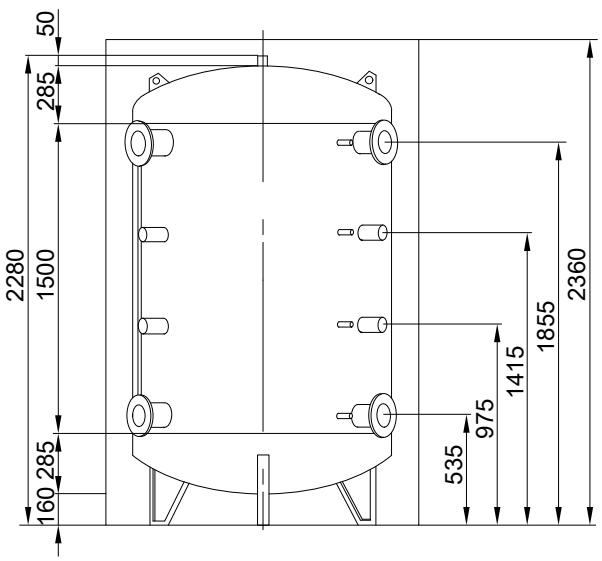
Specification

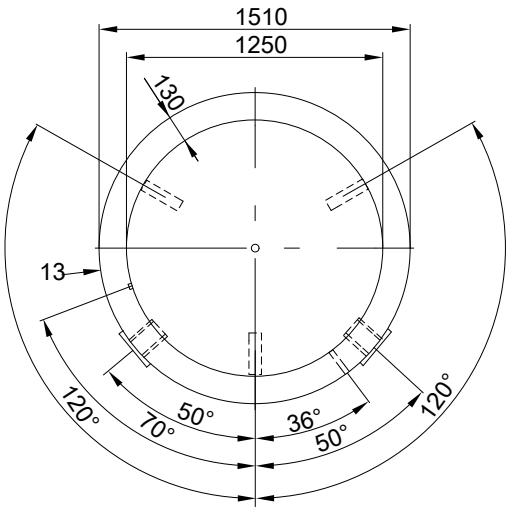
Type		Probe PSM 2000
Capacity	l	2021
Material		S 235 JR
Inner coating		Untreated
Outer coating		Rust protection
Operating pressure, heating		
Operating pressure, water	bar	3
	MPa	0.3
Test pressure	bar	4.5
	MPa	0.45
Max. operating temperature	°C	95
Connections		4 x DN 80 4 x 1½ fem. (DN 40)
Sensor connections		4 x ½ fem. (DN 15)
Cool-down losses per day	kWh	5.742
Thermal insulation		
Part no.		ZK02271
Insulation thickness	mm	130
Material		Fleece and skai jacket, silver

Note
Order sensor wells separately, see Viessmann pricelist.

Heating water buffer cylinder 2500 l

Part no. ZK02268





Specification

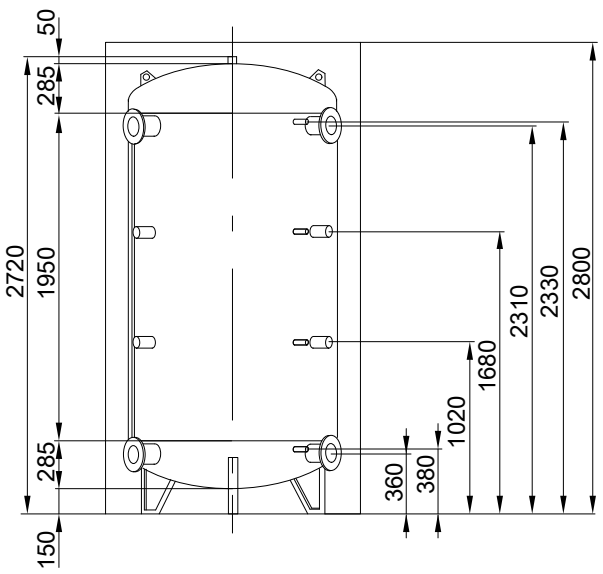
Type		Probe PSM 2500
Capacity	l	2304
Material		S 235 JR
Inner coating		Untreated
Outer coating		Rust protection
Operating pressure, heating		
Operating pressure, water	bar	3
	MPa	0.3
Test pressure	bar	4.5
	MPa	0.45
Max. operating temperature	°C	95
Connections		4 x DN 100 4 x 1½ fem. (DN 40)
Sensor connections		4 x ½ fem. (DN 15)
Cool-down losses per day	kWh	Not given
Thermal insulation		
Part no.		ZK02272
Insulation thickness	mm	130
Material		Fleece and skai jacket, silver

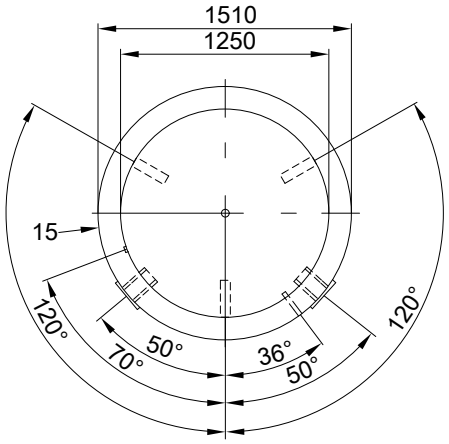
Note
Order sensor wells separately, see Viessmann pricelist.

Installation accessories (cont.)

Heating water buffer cylinder 3000 l

Part no. ZK02269





Specification

Type		Probe PSM 3000
Capacity	l	2852
Material		S 235 JR
Inner coating		Untreated
Outer coating		Rust protection
Operating pressure, heating		
Operating pressure, water	bar	3
	MPa	0.3
Test pressure	bar	4.5
	MPa	0.45
Max. operating temperature	°C	95
Connections		4 x DN 100 4 x 1½ fem. (DN 40)
Sensor connections		4 x ½ fem. (DN 15)
Cool-down losses per day	kWh	8.388
Thermal insulation		
Part no.		ZK02273
Insulation thickness	mm	130
Material		Fleece and skai jacket, silver

Note
Order sensor wells separately, see Viessmann pricelist.

Design information

3.1 Power supply and tariffs

Where heat pumps are used to heat buildings, the local power supply utility must first approve the installation [check with your local power supply utility].
Check the connection conditions specified by your local power supply utility for the stated equipment details. It is crucial to establish whether mono mode and/or mono energetic heat pump operation is feasible in the supply area.

It is also important to obtain information about standing charges and energy tariffs, about the options for utilising off-peak electricity during the night and about any power-off periods.
Address any questions relating to these issues to your customer's local power supply utility.

Application procedure

The following details are required to assess the effect of the heat pump operation on the grid of your local power supply utility:
- User address
- Location where the heat pump is to be used
- Type of demand in accordance with general tariffs (domestic, agricultural, commercial, professional and other use)
- Intended heat pump operating mode
- Heat pump manufacturer
- Type of heat pump
- Connected load in kW (from rated voltage and rated current)
- Max. starting current in A
- Max. heat load of the building in kW

3.2 Requirements for heat pump siting

Installation room:
- A plant room (supervised access area) is required for installation. Only a limited number of people may be accommodated in the plant room, some of whom must be familiar with the general safety precautions for the equipment.
- The installation room must be dry and safe from the risk of frost (> 3 °C).
- If frost protection is not guaranteed, an oil sump heater must additionally be installed for each compressor and a constant flow rate must be ensured with water-carrying installations.
- Never install heat pumps in living spaces or directly next to, below or above quiet rooms/bedrooms.
- When siting a boiler in the same installation room, the burner must be used in room sealed operation.
- Maintain the minimum clearances and minimum room volume (see the following chapter).
- Ensure that the temperature in the installation room does not exceed 30 °C.
- A head clearance of min. 2.1 m must be provided in operating and maintenance areas.

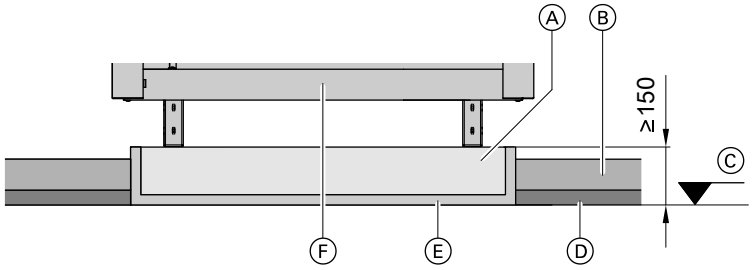
Sound insulation measures:
- Heat pump installation on anti-vibration platforms or plinths (see next chapter).
- Reduction of sound-reflecting surfaces, particularly on walls and ceilings.
  Rough structural renders absorb more sound than tiles.
- If quietness is a particularly important consideration, apply sound-absorbing material to the walls and ceilings (commercially available).
- When thermally insulating the hydraulic connections (see below), ensure that the line entries to the heat pump are also sound-insulated.
- To prevent possible effects of structure-borne noise as far as possible, it is recommended that the heat pump be installed at a physical distance from living spaces. Specifically, do not site the heat pump close to bedrooms.

Hydraulic connections:
- Always make hydraulic heat pump connections flexible and stress-free (e.g. by using Viessmann heat pump accessories).
- Apply anti-vibration fixings to pipework and installations.
- To prevent condensation, thermally insulate lines and components in the primary circuit with vapour diffusion-proof materials (incl. connection set to the evaporator).

Anti-vibration base

The heat pump should be sited on a base prepared on site for the purpose of optimised noise attenuation and even weight distribution.

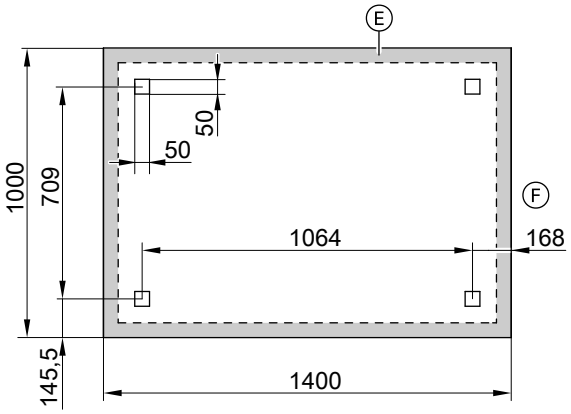
Note
For corner installation, the base must be enlarged by the minimum clearances (see chapter "Minimum clearances" on page 34).



Ⓐ Concrete B25, iron
Ⓑ Floor construction, screed
Ⓒ Top edge unfinished floor
Ⓓ Impact sound insulation as per regulations
Ⓔ Pressure-tested sound insulation layer, approx. 10 to 20 mm
Ⓕ Heat pump

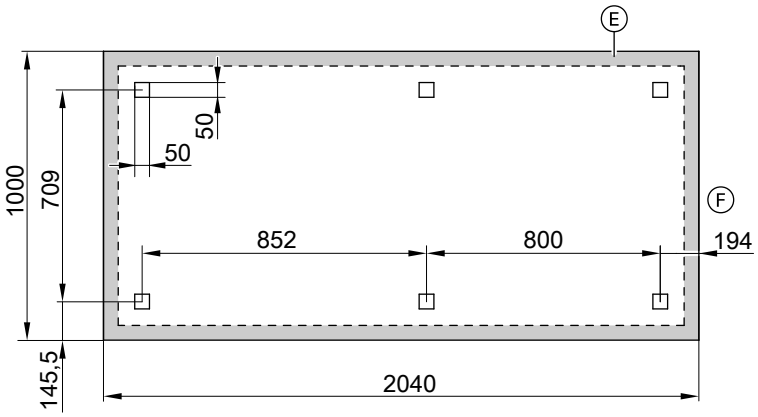
Pressure points of the heat pump feet

Types BW 302.D090 and BW 302.D110



□ Pressure point, foot
Ⓔ Pressure-tested sound insulation layer, approx. 10 to 20 mm

Type BW 302.D140, BW 302.D180 and BW 302.D230



□ Pressure point, foot
Ⓔ Pressure-tested sound insulation layer, approx. 10 to 20 mm
Ⓕ Front of the heat pump

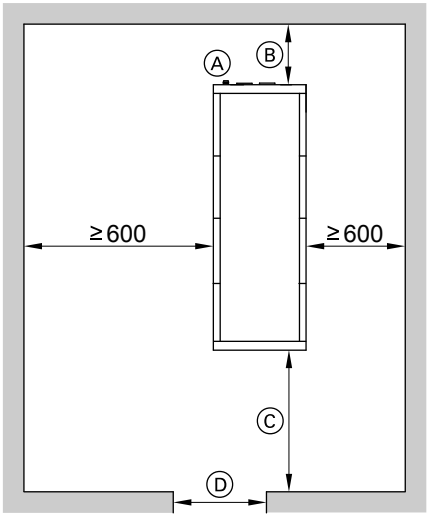
Ⓕ Front of the heat pump

3

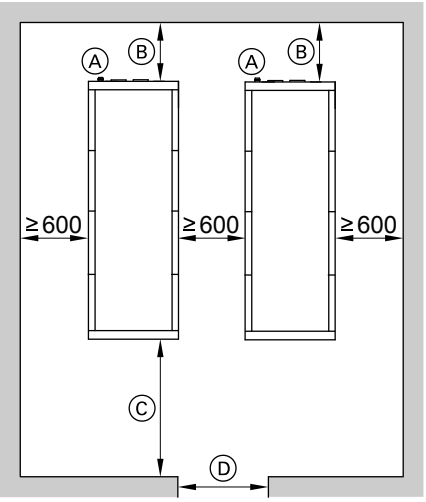
Minimum clearances

Ensure adequate clearance around the system for maintenance, repair and dismantling.

One heat pump



Cascade with 2 heat pumps



Ⓐ Power cable entry
Ⓑ With connection set and anti-vibration expansion joints (accessories)
≥ 1000 mm
Ⓒ Clearances for installation and maintenance:
≥ 500 mm
Ⓓ Clearance (according to DIN 18101):
≥ 944 mm

Note
The electronic injection valve and the compressor wiring chamber are located on the right-hand side.

Minimum room volume

According to EN 378, the minimum volume of the installation room depends on the refrigerant charge and composition.

$$V_{min} = \frac{m_{max}}{G}$$

V_{min} Minimum room volume in m^3
m_{max} Maximum refrigerant charge in kg
G Practical limit to EN 378, subject to the composition of the refrigerant

Refrigerant	Practical limit in kg/m³
R410A	0.44

Note
If several heat pumps are to be installed in one room, the minimum room volume must be calculated according to the appliance with the greatest refrigerant charge.

Minimum room volume, based on the available air volume
Taking into account the type and charge weight of the refrigerant used, the following minimum room volumes result.

Note
For refrigerant charge, see "Specification" or type plate.

Type	Minimum room volume in m³
BW 302.D090	24
BW 302.D110	30
BW 302.D140	39
BW 302.D180	51
BW 302.D230	97

Ventilation

If it is possible for the refrigerant concentration to exceed the practical limit, a **refrigerant sensor** must be provided in the plant room (installation height: ≥ 30 cm from floor to centre of sensor).
The emergency mechanical ventilation of the room must be activated when the limit is exceeded.
Ventilation of plant rooms must be adequate for both normal operating conditions (temperature) and emergency situations (accidents).

- The mechanical ventilation air flow rate must be at least equivalent to the calculated flow rate:
  Flow rate (m^3/s) = 0.014 x refrigerant charge $(kg)^{2/3}$
  Air change rate:
  – 15 x per hour for emergency ventilation (accidents)
  4 x per hour if people are present
- Installation of extract air duct: Extracting from the floor as refrigerant is heavier than air.

- The extract air must be routed to the outside.
- Ventilation must ensure the same flow rate as the extract air.

3.3 Applicable regulations and standards for heat pumps

The siting, operation and maintenance of heat pumps are generally subject to EN 378 and the applicable EU Regulation 517/2014 on fluorinated greenhouse gases.
EU Regulation 517/2014 stipulates the following:
The objective of this regulation is environmental protection through a reduction in the emission of fluorinated greenhouse gases.

Accordingly, this regulation sets out the following:
- Rules for limited emission, use, recovery and destruction of fluorinated greenhouse gases, as well as relevant additional measures
- Conditions for bringing into circulation certain products and equipment that contain fluorinated greenhouse gases or require them in order to operate
- Conditions for certain uses of fluorinated greenhouse gases
- Quantity limits for bringing into circulation partially fluorinated hydrocarbons

Additional, country-specific directives and standards must also be observed.

Required tightness check (operator obligation) in EU

Type	CO_2 equivalent in t	Standard	With LDS
BW 302.D090	< 50 (22.0)	Annually	24 months
BW 302.D110	< 50 (27.2)	Annually	24 months
BW 302.D140	< 50 (35.6)	Annually	24 months
BW 302.D180	< 50 (46.0)	Annually	24 months
BW 302.D230	> 50 (88.5)	6 months	Annually

Note
LDS = leak detection system (also gas detector).

3.4 Electrical connections for central heating and DHW heating

- Observe the technical connection requirements specified by your local power supply utility.
- Your local power supply utility will provide you with details regarding the required metering and switching equipment.
- A separate electricity meter should be provided for the heat pump.

The heat pump is equipped with a power circuit power supply (compressor) 3 x 400 V/50 Hz.

The control circuit is supplied with 230 V/50 Hz from the load circuit power supply (wired at the factory).
The control circuit fuse is located in the front wiring chamber. The heat pump control unit is also protected by a 6.3 A fuse (on main PCB in top of wiring chamber).

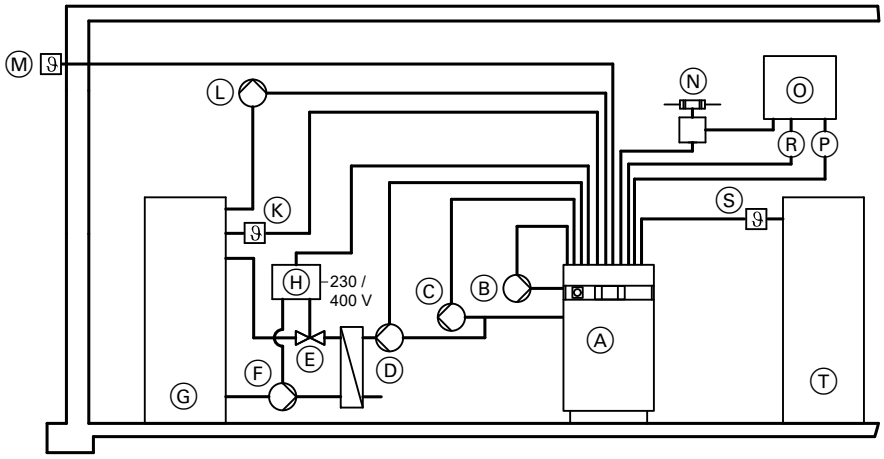
Power-OFF

It is possible for the power supply utility to shut down the compressor and instantaneous heating water heater (if installed). The ability to carry out such a shutdown may be a power supply utility requirement for providing a lower tariff.

