25 years KlimaTherm

KAISAI

KAISAI HEAT PUMPS

SELECTION OF AIR-TO-WATER HEAT PUMPS

- Air pumps do not provide 100% of the heating power demand at the design temperature
- A drop in air temperature causes a drop in the heating power of the pump.
- Extremely low temperatures can cause a complete shutdown.
- The need to use a second heat source.
- The need to determine the point of bivalence.

Bivalence point - the limit temperature to which the heat pump is able to fully cover the heating power requirement of the building without the use of an additional energy source. Below the bivalence point, an additional "peak" heat source is triggered.

SELECTION OF AIR-TO-WATER HEAT PUMPS

- principle of operation - bivalent point

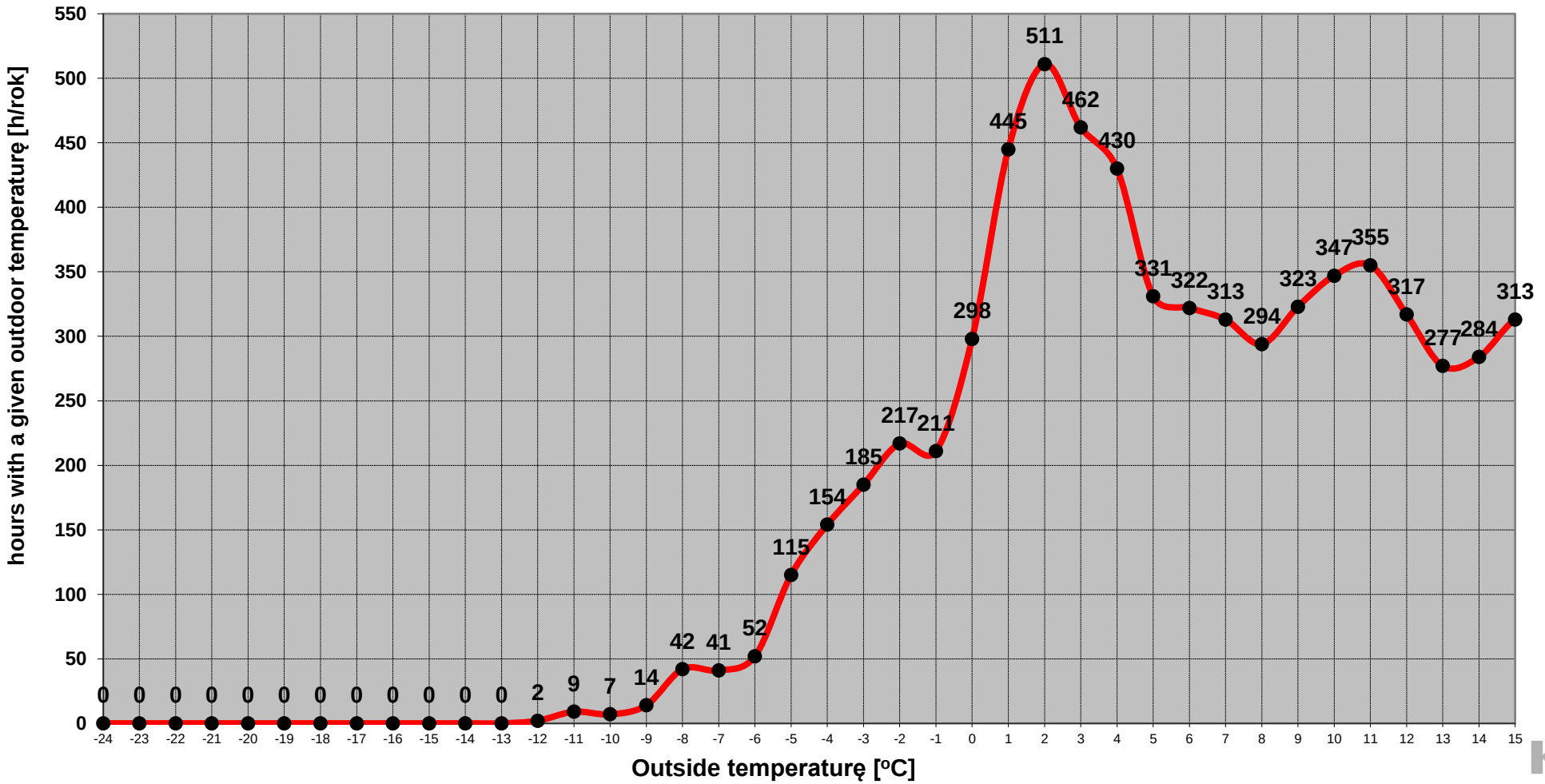
Determines the external temperature to which the heat pump provides heating power without any additional support.

Outdoor design temperature	bivalent point
- 16 °C	od - 4 °C do - 7 °C
- 18 °C	od - 5 °C do - 8 °C
- 20 °C	od - 6 °C do - 9 °C
- 22 °C	od - 7 °C do - 10 °C
- 24 °C	od - 8 °C do - 11 °C

The air heat pump is selected so that it covers 100% of the heat demand at the bivalent point. Below the bivalent point, the pump is supported by another heat source, e.g. an electric heater.

Outdoor temperature graph - Warsaw 2014

PORT PC



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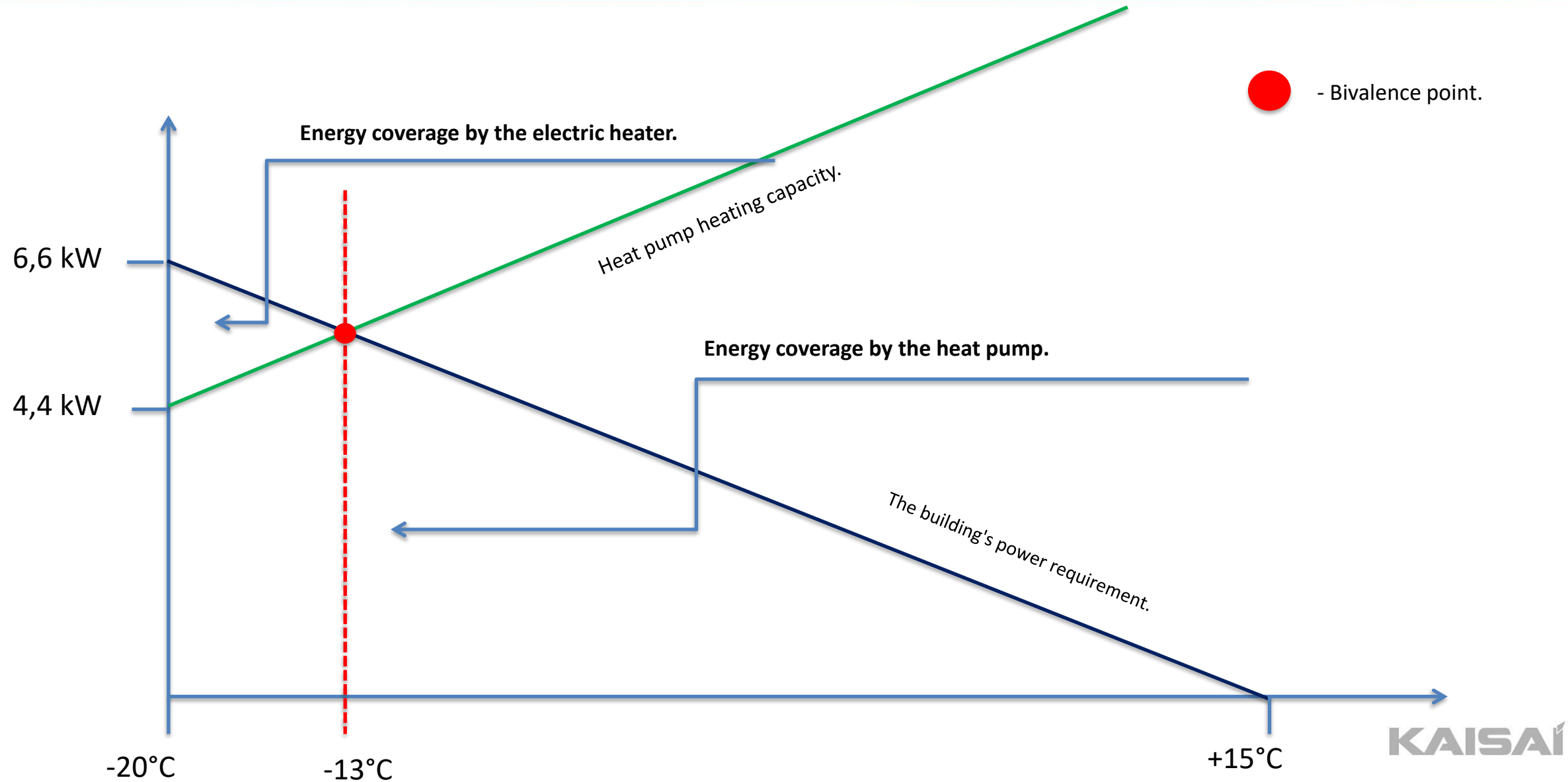
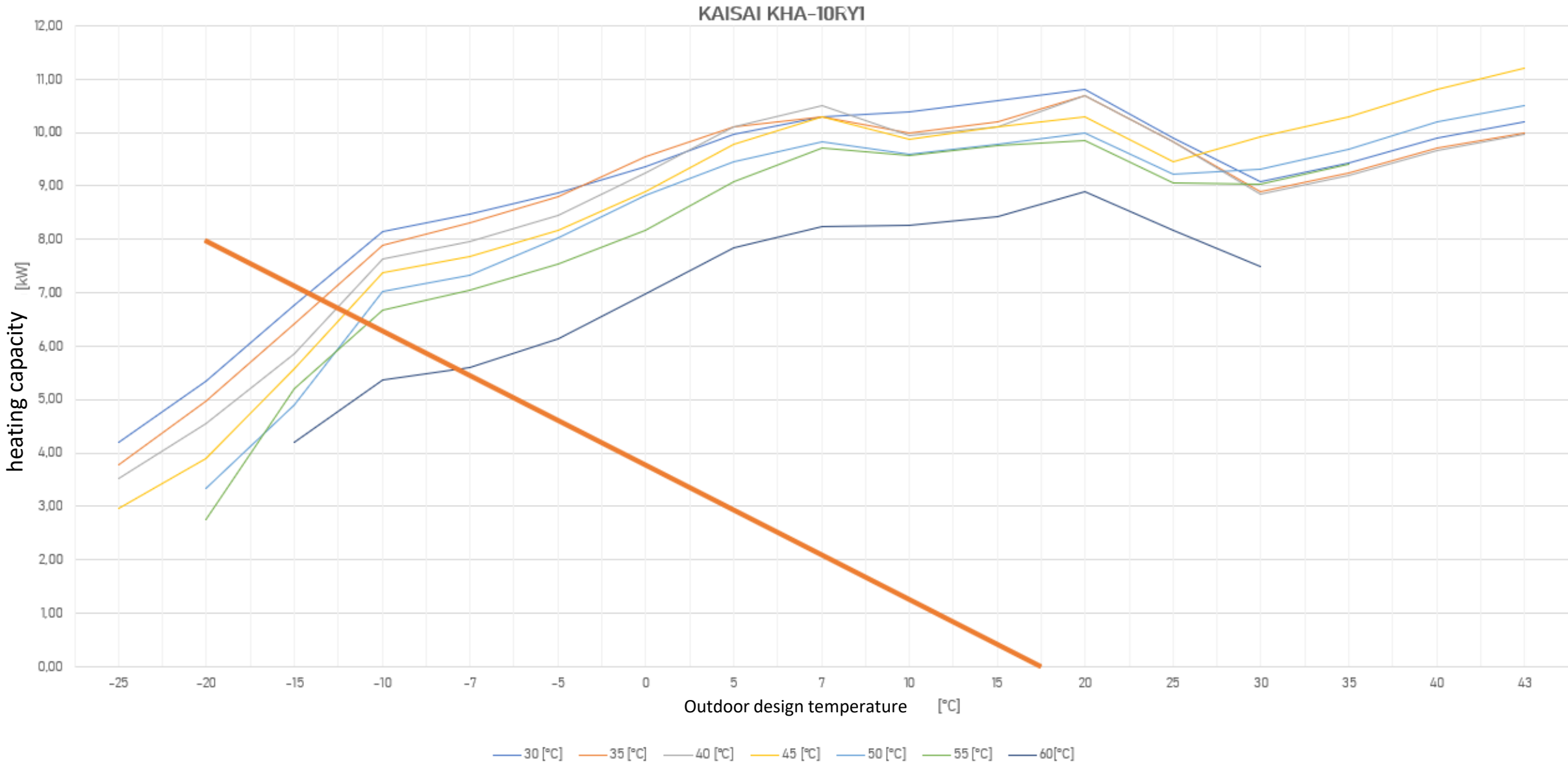
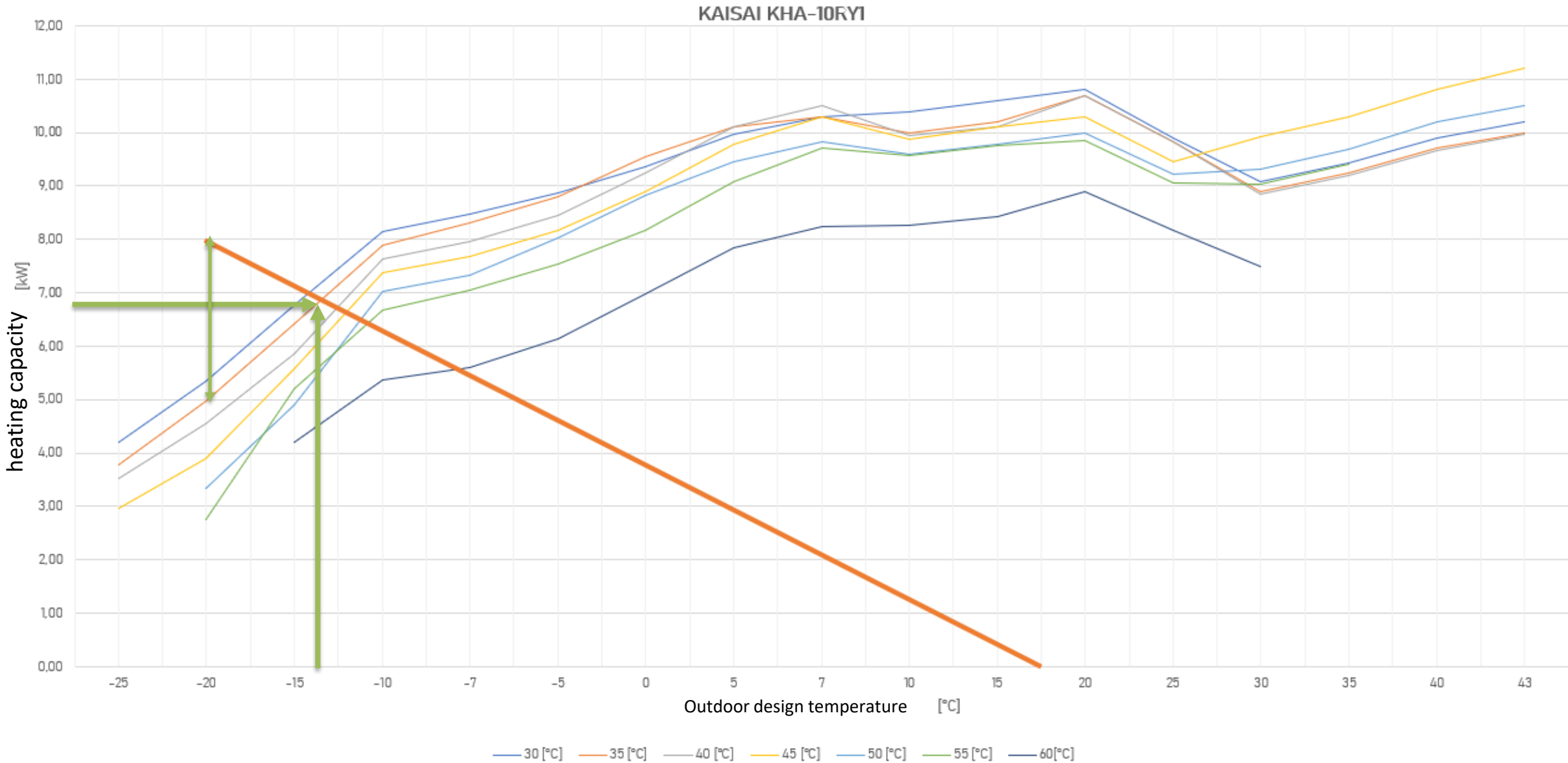

- Bivalence point.
Energy coverage by the electric heater.
Heat pump heating capacity.
6,6 kW
4,4 kW
Energy coverage by the heat pump.
The building's power requirement.
-20°C
-13°C
+15°C


KAISAI KHA-10RY1
heating capacity [kW]
12,00
11,00
10,00
9,00
8,00
7,00
6,00
5,00
4,00
3,00
2,00
1,00
0,00
-25
-20
-15
-10
-7
-5
0
5
7
10
15
20
25
30
35
40
43
Outdoor design temperature [°C]
30 [°C]
35 [°C]
40 [°C]
45 [°C]
50 [°C]
55 [°C]
60[°C]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12,00
11,00
10,00
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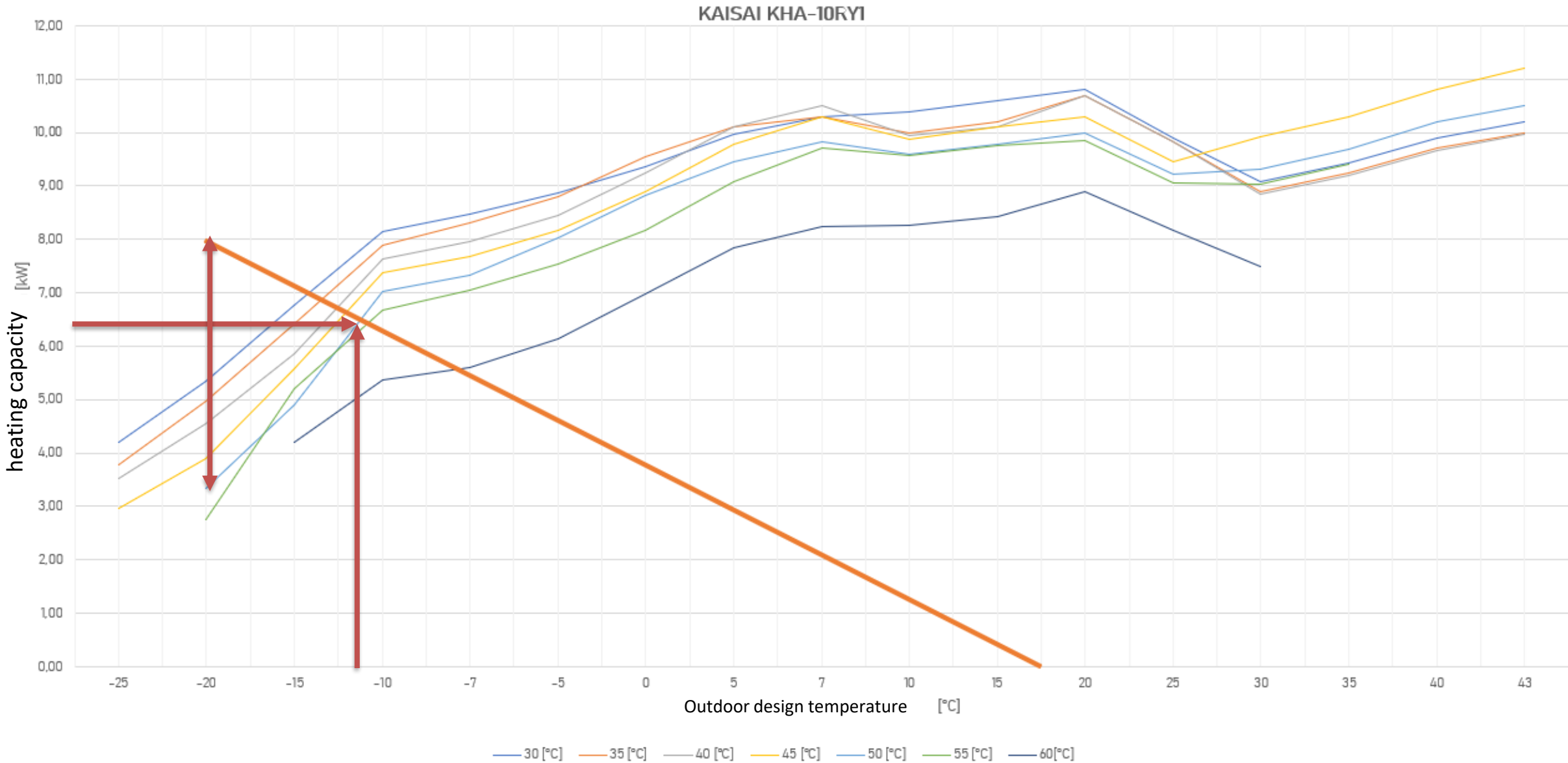
8,00
7,00
6,00
5,00
4,00
3,00
2,00
1,00
0,00
-25
-20
-15
-10
-7
-5
0
5
7
10
15
20
25
30
35
40
43
Outdoor design temperature [°C]
30 [°C]
35 [°C]
40 [°C]
45 [°C]
50 [°C]
55 [°C]
60[°C]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12,00
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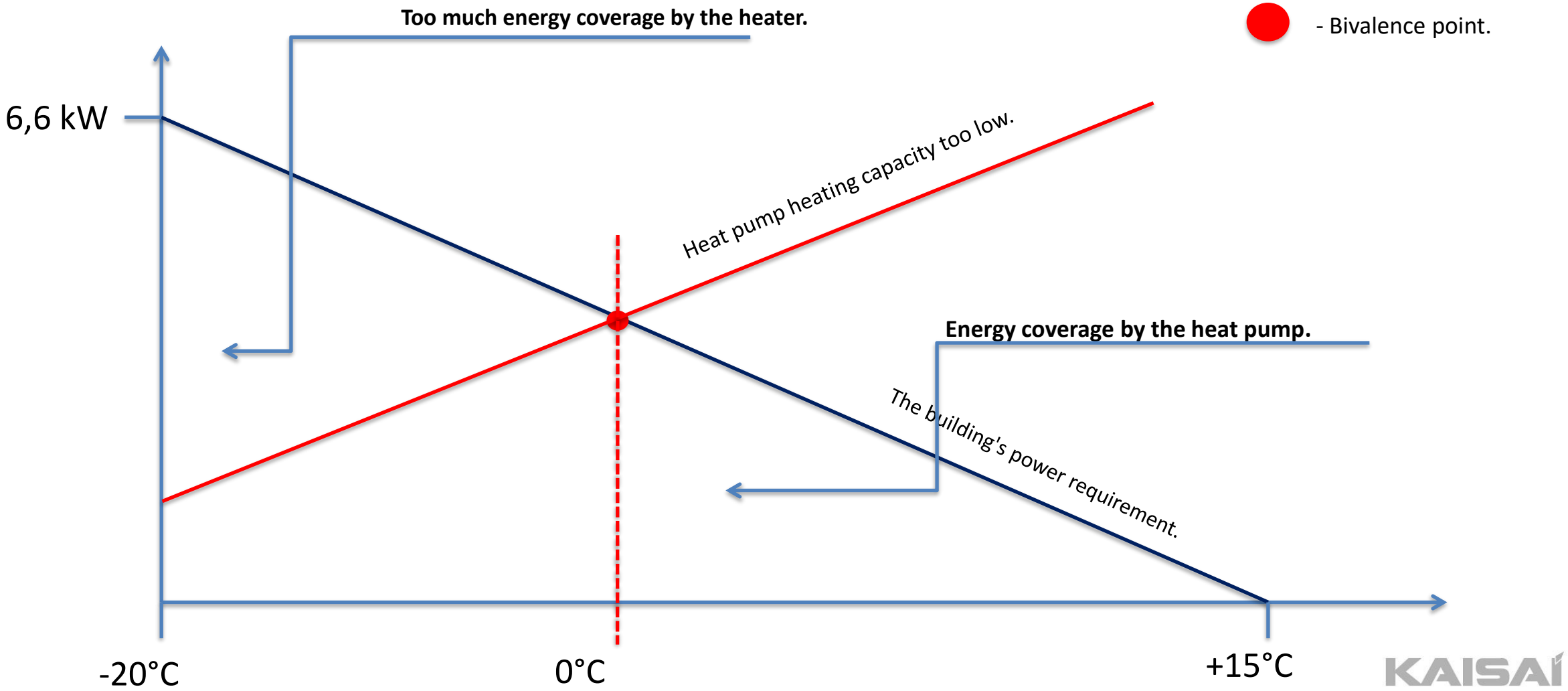
6,00
5,00
4,00
3,00
2,00
1,00
0,00
-25
-20
-15
-10
-7
-5
0
5
7
10
15
20
25
30
35
40
43
Outdoor design temperature [°C]
30 [°C]
35 [°C]
40 [°C]
45 [°C]
50 [°C]
55 [°C]
60[°C]

