



Ground-water and water-water HPBW-B

Technical parameters





Technical description of HP

The ground-water, water-water heat pump marked HPBW – B is a compact unit for indoor installation that can be used for two different primary sources of low-potential heat.

- For heat withdrawal from earth massif (bore holes or horizontal collectors)
- For heat withdrawal from underground water (pumping and drain wells)

User's communication with the control system and the heat pump control are provided in two variants, namely with the control panel built-in directly into the heat pump box or a separate control panel that can be also used as a reference room thermostat.

Heat pump noisiness

Reduction of noisiness and vibrations

- compressor acoustic enclosure
- acoustic insulation of the heat pump box
- compressor double-setting on anti-vibration segments

An overview of heat pump equipment

The HPBW – B heat pump comprises the following equipment:

- Regulation of a bivalence source (programmable output, on/off)
- Control panel
- Control of the three-way zone valve for hot water
- External probe for outside temperature
- Equithermic regulation
- Secondary circulation pump
- Control of two heating circuits
- Control of one mixing valve

The regulator provides the following functions

- delayed heat pump start after supply voltage connection or putting into ready-to-start condition (60 to 100 s) which prevents undesirable repeated starting in mains failures or improper handling with electric wiring;
- regulation of the minimum time of compressor shutdown (min. 5 minutes);
- bivalence heat source switching (programmable output);
- blocking of electric boiler operation in automatic mode according to external temperature (according to bivalence condition temperature);
- regulation outputs switching step-by-step according to the control temperature of heating medium;
- possibility of mixing circuit control using a three-point servo-drive 230 VAC
- automatic turns of the circulation pumps preventing pumps to "get stiff";
- possibility of starting mode utilization for putting under floor heating into operation – controlled warming and cooling in the under floor heating;
- domestic hot water warming using the heat pump, control of the three-way valve in the heat pump outlet;
- possibility of setting of the priority of heating or hot water warming in adjustable time intervals;





Heat accumulation

Suitable heat pump connection into a heating system is through a so called buffer tank providing the following functions:

- Separation of the flow through the heat pump and the flow through the heating system which ensures stable flow through the heat pump and thus heating water constant warming too;
- The buffer tank contains a heating water quantity sufficient for prevention of heat pump cycling in adverse conditions depending on the heat requirement of the building.

The accumulation volume shall be calculated as heat pump heating performance multiplied by fifteen, thus:

$$\text{Buffer tank [L]} = 15 \times \text{Heat pumps output [kW]}$$

In the case of a sufficient active volume of heat transfer medium in the heating system a thermo-hydraulic distribution header can be used.

Heat pump wiring

An electric switchboard comprising power elements and the control system is a part of the heat pump

Electric connection of the heat pump:

Inputs

- Protected power supply line 3x400V, 50 Hz for HP3BW-B or 230V, 50 Hz for HP1BW-B
- Communication line of an external control panel (if that panel is not a part of the heat pump)
- Communication line of a room thermostat (if the control panel is a part of the heat pump)
- External probes measuring outside temperature

Outputs

- Power line terminal of the primary circuit circulation pump
- Power line terminal of the heating circuit circulation pumps
- Power line terminal of the three-way zone valve for domestic hot water warming
- Terminal for mixing valve control
- Terminal for bivalence source control (on/off)
- Terminal for flow switch

The marking code of the heat pump – data for purchase order

HP3BW 11 B-1A			
Colour finish	A	...	standard
Styling model	1	...	in-built control panel
	2	...	external control panel
Equipment degree	B	...	basic
Nominal thermal performance		...	ad table
Heat pump type	BW	...	ground-water
Nominal supply voltage	1	...	single-phase 230 V, 50 Hz
	3	...	three-phase 3x400 V, 50 Hz
Heat pump marking			





