WAMAK

Heat pump

SCROLL

EEV

HEAT COOL

WEB APP

TWW 85 WHR

Product sheet ver. 2024/25

WAMAK TWW 85 WHR

Product description

Heat pump with two power stages for heating and domestic hot water. One short closed refrigerant circuit with a pair of quiet Scroll compressors and robust stainless steel plate heat exchangers. Through the connection kit, the circulation pumps can be easily and quickly connected while externally controlling their variable speed.

Use for waste heat recovery. The new technology of WHR Scroll compressors with a shifted working range to the high-temperature region with a favorable COP efficiency, which can even reach 4.2 ~ 4.5 at a water outlet temperature of 70 ~ 80 ºC and as long as the source temperature is between 30 ºC ~ 40 ºC.

Thermal energy from various industrial or ancillary processes is used as a primary source. Usually in the temperature range between 20° and 50°C. Depending on the quality and chemical composition of the process medium, the heat is extracted either directly in the heat pump or via a pre-wired heat exchanger with intermediate circuit. The heat pump then raises this temperature with high efficiency to a usable temperature for heating or hot water.

The twin compressors give the system robustness and the ability to distribute the heat output according to the actual load.

Product features

- Scroll compressor
- Electronic expansion valve
- Two-stage capacity control
- Phase and rotation control
- High pressure sensor - analogue
- Flow switch consumer - on/off - (with accessory)
- Flow switch source - on/off - (with accessory)
- DHW temperature sensor - (with accessory)
- Cascade control - (with accessory)
- Solid frame structure
- Sylomer pads under compressor unit
- Asymetric plate heat exchanger
- Multi-stage capacity control
- High pressure switch
- Low pressure sensor - analogue
- Flow sensor consumer - analogue - (with accessory)
- Outdoor temperature sensor - (with accessory)
- Buffer temperature sensor - (with accessory)
- Modbus connection - (with accessory)

Basic performance data - WAMAK TWW 85 WHR

Heating - EN 14511		
Heating capacity [kW]	W10 / W35 (max)	**46.1** (23.0 / 46.1)
	W10 / W35 (min)	**23.0** (23.0 / 46.1)
	W10 / W34	**46.4** (23.2 / 46.4)
Electrical power input [kW]	W10 / W35 (max)	**7.9** (3.9 / 7.9)
	W10 / W35 (min)	**3.9** (3.9 / 7.9)
	W10 / W34	**7.7** (3.8 / 7.7)
Heating efficiency faktor [COP]	W10 / W35 (max)	5.87
	W10 / W35 (min)	5.97
	W10 / W34	6.01
Seasonal space heating energy efficiency - SCOP EN 14825		
Average Climate / Low Temperature [35°C]	SCOP	6.59
	η [%]	263.5
	Label	A+++
	Qhe [kWh]	95242.6
	Pdesignh [kW]	46.1
	Tbivalent [°C]	-7
Cooling		
Cooling capacity - [kW]	A35 / W23-18	34.8
	A25 / W23-18	39.2
	A35 / W12-7	22.6
	A25 / W12-7	22.6
Seasonal space cooling energy efficiency - SEER EN 14825		
[W 23 / 18°C]	SEER	5.26
	Qce [kWh]	13560.0
	ηc [%]	210.3
Sound EN 12102		
Acoustic power - Lw	dB(A)	59.4
Acoustic pressure - Lp	**1 m** dB(A)	51.4
	5 m dB(A)	37.4
	10 m dB(A)	31.4
Mechanical and operational information		
Compressor type (3~ 400/50)	SCROLL / 2 /	On/Off
Refrigerant	R513A (GWP - 631)	9.6 kg
Operating limit temperatures heating - (min / max) [°C]		45 / **85**
Operating limit temperatures source - (min / max) [°C]		**-10** / 50
Weight		420 kg

Main technical data - WAMAK TWW 85 WHR

Enclosure type		VN1100
Basic dimensions	Height [mm]	1270
	Width [mm]	1100
	Length [mm]	750
Weight [kg]		420
Colour		Gray
Enclousure IP Class		IP20
Refrigeration cycle		
Compressor	Type	Scroll
	Number of stages	2
	On/Off	
	Power factor Cosϕ	0.60
	Winding resistance	1.47 Ohm
Refrigerant		R513A
	Volme	9.6 kg
	GWP	631
	Safety class	A1
Refrigeration oil type	POE RL32-3MAF	
	Oil volume	2 x 3.38 L
Maximal pressure - refrigerant [bar]		32
	PED class	2
EVI - vapour injection with economizer		
Electrical connection data		
Line voltage [#~ V/Hz]		3~ 400/50
Current	nominal [A]	26.38
	maximal [A]	35.40
	starting [A]	10.5
Softstart		-
Main safety		C40
Control System		

Main controller	SIEMENS	RVS 61	
Extension module	AVS75.3xx	AVS75.3xx	AVS75.372
Bus Clip-In			Modbus OCI352
Online connection		Web server OZW672	ToSyMo
Superheat controller			SEC61

*** with accessory

Heat energy rejection side data		
Operating limit temperatures heating	MAX [°C]	85
	MIN [°C]	45
for more see operating limits diagram		
Condenser	Port size	VIC 2.1/2 "
	Type	BPHE
	Count	1
	Material	AISI 316
Maximal operating pressure - refrigerant [bar]		32
Maximal operating pressure - Water [bar]		6
Testing pressure [bar]		70
Heat transfer medium		Water
Volume flow @ dT 5K (nom) - Water [m3/h]		5.53 ~ 11.06
Internal pressure drop - Water [kPa]		20
Temperature difference	@ 35°C (nom)	5 K
	@ 55°C	8 K
	@ 65°C	10 K
Renewable energy extraction side data		
Operating limit temperatures source	MIN [°C]	-10
	MAX [°C]	50
for more see operating limits diagram		
Evaporator	Port size	VIC 2.1/2 "
	Type	BPHE
	Count	1
	Material	AISI 316
Maximal operating pressure - refrigerant [bar]		20
Heat transfer medium		Water
Maximal operating pressure - Water [bar]		6
Volume flow - Water [m3/h]		5.20 ~ 10.40
Internal pressure drop - Water [kPa]		20
Temperature difference - Water		4 K

WAMAK TWW 85 WHR

ErP (EU) No 811/2013: Technical parameters for heat pump space heaters

Model	**TWW 85 WHR**
Air-to-water heat pump	no
Brine-to-water heat pump	no
Water-to-water heat pump	yes
Low-temperature heat pump	no
Equipped with a supplementary heater	no
Heat pump combination heater	no
Temperature application	low (35°C - 30°C)
Climate conditions	average

Item	Symbol	Value	Unit
Rated heat output at Tdesignh	Prated	46.1	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	46.4	kW
Tj = +2 °C	Pdh	47.5	kW
Tj = +7 °C	Pdh	24.1	kW
Tj = +12 °C	Pdh	24.5	kW
Tj = bivalent temperature	Pdh	46.1	kW
Tj = operation limit temperature	Pdh	---	kW
Bivalent temperature	Tbiv	-7	°C
Power consumption in modes other than active mode			
Off mode	Poff	0.040	kW
Thermostat-off mode	Pto	0.010	kW
Standby mode	Psb	0.010	kW
Crankcase heater mode	Pck	0.050	kW
Other items			
Capacity control		multi-stage	
Sound power level			
indoors	Lwa	59	dB
outdoors	Lwa	---	dB
Annual energy consumption	Q_{HE}	95242.6	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	ηs	263.5	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	COPd	6.01	-
Tj = +2 °C	COPd	6.6	-
Tj = +7 °C	COPd	7.2	-
Tj = +12 °C	COPd	7.7	-
Tj = bivalent temperature	COPd	5.9	-
Tj = operation limit temperature	COPd	---	-
Tj = operation limit temperature	TOL	---	°C
Heating water operating limit temperature	WTOL	85	°C
Supplementary heater			
Rated heat output	Psup	8.8	kW
Type of energy input		electricity	
For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m3/h
For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	5.20 ~ 10.40	m3/h

