WAMAK

Heat pump

SCROLL

EEV

HEAT COOL

WEB APP



TWW 82 EVI

WAMAK TWW 82 EVI

Product description

Heat pump with two power stages for heating and domestic hot water with the possibility of passive cooling control. 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 multi-family dwellings, suburban mixed-use buildings or commercial operations. The Urban range is based on a robust construction quality steel for all parts. High quality, long proven heat pump circuit components extend the life of the heat pump.

As a primary source, thermal energy from underground water at a depth of between 12 and 30 metres is used. A submersible pump delivers the groundwater to the heat pump and, depending on the quality and chemical composition, the heat from the groundwater is extracted either directly in the heat pump or through a separating heat exchanger with an intermediate circuit and antifreeze. The heat pump then raises this temperature to a usable temperature for heating or hot water.

The EVI (Enhanced Vapour Injection) technology allows the heat pump to achieve higher header flow temperatures even at lower source temperatures. EVI also has a possitive impact on the compressor lifespan and overall system stability because the discharge gas temperature from the compressor is lower.

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

Product features

- Scroll compressor
- EVI technology
- Asymetric plate heat exchanger
- Multi-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)
- Direct heating/cooling circuit control
- DHW circulation control
- DHW temperature sensor
- Cascade control - (with accessory)
- Solid frame structure
- Sylomer pads under compressor unit
- Electronic expansion valve
- Two-stage capacity control
- Compressor soft starter
- High pressure switch
- Low pressure sensor - analogue
- Flow sensor consumer - analogue - (with accessory)
- Mixed heating/cooling circuit control
- DHW switching control
- Outdoor temperature sensor
- Buffer temperature sensor
- Modbus connection - (with accessory)

Basic performance data - WAMAK TWW 82 EVI

Heating - EN 14511		
Heating capacity [kW]	W10 / W35 (max)	**84.6** (42.3 / 84.6)
	W10 / W35 (min)	**42.3** (42.3 / 84.6)
	W10 / W34	**84.6** (42.3 / 84.6)
Electrical power input [kW]	W10 / W35 (max)	**14.1** (7.0 / 14.1)
	W10 / W35 (min)	**7.0** (7.0 / 14.1)
	W10 / W34	**13.8** (10.5 / 21.3)
Heating efficiency faktor [COP]	W10 / W35 (max)	5.99
	W10 / W35 (min)	6.07
	W10 / W34	6.12
Seasonal space heating energy efficiency - SCOP EN 14825		
Average Climate / Low Temperature [35°C]	SCOP	6.78
	η [%]	271.1
	Label	A+++
	Qhe [kWh]	174783.6
	Pdesignh [kW]	84.6
	Tbivalent [°C]	-10
Cooling		
Cooling capacity - [kW]	A35 / W23-18	66.9
	A25 / W23-18	69.9
	A35 / W12-7	49.7
	A25 / W12-7	49.7
Seasonal space cooling energy efficiency - SEER EN 14825		
[W 23 / 18°C]	SEER	5.32
	Qce [kWh]	29820.0
	ηc [%]	212.9
Sound EN 12102		
Acoustic power - Lw	dB(A)	60
Acoustic pressure - Lp	**1 m** dB(A)	52
	5 m dB(A)	38
	10 m dB(A)	32
Mechanical and operational information		
Compressor type (3~ 400/50)	SCROLL / 2 /	On/Off
Refrigerant	R410A (GWP - 2088)	10.5 kg
Operating limit temperatures heating - (min / max) [°C]		25 / **65**
Operating limit temperatures source - (min / max) [°C]		**-10 (7)** / 30
Weight		438 kg

Main technical data - WAMAK TWW 82 EVI

Enclosure type		VN1100
Basic dimensions	Height [mm]	1270
	Width [mm]	1100
	Length [mm]	750
Weight [kg]		438
Colour		Gray
Enclousure IP Class		IP20
Refrigeration cycle		
Compressor	Type	Scroll
	Number of stages	2
	On/Off	
	Power factor Cosϕ	0.59
	Winding resistance	1.10 Ohm
Refrigerant		R410A
	Volme	10.5 kg
	GWP	2088
	Safety class	A1
Refrigeration oil type	POE RL32-3MAF	
	Oil volume	2 x 3.38 L
Maximal pressure - refrigerant [bar]		50
	PED class	2
EVI - vapour injection with economizer		
Electrical connection data		
Line voltage [#~ V/Hz]		3~ 400/50
Current	nominal [A]	30.10
	maximal [A]	52.00
	starting [A]	48.9
Softstart		2 x MCD 201
Main safety		C80
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]	65
	MIN [°C]	25
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]		50
Maximal operating pressure - Water [bar]		3
Testing pressure [bar]		70
Heat transfer medium		Water
Volume flow - Water [m3/h]		7.31 ~ 14.62
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 (7)
	MAX [°C]	30
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]		29
Heat transfer medium		Water
Maximal operating pressure - Water [bar]		3
Volume flow - Water [m3/h]		7.62 ~ 15.24
Internal pressure drop - Water [kPa]		20
Temperature difference - Water		4 K

WAMAK TWW 82 EVI

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

Model	**TWW 82 EVI**
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	84.6	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	84.6	kW
Tj = +2 °C	Pdh	84.3	kW
Tj = +7 °C	Pdh	42.1	kW
Tj = +12 °C	Pdh	42.0	kW
Tj = bivalent temperature	Pdh	84.6	kW
Tj = operation limit temperature	Pdh	---	kW
Bivalent temperature	Tbiv	-10	°C
Power consumption in modes other than active mode			
Off mode	Poff	0.010	kW
Thermostat-off mode	Pto	0.010	kW
Standby mode	Psb	0.010	kW
Crankcase heater mode	Pck	0.000	kW
Other items			
Capacity control		multi-stage	
Sound power level			
indoors	Lwa	60	dB
outdoors	Lwa	---	dB
Annual energy consumption	Q_{HE}	174783.6	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	ηs	271.1	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	COPd	6.12	-
Tj = +2 °C	COPd	6.7	-
Tj = +7 °C	COPd	7.2	-
Tj = +12 °C	COPd	7.6	-
Tj = bivalent temperature	COPd	6.0	-
Tj = operation limit temperature	COPd	---	-
Tj = operation limit temperature	TOL	---	°C
Heating water operating limit temperature	WTOL	65	°C
Supplementary heater			
Rated heat output	Psup	12.9	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	-	7.62 ~ 15.24	m3/h

