



WAMAK

Heat pump



TWVW 48 EVI

WAMAK TWW 48 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 positive 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 48 EVI

Heating - EN 14511		
Heating capacity [kW]	W10 / W35 (max)	50.5 (25.3 / 50.5)
	W10 / W35 (min)	25.3 (25.3 / 50.5)
	W10 / W34	50.6 (25.3 / 50.6)
Electrical power input [kW]	W10 / W35 (max)	8.6 (4.2 / 8.6)
	W10 / W35 (min)	4.2 (4.2 / 8.6)
	W10 / W34	8.4 (6.3 / 12.8)
Heating efficiency faktor [COP]	W10 / W35 (max)	5.90
	W10 / W35 (min)	5.98
	W10 / W34	6.03
Seasonal space heating energy efficiency - SCOP EN 14825		
Average Climate / Low Temperature [35°C]	SCOP	6.70
	η [%]	268.0
	Label	A+++
	Qhe [kWh]	104333.0
	Pdesignh [kW]	50.5
	Tbivalent [°C]	-10
Cooling		
Cooling capacity - [kW]	A35 / W23-18	39.8
	A25 / W23-18	41.7
	A35 / W12-7	29.6
	A25 / W12-7	29.6
Seasonal space cooling energy efficiency - SEER EN 14825		
[W 23 / 18°C]	SEER	5.29
	Qce [kWh]	17760.0
	η_c [%]	211.7
Sound EN 12102		
Acoustic power - Lw	dB(A)	55
Acoustic pressure - Lp	1 m dB(A)	47
	5 m dB(A)	33
	10 m dB(A)	27
Mechanical and operational information		
Compressor type (3~ 400/50)	SCROLL / 2 /	On/Off
Refrigerant	R410A (GWP - 2088)	8.5 kg
Operating limit temperatures heating - (min / max) [°C]	25 / 65	
Operating limit temperatures source - (min / max) [°C]	-10 (7) / 30	
Weight	275 kg	

Main technical data - WAMAK TWW 48 EVI

Enclosure type			VN1100		Heat energy rejection side data			
Basic dimensions	Height [mm]		1270		Operating limit temperatures heating	MAX [°C]	65	
	Width [mm]		1100			MIN [°C]	25	
	Length [mm]		750		for more see operating limits diagram			
Weight [kg]			275		Condenser	Port size	2 "	
Colour			Gray			Type	BPHE	
Enclosure IP Class			IP20			Count	1	
Refrigeration cycle						Material	AISI 316	
Compressor	Type		Scroll		Maximal operating pressure - refrigerant [bar]			45
	Number of stages		2		Maximal operating pressure - Water [bar]			3
	On/Off				Testing pressure [bar]			70
	Power factor Cosφ		0.64		Heat transfer medium			Water
	Winding resistance		1.79 Ohm		Volume flow - Water [m3/h]			4.37 ~ 8.74
Refrigerant			R410A		Internal pressure drop - Water [kPa]			20
	Volme		8.5 kg		Temperature difference	@ 35 °C (nom)	5 K	
	GWP		2088			@ 55 °C	8 K	
	Safety class		A1			@ 65 °C	10 K	
Refrigeration oil type	POE RL32-3MAF		Renewable energy extraction side data					
	Oil volume		2 x 1.89 L		Operating limit temperatures source	MIN [°C]	-10 (7)	
Maximal pressure - refrigerant [bar]			45			MAX [°C]	30	
	PED class		1		for more see operating limits diagram			
EVI - vapour injection with economizer				Evaporator	Port size	2 "		
Electrical connection data					Type	BPHE		
Line voltage [#~ V/Hz]		3~ 400/50			Count	1		
Current	nominal [A]		18.64		Material	AISI 316		
	maximal [A]		32.00		Maximal operating pressure - refrigerant [bar]		28	
	starting [A]		25.16		Heat transfer medium		Water	
Softstart				Maximal operating pressure - Water [bar]		3		
Main safety		C32		Volume flow - Water [m3/h]		4.54 ~ 9.08		
Control System				Internal pressure drop - Water [kPa]		12		
Main controller	SIEMENS	RVS 61	Temperature difference - Water					4 K
Extension module	AVS75.3xx	AVS75.3xx	AVS75.372					
Bus Clip-In			Modbus OCI352					
Online connection		Web server OZW672	ToSyMo					
Superheat controller			SEC61					
*** with accessory								

WAMAK TWW 48 EVI

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

Model	TWW 48 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	Item	Symbol	Value	Unit
Rated heat output at Tdesignh	Prated	50.5	kW	Seasonal space heating energy efficiency	ηs	268.0	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	50.6	kW	Tj = -7 °C	COPd	6.03	-
Tj = +2 °C	Pdh	50.6	kW	Tj = +2 °C	COPd	6.6	-
Tj = +7 °C	Pdh	25.4	kW	Tj = +7 °C	COPd	7.1	-
Tj = +12 °C	Pdh	25.4	kW	Tj = +12 °C	COPd	7.6	-
Tj = bivalent temperature	Pdh	50.5	kW	Tj = bivalent temperature	COPd	5.9	-
Tj = operation limit temperature	Pdh	---	kW	Tj = operation limit temperature	COPd	---	-
Bivalent temperature	Tbiv	-10	°C	Tj = operation limit temperature	TOL	---	°C
Power consumption in modes other than active mode				Heating water operating limit temperature	WTOL	65	°C
Off mode	Poff	0.010	kW	Supplementary heater			
Thermostat-off mode	Pto	0.010	kW	Rated heat output	Psup	7.7	kW
Standby mode	Psb	0.010	kW	Type of energy input		electricity	
Crankcase heater mode	Pck	0.000	kW				
Other items							
Capacity control		multi-stage		For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m3/h
Sound power level				For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	4.54 ~ 9.08	m3/h
indoors	Lwa	55	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	QHE	104333.0	kWh				