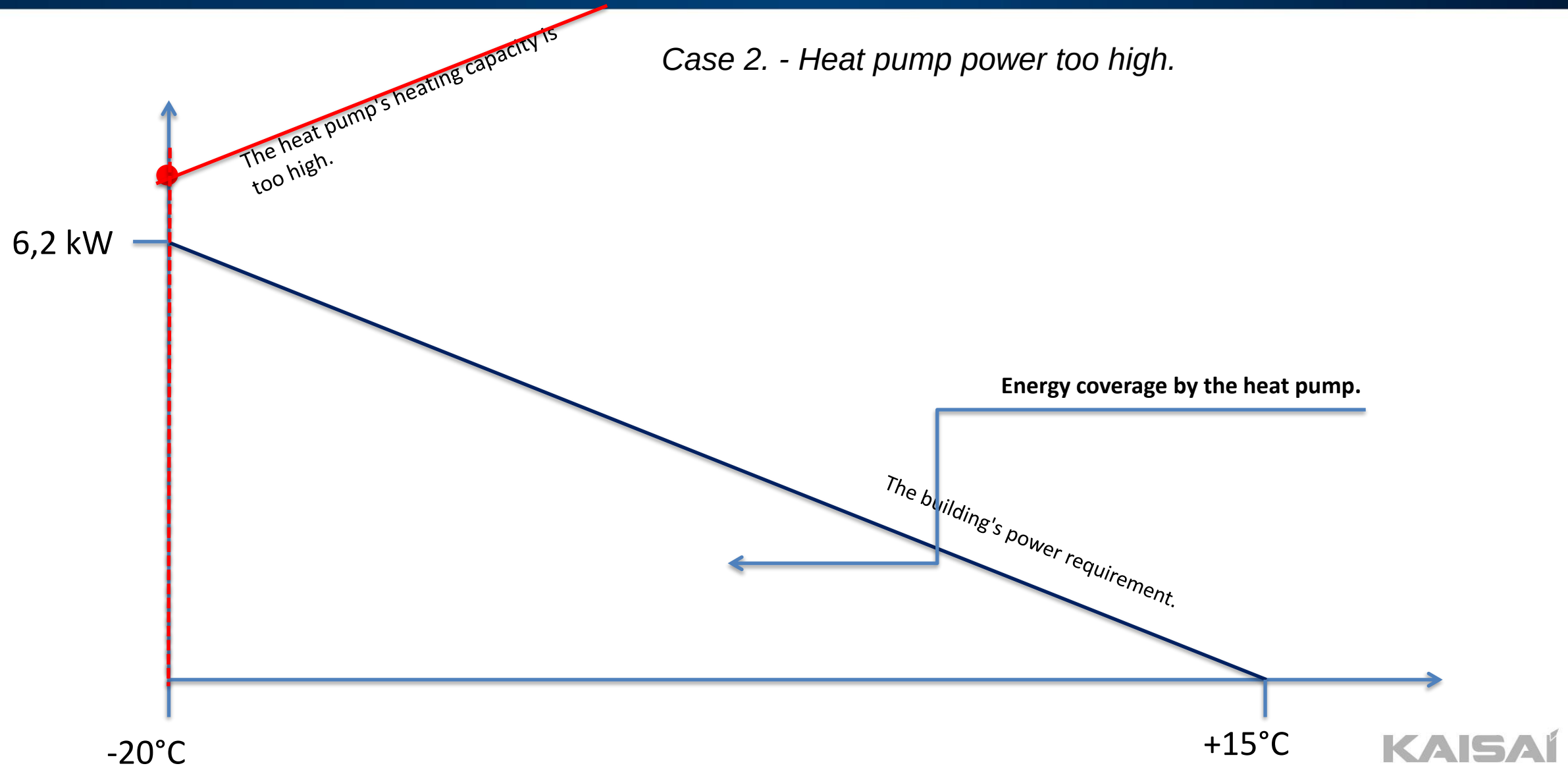
Case 1. - Too low power of the heat pump.



The consequences of selecting a heat pump with too little power

- meeting the energy demand only at high outside air temperatures.
- increased electricity consumption by heaters.
- high operating costs.
- no domestic hot water comfort

Case 2. - Heat pump power too high.



Consequences of selecting a heat pump that is too powerful.

- High investment costs
- Compressor energy consumption increased
- Risk of HP failure in DHW mode
  - Necessity to oversize the domestic hot water tank
  - Underheating of domestic hot water - no comfort of use.
- Risk of HP error. in central heating mode
  - The need to ensure an adequate flow / volume of water in the central heating system
  - A high probability of the need for a central heating buffer

QUESTIONS REGARDING THE SELECTION OF HEAT PUMPS

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1. Is the heating power demand of the building calculated (in "kilowatts" [kW] or [kWh/m2/year] - useful energy calculated now)?
2. What is the heated area of the building in m2 (if there is a garage, should it be heated?)?
3. What is the insulation of the building (thickness of the insulation on the walls, double/triple glazing windows, roof insulation, insulation of ground, is the garage insulated from the building, etc ...)?
4. When was the building constructed?
5. Address (for determining the climatic zone)
6. What is the heating system (radiators, underfloor heating, mixed)?
7. Number of permanent residents using domestic hot water?
8. Are there already or are there planned large domestic hot water consumers? (large bathtub 300-400l, rain shower 40-60l/min, etc. ...)
9. Is the heat pump supposed to work with another heat source (a solid fuel boiler, a fireplace with a water jacket, solar collectors)?
10. In case of changing the heat source, e.g. from an oil or gas boiler: How much fuel did you use on average in liters, m3, tons…?
11. In the case of a radiator system: what was the maximum temperature of the heating system set in severe frosts (e.g. at -18'C, -20'C)?

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DETERMINING THE HEATING POWER OF THE HEAT PUMP.

Method 1: W/m2 demand ratio method.

Method 2: Demand ratio method kWh/year.

Method 3: Known fuel consumption method.

DETERMINING THE HEATING POWER OF THE HEAT PUMP

W/m2 demand ratio method

- Passive houses: 15 W / m^2
- Energy-efficient houses (new construction): 40 W / m^2 (with recuperation)
- New construction with good thermal insulation: 50 W / m^2
- Old building with modern thermal insulation: 75 W / m^2

- We multiply the usable floor area of the building by the factor from the table above:

EXAMPLE :

q = 40 W/m^2

A = 150m^2

Q = 150 x 40 = 6 000W

DETERMINING THE HEATING POWER OF THE HEAT PUMP

Domestic hot water

Additionally, the power needed to prepare domestic hot water should be added.

When calculating the additional heat output of the DHW heat pump should be taken from 0.20-0.25 kW per person.

Additional hot water consumers should also be taken into account, such as:

- whirlpool tubs
- jacuzzi
- swimming pools
- shower cabins with hydro massages

EXAMPLE :

4 persons x 0,25kW = 1kW

Therefore, we add an additional amount to the calculated power of the heat pump 1kW.

DETERMINING THE HEATING POWER OF THE HEAT PUMP

The device should be selected in accordance with the total power requirement

$$Q_{HP} = Q_{CH} + Q_{DHW} + Q_s$$

Q_{HP} = heat pump heating capacity

Q_{CH} = heat demand for heating purposes

Q_{DHW} = heat demand for domestic hot water purposes

Q_S = heat demand for special purposes

EXAMPLE :

Demand for C.H.	q = 40 W/m^2	A=150m^2 Q = 150 x 40 = 6 000W
DHW demand		4per. x 250W = 1 000W
TOTAL power of the heat pump		**7 000 W**

DETERMINING THE HEATING POWER OF THE HEAT PUMP

Method 2: Method with the calculated energy demand factor.

Knowing the calculated energy demand indicator, we can determine the heating power of the device. The demand factor is determined, for example, in the building's energy certificate.

EXAMPLE:

E_{DR} = 80 kWh/m^2/year A=150m^2

Q = 150 x 80 = 12 000 kWh/year

$Q_{DHW.}$ = 4 x 1000kWh = 4000kWh

Q_{HP}=12 000 + 4 000 = 16 000kWh

We assume that the indicator is an ON / OFF heat pump operating 2000h / year

so the power of the heat pump:

Q = 16 000 / 2 000h = 8kW

DETERMINING THE HEATING POWER OF THE HEAT PUMP

Method 3: Method with the fuel consumption known to date

Knowing the current fuel consumption, we can determine the heating power of the device.

Natural gas:	9.5kWh / m3
Heating oil:	10kWh / l
LPG:	6.85kWh / l
Coal	7000 kWh / t

The efficiency of the combustion system should be taken into account and the indicator is an ON / OFF heat pump operating 2000h / year:

EXAMPLE:

V = 2 000 l/year - annual oil consumption, efficiency 80%

Q = 2 000 * 10 * 0,8/2000 = 8 kW

TOP SOURCES OF HEAT PUMPS.

The heat receivers from the heat pump are considered the upper source :

- Surface heating (floor, wall, ceiling)	T_{out} = 35 ° C
- Radiator heating (radiators)	T_{out} = 50 ° C !!!
- Water heaters	T_{out} = 45 ° C
- Fan coil units	T_{out} = 40 ° C
- Duct heaters	T_{out} = 35-40 °C

Main assumptions for the selection of heat pumps:

- Calculated heating power demand :	**???!!!**
- maximum water temperature :	**???!!!**
- heating system capacity	20l/1kW min. heating power or 5l/kW nom. power
- The area of the DHW tank coil	0,25m2/1kW nominal heating power

KHA+KMK, KHC

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eco home

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KHC-22/30RX3

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- Power range: 22, 30kW
- Supply temperature up to 60'C
- Supply temperature up to 60'C at -10'C external temperature
- Supply temperature up to 50'C at -15'C
- Cascade connections of up to 6 units (16 units via MODBUS)
- Support for 2 heating circuits
- Circulation pump, safety valve, vent valve, diaphragm vessel, flow sensor, controller, DH standard
- No build in auxiliary electric heater

R32

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KHA ARCTIC

WE CARE ABOUT AIR

- A wide range of power: 6, 8, 10, 12, 14, 16kW !!!
- Supply temperature up to 65'C
- Supply temperature up to 60'C, even at -15'C external temperature
- Supply temperature up to 57'C at -20'C !!!
- New, quiet design (sound pressure from 46dB (A)
- Built-in controller in the indoor unit
- Cascade connections of up to 6 units
- Support for 2 heating circuits
- Circulation pump, safety valve, vent valve, diaphragm vessel, flow sensor, controller, DHW tank sensor - as standard
- 3kW flow heater - 6kW, 9kW model - 8-16kW models

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KHC ARCTIC

WE CARE ABOUT AIR

- A wide range of power: 6, 8, 10, 12, 14, 16kW !!!
- Supply temperature up to 65'C
- Supply temperature up to 60'C, even at -15'C external temperature
- Supply temperature up to 57'C at -20'C !!!
- New, quiet design (sound pressure from 45dB (A)
- Cascade connections of up to 6 units
- Support for 2 heating circuits
- Circulation pump, safety valve, vent valve, diaphragm vessel, flow sensor, controller, DHW tank sensor - as standard
- 3kW flow heater - 6kW, 9kW model - 8-16kW models

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KMK-190/240L ARCTIC

WE CARE ABOUT AIR

Model				KMK-190L-100RY1		KMK-240L-100RY3		KMK-240L-160RY3
Names of the compatible outdoor unit models				KHA-06RY1	KHA-08RY1 KHA-10RY1	KHA-06RY1	KHA-08RY1 KHA-10RY1	KHA-12RY3 KHA-14RY3 KHA-16RY3
Heat Exchanger				plate	plate	plate	plate	plate
Water pump	type			DC Inverter	DC Inverter	DC Inverter	DC Inverter	DC Inverter
	head		m H_2O	9	9	9	9	9
expansion vessel		volume	l	8	8	8	8	8
Water consumption profile acc. to EN16147				L	L	XL	XL	XL
Domestic Hot Water *1	Energy efficiency class for DHW heating	temperate climate	class	A+	A+	A+	A+	A+
			COP	3.10	3.02	3.34	3.36	3.00
		warm climate	class	A+	A+	A+	A+	A+
			COP	3.80	3.66	4.24	4.18	3.73
		cold climate	class	A	A	A	A	A
			COP	2.50	2.61	2.63	2.72	2.24
DHW tank	type			Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	material			SUS 316L	SUS 316L	SUS 316L	SUS 316L	SUS 316L
	water capacity		L	190	190	240	240	240
	maximum water temperature		℃	70	70	70	70	70
	insulation (material)			Polyurethane (Cyclopentane)				
Electric power supply	voltage / number of phases / frequency		V/Ph/Hz	220÷240/1/50	220÷240/1/50	380÷415/3/50	380÷415/3/50	380÷415/3/50
	maximum working current (MCA)		A	14.3	14.3	14.3	14.3	14.3
Auxiliary electric heater	electric power		kW	3	3	3/6/9	3/6/9	3/6/9
	capacity levels			1	1	3	3	3
	power supply		V/Ph/Hz	220÷240/1/50	220÷240/1/50	380÷415/3/50	380÷415/3/50	380÷415/3/50

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KHA+KMK, KHC

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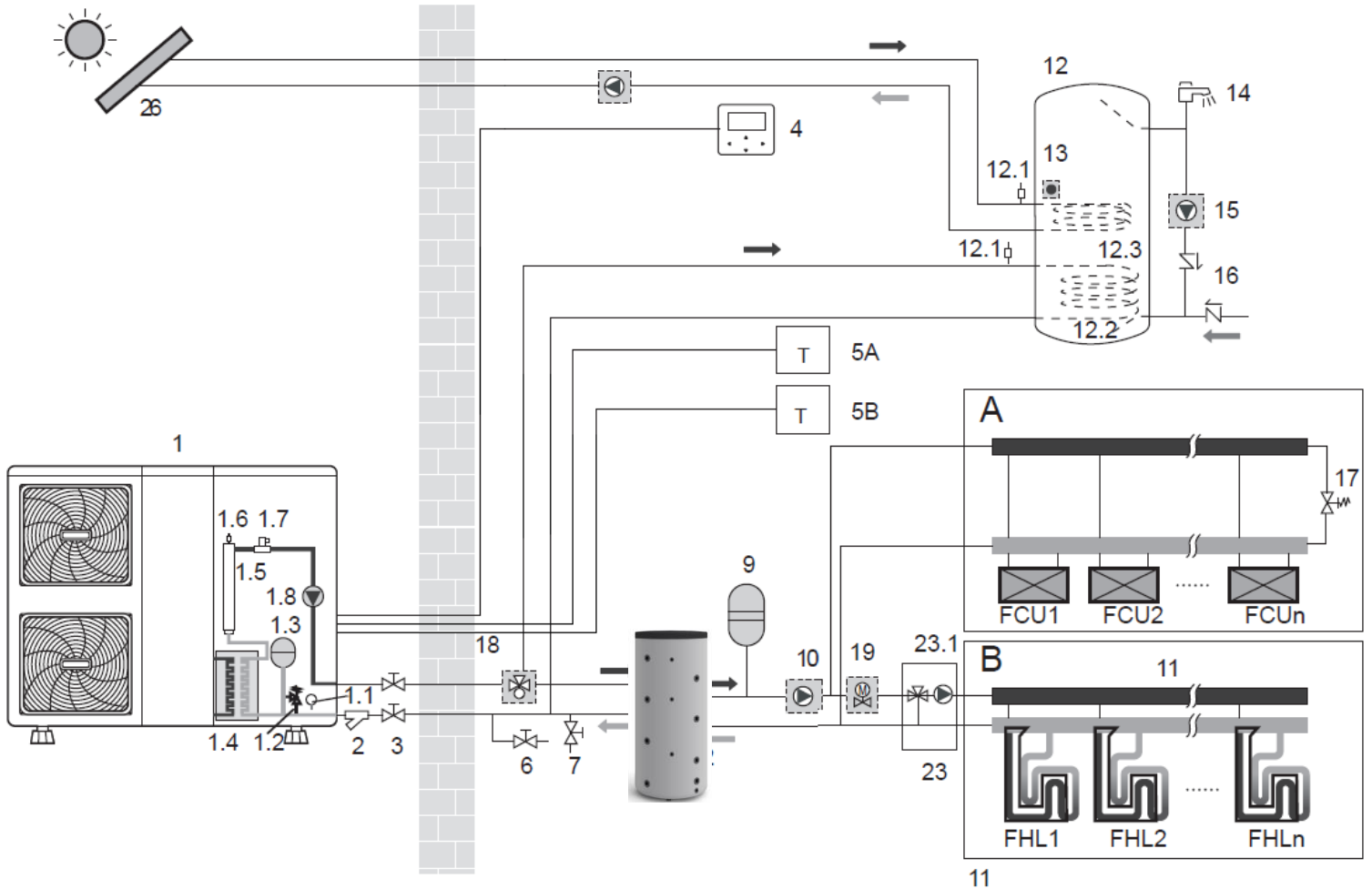
APPLICATION



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KHC (22, 30)

