



## Heat pump



# *TBW 98 EVI*

# WAMAK TBW 98 EVI

## Product description

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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, the thermal energy of the sun accumulated in the ground through a horizontal collector or geothermal energy through a deep borehole is used. In the collector or borehole, an antifreeze flows which takes the energy of the earth at a low temperature and the heat pump raises this temperature to a temperature usable 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

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

## Basic performance data - WAMAK TBW 98 EVI

Heating - EN 14511		
Heating capacity [kW]	B0 / W35 (max)	96.1 ( 48.1 / 96.1 )
	B0 / W35 (min)	48.1 ( 48.1 / 96.1 )
	B0 / W34	96.0 ( 48.0 / 96.0 )
Electrical power input [kW]	B0 / W35 (max)	21.7 ( 10.7 / 21.7 )
	B0 / W35 (min)	10.7 ( 10.7 / 21.7 )
	B0 / W34	21.2 ( 10.5 / 21.2 )
Heating efficiency faktor [COP]	B0 / W35 (max)	4.43
	B0 / W35 (min)	4.49
	B0 / W34	4.52
Seasonal space heating energy efficiency - SCOP EN 14825		
Average Climate / Low Temperature [35°C]	SCOP	5.01
	$\eta$ [%]	200.3
	Label	A+++
	Qhe [ kWh ]	39612.5
	Pdesignh [ kW ]	96.1
	Tbivalent [ °C ]	-10
Cooling		
Cooling capacity - [kW]	A35 / W23-18	96.9
	A25 / W23-18	101.8
	A35 / W12-7	96.9
	A25 / W12-7	96.9
Seasonal space cooling energy efficiency - SEER EN 14825		
[ W 23 / 18°C ]	SEER	5.14
	Qce [ kWh ]	10682.5
	$\eta_c$ [%]	205.7
Sound EN 12102		
Acoustic power - Lw	dB(A)	65.9
Acoustic pressure - Lp	1 m dB(A)	57.9
	5 m dB(A)	43.9
	10 m dB(A)	37.9
Mechanical and operational information		
Compressor type (3~ 400/50)	SCROLL / 2 /	On/Off
Refrigerant	R410A (GWP - 2088)	11.5 kg
Operating limit temperatures heating - (min / max ) [°C]		25 / 65
Operating limit temperatures source - (min / max ) [°C]		-10 (7) / 30
Weight		460 kg

## Main technical data - WAMAK TBW 98 EVI

Enclosure type			VN1100			Heat energy rejection side data												
Basic dimensions	Height [mm]	1270	Operating limit temperatures heating	MAX [°C]	65	for more see operating limits diagram	Condenser	Port size	VIC 2.1/2 "									
	Width [mm]	1100		MIN [°C]	25			Type	BPHE									
	Length [mm]	750		Count	1			Material	AISI 316									
Weight [kg]	460		Maximal operating pressure - refrigerant [bar]	50		for more see operating limits diagram	Maximal operating pressure - Water [bar]	6										
Colour	Gray		Testing pressure [bar]	70				Heat transfer medium	Water									
Enclosure IP Class	IP20		Volume flow @ dT 5K (nom) - Water [m3/h]	8.32 ~ 16.63				Internal pressure drop - Water [kPa]	20									
Refrigeration cycle			Compressor	Type	Scroll	Refrigerant	R410A	Volme	11.5 kg									
Refrigerant	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]	46.70																
	maximal [A]	74.80																
	starting [A]	63.04																
Softstart	-																	
Main safety	C80																	
Control System			Maximal operating pressure - refrigerant [bar]	29		for more see operating limits diagram	Evaporator	Port size	VIC 2.1/2 "									
Main controller	SIEMENS	RVS 61		Heat transfer medium	Ethylenglykol			Type	BPHE	Count	1							
	Extension module	AVS75.3xx		AVS75.3xx	AVS75.372							Brine proportion [%]	29					
Bus Clip-In	Modbus OCI352			Antifreeze to [°C]	-15			Maximal operating pressure - Ethylenglykol [bar]	6									
Online connection	Web server OZW672	ToSyMo		Maximal operating pressure - Ethylenglykol [bar]	6			Volume flow - Ethylenglykol [m3/h]	8.48 ~ 16.96									
Superheat controller	SEC61			Internal pressure drop - Ethylenglykol [kPa]	20		Temperature difference - Ethylenglykol	4 K										

\*\*\* with accessory

# WAMAK TBW 98 EVI

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

Model	TBW 98 EVI
Air-to-water heat pump	no
Brine-to-water heat pump	yes
Water-to-water heat pump	no
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	96.1	kW	Seasonal space heating energy efficiency	$\eta_s$	200.3	%
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	96.0	kW	Tj = -7 °C	COPd	4.52	-
Tj = +2 °C	Pdh	95.5	kW	Tj = +2 °C	COPd	4.9	-
Tj = +7 °C	Pdh	95.0	kW	Tj = +7 °C	COPd	5.3	-
Tj = +12 °C	Pdh	94.5	kW	Tj = +12 °C	COPd	5.7	-
Tj = bivalent temperature	Pdh	96.1	kW	Tj = bivalent temperature	COPd	4.4	-
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	18.5	kW
Standby mode	Psb	0.010	kW	Type of energy input	electricity		
Crankcase heater mode	Pck	0.000	kW				
Other items				For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m <sup>3</sup> /h
Capacity control	multi-stage			For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	8.48 ~ 16.96	m <sup>3</sup> /h
Sound power level							
indoors	Lwa	66	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	Q <sub>HE</sub>	39612.5	kWh				

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

Model	TBW 98 EVI
Air-to-water heat pump	no
Brine-to-water heat pump	yes
Water-to-water heat pump	no
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	98.3	kW	Seasonal space heating energy efficiency	$\eta_s$	160.5	%
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	98.9	kW	Tj = -7 °C	COPd	3.29	-
Tj = +2 °C	Pdh	98.9	kW	Tj = +2 °C	COPd	4.1	-
Tj = +7 °C	Pdh	97.2	kW	Tj = +7 °C	COPd	4.6	-
Tj = +12 °C	Pdh	96.7	kW	Tj = +12 °C	COPd	5.0	-
Tj = bivalent temperature	Pdh	98.3	kW	Tj = bivalent temperature	COPd	2.9	-
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	18.5	kW
Standby mode	Psb	0.010	kW	Type of energy input	electricity		
Crankcase heater mode	Pck	0.000	kW				
Other items				For air-to-water heat pumps: Rated air flow rate, outdoors	-	---	m <sup>3</sup> /h
Capacity control	multi-stage			For water- or brine-to-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger	-	8.48 ~ 16.96	m <sup>3</sup> /h
Sound power level							
indoors	Lwa	66	dB				
outdoors	Lwa	---	dB				
Annual energy consumption	Q <sub>HE</sub>	50568.0	kWh				

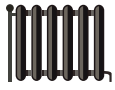
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**WAMAK**

TBW 98 EVI



55 °C

35 °C



**A+++**      **A+++**      **A+++**

66 dB

--- dB

■ 104	■ 99
■ 99	■ 97
■ 97	■ 92

kW                      kW

2019

811/2013

TBW 98 EVI

**ErP Data**

	55 °C	35 °C
Energy class	<b>A+++</b>	<b>A+++</b>
$\eta$ [%]	160.5	200.3
$P_{rated}$ [kW]	99	97
$Q_{HE}$ [kWh/y]	50568	39613
SCOP [-]	4.01	5.01
$T_{bivalent}$ [°C]	-10	-10

CONTROLLER



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

Heating performance data

Version: v2024.010-BW-WW

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

ZHI46K1P-TWD\_R410A\_2\_BWW

Operating conditions	Qh	P	COP
1 B0 / W30-35	96.1	21.7	4.43
2 B0 / W30-35 ( MIN )	48.1	10.7	4.49
A B0 / Wxx-34	96.0	21.2	4.52
B B0 / Wxx-30	95.5	19.4	4.92
C B0 / Wxx-27	47.5	8.9	5.32
D B0 / Wxx-24	47.3	8.3	5.68
E B0 / Wxx-35	96.1	21.7	4.43
F B0 / Wxx-35	96.1	21.7	4.43

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Low Temperature [35°C]	
SCOPon	5.01
SCOPnet	5.01
SCOP	5.01
η [ % ]	200.25
Label	A+++
Qh [ kWh ]	39613
Pdesignh [ kW ]	96.1
Tbivalent [ °C ]	-10

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

Operating conditions	Qh	P	COP
1 B0 / W47-55	98.3	34.0	2.89
2 B0 / W47-55 ( MIN )	49.1	16.5	2.93
A B0 / Wxx-52	98.9	31.0	3.29
B B0 / Wxx-42	98.9	24.2	4.13
C B0 / Wxx-36	48.6	10.6	4.59
D B0 / Wxx-30	48.3	9.6	5.05
E B0 / Wxx-55	98.3	34.0	2.89
F B0 / Wxx-54	99.0	31.8	3.12

SCOP DATA EN 14825:2018	
Source - Brine [0°C] / Medium Temperature [55°C]	
SCOPon	4.02
SCOPnet	4.02
SCOP	4.01
η [ % ]	160.49
Label	A+++
Qh [ kWh ]	50568
Pdesignh [ kW ]	98.3
Tbivalent [ °C ]	-10

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

Operating conditions	Qh	P	COP
1 W10 / W30-35	121.2	21.7	5.58
2 W10 / W30-35 ( MIN )	60.6	10.7	5.66
A W10 / Wxx-34	121.2	21.2	5.70
B W10 / Wxx-30	121.3	19.5	6.21
C W10 / Wxx-27	121.3	18.3	6.72
D W10 / Wxx-24	121.3	17.2	7.16
E W10 / Wxx-35	121.2	21.7	5.58
F W10 / Wxx-35	121.2	21.7	5.58

SCOP DATA EN 14825:2018	
Source - Water [10°C] / Low Temperature [35°C]	
SCOPon	6.33
SCOPnet	6.33
SCOP	6.32
η [ % ]	252.96
Label	A+++
Qh [ kWh ]	39550
Pdesignh [ kW ]	121.2
Tbivalent [ °C ]	-10.00



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

	Operating conditions	Qh	P	COP
1	W10 / W47-55	120.9	34.0	3.55
2	W10 / W47-55 ( MIN )	60.5	16.8	3.60
A	W10 / Wxx-52	122.1	31.0	3.94
B	W10 / Wxx-42	122.4	24.2	5.06
C	W10 / Wxx-36	122.6	21.5	5.79
D	W10 / Wxx-30	122.7	19.5	6.37
E	W10 / Wxx-55	120.9	34.0	3.55
F	W10 / Wxx-55	120.9	34.0	3.55

SCOP DATA EN 14825:2018	
<b>Source - Water [10°C] / Medium Temperature [55°C]</b>	
SCOPon	4.91
SCOPnet	4.91
SCOP	4.91
η [ % ]	196.37
Label	A+++
Qh [ kWh ]	50831
Pdesignh [ kW ]	120.9
Tbivalent [ °C ]	-10.00

**Low temperature cooling W 12 / 7°C**

	Operating conditions	Qc	P	EER
A	W30-35 / W12-7	74.8	23.2	3.22
B	W26-xx / W12-7	76.2	21.2	3.59
C	W22-xx / W12-7	77.3	19.4	3.98
D	W18-xx / W12-7	77.9	18.6	4.20

SEER DATA EN 14825:2018 [ W 12 / 7°C ]	
SEERon	3.86
SEER	3.86
Qc [ kWh ]	43680
η [ % ]	154.44

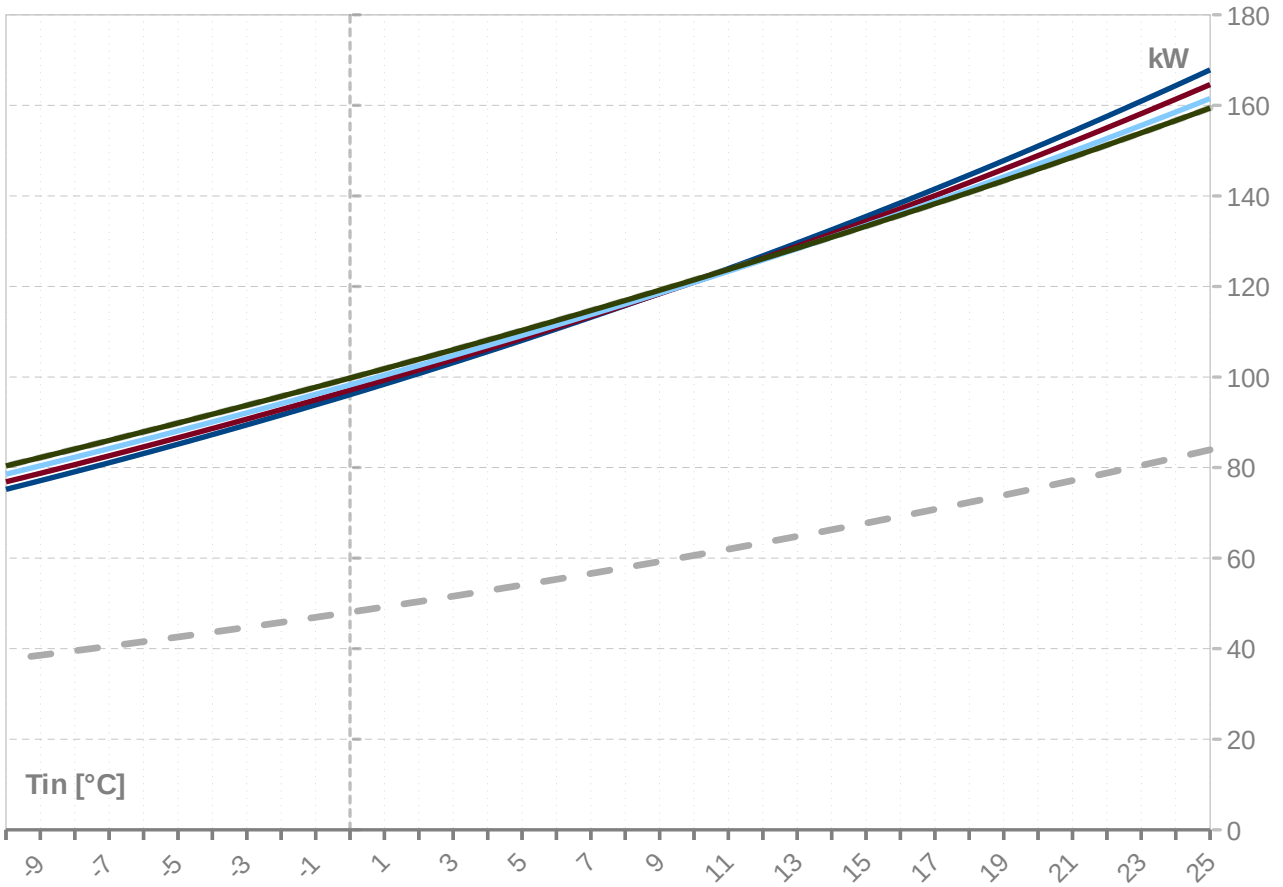
**Radiant cooling W 23 / 18°C**

	Operating conditions	Qc	P	EER
A	W50-xx / W23-18	86.9	36.5	2.38
B	W40-xx / W23-18	93.9	29.0	3.24
C	W30-35 / W23-18	99.5	23.2	4.29
D	W26-xx / W23-18	101.4	21.2	4.77