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

WAMAK TWW 82 EVI

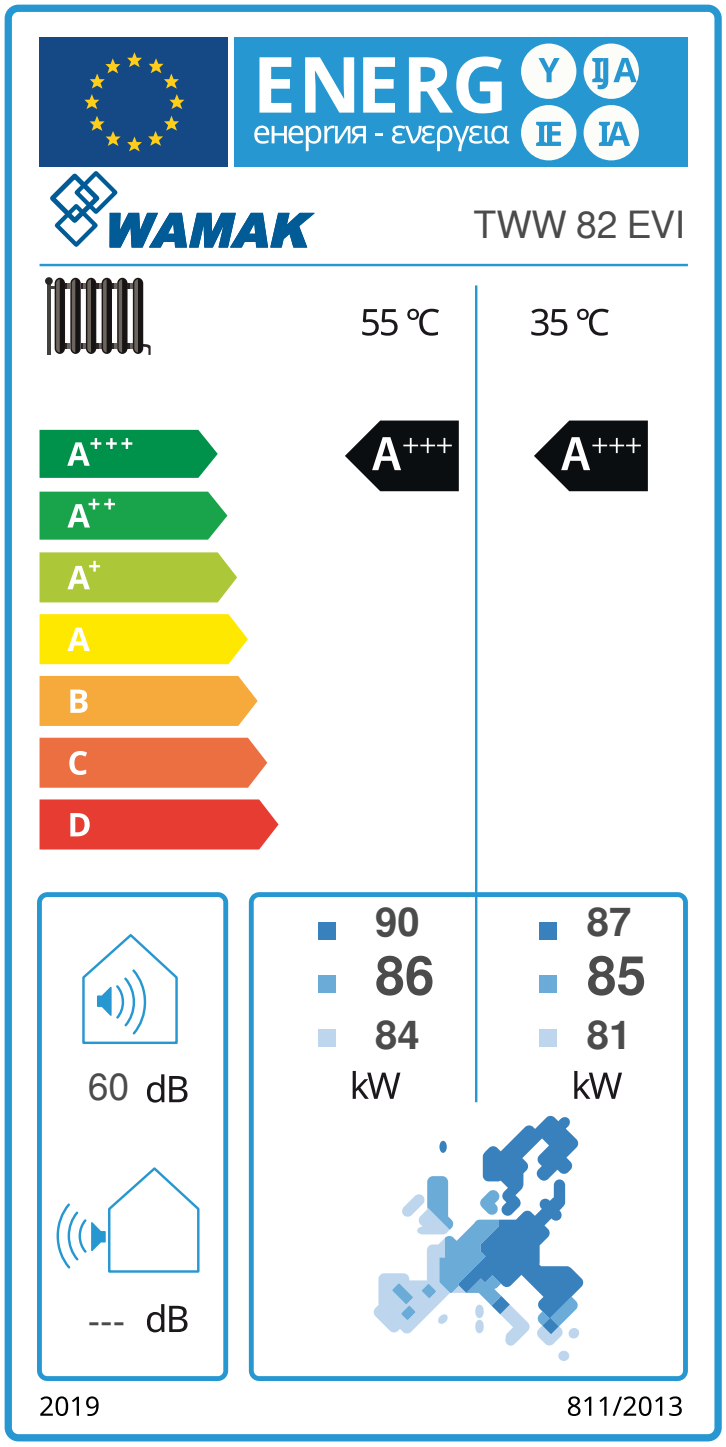
ErP (EU) No 811/2013: Technical parameters for heat pump space heaters

Model	**TWW 82 EVI**
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	85.6	kW
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	86.2	kW
Tj = +2 °C	Pdh	85.8	kW
Tj = +7 °C	Pdh	42.8	kW
Tj = +12 °C	Pdh	42.7	kW
Tj = bivalent temperature	Pdh	85.6	kW
Tj = operation limit temperature	Pdh	---	kW
Bivalent temperature	Tbiv	-10	°C
Power consumption in modes other than active mode			
Off mode	Poff	0.010	kW
Thermostat-off mode	Pto	0.010	kW
Standby mode	Psb	0.010	kW
Crankcase heater mode	Pck	0.000	kW
Other items			
Capacity control		multi-stage	
Sound power level			
indoors	Lwa	60	dB
outdoors	Lwa	---	dB
Annual energy consumption	Q_{HE}	176849.6	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	ηs	206.0	%
Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	COPd	4.05	-
Tj = +2 °C	COPd	5.4	-
Tj = +7 °C	COPd	6.2	-
Tj = +12 °C	COPd	6.8	-
Tj = bivalent temperature	COPd	3.6	-
Tj = operation limit temperature	COPd	---	-
Tj = operation limit temperature	TOL	---	°C
Heating water operating limit temperature	WTOL	65	°C
Supplementary heater			
Rated heat output	Psup	12.9	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	-	7.62 ~ 15.24	m3/h

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



TWW 82 EVI **ErP Data**

		55 °C	35 °C
Energy class		A+++	A+++
η	[%]	206.0	271.1
P_{rated}	[kW]	86	85
Q_{HE}	[kWh/y]	176850	174784
SCOP	[-]	5.15	6.78
$T_{bivalent}$	[°C]	-10	-10

CONTROLER

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

Heating performance data Version: v202223.006-BW-WW

Source - Brine [0°C] / Low Temperature [35°C] ZHI32K1P-TFD_R410A_2_BWW

	Operating conditions	Qh	P	COP
1	B0 / W30-35	66.8	14.4	4.63
2	B0 / W30-35 (MIN)	33.4	7.1	4.69
A	B0 / Wxx-34	66.7	14.1	4.73
B	B0 / Wxx-30	66.1	12.8	5.18
C	B0 / Wxx-27	32.8	5.9	5.60
D	B0 / Wxx-24	32.6	5.5	5.97
E	B0 / Wxx-35	66.8	14.4	4.63
F	B0 / Wxx-35	66.8	14.4	4.63

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Low Temperature [35°C]	
SCOPon	5.27
SCOPnet	5.27
SCOP	5.26
η [%]	210.52
Label	A+++
Qh [kWh]	138009
Pdesignh [kW]	66.8
Tbivalent [°C]	-10

Source - Brine [0°C] / Medium Temperature [55°C]

	Operating conditions	Qh	P	COP
1	B0 / W47-55	69.3	24.0	2.89
2	B0 / W47-55 (MIN)	34.7	11.7	2.93
A	B0 / Wxx-52	69.5	21.7	3.32
B	B0 / Wxx-42	69.0	16.3	4.28
C	B0 / Wxx-36	33.8	7.0	4.81
D	B0 / Wxx-30	33.5	6.3	5.32
E	B0 / Wxx-55	69.3	24.0	2.89
F	B0 / Wxx-54	69.7	22.2	3.13

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Medium Temperature [55°C]	
SCOPon	4.14
SCOPnet	4.14
SCOP	4.13
η [%]	165.38
Label	A+++
Qh [kWh]	143174
Pdesignh [kW]	69.3
Tbivalent [°C]	-10

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

	Operating conditions	Qh	P	COP
1	W10 / W30-35	84.6	14.1	5.99
2	W10 / W30-35 (MIN)	42.3	7.0	6.07
A	W10 / Wxx-34	84.6	13.8	6.12
B	W10 / Wxx-30	84.3	12.6	6.68
C	W10 / Wxx-27	42.1	5.9	7.19
D	W10 / Wxx-24	42.0	5.5	7.59
E	W10 / Wxx-35	84.6	14.1	5.99
F	W10 / Wxx-35	84.6	14.1	5.99

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Low Temperature [35°C]	
SCOPon	6.79
SCOPnet	6.79
SCOP	6.78
η [%]	271.11
Label	A+++
Qh [kWh]	174784
Pdesignh [kW]	84.6
Tbivalent [°C]	-10.00

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

	Operating conditions	Qh	P	COP
1	W10 / W47-55	85.6	23.7	3.61
2	W10 / W47-55 (MIN)	42.8	11.7	3.66
A	W10 / Wxx-52	86.2	21.3	4.05
B	W10 / Wxx-42	85.8	16.0	5.38
C	W10 / Wxx-36	42.8	6.9	6.21
D	W10 / Wxx-30	42.7	6.2	6.85
E	W10 / Wxx-55	85.6	23.7	3.61
F	W10 / Wxx-55	85.6	23.7	3.61