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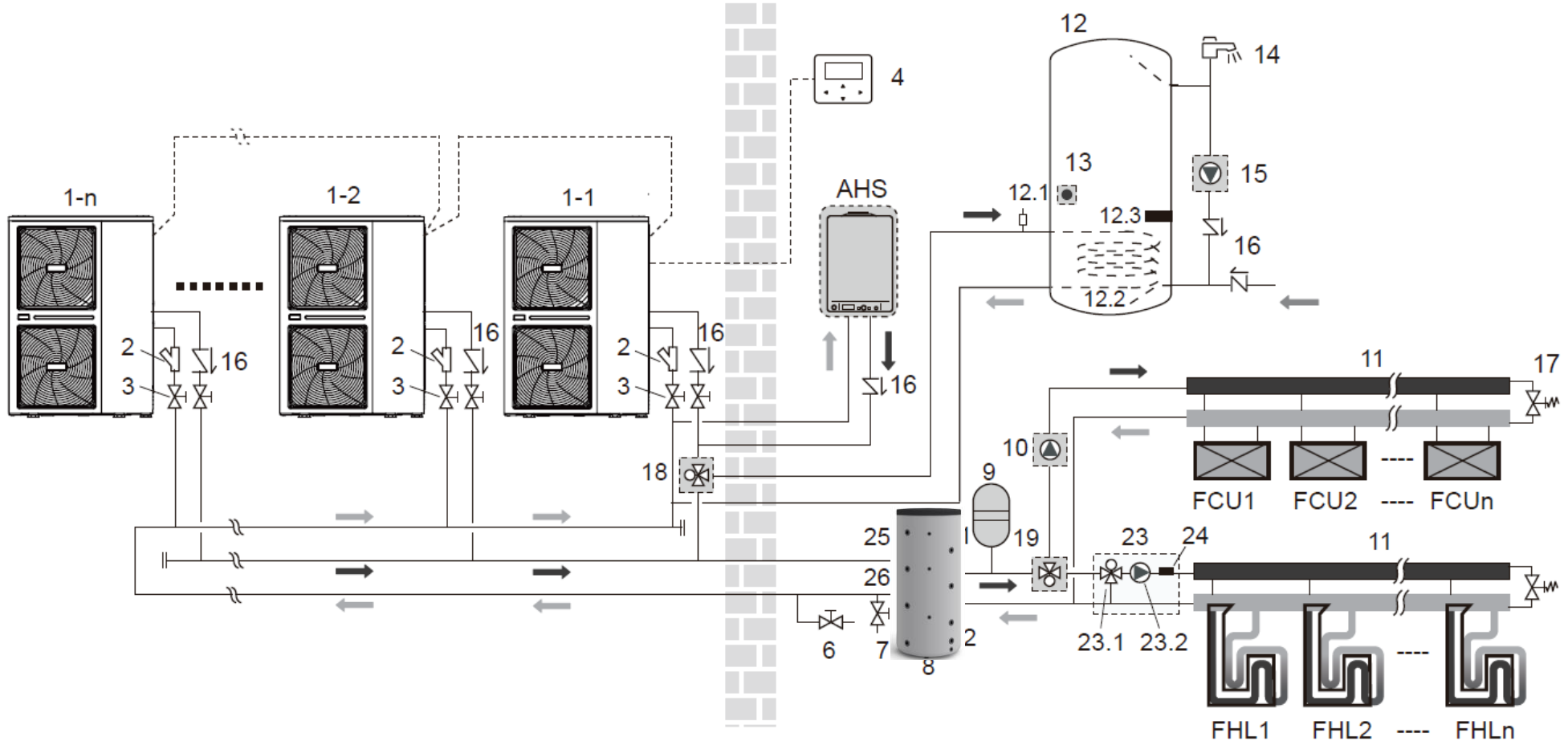
APPLICATION - CASCADE UP TO 6 UNITS



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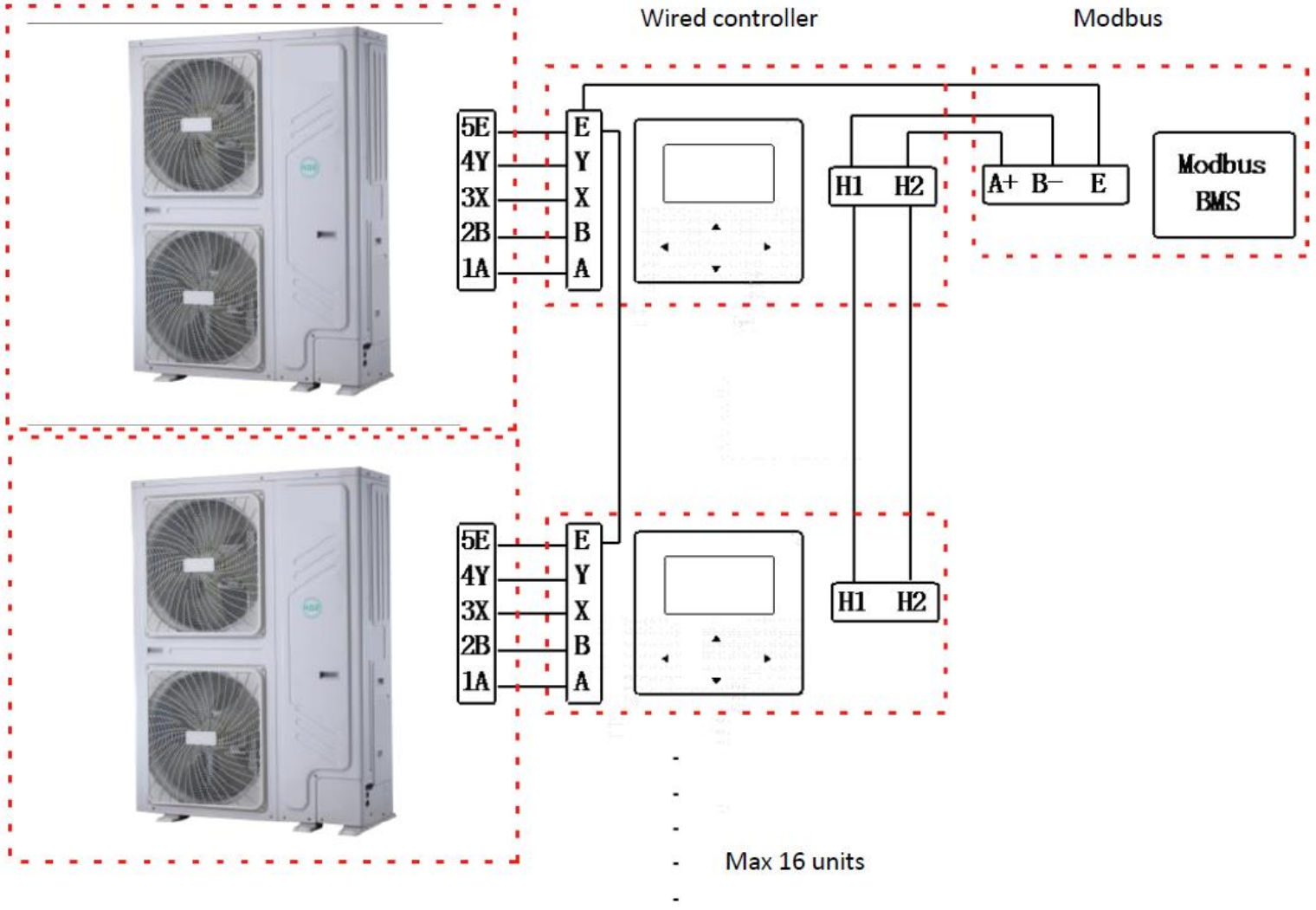
APPLICATION - CASCADE UP TO 16 UNITS



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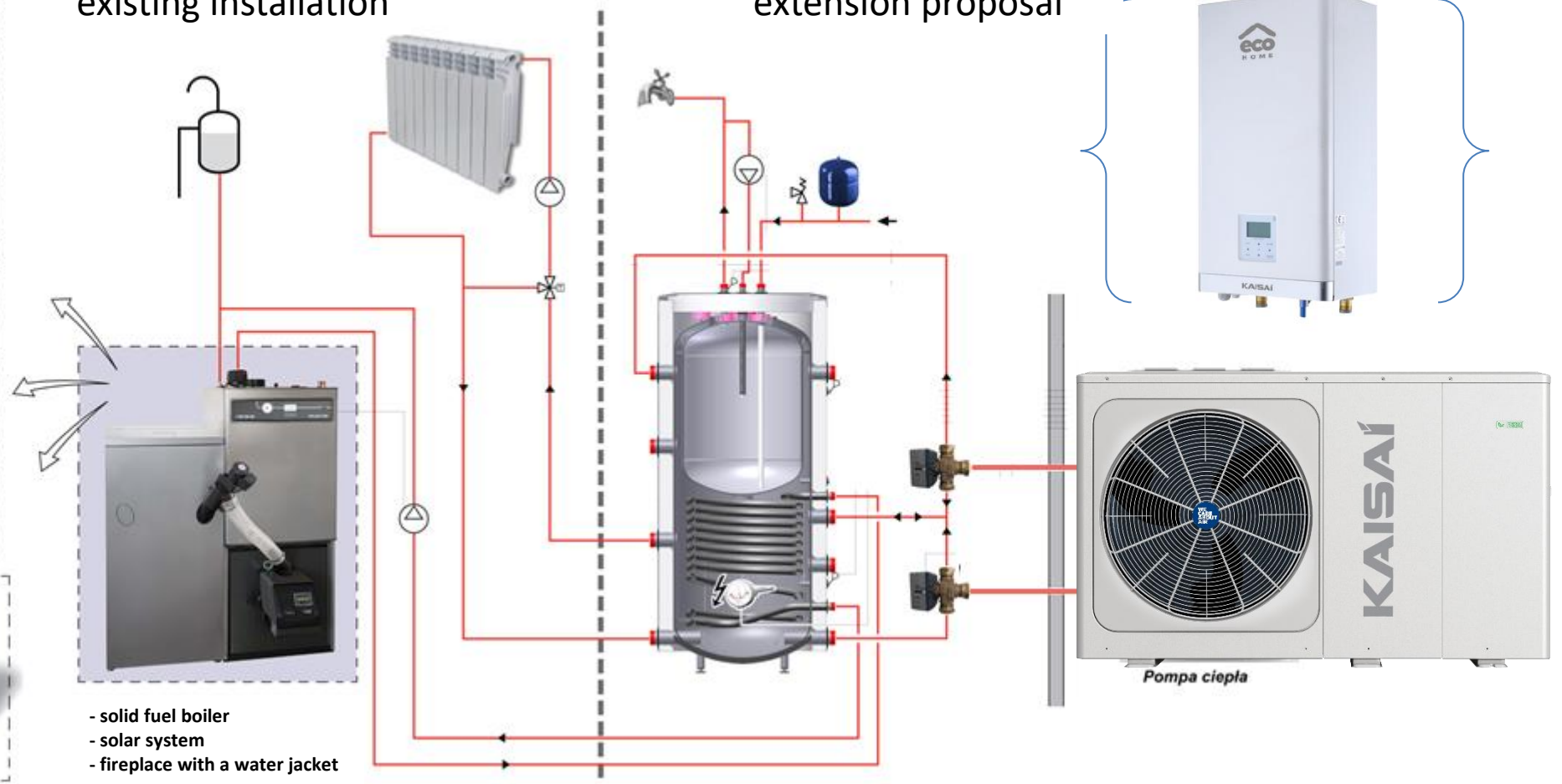
APPLICATION (OTHER HEAT SOURCE)

existing installation

extension proposal



- solid fuel boiler
- solar system
- fireplace with a water jacket

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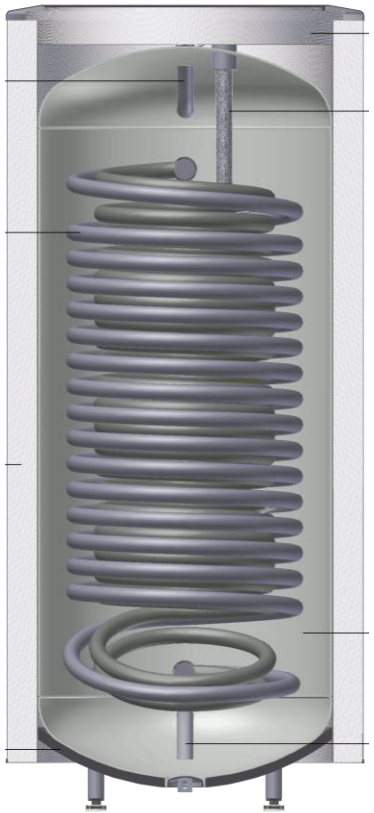
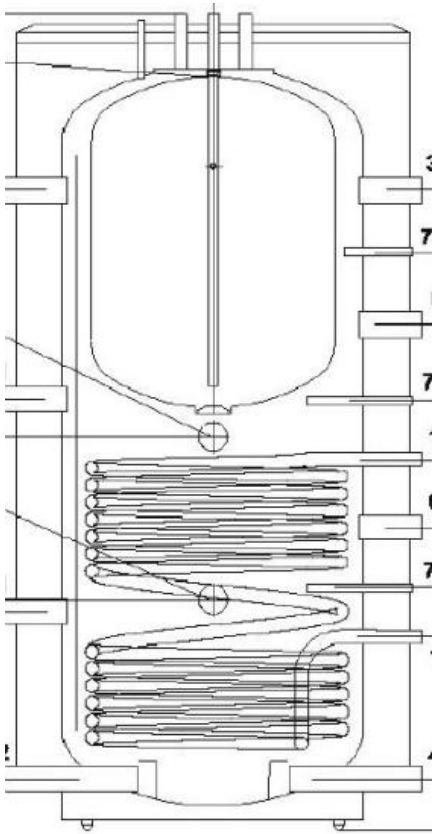
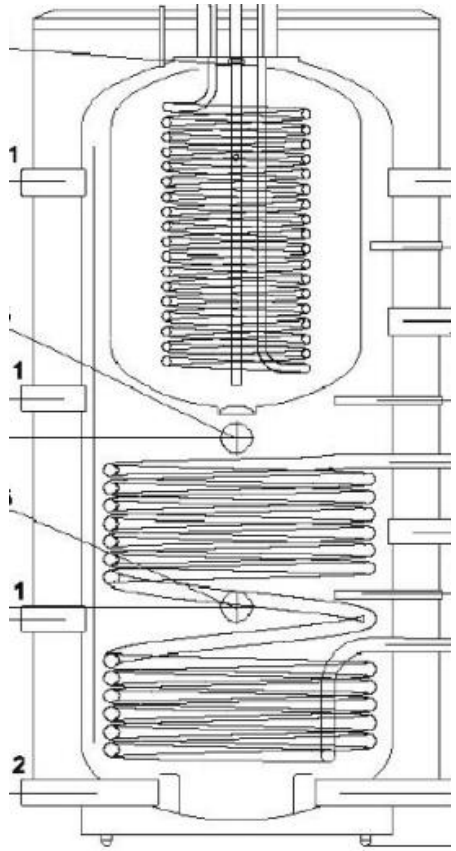
APPLICATION (DHW)







Coil min. 0.25 m2 / kW heating power of the heat pump

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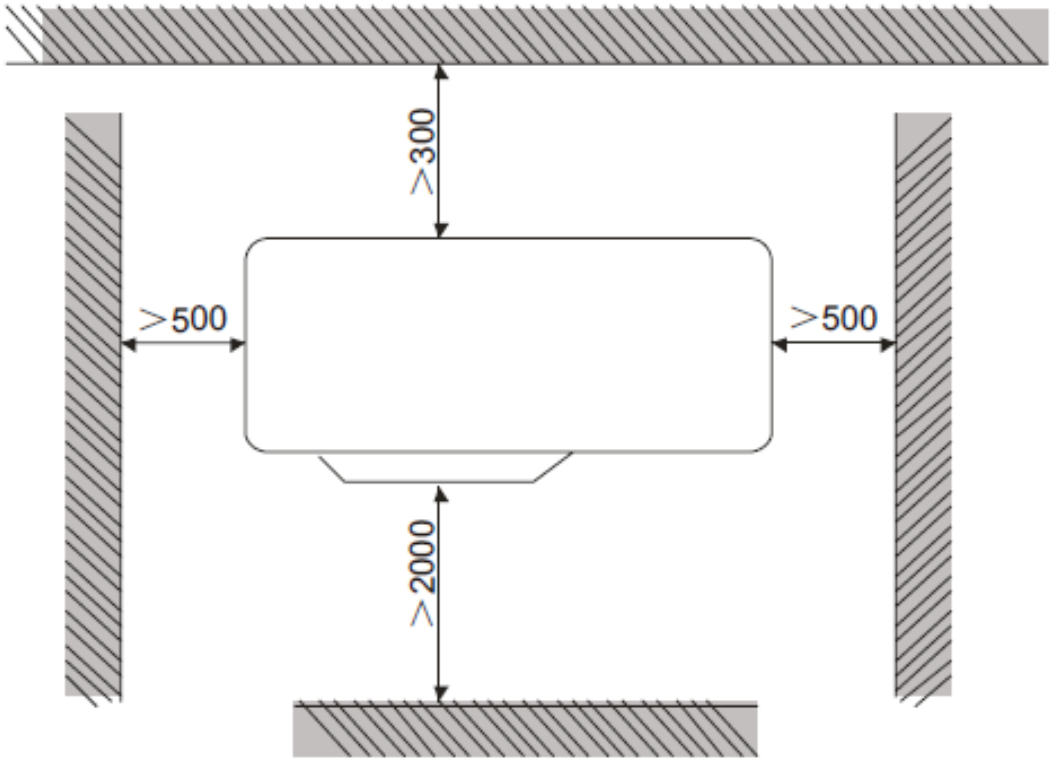
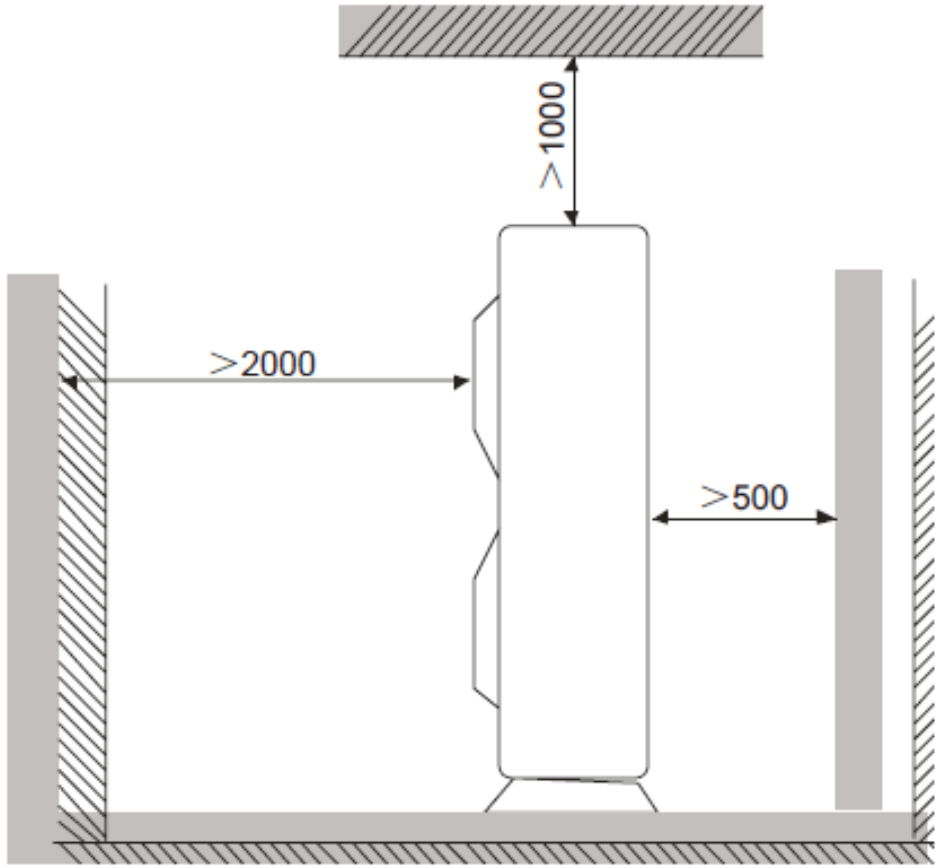
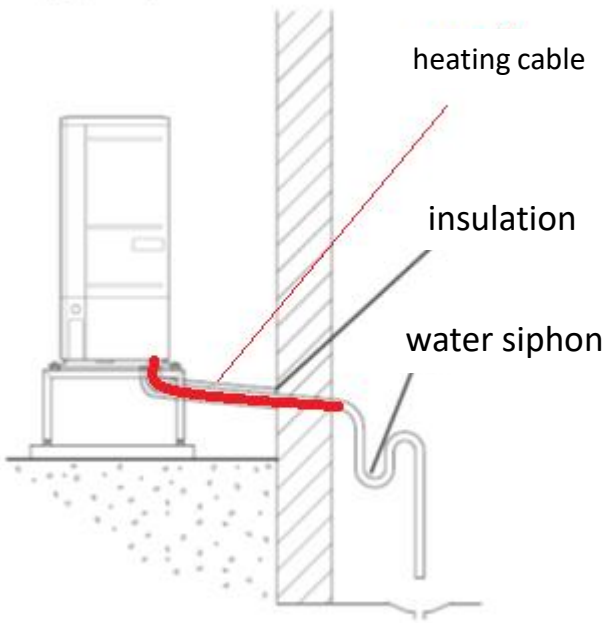
THE POSITION OF THE OUTDOOR UNIT