Contact details: WAMAK, s.r.o., Orovnica 252, 96652, Orovnica, Slovakia, info@wamak.sk

WAMAK TWW 85 WHR

ErP (EU) No 811/2013: Technical parameters for heat pump space heaters

Model	**TWW 85 WHR**
Air-to-water heat pump	no
Brine-to-water heat pump	no
Water-to-water heat pump	yes
Low-temperature heat pump	no
Equipped with a supplementary heater	no
Heat pump combination heater	no
Temperature application	middle (55°C - 47°C)
Climate conditions	average

Item	Symbol	Value	Unit
Rated heat output at Tdesignh	Prated	40.2	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	42.0	kW
Tj = +2 °C	Pdh	45.4	kW
Tj = +7 °C	Pdh	23.5	kW
Tj = +12 °C	Pdh	24.1	kW
Tj = bivalent temperature	Pdh	40.2	kW
Tj = operation limit temperature	Pdh	---	kW
Bivalent temperature	Tbiv	-7	°C
Power consumption in modes other than active mode			
Off mode	Poff	0.040	kW
Thermostat-off mode	Pto	0.010	kW
Standby mode	Psb	0.010	kW
Crankcase heater mode	Pck	0.050	kW
Other items			
Capacity control		multi-stage	
Sound power level			
indoors	Lwa	59	dB
outdoors	Lwa	---	dB
Annual energy consumption	Q_{HE}	83053.2	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	ηs	199.1	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	COPd	3.95	-
Tj = +2 °C	COPd	5.3	-
Tj = +7 °C	COPd	6.1	-
Tj = +12 °C	COPd	6.8	-
Tj = bivalent temperature	COPd	3.5	-
Tj = operation limit temperature	COPd	---	-
Tj = operation limit temperature	TOL	---	°C
Heating water operating limit temperature	WTOL	85	°C
Supplementary heater			
Rated heat output	Psup	8.8	kW
Type of energy input		electricity	
For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m3/h
For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	5.20 ~ 10.40	m3/h

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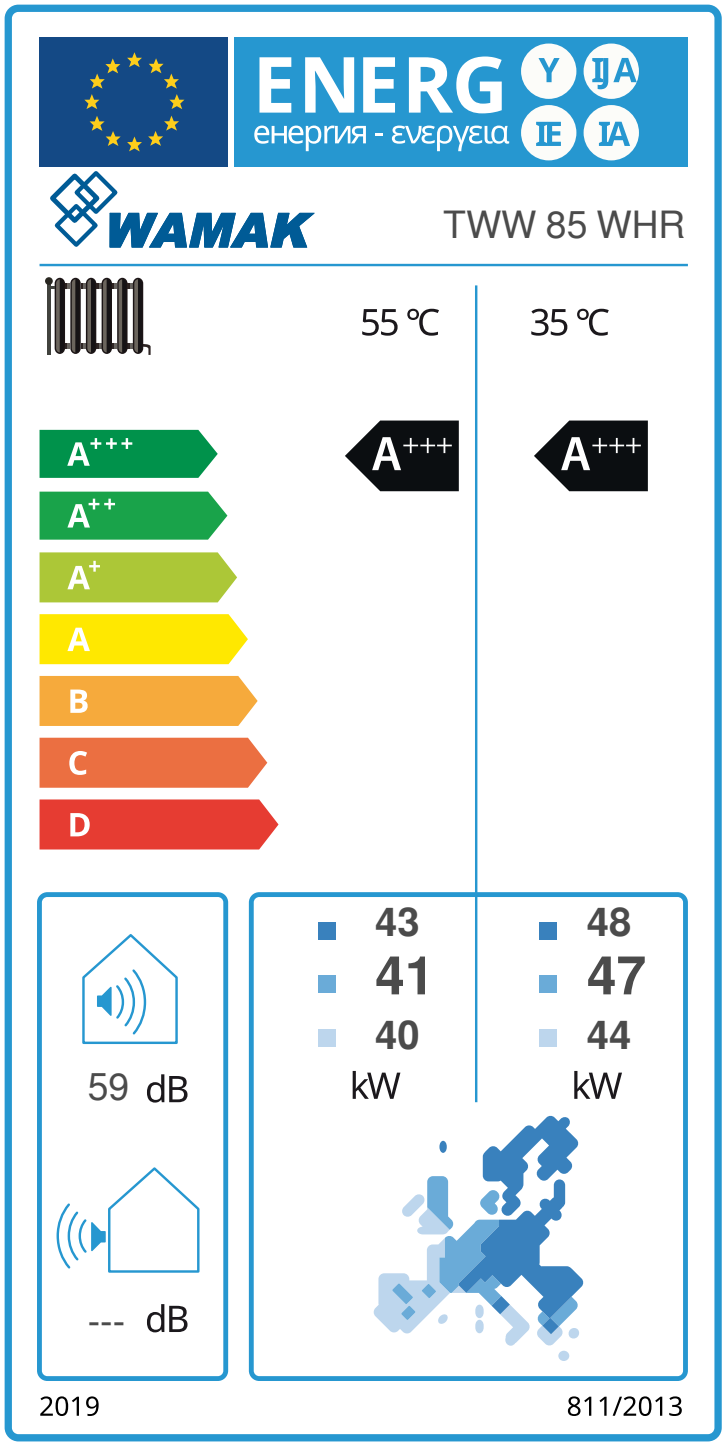


TWW 85 WHR **ErP Data**

		55 °C	35 °C
Energy class		A+++	A+++
η	[%]	199.1	263.5
P_{rated}	[kW]	41	47
Q_{HE}	[kWh/y]	83054	95243
SCOP	[-]	4.98	6.59
$T_{bivalent}$	[°C]	-7	-7

CONTROLER

+ QAA55/75	class **VII**	3.5% ↓
- QAA55/75	class **III**	1.5% ↓

Heating performance data **Heat recovery**

Version: v202223.006-WW-WHR

ZR108KRE-TFD_R513A_2_WHR

Operating conditions	Qh	P	COP
W45 / W80	86.0	19.1	4.50
W30 / W70	63.9	15.8	4.05
W25 / W60	71.2	13.0	5.46

Normative data: water - water application

Source - Water [10°C] / Low Temperature [35°C]

	Operating conditions	Qh	P	COP
1	W10 / W30-35	46.1	7.9	5.87
2	W10 / W30-35 (MIN)	23.0	3.9	5.97
A	W10 / Wxx-34	46.4	7.7	6.01
B	W10 / Wxx-30	47.5	7.2	6.61
C	W10 / Wxx-27	24.1	3.3	7.21
D	W10 / Wxx-24	24.5	3.2	7.72
E	W10 / Wxx-35	46.1	7.9	5.87
F	W10 / Wxx-35	46.1	7.9	5.87

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Low Temperature [35°C]	
SCOPon	6.75
SCOPnet	6.75
SCOP	6.59
η [%]	263.47
Label	A+++
Qh [kWh]	95243
Pdesignh [kW]	46.1
Tbivalent [°C]	-7.00

Source - Water [10°C] / Medium Temperature [55°C]