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Medium Temperature [55°C]	
SCOPon	5.16
SCOPnet	5.16
SCOP	5.15
η [%]	206.01
Label	A+++
Qh [kWh]	176850
Pdesignh [kW]	85.6
Tbivalent [°C]	-10.00

Low temperature cooling W 12 / 7°C

	Operating conditions	Qc	P	EER
A	W30-35 / W12-7	51.0	15.6	3.27
B	W26-xx / W12-7	51.9	14.1	3.67
C	W22-xx / W12-7	52.5	12.8	4.10
D	W18-xx / W12-7	52.8	12.2	4.33

SEER DATA EN 14825:2018 [W 12 / 7°C]	
SEERon	3.97
SEER	3.96
Qc [kWh]	29820
η [%]	158.57

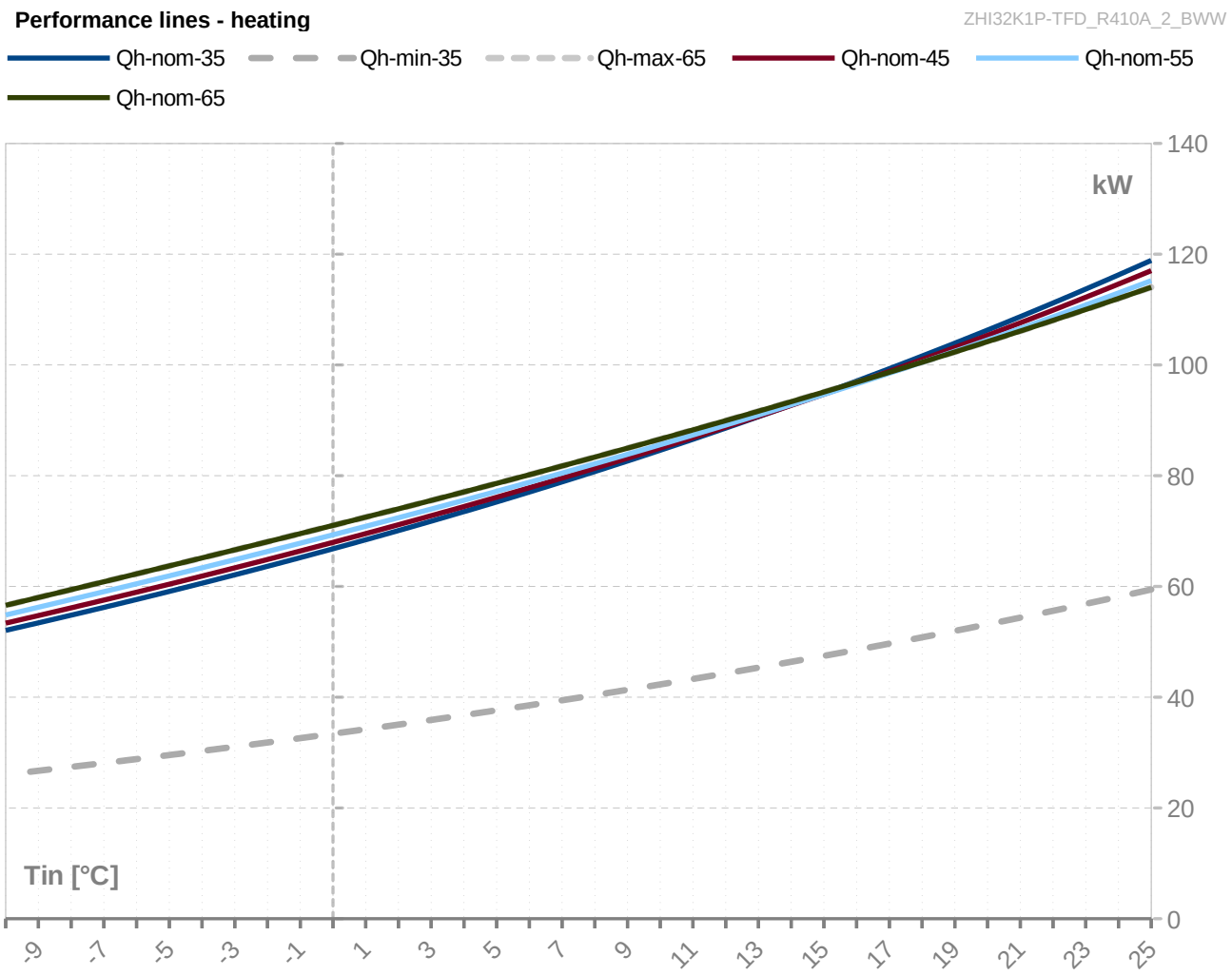
Radiant cooling W 23 / 18°C

	Operating conditions	Qc	P	EER
A	W50-xx / W23-18	60.1	25.9	2.32
B	W40-xx / W23-18	65.0	20.1	3.23
C	W30-35 / W23-18	68.6	15.6	4.40
D	W26-xx / W23-18	69.7	14.1	4.93

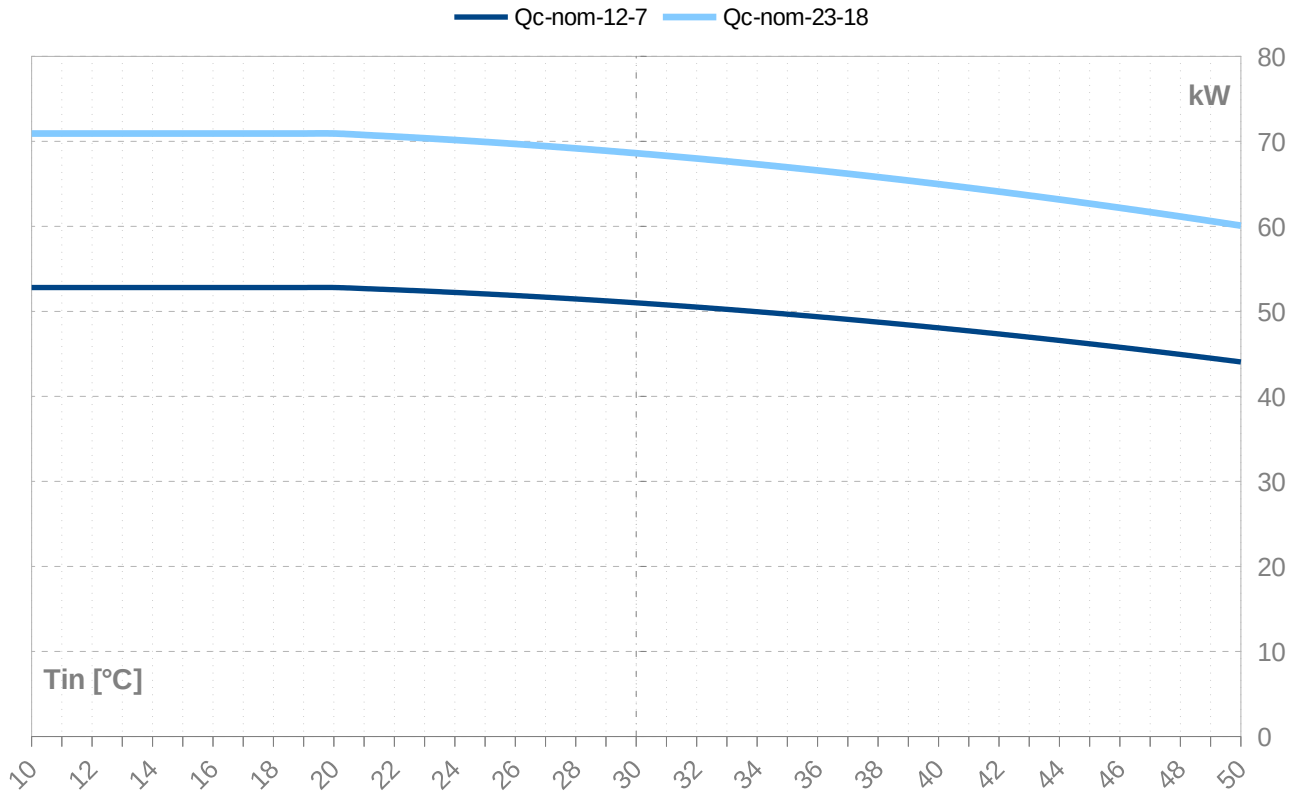
SEER DATA EN 14825:2018 [W 23 / 18°C]	
SEERon	5.33
SEER	5.32
Qc [kWh]	29820
η [%]	212.95

