VIESMANN

VITOCAL

Air source heat pumps with indoor and outdoor units
Monoblock version, 2.1 to 13.4 kW

Technical guide

VITOCAL 150-A

Type AWO(-M)-E-AC/AWO(-M)-E-AC-AF 151.A

Air source heat pump with electric drive in monoblock design with outdoor and indoor unit
- For room heating, room cooling and DHW heating in heating systems
- Indoor unit with control unit, instantaneous heating water heater, integral buffer cylinder, expansion vessel, safety assembly and integral heating/cooling circuit

Type AWO(-M)-E-AC/AWO(-M)-E-AC-AF 151.A SP

Equipment as above, with central 230 V~ power supply on the indoor unit

VITOCAL 151-A

Type AWOT(-M)-E-AC/AWOT(-M)-E-AC-AF 151.A

Compact air source heat pump with electric drive in monoblock design with outdoor and indoor unit
- For room heating, room cooling and DHW heating in heating systems
- Indoor unit with control unit, 190 l integral DHW cylinder, instantaneous heating water heater, integral buffer cylinder, expansion vessel, safety assembly

Type AWOT(-M)-E-AC/AWOT(-M)-E-AC-AF 151.A SP

Equipment as above, with central 230 V~ power supply on the indoor unit

6179959 GB 3/2023

Index

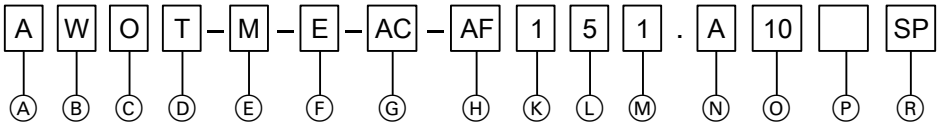
6179959

6179959

6179959

Product type designations

Vitocal 151-A, type



Pos.	Value	Meaning
Ⓐ	Medium, primary circuit	
	A	**A**ir
	B	**B**rine
	HA	**H**ybrid **A**ir
	W	**W**ater
Ⓑ	Medium, secondary circuit	
	W	**W**ater
Ⓒ	Model, part 1	
	B	Refrigerant circuit in split version (**Bi**-block)
	C	Circulation pumps and/or 3-way diverter valve installed (**C**ompact)
	H	High temperature version (**H**igh temperature)
	O	Outdoor installation (**O**utdoor)
	S	Heat pump, stage 2 without heat pump control unit (**S**lave)
	T	Compact heat pump (**T**ower)
Ⓓ	Model, part 2	
	I	Indoor installation (**I**ndoor)
	T	Compact heat pump (**T**ower)
	S	**S**lim design
Ⓔ	Outdoor unit power supply	
	M	230 V/50 Hz (**M**onophase)
	Empty	400 V/50 Hz
Ⓕ	Electric instantaneous heating water heater	
	E	**E**lectric heating built into heat pump
	Empty	Not built-in
Ⓖ	Cooling function	
	AC	Active cooling
	NC	Natural cooling

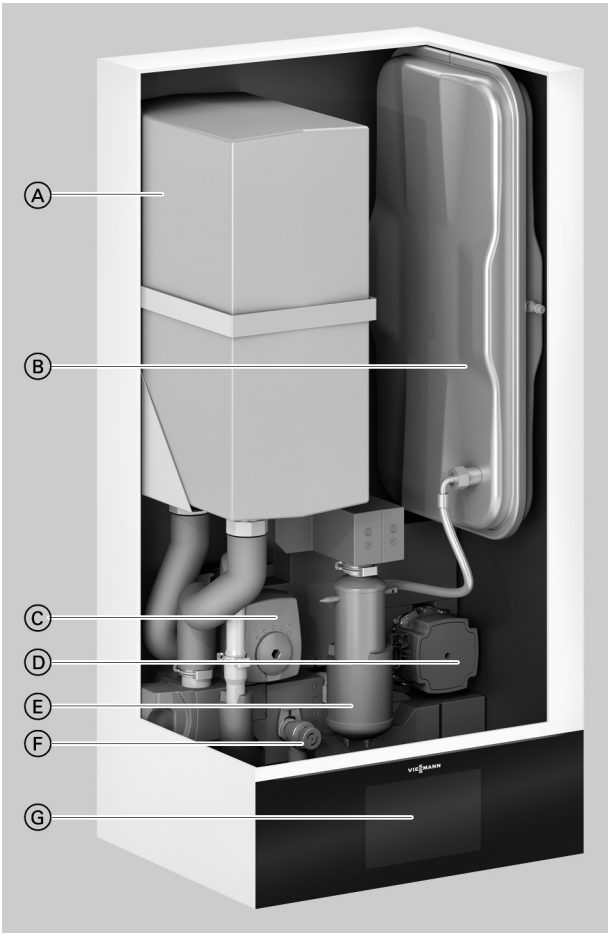
Pos.	Value	Meaning
Ⓗ	Ribbon heater for condensate pan	
	AF	Built into outdoor unit (**A**nti **F**reeze)
	Empty	Not built-in
Ⓚ	Viessmann product segment	
	1	100
	2	200
	3	300
Ⓛ	Flow temperature and DHW cylinder	
	0	Normal flow temperature, separate DHW cylinder required
	1/**2**/**3**	Normal flow temperature, built-in DHW cylinder
	4	Normal flow temperature, built-in DHW cylinder, with solar DHW heating
	5	High flow temperature, with built-in DHW cylinder, or separate DHW cylinder required
Ⓜ	Heat pumps: Number of compressors in refrigerant circuit	
	1	1 compressor
	2	2 compressors (connected in parallel)
	Hybrid appliances: Number of heat sources	
	2	2 heat sources, e.g. 1 compressor and 1 burner
Ⓝ	**A** to ...	Product generation
Ⓞ	Output class, similar to max. output in kW at A7/W35	
Ⓟ	Hydraulics, indoor unit	
	2C	2 integral heating/cooling circuits
	Empty	1 integral heating/cooling circuit
Ⓡ	Indoor unit equipment	
	SP	Central power supply 1/N/PE 230 V/50 Hz
	NEV	No expansion vessel
	I	Version integrated into living space (**I**nvisible)

6179959

2.1 Product description

Benefits

Indoor unit



Ⓐ Integral buffer cylinder
Ⓑ Expansion vessel
Ⓒ 4/3-way valve
Ⓓ Secondary pump (high efficiency circulation pump)
Ⓔ Instantaneous heating water heater
Ⓕ Safety valve
Ⓖ Heat pump control unit

- Low running costs thanks to high COP (coefficient of performance) to EN 14511: Up to 5.0 at A7/W35
- Output control and DC inverter for high efficiency in partial load operation
- Maximum flow temperature of up to 70 °C at an outside temperature of –10 °C enables use in both new build and modernisation projects.
- Self-optimising control of the flow rate via Viessmann Hydro Auto-Control
- Environmentally responsible, natural refrigerant R290 with a particularly low GWP of 0.02 (GWP = Global Warming Potential)
- Convenient reversible design for heating and cooling
- Quiet operation thanks to Advanced Acoustic Design (AAD)
- Web-enabled through integral WiFi or service link
- Operation, optimisation, maintenance and service via ViCare app and ViGuide
- Guided commissioning via ViGuide
- Individual room control with components from ViCare Smart Climate

Delivered condition

Indoor unit

- Integral 4/3-way valve for central heating/DHW heating/bypass
- Integral high efficiency circulation pump for the secondary circuit or heating/cooling circuit 1
- Integral instantaneous heating water heater
- Integral 16 l buffer cylinder
- Integral safety valve and digital pressure gauge
- Weather-compensated heat pump control unit with outside temperature sensor
- Flow sensor
- Wall mounting bracket, standard connection pipes
- Expansion vessel 10 l

- Types ... **SP**
  Central 230 V~ power supply with line protection

Outdoor unit

- Inverter-controlled compressor, 4-way diverter valve, electronic expansion valve, evaporator, condenser, EC fan
- Factory-filled with refrigerant R290
- Heating water filter upstream of condenser
- Transport aid

6179959

Vitocal 150-A (cont.)

■ Type AWO(-M)-E-AC-**AF**:
With integral electric ribbon heater for the condensate pan

Type overview

Type	Heating/cooling circuits integral	Heating/cooling circuits with buffer cylinder	Rated voltage: Control unit/PCB, indoor unit	Rated voltage: Instantaneous heating water heater	Rated voltage: Outdoor unit	Central indoor unit power supply	Condensate pan heating
AWO-E-AC 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	400 V~	—	□
AWO-M-E-AC 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	230 V~	—	□
AWO-M-E-AC 151.A SP	1	1 to 4	230 V~	230 V~	230 V~	X	□
AWO-E-AC-AF 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	400 V~	—	■
AWO-M-E-AC-AF 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	230 V~	—	■
AWO-M-E-AC-AF 151.A SP	1	1 to 4	230 V~	230 V~	230 V~	X	■

Heating/cooling circuits
Control unit/PCB, indoor unit
Outdoor unit
Instantaneous heating water heater

X Available
□ Accessories
■ Integral

2.2 Specification

Specification

Heat pumps with 230 V~ outdoor unit

Type AWO-M-E-AC/AWO-M-E-AC-AF	**151.A**	**04**	**06**	**08**	**10**	**13**	**16**
Heating performance data to EN 14511 (A2/W35)							
Rated heating output	kW	2.5	3.1	4.0	5.8	6.7	7.6
Fan speed	rpm	376	401	447			
Power consumption	kW	0.66	0.82	1.08	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		3.8	3.8	3.7	4.1	3.8	3.8
Output control	kW	1.8 to 4.5	1.8 to 6.0	1.8 to 6.8	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)							
Rated heating output	kW	4.0	4.8	5.6	7.3	8.1	9.1
Fan speed	rpm	412	443	482	430	440	450
Air flow rate	m^3/h	1813	1954	2125	4045	4188	4331
Power consumption	kW	0.80	0.98	1.19	1.46	1.62	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.7	5.0	5.0	4.9
Output control	kW	2.1 to 4.0	2.1 to 6.0	2.1 to 8.0	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9
Heating performance data to EN 14511 (A–7/W35)							
Rated heating output	kW	3.8	5.6	6.5	9.7	11.1	12.4
Power consumption	kW	1.27	2.00	2.41	3.23	3.87	4.39
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.7	3.0	2.87	2.82
Heating performance data to EN 14511 (A–7/W55)							
Rated heating output	kW	3.5	5.2	6.2	9.2	10.6	11.83
Power consumption	kW	1.63	2.46	3.06	4.79	5.12	5.28
Coefficient of performance ε in heating mode (COP)		2.2	2.1	2.0	1.9	2.1	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)							
Low temperature application (W35)							
– Energy efficiency η_S	%	185	180	175	190	178	178
– Rated heating output P_{rated}	kW	4.0	5.5	6.5	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.7	4.6	4.4	4.825	4.52	4.525
Medium temperature application (W55)							
– Energy efficiency η_S	%	140	141	137	145	141	141
– Rated heating output P_{rated}	kW	3.8	5.1	6.2	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.6	3.6	3.5	3.7	3.6	3.6
Energy efficiency class to Commission Regulation (EU) No 813/2013							
Heating, average climatic conditions							
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}	A^{++}	A^{++}	A^{++}
Cooling performance data to EN 14511 (A35/W7)							
Rated cooling capacity	kW	2.6	3.0	3.4	3.9	5.6	6.3
Fan speed	rpm				550	550	550
Power consumption	kW	0.90	1.03	1.17	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		2.9	2.9	2.9	3.3	3.4	3.4
Output control	kW	1.8 to 4.0	1.8 to 4.8	1.8 to 5.0	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7
Cooling performance data average climatic conditions (A35/W7)							
Rated cooling capacity P_{rated}	kW	3.0	3.6	4.4	6.9	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.8	3.9	4.0	3.6	3.8	4.1
Cooling performance data to EN 14511 (A35/W18)							
Rated cooling capacity	kW	4.0	5.0	6.0	9.6	11.0	13.2
Fan speed	rpm	—	—	—	550	550	550
Power consumption	kW	0.85	1.14	1.54	2.18	2.75	3.62
Coefficient of performance in cooling mode (EER)		4.7	4.4	3.9	4.4	4.0	3.7
Output control	kW	3.2 to 4.0	3.2 to 5.5	3.2 to 6.7	6.3 to 14.4	6.6 to 15.7	6.9 to 17.0

Vitocal 150-A (cont.)

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04	06	08	10	13	16
Cooling performance data average climatic conditions (A35/W18)							
Rated cooling capacity P_{rated}	kW	4.6	5.6	6.9	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		4.5	4.7	4.9	7.2	6.7	6.3
Air intake temperature							
Cooling mode							
– Min.	°C	10	10	10	10	10	10
– Max.	°C	45	45	45	45	45	45
Heating mode							
– Min.	°C	–20	–20	–20	–20	–20	–20
– Max.	°C	40	40	40	40	40	40
Heating water (secondary circuit)							
Capacity excl. expansion vessel	l	18	18	18	18	18	18
Heat pump circuit minimum flow rate (defrosting)	l/h	1000	1000	1000	1000	1000	1000
Max. flow temperature	°C	70	70	70	70	70	70
Outdoor unit electrical values							
Rated voltage		1/N/PE 230 V/50 Hz					
Max. operating current	A	15	15.5	16	20	20	24
Cos φ		0.99	0.99	0.99	0.99	0.99	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10	< 10	< 10	< 10
Fuse protection		B16A	B16A	B16A	B25A	B25A	B25A
IP rating		IP X4	IP X4	IP X4	IP X4	IP X4	IP X4
Indoor unit electrical values							
PCB							
– Rated voltage		1/N/PE 230 V/50 Hz					
– Power supply fuse protection		1 x B16A					
– Internal fuse protection		6.3 A H (slow)/250 V~					
Instantaneous heating water heater							
– Heating output	kW	8					
– Fuse rating, power supply 230 V~		3 x B16A, 1-pole					
– Fuse rating, power supply 400 V~		1 x B16A, 3-pole					
– Power supply fuse protection		3 x B16A					
Max. power consumption							
Outdoor unit							
– Fan	W	140	140	140	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	3.5	3.6	3.7	4.8	5.4	5.4
Indoor unit							
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000	1000	1000	1000
Mobile data transfer							
WiFi							
– Transfer standard		IEEE 802.11 b/g/n					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+15					
Low power radio							
– Transfer standard		IEEE 802.15.4					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+6					
Service link							
– Transfer standard		LTE-CAT-NB1					
– Frequency range band 3	MHz	1710 to 1785					
– Frequency range band 8	MHz	880 to 915					
– Frequency range band 20	MHz	832 to 862					
– Max. transmission power	dBm	+23					

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04	06	08	10	13	16
Refrigerant circuit							
Refrigerant		R290	R290	R290	R290	R290	R290
– Safety group		A3	A3	A3	A3	A3	A3
– Charge weight	kg	1.2	1.2	1.2	2	2	2
– Global warming potential (GWP)*2		0.02	0.02	0.02	0.02	0.02	0.02
– CO_2 equivalent	t	0.000024	0.000024	0.000024	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type	Twin rotary					
– Oil in compressor	Type	HAF68	HAF68	HAF68	HAF68	HAF68	HAF68
– Oil volume in compressor	l	0.840	0.840	0.840	1.150	1.150	1.150
		±0.020	±0.020	±0.020	±0.020	±0.020	±0.020
Permissible operating pressure							
– High pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
Outdoor unit dimensions							
Total length	mm	600	600	600	600	600	600
Total width	mm	1144	1144	1144	1144	1144	1144
Total height	mm	841	841	841	1382	1382	1382
Indoor unit dimensions							
Total length	mm	360	360	360	360	360	360
Total width	mm	450	450	450	450	450	450
Total height	mm	920	920	920	920	920	920
Total weight							
Indoor unit							
– Empty	kg	47	47	47	47	47	47
– Filled (max.)	kg	75	75	75	75	75	75
Outdoor unit	kg	162	162	162	191	191	191
Permissible operating pressure on the secondary side	bar	3	3	3	3	3	3
	MPa	0.3	0.3	0.3	0.3	0.3	0.3
Connections with connection pipes supplied							
Heating water flow/return, heating/cooling circuits or external buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor unit — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55							
– ErP	dB(A)	51	51	51	56	56	56
– Max.	dB(A)	56	58	59	66	66	66
– Low-noise mode (stage 2)	dB(A)	52	52	52	59	59	59

Heat pumps with 230 V~ outdoor unit and indoor unit with central power supply

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Heating performance data to EN 14511 (A2/W35)							
Rated heating output	kW	2.5	3.1	4.0	5.8	6.7	7.6
Fan speed	rpm	376	401	447			
Power consumption	kW	0.66	0.82	1.08	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		3.8	3.8	3.7	4.1	3.8	3.8
Output control	kW	1.8 to 4.5	1.8 to 6.0	1.8 to 6.8	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)							
Rated heating output	kW	4.0	4.8	5.6	7.3	8.1	9.1
Fan speed	rpm	412	443	482	430	440	450
Air flow rate	m^3/h	1813	1954	2125	4045	4188	4331
Power consumption	kW	0.80	0.98	1.19	1.46	1.62	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.7	5.0	5.0	4.9
Output control	kW	2.1 to 4.0	2.1 to 6.0	2.1 to 8.0	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9

*2 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*

Vitocal 150-A (cont.)

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Heating performance data to EN 14511 (A–7/W35)							
Rated heating output	kW	3.8	5.6	6.5	9.7	11.1	12.4
Power consumption	kW	1.27	2.00	2.41	3.23	3.87	4.39
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.7	3.0	2.87	2.82
Heating performance data to EN 14511 (A–7/W55)							
Rated heating output	kW	3.5	5.2	6.2	9.2	10.6	11.83
Power consumption	kW	1.63	2.46	3.06	4.79	5.12	5.28
Coefficient of performance ε in heating mode (COP)		2.2	2.1	2.0	1.9	2.1	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)							
Low temperature application (W35)							
– Energy efficiency η_S	%	185	180	175	190	178	178
– Rated heating output P_{rated}	kW	4.0	5.5	6.5	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.7	4.6	4.4	4.825	4.52	4.525
Medium temperature application (W55)							
– Energy efficiency η_S	%	140	141	137	145	141	141
– Rated heating output P_{rated}	kW	3.8	5.1	6.2	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.6	3.6	3.5	3.7	3.6	3.6
Energy efficiency class to Commission Regulation (EU) No 813/2013							
Heating, average climatic conditions							
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}	A^{++}	A^{++}	A^{++}
Cooling performance data to EN 14511 (A35/W7)							
Rated cooling capacity	kW	2.6	3.0	3.4	3.9	5.6	6.3
Fan speed	rpm				550	550	550
Power consumption	kW	0.90	1.03	1.17	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		2.9	2.9	2.9	3.3	3.4	3.4
Output control	kW	1.8 to 4.0	1.8 to 4.8	1.8 to 5.0	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7
Cooling performance data average climatic conditions (A35/W7)							
Rated cooling capacity P_{rated}	kW	3.0	3.6	4.4	6.9	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.8	3.9	4.0	3.6	3.8	4.1
Cooling performance data to EN 14511 (A35/W18)							
Rated cooling capacity	kW	4.0	5.0	6.0	9.6	11.0	13.2
Fan speed	rpm	—	—	—	550	550	550
Power consumption	kW	0.85	1.14	1.54	2.18	2.75	3.62
Coefficient of performance in cooling mode (EER)		4.7	4.4	3.9	4.4	4.0	3.7
Output control	kW	3.2 to 4.0	3.2 to 5.5	3.2 to 6.7	6.3 to 14.4	6.6 to 15.7	6.9 to 17.0
Cooling performance data average climatic conditions (A35/W18)							
Rated cooling capacity P_{rated}	kW	4.6	5.6	6.9	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		4.5	4.7	4.9	7.2	6.7	6.3
Air intake temperature							
Cooling mode							
– Min.	°C	10	10	10	10	10	10
– Max.	°C	45	45	45	45	45	45
Heating mode							
– Min.	°C	–20	–20	–20	–20	–20	–20
– Max.	°C	40	40	40	40	40	40
Heating water (secondary circuit)							
Capacity excl. expansion vessel	l	18	18	18	18	18	18
Heat pump circuit minimum flow rate (defrosting)	l/h	1000	1000	1000	1000	1000	1000
Max. flow temperature	°C	70	70	70	70	70	70

Vitocal 150-A (cont.)

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Outdoor unit electrical values							
Rated voltage				1/N/PE 230 V/50 Hz			
Max. operating current	A	15	15.5	16	20	20	24
Cos φ		0.99	0.99	0.99	0.99	0.99	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10	< 10	< 10	< 10
Fuse protection		B16A	B16A	B16A	B25A	B25A	B25A
IP rating		IP X4	IP X4	IP X4	IP X4	IP X4	IP X4
Indoor unit electrical values							
PCB							
– Rated voltage				1/N/PE 230 V/50 Hz			
– Internal fuse protection				6.3 A H (slow)/250 V~			
Instantaneous heating water heater							
– Heating output	kW			5			
Power supply, indoor unit							
– Rated voltage				1/N/PE 230 V/50 Hz			
– Power supply fuse protection				1 x B32A, 1-pole			
Max. power consumption							
Outdoor unit							
– Fan	W	140	140	140	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	3.5	3.6	3.7	4.8	5.4	5.4
Indoor unit							
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000	1000	1000	1000
Mobile data transfer							
WiFi							
– Transfer standard				IEEE 802.11 b/g/n			
– Frequency range	MHz			2000 to 2483.5			
– Max. transmission power	dBm			+15			
Low power radio							
– Transfer standard				IEEE 802.15.4			
– Frequency range	MHz			2000 to 2483.5			
– Max. transmission power	dBm			+6			
Service link							
– Transfer standard				LTE-CAT-NB1			
– Frequency range band 3	MHz			1710 to 1785			
– Frequency range band 8	MHz			880 to 915			
– Frequency range band 20	MHz			832 to 862			
– Max. transmission power	dBm			+23			
Refrigerant circuit							
Refrigerant		R290	R290	R290	R290	R290	R290
– Safety group		A3	A3	A3	A3	A3	A3
– Charge weight	kg	1.2	1.2	1.2	2	2	2
– Global warming potential (GWP)*2		0.02	0.02	0.02	0.02	0.02	0.02
– CO_2 equivalent	t	0.000024	0.000024	0.000024	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type			Twin rotary			
– Oil in compressor	Type	HAF68	HAF68	HAF68	HAF68	HAF68	HAF68
– Oil volume in compressor	l	0.840 ±0.020	0.840 ±0.020	0.840 ±0.020	1.150 ±0.020	1.150 ±0.020	1.150 ±0.020
Permissible operating pressure							
– High pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
Outdoor unit dimensions							
Total length	mm	600	600	600	600	600	600
Total width	mm	1144	1144	1144	1144	1144	1144
Total height	mm	841	841	841	1382	1382	1382

*2 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*

Vitocal 150-A (cont.)

Type AWO-M-E-AC/AWO-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Indoor unit dimensions							
Total length	mm	360	360	360	360	360	360
Total width	mm	450	450	450	450	450	450
Total height	mm	920	920	920	920	920	920
Total weight							
Indoor unit							
– Empty	kg	47	47	47	47	47	47
– Filled (max.)	kg	75	75	75	74	74	74
Outdoor unit	kg	162	162	162	191	191	191
Permissible operating pressure on the secondary side	bar	3	3	3	3	3	3
	MPa	0.3	0.3	0.3	0.3	0.3	0.3
Connections with connection pipes supplied							
Heating water flow/return, heating/cooling circuits or external buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor unit — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55							
– ErP	dB(A)	51	51	51	56	56	56
– Max.	dB(A)	56	58	59	66	66	66
– Low-noise mode (stage 2)	dB(A)	52	52	52	59	59	59

Heat pumps with 400 V~ outdoor unit

Type AWO-E-AC/AWO-E-AC-AF	151.A	10	13	16
Heating performance data to EN 14511 (A2/W35)				
Rated heating output	kW	5.8	6.7	7.6
Power consumption	kW	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		4.1	3.8	3.8
Output control	kW	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)				
Rated heating output	kW	7.3	8.1	9.1
Fan speed	rpm	430	440	567
Air flow rate	m^3/h	4045	4188	5393
Power consumption	kW	1.46	1.65	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.9
Output control	kW	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9
Heating performance data to EN 14511 (A–7/W35)				
Rated heating output	kW	9.7	11.1	12.4
Power consumption	kW	3.23	3.96	4.4
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.8
Heating performance data to EN 14511 (A–7/W55)				
Rated heating output	kW	6.75	7.56	11.8
Power consumption	kW	2.27	2.33	5.28
Coefficient of performance ε in heating mode (COP)		2.97	3.4	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)				
Low temperature application (W35)				
– Energy efficiency η_S	%	190	178	178
– Rated heating output P_{rated}	kW	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.825	4.52	4.525
Medium temperature application (W55)				
– Energy efficiency η_S	%	145	141	141
– Rated heating output P_{rated}	kW	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.7	3.6	3.6
Energy efficiency class to Commission Regulation (EU) No 813/2013 Heating, average climatic conditions				
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}
Cooling performance data to EN 14511 (A35/W7)				
Rated cooling capacity	kW	3.90	5.60	6.3
Fan speed	rpm	550	550	550
Power consumption	kW	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		3.30	3.40	3.40
Output control	kW	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7

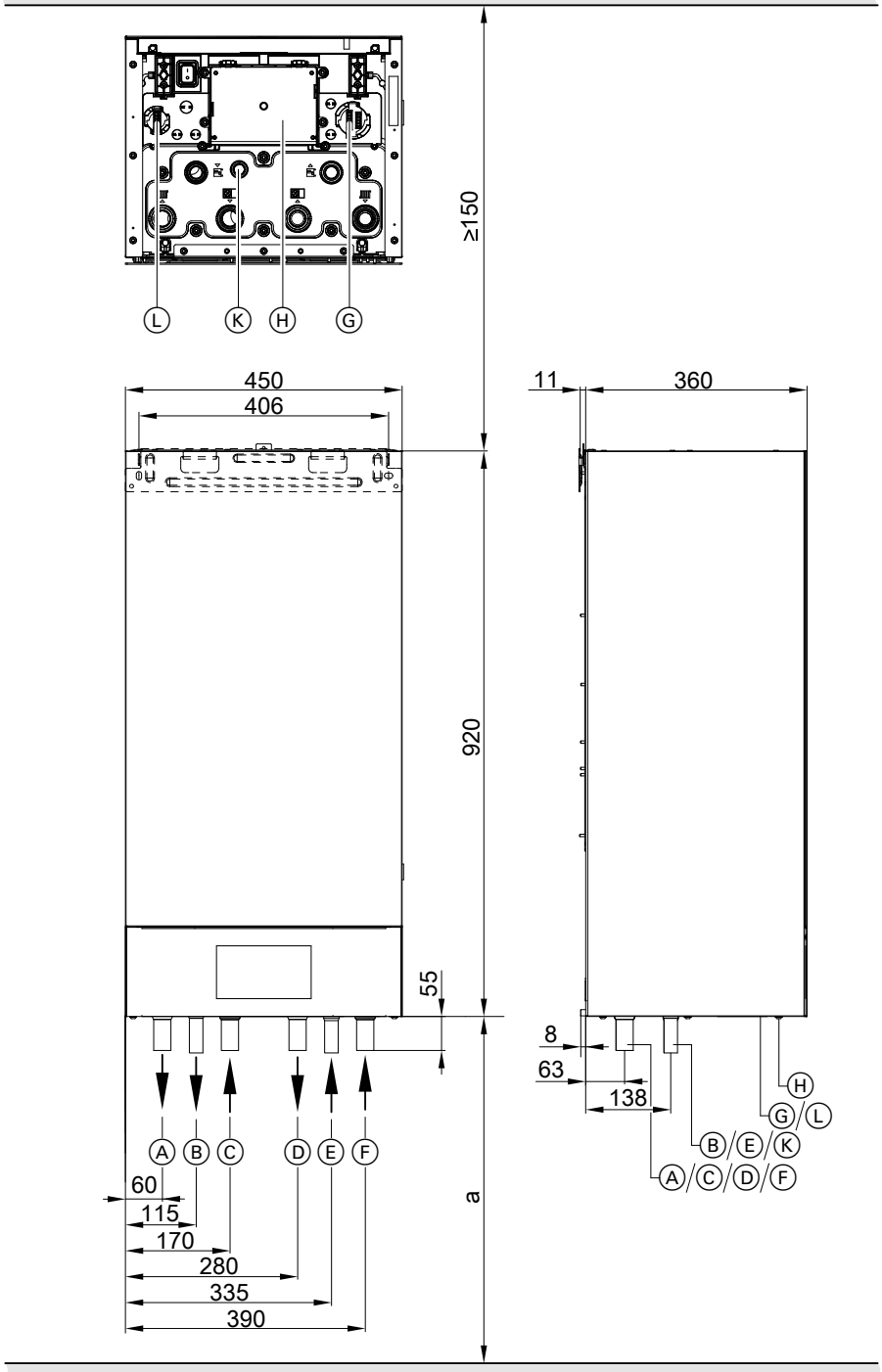
6179959

Type AWO-E-AC/AWO-E-AC-AF	151.A	10	13	16
Cooling performance data average climatic conditions (A35/W7)				
Rated cooling capacity P_{rated}	kW	6.90	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.60	3.80	4.10
Cooling performance data to EN 14511 (A35/W18)				
Rated cooling capacity	kW	9.50	11.20	13.30
Power consumption	kW	2.10	2.70	3.60
Coefficient of performance in cooling mode (EER)		4.50	4.10	3.70
Output control	kW	6.5 to 13.4	6.8 to 14.7	7.1 to 16.0
Cooling performance data average climatic conditions (A35/W18)				
Rated cooling capacity P_{rated}	kW	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		7.20	6.70	6.30
Air intake temperature				
Cooling mode				
– Min.	°C	10	10	10
– Max.	°C	45	45	45
Heating mode				
– Min.	°C	–20	–20	–20
– Max.	°C	40	40	40
Heating water (secondary circuit)				
Capacity excl. expansion vessel	l	18	18	18
Heat pump circuit minimum flow rate (defrosting)	l/h	1000	1000	1000
Max. flow temperature	°C	70	70	70
Outdoor unit electrical values				
Rated voltage			3/N/PE 400 V/50 Hz	
Max. operating current	A	11.5	11.5	11.5
Cos φ		0.92	0.92	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10
Fuse protection		B16A	B16A	B16A
IP rating		IP X4	IP X4	IP X4
Indoor unit electrical values				
PCB				
– Rated voltage			1/N/PE 230 V/50 Hz	
– Power supply fuse protection		1 x B16A	1 x B16A	1 x B16A
– Internal fuse protection			6.3 A H (slow)/250 V~	
Instantaneous heating water heater				
– Rated voltage			3/N/PE 400 V/50 Hz	
– Heating output	kW	8	8	8
– Power supply fuse protection		3 x B16A	3 x B16A	3 x B16A
Max. power consumption				
Outdoor unit				
– Fan	W	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	4.8	5.4	5.4
Indoor unit				
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000
Mobile data transfer				
WiFi				
– Transfer standard		IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n
– Frequency range	MHz	2000 to 2483.5	2000 to 2483.5	2000 to 2483.5
– Max. transmission power	dBm	+15	+15	+15
Low power radio				
– Transfer standard		IEEE 802.15.4	IEEE 802.15.4	IEEE 802.15.4
– Frequency range	MHz	2000 to 2483.5	2000 to 2483.5	2000 to 2483.5
– Max. transmission power	dBm	+6	+6	+6
Service link				
– Transfer standard		LTE-CAT-NB1	LTE-CAT-NB1	LTE-CAT-NB1
– Frequency range band 3	MHz	1710 to 1785	1710 to 1785	1710 to 1785
– Frequency range band 8	MHz	880 to 915	880 to 915	880 to 915
– Frequency range band 20	MHz	832 to 862	832 to 862	832 to 862
– Max. transmission power	dBm	+23	+23	+23

Type AWO-E-AC/AWO-E-AC-AF	151.A	10	13	16
Refrigerant circuit				
Refrigerant		R290	R290	R290
– Safety group		A3	A3	A3
– Charge weight	kg	2	2	2
– Global warming potential (GWP)*3		0.02	0.02	0.02
– CO_2 equivalent	t	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type	Twin rotary	Twin rotary	Twin rotary
– Oil in compressor	Type	HAF68	HAF68	HAF68
– Oil volume in compressor	l	1.150 ±0.020	1.150 ±0.020	1.150 ±0.020
Permissible operating pressure				
– High pressure side	bar	30.3	30.3	30.3
	MPa	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3
	MPa	3.03	3.03	3.03
Outdoor unit dimensions				
Total length	mm	600	600	600
Total width	mm	1144	1144	1144
Total height	mm	1382	1382	1382
Indoor unit dimensions				
Total length	mm	360	360	360
Total width	mm	450	450	450
Total height	mm	920	920	920
Total weight				
Indoor unit				
– Empty	kg	47	47	47
– Filled (max.)	kg	74	74	74
Outdoor unit	kg	197	197	197
Permissible operating pressure on the secondary side	bar	3	3	3
	MPa	0.3	0.3	0.3
Connections with connection pipes supplied				
Heating water flow/return, heating/cooling circuits or external buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor unit — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55				
– ErP	dB(A)	56	56	56
– Max.	dB(A)	66	66	66
– Low-noise mode	dB(A)	59	59	59

*3 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC)*

Dimensions – indoor unit



a Min. installation height:
Depending on the installation position of programming unit
Ⓐ Secondary circuit flow (heating/cooling circuit 1/external buffer cylinder), connection Cu 28 x 1.0 mm
Ⓑ DHW cylinder flow (on the heating water side), connection Cu 22 x 1.0 mm
Ⓒ Heating water **from** outdoor unit, connection Cu 28 x 1.0 mm
Ⓓ Heating water **to** outdoor unit, connection Cu 28 x 1.0 mm
Ⓔ DHW cylinder return (on the heating water side), connection Cu 22 x 1.0 mm
Ⓕ Secondary circuit return (heating/cooling circuit 1/external buffer cylinder), connection Cu 28 x 1.0 mm
Ⓖ Extra low voltage (ELV) connection sockets < 42 V
Ⓗ Junction box 230 V~
Ⓚ Drain hose safety valve
Ⓛ Extra low voltage (ELV) connection socket < 42 V

Min. installation height a

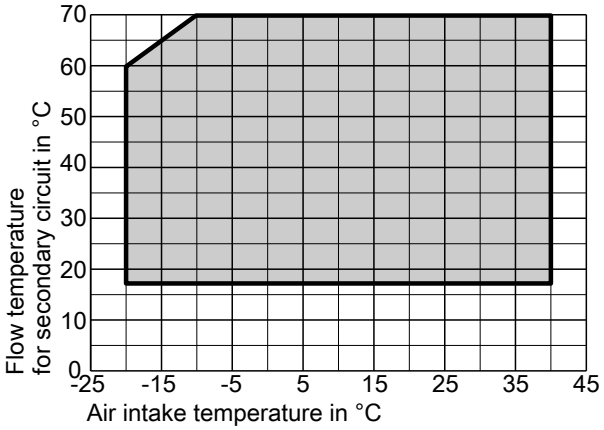
- ≥ 500 to ≥ 680 mm
- Depending on the pre-plumbing jig used and the mounting position of programming unit
- For further information: See page 105.

Outdoor unit dimensions

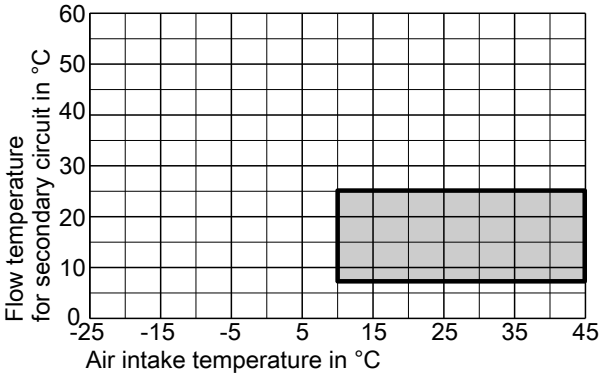
See page 35 onwards.

Application limits to EN 14511

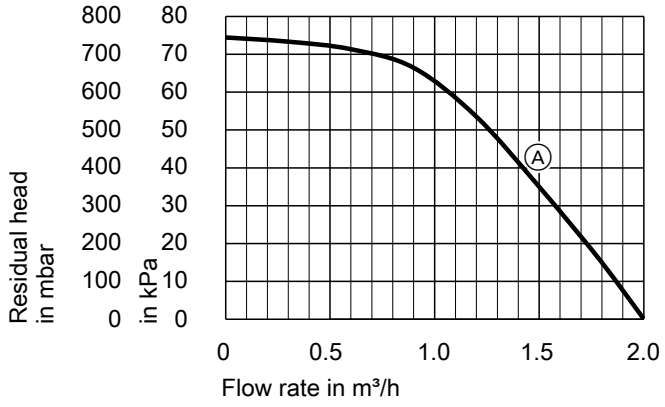
Heating



Cooling



Residual heads of the integral circulation pump

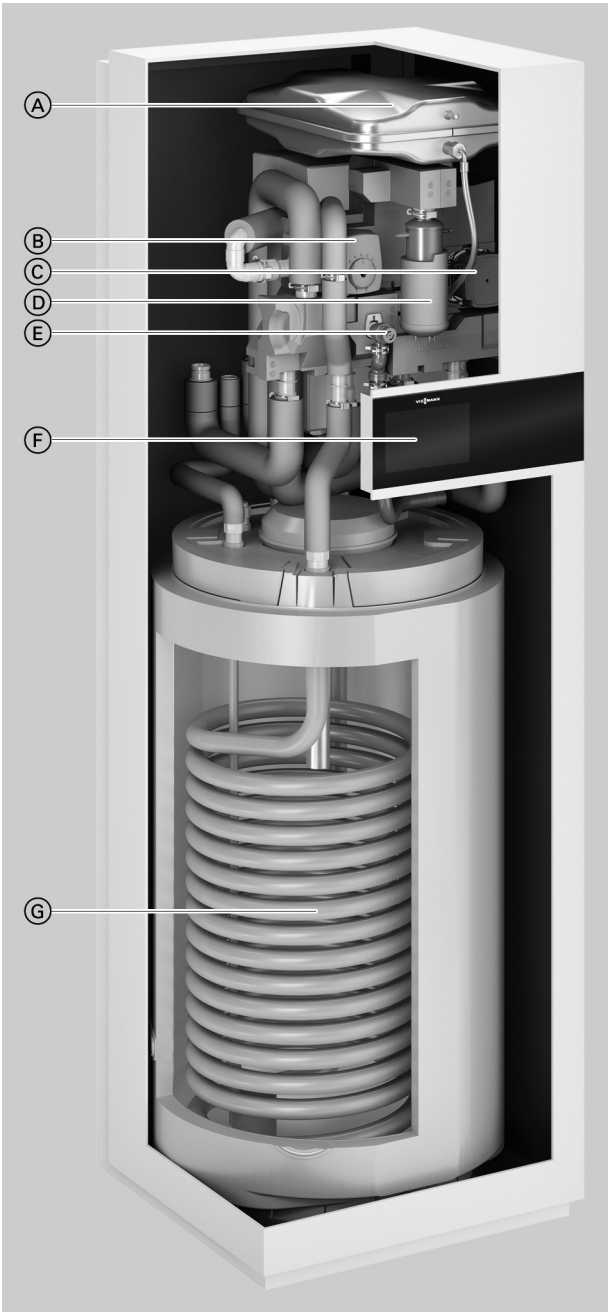


Ⓐ Secondary pump/circulation pump for heating/cooling circuit 1

3.1 Product description

Benefits

Indoor unit



Ⓐ Expansion vessel
Ⓑ 4/3-way valve
Ⓒ Secondary pump (high efficiency circulation pump)
Ⓓ Instantaneous heating water heater
Ⓔ Safety valve
Ⓕ Heat pump control unit
Ⓖ DHW cylinder 190 l

- Integral 190 l DHW cylinder
- Low running costs thanks to high COP (coefficient of performance) to EN 14511: Up to 5.0 at A7/W35
- Output control and DC inverter for high efficiency in partial load operation
- Maximum flow temperature of up to 70 °C at an outside temperature of –10 °C enables use in both new build and modernisation projects.
- Self-optimising control of the flow rate via Viessmann Hydro Auto-Control
- Environmentally responsible, natural refrigerant R290 with a particularly low GWP of 0.02 (GWP = Global Warming Potential)
- Convenient reversible design for heating and cooling
- Quiet operation thanks to Advanced Acoustic Design (AAD)
- Web-enabled through integral WiFi or service link
- Operation, optimisation, maintenance and service via ViCare app and ViGuide
- Guided commissioning via ViGuide
- Individual room control with components from ViCare Smart Climate

6179959

Delivered condition

Indoor unit

- Integral steel DHW cylinder with Ceraprotect enamel coating, protected from corrosion by a protective magnesium anode, with thermal insulation
- Integral 4/3-way valve for central heating/DHW heating/bypass
- Integral high efficiency circulation pump for the secondary circuit or heating/cooling circuit 1
- Integral instantaneous heating water heater
- Integral 16 l buffer cylinder
- Integral safety valve and digital pressure gauge
- Weather-compensated heat pump control unit with outside temperature sensor
- Flow sensor
- Expansion vessel 10 l

- Types ... **SP**
  Central 230 V~ power supply with line protection

Outdoor unit

- Inverter-controlled compressor, 4-way diverter valve, electronic expansion valve, evaporator, condenser, EC fan
- Factory-filled with refrigerant R290
- Heating water filter upstream of condenser
- Transport aid
- Type AWOT(-M)-E-AC-**AF**:
  With integral electric ribbon heater for the condensate pan

Type overview

Type	integral	with buffer cylinder	Rated voltage			Central indoor unit power supply	Condensate pan heating
AWOT-E-AC 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	400 V~	—	□
AWOT-M-E-AC 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	230 V~	—	□
AWOT-M-E-AC 151.A SP	1	1 to 4	230 V~	230 V~	230 V~	X	□
AWOT-E-AC-AF 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	400 V~	—	■
AWOT-M-E-AC-AF 151.A	1	1 to 4	230 V~	400 V~/ 230 V~	230 V~	—	■
AWOT-M-E-AC-AF 151.A SP	1	1 to 4	230 V~	230 V~	230 V~	X	■

Heating/cooling circuits
Control unit/PCB, indoor unit
Outdoor unit
Instantaneous heating water heater

X Available
□ Accessories
■ Integral

3.2 Specification

Specification

Heat pumps with 230 V~ outdoor unit

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	**151.A**	**04**	**06**	**08**	**10**	**13**	**16**
Heating performance data to EN 14511 (A2/W35)							
Rated heating output	kW	2.5	3.1	4.0	5.8	6.7	7.6
Fan speed	rpm	376	401	447			
Power consumption	kW	0.66	0.82	1.08	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		3.8	3.8	3.7	4.1	3.8	3.8
Output control	kW	1.8 to 4.5	1.8 to 6.0	1.8 to 6.8	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)							
Rated heating output	kW	4.0	4.8	5.6	7.3	8.1	9.1
Fan speed	rpm	412	443	482	430	440	450
Air flow rate	m^3/h	1813	1954	2125	4045	4188	4331
Power consumption	kW	0.80	0.98	1.19	1.46	1.62	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.7	5.0	5.0	4.9
Output control	kW	2.1 to 4.0	2.1 to 6.0	2.1 to 8.0	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9
Heating performance data to EN 14511 (A–7/W35)							
Rated heating output	kW	3.8	5.6	6.5	9.7	11.1	12.4
Power consumption	kW	1.27	2.00	2.41	3.23	3.87	4.39
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.7	3.0	2.87	2.82
Heating performance data to EN 14511 (A–7/W55)							
Rated heating output	kW	3.5	5.2	6.2	9.2	10.6	11.83
Power consumption	kW	1.63	2.46	3.06	4.79	5.12	5.28
Coefficient of performance ε in heating mode (COP)		2.2	2.1	2.0	1.9	2.1	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)							
Low temperature application (W35)							
– Energy efficiency η_S	%	185	180	175	190	178	178
– Rated heating output P_{rated}	kW	4.0	5.5	6.5	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.7	4.6	4.4	4.825	4.525	4.525
Medium temperature application (W55)							
– Energy efficiency η_S	%	140	141	137	145	141	141
– Rated heating output P_{rated}	kW	3.8	5.1	6.2	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.6	3.6	3.5	3.7	3.6	3.6
– DHW heating energy efficiency η_{wh}	%	102	102	102	130	130	130
Energy efficiency class to Commission Regulation (EU) No. 813/2013							
Heating, average climatic conditions							
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}	A^{++}	A^{++}	A^{++}
DHW heating, draw-off profile (XL)		A	A	A	A^{+}	A^{+}	A^{+}
Cooling performance data to EN 14511 (A35/W7)							
Rated cooling capacity	kW	2.6	3.0	3.4	3.9	5.6	6.3
Fan speed	rpm				550	550	550
Power consumption	kW	0.90	1.03	1.17	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		2.9	2.9	2.9	3.3	3.4	3.4
Output control	kW	1.8 to 4.0	1.8 to 4.8	1.8 to 5.0	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7
Cooling performance data average climatic conditions (A35/W7)							
Rated cooling capacity P_{rated}	kW	3.0	3.6	4.4	6.9	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.8	3.9	4.0	3.6	3.8	4.1

Vitocal 151-A (cont.)

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	151.A	04	06	08	10	13	16
Cooling performance data to EN 14511 (A35/W18)							
Rated cooling capacity	kW	4.0	5.0	6.0	9.6	11.0	13.2
Fan speed	rpm	—	—	—	550	550	550
Power consumption	kW	0.85	1.14	1.54	2.18	2.75	3.62
Coefficient of performance in cooling mode (EER)		4.7	4.4	3.9	4.4	4.0	3.7
Output control	kW	3.2 to 4.0	3.2 to 5.5	3.2 to 6.7	6.3 to 14.4	6.6 to 15.7	6.9 to 17.0
Cooling performance data average climatic conditions (A35/W18)							
Rated cooling capacity P_{rated}	kW	4.6	5.6	6.9	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		4.5	4.7	4.9	7.2	6.7	6.3
Air intake temperature							
Cooling mode							
– Min.	°C	10	10	10	10	10	10
– Max.	°C	45	45	45	45	45	45
Heating mode							
– Min.	°C	–20	–20	–20	–20	–20	–20
– Max.	°C	40	40	40	40	40	40
Heating water (secondary circuit)							
Capacity excl. expansion vessel	l	18	18	18	18	18	18
Heat pump circuit minimum flow rate (defrosting)	l/h	1000	1000	1000	1000	1000	1000
Max. flow temperature	°C	70	70	70	70	70	70
Outdoor unit electrical values							
Rated voltage, compressor		1/N/PE 230 V/50 Hz					
Max. operating current, compressor	A	15	15.5	16	20	20	24
Cos φ		0.99	0.99	0.99	0.99	0.99	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10	< 10	< 10	< 10
Fuse protection	A	B16A	B16A	B16A	B25A	B25A	B25A
IP rating		IP X4	IP X4	IP X4	IP X4	IP X4	IP X4
Indoor unit electrical values							
PCB							
– Rated voltage		230 V/50 Hz or 400 V/50 Hz					
– Power supply fuse protection		1 x B16A					
– Internal fuse protection		6.3 A H (slow)/250 V~					
Instantaneous heating water heater							
– Heating output	kW	8					
– Fuse rating, power supply 230 V~		3 x B16A, 1-pole					
– Fuse rating, power supply 400 V~		1 x B16A, 3-pole					
– Power supply fuse protection		3 x B16A					
Max. power consumption							
Outdoor unit							
– Fan	W	140	140	140	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	3.5	3.6	3.7	4.8	5.4	5.4
Indoor unit							
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000	1000	1000	1000

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	151.A	04	06	08	10	13	16
Mobile data transfer							
WiFi							
– Transfer standard		IEEE 802.11 b/g/n					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+15					
Low power radio							
– Transfer standard		IEEE 802.15.4					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+6					
Service link							
– Transfer standard		LTE-CAT-NB1					
– Frequency range band 3	MHz	1710 to 1785					
– Frequency range band 8	MHz	880 to 915					
– Frequency range band 20	MHz	832 to 862					
– Max. transmission power	dBm	+23					
Refrigerant circuit							
Refrigerant		R290	R290	R290	R290	R290	R290
– Safety group		A3	A3	A3	A3	A3	A3
– Charge weight	kg	1.2	1.2	1.2	2	2	2
– Global warming potential (GWP)*4		0.02	0.02	0.02	0.02	0.02	0.02
– CO_2 equivalent	t	0.000024	0.000024	0.000024	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type	Twin rotary					
– Oil in compressor	Type	HAF68	HAF68	HAF68	HAF68	HAF68	HAF68
– Oil volume in compressor	l	0.840 ±0.020	0.840 ±0.020	0.840 ±0.020	1.150 ±0.020	1.150 ±0.020	1.150 ±0.020
Permissible operating pressure							
– High pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
Integral DHW cylinder							
Capacity	l	190	190	190	190	190	190
Max. draw-off volume at cylinder temperature 40 °C, storage temperature 53 °C and draw-off rate 10 l/min	l	305	305	305	260	260	260
Max. permissible DHW temperature	°C	60	60	60	70	70	70
Outdoor unit dimensions							
Total length	mm	600	600	600	600	600	600
Total width	mm	1144	1144	1144	1144	1144	1144
Total height	mm	841	841	841	1382	1382	1382
Indoor unit dimensions							
Total length	mm	597	597	597	597	597	597
Total width	mm	600	600	600	600	600	600
Total height	mm	1900	1900	1900	1900	1900	1900
Total weight							
– Empty	kg	170	170	170	170	170	170
– With filled buffer cylinder	kg	386	386	386	386	386	386
Outdoor unit	kg	162	162	162	191	191	191
Permissible operating pressure, secondary side							
Heating water	bar	3	3	3	3	3	3
	MPa	0.3	0.3	0.3	0.3	0.3	0.3
DHW	bar	10	10	10	10	10	10
	MPa	1.0	1.0	1.0	1.0	1.0	1.0
Connections with connection pipes supplied							
Heating water flow/return, heating circuits or heating water buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55							
– ErP	dB(A)	51	51	51	59	59	59
– Max.	dB(A)	56	58	59	66	66	66
– Low-noise mode (stage 2)	dB(A)	52	52	52	59	59	59

*4 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).*

Heat pumps with 230 V~ outdoor unit and indoor unit with central power supply

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Heating performance data to EN 14511 (A2/W35)							
Rated heating output	kW	2.5	3.1	4.0	5.8	6.7	7.6
Fan speed	rpm	376	401	447			
Power consumption	kW	0.66	0.82	1.08	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		3.8	3.8	3.7	4.1	3.8	3.8
Output control	kW	1.8 to 4.5	1.8 to 6.0	1.8 to 6.8	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)							
Rated heating output	kW	4.0	4.8	5.6	7.3	8.1	9.1
Fan speed	rpm	412	443	482	430	440	450
Air flow rate	m^3/h	1813	1954	2125	4045	4188	4331
Power consumption	kW	0.80	0.98	1.19	1.46	1.62	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.7	5.0	5.0	4.9
Output control	kW	2.1 to 4.0	2.1 to 6.0	2.1 to 8.0	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9
Heating performance data to EN 14511 (A–7/W35)							
Rated heating output	kW	3.8	5.6	6.5	9.7	11.1	12.4
Power consumption	kW	1.27	2.00	2.41	3.23	3.87	4.39
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.7	3.0	2.87	2.82
Heating performance data to EN 14511 (A–7/W55)							
Rated heating output	kW	3.5	5.2	6.2	9.2	10.6	11.83
Power consumption	kW	1.63	2.46	3.06	4.79	5.12	5.28
Coefficient of performance ε in heating mode (COP)		2.2	2.1	2.0	1.9	2.1	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)							
Low temperature application (W35)							
– Energy efficiency η_S	%	185	180	175	190	178	178
– Rated heating output P_{rated}	kW	4.0	5.5	6.5	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.7	4.6	4.4	4.825	4.525	4.525
Medium temperature application (W55)							
– Energy efficiency η_S	%	140	141	137	145	141	141
– Rated heating output P_{rated}	kW	3.8	5.1	6.2	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.6	3.6	3.5	3.7	3.6	3.6
– DHW heating energy efficiency η_{wh}	%	102	102	102	130	130	130
Energy efficiency class to Commission Regulation (EU) No. 813/2013							
Heating, average climatic conditions							
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}	A^{+++}	A^{++}	A^{++}
DHW heating, draw-off profile (XL)		A	A	A	A^{+}	A^{+}	A^{+}
Cooling performance data to EN 14511 (A35/W7)							
Rated cooling capacity	kW	2.6	3.0	3.4	3.9	5.6	6.3
Fan speed	rpm				550	550	550
Power consumption	kW	0.90	1.03	1.17	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		2.9	2.9	2.9	3.3	3.4	3.4
Output control	kW	1.8 to 4.0	1.8 to 4.8	1.8 to 5.0	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7
Cooling performance data average climatic conditions (A35/W7)							
Rated cooling capacity P_{rated}	kW	3.0	3.6	4.4	6.9	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.8	3.9	4.0	3.6	3.8	4.1
Cooling performance data to EN 14511 (A35/W18)							
Rated cooling capacity	kW	4.0	5.0	6.0	9.6	11.0	13.2
Fan speed	rpm	—	—	—	550	550	550
Power consumption	kW	0.85	1.14	1.54	2.18	2.75	3.62
Coefficient of performance in cooling mode (EER)		4.7	4.4	3.9	4.4	4.0	3.7
Output control	kW	3.2 to 4.0	3.2 to 5.5	3.2 to 6.7	6.3 to 14.4	6.6 to 15.7	6.9 to 17.0

Vitocal 151-A (cont.)