	Operating conditions	Qh	P	COP
1	W10 / W47-55	40.2	11.5	3.49
2	W10 / W47-55 (MIN)	20.1	5.7	3.55
A	W10 / Wxx-52	42.0	10.6	3.95
B	W10 / Wxx-42	45.4	8.6	5.27
C	W10 / Wxx-36	23.5	3.8	6.14
D	W10 / Wxx-30	24.1	3.5	6.83
E	W10 / Wxx-55	40.2	11.5	3.49
F	W10 / Wxx-55	40.2	11.5	3.49

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Medium Temperature [55°C]	
SCOPon	5.08
SCOPnet	5.08
SCOP	4.98
η [%]	199.08
Label	A+++
Qh [kWh]	83053
Pdesignh [kW]	40.2
Tbivalent [°C]	-7.00

Low temperature cooling W 12 / 7°C

Operating conditions		Qc	P	EER
A	W30-35 / W12-7	24.3	8.3	2.94
B	W26-xx / W12-7	25.6	7.7	3.34
C	W22-xx / W12-7	26.8	7.1	3.77
D	W18-xx / W12-7	27.4	6.9	3.99

SEER DATA EN 14825:2018 [W 12 / 7°C]	
SEERon	3.63
SEER	3.53
Qc [kWh]	13560
η [%]	141.17

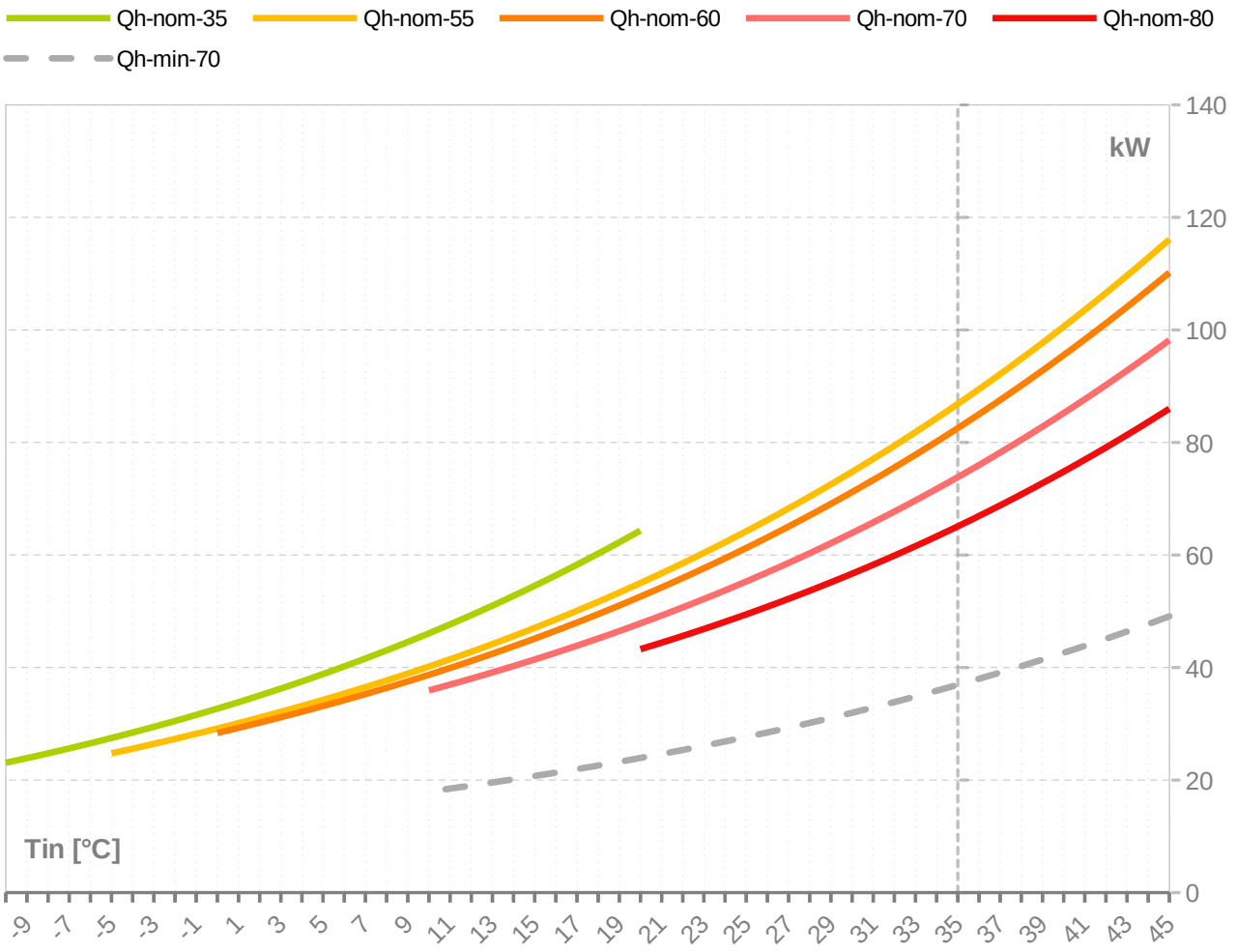
Radiant cooling W 23 / 18°C

Operating conditions		Qc	P	EER
A	W50-xx / W23-18	27.4	12.4	2.21
B	W40-xx / W23-18	32.5	10.1	3.23
C	W30-35 / W23-18	37.1	8.3	4.49
D	W26-xx / W23-18	38.8	7.7	5.06

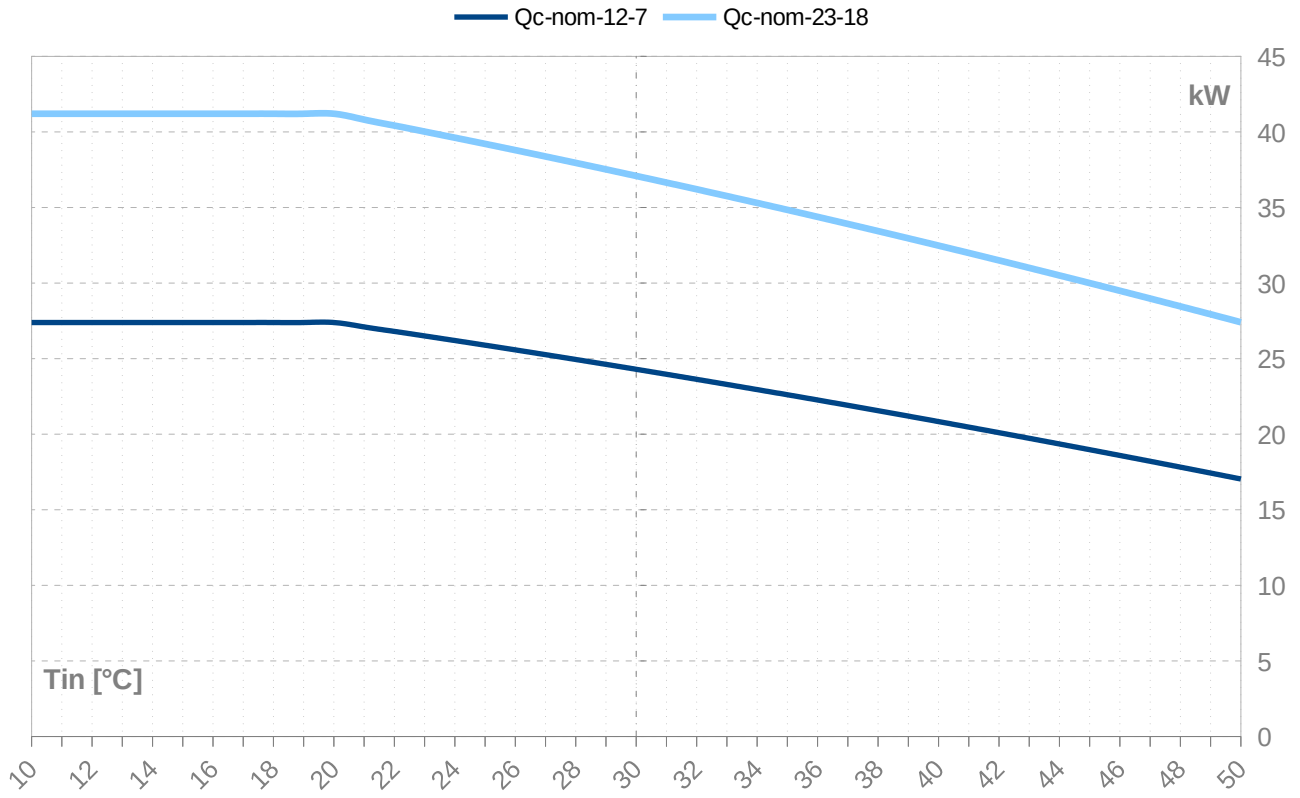
SEER DATA EN 14825:2018 [W 23 / 18°C]	
SEERon	5.49
SEER	5.26
Qc [kWh]	13560
η [%]	210.28

