



Heat pump



TWW 480 EVI

HeavyDuty

4L2

WAMAK TWW 480 EVI HeavyDuty 4L2

Product description

High-efficiency heat pump consisting of multiple modules of separate heat pumps. Each module contains one short closed refrigerant circuit with a pair of quiet Scroll compressors and robust stainless steel plate heat exchangers. Applications range from heating, cooling and domestic hot water heating of office or multi-functional buildings to cascading applications in industrial applications.

Use for demanding industrial applications. By combining the most suitable performance and application variants of heat pump modules, it is possible to tailor-make the complete system required. Each module is refrigeration, hydraulically and electrically isolated with a separate controller. The connection of the modules is cascaded, whereby each single controller can take over the function of the cascade master.

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)
- DHW temperature sensor
- Cascade control
- 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)
- Outdoor temperature sensor
- Buffer temperature sensor
- Modbus connection
- Two level frame

Basic performance data - WAMAK TWW 480 EVI HeavyDuty 4L2

Heating - EN 14511		
Heating capacity [kW]	W10 / W35 (max)	495.8 (62.0 / 495.8)
	W10 / W35 (min)	62.0 (62.0 / 495.8)
	W10 / W34	496.0 (62.0 / 496.0)
Electrical power input [kW]	W10 / W35 (max)	86.9 (10.6 / 86.9)
	W10 / W35 (min)	10.6 (10.6 / 86.9)
	W10 / W34	85.0 (15.1 / 123.8)
Heating efficiency faktor [COP]	W10 / W35 (max)	5.71
	W10 / W35 (min)	5.85
	W10 / W34	5.83
Seasonal space heating energy efficiency - SCOP EN 14825		
Average Climate / Low Temperature [35°C]	SCOP	3.79
	η [%]	151.7
	Label	A+++
	Qhe [kWh]	1024322.8
	Pdesignh [kW]	495.8
	Tbivalent [°C]	-10
Cooling		
Cooling capacity - [kW]	A35 / W23-18	387.4
	A25 / W23-18	407.2
	A35 / W12-7	291.0
	A25 / W12-7	291.0
Seasonal space cooling energy efficiency - SEER EN 14825		
[W 23 / 18°C]	SEER	5.15
	Qce [kWh]	174600.0
	η_c [%]	205.8
Sound EN 12102		
Acoustic power - Lw	dB(A)	76
Acoustic pressure - Lp	1 m dB(A)	68
	5 m dB(A)	54
	10 m dB(A)	48
Mechanical and operational information		
Compressor type (3~ 400/50)	SCROLL / 8 /	On/Off
Refrigerant	R410A (GWP - 2088)	4 x 15.8 kg
Operating limit temperatures heating - (min / max) [°C]		25 / 65
Operating limit temperatures source - (min / max) [°C]		-10 (7) / 30
Weight		2120 kg

Main technical data - WAMAK TWW 480 EVI HeavyDuty 4L2

Enclosure type			Heat energy rejection side data			
Basic dimensions	Height [mm]	2000	Operating limit temperatures heating	MAX [°C]	65	
	Width [mm]	2800		MIN [°C]	25	
	Length [mm]	1200	for more see operating limits diagram			
Weight [kg]		2120	Condenser	Port size	4 x VIC 2.1/2 "	
Colour		Gray		Type	BPHE	
Enclosure IP Class		IP20		Count	4	
Refrigeration cycle				Material	AISI 316	
Compressor	Type	Scroll	Maximal operating pressure - refrigerant [bar]		50	
	Number of stages	8	Maximal operating pressure - Water [bar]		3	
	On/Off		Testing pressure [bar]		70	
	Power factor Cosφ	0.64	Heat transfer medium		Water	
	Winding resistance	0.76 Ohm	Volume flow - Water [m3/h]		10.70 ~ 85.63	
Refrigerant		R410A	Internal pressure drop - Water [kPa]		4 x 20	
	Volme	4 x 15.8 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	8 x 3.38 L	Operating limit temperatures source	MIN [°C]	-10 (7)	
Maximal pressure - refrigerant [bar]		50		MAX [°C]	30	
	PED class	2	for more see operating limits diagram			
EVI - vapour injection with economizer			Evaporator	Port size	4 x VIC 2.1/2 "	
Electrical connection data				Type	BPHE	
Line voltage [#~ V/Hz]				Count	4	
Current	nominal [A]	188.24		Material	AISI 316	
	maximal [A]	299.20	Maximal operating pressure - refrigerant [bar]		29	
	starting [A]	57.2	Heat transfer medium		Water	
Softstart		8 x MCD 201	Maximal operating pressure - Water [bar]		3	
Main safety		C300	Volume flow - Water [m3/h]		11.05 ~ 88.42	
Control System			Internal pressure drop - Water [kPa]		4 x 20	
Main controller	SIEMENS	RVS 61	Temperature difference - Water			4 K
Extension module	AVS75.3xx	AVS75.3xx				
Bus Clip-In		LPB OCI346	Modbus OCI352			
Online connection		Web server OZW672	ToSyMo			
Superheat controller		SEC61				
*** with accessory						