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

WAMAK TWW 48 EVI

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

Model	TWW 48 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	Item	Symbol	Value	Unit
Rated heat output at Tdesignh	Prated	51.3	kW	Seasonal space heating energy efficiency	ηs	203.9	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature Tj			
Tj = -7 °C	Pdh	51.5	kW	Tj = -7 °C	COPd	4.02	-
Tj = +2 °C	Pdh	51.1	kW	Tj = +2 °C	COPd	5.3	-
Tj = +7 °C	Pdh	25.6	kW	Tj = +7 °C	COPd	6.1	-
Tj = +12 °C	Pdh	25.6	kW	Tj = +12 °C	COPd	6.8	-
Tj = bivalent temperature	Pdh	51.3	kW	Tj = bivalent temperature	COPd	3.6	-
Tj = operation limit temperature	Pdh	---	kW	Tj = operation limit temperature	COPd	---	-
Bivalent temperature	Tbiv	-10	°C	Tj = operation limit temperature	TOL	---	°C
Power consumption in modes other than active mode				Heating water operating limit temperature	WTOL	65	°C
Off mode	Poff	0.010	kW	Supplementary heater			
Thermostat-off mode	Pto	0.010	kW	Rated heat output	Psup	7.7	kW
Standby mode	Psb	0.010	kW	Type of energy input		electricity	
Crankcase heater mode	Pck	0.000	kW				
Other items							
Capacity control		multi-stage		For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m3/h
Sound power level				For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	4.54 ~ 9.08	m3/h
indoors	Lwa	55	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	QHE	105985.8	kWh				

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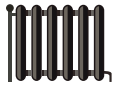
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WAMAK

TWW 48 EVI



55 °C

35 °C

A+++

A+++

A+++

A++

A+

A

B

C

D



55 dB



--- dB

■ 54
■ 52
■ 51
kW

■ 52
■ 51
■ 48
kW



2019

811/2013

TWW 48 EVI

ErP Data

55 °C

35 °C

Energy class

A+++

A+++

η [%]

203.9

268.0

P_{rated} [kW]

52

51

Q_{HE} [kWh/y]

105986

104333

SCOP [-]

5.10

6.70

$T_{bivalent}$ [°C]

-10

-10

CONTROLLER



+ 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]

ZHI18K1P-TFM_R410A_2_BWW

	Operating conditions	Qh	P	COP
1	B0 / W30-35	39.9	8.7	4.61
2	B0 / W30-35 (MIN)	20.0	4.3	4.68
A	B0 / Wxx-34	39.9	8.5	4.72
B	B0 / Wxx-30	39.7	7.7	5.15
C	B0 / Wxx-27	19.8	3.6	5.57
D	B0 / Wxx-24	19.8	3.3	5.93
E	B0 / Wxx-35	39.9	8.7	4.61
F	B0 / Wxx-35	39.9	8.7	4.61

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Low Temperature [35°C]	
SCOPon	5.25
SCOPnet	5.25
SCOP	5.23
η [%]	209.37
Label	A+++
Qh [kWh]	82433
Pdesignh [kW]	39.9
Tbivalent [°C]	-10

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

	Operating conditions	Qh	P	COP
1	B0 / W47-55	41.5	14.2	2.92
2	B0 / W47-55 (MIN)	20.7	6.9	2.96
A	B0 / Wxx-52	41.5	12.8	3.34
B	B0 / Wxx-42	41.1	9.7	4.27
C	B0 / Wxx-36	20.2	4.2	4.79
D	B0 / Wxx-30	20.1	3.8	5.29
E	B0 / Wxx-55	41.5	14.2	2.92
F	B0 / Wxx-54	41.6	13.2	3.16

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Medium Temperature [55°C]	
SCOPon	4.14
SCOPnet	4.14
SCOP	4.13
η [%]	165.16
Label	A+++
Qh [kWh]	85739
Pdesignh [kW]	41.5
Tbivalent [°C]	-10

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

	Operating conditions	Qh	P	COP
1	W10 / W30-35	50.5	8.6	5.90
2	W10 / W30-35 (MIN)	25.3	4.2	5.98
A	W10 / Wxx-34	50.6	8.4	6.03
B	W10 / Wxx-30	50.6	7.7	6.60
C	W10 / Wxx-27	25.4	3.6	7.13
D	W10 / Wxx-24	25.4	3.4	7.57
E	W10 / Wxx-35	50.5	8.6	5.90
F	W10 / Wxx-35	50.5	8.6	5.90

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Low Temperature [35°C]	
SCOPon	6.72
SCOPnet	6.72
SCOP	6.70
η [%]	268.02
Label	A+++
Qh [kWh]	104333
Pdesignh [kW]	50.5
Tbivalent [°C]	-10.00

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

Operating conditions		Qh	P	COP
1	W10 / W47-55	51.3	14.2	3.60
2	W10 / W47-55 (MIN)	25.6	7.0	3.65
A	W10 / Wxx-52	51.5	12.8	4.02
B	W10 / Wxx-42	51.1	9.7	5.29
C	W10 / Wxx-36	25.6	4.2	6.12
D	W10 / Wxx-30	25.6	3.8	6.77
E	W10 / Wxx-55	51.3	14.2	3.60
F	W10 / Wxx-55	51.3	14.2	3.60

SCOP DATA EN 14825:2018
Source - Water [10°C] / Medium Temperature [55°C]

SCOPon	5.11
SCOPnet	5.11
SCOP	5.10
η [%]	203.85
Label	A+++
Qh [kWh]	105986
Pdesignh [kW]	51.3
Tbivalent [°C]	-10.00

Low temperature cooling W 12 / 7°C

Operating conditions		Qc	P	EER
A	W30-35 / W12-7	30.4	9.3	3.27
B	W26-xx / W12-7	31.0	8.5	3.67
C	W22-xx / W12-7	31.6	7.7	4.09
D	W18-xx / W12-7	31.8	7.4	4.31

SEER DATA EN 14825:2018 [W 12 / 7°C]

