DHW | Renewables | Air conditioning | Room heating

Engineering and installation
Heat pumps

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STIEBEL ELTRON
Technik zum Wohlfühlen

Engineering and installation

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Specification

Dimensions in the diagrams are in millimetres unless stated otherwise. Pressure figures may be stated in pascals (MPa, hPa, kPa) or in bars (bar, mbar). The details of threaded connections are given in accordance with ISO 228. Fuse types and sizes are stated in accordance with VDE. Output details apply to new appliances with clean heat exchangers.

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Technical guide for heat pumps

Heat pumps protect our energy reserves

Advanced heat pumps save energy and reduce emissions

Heat is a fundamental human need. Many people today not only consider economy when they think of heating, but also consider the environmental impact. That both can be combined effectively is shown by the development of the heat pump. Heat pumps utilise the energy that is permanently present in the air, water and ground, and converts it into useful heating energy. This method of reclaiming almost inexhaustible useful heat does not harm the environment..

The heat pump is regulated subject to the outside temperature. The control unit safeguards the selected set temperature. As a result, the heat pump achieves an excellent quotient of "harvested" heat to expended primary energy. To put it into figures:

A heat pump enables up to five kWh of available energy to be obtained from one kWh of electrical energy from the air, groundwater or ground.

The compact design requires little space and ensures easy installation. The minimal effort needed for installation makes the air | water heat pump the easiest version to choose. Sited either indoors or outdoors, a heat pump can obtain usable heat from the outdoor air down to approximately -20 °C.

The importance of environmentally responsible products is continually increasing when it comes to making purchasing decisions. Our heat pumps transform the basic concept of heating homes ecologically and economically into a reality.

Futureproof solutions

In recent decades, we have invested much time and a great deal of care in the development of heat pumps. This has evolved into reliable series-ready technology that guarantees maximum convenience. A very wide range of heating system tasks can be solved conveniently and economically with our heat pumps range. Our heat pumps are part of an extensive range of system designs, the predominant aim of which is to translate our claim to high quality into futureproof, alternative technologies that are environmentally sound. As one of the most important manufacturers of products in the heating, ventilation, air conditioning and domestic hot water equipment sector, we feel a great sense of responsibility towards our environment. For that reason will we continue to adhere to our commitment to this sector.

Exclusive technology - hot water included

Hot water and cosy living are our business. You can also safeguard your domestic hot water supply with our DHW cylinders.

Have you already considered separating your DHW heating from your heating system? For a higher DHW demand, e.g. on commercial premises, a heat pump can also be used solely for DHW heating.

irrespective of whether you want to provide a centralised or decentralised supply. We offer a complete range of energy-efficient electric appliances.

Heat pump function

Heat pump principle

The heat transfer medium (refrigerant) makes the most important contribution towards the function of a heat pump. The heat transfer medium can evaporate at the lowest temperatures.

If outdoor air or water is routed via a heat exchanger in which the heat transfer medium is circulating, the latter extracts heat from the heat source. In this process, the heat transfer medium changes from its liquid to its gaseous state.

During this process, the heat source cools down by a few degrees.

A compressor draws the gaseous process medium in and compresses it. The increase in pressure also raises the temperature; in other words, the process medium is "pumped" to a higher temperature level.

That requires electrical energy. With suction gas-cooled compressors, motor heat is not lost. Motor heat is routed with the compressed heat transfer medium into the downstream condenser.

Here, the process medium transfers its absorbed energy to the circulating system of the hot water heating system by being returned into a liquid state again.

The prevalent pressure of the heat transfer medium is reduced with an expansion valve and the cycle starts again.

Heat pump coefficient of performance

The coefficient of performance ε_{HP} is equal to the quotient of heating output Q_{HP} and electrical power consumption P_{HP} in accordance with the following equation:

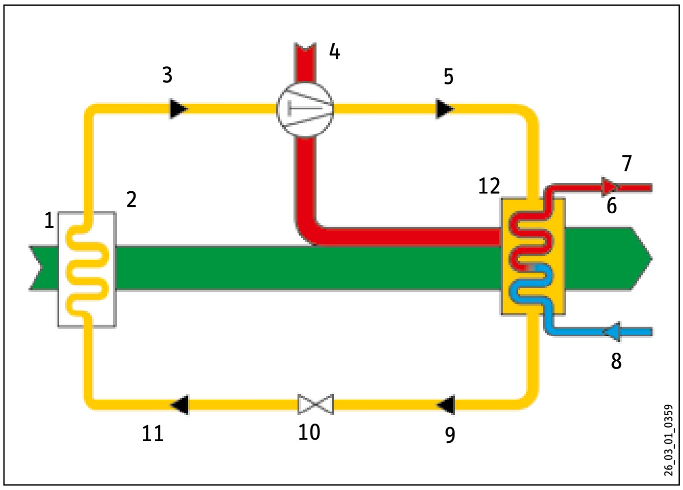
$$\varepsilon_{WP} = \frac{Q_{WP}}{P_{WP}}$$

It provides a factor, by which yield exceeds expenditure.

The coefficient of performance is subject to the temperature of the heat source and that of the heat consumer. The higher the heat source temperature and the lower the heat consumer temperature, the higher the coefficient of performance.

It always relates, as a current value, to a specific operating condition.

Main layout, heat pump refrigeration circuit



1 Environmental energy
2 Evaporator
3 Suction line, gaseous process medium, low pressure
4 Compressor
5 Pressure line, gaseous process medium, high pressure
6 Heating energy
7 Flow
8 Return
9 Liquid line, liquid process medium, high pressure
10 Expansion valve
11 Injection line, liquid process medium, low pressure
12 Condenser

Heat source air

Air heated by the sun is universally available. Even at -20 °C outdoor air temperature, heat pumps can still extract sufficient energy for heating mode.

Air as a heat source is at its coldest when the most heating energy is needed.

A heat pump can extract heat from air as a heat source down to approximately -20 °C. . However, the coefficient of performance falls as the heat source temperature decreases.

One solution is to combine a heat pump with a second heat generator that supports the heat pump during the short but particularly cold season.

One particular benefit is the ease of installation of air | water heat pumps, as no extensive ground work or well drilling is required.

Heat source water

Groundwater is a good store of solar energy. Even on the coldest days in winter, temperatures of +7 °C to +12 °C are maintained.

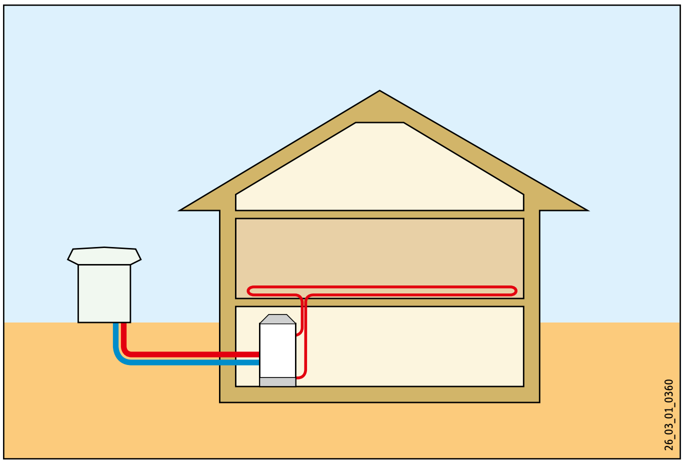
The constant temperature level of the heat source enables the heat pump to achieve an almost constant coefficient of performance all the year round.

Groundwater of suitable quality is not universally available in sufficient quantities. It is worthwhile using groundwater when possible.

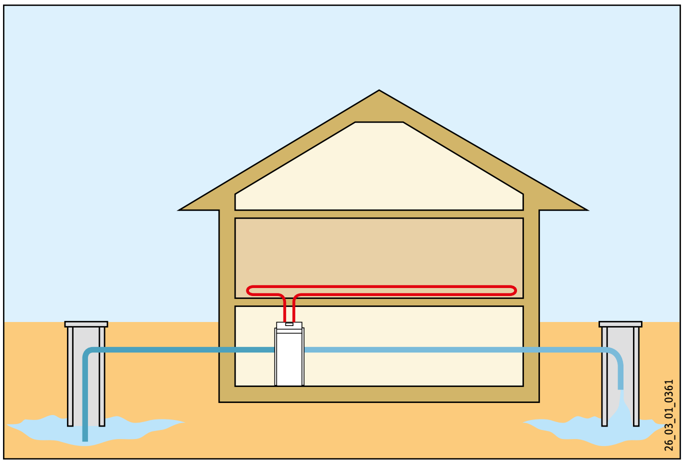
Utilising this heat source requires the drilling of a delivery well and a return well.

The use of groundwater usually requires the approval of your local water board [check local regulations]. Your local water board will advise you about the possibility of utilising these waterways.

General layout, air as heat source



General layout, groundwater as heat source



The ground is the source of thermal energy

Heat source: Ground with a geothermal collector

In Central Europe, even on cold winter days the ground remains sufficiently warm to a depth of approx. 1.20 m to 1.50 m to enable economical heat pump operation.

For a geothermal collector, you need a sufficiently large area of land for the pipe system that absorbs the geothermal heat. You need approximately two to three times as much surface area (ground) as the living area to be heated.

In dry, sandy soil, the geothermal collector can extract between 10 and 15 W/m² and up to 40 W/m² in ground that carries groundwater.

An environmentally responsible brine mixture that cannot freeze and which transports the yielded energy to the heat pump evaporator courses through the pipes.

If your property is large enough, you have an inexhaustible reserve of energy and ideal conditions for a brine | water heat pump.

Heat source: Ground with a geothermal probe system

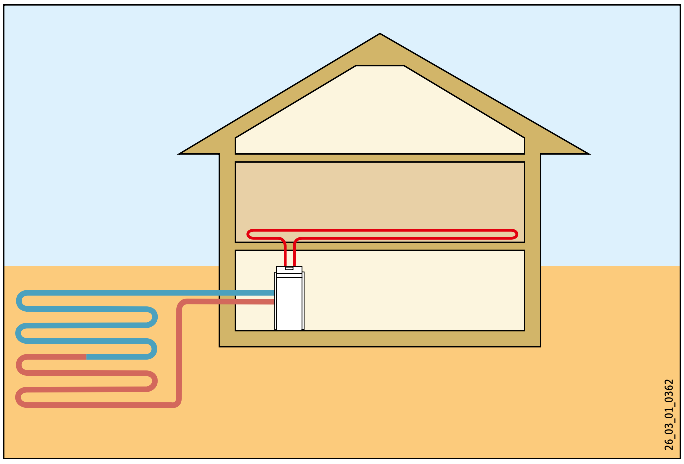
Vertical geothermal probes take up little space. Using specialist drilling equipment, geothermal probes can be sunk into the ground down to a depth of around 100 metres.

Geothermal probes comprise a probe foot and vertical probe pipes made from plastic. A brine mixture that extracts heat from the ground circulates through the plastic pipework.

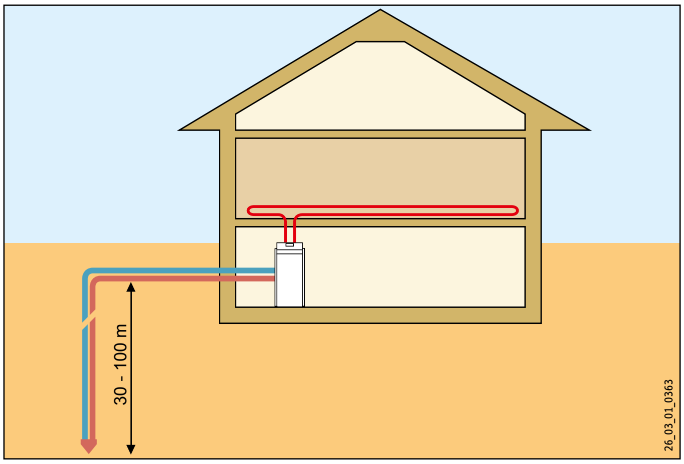
The extraction rate is dependent on the soil condition. The extraction rate is between approx. 30 and 100 W per metre of the geothermal probe. Subject to heat pump and ground conditions, several geothermal probes can be linked up to form a single heat source system.

In Germany, such systems need to be notified to and possibly authorised by the local water board.

General layout, geothermal collector as heat source



Main layout, geothermal probe as heat source



Mono mode / dual mode parallel / mono energetic

Operating modes

The following terminology is used for the method by which a heat pump is operated:

Mono mode

The heat pump is the sole provider of heating in the building.