Performance lines - heating

ZR108KRE-TFD_R513A_2_WHR



Performance lines - cooling



Th -OU	**[°C]**			**55**							
Ts -IN	**Qh nom**	**Qh min**	**Qh max**	**Pin nom**	**Pin min**	**Pin max**	**COP nom**	**Qc nom**	**Qc min**	**Qc max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
45	**116.1**	58.0	116.1	**12.3**	6.0	12.3	**9.48**	104.7	52.4	104.7	22.6
44	**112.8**	56.4	112.8	**12.2**	6.0	12.2	**9.23**	101.5	50.8	101.5	22.5
43	**109.7**	54.8	109.7	**12.2**	6.0	12.2	**8.99**	98.4	49.2	98.4	22.5
42	**106.6**	53.3	106.6	**12.2**	6.0	12.2	**8.76**	95.3	47.6	95.3	22.5
41	**103.5**	51.8	103.5	**12.1**	6.0	12.1	**8.53**	92.3	46.1	92.3	22.5
40	**100.6**	50.3	100.6	**12.1**	6.0	12.1	**8.30**	89.3	44.7	89.3	22.4
39	**97.7**	48.9	97.7	**12.1**	5.9	12.1	**8.08**	86.5	43.2	86.5	22.4
38	**94.9**	47.4	94.9	**12.1**	5.9	12.1	**7.86**	83.7	41.8	83.7	22.4
37	**92.1**	46.1	92.1	**12.0**	5.9	12.0	**7.65**	81.0	40.5	81.0	22.4
36	**89.5**	44.7	89.5	**12.0**	5.9	12.0	**7.45**	78.3	39.2	78.3	22.3
35	**86.9**	43.4	86.9	**12.0**	5.9	12.0	**7.24**	75.7	37.9	75.7	22.3
34	**84.3**	42.2	84.3	**12.0**	5.9	12.0	**7.05**	73.2	36.6	73.2	22.3
33	**81.8**	40.9	81.8	**11.9**	5.9	11.9	**6.85**	70.8	35.4	70.8	22.3
32	**79.4**	39.7	79.4	**11.9**	5.9	11.9	**6.66**	68.4	34.2	68.4	22.2
31	**77.1**	38.5	77.1	**11.9**	5.8	11.9	**6.48**	66.0	33.0	66.0	22.2
30	**74.8**	37.4	74.8	**11.9**	5.8	11.9	**6.30**	63.8	31.9	63.8	22.2
29	**72.6**	36.3	72.6	**11.9**	5.8	11.9	**6.12**	61.6	30.8	61.6	22.2
28	**70.4**	35.2	70.4	**11.8**	5.8	11.8	**5.95**	59.4	29.7	59.4	22.2
27	**68.3**	34.1	68.3	**11.8**	5.8	11.8	**5.78**	57.3	28.7	57.3	22.1
26	**66.2**	33.1	66.2	**11.8**	5.8	11.8	**5.62**	55.3	27.6	55.3	22.1
25	**64.2**	32.1	64.2	**11.8**	5.8	11.8	**5.45**	53.3	26.6	53.3	22.1
24	**62.3**	31.1	62.3	**11.8**	5.8	11.8	**5.30**	51.4	25.7	51.4	22.1
23	**60.4**	30.2	60.4	**11.7**	5.8	11.7	**5.15**	49.5	24.7	49.5	22.0
22	**58.5**	29.3	58.5	**11.7**	5.8	11.7	**5.00**	47.7	23.8	47.7	22.0
21	**56.7**	28.4	56.7	**11.7**	5.7	11.7	**4.85**	45.9	23.0	45.9	22.0
20	**55.0**	27.5	55.0	**11.7**	5.7	11.7	**4.71**	44.2	22.1	44.2	22.0
19	**53.3**	26.7	53.3	**11.7**	5.7	11.7	**4.57**	42.5	21.3	42.5	22.0
18	**51.7**	25.8	51.7	**11.6**	5.7	11.6	**4.44**	40.9	20.4	40.9	21.9
17	**50.1**	25.0	50.1	**11.6**	5.7	11.6	**4.31**	39.3	19.7	39.3	21.9
16	**48.5**	24.3	48.5	**11.6**	5.7	11.6	**4.18**	37.8	18.9	37.8	21.9
15	**47.0**	23.5	47.0	**11.6**	5.7	11.6	**4.06**	36.3	18.1	36.3	21.9
14	**45.6**	22.8	45.6	**11.6**	5.7	11.6	**3.94**	34.8	17.4	34.8	21.9
13	**44.2**	22.1	44.2	**11.6**	5.7	11.6	**3.82**	33.4	16.7	33.4	21.8
12	**42.8**	21.4	42.8	**11.5**	5.7	11.5	**3.71**	32.1	16.0	32.1	21.8
11	**41.5**	20.7	41.5	**11.5**	5.7	11.5	**3.60**	30.8	15.4	30.8	21.8
10	**40.2**	20.1	40.2	**11.5**	5.7	11.5	**3.49**	29.5	14.7	29.5	21.8
9	**38.9**	19.5	38.9	**11.5**	5.7	11.5	**3.38**	28.2	14.1	28.2	21.8
8	**37.7**	18.8	37.7	**11.5**	5.6	11.5	**3.28**	27.0	13.5	27.0	21.8
7	**36.5**	18.3	36.5	**11.5**	5.6	11.5	**3.18**	25.9	12.9	25.9	21.7
6	**35.4**	17.7	35.4	**11.5**	5.6	11.5	**3.09**	24.7	12.4	24.7	21.7
5	**34.2**	17.1	34.2	**11.4**	5.6	11.4	**2.99**	23.6	11.8	23.6	21.7
4	**33.2**	16.6	33.2	**11.4**	5.6	11.4	**2.90**	22.6	11.3	22.6	21.7
3	**32.1**	16.1	32.1	**11.4**	5.6	11.4	**2.81**	21.5	10.8	21.5	21.7
2	**31.1**	15.6	31.1	**11.4**	5.6	11.4	**2.73**	20.5	10.3	20.5	21.7
1	**30.1**	15.1	30.1	**11.4**	5.6	11.4	**2.64**	19.5	9.8	19.5	21.7
0	**29.2**	14.6	29.2	**11.4**	5.6	11.4	**2.56**	18.6	9.3	18.6	21.7
-1	**28.2**	14.1	28.2	**11.4**	5.6	11.4	**2.48**	17.7	8.8	17.7	21.6
-2	**27.3**	13.7	27.3	**11.4**	5.6	11.4	**2.40**	16.8	8.4	16.8	21.6
-3	**26.4**	13.2	26.4	**11.4**	5.6	11.4	**2.33**	15.9	7.9	15.9	21.6
-4	**25.6**	12.8	25.6	**11.3**	5.6	11.3	**2.25**	15.0	7.5	15.0	21.6
-5	**24.7**	12.4	24.7	**11.3**	5.6	11.3	**2.18**	14.2	7.1	14.2	21.6