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Cooling performance data average climatic conditions (A35/W18)							
Rated cooling capacity P_{rated}	kW	4.6	5.6	6.9	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		4.5	4.7	4.9	7.2	6.7	6.3
Air intake temperature							
Cooling mode							
– Min.	°C	10	10	10	10	10	10
– Max.	°C	45	45	45	45	45	45
Heating mode							
– Min.	°C	–20	–20	–20	–20	–20	–20
– Max.	°C	40	40	40	40	40	40
Heating water (secondary circuit)							
Capacity excl. expansion vessel	l	18	18	18	18	18	18
Heat pump circuit minimum flow rate	l/h	1000	1000	1000	1000	1000	1000
Max. flow temperature	°C	70	70	70	70	70	70
Outdoor unit electrical values							
Rated voltage, compressor		1/N/PE 230 V/50 Hz					
Max. operating current, compressor	A	15	15.5	16	20	20	24
Cos φ		0.99	0.99	0.99	0.99	0.99	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10	< 10	< 10	< 10
Fuse protection	A	B16A	B16A	B16A	B25A	B25A	B25A
IP rating		IP X4	IP X4	IP X4	IP X4	IP X4	IP X4
Indoor unit electrical values							
PCB							
– Rated voltage		1/N/PE 230 V/50 Hz					
– Internal fuse protection		6.3 A H (slow)/250 V~					
Instantaneous heating water heater							
– Heating output	kW	5					
Power supply, indoor unit							
– Rated voltage		1/N/PE 230 V/50 Hz					
– Power supply fuse protection		1 x B32A, 1-pole					
Max. power consumption							
Outdoor unit							
– Fan	W	140	140	140	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	3.5	3.6	3.7	4.8	5.4	5.4
Indoor unit							
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000	1000	1000	1000
Mobile data transfer							
WiFi							
– Transfer standard		IEEE 802.11 b/g/n					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+15					
Low power radio							
– Transfer standard		IEEE 802.15.4					
– Frequency range	MHz	2000 to 2483.5					
– Max. transmission power	dBm	+6					
Service link							
– Transfer standard		LTE-CAT-NB1					
– Frequency range band 3	MHz	1710 to 1785					
– Frequency range band 8	MHz	880 to 915					
– Frequency range band 20	MHz	832 to 862					
– Max. transmission power	dBm	+23					

Vitocal 151-A (cont.)

Type AWOT-M-E-AC/AWOT-M-E-AC-AF	151.A	04 SP	06 SP	08 SP	10 SP	13 SP	16 SP
Refrigerant circuit							
Refrigerant		R290	R290	R290	R290	R290	R290
– Safety group		A3	A3	A3	A3	A3	A3
– Charge weight	kg	1.2	1.2	1.2	2	2	2
– Global warming potential (GWP)*5		0.02	0.02	0.02	0.02	0.02	0.02
– CO_2 equivalent	t	0.000024	0.000024	0.000024	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type	Twin rotary					
– Oil in compressor	Type	HAF68	HAF68	HAF68	HAF68	HAF68	HAF68
– Oil volume in compressor	l	0.840 ±0.020	0.840 ±0.020	0.840 ±0.020	1.150 ±0.020	1.150 ±0.020	1.150 ±0.020
Permissible operating pressure							
– High pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3	30.3	30.3	30.3
	MPa	3.03	3.03	3.03	3.03	3.03	3.03
Integral DHW cylinder							
Capacity	l	190	190	190	190	190	190
Max. draw-off volume at cylinder temperature 40 °C, storage temperature 53 °C and draw-off rate 10 l/min	l	305	305	305	260	260	260
Max. permissible DHW temperature	°C	60	60	60	70	70	70
Outdoor unit dimensions							
Total length	mm	600	600	600	600	600	600
Total width	mm	1144	1144	1144	1144	1144	1144
Total height	mm	841	841	841	1382	1382	1382
Indoor unit dimensions							
Total length	mm	597	597	597	597	597	597
Total width	mm	600	600	600	600	600	600
Total height	mm	1900	1900	1900	1900	1900	1900
Total weight							
– Empty	kg	170	170	170	170	170	170
– With filled buffer cylinder	kg	386	386	386	386	386	386
Outdoor unit	kg	162	162	162	191	191	191
Permissible operating pressure, secondary side							
Heating water	bar	3	3	3	3	3	3
	MPa	0.3	0.3	0.3	0.3	0.3	0.3
DHW	bar	10	10	10	10	10	10
	MPa	1.0	1.0	1.0	1.0	1.0	1.0
Connections with connection pipes supplied							
Heating water flow/return, heating circuits or heating water buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55							
– ErP	dB(A)	51	51	51	56	56	56
– Max.	dB(A)	56	58	59	66	66	66
– Low-noise mode (stage 2)	dB(A)	52	52	52	59	59	59

Heat pumps with 400 V~ outdoor unit

Type AWOT-E-AC/AWOT-E-AC-AF	151.A	10	13	16
Heating performance data to EN 14511 (A2/W35)				
Rated heating output	kW	5.8	6.7	7.6
Power consumption	kW	1.41	1.76	2.00
Coefficient of performance ε in heating mode (COP)		4.1	3.8	3.8
Output control	kW	2.2 to 11.0	2.6 to 12.3	3.0 to 13.7
Heating performance data to EN 14511 (A7/W35, 5 K spread)				
Rated heating output	kW	7.3	8.1	9.1
Fan speed	rpm	430	440	567
Air flow rate	m^3/h	4045	4188	5393
Power consumption	kW	1.46	1.65	1.86
Coefficient of performance ε in heating mode (COP)		5.0	4.9	4.9
Output control	kW	2.6 to 12.0	3.0 to 13.4	3.3 to 14.9

*5 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).*

Type AWOT-E-AC/AWOT-E-AC-AF	151.A	10	13	16
Heating performance data to EN 14511 (A–7/W35)				
Rated heating output	kW	9.7	11.1	12.4
Power consumption	kW	3.23	3.96	4.4
Coefficient of performance ε in heating mode (COP)		3.0	2.8	2.8
Heating performance data to EN 14511 (A–7/W55)				
Rated heating output	kW	9.2	10.6	11.8
Power consumption	kW	4.79	5.12	5.28
Coefficient of performance ε in heating mode (COP)		1.9	2.1	2.2
Heating performance data to Commission Regulation (EU) No. 813/2013 (average climatic conditions)				
Low temperature application (W35)				
– Energy efficiency η_S	%	190	178	178
– Rated heating output P_{rated}	kW	9.8	12.4	13.67
– Seasonal coefficient of performance (SCOP)		4.825	4.525	4.525
Medium temperature application (W55)				
– Energy efficiency η_S	%	145	141	141
– Rated heating output P_{rated}	kW	9.37	12.1	13.37
– Seasonal coefficient of performance (SCOP)		3.7	3.6	3.6
– DHW heating energy efficiency η_{wh}	%	130	130	130
Energy efficiency class to Commission Regulation (EU) No. 813/2013				
Heating, average climatic conditions				
– Low temperature application (W35)		A^{+++}	A^{+++}	A^{+++}
– Medium temperature application (W55)		A^{++}	A^{++}	A^{++}
DHW heating, draw-off profile (XL)		A^{+}	A^{+}	A^{+}
Cooling performance data to EN 14511 (A35/W7)				
Rated cooling capacity	kW	3.90	5.60	6.3
Fan speed	rpm	550	550	550
Power consumption	kW	1.18	1.65	1.85
Coefficient of performance in cooling mode (EER)		3.30	3.40	3.40
Output control	kW	3.9 to 7.2	4.2 to 8.0	4.5 to 8.7
Cooling performance data average climatic conditions (A35/W7)				
Rated cooling capacity P_{rated}	kW	6.90	8.11	8.93
Seasonal cooling energy efficiency ratio (SEER)		3.60	3.80	4.10
Cooling performance data to EN 14511 (A35/W18)				
Rated cooling capacity	kW	9.50	11.20	13.30
Power consumption	kW	2.10	2.70	3.60
Coefficient of performance in cooling mode (EER)		4.50	4.10	3.70
Output control	kW	6.5 to 13.4	6.8 to 14.7	7.1 to 16.0
Cooling performance data average climatic conditions (A35/W18)				
Rated cooling capacity P_{rated}	kW	9.81	11.51	13.32
Seasonal cooling energy efficiency ratio (SEER)		7.20	6.70	6.30
Air intake temperature				
Cooling mode				
– Min.	°C	10	10	10
– Max.	°C	45	45	45
Heating mode				
– Min.	°C	-20	-20	-20
– Max.	°C	40	40	40
Heating water (secondary circuit)				
Capacity excl. expansion vessel	l	10	10	10
Heat pump circuit minimum flow rate (defrosting)	l/h	1000	1000	1000
Max. flow temperature	°C	70	70	70
Outdoor unit electrical values				
Rated voltage, compressor			3/N/PE 400 V/50 Hz	
Max. operating current, compressor	A	11.5	11.5	11.5
Cos φ		0.92	0.92	0.92
Compressor starting current, inverter controlled	A	< 10	< 10	< 10
Starting current, compressor with stalled armature	A	< 10	< 10	< 10
Fuse protection		B16A	B16A	B16A
IP rating		IP X4	IP X4	IP X4

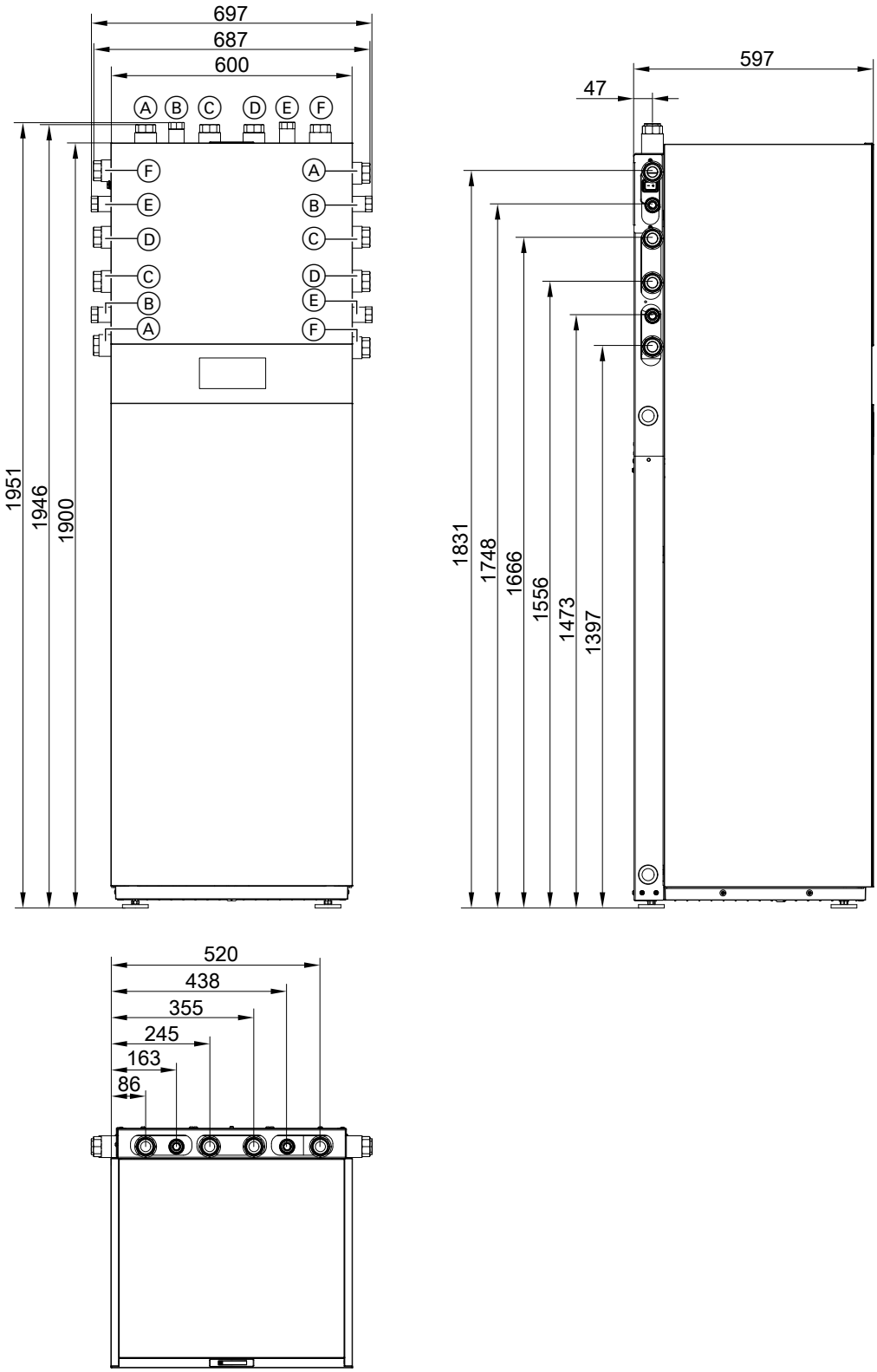
Type AWOT-E-AC/AWOT-E-AC-AF	151.A	10	13	16
Indoor unit electrical values				
PCB				
– Rated voltage			1/N/PE 230 V/50 Hz	
– Power supply fuse protection		1 x B16A	1 x B16A	1 x B16A
– Internal fuse protection			6.3 A H (slow)/250 V~	
Instantaneous heating water heater				
– Rated voltage			3/N/PE 400 V/50 Hz	
– Heating output	kW	8	8	8
– Power supply fuse protection		3 x B16A	3 x B16A	3 x B16A
Max. power consumption				
Outdoor unit				
– Fan	W	2 x 140	2 x 140	2 x 140
– Control unit/PCB	kW	4.8	5.4	5.4
Indoor unit				
– Integral secondary pump/heating circuit pump, heating/cooling circuit 1 (PWM)	W	60	60	60
– Energy efficiency index EEI of the circulation pumps		≤ 0.2	≤ 0.2	≤ 0.2
– Control unit/PCB	W	5	5	5
– Max. connected load, function components 230 V~	W	1000	1000	1000
Mobile data transfer				
WiFi				
– Transfer standard		IEEE 802.11 b/g/n	IEEE 802.11 b/g/n	IEEE 802.11 b/g/n
– Frequency range	MHz	2000 to 2483.5	2000 to 2483.5	2000 to 2483.5
– Max. transmission power	dBm	+15	+15	+15
Low power radio				
– Transfer standard		IEEE 802.15.4	IEEE 802.15.4	IEEE 802.15.4
– Frequency range	MHz	2000 to 2483.5	2000 to 2483.5	2000 to 2483.5
– Max. transmission power	dBm	+6	+6	+6
Service link				
– Transfer standard		LTE-CAT-NB1	LTE-CAT-NB1	LTE-CAT-NB1
– Frequency range band 3	MHz	1710 to 1785	1710 to 1785	1710 to 1785
– Frequency range band 8	MHz	880 to 915	880 to 915	880 to 915
– Frequency range band 20	MHz	832 to 862	832 to 862	832 to 862
– Max. transmission power	dBm	+23	+23	+23
Refrigerant circuit				
Refrigerant		R290	R290	R290
– Safety group		A3	A3	A3
– Charge weight	kg	2	2	2
– Global warming potential (GWP)*6		0.02	0.02	0.02
– CO_2 equivalent	t	0.00004	0.00004	0.00004
Compressor (hermetically sealed)	Type	Twin rotary	Twin rotary	Twin rotary
– Oil in compressor	Type	HAF68	HAF68	HAF68
– Oil volume in compressor	l	1.150 ±0.020	1.150 ±0.020	1.150 ±0.020
Permissible operating pressure				
– High pressure side	bar	30.3	30.3	30.3
	MPa	3.03	3.03	3.03
– Low pressure side	bar	30.3	30.3	30.3
	MPa	3.03	3.03	3.03
Integral DHW cylinder				
Capacity	l	190	190	190
Max. draw-off volume at DHW temperature 40 °C, storage temperature 53 °C and draw-off rate 10 l/min	l	260	260	260
Max. permissible DHW temperature	°C	70	70	70
Outdoor unit dimensions				
Total length	mm	600	600	600
Total width	mm	1144	1144	1144
Total height	mm	1382	1382	1382
Indoor unit dimensions				
Total length	mm	597	597	597
Total width	mm	600	600	600
Total height	mm	1900	1900	1900
Total weight				
Indoor unit with 1 integrated heating/cooling circuit				
– Empty	kg	170	170	170
– With filled buffer cylinder	kg	386	386	386
Outdoor unit	kg	197	197	197

*6 *Based on the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC).*

Vitocal 151-A (cont.)

Type AWOT-E-AC/AWOT-E-AC-AF	151.A	10	13	16
Permissible operating pressure, secondary side				
Heating water	bar	3	3	3
	MPa	0.3	0.3	0.3
DHW	bar	10	10	10
	MPa	1.0	1.0	1.0
Connections with connection pipes supplied				
Heating water flow/return, heating circuits or heating water buffer cylinder	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Heating water flow/return, DHW cylinder	mm	Cu 22 x 1.0	Cu 22 x 1.0	Cu 22 x 1.0
Outdoor unit heating water flow/return	mm	Cu 28 x 1.0	Cu 28 x 1.0	Cu 28 x 1.0
Length of connection line indoor — outdoor unit (hydraulic connection set)	m	5 to 20	5 to 20	5 to 20
Sound power of the outdoor unit at rated heating output (tested with reference to EN 12102/EN ISO 3744) Assessed total sound power level at A7/W55				
– ErP	dB(A)	56	56	56
– Max.	dB(A)	66	66	66
– Low-noise mode	dB(A)	59	59	59

Dimensions – indoor unit



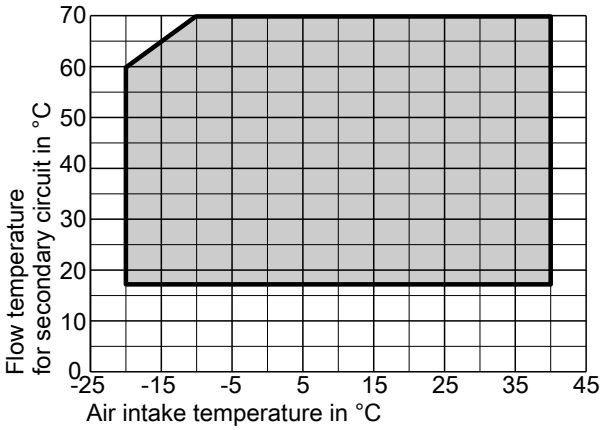
Ⓐ Secondary circuit flow (heating/cooling circuit 1/external buffer cylinder), connection Cu 28 x 1.0 mm
Ⓑ Cold water, connection Cu 22 x 1.0 mm
Ⓒ Heating water **from** outdoor unit, connection Cu 28 x 1.0 mm
Ⓓ Heating water **to** outdoor unit, connection Cu 28 x 1.0 mm
Ⓔ DHW, connection Cu 22 x 1.0 mm
Ⓕ Secondary circuit return (heating/cooling circuit 1/external buffer cylinder), connection Cu 28 x 1.0 mm

Outdoor unit dimensions

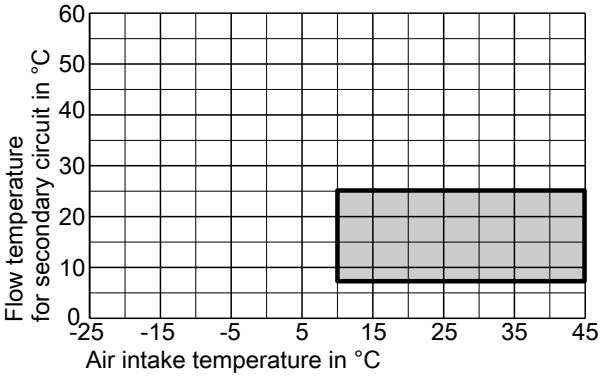
See page 35 onwards.

Application limits to EN 14511

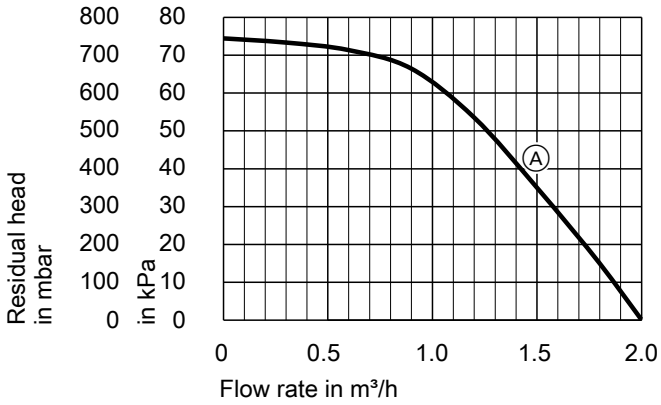
Heating



Cooling



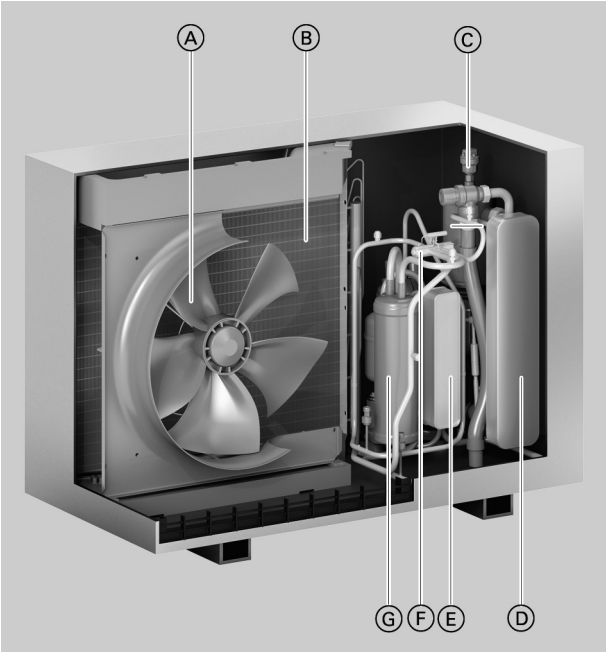
Residual heads of the integral circulation pump



Ⓐ Secondary pump/circulation pump for heating/cooling circuit 1

4.1 Outdoor unit with 1 fan, 230 V~

Description



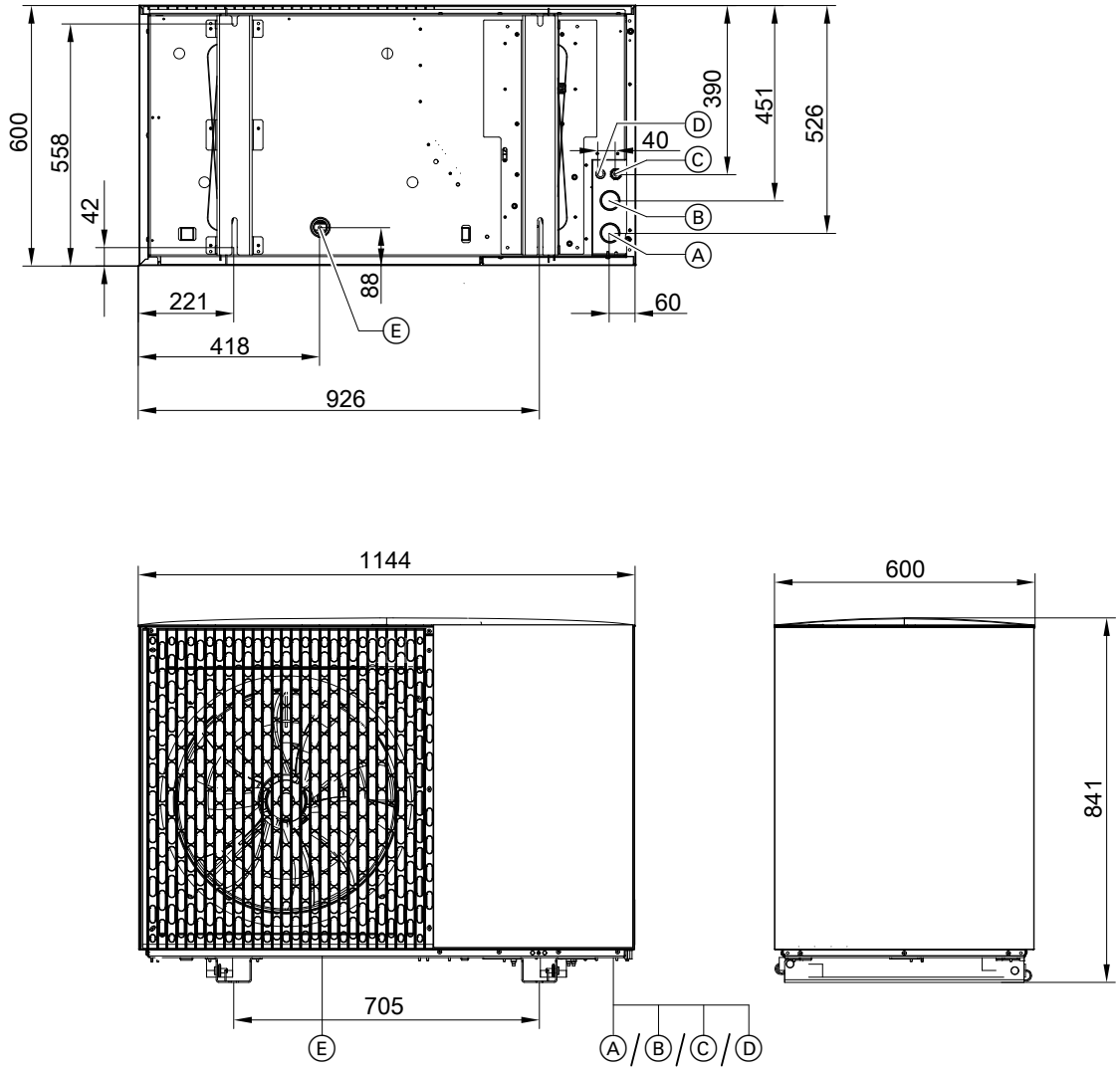
Ⓐ Power saving variable speed EC fan
Ⓑ Coated evaporator with corrugated fins for higher efficiency
Ⓒ Safety valve
Ⓓ Condenser
Ⓔ Suction gas cooler inverter
Ⓕ 4-way diverter valve
Ⓖ Hermetically sealed twin rotary compressor with output-dependent control

Heat pump allocation

Vitocal 150-A
- Type AWO-M-E-AC 151.A04 to A08
- Type AWO-M-E-AC-AF 151.A04 to A08
- Type AWO-M-E-AC 151.A04 SP to A08 SP
- Type AWO-M-E-AC-AF 151.A04 SP to A08 SP

Vitocal 151-A
- Type AWOT-M-E-AC 151.A04 to A08
- Type AWOT-M-E-AC-AF 151.A04 to A08
- Type AWOT-M-E-AC 151.A04 SP to A08 SP
- Type AWOT-M-E-AC-AF 151.A04 SP to A08 SP

Dimensions



Ⓐ Heating water **to** indoor unit (heating water outlet): Plug-in connection for Cu 28 x 1.0 mm
Ⓑ Heating water **from** indoor unit (heating water inlet): Plug-in connection for Cu 28 x 1.0 mm
Ⓒ Power cable
Ⓓ CAN bus communication cable (accessories)
Ⓔ Condensate drain

4.2 Outdoor unit with 2 fans, 230 V~ and 400 V~

Description

Ⓐ Power saving variable speed EC fan
Ⓑ Coated evaporator with corrugated fins for higher efficiency
Ⓒ Safety valve
Ⓓ Condenser
Ⓔ Inverter
Ⓕ Suction gas cooler inverter
Ⓖ 4-way diverter valve
Ⓗ Hermetically sealed twin rotary compressor with output-dependent control

Heat pump allocation

Heat pumps with 230 V~ outdoor unit

Vitocal 150-A
- Type AWO-M-E-AC 151.A10 to A16
- Type AWO-M-E-AC-AF 151.A10 to A16
- Type AWO-M-E-AC 151.A10 SP to A16 SP
- Type AWO-M-E-AC-AF 151.A10 SP to A16 SP

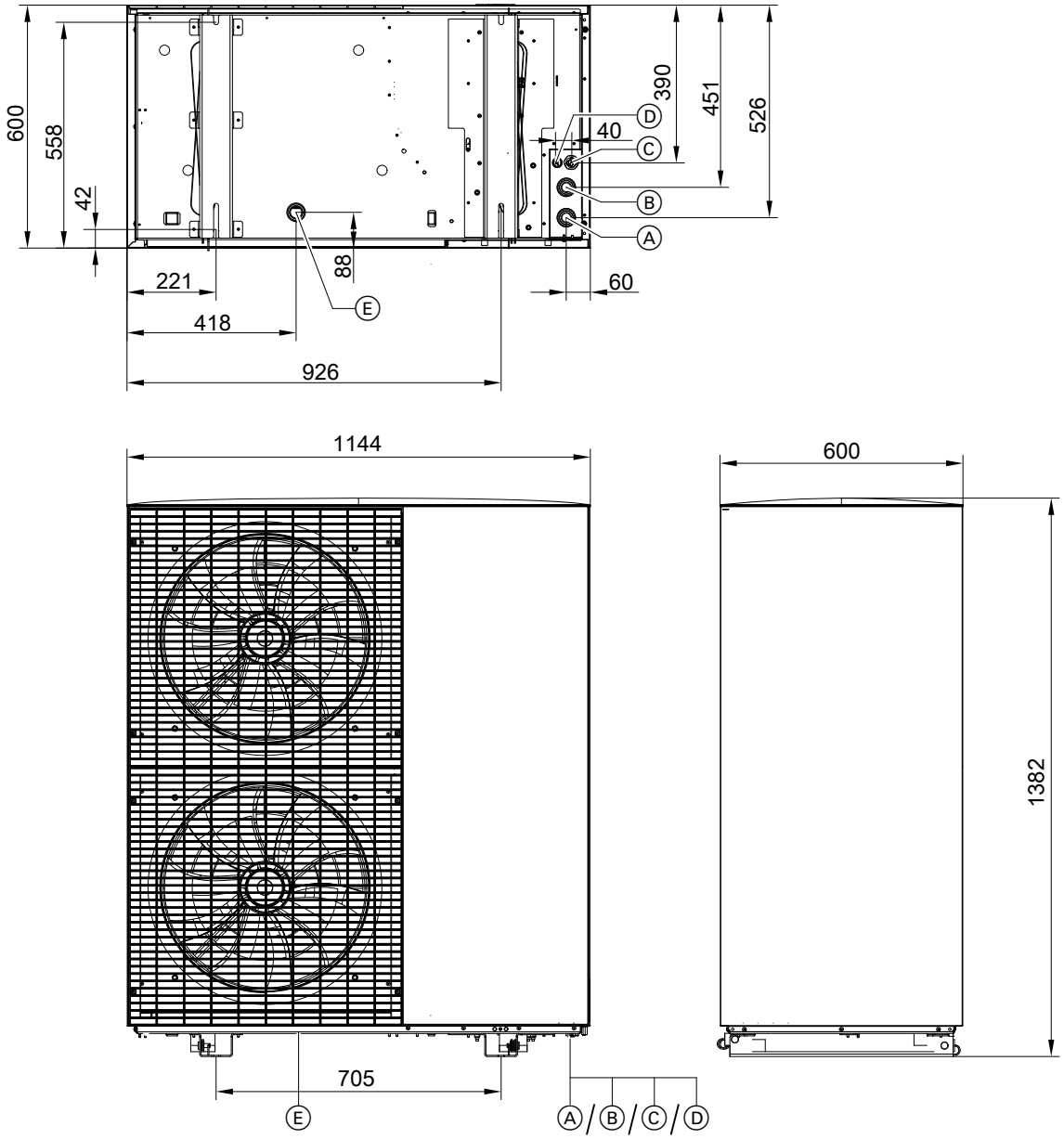
Vitocal 151-A
- Type AWOT-M-E-AC 151.A10 to A16
- Type AWOT-M-E-AC-AF 151.A10 to A16
- Type AWOT-M-E-AC 151.A10 SP to A16 SP
- Type AWOT-M-E-AC-AF 151.A10 SP to A16 SP

Heat pumps with 400 V~ outdoor unit

Vitocal 150-A
- Type AWO-E-AC 151.A10 to A16
- Type AWO-E-AC-AF 151.A10 to A16

Vitocal 151-A
- Type AWOT-E-AC 151.A10 to A16
- Type AWOT-E-AC-AF 151.A10 to A16

Dimensions



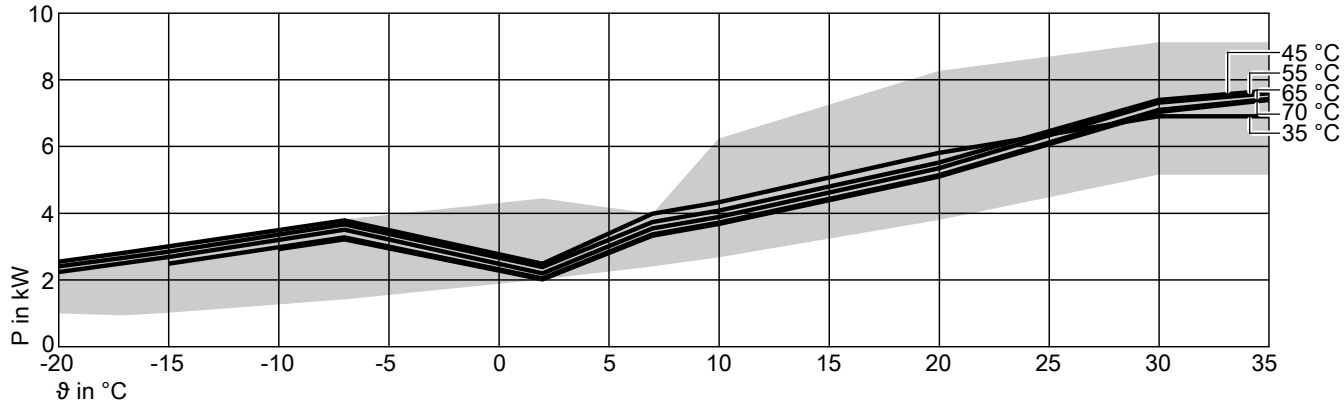
Ⓐ Heating water **to** indoor unit (heating water outlet): Plug-in connection for Cu 28 x 1.0 mm
Ⓑ Heating water **from** indoor unit (heating water inlet): Plug-in connection for Cu 28 x 1.0 mm
Ⓒ Power cable
Ⓓ CAN bus communication cable (accessories)
Ⓔ Condensate drain

Curves

5.1 Performance graph, outdoor unit type 151.A04, 230 V~

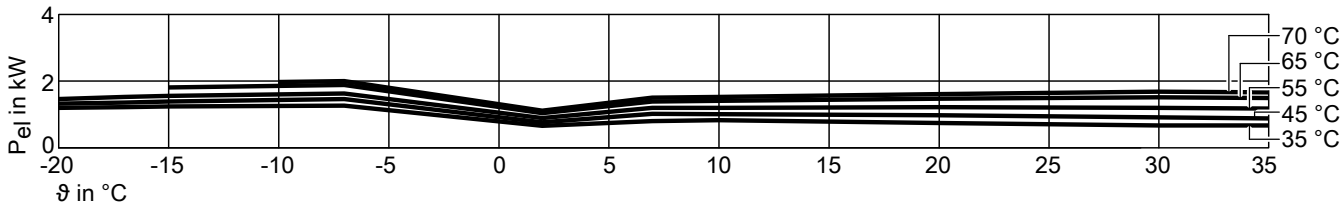
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C

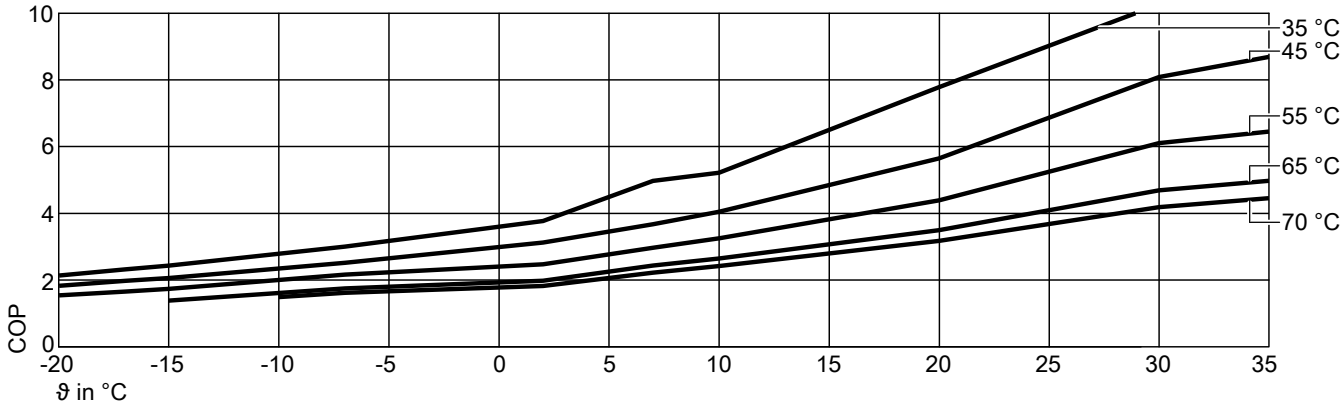


Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ	Air intake temperature
P	Heating output
P_{el}	Power consumption
COP	Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**	**35**								
	A	**°C**	**–20**	**–15**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	2.54	3.00	3.83	4.46	4.00	6.25	8.28	9.14	9.14
Rated heating output		kW	2.56	3.02	3.80	2.50	4.00	4.34	5.82	6.92	6.92
Power consumption		kW	1.20	1.24	1.27	0.66	0.80	0.83	0.75	0.67	0.67
Coefficient of performance ε (COP)			2.13	2.43	3.00	3.77	4.97	5.22	7.79	10.27	10.27
Min. heating output		kW	1.49	1.53	1.67	1.77	2.10	2.27	2.98	4.17	4.17

6179959

Curves (cont.)

Operating point	W	°C	45								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	2.39	2.84	3.64	4.35	5.49	5.98	7.95	10.52	10.86
Rated heating output		kW	2.42	2.86	3.68	2.40	3.75	4.09	5.53	7.41	7.69
Power consumption		kW	1.33	1.39	1.46	0.77	1.02	1.01	0.98	0.92	0.88
Coefficient of performance ε (COP)			1.82	2.06	2.52	3.12	3.67	4.05	5.65	8.09	8.70
Min. heating output		kW	1.39	1.42	1.53	1.60	1.88	2.07	2.89	3.83	3.83

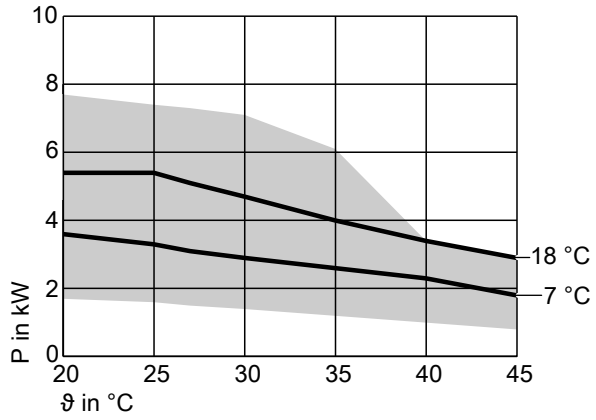
Operating point	W	°C	55								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	2.24	2.68	3.49	4.30	5.36	5.86	7.89	10.59	10.85
Rated heating output		kW	2.25	2.70	3.52	2.21	3.56	3.90	5.36	7.33	7.61
Power consumption		kW	1.46	1.56	1.63	0.89	1.20	1.20	1.22	1.20	1.18
Coefficient of performance ε (COP)			1.54	1.73	2.16	2.47	2.97	3.25	4.39	6.11	6.45
Min. heating output		kW	1.24	1.27	1.09	1.43	1.67	1.86	2.67	3.62	3.62

Operating point	W	°C	65								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW		2.48	3.26	4.44	5.19	5.68	7.68	10.37	10.34
Rated heating output		kW		2.50	3.29	2.06	3.38	3.73	5.15	7.11	7.44
Power consumption		kW		1.81	1.88	1.04	1.39	1.41	1.47	1.52	1.49
Coefficient of performance ε (COP)				1.38	1.75	1.98	2.43	2.64	3.49	4.69	4.98
Min. heating output		kW		1.07	1.24	1.67	2.00	2.22	3.19	4.29	4.29

Operating point	W	°C	70								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW			3.23	4.31	5.04	5.52	7.74	10.51	10.47
Rated heating output		kW			3.23	2.03	3.34	3.69	5.11	7.05	7.41
Power consumption		kW			2.00	1.12	1.51	1.53	1.61	1.68	1.66
Coefficient of performance ε (COP)					1.62	1.82	2.22	2.42	3.17	4.19	4.46
Min. heating output		kW			1.43	2.03	2.42	2.69	3.81	5.17	5.17

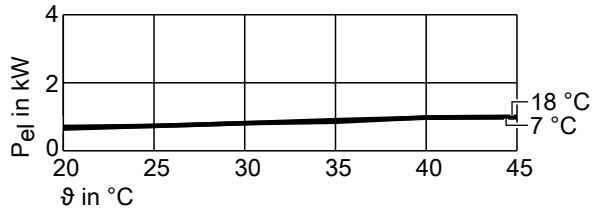
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

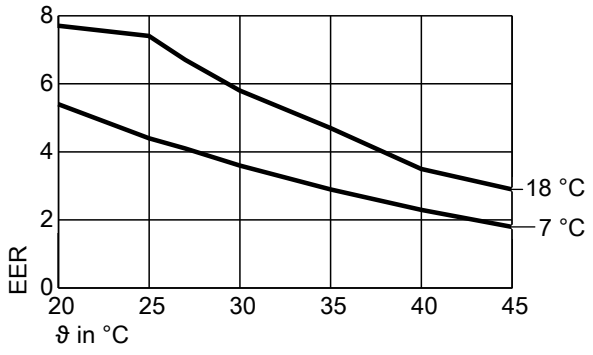


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Curves (cont.)

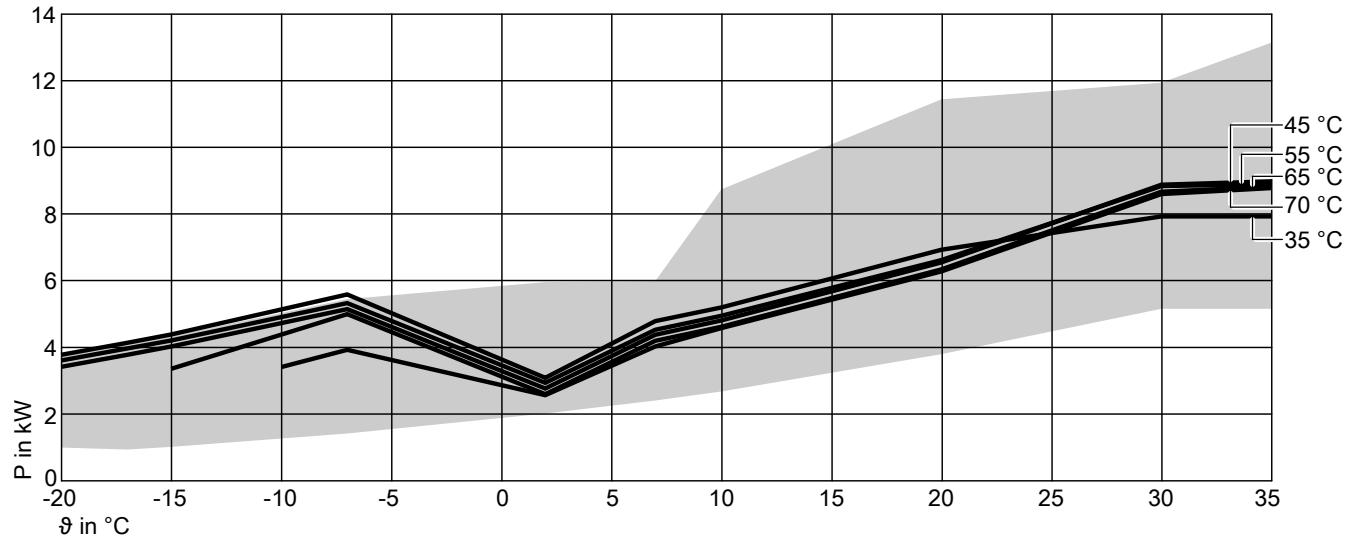
Operating point	W	°C	18						
	A	°C	20	25	27	30	35	40	45
Max. cooling capacity		kW	7.7	7.4	7.3	7.1	6.1	3.4	2.9
Cooling capacity		kW	5.4	5.4	5.1	4.7	4.0	3.4	2.9
Power consumption		kW	0.70	0.73	0.76	0.81	0.85	0.98	1.00
Energy efficiency ratio EER			7.7	7.4	6.7	5.8	4.7	3.5	2.9
Min. cooling capacity		kW	1.5	1.5	1.5	1.6	1.9	2.0	2.1

Operating point	W	°C	7						
	A	°C	20	25	27	30	35	40	45
Max. cooling capacity		kW	5.4	4.9	4.7	4.4	3.9	3.1	1.8
Cooling capacity		kW	3.6	3.3	3.1	2.9	2.6	2.3	1.8
Power consumption		kW	0.65	0.73	0.76	0.81	0.90	0.97	0.98
Energy efficiency ratio EER			5.4	4.4	4.1	3.6	2.9	2.3	1.8
Min. cooling capacity		kW	1.7	1.6	1.5	1.4	1.2	1.0	0.8

5.2 Performance graph, outdoor unit type 151.A06, 230 V~

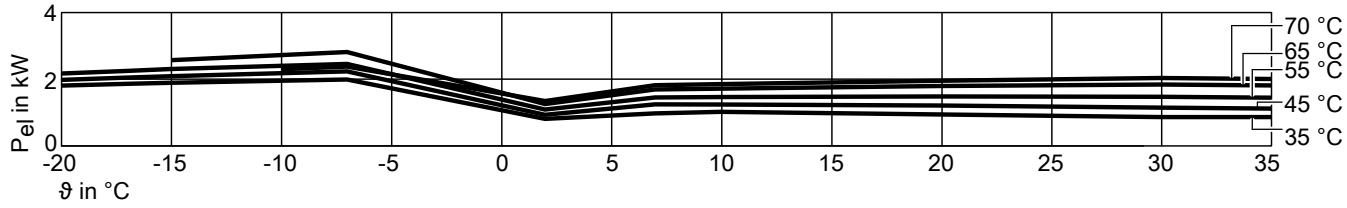
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C

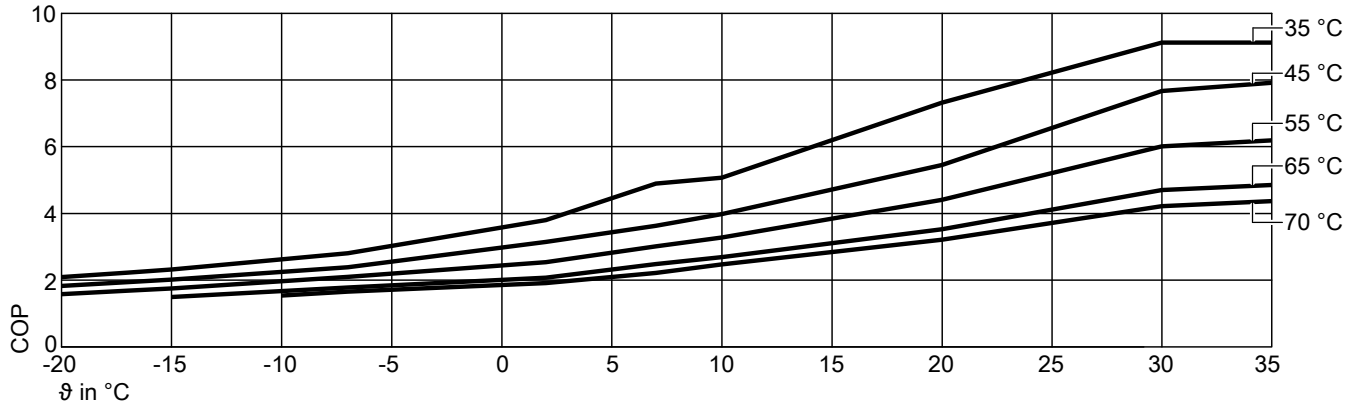


Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ	Air intake temperature
P	Heating output
P_{el}	Power consumption
COP	Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Curves (cont.)

Operating point	W	°C	35								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	3.74	4.35	5.46	5.97	6.00	8.75	11.45	11.95	13.15
Rated heating output		kW	3.79	4.40	5.60	3.10	4.80	5.21	6.94	7.94	7.94
Power consumption		kW	1.81	1.90	2.00	0.82	0.98	1.03	0.95	0.87	0.87
Coefficient of performance ε (COP)			2.09	2.32	2.81	3.80	4.90	5.07	7.32	9.13	9.13
Min. heating output		kW	1.49	1.53	1.67	1.77	2.10	2.27	2.98	4.17	4.17

Operating point	W	°C	45								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	3.57	4.17	5.25	5.91	7.19	8.48	11.11	13.18	13.16
Rated heating output		kW	3.62	4.22	5.34	2.95	4.54	4.96	6.63	8.85	8.91
Power consumption		kW	1.98	2.10	2.24	0.94	1.25	1.25	1.22	1.15	1.12
Coefficient of performance ε (COP)			1.82	2.01	2.38	3.14	3.63	3.98	5.45	7.68	7.92
Min. heating output		kW	1.39	1.42	1.53	1.60	1.88	2.07	2.89	3.83	3.83

Operating point	W	°C	55								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	3.37	3.95	5.04	5.94	7.16	8.40	11.12	13.26	13.19
Rated heating output		kW	3.43	4.04	5.16	2.78	4.39	4.82	6.56	8.89	8.99
Power consumption		kW	2.18	2.31	2.46	1.10	1.46	1.47	1.49	1.48	1.45
Coefficient of performance ε (COP)			1.58	1.75	2.10	2.54	3.01	3.28	4.41	6.01	6.19
Min. heating output		kW	1.24	1.27	1.09	1.43	1.67	1.86	2.67	3.62	3.62

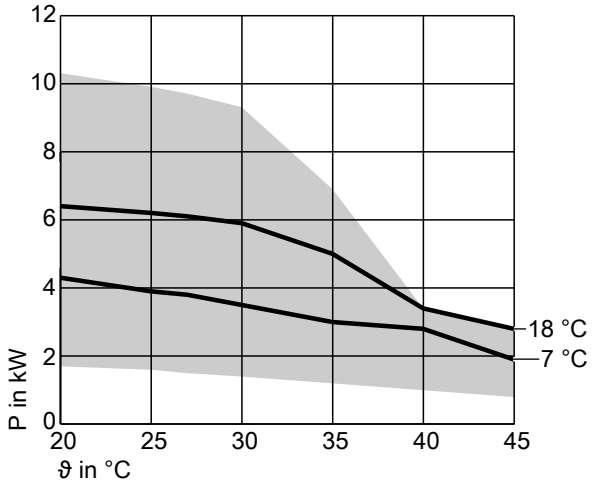
Operating point	W	°C	65								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW		3.24	4.69	5.90	7.37	8.03	10.93	12.30	12.65
Rated heating output		kW		3.37	5.01	2.61	4.21	4.63	6.35	8.68	8.83
Power consumption		kW		2.58	2.82	1.26	1.70	1.72	1.80	1.85	1.82
Coefficient of performance ε (COP)				1.49	1.78	2.07	2.48	2.69	3.52	4.70	4.85
Min. heating output		kW		1.07	1.24	1.67	2.00	2.22	3.19	4.29	4.29

Operating point	W	°C	70								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW			3.83	5.64	7.40	8.07	10.77	12.54	12.78
Rated heating output		kW			3.94	2.58	4.04	4.59	6.29	8.61	8.79
Power consumption		kW			2.38	1.35	1.83	1.86	1.96	2.04	2.01
Coefficient of performance ε (COP)					1.65	1.91	2.21	2.47	3.21	4.22	4.37
Min. heating output		kW			1.43	2.03	2.42	2.69	3.81	5.17	5.17

5

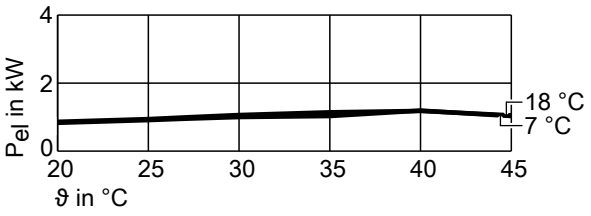
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C



Possible output range

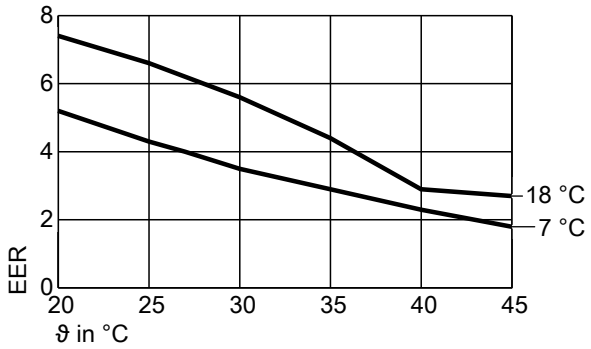
Power consumption for cooling at flow temperatures of 18 °C, 7 °C



6179959

Curves (cont.)

Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

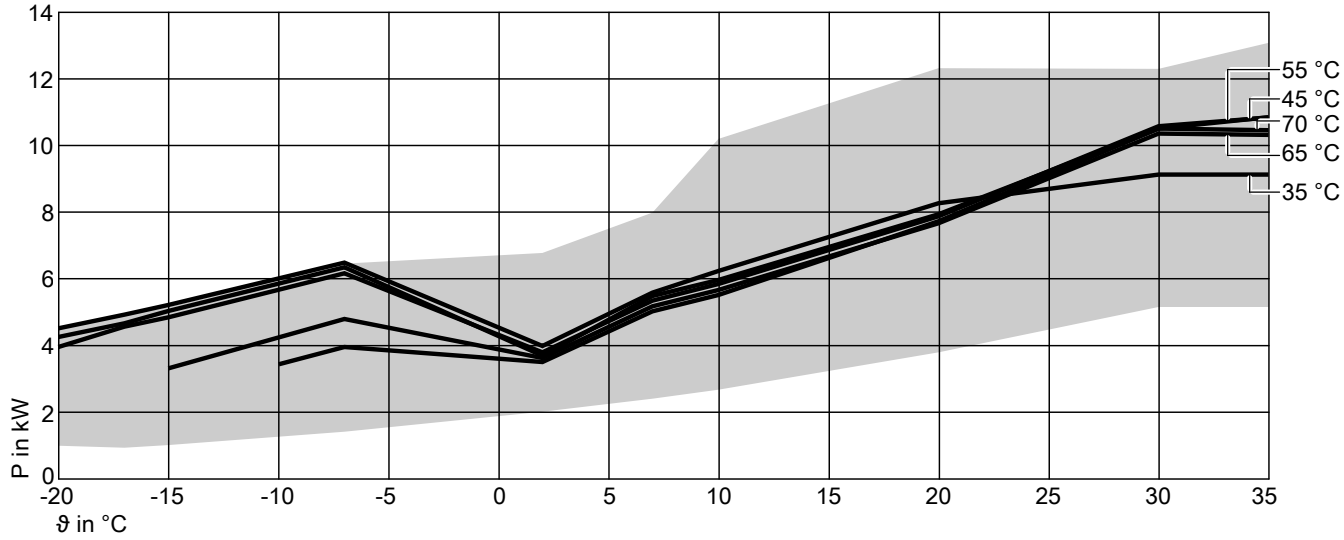
Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	10.3	9.9	9.7	9.3	6.9	3.4	2.8
Cooling capacity		kW	6.4	6.2	6.1	5.9	5.0	3.4	2.8
Power consumption		kW	0.86	0.94	0.99	1.06	1.14	1.18	1.05
Energy efficiency ratio EER			7.4	6.6	6.2	5.6	4.4	2.9	2.7
Min. cooling capacity		kW	1.5	1.5	1.5	1.6	1.9	2.0	2.1

Operating point	**W**	**°C**	**7**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	7.7	7.0	6.7	6.0	4.5	3.1	1.9
Cooling capacity		kW	4.3	3.9	3.8	3.5	3.0	2.8	1.9
Power consumption		kW	0.83	0.91	0.95	1.00	1.03	1.19	1.03
Energy efficiency ratio EER			5.2	4.3	4.0	3.5	2.9	2.3	1.8
Min. cooling capacity		kW	1.7	1.6	1.5	1.4	1.2	1.0	0.8

5.3 Performance graph, outdoor unit type 151.A08, 230 V~

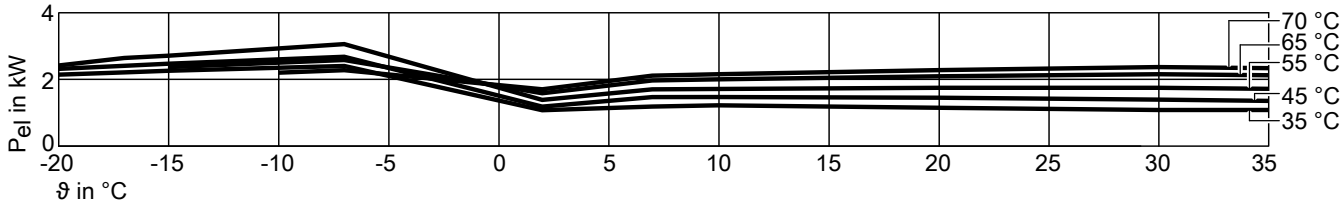
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C

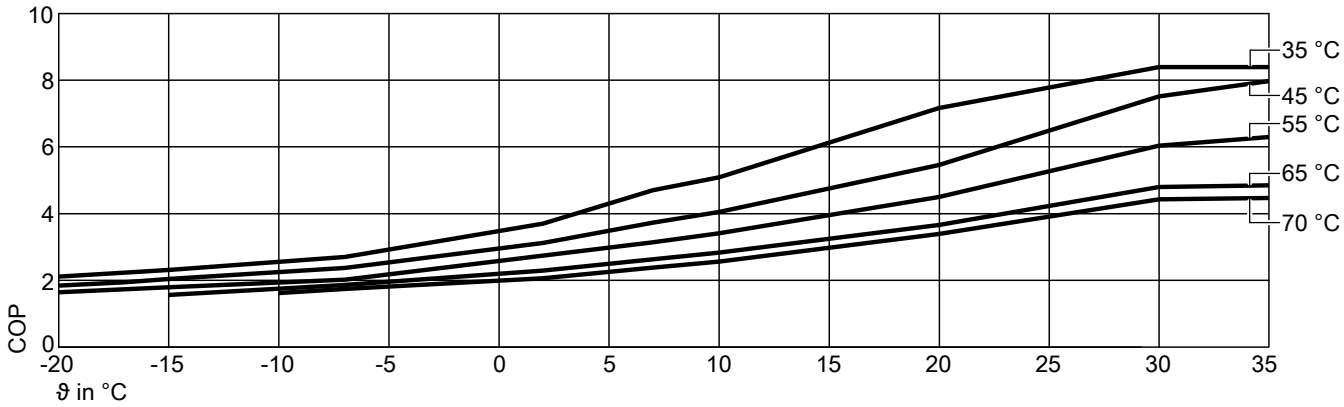


Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ	Air intake temperature
P	Heating output
P_{el}	Power consumption
COP	Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Curves (cont.)

Operating point	W	°C	35								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	4.49	5.17	6.47	6.79	8.00	10.21	12.33	12.31	13.09
Rated heating output		kW	4.53	5.23	6.50	4.00	5.60	6.25	8.28	9.14	9.14
Power consumption		kW	2.15	2.26	2.41	1.08	1.19	1.23	1.15	1.09	1.09
Coefficient of performance ε (COP)			2.11	2.31	2.70	3.70	4.70	5.09	7.17	8.40	8.40
Min. heating output		kW	1.49	1.53	1.67	1.77	2.10	2.27	2.98	4.17	4.17

Operating point	W	°C	45								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	4.23	4.90	6.26	6.78	8.37	9.97	11.52	13.04	12.64
Rated heating output		kW	4.27	5.05	6.36	3.71	5.50	5.98	7.95	10.52	10.86
Power consumption		kW	2.32	2.48	2.68	1.19	1.47	1.48	1.46	1.40	1.36
Coefficient of performance ε (COP)			1.84	2.04	2.37	3.12	3.73	4.05	5.46	7.52	7.98
Min. heating output		kW	1.39	1.42	1.53	1.60	1.88	2.07	2.89	3.83	3.83

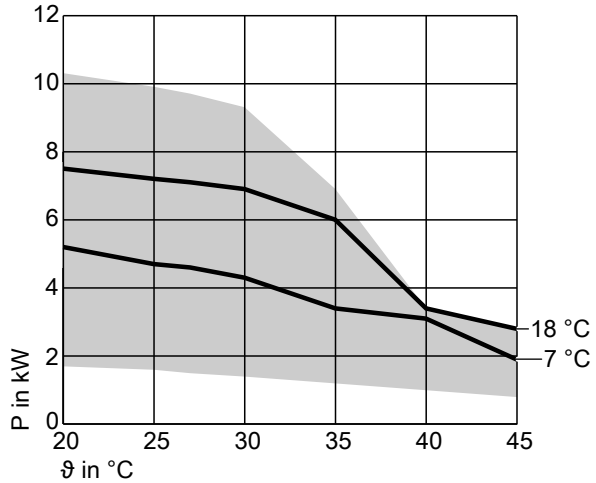
Operating point	W	°C	55								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW	3.78	4.71	6.03	6.83	8.38	9.94	11.50	13.07	13.11
Rated heating output		kW	3.97	4.86	6.18	3.81	5.36	5.86	7.89	10.59	10.85
Power consumption		kW	2.42	2.72	3.06	1.39	1.71	1.72	1.75	1.75	1.72
Coefficient of performance ε (COP)			1.64	1.79	2.02	2.74	3.14	3.41	4.50	6.04	6.30
Min. heating output		kW	1.24	1.27	1.09	1.43	1.67	1.86	2.67	3.62	3.62

Operating point	W	°C	65								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW		3.17	4.61	6.32	8.14	9.55	11.29	12.10	12.18
Rated heating output		kW		3.33	4.81	3.64	5.19	5.68	7.68	10.37	10.33
Power consumption		kW		2.37	2.59	1.59	1.97	2.01	2.10	2.16	2.13
Coefficient of performance ε (COP)				1.56	1.86	2.29	2.63	2.83	3.66	4.80	4.85
Min. heating output		kW		1.07	1.24	1.67	2.00	2.22	3.19	4.29	4.29

Operating point	W	°C	70								
	A	°C	–20	–15	–7	2	7	10	20	30	35
Max. heating output		kW			3.83	5.56	7.60	8.70	11.29	12.50	12.59
Rated heating output		kW			3.97	3.52	5.04	5.53	7.74	10.52	10.47
Power consumption		kW			2.28	1.71	2.12	2.16	2.28	2.37	2.34
Coefficient of performance ε (COP)					1.74	2.06	2.38	2.56	3.39	4.43	4.47
Min. heating output		kW			1.43	2.03	2.42	2.69	3.81	5.17	5.17

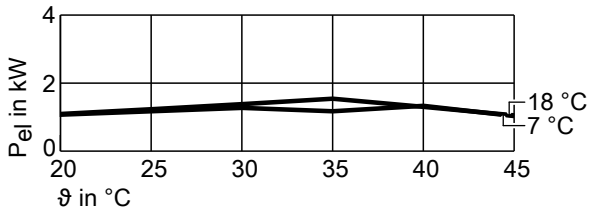
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C



Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C

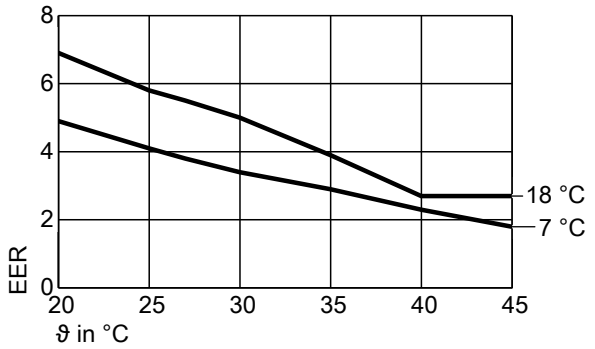


5

6179959

Curves (cont.)

Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

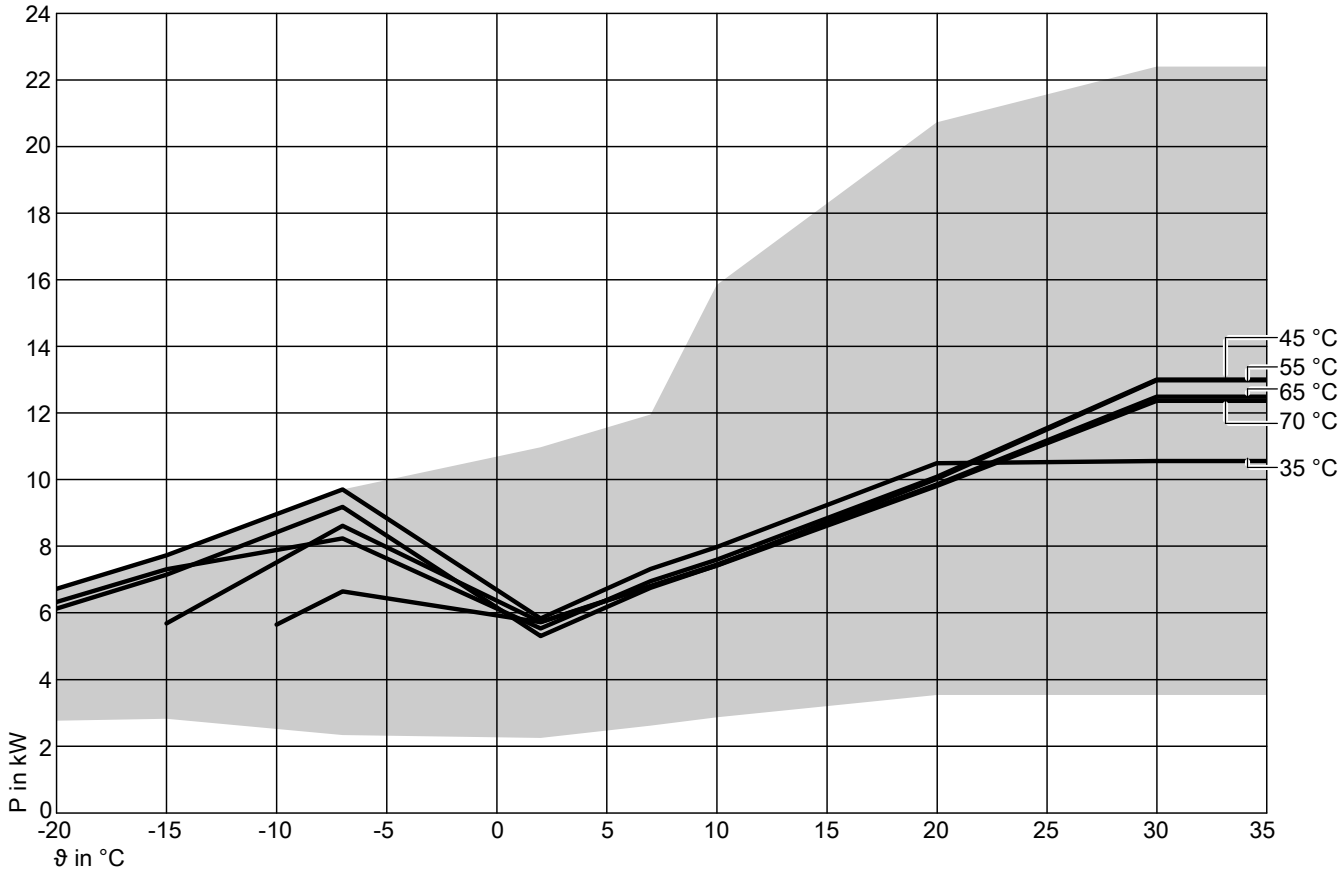
Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	10.3	9.9	9.7	9.3	6.9	3.4	2.8
Cooling capacity		kW	7.5	7.2	7.1	6.9	6.0	3.4	2.8
Power consumption		kW	1.09	1.23	1.29	1.38	1.54	1.30	1.05
Energy efficiency ratio EER			6.9	5.8	5.5	5.0	3.9	2.7	2.7
Min. cooling capacity		kW	1.5	1.5	1.5	1.6	1.9	2.0	2.1

Operating point	**W**	**°C**	**7**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	8.5	7.8	7.0	6.0	4.5	3.1	1.9
Cooling capacity		kW	5.2	4.7	4.6	4.3	3.4	3.1	1.9
Power consumption		kW	1.07	1.17	1.21	1.27	1.17	1.33	1.03
Energy efficiency ratio EER			4.9	4.1	3.8	3.4	2.9	2.3	1.8
Min. cooling capacity		kW	1.7	1.6	1.5	1.4	1.2	1.0	0.8

5.4 Performance graph, outdoor unit type 151.A10, 230 V~

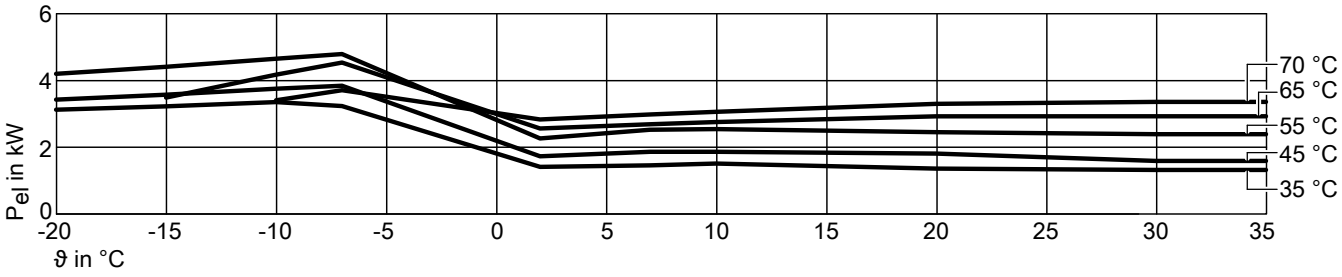
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



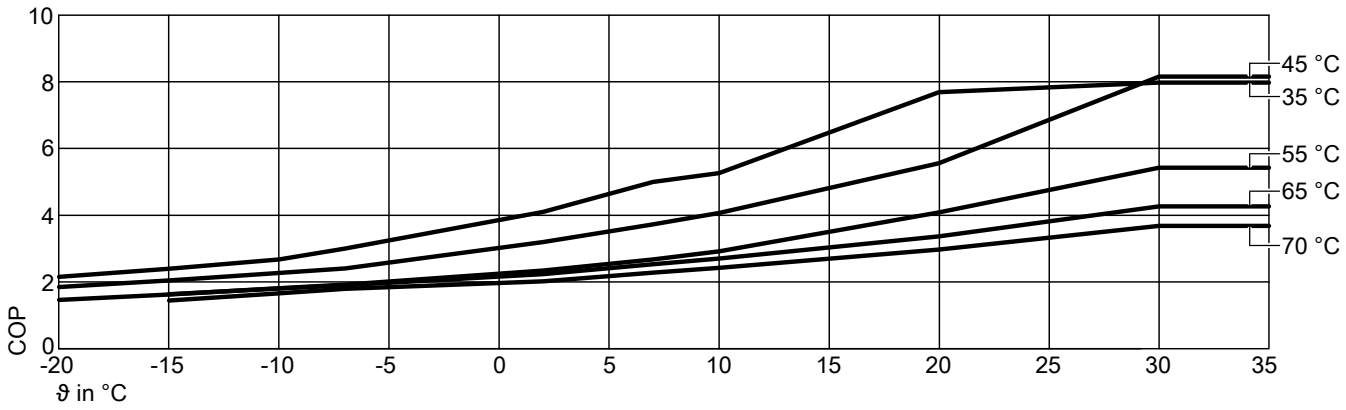
Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**					**35**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.72	7.72	8.96	9.70	10.97	11.95	15.84	20.73	22.40	22.40
Rated heating output		kW	6.72	7.72	8.96	9.70	5.80	7.30	7.97	10.49	10.56	10.56
Power consumption		kW	3.12	3.22	3.35	3.23	1.41	1.46	1.51	1.36	1.32	1.32
Coefficient of performance ε (COP)			2.15	2.39	2.67	3.00	4.10	5.00	5.27	7.70	7.98	7.98
Min. heating output		kW	2.75	2.81	2.51	2.32	2.24	2.61	2.86	3.53	3.53	3.53

Operating point	**W**	**°C**					**45**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.32	7.30	7.88	8.23	9.86	10.72	13.22	20.24	22.96	23.19
Rated heating output		kW	6.32	7.30	7.88	8.23	5.53	6.95	7.59	10.08	13.00	13.00
Power consumption		kW	3.43	3.57	3.47	3.42	1.73	1.87	1.87	1.81	1.59	1.59
Coefficient of performance ε (COP)			1.85	2.04	2.27	2.40	3.20	3.73	4.07	5.56	8.16	8.16
Min. heating output		kW	2.5	2.55	2.26	2.09	2.00	2.34	2.57	3.49	4.32	4.32

Operating point	**W**	**°C**					**55**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.12	7.14	8.41	9.18	10.86	11.86	15.16	19.69	21.88	22.16
Rated heating output		kW	6.12	7.14	8.41	9.18	5.30	6.75	7.42	10.02	12.98	12.98
Power consumption		kW	4.20	4.41	4.65	4.79	2.26	2.53	2.54	2.45	2.39	2.39
Coefficient of performance ε (COP)			1.46	1.62	1.81	1.92	2.34	2.67	2.92	4.09	5.43	5.43
Min. heating output		kW	2.30	2.35	2.08	1.93	2.64	3.12	3.44	4.68	5.62	5.62

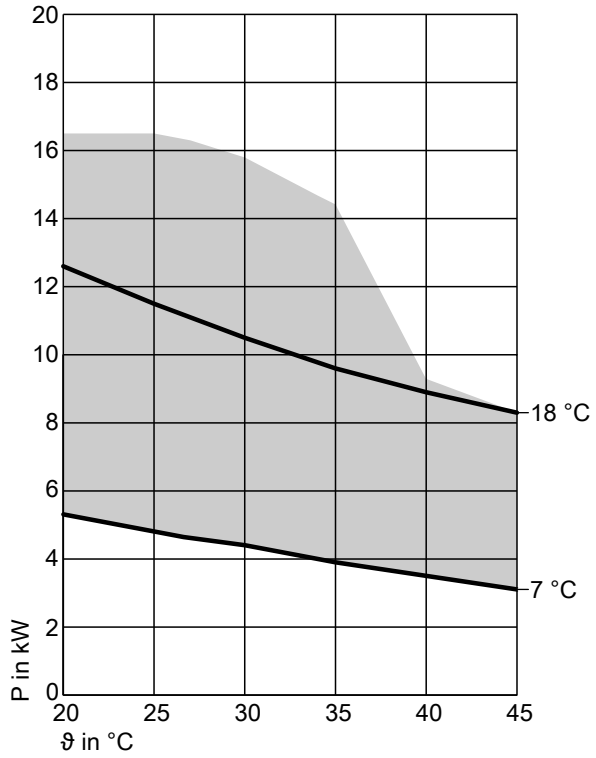
Operating point	**W**	**°C**					**65**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		5.68	7.51	8.61	10.87	11.84	14.84	18.25	21.03	21.03
Rated heating output		kW		5.68	7.51	8.61	5.72	6.80	7.44	9.85	12.49	12.49
Power consumption		kW		3.49	4.17	4.53	2.56	2.69	2.76	2.93	2.93	2.93
Coefficient of performance ε (COP)				1.63	1.80	1.90	2.23	2.53	2.70	3.37	4.27	4.27
Min. heating output		kW		2.24	2.42	2.52	3.50	4.23	4.69	6.48	8.05	8.05

Operating point	**W**	**°C**					**70**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			5.64	6.64	9.33	10.78	13.76	16.83	20.74	20.78
Rated heating output		kW			5.64	6.64	5.71	6.79	7.41	9.80	12.36	12.36
Power consumption		kW			3.41	3.71	2.83	2.98	3.06	3.30	3.36	3.36
Coefficient of performance ε (COP)					1.66	1.79	2.02	2.28	2.42	2.97	3.68	3.68
Min. heating output		kW			2.75	3.05	4.22	5.01	5.55	7.57	9.08	9.08

Curves (cont.)

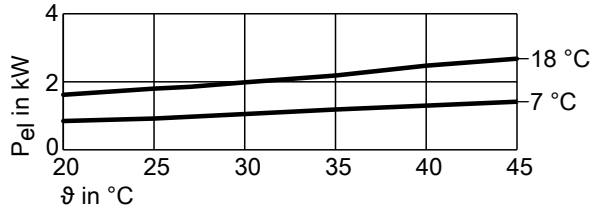
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

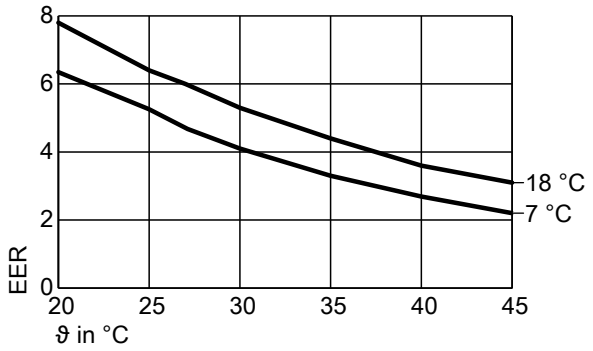


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W** / **A**	**°C** / **°C**	**18**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	16.50	16.50	16.30	15.80	14.40	9.30	8.30
Cooling capacity		kW	12.60	11.50	11.10	10.50	9.60	8.90	8.30
Power consumption		kW	1.62	1.80	1.85	1.98	2.18	2.47	2.68
Energy efficiency ratio EER			7.80	6.40	6.00	5.30	4.40	3.60	3.10
Min. cooling capacity		kW	7.40	7.10	6.90	6.70	6.30	5.80	4.20

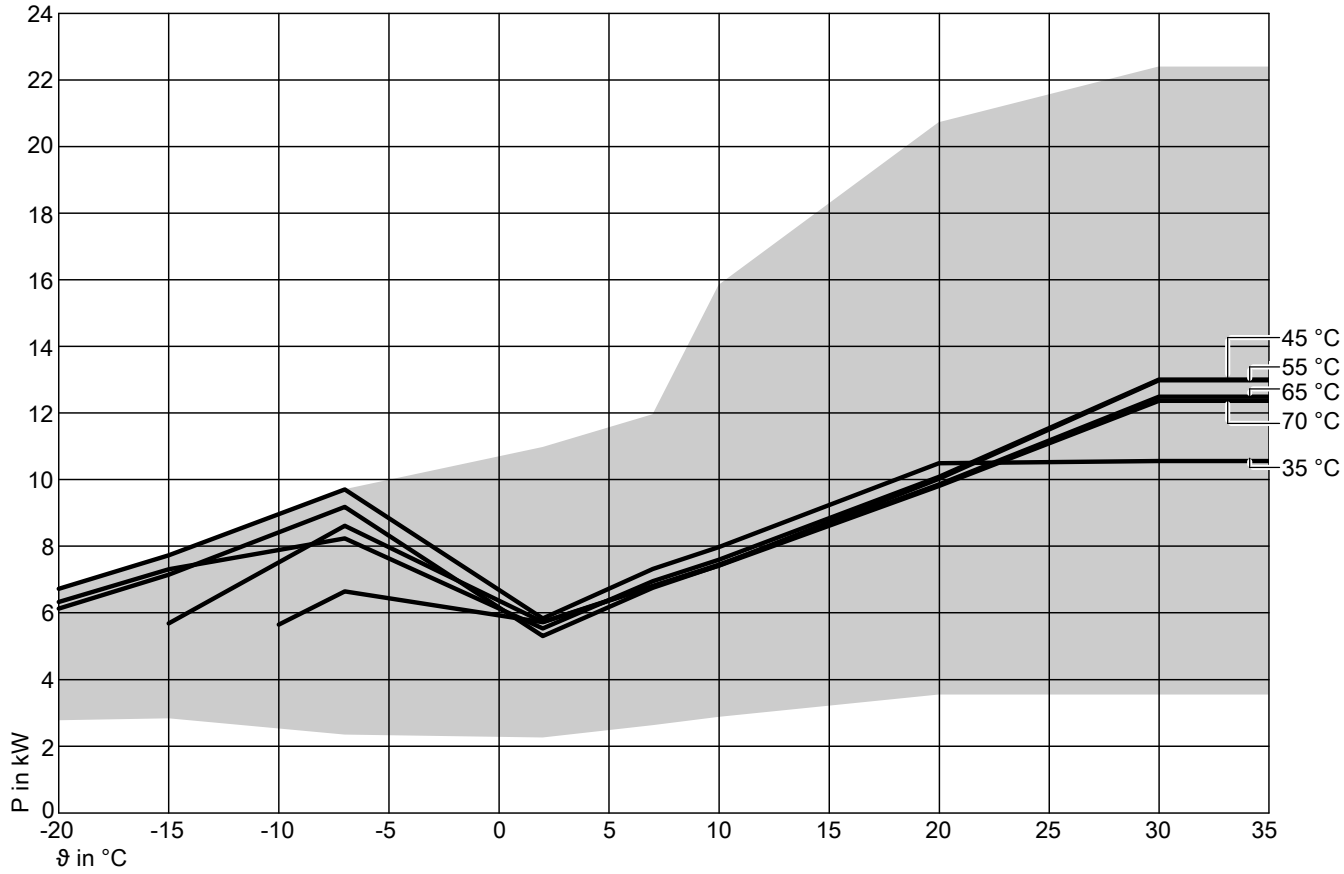
Operating point	**W** / **A**	**°C** / **°C**	**7**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	8.60	8.20	8.00	7.70	7.20	6.30	3.10
Cooling capacity		kW	5.30	4.80	4.60	4.40	3.90	3.50	3.10
Power consumption		kW	0.84	0.92	0.98	1.05	1.18	1.30	1.41
Energy efficiency ratio EER			6.30	5.20	4.70	4.10	3.30	2.70	2.20
Min. cooling capacity		kW	5.30	4.80	4.60	4.40	3.90	3.50	3.10

6179959

5.5 Performance graph, outdoor unit type 151.A10, 400 V~

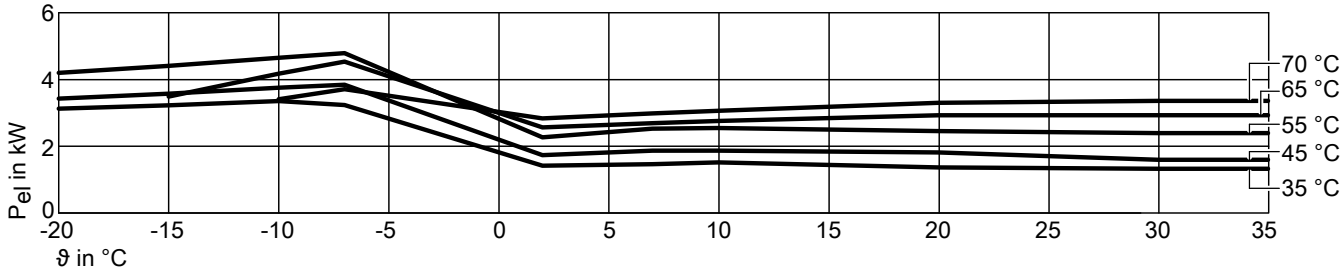
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



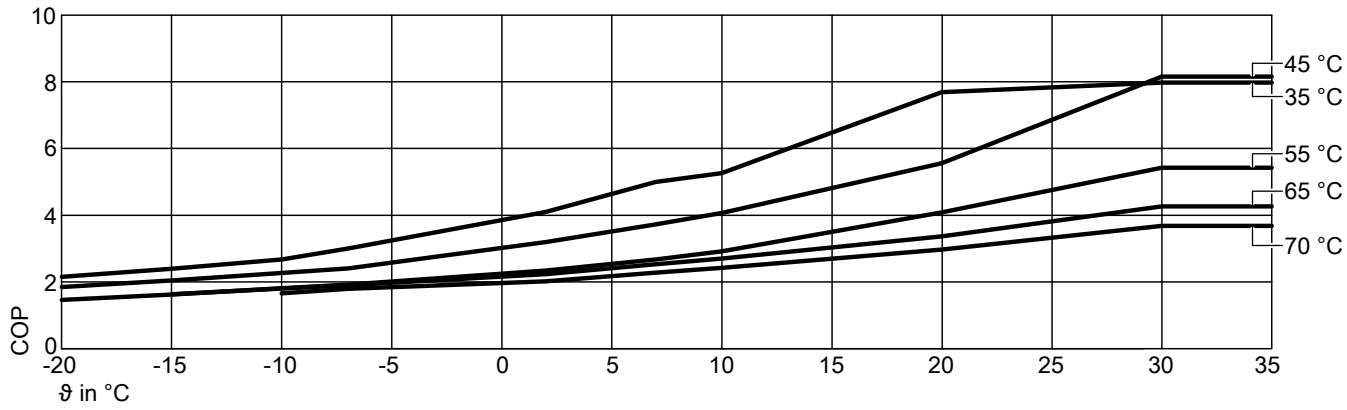
Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**										
	A	**°C**	**35**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.72	7.72	8.96	9.70	10.97	11.95	15.84	20.73	23.40	23.40
Rated heating output		kW	6.72	7.72	8.96	9.70	5.80	7.30	7.97	10.49	10.56	10.56
Power consumption		kW	3.12	3.22	3.35	3.23	1.41	1.46	1.51	1.36	1.32	1.32
Coefficient of performance ε (COP)			2.15	2.39	2.67	3.00	4.10	5.00	5.27	7.70	7.98	7.98
Min. heating output		kW	2.75	2.81	2.51	2.32	2.24	2.61	2.86	3.53	3.53	3.53

Operating point	**W**	**°C**										
	A	**°C**	**45**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.32	7.30	8.51	9.23	10.86	11.72	13.02	20.24	22.96	23.19
Rated heating output		kW	6.32	7.30	8.51	9.23	5.53	6.95	7.59	10.08	13.00	13.00
Power consumption		kW	3.43	3.57	3.75	3.84	1.73	1.87	1.87	1.81	1.59	1.59
Coefficient of performance ε (COP)			1.85	2.04	2.27	2.40	3.20	3.73	4.07	5.56	8.16	8.16
Min. heating output		kW	2.50	2.55	2.26	2.09	2.00	2.34	2.57	3.49	4.32	4.32

Operating point	**W**	**°C**										
	A	**°C**	**55**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	6.12	7.14	8.41	9.18	10.86	11.86	15.16	19.69	21.88	22.16
Rated heating output		kW	6.12	7.14	8.41	9.18	5.30	6.75	7.42	10.02	12.98	12.98
Power consumption		kW	4.20	4.41	4.65	4.79	2.26	2.53	2.54	2.45	2.39	2.39
Coefficient of performance ε (COP)			1.46	1.62	1.81	1.92	2.34	2.67	2.92	4.09	5.43	5.43
Min. heating output		kW	2.30	2.35	2.08	1.93	2.64	3.12	3.44	4.68	5.62	5.62

Operating point	**W**	**°C**										
	A	**°C**	**65**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		5.68	7.51	8.61	10.87	11.84	14.84	18.25	21.03	21.03
Rated heating output		kW		5.68	7.51	8.61	5.72	6.80	7.44	9.85	12.49	12.49
Power consumption		kW		3.49	4.17	4.53	2.56	2.69	2.76	2.93	2.93	2.93
Coefficient of performance ε (COP)				1.63	1.80	1.90	2.23	2.53	2.70	3.37	4.27	4.27
Min. heating output		kW		2.24	2.42	2.52	3.50	4.23	4.69	6.48	8.05	8.05

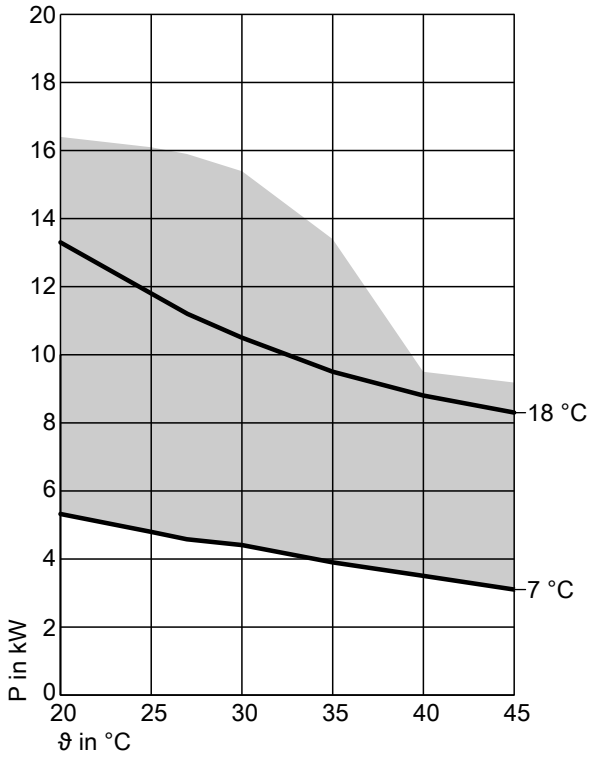
Operating point	**W**	**°C**										
	A	**°C**	**70**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			5.64	6.64	8.83	10.78	13.76	16.83	20.74	20.78
Rated heating output		kW			5.64	6.64	5.71	6.79	7.41	9.80	12.36	12.36
Power consumption		kW			3.41	3.71	2.83	2.98	3.06	3.30	3.36	3.36
Coefficient of performance ε (COP)					1.66	1.79	2.02	2.28	2.42	2.97	3.68	3.68
Min. heating output		kW			2.75	3.05	4.22	5.01	5.55	7.57	9.08	9.08

6179959

Curves (cont.)

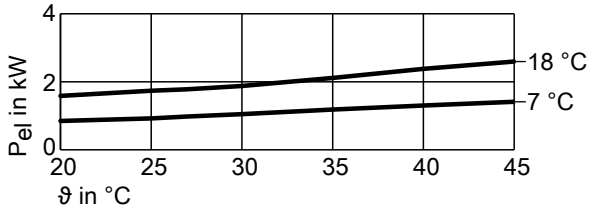
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

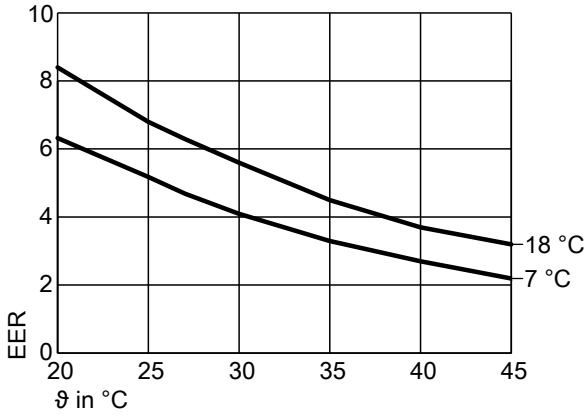


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

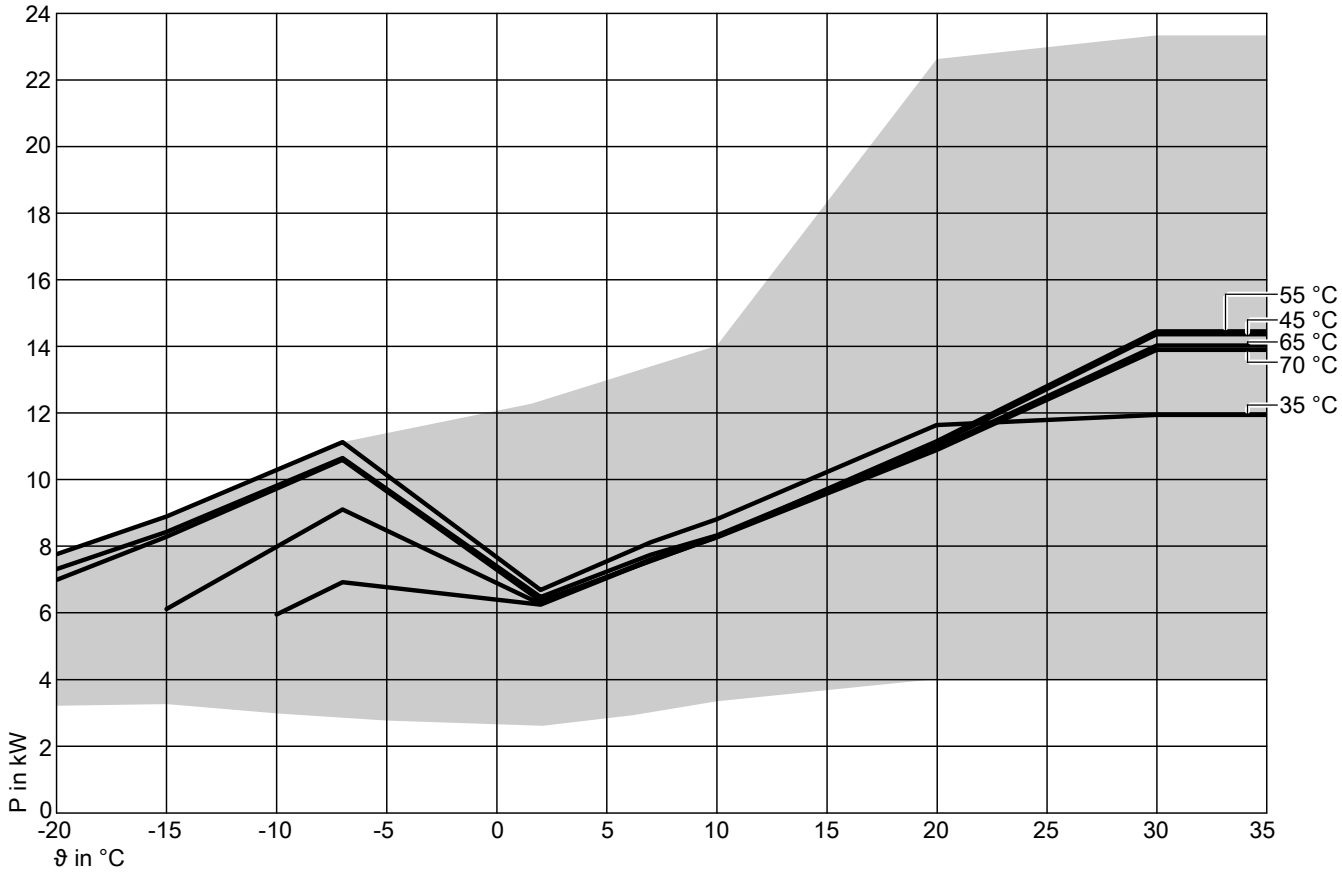
Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	16.40	16.10	15.90	15.40	13.40	9.50	9.20
Cooling capacity		kW	13.30	11.80	11.20	10.50	9.50	8.80	8.30
Power consumption		kW	1.58	1.74	1.78	1.88	2.11	2.38	2.59
Energy efficiency ratio EER			8.40	6.80	6.30	5.60	4.50	3.70	3.20
Min. cooling capacity		kW	7.80	7.40	7.20	6.90	6.50	6.10	5.70

Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	8.60	8.20	8.00	7.70	7.20	6.30	3.10
Cooling capacity		kW	5.30	4.80	4.60	4.40	3.90	3.50	3.10
Power consumption		kW	0.84	0.92	0.98	1.05	1.18	1.30	1.41
Energy efficiency ratio EER			6.30	5.20	4.70	4.10	3.30	2.70	2.20
Min. cooling capacity		kW	5.30	4.80	4.60	4.40	3.90	3.50	3.10

5.6 Performance graph, outdoor unit type 151.A13, 230 V~

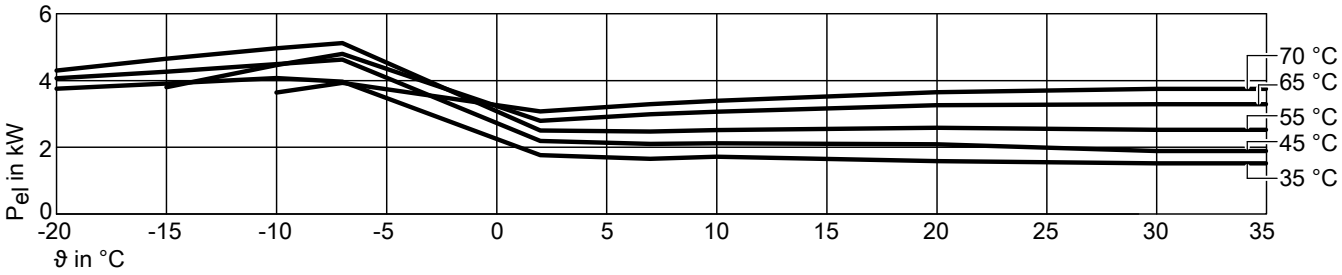
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



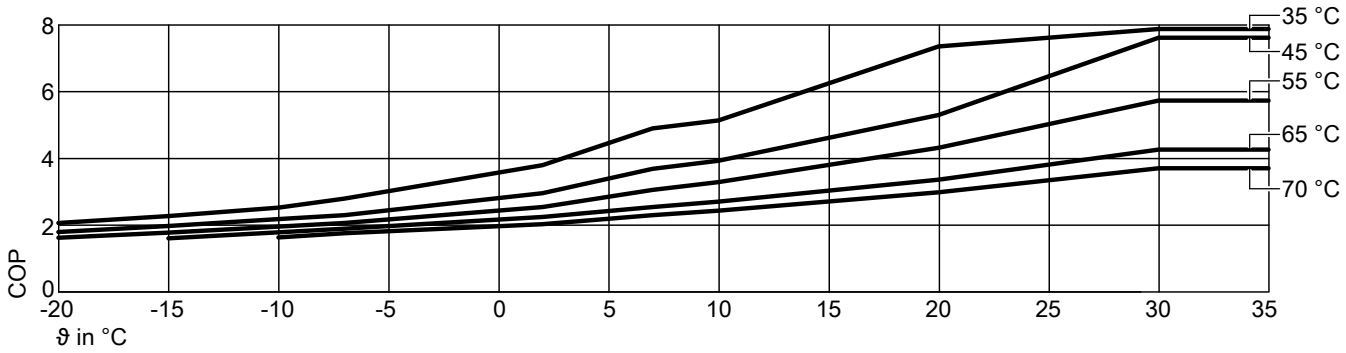
Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**									
	A	**°C**	**35**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.77	8.90	10.30	11.13	12.34	13.40	14.02	22.63	23.34	23.34
Rated heating output		kW	7.77	8.90	10.30	11.10	6.70	8.10	8.82	11.65	11.95	11.95
Power consumption		kW	3.75	3.91	4.07	3.96	1.76	1.65	1.72	1.58	1.52	1.52
Coefficient of performance ε (COP)			2.07	2.28	2.53	2.80	3.80	4.90	5.14	7.35	7.88	7.88
Min. heating output		kW	3.22	3.27	2.99	2.82	2.61	3.00	3.35	4.02	4.02	4.02

Operating point	**W**	**°C**									
	A	**°C**	**45**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.32	8.44	9.82	10.66	12.10	13.18	13.82	22.03	23.65	24.24
Rated heating output		kW	7.32	8.44	9.82	10.66	6.48	7.75	8.33	11.07	14.37	14.37
Power consumption		kW	4.07	4.26	4.49	4.63	2.19	2.10	2.12	2.09	1.89	1.89
Coefficient of performance ε (COP)			1.80	1.98	2.19	2.30	2.96	3.69	3.93	5.30	7.61	7.61
Min. heating output		kW	3.12	3.17	2.89	2.72	2.64	3.01	3.25	3.92	4.52	4.52

Operating point	**W**	**°C**									
	A	**°C**	**55**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.00	8.29	9.74	10.60	12.28	13.33	17.27	20.65	22.88	23.20
Rated heating output		kW	7.00	8.29	9.74	10.60	6.37	7.56	8.28	11.16	14.46	14.46
Power consumption		kW	4.30	4.65	4.96	5.12	2.50	2.47	2.51	2.58	2.52	2.52
Coefficient of performance ε (COP)			1.63	1.78	1.96	2.07	2.55	3.06	3.29	4.32	5.73	5.73
Min. heating output		kW	2.70	2.74	2.48	2.32	3.03	3.51	3.84	5.07	6.10	6.10

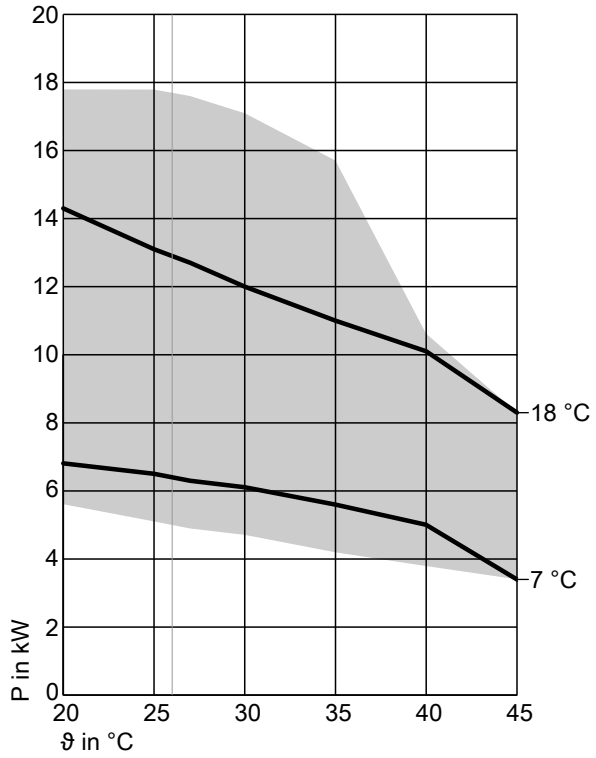
Operating point	**W**	**°C**									
	A	**°C**	**65**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		6.12	7.99	9.11	12.16	12.77	15.78	19.25	22.01	22.03
Rated heating output		kW		6.12	7.99	9.11	6.28	7.61	8.30	10.97	14.03	14.03
Power consumption		kW		3.80	4.46	4.80	2.79	2.99	3.06	3.26	3.29	3.29
Coefficient of performance ε (COP)				1.61	1.79	1.90	2.25	2.55	2.71	3.37	4.27	4.27
Min. heating output		kW		2.67	2.83	2.93	3.85	4.60	5.05	6.81	8.44	8.44

Operating point	**W**	**°C**									
	A	**°C**	**70**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			5.96	6.93	9.83	11.78	14.76	17.83	21.74	21.78
Rated heating output		kW			5.96	6.93	6.25	7.58	8.27	10.90	13.90	13.90
Power consumption		kW			3.64	3.93	3.07	3.29	3.39	3.65	3.75	3.75
Coefficient of performance ε (COP)					1.64	1.76	2.03	2.30	2.44	2.99	3.71	3.71
Min. heating output		kW			3.15	3.43	4.57	5.36	5.88	7.97	9.48	9.48

Curves (cont.)