This operating mode is suitable for all low temperature heating systems up to 60 °C flow temperature.

Dual mode parallel / mono energetic

Down to a certain outside temperature, the heat pump alone delivers the required heating energy. A second heat source starts at low temperatures. The share of the heat pump in the annual capacity is higher than with dual mode alternative operation.

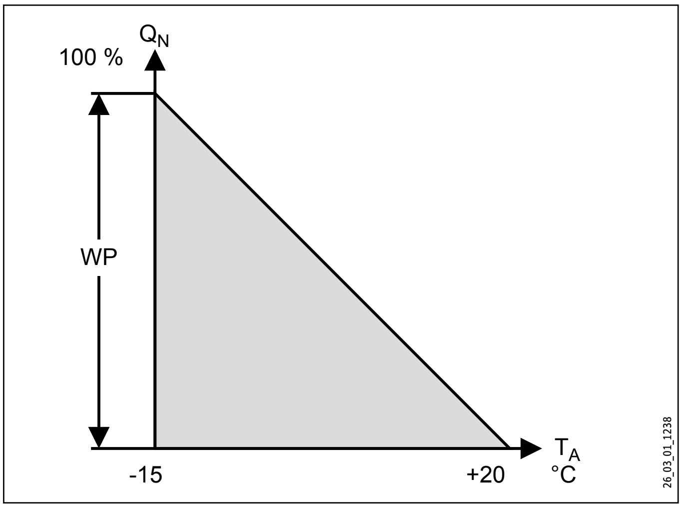
This operating mode is suitable for underfloor heating systems and radiators up to the maximum heat pump flow temperature.

Mono energetic

The heating system uses no second form of energy. The heat pump operates with outside air temperatures down to −20 °C. Upon demand, an electric emergency/booster heater starts at very low outside air temperatures.

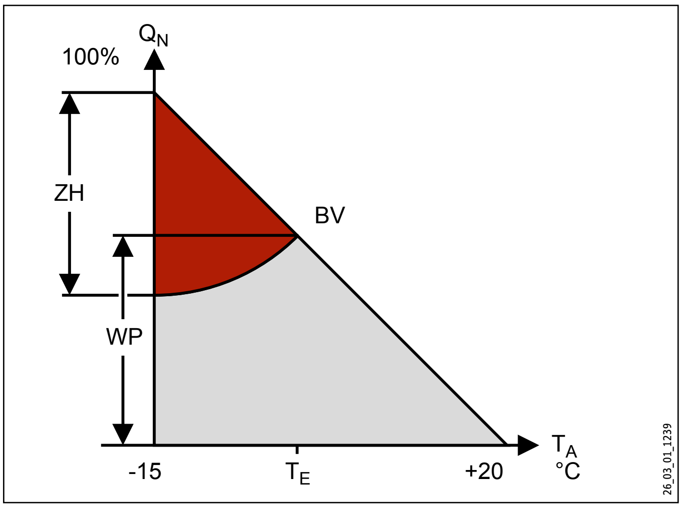
In mono energetic operating mode, the heat pump and the second heat generator are electrically operated.

Mono mode operation



QN Heat load
WP Heat pump
TA Outside temperature

Dual mode parallel and mono energetic mode



BV dual mode point
QN Heat load
WP Heat pump
TE Starting
ZH Booster heater / booster heater second heat generator
TA Outside temperature

Coverage according to DIN 4701-10

Coverage αHa in dual-mode parallel operation

Dual mode point T_E	°C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Coverage		1,00	0,99	0,99	0,99	0,99	0,98	0,97	0,96	0,95	0,93	0,90	0,87	0,83	0,77	0,70	0,61

Dual mode alternative / dual mode partial parallel

Dual mode - alternative

Down to an outside temperature determined by your contractor, such as 0 °C, the heat pump delivers the entire heating energy. When the temperature falls below that value, the heat pump switches itself OFF and the second heat generator takes over the heating operation.

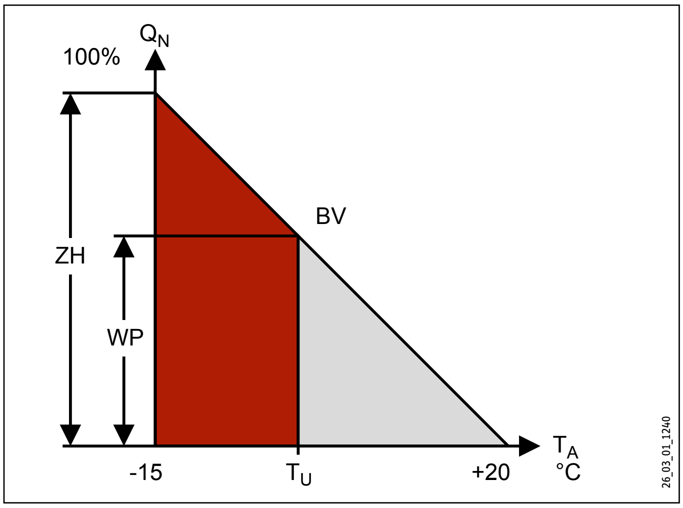
This operating mode is suitable for all heating systems above 60 °C flow temperature.

Dual mode, partially parallel

Down to a certain outside temperature, the heat pump alone delivers the required heating energy. The second heat source starts, if the temperature falls below that value. The heat pump is switched off when the flow temperature is no longer sufficient. The second heat source supplies the entire heating output.

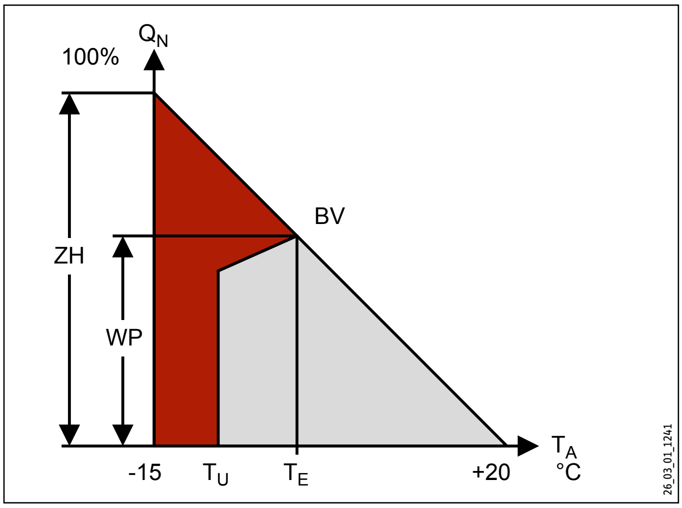
This operating mode is suitable for all heating systems above 60 °C flow temperature.

Dual mode alternative operation



BV	dual mode point	ZH	Booster heater / booster heater second heat generator
QN	Heat load	TU	Changeover point
WP	Heat pump	TA	Outside temperature

Dual mode partially parallel operation



BV	dual mode point	ZH	Booster heater / booster heater second heat generator
QN	Heat load	TU	Changeover point
WP	Heat pump	TA	Outside temperature
TE	Starting		

Coverage according to DIN 4701-10

Coverage αHa in dual-mode alternative operation

Dual mode point T_U	°C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5
Coverage		0,96	0,96	0,95	0,94	0,93	0,91	0,87	0,83	0,78	0,71	0,64	0,55	0,46	0,37	0,28	0,19

Requirements

Renewable Energies Heat Act (EEWärmeG) in new builds

The [German] Renewable Energies Heat Act (EEWärmeG) entered into force on 1st January 2009. In Germany, the goal is to increase the proportion of renewables in the final energy consumption for heating, cooling and DHW that is accounted for by renewable energies to 14 % by 2020.

The Renewable Energies Heat Act (EEWärmeG) came into force in 2009 and makes the use of renewable energies mandatory in new buildings with living space or available area of 50 m² or more. The law places minimum requirements on the efficiency of the system used and on its contribution towards covering thermal energy requirements. This refers to the calculated annually required final energy requirement for generating heat in buildings, not the primary energy requirement. The use of geothermal energy, environmental energy, solar energy and biomass is defined as renewables. Various alternative measures such as improved thermal insulation or the use of ventilation systems with heat recovery are also possible.

Combination of several measures

Compliance with the mandatory use of renewable energies can be accomplished via individual measures or a combination of several measures. This requires the percentages of the actual use of a heat pump, solar thermal system, biomass or alternative measures to correspond to 100 % in total in relation to the intended use.

Example: If a heat pump is combined with a solar thermal system, it is sufficient if the heat pump covers 25 % and the solar thermal system 7.5 % of the building's thermal energy requirement. Both requirements are thereby fulfilled 50 %. The mandatory use of renewable energies is fulfilled over all.

Renewable Energies Heat Act (EEWärmeG) for existing buildings

The Heating Act also presents the possibility of extending the mandatory use of renewables to existing buildings. In Baden-Württemberg, mandatory use has been implemented since January 2010. As under federal law [Germany], the heat demand as defined by the Energy Saving Ordinance (EnEV) must also be covered proportionally (min. 10 %) when heating systems are replaced by renewables, alternative measures, or both. Other states are following, for example Berlin.

Public subsidy

The installation of heating heat pumps is subsidised by public funds. This subsidy comes from the Federal Office for Economic Affairs and Export Control (BAFA). For this, system efficiency is subject to stricter requirements such as seasonal performance factors. It is also possible to apply for low interest loans from Germany's reconstruction loan corporation the Kreditanstalt für Wiederaufbau (KfW) under the KfW's "Energy efficient building" programme.

Compliance with mandatory use with a heat pump

Air | water heat pump

- Thermal energy demand covered at least 50 %
- Seasonal performance factor for room heating at least 3.5
- Seasonal performance factor for combined room heating and DHW heating at least 3.3
- Installation of an electricity and heat meter required

Brine | water heat pump

- Thermal energy demand covered at least 50 %
- Seasonal performance factor for room heating at least 4.0
- Seasonal performance factor for combined room heating and DHW heating at least 3.8
- Installation of an electricity and heat meter required for flow temperatures of over 35 °C

Compliance with mandatory use with a solar thermal system

- Thermal energy demand covered at least 15 % via solar radiation energy. With solar thermal systems, this meets the requirement.
  - Collector surface at least 4 % of the living area in single-family and two-family houses
  - Collector surface at least 3 % of the living area in apartment buildings (more than 2 dwelling units)
- Collectors must bear the EU test mark "Solar Keymark"

Compliance with mandatory use via alternative measures

- EnEV maximum values of primary energy demand and transmission heat loss HT‘ fallen below by at least 15 %
- Thermal energy demand covered at least 50 % by heat pumps with waste heat utilisation
- Thermal energy demand covered at least 50 % by ventilation systems with heat recovery
- Thermal energy demand covered at least 50 % by combined heat and power generation systems
- Thermal energy demand from local or district heating networks covered at least 50 % by renewable energies

Seasonal performance factor

The seasonal performance factor of a heat pump represents the ratio of the heat supplied annually for heating and DHW heating to the consumed drive energy. The seasonal performance factor is a basic measure of the energy efficiency of a heat pump system.

Determining the seasonal performance factor is, for example, a requirement for the specialist company declaration and the application for the market incentive programme of the Federal Office for Economic Affairs and Export Control (BAFA).

The seasonal performance factor does not just apply to certain operating states such as the COP. The seasonal performance factor is the basis for system comparisons and viability studies.

Calculation in accordance with VDI 4650 Part 1

The seasonal performance factor depends on a large number of factors that relate to the framework conditions of operation. Factors that influence the seasonal performance factor include, for example, the heat source temperature, the heating flow temperature and its curve over the heating season, use of the electrical emergency/booster heater, the proportion of DHW heating, the energy consumption for auxiliary drives and the temperature differential between the heating flow and the heating return.

These influencing variables are taken into account in the calculation according to VDI 4650. The coefficients of performance determined under standard conditions are matched with corrective factors to operating conditions that deviate.

The calculation according to VDI 4650 applies to electric heat pumps for room heating and DHW heating up to a rated heating output of 100 KW.

Calculation programmes are available online for our specialist partners.

Seasonal performance factor, heating system

The seasonal performance factor for room heating is calculated subject to the heat source. The standard outside temperature must be taken into account in the case of air | water heat pumps, i.e. the location and its climatic conditions. The changing outside air temperatures are included in the calculation via the coefficients of performance at various operating points.

A heat source temperature that is constant all year round is assumed for brine | water heat pumps and water | water heat pumps.