Technical parameters of the HPBW - B heat pumps in ground-water connection

HPBW - B (ground-water)		Single-phase HP1BW - B			Three-phase HP3BW - B		
Data	Unit	07 B	11 B	15 B	07 B	11 B	15 B
Energetic parameters B0/W35							
Heating output	kW	7,4	10,9	14,8	7,4	11,2	15,8
Effective input	kW	1,7	2,6	3,4	1,7	2,5	3,6
Performance factor [COP]	-	4,2	4,3	4,3	4,3	4,4	4,4
Energetic parameters B0/W45							
Heating output	kW	7,1	10,4	14,5	6,9	10,3	14,6
Effective input	kW	2,1	3,1	4,4	2,1	3,0	4,4
Performance factor [COP]	-	3,4	3,3	3,3	3,3	3,4	3,3
Energetic parameters B0/W55							
Heating output	kW	6,8	10,1	14,2	6,5	9,7	13,8
Effective input	kW	2,5	3,8	5,5	2,6	3,7	5,4
Performance factor [COP]	-	2,7	2,6	2,6	2,5	2,6	2,6
Hydraulic parameters							
Primary circuit - flow rate	m ³ /h	1,7	2,6	3,4	1,7	2,6	3,7
- pressure loss at HP	kPa	19	30	20	19	30	24
Secondary circuit - flow rate	m ³ /h	1,3	1,9	2,6	1,3	1,9	2,7
- pressure loss at HP	kPa	10	13	16	10	13	17
- built-in pump	-	25-60		25-80	25-60		25-80
Electric parameters / feeding voltage	V/Hz	1 x 230 / 50			3 x 400 / 50		
Start up current	A	45	45	45	19	28	35
Circuit - breaker	A	C25/1	C32/1	C40/1	C13/3	C16/3	C20/3
Compressor	-	Scroll					
Refrigerant (ecologically harmless)	-	R 407C					
Temp. range of the primary heat source	°C	-10 to +20					
Maximum outlet temperature	°C	60					
Size and weight							
width	mm	580			580		
depth	mm	600			600		
height	mm	1000			1000		
weight	kg	110	125	155	115	125	155

Energetic parameters are measured according to standard EN 14511.





Technical parameters of the HPBW - B heat pumps in water-water connection

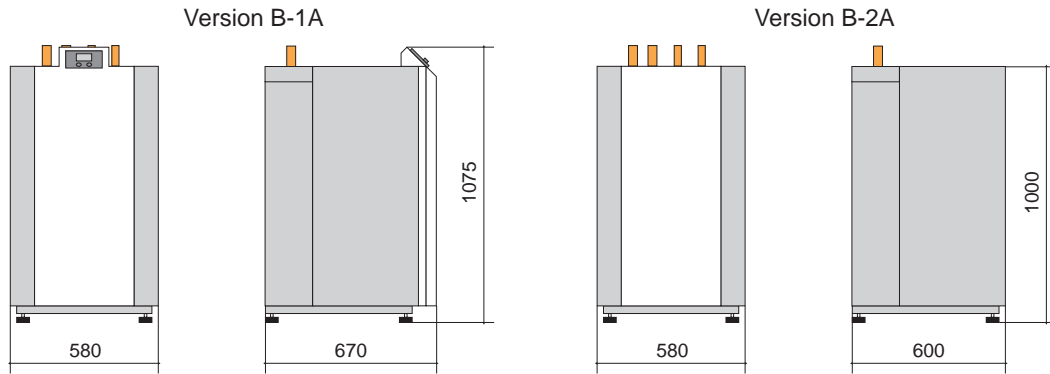
HPBW - B (water-water)		Single-phase HP1BW -B			Three-phase HP3BW - B		
Data	Unit	07 B	11 B	15 B	07 B	11 B	15 B
Energetic parameters W10/W35							
Heating output	kW	9,9	14,4	19,4	10,1	15,3	21,5
Effective input	kW	2,0	2,9	3,6	1,9	2,7	3,9
Performance factor [COP]	-	5,0	5,0	5,4	5,4	5,6	5,5
Energetic parameters W10/W45							
Heating output	kW	9,2	13,5	18,6	9,3	14,0	19,8
Effective input	kW	2,3	3,4	4,4	2,2	3,3	4,7
Performance factor [COP]	-	4,0	4,0	4,2	4,1	4,3	4,2
Energetic parameters W10/W55							
Heating output	kW	8,6	12,8	17,6	8,6	13,0	18,4
Effective input	kW	2,7	4,1	5,6	2,8	4,0	5,8
Performance factor [COP]	-	3,1	3,1	3,1	3,1	3,2	3,2
Hydraulic parameters							
Primary circuit - flow rate	m ³ /h	2,3	3,4	4,6	2,4	3,7	5,2
- pressure loss at HP	kPa	27	37	27	29	44	34
Secondary circuit - flow rate	m ³ /h	1,7	2,5	3,4	1,8	2,7	3,7
- pressure loss at HP	kPa	15	20	26	17	23	30
- built-in pump	-	25-60		25-80	25-60		25-80
Electric parameters / feeding voltage	V/Hz	1 x 230 / 50			3 x 400 / 50		
Start up current	A	45	45	45	19	28	35
Circuit - breaker	A	C25/1	C32/1	C40/1	C13/3	C16/3	C20/3
Compressor	-	Scroll					
Refrigerant (ecologically harmless)	-	R 407C					
Temp. range of the primary heat source	°C	+8 to +20					
Maximum outlet temperature	°C	60					
Size and weight							
width	mm	580			580		
depth	mm	600			600		
height	mm	1000			1000		
weight	kg	110	125	155	115	125	155

Energetic parameters are measured according to standard EN 14511.