WAMAK TWW 480 EVI HeavyDuty 4L2

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

Model	TWW 480 EVI HeavyDuty 4L2
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	495.8	kW	Seasonal space heating energy efficiency	η_s	151.7	%
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	496.0	kW	Tj = -7 °C	COPd	5.83	-
Tj = +2 °C	Pdh	496.5	kW	Tj = +2 °C	COPd	6.4	-
Tj = +7 °C	Pdh	62.1	kW	Tj = +7 °C	COPd	6.9	-
Tj = +12 °C	Pdh	62.1	kW	Tj = +12 °C	COPd	7.4	-
Tj = bivalent temperature	Pdh	495.8	kW	Tj = bivalent temperature	COPd	5.7	-
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	75.9	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	-	---	m ³ /h
Sound power level				For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	11.05 ~ 88.42	m ³ /h
indoors	Lwa	76	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	Q _{HE}	1024322.8	kWh				

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

WAMAK TWW 480 EVI HeavyDuty 4L2

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

Model	TWW 480 EVI HeavyDuty 4L2
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	493.4	kW	Seasonal space heating energy efficiency	η_s	131.8	%
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	498.6	kW	Tj = -7 °C	COPd	4.03	-
Tj = +2 °C	Pdh	500.4	kW	Tj = +2 °C	COPd	5.2	-
Tj = +7 °C	Pdh	62.7	kW	Tj = +7 °C	COPd	6.0	-
Tj = +12 °C	Pdh	62.8	kW	Tj = +12 °C	COPd	6.6	-
Tj = bivalent temperature	Pdh	493.4	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	75.9	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	-	---	m ³ /h
Sound power level				For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	11.05 ~ 88.42	m ³ /h
indoors	Lwa	76	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	Q _{HE}	1019364.4	kWh				

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



ENERG

енергия - ενεργεια



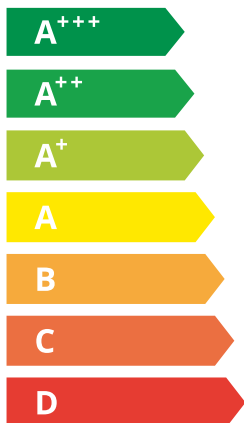
WAMAK

TWW 480 EVI
HeavyDuty 4L2



55 °C

35 °C



A++
A+++



76 dB



--- dB

■ 519
■ 494
■ 484
kW

■ 506
■ 496
■ 472
kW



2019

811/2013

TWW 480 EVI
HeavyDuty 4L2

ErP Data

55 °C

35 °C

Energy class	A++	A+++
η [%]	131.8	151.7
P_{rated} [kW]	494	496
Q_{HE} [kWh/y]	1019365	1024323
SCOP [-]	3.29	3.79
$T_{bivalent}$ [°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]

ZHI46K1P-TWD_R410A_8_BWW

	Operating conditions	Qh	P	COP
1	B0 / W30-35	393.7	86.8	4.53
2	B0 / W30-35 (MIN)	49.2	10.6	4.64
A	B0 / Wxx-34	393.3	84.9	4.63
B	B0 / Wxx-30	391.4	77.7	5.04
C	B0 / Wxx-27	48.7	8.9	5.50
D	B0 / Wxx-24	48.5	8.3	5.88
E	B0 / Wxx-35	393.7	86.8	4.53
F	B0 / Wxx-35	393.7	86.8	4.53

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Low Temperature [35°C]	
SCOPon	3.33
SCOPnet	5.85
SCOP	3.33
η [%]	133.08
Label	A++
Qh [kWh]	813384
Pdesignh [kW]	393.7
Tbivalent [°C]	-10

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

	Operating conditions	Qh	P	COP
1	B0 / W47-55	401.6	136.2	2.95
2	B0 / W47-55 (MIN)	50.2	16.6	3.02
A	B0 / Wxx-52	404.2	124.2	3.36
B	B0 / Wxx-42	404.9	97.0	4.22
C	B0 / Wxx-36	49.8	10.5	4.75
D	B0 / Wxx-30	49.5	9.5	5.22
E	B0 / Wxx-55	401.6	136.2	2.95
F	B0 / Wxx-54	404.6	127.1	3.18

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Medium Temperature [55°C]	
SCOPon	2.89
SCOPnet	4.63
SCOP	2.89
η [%]	115.63
Label	A+
Qh [kWh]	829706
Pdesignh [kW]	401.6
Tbivalent [°C]	-10

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

	Operating conditions	Qh	P	COP
1	W10 / W30-35	495.8	86.9	5.71
2	W10 / W30-35 (MIN)	62.0	10.6	5.85
A	W10 / Wxx-34	496.0	85.0	5.83
B	W10 / Wxx-30	496.5	78.1	6.35
C	W10 / Wxx-27	62.1	9.0	6.94
D	W10 / Wxx-24	62.1	8.4	7.39
E	W10 / Wxx-35	495.8	86.9	5.71
F	W10 / Wxx-35	495.8	86.9	5.71

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Low Temperature [35°C]	
SCOPon	3.79
SCOPnet	7.36
SCOP	3.79
η [%]	151.72
Label	A+++
Qh [kWh]	1024323
Pdesignh [kW]	495.8
Tbivalent [°C]	-10.00

WAMAK TWW 480 EVI HeavyDuty 4L2

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

Operating conditions		Qh	P	COP
1	W10 / W47-55	493.4	136.0	3.63
2	W10 / W47-55 (MIN)	61.7	16.6	3.72
A	W10 / Wxx-52	498.6	123.8	4.03
B	W10 / Wxx-42	500.4	96.7	5.17
C	W10 / Wxx-36	62.7	10.5	5.98
D	W10 / Wxx-30	62.8	9.5	6.58
E	W10 / Wxx-55	493.4	136.0	3.63
F	W10 / Wxx-55	493.4	136.0	3.63