1 Total seasonal performance factor

$$\beta_{WP} = \frac{1}{x * {}^{\alpha}/_{\beta_h} + y * {}^{\alpha}/_{\beta_w} + 1 - \alpha}$$

β_{WP} Total seasonal performance factor of the heat pump system
x Room heating proportion of the total heat requirement (standard 0.82)
y DHW heating proportion of the total heat requirement (standard 0.18)
α Heat pump coverage (Table 7)
β_h Seasonal performance factor, room heating (equation 2, equation 3)
β_w Seasonal performance factor, DHW heating (equation 4, equation 5, equation 6)

2 Seasonal performance factor, heating, air | water heat pumps

$$\beta_h = (\varepsilon_{N1} * F_{\vartheta 1} + \varepsilon_{N2} * F_{\vartheta 2} + \varepsilon_{N3} * F_{\vartheta 3}) * F_{\Delta\vartheta}$$

βh Seasonal performance factor, heating system
ε_{N1} Coefficient of performance A-7/W35
ε_{N2} COP A2/W35
ε_{N3} Coefficient of performance A10/W35
$F\Delta\vartheta$ Correction factor, heating as per table 2

3 Seasonal performance factor, heating, brine | water heat pumps

$$\beta_h = \frac{\varepsilon_N * F_{\vartheta} * F_{\Delta\vartheta}}{F_P}$$

β_h Seasonal performance factor, heating system
ε_N Coefficient of performance, heat source ground in the case of B0/W35, groundwater in the case of B10/W35
F_{ϑ} Correction factor, ground as per table 3 / groundwater as per table 4
$F_{\Delta\vartheta}$ Correction factor, heating as per table 2
F_P Correction factor, source pump as per table 6

Calculation of the seasonal performance factor

DHW heating

The total seasonal performance factor for systems in pure heating mode or systems with combined heating and DHW heating can be determined as per VDI 4650 Part 1. The calculation is also possible for a separate DHW heat pump.

Allowance must be made for the proportions of the total heat requirement, because in most cases higher temperatures are required for DHW heating than in heating mode. VDI 4650 suggests 18 % as the proportion for the DHW heating. If the standard heat load is low or for a larger number of persons, this proportion can increase.

The DHW proportion is set at 0 % when:

» no DHW is required

» the DHW is not heated via the heating heat pump

» the DHW is not heated via a DHW heat pump

4 Seasonal performance factor, DHW, air | water heat pumps

$$\beta_W = (\varepsilon_{N1} * 0{,}103 + \varepsilon_{N2} * 0{,}903 + \varepsilon_{N3} * 0{,}061) * F_{\Delta\vartheta}$$

β_W Seasonal performance factor, DHW heating
ε_{N1} Coefficient of performance A-7/W35
ε_{N2} COP A2/W35
ε_{N3} Coefficient of performance A10/W35
$F_{\Delta\vartheta}$ Correction factor, DHW heating as per table 2

5 Seasonal performance factor, DHW, brine | water heat pumps

$$\beta_W = \frac{\varepsilon_N * F_\vartheta * F_{\Delta\vartheta}}{F_P}$$

βW Seasonal performance factor, DHW heating
ε_N Coefficient of performance, heat source ground in the case of B0/W35, groundwater in the case of B10/W35
F_ϑ Correction factor, ground as per table 3 / groundwater as per table 4
$F_{\Delta\vartheta}$ Correction factor, heating as per table 2
F_P Correction factor, source pump as per table 6

6 Seasonal performance factor, DHW, DHW heat pumps with cellar air

$$\beta_W = \varepsilon_N * F_1 * 0{,}9$$

β_W Seasonal performance factor, DHW heating
ε_N Coefficient of performance for heating from 15 °C to 50 °C (air temperature 15 °C)
F_1 Correction factor for deviating temperatures at the test bed (as per table 1)

Table 1 – Correction factor, cellar air heat pump

DHW temperature, test bed °C	Correction factor F_1
45	0,95
50	1,00
55	1,05
60	1,10
65	1,15

Interim values for F1 are interpolated in linear fashion.

Heating, DHW, ground, groundwater

Table 2 - Correction factor, heating/DHW heating F$\Delta\vartheta$

Temperature differential Test bed	Underfloor heating 35 °C / 28 °C	Radiator heating system 55 °C / 45 °C	DHW heating Air | water heat pump	 Brine | water heat pump
3 K	1,041	1,072	1,041	1,072
4 K	1,031	1,061	1,031	1,061
5 K	1,020	1,051	1,020	1,051
6 K	1,010	1,041	1,010	1,041
7 K	1,000	1,031	1,000	1,031
8 K	0,990	1,020	0,990	1,020
9 K	0,980	1,010	0,980	1,010
10 K	0,969	1,000	0,969	1,000

Refer to the selected heat pump specification for the temperature differential at the test bed to EN 14511 / EN 255-3.

Table 3 - Correction factor, ground Fϑ

Minimum brine inlet temperature °C	Underfloor heating Flow 35 °C	Radiator heating system Flow 55 °C
5	1,150	0,956
4	1,137	0,943
3	1,125	0,930
2	1,113	0,917
1	1,100	0,904
0	1,087	0,890
-1	1,074	0,877
-2	1,062	0,864

Standard value for geothermal probe = 2 °C, geothermal collector = 0 °C. Increase the brine temperature by 2 °C if an extract air module LWM 250 is being used.

Table 4 - Correction factor, groundwater with intermediate heat exchanger Fϑ

Groundwater temperature	Underfloor heating Flow 35 °C	Radiator heating system Flow 55 °C
5	0,916	0,698
6	0,935	0,718
7	0,954	0,737
8	0,973	0,756
9	0,992	0,776
10	1,011	0,795
11	1,030	0,815
12	1,049	0,834
13	1,068	0,853
14	1,087	0,873
15	1,106	0,892
16	1,125	0,912
17	1,144	0,931
18	1,163	0,950

Standard value, groundwater = 10 °C. Applies only to systems with intermediate heat exchanger. A 3 K temperature differential was factored in for these systems.

Outdoor air, source pump

Table 5 - Correction factor outdoor air Fϑ1, Fϑ2, Fϑ3

Standard outside temperature °C	Correction factor	Underfloor heating system, new build Flow 35 °C	Underfloor heating system, older buildings Flow 35 °C	Radiators, new build Flow 55 °C	Radiators, older buildings Flow 55°
-10	Fϑ1	0,085	0,066	0,066	0,051
-10	Fϑ2	0,854	0,766	0,707	0,635
-10	Fϑ3	0,134	0,250	0,116	0,217
-12	Fϑ1	0,128	0,104	0,101	0,081
-12	Fϑ2	0,824	0,762	0,686	0,635
-12	Fϑ3	0,108	0,205	0,094	0,179
-14	Fϑ1	0,167	0,137	0,133	0,109
-14	Fϑ2	0,795	0,746	0,666	0,626
-14	Fϑ3	0,094	0,182	0,082	0,160
-16	Fϑ1	0,266	0,224	0,214	0,180
-16	Fϑ2	0,700	0,668	0,590	0,564
-16	Fϑ3	0,083	0,168	0,073	0,147

The correction factors apply to 12 °C and 15 °C.

Table 6 - Correction factor, source pump F_P

Heat pump heating output	Geothermal probe, geothermal collector	Groundwater with intermediate heat exchanger
< 10 kW	1,075	1,325
10 - 20 kW	1,075	1,275
> 20 kW	1,075	1,215

The correction factor F_P can be calculated for the construction project if the power consumption of the heat source pump is known. Make allowance for the brine and groundwater pump in the case of systems with an intermediate heat exchanger.

$$F_P = 1 + \frac{P_P}{P_{WP}}$$

P_P Power consumption, source pump
P_{WP} Heat pump power consumption

Table 7 – Heat pump coverage α for mono energetic operation

Dual mode point ϑ_{Dual}	°C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2
Coverage	α	1,00	0,99	0,99	0,99	0,99	0,98	0,97	0,96	0,95	0,93	0,90	0,87	0,83

» The design of most air | water heat pumps is mono energetic (dual mode point -5 °C).

» Operation of brine | water heat pumps and water | water heat pumps is normally in mono mode (coverage α = 1.0).

» Set the coverage α at 1.0 for dual systems with an oil/gas boiler.

» Do not include the second heat generator when calculating the seasonal performance factor.

Seasonal performance factors, air | water heat pumps

	New build / underfloor heating system				Older buildings / radiator heating				Older buildings / replacement convectors			
TV [°C]	35	35	35	35	55	55	55	55	45	45	45	45
TV-TR [K]	7	7	7	7	10	10	10	10	10	10	10	10
Heating limit [°C]	12	12	12	12	15	15	15	15	15	15	15	15
Outside temperature [°C]	-10	-12	-14	-16	-10	-12	-14	-16	-10	-12	-14	-16
WPL 15 AS	3,9	3,8	3,7	3,6	3,5	3,4	3,4	3,3	3,7	3,6	3,6	3,5
WPL 25 A	4,0	3,9	3,9	3,8	3,6	3,6	3,5	3,4	3,9	3,8	3,8	3,7
WPL 15 IS-2 / WPL 15 IKS-2	3,9	3,8	3,8	3,7	3,5	3,4	3,4	3,4	3,8	3,7	3,7	3,6
WPL 25 I-2 / WPL 25 IK-2	4,1	4,0	3,9	3,9	3,7	3,6	3,6	3,5	4,0	3,9	3,8	3,8
WPL 33 HT	3,7	3,6	3,5	3,4	3,3	3,2	3,2	3,1	3,6	3,5	3,4	3,3
WPL 10 AC	3,7	3,6	3,6	3,5	3,3	3,2	3,2	3,2	3,5	3,5	3,4	3,4
WPL 10 I	3,4	3,3	3,3	3,3	3,0	3,0	3,0	2,9	3,3	3,2	3,2	3,2
WPL 10 IK3	3,4	3,3	3,3	3,3	3,0	3,0	3,0	2,9	3,3	3,2	3,2	3,2
WPL 13 E	3,9	3,8	3,8	3,7	3,5	3,4	3,4	3,4	3,8	3,7	3,7	3,6
WPL 18 E	3,9	3,8	3,8	3,8	3,5	3,4	3,4	3,4	3,8	3,7	3,7	3,6
WPL 23 E	3,8	3,7	3,7	3,6	3,4	3,3	3,3	3,3	3,6	3,6	3,5	3,5
WPL 13 cool	3,6	3,5	3,5	3,5	3,2	3,2	3,1	3,1	3,5	3,4	3,4	3,3
WPL 18 cool	3,9	3,8	3,8	3,7	3,5	3,4	3,4	3,4	3,8	3,7	3,7	3,6
WPL 23 cool	3,7	3,6	3,6	3,5	3,3	3,2	3,2	3,2	3,5	3,5	3,5	3,4
WPL 13 A basic	3,8	3,7	3,7	3,6	3,5	3,4	3,3	3,3	3,7	3,6	3,6	3,5
WPL 20 A basic	3,6	3,5	3,5	3,4	3,2	3,1	3,1	3,1	3,5	3,4	3,3	3,3
WPL 34	3,5	3,4	3,4	3,3	3,1	3,1	3,0	3,0	3,4	3,3	3,3	3,2
WPL 47	3,6	3,5	3,5	3,4	3,2	3,2	3,1	3,1	3,5	3,4	3,4	3,3
WPL 57	3,4	3,4	3,3	3,3	3,1	3,0	3,0	2,9	3,3	3,2	3,2	3,1
WPL 34 ASR	3,5	3,4	3,4	3,3	3,1	3,1	3,0	3,0	3,4	3,3	3,3	3,2
WPL 47 ASR	3,6	3,5	3,5	3,4	3,2	3,2	3,1	3,1	3,5	3,4	3,4	3,3
WPL 57 ASR	3,4	3,4	3,3	3,3	3,1	3,0	3,0	2,9	3,3	3,2	3,2	3,1

Calculation to VDI 4650-1, current as of March 2009, mono energetic mode, dual point -5 °C, DHW heating with heat pump, DHW proportion 18 %.