SEERon	3.96
SEER	3.95
Qc [kWh]	17760
η [%]	158.09

Radiant cooling W 23 / 18°C

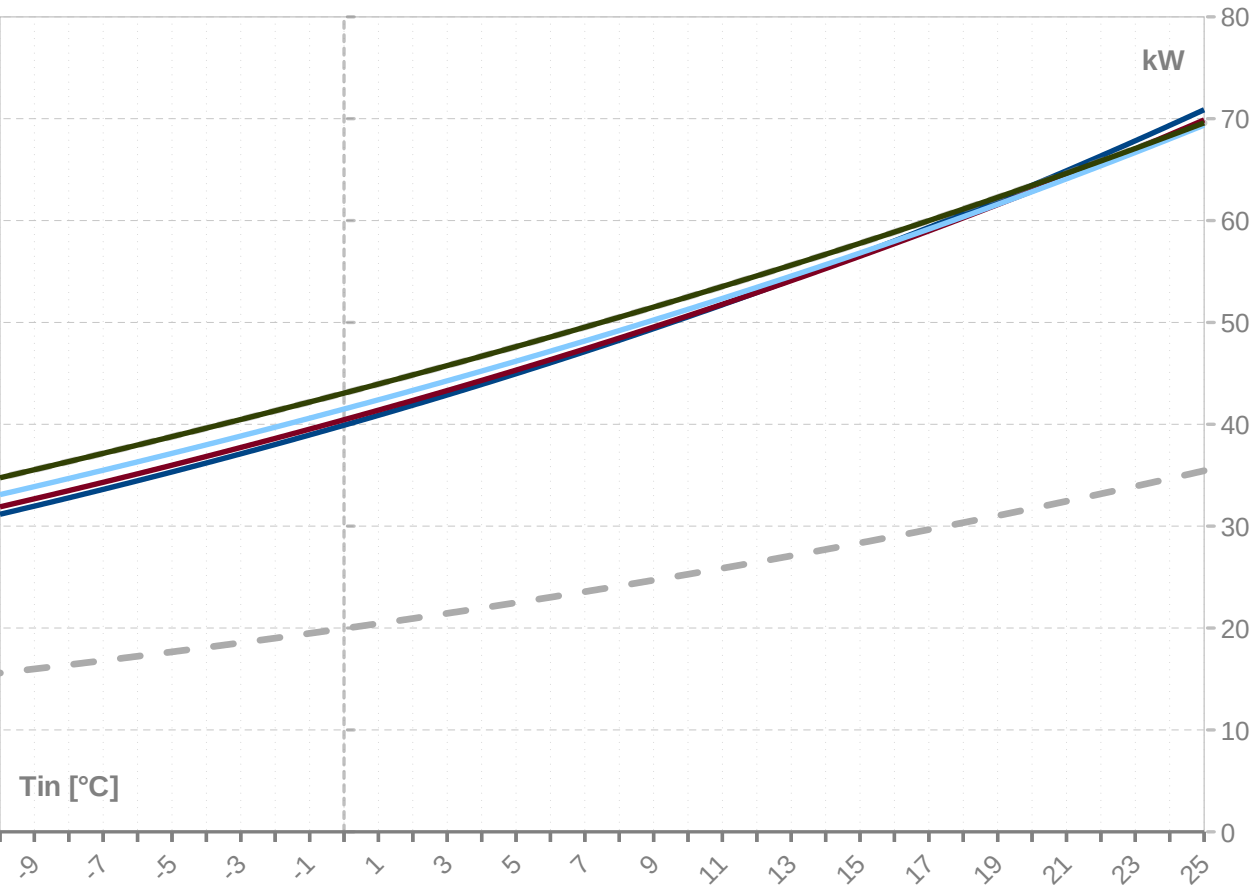
Operating conditions		Qc	P	EER
A	W50-xx / W23-18	36.2	15.3	2.37
B	W40-xx / W23-18	38.6	11.9	3.25
C	W30-35 / W23-18	40.8	9.3	4.39
D	W26-xx / W23-18	41.6	8.5	4.91

SEER DATA EN 14825:2018 [W 23 / 18°C]