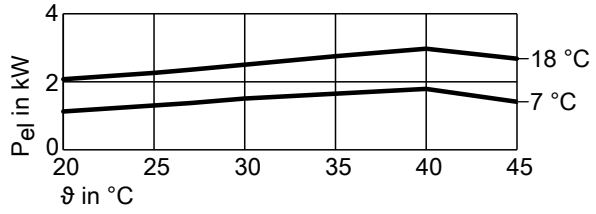
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

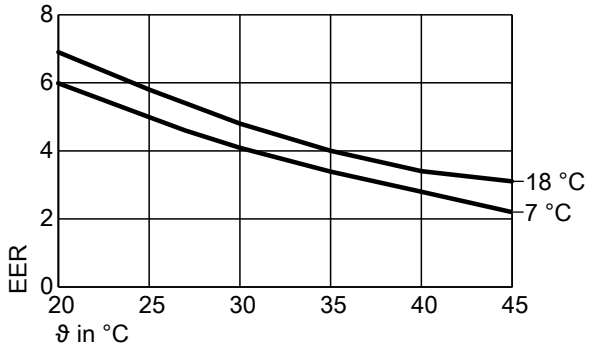


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

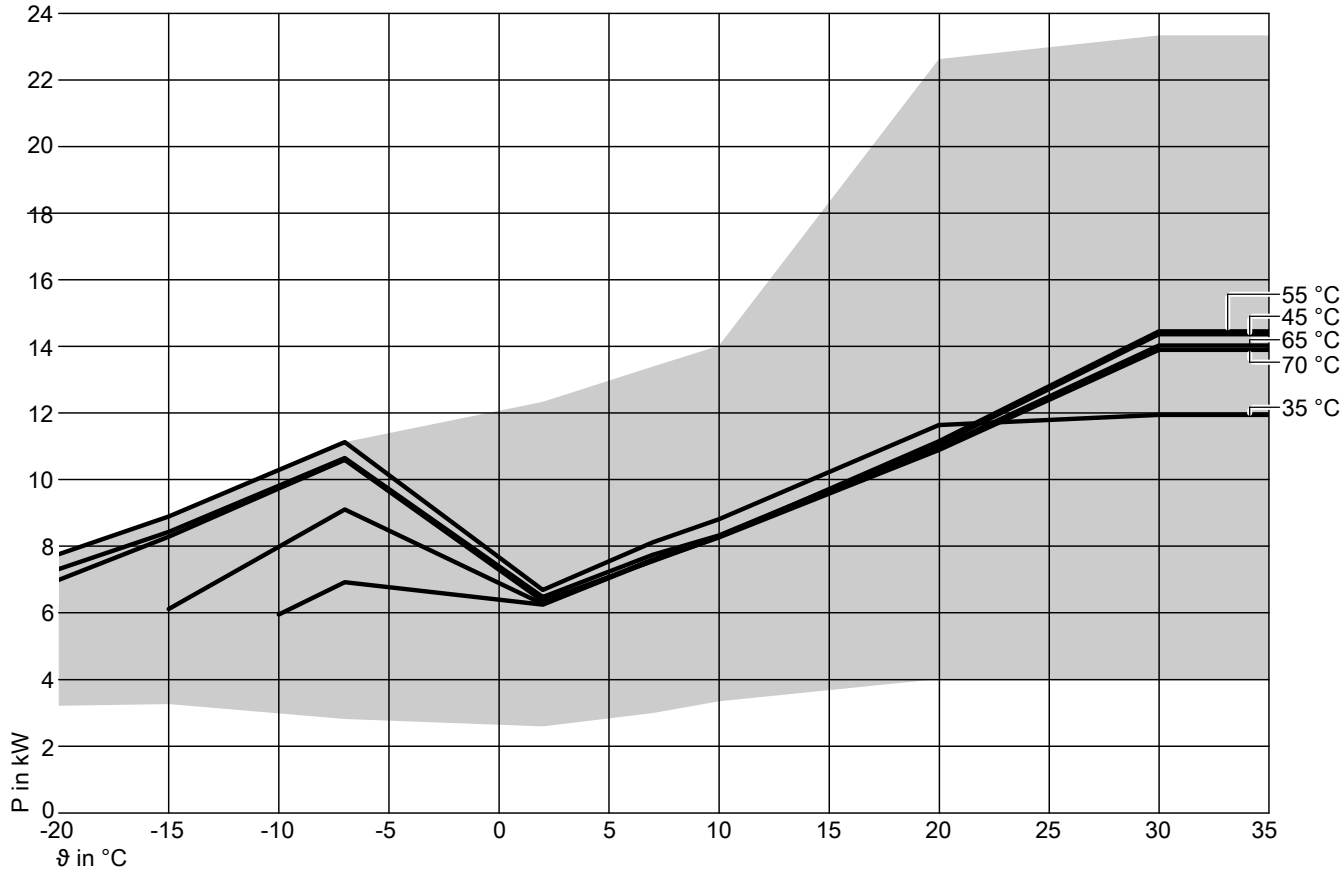
Operating point	**W** / **A**	**°C** / **°C**	**18**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	17.80	17.80	17.60	17.10	15.70	10.60	8.30
Cooling capacity		kW	14.30	13.10	12.70	12.00	11.00	10.10	8.30
Power consumption		kW	2.07	2.26	2.35	2.50	2.75	2.97	2.68
Energy efficiency ratio EER			6.90	5.80	5.40	4.80	4.00	3.40	3.10
Min. cooling capacity		kW	7.70	7.40	7.20	7.00	6.60	6.10	4.50

Operating point	**W** / **A**	**°C** / **°C**	**7**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	9.70	9.10	8.90	8.60	8.00	6.30	3.40
Cooling capacity		kW	6.80	6.50	6.30	6.10	5.60	5.00	3.40
Power consumption		kW	1.13	1.30	1.37	1.49	1.65	1.79	1.55
Energy efficiency ratio EER			6.00	5.00	4.60	4.10	3.40	2.80	2.20
Min. cooling capacity		kW	5.60	5.10	4.90	4.70	4.20	3.80	3.40

5.7 Performance graph, outdoor unit type 151.A13, 400 V~

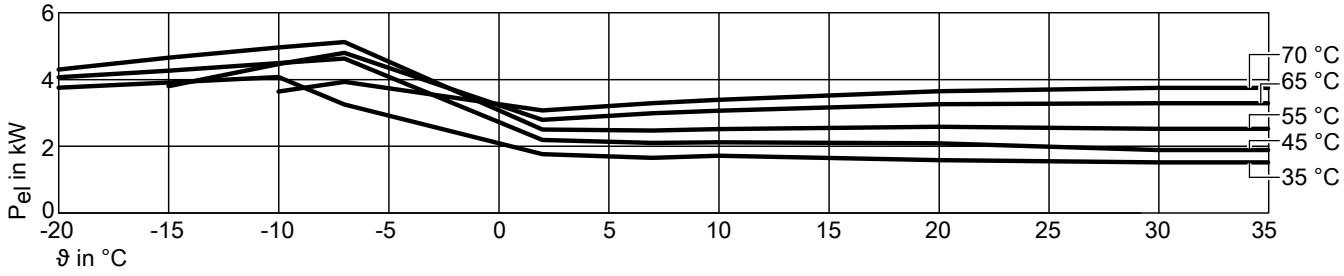
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Possible output range

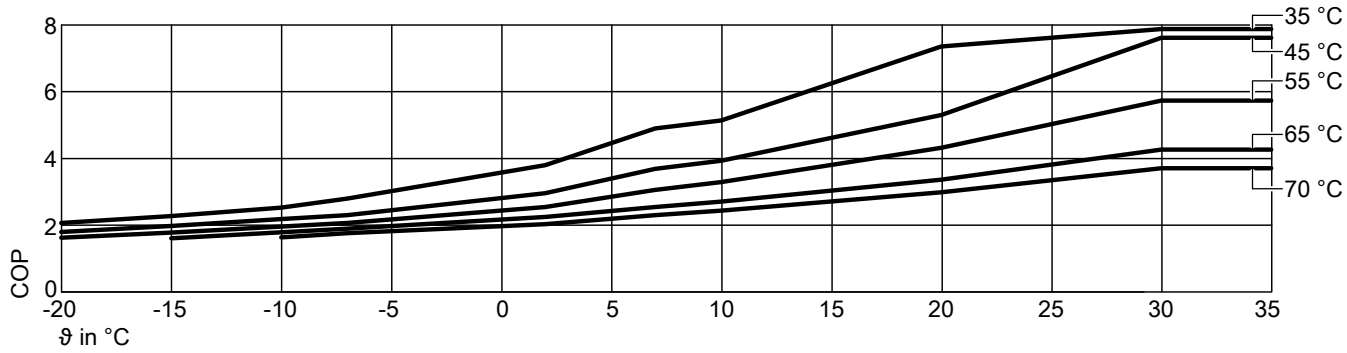
Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



5

Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**					**35**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.77	8.90	10.30	11.13	12.34	13.40	14.02	22.63	23.34	23.34
Rated heating output		kW	7.77	8.90	10.30	11.10	6.70	8.10	8.82	11.65	11.95	11.95
Power consumption		kW	3.75	3.91	4.07	3.96	1.76	1.65	1.72	1.58	1.52	1.52
Coefficient of performance ε (COP)			2.07	2.28	2.53	2.80	3.80	4.90	5.14	7.35	7.88	7.88
Min. heating output		kW	3.22	3.27	2.99	2.82	2.61	3.00	3.35	4.02	4.02	4.02

Operating point	**W**	**°C**					**45**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.32	8.44	9.82	10.66	12.10	13.18	13.82	22.03	23.65	24.24
Rated heating output		kW	7.32	8.44	9.82	10.66	6.48	7.75	8.33	11.07	14.37	14.37
Power consumption		kW	4.07	4.26	4.49	4.63	2.19	2.10	2.12	2.09	1.89	1.89
Coefficient of performance ε (COP)			1.80	1.98	2.19	2.30	2.96	3.69	3.93	5.30	7.61	7.61
Min. heating output		kW	2.72	2.77	2.49	2.32	2.24	2.61	2.85	3.52	4.52	4.52

Operating point	**W**	**°C**					**55**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.00	8.29	9.74	10.60	12.28	13.33	17.27	20.65	22.88	23.20
Rated heating output		kW	7.00	8.29	9.73	10.60	6.37	7.56	8.28	11.16	14.46	14.46
Power consumption		kW	4.30	4.65	4.96	5.12	2.50	2.47	2.51	2.58	2.52	2.52
Coefficient of performance ε (COP)			1.63	1.78	1.96	2.07	2.55	3.06	3.29	4.32	5.73	5.73
Min. heating output		kW	2.70	2.74	2.48	2.32	3.03	3.51	3.84	5.07	6.10	6.10

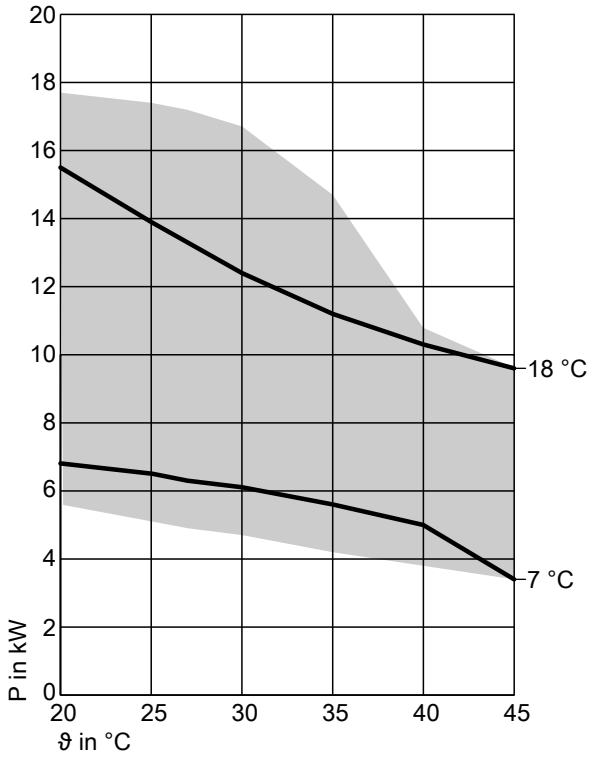
Operating point	**W**	**°C**					**65**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		6.12	7.99	9.11	12.16	12.77	15.78	19.25	22.01	22.03
Rated heating output		kW		6.12	7.99	9.11	6.28	7.61	8.30	10.97	14.03	14.03
Power consumption		kW		3.80	4.46	4.80	2.79	2.99	3.06	3.26	3.29	3.29
Coefficient of performance ε (COP)				1.61	1.79	1.90	2.25	2.55	2.71	3.37	4.27	4.27
Min. heating output		kW		2.67	2.83	2.93	3.85	4.60	5.05	6.81	8.44	8.44

Operating point	**W**	**°C**					**70**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			5.96	6.93	9.83	11.78	14.76	17.83	21.74	21.78
Rated heating output		kW			5.96	6.93	6.25	7.58	8.27	10.90	13.90	13.90
Power consumption		kW			3.64	3.93	3.07	3.29	3.39	3.65	3.75	3.75
Coefficient of performance ε (COP)					1.64	1.76	2.03	2.30	2.44	2.99	3.71	3.71
Min. heating output		kW			3.15	3.43	4.57	5.36	5.88	7.97	9.48	9.48

Curves (cont.)

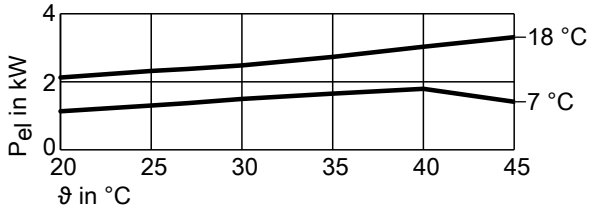
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

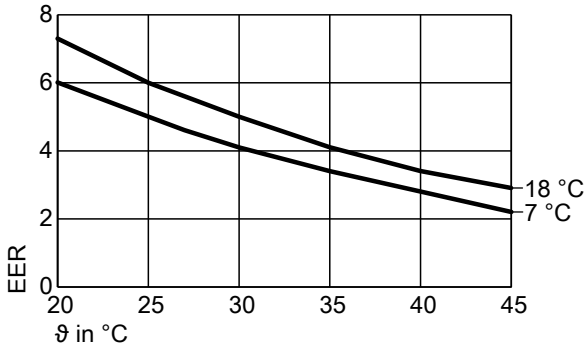


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

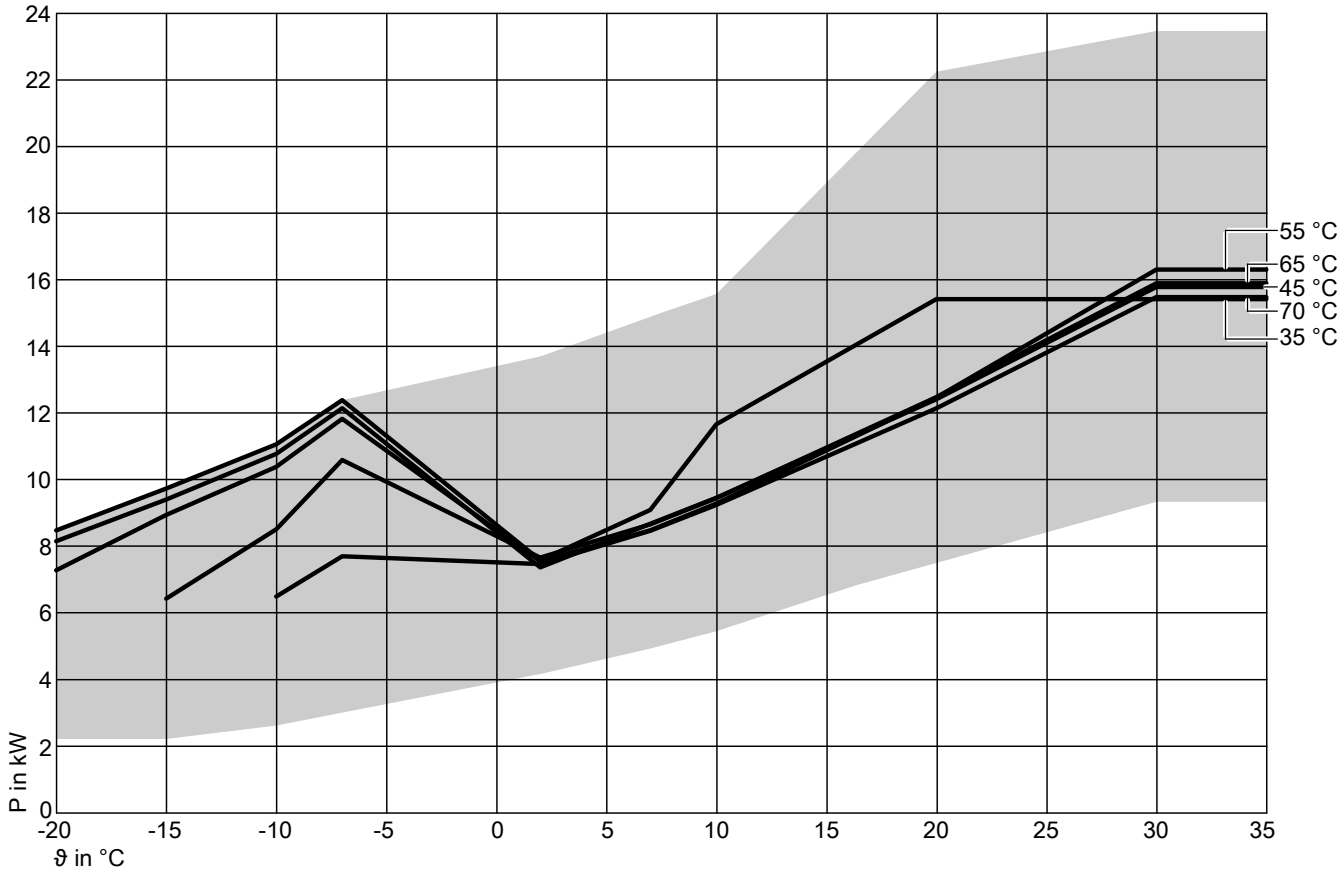
Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	17.70	17.40	17.20	16.70	14.70	10.80	9.60
Cooling capacity		kW	15.50	13.90	13.30	12.40	11.20	10.30	9.60
Power consumption		kW	2.12	2.32	2.38	2.48	2.73	3.03	3.31
Energy efficiency ratio EER			7.30	6.00	5.60	5.00	4.10	3.40	2.90
Min. cooling capacity		kW	8.10	7.70	7.50	7.20	6.80	6.40	6.00

Operating point	**W**	**°C**	**7**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	9.70	9.10	8.90	8.60	8.00	6.30	3.40
Cooling capacity		kW	6.80	6.50	6.30	6.10	5.60	5.00	3.40
Power consumption		kW	1.13	1.30	1.37	1.49	1.65	1.79	1.55
Energy efficiency ratio EER			6.00	5.00	4.60	4.10	3.40	2.80	2.20
Min. cooling capacity		kW	5.60	5.10	4.90	4.70	4.20	3.80	3.40

5.8 Performance graph, outdoor unit type 151.A16, 230 V~

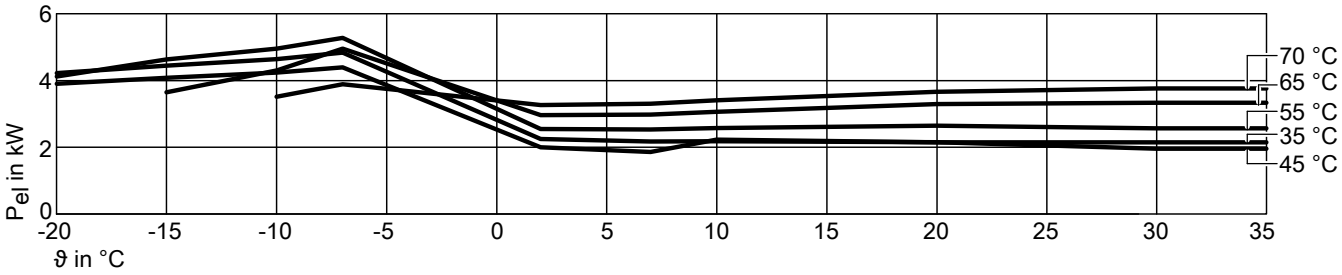
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



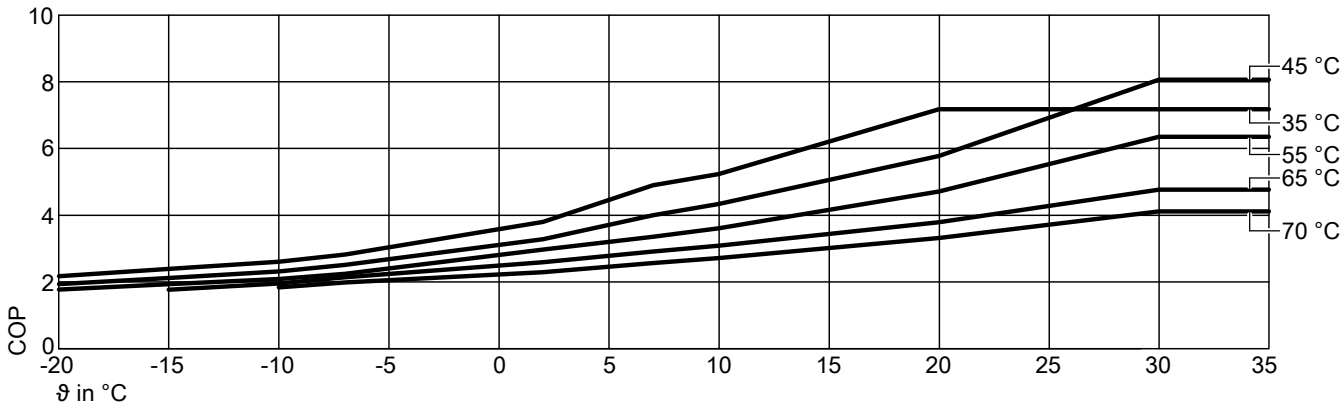
Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**					**35**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	8.49	9.74	11.07	12.39	13.70	14.90	15.57	22.24	23.46	23.46
Rated heating output		kW	8.49	9.74	11.07	12.39	7.59	9.10	11.67	15.42	15.42	15.42
Power consumption		kW	3.90	4.08	4.24	4.39	2.00	1.86	2.23	2.15	2.15	2.15
Coefficient of performance ε (COP)			2.17	2.39	2.61	2.82	3.80	4.90	5.24	7.18	7.18	7.18
Min. heating output		kW	3.00	3.00	3.00	3.00	3.00	3.30	3.30	3.55	3.55	3.55

Operating point	**W**	**°C**					**45**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	8.16	9.41	10.78	12.15	13.62	14.89	19.58	21.78	24.01	24.01
Rated heating output		kW	8.16	9.41	10.78	12.15	7.38	8.68	9.46	12.42	15.79	15.79
Power consumption		kW	4.22	4.45	4.64	4.84	2.25	2.17	2.18	2.15	1.96	1.96
Coefficient of performance ε (COP)			1.93	2.12	2.31	2.51	3.28	4.00	4.34	5.78	8.07	8.07
Min. heating output		kW	2.52	2.56	2.34	2.11	2.03	2.37	2.60	3.49	4.14	4.14

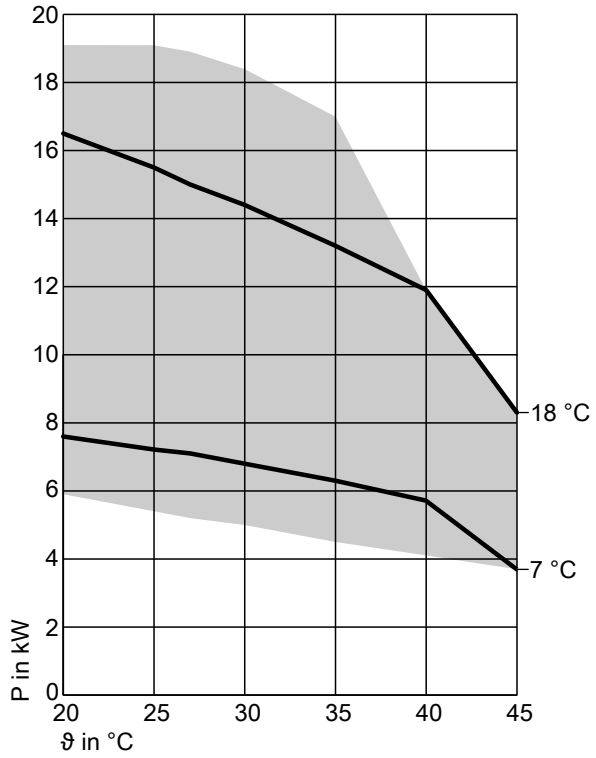
Operating point	**W**	**°C**					**55**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.29	8.95	10.39	11.83	13.74	14.58	18.48	21.59	23.35	23.02
Rated heating output		kW	7.29	8.95	10.39	11.83	7.56	8.49	9.29	12.47	16.31	16.31
Power consumption		kW	4.12	4.63	4.96	5.28	2.55	2.53	2.57	2.65	2.57	2.57
Coefficient of performance ε (COP)			1.77	1.93	2.09	2.24	2.97	3.35	3.61	4.71	6.36	6.36
Min. heating output		kW	2.31	2.35	2.14	1.93	2.64	3.13	3.44	4.69	5.56	5.56

Operating point	**W**	**°C**					**65**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		6.44	8.52	10.60	13.44	13.31	16.11	19.67	22.48	22.07
Rated heating output		kW		6.44	8.52	10.60	7.67	8.67	9.45	12.48	15.90	15.90
Power consumption		kW		3.65	4.30	4.96	2.96	2.98	3.06	3.29	3.33	3.33
Coefficient of performance ε (COP)				1.77	1.95	2.14	2.59	2.91	3.09	3.79	4.77	4.77
Min. heating output		kW		2.27	2.42	2.56	3.54	4.16	4.65	6.38	7.83	7.83

Operating point	**W**	**°C**					**70**				
	A	**°C**	**–20**	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			6.50	7.71	10.87	12.66	15.01	18.17	22.12	21.79
Rated heating output		kW			6.50	7.71	7.48	8.47	9.25	12.15	15.48	15.48
Power consumption		kW			3.51	3.89	3.26	3.30	3.41	3.66	3.76	3.76
Coefficient of performance ε (COP)					1.83	1.98	2.29	2.57	2.72	3.32	4.12	4.12
Min. heating output		kW			2.63	3.04	4.18	4.94	5.46	7.63	9.34	9.34

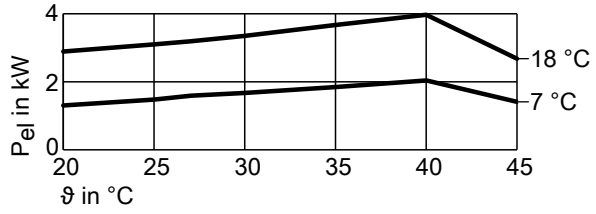
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

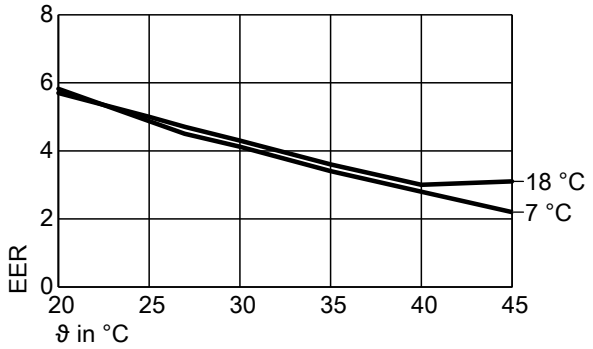


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

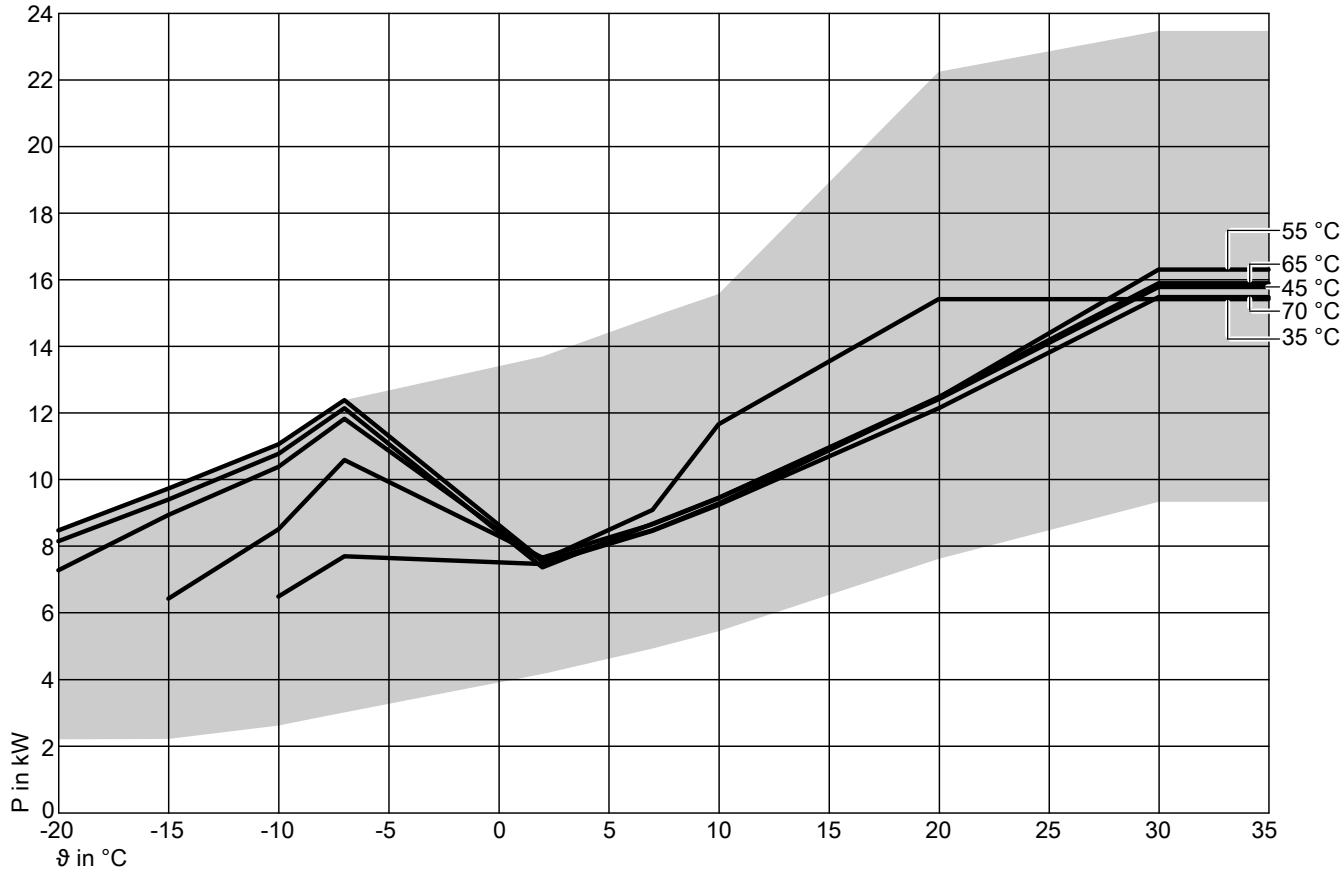
Operating point	**W** / **A**	**°C** / **°C**	**18**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	19.10	19.10	18.90	18.40	17.00	11.90	8.30
Cooling capacity		kW	16.50	15.50	15.00	14.40	13.20	11.90	8.30
Power consumption		kW	2.89	3.10	3.19	3.35	3.62	3.97	2.68
Energy efficiency ratio EER			5.70	5.00	4.70	4.30	3.65	3.00	3.10
Min. cooling capacity		kW	8.00	7.70	7.50	7.30	6.90	6.40	4.80

Operating point	**W** / **A**	**°C** / **°C**	**7**						
			20	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	11.00	10.10	9.70	9.30	8.70	6.30	3.70
Cooling capacity		kW	7.60	7.20	7.10	6.80	6.30	5.70	3.70
Power consumption		kW	1.31	1.47	1.58	1.66	1.85	2.04	1.68
Energy efficiency ratio EER			5.80	4.90	4.50	4.10	3.40	2.80	2.20
Min. cooling capacity		kW	5.90	5.40	5.20	5.00	4.50	4.10	3.70

5.9 Performance graph, outdoor unit type 151.A16, 400 V~

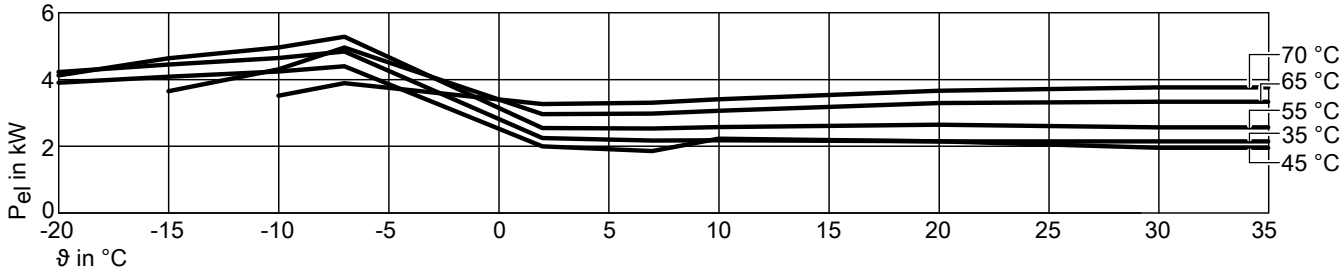
Heating

Heating output at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



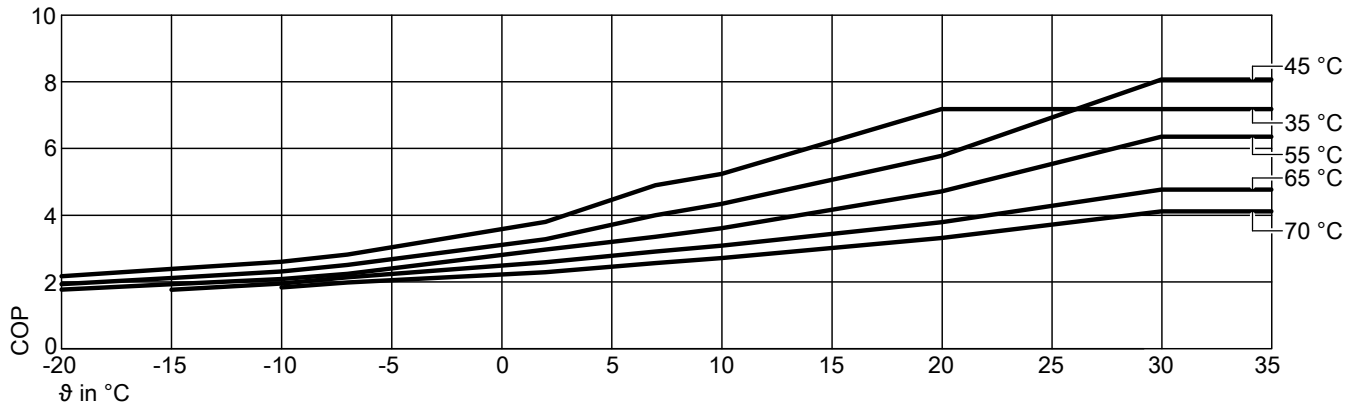
Possible output range

Power consumption for heating at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



Curves (cont.)

Coefficient of performance (COP) at flow temperatures of 35 °C, 45 °C, 55 °C, 65 °C, 70 °C



ϑ Air intake temperature
P Heating output
P_{el} Power consumption
COP Performance factor

Note

- *The COP data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**										
	A	**°C**	**35**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	8.49	9.74	11.07	12.39	13.70	14.90	15.57	22.24	23.46	23.46
Rated heating output		kW	8.49	9.74	11.07	12.39	7.59	9.10	11.67	15.42	15.42	15.42
Power consumption		kW	3.90	4.08	4.24	4.39	2.00	1.86	2.23	2.15	2.15	2.15
Coefficient of performance ε (COP)			2.17	2.39	2.61	2.82	3.80	4.90	5.24	7.18	7.18	7.18
Min. heating output		kW	2.75	2.80	2.58	2.35	2.27	2.64	2.88	3.55	3.55	3.55

Operating point	**W**	**°C**										
	A	**°C**	**45**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	8.16	9.41	10.78	12.15	13.62	14.89	19.58	21.78	24.01	24.01
Rated heating output		kW	8.16	9.41	10.78	12.15	7.38	8.68	9.46	12.42	15.79	15.79
Power consumption		kW	4.22	4.45	4.64	4.84	2.25	2.17	2.18	2.15	1.96	1.96
Coefficient of performance ε (COP)			1.93	2.12	2.31	2.51	3.28	4.00	4.34	5.78	8.07	8.07
Min. heating output		kW	2.52	2.56	2.34	2.11	2.03	2.37	2.60	3.49	4.14	4.14

Operating point	**W**	**°C**										
	A	**°C**	**55**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW	7.29	8.95	10.39	11.83	13.74	14.58	18.48	21.59	23.35	23.02
Rated heating output		kW	7.29	8.95	10.39	11.83	7.56	8.49	9.29	12.47	16.31	16.31
Power consumption		kW	4.12	4.63	4.96	5.28	2.55	2.53	2.57	2.65	2.57	2.57
Coefficient of performance ε (COP)			1.77	1.93	2.09	2.24	2.97	3.35	3.61	4.71	6.36	6.36
Min. heating output		kW	2.31	2.35	2.14	1.93	2.64	3.13	3.44	4.69	5.56	5.56

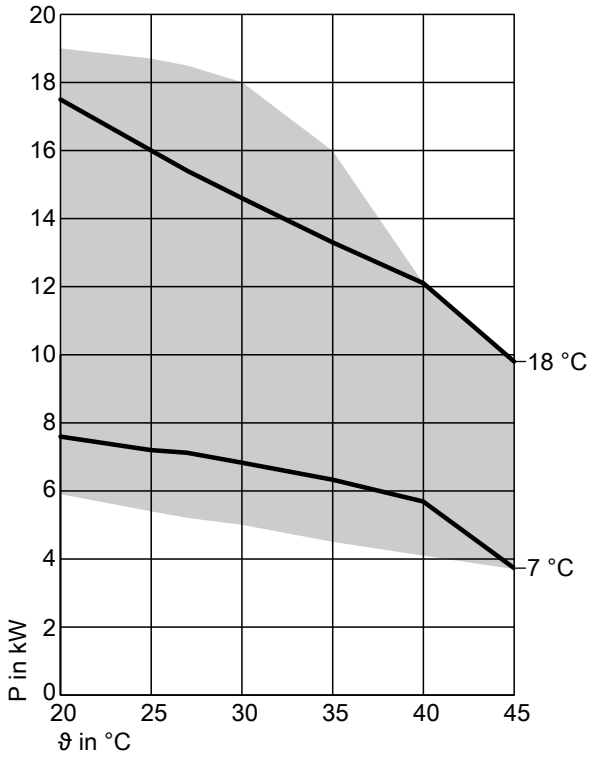
Operating point	**W**	**°C**										
	A	**°C**	**65**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW		6.44	8.52	10.60	13.44	13.31	16.11	19.67	22.48	22.07
Rated heating output		kW		6.44	8.52	10.60	7.67	8.67	9.45	12.48	15.90	15.90
Power consumption		kW		3.65	4.30	4.96	2.96	2.98	3.06	3.29	3.33	3.33
Coefficient of performance ε (COP)				1.77	1.95	2.14	2.59	2.91	3.09	3.79	4.77	4.77
Min. heating output		kW		2.27	2.42	2.56	3.54	4.16	4.65	6.38	7.83	7.83

Operating point	**W**	**°C**										
	A	**°C**	**70**									
			–20	**–15**	**–10**	**–7**	**2**	**7**	**10**	**20**	**30**	**35**
Max. heating output		kW			6.50	7.71	10.87	12.66	15.01	18.17	22.12	21.79
Rated heating output		kW			6.50	7.71	7.48	8.47	9.25	12.15	15.48	15.48
Power consumption		kW			3.51	3.89	3.26	3.30	3.41	3.66	3.76	3.76
Coefficient of performance ε (COP)					1.83	1.98	2.29	2.57	2.72	3.32	4.12	4.12
Min. heating output		kW			2.63	3.04	4.18	4.94	5.46	7.63	9.34	9.34

Curves (cont.)

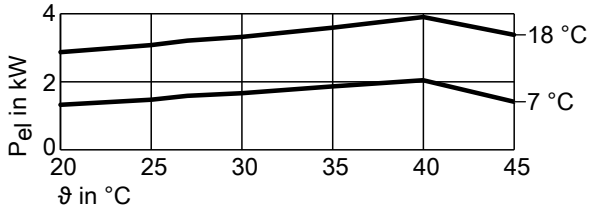
Cooling

Cooling capacity at flow temperatures of 18 °C, 7 °C

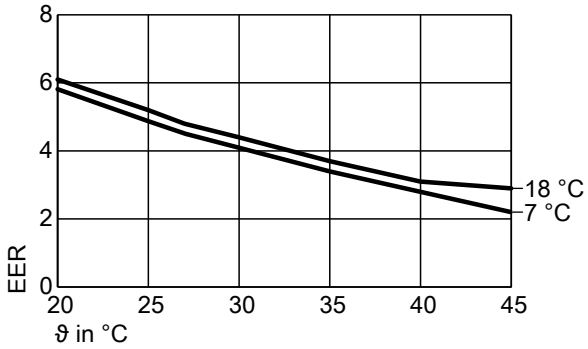


Possible output range

Power consumption for cooling at flow temperatures of 18 °C, 7 °C



Energy efficiency ratio EER at flow temperatures of 18 °C, 7 °C



ϑ Air intake temperature
P Cooling capacity
P_{el} Power consumption
EER Performance factor

Note

- *The EER data in the tables and graphs was calculated with reference to EN 14511.*
- *Performance characteristics apply to new appliances with clean plate heat exchangers.*

Operating point	**W**	**°C**	**18**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	19.00	18.70	18.50	18.00	16.00	12.10	9.80
Cooling capacity		kW	17.50	16.00	15.40	14.60	13.30	12.10	9.80
Power consumption		kW	2.87	3.08	3.21	3.32	3.59	3.90	3.38
Energy efficiency ratio EER			6.10	5.20	4.80	4.40	3.70	3.10	2.90
Min. cooling capacity		kW	8.40	8.00	7.80	7.50	7.10	6.70	6.30

Operating point	**W**	**°C**	**7**						
	A	**°C**	**20**	**25**	**27**	**30**	**35**	**40**	**45**
Max. cooling capacity		kW	11.00	10.10	9.70	9.30	8.70	6.30	3.70
Cooling capacity		kW	7.60	7.20	7.10	6.80	6.30	5.70	3.70
Power consumption		kW	1.31	1.47	1.58	1.66	1.85	2.04	1.68
Energy efficiency ratio EER			5.80	4.90	4.50	4.10	3.40	2.80	2.20
Min. cooling capacity		kW	5.90	5.40	5.20	5.00	4.50	4.10	3.70

6.1 Overview

General accessories and heating/cooling circuits

Accessories	Part no.	Vitocal 150-A	Vitocal 151-A
Ventilation unit: See page 65 onwards.			
Vitoair FS, type 300E	Z023297	X	X
Hydraulic connection accessories, secondary circuit: See page 65 onwards.			
Pre-plumbing jig for surface mounting	ZK06008	X	
Valve/fittings cover, 450 mm	7973427	X	
Ball valve set	ZK06057	X	X
Hydraulic connection sets for heating/cooling circuit, surface mounting			
– To the top	ZK06058		X
– To the left	ZK06059		X
– To the right	ZK06060		X
Pre-plumbing jig for compact appliance, heating/cooling circuit, surface mounting			
– To the top	ZK06061		X
– To the left	ZK06062		X
– To the right	ZK06063		X
DHW circulation connection set			
– With high efficiency circulation pump	ZK06064		X
– For on-site circulation pump	ZK06228		X
Heating filter with magnetite separation (backwashing)	7266384	X	X
Divicon heating/cooling circuit distributor: See page 69 onwards.			
Without mixer, fully fitted			
– With high efficiency circulation pump 25/6, DN 20 - R ¾	ZK06009	X	X
– With high efficiency circulation pump 25/6, DN 25 - R 1	ZK06010	X	X
– With high efficiency circulation pump 25/8, DN 32 - R 1¼	ZK06011	X	X
With mixer, fully fitted			
– With high efficiency circulation pump 25/6, DN 20 - R ¾	Z024426	X	X
– With high efficiency circulation pump 25/6, DN 25 - R 1	Z024427	X	X
– With high efficiency circulation pump 25/8, DN 32 - R 1¼	Z024428	X	X
Mixer extension kits: See control unit accessories on page 128.			
Cable set with plugs 40 and 74	ZK04322	X	X
Wall mounting bracket for individual Divicons	7465894	X	X
Bypass valve	7464889	X	X
Manifold for 2 Divicons			
– DN 20 - R ¾ / DN 25 - R 1	ZK06214	X	X
Wall mounting bracket for manifold	7465439	X	X
Cooling accessories: See page 74 onwards.			
Contact humidistat			
– 24 V⎓	7181418	X	X
– 230 V~	7452646	X	X
Miscellaneous: See page 90 onwards.			
Platform for unfinished floors	7417925		X
Drain outlet set	7176014		X

DHW heating accessories

Accessories	Part no.	Vitocal 150-A	Vitocal 151-A
DHW heating, general: See page 74 onwards.			
Safety assembly to DIN 1988	7180662	X	X
DHW heating with integral DHW cylinder: See page 75 onwards.			
Impressed current anode	Z004247		X
DHW heating with Vitocell 100-W, type CVWA/CVWB (300 l/390 l/500 l): See page 75 onwards.			
Vitocell 100-W, type CVWB, colour: Vitopearlwhite			
– Cylinder capacity 300 l	Z021898	X	
Vitocell 100-W, type CVWA, colour: Vitopearlwhite			
– Cylinder capacity 390 l	Z021899	X	
– Cylinder capacity 500 l	Z021900	X	
Immersion heater EHE			
– For cylinder capacity 300 l/390 l/500 l, installation in top section	Z012684	X	
– For cylinder capacity 300 l, installation in bottom section	Z021936	X	
– For cylinder capacity 390 l/500 l, installation in bottom section	Z021937	X	
Solar heat exchanger set for cylinder capacity of 390 l/500 l	7186663	X	
Impressed current anode	Z004247	X	

Installation accessories (cont.)

Accessories	Part no.	Vitocal 150-A	Vitocal 151-A
DHW heating with Vitocell 100-W, type CVAB (300 l): See page 81 onwards.			
Vitocell 100-W, type CVAB, cylinder capacity 300 l, colour: Vitopearlwhite	Z021912	X	
Immersion heater EHE, installation in bottom section	Z021939	X	
Impressed current anode	7265008	X	

Accessories, outdoor unit positioning

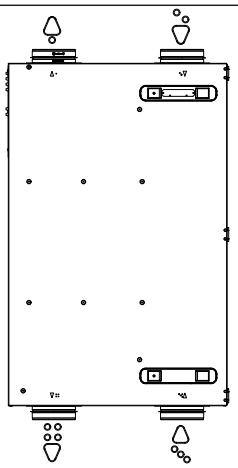
Accessories	Part no.	Vitocal 150-A	Vitocal 151-A
Outdoor unit positioning: See page 86 onwards.			
Basic connection set for outdoor unit	7973227	X	X
Floor bracket and wall outlet above ground level — connection set for floorstanding installation bracket			
– Copper pipes with thermal insulation	ZK06018	X	X
– Copper pipes without thermal insulation	ZK06428	X	X
– Stainless steel corrugated pipes with thermal insulation	ZK06019	X	X
Wall mounting bracket and wall outlet — connection set for wall mounting bracket			
– Copper pipes with thermal insulation	ZK06021	X	X
– Copper pipes without thermal insulation	ZK06429	X	X
Floor bracket and cables routed underground— connection set for floorstanding installation bracket			
– Stainless steel corrugated pipes with thermal insulation	ZK06020	X	X
Quattro connection line laid underground			
– Horizontal line length 5 m	7984138	X	X
– Horizontal line length 10 m	7984139	X	X
– Horizontal line length 15 m	7984140	X	X
– Horizontal line length 20 m	7984141	X	X
Ring seal for Quattro connection line laid underground	7984142	X	X
Supports for outdoor unit: See page 88 onwards.			
Design casing for floor bracket including wall connection	ZK06015	X	X
Bracket for floorstanding installation	ZK06013	X	X
Anti-vibration base	ZK06012	X	X
Design casing for wall mounting bracket	ZK06017	X	X
Bracket set for mounting the outdoor unit on a wall	ZK06016	X	X
Design casing for floor bracket	ZK06014	X	X
Miscellaneous: See page 90 onwards.			
Ribbon heater			
– Condensate pan	ZK06022	X	X
– Condensate drain	7973114	X	X
Cap set	ZK02933	X	X
Design covers for evaporator	ZK06215	X	X
Special cleaner	7249305	X	X

6.2 Ventilation unit

Vitoair FS, type 300E

Part no. Z023297

Overview of ventilation unit

Arrangement of air connectors	
Countercurrent/enthalpy heat exchanger	X
Wall mounting	X
Ceiling mounting	X
Floorstanding	X
Max. air flow rate in m^3/h	300
Max. area of residential unit in m^2 (standard value)	280
Constant flow rate control	X
Automatic bypass	X
Electric preheating coil	○

X Standard delivery/possible
○ Ventilation unit accessories

Note
Detailed information on planning a mechanical ventilation system with Vitoair FS: See technical guide "Vitoair FS".

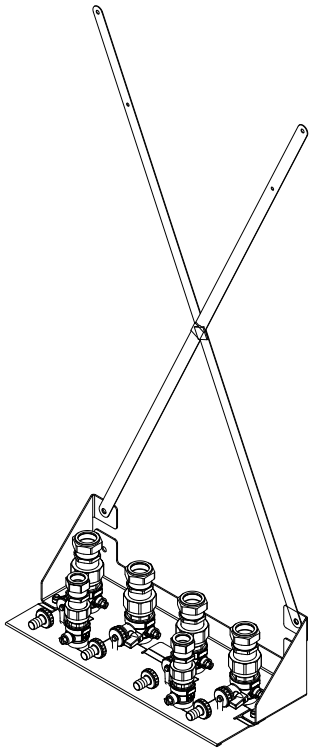
6.3 Hydraulic connection accessories, secondary circuit

Note
For hydraulic connection of the secondary circuit, one of the following connection accessories must be used.

Pre-plumbing jigs for surface mounting

Part no. ZK06008

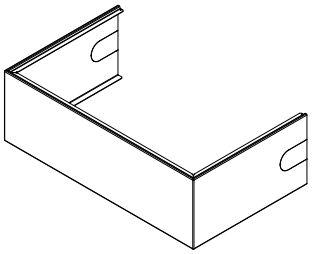
For indoor unit with 1 integral heating/cooling circuit:
- Width of indoor unit: 450 mm
- On-site insulation required for cooling mode
- With fixings
- With valves/fittings



Valve/fittings cover, 450 mm

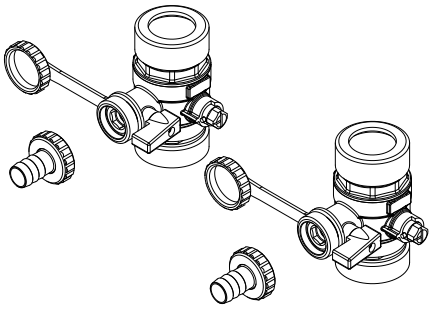
Part no. 7973427

For indoor units with a width of 450 mm
- Colour: Vitopearlwhite
- Direct installation on indoor unit
- Can also be used in conjunction with pre-plumbing jig



Ball valve set

Part no. ZK06057
Valves for flushing and venting:
Required if no pre-plumbing jig is used.

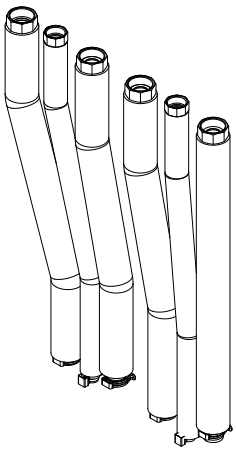


Hydraulic connection sets for heating/cooling circuit, surface mounting

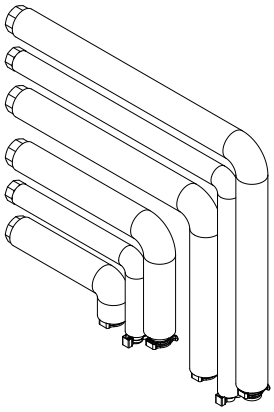
For indoor unit with 1 integrated heating/cooling circuit
- Thermally insulated heating water flow and heating water return line G 1¼
- Thermally insulated cold water and DHW line G 1

Installation accessories (cont.)

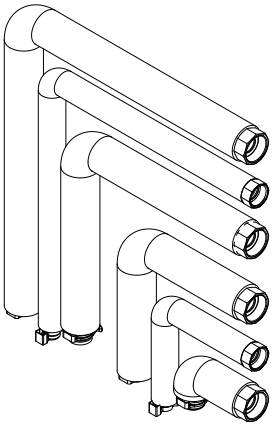
Part no. ZK06058
Connections at the top



Part no. ZK06059
Connection to the left



Part no. ZK06060
Connection to the right

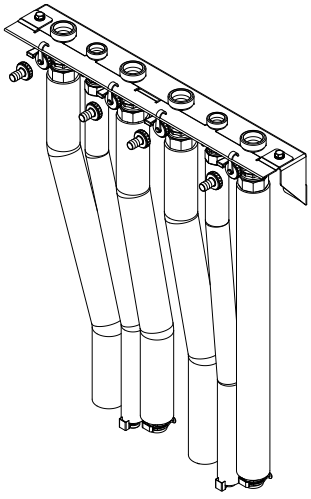


Pre-plumbing jigs for compact appliance, heating/cooling circuit, surface mounting

For indoor unit with 1 integrated heating/cooling circuit

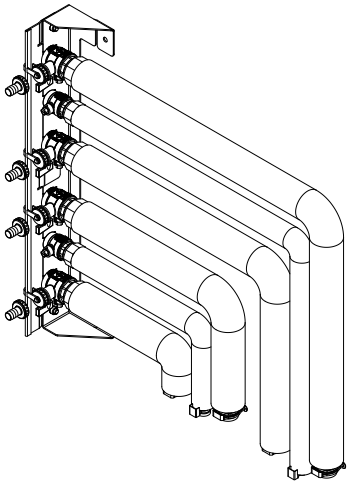
On-site insulation of shut-off valves required for cooling mode
- Fitting assembly
- Thermally insulated heating water flow and heating water return line G 1¼
- Thermally insulated cold water and DHW line G 1
- Shut-off valves for heating water flow and return with BDF valve
- Shut-off valves for drinking water

Part no. ZK06061
Connections at the top

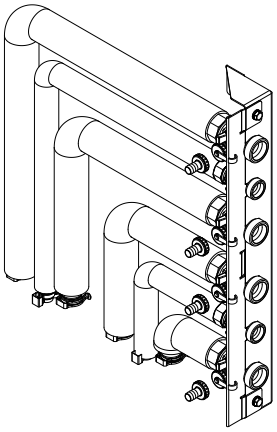


Installation accessories (cont.)

Part no. ZK06062
Connection to the left



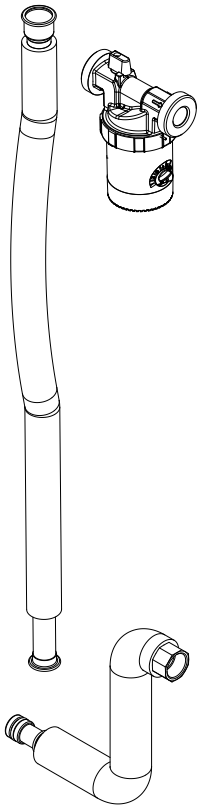
Part no. ZK06063
Connection to the right



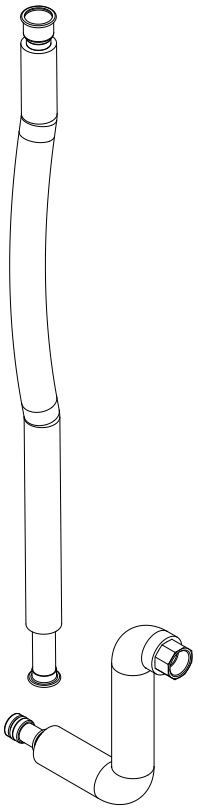
Connection sets, DHW circulation

Pipe assembly with thermal insulation

Part no. ZK06064
With high efficiency circulation pump



Part no. ZK06228
For on-site high efficiency circulation pump



6

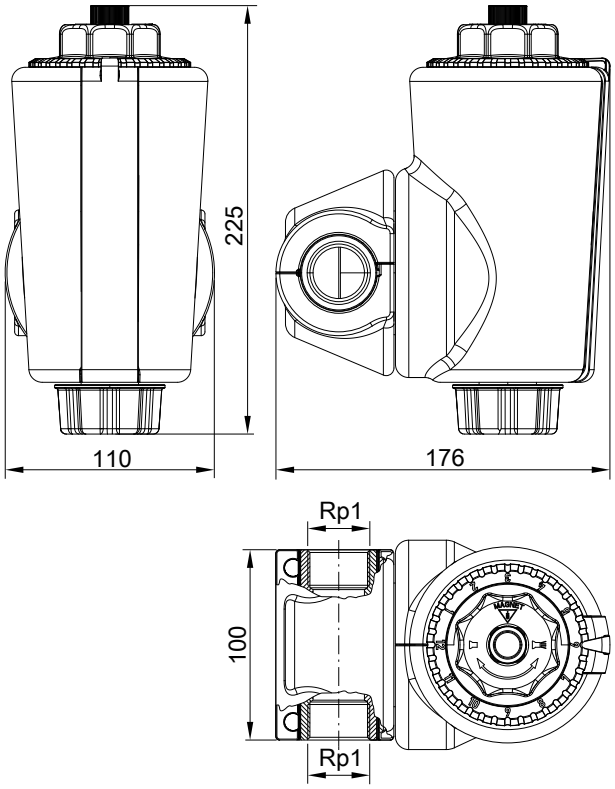
6179959

Heating filter with magnetite separation (backwashing)

Part no. 7266384

For installation between indoor and outdoor unit in the outdoor unit flow:
- Essential requirement in the case of heating system modernisations
- Recommended for new build

- Rotary connection flange for horizontal and vertical installation
- Stainless steel filter element
- Easy to backwash for cleaning the filter element and magnet
- Replaceable filter element
- Manual backwashing and maintenance display



Specification

Connections	DN 25, Rp 1
Max. operating pressure	10 bar 1000 kPa
Operating temperature	10 to 110 °C
Medium	Heating water
Min. pressure for backwashing	1.5 bar 150 kPa
Installation position	Main axis, vertical
Filter mesh size	100 µm
Flow rate	
– At pressure drop 0.1 bar (10 kPa)	2.56 m^3/h
– At pressure drop 0.15 bar (15 kPa)	3.20 m^3/h
– At pressure drop 0.18 bar (18 kPa)	3.60 m^3/h
K_{VS} value	8.0

6.4 Divicon heating circuit distributor

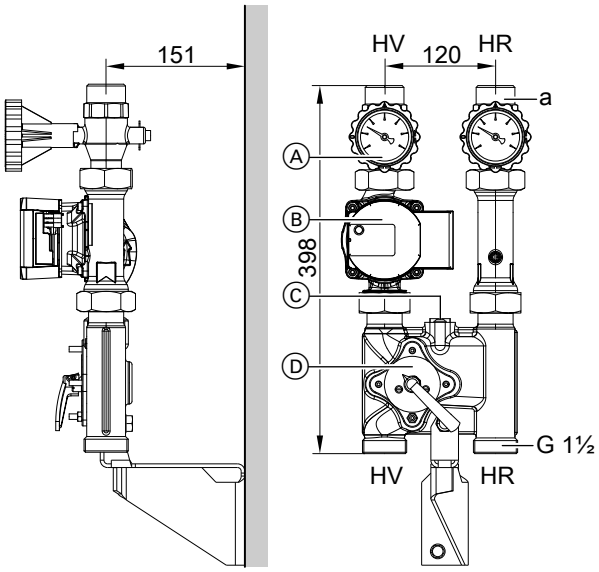
Design and function

- Available with connections R ¾, R 1 and R 1¼
- With heating/cooling circuit pump, check valve, ball valves with integral thermometers and 3-way mixer or without mixer
- Quick and simple installation due to pre-assembled unit and compact design
- All-round thermal insulation shells for low radiation losses
- High efficiency circulation pumps and optimised mixer curve ensure low electricity costs and precise control characteristics
- The bypass valve for hydronic balancing of the heating system is available as an accessory and is provided as a threaded component for inserting into the prepared hole in the cast body.
- Individually wall mounted or with a double manifold

Part no. of Divicon versions: See Viessmann pricelist.
The dimensions of the heating/cooling circuit distributor are the same, with or without mixer.