-- attention: operating limits not reflected in performance table

Th -OU	**[°C]**			**60**							
Ts -IN	**Qh nom**	**Qh min**	**Qh max**	**Pin nom**	**Pin min**	**Pin max**	**COP nom**	**Qc nom**	**Qc min**	**Qc max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
45	**110.2**	55.1	110.2	**13.3**	6.5	13.3	**8.29**	97.9	48.9	97.9	23.8
44	**107.1**	53.6	107.1	**13.3**	6.5	13.3	**8.07**	94.8	47.4	94.8	23.8
43	**104.1**	52.1	104.1	**13.3**	6.5	13.3	**7.85**	91.8	45.9	91.8	23.8
42	**101.2**	50.6	101.2	**13.2**	6.5	13.2	**7.64**	88.9	44.4	88.9	23.8
41	**98.3**	49.2	98.3	**13.2**	6.5	13.2	**7.44**	86.1	43.0	86.1	23.8
40	**95.5**	47.8	95.5	**13.2**	6.5	13.2	**7.24**	83.3	41.6	83.3	23.7
39	**92.8**	46.4	92.8	**13.2**	6.5	13.2	**7.04**	80.6	40.3	80.6	23.7
38	**90.1**	45.1	90.1	**13.2**	6.5	13.2	**6.85**	77.9	39.0	77.9	23.7
37	**87.5**	43.8	87.5	**13.1**	6.5	13.1	**6.66**	75.4	37.7	75.4	23.7
36	**85.0**	42.5	85.0	**13.1**	6.5	13.1	**6.48**	72.8	36.4	72.8	23.7
35	**82.6**	41.3	82.6	**13.1**	6.4	13.1	**6.30**	70.4	35.2	70.4	23.6
34	**80.2**	40.1	80.2	**13.1**	6.4	13.1	**6.12**	68.0	34.0	68.0	23.6
33	**77.8**	38.9	77.8	**13.1**	6.4	13.1	**5.95**	65.7	32.8	65.7	23.6
32	**75.6**	37.8	75.6	**13.1**	6.4	13.1	**5.79**	63.4	31.7	63.4	23.6
31	**73.3**	36.7	73.3	**13.0**	6.4	13.0	**5.62**	61.2	30.6	61.2	23.6
30	**71.2**	35.6	71.2	**13.0**	6.4	13.0	**5.46**	59.1	29.5	59.1	23.5
29	**69.1**	34.5	69.1	**13.0**	6.4	13.0	**5.31**	57.0	28.5	57.0	23.5
28	**67.0**	33.5	67.0	**13.0**	6.4	13.0	**5.16**	55.0	27.5	55.0	23.5
27	**65.1**	32.5	65.1	**13.0**	6.4	13.0	**5.01**	53.0	26.5	53.0	23.5
26	**63.1**	31.6	63.1	**13.0**	6.4	13.0	**4.87**	51.1	25.5	51.1	23.5
25	**61.2**	30.6	61.2	**12.9**	6.4	12.9	**4.73**	49.2	24.6	49.2	23.4
24	**59.4**	29.7	59.4	**12.9**	6.4	12.9	**4.59**	47.4	23.7	47.4	23.4
23	**57.6**	28.8	57.6	**12.9**	6.4	12.9	**4.46**	45.7	22.8	45.7	23.4
22	**55.9**	28.0	55.9	**12.9**	6.3	12.9	**4.33**	43.9	22.0	43.9	23.4
21	**54.2**	27.1	54.2	**12.9**	6.3	12.9	**4.21**	42.3	21.1	42.3	23.4
20	**52.6**	26.3	52.6	**12.9**	6.3	12.9	**4.09**	40.7	20.3	40.7	23.4
19	**51.0**	25.5	51.0	**12.9**	6.3	12.9	**3.97**	39.1	19.5	39.1	23.3
18	**49.5**	24.7	49.5	**12.8**	6.3	12.8	**3.85**	37.6	18.8	37.6	23.3
17	**48.0**	24.0	48.0	**12.8**	6.3	12.8	**3.74**	36.1	18.0	36.1	23.3
16	**46.5**	23.3	46.5	**12.8**	6.3	12.8	**3.63**	34.7	17.3	34.7	23.3
15	**45.1**	22.6	45.1	**12.8**	6.3	12.8	**3.52**	33.3	16.6	33.3	23.3
14	**43.8**	21.9	43.8	**12.8**	6.3	12.8	**3.42**	31.9	16.0	31.9	23.3
13	**42.4**	21.2	42.4	**12.8**	6.3	12.8	**3.32**	30.6	15.3	30.6	23.3
12	**41.2**	20.6	41.2	**12.8**	6.3	12.8	**3.22**	29.3	14.7	29.3	23.2
11	**39.9**	20.0	39.9	**12.8**	6.3	12.8	**3.13**	28.1	14.0	28.1	23.2
10	**38.7**	19.4	38.7	**12.8**	6.3	12.8	**3.04**	26.9	13.4	26.9	23.2
9	**37.5**	18.8	37.5	**12.7**	6.3	12.7	**2.95**	25.7	12.9	25.7	23.2
8	**36.4**	18.2	36.4	**12.7**	6.3	12.7	**2.86**	24.6	12.3	24.6	23.2
7	**35.3**	17.6	35.3	**12.7**	6.3	12.7	**2.77**	23.5	11.7	23.5	23.2
6	**34.2**	17.1	34.2	**12.7**	6.2	12.7	**2.69**	22.4	11.2	22.4	23.2
5	**33.2**	16.6	33.2	**12.7**	6.2	12.7	**2.61**	21.4	10.7	21.4	23.2
4	**32.1**	16.1	32.1	**12.7**	6.2	12.7	**2.53**	20.4	10.2	20.4	23.2
3	**31.2**	15.6	31.2	**12.7**	6.2	12.7	**2.46**	19.4	9.7	19.4	23.1
2	**30.2**	15.1	30.2	**12.7**	6.2	12.7	**2.38**	18.5	9.2	18.5	23.1
1	**29.3**	14.6	29.3	**12.7**	6.2	12.7	**2.31**	17.5	8.8	17.5	23.1
0	**28.4**	14.2	28.4	**12.6**	6.2	12.6	**2.24**	16.6	8.3	16.6	23.1
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-- attention: operating limits not reflected in performance table