SEER DATA EN 14825:2018 [ W 23 / 18°C ]	
SEERon	5.15
SEER	5.14
Qc [ kWh ]	43680
η [ % ]	205.69

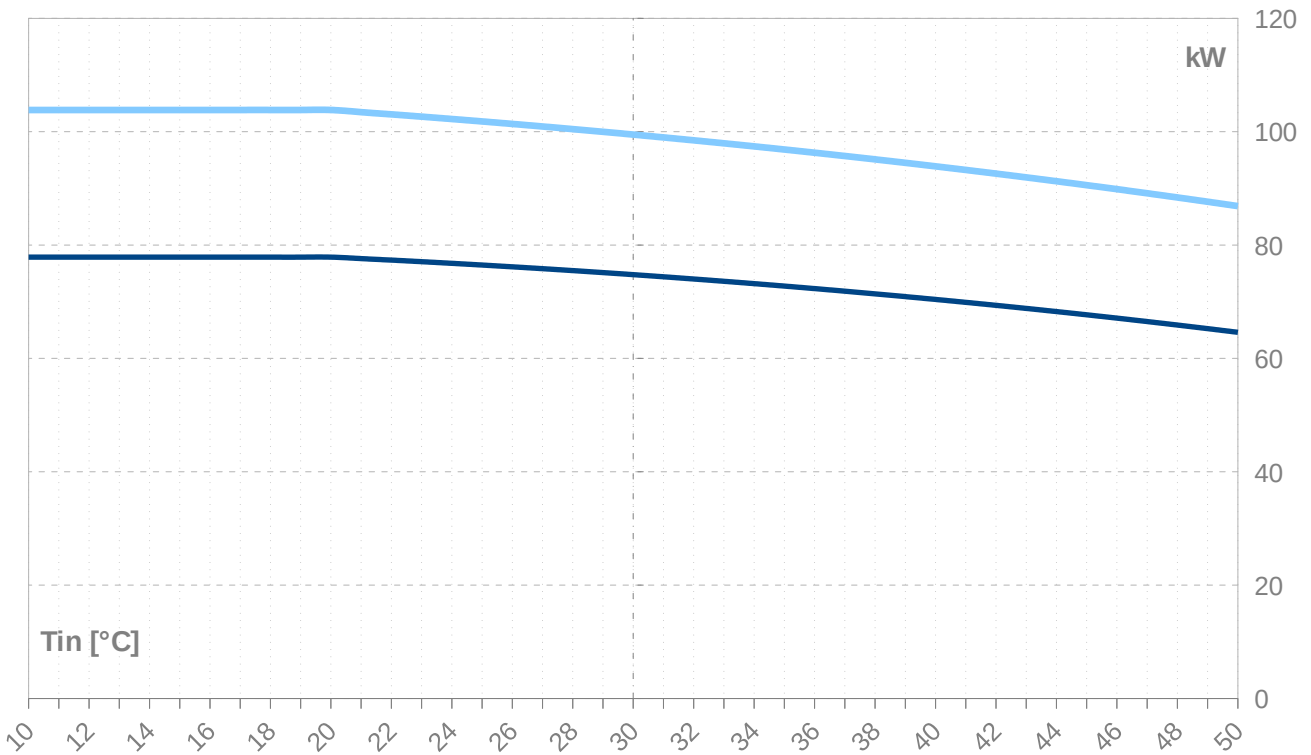
Performance lines - heating

- 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 [°C]	Qh nom [kW]	Qh min [kW]	Qh max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	COP nom kW / kW	Qc nom [kW]	Qc min [kW]	Qc max [kW]	I nom [A]
25	<b>167.8</b>	83.9	167.8	<b>22.1</b>	10.9	22.1	<b>7.59</b>	147.2	73.6	147.2	46.8
24	<b>164.4</b>	82.2	164.4	<b>22.1</b>	10.9	22.1	<b>7.45</b>	143.8	71.9	143.8	46.7
23	<b>160.9</b>	80.5	160.9	<b>22.0</b>	10.9	22.0	<b>7.31</b>	140.4	70.2	140.4	46.6
22	<b>157.6</b>	78.8	157.6	<b>22.0</b>	10.8	22.0	<b>7.18</b>	137.1	68.5	137.1	46.6
21	<b>154.3</b>	77.1	154.3	<b>21.9</b>	10.8	21.9	<b>7.04</b>	133.8	66.9	133.8	46.5
20	<b>151.0</b>	75.5	151.0	<b>21.9</b>	10.8	21.9	<b>6.90</b>	130.6	65.3	130.6	46.5
19	<b>147.8</b>	73.9	147.8	<b>21.8</b>	10.8	21.8	<b>6.76</b>	127.4	63.7	127.4	46.5
18	<b>144.6</b>	72.3	144.6	<b>21.8</b>	10.8	21.8	<b>6.63</b>	124.3	62.1	124.3	46.5
17	<b>141.5</b>	70.8	141.5	<b>21.8</b>	10.7	21.8	<b>6.49</b>	121.2	60.6	121.2	46.5
16	<b>138.5</b>	69.2	138.5	<b>21.8</b>	10.7	21.8	<b>6.36</b>	118.1	59.1	118.1	46.5
15	<b>135.5</b>	67.7	135.5	<b>21.8</b>	10.7	21.8	<b>6.23</b>	115.1	57.6	115.1	46.5
14	<b>132.5</b>	66.3	132.5	<b>21.7</b>	10.7	21.7	<b>6.10</b>	112.2	56.1	112.2	46.5
13	<b>129.6</b>	64.8	129.6	<b>21.7</b>	10.7	21.7	<b>5.96</b>	109.3	54.7	109.3	46.5
12	<b>126.8</b>	63.4	126.8	<b>21.7</b>	10.7	21.7	<b>5.84</b>	106.5	53.2	106.5	46.6
11	<b>123.9</b>	62.0	123.9	<b>21.7</b>	10.7	21.7	<b>5.71</b>	103.7	51.8	103.7	46.6
10	<b>121.2</b>	60.6	121.2	<b>21.7</b>	10.7	21.7	<b>5.58</b>	100.9	50.5	100.9	46.6
9	<b>118.5</b>	59.2	118.5	<b>21.7</b>	10.7	21.7	<b>5.46</b>	98.2	49.1	98.2	46.7
8	<b>115.8</b>	57.9	115.8	<b>21.7</b>	10.7	21.7	<b>5.34</b>	95.5	47.8	95.5	46.7
7	<b>113.2</b>	56.6	113.2	<b>21.7</b>	10.7	21.7	<b>5.22</b>	92.9	46.5	92.9	46.8
6	<b>110.6</b>	55.3	110.6	<b>21.7</b>	10.7	21.7	<b>5.10</b>	90.4	45.2	90.4	46.9
5	<b>108.1</b>	54.0	108.1	<b>21.7</b>	10.7	21.7	<b>4.98</b>	87.8	43.9	87.8	46.9
4	<b>105.6</b>	52.8	105.6	<b>21.7</b>	10.7	21.7	<b>4.87</b>	85.3	42.7	85.3	47.0
3	<b>103.2</b>	51.6	103.2	<b>21.7</b>	10.7	21.7	<b>4.75</b>	82.9	41.4	82.9	47.0
2	<b>100.8</b>	50.4	100.8	<b>21.7</b>	10.7	21.7	<b>4.64</b>	80.5	40.3	80.5	47.1
1	<b>98.4</b>	49.2	98.4	<b>21.7</b>	10.7	21.7	<b>4.53</b>	78.1	39.1	78.1	47.1
0	<b>96.1</b>	48.1	96.1	<b>21.7</b>	10.7	21.7	<b>4.43</b>	75.8	37.9	75.8	47.2
-1	<b>93.8</b>	46.9	93.8	<b>21.7</b>	10.7	21.7	<b>4.32</b>	73.6	36.8	73.6	47.3
-2	<b>91.6</b>	45.8	91.6	<b>21.7</b>	10.7	21.7	<b>4.22</b>	71.3	35.7	71.3	47.3
-3	<b>89.4</b>	44.7	89.4	<b>21.7</b>	10.7	21.7	<b>4.12</b>	69.2	34.6	69.2	47.3
-4	<b>87.3</b>	43.6	87.3	<b>21.7</b>	10.7	21.7	<b>4.02</b>	67.0	33.5	67.0	47.4
-5	<b>85.2</b>	42.6	85.2	<b>21.7</b>	10.7	21.7	<b>3.93</b>	64.9	32.5	64.9	47.4
-6	<b>83.1</b>	41.5	83.1	<b>21.7</b>	10.7	21.7	<b>3.83</b>	62.8	31.4	62.8	47.5
-7	<b>81.1</b>	40.5	81.1	<b>21.7</b>	10.7	21.7	<b>3.74</b>	60.8	30.4	60.8	47.5
-8	<b>79.1</b>	39.5	79.1	<b>21.7</b>	10.7	21.7	<b>3.65</b>	58.8	29.4	58.8	47.5
-9	<b>77.1</b>	38.6	77.1	<b>21.6</b>	10.7	21.6	<b>3.56</b>	56.9	28.4	56.9	47.5
-10	<b>75.2</b>	37.6	75.2	<b>21.6</b>	10.7	21.6	<b>3.48</b>	55.0	27.5	55.0	47.5
-11	<b>73.3</b>	36.6	73.3	<b>21.6</b>	10.6	21.6	<b>3.39</b>	53.1	26.6	53.1	47.5
-12	<b>71.4</b>	35.7	71.4	<b>21.6</b>	10.6	21.6	<b>3.31</b>	51.3	25.7	51.3	47.5
-13	<b>69.6</b>	34.8	69.6	<b>21.5</b>	10.6	21.5	<b>3.23</b>	49.5	24.8	49.5	47.4
-14	<b>67.8</b>	33.9	67.8	<b>21.5</b>	10.6	21.5	<b>3.16</b>	47.8	23.9	47.8	47.4
-15	<b>66.1</b>	33.0	66.1	<b>21.4</b>	10.6	21.4	<b>3.08</b>	46.1	23.0	46.1	47.3