This must **not** shut off the power supply to the Vitotronic control unit.

Note
- *The control circuit must be supplied with power **without** blocking by the power supply utility, so a separate power supply is required for the control circuit.*
- *A separate power supply for the control circuit necessitates a change to the internal wiring. This may only be carried out by an electrician according to the connection diagram.*
- *Use existing power-OFF contact for power-OFF times.*

Cables/leads required



Ⓐ Heat pump
Ⓑ Primary pump (brine), power cable (5 x 2.5 mm²)
Ⓒ Secondary pump, power cable (5 x 2.5 mm²)
Further circulation pumps are required for heating water buffer cylinders, heating circuits with mixers and external heat generators.
Ⓓ Circulation pump for cylinder heating (heating water side), power cable (3 x 1.5 mm²)
If a 400 V~ circulation pump is used, it must be connected via a contactor relay (5 x 2.5 mm²).
Ⓔ 2-way motorised valve, normally closed, power cable (3 x 1.5 mm²)
Ⓕ Cylinder loading pump (DHW side), power cable (3 x 1.5 mm²)
If a 400 V~ circulation pump is used, it must be connected via a contactor relay (5 x 2.5 mm²).
Ⓖ DHW cylinder
Ⓗ Control panel with contactor relay and separate power supply (control cable 3 x 1.5 mm²)
Ⓚ Cylinder temperature sensor, sensor lead (2 x 0.75 mm²)
Ⓛ DHW circulation pump, power cable (3 x 1.5 mm²)
Ⓜ Outside temperature sensor, sensor lead (2 x 0.75 mm²)
Ⓝ Instantaneous heating water heater (on site), regulated via heat pump control unit (control cable 5 x 2.5 mm², power cable as per manufacturer's instructions)
Fit the instantaneous heating water heater outside the heat pump.
Install the system flow temperature sensor in the direction of flow, downstream from the instantaneous heating water heater.
Ⓞ Electricity meter/domestic mains supply
Ⓟ Heat pump control unit power cable combined with power-OFF, 230 V~, 50 Hz (5 x 2.5 mm²)
Ⓡ Compressor power cable, 400 V~ (see "Recommended power cables")
Ⓢ Buffer temperature sensor, sensor lead (2 x 0.75 mm²)
Ⓣ Heating water buffer cylinder

Type BW as water/water heat pump: Take the following additional components into account:
- Well pump (connect motor protection via a separate motor overload relay)
- Flow switch
- Frost stat
- Separating heat exchanger

Note
When installing additional heating water buffer cylinders, heating circuits with mixer, external heat generators (gas/oil/wood) etc., allow for the additionally required supply and control cables and sensor leads.
Check the core cross-section of the power cables and enlarge if required.

Electrical connection requirements

Note
The type and cross-section of connecting cables must be determined by an authorised electrician in accordance with the local regulations.

Note
The control circuit power supply and the cable for the power-OFF signal can be combined in a single 5-core cable.

Cable lengths in the heat pump plus distance to wall

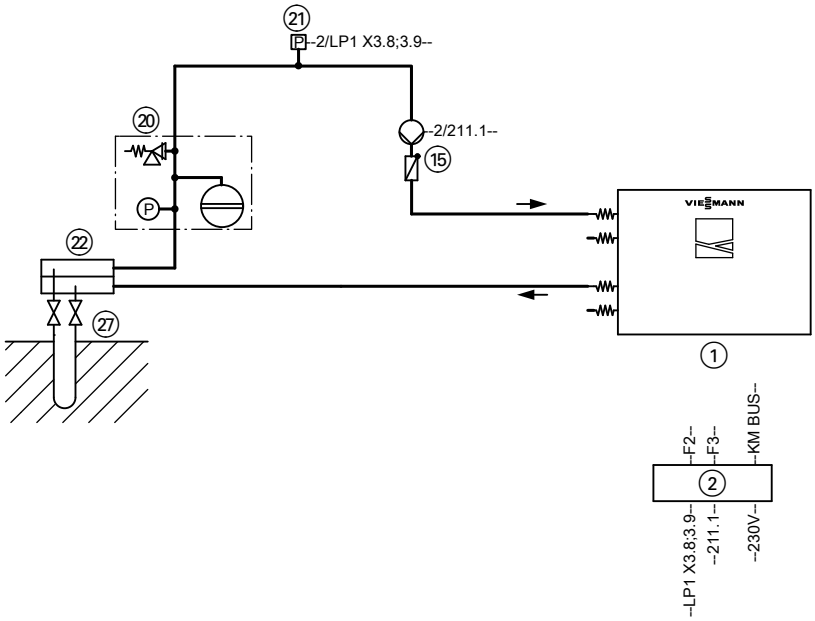
Control circuit power supply (230 V~ if on site)	3 m
Power circuit power supply (400 V~)	3 m
Additional connecting cables	2 m

Type BW 302.		D090	D110	D140	D180	D230
Electrical values, heat pump						
Rated voltage				3/N/PE 400 V/50 Hz		
Starting system				Soft start		
Starting current per compressor	A	87	113	136	155	204
Total starting current (per stage)	A	127	159	197	230	294
Max. total operating current	A	71	83	106	135	164
Max. total power consumption (B20/W60)	kW	30.69	40.57	50.05	66.19	81.88
Cos ϕ compressor for B0/W35		0.65	0.76	0.75	0.78	0.79
Cos ϕ compressor at max. output (B20/W60)		0.76	0.88	0.88	0.87	0.87
Internal protection per compressor (3/N/PE)	A	32	40	63	80	100
Internal protection for pumps and valves (3/N/PE)	A	16	16	16	16	16
Max. permissible power cable protection on site	A	80	100	125	160	200
IP rating		IP 20	IP 20	IP 20	IP 20	IP 20

3.5 Hydraulic connections

Primary circuit: Brine/water

Design with a primary pump



Required equipment

Pos.	Description
①	Heat pump
②	Heat pump control unit
⑮	(1st) Primary pump (fail-safe)
⑳	Brine safety assembly
㉑	Pressure switch, primary circuit
㉒	Brine manifold for geothermal probes/collectors
㉗	Geothermal probes

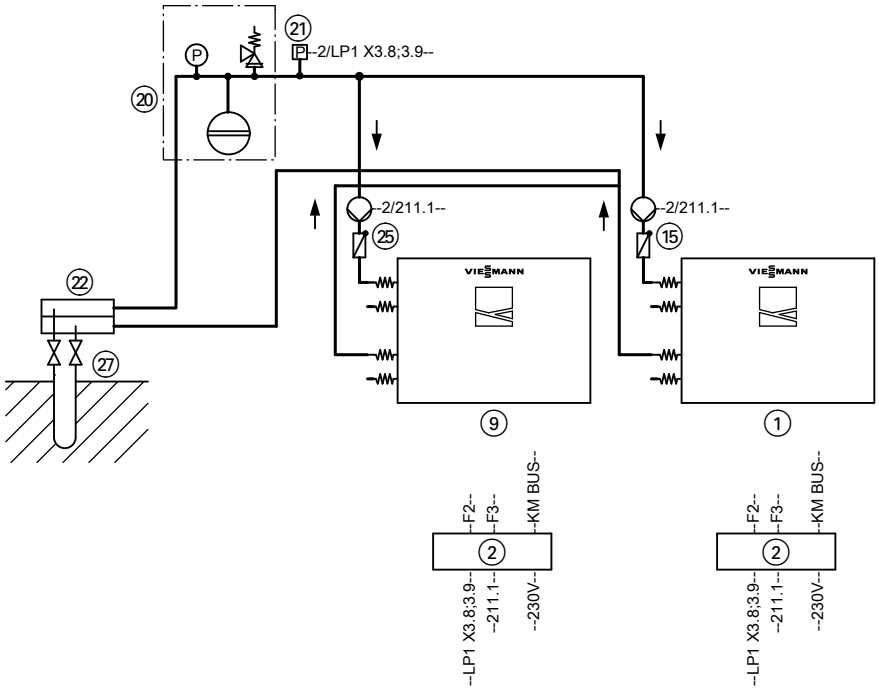
Note

If 2 primary pumps are used, at least 75 % of the nominal flow rate must be produced during partial load.

Primary circuit: Brine/water, cascade

Note

Cascades only with heat pumps of the same output

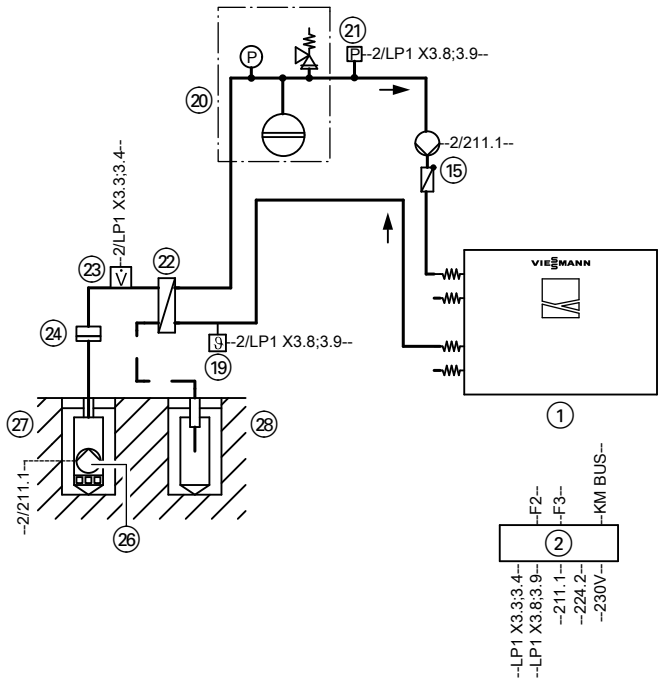


Equipment required

Pos.	Description
①	Heat pump I
②	Heat pump control unit with LON communication module (accessories)
⑨	Heat pump II
⑮	Primary pump, heat pump I (fail-safe)
	Note
	A primary pump can be used for each of the first and second stages.
⑳	Brine safety assembly
㉑	Pressure switch, primary circuit
㉒	Brine manifold, geothermal probes/collectors
㉕	Primary pump, heat pump II (fail-safe)
	Note
	A primary pump can be used for each of the first and second stages.
㉗	Geothermal probes

Note
If 2 primary pumps are used, at least 75 % of the nominal flow rate must be produced during partial load.

Primary circuit: Water/water with separating heat exchanger



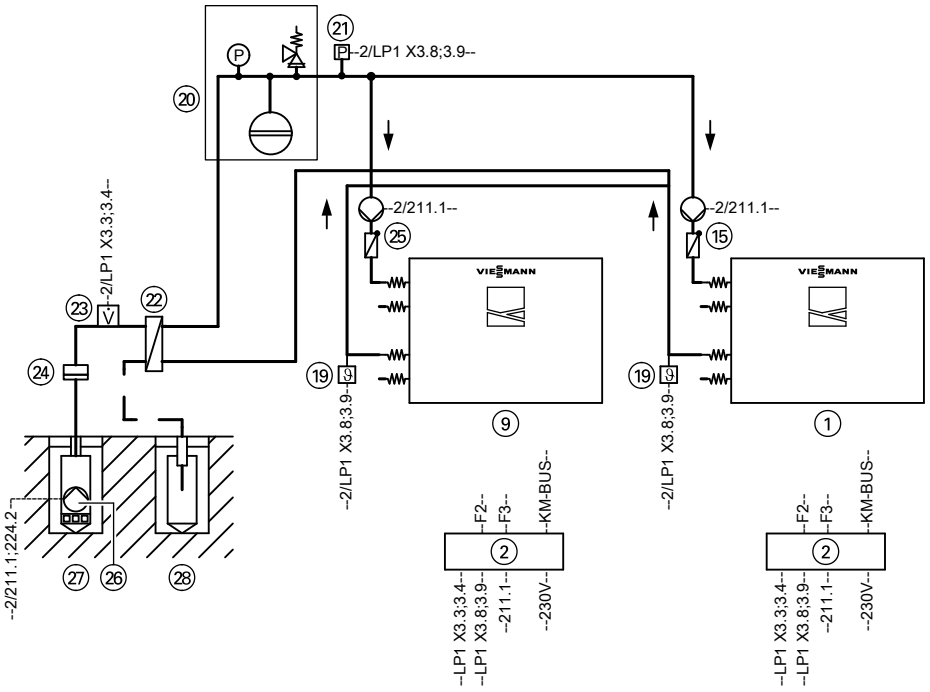
Required equipment

Pos.	Description
①	Heat pump
②	Heat pump control unit
⑮	(1st) Primary pump (fail-safe)
⑲	Frost stat, primary circuit (accessories) Installed immediately downstream of heat pump
⑳	Brine safety assembly
㉑	Pressure switch, primary circuit
㉒	Separating heat exchanger, primary circuit
㉓	Flow switch, well circuit (remove jumper when connecting)
㉔	Dirt trap
㉕	Optional: 2nd primary pump (fail-safe) for stage 2 ***Note*** – *Contactor relay required* – *Size 1st primary pump ⑮ for partial load.*
㉖	Well pump (suction pump for groundwater, fail-safe; connect via on-site contactor with fuse protection.)
㉗	Delivery well
㉘	Return well

Note
If 2 primary pumps are used, at least 75 % of the nominal flow rate must be produced during partial load.

Primary circuit: Water/water with separating heat exchanger, cascade

Note
Cascades only with heat pumps of the same output



Equipment required

Pos.	Description
①	Heat pump I
②	Heat pump control unit with LON communication module (accessories)
⑨	Heat pump II
⑮	Primary pump, heat pump I (fail-safe) ***Note*** *A primary pump can be used for each of the first and second stages.*
⑲	Frost stat, primary circuit (accessories) Installed immediately downstream of heat pump
⑳	Brine safety assembly
㉑	Pressure switch, primary circuit
㉒	Separating heat exchanger, primary circuit
㉓	Flow switch, well circuit (remove jumper when connecting)
㉔	Dirt trap
㉕	Primary pump, heat pump II (fail-safe) ***Note*** *A primary pump can be used for each of the first and second stages.*
㉖	Well pump (suction pump for groundwater, fail-safe; connect via on-site contactor with fuse protection.)
㉗	Delivery well
㉘	Return well

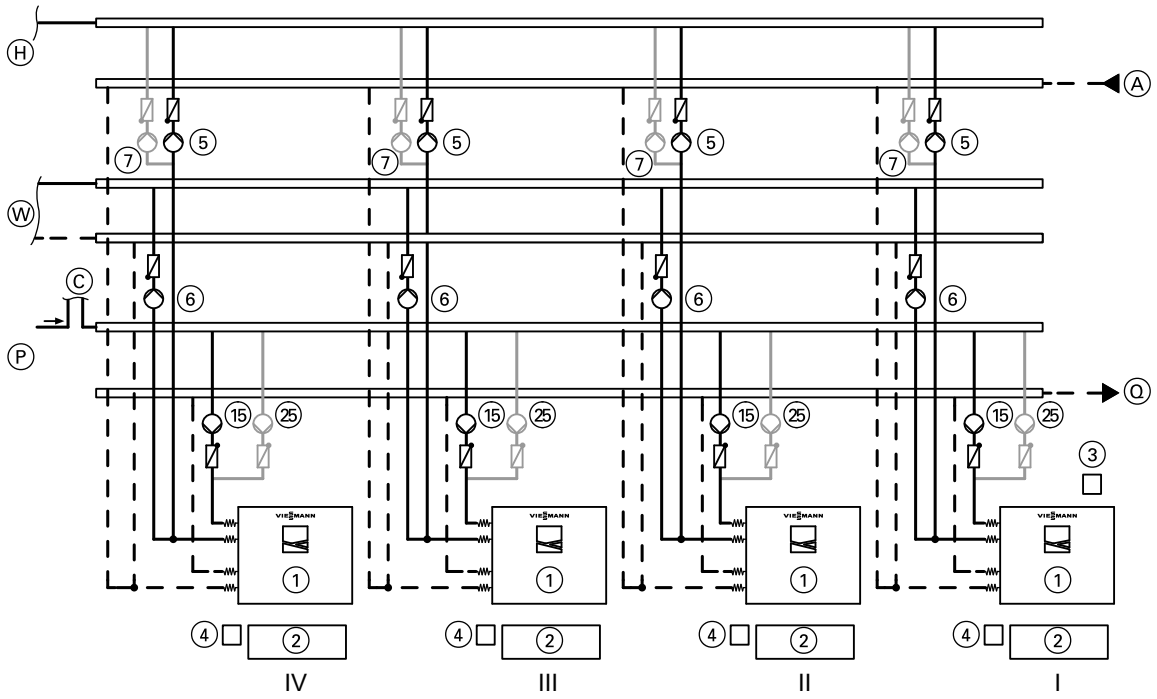
Note
If 2 primary pumps are used, at least 75 % of the nominal flow rate must be produced during partial load.

Heat pump cascade

A heat pump cascade consists of a lead heat pump and lag heat pumps.
Each lag heat pump has a heat pump control unit.
The lead heat pump regulates the operation of the heat pumps within the cascade.

- Up to 4 lag heat pumps when connected via LON

The following communication modules (accessories) must be fitted in the heat pump control units:
– LON cascade communication module in the lead heat pump
– LON communication module in lag heat pumps



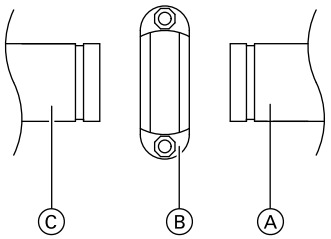
Ⓐ Interface to heating water buffer cylinder (return)
Ⓒ Interface to the separate cooling circuit or heating/cooling circuit
Ⓗ Interface to heating water buffer cylinder (flow)
Ⓟ Interface to primary circuit (flow)
Ⓠ Interface to primary circuit (return)
Ⓦ Interface to the DHW cylinder
I Lead heat pump in the heat pump cascade
II to IV Lag heat pumps in the heat pump cascade

Equipment required

Pos.	Description
	Heat generator
①	Heat pumps
②	Heat pump control unit
③	Outside temperature sensor
④	LON communication module for cascade control of the lead heat pump I or LON communication module for lag heat pumps II to IV
⑤	(1st) Secondary pump (fail-safe)
⑥	Circulation pump for cylinder heating (fail-safe)
⑦	2nd secondary pump (fail-safe) ***Note*** *– Contactor relay required* *– Size 1st secondary pump ⑤ for partial load.*
⑮	(1st) Primary pump (fail-safe)
㉕	Optional: 2nd primary pump (fail-safe) for stage 2 ***Note*** *– Contactor relay required* *– Size primary pumps ⑮ and ㉕ to at least 75 % of the nominal flow rate.*

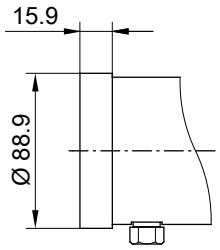
Connections to the heat pump

Connections to the heat pump on the primary and secondary sides are Victaulic connections. In the accessories, appropriate connecting cables/leads and couplings are combined as connection sets.