SCOP DATA EN 14825:2018

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

SCOPon	3.29
SCOPnet	5.63
SCOP	3.29
η [%]	131.78
Label	A++
Qh [kWh]	1019364
Pdesignh [kW]	493.4
Tbivalent [°C]	-10.00

Low temperature cooling W 12 / 7°C

Operating conditions		Qc	P	EER
A	W30-35 / W12-7	299.1	92.8	3.22
B	W26-xx / W12-7	304.6	84.9	3.59
C	W22-xx / W12-7	309.4	77.7	3.98
D	W18-xx / W12-7	311.5	74.2	4.20

SEER DATA EN 14825:2018 [W 12 / 7°C]

SEERon	3.86
SEER	3.86
Qc [kWh]	174600
η [%]	154.51

Radiant cooling W 23 / 18°C

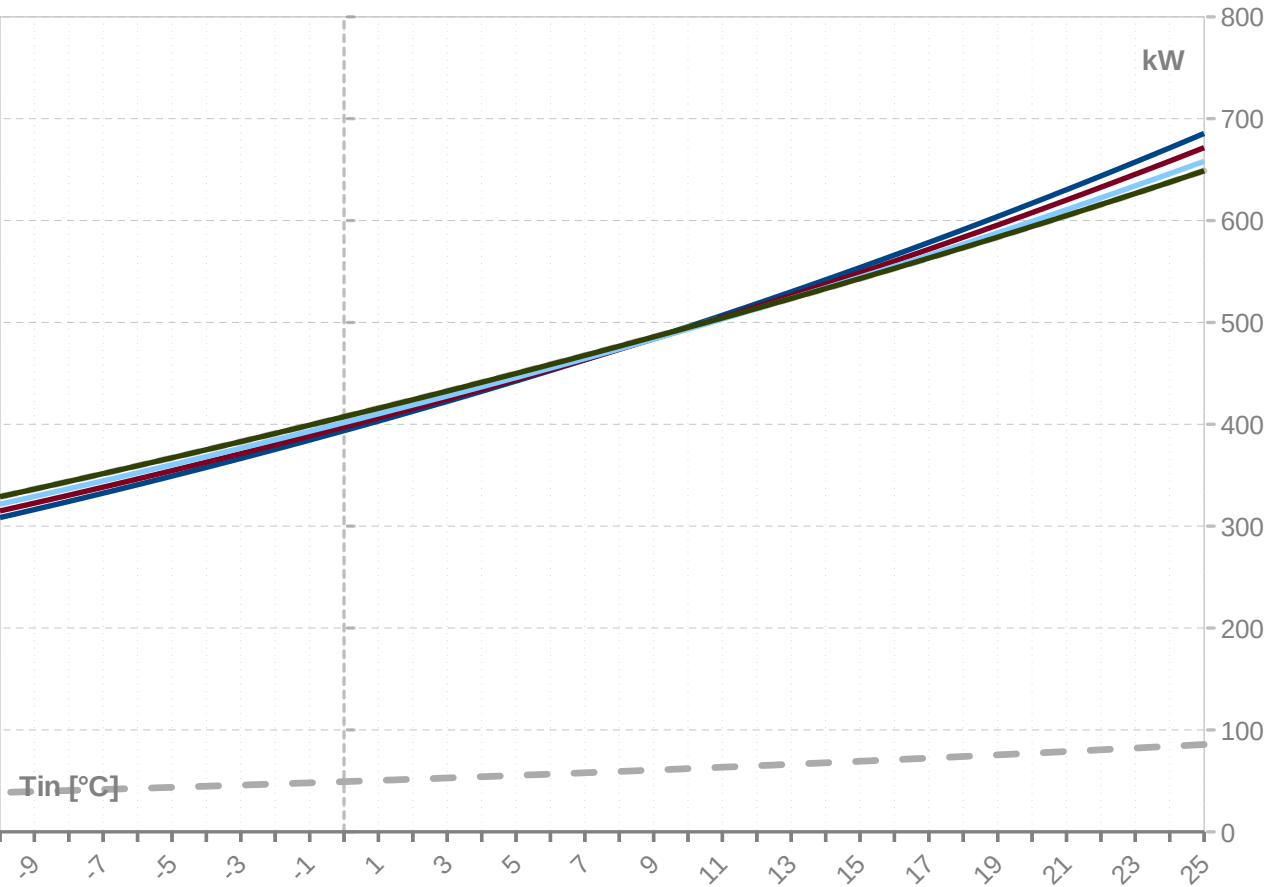
Operating conditions		Qc	P	EER
A	W50-xx / W23-18	347.5	145.9	2.38
B	W40-xx / W23-18	375.5	116.0	3.24
C	W30-35 / W23-18	398.0	92.8	4.29
D	W26-xx / W23-18	405.5	84.9	4.77

SEER DATA EN 14825:2018 [W 23 / 18°C]