Installation accessories (cont.)

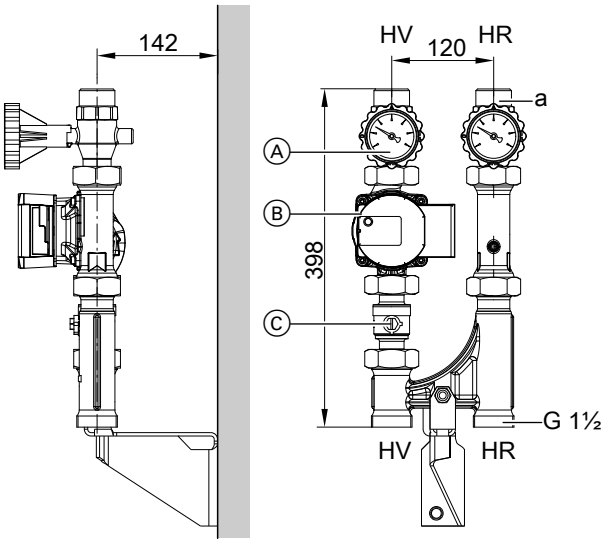
Divicon with mixer



Divicon with mixer: Wall mounting, shown without thermal insulation and mixer extension kit

HR Heating return
HV Heating flow
Ⓐ Ball valves with thermometer (as operating element)
Ⓑ Circulation pump
Ⓒ Bypass valve (accessories)
Ⓓ Mixer-3

Divicon without mixer



Divicon without mixer: Wall mounting, shown without thermal insulation

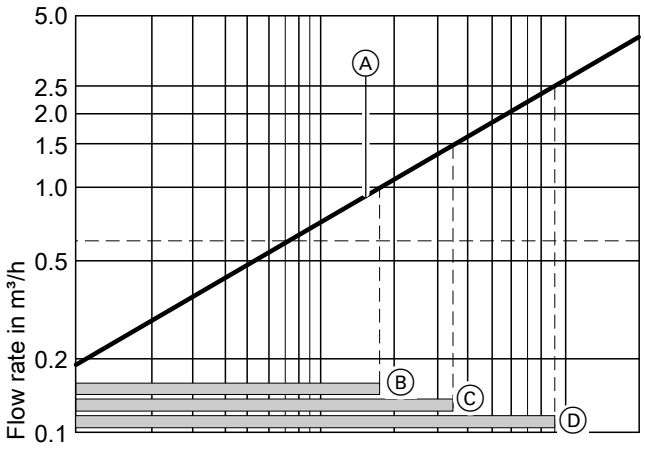
HR Heating return
HV Heating flow
Ⓐ Ball valves with thermometer (as operating element)
Ⓑ Circulation pump
Ⓒ Ball valve

Heating/cooling connection	**R**	**¾**	**1**	**1¼**
Max. flow rate	m^3/h	1.0	1.5	2.5
a (female)	Rp	¾	1	1¼
a (male)	G	1¼	1¼	2

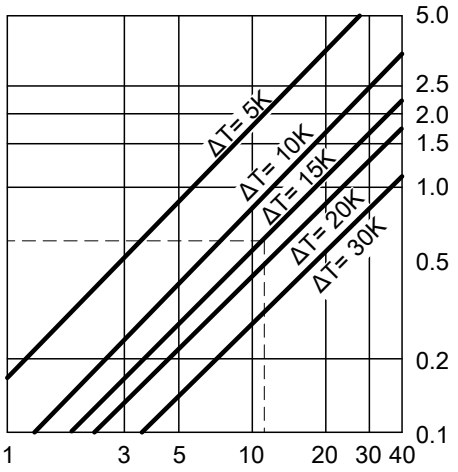
6

Installation accessories (cont.)

Determining the required nominal diameter



Mixer control characteristics



Heating circuit output in kW

Ⓐ Divicon with mixer-3
The operating ranges marked Ⓑ to Ⓓ provide optimum control characteristics with the Divicon mixer:
Ⓑ Divicon with mixer-3 (R ¾)
Operating range: 0 to 1.0 m³/h
Ⓒ Divicon with mixer-3 (R 1)
Operating range: 0 to 1.5 m³/h
Ⓓ Divicon with mixer-3 (R 1¼)
Operating range: 0 to 2.5 m³/h

Example:
- Heating/cooling circuit for radiators with a heating output $\dot{Q}$ = 11.6 kW
- Heating system temperature 75/60 °C (ΔT = 15 K)

$$\dot{Q} = \dot{m} \cdot c \cdot \Delta T \qquad c = 1.163 \ \frac{Wh}{kg \cdot K} \qquad \dot{m} \triangleq \dot{V} \ (1\ kg \approx 1\ dm^3)$$

$$\dot{V} = \frac{\dot{Q}}{c \cdot \Delta T} = \frac{11600\ W \cdot kg \cdot K}{1.163\ Wh \cdot (75\text{-}60)\ K} = 665 \ \frac{kg}{h} \triangleq 0.665 \ \frac{m^3}{h}$$

c Specific thermal capacity
$\dot{m}$ Mass flow rate
$\dot{Q}$ Heating output
$\dot{V}$ Flow rate

Using the value $\dot{V}$, select the smallest possible mixer within the application limit.
Result for this example: Divicon with mixer-3 (R ¾)

Circulation pump curves and pressure drop on the heating water side

The residual head of the circulation pump is derived from the differential between the selected pump curve and the pressure drop curve of the relevant heating circuit distributor and/or other components (pipe assembly, distributor, etc.).
The following pump graphs show the pressure drop curves of the different Divicon heating circuit distributors.
Maximum flow rate for Divicon:
- With R ¾ = 1.0 m³/h
- With R 1 = 1.5 m³/h
- With R 1 ¼ = 2.5 m³/h

Example:
Flow rate $\dot{V}$ = 0.665 m³/h

Selected:
- Divicon with mixer R ¾
- Wilo PARA 25/6 circulation pump, variable differential pressure operating mode and set to maximum delivery head
- Pump rate 0.7 m ³/h

Head of the relevant pump curve:	48 kPa
Divicon pressure drop:	3.5 kPa
Residual head:	48 kPa – 3.5 kPa = 44.5 kPa.

Note
For further components (pipe assembly, distributor, etc.) determine the pressure drop and deduct it from the residual head.

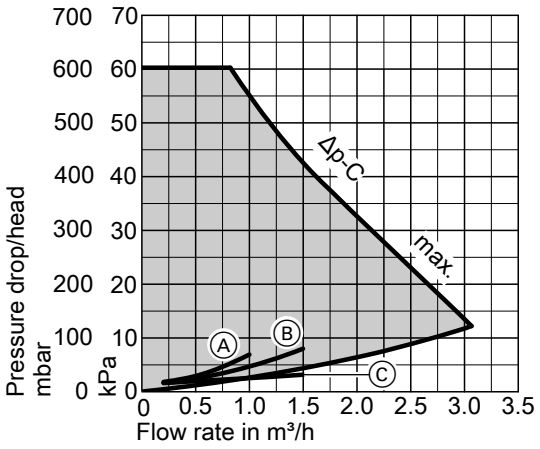
Differential pressure-dependent heating circuit pumps
According to the [German] Buildings Energy Act (GEG), circulation pumps in central heating systems must be sized in accordance with current technical rules.
Ecodesign Directive 2009/125/EC requires high efficiency circulation pumps to be used throughout Europe from 1 January 2013, if these pumps are not installed in the heat generator.

Design information
The use of differential pressure-dependent heating circuit pumps requires heating circuits with variable pump rates, e.g. single-line and twin-line heating systems with thermostatic valves and underfloor heating systems with thermostatic valves or zone valves.

Installation accessories (cont.)

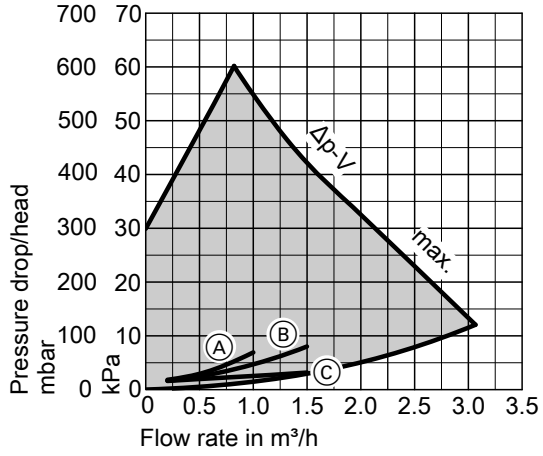
Wilo Para 25/6
- Particularly power saving, high efficiency circulation pump
- Energy efficiency index EEI ≤ 0.20

Operating mode: Constant differential pressure



Ⓐ Divicon R ¾ with mixer
Ⓑ Divicon R 1 with mixer
Ⓒ Divicon R ¾ and R 1 without mixer

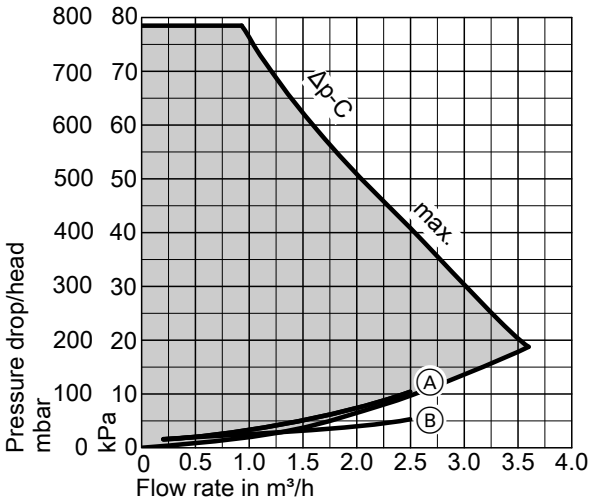
Operating mode: Variable differential pressure



Ⓐ Divicon R ¾ with mixer
Ⓑ Divicon R 1 with mixer
Ⓒ Divicon R ¾ and R 1 without mixer

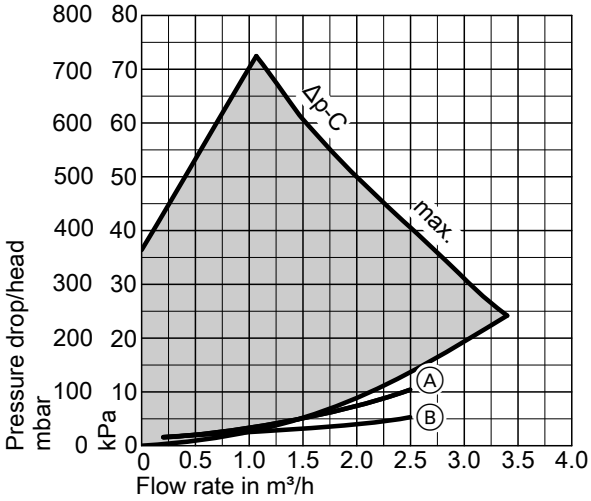
Wilo Para 25/8
- Energy efficiency index EEI ≤ 0.20

Operating mode: Constant differential pressure



Ⓐ Divicon R 1¼ with mixer
Ⓑ Divicon R 1¼ without mixer

Operating mode: Variable differential pressure



Ⓐ Divicon R 1¼ with mixer
Ⓑ Divicon R 1¼ without mixer

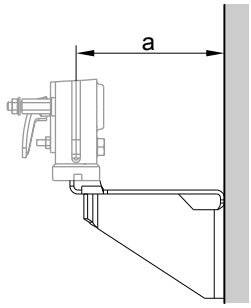
Cable set with plugs 40 and 74

Part no. ZK04322
For connecting the mixer PCBs with 2 or 3 heating circuits with mixer

The connecting cable included in standard delivery of the extension kits with mixer is replaced with the cable set with plugs 40 and 74.

Wall mounting bracket for individual Divicon

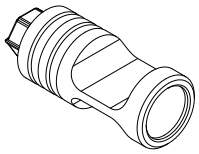
Part no. 7465894
With screws and rawl plugs



Divicon		With mixer	Without mixer
a	mm	151	142

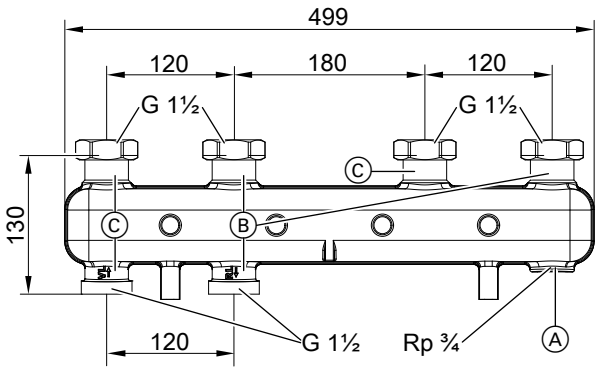
Bypass valve

Part no. 7464889
- For hydronic balancing of the heating circuit with mixer
- To be inserted into the Divicon.



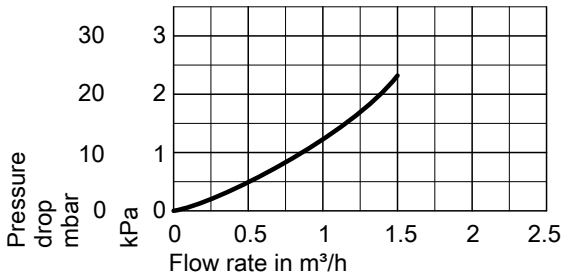
Manifold for 2 Divicons

Part no. ZK06214
- For Divicon R ¾ and R 1
- Incl. thermal insulation
- Wall mounted with wall mounting bracket to be ordered separately
- The connection between energy generator and manifold must be made on site.



Ⓐ Connection option for expansion vessel
Ⓑ Heating water/coolant return
Ⓒ Heating water/coolant flow

Pressure drop



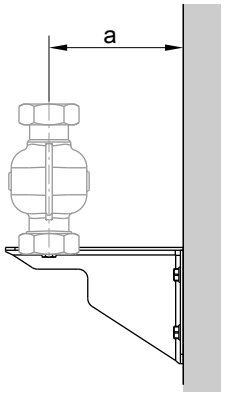
6

6179959

Wall mounting bracket for manifold

Part no. 7465439
With screws and rawl plugs

Divicon		R ¾ and R 1	R 1¼
a	mm	142	167



6.5 Accessories, cooling

Recommendation:
- Contact humidistat 24 V⎓:
  For systems with 1 **directly** connected heating/cooling circuit
- Contact humidistat 230 V~:
  For systems with external heating water/coolant buffer cylinder

Contact humidistat 24 V

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

Contact humidistat 230 V

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

6.6 Accessories for DHW heating, general

Safety assembly to DIN 1988

- **Part no. 7180662**
  10 bar (1 MPa)
- AT: **Part no. 7179666**
  6 bar (0.6 MPa)
- DN 20/R 1
- Max. heat input: 150 kW

Components:
- Shut-off valve
- Non-return valve and test connector
- Pressure gauge connector
- Diaphragm safety valve

6.7 Accessories for DHW heating with integral DHW cylinder

Impressed current anode

Part no. Z004247
- Maintenance-free
- Install in place of the magnesium anode supplied

6.8 DHW heating with Vitocell 100-W, type CVWA/CVWB (300 l/390 l/500 l)

Vitocell 100-V/100-W, type CVWA/CVWB: Vitopearlwhite

Observe the information on sizing DHW cylinders: See page 121 onwards.

Part no.	Cylinder type	Cylinder capacity
Z021898	CVWB	300 l
Z021899	CVWA	390 l
Z021900	CVWA	500 l

Information on continuous output
When designing systems with the specified or calculated continuous output, allow for a matching circulation pump. The stated continuous output is achieved only if the heat generator's rated heating output is ≥ continuous output.

Sizing entry points
The actual dimensions of the DHW cylinder may vary slightly due to manufacturing tolerances.

Specification

Type			**CVWB**	**CVWA**	
Cylinder capacity (AT: Actual water capacity)		**l**	**300**	**390**	**500**
Heating water capacity		l	22	27	40
Gross volume		l	322	417	540
DIN registration no.			Applied for	9W173-13MC/E	
Continuous output at heating water flow rate stated below					
– For DHW heating from **10 to 45 °C** and following **heating water** flow temperatures					
	90 °C	kW	85	98	118
		l/h	2093	2422	2896
	80 °C	kW	71	82	99
		l/h	1749	2027	2428
	70 °C	kW	57	66	79
		l/h	1399	1623	1950
	60 °C	kW	42	49	59
		l/h	1033	1202	1451
	50 °C	kW	25	29	36
		l/h	617	723	881
– For DHW heating from **10 to 60 °C** and following **heating water** flow temperatures					
	90 °C	kW	73	85	102
		l/h	1255	1458	1754
	80 °C	kW	58	67	81
		l/h	995	1159	1399
	70 °C	kW	41	48	59
		l/h	710	830	1008
Heating water flow rate for the stated continuous outputs		m^3/h	3.0	3.0	3.0
Draw-off rate		l/min	15	15	15
Drawable water volume without reheating					
– Cylinder volume heated to 45 °C Water at t = 45 °C (constant)		l	210	285	350
– Cylinder volume heated to 55 °C Water at t = 55 °C (constant)		l	210	285	350
Heat-up time if connected to a heat pump with 16 kW rated heating output and a heating water flow temperature of 55 **or** 65 °C					
– For DHW heating from 10 to 45 °C		min	50	60	66
– For DHW heating from 10 to 55 °C		min	60	76	85
Max. connectible heat pump output at 65 °C heating water flow and 55 °C DHW temperature and the specified heating water flow rate		kW	12	15	17
Max. aperture area that can be connected to the solar heat exchanger set (accessories)					
– Vitosol-T		m^2	—	6	6
– Vitosol-F		m^2	—	11.5	11.5

6

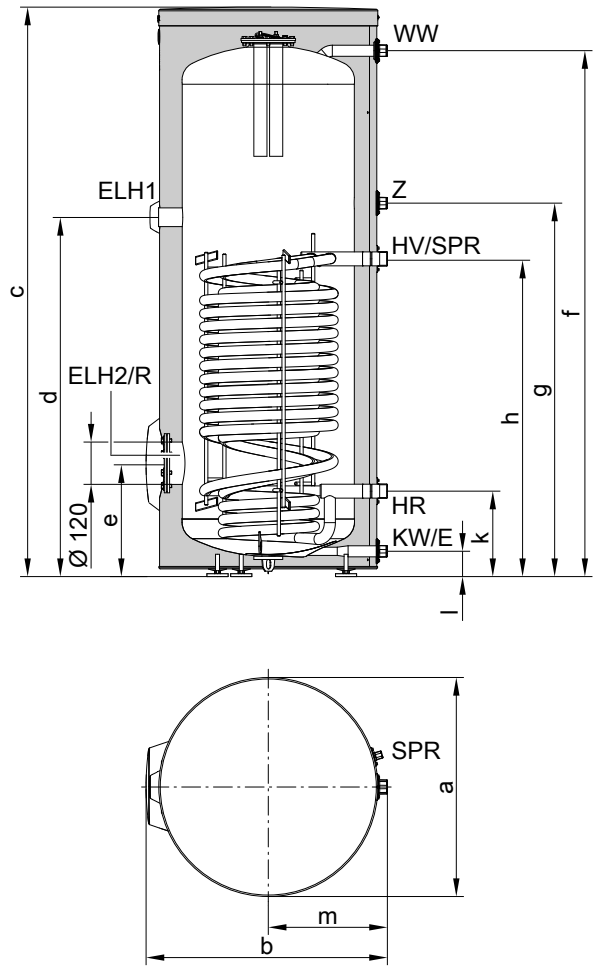
Installation accessories (cont.)

Type			CVWB	CVWA	
Cylinder capacity **(AT: Actual water capacity)**		**l**	**300**	**390**	**500**
Performance factor N_L in conjunction with a heat pump					
Cylinder storage temperature					
	45 °C		1.7	2.5	3.5
	50 °C		1.9	2.8	3.9
Standby heat loss		kWh/24 h	1.62	1.80	1.90
Permissible temperatures					
– Heating water side		°C	110	110	110
– DHW side		°C	95	95	95
– Solar side		°C	140	140	140
Permissible operating pressure					
– Heating water side		bar	10	10	10
		MPa	1.0	1.0	1.0
– DHW side		bar	10	10	10
		MPa	1.0	1.0	1.0
– Solar side		bar	10	10	10
		MPa	1.0	1.0	1.0
Dimensions					
Length a (∅)					
– Incl. thermal insulation		mm	668	859	859
– Excl. thermal insulation		mm	—	650	650
Total width b					
– Incl. thermal insulation		mm	714	923	923
– Excl. thermal insulation		mm	—	881	881
Height c					
– Incl. thermal insulation		mm	1687	1624	1948
– Excl. thermal insulation		mm	—	1522	1844
Height when tilted					
– Incl. thermal insulation		mm	1790	—	—
– Excl. thermal insulation		mm	—	1550	1860
Total weight incl. thermal insulation		kg	150	190	200
Heating surface		m^2	3.0	4.0	5.5
Connections					
Heating water flow and return (male thread)		R	1¼	1¼	1¼
Cold water, DHW (male thread)		R	1	1¼	1¼
Solar heat exchanger set (male thread)		R	—	¾	¾
DHW circulation (male thread)		R	¾	¾	¾
Immersion heater (female thread)		Rp	1½	1½	1½
Energy efficiency class			B	B	B
Colour					
– Vitocell 100-V			Vitosilver	Vitosilver or Vitopearlwhite	
– Vitocell 100-W			Vitopearlwhite	—	

6

6179959

Measurements, type CVWB, 300 l capacity

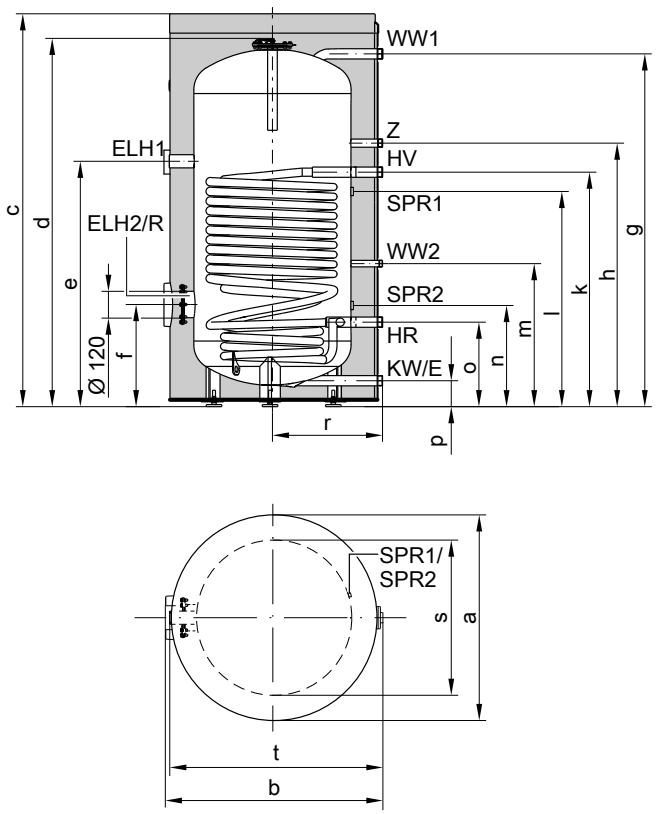


E Drain
ELH1 Connector for immersion heater
ELH2 Flanged aperture for immersion heater
HR Heating water return
HV Heating water flow
KW Cold water
R Inspection and cleaning aperture with flange cover
SPR Clamping device for securing immersion temperature sensors to the cylinder jacket, with fixing points for 3 immersion temperature sensors
WW DHW
Z DHW circulation

Dimensions of type CVWB

Cylinder capacity		l	300
Length (∅)	a	mm	668
Width	b	mm	714
Height	c	mm	1687
	d	mm	1100
	e	mm	351
	f	mm	1607
	g	mm	1143
	h	mm	974
	k	mm	266
	l	mm	83
	m	mm	362

Measurements, type CVWA, 390, 500 l capacity



E Drain
ELH1 Connector for immersion heater
ELH2 Flanged aperture for immersion heater
HR Heating water return
HV Heating water flow
KW Cold water
R Inspection and cleaning aperture with flange cover
SPR1 Clamping device for securing immersion temperature sensors to the cylinder jacket, with fixing points for 3 immersion temperature sensors
SPR2 Clamping device for securing immersion temperature sensors to the cylinder jacket, with fixing points for 3 immersion temperature sensors
WW1 DHW
WW2 DHW from solar heat exchanger set
Z DHW circulation

Dimensions of type CVWA

Cylinder capacity		l	390	500
Length (∅)	a	mm	859	859
Width	b	mm	923	923
Height	c	mm	1624	1948
	d	mm	1522	1844
	e	mm	1000	1307
	f	mm	403	442
	g	mm	1439	1765
	h	mm	1070	1370
	k	mm	950	1250
	l	mm	816	1116
	m	mm	572	572
	n	mm	366	396
	o	mm	330	330
	p	mm	88	88
	r	mm	455	455
	s	mm	650	650
	t	mm	881	881

6

6179959

Installation accessories (cont.)

Performance factor N_L to DIN 4708

Cylinder capacity	l	300	390	500
Performance factor N_L				
Heating water flow temperature				
90 °C		9.5	12.6	16.5
80 °C		8.5	11.3	14.9
70 °C		7.5	10.0	13.3

- The performance factor N_L depends on the cylinder storage temperature T_{cyl}
- Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\ K/-0\ K}$

Standard values for performance factor N_L
- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

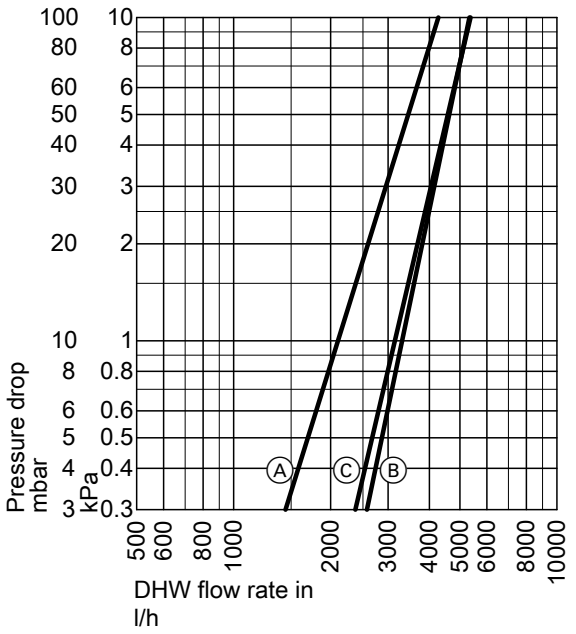
Peak output over 10 min, relative to performance factor N_L

Cylinder capacity	l	300	390	500
Peak output for heating the DHW from 10 to 45 °C				
Heating water flow temperature				
90 °C	l/10 min	415	540	690
80 °C	l/10 min	400	521	667
70 °C	l/10 min	357	455	596

Max. draw-off rate over 10 min., relative to performance factor N_L

Cylinder capacity	l	300	390	500
Max. draw-off rate for DHW heating from 10 to 45 °C, with reheating				
Heating water flow temperature				
90 °C	l/min	41	54	69
80 °C	l/min	40	52	66
70 °C	l/min	35	46	59

Pressure drop on the DHW side



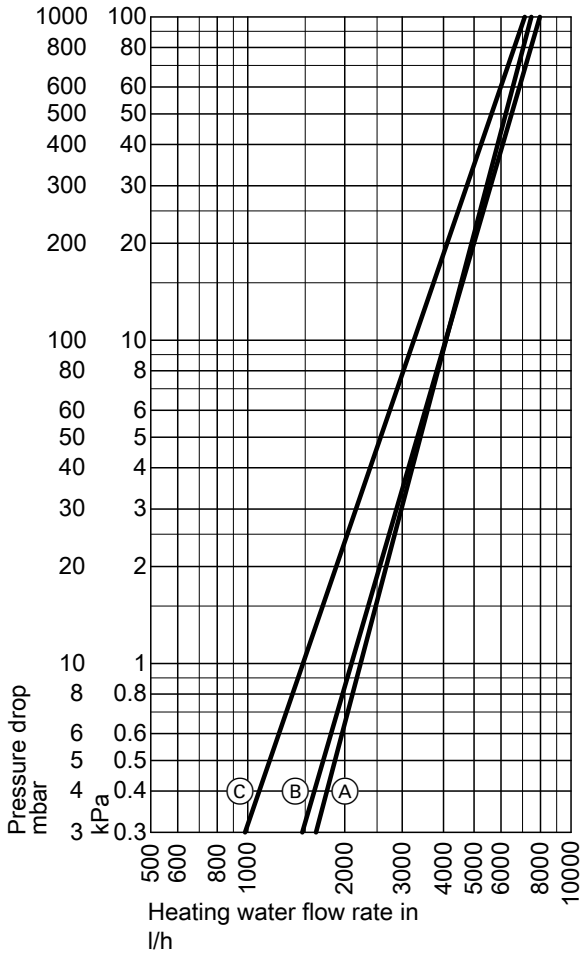
Ⓐ Cylinder capacity 300 l
Ⓑ Cylinder capacity 390 l
Ⓒ Cylinder capacity 500 l

6

6179959

Installation accessories (cont.)

Pressure drop on the heating water side



Ⓐ Cylinder capacity 300 l
Ⓑ Cylinder capacity 390 l
Ⓒ Cylinder capacity 500 l

Immersion heater EHE

Part no. Z012684

For installation in the connector in the **upper** part of the Vitocell 100-V/100-W, type CVWA/CVWB with cylinder volume of **300 l**/**390 l**/**500 l**

- Use the immersion heater only with soft to medium hard water up to 14 °dH (hardness level 2, up to 2.5 mol/m³).
- The heating output can be selected: 2, 4 or 6 kW

Components:
- High limit safety cut-out
- Temperature controller

Specification

Output	**kW**	**2**	**4**	**6**
Rated voltage		3/N/PE 400 V/50 Hz		
IP rating		IP 45	IP 45	IP 45
Rated current	A	8.7	8.7	8.7
Heat-up time from 10 to 60 °C				
– Cylinder volume 300 l	h	2.90	1.45	1.00
– Cylinder volume 390 l	h	3.74	1.87	1.25
– Cylinder volume 500 l	h	3.86	1.93	1.29
Content that can be heated by the immersion heater				
– Cylinder volume 300 l	l	101	101	101
– Cylinder volume 390 l	l	129	129	129
– Cylinder volume 500 l	l	133	133	133

Immersion heater EHE

- **Part no. Z021936**:
  For installation in the flanged aperture on the **lower** part of the 100-W. type CVWB with cylinder volume of **300 l**
- **Part no. Z021937**:
  For installation in the connector in the **lower** part of the 100-W, type CVWA with cylinder volume of **390 l** and **500 l**
- Use the immersion heater only with soft to medium hard water with a calcium hardness up to 14 °dH (hardness level 2, up to 2.5 mol/m³).
- The heating output can be selected: 2, 4 or 6 kW

Installation accessories (cont.)

Components:
- High limit safety cut-out
- Temperature controller
- Flange
- Colour of flange cover: Vitopearlwhite
- Gasket

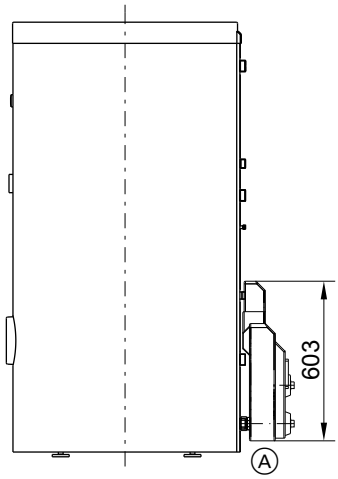
Specification

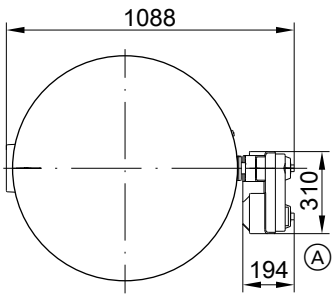
Output	**kW**	**2**	**4**	**6**
Rated voltage		3/N/PE 400 V/50 Hz		
IP rating		IP 45	IP 45	IP 45
Rated current	A	8.7	8.7	8.7
Heat-up time from 10 to 60 °C				
– Cylinder volume 300 l	h	6.80	3.40	2.30
– Cylinder volume 390 l	h	8.73	4.36	2.91
– Cylinder volume 500 l	h	10.82	5.41	3.61
Content that can be heated by the immersion heater				
– Cylinder volume 300 l	l	236	236	236
– Cylinder volume 390 l	l	301	301	301
– Cylinder volume 500 l	l	373	373	373

Solar heat exchanger set

Part no. 7186663
For connecting the solar collectors to the DHW cylinder (390 and 500 l capacity)
Suitable for systems to DIN 4753. Up to a total water hardness of 20 °dH (3.6 mol/m³)

Max. collector surface area that can be connected:
- 11.5 m² flat-plate collectors
- 6 m² tube collectors





Ⓐ Solar heat exchanger set

Specification

Permissible temperatures	
Solar side	140 °C
Heating water side	110 °C
DHW side	
– For boiler operation	95 °C
– For solar operation	60 °C
Permissible operating pressure	10 bar (1.0 MPa)
Solar side, heating and DHW side	
Test pressure	13 bar (1.3 MPa)
Solar side, heating and DHW side	
Minimum wall clearance	350 mm
For installation of the solar heat exchanger set	
Circulation pump	
Power supply	230 V/50 Hz
IP rating	IP 42

6

Impressed current anode

Part no. Z004247
- Maintenance-free
- For installation in the Vitocell 100-V/100-W, type CVWA/CVWB in place of the protective magnesium anode supplied

6.9 DHW heating with Vitocell 100-W, type CVAB (300 l)

Vitocell 100-W, type CVAB: Vitopearlwhite

Part no. Z021912
Observe the information on sizing DHW cylinders: See page 121 onwards.

Information on continuous output
When designing systems with the specified or calculated continuous output, allow for a matching circulation pump. The stated continuous output is achieved only if the heat generator's rated heating output is ≥ continuous output.

Sizing entry points
The actual dimensions of the DHW cylinder may vary slightly due to manufacturing tolerances.

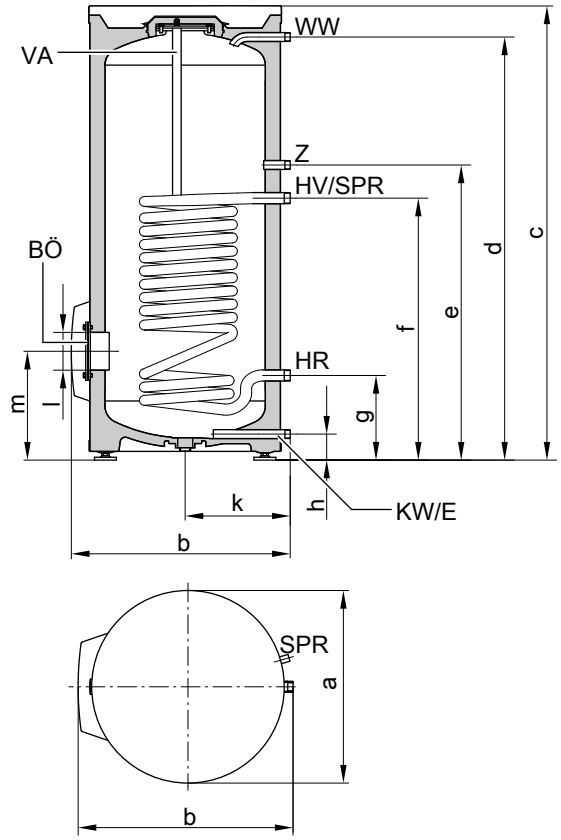
Specification

Type			**CVAB**	**CVA**	**CVAA**	
Cylinder capacity (AT: Actual water capacity)		**l**	**300**	**500**	**750**	**950**
Heating water capacity		l	10.0	12.5	29.7	33.1
Gross volume		l	310.0	512.5	779.7	983.1
DIN registration number			9W241–13 MC/E			
Continuous output at heating water flow rate stated below						
– For DHW heating from **10 to 45 °C** and following **heating water** flow temperatures						
	90 °C	kW	53	70	109	116
		l/h	1302	1720	2670	2861
	80 °C	kW	44	58	91	98
		l/h	1081	1425	2236	2398
	70 °C	kW	33	45	73	78
		l/h	811	1106	1794	1926
	60 °C	kW	23	32	54	58
		l/h	565	786	1332	1433
	50 °C	kW	18	24	33	35
		l/h	442	589	805	869
– For DHW heating from **10 to 60 °C** and following **heating water** flow temperatures						
	90 °C	kW	45	53	94	101
		l/h	774	911	1613	1732
	80 °C	kW	34	44	75	80
		l/h	584	756	1284	1381
	70 °C	kW	23	33	54	58
		l/h	395	567	923	995
Heating water flow rate for the stated continuous outputs		m^3/h	3.0	3.0	3.0	3.0
Standby heat loss		kWh/24 h	1.56	1.95	2.28	2.48
Permissible temperatures						
– Heating water side		°C	160	160	160	160
– DHW side		°C	95	95	95	95
Permissible operating pressure						
– Heating water side		bar	10	25	25	25
		MPa	1.0	2.5	2.5	2.5
– DHW side		bar	10	10	10	10
		MPa	1.0	1.0	1.0	1.0

Installation accessories (cont.)

Type		CVAB	CVA	CVAA	
Cylinder capacity	**l**	**300**	**500**	**750**	**950**
(AT: Actual water capacity)					
Dimensions					
Length a (∅)					
– Incl. thermal insulation	mm	668	859	1062	1062
– Excl. thermal insulation	mm	—	650	790	790
Width b					
– Incl. thermal insulation	mm	706	923	1110	1110
– Excl. thermal insulation	mm	—	837	1005	1005
Height c					
– Incl. thermal insulation	mm	1687	1948	1897	2197
– Excl. thermal insulation	mm	—	1844	1817	2123
Height when tilted					
– Incl. thermal insulation	mm	1790	—	—	—
– Excl. thermal insulation	mm	—	1860	1980	2286
Total weight incl. thermal insulation	kg	115	181	301	363
Heating surface	m^2	1.5	1.9	3.5	3.9
Connections (male thread)					
Heating water flow and return	R	1	1	1¼	1¼
Cold water, DHW	R	1	1¼	1¼	1¼
DHW circulation	R	1	1	1¼	1¼
Energy efficiency class		B	B	—	—
Colour					
– Vitosilver		X	X	X	
– Vitopearlwhite		X	X	—	

Dimensions of type CVAB, 300 l capacity



BÖ Inspection and cleaning aperture
E Drain

HR Heating water return
HV Heating water flow
KW Cold water
SPR Sensor well for cylinder temperature sensor and temperature controller (internal diameter 16 mm)
VA Protective magnesium anode
WW DHW
Z DHW circulation

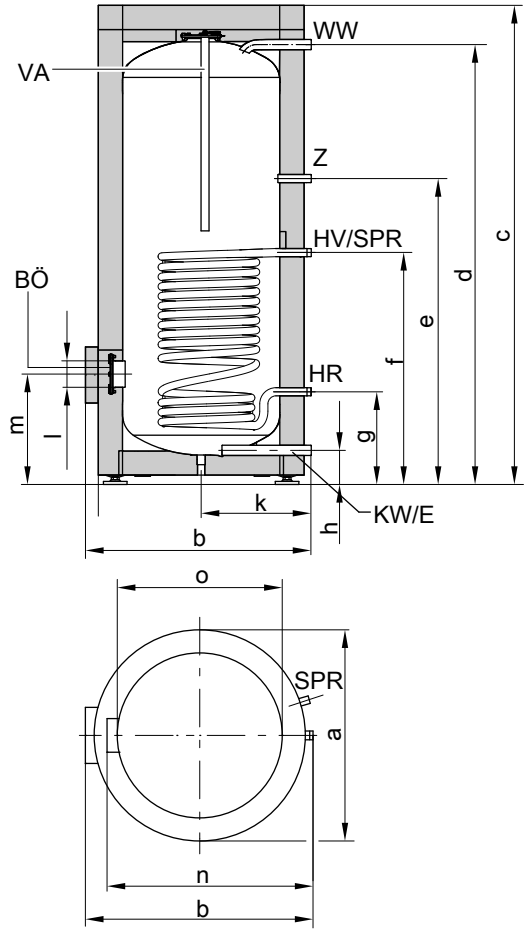
Dimensions of type CVAB

Cylinder capacity		l	300
Length (∅)	a	mm	668
Width	b	mm	706
Height	c	mm	1687
	d	mm	1607
	e	mm	1122
	f	mm	882
	g	mm	267
	h	mm	83
	k	mm	362
	l	mm	∅ 100
	m	mm	340

6

6179959

Measurements, type CVA, 500 l capacity

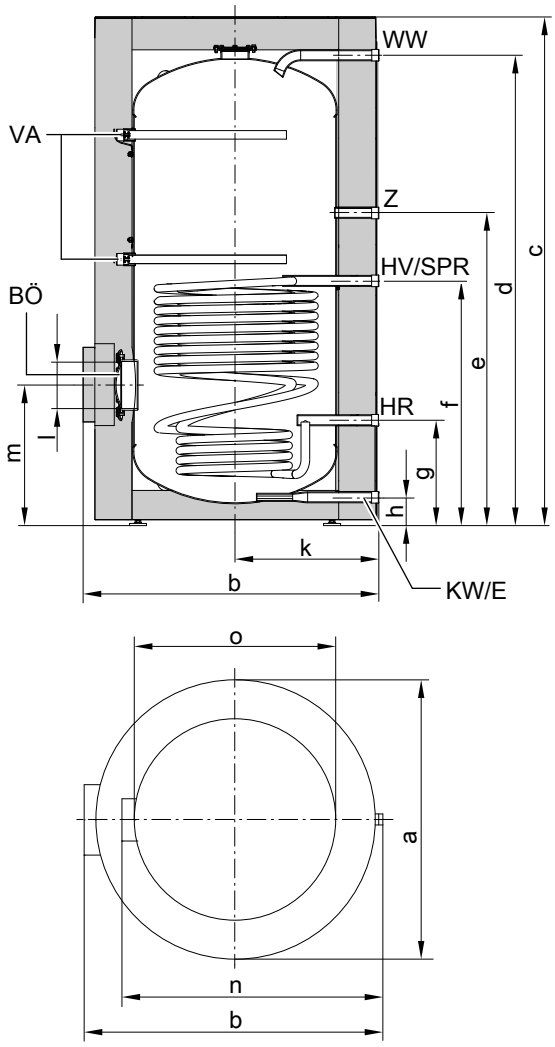


BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Cylinder temperature sensor of the cylinder temperature controller or temperature controller (internal diameter of sensor well 16 mm)
VA Protective magnesium anode
WW DHW
Z DHW circulation

Dimensions of type CVA

Cylinder capacity		**l**	**500**
Length (∅)	a	mm	859
Width	b	mm	923
Height	c	mm	1948
	d	mm	1784
	e	mm	1230
	f	mm	924
	g	mm	349
	h	mm	107
	k	mm	455
	l	mm	∅ 100
	m	mm	422
Excl. thermal insulation	n	mm	837
Excl. thermal insulation	o	mm	∅ 650

Measurements, type CVAA, 750 and 950 l capacity



BÖ Inspection and cleaning aperture
E Drain
HR Heating water return
HV Heating water flow
KW Cold water
SPR Clamping device for securing immersion temperature sensors to the cylinder jacket; fixing points for 3 immersion temperature sensors per clamping device
VA Protective magnesium anode
WW DHW
Z DHW circulation

Dimensions of type CVAA

Cylinder capacity		**l**	**750**	**950**
Length (∅)	a	mm	1062	1062
Width	b	mm	1110	1110
Height	c	mm	1897	2197
	d	mm	1788	2094
	e	mm	1179	1283
	f	mm	916	989
	g	mm	377	369
	h	mm	79	79
	k	mm	555	555
	l	mm	∅ 180	∅ 180
	m	mm	513	502
Excl. thermal insulation	n	mm	1005	1005
Excl. thermal insulation	o	mm	∅ 790	∅ 790

Installation accessories (cont.)

Performance factor N_L to DIN 4708

Cylinder capacity	l	300	500	750	950
Performance factor N_L					
Heating water flow temperature					
90 °C		9.7	21.0	38.0	44.0
80 °C		9.3	19.0	32.0	42.0
70 °C		8.7	16.5	25.0	39.0

- The performance factor N_L depends on the cylinder storage temperature T_{cyl}.
- Cylinder storage temperature T_{cyl} = cold water inlet temperature + 50 K $^{+5\ K/-0\ K}$

Standard values for performance factor N_L
- T_{cyl} = 60 °C → 1.0 × N_L
- T_{cyl} = 55 °C → 0.75 × N_L
- T_{cyl} = 50 °C → 0.55 × N_L
- T_{cyl} = 45 °C → 0.3 × N_L

Peak output over 10 min, relative to performance factor N_L

Cylinder capacity	l	300	500	750	950
Peak output for DHW heating from 10 to 45 °C					
Heating water flow temperature					
90 °C	l/10 min	407	618	850	937
80 °C	l/10 min	399	583	770	915
70 °C	l/10 min	385	540	665	875

Max. draw-off rate over 10 min., relative to performance factor N_L

Cylinder capacity	l	300	500	750	950
Max. draw-off rate for DHW heating from 10 to 45 °C, with reheating					
Heating water flow temperature					
90 °C	l/min	41	62	85	94
80 °C	l/min	40	58	77	92
70 °C	l/min	39	54	67	88

Drawable water volume

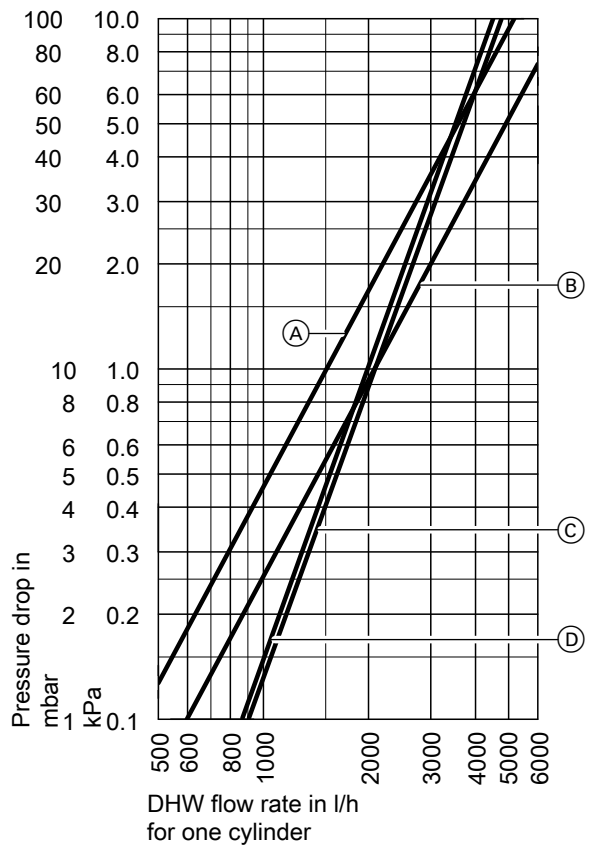
Cylinder capacity	l	300	500	750	950
Draw-off rate for cylinder volume heated to 60 °C	l/min	15	15	20	20
Drawable water volume without reheating Water at t = 60 °C (constant)	l	240	420	615	800

Heat-up time
The specified heat-up times will be achieved when the maximum continuous output of the DHW cylinder is made available at the relevant heating water flow temperature and when DHW is heated from 10 to 60 °C.

Cylinder capacity	l	300	500	750	950
Heat-up time					
Heating water flow temperature					
90 °C	min	23	28	23	35
80 °C	min	31	36	31	45
70 °C	min	45	50	45	70

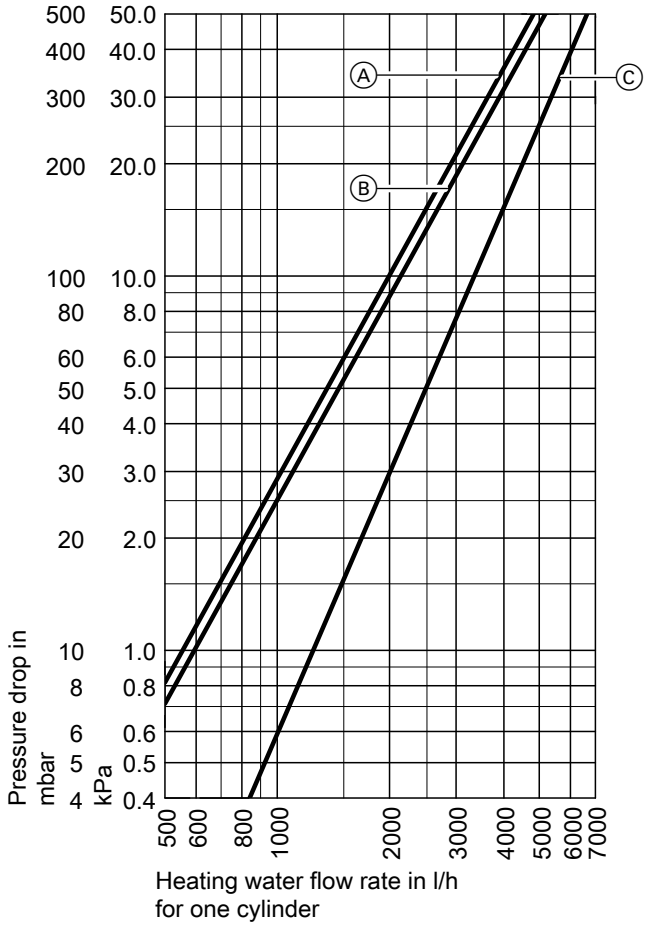
Installation accessories (cont.)