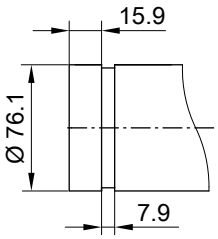
Ⓐ Connection pipe
Ⓑ Victaulic coupling
Ⓒ Flange adaptor

Primary side connection



Victaulic 3" (DN 80)

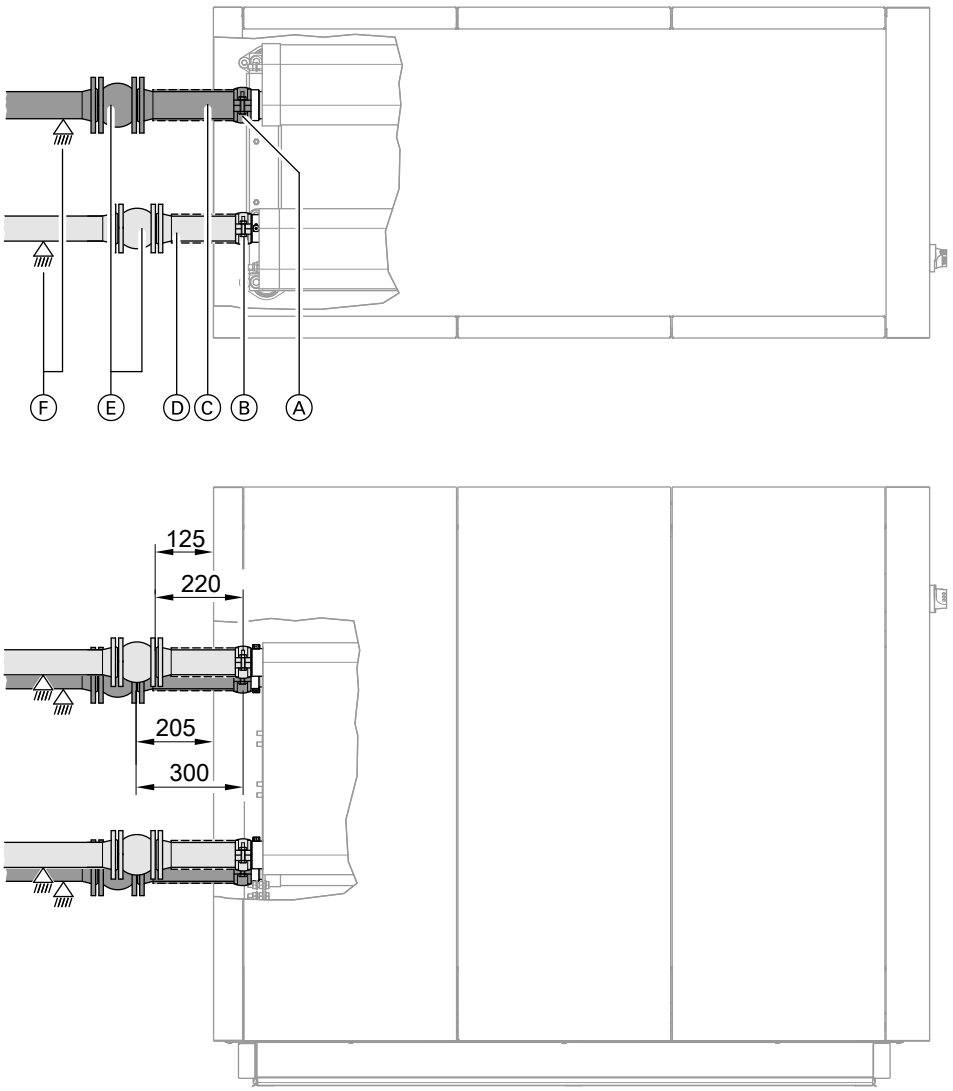
Secondary side connection



Victaulic 2½" (DN 65)

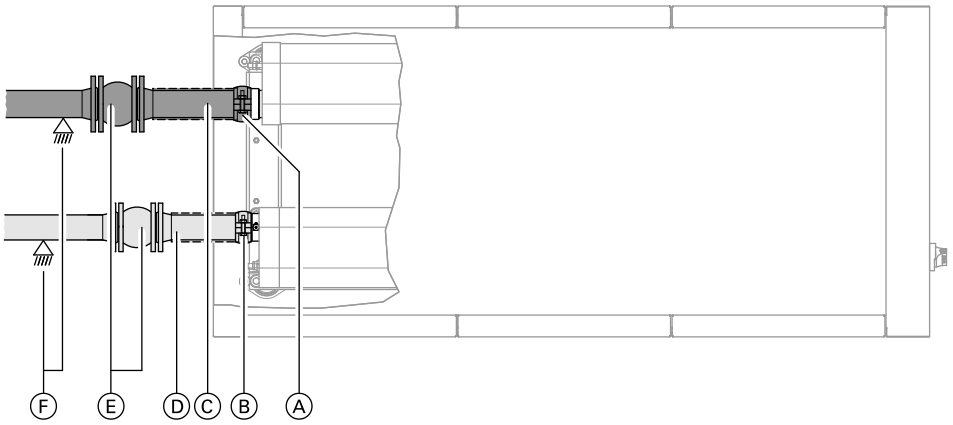
Connection set and anti-vibration expansion joints

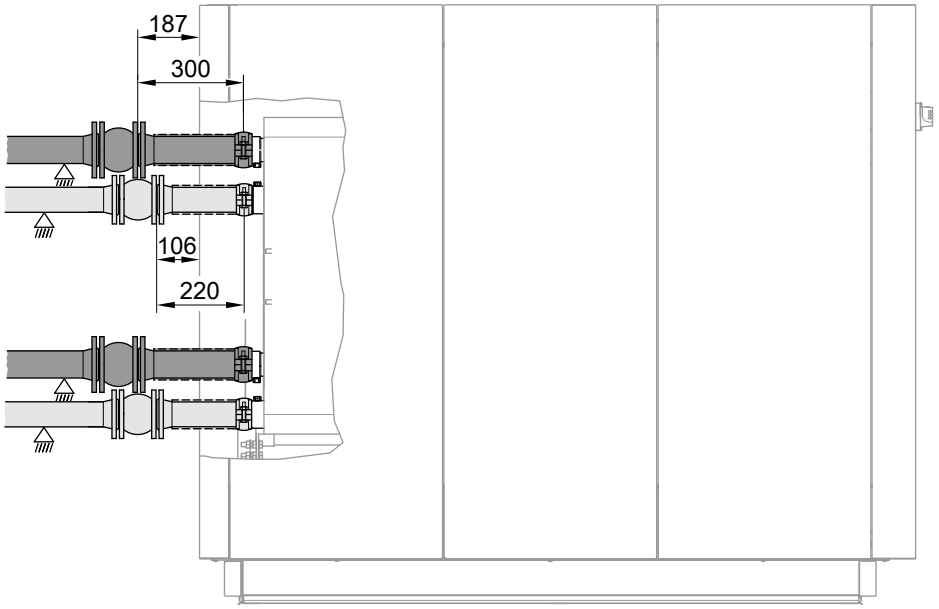
Installation accessories: See page 23.



Type BW 302.D090 to BW 302.D180

Ⓐ Victaulic coupling 3" (primary circuit)
Ⓑ Victaulic coupling 2½" (secondary circuit)
Ⓒ Flange adaptor 3" DN 80/PN 10, short (primary circuit), without anti-vibration elements
Ⓓ Flange adaptor 2½" DN 65/PN 10, short (secondary circuit), without anti-vibration elements
Ⓔ Anti-vibration expansion joints, on site
Ⓕ Hydraulic line fixings





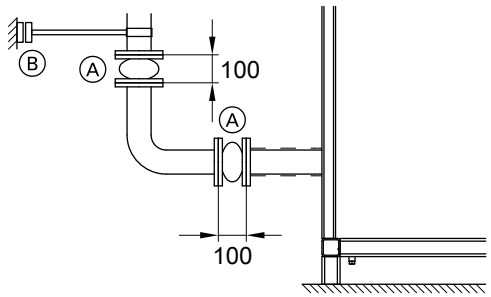
Type BW 302.D230

Ⓐ Victaulic coupling 3" (primary circuit)
Ⓑ Victaulic coupling 2½" (secondary circuit)
Ⓒ Flange adaptor 3" DN 80/PN 10, short (primary circuit), without anti-vibration elements
Ⓓ Flange adaptor 2½" DN 65/PN 10, short (secondary circuit), without anti-vibration elements
Ⓔ Anti-vibration expansion joints, on site
Ⓕ Hydraulic line fixings

Sound insulation of hydraulic lines

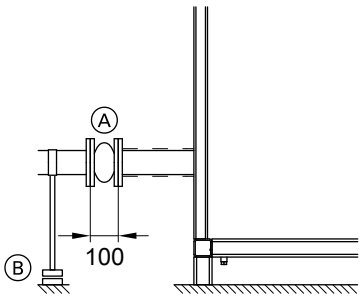
Heat pumps generate vibrations and structure-borne noise. In case of incorrect installation, these can be transmitted even to far away rooms via the pipework.
Spring-mounted compressors substantially reduce the transfer of vibrations to the floor. The anti-vibration bases described in chapter "Requirements for heat pump siting" are another structural measure for challenging applications.
The transfer of "airborne noise" is reduced to such an extent by a sound-insulating casing that values below 58 dB are achieved.
The hydraulic lines can transfer shocks and vibrations to walls.

The obvious solution here is sound insulation with rubber expansion joints:
- Basic sound insulation with one rubber expansion joint per connection for the standard application (installation in connection direction)
- Optimised sound insulation with two rubber expansion joints per connection for challenging applications (with on-site 90° bend)
- When thermally insulating the hydraulic connections, ensure that the line entries to the heat pump are also sound-insulated (see "Requirements for heat pump siting").



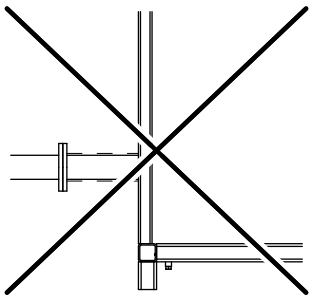
Optimised sound insulation

Ⓐ Rubber expansion joint
Ⓑ Rubber-mounted base plate



Basic sound insulation

Ⓐ Rubber expansion joint
Ⓑ Rubber-mounted base plate

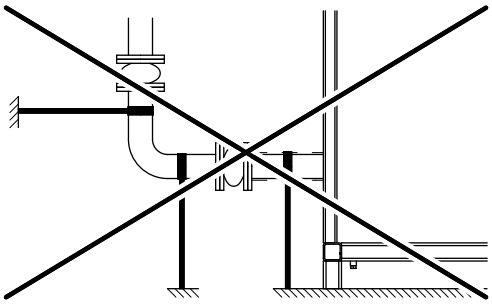


No sound insulation

Note
If adaptors are used, compensators must always be installed for vibration isolation.
For sound insulation without rubber expansion joints, an on-site solution must be provided.

Fastening of pipes to the wall/floor
Standard rubber pipe clamps only dampen flow noises.
Rubber-mounted base plates reduce the transfer of low-frequency vibrations and structure-borne noise to a minimum.

Note
*Do **not** secure the lines between the expansion joints and the heat pump.*



No sound insulation, due to incorrect fixing points

3.6 Minimum hydraulic requirements

Minimum requirements for the heat pump

Heat pumps with high flow rates and optimised pipework systems require fundamental measures to prevent incorrect functions.

- Set primary and secondary pumps to constant speed.
- Observe the minimum flow rates at all operating points.
- Circulation pumps with automatic overload cut-off functions should be avoided or supplemented with an additional flow switch for each heat pump in the pipework system.
- Size pipework systems to a low pressure drop.
- The pipework for cascades with 2 heat pumps must only be installed according to the Tichelmann principle to keep the pressure drop constant for the appliances.
  Ensure a parallel arrangement with the option for hydronic balancing between the two appliances. They must also be sized to have the same output.
- Heat pumps not installed according to the Tichelmann principle will show severe flow rate fluctuations at full load (all heat pumps in operation). This can lead to a complete loss of flow rate at the heat pump furthest away.
- Heat pump systems must be operated with sufficiently sized heating water buffer cylinders. See chapter "Systems with heating water buffer cylinder".
- To connect the heat pump to the pipework system, suitable components must be used to reduce the transmission of vibrations; see "Heat pump connections" on this subject.

- Observe the requirements for fill water quality (see page 48). Oxygen and corrosion in steel pipework systems cause sludge in heat exchangers which results in reduced performance.
- The primary and secondary sides should be equipped with a dirt filter or strainer upstream of their entry into the heat pump, to prevent any deposits or contamination of the geothermal probe and geothermal collectors entering the evaporator.

3.7 Sizing the heat pump

First establish the standard heat load Φ_{HL} of the building. For discussions with customers and for the preparation of a quotation, in most cases estimating the heat load is adequate.

As with all heating systems, determine the standard heat load of the building to EN 12831 before ordering the appropriate heat pump.

Mono mode operation

Sizing is of particular relevance to heat pump systems that are to be operated in mono mode, since oversized equipment frequently incurs disproportionate system costs. Oversizing should therefore be avoided!

When sizing the heat pump, observe the following:
- Take into account supplements to the heat load of the building to cover power-OFF periods. [In Germany] the power supply utility may interrupt the power supply of heat pumps for up to 3 x 2 hours within a period of 24 hours.
  Observe additional individual arrangements for customers with special tariffs.
- The building inertia means that 2 hours of power-OFF time are generally not taken into consideration.

Note
The ON periods between 2 power-OFF times must be at least as long as the preceding power-OFF time.

Estimate of the heat load based on the heated area
The heated surface area (in m^2) is multiplied by the following specific heat demand:

Passive house	10 W/m^2
Low energy house	40 W/m^2
New build (to EnEV)	50 W/m^2
House (built prior to 1995 with standard thermal insulation)	80 W/m^2
Older house (without thermal insulation)	120 W/m^2

Theoretical sizing with a blocking time of 3 × 2 hours
Example:
For a new building with good thermal insulation (50 W/m^2) and a heated area of 2000 m^2
- Estimated heat load: 100 kW
- Maximum blocking time of 3 × 2 hours at a minimum outside temperature in accordance with EN 12831

24 h, therefore, result in a daily heat volume of:
- 100 kW · 24 h = 2400 kWh

To cover the maximum daily heat amount, only 18 h/day are available for heat pump operation on account of the power-OFF periods. The building inertia means that 2 hours of the period during which power is blocked are not taken into consideration.
- 2400 kWh / (18 + 2) h = 120 kW

In other words, the heat pump output would need to be increased by 20 %, if the power supply were blocked for a maximum of 3 × 2 hours per day.
Frequently, power-OFF periods are only invoked if there is a need to do so. Please contact the customer's power supply utility to enquire about power-OFF periods.

Supplement for DHW heating in mono mode operation

Note
In dual mode heat pump operation, the heating output available is generally so high that this supplement does not need to be taken into consideration.

For a general residential building, a max. DHW demand of approx. 50 l per person per day at approx. 45 °C is assumed.
- This demand represents an additional heat load of approx. 0.25 kW per person given a heat-up time of 8 h.
- This supplement will only be taken into consideration if the sum total of the additional heat load exceeds 20 % of the heat load calculated to EN 12831.

	DHW demand at a DHW temperature of 45 °C in l per person/day	**Specific available heat in Wh per person/day**	**Recommended heat load supplement for DHW heating*4 in kW/person**
Low demand	15 to 30	600 to 1200	0.08 to 0.15
Standard demand*5	30 to 60	1200 to 2400	0.15 to 0.30

*4 *With a DHW cylinder heat-up time of 8 h.*
*5 *Select a higher supplement if the actual DHW demand exceeds the stated values.*

Or

	DHW demand at a DHW temperature of 45 °C in l per person/day	Specific available heat in Wh per person/day	Recommended heat load supplement for DHW heating*4 in kW/person
Apartment (billing according to demand)	30	Approx. 1200	Approx. 0.150
Apartment (flat rate billing)	45	Approx. 1800	Approx. 0.225
Detached house*5 (average demand)	50	Approx. 2000	Approx. 0.250

Supplement for setback mode
As the heat pump control unit is equipped with a temperature limiter for setback mode, the supplement for setback mode to EN 12831 can be ignored.
In addition, the control unit is equipped with start optimisation, which means that there is also no need for a supplement for heating up from setback mode.

Both functions must be enabled in the control unit. If any of the supplements are omitted because of the activated control unit functions then this must be documented when the system is handed over to the operator.
If, irrespective of the above mentioned control options, these supplements are nevertheless to be taken into account, the calculation should be made with reference to EN 12831.

Mono energetic operation

In heating mode, the heat pump system is supplemented by an electric booster heater (on site, e.g. instantaneous heating water heater). The control unit switches the instantaneous heating water heater on, subject to the outside temperature (dual mode temperature) and heat load.

Note
*The proportion of the electric power drawn by the electric booster heater is **not** generally charged at special tariffs.*

Sizing for a typical system configuration:
- Size the heating output of the heat pump to approx. 70 to 85 % of the max. required building heat load to EN 12831.
- The heat pump covers approx. 95 % of the annual heat load.
- Blocking times do not need to be taken into consideration.

Note
The reduced size of the heat pump, compared to mono mode operation, means that the runtime will increase. To compensate for this, increase the size of the heat source for brine/water heat pumps. For a geothermal probe system, as a rule of thumb the annual extraction rate must not exceed 100 kWh/m · p.a.

Instantaneous heating water heater (on site)
An electric instantaneous heating water heater can be integrated in the heating water flow as an auxiliary heat source. The instantaneous heating water heater is connected and protected via a separate power supply connection.

The heat pump control unit regulates this function. The instantaneous heating water heater can be enabled separately for central heating and DHW heating.
If enabled by the respective parameter, the heat pump control unit starts stages 1, 2 or 3 of the instantaneous heating water heater, subject to the prevailing heat demand. As soon as the maximum flow temperature in the secondary circuit is reached, the heat pump control unit switches the instantaneous heating water heater off.
Parameter "Stage at power-OFF" restricts the output stage of the instantaneous heating water heater for the duration of the power-OFF period.
To limit the total power consumption, the heat pump control unit stops the instantaneous heating water heater for a few seconds directly before the compressor starts. Each stage is subsequently started individually one after the other at intervals of 10 s.
If the instantaneous heating water heater is on and the differential between flow and return temperatures in the secondary circuit does not rise by at least 1 K within 24 h, the heat pump control unit displays a fault message.