-- attention: operating limits not reflected in performance table

ZHI46K1P-TWD\_R410A\_2\_BWW

Th -OU	45										
[°C]	Qh nom [kW]	Qh min [kW]	Qh max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	COP nom kW / kW	Qc nom [kW]	Qc min [kW]	Qc max [kW]	I nom [A]
25	<b>164.6</b>	82.3	164.6	<b>26.6</b>	13.1	26.6	<b>6.18</b>	139.7	69.9	139.7	52.9
24	<b>161.4</b>	80.7	161.4	<b>26.6</b>	13.1	26.6	<b>6.06</b>	136.5	68.2	136.5	52.8
23	<b>158.2</b>	79.1	158.2	<b>26.6</b>	13.1	26.6	<b>5.94</b>	133.3	66.7	133.3	52.8
22	<b>155.0</b>	77.5	155.0	<b>26.6</b>	13.1	26.6	<b>5.82</b>	130.2	65.1	130.2	52.7
21	<b>151.9</b>	76.0	151.9	<b>26.6</b>	13.1	26.6	<b>5.71</b>	127.1	63.5	127.1	52.7
20	<b>148.9</b>	74.4	148.9	<b>26.6</b>	13.1	26.6	<b>5.59</b>	124.0	62.0	124.0	52.7
19	<b>145.9</b>	73.0	145.9	<b>26.6</b>	13.1	26.6	<b>5.48</b>	121.0	60.5	121.0	52.7
18	<b>143.0</b>	71.5	143.0	<b>26.6</b>	13.1	26.6	<b>5.37</b>	118.1	59.0	118.1	52.7
17	<b>140.0</b>	70.0	140.0	<b>26.6</b>	13.1	26.6	<b>5.26</b>	115.2	57.6	115.2	52.7
16	<b>137.2</b>	68.6	137.2	<b>26.6</b>	13.1	26.6	<b>5.15</b>	112.3	56.2	112.3	52.7
15	<b>134.4</b>	67.2	134.4	<b>26.7</b>	13.1	26.7	<b>5.04</b>	109.5	54.7	109.5	52.7
14	<b>131.6</b>	65.8	131.6	<b>26.7</b>	13.2	26.7	<b>4.94</b>	106.7	53.4	106.7	52.7
13	<b>128.9</b>	64.4	128.9	<b>26.7</b>	13.2	26.7	<b>4.83</b>	104.0	52.0	104.0	52.7
12	<b>126.2</b>	63.1	126.2	<b>26.7</b>	13.2	26.7	<b>4.73</b>	101.3	50.6	101.3	52.8
11	<b>123.6</b>	61.8	123.6	<b>26.7</b>	13.2	26.7	<b>4.63</b>	98.6	49.3	98.6	52.8
10	<b>121.0</b>	60.5	121.0	<b>26.7</b>	13.2	26.7	<b>4.53</b>	96.0	48.0	96.0	52.8
9	<b>118.4</b>	59.2	118.4	<b>26.7</b>	13.2	26.7	<b>4.43</b>	93.4	46.7	93.4	52.8
8	<b>115.9</b>	57.9	115.9	<b>26.7</b>	13.2	26.7	<b>4.33</b>	90.9	45.4	90.9	52.8
7	<b>113.4</b>	56.7	113.4	<b>26.8</b>	13.2	26.8	<b>4.24</b>	88.4	44.2	88.4	52.9
6	<b>111.0</b>	55.5	111.0	<b>26.8</b>	13.2	26.8	<b>4.14</b>	86.0	43.0	86.0	52.9
5	<b>108.6</b>	54.3	108.6	<b>26.8</b>	13.2	26.8	<b>4.05</b>	83.5	41.8	83.5	52.9
4	<b>106.2</b>	53.1	106.2	<b>26.8</b>	13.2	26.8	<b>3.96</b>	81.2	40.6	81.2	52.9
3	<b>103.9</b>	51.9	103.9	<b>26.8</b>	13.2	26.8	<b>3.88</b>	78.8	39.4	78.8	52.9
2	<b>101.6</b>	50.8	101.6	<b>26.8</b>	13.2	26.8	<b>3.79</b>	76.6	38.3	76.6	53.0
1	<b>99.3</b>	49.7	99.3	<b>26.8</b>	13.2	26.8	<b>3.71</b>	74.3	37.2	74.3	53.0
0	<b>97.1</b>	48.6	97.1	<b>26.8</b>	13.2	26.8	<b>3.62</b>	72.1	36.0	72.1	53.0
-1	<b>94.9</b>	47.5	94.9	<b>26.8</b>	13.2	26.8	<b>3.54</b>	69.9	35.0	69.9	53.0
-2	<b>92.8</b>	46.4	92.8	<b>26.8</b>	13.2	26.8	<b>3.46</b>	67.8	33.9	67.8	52.9
-3	<b>90.7</b>	45.3	90.7	<b>26.8</b>	13.2	26.8	<b>3.39</b>	65.7	32.8	65.7	52.9
-4	<b>88.6</b>	44.3	88.6	<b>26.8</b>	13.2	26.8	<b>3.31</b>	63.6	31.8	63.6	52.9
-5	<b>86.6</b>	43.3	86.6	<b>26.8</b>	13.2	26.8	<b>3.24</b>	61.6	30.8	61.6	52.9
-6	<b>84.6</b>	42.3	84.6	<b>26.7</b>	13.2	26.7	<b>3.16</b>	59.6	29.8	59.6	52.8
-7	<b>82.6</b>	41.3	82.6	<b>26.7</b>	13.2	26.7	<b>3.09</b>	57.6	28.8	57.6	52.8
-8	<b>80.6</b>	40.3	80.6	<b>26.7</b>	13.2	26.7	<b>3.02</b>	55.7	27.9	55.7	52.7
-9	<b>78.7</b>	39.4	78.7	<b>26.6</b>	13.1	26.6	<b>2.96</b>	53.8	26.9	53.8	52.6
-10	<b>76.8</b>	38.4	76.8	<b>26.6</b>	13.1	26.6	<b>2.89</b>	52.0	26.0	52.0	52.5
-11	<b>75.0</b>	37.5	75.0	<b>26.5</b>	13.1	26.5	<b>2.82</b>	50.2	25.1	50.2	52.4
-12	<b>73.2</b>	36.6	73.2	<b>26.5</b>	13.1	26.5	<b>2.76</b>	48.4	24.2	48.4	52.3
-13	<b>71.4</b>	35.7	71.4	<b>26.4</b>	13.0	26.4	<b>2.70</b>	46.7	23.3	46.7	52.2
-14	<b>69.6</b>	34.8	69.6	<b>26.4</b>	13.0	26.4	<b>2.64</b>	45.0	22.5	45.0	52.0
-15	<b>67.9</b>	33.9	67.9	<b>26.3</b>	13.0	26.3	<b>2.58</b>	43.3	21.6	43.3	51.9

-- attention: operating limits not reflected in performance table

Th -OU	55										
Ts -IN [°C]	Qh nom [kW]	Qh min [kW]	Qh max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	COP nom kW / kW	Qc nom [kW]	Qc min [kW]	Qc max [kW]	I nom [A]
25	161.5	80.8	161.5	33.7	16.6	33.7	4.79	130.0	65.0	130.0	61.3
24	158.5	79.3	158.5	33.7	16.6	33.7	4.70	127.0	63.5	127.0	61.3
23	155.6	77.8	155.6	33.7	16.6	33.7	4.61	124.1	62.0	124.1	61.3
22	152.7	76.3	152.7	33.8	16.6	33.8	4.52	121.2	60.6	121.2	61.3
21	149.8	74.9	149.8	33.8	16.7	33.8	4.44	118.3	59.1	118.3	61.3
20	147.0	73.5	147.0	33.8	16.7	33.8	4.35	115.4	57.7	115.4	61.3
19	144.2	72.1	144.2	33.8	16.7	33.8	4.26	112.6	56.3	112.6	61.3
18	141.5	70.7	141.5	33.9	16.7	33.9	4.18	109.9	54.9	109.9	61.3
17	138.8	69.4	138.8	33.9	16.7	33.9	4.10	107.1	53.6	107.1	61.4
16	136.1	68.1	136.1	33.9	16.7	33.9	4.01	104.4	52.2	104.4	61.4
15	133.5	66.7	133.5	33.9	16.7	33.9	3.93	101.8	50.9	101.8	61.4
14	130.9	65.4	130.9	34.0	16.7	34.0	3.86	99.2	49.6	99.2	61.4
13	128.3	64.2	128.3	34.0	16.8	34.0	3.78	96.6	48.3	96.6	61.5
12	125.8	62.9	125.8	34.0	16.8	34.0	3.70	94.1	47.0	94.1	61.5
11	123.4	61.7	123.4	34.0	16.8	34.0	3.63	91.6	45.8	91.6	61.5
10	120.9	60.5	120.9	34.0	16.8	34.0	3.55	89.1	44.6	89.1	61.5
9	118.5	59.3	118.5	34.0	16.8	34.0	3.48	86.7	43.4	86.7	61.5
8	116.1	58.1	116.1	34.1	16.8	34.1	3.41	84.3	42.2	84.3	61.5
7	113.8	56.9	113.8	34.1	16.8	34.1	3.34	82.0	41.0	82.0	61.5
6	111.5	55.7	111.5	34.1	16.8	34.1	3.27	79.7	39.8	79.7	61.5
5	109.2	54.6	109.2	34.1	16.8	34.1	3.20	77.4	38.7	77.4	61.5
4	107.0	53.5	107.0	34.1	16.8	34.1	3.14	75.1	37.6	75.1	61.5
3	104.7	52.4	104.7	34.1	16.8	34.1	3.07	72.9	36.5	72.9	61.5
2	102.6	51.3	102.6	34.1	16.8	34.1	3.01	70.8	35.4	70.8	61.5
1	100.4	50.2	100.4	34.0	16.8	34.0	2.95	68.6	34.3	68.6	61.4
0	98.3	49.1	98.3	34.0	16.8	34.0	2.89	66.5	33.3	66.5	61.4
-1	96.2	48.1	96.2	34.0	16.8	34.0	2.83	64.4	32.2	64.4	61.3
-2	94.1	47.1	94.1	34.0	16.8	34.0	2.77	62.4	31.2	62.4	61.3
-3	92.1	46.0	92.1	33.9	16.7	33.9	2.71	60.4	30.2	60.4	61.2
-4	90.1	45.0	90.1	33.9	16.7	33.9	2.66	58.4	29.2	58.4	61.1
-5	88.1	44.0	88.1	33.9	16.7	33.9	2.60	56.5	28.2	56.5	61.0
-6	86.1	43.1	86.1	33.8	16.7	33.8	2.55	54.6	27.3	54.6	60.9
-7	84.2	42.1	84.2	33.7	16.6	33.7	2.50	52.7	26.3	52.7	60.8
-8	82.3	41.1	82.3	33.7	16.6	33.7	2.44	50.8	25.4	50.8	60.6
-9	80.4	40.2	80.4	33.6	16.6	33.6	2.39	49.0	24.5	49.0	60.5
-10	78.5	39.3	78.5	33.5	16.5	33.5	2.34	47.2	23.6	47.2	60.3
-11	76.7	38.3	76.7	33.4	16.5	33.4	2.29	45.5	22.7	45.5	60.1
-12	74.9	37.4	74.9	33.3	16.4	33.3	2.25	43.7	21.9	43.7	59.9
-13	73.1	36.5	73.1	33.2	16.4	33.2	2.20	42.1	21.0	42.1	59.7
-14	71.3	35.7	71.3	33.1	16.3	33.1	2.15	40.4	20.2	40.4	59.4
-15	69.6	34.8	69.6	33.0	16.3	33.0	2.11	38.7	19.4	38.7	59.2

-- attention: operating limits not reflected in performance table

Th -OU	[°C]	65 (T-max)									
		Ts -IN [°C]	Qh nom [kW]	Qh min [kW]	Qh max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	COP nom kW / kW	Qc nom [kW]	Qc min [kW]
25	<b>159.4</b>	79.7	159.4	<b>42.9</b>	21.2	42.9	<b>3.71</b>	119.3	59.7	119.3	72.0
24	<b>156.6</b>	78.3	156.6	<b>43.0</b>	21.2	43.0	<b>3.65</b>	116.5	58.3	116.5	72.0
23	<b>153.9</b>	77.0	153.9	<b>43.0</b>	21.2	43.0	<b>3.58</b>	113.8	56.9	113.8	72.1
22	<b>151.2</b>	75.6	151.2	<b>43.0</b>	21.2	43.0	<b>3.51</b>	111.0	55.5	111.0	72.2
21	<b>148.6</b>	74.3	148.6	<b>43.1</b>	21.2	43.1	<b>3.45</b>	108.3	54.2	108.3	72.2
20	<b>145.9</b>	73.0	145.9	<b>43.1</b>	21.3	43.1	<b>3.39</b>	105.7	52.8	105.7	72.3
19	<b>143.3</b>	71.7	143.3	<b>43.1</b>	21.3	43.1	<b>3.32</b>	103.1	51.5	103.1	72.3
18	<b>140.8</b>	70.4	140.8	<b>43.2</b>	21.3	43.2	<b>3.26</b>	100.5	50.2	100.5	72.4
17	<b>138.3</b>	69.1	138.3	<b>43.2</b>	21.3	43.2	<b>3.20</b>	97.9	49.0	97.9	72.4
16	<b>135.8</b>	67.9	135.8	<b>43.2</b>	21.3	43.2	<b>3.14</b>	95.4	47.7	95.4	72.5
15	<b>133.3</b>	66.7	133.3	<b>43.2</b>	21.3	43.2	<b>3.08</b>	92.9	46.5	92.9	72.6
14	<b>130.9</b>	65.4	130.9	<b>43.2</b>	21.3	43.2	<b>3.03</b>	90.5	45.3	90.5	72.6
13	<b>128.5</b>	64.2	128.5	<b>43.3</b>	21.3	43.3	<b>2.97</b>	88.1	44.0	88.1	72.6
12	<b>126.1</b>	63.1	126.1	<b>43.3</b>	21.3	43.3	<b>2.92</b>	85.7	42.9	85.7	72.7
11	<b>123.8</b>	61.9	123.8	<b>43.3</b>	21.3	43.3	<b>2.86</b>	83.4	41.7	83.4	72.7
10	<b>121.5</b>	60.7	121.5	<b>43.3</b>	21.3	43.3	<b>2.81</b>	81.0	40.5	81.0	72.7
9	<b>119.2</b>	59.6	119.2	<b>43.3</b>	21.3	43.3	<b>2.75</b>	78.8	39.4	78.8	72.8
8	<b>116.9</b>	58.5	116.9	<b>43.3</b>	21.3	43.3	<b>2.70</b>	76.5	38.3	76.5	72.8
7	<b>114.7</b>	57.3	114.7	<b>43.2</b>	21.3	43.2	<b>2.65</b>	74.3	37.1	74.3	72.8
6	<b>112.5</b>	56.2	112.5	<b>43.2</b>	21.3	43.2	<b>2.60</b>	72.1	36.1	72.1	72.8
5	<b>110.3</b>	55.2	110.3	<b>43.2</b>	21.3	43.2	<b>2.55</b>	70.0	35.0	70.0	72.8
4	<b>108.1</b>	54.1	108.1	<b>43.2</b>	21.3	43.2	<b>2.50</b>	67.8	33.9	67.8	72.7
3	<b>106.0</b>	53.0	106.0	<b>43.1</b>	21.3	43.1	<b>2.46</b>	65.7	32.9	65.7	72.7
2	<b>103.9</b>	52.0	103.9	<b>43.1</b>	21.3	43.1	<b>2.41</b>	63.7	31.8	63.7	72.6
1	<b>101.8</b>	50.9	101.8	<b>43.1</b>	21.2	43.1	<b>2.37</b>	61.6	30.8	61.6	72.6
0	<b>99.8</b>	49.9	99.8	<b>43.0</b>	21.2	43.0	<b>2.32</b>	59.6	29.8	59.6	72.5
-1	<b>97.7</b>	48.9	97.7	<b>42.9</b>	21.2	42.9	<b>2.28</b>	57.6	28.8	57.6	72.4
-2	<b>95.7</b>	47.9	95.7	<b>42.9</b>	21.1	42.9	<b>2.23</b>	55.7	27.8	55.7	72.3
-3	<b>93.7</b>	46.9	93.7	<b>42.8</b>	21.1	42.8	<b>2.19</b>	53.8	26.9	53.8	72.2
-4	<b>91.8</b>	45.9	91.8	<b>42.7</b>	21.1	42.7	<b>2.15</b>	51.9	25.9	51.9	72.1
-5	<b>89.8</b>	44.9	89.8	<b>42.6</b>	21.0	42.6	<b>2.11</b>	50.0	25.0	50.0	71.9
-6	<b>87.9</b>	43.9	87.9	<b>42.5</b>	21.0	42.5	<b>2.07</b>	48.2	24.1	48.2	71.8
-7	<b>86.0</b>	43.0	86.0	<b>42.4</b>	20.9	42.4	<b>2.03</b>	46.4	23.2	46.4	71.6
-8	<b>84.1</b>	42.0	84.1	<b>42.3</b>	20.9	42.3	<b>1.99</b>	44.6	22.3	44.6	71.4
-9	<b>82.2</b>	41.1	82.2	<b>42.2</b>	20.8	42.2	<b>1.95</b>	42.8	21.4	42.8	71.2
-10	<b>80.4</b>	40.2	80.4	<b>42.0</b>	20.7	42.0	<b>1.91</b>	41.1	20.5	41.1	70.9
-11	<b>78.5</b>	39.3	78.5	<b>41.9</b>	20.7	41.9	<b>1.87</b>	39.4	19.7	39.4	70.6
-12	<b>76.7</b>	38.3	76.7	<b>41.7</b>	20.6	41.7	<b>1.84</b>	37.7	18.9	37.7	70.4
-13	<b>74.9</b>	37.4	74.9	<b>41.6</b>	20.5	41.6	<b>1.80</b>	36.1	18.0	36.1	70.1
-14	<b>73.1</b>	36.5	73.1	<b>41.4</b>	20.4	41.4	<b>1.77</b>	34.4	17.2	34.4	69.7
-15	<b>71.3</b>	35.6	71.3	<b>41.2</b>	20.3	41.2	<b>1.73</b>	32.8	16.4	32.8	69.4