SEERon	5.15
SEER	5.15
Qc [kWh]	174600
η [%]	205.81

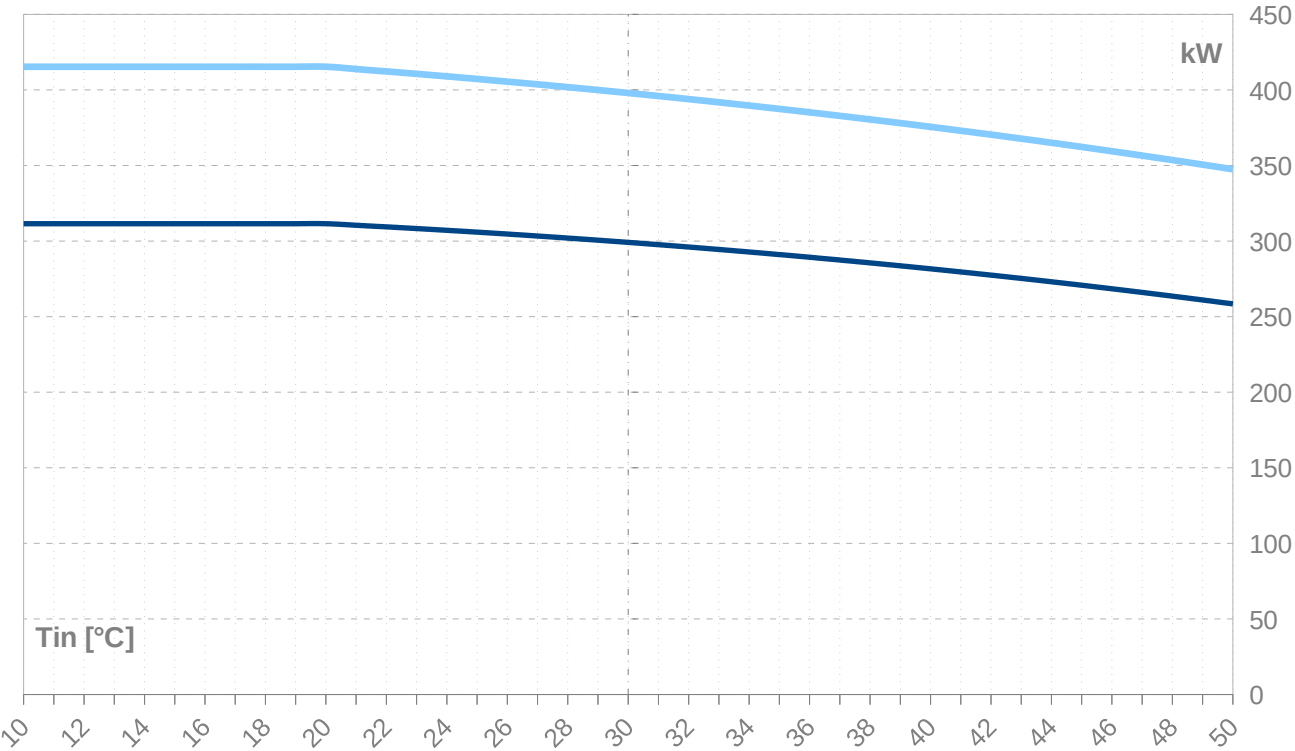
Performance lines - heating

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	685.5	85.7	685.5	88.7	10.8	88.7	7.73	602.6	75.3	602.6	187.6
24	671.4	83.9	671.4	88.5	10.8	88.5	7.59	588.7	73.6	588.7	187.2
23	657.4	82.2	657.4	88.2	10.8	88.2	7.45	575.0	71.9	575.0	186.9
22	643.7	80.5	643.7	88.0	10.7	88.0	7.31	561.5	70.2	561.5	186.6
21	630.3	78.8	630.3	87.8	10.7	87.8	7.18	548.2	68.5	548.2	186.4
20	617.0	77.1	617.0	87.7	10.7	87.7	7.04	535.1	66.9	535.1	186.2
19	604.0	75.5	604.0	87.5	10.7	87.5	6.90	522.2	65.3	522.2	186.0
18	591.1	73.9	591.1	87.4	10.7	87.4	6.76	509.5	63.7	509.5	185.9
17	578.5	72.3	578.5	87.3	10.6	87.3	6.63	497.0	62.1	497.0	185.9
16	566.1	70.8	566.1	87.2	10.6	87.2	6.49	484.7	60.6	484.7	185.9
15	553.9	69.2	553.9	87.1	10.6	87.1	6.36	472.5	59.1	472.5	185.9
14	541.9	67.7	541.9	87.0	10.6	87.0	6.23	460.6	57.6	460.6	185.9
13	530.0	66.3	530.0	87.0	10.6	87.0	6.10	448.8	56.1	448.8	186.0
12	518.4	64.8	518.4	86.9	10.6	86.9	5.96	437.3	54.7	437.3	186.1
11	507.0	63.4	507.0	86.9	10.6	86.9	5.84	425.9	53.2	425.9	186.3
10	495.8	62.0	495.8	86.9	10.6	86.9	5.71	414.7	51.8	414.7	186.4
9	484.8	60.6	484.8	86.8	10.6	86.8	5.58	403.7	50.5	403.7	186.6
8	473.9	59.2	473.9	86.8	10.6	86.8	5.46	392.8	49.1	392.8	186.8
7	463.3	57.9	463.3	86.8	10.6	86.8	5.34	382.2	47.8	382.2	187.0
6	452.8	56.6	452.8	86.8	10.6	86.8	5.22	371.7	46.5	371.7	187.2
5	442.5	55.3	442.5	86.8	10.6	86.8	5.10	361.4	45.2	361.4	187.4
4	432.4	54.0	432.4	86.8	10.6	86.8	4.98	351.3	43.9	351.3	187.7
3	422.4	52.8	422.4	86.8	10.6	86.8	4.87	341.4	42.7	341.4	187.9
2	412.7	51.6	412.7	86.8	10.6	86.8	4.75	331.6	41.4	331.6	188.1
1	403.1	50.4	403.1	86.8	10.6	86.8	4.64	322.0	40.3	322.0	188.3
0	393.7	49.2	393.7	86.8	10.6	86.8	4.53	312.6	39.1	312.6	188.6
-1	384.4	48.1	384.4	86.8	10.6	86.8	4.43	303.3	37.9	303.3	188.8
-2	375.4	46.9	375.4	86.8	10.6	86.8	4.32	294.3	36.8	294.3	189.0
-3	366.4	45.8	366.4	86.8	10.6	86.8	4.22	285.3	35.7	285.3	189.2
-4	357.7	44.7	357.7	86.8	10.6	86.8	4.12	276.6	34.6	276.6	189.4
-5	349.1	43.6	349.1	86.8	10.6	86.8	4.02	268.0	33.5	268.0	189.5
-6	340.6	42.6	340.6	86.8	10.6	86.8	3.93	259.6	32.5	259.6	189.7
-7	332.4	41.5	332.4	86.7	10.6	86.7	3.83	251.4	31.4	251.4	189.8
-8	324.2	40.5	324.2	86.7	10.6	86.7	3.74	243.3	30.4	243.3	189.9
-9	316.2	39.5	316.2	86.6	10.6	86.6	3.65	235.3	29.4	235.3	190.0
-10	308.4	38.6	308.4	86.6	10.6	86.6	3.56	227.6	28.4	227.6	190.0
-11	300.7	37.6	300.7	86.5	10.6	86.5	3.48	220.0	27.5	220.0	190.0
-12	293.2	36.6	293.2	86.4	10.5	86.4	3.39	212.5	26.6	212.5	189.9
-13	285.8	35.7	285.8	86.2	10.5	86.2	3.31	205.2	25.7	205.2	189.9
-14	278.5	34.8	278.5	86.1	10.5	86.1	3.23	198.1	24.8	198.1	189.7
-15	271.4	33.9	271.4	86.0	10.5	86.0	3.16	191.1	23.9	191.1	189.6