SEERon	5.30
SEER	5.29
Qc [kWh]	17760
η [%]	211.71

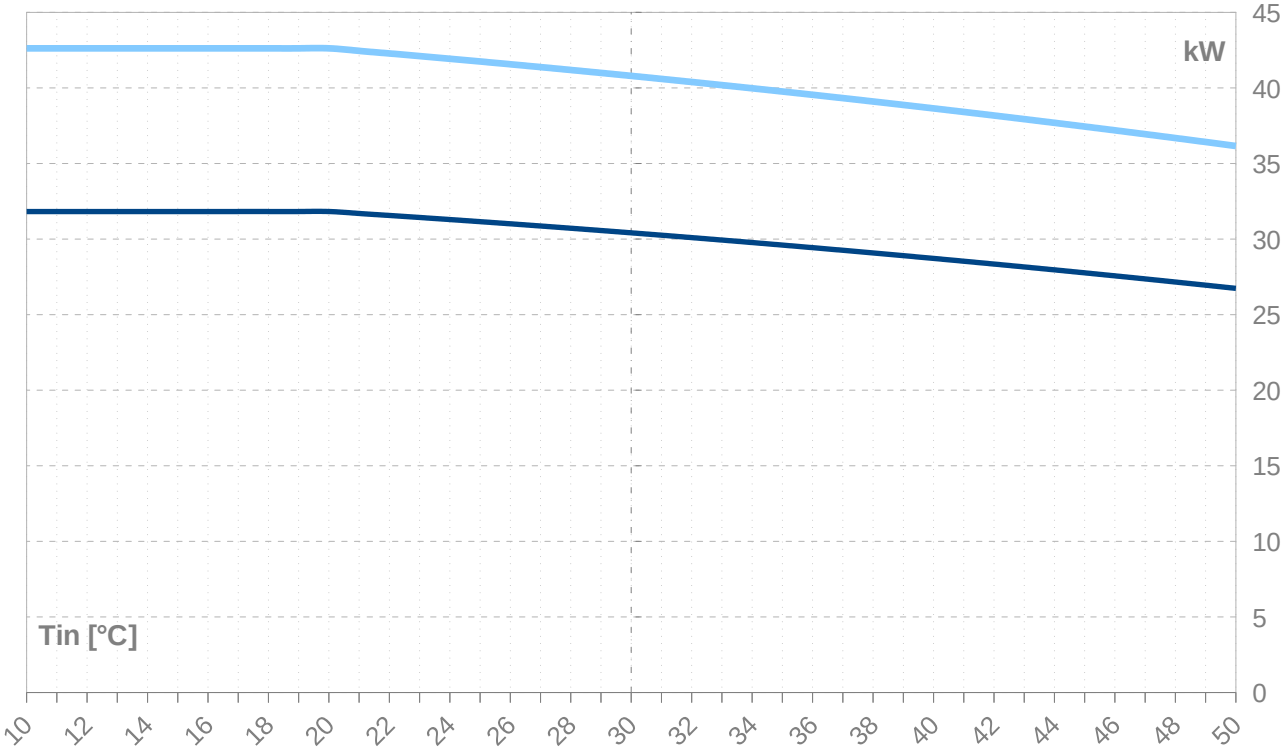
Performance lines - heating

Qh-nom-35 Qh-min-35 Qh-max-65 Qh-nom-45 Qh-nom-55 Qh-nom-65



Performance lines - cooling

Qc-nom-12-7 Qc-nom-23-18



Th -OU	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	70.9	35.4	70.9	8.6	4.2	8.6	8.27	62.9	31.4	62.9	18.7
24	69.3	34.7	69.3	8.6	4.2	8.6	8.10	61.3	30.7	61.3	18.7
23	67.8	33.9	67.8	8.6	4.2	8.6	7.93	59.8	29.9	59.8	18.7
22	66.3	33.2	66.3	8.5	4.2	8.5	7.76	58.4	29.2	58.4	18.7
21	64.9	32.4	64.9	8.5	4.2	8.5	7.60	56.9	28.5	56.9	18.7
20	63.5	31.7	63.5	8.5	4.2	8.5	7.43	55.5	27.7	55.5	18.7
19	62.1	31.0	62.1	8.5	4.2	8.5	7.27	54.1	27.0	54.1	18.7
18	60.7	30.3	60.7	8.5	4.2	8.5	7.11	52.7	26.4	52.7	18.7
17	59.3	29.7	59.3	8.5	4.2	8.5	6.95	51.4	25.7	51.4	18.7
16	58.0	29.0	58.0	8.5	4.2	8.5	6.79	50.0	25.0	50.0	18.7
15	56.7	28.3	56.7	8.5	4.2	8.5	6.64	48.7	24.4	48.7	18.7
14	55.4	27.7	55.4	8.5	4.2	8.5	6.48	47.4	23.7	47.4	18.7
13	54.2	27.1	54.2	8.6	4.2	8.6	6.33	46.2	23.1	46.2	18.7
12	52.9	26.5	52.9	8.6	4.2	8.6	6.18	44.9	22.5	44.9	18.7
11	51.7	25.9	51.7	8.6	4.2	8.6	6.04	43.7	21.9	43.7	18.7
10	50.5	25.3	50.5	8.6	4.2	8.6	5.90	42.5	21.3	42.5	18.7
9	49.4	24.7	49.4	8.6	4.2	8.6	5.76	41.4	20.7	41.4	18.7
8	48.3	24.1	48.3	8.6	4.2	8.6	5.62	40.2	20.1	40.2	18.7
7	47.1	23.6	47.1	8.6	4.2	8.6	5.48	39.1	19.6	39.1	18.7
6	46.0	23.0	46.0	8.6	4.2	8.6	5.35	38.0	19.0	38.0	18.7
5	45.0	22.5	45.0	8.6	4.2	8.6	5.22	36.9	18.5	36.9	18.7
4	43.9	22.0	43.9	8.6	4.3	8.6	5.09	35.9	17.9	35.9	18.7
3	42.9	21.4	42.9	8.6	4.3	8.6	4.97	34.8	17.4	34.8	18.8
2	41.9	20.9	41.9	8.6	4.3	8.6	4.85	33.8	16.9	33.8	18.8
1	40.9	20.4	40.9	8.6	4.3	8.6	4.73	32.8	16.4	32.8	18.8
0	39.9	20.0	39.9	8.7	4.3	8.7	4.61	31.8	15.9	31.8	18.8
-1	38.9	19.5	38.9	8.7	4.3	8.7	4.50	30.9	15.4	30.9	18.8
-2	38.0	19.0	38.0	8.7	4.3	8.7	4.39	29.9	15.0	29.9	18.8
-3	37.1	18.5	37.1	8.7	4.3	8.7	4.28	29.0	14.5	29.0	18.8
-4	36.2	18.1	36.2	8.7	4.3	8.7	4.17	28.1	14.0	28.1	18.8
-5	35.3	17.7	35.3	8.7	4.3	8.7	4.07	27.2	13.6	27.2	18.8
-6	34.5	17.2	34.5	8.7	4.3	8.7	3.97	26.3	13.2	26.3	18.8
-7	33.6	16.8	33.6	8.7	4.3	8.7	3.87	25.5	12.7	25.5	18.8
-8	32.8	16.4	32.8	8.7	4.3	8.7	3.77	24.7	12.3	24.7	18.8
-9	32.0	16.0	32.0	8.7	4.3	8.7	3.68	23.9	11.9	23.9	18.8
-10	31.2	15.6	31.2	8.7	4.3	8.7	3.59	23.1	11.5	23.1	18.8
-11	30.4	15.2	30.4	8.7	4.3	8.7	3.50	22.3	11.1	22.3	18.8
-12	29.6	14.8	29.6	8.7	4.3	8.7	3.41	21.5	10.8	21.5	18.8
-13	28.9	14.4	28.9	8.7	4.3	8.7	3.33	20.8	10.4	20.8	18.8
-14	28.1	14.1	28.1	8.7	4.3	8.7	3.25	20.0	10.0	20.0	18.8
-15	27.4	13.7	27.4	8.6	4.3	8.6	3.17	19.3	9.7	19.3	18.8