-- attention: operating limits not reflected in performance table

Tc -OU		W 12 / 7 °C									
[°C]	Qc nom [kW]	Qc min [kW]	Qc max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	EER kW / kW	Qh nom [kW]	Qh min [kW]	Qh max [kW]	I nom [A]
40	<b>70.4</b>	35.2	70.4	<b>29.0</b>	14.3	29.0	<b>2.43</b>	97.5	48.7	97.5	55.5
39	<b>70.9</b>	35.5	70.9	<b>28.4</b>	14.0	28.4	<b>2.50</b>	97.4	48.7	97.4	54.7
38	<b>71.4</b>	35.7	71.4	<b>27.7</b>	13.7	27.7	<b>2.58</b>	97.3	48.6	97.3	54.0
37	<b>71.9</b>	35.9	71.9	<b>27.1</b>	13.4	27.1	<b>2.65</b>	97.2	48.6	97.2	53.3
36	<b>72.3</b>	36.2	72.3	<b>26.5</b>	13.1	26.5	<b>2.73</b>	97.1	48.5	97.1	52.6
35	<b>72.8</b>	36.4	72.8	<b>25.9</b>	12.8	25.9	<b>2.81</b>	97.0	48.5	97.0	52.0
34	<b>73.2</b>	36.6	73.2	<b>25.4</b>	12.5	25.4	<b>2.89</b>	96.9	48.4	96.9	51.3
33	<b>73.6</b>	36.8	73.6	<b>24.8</b>	12.2	24.8	<b>2.97</b>	96.8	48.4	96.8	50.7
32	<b>74.0</b>	37.0	74.0	<b>24.3</b>	12.0	24.3	<b>3.05</b>	96.7	48.3	96.7	50.1
31	<b>74.4</b>	37.2	74.4	<b>23.7</b>	11.7	23.7	<b>3.14</b>	96.6	48.3	96.6	49.5
30	<b>74.8</b>	37.4	74.8	<b>23.2</b>	11.4	23.2	<b>3.22</b>	96.4	48.2	96.4	48.9
29	<b>75.1</b>	37.6	75.1	<b>22.7</b>	11.2	22.7	<b>3.31</b>	96.3	48.2	96.3	48.3
28	<b>75.5</b>	37.7	75.5	<b>22.2</b>	10.9	22.2	<b>3.40</b>	96.2	48.1	96.2	47.7
27	<b>75.8</b>	37.9	75.8	<b>21.7</b>	10.7	21.7	<b>3.49</b>	96.1	48.1	96.1	47.2
26	<b>76.2</b>	38.1	76.2	<b>21.2</b>	10.5	21.2	<b>3.59</b>	96.0	48.0	96.0	46.7
25	<b>76.5</b>	38.2	76.5	<b>20.8</b>	10.2	20.8	<b>3.68</b>	95.9	47.9	95.9	46.1
24	<b>76.8</b>	38.4	76.8	<b>20.3</b>	10.0	20.3	<b>3.78</b>	95.7	47.9	95.7	45.6
23	<b>77.1</b>	38.5	77.1	<b>19.9</b>	9.8	19.9	<b>3.88</b>	95.6	47.8	95.6	45.1
22	<b>77.3</b>	38.7	77.3	<b>19.4</b>	9.6	19.4	<b>3.98</b>	95.5	47.7	95.5	44.6
21	<b>77.6</b>	38.8	77.6	<b>19.0</b>	9.4	19.0	<b>4.09</b>	95.3	47.7	95.3	44.1
20	<b>77.9</b>	38.9	77.9	<b>18.6</b>	9.1	18.6	<b>4.20</b>	95.2	47.6	95.2	43.6

Tc [°C]		W 23 / 18 °C									
[°C]	Qc nom [kW]	Qc min [kW]	Qc max [kW]	Pin nom [kW]	Pin min [kW]	Pin max [kW]	EER kW / kW	Qh nom [kW]	Qh min [kW]	Qh max [kW]	I nom [A]
40	<b>93.9</b>	46.9	93.9	<b>29.0</b>	14.3	29.0	<b>3.24</b>	120.9	60.4	121.0	55.4
39	<b>94.5</b>	47.3	94.5	<b>28.4</b>	14.0	28.4	<b>3.33</b>	120.9	60.5	121.0	54.7
38	<b>95.1</b>	47.6	95.1	<b>27.7</b>	13.7	27.7	<b>3.43</b>	120.9	60.5	120.9	53.9
37	<b>95.7</b>	47.9	95.7	<b>27.1</b>	13.4	27.1	<b>3.53</b>	120.9	60.5	120.9	53.2
36	<b>96.3</b>	48.1	96.3	<b>26.5</b>	13.1	26.5	<b>3.63</b>	121.0	60.5	120.9	52.4
35	<b>96.9</b>	48.4	96.9	<b>25.9</b>	12.8	25.9	<b>3.74</b>	121.0	60.5	120.9	51.7
34	<b>97.4</b>	48.7	97.4	<b>25.4</b>	12.5	25.4	<b>3.84</b>	121.0	60.5	120.9	51.1
33	<b>97.9</b>	49.0	97.9	<b>24.8</b>	12.2	24.8	<b>3.95</b>	121.0	60.5	120.9	50.4
32	<b>98.5</b>	49.2	98.5	<b>24.3</b>	12.0	24.3	<b>4.06</b>	121.1	60.5	120.9	49.7
31	<b>99.0</b>	49.5	99.0	<b>23.7</b>	11.7	23.7	<b>4.17</b>	121.1	60.5	120.9	49.1
30	<b>99.5</b>	49.7	99.5	<b>23.2</b>	11.4	23.2	<b>4.29</b>	121.1	60.6	120.9	48.5
29	<b>100.0</b>	50.0	100.0	<b>22.7</b>	11.2	22.7	<b>4.41</b>	121.1	60.6	120.9	47.9
28	<b>100.5</b>	50.2	100.5	<b>22.2</b>	10.9	22.2	<b>4.53</b>	121.2	60.6	120.9	47.2
27	<b>100.9</b>	50.5	100.9	<b>21.7</b>	10.7	21.7	<b>4.65</b>	121.2	60.6	120.9	46.6
26	<b>101.4</b>	50.7	101.4	<b>21.2</b>	10.5	21.2	<b>4.77</b>	121.2	60.6	121.0	46.1
25	<b>101.8</b>	50.9	101.8	<b>20.8</b>	10.2	20.8	<b>4.90</b>	121.2	60.6	121.0	45.5
24	<b>102.2</b>	51.1	102.2	<b>20.3</b>	10.0	20.3	<b>5.03</b>	121.3	60.6	121.0	44.9
23	<b>102.7</b>	51.3	102.7	<b>19.9</b>	9.8	19.9	<b>5.17</b>	121.3	60.6	121.0	44.3
22	<b>103.1</b>	51.5	103.1	<b>19.4</b>	9.6	19.4	<b>5.31</b>	121.3	60.6	121.1	43.8
21	<b>103.4</b>	51.7	103.4	<b>19.0</b>	9.4	19.0	<b>5.45</b>	121.3	60.6	121.1	43.2
20	<b>103.8</b>	51.9	103.8	<b>18.6</b>	9.1	18.6	<b>5.60</b>	121.3	60.6	121.1	42.6

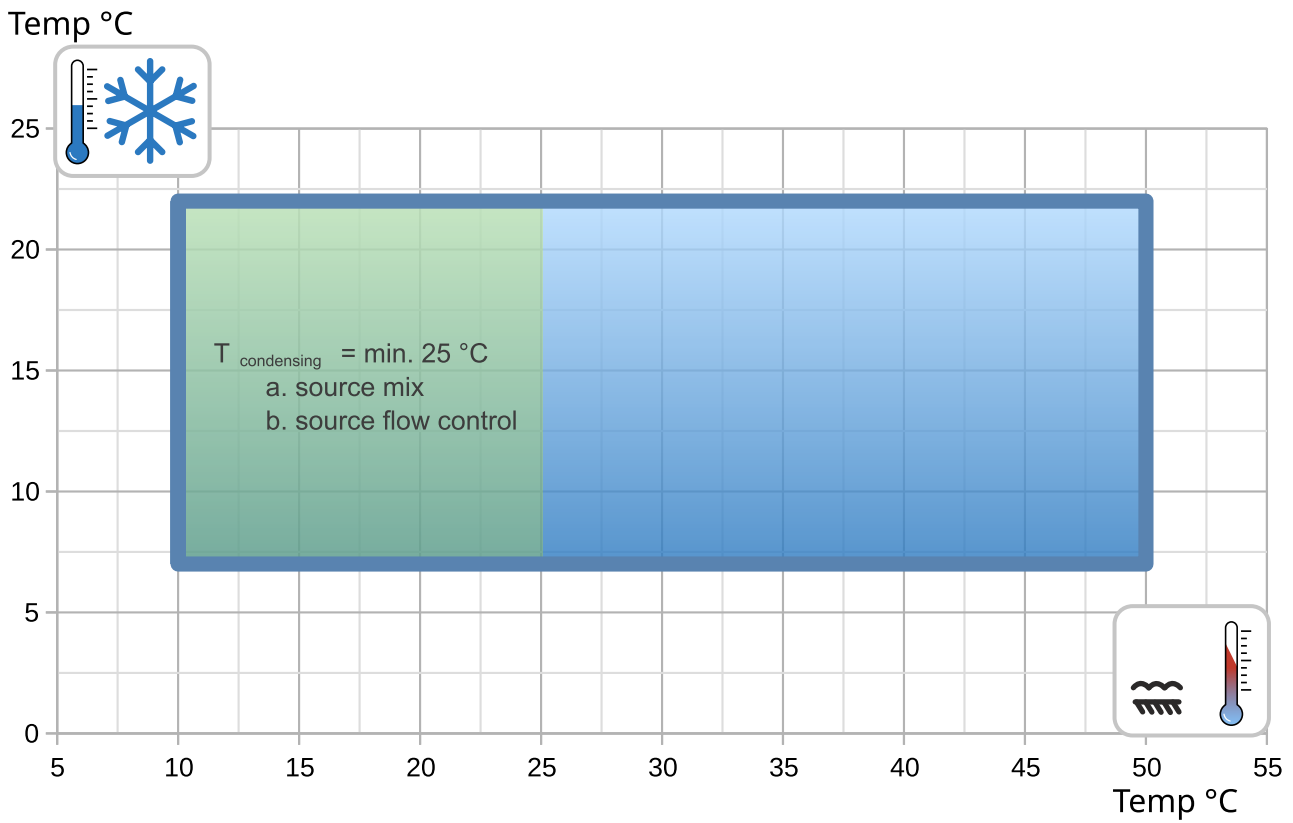
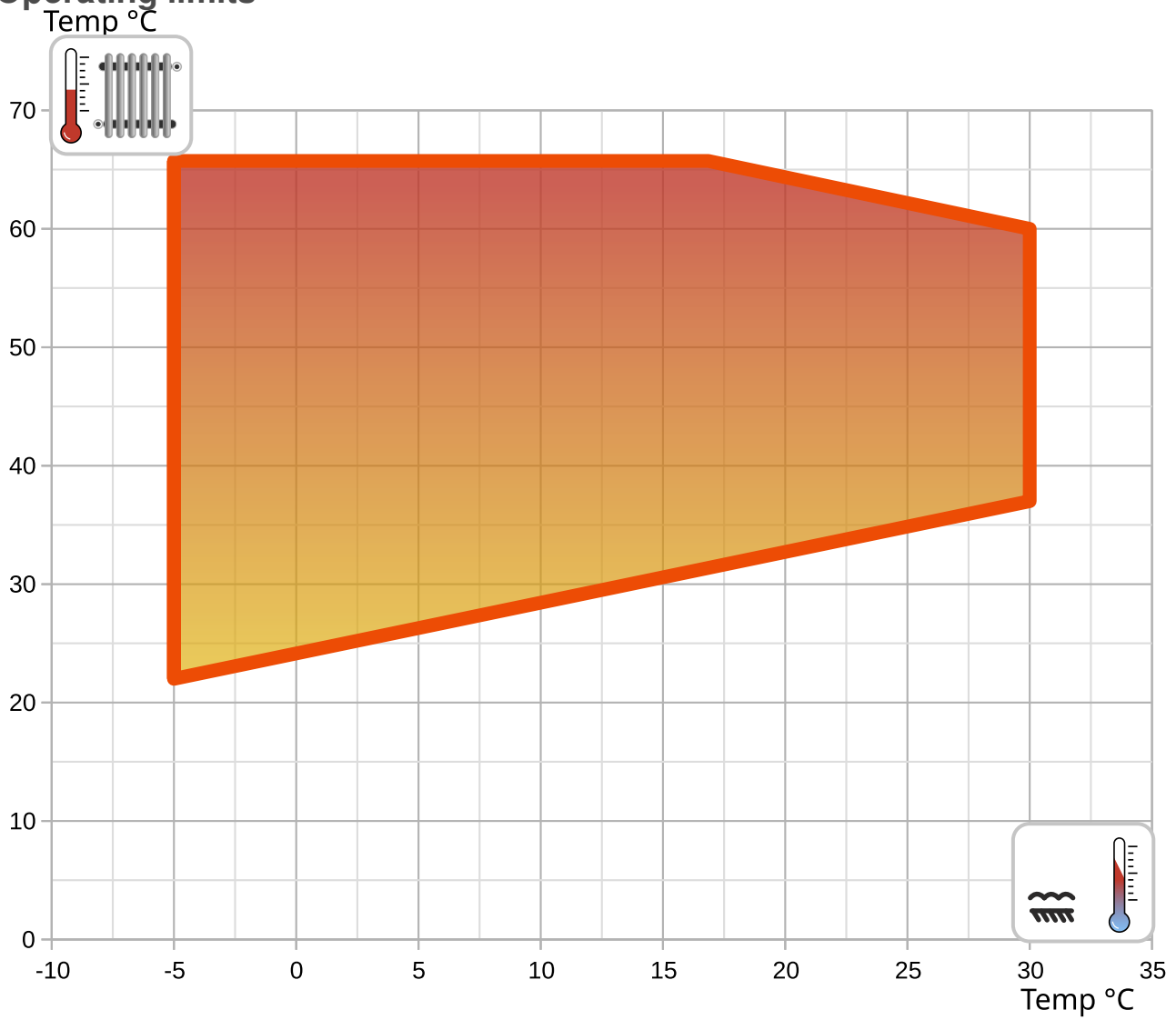
-- attention: operating limits not reflected in performance table