-- attention: operating limits not reflected in performance table

ZHI46K1P-TWD_R410A_8_BWW

WAMAK TWW 480 EVI HeavyDuty 4L2

Th -OU	45										
°C]	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	671.5	83.9	671.5	106.7	13.0	106.7	6.30	571.9	71.5	571.9	211.8
24	658.4	82.3	658.4	106.6	13.0	106.6	6.18	558.8	69.9	558.8	211.5
23	645.4	80.7	645.4	106.5	13.0	106.5	6.06	545.9	68.2	545.9	211.3
22	632.7	79.1	632.7	106.5	13.0	106.5	5.94	533.2	66.7	533.2	211.1
21	620.1	77.5	620.1	106.5	13.0	106.5	5.82	520.7	65.1	520.7	211.0
20	607.8	76.0	607.8	106.5	13.0	106.5	5.71	508.3	63.5	508.3	210.9
19	595.6	74.4	595.6	106.5	13.0	106.5	5.59	496.2	62.0	496.2	210.8
18	583.6	73.0	583.6	106.5	13.0	106.5	5.48	484.2	60.5	484.2	210.8
17	571.8	71.5	571.8	106.5	13.0	106.5	5.37	472.3	59.0	472.3	210.7
16	560.2	70.0	560.2	106.5	13.0	106.5	5.26	460.7	57.6	460.7	210.7
15	548.8	68.6	548.8	106.6	13.0	106.6	5.15	449.2	56.2	449.2	210.8
14	537.5	67.2	537.5	106.6	13.0	106.6	5.04	437.9	54.7	437.9	210.8
13	526.4	65.8	526.4	106.7	13.0	106.7	4.94	426.8	53.4	426.8	210.9
12	515.5	64.4	515.5	106.7	13.0	106.7	4.83	415.9	52.0	415.9	210.9
11	504.8	63.1	504.8	106.8	13.0	106.8	4.73	405.1	50.6	405.1	211.0
10	494.2	61.8	494.2	106.8	13.0	106.8	4.63	394.5	49.3	394.5	211.1
9	483.8	60.5	483.8	106.9	13.0	106.9	4.53	384.0	48.0	384.0	211.2
8	473.6	59.2	473.6	106.9	13.0	106.9	4.43	373.7	46.7	373.7	211.3
7	463.5	57.9	463.5	107.0	13.1	107.0	4.33	363.6	45.4	363.6	211.4
6	453.6	56.7	453.6	107.0	13.1	107.0	4.24	353.6	44.2	353.6	211.5
5	443.8	55.5	443.8	107.1	13.1	107.1	4.14	343.8	43.0	343.8	211.6
4	434.2	54.3	434.2	107.1	13.1	107.1	4.05	334.2	41.8	334.2	211.7
3	424.8	53.1	424.8	107.2	13.1	107.2	3.96	324.7	40.6	324.7	211.7
2	415.5	51.9	415.5	107.2	13.1	107.2	3.88	315.4	39.4	315.4	211.8
1	406.4	50.8	406.4	107.2	13.1	107.2	3.79	306.2	38.3	306.2	211.8
0	397.4	49.7	397.4	107.2	13.1	107.2	3.71	297.2	37.2	297.2	211.9
-1	388.5	48.6	388.5	107.2	13.1	107.2	3.62	288.4	36.0	288.4	211.9
-2	379.8	47.5	379.8	107.2	13.1	107.2	3.54	279.7	35.0	279.7	211.8
-3	371.2	46.4	371.2	107.2	13.1	107.2	3.46	271.1	33.9	271.1	211.8
-4	362.8	45.3	362.8	107.1	13.1	107.1	3.39	262.7	32.8	262.7	211.7
-5	354.5	44.3	354.5	107.1	13.1	107.1	3.31	254.5	31.8	254.5	211.6
-6	346.3	43.3	346.3	107.0	13.1	107.0	3.24	246.4	30.8	246.4	211.4
-7	338.3	42.3	338.3	106.9	13.0	106.9	3.16	238.4	29.8	238.4	211.2
-8	330.4	41.3	330.4	106.8	13.0	106.8	3.09	230.6	28.8	230.6	211.0
-9	322.6	40.3	322.6	106.7	13.0	106.7	3.02	222.9	27.9	222.9	210.8
-10	314.9	39.4	314.9	106.6	13.0	106.6	2.96	215.4	26.9	215.4	210.4
-11	307.4	38.4	307.4	106.4	13.0	106.4	2.89	208.0	26.0	208.0	210.1
-12	299.9	37.5	299.9	106.2	13.0	106.2	2.82	200.8	25.1	200.8	209.7
-13	292.6	36.6	292.6	106.0	12.9	106.0	2.76	193.7	24.2	193.7	209.2
-14	285.5	35.7	285.5	105.7	12.9	105.7	2.70	186.7	23.3	186.7	208.7
-15	278.4	34.8	278.4	105.5	12.9	105.5	2.64	179.9	22.5	179.9	208.1