-- attention: operating limits not reflected in performance table

ZHI18K1P-TFM_R410A_2_BWW

Th -OU	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	69.9	34.9	69.9	10.6	5.2	10.6	6.57	60.0	30.0	60.0	20.7
24	68.4	34.2	68.4	10.6	5.2	10.6	6.43	58.5	29.2	58.5	20.7
23	67.0	33.5	67.0	10.7	5.3	10.7	6.29	57.1	28.5	57.1	20.8
22	65.6	32.8	65.6	10.7	5.3	10.7	6.15	55.7	27.8	55.7	20.8
21	64.2	32.1	64.2	10.7	5.3	10.7	6.02	54.3	27.1	54.3	20.8
20	62.9	31.4	62.9	10.7	5.3	10.7	5.88	52.9	26.5	52.9	20.8
19	61.6	30.8	61.6	10.7	5.3	10.7	5.75	51.6	25.8	51.6	20.8
18	60.3	30.1	60.3	10.7	5.3	10.7	5.62	50.3	25.1	50.3	20.8
17	59.0	29.5	59.0	10.7	5.3	10.7	5.50	49.0	24.5	49.0	20.9
16	57.7	28.9	57.7	10.7	5.3	10.7	5.37	47.7	23.8	47.7	20.9
15	56.5	28.2	56.5	10.8	5.3	10.8	5.25	46.5	23.2	46.5	20.9
14	55.3	27.6	55.3	10.8	5.3	10.8	5.13	45.2	22.6	45.2	20.9
13	54.1	27.0	54.1	10.8	5.3	10.8	5.02	44.0	22.0	44.0	20.9
12	52.9	26.5	52.9	10.8	5.3	10.8	4.90	42.8	21.4	42.8	20.9
11	51.8	25.9	51.8	10.8	5.3	10.8	4.79	41.7	20.8	41.7	21.0
10	50.7	25.3	50.7	10.8	5.3	10.8	4.68	40.6	20.3	40.6	21.0
9	49.6	24.8	49.6	10.8	5.3	10.8	4.57	39.4	19.7	39.4	21.0
8	48.5	24.2	48.5	10.8	5.3	10.8	4.47	38.3	19.2	38.3	21.0
7	47.4	23.7	47.4	10.9	5.4	10.9	4.37	37.3	18.6	37.3	21.0
6	46.3	23.2	46.3	10.9	5.4	10.9	4.27	36.2	18.1	36.2	21.0
5	45.3	22.7	45.3	10.9	5.4	10.9	4.17	35.2	17.6	35.2	21.0
4	44.3	22.2	44.3	10.9	5.4	10.9	4.07	34.1	17.1	34.1	21.0
3	43.3	21.7	43.3	10.9	5.4	10.9	3.98	33.2	16.6	33.2	21.0
2	42.3	21.2	42.3	10.9	5.4	10.9	3.89	32.2	16.1	32.2	21.0
1	41.4	20.7	41.4	10.9	5.4	10.9	3.80	31.2	15.6	31.2	21.0
0	40.4	20.2	40.4	10.9	5.4	10.9	3.71	30.3	15.1	30.3	21.1
-1	39.5	19.8	39.5	10.9	5.4	10.9	3.63	29.3	14.7	29.3	21.1
-2	38.6	19.3	38.6	10.9	5.4	10.9	3.54	28.4	14.2	28.4	21.1
-3	37.7	18.9	37.7	10.9	5.4	10.9	3.46	27.5	13.8	27.5	21.0
-4	36.8	18.4	36.8	10.9	5.4	10.9	3.38	26.7	13.3	26.7	21.0
-5	36.0	18.0	36.0	10.9	5.4	10.9	3.31	25.8	12.9	25.8	21.0
-6	35.1	17.6	35.1	10.9	5.4	10.9	3.23	25.0	12.5	25.0	21.0
-7	34.3	17.2	34.3	10.9	5.4	10.9	3.16	24.2	12.1	24.2	21.0
-8	33.5	16.7	33.5	10.8	5.3	10.8	3.09	23.4	11.7	23.4	21.0
-9	32.7	16.3	32.7	10.8	5.3	10.8	3.02	22.6	11.3	22.6	21.0
-10	31.9	15.9	31.9	10.8	5.3	10.8	2.95	21.8	10.9	21.8	21.0
-11	31.1	15.6	31.1	10.8	5.3	10.8	2.88	21.0	10.5	21.0	21.0
-12	30.3	15.2	30.3	10.8	5.3	10.8	2.82	20.3	10.1	20.3	20.9
-13	29.6	14.8	29.6	10.7	5.3	10.7	2.75	19.6	9.8	19.6	20.9
-14	28.9	14.4	28.9	10.7	5.3	10.7	2.69	18.8	9.4	18.8	20.9
-15	28.1	14.1	28.1	10.7	5.3	10.7	2.63	18.1	9.1	18.1	20.8