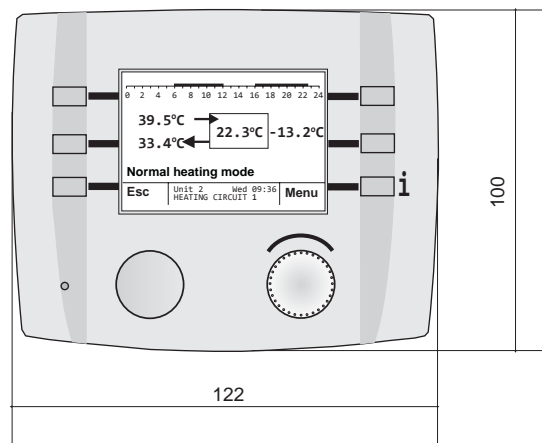




Dimensional sketches of ground-water and water-water heat pumps, HP3BW - B und HP1BW - B



Dimensional sketches of the control panel





Connection diagrams of the ground-water and water-water HPBW-B heat pumps

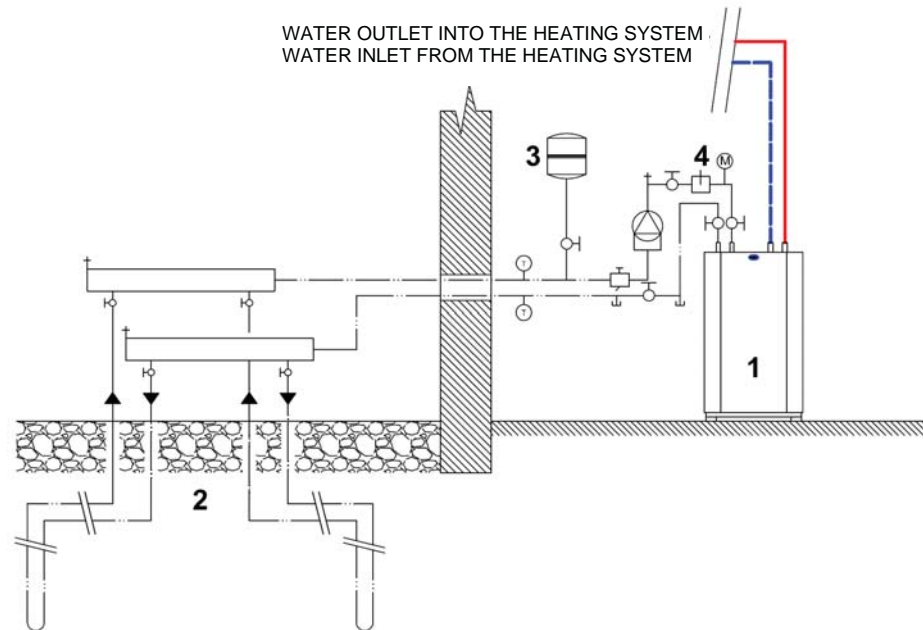


Fig. 1 - Heat pump HPBW – B (ground-water)