Th -OU	**[°C]**			**70**							
Ts -IN	**Qh nom**	**Qh min**	**Qh max**	**Pin nom**	**Pin min**	**Pin max**	**COP nom**	**Qc nom**	**Qc min**	**Qc max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
45	**98.2**	49.1	98.2	**15.8**	7.8	15.8	**6.20**	83.5	41.7	83.5	26.8
44	**95.5**	47.7	95.5	**15.8**	7.8	15.8	**6.02**	80.8	40.4	80.8	26.8
43	**92.8**	46.4	92.8	**15.8**	7.8	15.8	**5.86**	78.1	39.1	78.1	26.8
42	**90.2**	45.1	90.2	**15.8**	7.8	15.8	**5.70**	75.5	37.8	75.5	26.8
41	**87.7**	43.8	87.7	**15.8**	7.8	15.8	**5.54**	73.0	36.5	73.0	26.8
40	**85.2**	42.6	85.2	**15.8**	7.8	15.8	**5.38**	70.5	35.3	70.5	26.8
39	**82.8**	41.4	82.8	**15.8**	7.8	15.8	**5.23**	68.1	34.1	68.1	26.8
38	**80.5**	40.2	80.5	**15.8**	7.8	15.8	**5.09**	65.8	32.9	65.8	26.8
37	**78.2**	39.1	78.2	**15.8**	7.8	15.8	**4.94**	63.5	31.8	63.5	26.8
36	**76.0**	38.0	76.0	**15.8**	7.8	15.8	**4.80**	61.3	30.7	61.3	26.8
35	**73.8**	36.9	73.8	**15.8**	7.8	15.8	**4.67**	59.2	29.6	59.2	26.8
34	**71.7**	35.9	71.7	**15.8**	7.8	15.8	**4.54**	57.1	28.5	57.1	26.8
33	**69.7**	34.8	69.7	**15.8**	7.8	15.8	**4.41**	55.0	27.5	55.0	26.8
32	**67.7**	33.9	67.7	**15.8**	7.8	15.8	**4.28**	53.1	26.5	53.1	26.7
31	**65.8**	32.9	65.8	**15.8**	7.8	15.8	**4.16**	51.1	25.6	51.1	26.7
30	**63.9**	32.0	63.9	**15.8**	7.8	15.8	**4.05**	49.3	24.6	49.3	26.7
29	**62.1**	31.0	62.1	**15.8**	7.8	15.8	**3.93**	47.4	23.7	47.4	26.7
28	**60.3**	30.2	60.3	**15.8**	7.8	15.8	**3.82**	45.7	22.8	45.7	26.7
27	**58.6**	29.3	58.6	**15.8**	7.8	15.8	**3.71**	43.9	22.0	43.9	26.7
26	**56.9**	28.5	56.9	**15.8**	7.8	15.8	**3.61**	42.3	21.1	42.3	26.7
25	**55.3**	27.6	55.3	**15.8**	7.8	15.8	**3.50**	40.6	20.3	40.6	26.7
24	**53.7**	26.9	53.7	**15.8**	7.8	15.8	**3.40**	39.1	19.5	39.1	26.7
23	**52.2**	26.1	52.2	**15.8**	7.8	15.8	**3.31**	37.5	18.8	37.5	26.7
22	**50.7**	25.3	50.7	**15.8**	7.8	15.8	**3.21**	36.1	18.0	36.1	26.7
21	**49.2**	24.6	49.2	**15.8**	7.7	15.8	**3.12**	34.6	17.3	34.6	26.7
20	**47.8**	23.9	47.8	**15.8**	7.7	15.8	**3.04**	33.2	16.6	33.2	26.7
19	**46.5**	23.2	46.5	**15.8**	7.7	15.8	**2.95**	31.9	15.9	31.9	26.7
18	**45.2**	22.6	45.2	**15.8**	7.7	15.8	**2.87**	30.5	15.3	30.5	26.7
17	**43.9**	21.9	43.9	**15.8**	7.7	15.8	**2.79**	29.3	14.6	29.3	26.7
16	**42.6**	21.3	42.6	**15.7**	7.7	15.7	**2.71**	28.0	14.0	28.0	26.7
15	**41.4**	20.7	41.4	**15.7**	7.7	15.7	**2.63**	26.8	13.4	26.8	26.7
14	**40.3**	20.1	40.3	**15.7**	7.7	15.7	**2.56**	25.7	12.8	25.7	26.7
13	**39.1**	19.6	39.1	**15.7**	7.7	15.7	**2.49**	24.5	12.3	24.5	26.7
12	**38.0**	19.0	38.0	**15.7**	7.7	15.7	**2.42**	23.4	11.7	23.4	26.7
11	**37.0**	18.5	37.0	**15.7**	7.7	15.7	**2.35**	22.4	11.2	22.4	26.7
10	**35.9**	18.0	35.9	**15.7**	7.7	15.7	**2.28**	21.3	10.7	21.3	26.7
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-- attention: operating limits not reflected in performance table

Th -OU	**[°C]**						**80**				
Ts -IN	**Qh nom**	**Qh min**	**Qh max**	**Pin nom**	**Pin min**	**Pin max**	**COP nom**	**Qc nom**	**Qc min**	**Qc max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
45	**86.0**	43.0	86.0	**19.1**	9.4	19.1	**4.50**	68.3	34.1	68.3	30.5
44	**83.7**	41.8	83.7	**19.1**	9.4	19.1	**4.37**	65.9	33.0	65.9	30.5
43	**81.4**	40.7	81.4	**19.1**	9.4	19.1	**4.25**	63.6	31.8	63.6	30.5
42	**79.1**	39.6	79.1	**19.2**	9.4	19.2	**4.13**	61.3	30.7	61.3	30.5
41	**76.9**	38.5	76.9	**19.2**	9.4	19.2	**4.01**	59.2	29.6	59.2	30.5
40	**74.8**	37.4	74.8	**19.2**	9.4	19.2	**3.90**	57.0	28.5	57.0	30.5
39	**72.8**	36.4	72.8	**19.2**	9.4	19.2	**3.79**	55.0	27.5	55.0	30.6
38	**70.8**	35.4	70.8	**19.2**	9.4	19.2	**3.68**	52.9	26.5	52.9	30.6
37	**68.8**	34.4	68.8	**19.2**	9.5	19.2	**3.58**	51.0	25.5	51.0	30.6
36	**66.9**	33.5	66.9	**19.2**	9.5	19.2	**3.48**	49.1	24.5	49.1	30.6
35	**65.1**	32.5	65.1	**19.3**	9.5	19.3	**3.38**	47.2	23.6	47.2	30.6
34	**63.3**	31.7	63.3	**19.3**	9.5	19.3	**3.29**	45.4	22.7	45.4	30.6
33	**61.6**	30.8	61.6	**19.3**	9.5	19.3	**3.19**	43.7	21.8	43.7	30.6
32	**59.9**	29.9	59.9	**19.3**	9.5	19.3	**3.11**	42.0	21.0	42.0	30.6
31	**58.3**	29.1	58.3	**19.3**	9.5	19.3	**3.02**	40.4	20.2	40.4	30.7
30	**56.7**	28.3	56.7	**19.3**	9.5	19.3	**2.94**	38.8	19.4	38.8	30.7
29	**55.1**	27.6	55.1	**19.3**	9.5	19.3	**2.85**	37.2	18.6	37.2	30.7
28	**53.6**	26.8	53.6	**19.3**	9.5	19.3	**2.78**	35.7	17.9	35.7	30.7
27	**52.2**	26.1	52.2	**19.3**	9.5	19.3	**2.70**	34.3	17.1	34.3	30.7
26	**50.8**	25.4	50.8	**19.3**	9.5	19.3	**2.63**	32.9	16.4	32.9	30.7
25	**49.4**	24.7	49.4	**19.4**	9.5	19.4	**2.55**	31.5	15.7	31.5	30.7
24	**48.1**	24.1	48.1	**19.4**	9.5	19.4	**2.49**	30.2	15.1	30.2	30.8
23	**46.8**	23.4	46.8	**19.4**	9.5	19.4	**2.42**	28.9	14.4	28.9	30.8
22	**45.6**	22.8	45.6	**19.4**	9.5	19.4	**2.35**	27.6	13.8	27.6	30.8
21	**44.4**	22.2	44.4	**19.4**	9.5	19.4	**2.29**	26.4	13.2	26.4	30.8
20	**43.3**	21.6	43.3	**19.4**	9.5	19.4	**2.23**	25.3	12.6	25.3	30.8
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-- attention: operating limits not reflected in performance table