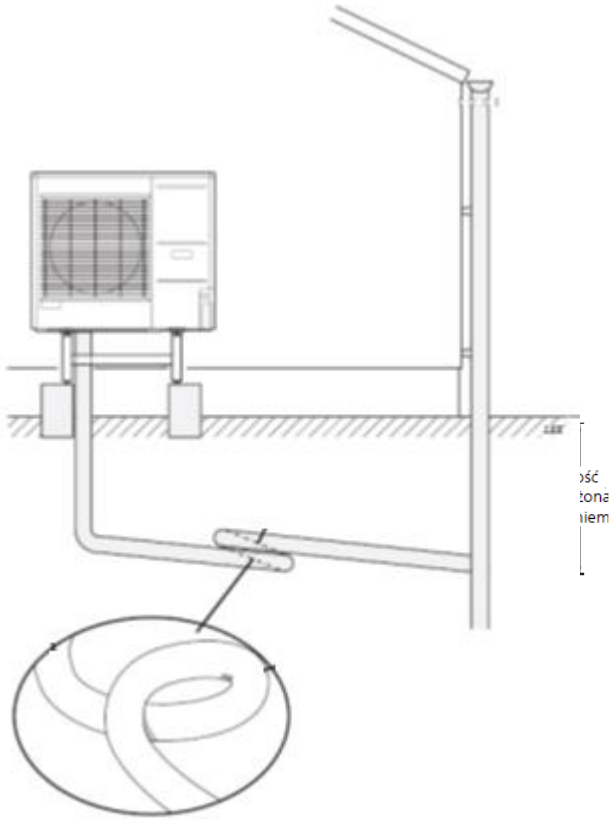




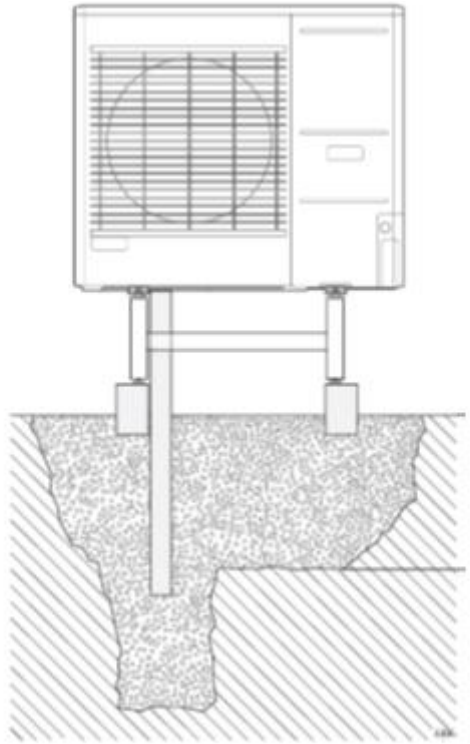
THE POSITION OF THE OUTDOOR UNIT

water outflow to the room





drainage of water into the ground



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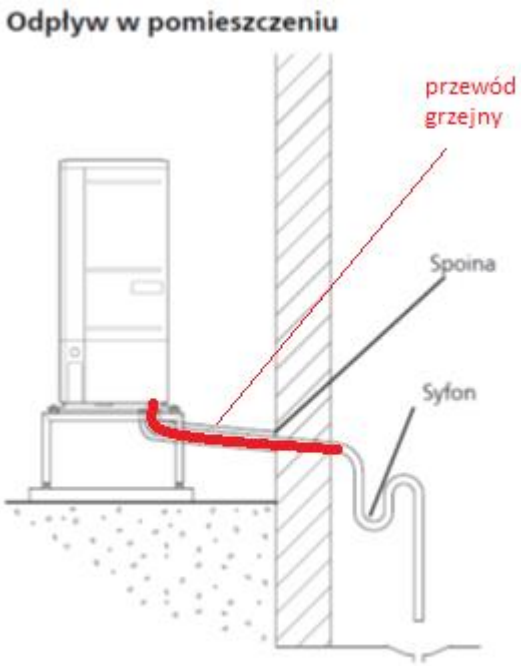

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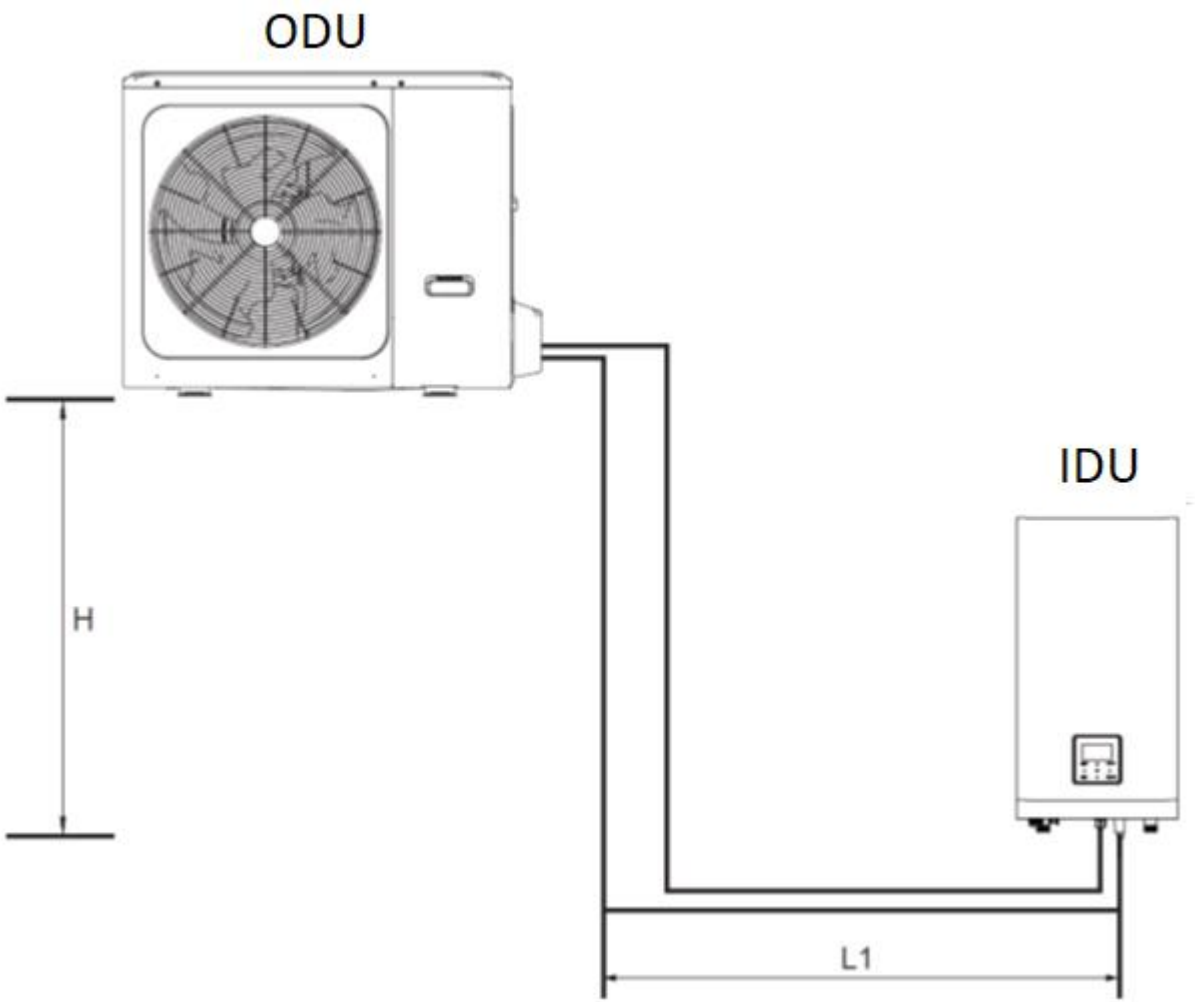
KHA freon installation ...



Models	6~16 kW
Max.piping length (H+L1)	30m
Max difference in height (H)	20m

MODEL	Refrigerant	Gas side/Liquid side
6kW	R32	Φ15.9/Φ6.35
8/10kW	R32	Φ15.9/Φ9.52
3-phase 12/14/16kW	R32	Φ15.9/Φ9.52

Refrigerant to be added	Model	Total liquid pipe length L(m)	
		≤15m	>15m
Total additional refrigerant	6kW	0g	(L-15)×20g
	8/10/12/14/16kW	0g	(L-15)×38g

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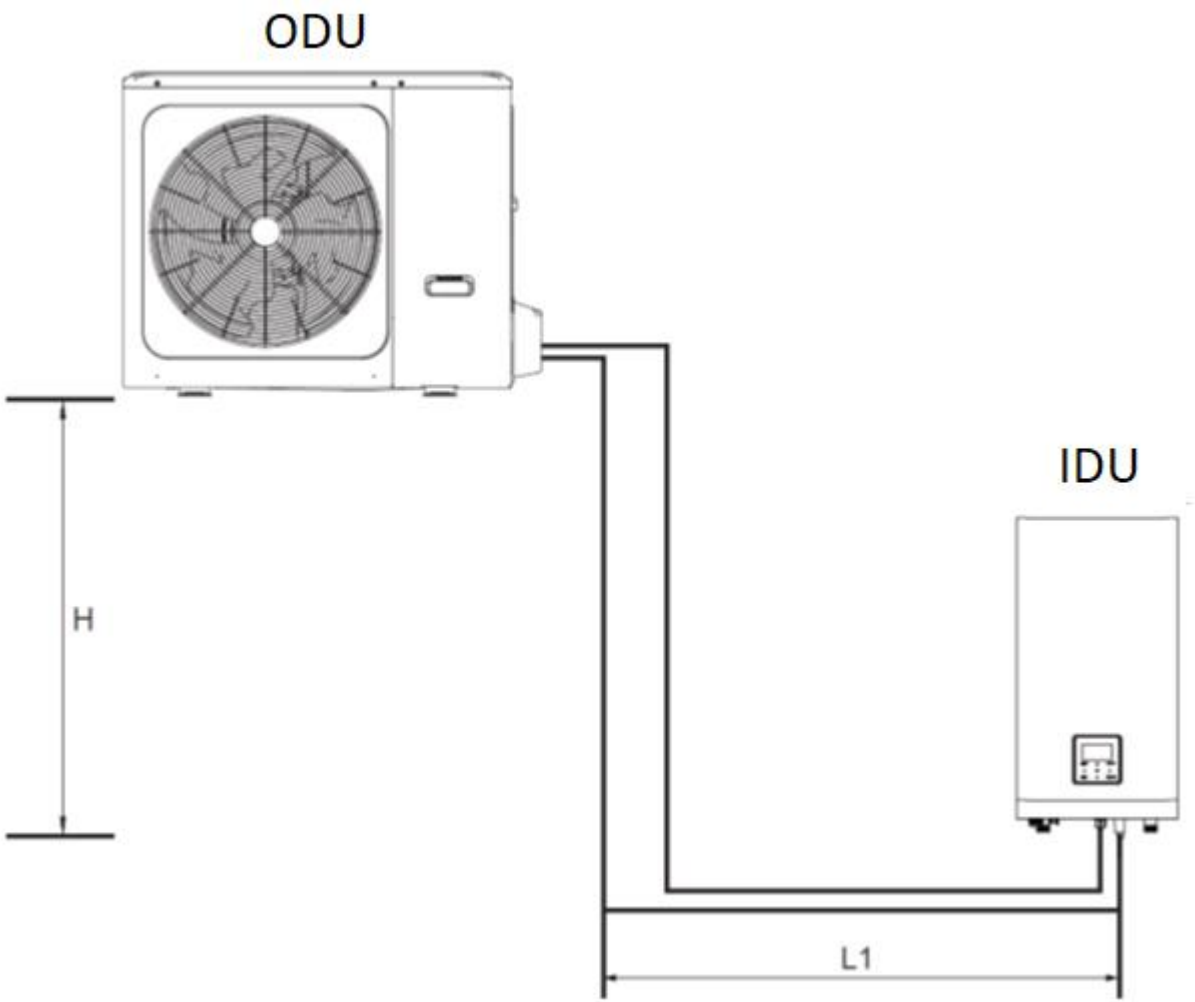

15 INPUT DEFINE	
15.6 Ta	HMI
15.7 Ta-adj	-2°C
15.8 SOLAR INPUT	NON
15.9 F-PIPE LENGTH	<10m
15.10 RT/Ta_PCB	NON
ADJUST	

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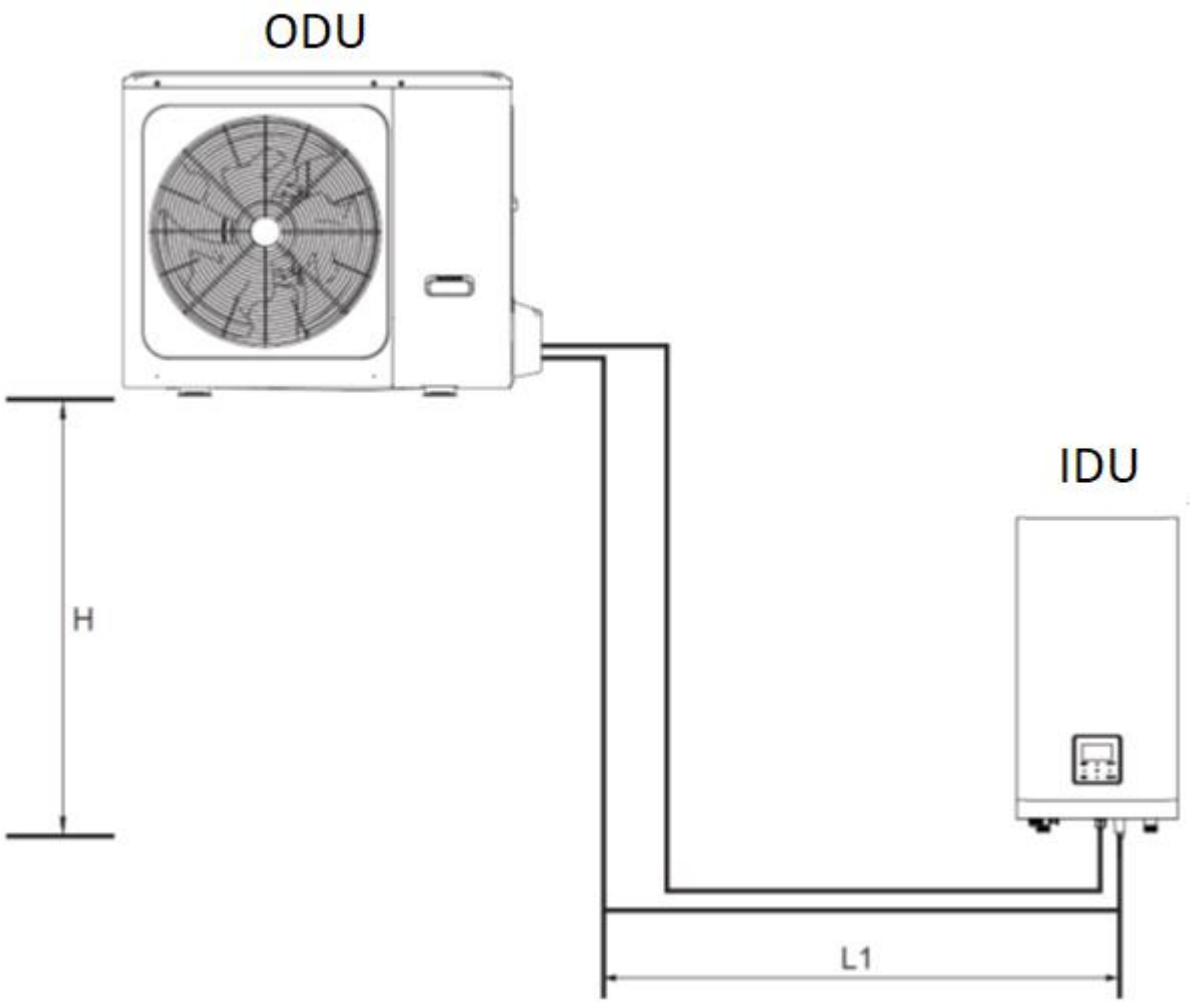

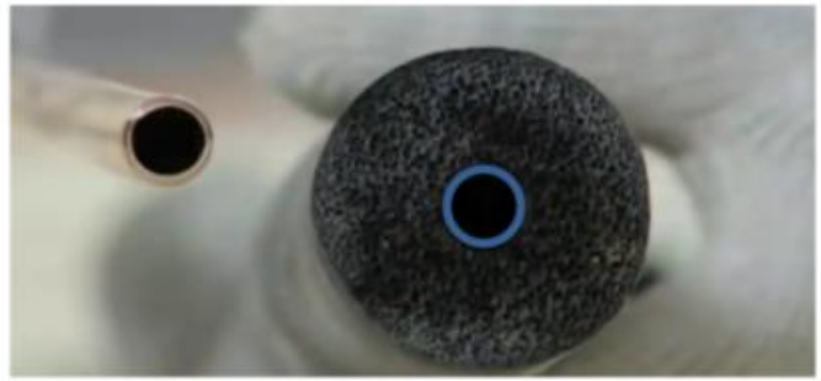

Pipe diameter	Thickness
Φ6.35~15.9mm	≥15mm
Φ15.9~38.1mm	≥20mm

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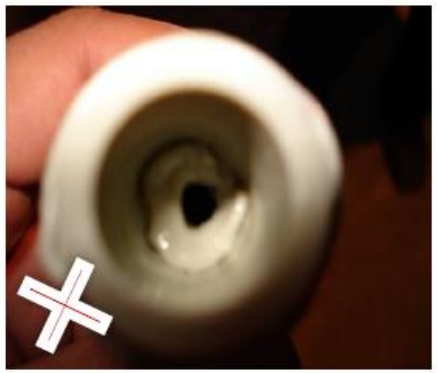
Installation errors.