Performance lines - heating

ZHI32K1P-TFD_R410A_2_BWW



Performance lines - cooling



Th -OU	**[°C]**			**35**							
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]
25	**118.9**	59.4	118.9	**14.8**	7.3	14.8	**8.01**	105.0	52.5	105.0	30.3
24	**116.3**	58.1	116.3	**14.7**	7.3	14.7	**7.90**	102.5	51.3	102.5	30.2
23	**113.7**	56.9	113.7	**14.6**	7.2	14.6	**7.78**	100.1	50.0	100.1	30.1
22	**111.2**	55.6	111.2	**14.5**	7.2	14.5	**7.66**	97.6	48.8	97.6	30.0
21	**108.7**	54.4	108.7	**14.4**	7.1	14.4	**7.53**	95.2	47.6	95.2	29.9
20	**106.3**	53.2	106.3	**14.4**	7.1	14.4	**7.40**	92.9	46.4	92.9	29.8
19	**103.9**	52.0	103.9	**14.3**	7.1	14.3	**7.27**	90.6	45.3	90.6	29.7
18	**101.6**	50.8	101.6	**14.3**	7.0	14.3	**7.13**	88.3	44.1	88.3	29.7
17	**99.3**	49.7	99.3	**14.2**	7.0	14.2	**6.99**	86.1	43.0	86.1	29.7
16	**97.1**	48.5	97.1	**14.2**	7.0	14.2	**6.85**	83.9	41.9	83.9	29.6
15	**94.9**	47.5	94.9	**14.2**	7.0	14.2	**6.71**	81.7	40.8	81.7	29.6
14	**92.8**	46.4	92.8	**14.1**	7.0	14.1	**6.56**	79.6	39.8	79.6	29.6
13	**90.7**	45.3	90.7	**14.1**	7.0	14.1	**6.42**	77.5	38.7	77.5	29.6
12	**88.6**	44.3	88.6	**14.1**	7.0	14.1	**6.27**	75.4	37.7	75.4	29.6
11	**86.6**	43.3	86.6	**14.1**	7.0	14.1	**6.13**	73.4	36.7	73.4	29.7
10	**84.6**	42.3	84.6	**14.1**	7.0	14.1	**5.99**	71.4	35.7	71.4	29.7
9	**82.7**	41.3	82.7	**14.1**	7.0	14.1	**5.84**	69.4	34.7	69.4	29.7
8	**80.7**	40.4	80.7	**14.2**	7.0	14.2	**5.70**	67.5	33.8	67.5	29.8
7	**78.9**	39.4	78.9	**14.2**	7.0	14.2	**5.56**	65.6	32.8	65.6	29.8
6	**77.1**	38.5	77.1	**14.2**	7.0	14.2	**5.42**	63.8	31.9	63.8	29.9
5	**75.3**	37.6	75.3	**14.3**	7.0	14.3	**5.28**	61.9	31.0	61.9	30.0
4	**73.5**	36.7	73.5	**14.3**	7.0	14.3	**5.14**	60.2	30.1	60.2	30.0
3	**71.8**	35.9	71.8	**14.3**	7.1	14.3	**5.01**	58.4	29.2	58.4	30.1
2	**70.1**	35.0	70.1	**14.4**	7.1	14.4	**4.88**	56.7	28.3	56.7	30.1
1	**68.4**	34.2	68.4	**14.4**	7.1	14.4	**4.75**	55.0	27.5	55.0	30.2
0	**66.8**	33.4	66.8	**14.4**	7.1	14.4	**4.63**	53.3	26.7	53.3	30.3
-1	**65.2**	32.6	65.2	**14.5**	7.1	14.5	**4.50**	51.7	25.8	51.7	30.3
-2	**63.6**	31.8	63.6	**14.5**	7.2	14.5	**4.38**	50.1	25.0	50.1	30.4
-3	**62.1**	31.0	62.1	**14.6**	7.2	14.6	**4.26**	48.5	24.2	48.5	30.5
-4	**60.6**	30.3	60.6	**14.6**	7.2	14.6	**4.15**	46.9	23.5	46.9	30.5
-5	**59.1**	29.5	59.1	**14.6**	7.2	14.6	**4.04**	45.4	22.7	45.4	30.6
-6	**57.6**	28.8	57.6	**14.7**	7.2	14.7	**3.93**	43.9	22.0	43.9	30.6
-7	**56.2**	28.1	56.2	**14.7**	7.3	14.7	**3.82**	42.5	21.2	42.5	30.7
-8	**54.8**	27.4	54.8	**14.7**	7.3	14.7	**3.72**	41.0	20.5	41.0	30.7
-9	**53.4**	26.7	53.4	**14.8**	7.3	14.8	**3.62**	39.6	19.8	39.6	30.7
-10	**52.1**	26.0	52.1	**14.8**	7.3	14.8	**3.52**	38.3	19.1	38.3	30.8
-11	**50.7**	25.4	50.7	**14.8**	7.3	14.8	**3.43**	36.9	18.4	36.9	30.8
-12	**49.4**	24.7	49.4	**14.8**	7.3	14.8	**3.33**	35.6	17.8	35.6	30.8
-13	**48.1**	24.1	48.1	**14.8**	7.3	14.8	**3.25**	34.3	17.1	34.3	30.8
-14	**46.8**	23.4	46.8	**14.8**	7.3	14.8	**3.16**	33.0	16.5	33.0	30.8
-15	**45.6**	22.8	45.6	**14.8**	7.3	14.8	**3.08**	31.7	15.9	31.7	30.7