Pressure drop on the DHW side



Ⓐ Cylinder capacity 300 l
Ⓑ Cylinder capacity 500 l
Ⓒ Cylinder capacity 750 l
Ⓓ Cylinder capacity 950 l

Pressure drop on the heating water side



Ⓐ Cylinder capacity 500 l
Ⓑ Cylinder capacity 300 l
Ⓒ Cylinder capacity 750 l and 950 l

Immersion heater EHE

Part no. Z021939
- For cylinder capacity of **300 l**
- For installation into the **lower** flanged aperture
- Use the immersion heater only with soft to medium hard water with a calcium hardness up to 14 °dH (hardness level 2, up to 2.5 mol/m³).
- The heating output can be selected: 2, 4 or 6 kW

Components:
- High limit safety cut-out
- Temperature controller
- Flange
- Colour of flange cover: Vitopearlwhite
- Gasket

Specification

Output	**kW**	**2**	**4**	**6**
Rated voltage		3/N/PE 400 V/50 Hz		
IP rating		IP 44	IP 44	IP 44
Rated current	A	8.7	8.7	8.7
Heat-up time from 10 to 60 °C		7.4	3.7	2.5
Content that can be heated by the immersion heater	l	254	254	254

Impressed current anode

Part no. 7265008
- Maintenance free
- Install in place of the magnesium anode supplied

6.10 Siting the outdoor unit

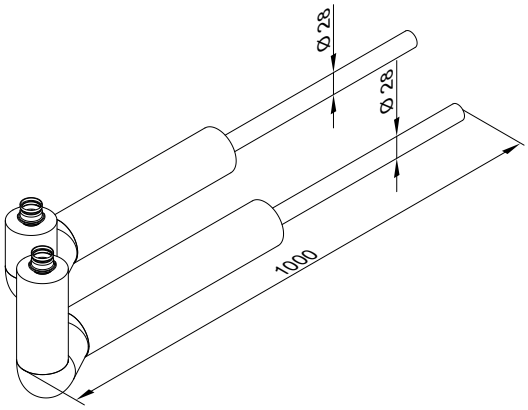
Basic connection set for outdoor unit

Part no. 7973227
For connecting the outdoor unit to the heating system:
2 x copper pipe Ø 28 mm with plug-in connector, length 50 mm

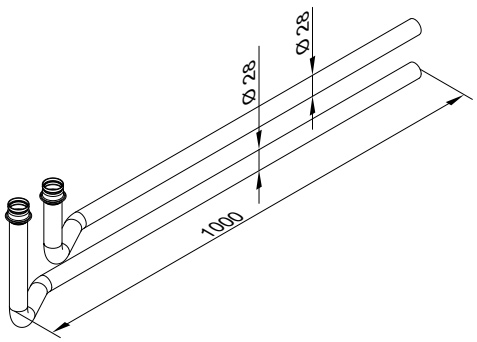
Connection sets for floor bracket, pipework above ground level

For connecting the outdoor unit to the heating system:
- 2 x copper pipe Ø 28 mm, length 1 m
  Or
- 2 x stainless steel corrugated pipes DN 25 x 600 mm with union nut 1¼" and push-in nipple
- Wall outlet DN 150, 750 mm long
- Sealing insert with entries 2 x for Ø 28 mm and 3 x for Ø 18 mm
- Cap with entries 2 x for Ø 28 mm and 3 x for lines of varying diameters

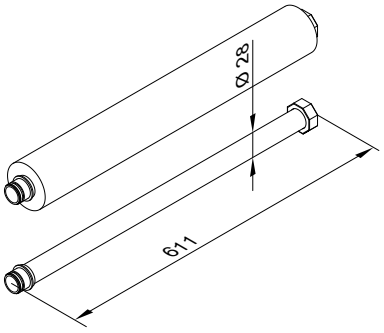
Part no. ZK06018
Copper pipes with thermal insulation



Part no. ZK06428
Copper pipes without thermal insulation



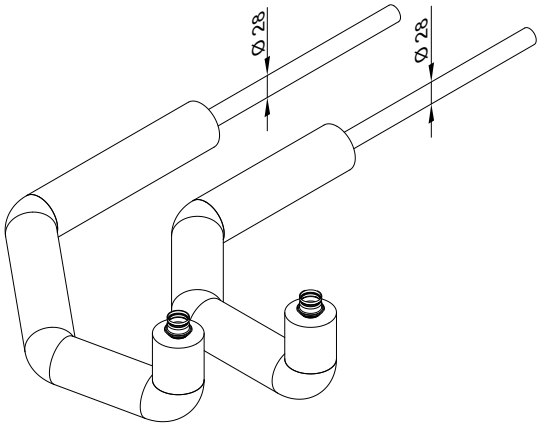
Part no. ZK06019
Stainless steel corrugated pipes with thermal insulation



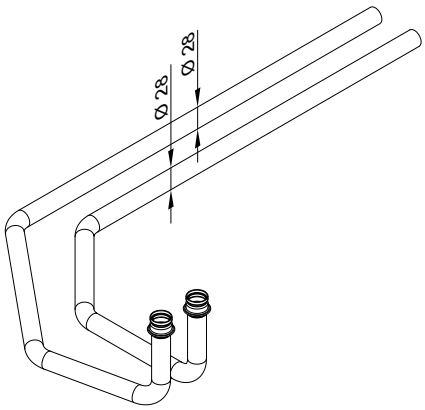
Connection set for wall mounting bracket

For connecting the outdoor unit to the heating system:
- 2 x copper pipe Ø 28 mm, length 1 m
- Wall outlet DN 150, 750 mm long
- Sealing insert with entries for copper pipe 2 x for Ø 28 mm and 3 x for Ø 18 mm
- Cap with entries for copper pipe 2 x for Ø 28 mm and 3 x for lines of varying diameters

Part no. ZK06021
Incl. thermal insulation



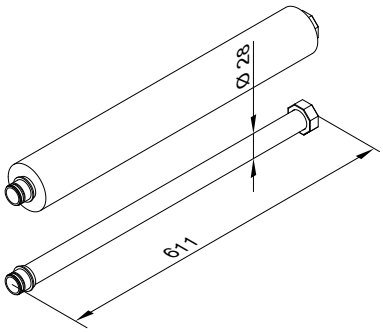
Part no. ZK06429
Excl. thermal insulation



Connection set for floor bracket, pipework below ground level

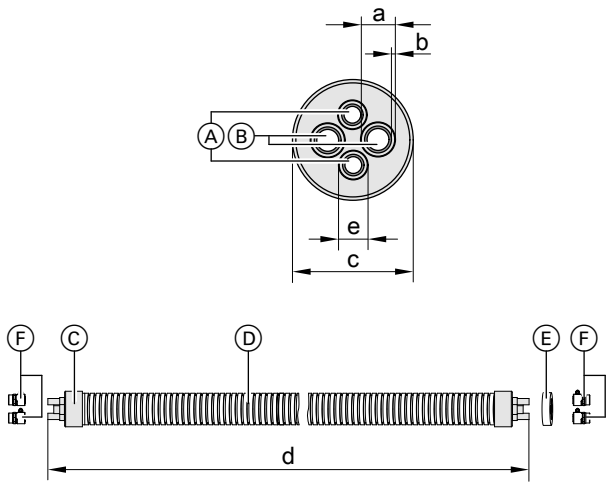
Part no. ZK06020

For connecting the outdoor unit to the heating system:
- 2 x stainless steel corrugated pipes DN 25 x 600 mm with union nut 1¼" and push-in nipple



Quattro connection line laid underground

For hydraulic connection of the outdoor unit to the indoor unit, flexible routing underground:
- 4 adaptors DN 32 to R 1¼ (male)
- 2 rubber end collars
- 1 roll of route warning tape



Ⓐ Conduits for 230 V~/400 V~ connecting cables and for bus communication cable
Ⓑ Flow and return lines made of polybutene PB 40 x 3.7

Ⓒ Outside end collar
Ⓓ Outer pipe, thermally insulated
Ⓔ Inside end collar
Ⓕ Adaptors

Flow and return lines Ⓑ		DN 32
– Dim. a: External∅		40 mm
– Dim. b: Wall thickness		3.7 mm
– Adaptors: 4 pce		DN 32 to G 1¼
Conduits: 2 pce		
– Dim. e: External∅		32 mm
– Internal∅		25 mm
Outer pipe Ⓒ		
– Dim. c: External∅		160 mm
Min. bending radius		600 mm
Number of end collars Ⓐ		2
Dim. d: Line length		
– 5 m	Part no.	**7984138**
– 10 m	Part no.	**7984139**
– 15 m	Part no.	**7984140**
– 20 m	Part no.	**7984141**

- The flow and return lines are made of polybutene to EN ISO 15876 with a pressure rating of 8 bar at 95 °C. To differentiate between the two pipes, one is marked with a stripe.
- The flow and return lines can be trimmed.
- The thermal insulation is made from longitudinally watertight polyolefin foam, which is connected to the polyethylene (HDPE) outer pipe.
- To seal the opening through the wall or floor plate, always use a ring seal (accessories).

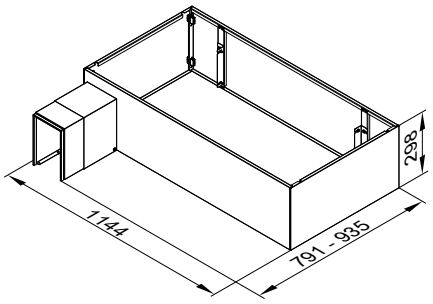
Ring seal for Quattro connection line laid underground

Part no. 7984142
- To seal against infiltrating water when laid underground with Quattro DN 32 hydraulic connection set
- For direct use in waterproof concrete. With other wall materials, use an appropriate pipe liner.

6.11 Brackets for outdoor unit

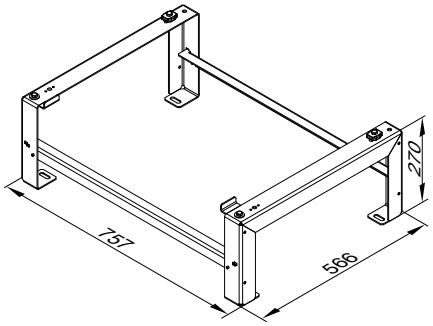
Design casing for floor bracket including wall connection

Part no. ZK06015
- For covering the hydraulic pipework between the heat pump and the building at a distance of 200 to 300 mm
- For wall mounting and floorstanding installation when the pipework is above ground level
- Made from zinc-plated sheet steel
- Colour: Vitographite



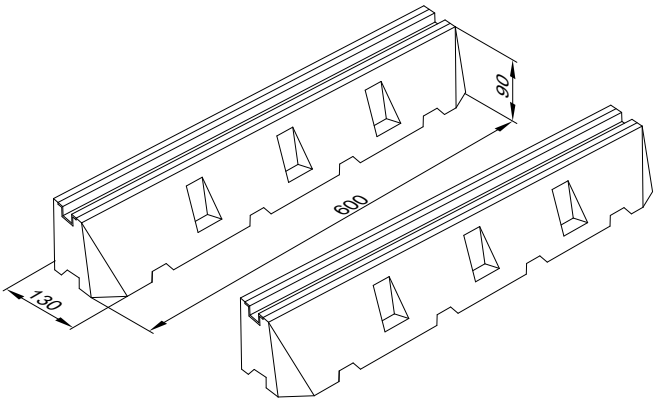
Bracket for floorstanding installation

Part no. ZK06013
- For positioning on level ground
- Made from stainless steel profiles
- The design casing for the floor bracket can be retrofitted.



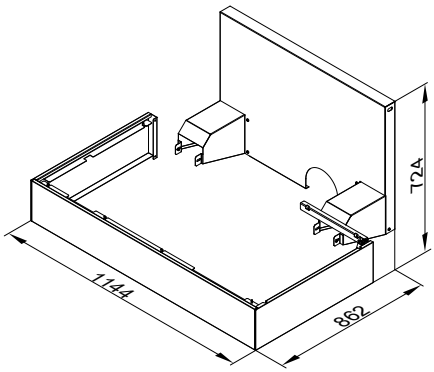
Anti-vibration base

Part no. ZK06012
Anti-vibration base for mounting the outdoor unit on a solid surface



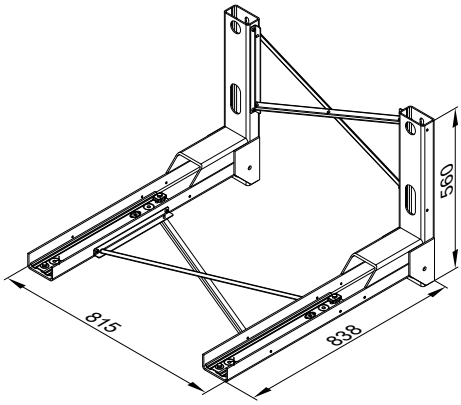
Design casing for wall mounting bracket

Part no. ZK06017
- For covering the hydraulic pipework when wall mounted
- Colour: Vitographite



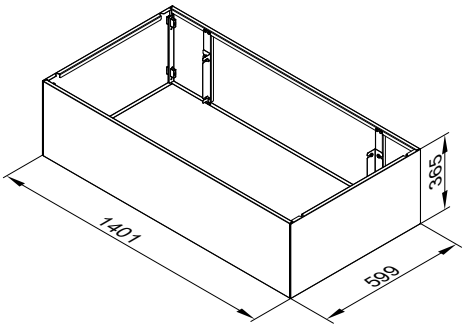
Bracket set for mounting the outdoor unit on a wall

Part no. ZK06016
- Made from zinc-plated sheet steel
- Can be used for outdoor units weighing up to 250 kg



Design casing for floor bracket

Part no. ZK06014
- For positioning on level ground
- Colour: Vitographite

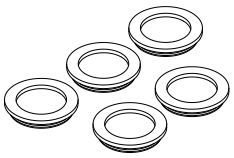


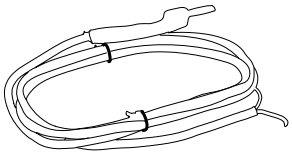
6.12 Miscellaneous

Electric ribbon heater for condensate pan

Part no. ZK06022
- As frost protection for the outdoor unit condensate pan
- Only for free flowing condensate
- Ribbon heater length 1.6 m
- With retaining clips to secure the ribbon heater in the condensate pan

Note
- *In conjunction with refrigerant R290, **only** this electric ribbon heater can be used. The use of an on-site ribbon heater is prohibited.*
- *If the condensate is routed away via a drainage pipe or hose, both the condensate pan and the drainage pipe or hose must be protected from frost with a ribbon heater, e.g. with the "electric ribbon heater for condensate drain".*

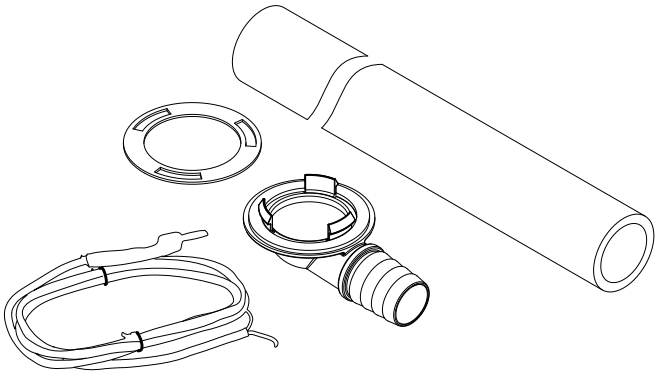




Ribbon heater for condensate drain

Part no. 7973114
- For routing condensate away via a drainage pipe or hose
- In addition to electric ribbon heater for condensate pan

Components:
- Ribbon heater, length: 2.8 m
- Drainage hose, length: 1.25 m, ∅ 33.4 mm, wall thickness: 4 mm
- Condensate drain elbow



Cap set

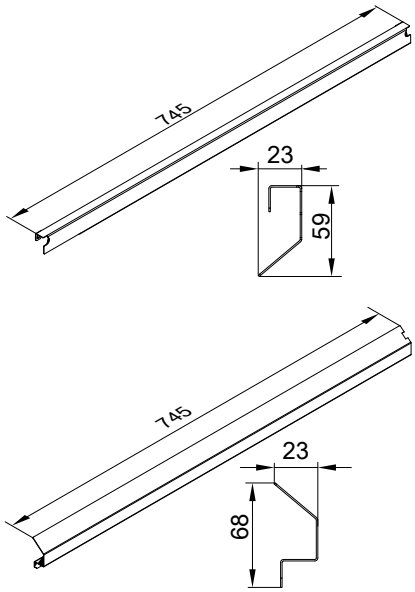
Part no. ZK02933
Caps for covering the openings at the outdoor unit base rails

Design covers for evaporator

Part no. ZK06215
- To encase the EPP parts around the evaporator
- Colour: Vitographite

Note
*The evaporator design covers can **not** be used together with the grille design casing.*

Installation accessories (cont.)

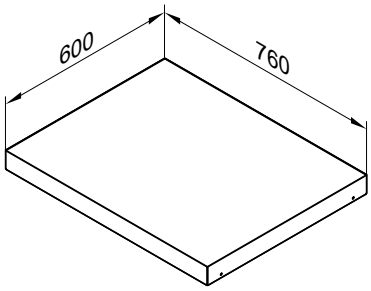


Special cleaner

Part no. 7249305
1 l spray bottle for cleaning the evaporator

Platform for unfinished floors

Part no. 7417925

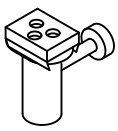


- With adjustable feet, for screed heights between 10 and 18 cm.
- For installation of the appliance on unfinished floors; suitable for siting tight against the wall.
- Incl. thermal insulation.

Note
In the case of installation flush with the wall, insert edge insulation strips for sound insulation between the platform for unfinished floors and the wall.

Tundish set

Part no. 7176014



Tundish with trap and bezel: DN 40

Design information

7.1 Power supply and tariffs

According to current Federal tariffs [Germany], the electrical demand for heat pumps is considered domestic usage. Where heat pumps are used to heat buildings, the local power supply company must first give permission [check with your local power supply company].

Check the connection conditions specified by your local power supply utility for the stated equipment details. It is crucial to establish whether a 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

7.2 Siting the outdoor unit

The outdoor units are painted with UV resistant paint.

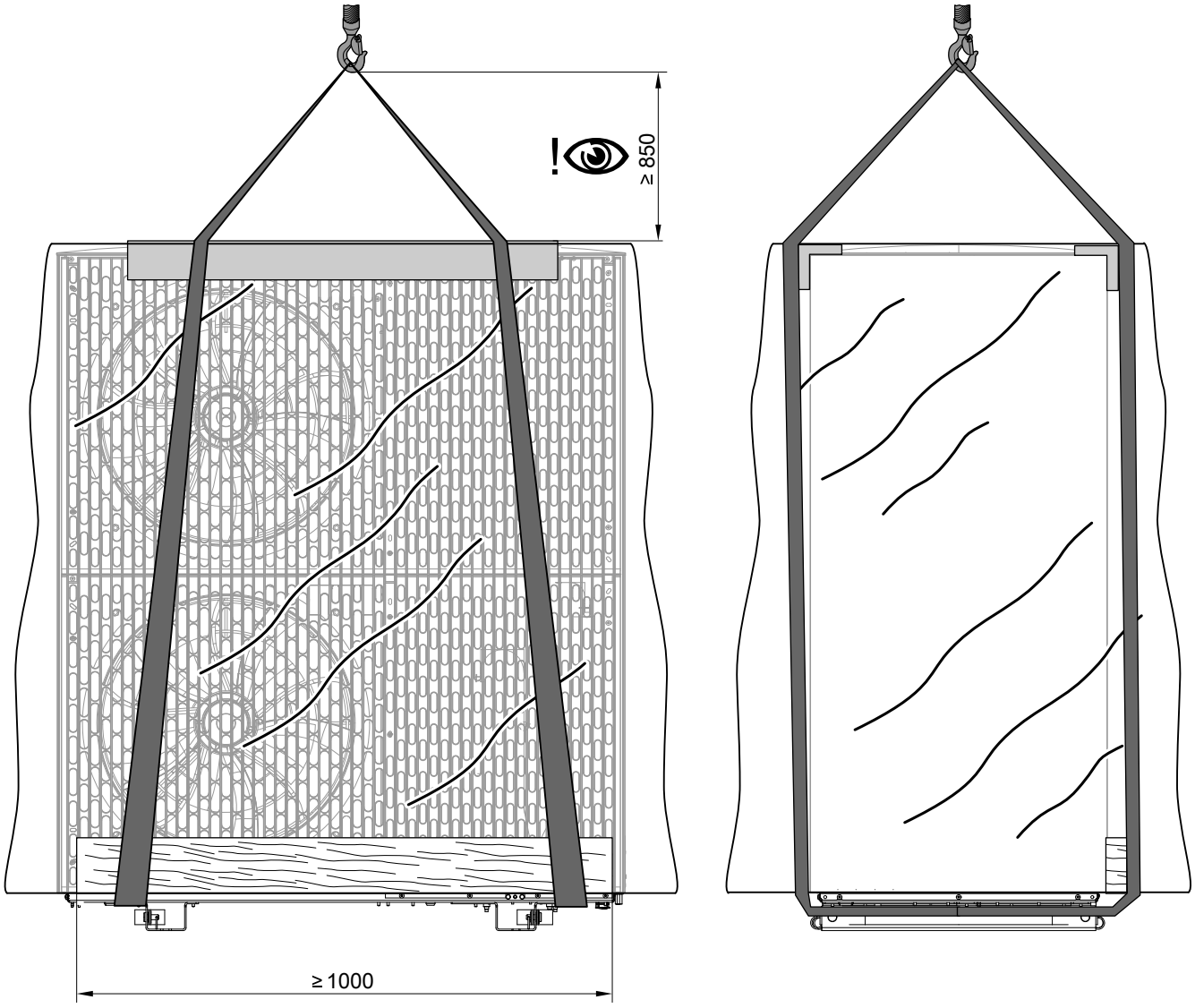
Note
When the heat pump is installed in a corrosive atmosphere, the ambient air and the air drawn in by the heat pump contain substances such as ammonia, sulphur, chloride, salts, etc. These substances can cause internal and external damage to the heat pump. Viessmann heat pumps for outdoor installation are designed for operation in moderately aggressive atmospheres. This makes them suitable for installation in urban and industrial environments as well as in coastal areas.
Higher corrosive loads can cause visual defects on the casing or affect operation. The service life of the heat pump may be shortened.

Transporting the outdoor unit

Incorrect unloading and transportation can result in damage to the outdoor unit. Should damage to the refrigerant circuit occur, there is the risk of explosion or asphyxiation. Equipment damaged in transit should not be used.

The outdoor unit may be transported **only** with transport aids or a crane:
- **Transport aid**
  The transport aid is factory-fitted to the outdoor unit on site and is removed at the final installation site.
  Check transport aids for damage **before** handling.
- **Crane**
  On-site lifting gear such as slings and cross beams should be checked for damage **before** transportation.

During transportation, observe the following points:
- Avoid mechanical stresses, e.g. compression and tensile strain, jolts, vibrations.
- Protect the evaporator from mechanical stress, e.g. with cardboard packaging or bubble wrap.
- Remove the packaging from the outdoor unit only after transporting.
- Take note of the weight of the outdoor unit: See chapter "Specification".
- Scratches on the outer casing can lead to corrosion damage. Protect outdoor unit against direct contact with tools and transport equipment, e.g. using cardboard packaging or bubble wrap.
- Note the max. tilting angle of 45°.



Transport by crane using the example of the outdoor unit with 2 fans

Requirements of the installation location

- Maximum geographical height of the installation location: 1500 m above sea level
- Select a site with good air circulation, so that the cooled air can dissipate and be replaced by warm air.
- Do not install in recesses or between walls. This could result in an "air short circuit" between the air being discharged and the air being drawn in.
  - An "air short circuit" during **heating mode** will result in the cooled, discharged air re-entering the unit. This can result in reduced heat pump efficiency and defrosting problems.
  - An air short circuit during **cooling mode** will result in the heated, discharged air re-entering the unit. This can lead to high pressure faults.
- If siting the appliance in a location that is exposed to wind, ensure that the wind cannot influence the fan area. Strong wind can have a negative influence on the air flow through the evaporator.
- Select an installation location where the evaporator cannot be blocked by leaves, snow, etc.
- Select the installation location giving due consideration to the physical laws concerning the propagation and reflection of sound.
- Do not install above cellar shafts or floor troughs.
- Do not install near windows or bedrooms.
- To avoid increased wind loads, maintain 1 m distance from building edges and corners.
- Maintain a clearance of at least 3 m to pathways, downpipes or sealed surfaces. The cooled air in the discharge area creates a risk of ice forming when outside temperatures are below 10 °C.
- The installation location must be easily accessible, for example for maintenance work: See "Minimum clearances".

Additional requirements for flat roof installation:

- Never install the outdoor unit on a flat roof immediately next to or above living rooms or bedrooms.
- Do not locate in front of windows, or keep a distance of 1 m from them.
- Due to the higher static loads (roof/wind load) and the higher acoustic requirements for roof installation, a design engineer should be involved. The design engineer will determine the static load requirements and distance from the edges of buildings, and will produce an acoustic plan.

Siting

- In accordance with EN 378-3, the outdoor unit may only be installed in the open air.
- The refrigerant circuit in the outdoor unit contains easily flammable refrigerant belonging to safety group A3 according to ANSI/ ASHRAE Standard 34.
  Therefore a safety zone is defined in the immediate vicinity of the outdoor unit, in which special requirements apply: See chapter "Safety zone".
- Observe the information regarding noise levels.
  Sound emission regulations (TA Lärm in Germany) must be observed.
- When siting the heat pump, always take into account the distances to neighbouring properties in accordance with local building regulations.
- Do not install with the discharge side facing towards the house wall or the main wind direction.
- During defrosting, cool vapour escapes from the outdoor unit air discharge vents. This vapour discharge must be taken into consideration during installation (choosing the installation location, orientation of the heat pump).
- Provide wall outlets and protective conduits for the hydraulic connection lines and electrical connecting cables without moulded parts or changes of direction.
  All wall outlets must be made **gas-tight**. This also includes wall outlets that **lie below ground level in the safety zone**.
- Provide equipment for the protection of the outdoor unit against mechanical damage e.g. Impact damage from footballs.
- Take environmental and weather influences into account in the selection of the installation location, e.g. flooding, wind, snow, ice damage, etc. Install suitable protection equipment if required.

Siting in garages, multi-storey car parks and car parking areas:

- Prior to installation, it must be established for the case in question whether the installation is permissible under local garage and parking area regulations (German regulations GaStellV, GaStplVO, BetrVO).
- Systems with refrigerants belonging to safety group A3 must be fitted with impact protection. This impact protection must be designed so that a strike by a vehicle at the applicable maximum speed does not result in damage to the refrigerant circuit.
- Mark the outdoor unit safety zone with prohibition notices to identify ignition sources.
- Siting in underground car parks is **not** permissible.

Siting in coastal areas: Distance < 1000 m

- In coastal areas salt and sand particles in the air increase the likelihood of corrosion:
  Site the heat pump where it is protected from direct onshore wind.
- If required, provide a wind break on site. Observe the minimum clearances to the heat pump: See the following chapter.

Types of installation

- Floorstanding installation with line entry above ground level
- Floorstanding installation with line entry below ground level
- Wall mounting
- Roof installation (flat or pitched roof)

Note
We recommend installing the outdoor unit on a roof only if floor or wall installation is not possible due to the site conditions.

Floorstanding installation

Particularly in adverse climatic environments (minus temperatures, snow and humidity) a distance to the substrate of at least 300 mm is required.

- Secure the outdoor unit with supports for floorstanding installation (accessories) onto a concrete foundation.
  Use ground anchors with a tensile force of at least 2.5 kN to secure the support to the foundation.
- If the supports cannot be used, site the outdoor unit on a concrete foundation ≥ 150 mm high using an anti-vibration base (accessories).
  If the outdoor unit is installed under a snow-free awning, (e.g. a carport) a lower plinth can be used.
- Take the weight of the outdoor unit into account: See chapter "Specification".

Wall mounting

- Use the wall mounting bracket set (accessories).
- The wall must meet the structural requirements.
  Use suitable fixing materials, depending on the wall structure.
- If there is no level access to the outdoor unit, ensure it is easily accessible all year round for service and maintenance. Provide sufficient maintenance areas. Install suitable protection equipment, e.g. fall protection.

Roof installation

Flat roof installation

Note
Due to the higher static loads (roof/wind load) and the higher acoustic requirements for roof installation, the structural calculations and sound concept require input from specialist design engineers.

If the outdoor unit is to be installed on a flat roof, in addition to the requirements for floor and wall installation, the planning measures to be taken into account include the following:

- As the outdoor unit is located higher up when installed on a flat roof, operating noise propagation is more intense than when the unit is installed on the ground. Roof surfaces are normally more reverberant than areas on the ground.
  To prevent noise nuisance, install the outdoor unit at a sufficient distance from neighbouring buildings. If required, provide suitable noise reduction measures. Take into account sound reflection from the surfaces of buildings when analysing sound propagation: See information on structure-borne noise insulation and vibration isolation.
- Provide on-site wind protection measures if required, e.g. screens, walls, etc.
- Check to ensure that the installed height of the outdoor unit does not exceed the permissible building height, e.g. as specified in outline planning restrictions.
- Provide easy, year-round access to the outdoor unit for service and maintenance. Provide sufficient maintenance areas which comply with the safety regulations.
  Install suitable protection equipment which complies with the safety regulations, e.g. anchorage points.
- Recommendation: Install the heat pump on a steel-reinforced concrete roof
- Installation on flat roofs with a low weight per unit area (e.g. roofs made from timber rafters or trapezoidal sheet metal) is **not permissible**.
- With flat roof installation, considerable wind loads may occur, depending on the relevant wind zone and the height of the building. Have the substructure designed according to DIN 1991-1-4 by a specialist design engineer.
- The higher roof and wind loads must be taken into account in the structural calculations and the fixture system of the outdoor unit. It is essential to comply with the specifications provided by the design engineer with regard to statics, distances from building edges and the sound concept.
- Where design casings are concerned, check that these are able to withstand wind and snow loads. Some of the design casings simply attach magnetically to the outdoor unit.

Pitched roof installation

We recommend installing the outdoor unit **only** on the floor, the wall or a flat roof.

If due to the building characteristics the outdoor unit can be installed only on a pitched roof, the same requirements apply as for flat roof installation.

Weather influences

- Observe wind loads when installing the unit on sites exposed to the wind.
- Fit the pipework exposed to the outdoor air outside the support for floorstanding installation (accessories) with adequately thick thermal insulation in accordance with the German Buildings Energy Act (GEG): See the following table.

Pipework internal ∅	Min. thickness of thermal insulation layer with λ = 0.035 W/(m·K)
≤ 22 mm	40 mm
> 22 mm	60 mm

λ Thermal conductivity

- If a design casing for the support for floorstanding installation (accessories) is used:
  For pipework inside the support, use the thermal insulation supplied.
- Incorporate the outdoor unit into the lightning protection system.
- Note the heat absorbed (heating mode) and heat emitted (cooling mode) by the appliance when designing weatherproofing measures or an enclosure.

Condensate

In regions where the outside temperature is often below 0 °C, we recommend installing an electrical ribbon heater (accessories) for the condensate pan of the outdoor unit. For types ...-AF an electric ribbon heater is factory-fitted.

Floorstanding installation:

- Ensure that condensate can drain freely.
- Allow condensate to soak away into a gravel bed or into a deep seepage layer, or direct it into the waste water system: See chapter "Draining condensate via a soakaway".

Note

If refrigerant gets into the waste water system (e.g. as a result of a leak in the refrigerant circuit), there is a risk of explosion. Therefore, only connect the condensate drain to the waste water system via a trap.

Wall mounting:

- Ensure that condensate can drain freely.
- Allow condensate to soak away into a gravel bed: See chapter "Draining condensate via a soakaway".

Flat roof installation:

- Allowing the condensate to drain freely onto the roof surface is not permissible, as this may result in the formation of layers of ice. Layers of ice on the roof may prevent further condensate from draining freely, resulting in increased roof loads.
- Use an electric ribbon heater for the condensate pipe (accessories).
- To drain the condensate, connect the condensate hose on the outdoor unit to an insulated condensate pipe. The condensate pipe is part of the standard delivery of the electric ribbon heater for the condensate pipe.
  If required, insert the condensate hose via a trap insert.

Structure-borne noise insulation and vibration isolation between the building and outdoor unit

- Route cables/leads between the indoor and outdoor units so they are not stressed.
- Installation only on walls with a high weight per unit area (> 250 kg/m²); in other words not on lightweight walls, roof structures, etc.
- Vibration isolation components are included in the standard delivery of the wall mounting bracket.
- Do not use additional anti-vibration mounts, springs, rubber mounts, etc.

- When installing the outdoor unit on roof surfaces, there is a risk that structure-borne noise and vibrations will be transmitted into the building.
  If the outdoor unit is installed on freestanding garages, insufficient structure-borne noise insulation and vibration isolation can cause excessive noise due to resonance amplification.
- When using a KG conduit:
  After installing the hydraulic connection lines, fill the KG conduit with sand.

See chapter "Information on reducing sound emissions" on page 115.

Safety zone

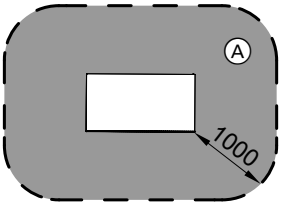
The refrigerant circuit in the outdoor unit contains easily flammable refrigerant in safety group A3 according to ISO 817 and ANSI/ASHRAE Standard 34.
Therefore a safety zone is defined in the immediate vicinity of the outdoor unit, in which special requirements apply.

The following conditions must not be present or occur within the safety zone:
- Building openings, e.g. windows, doors, light wells, flat roof windows
- Outdoor air and exhaust air apertures from ventilation and air conditioning systems
- Property boundaries, neighbouring properties, footpaths and driveways
- Pump shafts, inlets to waste water systems, downpipes and waste water shafts, etc.
- Other slopes, troughs, depressions, shafts
- Electrical house supply connections
- Electrical systems, sockets, lamps, light switches
- Snowfall from roofs

Do not introduce ignition sources into the safety zone:
- Naked flames or burner gauze assemblies
- Grills
- Tools that generate sparks
- Electrical devices not free of ignition sources, mobile devices with integrated batteries (e.g. mobile phones, fitness watches, etc.)
- Objects with temperatures above 360 °C

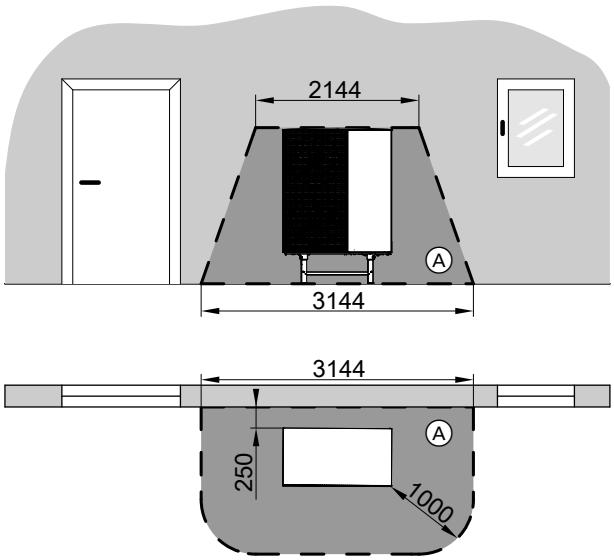
Note
The particular safety zone is dependent on the surroundings of the outdoor unit.
- *The safety zones shown in the following are for the floorstanding installation of an outdoor unit with 2 fans.*
  - *These safety zones also apply to outdoor units with 1 fan.*
  - *These safety zones also apply to wall and roof installation.*
- *In the case of wall installation, the requirements listed above also apply to the area **below** the outdoor unit, down to the ground.*

Freestanding positioning of the outdoor unit



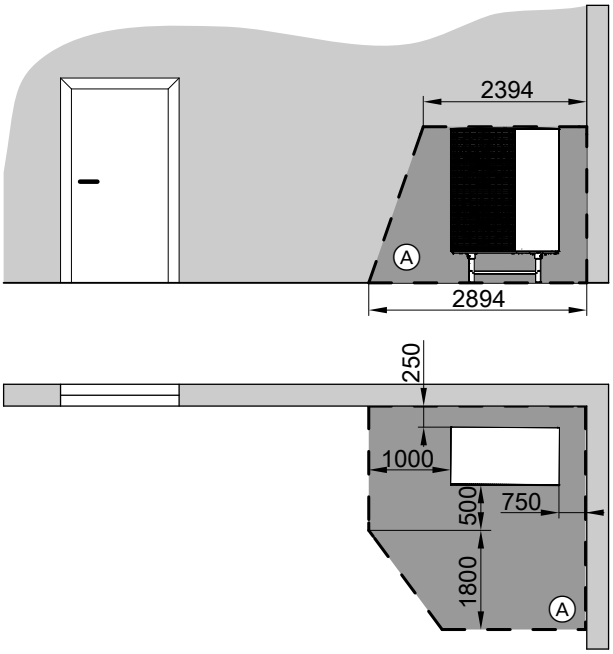
Ⓐ Safety zone

Siting the outdoor unit in front of an external wall



Ⓐ Safety zone

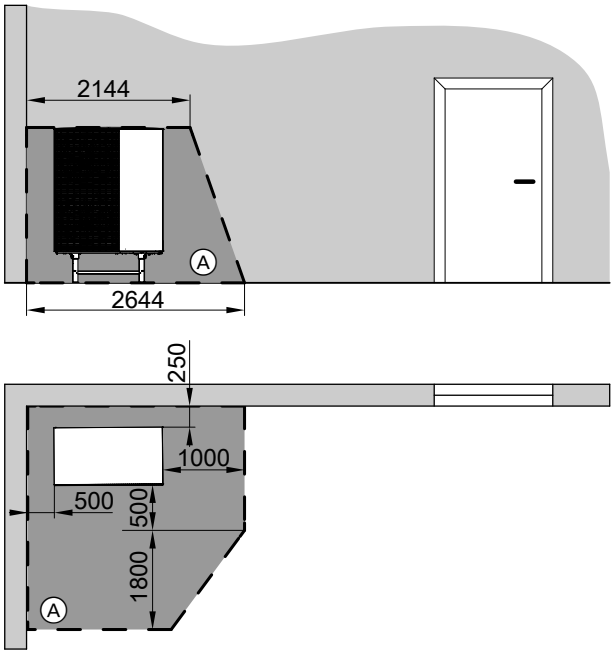
Corner positioning of the outdoor unit, right



Ⓐ Safety zone

Floor area of safety zone
If necessary, it is possible to deviate from the dimensions of 1000 mm to the side and 1800 mm to the front. Please note the following:
- *There **must** be a safety zone to the front and side.*
- *The floor area of the safety zone **must** be observed.*

Corner positioning of the outdoor unit, left

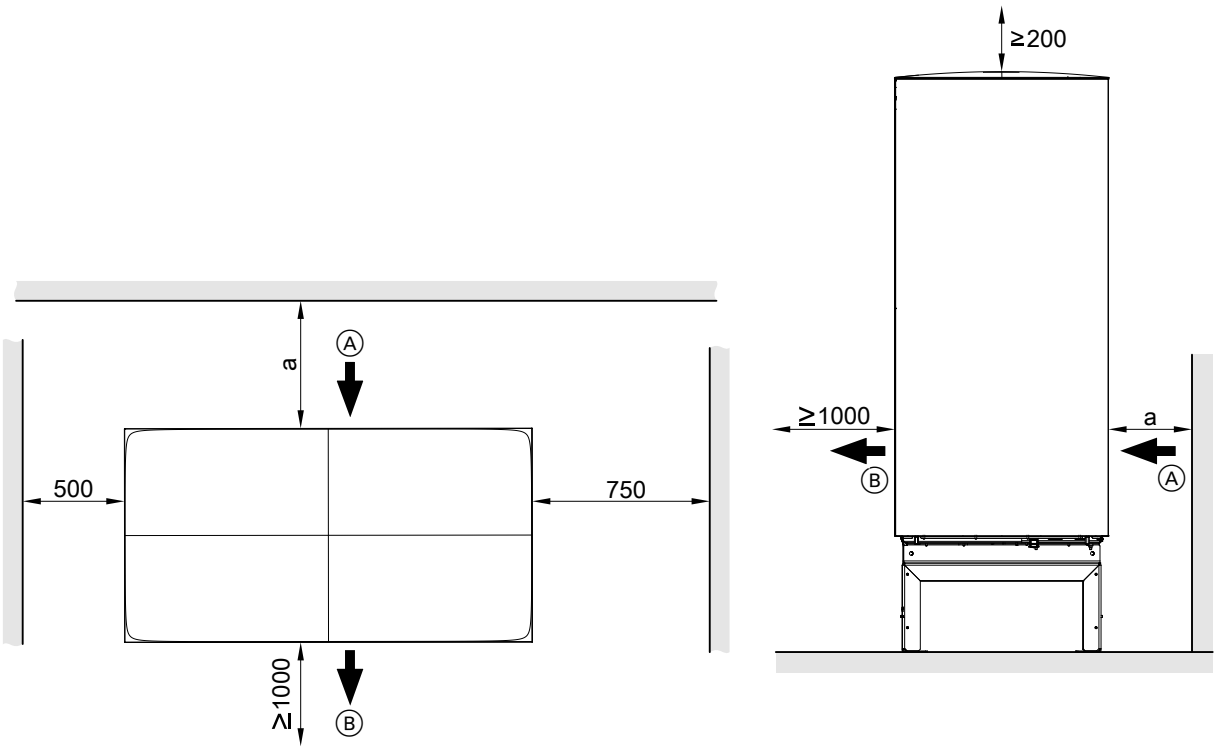


Ⓐ Safety zone

Floor area of safety zone
If necessary, it is possible to deviate from the dimensions of 1000 mm to the side and 1800 mm to the front. Please note the following:
- *There **must** be a safety zone to the front and side.*
- *The floor area of the safety zone **must** be observed.*

Outdoor unit minimum clearances

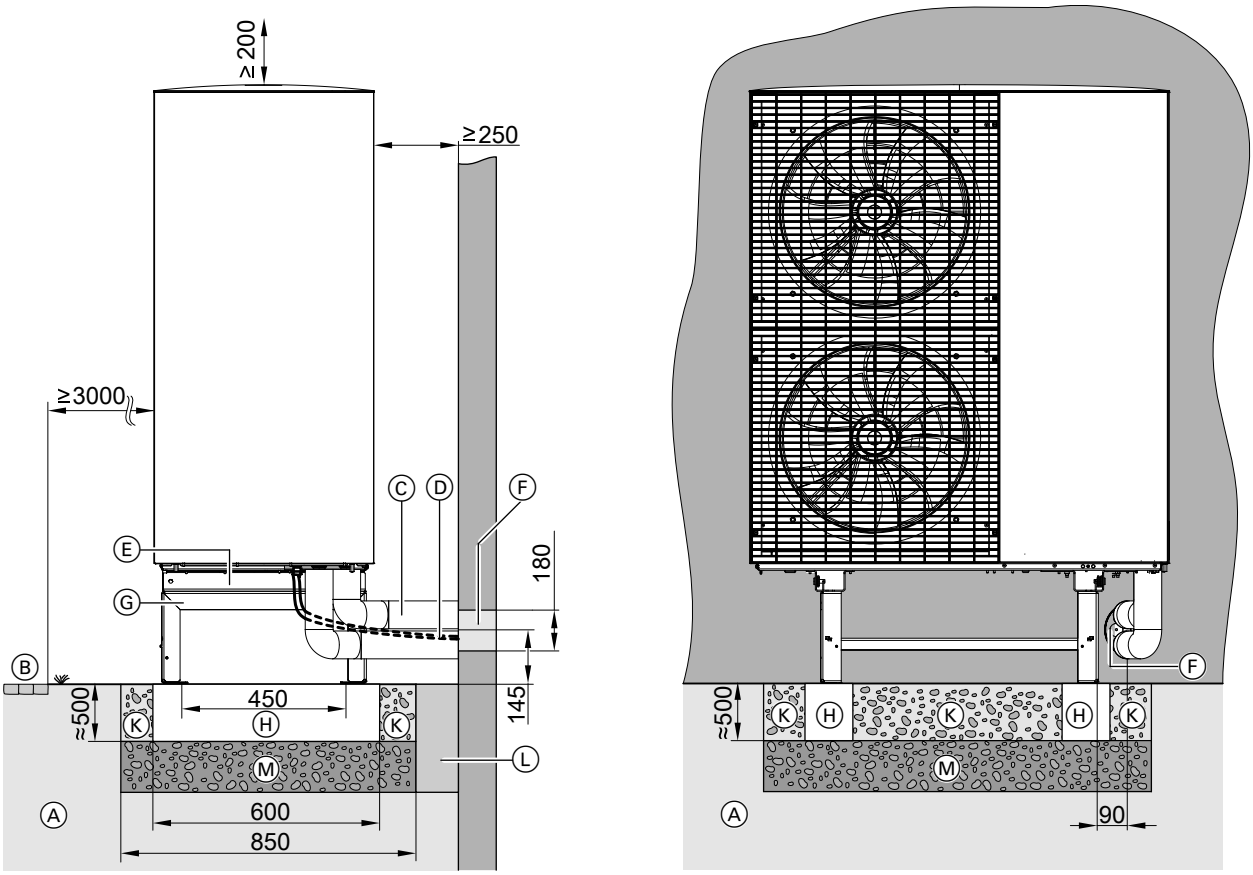
Note
The minimum distances shown in the following are identical for outdoor units with 1 and 2 fans.



Ⓐ Air intake
Ⓑ Air discharge
a ■ Line entry above ground level:
≥ 250 mm
■ Line entry below ground level:
≥ 450 mm

Floorstanding installation with support: Line entry above ground level

Note
The following information for floorstanding installation applies to outdoor units with 1 and 2 fans. The outdoor unit with 2 fans is shown as an example.



Ⓐ Ground
Ⓑ Pathway, patio
Ⓒ Hydraulic connection lines, indoor/outdoor unit
Ⓓ Indoor/outdoor unit CAN bus communication cable and outdoor unit power cable:
Route the cables free of stress.
Ⓔ Condensate drain in the base plate:
Do not connect anything if the condensate can drain freely.
Ⓕ Gas-tight wall outlet (accessories) for electrical cables and hydraulic lines
Ⓖ Support for floorstanding installation (accessories), illustration without design casing (accessories)
Ⓗ Foundation strip
Ⓚ For free drainage of condensate: Gravel bed as soakaway
Ⓛ Flexible separating layer between the foundations and the building
Ⓜ Frost protection for foundations (compacted crushed stone, e.g. 0 to 32/56 mm); thickness of layer subject to local requirements and building regulations

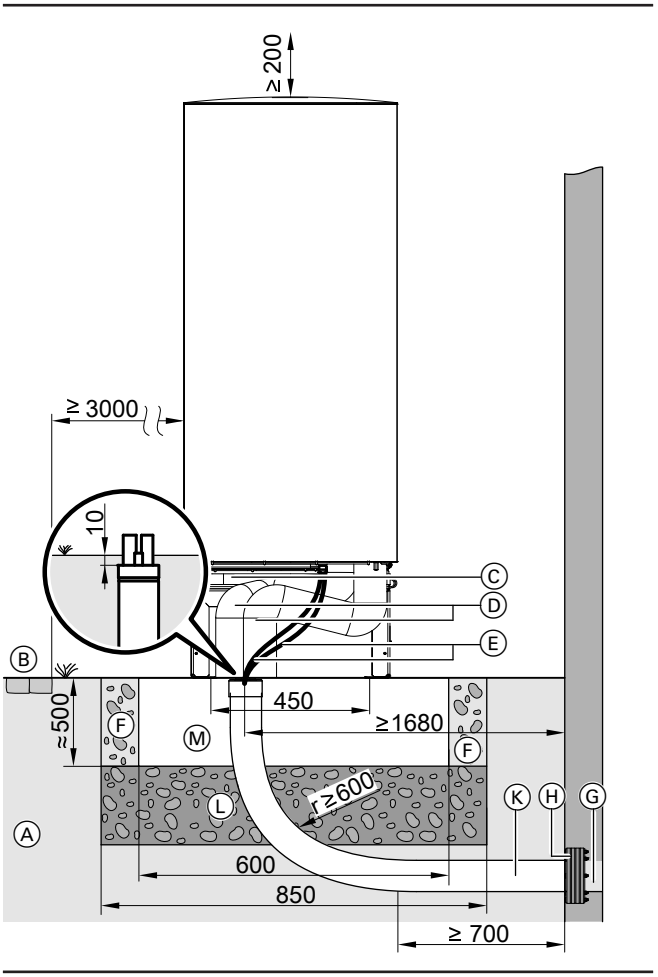
Note

- *Provide thermal insulation of sufficient thickness on the pipework to the outdoor air: See table on page 95.*
- *Protect the pipework against damage. Avoid trip hazards.*

Floorstanding installation with support: Line entry below ground level

Note

The following information for floorstanding installation applies to outdoor units with 1 and 2 fans. The outdoor unit with 2 fans is shown as an example.



Ⓐ Ground
Ⓑ Pathway, patio

Ⓒ Support for floorstanding installation (accessories)
Ⓓ Connection set, floorstanding installation (accessories)
Ⓔ Indoor/outdoor unit CAN bus communication cable and outdoor unit power cable:
Route the cables free of strain.
Ⓕ For free drainage of condensate: Gravel bed as soakaway
Ⓖ Gas-tight wall outlet (on site) for Quattro connection line laid underground (accessories)
Ⓗ Ring seal (accessories)
Ⓚ Quattro connection line laid underground (accessories)
Ⓛ Foundation strips
Ⓜ Frost protection for foundations (compacted crushed stone, e.g. 0 to 32/56 mm); thickness of layer subject to local requirements and building regulations
r Bending radius

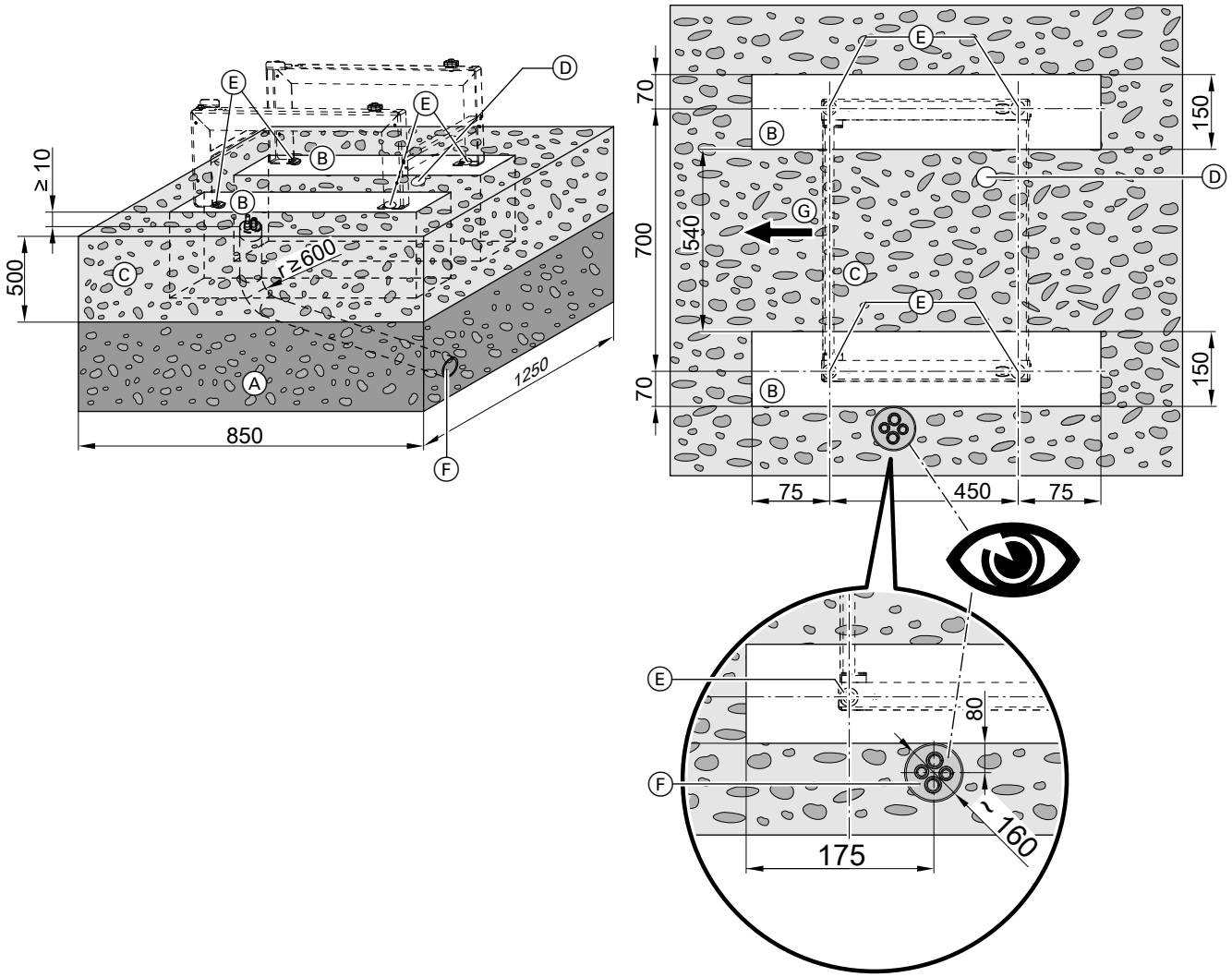
Note

- *Provide thermal insulation of sufficient thickness on the pipework to the outdoor air: See table on page 95.*
- *Protect the pipework against damage. Avoid trip hazards.*

Foundation for installation with support for floorstanding installation (accessories)

Provide 2 horizontal foundation strips.
- Max. tilt tolerance: ±10 mm for every 1 m of length

Recommendation: Construct concrete foundations in accordance with the following diagram. The stated thickness of the layers represents an average value. These values should be adjusted to suit the local conditions. Observe the standard rules of building engineering.

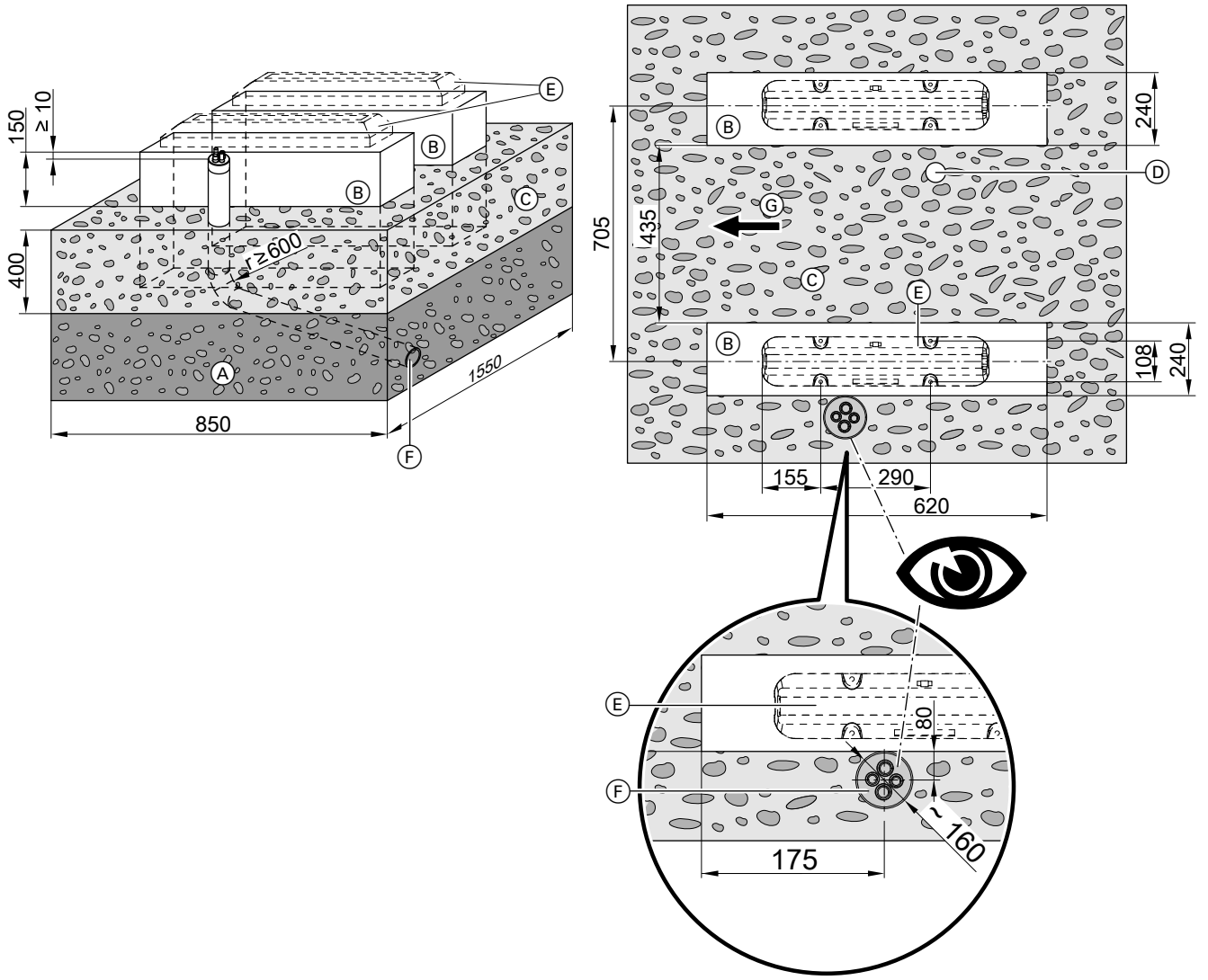


Ⓐ Frost protection for foundations: compacted crushed stone (e.g. 0 to 32/56 mm); thickness of layer subject to local requirements and building regulations
Ⓑ Foundation strip of reinforced concrete
Ⓒ For free drainage of condensate: Gravel bed as soakaway
Ⓓ Conduit (min. DN 40) for draining condensate via waste water system or seepage layer
Ⓔ Fixing points for support:
Use ground anchors with a tensile force of at least 2.5 kN.
Ⓕ Quattro connection line (accessories) for use when cable/line entry is below ground level:
So that the floorstanding installation connection set (accessories) can be used, align the Quattro connection line flush with and parallel to the edge of the foundation.
Ⓖ Air discharge
r Bending radius

Foundation for installation with anti-vibration feet (accessories)

Provide 2 horizontal foundation strips.
■ Max. tilt tolerance: ±10 mm for every 1 m of length

Recommendation: Construct concrete foundations in accordance with the following diagram. The stated thickness of the layers represents an average value. These values should be adjusted to suit the local conditions. Observe the standard rules of building engineering.