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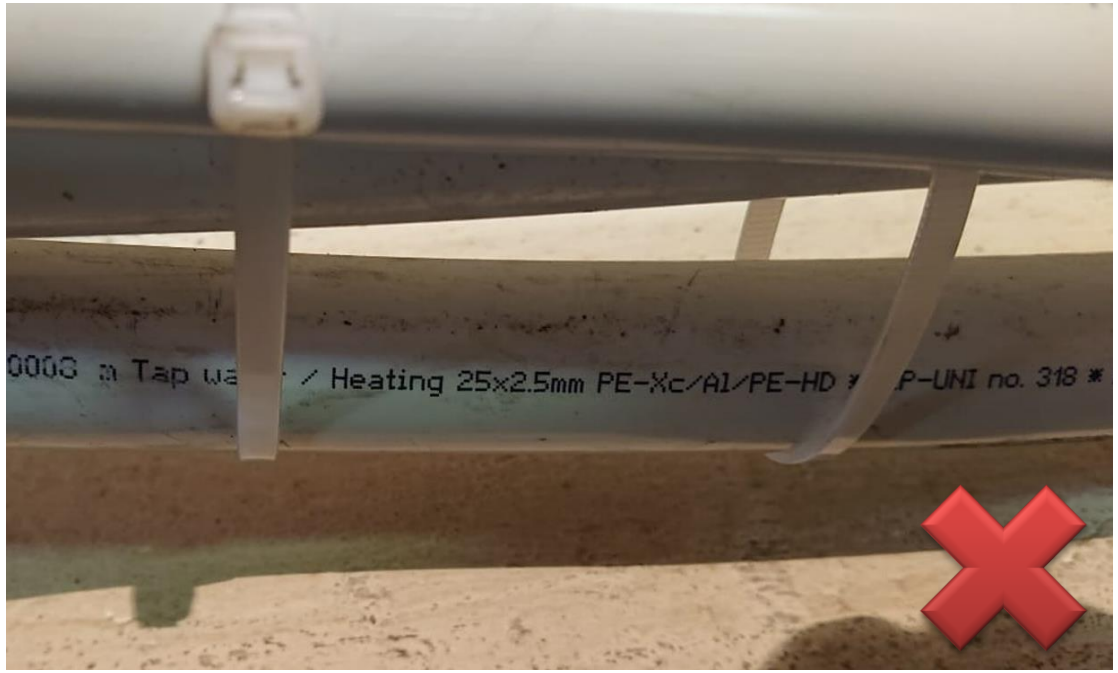
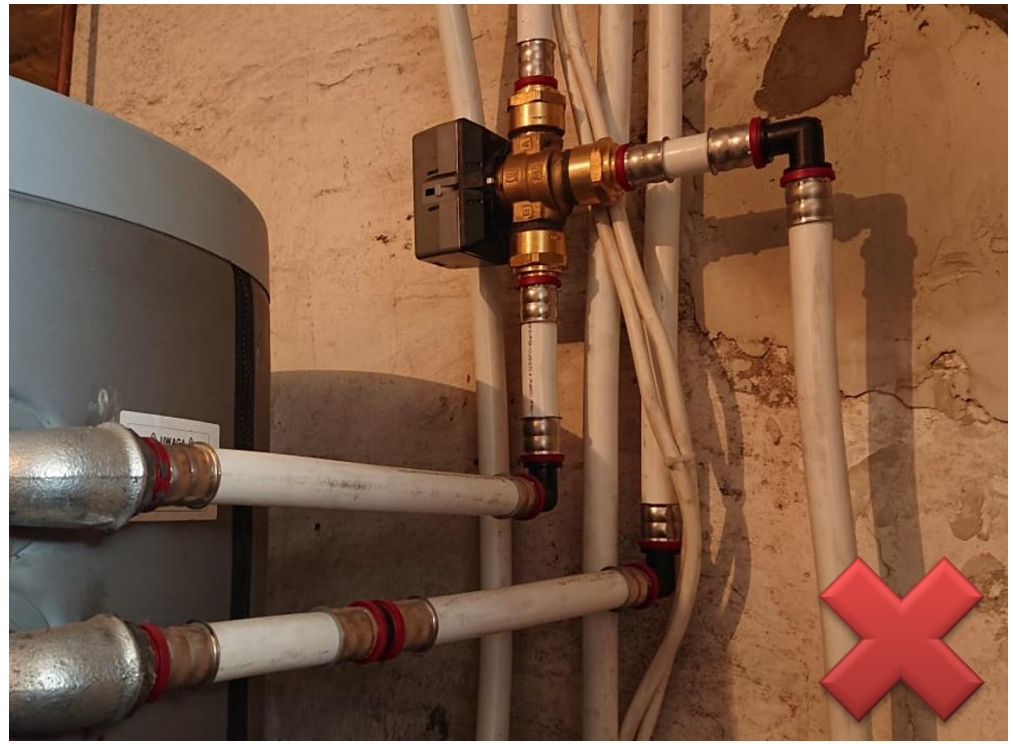
Installation errors





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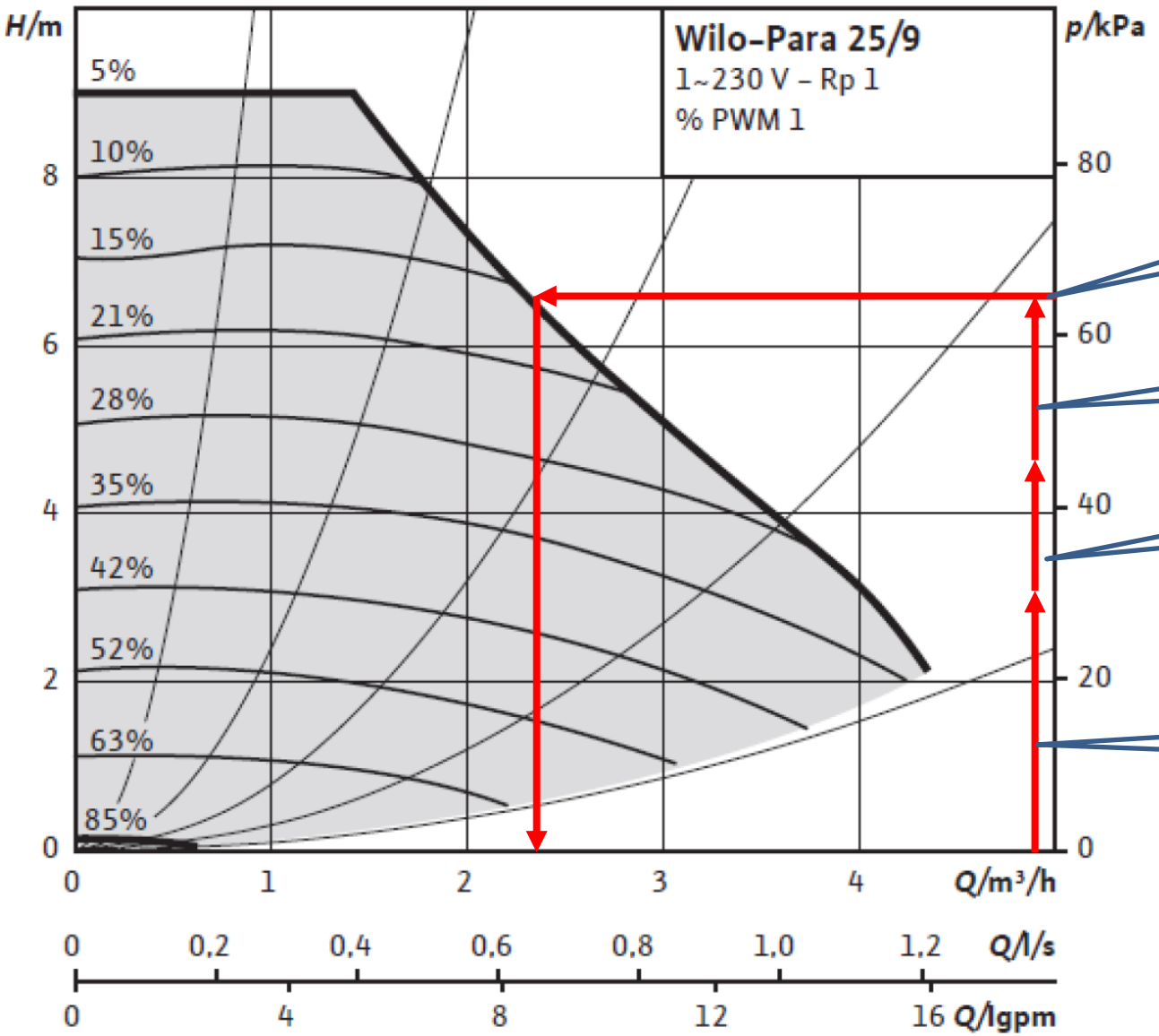
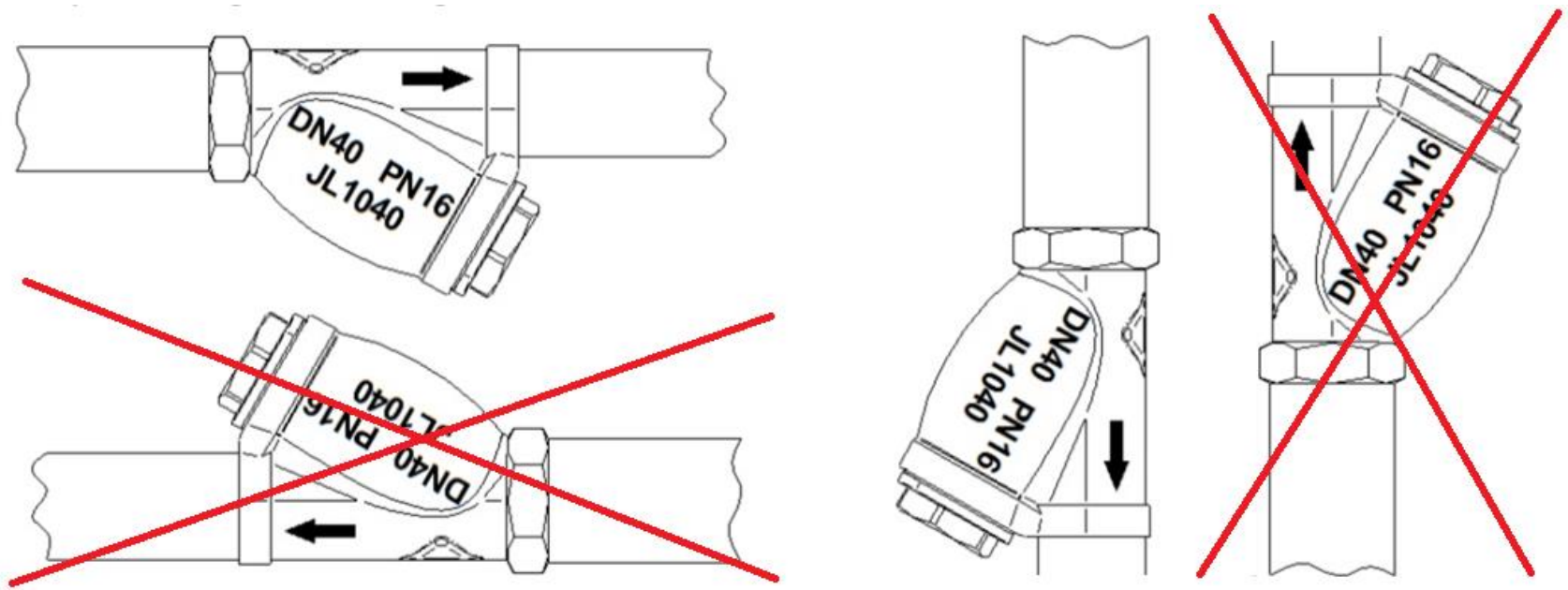


Estimated total value of resistances

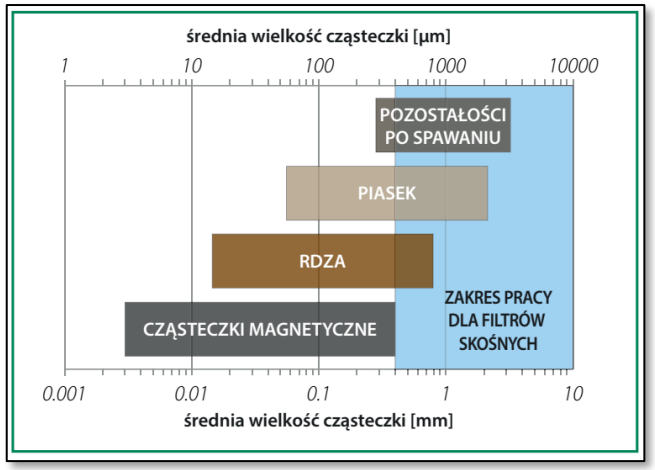
Linear resistance of pipes

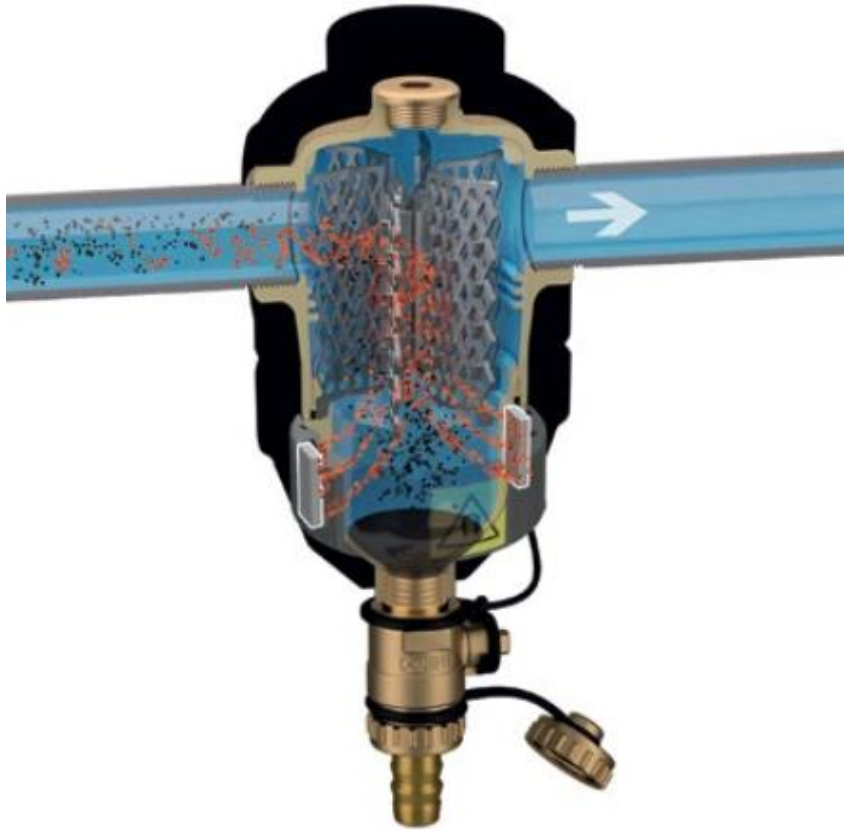
Local resistance: bends, valves and fittings (e.g. filter)

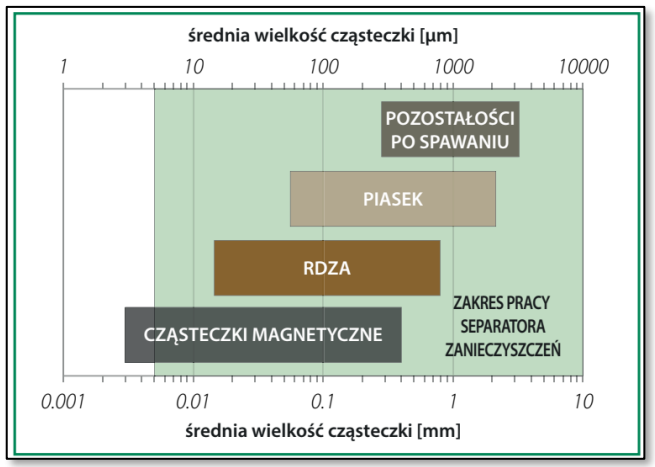
Heat Exchanger resistance



Installation errors







Kvs!!!!!!

KHA+KMK, KHC

WE CARE ABOUT AIR

eco home
pompy ciepła

WIRED CONTROLLER

- Multilingual menu
- Newly designed controller
- Operation via WiFi wireless network
- Modbus RTU protocol - possibility to connect up to 16 devices and integration with BMS
- Supports cascade connection of up to 6 units
- Simple and quick change of heat pump operating parameters
- Checking the operating parameters in real time
- Communication cable length adjustable up to 50 m
- Built-in temperature sensor
- Possibility to update software via USB and save heat pump settings to a memory stick
- Wi-Fi module

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KHA+KMK, KHC

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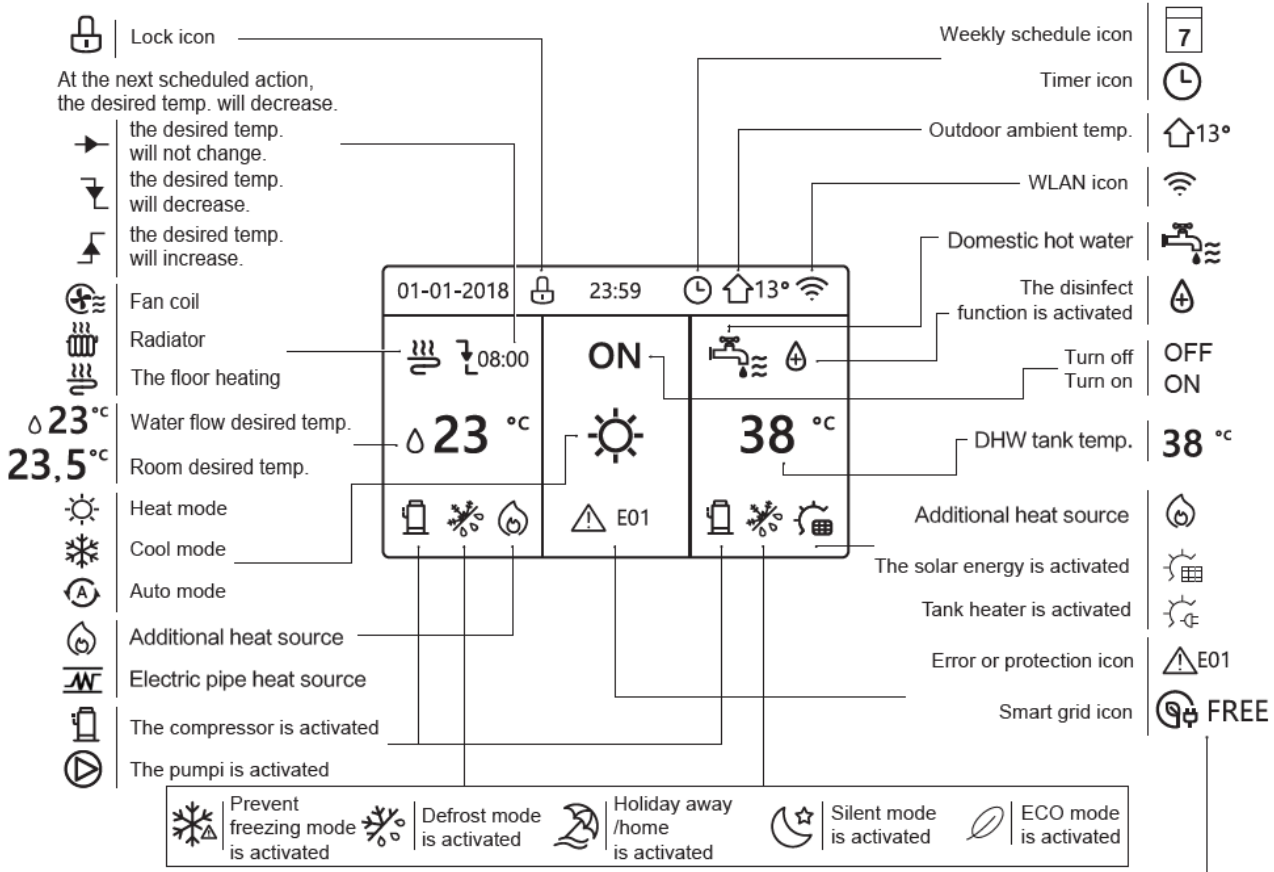
pompy ciepła

CONTROL



	Fan coil	Radiator	The floor heating	Domestic hot water
ON				
OFF				

	Free electricity	Valley electricity	Peak electricity
Smart grid	FREE	VALLEY	PEAK

R32

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WE CARE ABOUT AIR

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pompy ciepła

CONTROL - DHW

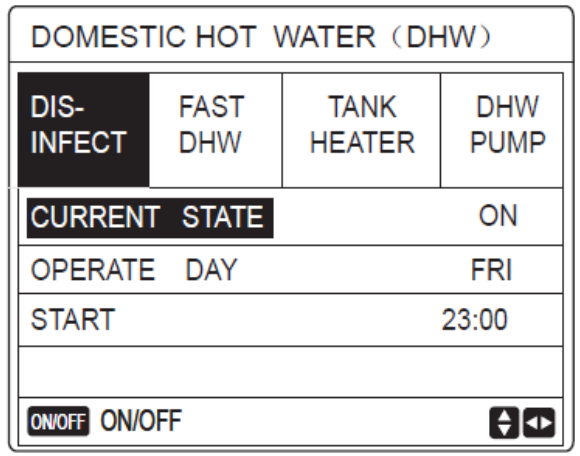
Domestic hot water (DHW):

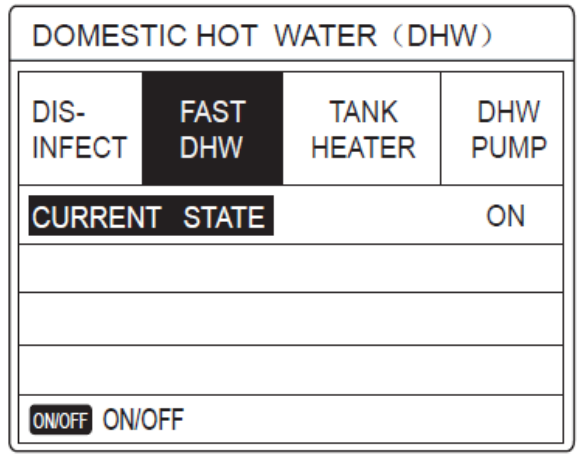
1) DISINFECTION

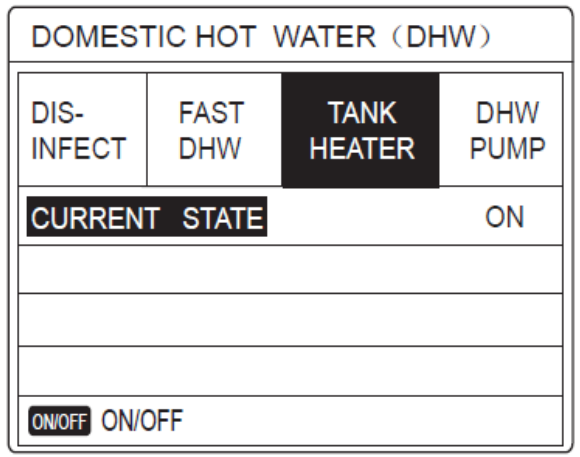
2) QUICK DHW

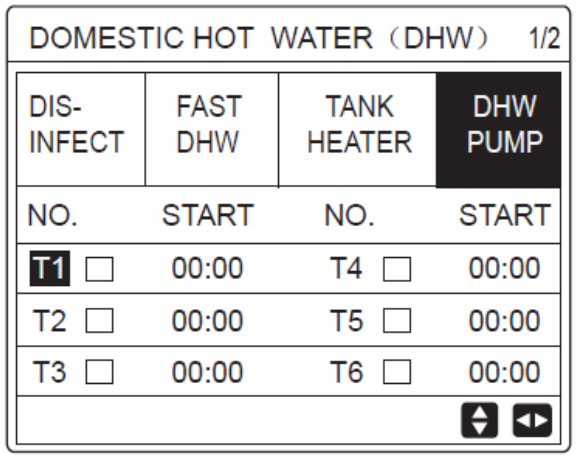
3) TANK HEATER

4) DHW PUMP









R32

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KHA+KMK, KHC (ARCTIC)