Dual mode operation

External heat generator
The heat pump control unit enables dual mode operation of the heat pump with an external heat generator, e.g. oil boiler.
The external heat generator is hydraulically connected in such a way that the heat pump can also be used as a return temperature raising facility for the boiler. System separation is provided with either a low loss header or a heating water buffer cylinder.
For optimum heat pump operation, the external heat generator must be integrated via a mixer into the heating water flow. Direct activation of this mixer by the heat pump control unit results in a quick response.
If the outside temperature (long term average) is below the dual mode temperature, the heat pump control unit starts the external heat generator. In the case of direct heat demand from the consumers (e.g. for frost protection or if the heat pump is faulty), the external heat generator is also started above the dual mode temperature.

The external heat generator can also be enabled for DHW heating.

Note
*The heat pump control unit does **not** contain any safety functions for the external heat generator. To prevent excessive temperatures in the heat pump flow and return in case of a fault, high limit safety cutouts **must** be provided to stop the external heat generator (switching threshold 70 °C).*

4 With a DHW cylinder heat-up time of 8 h.

5 Select a higher supplement if the actual DHW demand exceeds the stated values.

3.8 Water quality, heat transfer medium and soldered plate heat exchanger

DHW

The appliances can be used with potable water up to 20 °dH (3.58 mol/m³). In case of higher hardness levels, a softening system for potable water is required on site to protect the plate heat exchanger in the primary store system.

Heating water and coolant

Unsuitable fill and top-up water increases the level of deposits and corrosion. This can result in system damage.
Observe VDI 2035 regarding the quality and amount of heating water, including fill and top-up water.

- Flush the heating system thoroughly before filling.
- Only fill with water of potable quality.
- Soften fill water with a water hardness above 16.8 °dH (3.0 mol/m³), e.g. with the small softening system for heating water (see the Viessmann Vitoset pricelist).

For further information about fill and top-up water: See technical guide "Heat pump principles".

Heat transfer medium, primary circuit (brine circuit)

Brine/water heat pumps:

- The primary circuit may only be filled with heat transfer medium containing corrosion inhibitors and frost protection down to at least –16.1 °C (freezing point) (e.g. Tyfocor GE). Never dilute the heat transfer medium with water.
- Never use zinc-plated/galvanised pipes for the primary circuit.

Water/water heat pumps:

- With separating heat exchanger:
  Fill the primary circuit with antifreeze mixture (brine with frost protection down to at least –9.0 °C (freezing point)).
- Without separating heat exchanger:
  Groundwater or coolant must comply with the water quality requirements for heat exchangers:
  – Plate heat exchanger:
    See table "Resistance of copper or stainless steel plate heat exchangers to substances contained in water" in technical guide "Heat pump principles".
  – Tubular heat exchanger:
    On request.

Frost protection of ethylene glycol/water mixtures

The frost protection provided by antifreeze can be estimated using the freezing point. (commonly called frost protection)
The freezing point is the temperature at which the first ice crystals form for a given ethylene glycol concentration. This results in an ice slurry which has no explosive effect. Further reduction in temperature results in the ice slurry becoming ever thicker until it freezes solid at the setting point. The risk of a system burst only exists below this temperature. The average of the freezing point and the setting point is referred to as cold protection. This systematically lies 2 to 3 K below the freezing point.

The following table lists freezing points, setting points and the cold protection calculated from these for Tyfocor GE/water mixtures.

Tyfocor GE concentrate in % by vol.	Freezing point in °C (to ASTM D 1177)	Setting point in °C (to DIN 51583)	Cold protection in °C (calculated)
20	–9.0	–13.0	–11.0
25	–12.3	–17.3	–14.8
30	–16.1	–22.0	–19.1
35	–20.4	–26.9	–23.7

Note

- *Failure to provide the minimum frost protection can result in damage to the heat pump.*
- *Setting the frost protection (or ethylene glycol percentage) too high results in a reduced heating output.*

Resistance of copper-brazed or welded stainless steel plate heat exchangers to water-borne substances

Substance Organic materials	Concentration mg/l If verifiable	Copper	Stainless steel
Ammonia (NH_3)	< 2	+	+
	2-20	0	+
	> 20	–	0
Chloride (Cl)	< 300	+	+
	> 300	–	0
Electrical conductivity	< 10 µS/cm	0	0
	10-500 µS/cm	+	+
	> 500 µS/cm	–	0
Iron (Fe), dissolved	< 0.2	+	+
	> 0.2	0	0
Free (corrosive) carbonic acid (CO_2)	< 5	+	+
	5-20	0	+
	> 20	–	0
Free chlorine gas (Cl_2)	< 1	+	+
	1-5	0	+
	> 5	–	0
Manganese (Mn), dissolved	< 0.1	+	+
	> 0.1	0	0
Nitrates (NO_3), dissolved	< 100	+	+
	> 100	0	+
pH values	< 7.5	0	0
	7.5-9.0	+	+
	> 9.0	0	+
Oxygen	< 0.2	+	+
	> 0.2	0	+
Hydrogen sulphide (H_2S)	< 0.05	+	+
	> 0.05	–	0
Hydrogen carbonate (HCO_3) Sulphates (SO_4^{2-})	< 1.0 > 1.0	0 +	0 +
Hydrogen carbonate (HCO_3)	< 70	0	+
	70-300	+	+
	> 300	0	0
Aluminium (Al), dissolved	< 0.2	+	+
	> 0.2	0	+
Sulphates (SO_4^{2-})	< 70	+	+
	70-300	0	+
	> 300	–	0
Sulphide (SO_3)	< 1	+	+
Total hardness	up to 15 °dH	+	+
Filterable materials	< 30 mg/l	+	+
Lead	< 0.05	+	+

+ Good resistance under standard conditions
0 There is a high risk of corrosion if several factors are rated 0.
– Unsuitable

Note
Ensure that the water quality is guaranteed over the entire lifecycle of the application.
Take into account that the water quality can change subject to the environmental situation (dry season, rainfall, summer, winter, etc.).

3.9 Heat source geothermal probes

Heat yield with geothermal probes

Geothermal probes can be designed and configured in accordance with VDI 4640 (Germany). In Switzerland, the specifications of SIA 384 plus cantonal and local regulations apply.

Authorising body for boreholes in Germany:
- Boreholes < 100 m: Water Board
- Boreholes > 100 m: Local mining board

The drilling contractors engaged for the drilling work should be certified according to DVGW Code of Practice W 120 or the FWS quality seal.
We recommend that all sizing is carried out by an appropriate service provider in line with local conditions.

Frost protection

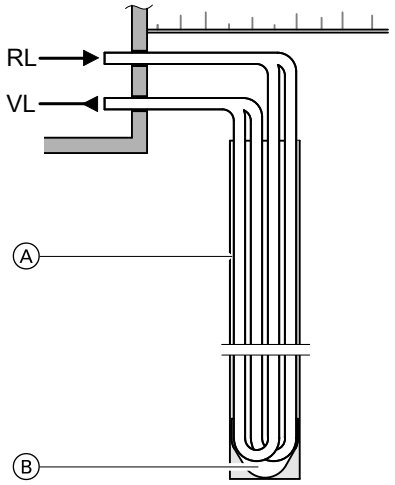
For problem-free operation of the heat pump, use an ethylene glycol-based antifreeze in the primary circuit (brine). This must ensure frost protection down to at least –16.1 °C (freezing point) and contain suitable anti-corrosion inhibitors. Ready-mixed solutions ensure an even distribution of concentrate.
For the primary circuit (brine), we recommend Viessmann Tyfocor GE heat transfer medium which is based on ethylene glycol (ready-mixed and with frost protection down to –16.1 °C (freezing point), green).

Where the following conditions are met, bioethanol-based antifreeze can be used with Viessmann brine/water heat pumps:
- Ready-mixed solution concentration: ≤ 30 % by vol.
- Recommendation: With corrosion inhibitors to improve residual alkalinity
- Please observe manufacturer usage instructions and safety datasheets.

Notes
- *When selecting the antifreeze, always observe the stipulations of the authorising body.*
- *Failure to provide the minimum frost protection can result in damage to the heat pump.*
- *Setting the frost protection (or ethylene glycol percentage) too high results in a reduced heating output.*

3

Geothermal probe



RL Primary return
VL Primary flow
Ⓐ Bentonite-cement suspension
Ⓑ Protective cap

In the following we consider the double U-shaped tubular probe.
One version would be two double U-shaped tubular loops made from plastic in one borehole. All cavities between the pipes and the ground are filled with a highly conductive material (bentonite).
We recommend the following distance between 2 geothermal probes:
- Up to 50 m deep: Min. 5 m
- Up to 100 m deep: Min. 6 m

Notify the relevant authorities well in advance of commencing such installations.
The geothermal probes are installed either by drilling or by ramming, subject to their respective design. Systems of this type require a permit from the local water board.
Further information can be obtained from the geothermal probe manufacturer.

Note
Simulation programs are purely for sizing; geothermal probes for Vitocal heat pumps require proper geological engineering.

Possible specific extraction rates q_E for double U-shaped pipe probes (to VDI 4640Part 2)

Subsoil	Specific extraction rate q_E in W/m
Standard values	
Poor subsoil (dry sediment) (λ < 1.5 W/(m · K))	20
Normal solid rock subsoil and Water-saturated sediment (1.5 ≤ λ ≤ 3.0 W/(m · K))	50
Solid rock with high thermal conductivity (λ > 3.0 W/(m · K))	70
Individual rocks	
Gravel, sand (dry)	< 20
Gravel, sand (aquiferous)	55-65
Clay, loam (damp)	30-40
Limestone (solid)	45-60
Sandstone	55-65
Acidic magmatite (e.g. granite)	55-70
Basic magmatite (e.g. basalt)	35-55
Gneiss	60-70

Rough sizing
The basis for sizing is the cooling capacity $\dot{Q}_K$ of the heat pump at **operating point B0/W35**.
Required probe length $l = \dot{Q}_K/\dot{q}_E$ ($\dot{q}_E$ = average extraction rate subject to ground conditions).
For an estimated sizing, we recommend calculation with
$\dot{q}_E$ = 35 W/m
The precise sizing depends on the ground structure and the water-carrying ground strata, and can only be determined following a local inspection by the drilling contractor.

Note
The reduction of the number of drilled holes in favour of probe depth increases the pressure drop to be overcome and the required pump rate.

Information regarding dual mode parallel and mono energetic operation
In case of dual mode parallel and mono energetic operation, consider the higher heat source load (see "Sizing"). As a guide, a geothermal probe system should not exceed an annual extraction rate of 100 kWh/m · p.a.

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Pump output supplements (percentage) for operation with Tyfocor GE concentrate/water mixtures

Design flow rate
$\dot{Q}_A = \dot{Q}_{water} + f_Q$ (in %)
Design delivery head
$H_A = H_{water} + f_H$ (in %)
The higher pump rate details $\dot{Q}_A$ and H_A should be used to select the pump.

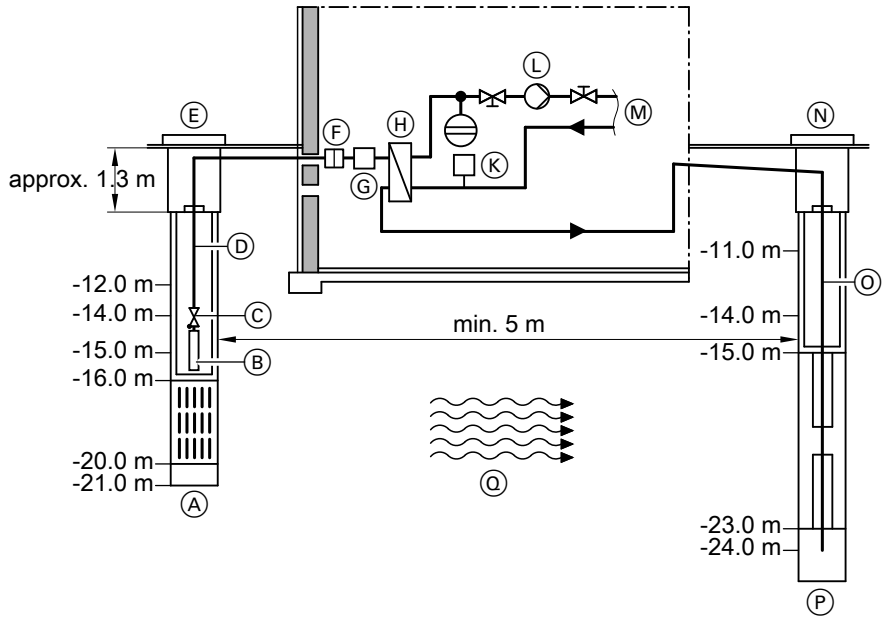
Note
The supplements only comprise the corrections for the circulation pumps. System curve and data corrections can be determined with the help of technical literature or information provided by the valve manufacturer.
The Viessmann ready-mixed Tyfocor GE heat transfer medium (ZK05914 and ZK05915) has a Tyfocor GE concentration of 30 % by vol. and thus provides frost protection down to at least –16.1 °C (freezing point).

Volume ratio of Tyfocor GE concentrate	**%**	**25**	**30**	**35**	**40**	**45**	**50**
At operating temperature 0 °C							
– f_Q	%	7	8	10	12	14	17
– f_H	%	5	6	7	8	9	10
At operating temperature +2.5 °C							
– f_Q	%	7	8	9	11	13	16
– f_H	%	5	6	6	7	8	10
At operating temperature +7.5 °C							
– f_Q	%	6	7	8	9	11	13
– f_H	%	5	6	6	6	7	9

3.10 Heat source groundwater

Via an intermediate circuit, brine/water heat pumps can use groundwater and coolant as a heat source.

Hydraulic connection, groundwater



Ⓐ Delivery well
Ⓑ Well pump
Ⓒ Non-return valve
Ⓓ Supply pipe
Ⓔ Well shaft
Ⓕ Dirt trap (on site)
Ⓖ Flow switch, well circuit
Ⓗ Separating heat exchanger, intermediate circuit
Ⓚ Primary circuit frost stat
Ⓛ Primary pump (integrated subject to type)
Ⓜ To the heat pump
Ⓝ Well shaft
Ⓞ Pressure pipe
Ⓟ Return well
Ⓠ Groundwater flow direction

Heat pumps that utilise groundwater as a heat source achieve high performance factors. Groundwater offers a constant temperature all year round of 7 to 12 °C. Therefore the temperature level needs to be raised by only a small amount (compared to other heat sources) to be useful for heating purposes.
Depending on the design, the heat pump cools the groundwater by up to 4 K, although its consistency remains otherwise unchanged.

- Due to the cost of pumping systems, we recommend that for detached houses and two-family houses the groundwater is pumped from a maximum depth of approx. 15 m (see the above diagram). For commercial or large scale systems, pumping from greater depths could still be viable.
- Maintain a min. distance of 5 m between the point of extraction (delivery well) and the point of return (return well). Delivery and return wells must be located in the line of flow of the groundwater to prevent a "flow short circuit". Construct the return well so that the water exits below the groundwater level.
- The groundwater flow and return lines to/from the heat pump must be protected against frost and must fall towards the well.
- Due to fluctuating water quality, we generally recommend system separation between wells and heat pump (see technical guide "Heat pump principles").

  Note
  The intermediate circuit must be filled with an antifreeze that ensures frost protection down to at least –9.0 °C (freezing point).

- Determine the water quality in terms of constituents and physical and chemical properties. Take into account that the results of analyses will vary due to specific and general environmental conditions (rain, summer, winter, etc.).

Calculating the groundwater volume

The required groundwater flow rate depends on the heat pump output and the rate of groundwater cooling.
For minimum flow rates, see the heat pump specification.

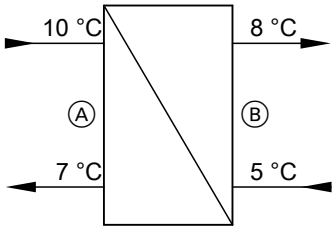
When sizing the primary pumps, please note that higher flow rates result in increased internal pressure drop.

Permits for a groundwater/water heat pump system

This project requires permission from the "local water authority" [check local regulations].
Where buildings must be connected to the public water system, the utilisation of the groundwater as a heat source for heat pumps must be authorised by your local authority [check local regulations].

Permits can be subject to certain stipulations.

Sizing the separating heat exchanger



Ⓐ Well circuit (water)
Ⓑ Primary circuit (brine)

Note
Fill the intermediate circuit with antifreeze mixture (brine with frost protection down to at least –9.0 °C (freezing point)).

For the operational reliability of the brine/water heat pump and for optimised service, a separating heat exchanger is used in the primary circuit (intermediate circuit). Subject to the correct sizing of the primary pump and the optimum layout of the primary circuit, the coefficient of performance of a water/water application with intermediate circuit will be reduced by a maximum of 0.4 (compared to a direct water/water heat pump without intermediate circuit).

In general, the water quality must be assessed here (see table, page 49). With suitable water quality, we recommend the use of the threaded stainless steel plate heat exchanger from the Viessmann pricelist; see following selection table.
Sizing of the primary circuit is calculated with antifreeze providing frost protection down to at least –9.0 °C (freezing point).