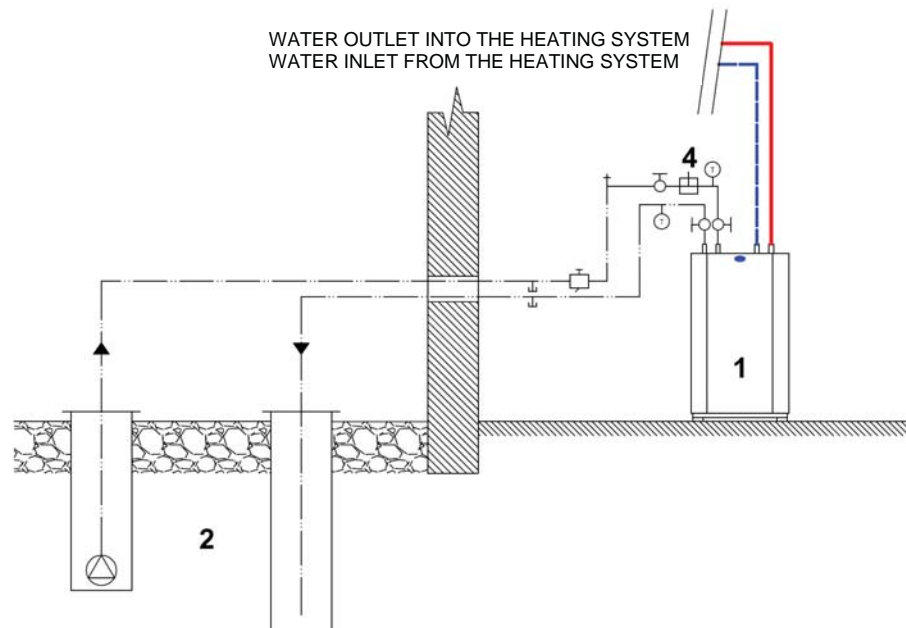


Fig. 2 - Heat pump HPBW – B (water-water)

EXPLANATION:

1. HEAT PUMP HPBW - B
2. PRIMARY SIDE – BOREHOLES, HORIZONTAL COLLECTORS OR PUMPING WELL AND DRAIN WELL
3. EXPANSION VESSEL
4. FLOW SWITCH

EXPLANATION TO PIPELINE:

- HOT WATER SUPPLY
- RETURN HOT WATER
- PRIMARY SIDE





Connection diagrams of the HPBW-B heat pumps for hot water warming

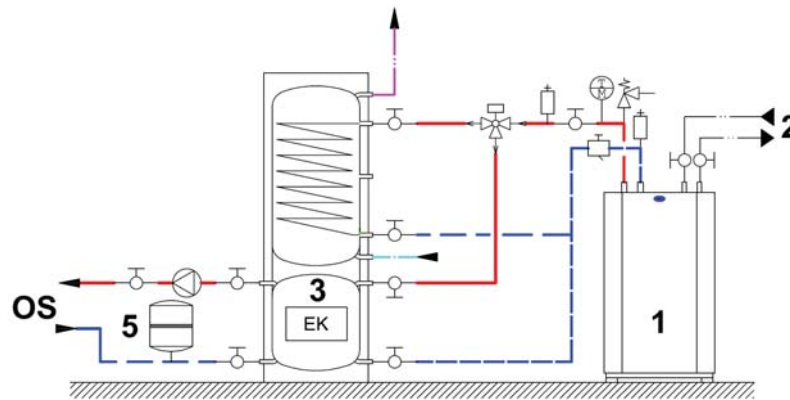


Fig. 3 - Heat pump HPBW – B with the application of a combined tank for heating water accumulation and hot water warming

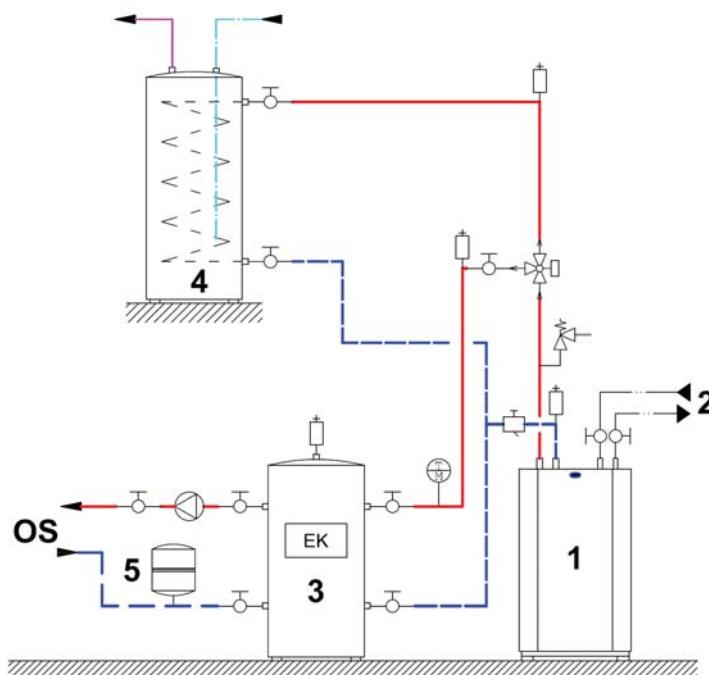


Fig. 4 - Heat pump HPBW – B with application of a non-directly heating cylinder for hot water warming

EXPLANATION:

1. HEAT PUMP HPBW - B
2. PRIMARY SIDE
- 3a. COMBINED BUFFER TANK
- 3b. BUFFER TANK
4. NON-DIRECTLY HEATING CYLINDER
5. EXPANSION VESSEL

EXPLANATION TO PIPELINE:

- HOT WATER SUPPLY
- RETURN HOT WATER
- PRIMARY PIPELINE
- COLD WATER
- HOT WATER