WE CARE ABOUT AIR

eco home
pompy ciepła

CONTROL - OTHER

OPERATION PARAMETER	#00
ONLINE UNITS NUMBER	1
OPERATE MODE	COOL
SV1 STATE	ON
SV2 STATE	OFF
SV3 STATE	OFF
PUMP_I	ON
ADDRESS	1/9

OPERATION PARAMETER	#00
PUMP-O	OFF
PUMP-C	OFF
PUMP-S	OFF
PUMP-D	OFF
PIPE BACKUP HEATER	OFF
TANK BACKUP HEATER	ON
ADDRESS	2/9

OPERATION PARAMETER	#00
GAS BOILER	OFF
T1 LEAVING WATER TEMP.	35°C
WATER FLOW	1.72m3/h
HEAT PUMP CAPACTIY	11.52kW
POWER CONSUM.	1000kWh
Ta ROOM TEMP	25°C
ADDRESS	3/9

OPERATION PARAMETER	#00
T5 WATER TANK TEMP.	53°C
Tw2 CIRCUIT2 WATER TEMP.	35°C
TIS' C1 CLI. CURVE TEMP.	35°C
TIS2' C2 CLI. CURVE TEMP.	35°C
TW_O PLATE W-OUTLET TEMP.	35°C
TW_I PLATE W-INLET TEMP.	30°C
ADDRESS	4/9

OPERATION PARAMETER	#00
Tbt1 BUFFERTANK_UP TEMP.	35°C
Tbt2 BUFFERTANK_LOW TEMP.	35°C
Tsolar	25°C
IDU SOFTWARE	01-09-2019V01
ADDRESS	5/9

OPERATION PARAMETER	#00
ODU MODEL	6kW
COMP.CURRENT	12A
COMP.FREQENCY	24Hz
COMP.RUN TIME	54 MIN
COMP.TOTAL RUN TIME	1000Hrs
EXPANSION VALVE	200P
ADDRESS	6/9

OPERATION PARAMETER	#00
FAN SPEED	600R/MIN
IDU TARGET FREQUENCY	46Hz
FREQUENCY LIMITED TYPE	5
SUPPLY VOLTAGE	230V
DC GENERATRIX VOLTAGE	420V
DC GENERATRIX CURRENT	18A
ADDRESS	7/9

OPERATION PARAMETER	#00
TW_O PLATE W-OUTLET TEMP.	35°C
TW_I PLATE W-INLET TEMP.	30°C
T2 PLATE F-OUT TEMP.	35°C
T2B PLATE F-IN TEMP.	35°C
Th COMP. SUCTION TEMP.	5°C
Tp COMP. DISCHARGE TEMP.	75°C
ADDRESS	8/9

OPERATION PARAMETER	#00
T3 OUTDOOR EXCHARGE TEMP.	5°C
T4 OUTDOOR AIR TEMP.	5°C
TF MODULE TEMP.	55°C
P1 COMP. PRESSURE	2300kPa
ODU SOFTWARE	01-09-2018V01
HMI SOFTWARE	01-09-2018V01
ADDRESS	9/9

R32

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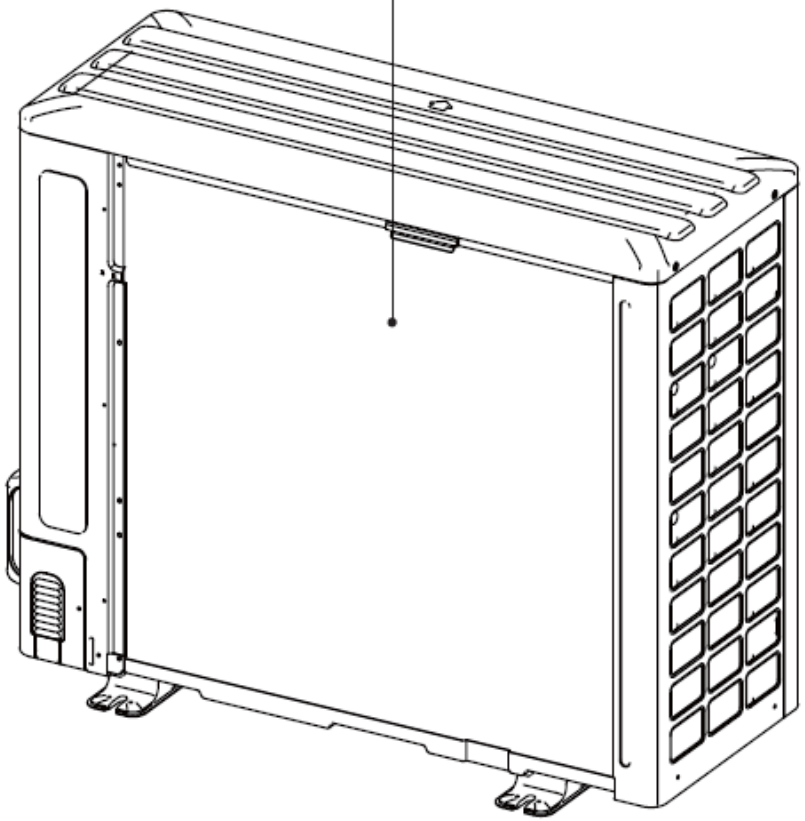
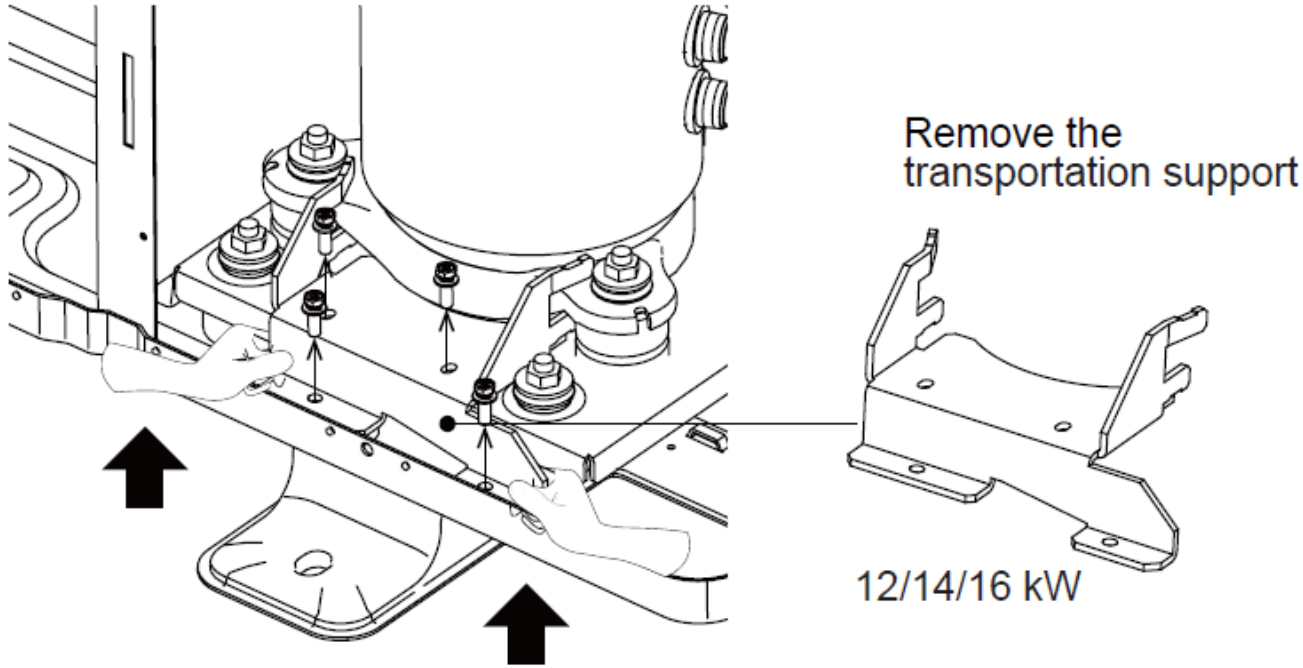
BEFORE STARTING THE HEAT PUMP !!!

WE CARE ABOUT AIR

Please remove the hollow plate after installation.





R32

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ELECTRICAL CONNECTIONS KMK/KHC (RY)

WE CARE ABOUT AIR

1 zone: c.o. + DHW

2 zone: with mixing group

Order	Port	Code	Assembly unit
1	CN21	POWER	Port for power supply
2	S3	/	Rotary dip switch
3	DIS1	/	Digital display
4	CN5	GND	Port for ground
5	CN28	PUMP	Port for variable speed pump power input
6	CN25	DEBUG	Port for IC programming
7	S1,S2,S4,SW9	/	Dip switch
8	CN4	USB	Port for USB programming
9	CN8	FS	Port for flow switch
10	CN6	T2	Port for temperature sensor of refrigerant liquid side temperature of indoor unit (heating mode)
		T2B	Port for temperature sensor of refrigerant gas side temperature of indoor unit (cooling mode)
		TW_in	Port for temperature sensor of inlet water temperature of plate heat exchanger
		TW_out	Port for temperature sensor of outlet water temperature of plate heat exchanger
		T1	Port for temperature sensor of final outlet water temperature of indoor unit
11	CN24	Tbt1	Port for upper temp. sensor of balance tank
13	CN13	T5	Port for domestic hot water tank temp. sensor
14	CN15	Tw2	Port for zone 2 temp.sensor of outlet water
15	CN18	Tsolar	Port for solar panel temp. sensor
16	CN17	PUMP_BP	Port for variable speed pump communication
17	CN31	HT	Control port for room thermostat (heating mode)
		COM	Power port for room thermostat
		CL	Control port for room thermostat (cooling mode)
18	CN35	SG	Port for smart grid (grid signal)
		EVU	Port for smart grid (photovoltaic signal)

Order	Port	Code	Assembly unit
19	CN36	M1 M2	Port for remote switch
		T1 T2	Port for thermostat transfer board
20	CN19	P Q	Communicate port between indoor unit and outdoor unit
21	CN14	A B X Y E	Port for communication with the wired controller
22	CN30	1 2 3 4 5	Port for communication with the wired controller
		6 7	Communicate port between indoor unit and outdoor unit
		9 10	Port for Internal machine Parallel
23	CN7	26 30/31 32	Compressor run/Defrost run
		25 29	Port for antifreeze E-heating tape(external)
		27 28	Port for additional heat source
24	CN11	1 2	Input port for solar energy
		3 4 15	Port for room thermostat
		5 6 16	Port for SV1(3-way valve) *
		7 8 17	Port for SV2(3-way valve)
		9 21	Port for zone 2 pump
		10 22	Port for outside circulation pump
		11 23	Port for solar energy pump
		12 24	Port for DHW pipe pump
		13 16	Control port for tank booster heater
		14 17	Control port for internal backup heater 1
		18 19 20	Port for SV3(3-way valve)
25	CN2	TBH_FB	Feedback port for external temperature switch(shorted in default)
26	CN1	IBH1/2_FB	Feedback port for temperature switch (shorted in default)
27	CN22	IBH1	Control port for internal backup heater 1
		IBH2	Reserved
		TBH	Control port for tank booster heater
28	CN41	HEAT8	Port for anti-freeze electric heating tape(internal)
29	CN40	HEAT7	Port for anti-freeze electric heating tape(internal)
30	CN42	HEAT6	Port for anti-freeze electric heating tape(internal)
31	CN29	HEAT5	Port for anti-freeze electric heating tape(internal)
32	CN32	IBH0	Port for backup heater

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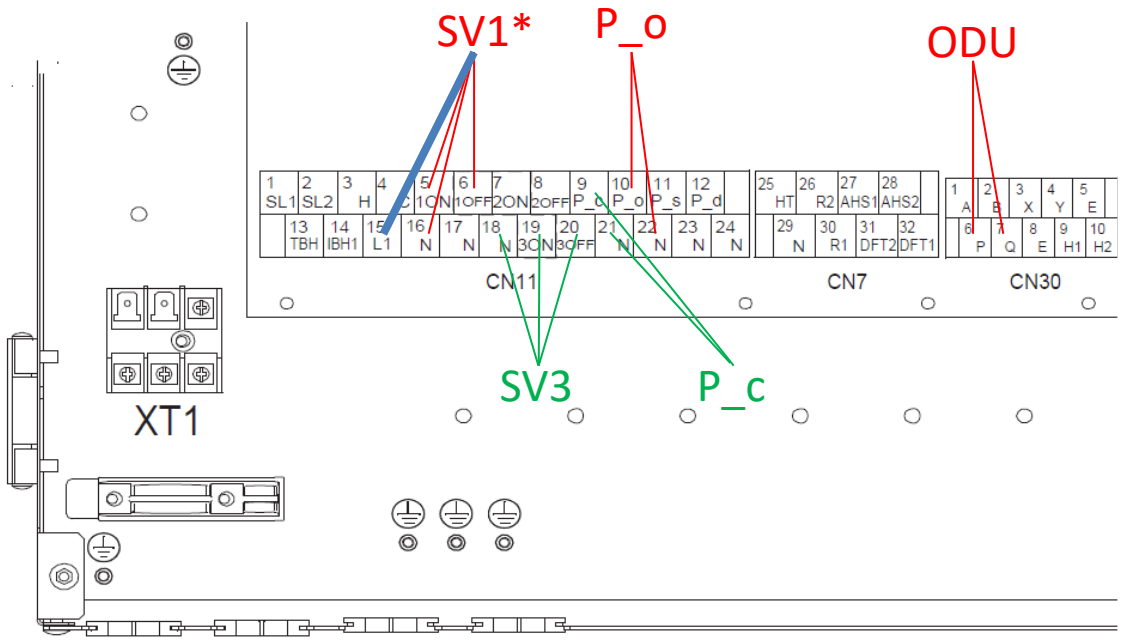
ELECTRICAL CONNECTIONS KMK/KHC (RY)

WE CARE ABOUT AIR



*- in case of using an actuator with constant control voltage on one wire, it should be connected to terminal no.15 (L1) on CN11

	Code	Print		Connect to
CN11	①	1	SL1	Solar energy input signal
		2	SL2	
	②	3	H	Room thermostat input（high voltage）*
		4	C	
		15	L1	
	③	5	1ON	SV1(3-way valve)
		6	1OFF	
		16	N	
	④	7	2ON	SV2(3-way valve)
		8	2OFF	
		17	N	
	⑤	9	P_c	Pumpc(zone2 pump)
		21	N	
	⑥	10	P_o	Outside circulation pump /zone1 pump
		22	N	
	⑦	11	P_s	Solar energy pump
		23	N	
	⑧	12	P_d	DHW pipe pump
		24	N	
	⑨	13	TBH	Tank booster heater
		16	N	
	⑩	14	IBH1	Internal backup heater 1
		17	N	
	⑪	18	N	SV3(3-way valve)
		19	3ON	
		20	3OFF	

	Code	Print		Connect to
CN30	①	1	A	Wired controller
		2	B	
		3	X	
		4	Y	
		5	E	
	②	6	P	Outdoor unit
		7	Q	
	③	9	H1	Internal machine Parallel
		10	H2	

	Code	Print		Connect to
CN7	①	26	R2	Compressor run
		30	R1	
		31	DFT2	Defrost or alarm signal
		32	DFT1	
	②	25	HT	Antifreeze E-heating tape(external)
		29	N	
	③	27	AHS1	Additional heat source
		28	AHS2	

XT1	L	Indoor unit power supplier
	N	
	G	

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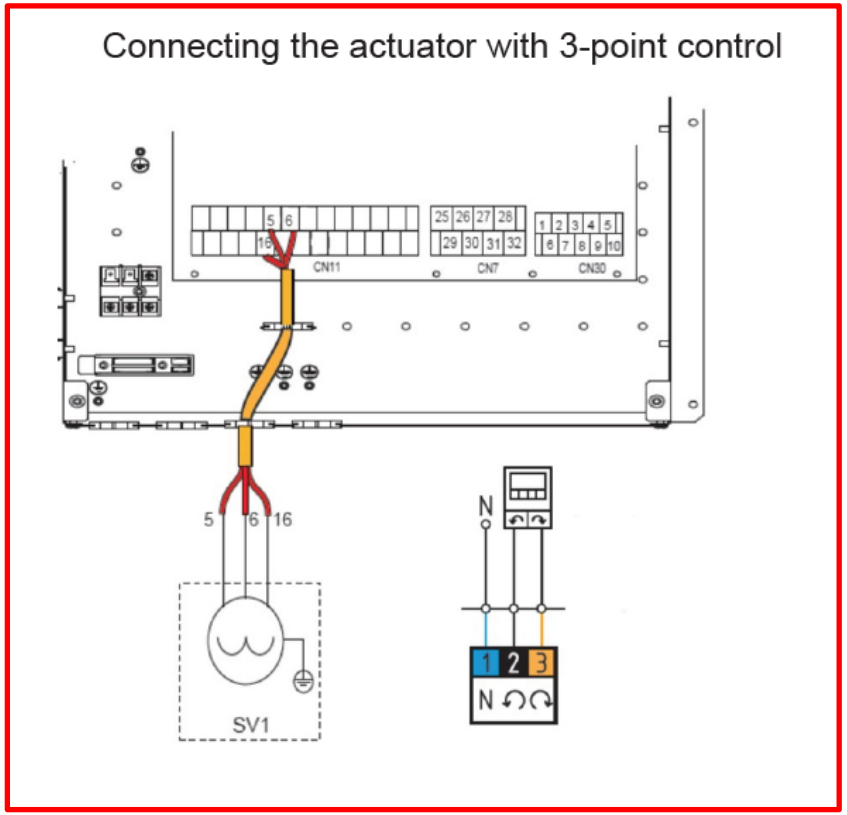
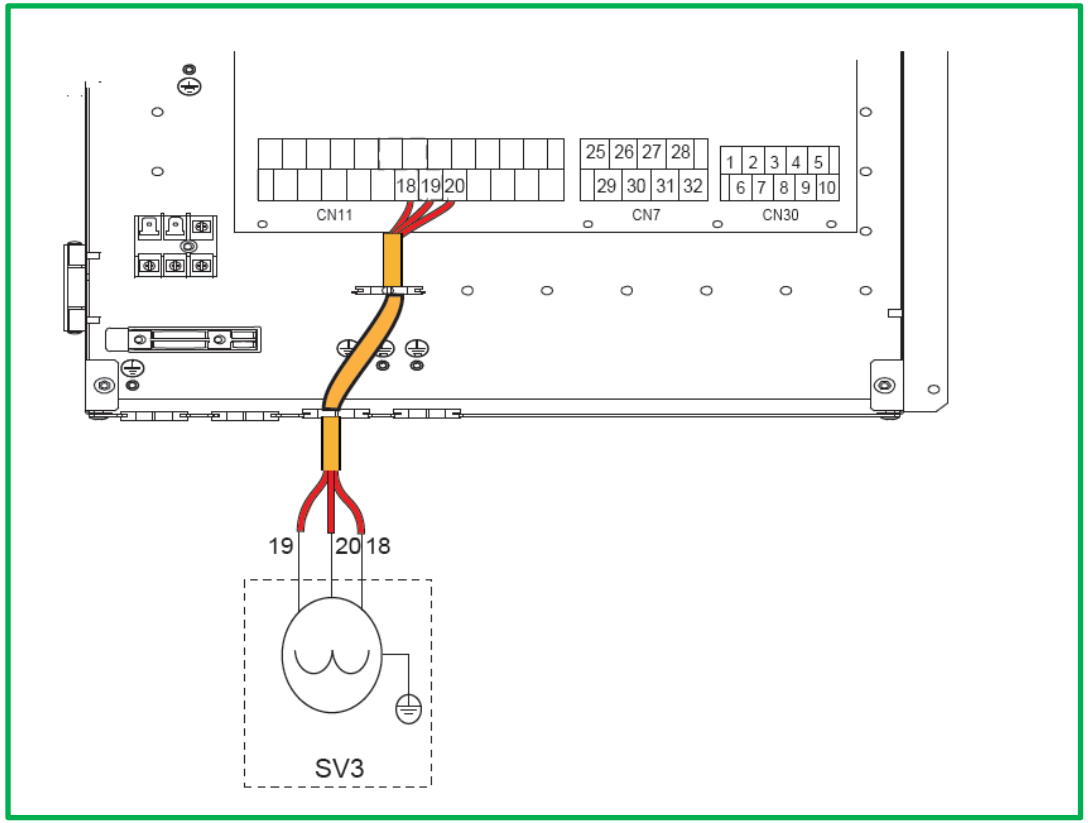
ELECTRICAL CONNECTIONS KMK/KHC (RY)

WE CARE ABOUT AIR

c.o. / DHW*



2 zone



*- in case of using an actuator with constant control voltage on one wire, it should be connected to terminal no.15 (L1) on CN11