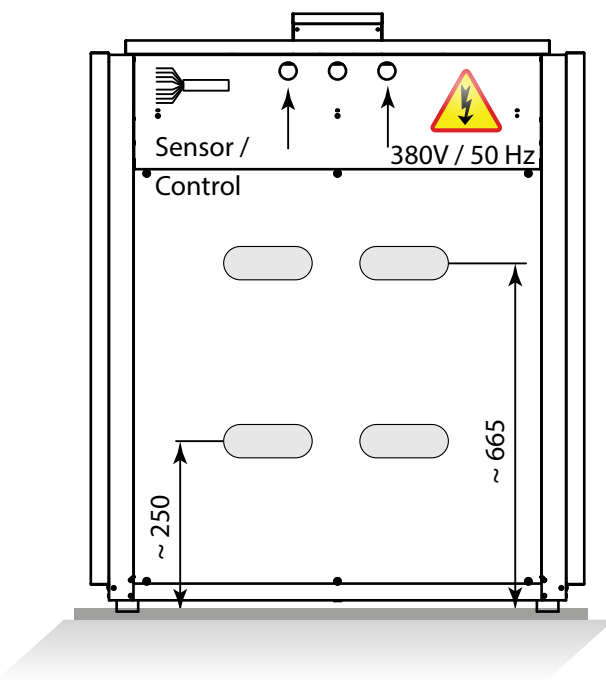
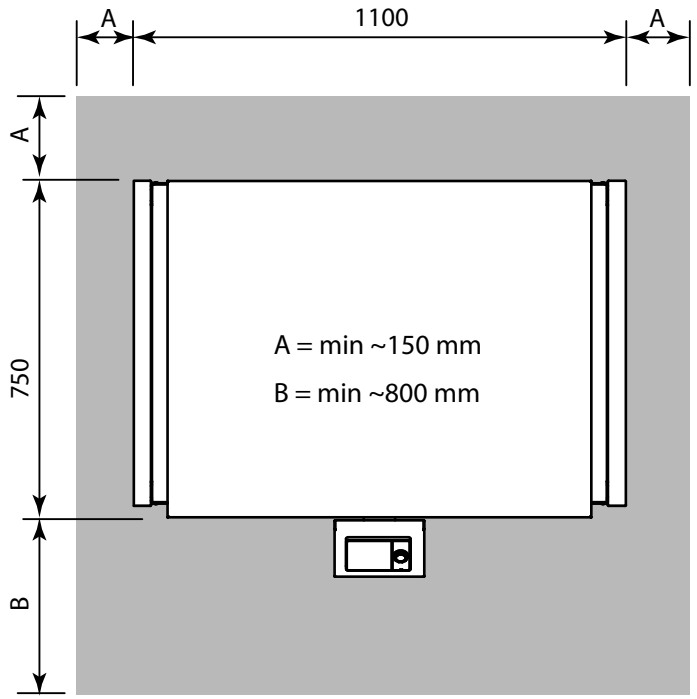
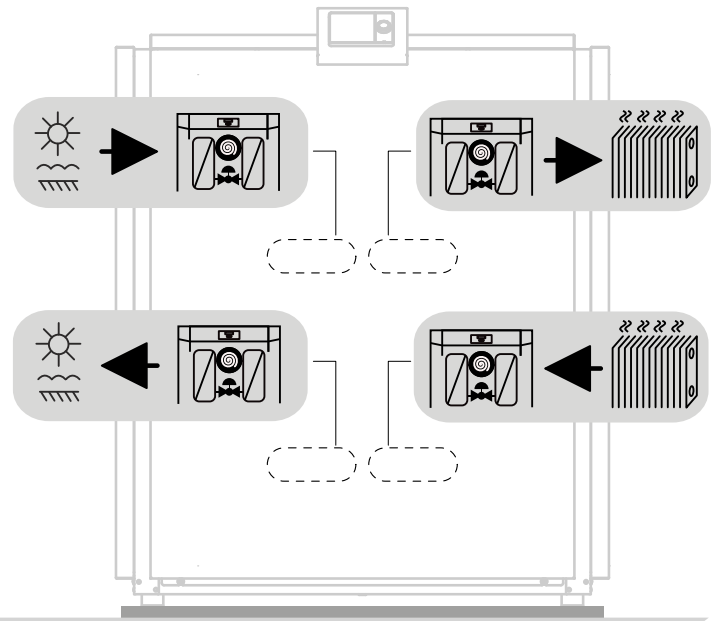
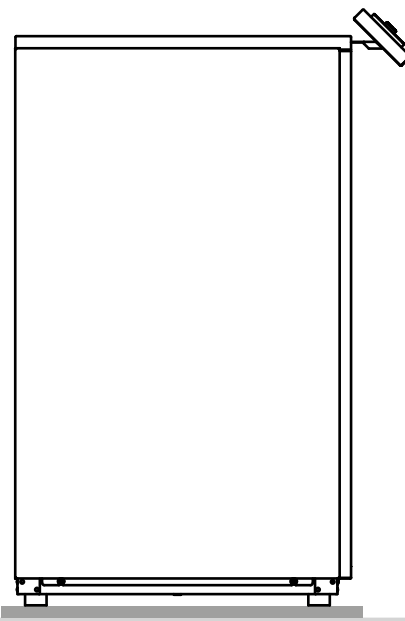
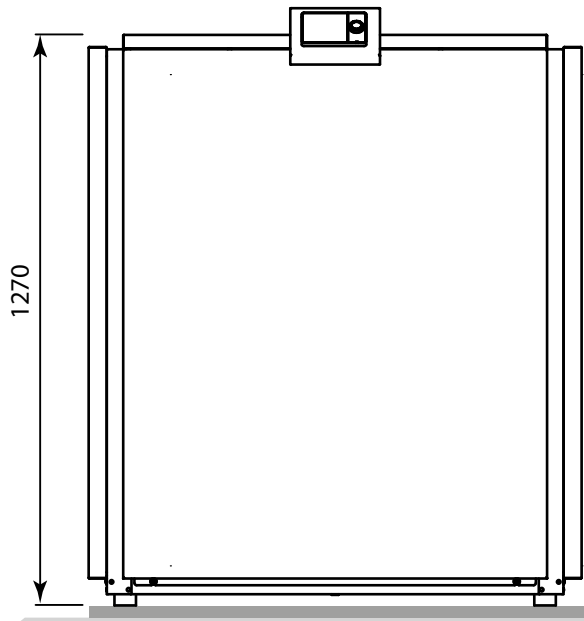
LEGEND:

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

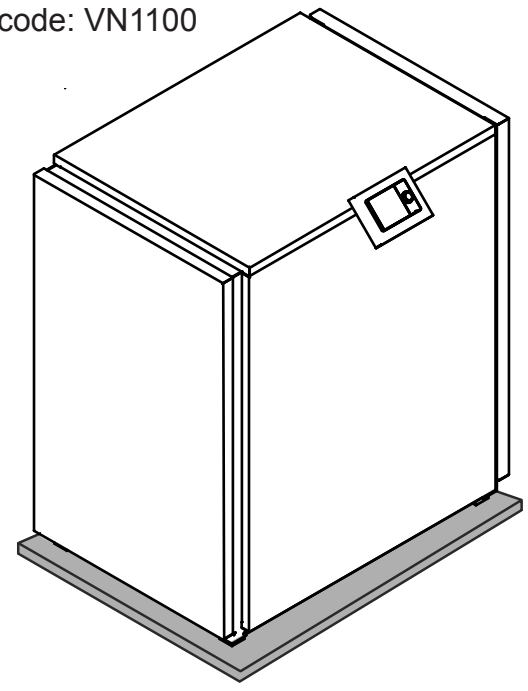


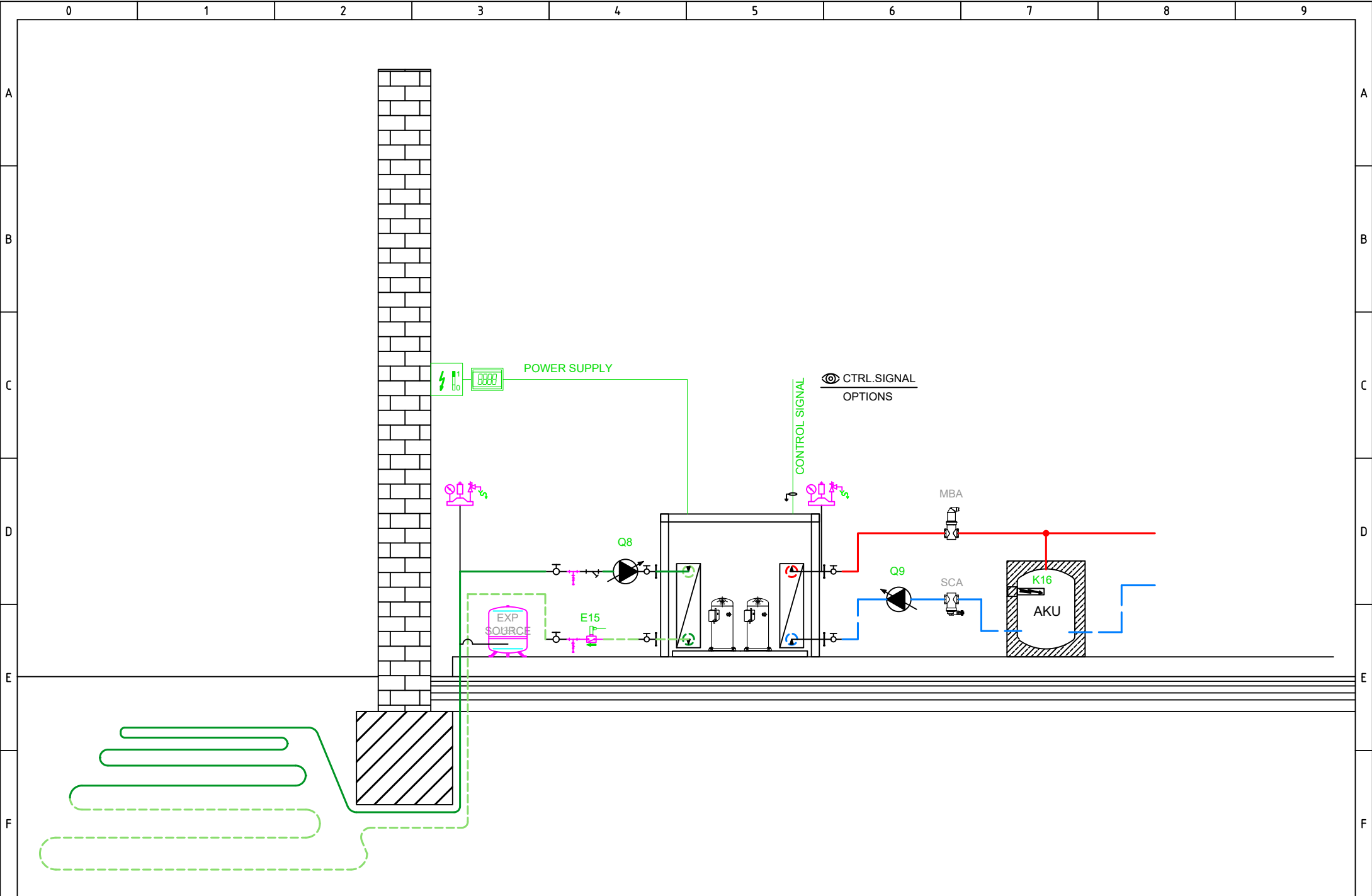
### Operating limits



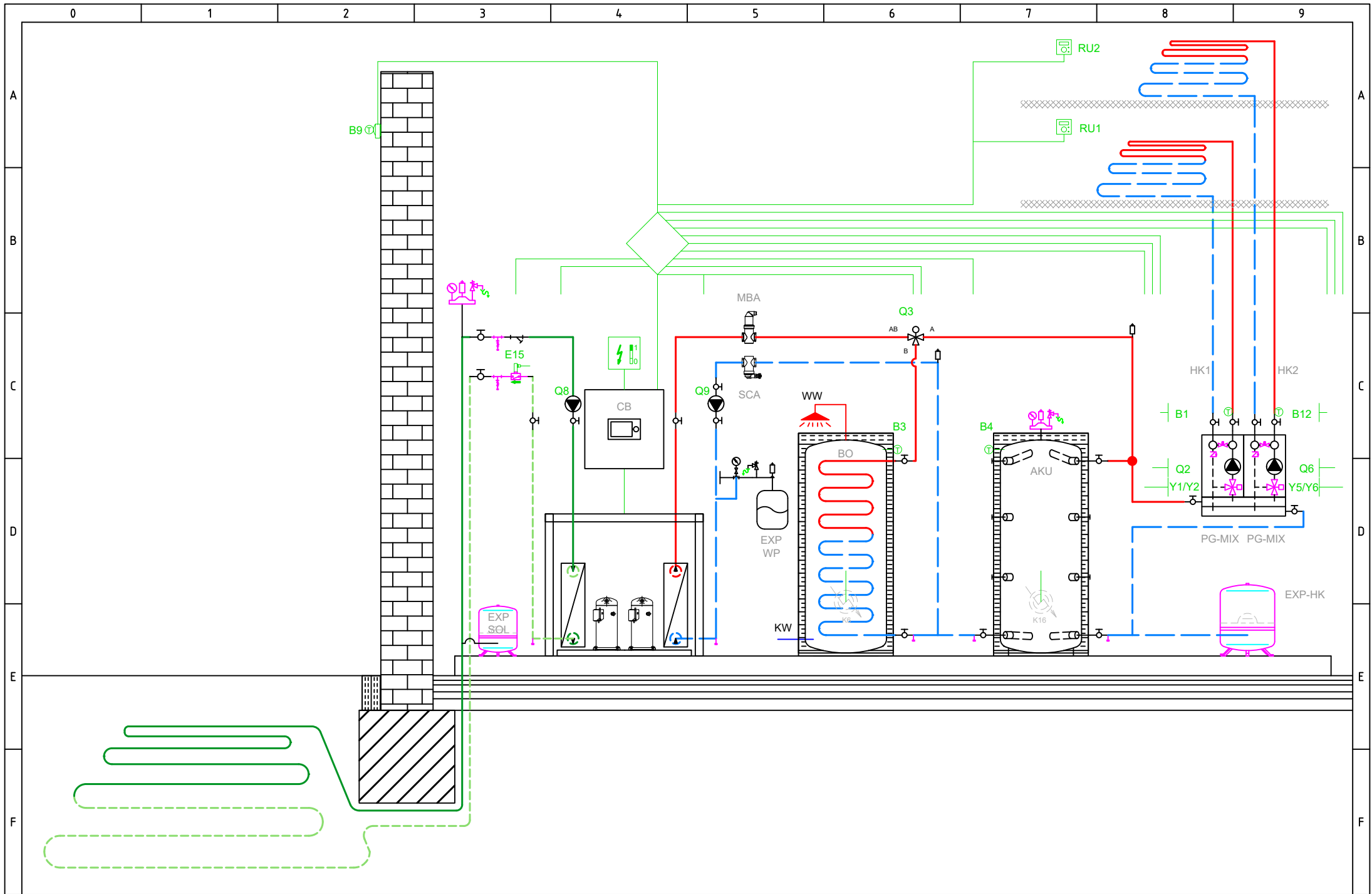


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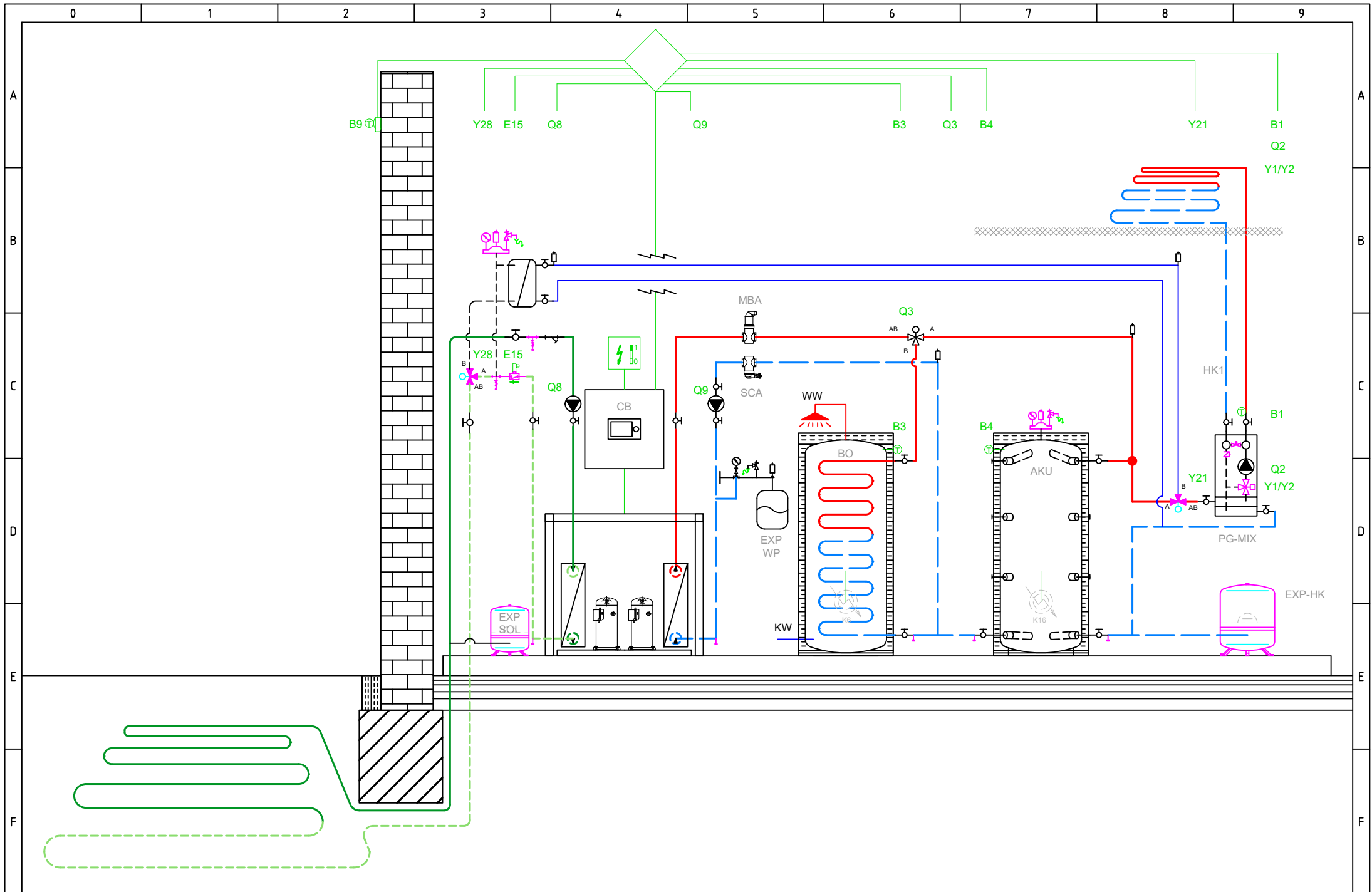




FACTORY SETTINGS



BASIC APPLICATION



OPTIONAL APPLICATION

Total: max 6A  
1 x QX...: max 2A

Main power supply 230V / 50 Hz  
Ground  
Neutral conductor

- E9 Low-pressure switch E9
- E10 High-pressure switch E10
- E15 Flow switch source E15
- E24 Flow switch consumers E24
- E6 Electrical utility lock E6
- E12 Overload compressor 2 E12
- E21 Mains supervision E21
- E22 Mains supervision E22
- E23 Mains supervision E23
- E11 Overload compressor 1 E11
- K1 Compressor stage 1 K1

Q8 Source pump Q8

Q9 Condenser pump Q9

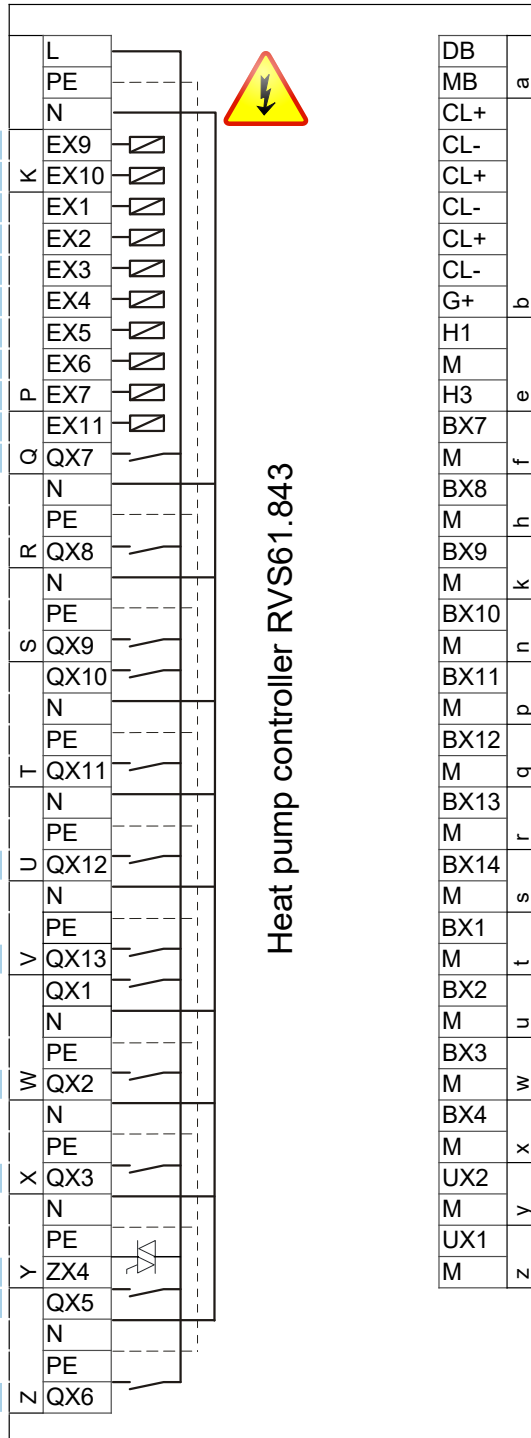
K10 Alarm output K10

K40 Crankcase heater K40

K81 Valve evaporator K81

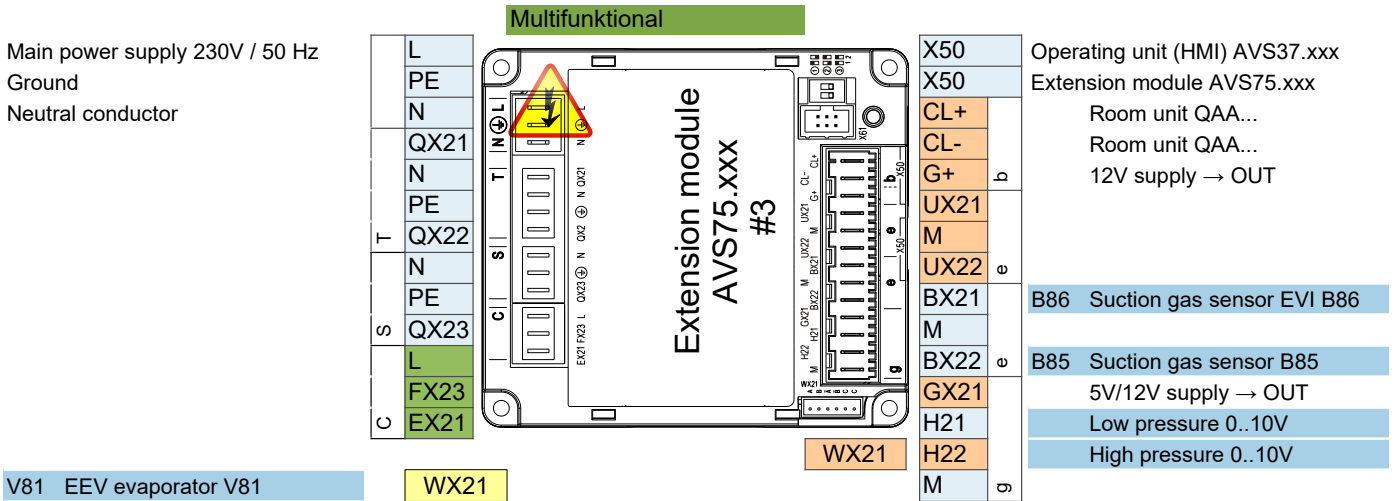
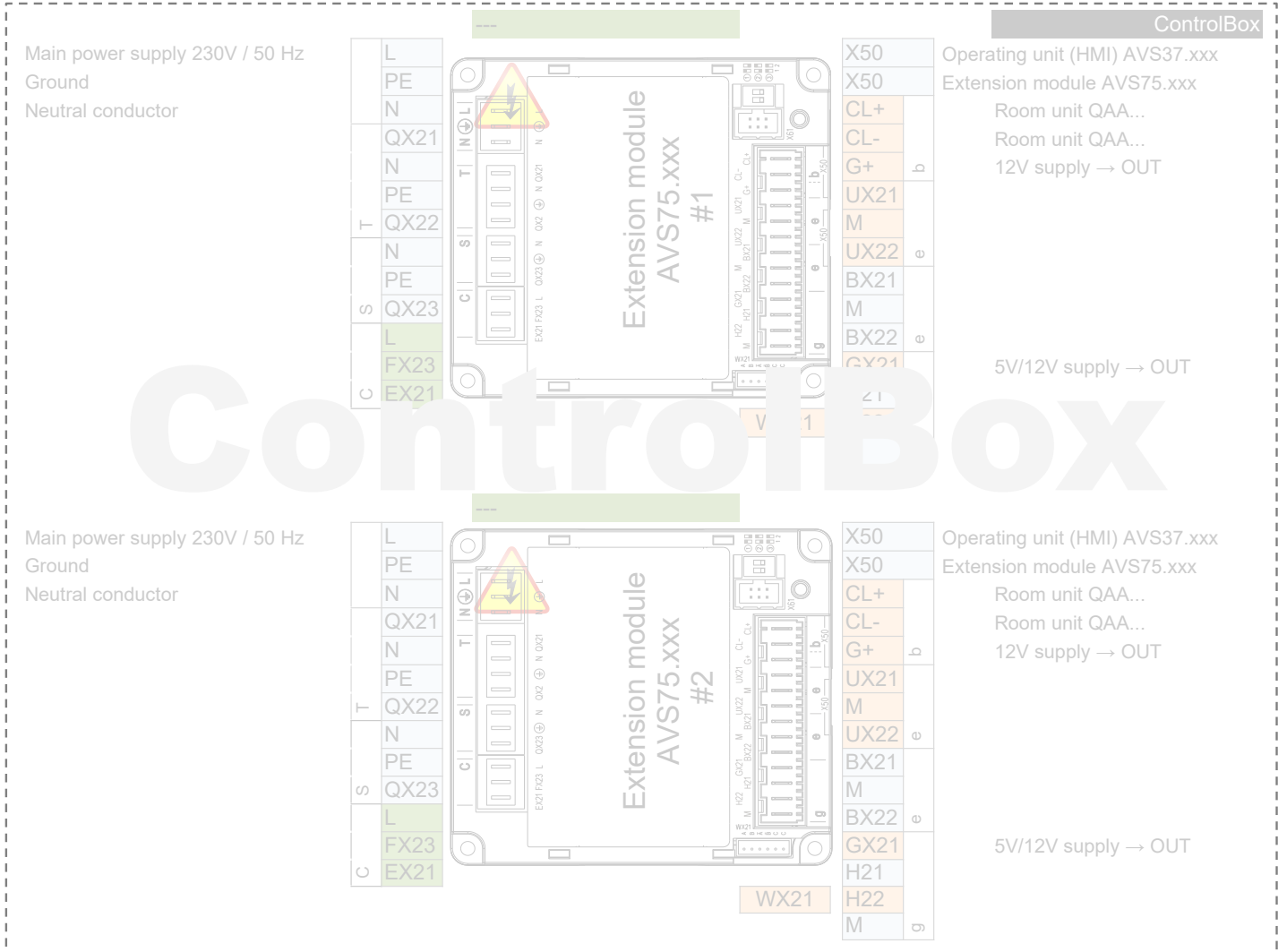
K82 Valve EVI K82