-- attention: operating limits not reflected in performance table

Th -OU	**[°C]**			**45**							
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]
25	**117.0**	58.5	117.0	**17.8**	8.8	17.8	**6.56**	100.4	50.2	100.4	34.0
24	**114.6**	57.3	114.6	**17.8**	8.8	17.8	**6.44**	98.0	49.0	98.0	33.9
23	**112.2**	56.1	112.2	**17.8**	8.8	17.8	**6.32**	95.7	47.8	95.7	33.9
22	**109.9**	54.9	109.9	**17.7**	8.7	17.7	**6.20**	93.3	46.7	93.3	33.8
21	**107.6**	53.8	107.6	**17.7**	8.7	17.7	**6.08**	91.1	45.5	91.1	33.8
20	**105.4**	52.7	105.4	**17.7**	8.7	17.7	**5.95**	88.8	44.4	88.8	33.8
19	**103.1**	51.6	103.1	**17.7**	8.7	17.7	**5.83**	86.6	43.3	86.6	33.8
18	**101.0**	50.5	101.0	**17.7**	8.7	17.7	**5.70**	84.4	42.2	84.4	33.8
17	**98.9**	49.4	98.9	**17.7**	8.7	17.7	**5.58**	82.3	41.2	82.3	33.9
16	**96.8**	48.4	96.8	**17.7**	8.7	17.7	**5.46**	80.2	40.1	80.2	33.9
15	**94.7**	47.4	94.7	**17.8**	8.8	17.8	**5.34**	78.1	39.1	78.1	33.9
14	**92.7**	46.3	92.7	**17.8**	8.8	17.8	**5.21**	76.1	38.0	76.1	34.0
13	**90.7**	45.4	90.7	**17.8**	8.8	17.8	**5.09**	74.1	37.0	74.1	34.0
12	**88.8**	44.4	88.8	**17.8**	8.8	17.8	**4.98**	72.1	36.1	72.1	34.1
11	**86.9**	43.4	86.9	**17.9**	8.8	17.9	**4.86**	70.2	35.1	70.2	34.1
10	**85.0**	42.5	85.0	**17.9**	8.8	17.9	**4.74**	68.3	34.1	68.3	34.2
9	**83.2**	41.6	83.2	**18.0**	8.9	18.0	**4.63**	66.4	33.2	66.4	34.2
8	**81.4**	40.7	81.4	**18.0**	8.9	18.0	**4.52**	64.5	32.3	64.5	34.3
7	**79.6**	39.8	79.6	**18.1**	8.9	18.1	**4.41**	62.7	31.4	62.7	34.4
6	**77.8**	38.9	77.8	**18.1**	8.9	18.1	**4.30**	60.9	30.5	60.9	34.4
5	**76.1**	38.1	76.1	**18.1**	8.9	18.1	**4.20**	59.2	29.6	59.2	34.5
4	**74.4**	37.2	74.4	**18.2**	9.0	18.2	**4.09**	57.4	28.7	57.4	34.5
3	**72.8**	36.4	72.8	**18.2**	9.0	18.2	**3.99**	55.7	27.9	55.7	34.6
2	**71.1**	35.6	71.1	**18.3**	9.0	18.3	**3.89**	54.1	27.0	54.1	34.7
1	**69.5**	34.8	69.5	**18.3**	9.0	18.3	**3.80**	52.4	26.2	52.4	34.7
0	**67.9**	34.0	67.9	**18.4**	9.1	18.4	**3.70**	50.8	25.4	50.8	34.8
-1	**66.4**	33.2	66.4	**18.4**	9.1	18.4	**3.61**	49.2	24.6	49.2	34.8
-2	**64.9**	32.4	64.9	**18.4**	9.1	18.4	**3.52**	47.7	23.8	47.7	34.8
-3	**63.4**	31.7	63.4	**18.5**	9.1	18.5	**3.43**	46.1	23.1	46.1	34.9
-4	**61.9**	30.9	61.9	**18.5**	9.1	18.5	**3.35**	44.6	22.3	44.6	34.9
-5	**60.4**	30.2	60.4	**18.5**	9.1	18.5	**3.27**	43.1	21.6	43.1	34.9
-6	**59.0**	29.5	59.0	**18.5**	9.1	18.5	**3.18**	41.7	20.8	41.7	34.9
-7	**57.5**	28.8	57.5	**18.5**	9.1	18.5	**3.11**	40.2	20.1	40.2	34.9
-8	**56.1**	28.1	56.1	**18.5**	9.1	18.5	**3.03**	38.8	19.4	38.8	34.9
-9	**54.7**	27.4	54.7	**18.5**	9.1	18.5	**2.96**	37.4	18.7	37.4	34.8
-10	**53.4**	26.7	53.4	**18.5**	9.1	18.5	**2.88**	36.1	18.0	36.1	34.8
-11	**52.0**	26.0	52.0	**18.5**	9.1	18.5	**2.81**	34.7	17.4	34.7	34.7
-12	**50.7**	25.3	50.7	**18.5**	9.1	18.5	**2.75**	33.4	16.7	33.4	34.7
-13	**49.3**	24.7	49.3	**18.4**	9.1	18.4	**2.68**	32.1	16.1	32.1	34.6
-14	**48.0**	24.0	48.0	**18.4**	9.1	18.4	**2.61**	30.9	15.4	30.9	34.5
-15	**46.7**	23.4	46.7	**18.3**	9.0	18.3	**2.55**	29.6	14.8	29.6	34.4