-- attention: operating limits not reflected in performance table

Th -OU	55										
	°C										
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	69.4	34.7	69.4	14.0	6.9	14.0	4.96	56.3	28.1	56.3	24.5
24	68.0	34.0	68.0	14.0	6.9	14.0	4.85	54.9	27.5	54.9	24.6
23	66.7	33.3	66.7	14.0	6.9	14.0	4.75	53.6	26.8	53.6	24.6
22	65.4	32.7	65.4	14.1	6.9	14.1	4.65	52.2	26.1	52.2	24.6
21	64.1	32.0	64.1	14.1	6.9	14.1	4.55	50.9	25.5	50.9	24.6
20	62.8	31.4	62.8	14.1	7.0	14.1	4.46	49.7	24.8	49.7	24.7
19	61.6	30.8	61.6	14.1	7.0	14.1	4.36	48.4	24.2	48.4	24.7
18	60.4	30.2	60.4	14.1	7.0	14.1	4.27	47.2	23.6	47.2	24.7
17	59.2	29.6	59.2	14.2	7.0	14.2	4.18	45.9	23.0	45.9	24.7
16	58.0	29.0	58.0	14.2	7.0	14.2	4.09	44.7	22.4	44.7	24.7
15	56.8	28.4	56.8	14.2	7.0	14.2	4.01	43.6	21.8	43.6	24.8
14	55.7	27.8	55.7	14.2	7.0	14.2	3.92	42.4	21.2	42.4	24.8
13	54.6	27.3	54.6	14.2	7.0	14.2	3.84	41.3	20.6	41.3	24.8
12	53.4	26.7	53.4	14.2	7.0	14.2	3.76	40.2	20.1	40.2	24.8
11	52.4	26.2	52.4	14.2	7.0	14.2	3.68	39.1	19.5	39.1	24.8
10	51.3	25.6	51.3	14.2	7.0	14.2	3.60	38.0	19.0	38.0	24.8
9	50.2	25.1	50.2	14.2	7.0	14.2	3.53	36.9	18.5	36.9	24.8
8	49.2	24.6	49.2	14.2	7.0	14.2	3.45	35.9	18.0	35.9	24.8
7	48.2	24.1	48.2	14.2	7.0	14.2	3.38	34.9	17.4	34.9	24.8
6	47.2	23.6	47.2	14.2	7.0	14.2	3.31	33.9	16.9	33.9	24.8
5	46.2	23.1	46.2	14.2	7.0	14.2	3.24	32.9	16.4	32.9	24.8
4	45.2	22.6	45.2	14.2	7.0	14.2	3.18	31.9	16.0	31.9	24.8
3	44.3	22.1	44.3	14.2	7.0	14.2	3.11	31.0	15.5	31.0	24.8
2	43.3	21.7	43.3	14.2	7.0	14.2	3.05	30.1	15.0	30.1	24.8
1	42.4	21.2	42.4	14.2	7.0	14.2	2.99	29.1	14.6	29.1	24.8
0	41.5	20.7	41.5	14.2	7.0	14.2	2.92	28.2	14.1	28.2	24.8
-1	40.6	20.3	40.6	14.2	7.0	14.2	2.86	27.4	13.7	27.4	24.7
-2	39.7	19.9	39.7	14.2	7.0	14.2	2.81	26.5	13.2	26.5	24.7
-3	38.8	19.4	38.8	14.1	7.0	14.1	2.75	25.7	12.8	25.7	24.7
-4	38.0	19.0	38.0	14.1	7.0	14.1	2.69	24.8	12.4	24.8	24.7
-5	37.1	18.6	37.1	14.1	6.9	14.1	2.64	24.0	12.0	24.0	24.6
-6	36.3	18.2	36.3	14.0	6.9	14.0	2.59	23.2	11.6	23.2	24.6
-7	35.5	17.7	35.5	14.0	6.9	14.0	2.53	22.4	11.2	22.4	24.6
-8	34.7	17.3	34.7	14.0	6.9	14.0	2.48	21.6	10.8	21.6	24.5
-9	33.9	16.9	33.9	13.9	6.9	13.9	2.43	20.9	10.4	20.9	24.5
-10	33.1	16.5	33.1	13.9	6.8	13.9	2.39	20.1	10.1	20.1	24.4
-11	32.3	16.2	32.3	13.8	6.8	13.8	2.34	19.4	9.7	19.4	24.4
-12	31.5	15.8	31.5	13.8	6.8	13.8	2.29	18.7	9.3	18.7	24.3
-13	30.8	15.4	30.8	13.7	6.8	13.7	2.25	18.0	9.0	18.0	24.2
-14	30.0	15.0	30.0	13.7	6.7	13.7	2.20	17.3	8.6	17.3	24.2
-15	29.3	14.7	29.3	13.6	6.7	13.6	2.16	16.6	8.3	16.6	24.1

-- attention: operating limits not reflected in performance table

Th -OU	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	69.6	34.8	69.6	18.4	9.1	18.4	3.78	52.4	26.2	52.4	30.1
24	68.3	34.2	68.3	18.4	9.1	18.4	3.71	51.1	25.6	51.1	30.1
23	67.1	33.5	67.1	18.5	9.1	18.5	3.63	49.8	24.9	49.8	30.1
22	65.8	32.9	65.8	18.5	9.1	18.5	3.56	48.6	24.3	48.6	30.2
21	64.6	32.3	64.6	18.5	9.1	18.5	3.50	47.4	23.7	47.4	30.2
20	63.4	31.7	63.4	18.5	9.1	18.5	3.43	46.2	23.1	46.2	30.2
19	62.3	31.1	62.3	18.5	9.1	18.5	3.36	45.0	22.5	45.0	30.2
18	61.1	30.6	61.1	18.5	9.1	18.5	3.30	43.8	21.9	43.8	30.2
17	60.0	30.0	60.0	18.5	9.1	18.5	3.24	42.7	21.3	42.7	30.2
16	58.9	29.4	58.9	18.5	9.1	18.5	3.17	41.6	20.8	41.6	30.2
15	57.8	28.9	57.8	18.5	9.1	18.5	3.11	40.5	20.2	40.5	30.2
14	56.7	28.3	56.7	18.5	9.1	18.5	3.06	39.4	19.7	39.4	30.2
13	55.6	27.8	55.6	18.5	9.1	18.5	3.00	38.3	19.1	38.3	30.2
12	54.6	27.3	54.6	18.5	9.1	18.5	2.94	37.3	18.6	37.3	30.2
11	53.5	26.8	53.5	18.5	9.1	18.5	2.89	36.2	18.1	36.2	30.2
10	52.5	26.3	52.5	18.5	9.1	18.5	2.83	35.2	17.6	35.2	30.2
9	51.5	25.8	51.5	18.5	9.1	18.5	2.78	34.2	17.1	34.2	30.2
8	50.5	25.3	50.5	18.5	9.1	18.5	2.73	33.2	16.6	33.2	30.2
7	49.5	24.8	49.5	18.5	9.1	18.5	2.68	32.3	16.1	32.3	30.2
6	48.6	24.3	48.6	18.5	9.1	18.5	2.63	31.3	15.7	31.3	30.1
5	47.6	23.8	47.6	18.4	9.1	18.4	2.58	30.4	15.2	30.4	30.1
4	46.7	23.3	46.7	18.4	9.1	18.4	2.54	29.5	14.7	29.5	30.1
3	45.8	22.9	45.8	18.4	9.1	18.4	2.49	28.6	14.3	28.6	30.0
2	44.9	22.4	44.9	18.3	9.0	18.3	2.45	27.7	13.9	27.7	30.0
1	44.0	22.0	44.0	18.3	9.0	18.3	2.40	26.9	13.4	26.9	29.9
0	43.1	21.5	43.1	18.3	9.0	18.3	2.36	26.0	13.0	26.0	29.9
-1	42.2	21.1	42.2	18.2	9.0	18.2	2.32	25.2	12.6	25.2	29.8
-2	41.3	20.7	41.3	18.2	9.0	18.2	2.27	24.4	12.2	24.4	29.8
-3	40.5	20.2	40.5	18.1	8.9	18.1	2.23	23.6	11.8	23.6	29.7
-4	39.6	19.8	39.6	18.1	8.9	18.1	2.19	22.8	11.4	22.8	29.6
-5	38.8	19.4	38.8	18.0	8.9	18.0	2.16	22.0	11.0	22.0	29.6
-6	38.0	19.0	38.0	17.9	8.8	17.9	2.12	21.2	10.6	21.2	29.5
-7	37.1	18.6	37.1	17.9	8.8	17.9	2.08	20.5	10.2	20.5	29.4
-8	36.3	18.2	36.3	17.8	8.8	17.8	2.04	19.7	9.9	19.7	29.3
-9	35.5	17.8	35.5	17.7	8.7	17.7	2.01	19.0	9.5	19.0	29.2
-10	34.7	17.4	34.7	17.6	8.7	17.6	1.97	18.3	9.1	18.3	29.1
-11	34.0	17.0	34.0	17.5	8.6	17.5	1.94	17.6	8.8	17.6	29.0
-12	33.2	16.6	33.2	17.4	8.6	17.4	1.90	16.9	8.5	16.9	28.9
-13	32.4	16.2	32.4	17.3	8.5	17.3	1.87	16.2	8.1	16.2	28.8
-14	31.7	15.8	31.7	17.2	8.5	17.2	1.84	15.6	7.8	15.6	28.7
-15	30.9	15.5	30.9	17.1	8.4	17.1	1.81	14.9	7.5	14.9	28.6