Note
- *Failure to provide the minimum frost protection can result in damage to the heat pump.*
- *Setting the frost protection (or ethylene glycol percentage) too high results in a reduced heating output.*

Separating heat exchanger selection lists

Vitocal 300-G Pro Type	Cooling capacity at W 10 °C	Flow rate Well circuit (water)	Primary circuit (brine)*6	Pressure drop Plate heat exchanger, well circuit (water)	Plate heat exchanger, primary circuit (brine)*6	Heat exchanger, heat pump (brine)	Plate heat exchanger, threaded
	kW	m³/h	m³/h	kPa	kPa	kPa	Part no.
BW 302.D090	89.6	25.7	26.4	22	27	39	ZK05302
BW 302.D110	116.8	33.4	34.5	23	30	44	ZK05303
BW 302.D140	146.0	41.8	43.1	26	33	44	ZK05304
BW 302.D180	189.6	54.3	56.0	29	36	50	ZK05305
BW 302.D230	235.0	67.3	69.4	20	25	44	ZK05306

*6 *Measured with a Tyfocor GE mixture 20 % by vol. (frost protection down to at least –9.0 °C)*

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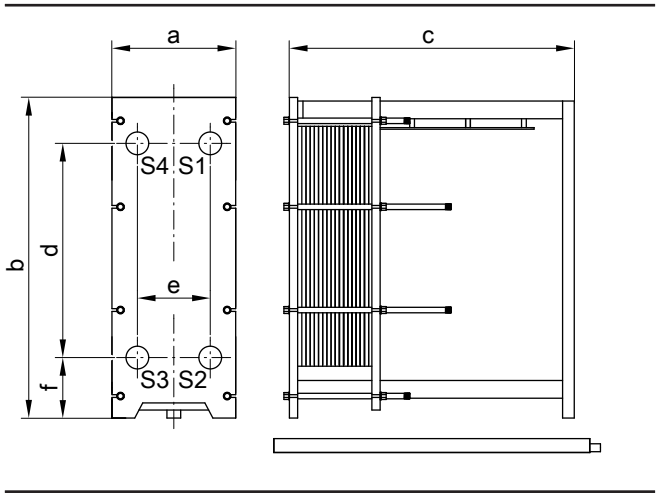
Systems with heating water buffer cylinder



Separating heat exchanger dimensions

Vitocal 300-G Pro Type	Separating heat exchanger Part no.	a	b	c	d	e	f	Well circuit/ primary circuit connection	Drip pan Width x depth x height in mm
BW 302.D090	ZK05302	320	832	590	592	135	140	R 2	400 x 750 x 50
BW 302.D110	ZK05303	320	832	840	592	135	140	R 2	400 x 1000 x 50
BW 302.D140	ZK05304	320	832	840	592	135	140	R 2	400 x 1000 x 50
BW 302.D180	ZK05305	450	1166	636	779	226	220	DN 100	550 x 750 x 50
BW 302.D230	ZK05306	450	1166	1036	779	226	220	DN 100	550 x 1150 x 50

Coolant

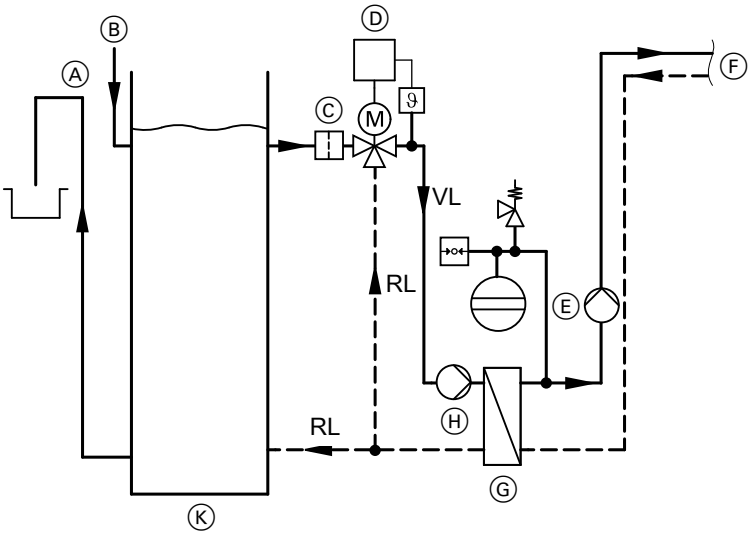
If coolant from an industrial waste heat process is used as a heat source for a water/water heat pump, please observe the following:

- The water quality must be within the applicable limits:
  - Plate heat exchanger:
    See table "Resistance of copper or stainless steel plate heat exchangers to substances contained in water" in technical guide "Heat pump principles".
  - Tubular heat exchanger:
    On request
- If the water quality falls outside these limits, use a stainless steel separating heat exchanger. See threaded stainless steel plate heat exchanger in the table on page 52. Sizing is carried out by the manufacturer of the heat exchanger.

Note

Vitocal 300-G Pro as a water/water heat pump with coolant:
A separating heat exchanger is required for system separation ***in all cases*** *(accessory, see Viessmann pricelist).*
The max. inlet temperature must then be limited as for the water/water heat pump to 20 °C.

- The available amount of water must satisfy the minimum flow rates of the primary side of the heat pump (see Specification).
- The max. inlet temperature for water/water heat pumps is 20 °C. With higher coolant temperatures, low end controllers (e.g. as offered by Landis & Staefa GmbH, Siemens Building Technologies) on the primary side of the heat pump must limit the max. inlet temperature to 20 °C by adding cool return water.



Ⓐ Overflow
Ⓑ Inlet
Ⓒ Dirt filter (on site)
Ⓓ Low end controller and valve (on site)
Ⓔ Primary pump
Ⓕ To the heat pump
Ⓖ Primary circuit separating heat exchanger (see page 52.)
Ⓗ Circulation pump (≙ well pump)
Ⓚ Water container
(min. 3000 l capacity, on site)

3.11 Systems with heating water buffer cylinder

In systems with high output, the charging of the heating water buffer cylinder takes on a central function.
For systems with small water volumes (e.g. heating systems with radiators), use a heating water buffer cylinder to prevent excessive heat pump cycling (starting/stopping).

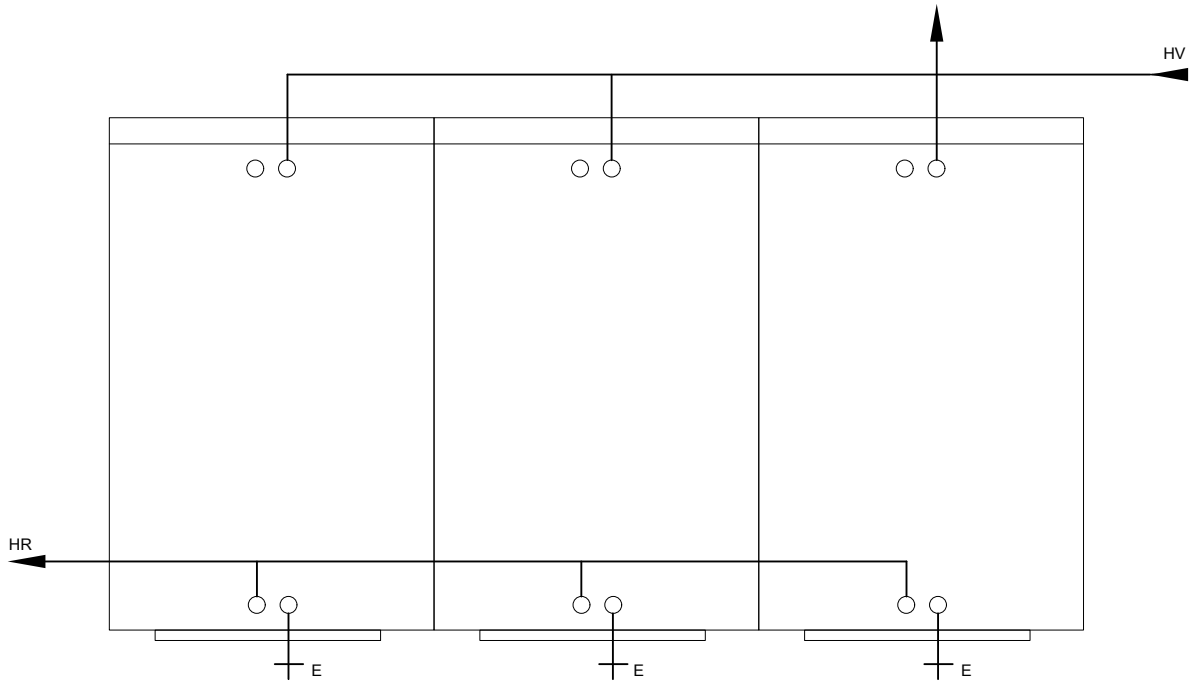
Benefits of a heating water buffer cylinder:
- Bridging power-OFF times:
  At peak times, heat pumps may be switched off by your local power supply utility, subject to your electricity tariff. A heating water buffer cylinder supplies the heating circuits even during this power-OFF time.
- Constant flow rate through the heat pump:
  Heating water buffer cylinders are designed to provide hydraulic separation of the volume flow in the secondary circuit and the heating circuit. For example, if the heating circuit flow rate is reduced via thermostatic valves, the flow rate in the secondary circuit remains constant.
- Longer heat pump operating times

Because of the increased water volume of the heat generator and the fact that it may have a separate shut-off facility, an additional (or larger) expansion vessel should be provided.

Note
The flow rate of the secondary pump should be greater than that of the heating circuit pumps.

The heat pump is protected in accordance with EN 12828.

Cascade, heating water buffer cylinder



E Drain
HR Heating return
HV Heating flow

Note
The system pipework for a buffer cylinder cascade must be installed according to the Tichelmann principle. Other hydraulic pipework versions always require line regulating valves to be installed and balanced.

Heating water buffer cylinder for optimised runtimes

V_{HP} = Heating water buffer cylinder volume in litres (Q_{WP} * volume coefficient)
Q_{WP} = Absolute rated heating output of the heat pump under full load at design point
"Minimum" volume coefficient = 20
"Optimum" volume coefficient = 40

Example:
Minimum: Type BW 302.D230 with B0/W35
Q_{WP} = 222 kW (1-stage 111 kW)
V_{HP} = Q_{WP} * "minimum" volume coefficient
V_{HP} = 111 * 20
= 2220 l

Example:
Optimum: Type BW 302.D230 with B0/W35
Q_{WP} = 222 kW (1-stage 111 kW)
V_{HP} = Q_{WP} * "optimum" volume coefficient
V_{HP} = 111 * 40
= 4440 l

Note
With heat pump cascades, the volume of the heating water buffer cylinder can be sized for runtime optimisation to match the heat pump with the highest rated heating output.
With multi stage heat pumps, the volume of the heating water buffer cylinder can be sized to match the output of one heat pump stage.

Heating water buffer cylinder for bridging periods when the supply is blocked

This version can be used on heat distribution systems without additional storage mass (e.g. radiators, hydraulic hot air fans).
100 % thermal storage for the power-OFF times is possible but not recommended, as the heating water buffer cylinder volume would need to be very large.

Example:
Φ_{HL} = 100 kW = 100000 W
t_{Sz} = 2 h (max. 3 x per day)
$\Delta\vartheta$ = 10 K
c_P = 1.163 Wh/(kg*K) for water

c_P Spec. thermal capacity in kWh/(kg*K)
Φ_{HL} Heat load of the building in kW
t_{Sz} Blocking time in h
V_{HP} Heating water buffer cylinder volume in litres
$\Delta\vartheta$ System cool-down in K

100 % sizing
(subject to the available heating surfaces)

$$V_{HP} = \frac{\Phi_{HL} * t_{Sz}}{c_P * \Delta\vartheta}$$

$$V_{HP} = \frac{100000\ W * 2\ h}{1.163\ Wh/(kg * K) * 10\ K} = 17200\ kg$$

17200 kg of water corresponds to a heating water buffer cylinder capacity of 17200 litres.
Selection: Special heating water buffer cylinder with appropriately sized connections (≥ 2½" (DN 65))

Rough sizing
(subject to the utilisation of the delayed building heat loss)
V_{HP} = Φ_{HL} * (60 to 80 litres)
V_{HP} = 100 * 60 litres
V_{HP} = 6000 litre cylinder capacity

Selection: Heating water buffer cylinder 2 x 3000 litres.

Note:

Heating output	Connection, heating water buffer cylinder
Up to 120 kW	≥ DN 65 (2½")
Up to 200 kW	≥ DN 80 (3")
Up to 300 kW	DN 100

Note
Observe the heating water buffer cylinder pressure drop.

3.12 Room heating/room cooling

Heating circuit

Minimum flow rate
Heat pumps require a minimum heating water flow rate (see specification), which must be maintained at all times. To ensure the minimum flow rate, install an overflow valve or low loss header in systems without a heating water buffer cylinder. When utilising an overflow valve, the control unit must be set to "Constant pressure control" for high efficiency circulation pumps.

Low loss header
When using a low loss header, it must be ensured that the flow rate on the heating circuit side is greater than the flow rate on the secondary side of the heat pump.

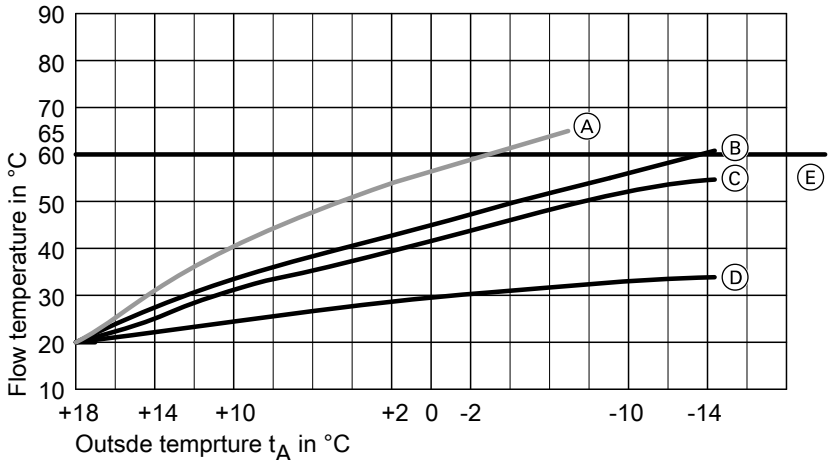
To prevent a fault shutdown, the minimum volume of the low loss header must be 3 litres per kW rated heating output. The heat pump control unit treats a low loss header in the same way as a small heating water buffer cylinder. Therefore, configure the low loss header by means of the control unit settings as a heating water buffer cylinder.

Note
A further circulation pump is required.

Heating circuit and heat distribution

Different heating water flow temperatures are required depending on the heating system design.
Heat pumps achieve a max. flow temperature of 60 °C from a brine inlet temperature of 5 °C.

To enable the mono mode operation of the heat pump, install a low temperature heating system with a heating water flow temperature of ≤ 50 °C.
The lower the selected maximum heating water flow temperature, the higher the seasonal performance factor of the heat pump.



Ⓑ Max. heating water flow temperature = 60 °C
Ⓒ Max. heating water flow temperature = 55 °C, requirement for mono mode heat pump operation
Ⓓ Max. heating water flow temperature = 35 °C, ideal for mono mode heat pump operation
Ⓔ Max. heat pump flow temperature, e.g. = 60 °C

3.13 Cooling mode

Types and configuration

Natural cooling function:

The compressor is switched off. Exchange of heat takes place directly through the primary circuit.

Cooling with groundwater

Groundwater offers ideal conditions for achieving a high cooling capacity with natural cooling (NC).
At 8 to 12 °C, groundwater temperatures are low enough all year round for operation with active cooling to be sufficient.
The cooling capacity is determined by nothing but the groundwater flow rate and the temperature spread. At the same time, the cooling system should be sized for the maximum available groundwater temperature.

Cooling system sizing W13/W18 °C or W14/W19 °C
- Raising the cooling capacity by increasing the groundwater flow rate for operation with natural cooling is more cost effective than operating with active cooling (compressor running).
- With natural cooling, the groundwater only draws the cooling capacity actually required.

Cooling mode

Cooling mode is possible either with one of the available heating circuits, or with a separate cooling circuit (e.g. chilled ceilings or fan convectors).

Operating modes
Cooling operation via the heating circuits is carried out in the "Standard" and "Fixed value" operating modes. The separate cooling circuit is additionally cooled in "Reduced" and "DHW only" operating modes. The latter enables continuous cooling of a room, e.g. a warehouse during the summer months.
The cooling capacity is subject to either weather-compensated control according to the heating or cooling curve, or room temperature-dependent control.

Note
For cooling mode in the following cases, a room temperature sensor must be installed and enabled:
- *Weather-compensated cooling mode with room influence*
- *Room temperature-dependent cooling mode*

A room temperature sensor must always be installed for a separate cooling circuit.

Weather-compensated control
In weather-compensated cooling mode, the set flow temperature is calculated from the relevant set room temperature and the current outside temperature (long term average) according to the cooling curve. The level and slope are adjustable.

"Standard" operating mode
The cooling capacity for the heating circuits is subject to either weather-compensated control according to the cooling curve, or room temperature-dependent control.

"Fixed value" operating mode
In "Fixed value" mode, the room is cooled with the minimum flow temperature.

Natural cooling function (NC)

Function description

With natural cooling, the heat pump control unit regulates the following functions:
- Switching all necessary circulation pumps, diverter valves & mixers
- Recording all essential temperatures
- Dew point monitoring

The control unit enables the natural cooling function if the outside temperature exceeds the cooling limit (adjustable). Control in weather-compensated mode when cooling via a heating circuit (underfloor heating circuit). When a separate cooling circuit is used, e.g. a fan convector, then control is room temperature-dependent.
DHW heating by the heat pump is possible during cooling mode.

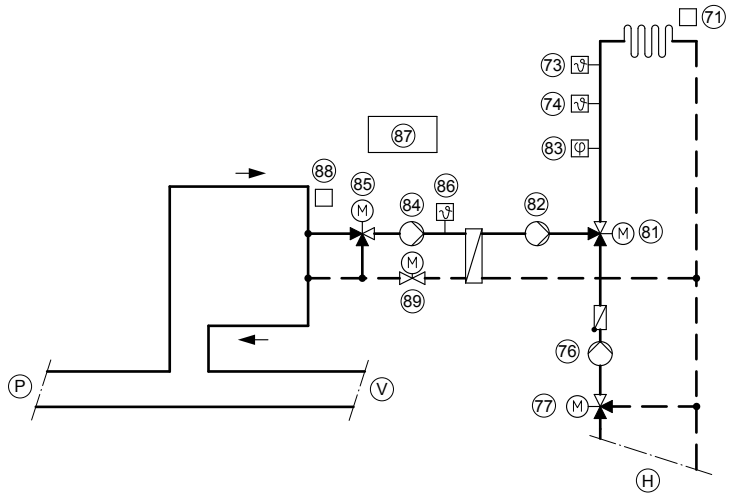
Note
- *For cooling operation via a separate cooling circuit, a room temperature sensor must be installed and enabled.*
- *For cooling operation via a separate cooling circuit or heating circuit without mixer, use a contact temperature sensor to capture the flow temperature.*

Hydraulic connection
The maximum transferable cooling capacity depends on the geothermal probes, the ground temperatures and the
NC cooling heat exchanger.
For cooling, it is possible to connect either a heating/cooling circuit, e.g. underfloor heating circuit, or a separate cooling circuit, e.g. a fan convector.