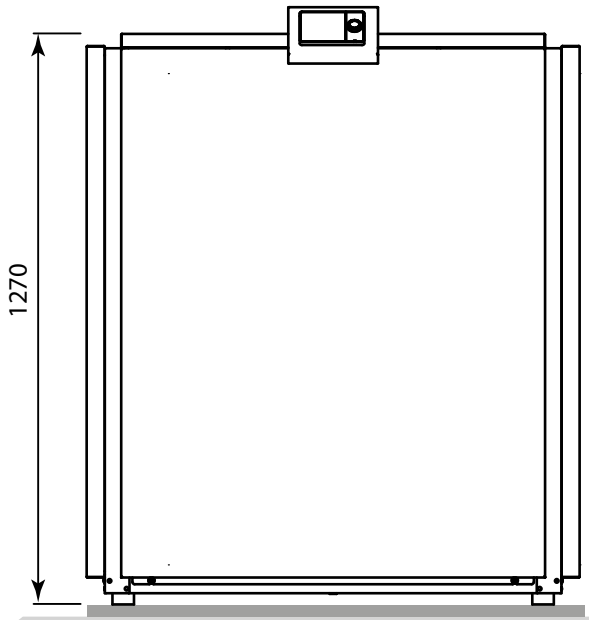
Tc -OU	**[°C]**			**W 12 / 7 °C**							
Ts -IN	**Qc nom**	**Qc min**	**Qc max**	**Pin nom**	**Pin min**	**Pin max**	**EER**	**Qh nom**	**Qh min**	**Qh max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
40	**20.8**	10.4	20.8	**10.1**	4.9	10.1	**2.07**	30.2	15.1	30.2	20.2
39	**21.2**	10.6	21.2	**9.9**	4.8	9.9	**2.15**	30.3	15.2	30.3	20.0
38	**21.6**	10.8	21.6	**9.7**	4.8	9.7	**2.23**	30.5	15.3	30.5	19.7
37	**21.9**	11.0	21.9	**9.5**	4.7	9.5	**2.31**	30.7	15.3	30.7	19.5
36	**22.3**	11.1	22.3	**9.3**	4.6	9.3	**2.40**	30.9	15.4	30.9	19.3
35	**22.6**	11.3	22.6	**9.1**	4.5	9.1	**2.48**	31.1	15.5	31.1	19.2
34	**23.0**	11.5	23.0	**8.9**	4.4	8.9	**2.57**	31.2	15.6	31.2	19.0
33	**23.3**	11.6	23.3	**8.8**	4.3	8.8	**2.66**	31.4	15.7	31.4	18.8
32	**23.6**	11.8	23.6	**8.6**	4.2	8.6	**2.75**	31.6	15.8	31.6	18.6
31	**24.0**	12.0	24.0	**8.4**	4.1	8.4	**2.84**	31.8	15.9	31.8	18.5
30	**24.3**	12.1	24.3	**8.3**	4.1	8.3	**2.94**	32.0	16.0	32.0	18.3
29	**24.6**	12.3	24.6	**8.1**	4.0	8.1	**3.04**	32.1	16.1	32.1	18.2
28	**24.9**	12.5	24.9	**8.0**	3.9	8.0	**3.13**	32.3	16.2	32.3	18.1
27	**25.3**	12.6	25.3	**7.8**	3.8	7.8	**3.24**	32.5	16.3	32.5	17.9
26	**25.6**	12.8	25.6	**7.7**	3.8	7.7	**3.34**	32.7	16.3	32.7	17.8
25	**25.9**	12.9	25.9	**7.5**	3.7	7.5	**3.44**	32.9	16.4	32.9	17.7
24	**26.2**	13.1	26.2	**7.4**	3.6	7.4	**3.55**	33.0	16.5	33.0	17.6
23	**26.5**	13.3	26.5	**7.2**	3.6	7.2	**3.66**	33.2	16.6	33.2	17.5
22	**26.8**	13.4	26.8	**7.1**	3.5	7.1	**3.77**	33.4	16.7	33.4	17.4
21	**27.1**	13.5	27.1	**7.0**	3.4	7.0	**3.88**	33.6	16.8	33.6	17.4
20	**27.4**	13.7	27.4	**6.9**	3.4	6.9	**3.99**	33.8	16.9	33.8	17.3

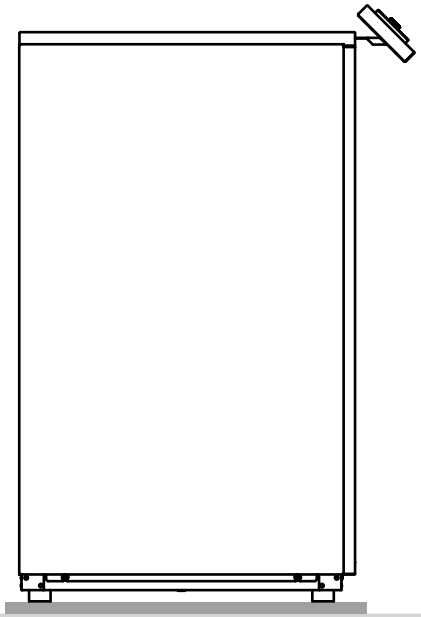
Tc [°C]				**W 23 / 18 °C**							
0	**Qc nom**	**Qc min**	**Qc max**	**Pin nom**	**Pin min**	**Pin max**	**EER**	**Qh nom**	**Qh min**	**Qh max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
40	**32.5**	16.2	32.5	**10.1**	4.9	10.1	**3.23**	42.0	21.0	39.0	20.3
39	**33.0**	16.5	33.0	**9.9**	4.8	9.9	**3.34**	42.3	21.1	39.3	20.1
38	**33.4**	16.7	33.4	**9.7**	4.8	9.7	**3.46**	42.6	21.3	39.6	19.9
37	**33.9**	17.0	33.9	**9.5**	4.7	9.5	**3.58**	42.8	21.4	39.9	19.7
36	**34.4**	17.2	34.4	**9.3**	4.6	9.3	**3.70**	43.1	21.6	40.2	19.5
35	**34.8**	17.4	34.8	**9.1**	4.5	9.1	**3.82**	43.4	21.7	40.5	19.3
34	**35.3**	17.6	35.3	**8.9**	4.4	8.9	**3.95**	43.7	21.9	40.8	19.2
33	**35.8**	17.9	35.8	**8.8**	4.3	8.8	**4.08**	44.0	22.0	41.1	19.0
32	**36.2**	18.1	36.2	**8.6**	4.2	8.6	**4.21**	44.3	22.2	41.4	18.8
31	**36.6**	18.3	36.6	**8.4**	4.1	8.4	**4.35**	44.6	22.3	41.7	18.7
30	**37.1**	18.5	37.1	**8.3**	4.1	8.3	**4.49**	44.9	22.5	42.0	18.5
29	**37.5**	18.8	37.5	**8.1**	4.0	8.1	**4.63**	45.2	22.6	42.3	18.4
28	**37.9**	19.0	37.9	**8.0**	3.9	8.0	**4.77**	45.5	22.8	42.6	18.2
27	**38.4**	19.2	38.4	**7.8**	3.8	7.8	**4.91**	45.8	22.9	42.8	18.1
26	**38.8**	19.4	38.8	**7.7**	3.8	7.7	**5.06**	46.1	23.0	43.1	18.0
25	**39.2**	19.6	39.2	**7.5**	3.7	7.5	**5.21**	46.4	23.2	43.4	17.9
24	**39.6**	19.8	39.6	**7.4**	3.6	7.4	**5.37**	46.6	23.3	43.7	17.8
23	**40.0**	20.0	40.0	**7.2**	3.6	7.2	**5.52**	46.9	23.5	44.0	17.7
22	**40.4**	20.2	40.4	**7.1**	3.5	7.1	**5.68**	47.2	23.6	44.3	17.6
21	**40.8**	20.4	40.8	**7.0**	3.4	7.0	**5.84**	47.5	23.7	44.6	17.5
20	**41.2**	20.6	41.2	**6.9**	3.4	6.9	**6.01**	47.7	23.9	44.9	17.4