K2 Compressor stage 2 K2



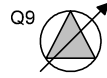
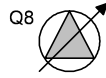
DB		LPB Bus data
MB	a	LPB Bus GND
CL+		Room unit QAA...
CL-		Room unit QAA...
CL+		Room unit QAA... 2.
CL-		Room unit QAA... 2.
CL+		Room unit QAA... 3.
CL-		Room unit QAA... 3.
G+	b	12V supply → OUT
H1		
M		
H3	e	Consumer request VK1
BX7		B81 Hot-gas sensor K1 B81
M	f	
BX8		
M	h	
BX9		
M	k	
BX10		B21 HP flow sensor B21
M	n	
BX11		
M	p	
BX12		B71 HP return sensor B71
M	q	
BX13		B91 Source inlet sensor B91
M	r	
BX14		B84 Source outl sens B92/B84
M	s	
BX1		
M	t	
BX2		
M	u	
BX3		B83 Refrig sensor liquid B83
M	w	
BX4		B82 Hot-gas sensor K2 B82
M	x	
UX2		Condenser pump Q9
M	y	0..10 V Signal
UX1		Source pump Q8
M	z	0..10 V Signal

- AVS75.390
- AVS75.391
- AVS75.370



HEAT PUMP

EXTERNAL  
INTERNAL



K1

K2

K82

K81

K40

K10

Q8 UX1

Q9 UX2

E11  
KRW1  
F1K  
E11

E12  
KRW2  
F2K  
E12

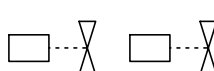
E6

E24  
Q9.ERR  
F1S  
E24

E15  
Q8.ERR  
F1Z  
E15

E10

E9

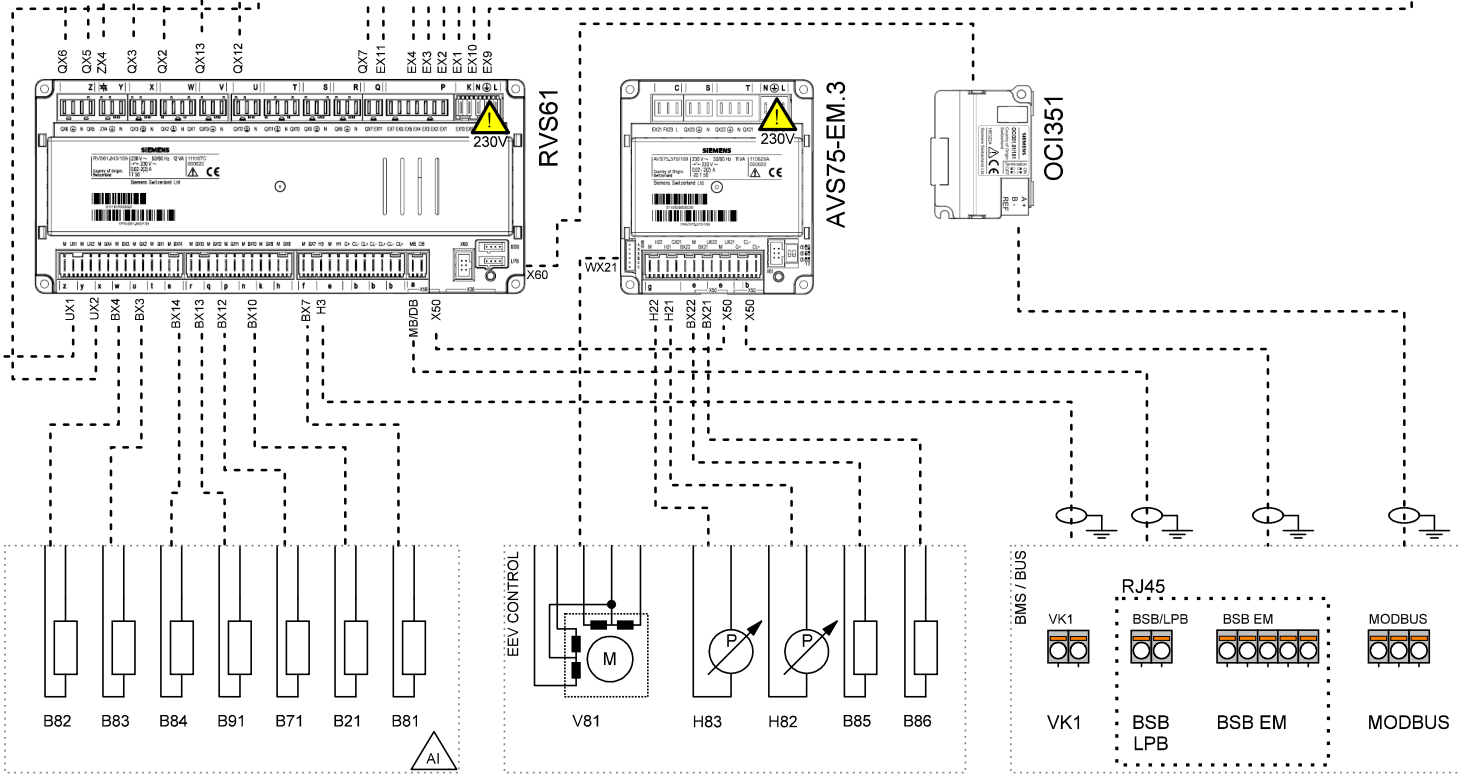
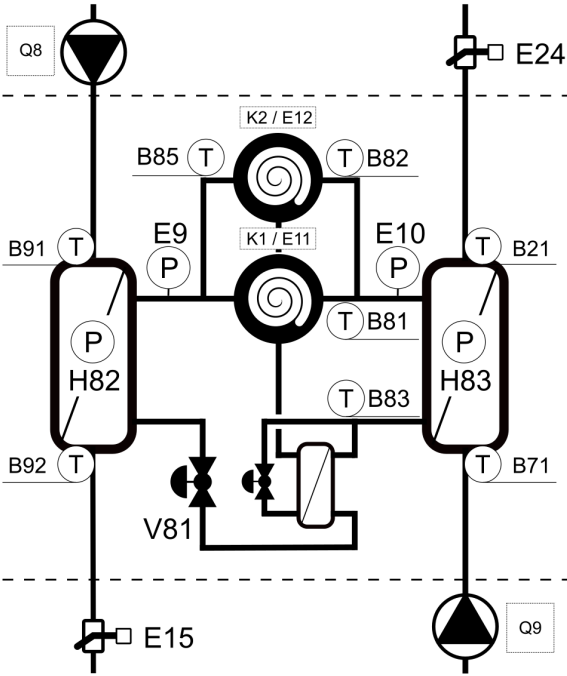


230V,50Hz  
max 6A

0...10V

230V,50Hz  
max 6A

0...10V



PWR SPLY: ..... 3~ 400V, 50 Hz  
CTRL: ..... 1~ 230V, 50 HZ

Company

Title  
TBW-TWW

Version / Note  
05/2024

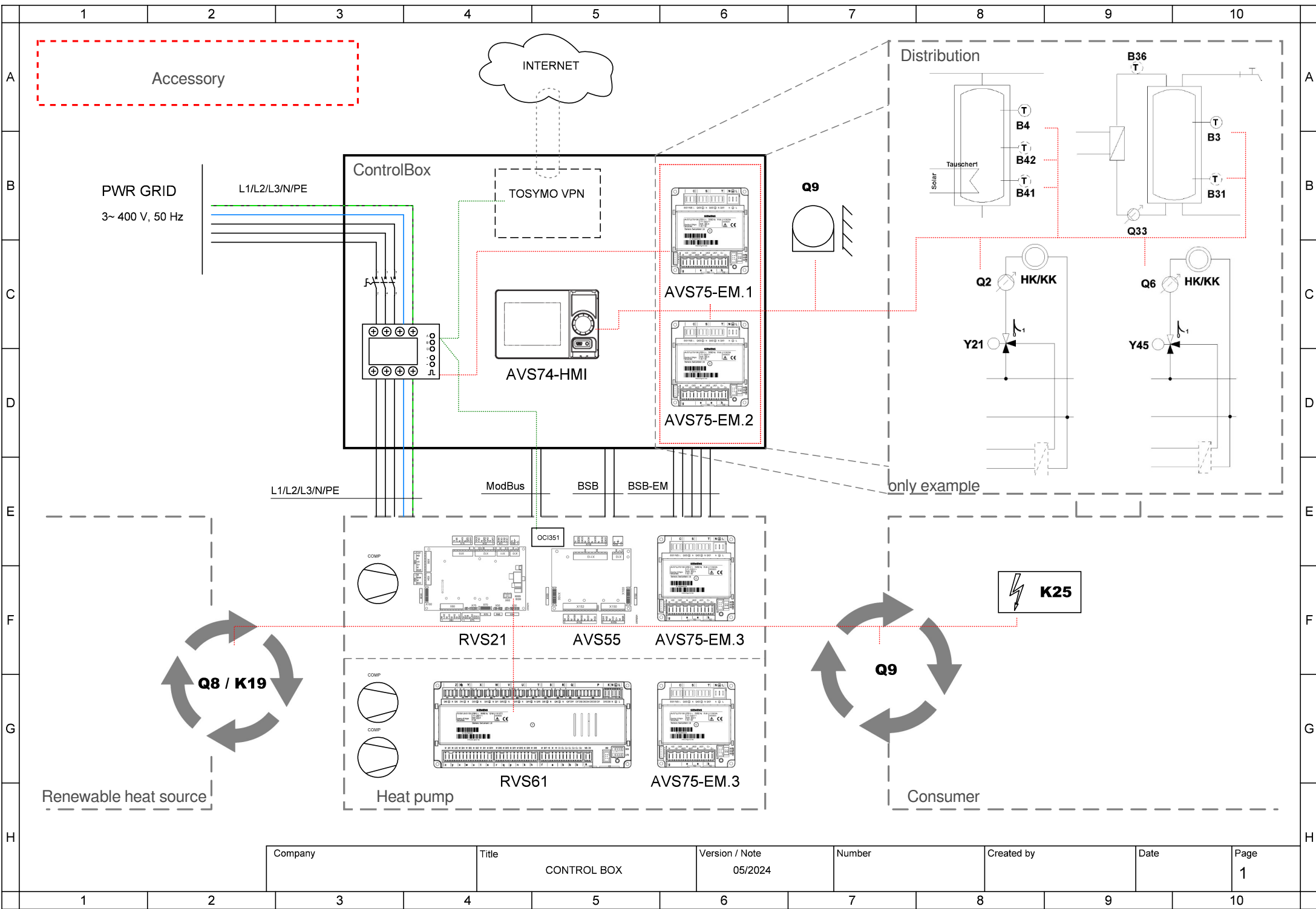
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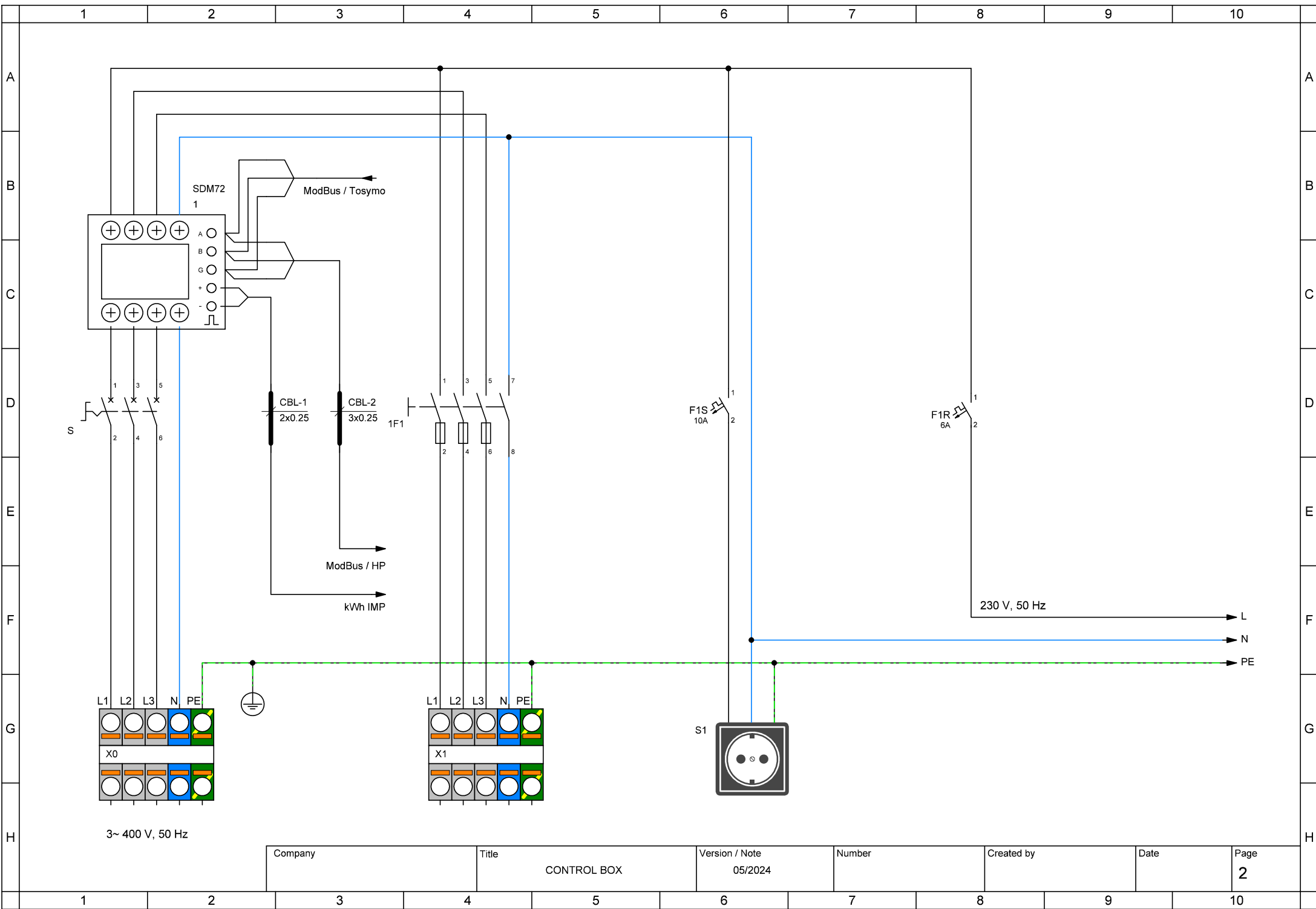
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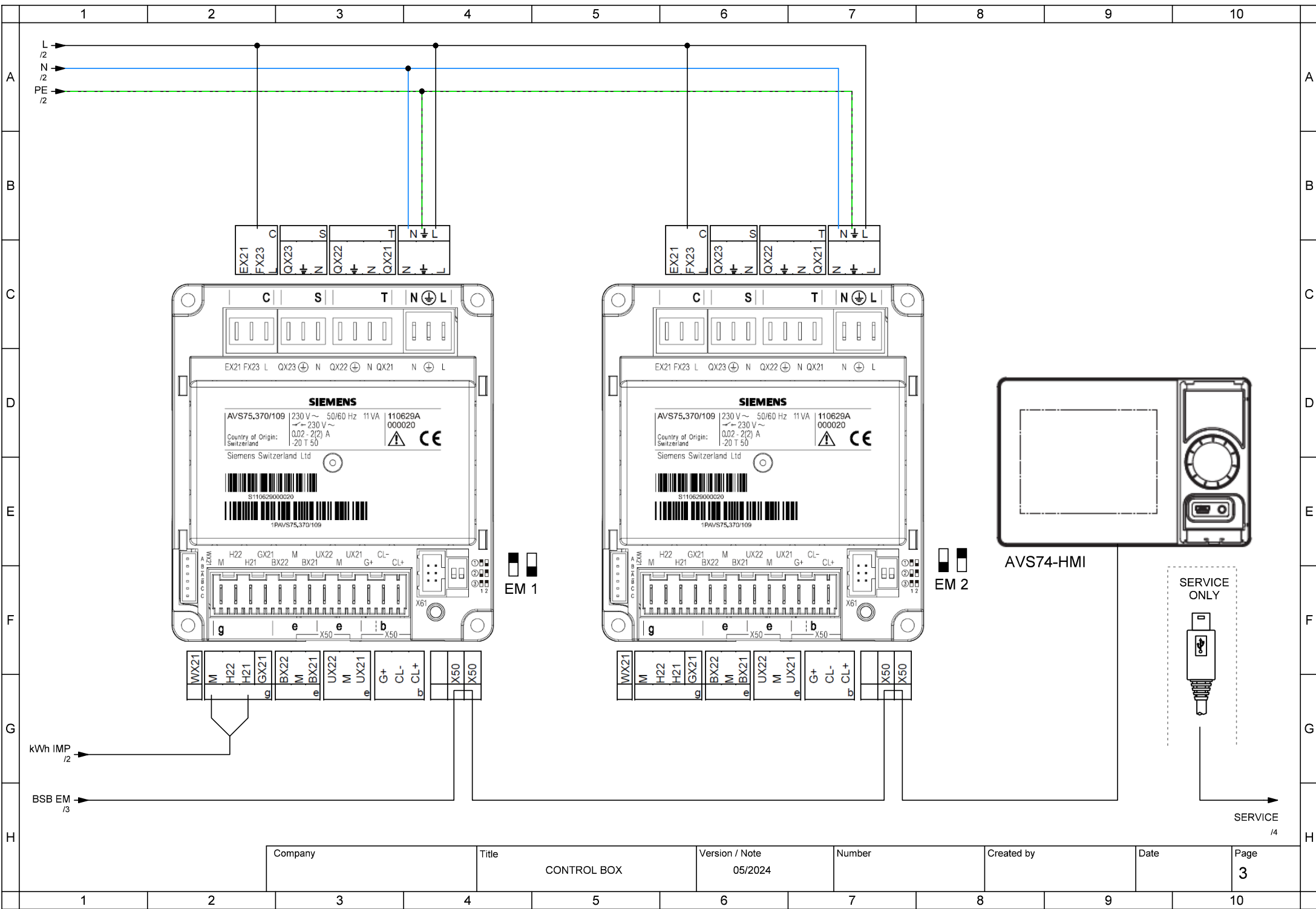