-- attention: operating limits not reflected in performance table

Th -OU	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	658.1	82.3	658.1	134.7	16.4	134.7	4.89	532.4	66.5	532.4	245.2
24	646.0	80.8	646.0	134.7	16.4	134.7	4.79	520.2	65.0	520.2	245.2
23	634.1	79.3	634.1	134.8	16.5	134.8	4.70	508.1	63.5	508.1	245.1
22	622.3	77.8	622.3	134.9	16.5	134.9	4.61	496.3	62.0	496.3	245.1
21	610.7	76.3	610.7	135.0	16.5	135.0	4.52	484.6	60.6	484.6	245.1
20	599.2	74.9	599.2	135.1	16.5	135.1	4.44	473.1	59.1	473.1	245.2
19	588.0	73.5	588.0	135.2	16.5	135.2	4.35	461.7	57.7	461.7	245.2
18	576.8	72.1	576.8	135.3	16.5	135.3	4.26	450.5	56.3	450.5	245.3
17	565.9	70.7	565.9	135.4	16.5	135.4	4.18	439.4	54.9	439.4	245.4
16	555.1	69.4	555.1	135.5	16.5	135.5	4.10	428.5	53.6	428.5	245.5
15	544.4	68.1	544.4	135.6	16.5	135.6	4.01	417.8	52.2	417.8	245.5
14	533.9	66.7	533.9	135.7	16.6	135.7	3.93	407.2	50.9	407.2	245.6
13	523.6	65.4	523.6	135.8	16.6	135.8	3.86	396.8	49.6	396.8	245.7
12	513.4	64.2	513.4	135.9	16.6	135.9	3.78	386.5	48.3	386.5	245.8
11	503.3	62.9	503.3	136.0	16.6	136.0	3.70	376.4	47.0	376.4	245.9
10	493.4	61.7	493.4	136.0	16.6	136.0	3.63	366.4	45.8	366.4	246.0
9	483.6	60.5	483.6	136.1	16.6	136.1	3.55	356.5	44.6	356.5	246.1
8	474.0	59.3	474.0	136.2	16.6	136.2	3.48	346.8	43.4	346.8	246.1
7	464.5	58.1	464.5	136.2	16.6	136.2	3.41	337.3	42.2	337.3	246.2
6	455.1	56.9	455.1	136.3	16.6	136.3	3.34	327.9	41.0	327.9	246.2
5	445.9	55.7	445.9	136.3	16.6	136.3	3.27	318.6	39.8	318.6	246.2
4	436.8	54.6	436.8	136.3	16.6	136.3	3.20	309.5	38.7	309.5	246.2
3	427.8	53.5	427.8	136.3	16.6	136.3	3.14	300.5	37.6	300.5	246.1
2	419.0	52.4	419.0	136.3	16.6	136.3	3.07	291.7	36.5	291.7	246.0
1	410.2	51.3	410.2	136.2	16.6	136.2	3.01	283.0	35.4	283.0	245.9
0	401.6	50.2	401.6	136.2	16.6	136.2	2.95	274.5	34.3	274.5	245.8
-1	393.1	49.1	393.1	136.1	16.6	136.1	2.89	266.0	33.3	266.0	245.6
-2	384.7	48.1	384.7	136.0	16.6	136.0	2.83	257.7	32.2	257.7	245.4
-3	376.5	47.1	376.5	135.9	16.6	135.9	2.77	249.6	31.2	249.6	245.1
-4	368.3	46.0	368.3	135.7	16.6	135.7	2.71	241.5	30.2	241.5	244.8
-5	360.3	45.0	360.3	135.6	16.5	135.6	2.66	233.6	29.2	233.6	244.4
-6	352.3	44.0	352.3	135.4	16.5	135.4	2.60	225.9	28.2	225.9	244.0
-7	344.5	43.1	344.5	135.2	16.5	135.2	2.55	218.2	27.3	218.2	243.6
-8	336.7	42.1	336.7	134.9	16.5	134.9	2.50	210.7	26.3	210.7	243.1
-9	329.1	41.1	329.1	134.7	16.4	134.7	2.44	203.3	25.4	203.3	242.5
-10	321.6	40.2	321.6	134.4	16.4	134.4	2.39	196.1	24.5	196.1	241.9
-11	314.1	39.3	314.1	134.1	16.4	134.1	2.34	188.9	23.6	188.9	241.2
-12	306.7	38.3	306.7	133.7	16.3	133.7	2.29	181.9	22.7	181.9	240.4
-13	299.5	37.4	299.5	133.3	16.3	133.3	2.25	175.0	21.9	175.0	239.6
-14	292.3	36.5	292.3	132.9	16.2	132.9	2.20	168.2	21.0	168.2	238.7
-15	285.2	35.7	285.2	132.4	16.2	132.4	2.15	161.5	20.2	161.5	237.7