d0000024043

Brine | water heat pumps

Seasonal performance factors, brine | water heat pumps

	New build / underfloor heating system		Older buildings / radiator heating		Older buildings / replacement convectors	
TV [°C]	35	35	55	55	45	45
TV-TR [K]	7	7	10	10	10	10
Source temperature [°C]	2	0	2	0	2	0
Source	Geothermal probe	Geothermal collector	Geothermal probe	Geothermal collector	Geothermal probe	Geothermal collector
WPC 04 / WPC 04 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPC 05 / WPC 05 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPC 07 / WPC 07 cool	5,1	5,0	4,4	4,3	4,8	4,6
WPC 10 / WPC 10 cool	5,1	5,0	4,4	4,3	4,8	4,6
WPC 13 / WPC 13 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPF 04 / WPF 04 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPF 05 / WPF 05 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPF 07 / WPF 07 cool	5,1	5,0	4,4	4,3	4,8	4,6
WPF 10 / WPF 10 cool	5,1	5,0	4,4	4,3	4,8	4,6
WPF 13 / WPF 13 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPF 16 / WPF 16 cool	4,9	4,8	4,2	4,1	4,6	4,5
WPF 5 basic	4,5	4,4	3,9	3,7	4,2	4,1
WPF 7 basic	4,5	4,4	3,9	3,7	4,2	4,1
WPF 10 basic	4,6	4,5	3,9	3,8	4,3	4,2
WPF 13 basic	4,5	4,3	3,8	3,7	4,1	4,0
WPF 16 basic	4,4	4,3	3,7	3,6	4,1	4,0
WPF 10 M	4,6	4,5	3,9	3,8	4,3	4,2
WPF 13 M	4,7	4,6	4,0	3,9	4,4	4,2
WPF 16 M	4,5	4,3	3,8	3,7	4,1	4,0
WPF 20 Set	4,6	4,5	3,9	3,8	4,3	4,2
WPF 23 Set	4,6	4,5	4,0	3,9	4,3	4,2
WPF 26 Set	4,7	4,6	4,0	3,9	4,4	4,2
WPF 29 Set	4,6	4,5	3,9	3,8	4,2	4,1
WPF 32 Set	4,6	4,5	3,9	3,8	4,2	4,1
WPF 20	4,8	4,7	4,8	4,0	4,4	4,3
WPF 27	5,0	4,8	4,2	4,1	4,6	4,5
WPF 35	4,8	4,7	4,1	4,0	4,5	4,4
WPF 40	4,8	4,7	4,1	4,0	4,4	4,3
WPF 52	4,9	4,8	4,2	4,1	4,6	4,5
WPF 66	4,7	4,6	4,0	3,9	4,3	4,2
WPF 27 HT	4,4	4,3	3,8	3,7	4,1	4,0

Calculation to VDI 4650-1, current as of March 2009, mono mode, DHW heating with heat pump, DHW proportion 18 %, calculation for probe/collector with efficient pump (6 m head)

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Water | water heat pumps

Seasonal performance factors, water | water heat pumps

	New build / underfloor heating system	Older buildings / radiator heating	Older buildings / replacement convectors
TV [°C]	35	55	45
TV-TR [K]	7	10	10
Source temperature [°C]	10	10	10
Source	Groundwater	Groundwater	Groundwater
WPW 06 Set	5,0	4,1	4,6
WPW 07 Set	5,0	4,1	4,6
WPW 10 Set	5,2	4,3	4,8
WPW 13 Set	5,4	4,5	5,0
WPW 18 Set	5,3	4,4	4,8
WPW 22 Set	5,4	4,5	5,0
WPW 7 basic Set	4,7	3,9	4,3
WPW 10 basic Set	4,9	4,1	4,5
WPW 13 basic Set	5,0	4,2	4,6
WPW 18 basic Set	5,1	4,3	4,7
WPW 22 basic Set	4,7	4,0	4,4

Calculation to VDI 4650-1, current as of March 2009, mono mode, DHW heating with heat pump, DHW proportion 18 %, calculation for groundwater with source pump standard values.

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General design information

Design information

To size heat pump systems accurately, the following points regarding the building to be heated or cooled must be known, or the following engineering steps must be carried out.

» Calculation of heat load to EN 12831
» Calculation of the cooling load to VDI 2078
» Ascertaining the heating surface temperature
» Determining the maximum flow temperature
» Establish or select the most favourable heat source
» Determine the operating mode of the heat pump according to the heating system.
» Sizing the heat pump according to heat load and operating mode
» Power supply conditions and requirements of the heat pump control unit
» Connection of the heat pump to the heating system
» DHW heating with the heating heat pump
» General regulations and guidelines/directives

Terminology and descriptions

Defrosting

Removing hoarfrost or ice build-up from the evaporator of an air | water heat pump.

Process medium

Special term for refrigerant in heat pump systems

Dual mode temperature

Outside temperature, which dictates when a second heat source is started.

Enthalpy:

According to its definition, it is the sum of internal energy and displacement work. The specific enthalpy (kJ/kg) is used for calculations.

Expansion valve

Component of the heat pump between the condenser and the evaporator for reducing the condensation pressure to the evaporation pressure that equates to the evaporation temperature. In addition the expansion valve regulates the injection volume of the process medium, subject to the evaporator load.

Fill level

The mass of the process medium inside the heat pump

Heating output

The heating output is the available heat produced by the heat pump.

Seasonal performance factor

Quotient of heat and compressor drive work over a definite period

Annual expenditure of energy

The annual expenditure of energy is the flip-side of the seasonal performance factor.

Cooling capacity

Heat flow extracted by the heat pump evaporator.

Refrigerant

Material with a low boiling point, which is evaporated by heat absorption and re-liquefied through heat transfer in a circular process.

Circular process

Constantly repeating changes in condition of a process medium by adding and extracting energy in a sealed system.

Coefficient of performance (COP)

Factor comprising the heating output and the compressor drive rating. The coefficient of performance is a present value in a defined operating state. The heating load is always greater than the compressor drive rating; hence the COP is always > 1. Equation symbol: ε

lg p, h-diagram

Graphic representation of the thermodynamic properties of heat transfer media (enthalpy h, pressure p).

Rated consumption (compressor)

The maximum power consumption of the heat pump during constant operation under defined conditions. It is decisive for connection to the mains power supply. The rated consumption is shown on the type plate.

Standard efficiency

Quotient derived from the used and related expended work or heat

Off-periods

Times at which the special heat pump tariffs offered by the energy supply utility are not available or during which the heat pump system is completely blocked.

Evaporator

Heat exchanger of a heat pump, in which energy is extracted from the heat source by evaporating a process medium.

Compressor

Machine for the mechanical transportation and compression of vapours and gases. Differentiation according to type.

Condenser

Heat exchanger of a heat pump, in which energy is transferred to the heat transfer medium by condensing refrigerant.

Heat pump

Machine that absorbs a thermal flow at a low temperature and transfers it through energy supplied at a higher temperature. If the "warm side" of a heat pump is used, this is utilised as the heating heat pump. If the "cold side" of a heat pump is used, this is utilised for cooling.

Heat pump system

Total system, comprising a heat source and a heat pump system.

Terminology and descriptions

Compact heat pump system

Fully-wired appliance, where the complete refrigerant circuit, incl. safety and control equipment, has been manufactured and tested.

Heat source

Medium, from which the heat pump extracts energy.

Heat consumer system (WNA)

Equipment for heat transfer to the heating system.

Heat source system (WQA)

Equipment for the extraction of energy from a heat source and the transportation of the heat transfer medium between the heat source and the "cold side" of the heat pump, including all auxiliary equipment.

Heat transfer medium

Liquid or gaseous medium, e.g. brine mixture, water or air, with which heat is transported.

Auxiliary energy

Energy required for the operation of auxiliary equipment.

Summary of formulae

Amount of heat

$$Q = m * c * (t_2 - t_1)$$

Q Heat amount [Wh]
m Amount of water [kg]
c Specific heat Wh/kgK [1.163 Wh/kgK]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]

Heating output

$$Q = A * k * \Delta\vartheta$$

Q Heating output [W]
A Area [m²]
k Heat transfer coefficient [W/m²K]
$\Delta\vartheta$ Temperature differential [K]

k value

$$k = \frac{1}{\frac{1}{\alpha_i} + \frac{d}{\lambda} + \frac{1}{\alpha_a}}$$

k k value [W/m²K]
α_i Heat transfer coefficient, internal [W/m²K]
α_a Heat transfer coefficient, external [W/m²K]
λ Thermal conductivity [W/mK]

Connected load

$$P = \frac{m * c * (t_2 - t_1)}{T * \eta}$$

P Connected load [W]
m Amount of water [kg]
c Specific heat [Wh/kgK]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]
T Heat-up time [h]
η Efficiency

Duct work curve

$$\frac{\Delta p_1}{\Delta p_2} = \left(\frac{V_1}{V_2}\right)^2$$

Δp_1 Pressure differential [Pa]
Δp_2 Pressure differential [Pa]
V_1 Flow rate [m³/h]
V_2 Flow rate [m³/h]

Heat-up time

$$T = \frac{m * c * (t_2 - t_1)}{P * \eta}$$

T Heat-up time [h]
m Amount of water [kg]
c Specific heat [Wh/kgK]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]
P Connected load [W]
η Efficiency

Pressure drop

$$\Delta p = L * R + Z$$

Δp Pressure differential [Pa]
R Tubes frictional resistance
L Pipe length [m]
Z Pressure drop of the individual resistances [Pa]

Individual resistances

$$Z = \sum Z * \frac{\zeta}{2} * v^2$$

z Drag coefficient. The drag coefficient "Z" can be taken from the tables, using the sum "z" and the velocity in the pipework.
ς Density
v Flow velocity [m/s]

Heat load - estimate

$$Q_N = \frac{B_a}{250}$$

Mixed water temperature

$$t_m = \frac{(m_1 * t_1) + (m_2 * t_2)}{(m_1 + m_2)}$$

t_m Mixed water temperature [°C]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]
m_1 Amount of cold water [kg]
m_2 Amount of DHW [kg]

Amount of mixed water

$$m_m = \frac{m_2 * (t_2 - t_1)}{t_m - t_1}$$

m_m Mixed water volume [kg]
m_1 Amount of cold water [kg]
m_2 Amount of DHW [kg]
t_m Mixed water temperature [°C]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]

Amount of DHW

$$m_2 = \frac{m_m * (t_m - t_1)}{t_2 - t_1}$$

m_m Mixed water volume [kg]
m_1 Amount of cold water [kg]
m_2 Amount of DHW [kg]
t_m Mixed water temperature [°C]
t_1 Cold water temperature [°C]
t_2 DHW temperature [°C]

Heat load - estimated according to oil consumption

$$Q_N = \frac{B_a * \eta * H_u}{b_{VH}}$$

Q_N Heat load [kW]
B_a Annual oil consumption [l]. Average consumption over the last five years, minus 75 litres of oil per person for DHW heating.
η Seasonal efficiency [to DIN] (h = 0.7)
H_u Calorific value of fuel oil [10 kWh/l]
b_{VH} Hours of full utilisation (average value 1800 h/a)

Calculation of the sound pressure level from the sound power level

$$L_P A = L_W A + 10log_{10}\left[\frac{Q}{(4 * \pi + d^2)}\right]$$

L_pA A - Weighted sound pressure level in dB(A)
L_WA A - Weighted sound power level in dB(A)
Q Correction factor
d Distance in m

Regulations and guidelines/directives

The contractor

The siting, installation, adjustment and initial start-up of a heat pump system must be carried out by a qualified contractor, giving due consideration to the operating and installation instructions. The electrical connection of the heat pump must only be carried out by a contractor authorised by the relevant power supply utility, giving due consideration to the relevant VDE regulations as well as the instructions of the relevant power supply utility (technical connection conditions or local regulations). The installer also makes the relevant application to the power supply utility.

General conditions

Observe the following acts, standards, regulations and orders during the installation and operation of heat pump heating systems in Germany: Outside Germany, observe all regulations and guidelines/directives that may apply to your specific country.

Building Regulations and others

Observe all relevant local and national standards since heat pumps represent "structural systems" in accordance with the state building regulations [Germany]. Therefore check with the local building regulations authority regarding applicable regulations prior to the installation of a heat pump. In accordance with the regulation dealing with projects that are not subject to mandatory permission or notification according to the State Building Regulations (Release Regulation) dated 5th September 1987 for the state of North Rhine-Westphalia, the installation and modification of heat pumps with a drive rating up to 50 kW require neither a permit nor notification. The building owner may need to notify the relevant authority of the system installation after the heat pump installation has been completed. This notification should be accompanied by a manufacturer's declaration that the intended installation will comply with the requirements of the building regulations. The requirement for a permit in accordance with the "Wasserhaushaltsgesetz (WHG)" [Germany] remains unaffected by this exemption.