Components required:
- Circulation pumps
- Diverter valves
- Mixers
- Sensors
- KM-BUS interface for heat pump control unit

Note
- *To prevent condensation, provide vapour diffusion-proof thermal insulation for all primary side and cold water lines, in accordance with engineering standards. (incl. connection set up to the evaporator)*
- *Additional power supplies are required for the cooling function components.*

Hydraulic connection with natural cooling
Schematic diagram (for required accessories, see "Overview of installation accessories")



Ⓗ Interface to secondary-side heat pump, further heating circuits or heating water buffer cylinder
Ⓟ Interface to the primary circuit
Ⓥ Interface to Vitocal, primary side

Pos.	Description
	Natural cooling function (NC)
	Note *All required components (with a suitably designed plate heat exchanger) for the cooling circuit must be provided on site.*
⑧①	3-way diverter valve
⑧②	Secondary cooling circuit pump
⑧③	Contact humidistat – part of the NC control panel standard delivery
⑧④	Primary cooling circuit pump
⑧⑤	Mixer motor - 3-way mixer
⑧⑥	Frost stat – part of the NC control panel standard delivery
⑧⑦	NC control panel
⑧⑧	Extension kit for heating circuit (cooling circuit) with mixer – part of the NC control panel standard delivery
⑧⑨	2-way motorised valve, normally closed
	Heating circuit with mixer
⑦①	Vitotrol 200 remote control (accessories)
⑦③	Flow temperature sensor – part of the NC control panel standard delivery
⑦④	Temperature limiter to restrict the maximum temperature for underfloor heating systems
⑦⑥	Heating circuit pump
⑦⑦	Mixer motor - 3-way mixer

Cooling with an underfloor heating system
The underfloor heating system can be used for heating and for cooling buildings and rooms.
Underfloor heating systems are hydraulically connected to the brine circuit via a plate heat exchanger. A mixer is required to match the cooling load of the rooms to the outside temperature. Similar to a heating curve, the cooling capacity can be matched exactly to the cooling load via a cooling curve and the cooling circuit mixer that is regulated by the heat pump control unit.
Surface temperature limits must be maintained to observe comfort criteria and to prevent condensation. For example, the surface temperature of an underfloor heating system in cooling mode must not fall below 20 °C.
Install a natural cooling contact humidistat (for capturing the dew point) in the underfloor heating system flow to prevent condensation forming on the floor surface. This safely prevents the formation of condensate, even if weather conditions change quite rapidly (e.g. during a thunderstorm).
The underfloor heating system should be sized in accordance with a flow/return temperature pair of approx. 14/18 °C.
The following table can assist in estimating the possible cooling capacity of an underfloor heating system.

As a general rule:
The minimum flow temperature for cooling with an underfloor heating system and the minimum surface temperature are subject to the prevailing ambient conditions inside the room (air temperature and relative humidity). These must therefore also be taken into consideration during the design phase.

Estimating the cooling capacity of an underfloor heating system subject to floor covering and the spacing between pipe runs (assumed flow temperature of approx. 16 °C, return temperature approx. 20 °C)

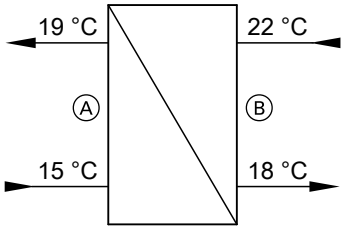
Flooring		Tiles			Carpet		
Spacing	**mm**	**75**	**150**	**300**	**75**	**150**	**300**
Cooling capacity with a pipe diameter of							
–10 mm	W/m²	40	31	20	27	23	17
–17 mm	W/m²	41	33	22	28	24	18
–25 mm	W/m²	43	36	25	29	26	20

The values provided relate to the following general conditions:

Room temperature	26 °C
Relative humidity	50 %
Dew point temperature	15 °C

Sizing the NC plate heat exchanger

The following table may be used for rough sizing.
Perform a cooling load calculation in accordance with VDI 2078 for precise sizing.



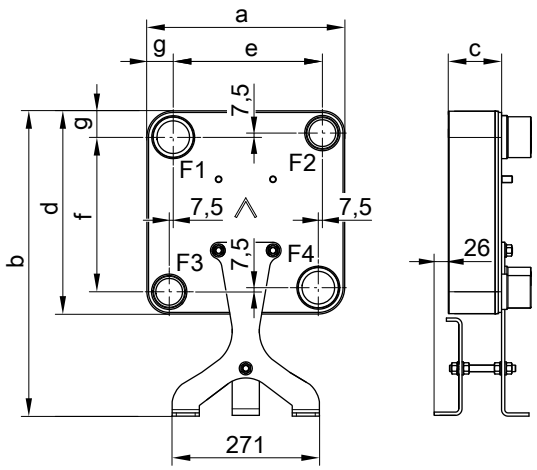
Ⓐ Cooling circuit, primary side (brine down to –15 °C / 25 %)
Ⓑ Cooling circuit secondary side (water)

NC plate heat exchanger selection

The maximum cooling capacity for the brine/water heat pump is calculated by multiplying the heat pump cooling capacity at a geothermal probe extraction rate of 50 W/m by 0.8.

For primary side B10/B12, secondary side W18/W14

Vitocal 300-G Pro Type	Max. cooling capacity kW	Flow rate Primary side (Ⓐ) m³/h	Secondary side (Ⓑ) m³/h	Pressure drop Primary side (Ⓐ) kPa	Secondary side (Ⓑ) kPa	NC plate heat exchanger Part no.
BW 302.D090	48	10.8	10.4	9	1	ZK05328
BW 302.D110	61	13.7	13.2	9	1	ZK05329
BW 302.D140	77	17.3	16.6	9	1	ZK05330
BW 302.D180	98	22.0	21.1	11	2	ZK05331
BW 302.D230	112	25.2	24.2	13	2	ZK05331



NC plate heat exchanger dimensions

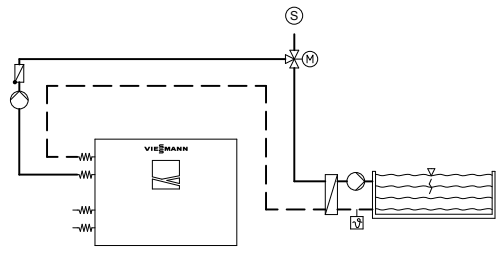
Vitocal 300-G Pro Type	NC plate heat exchanger Part no.	a	b	c	d	e	f	g	Primary side/ secondary side connection
BW 302.D090	ZK05328	364	550	195.8	374	274.5	284.5	48.5	R 2½ / R 2
BW 302.D110	ZK05329	364	553	247.1	374	274.5	284.5	48.5	R 2½ / R 2
BW 302.D140	ZK05330	364	553	341.3	374	274.5	284.5	48.5	R 2½ / R 2
BW 302.D180 BW 302.D230	ZK05331	364	553	409.8	374	274.5	284.5	48.5	R 2½ / R 2

3.14 Swimming pool heating

Hydraulic connection, swimming pool

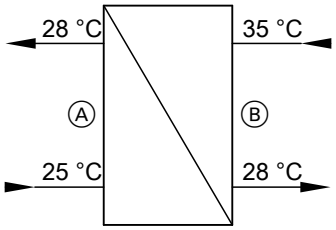
Swimming pool heating is effected hydraulically via the changeover of a second 3-way diverter valve (accessories).
If the temperature falls below the value set at the swimming pool temperature controller (accessories), a demand signal is sent to the heat pump control unit via the external EA1 extension (accessories).
In the delivered condition, central heating and DHW heating have priority over swimming pool heating.

For more detailed information regarding systems with swimming pool heating, see **www.viessmann-schemes.com**.



(S) Interface to heating water buffer cylinder

Sizing the swimming pool plate heat exchanger



Ⓐ Swimming pool (swimming pool water)
Ⓑ Heat pump (heating water)

Use only stainless steel plate heat exchangers (threaded) that are suitable for potable water for swimming pool heating.
Size the plate heat exchanger subject to the max. output and the temperature specified for the plate heat exchanger.

Note
The flow rates calculated during sizing must be maintained during the installation.

Selecting a plate heat exchanger for a swimming pool

Primary source brine, geothermal probes, at B0

Vitocal 300-G Pro Type	Rated heating output	Flow rate		Pressure drop		Plate heat exchanger
		Primary side (Ⓐ)	Secondary side (Ⓑ)	Primary side (Ⓐ)	Secondary side (Ⓑ)	
	kW	m^3/h	m^3/h	kPa	kPa	Part no.
BW 302.D090	84.9	24.4	10.5	20	4	ZK05320
BW 302.D110	108.7	31.1	13.4	20	4	ZK05321
BW 302.D140	135.3	39.7	17.0	19	4	ZK05322
BW 302.D180	174.9	50.4	21.6	20	4	ZK05324
BW 302.D230	222.2	64.0	27.5	20	4	ZK05327

Primary source water, at B8

Vitocal 300-G Pro Type	Rated heating output	Flow rate		Pressure drop		Plate heat exchanger
		Primary side (Ⓐ)	Secondary side (Ⓑ)	Primary side (Ⓐ)	Secondary side (Ⓑ)	
	kW	m^3/h	m^3/h	kPa	kPa	Part no.
BW 302.D090	107.2	31.0	13.3	19	4	ZK05321
BW 302.D110	139.8	40.3	17.3	20	4	ZK05322
BW 302.D140	175.0	50.4	21.6	17	4	ZK05323
BW 302.D180	227.0	65.4	28.1	20	4	ZK05325
BW 302.D230	283.0	81.6	35.0	20	4	ZK05326

Note
Performance data to EN 14511 corresponds to a temperature spread of 3 K with 8 °C at brine inlet and 5 °C at brine outlet.

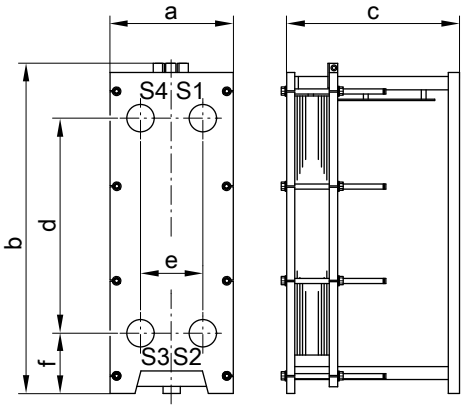


Plate heat exchanger dimensions

Plate heat exchanger Part no.	a	b	c	d	e	f	Primary side/secondary side connection
ZK05320	320	832	375 ±10	592	135	140	R 2
ZK05321	320	832	590 ±10	592	135	140	R 2
ZK05322	320	832	590 ±10	592	135	140	R 2
ZK05323	450	1166	636 ±10	779	226	220	Flange DN 100
ZK05324	450	1166	636 ±10	779	226	220	Flange DN 100
ZK05325	450	1166	636 ±10	779	226	220	Flange DN 100
ZK05326	450	1166	636 ±10	779	226	220	Flange DN 100
ZK05327	450	1166	636 ±10	779	226	220	Flange DN 100

3.15 DHW heating

Function description

Compared to central heating, DHW heating makes fundamentally different demands, as almost identical amounts of heat must be provided all the year round at the same temperature level.
In the delivered condition, DHW heating by the heat pump takes priority over the heating circuits.
The heat pump control unit switches the DHW circulation pump OFF during cylinder heating to prevent cylinder heating from being impaired or extended.

The max. cylinder storage temperature is limited subject to the heat pump used and the individual system configuration. Storage temperatures above this limit are only feasible with the assistance of a booster heater.

Booster heaters suitable for DHW reheating:
- External heat generator
- Instantaneous heating water heater (on site)
- Immersion heater (on site)

The integral load manager in the heat pump control unit decides which heat sources to use for DHW heating. Generally the external heat source has priority over the electric heaters.

If one of the following criteria is met, the booster heaters begin cylinder heating:
- Cylinder temperature below 3 °C (frost protection).
- Heat pump supplies no heating output and actual temperature has fallen below set value at the top cylinder temperature sensor.

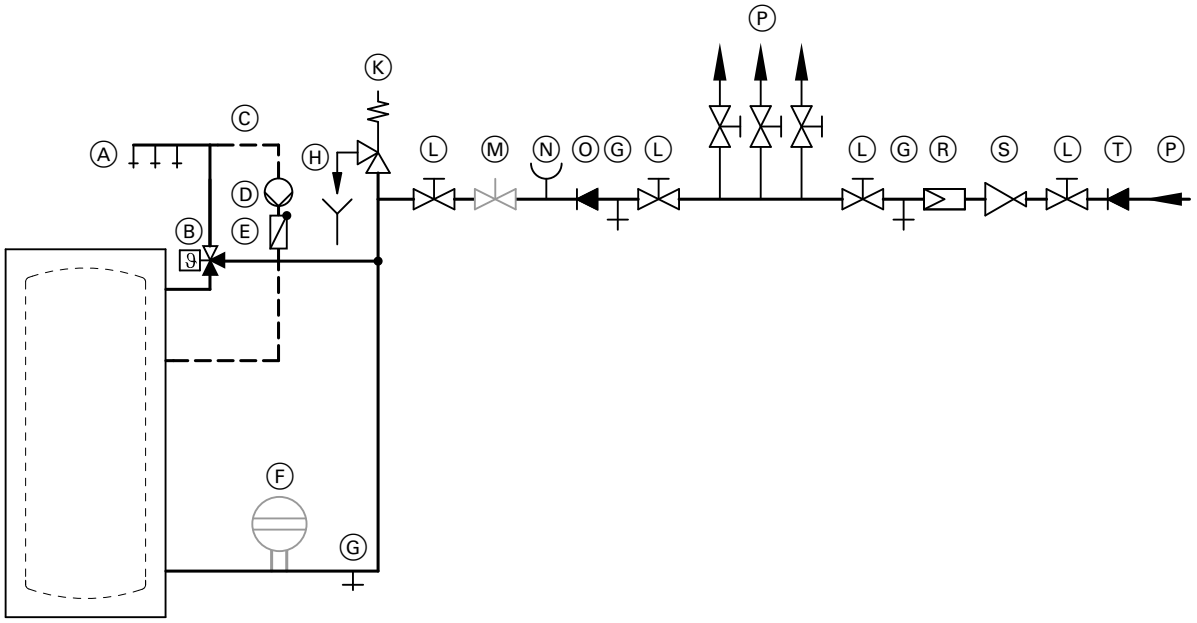
Note
The immersion heater in the DHW cylinder and the external heat source stop as soon as the set value at the top temperature sensor is reached, minus a hysteresis of 1 K.

When selecting the DHW cylinder ensure that its indirect coil surface area is large enough for the purpose.

DHW heating should ideally take place during the night after 22:00 h. This has the following advantages:
- All of the heat pump heating output is available for heating operation during the daytime.
- Better utilisation of economy (night) tariffs (if offered by the power supply utility).
- DHW cylinder heating and simultaneous drawing can be avoided. When using an external heat exchanger, the system may not always achieve the required draw-off temperatures because of the system design.

Connection on the DHW side

For connecting the DHW side, observe EN 806, DIN 1988 and DIN 4753 (CH: SVGW regulations). Observe other country-specific standards as applicable.



Example with Vitocell 100-V, type CVWA

Ⓐ DHW
Ⓑ Automatic thermostatic mixing valve
Ⓒ DHW circulation pipe
Ⓓ DHW circulation pump
Ⓔ Spring-loaded check valve
Ⓕ Expansion vessel, suitable for drinking water
Ⓖ Drain outlet
Ⓗ Visible discharge pipe outlet point (tundish)
Ⓚ Safety valve
Ⓛ Shut-off valve
Ⓜ Flow regulating valve (installation recommended)
Ⓝ Pressure gauge connection
Ⓞ Non-return valve
Ⓟ Cold water
Ⓡ Drinking water filter
Ⓢ Pressure reducer to DIN 1988-200:2012-05
Ⓣ Non-return valve/pipe separator

Safety valve

Protect the DHW cylinder with a safety valve against unduly high pressure.

Recommendation: Install the safety valve higher than the top edge of the cylinder. This protects the valve against contamination, scaling and high temperatures. The DHW cylinder will also not need to be drained when working on the safety valve.

Automatic thermostatic mixing valve

With appliances that heat DHW to temperatures above 60 °C, an automatic thermostatic mixing valve must be installed in the DHW line as protection against scalding.

This also particularly applies when connecting solar thermal systems.

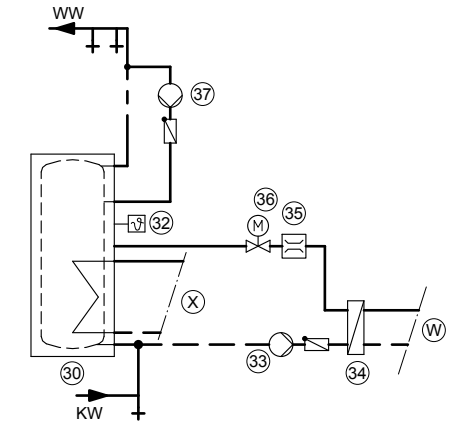
Cylinder loading system

Hydraulic connection, cylinder loading system
Schematic diagram (for required accessories, see "Overview of installation accessories")

Cylinder without heating lance

Note
*This system is only suitable if **no** extraction (drawing) takes place during the heating process.*

Design information (cont.)



KW Cold water
WW DHW

Required equipment

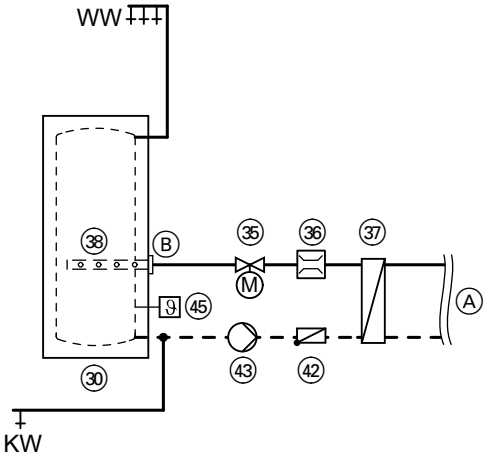
Pos.	Designation
30	DHW cylinder (on site or on request)
32	Cylinder temperature sensor
33	Cylinder loading pump (DHW side, fail-safe)
34	Plate heat exchanger
35	Flow limiter
36	Motorised 2-way valve, normally closed
37	DHW circulation pump

Ⓦ Heat pump interface
Ⓧ Interface to the solar thermal system or the external heat generator

Cylinder with external heat exchanger (cylinder loading system) and heating lance

During cylinder heating (no draw-off) in the cylinder loading system, cold water from the bottom of the cylinder is extracted by the cylinder loading pump, heated in the heat exchanger and returned to the cylinder via the heating lance installed in the flange.
The generously sized outlet apertures in the heating lance result in low flow velocities, which in turn provide clear temperature stratification inside the cylinder.
DHW reheating is possible if an immersion heater is also installed (on site).