Ⓐ Frost protection for foundations: compacted crushed stone, e.g. 0 to 32/56 mm
Thickness of layer subject to local requirements and building regulations
Ⓑ Foundation strip of reinforced concrete
Ⓒ For free drainage of condensate: Gravel bed as soakaway
Ⓓ Conduit (min. DN 40) for draining condensate via waste water system or seepage layer
Ⓔ Anti-vibration feet (accessories):
Observe installation instructions.
Ⓕ Quattro connection line (accessories) for use when cable/line entry is below ground level:
So that the floorstanding installation connection set (accessories) can be used, align the Quattro connection line flush with and parallel to the edge of the foundation.
Ⓖ Air discharge
r Bending radius

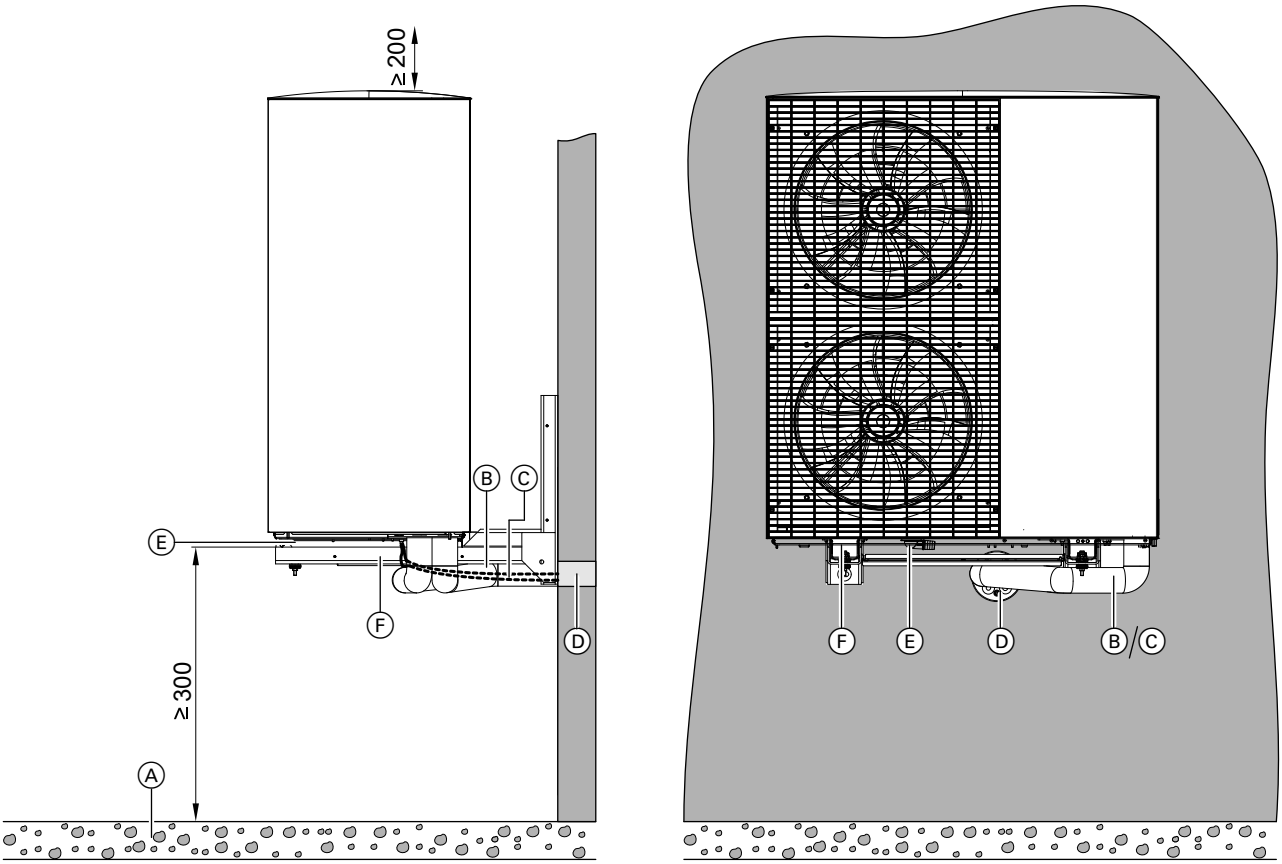
Installation instructions for anti-vibration base

- *Align the anti-vibration base horizontally on the foundation using the spirit levels supplied.*
- *Use tension rods with a tensile force of at least 1.25 kN per fixing point.*
- *Drill holes where marked, according to the nominal diameter of the tension rod.*
- *Increase bearing surface of screw heads or nuts with washer.*

Wall mounting with bracket set for wall mounting

Note

The following information for floorstanding installation applies to outdoor units with 1 and 2 fans. The outdoor unit with 2 fans is shown as an example.



Ⓐ Gravel bed as condensate soakaway
Ⓑ Connection set for wall mounting bracket (accessories)
Ⓒ Indoor/outdoor unit CAN bus communication cable and outdoor unit power cable:
Route the cables free of stress.
Ⓓ Gas-tight wall outlet (accessories) for electrical cables and hydraulic lines
Ⓔ Condensate drain in the base plate:
Do not seal the opening.
Ⓕ Bracket for wall mounting (accessories)

Note

- *For precise marking of the drill holes, including the wall opening, a drilling template is supplied with the wall mounting bracket.*
- *Provide thermal insulation of sufficient thickness on the pipework to the outdoor air: See table on page 95.*

Free condensate drain without drain pipe

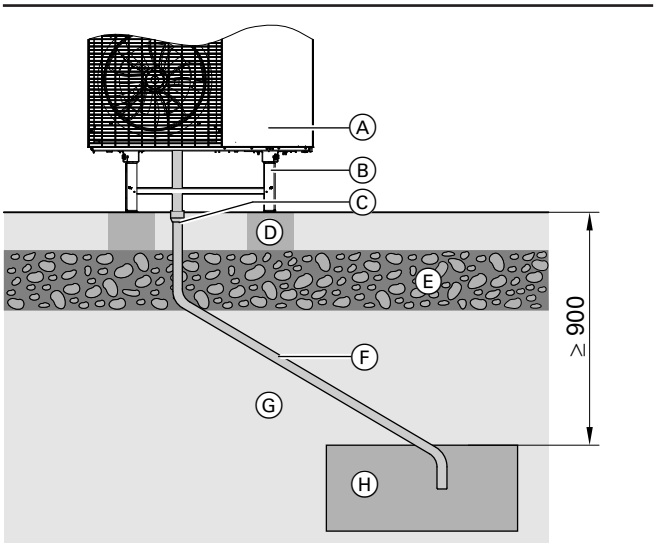
Allow the condensate to drain away freely **without** a drain pipe into a gravel bed beneath the outdoor unit.

Draining condensate via drain pipe

Note

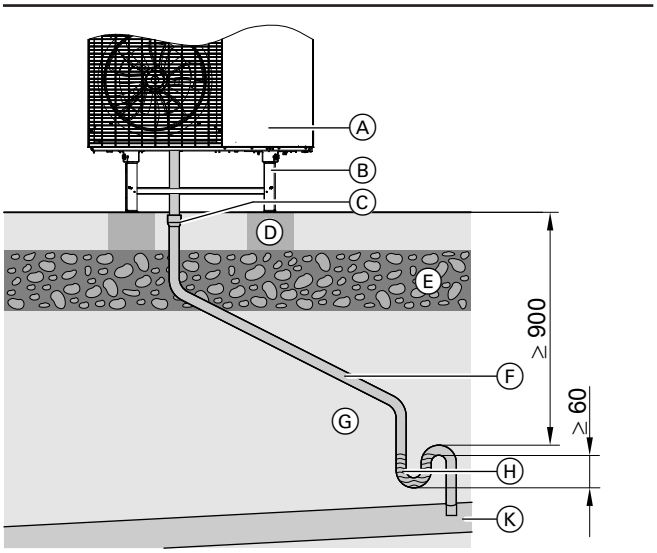
To ensure correct function of the condensate drain even at low temperatures, provide a ribbon heater in the drain pipe (accessories).

Draining condensate via drain pipe in seepage layer



Ⓐ Outdoor unit
Ⓑ Support for floorstanding installation (accessories)
Ⓒ Condensate drain connector
Ⓓ Foundation
Ⓔ Frost protection (compacted crushed stone)
Ⓕ Drain pipe (at least DN 40) with ribbon heater (accessories)
Ⓖ Ground
Ⓗ Seepage layer for removal of condensate

Draining condensate via waste water system



Ⓐ Outdoor unit
Ⓑ Support for floorstanding installation (accessories)
Ⓒ Condensate drain connector
Ⓓ Foundation
Ⓔ Frost protection (compacted crushed stone)
Ⓕ Drain pipe (at least DN 40) with ribbon heater (accessories)
Ⓖ Ground
Ⓗ Stench trap in an area free from the risk of frost
Ⓚ Drain

7.3 Siting the indoor unit

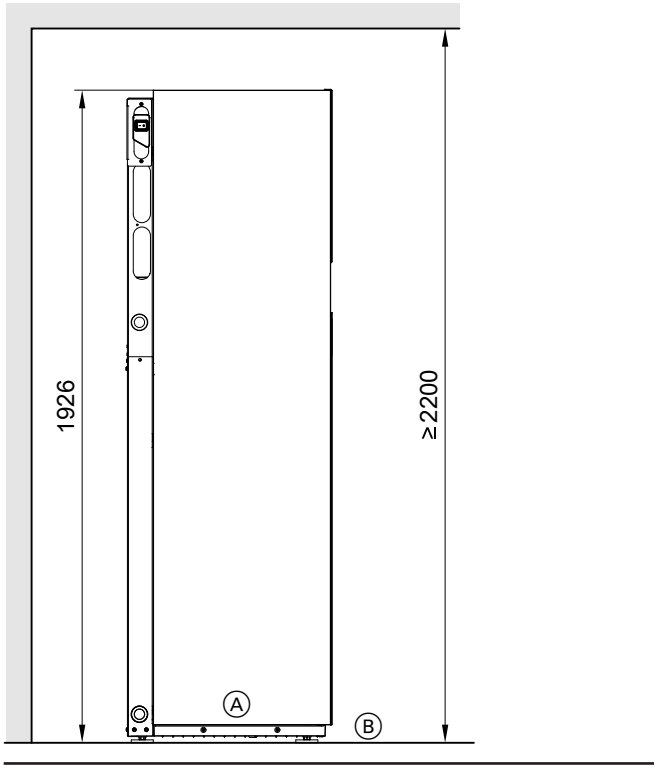
Installation room requirements

- The installation room must be dry and free from the risk of frost.
- Ensure ambient temperatures between 0 and 35 °C.
- Max. 70 % relative humidity: Corresponding to an absolute humidity of approx. 25 g water vapour/kg of dry air at 35 °C.
- Avoid dust, gases and vapours due to a risk of explosion in the installation room.

Siting requirements

- Provide a drain connection for the safety valve.
  Connect the safety valve drain hose to the waste water system with a fall and a pipe vent.
- Provide shut-off equipment for heating water flow, heating water return and DHW cylinder return.

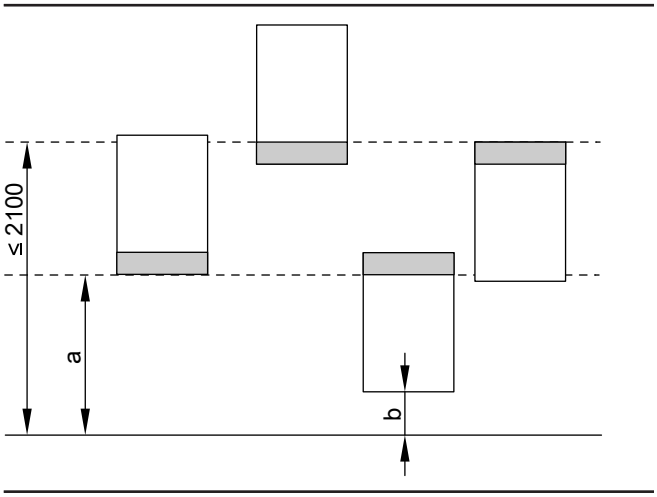
Minimum room height Vitocal 151-A



Ⓐ Indoor unit with integral DHW cylinder
Ⓑ Finished floor level or top edge of platform for unfinished floors

Minimum installation height of Vitocal 150-A

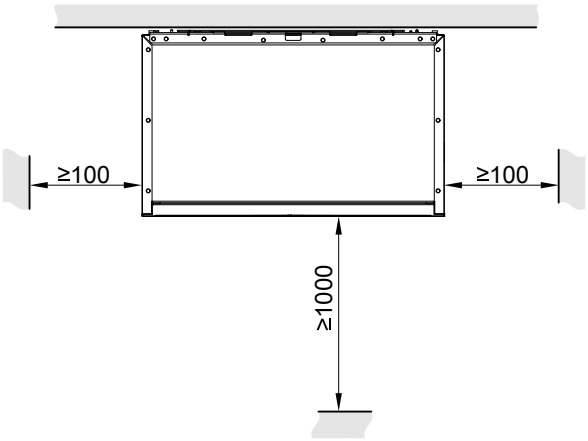
In the delivered condition, the programming unit is located at the bottom. For easier access, the programming unit can be fitted at the top, e.g. for lower installation heights.



Recommended dimensions

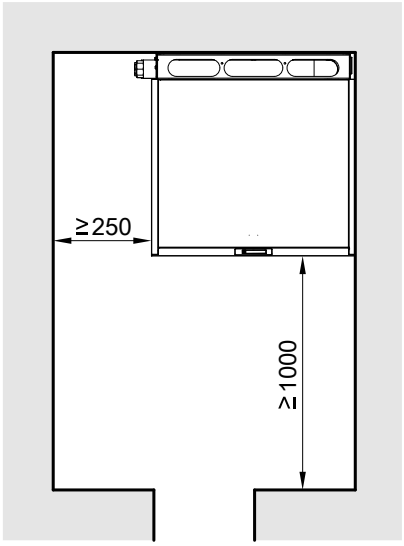
		a	b
Without pre-plumbing jig for surface mounting	mm	≥ 600	≥ 500
With pre-plumbing jig for surface mounting (accessories)	mm	≥ 680	≥ 680

Minimum clearances Vitocal 150-A

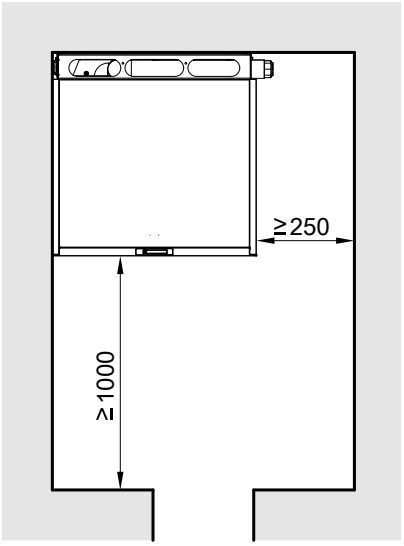


Minimum clearances Vitocal 151-A

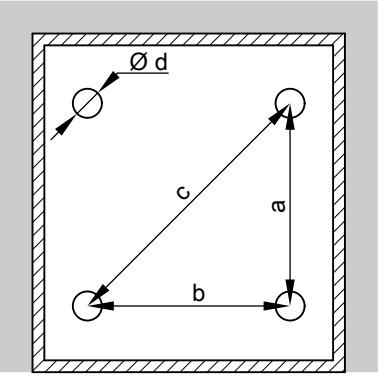
Secondary circuit connections, left/top



Secondary circuit connections, right/top



Pressure points for Vitocal 151-A



a 478 mm
b 478 mm
c 677 mm
d 64 mm

Note

- *Observe the permissible floor load.*
- *Level the appliance horizontally.*
- *If the adjustable feet are used to compensate for an uneven floor (max. 10 mm), distribute the pressure load on the individual feet evenly.*

- The total weight of the indoor unit with filled DHW cylinder and 1 integral heating/cooling circuit is 386 kg.
  Each pressure point (each with an area of 3217 mm^2) is subject to a load of up to 96.5 kg.
- The total weight of the indoor unit with filled DHW cylinder and 2 integral heating/cooling circuits is 426 kg.
  Each pressure point (each with an area of 3217 mm^2) is subject to a load of up to 109 kg.

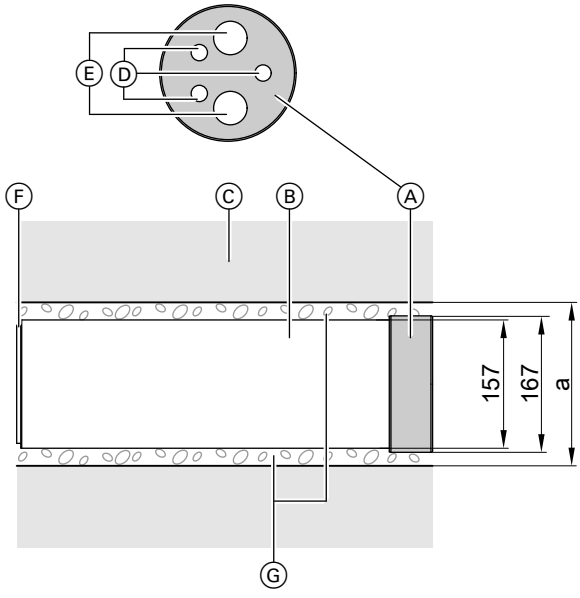
7.4 Connection between the indoor and outdoor units

The hydraulic and electrical connection lines can be routed above or below ground level:

- Options when routing **above** ground level:
  Cable/line entry through the wall
- Options when routing **below** ground level:
  – Cable/line entry through the wall
  – Cable/line entry through the floor plate

- Always ensure the cable/line entry is gas-tight.
- Install heating filter with magnetite separation (backwashing, accessories) between the indoor and outdoor units in the outdoor unit return:
  – Required in the case of heating system modernisations
  – Recommended in the case of new builds
- Recommendation: Use a hydraulic connection set (accessories)
- When routing through the floor plate, position the required connecting cables and cable entries **before** installing the floor plate.
- When routing underground: Seal the wall or floor plate entry against infiltrating water using a ring seal (accessories).

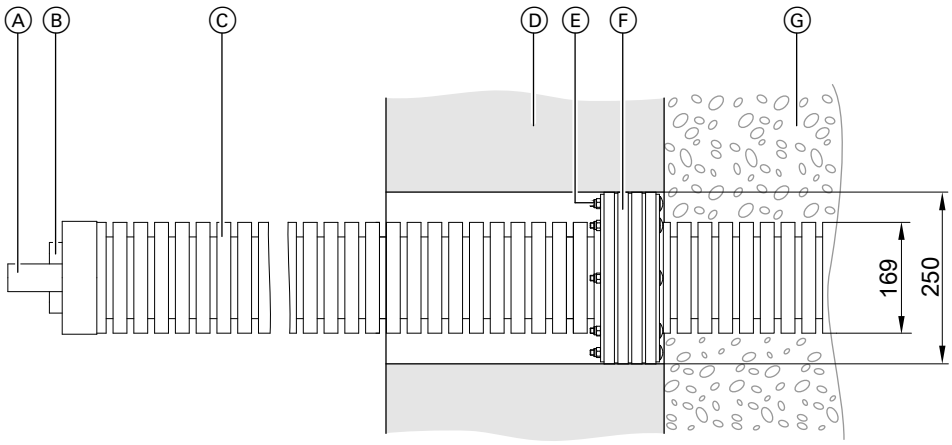
Cable/line entry above ground level



With wall outlet from connection set

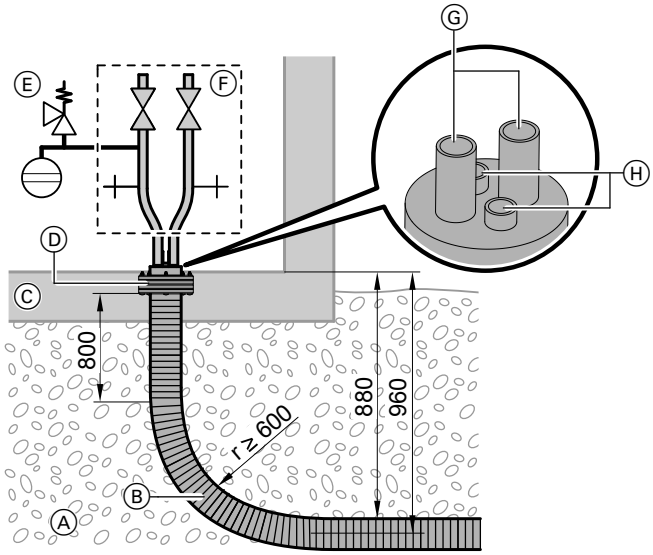
Ⓐ Cap inside the building
Ⓑ Conduit
Ⓒ Wall
Ⓓ Openings for 230 V~/400 V~ connecting cables and for bus communication cable
Ⓔ Openings for hydraulic connection lines
Ⓕ Sealing insert outside the building
Ⓖ Seal
a The size of the wall opening depends on the type of the wall and the seal required.

Cable/line entry below ground level through the wall



Ⓐ Flow and return lines for Quattro connection line made of polybutene PB 40 x 3.7
Ⓑ Conduits for 230 V~/400 V~ connecting cables and for bus communication cable
Ⓒ Quattro connection line
Ⓓ Wall
Ⓔ Ring seal: orientated with nuts towards the inside
Ⓕ Ring seal
Ⓖ Sand outside the building

Cable/line entry below ground level through the floor plate



Ⓒ Floor plate
Ⓓ Ring seal: orientated with nuts towards the inside
Ⓔ Expansion vessel with safety assembly (accessories)
Ⓕ Drain & fill facility (for draining with compressed air)
Ⓖ Flow and return lines for Quattro connection line made of polybutene PB 40 x 3.7
Ⓗ Conduits for 230 V~/400 V~ connecting cables and for bus communication cable
r Bending radius

Ⓐ Earth/gravel outside the building
Ⓑ Quattro connection line

7.5 Electrical connections

Electrical installation requirements

- Observe the technical connection requirements specified by the local power supply utility.
- The local power supply utility will provide details regarding the required metering and switching equipment.
- Provide a separate electricity meter for the heat pump.

Mains voltage
The heat pumps are operated with 230 V~ or 400 V~, depending on type:

Vitocal 150-A

Type	Compressor	
	230 V~	400 V~
AWO-M-E-AC 151.A AWO-M-E-AC 151.A SP AWO-M-E-AC-AF 151.A AWO-M-E-AC-AF 151.A SP	X	
AWO-E-AC 151.A AWO-E-AC-AF 151.A		X

Vitocal 151-A

Type	Compressor	
	230 V~	400 V~
AWOT-M-E-AC 151.A AWOT-M-E-AC 151.A SP AWOT-M-E-AC-AF 151.A AWOT-M-E-AC-AF 151.A SP	X	
AWOT-E-AC 151.A AWOT-E-AC-AF 151.A		X

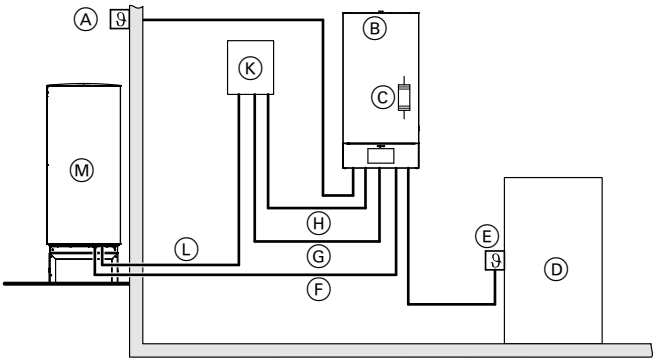
- The fan fuses are located in the outdoor unit.
- The instantaneous heating water heater is operated with 400 V~ or 230 V~. The instantaneous heating water heater is located in the indoor unit.
- The control circuit requires a power supply of 230 V~. The fuses for the control circuit (6.3 A) are located in the indoor unit.

Power-OFF

If economy tariffs are available, the power supply utility can switch off the compressor and instantaneous heating water heater (if present) at certain times of day via an external switching contact. This must **not** shut off the power supply to the heat pump control unit.

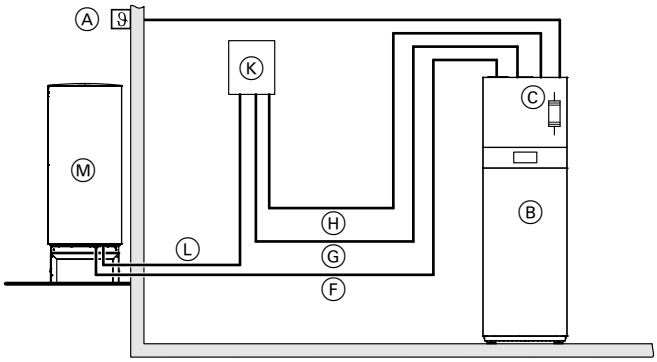
Wiring diagram

Vitocal 150-A



Ⓐ Outside temperature sensor, sensor lead: 2 x 1.5 mm²
Ⓑ Indoor unit
Ⓒ Instantaneous heating water heater
Ⓓ DHW cylinder
Ⓔ Cylinder temperature sensor with sensor lead (accessories)
Ⓕ CAN bus cable for indoor/outdoor unit (accessory or supplied on site): See chapter "CAN bus cable for indoor/outdoor unit".
Ⓖ Power cable for heat pump control unit: See chapter "Recommended power cables".
Types ... SP: A common power cable for the instantaneous heating water heater and heat pump control unit
Ⓗ Power cable for instantaneous heating water heater: See chapter "Recommended power cables".
Types ... SP: A common power cable for the instantaneous heating water heater and heat pump control unit
Ⓚ Electricity meter/mains
Ⓛ Compressor power cable, 230 V~ or 400 V~: See chapter "Recommended power cables".
Ⓜ Outdoor unit

Vitocal 151-A



Ⓐ Outside temperature sensor, sensor lead: 2 x 1.5 mm²
Ⓑ Indoor unit
Ⓒ Instantaneous heating water heater
Ⓕ CAN bus cable for indoor/outdoor unit (accessory or supplied on site): See chapter "CAN bus cable for indoor/outdoor unit (on site)",
Ⓖ Power cable for heat pump control unit: See chapter "Recommended power cables".
Ⓗ Power cable for instantaneous heating water heater: See chapter "Recommended power cables".
Ⓚ Electricity meter/mains
Ⓛ Compressor power cable, 230 V~ or 400 V~: See chapter "Recommended power cables".
Ⓜ Outdoor unit

Note

For the external buffer cylinder and the heating/cooling circuits connected to it, additional power supply cables, control cables and sensor cables must be factored in.
Check the power cable cross-sections. Enlarge if necessary.

Design information (cont.)

Cable lengths in the indoor unit

Vitocal 150-A

Connection cables	Cable lengths in the indoor unit
– 230 V~, e.g. for circulation pumps	0.5 m
Note *Route the cables to the HPMU electronics module so they are flexible.*	
– < 42 V, e.g. for sensors	0.7 m

Note

- *Some connection areas, e.g. for power supply and the CAN bus communication cable, are located on the underside of the indoor unit.*
- *The electrical cables/leads required for operation of the outdoor unit are connected only to the **outside** of the outdoor unit.*

Vitocal 151-A

Connection cables	Cable lengths in the indoor unit
– 230 V~, e.g. for circulation pumps	1.3 m
Note *Route the cables to the HPMU electronics module so they are flexible.*	
– < 42 V, e.g. for sensors	0.8 m

Note

*The electrical cables/leads required for operation of the outdoor unit are connected only to the **outside** of the outdoor unit.*

Recommended power cables

Indoor unit

Power supply		Cable	Max. cable length
Control unit/PCB 230 V~			
	– Without power-OFF	3 x 1.5 mm²	50 m
	– With power-OFF	5 x 1.5 mm²	50 m
Instantaneous heating water heater			
400 V~		5 x 2.5 mm²	25 m
230 V~	– 1-phase	3 x 2.5 mm²	25 m
	– 2-phase in the 3-phase network	5 x 2.5 mm²	25 m
	– 2-phase in the 1-phase network	7 x 2.5 mm²	25 m
	– 3-phase	7 x 2.5 mm²	25 m

Heat pumps with central power supply (types ... SP)

Power supply	Cable	Max. cable length
Indoor unit 230 V~	3 x 6.0 mm²	30 m

Outdoor units

Power supply	Cable	Max. cable length
Outdoor unit 230 V~	3 x 2.5 mm²	20 m
	Or	
	3 x 4.0 mm²	32 m
Outdoor unit 400 V~	5 x 2.5 mm²	30 m

CAN bus cable

CAN bus cable, indoor/outdoor unit

Recommended connection cable (accessory)
Fully wired, shielded CAN bus communication cable between the outdoor and indoor unit; length 5 m, 10 m or 30 m (accessories)

On-site cables

Recommended cable type (on site):

CAN bus cable	Twisted pair cable compliant with ISO 11898-2, shielded
– **Cable cross-section**	0.34 to 0.6 mm²
– **Characteristic impedance**	95 to 140 Ω
– **Max. length** (entire CAN bus system)	120 m

Alternative cable types (on site):

CAN bus cable – Max. length (entire CAN bus system)	2-core, CAT7, shielded 120 m
CAN bus cable – Max. length (entire CAN bus system)	2-core, CAT5, shielded 120 m

Connection to other Viessmann appliances via CAN bus

The heat pump can be connected with other compatible appliances via the external CAN bus. Depending on what other compatible appliances it is combined with, this may bring benefits such as shared use of a connectivity module or even joint commissioning and operation via an app.

- The Viessmann CAN bus is designed for "line" bus topology with a terminator at both ends.
  When integrating into an external CAN bus system, a distinction is made as to whether the heat pump is the first, last or central subscriber. The terminator connected at the factory may need to be removed.
- With CAN bus, the transmission quality and the cable lengths depend on the electrical properties of the cable.
- Only use **one** cable type within a CAN bus.

Recommended cable

- Recommended cable:
  Fully wired bus cable (accessories), length: 5, 15 or 30 m
- For wiring on site:
  Only use cable types listed in the following tables.

Recommended cable type (on site):

CAN bus cable	Twisted pair cable compliant with ISO 11898-2, shielded
– **Cable cross-section**	0.34 to 0.6 mm^2
– **Characteristic impedance**	95 to 140 Ω
– **Max. length** (entire CAN bus system)	200 m

Alternative cable types (on site):

CAN bus cable – Max. length (entire CAN bus system)	2-core, CAT7, shielded 200 m
CAN bus cable – Max. length (entire CAN bus system)	2-core, CAT5, shielded 200 m

7.6 Noise emissions

Principles

Sound power level L_W

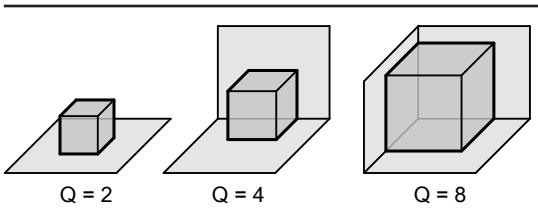
This describes the entire sound emissions in all directions emanating from the heat pump. It does **not** depend on the surrounding conditions (reflections) and is a value that can be used for direct comparisons of sound sources (heat pumps).

Sound pressure level L_P

The sound pressure level is a measure to assist orientation regarding the volume of noise perceived by the ear at a specific location. The sound pressure level is substantially influenced by the distance and ambient conditions. The sound pressure level is thus dependent on the measuring location, which is often at a distance of 1 m. Standard measuring microphones measure the sound pressure directly.
The sound pressure level is the variable that is used to assess immissions from individual systems.

Sound reflection and sound pressure level (directivity Q)

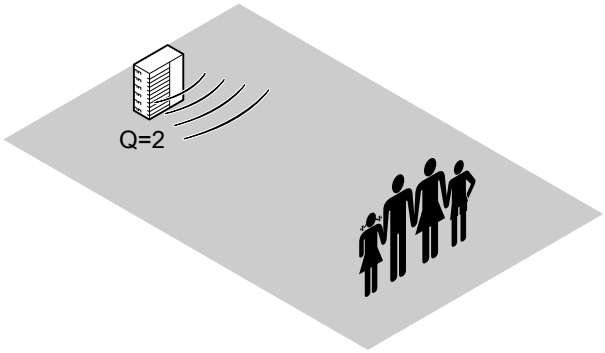
The sound pressure level increases exponentially with the number of adjacent, vertical, fully reflective surfaces (e.g. walls) compared to installation in a free field (Q = directivity), as sound projection is restricted compared to installation in a free field.



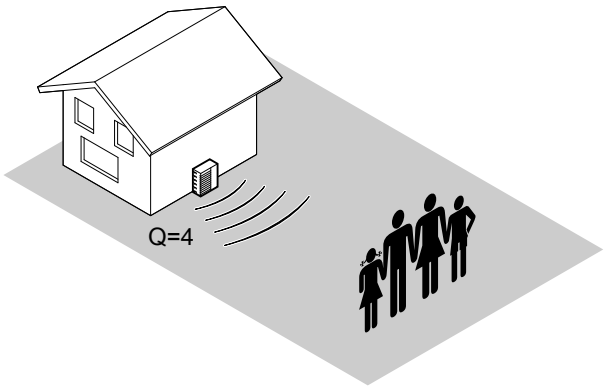
Q Directivity

Design information (cont.)

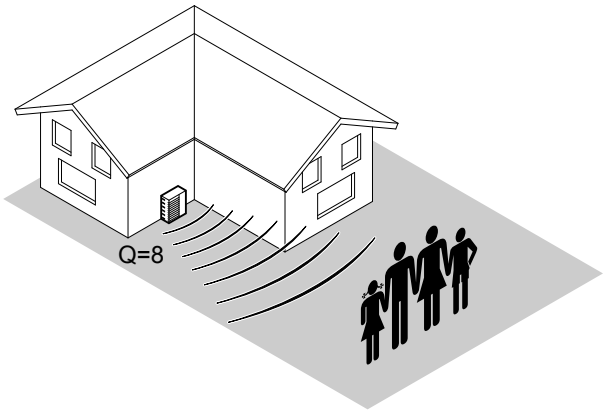
Q=2: Freestanding outdoor unit at a large distance from the building



Q=4: Outdoor unit close to a house wall



Q=8: Outdoor unit close to a house wall, next to a projecting wall corner



The following table shows the extent to which the sound pressure level L_P changes according to directivity Q and the distance from the appliance in relation to the sound power level L_W measured directly at the appliance or at the air diffuser.
The values listed in the table were calculated according to the following formula:

$$L = L_W + 10 \cdot \log \left(\frac{Q}{4 \cdot \pi \cdot r^2} \right)$$

L	=	Sound level at the receiver
L_W	=	Sound power level at the sound source
Q	=	Directivity
r	=	Distance between receiver and sound source

The legal requirements concerning sound propagation apply under the following idealised conditions:
- The sound source is a point source of sound.
- Installation and operating conditions for the heat pump correspond to the conditions when determining the sound power.
- At Q = 2, sound is emitted in a free field, no surrounding reflective objects/buildings.
- At Q = 4 and Q = 8, full reflection on adjacent surfaces is assumed.
- Unrelated noise from other surrounding sources is not taken into account.

Directivity Q, calculated on site	Distance from the sound source in m								
	1	2	4	5	6	8	10	12	15
	Energy-equivalent duration of sound pressure level L_P of the heat pump in relation to the sound power level L_W measured at the appliance/air duct in dB(A)								
2	–8.0	–14.0	–20.0	–22.0	–23.5	–26.0	–28.0	–29.5	–31.5
4	–5.0	–11.0	–17.0	–19.0	–20.5	–23.0	–25.0	–26.5	–28.5
8	–2.0	–8.0	–14.0	–16.0	–17.5	–20.0	–22.0	–23.5	–25.5

Note

- *In practice, actual values may differ from those shown here due to sound reflection or sound absorption as a result of local conditions. Therefore, the situations described for example by Q = 4 and Q = 8 often give only an approximate picture of the actual conditions at the emission site.*
- *If the heat pump sound pressure level as calculated approximately from the table is less than 3 dB(A) different from the permissible standard value given by the TA Lärm, a precise sound immissions prognosis must be produced (consult an acoustic engineer).*

Standard values for assessing the sound pressure level to TA Lärm (measured outside the building)

Area/object: Determined according to outline planning restrictions; check with local authorities.	**Standard immissions value (sound pressure level) in dB(A)**: Valid for the sum of all sounds that have an influence	
	During the day	At night
Area with a mix of commercial installations and residential units where neither commercial installations nor residential units dominate.	60	45
Areas with predominantly residential units.	55	40
Areas with only residential units.	50	35
Residential units that are structurally connected to the heat pump system	40	30

Note

- *Sound emission regulations (TA-Lärm in Germany) must be observed.*
- *When siting the heat pump, always take into account the distances to neighbouring properties in accordance with local building regulations.*

Sound pressure level at different distances to the appliance

Information on the values in the following tables

- Measured, weighted total sound power level L_W:
  Total sound power level measurement was performed with reference to EN ISO 12102/EN ISO 9614-2, accuracy category 2 under the following conditions: A $7^{\pm 3\,K}$/W $55^{\pm 2\,K}$
- Calculated sound pressure level L_P:
  Calculation on the basis of the actual effective total sound power level, in accordance with the formula in chapter "Principles"
- In practice, actual values may differ from those shown here due to sound reflection or absorption as a result of local conditions. Therefore, the situations described for example by Q = 4 and Q = 8 often give only an approximate picture of the actual conditions at the emission site.

Note on the following tables

The data for the "Night" fan speed relate to low-noise mode at level 2.

Outdoor unit type 151.A04, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	52	2	44	38	32	30	28	26	24	22	20
		4	47	41	35	33	31	29	27	25	24
		8	50	44	38	36	34	32	30	28	27
Max.	56	2	48	42	36	34	32	30	28	26	24
		4	51	45	39	37	35	33	31	29	28
		8	54	48	42	40	38	36	34	32	31

Design information (cont.)

Outdoor unit type 151.A06, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	52	2	44	38	32	30	28	26	24	22	20
		4	47	41	35	33	31	29	27	25	24
		8	50	44	38	36	34	32	30	28	27
Max.	58	2	50	44	38	36	34	32	30	28	26
		4	53	47	41	39	37	35	33	31	30
		8	56	50	44	42	40	38	36	34	33

Outdoor unit type 151.A08, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	52	2	44	38	32	30	28	26	24	22	20
		4	47	41	35	33	31	29	27	25	24
		8	50	44	38	36	34	32	30	28	27
Max.	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34

Outdoor unit type 151.A10, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Outdoor unit type 151.A13, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Outdoor unit type 151.A16, 230 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_P in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Outdoor unit type 151.A10, 400 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_p in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Outdoor unit type 151.A13, 400 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_p in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Outdoor unit type 151.A16, 400 V~

Fan speed	Sound power level L_W in dB(A)	Directivity Q	Distance from the outdoor unit in m								
			1	2	4	5	6	8	10	12	15
			Sound pressure level L_p in dB(A)								
Night	59	2	51	45	39	37	35	33	31	29	27
		4	54	48	42	40	38	36	34	32	31
		8	57	51	45	43	41	39	37	35	34
Max.	66	2	58	52	46	44	42	40	38	36	34
		4	61	55	49	47	45	43	41	39	38
		8	64	58	52	50	48	46	44	42	41

Information on reducing sound emissions

- Do not site the outdoor unit immediately next to/above living/bedrooms or their windows.
- Structure-borne noise insulation of the outdoor unit to the building structure must be ensured by on-site measures.
- Line entries through ceilings, walls and roofs must have sound insulation. Use suitable insulating materials to prevent the transmission of airborne and structure-borne noise: See the information about siting the indoor unit on page 104 onwards.
- Do not site the outdoor unit immediately next to neighbouring buildings or properties. See the information about siting the outdoor unit on page 92 onwards.
- The sound pressure level can increase if the outdoor unit is sited in unfavourable physical positions.
  In this context, please observe the following:
  – Avoid surroundings with reverberant floors (e.g. concrete or paving), as the sound pressure level can be increased through reflection. Surroundings where the ground is covered with vegetation (e.g. a lawn) can noticeably reduce the sound pressure level.
  – Site the outdoor unit with as much space around it as possible: See page 111.
- If the requirements of the TA Lärm [Germany] are not observed, suitable building measures (e.g. additional planting) must be employed to reduce the sound pressure level to acceptable levels: See page 111.

7.7 Sizing the heat pump

On heat pumps with Viessmann One Base, the flow rate required to meet the heat demand is controlled automatically through the integral 4/3-way valve. To ensure an adequate heat supply, the correct heat pump for the required heat load must be determined.
A heat pump that is too large can cause more frequent on/off cycling, especially when outside temperatures are moderate, e.g. in spring and autumn. When sizing the heat pump, therefore, it is not only the building heat load and maximum heating output that are relevant but also the lower modulation range. To prevent frequent on/off cycling at moderate outside temperatures, therefore, a larger buffer volume may be helpful.

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 Φ_{HL} of the building to EN 12831 before selecting and ordering the appropriate heat pump. The planning software "Heat pump planner" can be used for this purpose: See **https://heatpump-planner.viessmann.com**.

Mono mode operation

According to EN 12831, the heat pump in a mono mode system, as the sole heat generator, must be able to cover the entire heat demand of the building.
For mono mode operation, take into account the likely primary inlet temperatures at the installation site and the heat pump application limits:
For minimum primary inlet temperature and minimum secondary circuit flow temperature: See chapter "Application limits to EN 14511".
Please also note that, in mono mode, the heat pump heating output and the maximum secondary circuit flow temperature are influenced by the primary inlet temperature. This can result in comfort losses, for DHW heating in particular.

Therefore please note the following design points:
- Check whether the maximum heat pump flow temperature, achieved at the prevailing primary inlet temperatures, fulfils the local DHW heating requirements.
- During commissioning or service, the secondary circuit temperature may lie below the required minimum heat pump flow temperature. The heat pump compressor does not then start independently.
- If frost protection mode is permanently enabled (e.g. in a holiday home), the secondary circuit temperature can drop below the minimum heat pump flow temperature. The heat pump compressor does not then start independently.

As a result, even with a mono mode heat pump design, an additional heat generator must always be included in the design; e.g. an instantaneous heating water heater.
If the heat pump **cannot** meet the heat demand in mono mode, it must be operated in **mono energetic mode** (with instantaneous heating water heater) or in **dual mode** (with external heat generator). Otherwise there is a risk of the condenser freezing, causing significant damage to the heat pump.

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 GEG)	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 power-OFF time of 3 × 2 hours or when used in Smart Grid
Example:
Low energy house (40 W/m^2) and a heated area of 180 m^2
- Estimated heat load: 7.2 kW
- Maximum power-OFF time: 3 x 2 h at minimum outside temperature to EN 12831

For a 24 h period, this results in a daily heat volume of:
- 7.2 kW x 24 h = 173 kWh

To cover the maximum daily heat demand, only 18 h per day are available on account of the times when the power supply is off. Building inertia means that 2 hours will not be taken into consideration.
- 173 kWh / (18 + 2) h = 8.65 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 times are only invoked if there is a need to do so. For more information on the relevant power-OFF times, ask the power supply utility responsible.

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[*7] in kW/person
Low demand	15 to 30	600 to 1200	0.08 to 0.15
Standard demand[*8]	30 to 60	1200 to 2400	0.15 to 0.30

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[*7] 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[*8] (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 pumps are supported by the integral 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
*That part of the electric power drawn by the instantaneous heating water heater will generally **not** be 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 maximum 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.

7.8 Hydraulic conditions for the secondary circuit

Minimum flow rate and minimum system volume

To ensure fault-free operation of an air source heat pump, a minimum flow rate and minimum system volume must be observed. Heat pumps with Viessmann One Base are factory-fitted with Hydro AutoControl for this purpose. Hydro AutoControl includes, among other things, a factory-fitted buffer cylinder in the indoor unit and an electronically controlled 4/3-way valve.
- Using the 4/3-way valve, the minimum flow rate of > 300 l/h between the indoor and outdoor units is ensured under all operating conditions. The flow rate to the heating circuits may, depending on operating conditions, fall below 300 l/h.
- When defrosting, a flow rate of > 1000 l/h may occur between the indoor and outdoor units, depending on demand. During defrosting, there is no supply to the heating circuits.

Note
- *Only the flow rate between the indoor and outdoor units is measured internally and displayed on the heat pump control unit.*
- *The flow rates for the heating circuits and DHW heating can be adjusted to system-specific requirements via parameters.*

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

Heating water filter

When modernising a heating system, installation of a heating water filter between the indoor and outdoor units is required. The heating water filter is fitted in the return to the outdoor unit.

It is recommended to install the heating filter with magnetite separation (accessories), as the filtration properties of this heating water filter are tailored to the heat pump.

Systems with an external buffer cylinder connected in parallel

In addition to the buffer cylinder built into the indoor unit, the heat pump can also supply an external buffer cylinder connected in parallel.

Benefits

- Heating circuits with mixer can be supplied with a different flow temperature to a heating circuit without mixer.
- The system can be supplied by additional heat sources:
  - External buffer cylinder heating via solar central heating backup
  - External buffer cylinder heating via the heat pump, if electrical energy is provided by self-generated power from the photovoltaic system.
- Bridging power-OFF times:
  Subject to the electricity tariff, heat pumps can be switched off at peak times by the power supply utility. The external buffer cylinder supplies the heating circuits even during this power-OFF time.
- An additional external buffer cylinder can significantly extend the runtime of the heat pump. This prevents frequent starting and stopping (cycling) of the heat pump.

Implementation instructions

- When sizing the external buffer cylinder, note whether underfloor and/or radiator heating circuits are connected.
- Due to the large volume of water and possible separate shut-off equipment for the heat generator, allow for a second or a larger expansion vessel.
- Set up the safety equipment for the system according to EN 12828.
- The volumetric flow rate of the secondary pump must be greater than that of the heating circuit pumps.
- In conjunction with an underfloor heating circuit, a temperature limiter must be installed to limit the maximum temperature of underfloor heating (part no. 7151728 or 7151729).

Systems without external buffer cylinder

Through Hydro AutoControl, the minimum system volume and minimum flow rate are always available. The heat pump can therefore safely defrost at any time

To prevent the building from cooling down, fit an external buffer cylinder with a minimum volume of 200 l under the following conditions:

- The system is operated solely with radiators.
  And
- The selected electricity tariff includes a power-OFF period.

Max. hydraulic system pressure

The maximum system pressure on the heating water side is 3 bar (0.3 MPa). Do not exceed this hydraulic pressure!

7.9 Design guide for the secondary circuit

Through Hydro AutoControl, the minimum system volume and minimum flow rate are always available.

The following table gives an overview of the components used to supply the connected heating/cooling circuits reliably and safely.

- Pipework cross-sections in secondary circuit
- Integral buffer cylinder (factory-installed)
- External buffer cylinder connected in parallel to the heat pump

$\dot{V}_{min}$ in l/h	$\varnothing_{pipes}$	Buffer cylinder (recommended minimum)		
		⫴ + PSU or ◎	◎ + PSU	⫴ + ◎ + PSU
1000	DN 25/DN 32 *Observe the information!*	Integrated buffer cylinder	Vitocell 100-E	

Icons:

- $\dot{V}_{min}$ Minimum flow rate, secondary circuit
- $\varnothing_{pipes}$ Minimum diameter of pipes in secondary circuit
- ⫴ Underfloor heating circuit
- ◎ Radiator heating circuit
- PSU Electricity tariff with power-OFF period

Notes on secondary circuit pipework minimum diameter $\varnothing_{pipes}$

To allow the heat pump to defrost safely at any time, a minimum flow rate of 1000 l/h is required between the indoor unit and outdoor unit.

Hydro AutoControl guarantees this minimum flow rate as long as the following recommendations are observed:

Floor or wall mounting of the outdoor unit close to buildings with the hydraulic connection accessories from the Viessmann product range, see "Installation accessories":

- The outdoor unit can be connected to the building up to a length of 2 m with a cable cross-section of DN 25.
- Depending on the pipe length and the required flow rate, enlarge the cable cross-section within the building to DN 32, if necessary.

Installation of the outdoor unit further from the building, pipework below ground level:
- Connecting cable to the indoor unit in DN 32.

The recommended minimum diameter of the pipework can be varied under the following conditions:
- Carry out a pipework calculation using the selected pipe diameter. This calculation must prove that the required flow rate in relation to the residual head is maintained: See heat pump specification.

Information on the buffer cylinder

In systems with power supply utility power-OFF times, fit an adequately sized external buffer cylinder. We recommend sizing this buffer cylinder according to VDI 4645: allow for a buffer volume of 30 to 40 l per kW of heat pump output and hour of power-OFF time.

Pipework volume

Pipe	Nominal diameter	Dimension x wall thickness in mm	Volume in l/m
Copper pipe	DN 20	22 x 1	0.31
	DN 25	28 x 1	0.53
	DN 32	35 x 1	0.84
	DN 40	42 x 1	1.23
	DN 50	54 x 2	2.04
	DN 60	64 x 2	2.83
Threaded pipes	¾ in.	26.9 x 2.65	0.37
	1 in.	33.7 x 3.25	0.58
	1¼ in.	42.4 x 3.25	1.01
	1½ in.	48.3 x 3.25	1.37
	2 in.	60.3 x 3.65	2.21
Composite pipes	DN 20	26 x 3.0	0.31
	DN 25	32 x 3.0	0.53
	DN 32	40 x 3.5	0.86
	DN 40	50 x 4.0	1.39
	DN 50	63 x 6.0	2.04
Hydraulic connection lines	DN 32	40 x 3.7	0.84
	DN 40	50 x 4.6	1.31

Note
If the heat pump is also used for cooling, the heating water flow and heating water return must be thermally insulated with vapour diffusion-proof material.

Further hydraulic data

Circulation pump	Factory-fitted
Residual heads with integral circulation pump	See pages 18 and 31.

7.10 Water quality

Heating water

Unsuitable fill and top-up water increases the level of deposits and corrosion. This can lead to system damage.
Hard water can also cause damage to the instantaneous heating water heater in particular.
Observe VDI 2035 regarding 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.
- To protect the instantaneous heating water heater, only fill and operate the system with softened water.
- Do not use antifreeze (e.g. water/glycol mixture) in the heating water.
- Do not use chemical additives in the system.

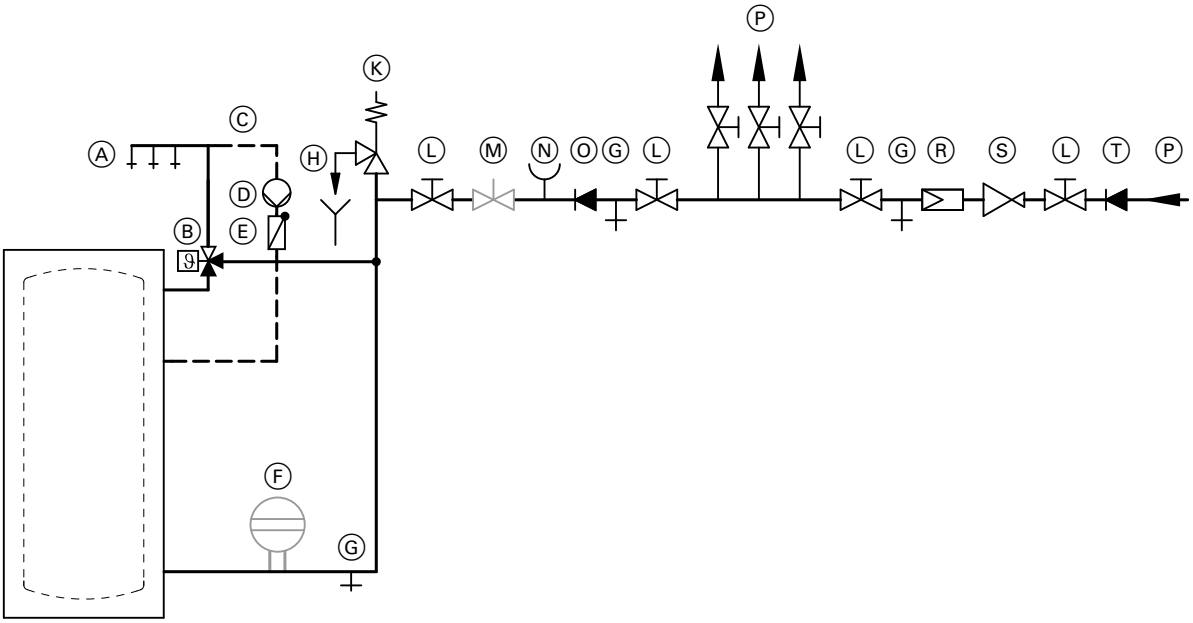
For further information about fill and top-up water: See technical guide "Heat pump principles".