-- attention: operating limits not reflected in performance table

WAMAK TWW 480 EVI HeavyDuty 4L2

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	648.9	81.1	648.9	171.6	20.9	171.6	3.78	488.6	61.1	488.6	287.8
24	637.6	79.7	637.6	171.7	21.0	171.7	3.71	477.3	59.7	477.3	288.0
23	626.6	78.3	626.6	171.9	21.0	171.9	3.65	466.1	58.3	466.1	288.2
22	615.7	77.0	615.7	172.0	21.0	172.0	3.58	455.0	56.9	455.0	288.4
21	604.9	75.6	604.9	172.1	21.0	172.1	3.51	444.1	55.5	444.1	288.6
20	594.2	74.3	594.2	172.3	21.0	172.3	3.45	433.4	54.2	433.4	288.9
19	583.7	73.0	583.7	172.4	21.0	172.4	3.39	422.8	52.8	422.8	289.1
18	573.4	71.7	573.4	172.5	21.0	172.5	3.32	412.3	51.5	412.3	289.3
17	563.2	70.4	563.2	172.6	21.1	172.6	3.26	402.0	50.2	402.0	289.6
16	553.1	69.1	553.1	172.7	21.1	172.7	3.20	391.8	49.0	391.8	289.8
15	543.1	67.9	543.1	172.8	21.1	172.8	3.14	381.7	47.7	381.7	290.0
14	533.2	66.7	533.2	172.9	21.1	172.9	3.08	371.8	46.5	371.8	290.2
13	523.5	65.4	523.5	172.9	21.1	172.9	3.03	362.0	45.3	362.0	290.4
12	513.9	64.2	513.9	173.0	21.1	173.0	2.97	352.4	44.0	352.4	290.6
11	504.4	63.1	504.4	173.0	21.1	173.0	2.92	342.8	42.9	342.8	290.7
10	495.1	61.9	495.1	173.1	21.1	173.1	2.86	333.4	41.7	333.4	290.8
9	485.8	60.7	485.8	173.1	21.1	173.1	2.81	324.2	40.5	324.2	291.0
8	476.7	59.6	476.7	173.1	21.1	173.1	2.75	315.1	39.4	315.1	291.0
7	467.7	58.5	467.7	173.0	21.1	173.0	2.70	306.1	38.3	306.1	291.1
6	458.7	57.3	458.7	173.0	21.1	173.0	2.65	297.2	37.1	297.2	291.1
5	449.9	56.2	449.9	172.9	21.1	172.9	2.60	288.4	36.1	288.4	291.1
4	441.2	55.2	441.2	172.8	21.1	172.8	2.55	279.8	35.0	279.8	291.0
3	432.6	54.1	432.6	172.7	21.1	172.7	2.50	271.3	33.9	271.3	290.9
2	424.1	53.0	424.1	172.6	21.1	172.6	2.46	262.9	32.9	262.9	290.8
1	415.7	52.0	415.7	172.4	21.0	172.4	2.41	254.7	31.8	254.7	290.6
0	407.4	50.9	407.4	172.2	21.0	172.2	2.37	246.5	30.8	246.5	290.3
-1	399.1	49.9	399.1	172.0	21.0	172.0	2.32	238.5	29.8	238.5	290.0
-2	391.0	48.9	391.0	171.8	21.0	171.8	2.28	230.6	28.8	230.6	289.7
-3	382.9	47.9	382.9	171.5	20.9	171.5	2.23	222.8	27.8	222.8	289.3
-4	375.0	46.9	375.0	171.2	20.9	171.2	2.19	215.1	26.9	215.1	288.8
-5	367.1	45.9	367.1	170.9	20.9	170.9	2.15	207.5	25.9	207.5	288.3
-6	359.3	44.9	359.3	170.5	20.8	170.5	2.11	200.1	25.0	200.1	287.7
-7	351.6	43.9	351.6	170.1	20.8	170.1	2.07	192.7	24.1	192.7	287.0
-8	343.9	43.0	343.9	169.7	20.7	169.7	2.03	185.5	23.2	185.5	286.3
-9	336.3	42.0	336.3	169.2	20.6	169.2	1.99	178.3	22.3	178.3	285.5
-10	328.8	41.1	328.8	168.7	20.6	168.7	1.95	171.3	21.4	171.3	284.6
-11	321.4	40.2	321.4	168.1	20.5	168.1	1.91	164.4	20.5	164.4	283.6
-12	314.0	39.3	314.0	167.6	20.4	167.6	1.87	157.6	19.7	157.6	282.6
-13	306.7	38.3	306.7	166.9	20.4	166.9	1.84	150.9	18.9	150.9	281.5
-14	299.5	37.4	299.5	166.3	20.3	166.3	1.80	144.2	18.0	144.2	280.3
-15	292.3	36.5	292.3	165.5	20.2	165.5	1.77	137.7	17.2	137.7	279.0