-- attention: operating limits not reflected in performance table

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]
25	**115.2**	57.6	115.2	**23.1**	11.4	23.1	**4.98**	93.6	46.8	93.6	40.3
24	**113.0**	56.5	113.0	**23.1**	11.4	23.1	**4.88**	91.4	45.7	91.4	40.4
23	**110.8**	55.4	110.8	**23.2**	11.4	23.2	**4.78**	89.2	44.6	89.2	40.4
22	**108.7**	54.3	108.7	**23.2**	11.4	23.2	**4.69**	87.0	43.5	87.0	40.4
21	**106.6**	53.3	106.6	**23.2**	11.5	23.2	**4.59**	84.9	42.4	84.9	40.5
20	**104.5**	52.3	104.5	**23.3**	11.5	23.3	**4.49**	82.8	41.4	82.8	40.5
19	**102.5**	51.2	102.5	**23.3**	11.5	23.3	**4.40**	80.7	40.4	80.7	40.6
18	**100.5**	50.2	100.5	**23.3**	11.5	23.3	**4.31**	78.7	39.3	78.7	40.6
17	**98.5**	49.3	98.5	**23.4**	11.5	23.4	**4.21**	76.7	38.3	76.7	40.7
16	**96.6**	48.3	96.6	**23.4**	11.6	23.4	**4.12**	74.7	37.4	74.7	40.8
15	**94.7**	47.3	94.7	**23.5**	11.6	23.5	**4.03**	72.8	36.4	72.8	40.8
14	**92.8**	46.4	92.8	**23.5**	11.6	23.5	**3.95**	70.8	35.4	70.8	40.9
13	**91.0**	45.5	91.0	**23.6**	11.6	23.6	**3.86**	68.9	34.5	68.9	41.0
12	**89.1**	44.6	89.1	**23.6**	11.6	23.6	**3.77**	67.1	33.5	67.1	41.0
11	**87.4**	43.7	87.4	**23.7**	11.7	23.7	**3.69**	65.3	32.6	65.3	41.1
10	**85.6**	42.8	85.6	**23.7**	11.7	23.7	**3.61**	63.5	31.7	63.5	41.1
9	**83.9**	41.9	83.9	**23.8**	11.7	23.8	**3.53**	61.7	30.8	61.7	41.2
8	**82.2**	41.1	82.2	**23.8**	11.7	23.8	**3.45**	59.9	30.0	59.9	41.3
7	**80.5**	40.2	80.5	**23.8**	11.8	23.8	**3.38**	58.2	29.1	58.2	41.3
6	**78.8**	39.4	78.8	**23.9**	11.8	23.9	**3.30**	56.5	28.3	56.5	41.4
5	**77.2**	38.6	77.2	**23.9**	11.8	23.9	**3.23**	54.8	27.4	54.8	41.4
4	**75.6**	37.8	75.6	**23.9**	11.8	23.9	**3.16**	53.2	26.6	53.2	41.4
3	**74.0**	37.0	74.0	**24.0**	11.8	24.0	**3.09**	51.6	25.8	51.6	41.5
2	**72.4**	36.2	72.4	**24.0**	11.8	24.0	**3.02**	50.0	25.0	50.0	41.5
1	**70.9**	35.4	70.9	**24.0**	11.8	24.0	**2.95**	48.4	24.2	48.4	41.5
0	**69.3**	34.7	69.3	**24.0**	11.8	24.0	**2.89**	46.9	23.4	46.9	41.5
-1	**67.8**	33.9	67.8	**24.0**	11.9	24.0	**2.82**	45.4	22.7	45.4	41.5
-2	**66.3**	33.2	66.3	**24.0**	11.8	24.0	**2.76**	43.9	21.9	43.9	41.4
-3	**64.8**	32.4	64.8	**24.0**	11.8	24.0	**2.70**	42.4	21.2	42.4	41.4
-4	**63.4**	31.7	63.4	**24.0**	11.8	24.0	**2.64**	41.0	20.5	41.0	41.4
-5	**61.9**	31.0	61.9	**24.0**	11.8	24.0	**2.58**	39.5	19.8	39.5	41.3
-6	**60.5**	30.2	60.5	**23.9**	11.8	23.9	**2.53**	38.1	19.1	38.1	41.2
-7	**59.0**	29.5	59.0	**23.9**	11.8	23.9	**2.47**	36.7	18.4	36.7	41.1
-8	**57.6**	28.8	57.6	**23.8**	11.8	23.8	**2.42**	35.4	17.7	35.4	41.0
-9	**56.2**	28.1	56.2	**23.8**	11.7	23.8	**2.37**	34.0	17.0	34.0	40.9
-10	**54.8**	27.4	54.8	**23.7**	11.7	23.7	**2.32**	32.7	16.4	32.7	40.8
-11	**53.5**	26.7	53.5	**23.6**	11.6	23.6	**2.27**	31.4	15.7	31.4	40.6
-12	**52.1**	26.0	52.1	**23.5**	11.6	23.5	**2.22**	30.1	15.1	30.1	40.4
-13	**50.7**	25.4	50.7	**23.4**	11.5	23.4	**2.17**	28.9	14.4	28.9	40.2
-14	**49.4**	24.7	49.4	**23.3**	11.5	23.3	**2.12**	27.6	13.8	27.6	40.0
-15	**48.0**	24.0	48.0	**23.1**	11.4	23.1	**2.08**	26.4	13.2	26.4	39.8

-- attention: operating limits not reflected in performance table

Th -OU	**[°C]**			**65 (T-max)**							
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]
25	**114.0**	57.0	114.0	**30.4**	15.0	30.4	**3.75**	85.7	42.8	85.7	49.3
24	**112.0**	56.0	112.0	**30.4**	15.0	30.4	**3.68**	83.6	41.8	83.6	49.4
23	**110.0**	55.0	110.0	**30.5**	15.0	30.5	**3.61**	81.6	40.8	81.6	49.4
22	**108.1**	54.0	108.1	**30.5**	15.1	30.5	**3.54**	79.6	39.8	79.6	49.5
21	**106.1**	53.1	106.1	**30.6**	15.1	30.6	**3.47**	77.6	38.8	77.6	49.6
20	**104.2**	52.1	104.2	**30.6**	15.1	30.6	**3.40**	75.6	37.8	75.6	49.7
19	**102.3**	51.2	102.3	**30.7**	15.1	30.7	**3.34**	73.7	36.9	73.7	49.8
18	**100.5**	50.2	100.5	**30.7**	15.1	30.7	**3.27**	71.8	35.9	71.8	49.8
17	**98.7**	49.3	98.7	**30.8**	15.2	30.8	**3.21**	69.9	35.0	69.9	49.9
16	**96.9**	48.4	96.9	**30.8**	15.2	30.8	**3.14**	68.1	34.1	68.1	50.0
15	**95.1**	47.6	95.1	**30.9**	15.2	30.9	**3.08**	66.3	33.1	66.3	50.0
14	**93.4**	46.7	93.4	**30.9**	15.2	30.9	**3.02**	64.5	32.3	64.5	50.1
13	**91.6**	45.8	91.6	**30.9**	15.3	30.9	**2.96**	62.8	31.4	62.8	50.2
12	**89.9**	45.0	89.9	**31.0**	15.3	31.0	**2.90**	61.0	30.5	61.0	50.2
11	**88.3**	44.1	88.3	**31.0**	15.3	31.0	**2.85**	59.3	29.7	59.3	50.3
10	**86.6**	43.3	86.6	**31.0**	15.3	31.0	**2.79**	57.6	28.8	57.6	50.3
9	**85.0**	42.5	85.0	**31.1**	15.3	31.1	**2.74**	56.0	28.0	56.0	50.3
8	**83.4**	41.7	83.4	**31.1**	15.3	31.1	**2.68**	54.3	27.2	54.3	50.4
7	**81.8**	40.9	81.8	**31.1**	15.3	31.1	**2.63**	52.7	26.4	52.7	50.4
6	**80.2**	40.1	80.2	**31.1**	15.3	31.1	**2.58**	51.1	25.6	51.1	50.4
5	**78.6**	39.3	78.6	**31.1**	15.3	31.1	**2.53**	49.6	24.8	49.6	50.4
4	**77.1**	38.5	77.1	**31.1**	15.3	31.1	**2.48**	48.0	24.0	48.0	50.4
3	**75.5**	37.8	75.5	**31.1**	15.3	31.1	**2.43**	46.5	23.3	46.5	50.3
2	**74.0**	37.0	74.0	**31.0**	15.3	31.0	**2.38**	45.0	22.5	45.0	50.3
1	**72.5**	36.3	72.5	**31.0**	15.3	31.0	**2.34**	43.5	21.8	43.5	50.3
0	**71.0**	35.5	71.0	**31.0**	15.3	31.0	**2.29**	42.1	21.0	42.1	50.2
-1	**69.5**	34.8	69.5	**30.9**	15.2	30.9	**2.25**	40.7	20.3	40.7	50.1
-2	**68.1**	34.0	68.1	**30.9**	15.2	30.9	**2.21**	39.2	19.6	39.2	50.0
-3	**66.6**	33.3	66.6	**30.8**	15.2	30.8	**2.16**	37.9	18.9	37.9	49.9
-4	**65.1**	32.6	65.1	**30.7**	15.1	30.7	**2.12**	36.5	18.2	36.5	49.7
-5	**63.7**	31.9	63.7	**30.6**	15.1	30.6	**2.08**	35.1	17.6	35.1	49.6
-6	**62.3**	31.1	62.3	**30.5**	15.0	30.5	**2.04**	33.8	16.9	33.8	49.4
-7	**60.8**	30.4	60.8	**30.4**	15.0	30.4	**2.00**	32.5	16.2	32.5	49.2
-8	**59.4**	29.7	59.4	**30.2**	14.9	30.2	**1.97**	31.2	15.6	31.2	49.0
-9	**58.0**	29.0	58.0	**30.1**	14.8	30.1	**1.93**	29.9	15.0	29.9	48.8
-10	**56.6**	28.3	56.6	**29.9**	14.8	29.9	**1.89**	28.6	14.3	28.6	48.5
-11	**55.2**	27.6	55.2	**29.7**	14.7	29.7	**1.86**	27.4	13.7	27.4	48.3
-12	**53.8**	26.9	53.8	**29.5**	14.6	29.5	**1.82**	26.2	13.1	26.2	48.0
-13	**52.4**	26.2	52.4	**29.3**	14.5	29.3	**1.78**	25.0	12.5	25.0	47.6
-14	**50.9**	25.5	50.9	**29.1**	14.4	29.1	**1.75**	23.8	11.9	23.8	47.3
-15	**49.5**	24.8	49.5	**28.9**	14.2	28.9	**1.72**	22.6	11.3	22.6	46.9