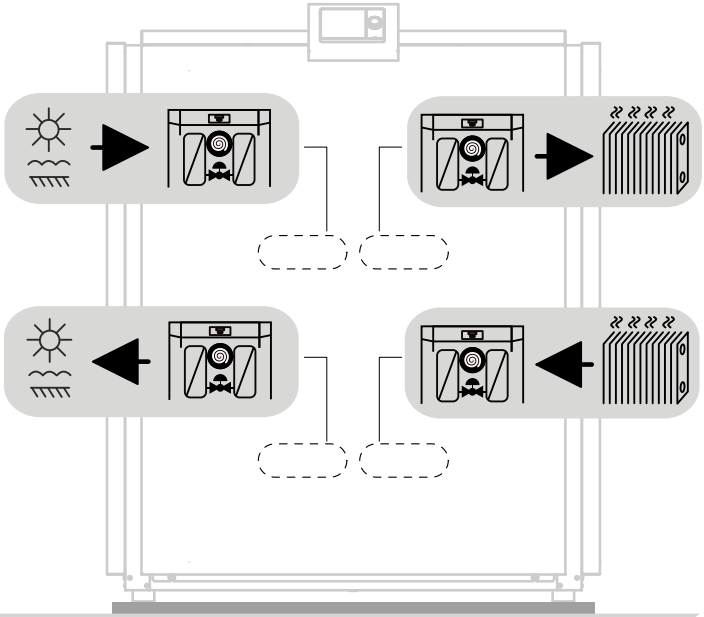
-- attention: operating limits not reflected in performance table

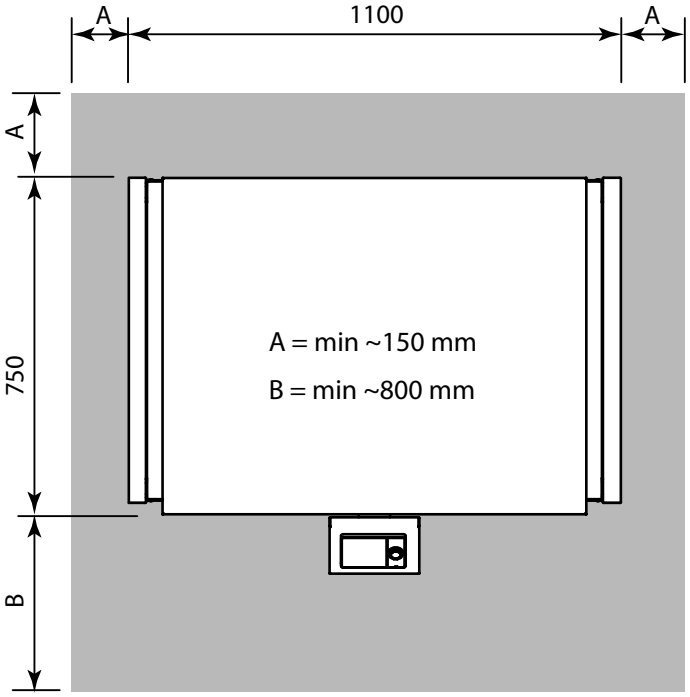
LEGEND:

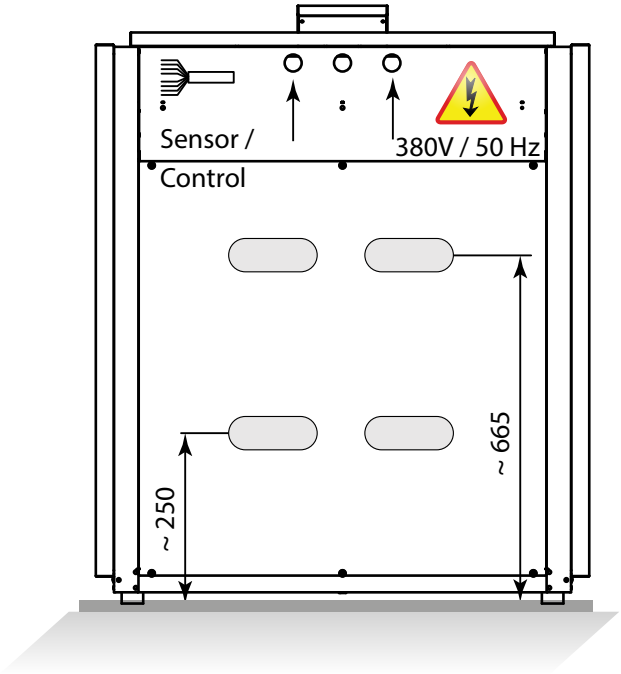
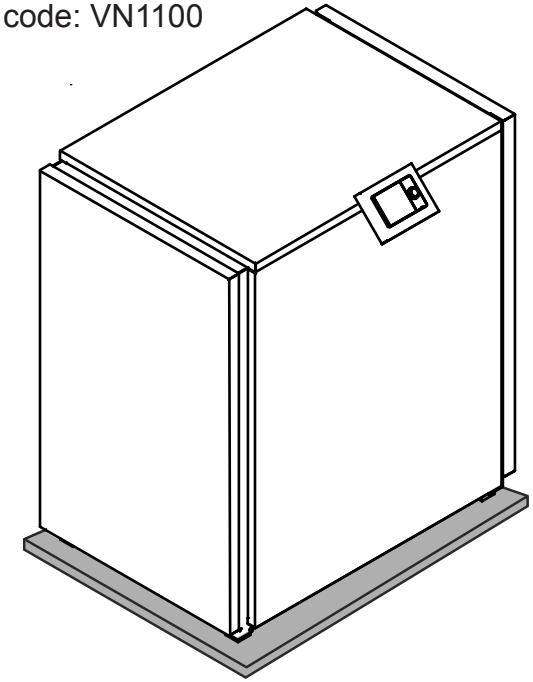
Ts-IN: Temperature renewable source - inlet [°C]
Th-OU: Temperature heating - outlet (flow) [°C]
Tc-OU: Temperature cooling - outlet (flow) [°C]
Qh nom: Heating capacity nominal
Qh min: Heating capacity minimal
Qh max: Heating capacity maximal
Pin nom: Power input at nominal heating capacity
Pin min: Power input at minimal heating capacity
Pin max: Power input at maximal heating capacity
COP nom: coefficient of performance at nominal heating capacity
Qc nom: cooling / heat extraction capacity at nominal heating capacity
Qc min: cooling / heat extraction at minimal heating capacity
Qc max: cooling / heat extraction at maximal heating capacity
I nom: Current at nominal heating capacity
EER: energy efficiency ratio at nominal cooling capacity











int. code: VN1100