-- attention: operating limits not reflected in performance table

Tc -OU	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	28.7	14.4	28.7	11.9	5.9	11.9	2.42	39.8	19.9	39.8	22.1
39	28.9	14.5	28.9	11.6	5.7	11.6	2.49	39.7	19.9	39.7	21.8
38	29.1	14.5	29.1	11.3	5.6	11.3	2.57	39.6	19.8	39.6	21.5
37	29.3	14.6	29.3	11.0	5.4	11.0	2.65	39.6	19.8	39.6	21.2
36	29.4	14.7	29.4	10.8	5.3	10.8	2.73	39.5	19.7	39.5	20.9
35	29.6	14.8	29.6	10.5	5.2	10.5	2.82	39.4	19.7	39.4	20.6
34	29.8	14.9	29.8	10.2	5.1	10.2	2.91	39.3	19.7	39.3	20.4
33	29.9	15.0	29.9	10.0	4.9	10.0	2.99	39.3	19.6	39.3	20.1
32	30.1	15.0	30.1	9.8	4.8	9.8	3.08	39.2	19.6	39.2	19.9
31	30.3	15.1	30.3	9.5	4.7	9.5	3.18	39.1	19.6	39.1	19.6
30	30.4	15.2	30.4	9.3	4.6	9.3	3.27	39.1	19.5	39.1	19.4
29	30.6	15.3	30.6	9.1	4.5	9.1	3.37	39.0	19.5	39.0	19.2
28	30.7	15.4	30.7	8.9	4.4	8.9	3.46	39.0	19.5	39.0	19.0
27	30.9	15.4	30.9	8.7	4.3	8.7	3.56	38.9	19.5	38.9	18.8
26	31.0	15.5	31.0	8.5	4.2	8.5	3.67	38.9	19.5	38.9	18.6
25	31.2	15.6	31.2	8.3	4.1	8.3	3.77	38.9	19.4	38.9	18.4
24	31.3	15.6	31.3	8.1	4.0	8.1	3.87	38.8	19.4	38.8	18.2
23	31.4	15.7	31.4	7.9	3.9	7.9	3.98	38.8	19.4	38.8	18.1
22	31.6	15.8	31.6	7.7	3.8	7.7	4.09	38.8	19.4	38.8	17.9
21	31.7	15.8	31.7	7.5	3.7	7.5	4.20	38.7	19.4	38.7	17.7
20	31.8	15.9	31.8	7.4	3.6	7.4	4.31	38.7	19.4	38.7	17.6

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	38.6	19.3	38.6	11.9	5.9	11.9	3.25	49.7	24.9	50.5	22.1
39	38.9	19.4	38.9	11.6	5.7	11.6	3.35	49.7	24.8	50.4	21.8
38	39.1	19.6	39.1	11.3	5.6	11.3	3.46	49.6	24.8	50.3	21.4
37	39.3	19.7	39.3	11.0	5.4	11.0	3.56	49.6	24.8	50.2	21.1
36	39.5	19.8	39.5	10.8	5.3	10.8	3.67	49.5	24.8	50.1	20.8
35	39.8	19.9	39.8	10.5	5.2	10.5	3.79	49.5	24.7	50.1	20.6
34	40.0	20.0	40.0	10.2	5.1	10.2	3.90	49.5	24.7	50.0	20.3
33	40.2	20.1	40.2	10.0	4.9	10.0	4.02	49.4	24.7	49.9	20.0
32	40.4	20.2	40.4	9.8	4.8	9.8	4.14	49.4	24.7	49.8	19.8
31	40.6	20.3	40.6	9.5	4.7	9.5	4.26	49.4	24.7	49.8	19.5
30	40.8	20.4	40.8	9.3	4.6	9.3	4.39	49.4	24.7	49.7	19.3
29	41.0	20.5	41.0	9.1	4.5	9.1	4.52	49.4	24.7	49.7	19.1
28	41.2	20.6	41.2	8.9	4.4	8.9	4.65	49.4	24.7	49.6	18.9
27	41.4	20.7	41.4	8.7	4.3	8.7	4.78	49.4	24.7	49.6	18.7
26	41.6	20.8	41.6	8.5	4.2	8.5	4.91	49.4	24.7	49.5	18.5
25	41.7	20.9	41.7	8.3	4.1	8.3	5.05	49.4	24.7	49.5	18.3
24	41.9	21.0	41.9	8.1	4.0	8.1	5.19	49.4	24.7	49.5	18.2
23	42.1	21.1	42.1	7.9	3.9	7.9	5.33	49.4	24.7	49.4	18.0
22	42.3	21.1	42.3	7.7	3.8	7.7	5.48	49.4	24.7	49.4	17.9
21	42.4	21.2	42.4	7.5	3.7	7.5	5.62	49.5	24.7	49.4	17.7
20	42.6	21.3	42.6	7.4	3.6	7.4	5.77	49.5	24.7	49.4	17.6