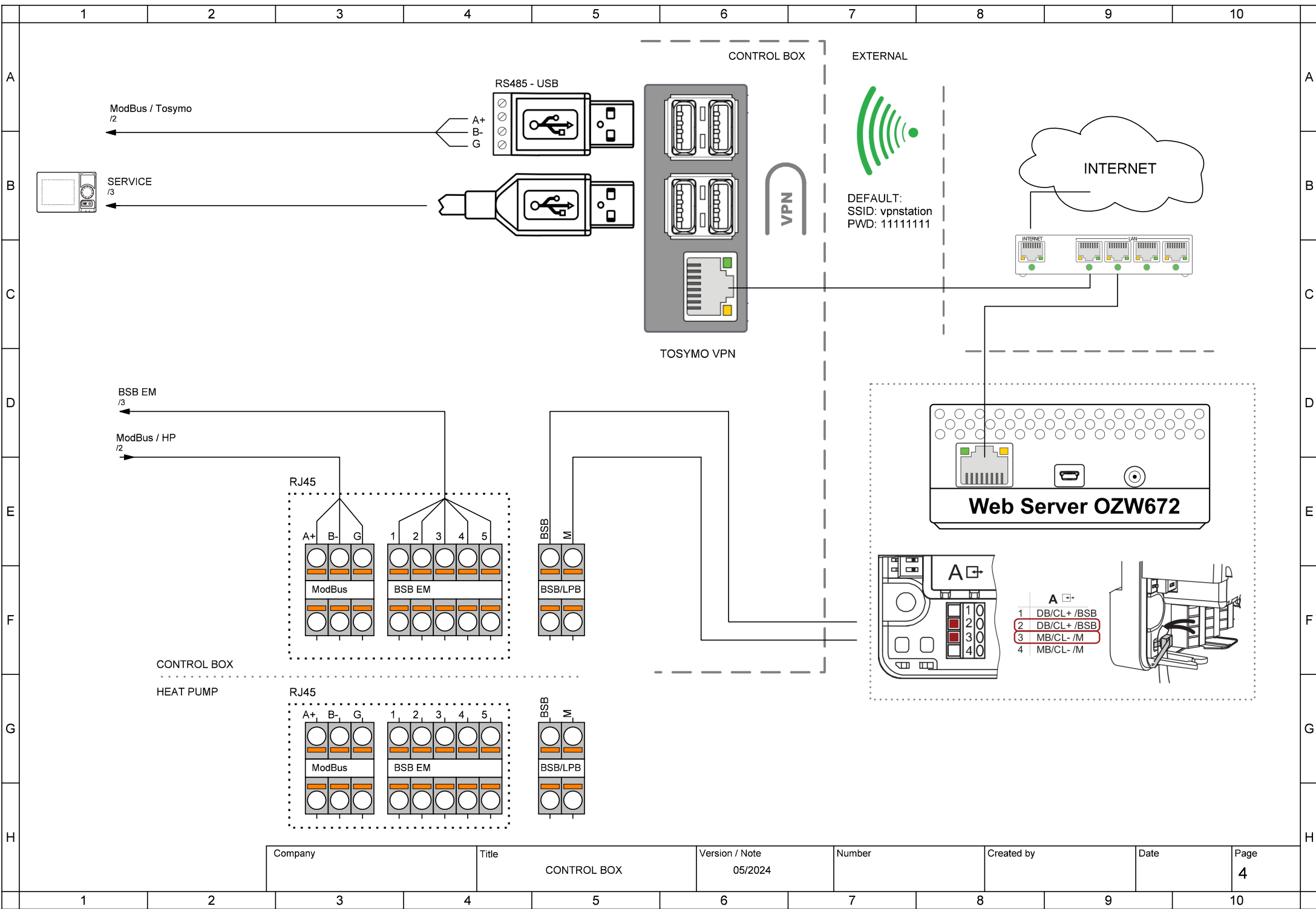
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	CONTROL BOX	05/2024				1



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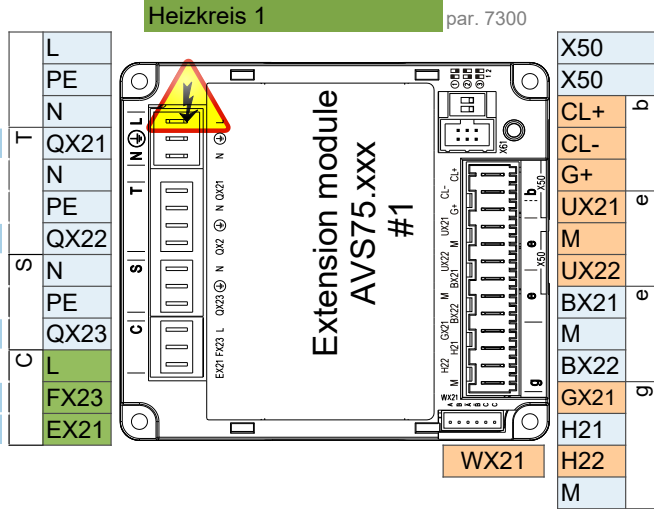
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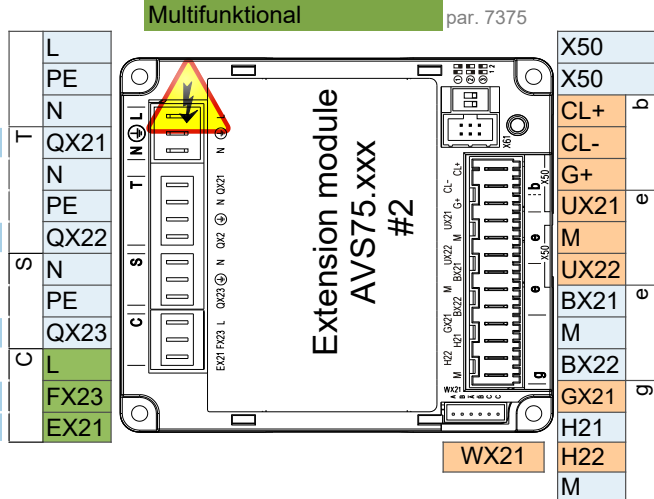
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- AVS75.390
- AVS75.391
- AVS75.370

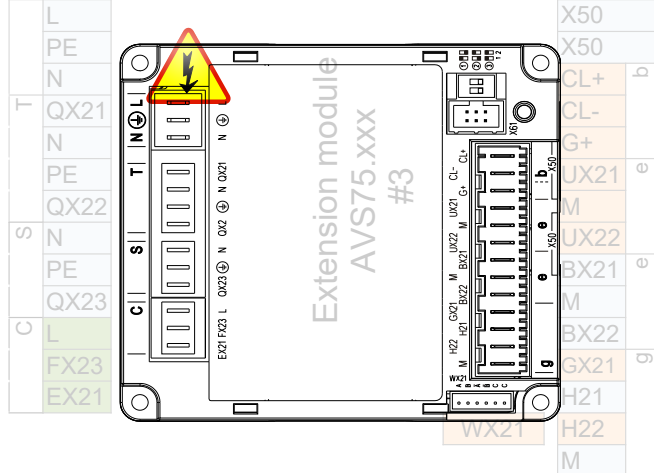
- AVS75.370**  
 Main power supply 230V / 50 Hz  
 Ground  
 Neutral conductor  
**Y1** Mixing valve Open  
  
**Y2** Mixing valve Close  
  
**Q2** Heat circuit pump HC1 Q2  
  
**L** Phase 230V  
**E61** Smart grid E61



- AVS75.370**  
 Main power supply 230V / 50 Hz  
 Ground  
 Neutral conductor  
**Q3** DHW ctrl elem Q3  
  
**K6** El imm heater DHW K6  
  
**Q6** Heat circuit pump HC2 Q6  
  
**L** Phase 230V  
**E62** Smart grid E62



- Main power supply 230V / 50 Hz  
 Ground  
 Neutral conductor



Attention: Extension module 3 is inside the heat pump

## Control connection options

### 1 ControlBox

---

ControlBox, with two built-in extension modules, enables numerous options for application control on the consumer side behind the heat pump. For more, see the ControlBox schematic and the application diagrams sheet.

### 2 Fix flow temperature setpoint - On / Off dry (potential free) contact

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2 wire shielded cable 2 x 0.5 mm<sup>2</sup> - Setpoint = 45°C (editable by param. 1859)

Connection terminal - see wiring diagram

### 3 Analog 0..10V flow temperature setpoint control

---

2 wire shielded cable 2 x 0.5 mm<sup>2</sup> - Setpoint: 0V = 16°C ~ 10V = 60°C ( editable in parameter set )

Connection terminal - see wiring diagram

### 4 ModBus RTU communication command

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3 wire shielded cable min. 3 x 0.25mm<sup>2</sup>

For ModBus mapping table contact technical support

### 5 MQTT IoT communication protocol

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For more information contact technical support