Special laws governing the utilisation of various heat sources

The utilisation of heat latent in the environment may be subject to legal regulations that are designed to ensure that other private and public concerns are not impeded, and that these measures will not exert dangerous environmental influences.

Main layout groundwater heat pump system

The extraction of groundwater as heat source for a heat pump and the reintroduction of the cooled groundwater requires a permit acc. to paragraph 3 sect. 1 no. 6 and paragraph 3 sect. 1 no. 5 of the Wasserhaushaltsgesetzes (WHG) [Germany].

The ground is the source of thermal energy

The extraction of heat through pipes embedded in the ground through which a heat transfer medium circulates generally requires notification to the water board or their permission. If the geothermal collector is in the groundwater, it could be mandatory to obtain a permit in accordance with the Federal Water Act [Germany]. However, this case has not been finally regulated. We recommend consulting the relevant water authority before commencing building.

Heat source

The utilisation of the outside air as heat source with regard to the entitlement to cool the outside air is not subject to statutory regulations However, observe the technical instructions regarding protection against noise emissions [TA-Lärm in Germany, or local regulations] from evaporators. The expelled chilled air may result in a nuisance for neighbours (LBO sect.18).

Federal Immissions Act (BImSchG) and TA-Lärm [German noise regulation]

Heat pumps are "systems" as defined under the German Immissions Act. The BImSchG differentiates between systems subject to permit (paras. 44, 22) and systems requiring no permit.

Systems requiring permits are listed finally in the fourth BImSchV. No heat pumps of any kind are listed here. For that reason, heat pumps are subject to para. 22 to 25 BImSchG, i.e. they must be installed and operated in such a way that avoidable nuisance is limited to a minimum. Regarding the noise emitted by heat pump systems, observe the technical instructions appertaining to the protection against noise as per TA-Lärm [or local regulations]. The sound pressure levels in the TA-Lärm (German noise regulation) table have been set as the guideline emission values for living space. The guideline emission values vary, depending on the surrounding buildings.

DIN standards

- EN 12831 Heating systems in buildings – procedure to calculate the standard heat load
- DIN 4108 Thermal insulation and energy saving in buildings
- DIN 4109 Sound insulation in buildings
- DIN 8901 Refrigerating systems and heat pumps – protection of the ground, groundwater and surface water– technical safety and environmental requirements and test
- DIN 4701-10 Energy efficiency of heating and ventilation systems in buildings: Central heating, DHW heating, ventilation

Regulations and guidelines/directives

VDI guidelines

- VDI 2067 Efficiency of technical building systems
- VDI 2068 Measuring, monitoring and control equipment in heating systems with water as heat transfer medium
- VDI 2715 Noise reduction in hot water heating systems.
- VDI 4640-2 Thermal utilisation of the ground – ground source heat pump systems
- VDI 4650 (Draft) Heat pump calculations. Abridged procedure for calculating the annual expenditure of energy values of heat pump systems
- VDI 2078 Cooling load calculation for air conditioned rooms

Regulations regarding the water side

- EN 806 Technical rules for DHW installations
- DIN 4708-1 Central DHW heating systems – part 1: Terminology and calculation principles
- EN 378 Refrigeration systems and heat pumps – technical safety and environmental requirements
- EN 14511-1 to 4 Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for room heating and cooling – Part 1: Terminology, part 2: Test conditions, part 3: Test procedures, part 4: Requirements
- EN 12828 Heating systems in buildings – Engineering hot water heating systems
- TRD 721 Safety equipment to prevent excess pressure; safety valves for steam boilers in category II
- DVGW Code of Practice W 101 Guidelines for protected potable water areas, Part 1: Protected groundwater areas
- DVGW Code of practice W 501 Potable water heating and routing systems - Technical measures for the reduction of the growth of legionella bacteria – Engineering, installing, operating and modernising potable water installations

Power regulations

- VDE 0100 Regulations for the installation of HV systems up to 1000 V
- VDE 0105 Regulations for the operation of three-phase systems
- VDE 0700 Safety of electrical equipment for domestic use and similar purposes

Accident prevention instructions by the governing body of the trade associations

- BGV D4 Accident prevention instructions; refrigerating equipment, heat pumps and cooling facilities

Additional standards and regulations for dual mode heat pump systems

Observe the following acts, standards, regulations and orders during the installation of an additional combustion system for solid, liquid or gaseous fuels:

Combustion Order [or local/national equivalent]

- Feu Vo part II, para. 4, sect. 2, sect. 4
- EN 267 Oil combustion system – technical rules - oil combustion installation (TRÖ) - test

Safety principles

- DIN 4787 atomising oil burners, terminology, technical safety requirements, testing, identification
- EN 12285-1 Workshop fabricated steel tanks – Part 1: Horizontal single or twin wall cylindrical tanks for the underground storage of combustible and non-combustible liquids that represent a risk to groundwater
- Factory-produced steel tanks - part 2: Horizontal single or twin wall cylindrical tanks for the above-ground storage of combustible and non-combustible liquids that represent a risk to groundwater
- DIN 6618-1 Vertical steel containers (tanks), single wall, for above-ground storage of combustible and non-combustible liquids that represent a risk to groundwater
- DIN 6619-1 Vertical steel containers (tanks), single wall, for underground storage of combustible and non-combustible liquids that represent a risk to groundwater
- DIN 6620-1; Cylinder banks (tanks) made from steel for the above-ground storage of combustible liquids, safety category A III
- DIN 6625-1 Locally-manufactured steel containers (tanks), for above-ground storage of combustible liquids in safety category A III that represent a risk to groundwater and non-combustible liquids that represent a risk to groundwater
- DIN 18160-1; Flue systems
- DIN 18381 VOB Payment and contract order for construction services – Part C: General technical contract conditions for construction services (ATV) – gas, water and drainage installation systems inside buildings

DVGW guidelines (DVGW Codes of practice)

- TRF 1996 Technical rules for LPG
- G 430 Guidelines for the installation and operation of low pressure gas tanks
- G 600 Technical rules for gas installations
- G 626 Technical rules for the mechanical routing of flue gases for open flue combustion equipment in flue and central ventilation systems
- G 666 Guidelines for cooperation between the gas supply utilities and the contract installation companies

Standard building heat load

The heating output that must normally be routed into the room/building at the normal outdoor temperature (design temperature) is designated as the standard heat load of a room/building, so that the standard indoor temperatures or the agreed room temperatures can be attained. The standard heat load is a property of the room/building and forms the basis for the sizing of the heat generator, the heat distribution system (e.g. radiators or underfloor heating) and the energy consumption evaluation. This is not to be confused with the annual heat demand to DIN V 4108-6, which is unsuitable for sizing the heat generator.

The standard heat load is composed of the heat flux through thermal conduction via enclosing surfaces (transmission) and the heat flux for heating of incoming outdoor air (ventilation heat load).

The standard building heat load is calculated to EN 12831 "Heating systems in buildings – procedure to calculate the standard heat load".

The result of this calculation is crucial to the sizing of the heat pump system and is necessary for preparing a reliable tender. Both over and under-sizing of a heat pump system is uneconomical, disadvantageous to the system's operation and also limits the system's operational reliability.

Exact calculation of the standard heat load is recommended in all cases. Known fuel consumptions or typological indicators are suitable for estimated sizing of dual mode systems for example.

Subject to the heated living space

Refer to the table for an estimated specific heat load per m² of heated living area.

Q_N = Wohnfläche * Watt/m²

Single-family or two-family house (older building/existing):

Thermal insulation of the external wall	Window	Floors	Watt per m² living area
No	Single glazed	1	160
No	Single glazed	2	140
No	Double glazed	1 - 2	100
Yes	Double glazed	1 - 2	80
Yes	Insulation glazing	1 - 2	50

Subject to oil consumption

The heat load can be estimated as follows from the average oil consumption over the past five years:

$$Q_N = \frac{B_a * \eta * H_u}{b_{VH}}$$

Q_N Heat load [kW]
B_a Annual oil consumption [l] (average consumption over the past five years, minus 75 litres of oil per person for DHW heating).
η Seasonal efficiency [to DIN] (h = 0.7)
H_u Calorific value of fuel oil [10 kWh/l]
b_{VH} Hours of full utilisation (average value 1800 h/a)

Brief formula:

$$Q_N = \frac{B_a}{250}$$

Subject to gas consumption

The heat load can be estimated as follows from the average gas consumption over the past five years:

$$Q_N = \frac{B_a * \eta}{b_{VH}}$$

Q_N Heat load [kW]
B_a Annual gas consumption [kWh]
η Annual efficiency (η = 0.8)
b_{VH} Hours of full utilisation (average value 1800 h/a)

Flow temperature

Heating surface temperature

The flow temperature of the heating system is decisive for the application options and the operating mode of the heat pump.

Heating systems that require a flow temperature in excess of +60 °C can only be operated with a heat pump in dual mode together with a second heat source or with a high temperature heat pump. The changeover point of the heat pump is determined not only by the heating output of the heat pump, but also by the sizing of the heating surfaces.

Radiator heating systems used to be sized around a flow temperature of 75 °C. Today, retrofitting thermal insulation or oversizing generally means, that a flow temperature of only +60 °C or less is generally required.

The heating surfaces of new systems should be sized around a flow temperature of no more than +55 °C to enable mono mode operation.

Example

Up to what outside temperature can a heating system with a flow temperature of +75 °C (heating curve B) be operated with a heat pump operating with a flow temperature of up to +60 °C?

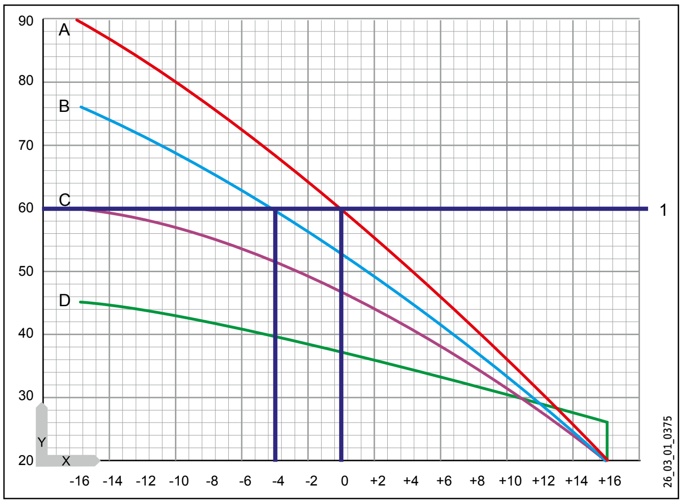
In this example, the point of intersection between the heating curve B and the max. heat pump flow temperature of +60 °C arrives at an outside temperature of – 4 °C. The application limit of this heat pump therefore lies at an outside temperature of – 4 °C because of the heat distribution system.

Practical experience has shown that the heating limit extends to a lower temperature range through external and internal energy recovery. This means that the heat pump covers a higher percentage of the annual heating load.

Rule of thumb

The lower the flow temperature of the heating system, the higher the output of the heat pump.

Flow temperatures for the corresponding outside temperatures



X Outside temperature [°C]
Y Heating flow temperature [°C]
1 Heat pump flow temperature [°C]
A-D Flow temperature curves

According to the above diagram the following flow temperatures produce the following changeover points to start the second heat source:

Curve	Flow temperature °C	Changeover point °C	Operating mode
A	90	0	dual mode
B	75	-4	dual mode
C	<60	-	Mono mode
D	<60	-	Mono mode

Sizing of heat pumps

Power supply utilities can shut down the power supply of the heat pump system for two hours three times per day in return for favourable tariffs. However, the heat load of the building must be covered 24 hours per day. For the sizing of the heat pump system, this means an increase in the building's heat load by a factor of 1.1.

$$Q_{WP} = Q_{N\ Geb.} * 1{,}1$$

Air | water heat pumps

The heating output of air | water heat pumps is subject to the outside temperature. This has the disadvantage that the heating output of the heat pump also falls with falling outside temperatures, whilst the heat load actually increases.

Air | water heat pumps have a mono energetic configuration.

Brine | water heat pumps

The temperature of the heat source is near constant all the year round. This means, that the heat pump heating output too is almost constant.

Brine | water heat pumps normally have a mono mode configuration.