Ⓐ Heat pump interface
Ⓑ DHW inlet from the heat exchanger



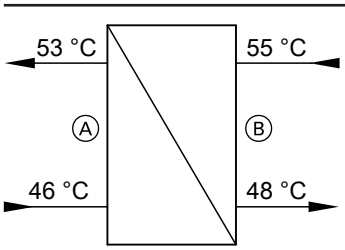
KW Cold water
WW DHW

Equipment required

Pos.	Designation	Quantity	Part no.
30	DHW cylinder	1	On site
35	2-way motorised ball valve (N/C)	1	See Viessmann pricelist
36	Flow limiter	1	On site
37	Plate heat exchanger	1	On site
38	Heating lance	1	On site
42	Check valve	1	On site
43	Cylinder loading pump	1	On site
45	Cylinder temperature sensor	1	7170965

Selecting a cylinder loading system

Loading cylinder
The loading cylinder must also be selected according to the flow rates. Heating via a heating lance is beneficial. The average achievable cylinder water temperature with the following sizing is approx. 45 °C.



Ⓐ DHW cylinder (domestic hot water)
Ⓑ Heat pump (heating water)

Plate heat exchanger selection up to limit operation W10/W35

Vitocal 300-G Pro Type	Rated heating output kW	Flow rate DHW side (Ⓐ) m³/h	Heating water side (Ⓑ) m³/h	Pressure drop DHW side (Ⓐ) kPa	Heating water side (Ⓑ) kPa	Plate heat exchanger (threaded) Part no.
1-stage operating mode						
BW 302.D090	53.5	6.7	6.7	13	12	ZK05309
BW 302.D110	69.9	8.7	8.7	12	11	ZK05310
BW 302.D140	87.5	10.9	10.9	15	14	ZK05311
BW 302.D180	113.5	14.1	14.1	20	20	ZK05312
BW 302.D230	141.5	17.6	17.9	21	21	ZK05313

Note
- *A separate cylinder loading pump is **always** required.*
- *DHW heating with the Vitocal 300-G Pro in 2-stage operating mode is **not** recommended due to the high flow rates and outputs. In large systems, we recommend using other heat pumps for DHW heating, e.g. Vitocal 350-G (8 kW, 18 kW), other special high temperature heat pumps, special return heat pumps (6 to 150 kW).*

Standard values, min. cylinder volume for 2-stage heat pump

Heat pump output at 0/35 °C	Cylinder volume
< 60 kW	750 l
60-100 kW	1000 l
100-150 kW	1500 l
< 150 kW	2000 l

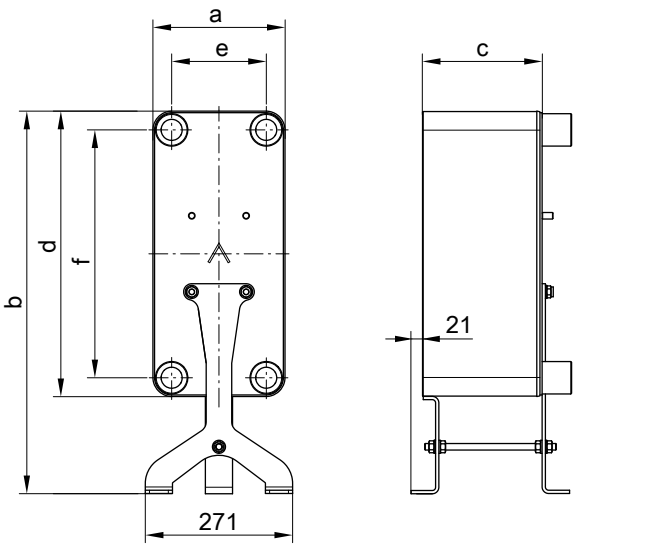


Plate heat exchanger dimensions

Vitocal 300-G Pro Type	Plate heat exchanger Part no.	a	b	c	d	e	f	Connection, DHW side/heating water side G
BW 302.D090	ZK05309	243	704	124	525	174	456	R 2
BW 302.D110	ZK05310	243	704	170	525	174	456	R 2
BW 302.D140	ZK05311	243	704	193	525	174	456	R 2
BW 302.D180	ZK05312	243	704	216	525	174	456	R 2
BW 302.D230	ZK05313	243	704	285	525	174	456	R 2

Heat pump control unit

4.1 Vitotronic 200, type WO1C

Vitotronic 200, type WO1C: Layout and functions

Modular design
The control unit comprises the standard modules, PCBs and the programming unit.

Standard modules:
- ON/OFF switch
- Optolink interface
- Operating and fault display
- Fuses

PCBs for connecting external components:
- Connections for 230 V~ components, such as pumps, mixers etc.
- Connections for signal and safety components
- Connections for temperature sensors and KM BUS

Programming unit
- Straight forward operation:
  - Plain text display with graphic ability
  - Large font and black/white depiction for good contrast
  - Context-sensitive help texts
- With time switch
- Operating keys:
  - Navigation
  - Confirmation
  - Help
  - Extended menu
- Settings:
  - Standard and reduced room temperature
  - Standard and second DHW temperature
  - Operating program
  - Time programs, e.g. for central heating, DHW heating, DHW circulation and heating water buffer cylinder
  - Economy mode
  - Party mode
  - Holiday program
  - Heating and cooling curves
  - Parameter
- Display:
  - Flow temperatures
  - DHW temperature
  - Information
  - Operating data
  - Diagnostic details
  - Information, warning and fault messages

Heat pump control unit (cont.)

■ Available languages:
  – German
  – Bulgarian
  – Czech
  – Danish
  – English
  – Spanish
  – Estonian
  – French
  – Croatian
  – Italian
  – Latvian
  – Lithuanian
  – Hungarian
  – Dutch
  – Polish
  – Russian
  – Romanian
  – Slovenian
  – Finnish
  – Swedish
  – Turkish

Functions

■ Electronic maximum and minimum temperature limit
■ Demand-dependent shutdown of the heat pump and the pumps for the primary and secondary circuits
■ Adjustment of a variable heating and cooling limit
■ Pump anti-seizing protection
■ Monitoring frost protection of system components
■ Integral diagnostic system
■ Cylinder temperature controller with priority control
■ Auxiliary function for DHW heating (short-term heating to a higher temperature)
■ Control of a heating water buffer cylinder
■ Screed drying program
■ External hook-ups: Mixer OPEN, mixer CLOSE, changeover of operating mode (with external EA1 extension, accessories)
■ External demand (adjustable set flow temperature) and heat pump blocking, specifying the set flow temperature via an external 0 to 10 V signal (with external EA1 extension, accessories)
■ Function check of controlled components, e.g. circulation pumps
■ Optimised utilisation of power generated by the photovoltaic system (on-site power consumption)
■ Control and operation of compatible Viessmann ventilation units

Functions subject to heat pump type

	Vitocal 300-G Pro
Weather-compensated control of the flow temperatures for heating or cooling mode	
– System flow temperature or flow temperature of heating circuit without mixer A1	X
– Flow temperature, heating circuit with mixer M2: Direct control of the mixer motor by the control unit Control of the mixer motor via the KM-BUS	X
– Flow temperature, heating circuit with mixer M3: Control of the mixer motor via the KM-BUS	X
– Flow temperature for cooling via a heating/cooling circuit or separate cooling circuit	X
Cooling function	
– Natural cooling function (NC)	X
– Active cooling function (AC)	—
Solar DHW heating/central heating backup	
Solar circuit pump **with** control via PWM signal: – Control with solar control module, type SM1 (accessories) ***Note*** *Solar control module, type SM1 is integrated in the Solar-Divicon, part no. 7429073.*	X
Solar circuit pump **without** control via PWM signal (on-site): – Control unit with integral solar control function	—
External heat generator control unit (e.g. oil/gas boiler)	X
Control of instantaneous heating water heater	X
Control of swimming pool heating	X
Control of heat pump cascade – For up to 5 Vitocal appliances via LON, LON communication module required (accessories)	X
Connection to higher ranking KNX/EIB system Via Vitogate 200, type KNX (LON communication module required, accessory).	X

Heat pump control unit (cont.)

Data communication overview

Device	Vitoconnect type OPTO2		Vitocom 100 type LAN1		Vitocom 300 type LAN3	
Operation	**ViCare app**	**Vitoguide**	**Vitotrol app**	**Vitodata 100**	**Vitodata 100**	**Vitodata 300**
Communication	WiFi Push notification	Email	Ethernet, IP networks Vitotrol app	Email, SMS, fax	Ethernet, IP networks Email, SMS, fax	
Max. number of heating systems	1	1	1	1	1	5
Max. number of heating circuits	3	3	3	32	32	32
Remote monitoring	X	X	X	X	X	X
Telecontrol	X	X	X	X	X	X
Remote setting (setting the heat pump control parameters)	–	–	–	–	–	X
Linking in the heat pump control unit	Optolink	Optolink	LON	LON	LON	LON
Accessories required for the heat pump control unit	–	–	Communication module (Vitocom standard delivery or accessories)			

Information on Vitoconnect
Heating system: Only 1 heat generator

Information on Vitodata 100
The full extent of the heat pump energy statement cannot be retrieved.

The requirements of EN 12831 for calculating the heat load are met.
To reduce the heat-up output, the "Reduced" operating status is switched to the "Standard" operating status if outside temperatures are low.
According to the [German] Energy Saving Ordinance, the temperature in each room must be individually controlled, e.g. by means of thermostatic valves.

4

Time switch

Digital time switch (integrated into the programming unit)
- Individual day and seven-day program
- Automatic summer/wintertime changeover
- Automatic function for DHW heating and DHW circulation pump
- Standard switching times are preset at the factory, e.g. for central heating, DHW heating, charging a heating water buffer cylinder and switching the DHW circulation pump.
- Time program is individually adjustable; up to 8 time phases per day
  Shortest switching interval: 10 min
  Power reserve: 14 days

Setting the operating programs

Frost protection monitoring for the system components is enabled in all operating programs (see frost protection function).
You can select the following operating programs via the menu:
- For heating/cooling circuits:
  "Heating and DHW" or "heating, cooling and DHW"
- For a separate cooling circuit:
  "Cooling"
- "Only DHW"; separate settings for each heating circuit

  Note
  If the heat pump only needs to be on for DHW heating (e.g. in the summer), the operating program "Only DHW" must be selected for ***all*** *heating circuits.*

- "Standby mode"
  Frost protection only

The operating programs can also be switched over externally, e.g. by Vitocom 100.

Frost protection function

- If the outside temperature falls below +1 °C, the frost protection function is switched on.
  With active frost protection, the heating circuit pump will be switched on and the flow temperature in the secondary circuit will be maintained at a lower temperature of approx. 20 °C.
  The DHW cylinder will be heated to approx. 20 °C.
- If the outside temperature exceeds +3 °C, the frost protection function is switched off.

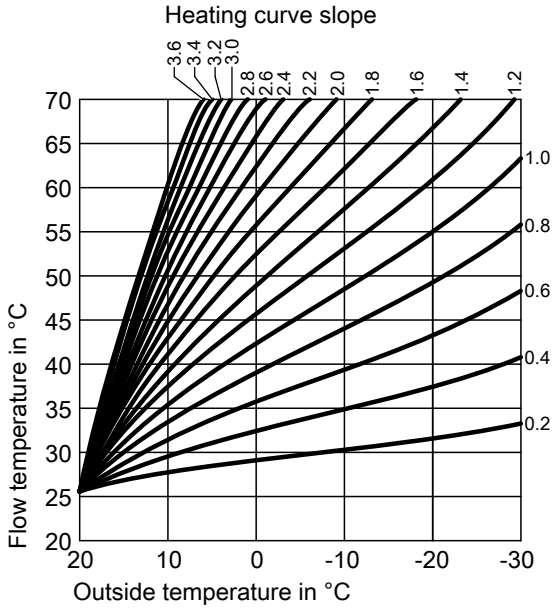
Heating and cooling curve settings (slope and level)

The Vitotronic 200 regulates the flow temperatures for the heating/cooling circuits in weather-compensated mode:

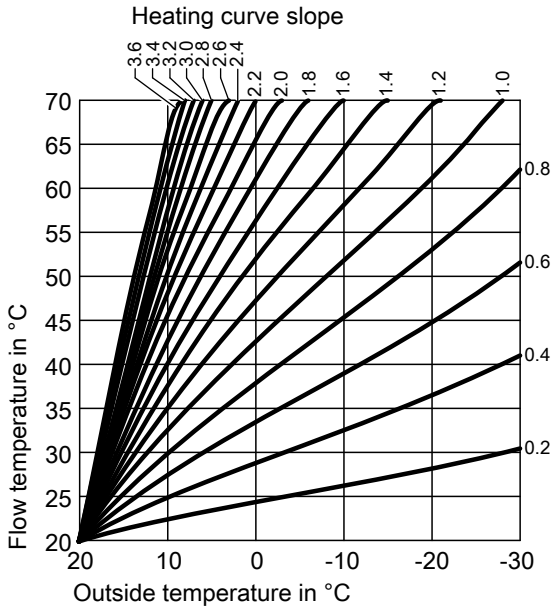
- System flow temperature or flow temperature of heating circuit without mixer A1
- Flow temperature, heating circuit with mixer M2:
  Depending on the heat pump, the mixer motor is controlled either directly by the control unit or via the KM-BUS.
- Flow temperature, heating circuit with mixer M3:
  Not available with every heat pump; mixer motor control via the KM-BUS.
- Flow temperature for cooling via heating circuit; the separate cooling circuit is regulated depending on the room temperature.

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 or cooled.
Adjusting the heating or cooling curves matches the flow temperature to these conditions.

- Heating curves:
  The flow temperature of the secondary circuit is restricted at the upper end of the scale by the temperature limiter and the maximum temperature set at the heat pump control unit.



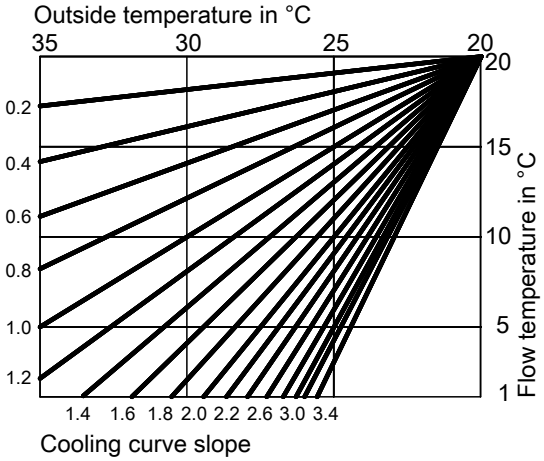
Heating curves for one heating circuit without mixer



Heating curves for one heating circuit with mixer

Heat pump control unit (cont.)

■ Cooling curves:
The flow temperature of the secondary circuit is restricted at the lower end of the scale by the minimum temperature set at the heat pump control unit.



Heating systems with heating water buffer cylinder

When using hydraulic separation, a temperature sensor must be integrated in the heating water buffer cylinder. This temperature sensor is connected to the heat pump control unit.

Specification Vitotronic 200, type WO1C

General	
Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	6 A
Protection class	I
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
DHW temperature setting range	10 to +70 °C
Heating and cooling curves setting range	
– Slope	0 to 3.5
– Level	–15 to +40 K

Power supply for DHW circulation pump
DHW circulation pumps with their own internal control units must be connected via a separate power supply. It is ***not*** *permissible to use the power supply from the Vitotronic control unit or Vitotronic accessories.*

Connection values of the function components

Component	Connected load [W]	Voltage [V]	Max. switching current [A]
Primary pump and control of the well pump	200	230	4 (2)
Secondary pump	130	230	4 (2)
3-way diverter valve central heating/DHW heating in conjunction with a cylinder loading system: Cylinder loading pump and 2-way shut-off valve	130	230	4 (2)
Instantaneous heating water heater control, stage 1 and 2	10	230	4 (2)
Cooling control	10	230	4 (2)
Heating circuit pump A1/HC1 and M2/HC2	100	230	4 (2)
DHW circulation pump	50	230	4 (2)
Solar circuit pump	130	230	4 (2)
Mixer motor control, signal mixer CLOSE	10	230	0.2 (0.1)
Mixer motor control, signal mixer OPEN	10	230	0.2 (0.1)
Total	Max. 1000		Max. 5(3) A

5.1 Overview, control unit accessories

Accessories	Part no.
Remote control units: See page 71.	
Vitotrol 200-A	Z008341
Wireless remote control units: See page 72.	
Vitotrol 200-RF	Z011219
Wireless base station	Z011413
Wireless repeater	7456538
Sensors: See page 74.	
Room temperature sensor (NTC 10 kΩ)	7438537
Contact temperature sensor (NTC 10 kΩ)	7426463
Immersion temperature sensor (NTC 10 kΩ)	7438702
Safety equipment: See page 75.	
Gas detector (for R410A)	ZK04685
Miscellaneous: See page 75.	
Contactor relay	7814681
KM-BUS distributor	7415028
Solar control module	Z014470
Temperature control for DHW cylinder: See page 77.	
Temperature controller	7151989
Swimming pool temperature controller: See page 78.	
Temperature controller for regulating swimming pool temperature	7009432
Extension for heating circuit control unit for integration of the external heat generator or for heating circuit with mixer M2/HC2 (direct control via the Vitotronic): See page 78.	
Mixer extension kit	7441998
Mixer motor	7450657
Extension for heating circuit control unit for heating circuit with mixer M3/HC3 (control via the Vitotronic KM-BUS): See page 78.	
Mixer extension kit (mixer mounting)	ZK02940
Mixer extension kit (wall mounting)	ZK02941
External H1 extension	7179058
Immersion thermostat	7151728
Contact thermostat	7151729
Function extensions: See page 81.	
AM1 extension	7452092
EA1 extension	7452091
Communication technology: See page 82.	
Vitoconnect OPTO2	ZK04783
Vitocom 100, type LAN1 with communication module	Z011224
Vitocom 300, type LAN3	Z011399
Vitogate 200, type KNX	Z012827
Vitogate 300, type BN/MB	Z013294
LON communication module for cascade control	7172174
LON communication module	7172173
LON cable for control unit data exchange	7143495
LON coupling, RJ45	7143496
LON plug-in connector, RJ45	7199251
LON socket, RJ45	7171784
Terminator	7143497

Note
The following description of control unit accessories lists all functions and connections of each control unit accessory. The functions that are possible depend on the heat generator.

5.2 Remote control units

Information on Vitotrol 200-A

A Vitotrol 200-A can be used for each heating or cooling circuit.
The Vitotrol 200-A can operate 1 heating/cooling circuit.
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)

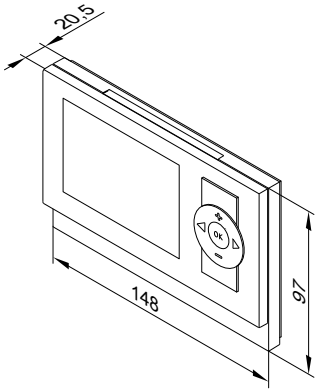
    Note
    The set room temperature for reduced mode (reduced room temperature) is set at the control unit.