Dirt and magnetite separator
Particularly with existing systems, contaminated heating water can lead to increased wear or faults with individual components, e.g. pumps and valves.
Particles of rust and dirt can reduce the efficiency of the heat pump and block the condenser. Consequently, the system cannot be guaranteed to operate without faults at all times.
The ingress of oxygen (for example via compression fittings) can also cause corrosion in new systems, e.g. on the heat exchanger in the DHW cylinder.
We therefore recommend installing a heating filter with magnetite separation in both existing and new heating systems: See "Installation accessories" or Vitoset pricelist.

7.11 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.

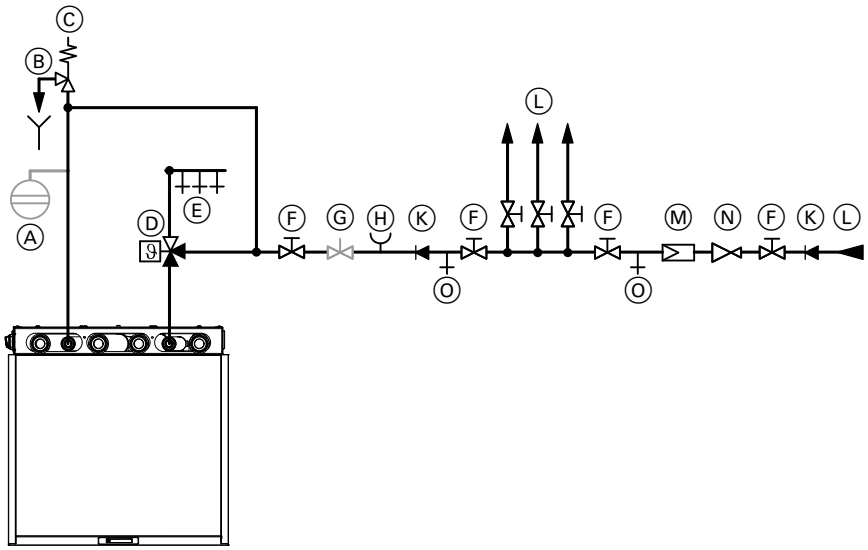
Vitocal 150-A



Example with Vitocell 100-V, type CVWB

Ⓐ DHW
Ⓑ Automatic thermostatic mixing valve
Ⓒ DHW circulation pipe
Ⓓ DHW circulation pump
Ⓔ Spring-loaded check valve
Ⓕ Expansion vessel, suitable for drinking water
Ⓖ Drain
Ⓗ Visible discharge pipe outlet point
Ⓚ 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

Vitocal 151-A



Ⓐ Expansion vessel, suitable for drinking water
Ⓑ Visible discharge pipe outlet point
Ⓒ Safety valve
Ⓓ Automatic thermostatic mixing valve
Ⓔ DHW
Ⓕ Shut-off valve
Ⓖ Flow regulating valve
Ⓗ Pressure gauge connection
Ⓚ Non-return valve/pipe separator
Ⓛ Cold water
Ⓜ Drinking water filter
Ⓝ Pressure reducer to DIN 1988-200:2012-05
Ⓞ Drain valve

Safety valve

The DHW cylinder **must** have a safety valve to protect against unduly high pressure.
Recommendation: Install safety valve above top edge of cylinder. This means the DHW cylinder will not need to be drained when working on the safety valve.

CH: According to W3 "Principles for creating potable water installations", safety valves must be drained directly via a visible unrestricted drain or via a short outlet line to the drain network.

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.

7.12 DHW cylinder selection

For systems with Viessmann heat pumps, we recommend using only the approved Viessmann DHW cylinders listed in this technical guide.
For the best possible system operation and efficiency, the following design information and calculation principles must be taken into account when sizing the DHW cylinder.

Note

- *If a Viessmann DHW cylinder is **not** being used, it is the personal responsibility of the specialist design engineer to guarantee that the following design information and calculation principles are applied when sizing the DHW cylinder.*
- *Any local requirements regarding DHW heating should be taken into account in the design process.*

Heat exchanger surface area
To enable the heat pump to transfer heat to the water, the DHW cylinder must have a sufficiently large heat exchanger surface area. If the surface area is too small, the return temperature will exceed the permitted value during cylinder heating and the heat pump will switch off. Cylinder heating will consequently stop before the set cylinder temperature programmed at the heat pump control unit is reached. As a result, the heat pump will switch on and off frequently while heating the cylinder and the set cylinder temperature will not be reached.
In the case of Viessmann DHW cylinders, the heat exchanger surface area required for heat pump operation has already been taken into account at the development stage. As a result, approved combinations of heat pump and DHW cylinder have been devised.
For third party cylinders, the required heat exchanger area can be roughly estimated:
Min. heat exchanger area = 0.25 m^2/kW of transferable heating output in summer

This calculation prevents the heat pump from switching off prematurely even when the primary inlet temperature is high, e.g. in summer.

Note
- *In the case of heat pumps with inverter and output-dependent control, the rated heating output can be used for the calculation, since the cylinder is heated under partial load.*
- *The heat exchanger surface area of third party cylinders can be found in the relevant documents provided by the manufacturer.*

Max. cylinder temperature

The max. achievable cylinder temperature is influenced by the following factors:
- Secondary circuit flow temperature
- Temperature spread between secondary circuit flow and return

Flow temperature in the secondary circuit
The max. achievable flow temperature in the secondary circuit is dependent on the primary inlet temperature: See chapter "Application limits".
If the heat pump cannot achieve the required cylinder temperature in mono mode operation, it must be operated in mono energetic mode (with instantaneous heating water heater) or dual mode (with external heat generator).

Temperature spread between secondary circuit flow and return
For fault-free heat pump operation, there needs to be a sufficient temperature spread between the secondary circuit flow and return. Particularly with heat pumps with a fixed heating output, a high temperature spread enables the cylinder to be efficiently heated up to the set cylinder temperature.

Standard values for the temperature spread for adjustment of the flow rate at the start of cylinder heating:
- Heat pumps with fixed heating output: 5 to 8 K
- Heat pumps with inverter and output-dependent control: 4 to 5 K

Lines to the DHW cylinder

For highly efficient DHW heating, we recommend taking the following into account:
- Observe the minimum diameter for the lines connecting the DHW cylinder to the heat pump: See chapter "Design guide for the secondary circuit"
- Keep the lines between heat pump and DHW cylinder as short as possible and keep changes of direction to a minimum.

Maximum cylinder storage temperature with Vitocal 150-A
The maximum cylinder storage temperature depends on the selected DHW cylinder and on the heat exchanger that is installed in it. Depending on the DHW cylinder, the maximum cylinder storage temperature will be between 50 °C and 60 °C.

Note
- *The stated cylinder storage temperature can only be achieved in the temperature range within the application limits to EN 14511 in which the heat pump reaches the max. flow temperature.*
- *The cylinder sizes listed in the following table are **standard values**. They are based on the following DHW demand: 50 l per person per day at a DHW temperature of 45 °C*

Vitocal 150-A

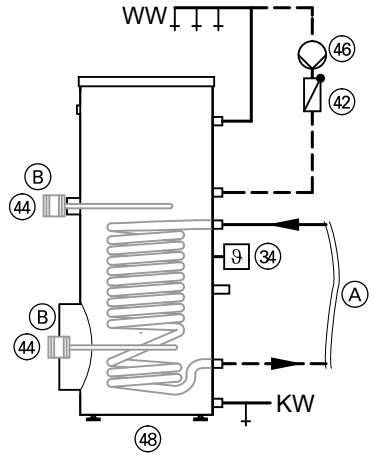
Heat pump operating mode	3 to 5 occupants		6 to 8 occupants	
	DHW cylinder	Capacity	DHW cylinder	Capacity
Mono mode	Vitocell 100-W, type CVAB	300 l	Vitocell 100-V, type CVA	500 l
	Vitocell 100-V/100-W, type CVWA/CVWB	300 l 390 l	Vitocell 100-V, type CVWA	500 l

To ensure the DVGW Code of Practice is fulfilled, an instantaneous heating water heater or second heat generator should be installed, so that DHW temperatures reach > 60 °C. Equipping the heat pump with an instantaneous heating water heater fulfils this requirement.

Specification – DHW cylinder
See technical guides for DHW cylinders.

System examples

DHW cylinder with internal indirect coils



Hydraulic scheme when using e.g. Vitocell 100-V

Ⓐ Heat pump connection
Ⓑ Immersion heater EHE can be installed in top or bottom section
KW Cold water
WW DHW

Equipment required

Pos.	Description	Quantity	Part no.
㉞	Cylinder temperature sensor	1	7438702
㊷	Spring-loaded check valve	1	On site
㊹	Immersion heater EHE	1	See Viessmann pricelist.
㊻	DHW circulation pump	1	See Vitoset pricelist.
㊽	DHW cylinder	1	See Viessmann pricelist.

7.13 Cooling mode

For cooling, the heat pumps operate in reverse mode. This means that the heat pump cycle is reversed.

System configurations for room cooling
Depending on the system configuration, cooling mode is possible via one or via several heating/cooling circuits simultaneously.
- Cooling mode is possible via the heating/cooling circuits directly connected to the indoor unit.
- Cooling is **not** possible via a heating circuit connected to an external buffer cylinder.

Detailed information on system examples with room cooling can be found at: **www.viessmann-schemes.com**

Cooling circuits

Cooling is provided room temperature-dependent via a heating/cooling circuit e.g. Via an underfloor heating circuit:
- For room temperature-dependent cooling mode, a room temperature sensor must be present and activated.
- Suitable thermostatic valves must be used for cooling via an underfloor heating circuit. Ensure that the thermostatic valves can be opened via the AC signal or manually to enable cooling operation during the cooling period. Radiators, panel radiators and similar are not suitable for cooling mode.
- To prevent the formation of condensate, all visible components e.g. pipes, pumps, etc. must be thermally insulated with vapour diffusion-proof material.

Room temperature-dependent cooling mode
The flow temperature depends on the type of cooling circuit, e.g. whether cooling is via a fan convector or an underfloor heating circuit.

Cooling via underfloor heating circuit
The underfloor heating circuit can be used for heating and for cooling buildings and rooms.

Surface temperature limits must be maintained to observe comfort criteria and to prevent condensation. Therefore, the surface temperature of an underfloor heating system in cooling mode must not fall below 20 °C.
To prevent the formation of condensate on the surface of underfloor heating systems, install a contact humidistat (accessories) into the underfloor heating system flow. 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 be used to estimate the possible cooling capacity of an underfloor heating system.

The following applies in general:
The minimum flow temperature for cooling with an underfloor heating system and the minimum surface temperature are subject to the prevailing climatic conditions in the room (air temperature and relative humidity). These conditions must therefore also be taken into consideration during the engineering stage.

Estimated cooling capacity of an underfloor heating system depending on the floor covering and pipe spacing (assumed flow temperature approx. 16 °C, return temperature approx. 20 °C)

Flooring		Tiles			Carpet		
Installation spacing	**mm**	**75**	**150**	**300**	**75**	**150**	**300**
Cooling capacity with pipe diameter							
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

Details applicable to the following conditions:
- Room temperature: 26 °C
- Relative humidity: 50 %
- Dew point temperature: 15 °C

7.14 Leak test on the refrigerant circuit

Heat pump refrigerant circuits containing a refrigerant with a CO_2 equivalent of 5 t or more must be tested regularly for tightness in accordance with EU Regulation No. 517/2014. In the case of hermetically sealed refrigerant circuits, this regular testing is required for a CO_2 equivalent of 10 t or more.
The intervals at which the refrigerant circuits will need to be tested depend on the level of CO_2 equivalent. If leak detection facilities are available on site, the test intervals are extended.

The Vitocal 150-A and Vitocal 151-A heat pumps have hermetically sealed refrigerant circuits. The CO_2 equivalent is below 10 t for all appliances.
A regular leak test of the refrigerant circuit is therefore **not** prescribed.

7.15 Intended use

The appliance is only intended to be installed and operated in sealed unvented heating systems that comply with EN 12828, with due attention paid to the associated installation, service and operating instructions.

Depending on the version, the appliance can only be used for the following purposes:
- Central heating
- Central cooling
- DHW heating

The range of functions can be extended with additional components and accessories.

Intended use presupposes that a fixed installation in conjunction with permissible, system-specific components has been carried out.

Commercial or industrial usage for a purpose other than central heating/cooling or DHW heating shall be deemed inappropriate.

Incorrect usage or operation of the appliance (e.g. the appliance being opened by the system user) is prohibited and will result in an exclusion of liability. Incorrect usage also occurs if the components in the heating system are modified from their intended function.

Note
The appliance is intended exclusively for domestic or semi-domestic use, i.e. even users who have not had any instruction are able to operate the appliance safely.

Heat pump control unit

8.1 Viessmann One Base

The heat pump control unit is based on Viessmann One Base. Viessmann One Base networks the products and systems in Viessmann's integrated range of solutions and links them with the digital services of the future.

With Viessmann One Base, product upgrades are also possible for existing systems at any time. These upgrades can both extend the control functions described below and increase system efficiency.

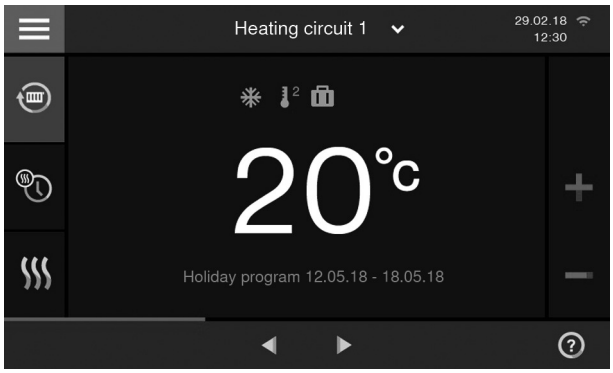
8.2 Layout and functions

Modular design

The control unit is integrated into the indoor unit.

The control unit comprises electronics modules and the HMI programming unit:
- HMI programming unit with 7 inch colour touchscreen and integral TCU communication module
- HPMU electronics module:
  - Connection of actuators
  - Connection of components and accessories via PlusBus and CAN bus
  - Power supply to accessories
- EHCU electronics module for instantaneous heating water heater and contact humidistat
- Status indicator (Lightguide) for operating and fault display

Programming unit



- The control unit can be set to the following operating modes:
  - Weather-compensated operation
    The outside temperature sensor must be connected.
  - Room temperature-dependent operation
- Easy operation:
  - Touchscreen with graphic display and plain text
  - Large font and colour depiction for good contrast
  - Context-sensitive help texts
- Connectivity:
  - Integral WiFi interface
  - Access point mode
  - Communication module, Service Link
  - Low power radio
- Digital time switch
- Touchscreen:
  - Navigation
  - Settings
  - Confirmation
  - Help and additional information
  - Menu
- Settings:
  - Room climate (heating/cooling circuits)
  - Set room temperature
    - Reduced
    - Normal
    - Comfort
  - Set cylinder temperature
  - One-off DHW heating
  - Operating programs for room climate and DHW heating
  - Time programs for room climate, DHW heating and DHW circulation
  - Comfort mode
  - Holiday program
  - Holiday at home
  - Heating curves
  - Hygiene function (increased DHW hygiene)
  - Parameter
  - Emergency mode
  - Low-noise mode
- Displays:
  - Outside temperature
  - Secondary circuit flow temperature
  - Flow temperature, heating/cooling circuit with mixer
  - Set flow temperature
  - Cylinder temperature
  - Operating data
  - Energy consumption data (in the energy cockpit)
  - Diagnostic data
  - Fault messages
- Available languages:
  - Deutsch
  - Czech
  - Danish
  - English
  - French
  - Italian
  - Dutch
  - Polish
  - Slovak
  - Swedish
  - Estonian
  - Croatian
  - Latvian
  - Lithuanian
  - Norwegian
  - Bulgarian
  - Portuguese
  - Romanian
  - Russian
  - Serbian
  - Slovenian
  - Spanish
  - Finnish
  - Ukrainian
  - Hungarian

Functions

- Weather-compensated control of the flow temperature
- Control of 1 directly connected heating/cooling circuit without mixer
  Or
- In conjunction with external buffer cylinder:
  Control of 1 heating circuit without mixer **and** max. 3 heating circuits with mixer
- Electronic maximum and minimum temperature limit
- Demand-dependent heating/cooling circuit pump and compressor shutdown
- Variable heating limit setting
- Automatic winter/summertime changeover
- Individually programmable switching times for heating/cooling operation and DHW heating:
  Up to 4 time phases per day
- Frost protection monitoring for the system
- Integral diagnostic system
- Service indicator

Heat pump control unit (cont.)

- Commissioning via commissioning assistant on the HMI programming unit
  Or via ViGuide
- Cylinder temperature controller with priority control
- Hygiene function for DHW heating (short term heating to a higher temperature)
- Screed drying program simultaneously for all heating/cooling circuits (selection of 6 stored programs)
- External heating circuit hook-up (weather-compensated control of flow temperature for up to 4 heating/cooling circuits in conjunction with room thermostat)
- Optimised energy management, e.g. in conjunction with photovoltaic system, power storage system
- Setting of low-noise mode for the outdoor unit
- Connection option for extension modules

Viessmann energy management

Viessmann energy management is integrated into the latest generation of Viessmann heat pumps and power storage systems. This energy management allows balancing operation of components in the home, which generate, consume or store electricity.
Its focus is on self-consumption optimisation of self-generated power from photovoltaic systems. The energy management system provides extensive information on electricity flows and CO_2 reduction. In addition to thermal consumption values, electrical values can also be visualised and displayed via the ViCare App for the system user and the ViGuide for the trade partner.
The integrated energy management is a constantly growing system that is regularly extended with new functions and solutions. If required, system users and trade partners can add further optimisation functions in the ViCare App or in ViGuide.

Significant product features:
- Live view of energy flows in the home, for generation, storage and consumption, including a 2-year history in the ViCare App and ViGuide
- With photovoltaics and heat pump:
  – View of self-consumption, self-sufficiency and CO_2 reduction
  – PV self-consumption optimisation
- With photovoltaics, power storage system and heat pump:
  – View of self-consumption, self-sufficiency, CO_2 reduction and battery charge level
  – PV self-consumption optimisation taking into account the power storage system

Supported systems:
- Power storage system Vitocharge VX3 in conjunction with heat pumps (from 11/2017), connected via Vitoconnect, type OPTO2 and EEBUS to Vitocharge VX3.
- Power storage system Vitocharge VX3 in conjunction with heat pumps with Viessmann One Base
- Heat pump with Viessmann One Base in conjunction with a photovoltaic system of a third party provider

Required accessories:
- For visualisation of electrical consumption values of the building, an energy meter is required at the grid connection point of the building.
- For self-consumption optimisation of the self-generated power from photovoltaic systems, an electricity meter is required in the supply line of the photovoltaic system.
- Suitable energy meter: See chapter "Accessories, photovoltaics".

Further information on system requirements, functions and use:
See **www.viessmann.de/energy-management**.

Information on the PlusBus subscribers

The following PlusBus subscribers can be connected to the control units:
- Max. 3 extensions EM-M1 or EM-MX (ADIO electronics module)

PlusBus cable (unshielded)
- 2-core
- Cable cross-section: 0.34 mm^2
- Max. total length: 50 m

Note
Max. power consumption of all components directly connected to the control unit: 6 A
If the max. power consumption is exceeded, connect one or more extensions via an ON/OFF switch directly to the mains supply.

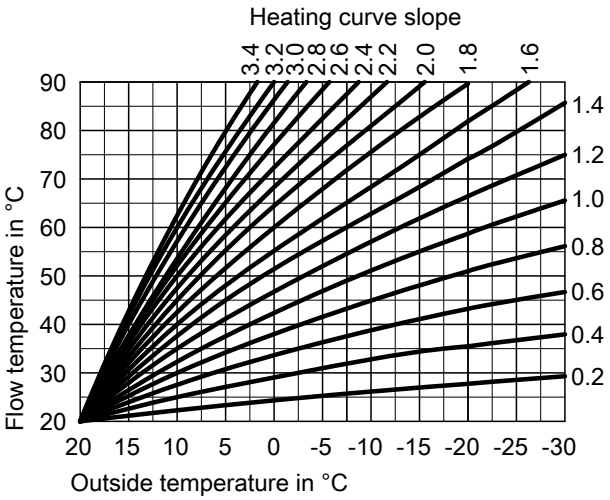
Frost protection function

- The frost protection function will start when the outside temperature falls below approx. +1 °C.
  With active frost protection, the secondary pump is switched on. The reduced flow temperature is set.
- If the cylinder temperature is < 5 °C, the DHW cylinder is heated to 20 °C. If the system is set to weather-compensated control with room temperature hook-up, the frost protection function will not be active for the heating circuits (if the contact is not assigned). In such cases, frost protection for the heating circuit must be provided on site.
- The frost protection function will stop when the outside temperature exceeds approx. +3 °C.

Heat pump control unit (cont.)

Setting the heating curves (slope and level)

The flow temperature of the heating/cooling circuits without mixer **and** the flow temperature of the heating/cooling circuits with mixer (in conjunction with mixer extension kit) are weather-compensated. The highest currently required set flow temperature can be increased by a fixed value.
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.
By adjusting the heating curves, the flow temperature in the secondary circuit is matched to these conditions.
The flow temperature is restricted at the upper end of the scale by the temperature limiter and the maximum temperature set at the electronic maximum temperature limiter.
The flow temperature in the heating/cooling circuits cannot exceed the heat pump flow temperature.



Systems with external buffer cylinder

When using an external buffer cylinder, a buffer temperature sensor must be installed. This buffer temperature sensor is connected to the heat pump control unit.

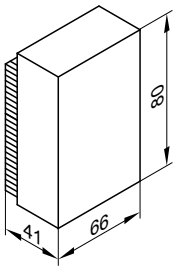
Outside temperature sensor

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 cable immediately next to 230/400 V cables.



Specification

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

8.3 Specification, heat pump control unit

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	6 A
Protection class	I
Permissible ambient temperature	
– Operation	5 to +35 °C Installation in living spaces or boiler rooms (standard ambient conditions)
– Storage and transport	–20 to +65 °C
Electronic temperature limiter setting (heating mode)	91 °C (cannot be changed)
Setting range for DHW temperature	10 to 60 °C: On indoor units with integral DHW cylinder, up to 70 °C
Setting range for heating curve	
– Slope	0.2 to 3.5
– Level	–13 to 40 K

Mobile data transfer via communication module (integral)

WiFi	
– Transfer standard	IEEE 802.11 b/g/n
– Frequency range	2000 to 2483.5 Mhz
– Max. transmission power	+ 15 dBm
Low power radio	
– Transfer standard	IEEE 802.15.4
– Frequency range	2000 to 2483.5 Mhz
– Max. transmission power	+ 10 dBm
Service link	
– Transfer standard	LTE-CAT-NB1
– Frequency range band 3	1710 to 1785 Mhz
– Frequency range band 8	880 to 915 Mhz
– Frequency range band 20	832 to 862 Mhz
– Max. transmission power	+ 23 dBm

Control unit accessories

9.1 Overview

Accessories	Part no.	Vitocal 150-A	Vitocal 151-A
Photovoltaics: See page 129 onwards.			
3-phase energy meter, balancing	ZK06026	X	X
3-phase electricity meter, non-balancing	ZK06027	X	X
Bus cables: See page 129 onwards.			
Bus communication cable, indoor/outdoor unit			
– Length 5 m	7973122	X	X
– Length 15 m	7973123	X	X
– Length 30 m	7973124	X	X
Bus cable for networking bus subscribers			
– Length 5 m	ZK06219	X	X
– Length 15 m	ZK06220	X	X
– Length 30 m	ZK06221	X	X
Wireless accessories: See page 129 onwards.			
ViCare thermostatic radiator valve	ZK03840	X	X
ViCare floor thermostat	ZK03838	X	X
ViCare climate sensor – temperature and humidity sensor	ZK03839	X	X
Remote control units: See page 130 onwards.			
Vitotrol 300-E	7959522	X	X
Power supply unit for flush mounting	ZK03842	X	X
Sensors: See page 131 onwards.			
Immersion temperature sensor (NTC 10 kΩ)	7438702	X	X
Contact temperature sensor (NTC 10 kΩ)	7426463	X	X
Extension for heating circuit control unit: See page 132 onwards.			
Contact temperature limiter for directly connected heating/cooling circuit	ZK04647	X	X
Immersion temperature limiter	7151728	X	X
Contact temperature limiter	7151729	X	X
EM-MX mixer extension kit (mixer mounting)	Z017409	X	X
EM-M1 mixer extension kit (wall mounting)	Z025981	X	X
Communication technology: See page 134 onwards.			
WAGO KNX/TP gateway	Z024994	X	X
WAGO MB/TCP gateway	Z019286	X	X
WAGO MB/RTU gateway	Z019287	X	X
Wall mounted enclosure for WAGO gateway	ZK04917	X	X
CAN bus cable	ZK04974	X	X

Note

The following description of control unit accessories lists all functions and connections of each control unit accessory. Not all of these functions and connections are available for every heat pump.

9.2 Photovoltaics

3-phase electricity meter

Part no. ZK06026

Phase-balancing bidirectional meter
- With CAN bus interface
- To ensure the heat pump makes optimum use of the power generated on site by the photovoltaic system

3-phase electricity meter

Part no. ZK06027

Non-balancing bidirectional meter: The currents in the same metering direction are totalled.
- With CAN bus interface
- To ensure the heat pump makes optimum use of the power generated on site by the photovoltaic system

9.3 Bus cables

Bus communication cable

Length	Part no.
5 m	7973122
15 m	7973123
30 m	7973124

Fully wired, shielded CAN bus communication cable between the outdoor and indoor unit

Bus connecting cable

Length	Part no.
5 m	ZK06219
15 m	ZK06220
30 m	ZK06221

Fully wired, shielded CAN bus connecting cable for networking bus subscribers in the system network, e.g. Vitoair, Vitocal, Vitocharge, etc.

9.4 Wireless accessories

ViCare thermostatic radiator valve

(low power radio)

Part no. ZK03840
Battery-powered radiator actuator for individual room control in conjunction with the Vitoconnect, white.
- With integral temperature sensor for capturing the current room temperature
- "Open window" detection
- Max. actuating force: 70 N
- Max. valve lift: 4.35 mm
- Easy installation on M 30 x 1.5 mm thermostatic valves
- Can be installed on Danfoss thermostatic valves using the adaptor set supplied

Standard delivery:
- ViCare thermostatic radiator valve
- Batteries 1.5 V (type AA, 2 pce)
- Adaptor set for Danfoss thermostatic valves, types RA, RAV and RAVL

Note
For precise room temperature control we recommend the use of a ViCare climate sensor.

ViCare floor thermostat

(low power radio)

Part no. ZK03838
Floor thermostat for individual room control in conjunction with Vitoconnect
- Intelligent control of an underfloor heating system with up to 6 heating zones (18 thermal actuators)
- The ViCare floor thermostat has a (230 V) floating contact for controlling a pump.
- An integral frost protection function prevents damage to the fabric of the building.
- An anti-limescale function prevents the actuator valves from seizing up.
- Compatible with N/O and N/C thermal actuators.
- The room temperature can be set for each heating zone using the ViCare floor thermostat and the ViCare app. Each heating zone requires 1 ViCare climate sensor for specifying the temperature value.

Standard delivery:
- ViCare floor thermostat
- External antenna with connecting lead, length 1.3 m
- Contact temperature sensor with 1.8 m connecting lead and hose clip
- Connecting lead with plug, length 1.2 m
- Tool for operating the pairing button
- Installation material for wall mounting

ViCare climate sensor – temperature and humidity sensor

(low power radio)

Part no. ZK03839

Battery operated temperature and humidity sensor for monitoring the room climate. The sensor can be connected to the Vitoair FS mechanical ventilation system, a heat generator with integral communication module or a Vitoconnect.
- The ViCare climate sensor captures the temperature and the relative humidity in the room.
- In rooms with ViCare thermostatic radiator valves or ViCare floor thermostats, the ViCare climate sensor enables precise individual room control.

Standard delivery:
- ViCare climate sensor
- Battery, button cell CR2450, 600 mAh
- Installation material for wall mounting

Note

1 climate sensor is required for each heating zone when combined with the ViCare floor thermostat. We recommend using ViCare climate sensors in very large rooms where ViCare thermostatic radiator valves are in use.

9.5 Remote control units

Vitotrol 300-E

Part no. 7959522
- Wireless remote control with integrated low power wireless transmitter
- For max. 4 heating/cooling circuits and 1 ventilation unit
- Not in conjunction with hardwired remote control units

Note

Cannot be used if the heat generator is configured as for an "apartment building".

Displays
- Room temperature
- Outside temperature
- Room air humidity

Settings
- Set room temperature for reduced mode (reduced room temperature), standard mode (standard room temperature) and comfort mode (comfort room temperature) per heating/cooling circuit
- Operating programs "Holiday at home" and holiday program
- Room temperature hook-up via integrated room temperature sensor
- Operating programs heating/cooling circuits and DHW heating
- Energy cockpit
- With ViCare single room control: Temperatures and time program for each room

Note

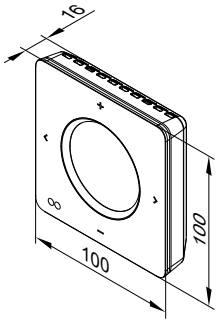
Additional ViCare components are required for individual room control.

Additional settings for the ventilation unit:
- Ventilation operating program
- Ventilation stages
- Low-noise mode and intensive ventilation
- Bypass function
- Ventilation cockpit

Installation location
- Weather-compensated operation:
  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:
  – Installation only in enclosed buildings
  – Distance to floor min. 1.5 m
  – Not next to windows or doors
  – Not above radiators
  – Not between shelves, in recesses, etc.
  – Not near heat sources (direct sunlight, fireplace, TV set, etc.)

Standard delivery
- Wireless remote control
- Plug-in power supply unit
- Fixing materials

Specification



Vitotrol 300-E

Rated voltage	– Plug-in power supply unit: 5 V⎓ – Power supply unit for flush mounting: 12 V⎓
Rated current	– Plug-in power supply unit: 0.8 A – Power supply unit for flush mounting: 0.33 A
Internet protocol	IPv4
IP assignment	DHCP
Power consumption	4 W
Protection class	III
IP rating	IP 20D to EN 60529; ensure through design/installation.
WiFi	
WiFi frequency	2.4 GHz
WiFi encryption	Unencrypted or WPA2
Frequency band	2400.0 to 2483.5 MHz
Max. transmission power	0.1 W (e.i.r.p.)
Low power radio	
Radio frequency	2.4 GHz
Encryption	Encrypted
Wireless range through walls	Up to 14 m (depending on wall thickness and wall type)
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

Rated voltage	100 to 240 V~
Rated frequency	50/60 Hz
Output voltage	5 V⎓
Output current	2 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

9

Power supply unit

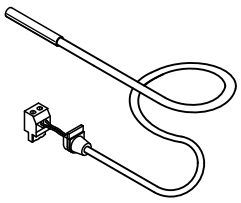
Part no. ZK03842
12 V

For Vitotrol 300-E for flush mounting

9.6 Sensors

Immersion temperature sensor

Part no. 7438702
- To capture the temperature in a sensor well
- For installation in a DHW cylinder or heating water buffer cylinder

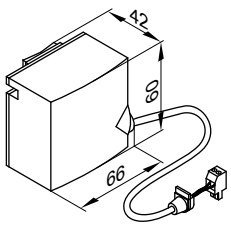


Specification

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

Contact temperature sensor

Part no. 7426463
To capture the temperature on a pipe



Secured with a tie.

Specification

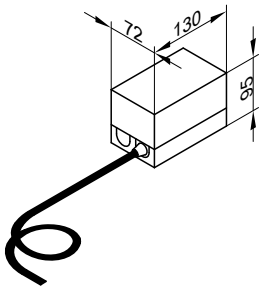
Lead length	5.8 m, fully wired
IP rating	IP 32D to EN 60529; ensure through design/installation
Sensor type	Viessmann NTC 10 kΩ at 25 °C
Permissible ambient temperature	
– Operation	0 to +120 °C
– Storage and transport	–20 to +70 °C

9.7 Heating circuit control unit extension

Contact temperature limiter

Part no. ZK04647

Can be used as a maximum temperature limiter for underfloor heating systems (only in conjunction with metal pipes).
The temperature limiter is fitted to the heating flow. If the flow temperature is too high, the temperature limiter switches off the heat generator.



Specification

Lead length	1.5 m
Setting range	30 to 80 °C
Switching differential	6.5 K ±2.5 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	Inside the enclosure
Protection rating to EN 60529	IP 41

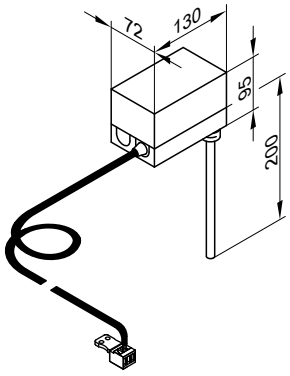
Usage

In systems without an external buffer cylinder for directly connected circuits without mixer

Immersion temperature limiter

Part no. 7151728

May be used as a maximum temperature limiter for underfloor heating systems.
The temperature limiter is fitted to the heating flow. If the flow temperature is too high, the temperature limiter switches off the heating circuit pump.



Specification

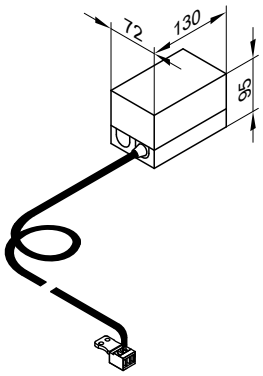
Lead length	4.2 m, fully wired
Setting range	30 to 80 °C
Switching differential	Max. 11 K
Breaking capacity	6(1.5) A, 250 V~
Setting scale	Inside the enclosure
Stainless steel sensor well (male thread)	R ½ x 200 mm
DIN reg. no.	DIN TR 1168

Usage

In systems with an external buffer cylinder for heating circuits with a separate heating circuit pump and mixer extension kit

Contact temperature limiter

Part no. 7151729
Can be used as a maximum temperature limiter for underfloor heating systems (only in conjunction with metal pipes).
The temperature limiter is fitted to 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 enclosure
DIN reg. no.	DIN TR 1168

Usage
In systems with an external buffer cylinder for heating circuits with a separate heating circuit pump and mixer extension kit

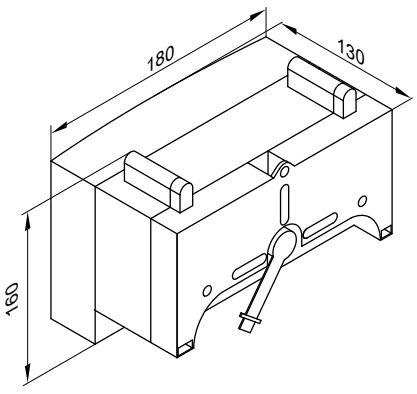
EM-MX mixer extension kit with integral mixer motor

Part no. Z017409
PlusBus subscriber

Components:
- Mixer PCB (ADIO electronics module) with mixer motor for Viessmann mixer DN 20 to DN 50 and R ½ to R 1¼
- Flow temperature sensor (contact temperature sensor) with connecting lead and plug
- Plug for connecting the heating circuit pump
- Power cable (3.0 m long) with plug
- PlusBus connecting lead (3.0 m long) with plug
- Option to connect immersion temperature sensor low loss header (separate accessory)

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

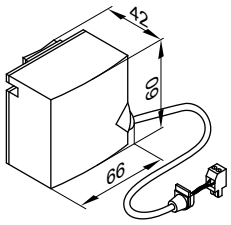
Mixer PCB with mixer motor



Specification - Mixer PCB with mixer motor

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	6 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]	1 A, 230 V~
– Mixer motor [52]	0.1 A, 230 V~
Torque	3 Nm
Required runtime of the mixer motor for 90° ◁	Approx. 120 s

Flow temperature sensor (contact temperature sensor)



Secured with a tie.

Flow temperature sensor specification

Lead 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

Note

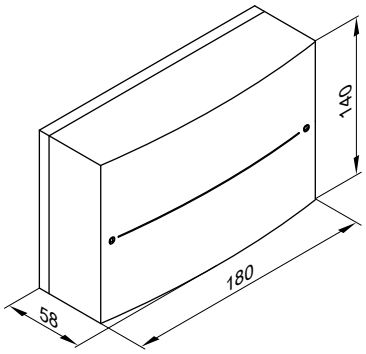
- *The EM-MX mixer extension kit with integral mixer motor is suitable only for heating operation.*
- *Only for heat pumps with 1 directly connected heating circuit*

EM-M1 mixer extension kit for separate mixer motor

Part no. Z025981
PlusBus subscriber
For connecting a separate mixer motor

Components:
- Mixer PCB (ADIO electronics module) for connecting a separate mixer motor
- Flow temperature sensor (contact temperature sensor) with connecting lead and plug
- Plug for connecting the heating circuit pump and the mixer motor
- Power cable (3.0 m long) with plug
- PlusBus connecting lead (3.0 m long) with plug
- Option to connect low loss header immersion temperature sensor (separate accessories)

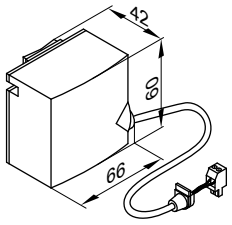
Mixer PCB



Mixer PCB specification

Rated voltage	230 V~
Rated frequency	50 Hz
Rated current	2 A
Power consumption	2 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]	1 A, 230 V~
– Mixer motor [52]	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

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

Note

- *The EM-M1 mixer extension kit is suitable for heating and cooling operation.*
- *Only for heat pumps with 1 directly connected heating circuit*

9.8 Communication technology

Note

For further information on communication technology, see the "Data communication" technical guide.

WAGO KNX/TP gateway

Part no. Z024994

For data exchange with an external system based on the KNX/TP communication standard
- WAGO KNX/TP gateway for mounting on a top-hat rail

  Connections:
  – KNX/TP-1 terminals for connection to an on-site KNX system
  – CAN bus terminals for connecting the cable to the heat generator
  – Power supply 230 V~ via plug-in power supply unit
- Power supply unit for mounting on a top-hat rail

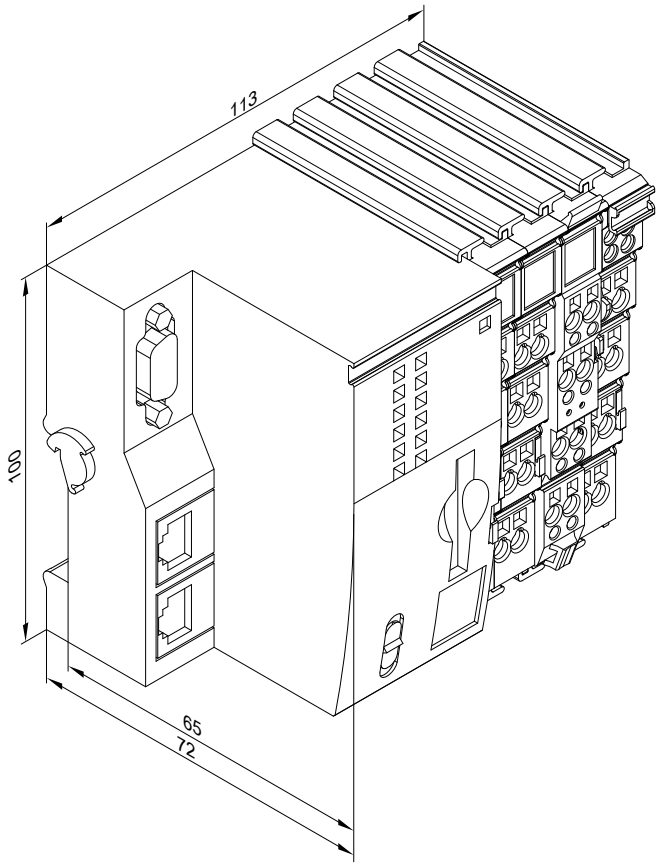
Accessories
- Wall mounted enclosure: **Part no. ZK04917**
- CAN bus cable, length 7 m: **Part no. ZK04974**

Functions
- Transfer of appliance data and operating data:
  – Data transmission from the Viessmann control unit to the WAGO KNX/TP gateway via CAN bus
  – Data transmission from the WAGO KNX/TP gateway to the Modbus system via the Modbus (on-site connecting cable)
- Remote control of heat generators, e.g. switching, changing set values, via suitable visualisation
- Remote monitoring of the heat generator, e.g. actual values, operating states, via the on-site Modbus system
- Relaying fault and maintenance messages

Specification

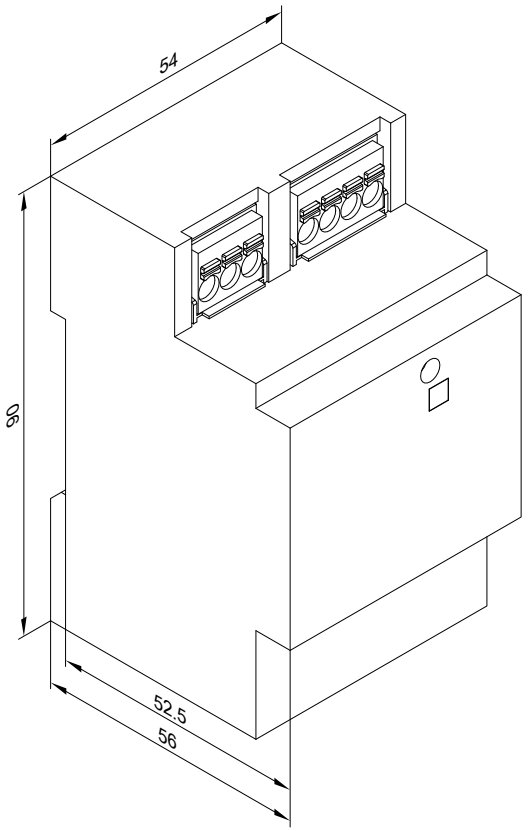
WAGO KNX/TP gateway

Power supply	24 V⎓
Max. power consumption	124 mA
Rated output	3.0 W
IP rating	IP 20
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage	−20 to +60 °C
– Transport	−20 to +60 °C for max. 3 months or average 35 °C
Permissible relative humidity	
– Operation at 0 to 39 °C	– Up to 95 %
– Operation at 40 °C	– Up to 50 %
– Storage and transport	Up to 95 %, non-condensing
Installation	Top-hat rail TS 35 to EN 50022



Power supply unit

Rated voltage	100 to 240 V~
Rated frequency	50 to 60 Hz
Rated current	1.34 A⎓
Output voltage	24 V⎓
Protection class	II
IP rating	IP 20
Primary/secondary galvanic isolation	SELV to EN 60335
Electrical safety	EN 60335
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–40 to +85 °C



Note
For further information, see ***www.automation-gateway.info.***
The connection to the on-site external control system and the configuration of the WAGO gateway must be carried out by a qualified contractor.

WAGO MB/TCP gateway

Part no. Z019286

For data exchange with an external system on the basis of the Modbus/TCP communication standard
- WAGO MB/TCP gateway for mounting on a top-hat rail

  Connections:
  - Modbus/TCP terminals for connection to on-site Modbus system
  - CAN bus terminals for connecting the cable to the heat generator
  - Power supply 230 V~ via plug-in power supply unit
- Power supply unit for mounting on a top-hat rail

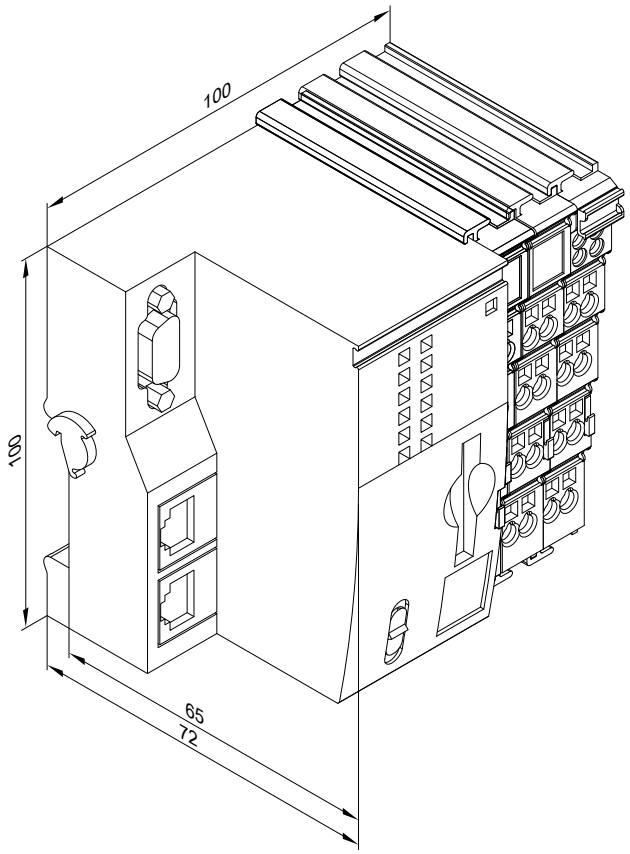
Accessories
- Wall mounted enclosure: **Part no. ZK04917**
- CAN bus cable, length 7 m: **Part no. ZK04974**

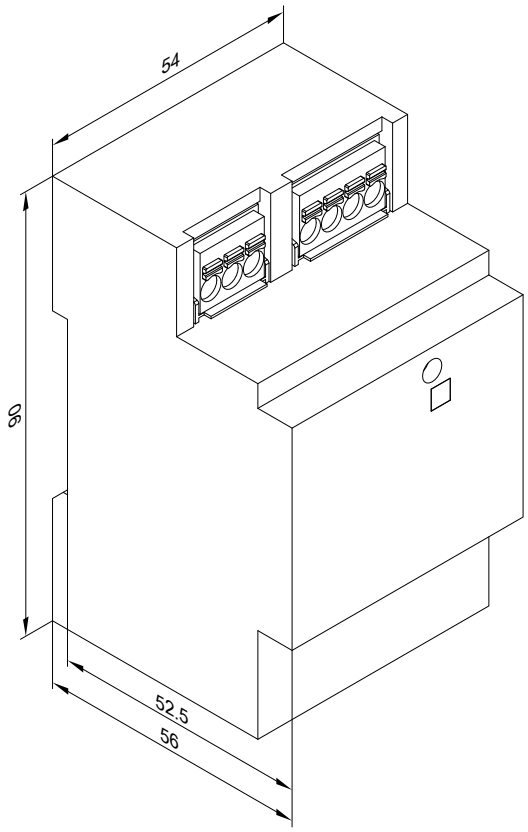
Functions
- Transfer of appliance data and operating data:
  - Data transmission from the Viessmann control unit to the WAGO MB/TCP gateway via CAN bus
  - Data transmission from the WAGO MB/TCP gateway to the Modbus system via the Modbus (on-site connecting cable)
- Remote control of heat generators, e.g. switching, changing set values, via suitable visualisation
- Remote monitoring of the heat generator, e.g. actual values, operating states, via the on-site Modbus system
- Relaying fault and maintenance messages

Specification

WAGO MB/TCP gateway

Power supply	24 V⎓
Max. power consumption	116 mA
Rated output	2.8 W
IP rating	IP 20
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage	−20 to +60 °C
– Transport	−20 to +60 °C for max. 3 months or average 35 °C
Installation	Top-hat rail TS 35 to EN 50022





Power supply unit

Rated voltage	100 to 240 V~
Rated frequency	50 to 60 Hz
Rated current	1.34 A⎓
Output voltage	24 V⎓
Protection class	II
IP rating	IP 20
Primary/secondary galvanic isolation	SELV to EN 60335
Electrical safety	EN 60335
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–40 to +85 °C

Note
For further information, see ***www.automation-gateway.info.***
The connection to the on-site external control system and the configuration of the WAGO gateway must be carried out by a qualified contractor.

WAGO MB/RTU gateway

Part no. Z019287

For data exchange with an external system on the basis of the Modbus RTU communication standard
- WAGO MB/RTU gateway for mounting on a top-hat rail

  Connections:
  - Modbus/RTU terminals for connection to on-site Modbus system
  - CAN bus terminals for connecting the cable to the heat generator
  - Power supply 230 V~ via plug-in power supply unit
- Power supply unit for mounting on a top-hat rail

Accessories
- Wall mounted enclosure: **Part no. ZK04917**
- CAN bus cable, length 7 m: **Part no. ZK04974**

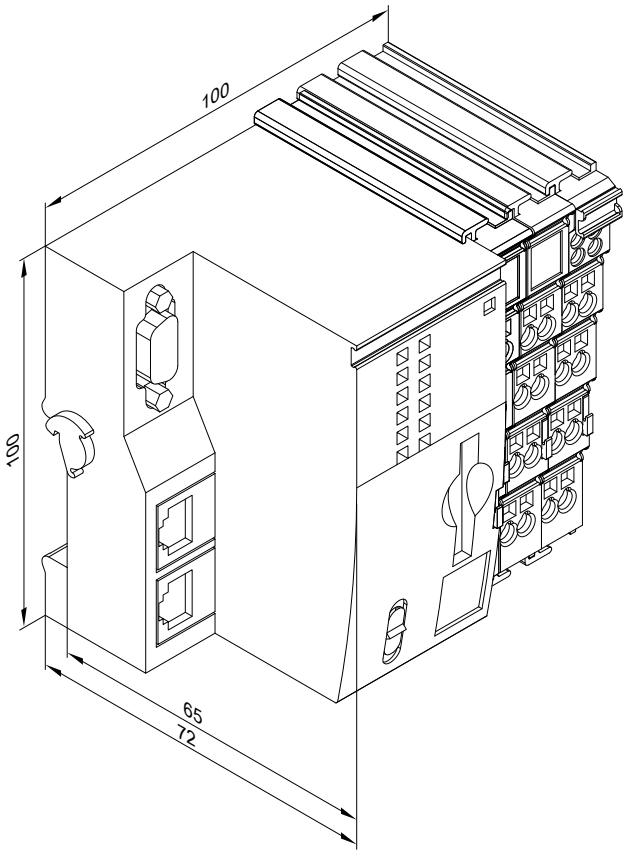
Functions
- Transfer of appliance data and operating data:
  - Data transmission from the Viessmann control unit to the WAGO MB/RTU gateway via CAN bus
  - Data transmission from the WAGO MB/RTU gateway to the Modbus system via the Modbus (on-site connecting cable)
- Remote control of heat generators, e.g. switching, changing set values, via suitable visualisation
- Remote monitoring of the heat generator, e.g. actual values, operating states, via the on-site Modbus system
- Relaying fault and maintenance messages

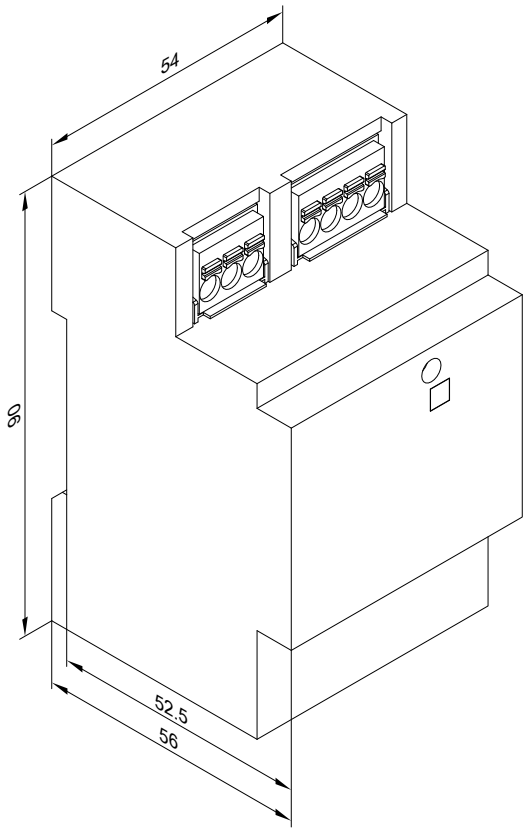
Control unit accessories (cont.)

Specification

WAGO MB/RTU gateway

Power supply	24 V⎓
Max. power consumption	141 mA
Rated output	3.4 W
IP rating	IP 20
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage	−20 to +60 °C
– Transport	−20 to +60 °C for max. 3 months or average 35 °C
Installation	Top-hat rail TS 35 to EN 50022





Note
For further information, see ***www.automation-gateway.info.***
The connection to the on-site external control system and the configuration of the WAGO gateway must be carried out by a qualified contractor.

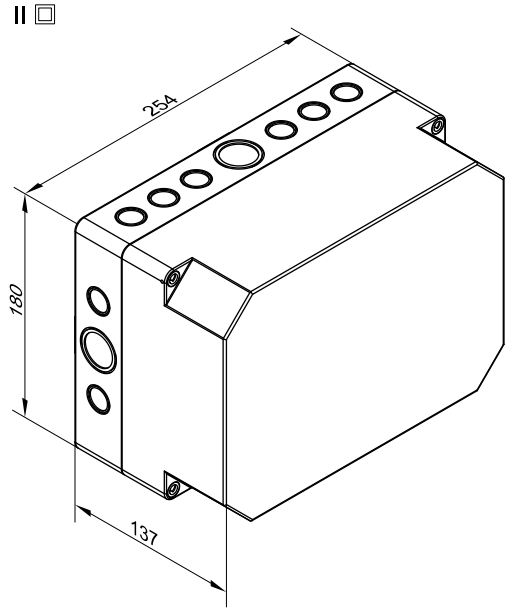
Power supply unit

Rated voltage	100 to 240 V~
Rated frequency	50 to 60 Hz
Rated current	1.34 A⎓
Output voltage	24 V⎓
Protection class	II
IP rating	IP 20
Primary/secondary galvanic isolation	SELV to EN 60335
Electrical safety	EN 60335
Permissible ambient temperature	
– Operation	0 to +40 °C
– Storage and transport	–40 to +85 °C

Wall mounted enclosure (accessories) for WAGO gateway

Part no. ZK04917
Enclosure for Wago gateway for wall mounting

IP66
II ⧈



CAN bus cable

Part no. ZK04974

Cable to connect the WAGO gateway to the heat generator
- Length: 7 m
- Plug pre-wired

Keyword index

Keyword index

Keyword index

6179959

Keyword index

Subject to technical modifications.

Viessmann Climate Solutions SE
35108 Allendorf / Germany
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

6179959