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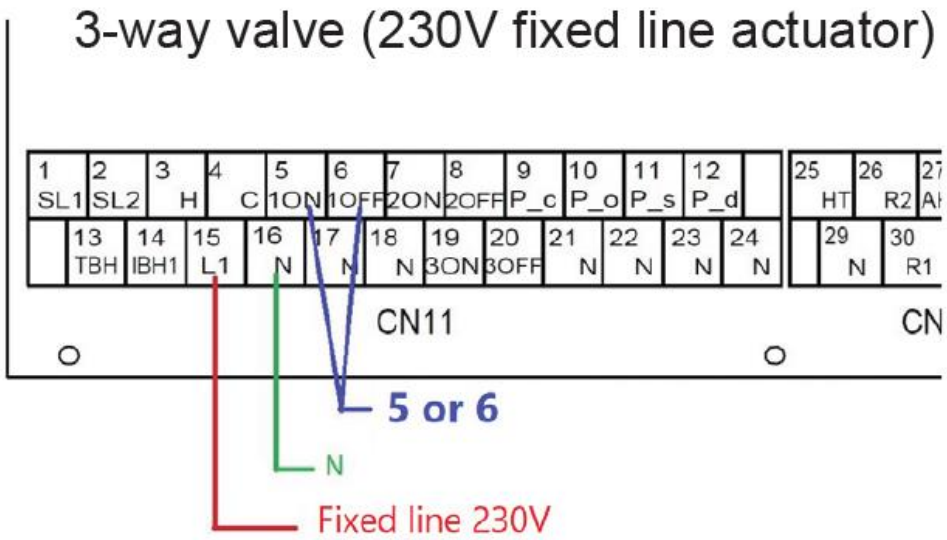
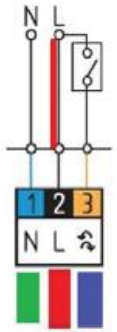
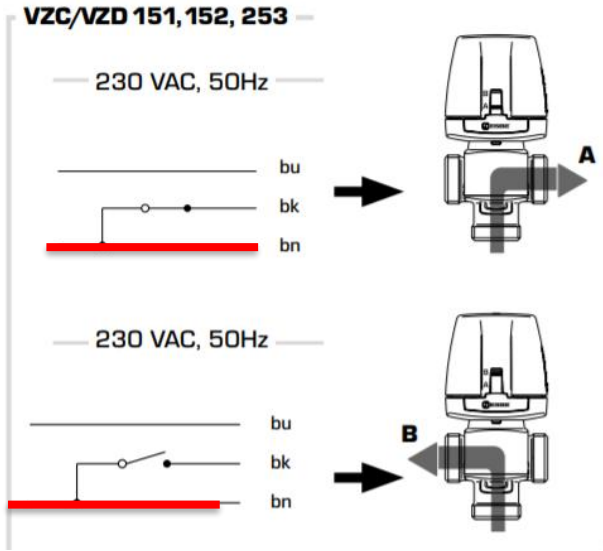
ELECTRICAL CONNECTIONS KMK/KHC (RY)

WE CARE ABOUT AIR

3-WAY VALVE
(230V FIXED LINE ACTUATOR)







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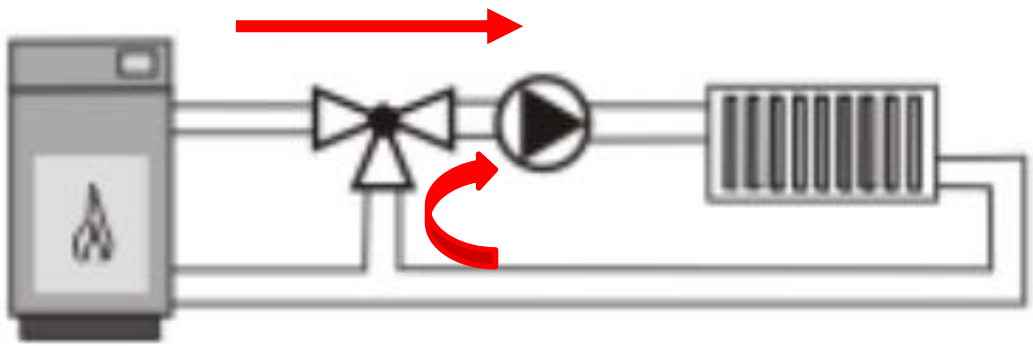
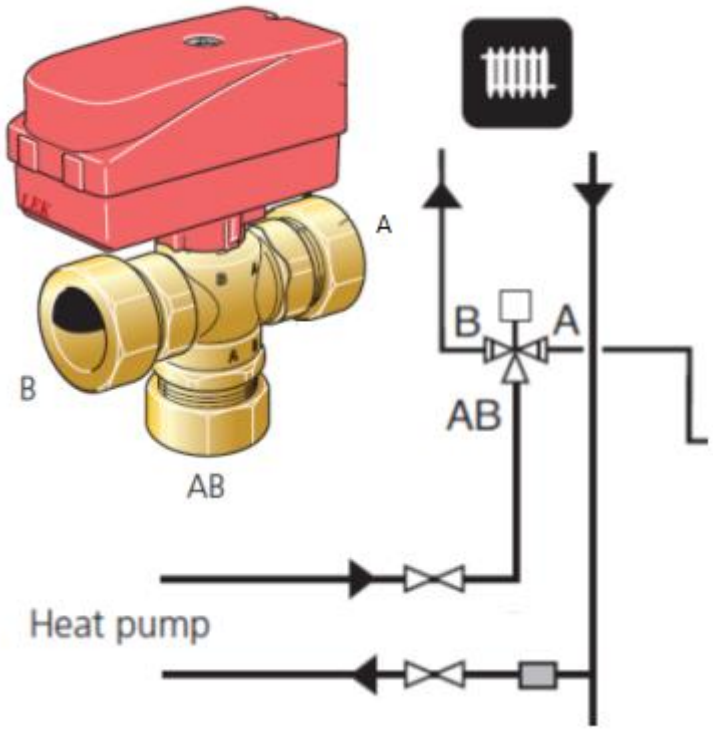
HYDRAULIC CONNECTIONS KMK/KHC

WE CARE ABOUT AIR

3-WAY VALVE





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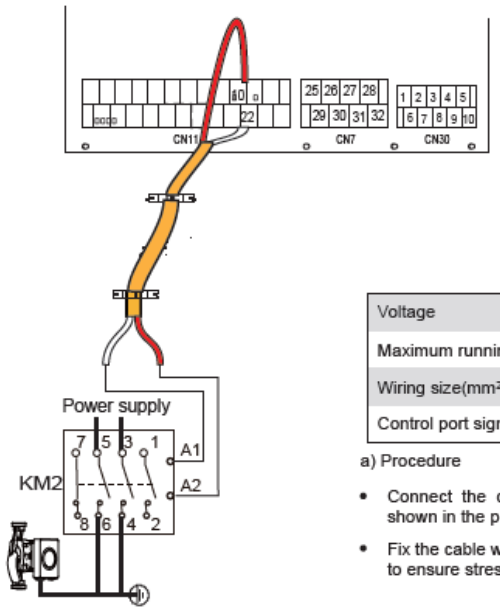
ELECTRICAL CONNECTIONS KMK/KHC (RY)

WE CARE ABOUT AIR

For outside circulation pump P_o:

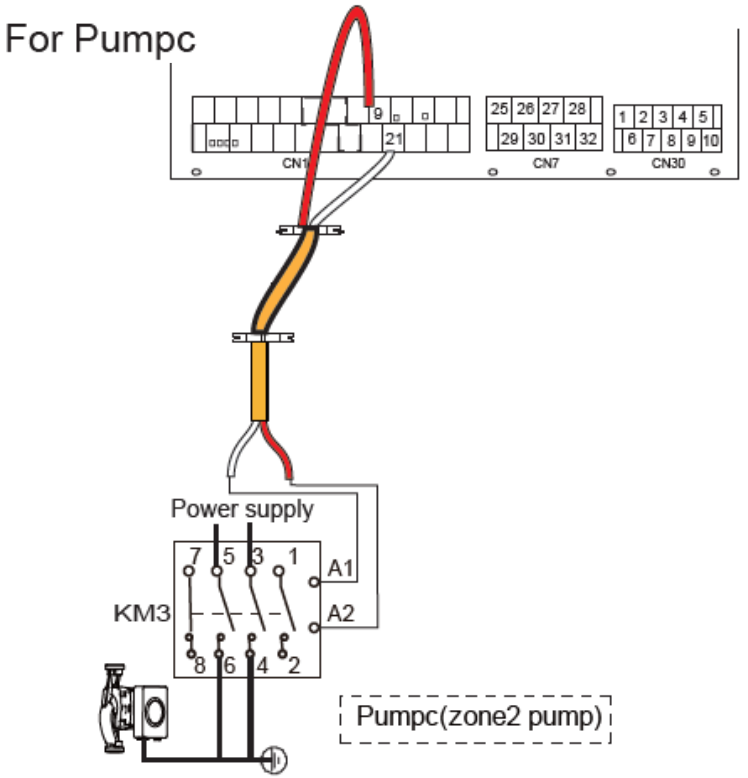


Voltage	220-240VAC
Maximum running current(A)	0.2
Wiring size(mm²)	0.75
Control port signal type	Type 2

a) Procedure

- Connect the cable to the appropriate terminals as shown in the picture.
- Fix the cable with cable ties to the cable tie mountings to ensure stress relief.

For Pumpc



A CONTACTOR IS REQUIRED
TO CONNECT THE
CIRCULATION PUMPS

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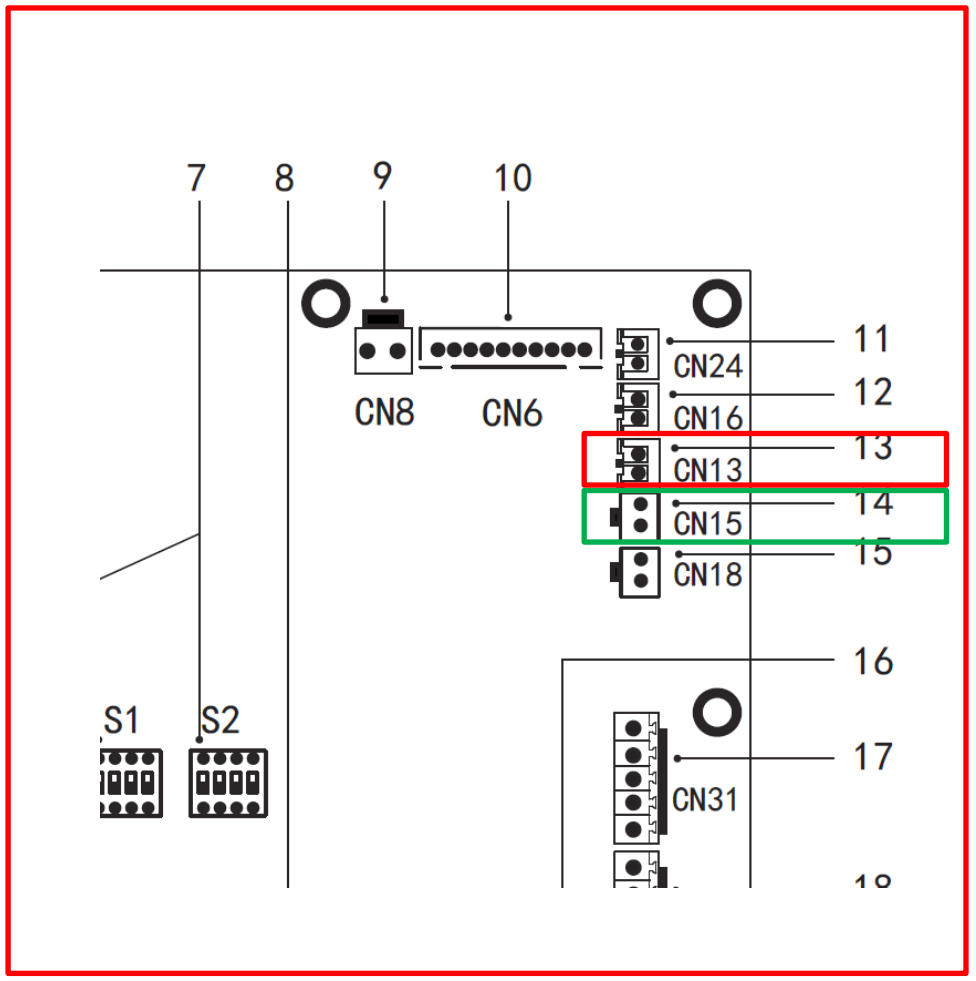
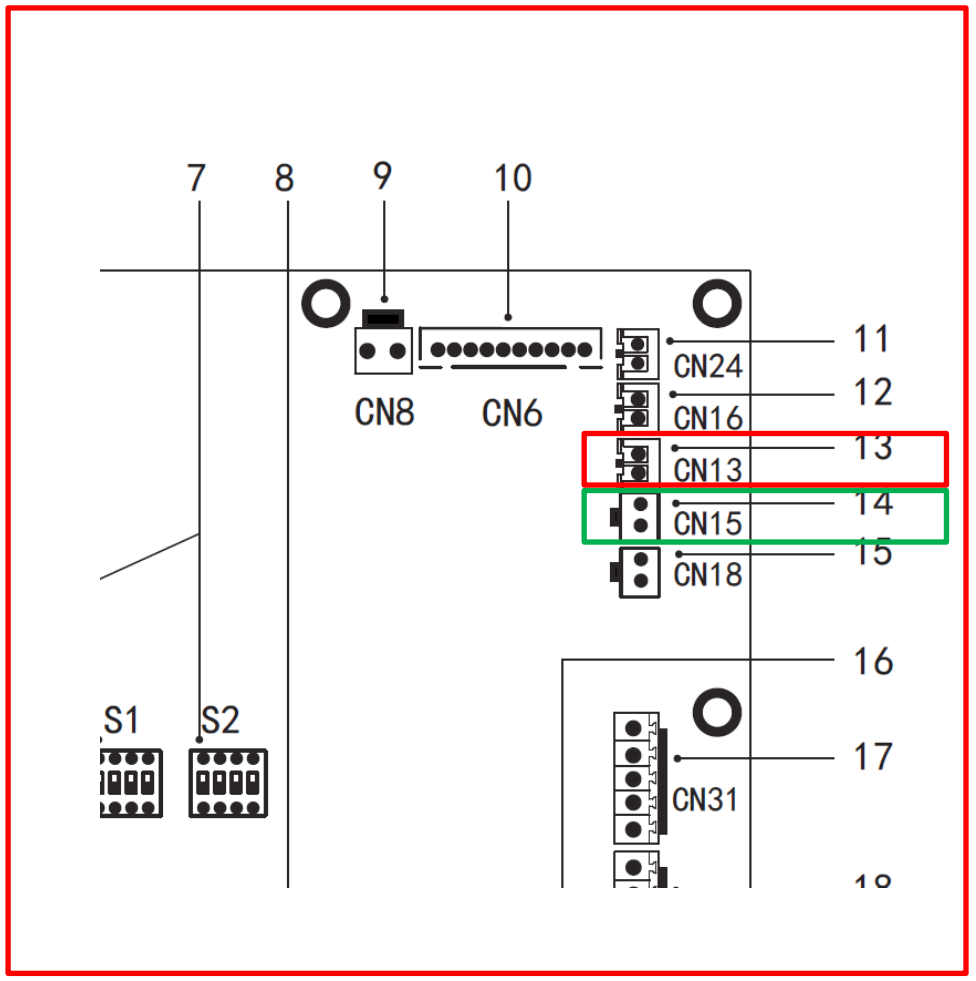
ELECTRICAL CONNECTIONS KMK/KHC (RY)



Connection of the DHW temperature sensor (T5) and the temperature sensor of the second heating circuit.

CN24	Tbt1	Port for upper temp. sensor of balance tank
CN13	T5	Port for domestic hot water tank temp. sensor
CN15	Tw2	Port for zone 2 temp.sensor of outlet water
CN18	Tsolar	Port for solar panel temp. sensor

ELECTRICAL CONNECTIONS KMK/KHC (RY)



Connection of the DHW temperature sensor (T5) and the temperature sensor of the second heating circuit.

CN24	Tbt1	Port for upper temp. sensor of balance tank
CN13	T5	Port for domestic hot water tank temp. sensor
CN15	Tw2	Port for zone 2 temp.sensor of outlet water
CN18	Tsolar	Port for solar panel temp. sensor

POPMPY KHX- R290

WE CARE ABOUT AIR

- KHX-09PY1
- KHX-14PY3
- KHX-16PY3

A+++
najwyższa klasa energetyczna

cicha praca urządzenia

75 °C
bardzo wysoka temperatura wyjścia wody

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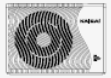
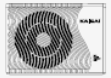
TECHNICAL DATA

Model			KHX-09PY1	KHX-14PY3	KHX-16PY3
					
Heating A7W35 ΔT=5, R.H. 85%	nominal heat capacity (range)	kW	8.90 (3.10 ~ 8.90)	14.95 (5.40 ~ 14.95)	22.00 (8.00 ~ 22.00)
	electric energy consumption (range)	kW	1.98 (0.68 ~ 2.10)	3.29 (1.05 ~ 3.85)	4.94 (1.60 ~ 6.90)
	COP	W/W	4.49 (4.76 ~ 4.23)	4.54 (5.09 ~ 4.53)	4.45 (4.99 ~ 4.44)
Heating A2W55 ΔT=5, R.H. 85%	nominal heat capacity (range)	kW	6.52	10.95	16.11
	electric energy consumption (range)	kW	2.19	3.65	5.48
	COP	W/W	2.97	3.00	2.94
Heating A-7W35 ΔT=5, R.H. 85%	nominal heat capacity (range)	kW	7.18	12.06	17.75
	electric energy consumption (range)	kW	1.87	3.11	4.65
	COP	W/W	3.84	3.88	3.82
Cooling A35W18 ΔT=5	nominal heat capacity (range)	kW	1.20 ~ 5.72	3.60 ~ 10.50	4.20 ~ 15.00
	electric energy consumption (range)	kW	0.65 ~ 2.40	1.12 ~ 4.47	1.80 ~ 7.30
ErP	seasonal energy efficiencya ηS avarage climate 35°C / 55°C	%	205 / 150	202 / 155	201 / 150
	annual energy consumption avarage climate 35°C / 55°C	kWh	1970 / 2575	3750 / 4828	5076 / 6672
	seasonal energy efficiencya ηS cold climate 35°C / 55°C	%	170 / 127	168 / 131	154 / 127
	annual energy consumption cold climate 35°C / 55°C	kWh	3110 / 4019	5913 / 7536	9530 / 10599
Seasonal space heating energy efficiency class (avarage climate)	TWW at 35°C class		A+++	A+++	A+++
	TWW at 55°C class		A+++	A+++	A+++

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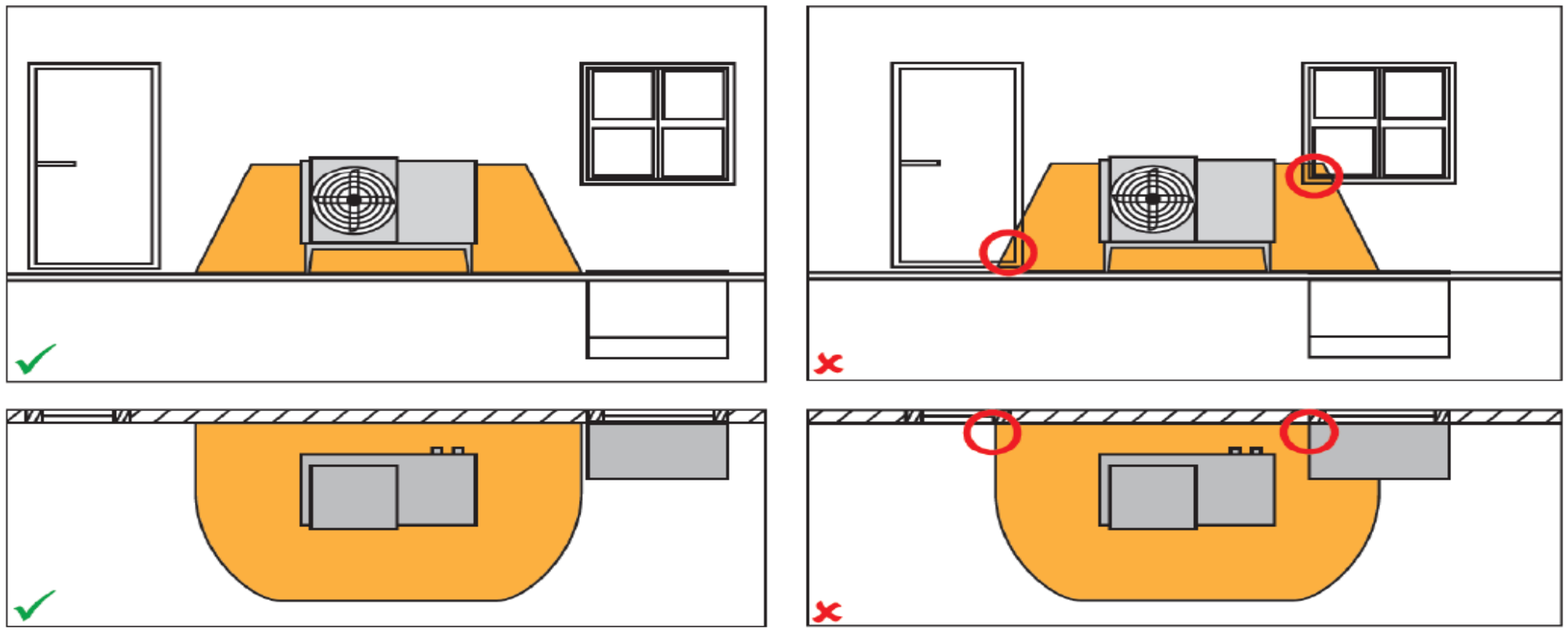
OUTDOOR INSTALLATION ON GROUND LEVEL