  - 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.*

5.3 Wireless remote control units

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 or cooling circuit.
The Vitotrol 200-RF can operate one heating/cooling circuit.
Up to 3 wireless remote control units can be connected to the control unit.

Note
*The wireless remote control unit **cannot** be combined with a hard-wired remote control.*

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)

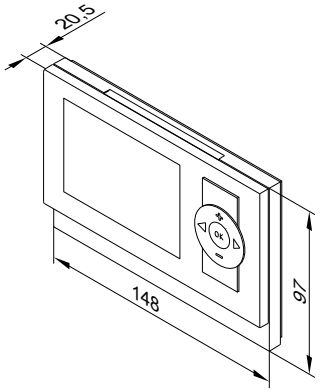
    Note
    The set room temperature for reduced mode (reduced room temperature) is set at the control unit.

  - 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.



Specification

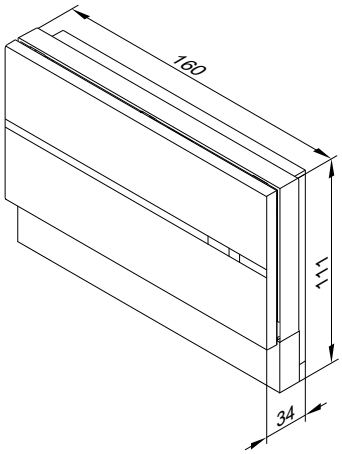
Power supply	2 AA batteries 3 V
Radio frequency	868 MHz
Wireless range	See "Wireless accessories" technical guide
Protection class	III
IP rating	IP 30 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Setting 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 lead immediately next to 230 V/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

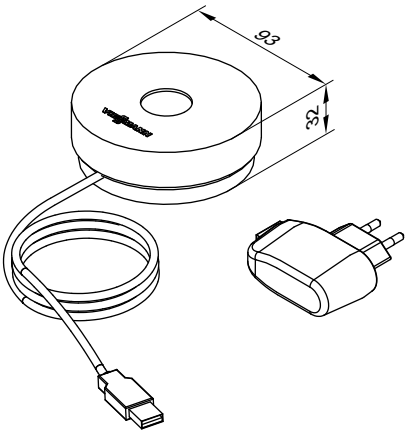
Wireless repeater

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 unit accessories (cont.)



Specification

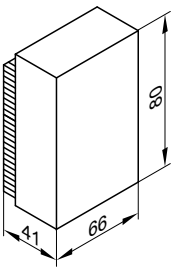
Power supply	230 V~/5 V⎓ via plug-in power supply unit
Power consumption	0.25 W
Radio frequency	868 MHz
Lead length	1.1 m with plug
Safety category	II
IP rating	IP 20 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +55 °C
– Storage and transport	−20 to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

5.4 Sensors

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 mm^2 (copper)
- Never route this lead immediately next to 230 V/400 V cables.

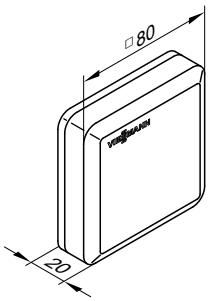


Specification

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

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 mm^2 (copper)
- Max. lead length from the remote control: 30 m
- Never route this cable immediately next to 230/400 V cables.



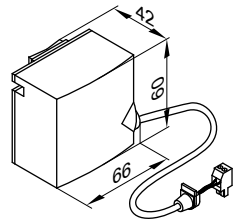
Specification

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

5837160

Contact temperature sensor

Part no. 7426463
To capture the temperature on a pipe



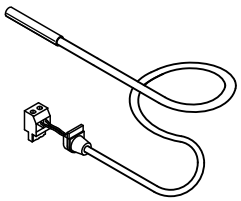
Secured with a tie.

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. 7438702
To capture a temperature in a sensor well



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

Threaded sensor well

Suitable for a 6 mm ∅ sensor
Connection ½"

Length in mm	Part no.
50	7511394
100	ZK03843
150	ZK03844
200	7549713
250	ZK03845
450	7511395

5.5 Safety equipment

Gas detector (for R410A)

Part no. ZK04685
R410A gas detector (also LDS leak detection system) for monitoring the concentrations of refrigerant in the test room and indicating refrigerant leaks using connectible signal units (on site).

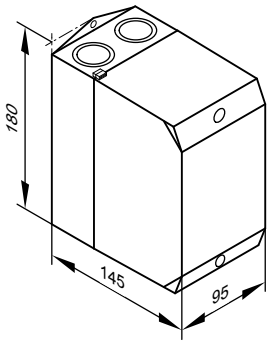
Specification

Supply voltage	24 V DC (±10 %)
Application limits	–30 to +50 °C
Dimensions	100 x 100 x 57 mm
Weight	370 g
IP rating	IP 54

5.6 Miscellaneous

Contactor relay

Part no. 7814681
- Contactor in small enclosure
- With 4 N/C and 4 N/O contacts
- With terminal strips for earth conductors

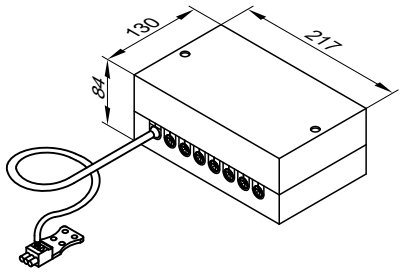


Specification

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

KM BUS distributor

Part no. 7415028
For connecting 2 to 9 devices to the KM BUS



Specification

Cable length	3.0 m, fully wired
IP rating	IP 32 to EN 60529; ensure through design/installation
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	−20 to +65 °C

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

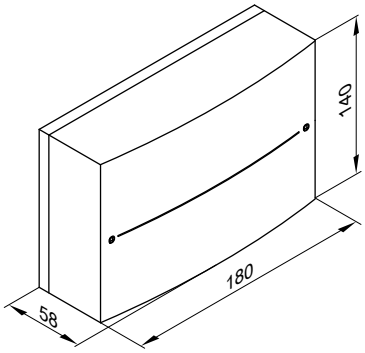
Cylinder temperature sensor
For connection inside the appliance

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).



Solar control module specification

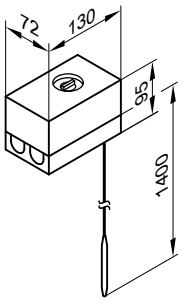
Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
Protection class	I
IP rating	IP 20 to EN 60529; ensure through design/installation.
Function type	Type 1B to EN 60730-1
Permissible ambient temperature	
– Operation	0 to +40 °C, use in the living space or boiler room (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

5.7 Temperature control for DHW cylinder

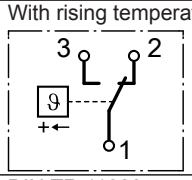
Temperature controller

Part no. 7151989

- With a thermostatic system
- With top-hat rail to be fitted to the DHW cylinder or the wall
- With selector on the outside of the casing
- Without sensor well
  The sensor well is part of the standard delivery of DHW cylinders from Viessmann.



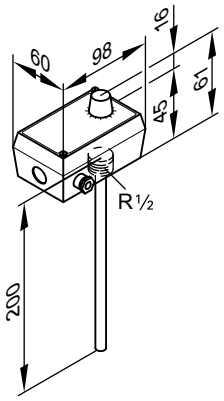
Specification

Connection	3-core lead with a cross-section of 1.5 mm²
IP rating	IP 41 to EN 60529
Setting range	30 to 60 °C, adjustable up to 110 °C
Switching differential	Max. 11 K
Breaking capacity	6(1.5) A 250 V~
Switching function	With rising temperature from 2 to 3 
DIN registration number	DIN TR 116807 or DIN TR 96808

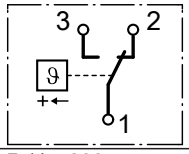
5.8 Swimming pool temperature control

Temperature controller for regulating the swimming pool temperature

Part no. 7009432



Specification

Connection	3-core lead with a cross-section of 1.5 mm²
Setting range	0 to 35 °C
Switching differential	0.3 K
Breaking capacity	10(2) A, 250 V~
Switching function	with rising temperature from 2 to 3 
Stainless steel sensor well	R ½ x 200 mm

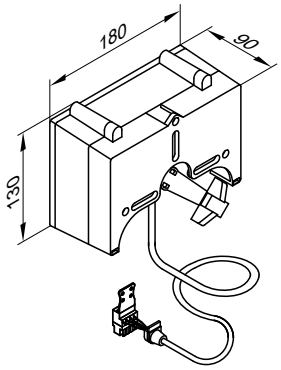
5.9 Heating circuit control unit extension

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 ½ 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

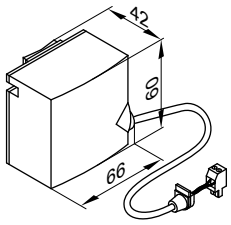
Mixer motor



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

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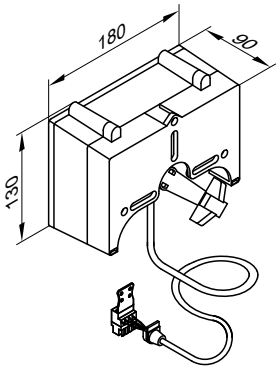
Mixer motor

Part no. 7450657



Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Power consumption	4 W
Protection class	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

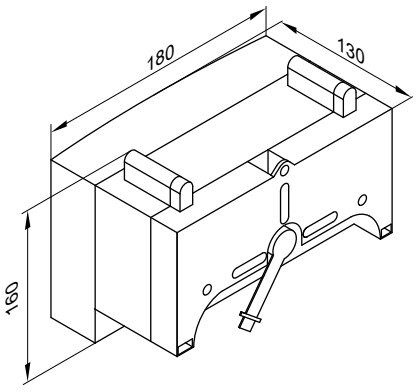
Mixer extension kit with integral mixer motor

Part no. ZK02940
KM-BUS subscribers

Components:
- Mixer PCB with mixer motor for Viessmann mixer DN 20 to DN 50 and R ½ to R 1¼
- Flow temperature sensor (contact temperature sensor)
- Plug for connecting the heating circuit pump
- Power cable (3.0 m long) with plug
- Bus connecting cable (3.0 m long) with plug

The mixer motor is mounted directly onto the Viessmann mixer DN 20 to DN 50 and R ½ to R 1¼.

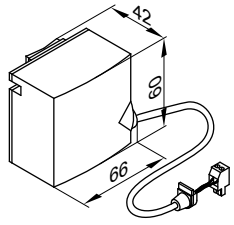
Mixer PCB with mixer motor



Specification, mixer PCB with mixer motor

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	5.5 W
IP rating	IP 32D to EN 60529; ensure through design/installation
Protection class	I
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Rated breaking capacity of the relay output for heating circuit pump [20]	2(1) A, 230 V~
Torque	3 Nm
Runtime for 90° ◁	120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

Specification, flow temperature sensor

Cable length	2.0 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

Mixer extension kit for separate mixer motor

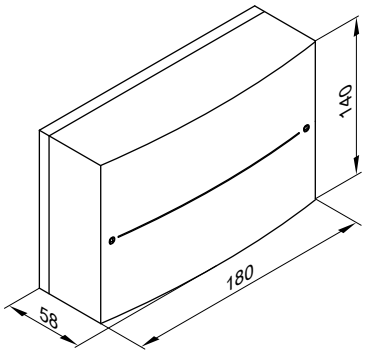
Part no. ZK02941
KM-BUS subscribers
For connecting a separate mixer motor
Components:

- Mixer PCB for connecting a separate mixer motor
- Flow temperature sensor (contact temperature sensor)
- Plug for connecting the heating circuit pump and the mixer motor

Control unit accessories (cont.)

- Power cable (3.0 m long) with plug
- Bus connecting cable (3.0 m long) with plug

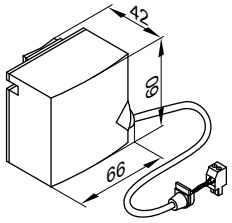
Mixer PCB



Specification mixer PCB

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	1.5 W
IP rating	IP 20D to EN 60529, ensure through design/installation
Protection class	I
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–20 to +65 °C
Rated relay output breaking capacity	
– Heating circuit pump [20]	2(1) A, 230 V~
– Mixer motor	0.1 A, 230 V~
Required runtime of the mixer motor for 90° ◁	Approx. 120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

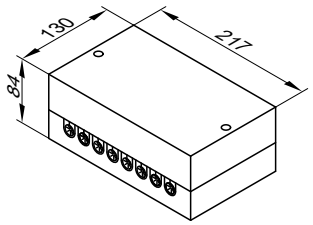
Specification, flow temperature sensor

Cable 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

H1 external extension

Part no. 7179058
Function extension inside a casing for wall mounting

Using the extension enables up to six functions:
- Cascade switching for up to 4 Vitocal appliances
- Swimming pool heating function
- Minimum heating water temperature demand
- External demand and blocking
- Set flow temperature of secondary circuit specified via a 0-10 V input
- External changeover of operating status

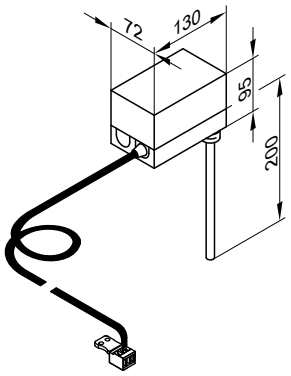


Specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	4 A
Power consumption	4 W
Protection class	I
IP rating	IP 32
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

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.

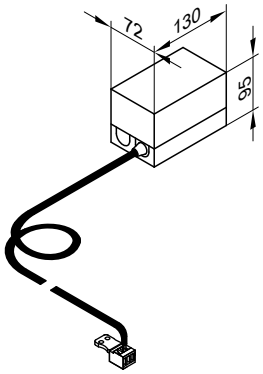


Specification

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

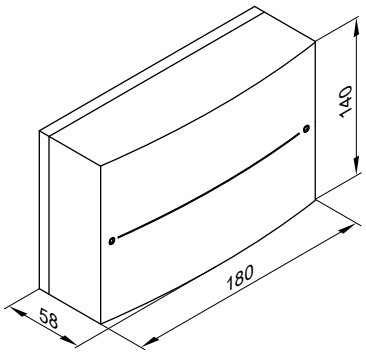
Lead length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	Max. 14 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	Inside the casing
DIN reg. no.	DIN TR 1168

5.10 Function extensions

AM1 extension

Part no. 7452092
Function extension inside enclosure, for wall mounting

Using the extension allows the following functions to be achieved:
- Cooling via coolant buffer cylinder
- or
  Central fault message
- Heat transfer to the coolant buffer cylinder



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

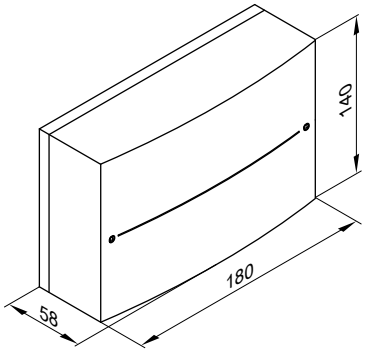
EA1 extension

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.



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, 250 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

5.11 Communication technology

Note
For more information on communication technology: See the "Data communication" technical guide

Vitoconnect, type OPTO2

Part no. ZK04789

- Internet interface for remote control of a heating system with 1 heat generator via WiFi with DSL router
- Compact device for wall mounting
- For system operation with **ViCare app** and/or **Vitoguide**

Functions when operating with the ViCare app
- Calling up the temperatures of connected heating circuits
- Intuitive adjustment of preferred temperatures and time programs for central heating and DHW heating
- Heating system fault reporting by push notification

The ViCare app supports mobile devices with the following operating systems:
- Apple iOS
- Google Android

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Control unit accessories (cont.)

Note
- *Compatible versions: Visit the App Store or Google Play.*
- *Further information: Visit* ***www.vicare.info***

Functions when operating with Vitoguide
- Monitoring of heating system following service clearance by the system user
- Access to operating programs, set values and time programs
- Retrieving system information for all connected heating systems
- Display and forwarding of fault messages in plain text

Vitoguide supports the following end devices:
- Mobile devices with a screen size of 8 inches or larger

Note
Further information: Visit ***www.vitoguide.info***

On-site requirements
- Compatible heating systems with Vitoconnect, type OPTO2

Note
Supported control units: Visit ***www.viessmann.de/vitoconnect***

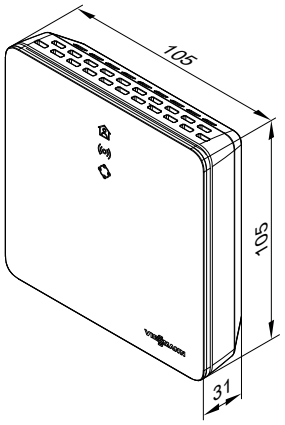
- Before commissioning, check the system requirements for communication via local IP networks/WiFi.
- Port 443 (HTTPS) and port 123 (NTP) must be open.
- The MAC address is printed on the device label.
- Internet connection with flat rate data (**without time or volume restrictions**)

Installation location
- Installation type: Wall mounting
- Installation only in enclosed buildings
- The installation location must be dry and free of frost.
- Distance to heat generator min. 0.3 m and max. 2.5 m
- Standard socket 230 V/50 Hz
  or
  US/CA: Socket 120 V/60 Hz
  max. 1.5 m to installation location
- Internet access with adequate WiFi signal

Note
The WiFi signal strength can be increased with commercially available WiFi repeaters.

Standard delivery
- Web interface for wall mounting
- Power cable with plug-in power supply unit (1.5 m long)
- Connecting cable with Optolink/USB (WiFi module/boiler control unit, 3 m long)

Specification



Vitoconnect specification

Rated voltage	12 V⎓
WiFi frequency	2.4 GHz
WiFi encryption	Unencrypted or WPA2
Frequency band	2400.0 to 2483.5 MHz
Max. transmitting power	0.1 W (e.i.r.p.)
Internet protocol	IPv4
IP assignment	DHCP
Rated current	0.5 A
Power consumption	5.5 W
Protection class	III
IP rating	IP 20D to EN 60529
Permissible ambient temperature	
– Operation	5 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +60 °C

Plug-in power supply unit specification

Rated voltage	100 to 240 V~
Rated frequency	50/60 Hz
Output voltage	12 V⎓
Output current	1 A
Protection class	II
Permissible ambient temperature	
– Operation	5 to +40 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +60 °C

Keyword index

5837160

Keyword index

Subject to technical modifications.

Viessmann Werke GmbH & Co. KG
D-35107 Allendorf
Telephone: +49 6452 70-0
Fax: +49 6452 70-2780
www.viessmann.com

Viessmann Limited
Hortonwood 30, Telford
Shropshire, TF1 7YP, GB
Telephone: +44 1952 675000
Fax: +44 1952 675040
E-mail: info-uk@viessmann.com

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