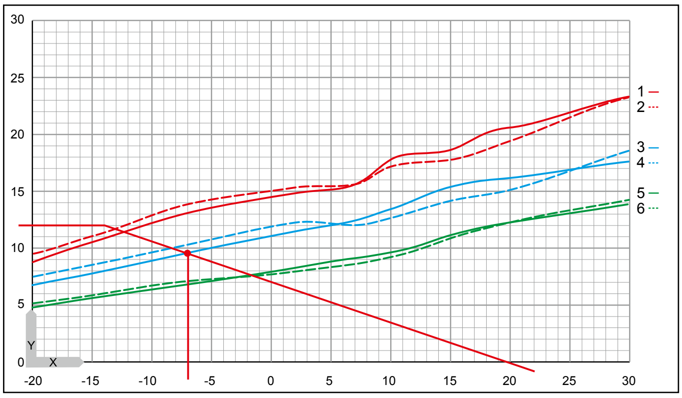
Brine | water heat pumps with groundwater as heat source

The temperature of the heat source is near constant all the year round. This means, that the heat pump heating output too is almost constant.

The temperature of the heat source is approximately constant all year round and is approximately +10 °C.

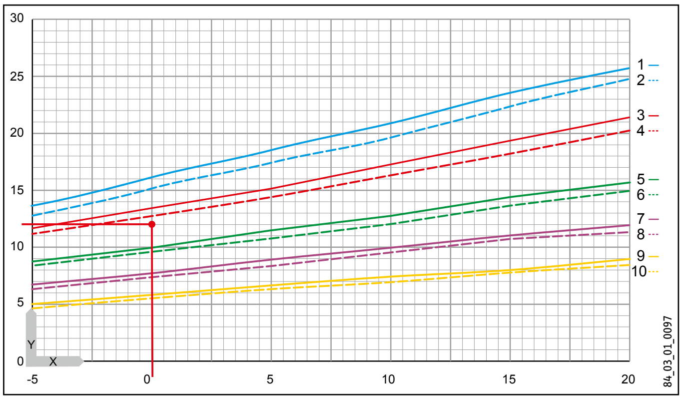
In the case of heat source systems with intermediate heat exchangers, the heat pump inlet temperature is approx. 3 K lower.

Air | water heat pump sizing example

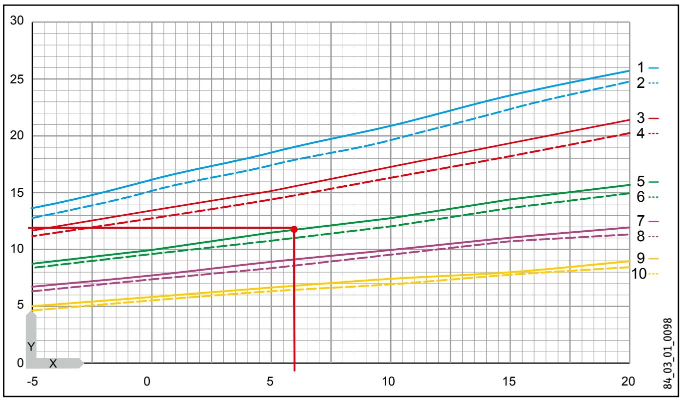


X Air inlet temperature [°C]
Y Heating output [kW]
1 WPL 23 E, T_V 35 °C
2 WPL 23 E, T_V 50 °C
3 WPL 18 E, T_V 35 °C
4 WPL 23 E, T_V 50 °C
5 WPL 13 E, T_V 35 °C
6 WPL 13 E, T_V 50 °C

Brine | water heat pump sizing example



Brine | water heat pump with water as heat source, sizing example



X Heat source temperature [°C]
Y Heating output [kW]
1 WPF 16 E, T_V 35 °C
2 WPF 16 E, T_V 50 °C
3 WPF 13 E, T_V 35 °C
4 WPF 13 E, T_V 50 °C
5 WPF 10 E, T_V 35 °C
6 WPF 10 E, T_V 50 °C
7 WPF 7 E, T_V 35 °C
8 WPF 7 E, T_V 50 °C
9 WPF 5 E, T_V 35 °C
10 WPF 5 E, T_V 50 °C

Air | water heat pump sizing example

The illustration shows the relationship between the building's heat load and the heating output of the heat pump.

The intersection of the curves provides the dual mode point (start of the second heat source). The dual mode point in mono energetic operation should lie between an outside temperature of -3 °C and -7 °C in order to cover a large proportion of the annual heat load with the heat pump.

Sizing example

The example is a house with a heat demand of 11.0 kW. The heat distribution system comprises low temperature radiators, designed for 55/45 (55 °C flow temperature at -14 °C outside temperature). The dual mode point should lie between −3 °C and −7 °C.

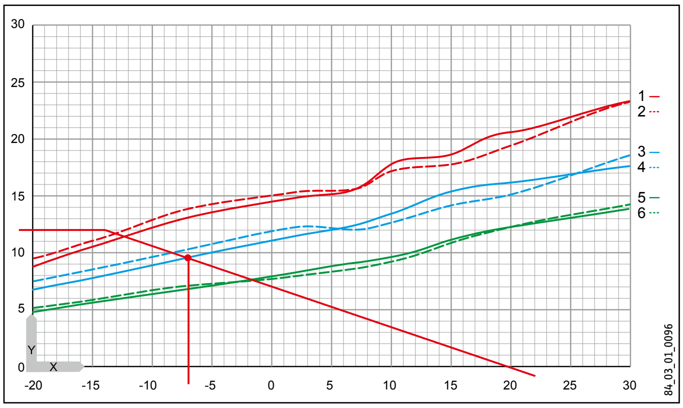
Result

The required heating output of the heat pump for an underfloor heating system and six hours blocking time (factor 1.1):

11,0 kW x 1,1 = 12,1 kW.

The WPL 18 E was selected, which independently covers a heat demand down to -7 °C outside temperature and reaches an annual heating proportion of 98 %.

Air | water heat pump sizing example



X Air inlet temperature [°C]
Y Heating output [kW]
1 WPL 23 E, T_V 35 °C
2 WPL 23 E, T_V 50 °C
3 WPL 18 E, T_V 35 °C
4 WPL 18 E, T_V 50 °C
5 WPL 13 E, T_V 35 °C
6 WPL 13 E, T_V 50 °C

Annual coverage by the heating heat pump

dual mode point [°C]	Parallel (mono energetic) mode Coverage according to climate zone				
	-10 °C	-12 °C	-14 °C	-16 °C	-18 °C
− 12	1,00	1,00	1,00	0,99	0,98
− 10	1,00	1,00	0,99	0,98	0,97
− 8	1,00	0,99	0,98	0,97	0,96
− 6	0,99	0,99	0,98	0,97	0,95
− 4	0,99	0,98	0,97	0,95	0,93
− 2	0,98	0,96	0,94	0,92	0,90
0	0,96	0,93	0,90	0,87	0,85
+ 2	0,92	0,88	0,85	0,81	0,77
+ 4	0,87	0,83	0,79	0,74	0,69
+ 6	0,81	0,77	0,72	0,67	0,62
+ 8	0,75	0,71	0,65	0,59	0,52

Air | water heat pumps (output-dependent control)

The continuous speed change of the compressor adapts the heating output to the building heat load.

Due to the constantly high heating output, air | water heat pumps with inverter technology can be operated in mono mode.

Mono energetic operating mode up to the dual mode point ≤ -5 °C is also possible.

Due to output regulation leads to further advantages in heat pump operation and increased system efficiency.

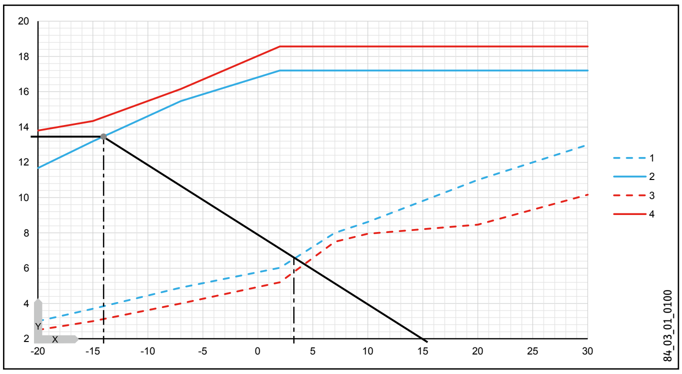
» Constant heat emission at the required flow temperature level
» Longer runtimes therefore less start-up losses
» Output regulation of the auxiliary drives such as fans or circulation pumps
» Lower sound power level in partial load operation
» Separate control of the heating output in DHW mode
» Compact design
» Lower cost of defrosting the heat pump evaporator

Limits are set on a heat pump's output control insofar as a minimum output must be delivered at all times, which increases along with the outside temperature. Take this into consideration when engineering the system.

If too large a heat pump with output-dependent control is used, it cannot achieve its full potential. Minimum and maximum application limits therefore apply to heat pumps with output-dependent control.

Sizing example

Mono mode operation

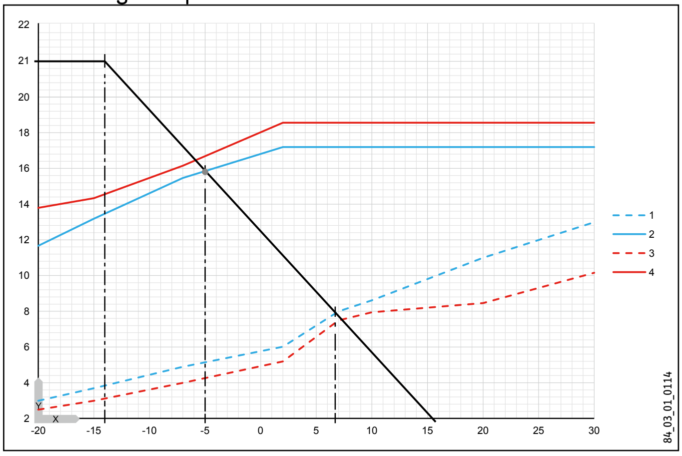


Example: Standard outside temperature = -14 °C

X	Outside temperature [°C]	3	min. W55
Y	Heating output [kW]	4	max. W55
1	min. W35		
2	max. W35		

Sizing example

Mono energetic operation



Example: Standard outside temperature = -14 °C

X	Outside temperature [°C]	3	min. W55
Y	Heating output [kW]	4	max. W55
1	min. W35		
2	max. W35		

Power supply and tariffs

Power supply

The electricity required to drive heat pumps may be classified as domestic power consumption.

The local power supply utility needs to approve the installation of heat pumps for central heating purposes.

Ask your power supply utility about their connection conditions for the specified equipment. It is of particular interest to check whether mono energetic heat pump operation is feasible in your region.

Information regarding standing charges and supply tariffs, the possibility of utilising favourable night tariffs and possible shut-down periods are also important.

Your local power supply utility will be a valuable contact in these matters.

Application procedures

The following details are required to assess the effects of heat pump operation on the grid of your local power supply utility:

» User address
» Location of the heat pumps
» Operating mode according to all tariffs (domestic, agricultural, commercial, professional and other demand)
» Intended operating mode of the heat pump
» Heat pump manufacturer
» Heat pump type
» Connected load in kW
» Maximum starting current in amps (manufacturer's details)
» heat load of the building in kW.

Requirements for the electrical installation of heat pumps

» The technical connection conditions of the relevant power supply utility must be observed.
» For information regarding the necessary switching and metering equipment, contact your power supply utility.

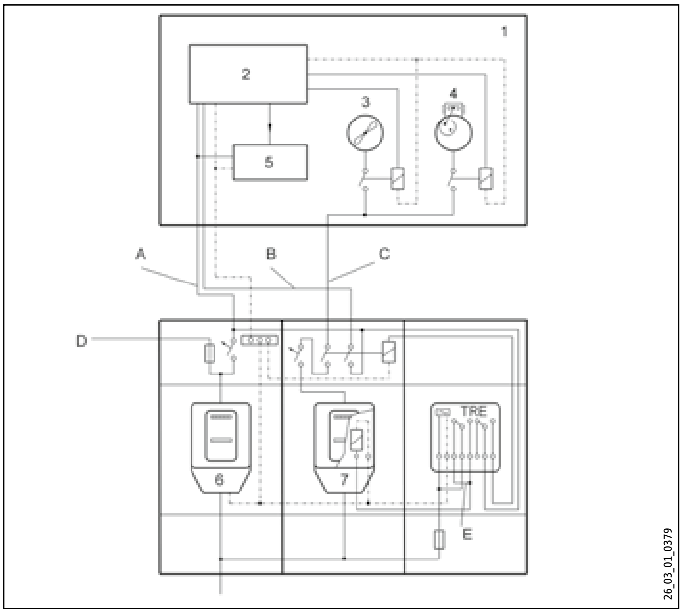
Cable cross-sections

According to VDE 0298-4, the following cable cross sections must be used subject to fuse protection and cable routing. The BUS cable requires a cable J-Y (St) 2x2x0.8 mm².