A3



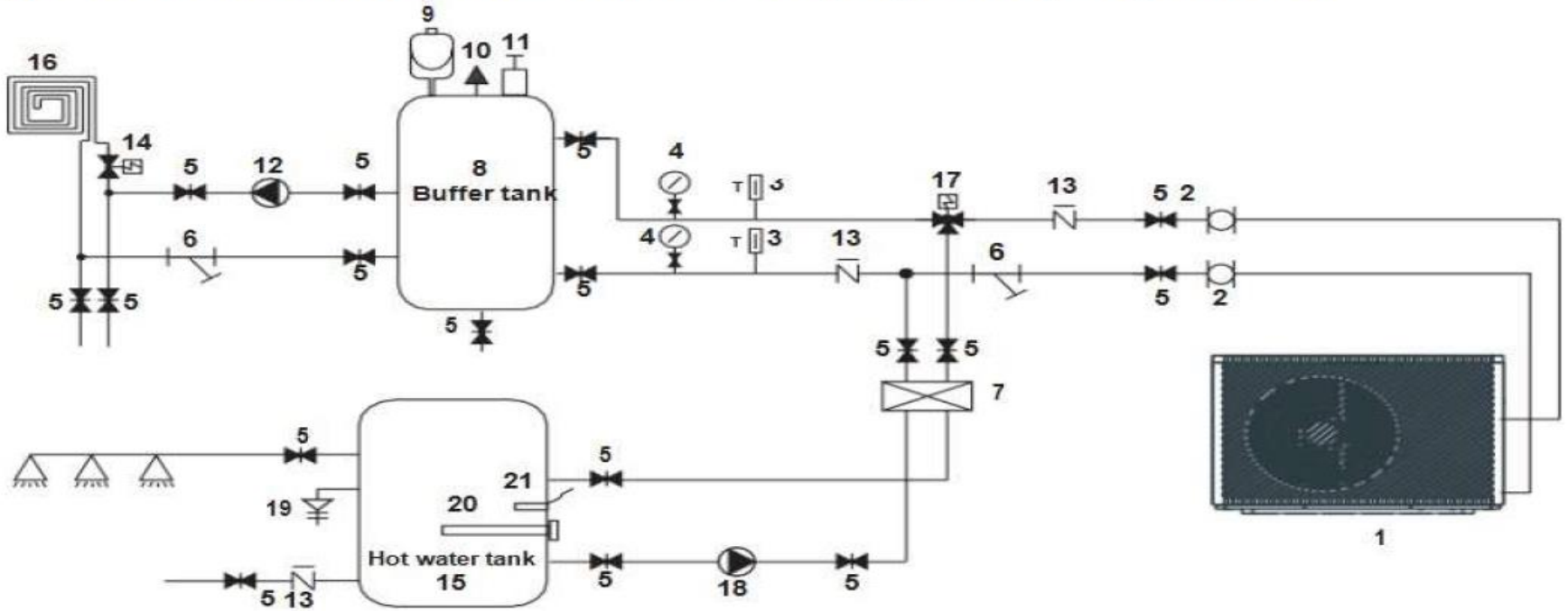
Rysunek 2: Strefa ochronna w przypadku zlokalizowania przy ścianie

WE CARE ABOUT AIR

INSTALACJA HYDRAULICZNA

6.1. Zastosowanie pompy ciepła

6.1.1. Ogrzewanie/chłodzenie domu + ciepłej wody użytkowej



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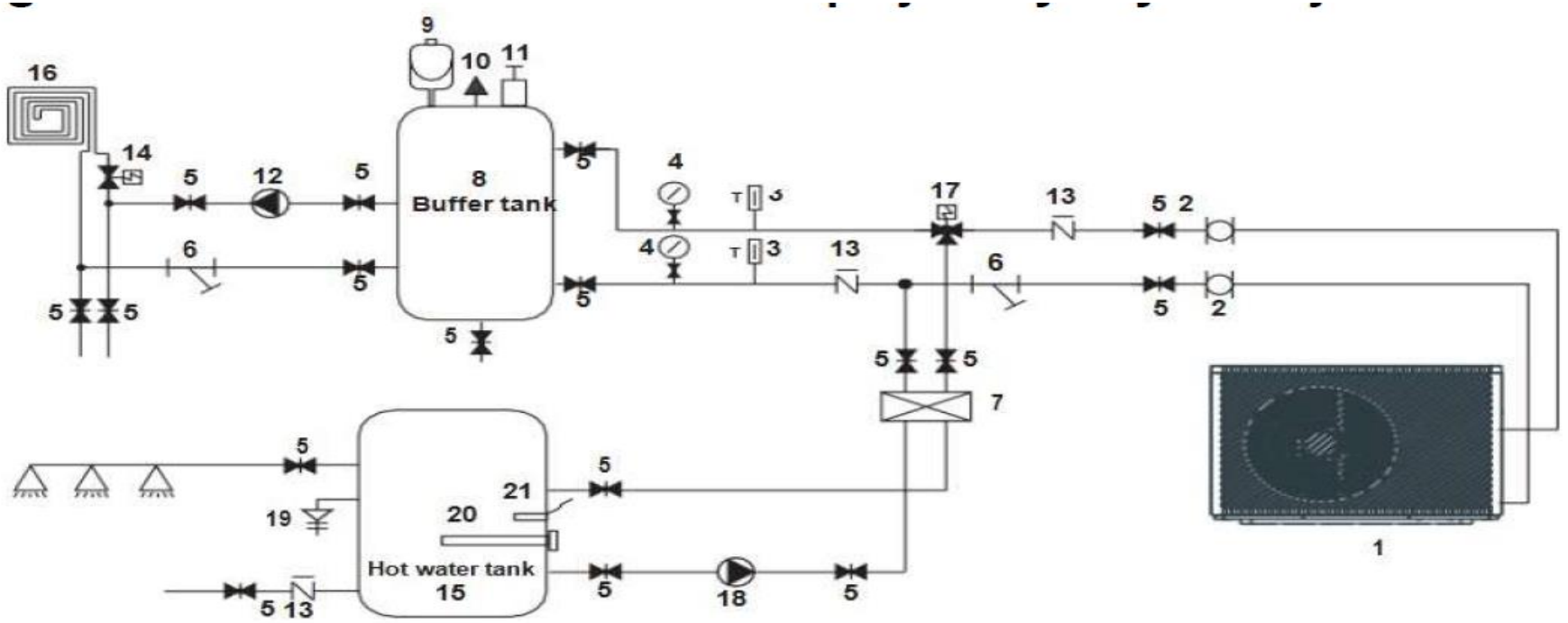
WE CARE ABOUT AIR

HYDRAULIC INSTALLATION



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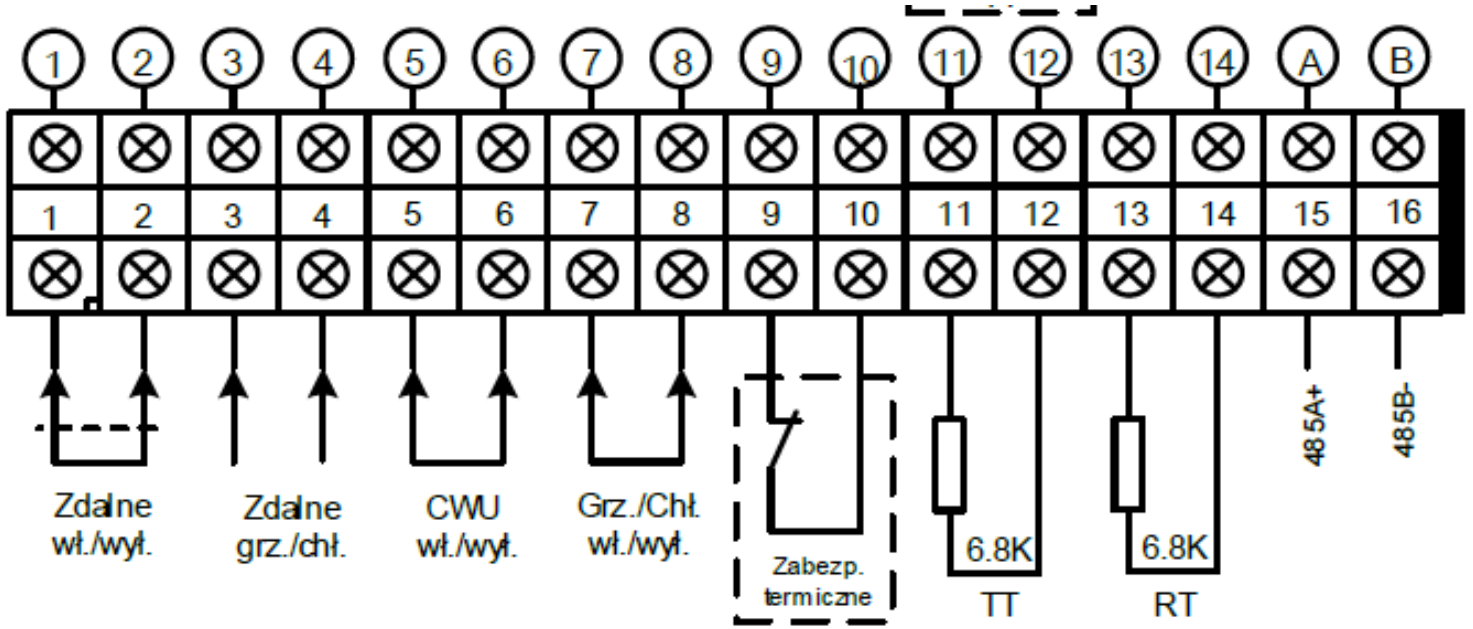
ELECTRICAL CONNECTION



KAISAI

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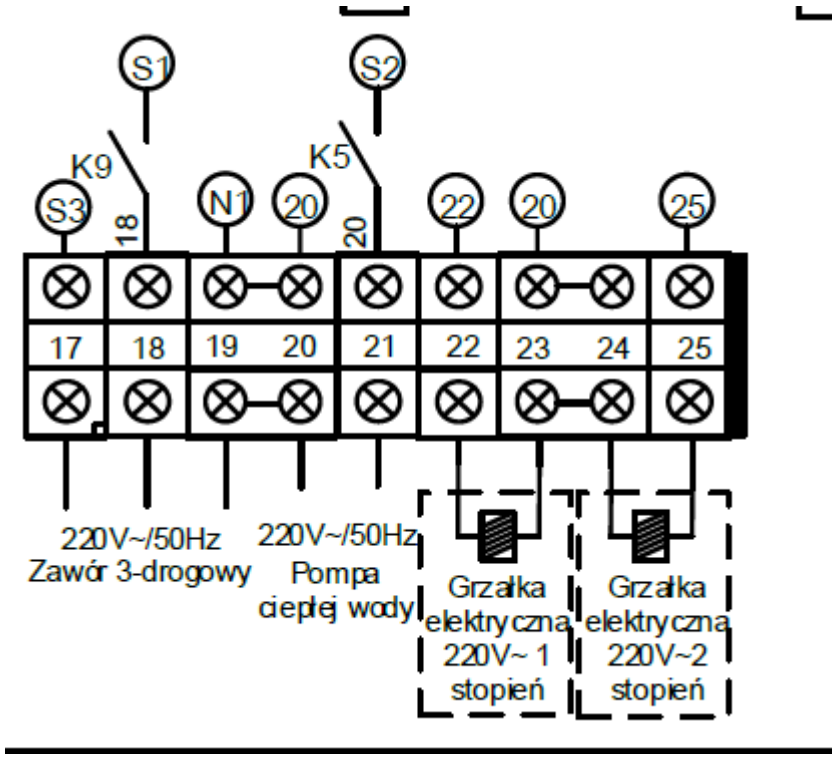
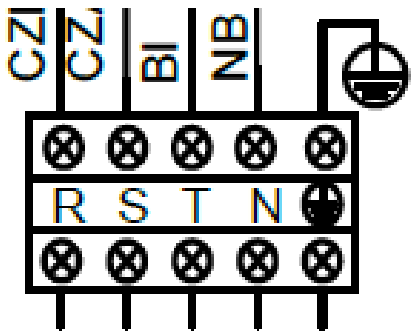
ELECTRICAL CONNECTION





DO ZASILANIA

380-415V/3N~/50HZ

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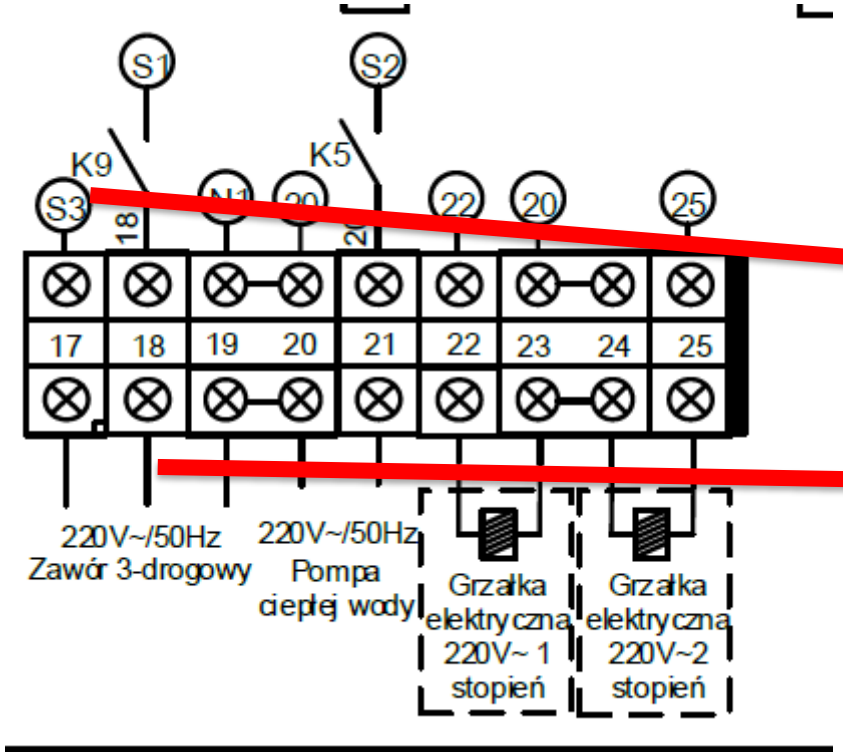
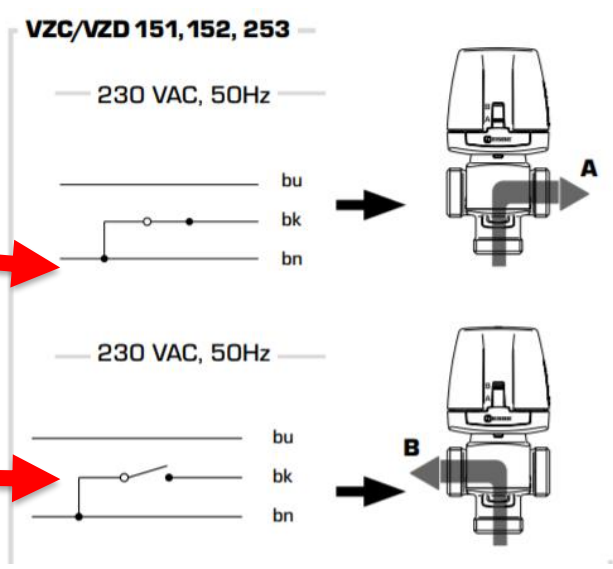
ELECTRICAL CONNECTION





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CONTROL PANEL OPERATION

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CONTROL PANEL OPERATION

Password: 22 or 022

855 → Factory reset

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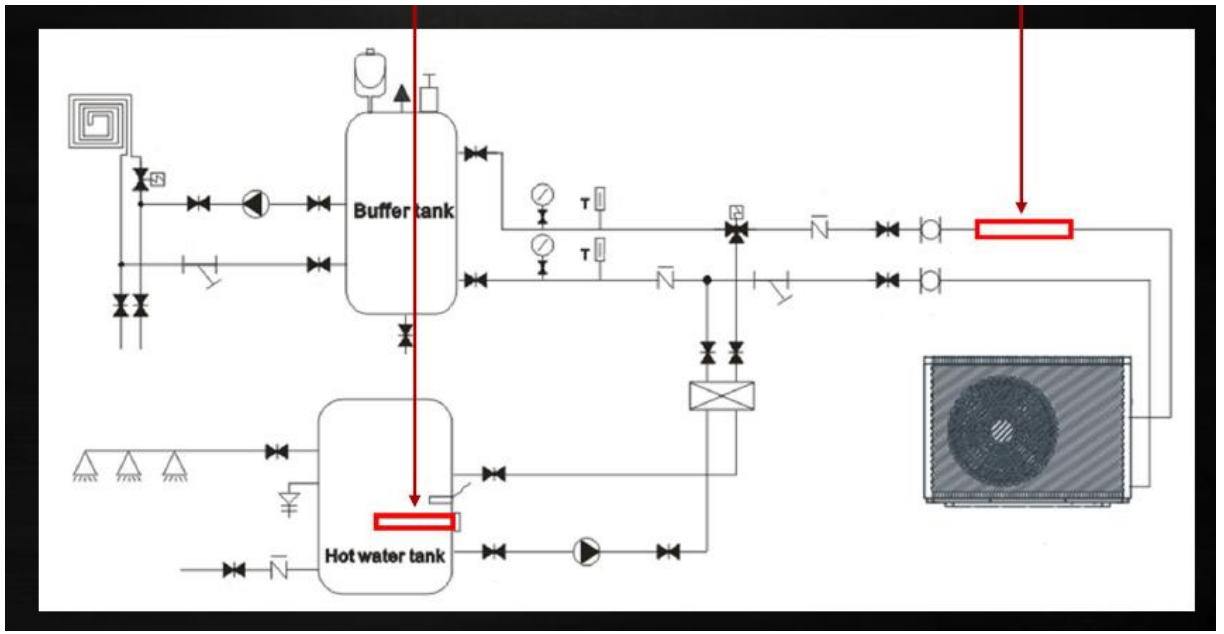
OPERATION OF THE ELECTRIC HEATER 1/2

- **R35 - PARAMETER CORRESPONDING TO THE USE OF ELECTRIC HEATERS**

- R35 = 0 ELECTRIC HEATERS WILL NOT BE USED.
- R35 = 1 FLOW HEATER.
- R35 = 2 HEATERS IN THE DHW TANK.
- R35 = 3 HEATERS IN BUFFER TANK.



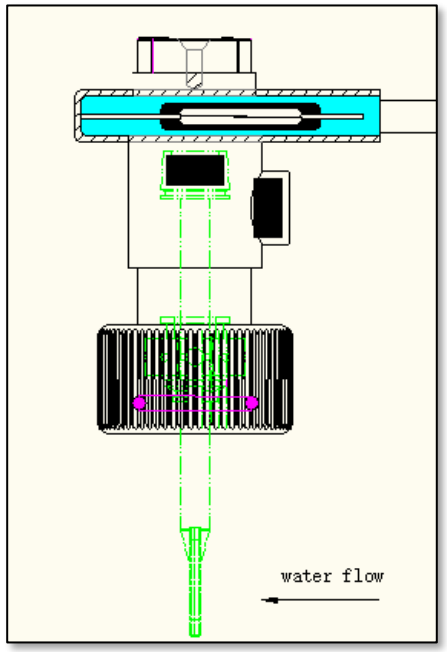
Service parameters

H18- BACKUP HEATERS
1- Step 1
2- Step 2
3- Step 3

Service parameters

R04 - Temperature drop which turns on heating
R05 - Temperature increase resulting in heating being turned off
R16 - Temperature drop causing DHW heating to turn on
R17 - Temperature increase that turns off DHW heating

E29	Secondary Anti-freezing Protection	Ambient temp.≤0℃, water inlet≤2℃	It is the protection in winter. Once the water temperature up to 15 °C or the ambient temp is higher than 1 °C, the error code disappears.
E032	Flow Switch Protection	Flow switch is open	1. Detect the connection of cables. 2. Detect the flow switch. 3. Detect the water valve is opened or opened fully. 4. Detect the water pump and the filter. 5. Maybe there is some air in the water route.
E051	Compressor Over current Shutdown Fault	Compressor Over current	1. Check ambient temp. and inlet/outlet water temp.; 2. Turn on the unit. Record and analyze the changing process of high/low pressure, discharge/suction temp., EEV step, compressor frequency and running current.




Thank you