-- 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	281.6	35.2	281.6	116.0	14.2	116.0	2.43	389.9	48.7	389.9	221.9
39	283.6	35.5	283.6	113.4	13.8	113.4	2.50	389.5	48.7	389.5	218.9
38	285.6	35.7	285.6	110.9	13.5	110.9	2.58	389.1	48.6	389.1	216.0
37	287.4	35.9	287.4	108.4	13.2	108.4	2.65	388.7	48.6	388.7	213.2
36	289.3	36.2	289.3	106.0	12.9	106.0	2.73	388.3	48.5	388.3	210.5
35	291.0	36.4	291.0	103.7	12.7	103.7	2.81	387.9	48.5	387.9	207.8
34	292.8	36.6	292.8	101.4	12.4	101.4	2.89	387.5	48.4	387.5	205.3
33	294.4	36.8	294.4	99.2	12.1	99.2	2.97	387.1	48.4	387.1	202.7
32	296.0	37.0	296.0	97.0	11.8	97.0	3.05	386.6	48.3	386.6	200.3
31	297.6	37.2	297.6	94.9	11.6	94.9	3.14	386.2	48.3	386.2	197.9
30	299.1	37.4	299.1	92.8	11.3	92.8	3.22	385.8	48.2	385.8	195.5
29	300.6	37.6	300.6	90.8	11.1	90.8	3.31	385.3	48.2	385.3	193.2
28	302.0	37.7	302.0	88.8	10.8	88.8	3.40	384.9	48.1	384.9	191.0
27	303.3	37.9	303.3	86.8	10.6	86.8	3.49	384.4	48.1	384.4	188.8
26	304.6	38.1	304.6	84.9	10.4	84.9	3.59	384.0	48.0	384.0	186.6
25	305.9	38.2	305.9	83.1	10.1	83.1	3.68	383.5	47.9	383.5	184.5
24	307.1	38.4	307.1	81.2	9.9	81.2	3.78	383.0	47.9	383.0	182.4
23	308.3	38.5	308.3	79.4	9.7	79.4	3.88	382.4	47.8	382.4	180.3
22	309.4	38.7	309.4	77.7	9.5	77.7	3.98	381.9	47.7	381.9	178.3
21	310.4	38.8	310.4	75.9	9.3	75.9	4.09	381.3	47.7	381.3	176.2
20	311.5	38.9	311.5	74.2	9.1	74.2	4.20	380.8	47.6	380.8	174.2

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	375.5	46.9	375.5	116.0	14.2	116.0	3.24	483.6	60.4	484.0	221.7
39	378.0	47.3	378.0	113.4	13.8	113.4	3.33	483.6	60.5	483.8	218.6
38	380.5	47.6	380.5	110.9	13.5	110.9	3.43	483.7	60.5	483.7	215.6
37	382.8	47.9	382.8	108.4	13.2	108.4	3.53	483.8	60.5	483.6	212.6
36	385.2	48.1	385.2	106.0	12.9	106.0	3.63	483.9	60.5	483.6	209.8
35	387.4	48.4	387.4	103.7	12.7	103.7	3.74	484.0	60.5	483.5	207.0
34	389.6	48.7	389.6	101.4	12.4	101.4	3.84	484.0	60.5	483.5	204.2
33	391.8	49.0	391.8	99.2	12.1	99.2	3.95	484.1	60.5	483.5	201.6
32	393.9	49.2	393.9	97.0	11.8	97.0	4.06	484.3	60.5	483.5	199.0
31	396.0	49.5	396.0	94.9	11.6	94.9	4.17	484.4	60.5	483.5	196.4
30	398.0	49.7	398.0	92.8	11.3	92.8	4.29	484.5	60.6	483.6	193.9
29	399.9	50.0	399.9	90.8	11.1	90.8	4.41	484.6	60.6	483.6	191.4
28	401.8	50.2	401.8	88.8	10.8	88.8	4.53	484.7	60.6	483.7	189.0
27	403.7	50.5	403.7	86.8	10.6	86.8	4.65	484.8	60.6	483.8	186.6
26	405.5	50.7	405.5	84.9	10.4	84.9	4.77	484.8	60.6	483.9	184.2
25	407.2	50.9	407.2	83.1	10.1	83.1	4.90	484.9	60.6	484.0	181.9
24	408.9	51.1	408.9	81.2	9.9	81.2	5.03	485.0	60.6	484.0	179.6
23	410.6	51.3	410.6	79.4	9.7	79.4	5.17	485.1	60.6	484.1	177.3
22	412.2	51.5	412.2	77.7	9.5	77.7	5.31	485.1	60.6	484.3	175.0
21	413.8	51.7	413.8	75.9	9.3	75.9	5.45	485.2	60.6	484.4	172.8
20	415.3	51.9	415.3	74.2	9.1	74.2	5.60	485.2	60.6	484.5	170.5

-- 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