MCB/fuse rating	Cable cross-section mm^2	Conditions
C 10	1.5 mm^2	
C 16	1.5 mm^2	With only two live cores and routing on a wall or in an electrical conduit on a wall
C 16	2.5 mm^2	
C 20	4.0 mm^2	
C 20	2.5 mm^2	When routing on a wall or in an electrical conduit on a wall
C 25	4.0 mm^2	When routing a multi core cable on a wall or in an electrical conduit on the wall
C 25	6.0 mm^2	When routing in a wall
C 35	10.0 mm^2	
C 50	16.0 mm^2	

Installation example for a heat pump system with ripple control receiver

Earth conductor not shown



1 Heat pump system
2 Control unit
3 Fan or circulation pump
4 Compressor
5 Auxiliary drives
6 Domestic electricity meter
7 Heat pump meter
A Unregulated main power circuit
B Regulated control voltage circuit
C Regulated main power circuit
D To the power distribution board
E for excitation with high tariff power

Heating water quality

Water quality

The heating water quality has an impact on the components that are part of the water circuit as well as on the function of the entire system.

Here, the water hardness and the substances in the water are the crucial factors.

In Germany, the water quality of heating systems between 20 and 300 kW output are regulated by the VDI 2035.

In accordance with VDI 2035, part 1, fill and top-up water of heating systems must be treated or softened to prevent damage. If the limits specified in the table are not adhered to, soften the heating water.

General function

Our softening appliances work on the ion exchange principle.

When exchanging ions, the fill water as well as the top-up water are routed through a sodium-ion exchange resin.

Calcium ions and magnesium ions are replaced with sodium ions. By replacing the Ca and Mg ions, chemical compounds based on the aforementioned are no longer possible in the heating water, in other words, soft water free from calcium is generated.

This chemical process has no negative effect on heating water or the service life of system components and parts.

Local water hardness

There are local differences in the level of hardness and the composition of drinking water.

Check with the relevant water board regarding information on the actual hardness level of local water.

Benefits of water softening

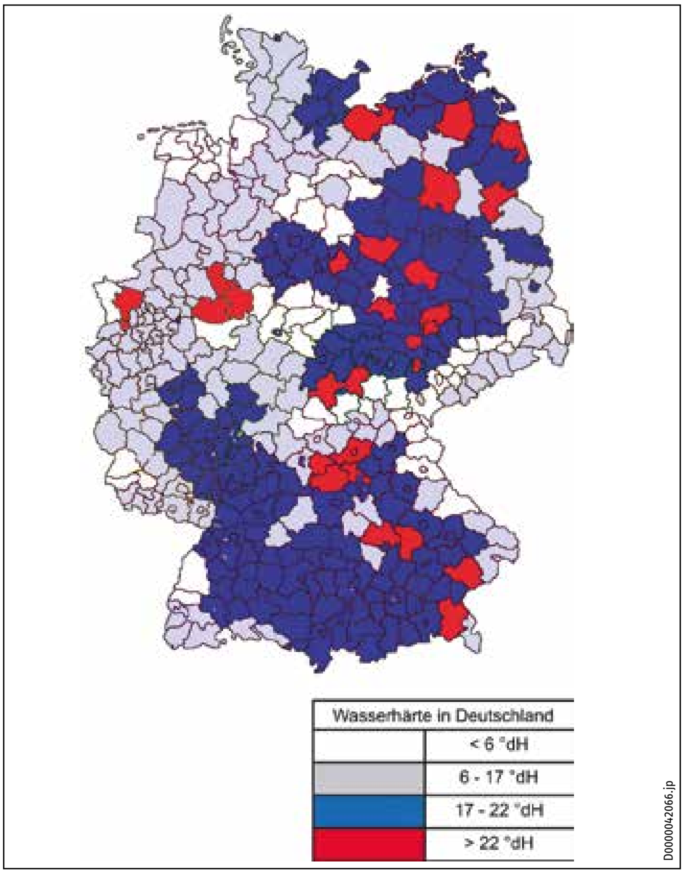
» Preventing thermal stresses through deposits
» Prevention of mechanical stresses and component failure
» Energy saving through optimised heat exchanger surfaces

Total hardness limits

Output	Total hardness limit in °dH subject to the specific system volume* (VDI 2035)		
	< 20 l/kW	≥ 20 <50 l/kW	≥ 50 l/kW
<50 kW	≤16,8 °dH	≤11,2 °dH	<0.11 °dH
50 - 200 kW	≤11,2 °dH	≤8,4 °dH	<0.11 °dH
200 - 600 kW	≤8,4 °dH	≤0,11 °dH	<0.11 °dH
> 600 kW	<0.11 °dH	<0.11 °dH	<0.11 °dH

*System volume/lowest individual heating output

Water hardness in Germany



HZEA / HZEN

Sizing for the first system fill

The number of cartridges for the first filling of a system is calculated in accordance with the following formula:

$$P_{ANZ} = \frac{V_{ANL} * (°dH_{IST} - °dH_{SOLL})}{K_{WWM}}$$

P_{ANZ}	Number of cartridges
V_{ANL}	System volume
K_{WWM}	Soft water capacity in litres * °dH
$°dH_{IST}$	Actual water hardness
$°dH_{SOLL}$	Set water hardness

Use the corresponding limit from the "Total hardness limits" table to calculate the number of cartridges.

Sizing example – first fill:

V_{ANL} = 200 l
$°dH_{ist}$ = 20 °dH
$°dH_{soll}$ = 0,11 °dH
K_{WWM} = 6000 l °dH
P_{ANZ} = ?

$$P_{ANZ} = \frac{V_{ANL} * (°dH_{IST} - °dH_{SOLL})}{K_{WWM}}$$

Result = 0.663 ≅ 1.0

One cartridge is required for the initial fill.

Cartridge service life

The achievable volume of softened water and the top-up volume are used as the basis for calculating the service life of cartridges. The annual top-up volume is assumed to be 10 % of the system volume.

The amount of softened water is calculated according to the following formula:

$$V_{WWM} = \frac{K_{WWM}}{°dH}$$

V_{WWM}	Volume of softened water
K_{WWM}	Soft water capacity in litres * °dH
$°dH_{ist}$	Total water hardness

Sample calculation for the amount of softened water:

K_{WWM} = 6000 l °dH
$°dH_{ist}$ = 20 °dH
V_{WWM} = ?

$$V_{WWM} = \frac{K_{WWM}}{°dH}$$

Result = 300 l

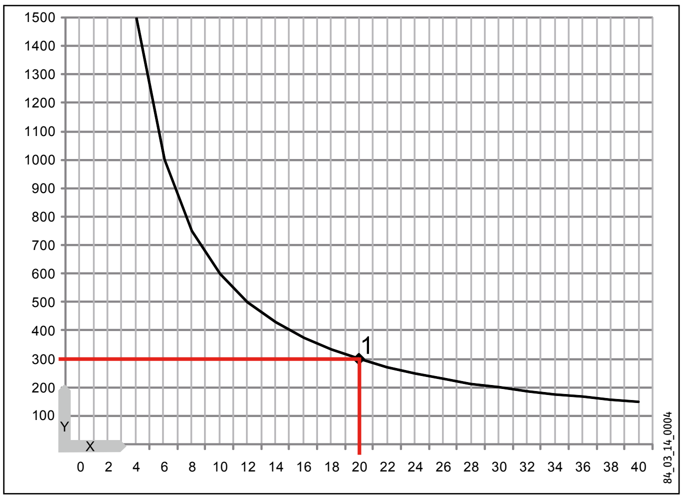
One cartridge generates 300 l of softened water.

Sample service life calculation:

V_{ANL} = 2000 l
V_{WWM} = 300 l
Service life (a) = V_{WWM} / (V_{ANL} * 0.1)

With a system volume of 2000 litres and 300 litres of softened water, a service life of 1.5 years results.

Total volume of softened water



x	Total water hardness in °dH
y	Amount of softened water in litres
1	Example: Amount of softened water at 20°dH

Cost calculation to VDI 2067

Basics

Viability calculations serve to compare different heat sources and system concepts. They also offer a basis for an objective decision. For this, all possible costs should be included and split over the respective cost categories. It is possible to examine the influence of the different types of costs separately.

Cost calculation to VDI 2067

The VDI 2067 guideline concerns the viability calculation of technical services for buildings; it uses the annuity method. It is structured as follows:

Group 1 (sheet 10 to 14):

Energy demand of heated and air-conditioned buildings.

Group 2 (Part 20 to 27):

Energy expenditure of the utilisation transfer for, amongst other things, the hot water heating system and DHW heating.

Group 3 (sheet 30):

Distribution energy expenditure.

Group 4 (Part 40 to 46):

Energy expenditure of the manufacture of, for example, heat pump systems and boiler systems.

This calculation takes into account the dynamic development of costs, interest and prices for a period in the future. Tables A7 and A8 on sheet 1 detail the required interest and annuity factors that are applied to the investment total over the period under consideration and stay the same each year.

Costs are split over the following categories for this calculation:

Capital costs

Capital costs include interest and repayment of the invested capital for the respective system. Tables A2 to A4 on sheet 1 detail the service life plus a supplemental factor for repair of the respective system components.

Costs of consumption

Energy costs in particular make up the consumption-dependent costs. However, costs for auxiliary energy, fuels, delivery and possible storage are also reflected here.

Operational costs

This cost category includes particularly maintenance, monitoring and cleaning. The supplements for these cost categories are listed in tables A2 to A4 on sheet 1.

Miscellaneous costs

Miscellaneous costs include all other ancillary costs such as, for example, insurances or general expenditure.

The structure as well as the different types of costs enable the use even of parts of the guideline for further comparisons. Particularly large systems can frequently only be financed with credit. For this purpose, the annuity method on its own is, in most cases, unlikely to be satisfactory. The combined illustration of return, cash value and amortisation offers a more transparent overview. Nevertheless, all considerations also include costs related to consumption and operation.

Annuity calculation

The VDI 2067 uses the annuity method. The annuity factor determines the uniform payments in connection with an investment that are due annually.

The annuity method provides a dynamic investment calculation that converts the payments received and made into equal annual contributions (annuities).

Primarily, the annuity method is used in the investment and finance sector.

However, it is also used in cost accounting when long-term decisions are involved.

Amortisation calculation

An investment is viable if, with the given interest rate, an average annual surplus can be achieved that is greater or equal to zero. Using the cash value and the cash value factor the amortisation can be calculated.

Cash value

The value of one or several capital sums due in future within the reference time. The cash value or present value is the current value of future receipts or payments resulting from discounting.

Cash value factor

The discounting total factor (cash value factor, interest cash value factor, discounting total factor, capitalisation factor) is one of the financial-mathematical factors. It applies interest to the segments g of a series of payments, taking into consideration the rate of interest and compound interest, and at the same time adds the cash values together. Diverse models, types and finance subsidies offer a wide spectrum for the application of large heat pumps. Considering each specific project individually is therefore a must. We would be happy to assist you with that. The terms and definitions explained here as well as the annuity method are the basis for the following sample cost calculations. Mono mode as well as dual mode parallel operation are indicated in the comparison of different heat pumps. The latter has been shown in this example in mono energetic form. This example makes it clear that the combination of base and peak load heat sources are worth considering. The relationship between the base and peak load, as well as the resulting coverage are crucial.