-- 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

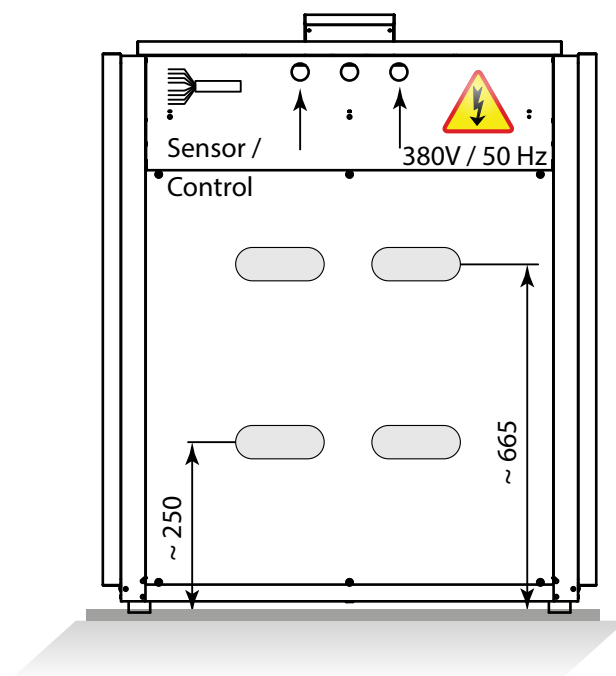
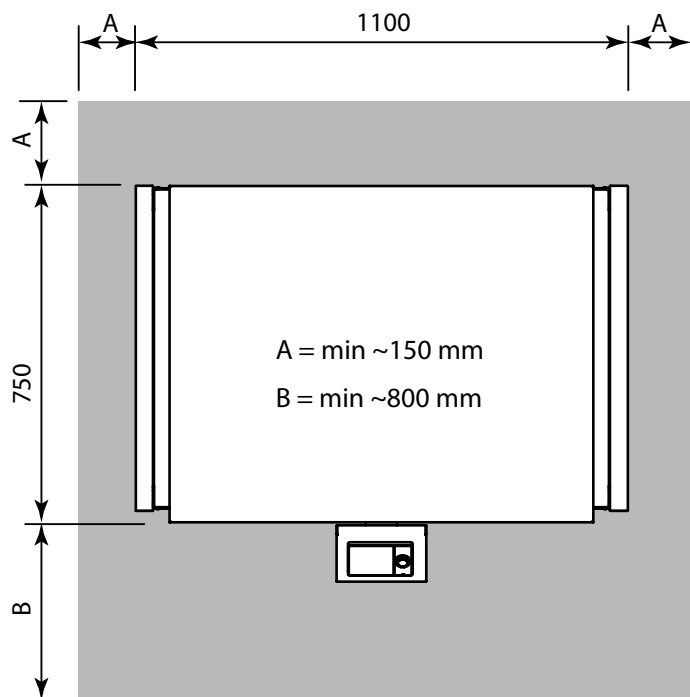
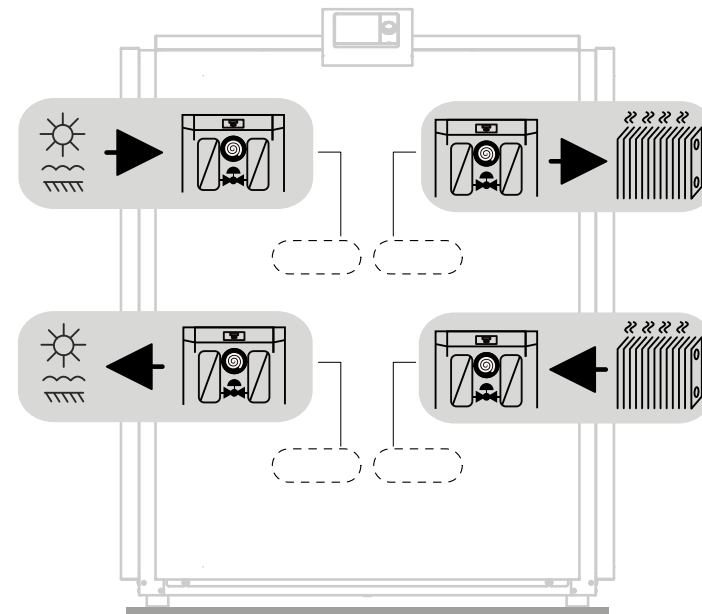
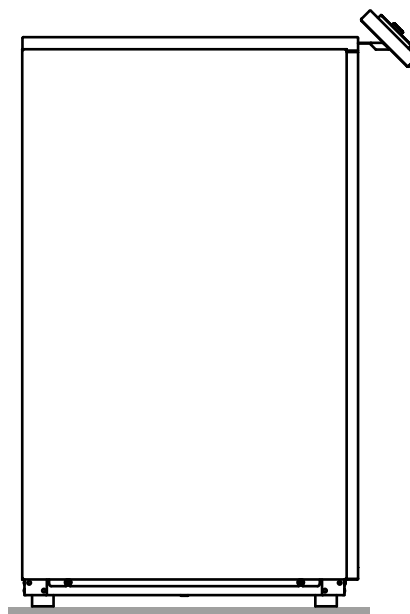
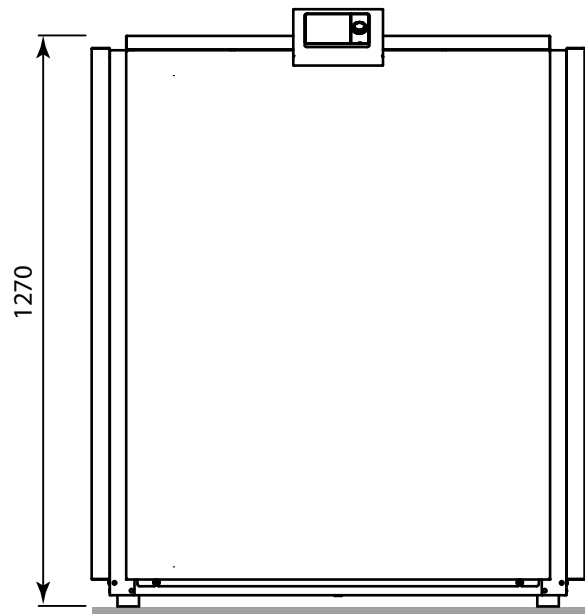
Qc nom: cooling / heat extraction capacity at nominal heating capacity

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