-- attention: operating limits not reflected in performance table

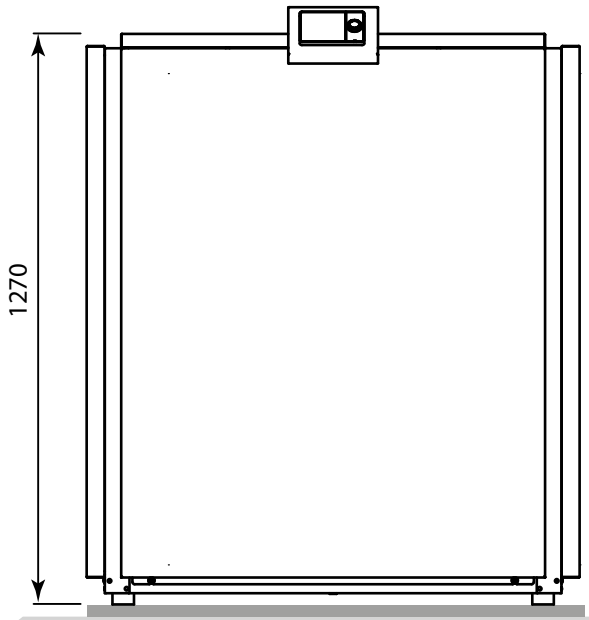
Tc -OU	**[°C]**			**W 12 / 7 °C**							
Ts -IN	**Qc nom**	**Qc min**	**Qc max**	**Pin nom**	**Pin min**	**Pin max**	**EER**	**Qh nom**	**Qh min**	**Qh max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
40	**48.1**	24.0	48.1	**20.1**	9.9	20.1	**2.39**	66.8	33.4	66.8	36.8
39	**48.4**	24.2	48.4	**19.6**	9.7	19.6	**2.47**	66.7	33.4	66.7	36.2
38	**48.7**	24.4	48.7	**19.1**	9.4	19.1	**2.55**	66.6	33.3	66.6	35.6
37	**49.1**	24.5	49.1	**18.6**	9.2	18.6	**2.63**	66.5	33.2	66.5	35.1
36	**49.4**	24.7	49.4	**18.2**	9.0	18.2	**2.72**	66.3	33.2	66.3	34.5
35	**49.7**	24.8	49.7	**17.7**	8.7	17.7	**2.81**	66.2	33.1	66.2	34.0
34	**50.0**	25.0	50.0	**17.3**	8.5	17.3	**2.89**	66.1	33.0	66.1	33.5
33	**50.2**	25.1	50.2	**16.8**	8.3	16.8	**2.98**	66.0	33.0	66.0	33.0
32	**50.5**	25.3	50.5	**16.4**	8.1	16.4	**3.08**	65.8	32.9	65.8	32.5
31	**50.8**	25.4	50.8	**16.0**	7.9	16.0	**3.17**	65.7	32.9	65.7	32.1
30	**51.0**	25.5	51.0	**15.6**	7.7	15.6	**3.27**	65.6	32.8	65.6	31.6
29	**51.2**	25.6	51.2	**15.2**	7.5	15.2	**3.37**	65.5	32.7	65.5	31.2
28	**51.5**	25.7	51.5	**14.8**	7.3	14.8	**3.47**	65.3	32.7	65.3	30.8
27	**51.7**	25.8	51.7	**14.5**	7.1	14.5	**3.57**	65.2	32.6	65.2	30.3
26	**51.9**	25.9	51.9	**14.1**	7.0	14.1	**3.67**	65.1	32.5	65.1	29.9
25	**52.1**	26.0	52.1	**13.8**	6.8	13.8	**3.78**	64.9	32.5	64.9	29.5
24	**52.2**	26.1	52.2	**13.4**	6.6	13.4	**3.88**	64.8	32.4	64.8	29.2
23	**52.4**	26.2	52.4	**13.1**	6.5	13.1	**3.99**	64.6	32.3	64.6	28.8
22	**52.5**	26.3	52.5	**12.8**	6.3	12.8	**4.10**	64.5	32.3	64.5	28.4
21	**52.7**	26.3	52.7	**12.5**	6.2	12.5	**4.21**	64.4	32.2	64.4	28.1
20	**52.8**	26.4	52.8	**12.2**	6.0	12.2	**4.33**	64.2	32.1	64.2	27.7

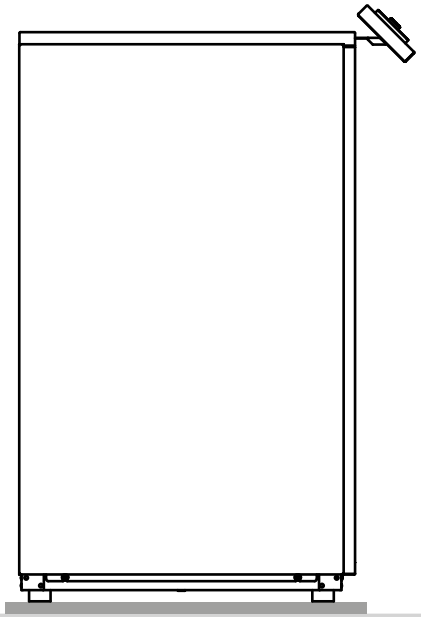
Tc [°C]				**W 23 / 18 °C**							
0	**Qc nom**	**Qc min**	**Qc max**	**Pin nom**	**Pin min**	**Pin max**	**EER**	**Qh nom**	**Qh min**	**Qh max**	**I nom**
[°C]	**[kW]**	[kW]	[kW]	**[kW]**	[kW]	[kW]	**kW / kW**	[kW]	[kW]	[kW]	[A]
40	**65.0**	32.5	65.0	**20.1**	9.9	20.1	**3.23**	83.4	41.7	84.1	36.3
39	**65.4**	32.7	65.4	**19.6**	9.7	19.6	**3.34**	83.3	41.7	84.0	35.7
38	**65.8**	32.9	65.8	**19.1**	9.4	19.1	**3.44**	83.2	41.6	84.0	35.1
37	**66.2**	33.1	66.2	**18.6**	9.2	18.6	**3.55**	83.2	41.6	83.9	34.5
36	**66.6**	33.3	66.6	**18.2**	9.0	18.2	**3.67**	83.1	41.6	83.8	34.0
35	**66.9**	33.5	66.9	**17.7**	8.7	17.7	**3.78**	83.1	41.5	83.7	33.4
34	**67.3**	33.7	67.3	**17.3**	8.5	17.3	**3.90**	83.0	41.5	83.6	32.9
33	**67.6**	33.8	67.6	**16.8**	8.3	16.8	**4.02**	83.0	41.5	83.6	32.4
32	**68.0**	34.0	68.0	**16.4**	8.1	16.4	**4.14**	82.9	41.5	83.5	31.9
31	**68.3**	34.1	68.3	**16.0**	7.9	16.0	**4.27**	82.9	41.4	83.4	31.5
30	**68.6**	34.3	68.6	**15.6**	7.7	15.6	**4.40**	82.8	41.4	83.4	31.0
29	**68.9**	34.4	68.9	**15.2**	7.5	15.2	**4.53**	82.8	41.4	83.3	30.6
28	**69.2**	34.6	69.2	**14.8**	7.3	14.8	**4.66**	82.7	41.4	83.2	30.2
27	**69.4**	34.7	69.4	**14.5**	7.1	14.5	**4.79**	82.7	41.3	83.2	29.7
26	**69.7**	34.8	69.7	**14.1**	7.0	14.1	**4.93**	82.6	41.3	83.1	29.3
25	**69.9**	35.0	69.9	**13.8**	6.8	13.8	**5.07**	82.5	41.3	83.1	29.0
24	**70.2**	35.1	70.2	**13.4**	6.6	13.4	**5.22**	82.5	41.2	83.0	28.6
23	**70.4**	35.2	70.4	**13.1**	6.5	13.1	**5.36**	82.4	41.2	83.0	28.2
22	**70.6**	35.3	70.6	**12.8**	6.3	12.8	**5.51**	82.3	41.2	82.9	27.9
21	**70.7**	35.4	70.7	**12.5**	6.2	12.5	**5.66**	82.3	41.1	82.9	27.6
20	**70.9**	35.5	70.9	**12.2**	6.0	12.2	**5.81**	82.2	41.1	82.8	27.2

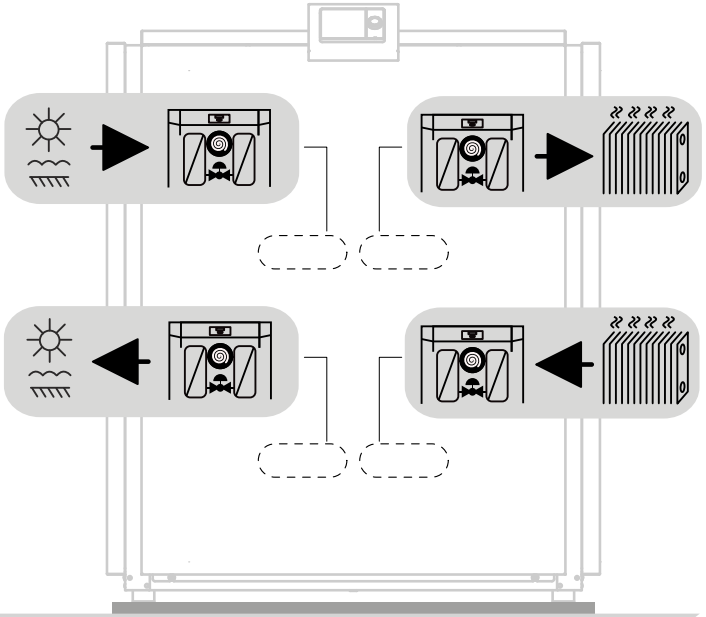
-- attention: operating limits not reflected in performance table

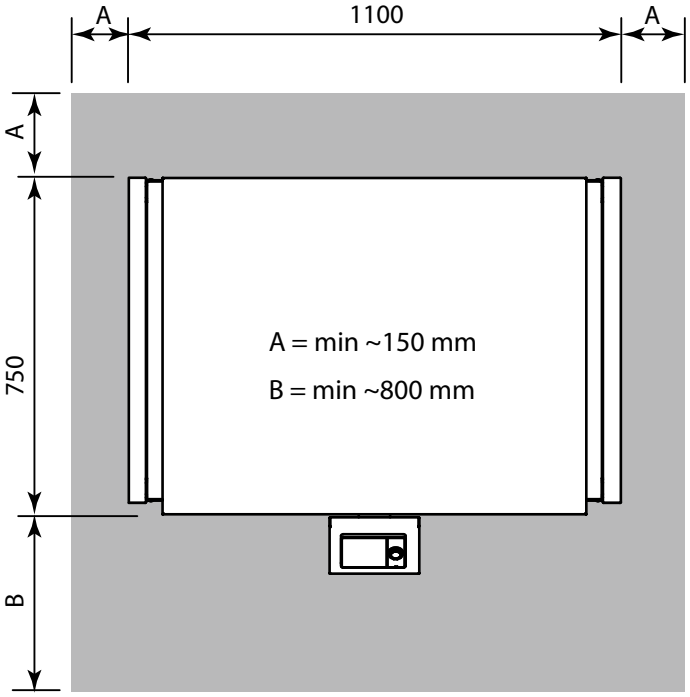
LEGEND:

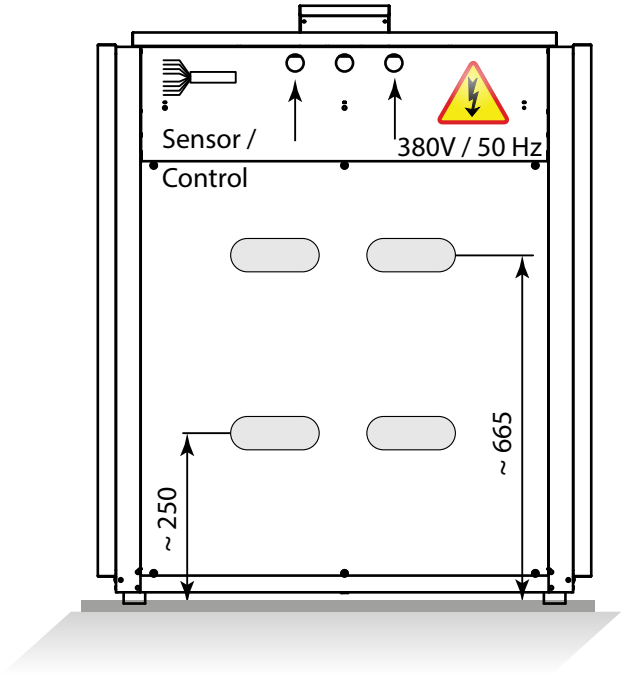
Ts-IN: Temperature renewable source - inlet [°C]
Th-OU: Temperature heating - outlet (flow) [°C]
Tc-OU: Temperature cooling - outlet (flow) [°C]
Qh nom: Heating capacity nominal
Qh min: Heating capacity minimal
Qh max: Heating capacity maximal
Pin nom: Power input at nominal heating capacity
Pin min: 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