Cost calculation to VDI 2067

Heat load of the building in kW	9	9	9
Hours run at full utilisation	1786	1786	1786
Specific heat demand in W/m²	50	50	50
Number of occupants	4	4	4
Energy consumption kWh/person/day	2	2	2
Annuity (service life and interest rate)	0,0899	0,0899	0,0899
Operating mode of the heating heat pump	Parallel	Mono mode	–
Booster heater	Power	no	–
Solar backup	no	no	DHW

Cost category	Heating systems	WPL 13 E Air/water heat pump	WPF 10 E Brine/water heat pump	Gas condensing with solar thermal system
1. System details				
Energy price for heating	Ct/kWh	20,10	20,10	7,70
Domestic energy price	Ct/kWh	27,00	27,00	27,00
Standing charge p.a.	€	60,00	60,00	170,00
Distribution efficiency	η	0,98	0,98	0,98
Heat generation efficiency	η	1,00	1,00	0,99
DHW efficiency	η	1,00	1,00	0,80
Seasonal performance factor	ε	3,60	4,60	0,00
Dual mode point	°C	-5	-12	0
Heating coverage	%	0,97	1,00	0,00
DHW coverage	%	0,95	1,00	0,00
Solar/heating coverage	%	0,00	0,00	0,00
Solar heating/DHW coverage	%	0,00	0,00	0,50
Solar collectors (aperture area)	m²	0,00	0,00	5,00
2. Investment costs				
Complete heat source	€	11.000,00	9.000,00	4.000,00
Heating system	€	3.600,00	3.600,00	3.600,00
Heating system installation	€	1.800,00	1.800,00	1.800,00
Electrical installation	€	1.350,00	1.350,00	450,00
DHW cylinder	€	2.000,00	2.000,00	2.000,00
DHW installation	€	1.000,00	1.000,00	1.000,00
Oil tank and storage room	€	0,00	0,00	0,00
Gas connection	€	0,00	0,00	1.300,00
Chimney	€	0,00	0,00	2.000,00
Heat source system	€	0,00	9.000,00	0,00
Solar collectors	€	0,00	0,00	1.500,00
Solar pipework	€	0,00	0,00	200,00
Solar installation costs	€	0,00	0,00	600,00
Subsidy	€	0,00	0,00	0,00
Total	€	20.750,00	27.750,00	18.450,00
3. Capital costs				
Capital costs	€	1.866,00	2.496,00	1.659,00
Maintenance	€	208,00	278,00	185,00
Total	€	2.074,00	2.774,00	1.844,00
4. Operational costs				
Maintenance	€	0,00	0,00	150,00
Flue gas inspector	€	0,00	0,00	70,00
Total	€	0,00	0,00	220,00
5. Consumption costs				
Heating	0	Power	Power	0
Annual energy demand	kWh	16.074	16.074	16.074
Energy consumption, heating	kWh	4.419	3.566	16.568
Energy consumption, booster heater	kWh	492	0	0
Annual auxiliary energy demand	kWh	300	300	300
DHW	0			
Annual energy demand	kWh	2.920	2.920	2.920
Energy consumption, DHW	kWh	771	635	1.825
Energy consumption, booster heater	kWh	146	0	0
Solar	0			
Energy yield, heating	kWh	0	0	0
Energy yield, DHW	kWh	0	0	1.460
Energy consumption, solar	kWh	0	0	160
Results				
Total energy consumption	kWh	6.128	4.500	18.853
Total CO2 emissions	kg	4.167	3.060	4.911
System energy costs	€	1.312,00	986,00	1.711,20
Total system costs	€	3.386,00	3.760,00	3.775,20
Primary energy factor	0	2,70	2,70	1,10
Primary energy demand	kWh	16.546	12.151	20.738

Calculation in accordance with your data and with reference to VDI 2067; accuracy not guaranteed

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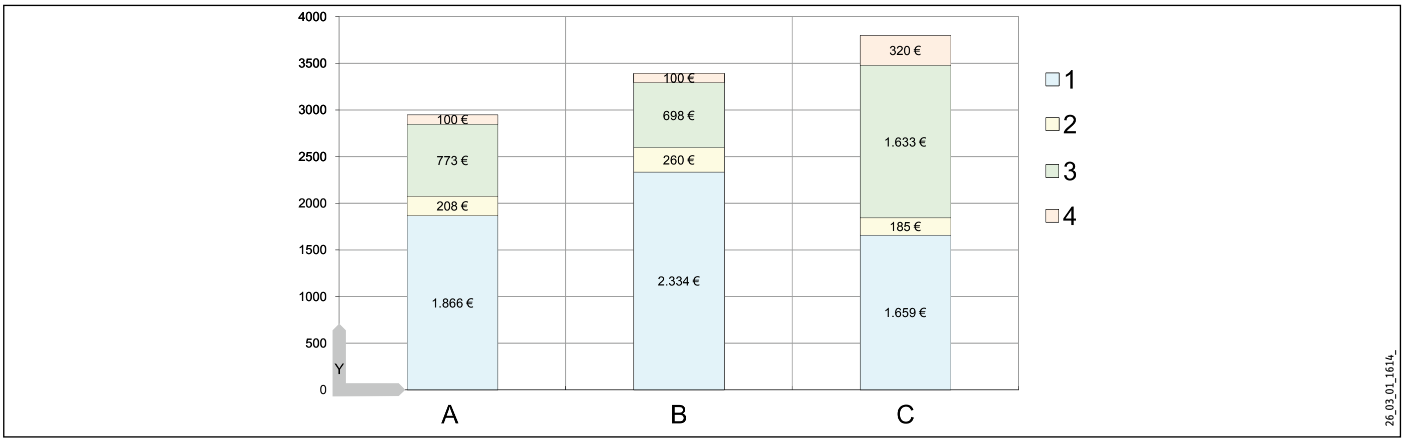
Total costs per year

Example:

Annual cost breakdown



Y Costs [€/a]
A WPL 13 E
B WPF 10 E
C Gas heating
1 Capital costs
2 Maintenance
3 Energy costs
4 Maintenance

Year	WPL 13 E			WPF 10 E			Gas heating			Interest on capital	Differential costs WPL 13 / gas heating			Differential costs WPF 10 / gas heating		
	Rate of price increase			Rate of price increase			Rate of price increase				Capital differential			Capital differential		
	2%	2%		2%	2%		2%	2%		4%						
	Energy costs	Operating costs	Total	Energy costs	Operating costs	Total	Energy costs	Operating costs	Total	Present value factor	Cost differential	Present value	Return	Cost differential	Present value	Return
1	1.312 €	208 €	1.520 €	986 €	278 €	1.264 €	1.711 €	405 €	2.116 €	0,962	596 €	573 €	1.727 €	852 €	819 €	8.481 €
2	1.338 €	212 €	1.550 €	1.006 €	284 €	1.289 €	1.745 €	413 €	2.159 €	0,925	608 €	562 €	1.164 €	869 €	804 €	7.677 €
3	1.365 €	216 €	1.581 €	1.026 €	289 €	1.315 €	1.780 €	421 €	2.202 €	0,889	620 €	551 €	613 €	887 €	788 €	6.889 €
4	1.392 €	221 €	1.613 €	1.046 €	295 €	1.341 €	1.816 €	430 €	2.246 €	0,855	633 €	541 €	72 €	904 €	773 €	6.116 €
5	1.420 €	225 €	1.645 €	1.067 €	301 €	1.368 €	1.852 €	438 €	2.291 €	0,822	645 €	530 €	-458 €	922 €	758 €	5.357 €
6	1.449 €	230 €	1.678 €	1.089 €	307 €	1.396 €	1.889 €	447 €	2.336 €	0,790	658 €	520 €	-978 €	941 €	744 €	4.614 €
7	1.478 €	234 €	1.712 €	1.110 €	313 €	1.423 €	1.927 €	456 €	2.383 €	0,760	671 €	510 €	-1.489 €	960 €	729 €	3.885 €
8	1.507 €	239 €	1.746 €	1.133 €	319 €	1.452 €	1.966 €	465 €	2.431 €	0,731	685 €	500 €	-1.989 €	979 €	715 €	3.169 €
9	1.537 €	244 €	1.781 €	1.155 €	326 €	1.481 €	2.005 €	475 €	2.479 €	0,703	699 €	491 €	-2.480 €	998 €	702 €	2.468 €
10	1.568 €	249 €	1.817 €	1.178 €	332 €	1.511 €	2.045 €	484 €	2.529 €	0,676	713 €	481 €	-2.961 €	1.018 €	688 €	1.780 €
11	1.599 €	254 €	1.853 €	1.202 €	339 €	1.541 €	2.086 €	494 €	2.580 €	0,650	727 €	472 €	-3.433 €	1.039 €	675 €	1.105 €
12	1.631 €	259 €	1.890 €	1.226 €	346 €	1.572 €	2.128 €	504 €	2.631 €	0,625	741 €	463 €	-3.896 €	1.060 €	662 €	443 €
13	1.664 €	264 €	1.928 €	1.250 €	353 €	1.603 €	2.170 €	514 €	2.684 €	0,601	756 €	454 €	-4.350 €	1.081 €	649 €	-206 €
14	1.697 €	269 €	1.966 €	1.275 €	360 €	1.635 €	2.214 €	524 €	2.738 €	0,577	771 €	445 €	-4.796 €	1.102 €	637 €	-843 €
15	1.731 €	274 €	2.006 €	1.301 €	367 €	1.668 €	2.258 €	534 €	2.792 €	0,555	787 €	437 €	-5.233 €	1.124 €	624 €	-1.467 €
16	1.766 €	280 €	2.046 €	1.327 €	374 €	1.701 €	2.303 €	545 €	2.848 €	0,534	802 €	428 €	-5.661 €	1.147 €	612 €	-2.079 €
17	1.801 €	286 €	2.087 €	1.354 €	382 €	1.735 €	2.349 €	556 €	2.905 €	0,513	818 €	420 €	-6.081 €	1.170 €	601 €	-2.680 €
18	1.837 €	291 €	2.128 €	1.381 €	389 €	1.770 €	2.396 €	567 €	2.963 €	0,494	835 €	412 €	-6.493 €	1.193 €	589 €	-3.269 €
19	1.874 €	297 €	2.171 €	1.408 €	397 €	1.805 €	2.444 €	578 €	3.022 €	0,475	852 €	404 €	-6.897 €	1.217 €	578 €	-3.847 €
20	1.911 €	303 €	2.214 €	1.436 €	405 €	1.841 €	2.493 €	590 €	3.083 €	0,456	869 €	396 €	-7.294 €	1.241 €	567 €	-4.413 €

Consumption costs: Includes fuel costs, meter rental and standing charge
Operating costs: Includes service costs, maintenance and flue gas inspector costs
Capital differential: Difference in investment compared to the heat pump system
Cost differential: Difference in running costs compared to the heat pump system
Cumulative return: Capital differential minus annual cost differential
Present value factor: The present value factor is a financial calculation factor. It applies interest to the segments g of a series of payments, taking the rate of interest and compound interest into consideration, and adds the present values together.
Present value: The value of one or more capital sums due in the future in relation to the reference time. The cash value or present value is the current value of future receipts or payments as a result of discounting.

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Hydraulic connection into the heat consumer system

Buffer cylinder

For a perfect operation, heat pumps require a minimum flow rate of heating water. It is recommended to use a buffer cylinder in order to ensure trouble-free heat pump operation.

Among other things, buffer cylinders provide hydraulic separation between the volume flows in the heat pump circuit and the heating circuit. The flow rate in the heat pump circuit remains constant if the flow rate in the heating circuit is reduced by thermostatic valves, for example.

The combination of heat pumps and heating distribution and transfer systems with a low water content, e.g. radiator heating systems, normally results in the heat generator switching itself on and off regularly (cycling), particularly in partial load operation. To avoid this, it is necessary to install a suitably sized buffer cylinder or, in the case of heat pumps with output-dependent control, to utilise the variable output range.

Some heat pumps, particularly air | water heat pumps, additionally require a buffer volume for defrost mode. Refer to the following pages and tables for specific recommendations for action depending on the heat pump type.

Subject to tariff and country concerned, heat pumps can be switched off by electricity supply utilities during peak times. For radiator heating systems that cool down rapidly, the buffer cylinder volume is selected so that the heat stored therein is sufficient to cover any power-OFF periods.

Basis for decisions

It is always recommended to use a buffer cylinder. Technically, systems without a buffer cylinder are only appropriate if the following conditions are met:

» The minimum flow rate on the water side is ensured at all times through the heat pump.
» There are no blocking times expected for the power supply, or an area heating system is installed
» There is no provision for incorporating additional heat generators
» The heat distribution system will be installed new and sized to the heat pump's minimum flow rate
» No buffer cylinder is specified for the installed heat pump.

Benefits of a heat pump system with buffer cylinder

» No modification of the existing system relative to the pipework dimensions
» No flow noise in the heat distribution system
» Constant flow rate through the heat pump
» No reduction in comfort during power-OFF periods
» Other heat generators can be incorporated without any problem

Heat pumps with buffer cylinder

Heating system

The additional water volume in the buffer cylinder and the possibility of shutting down the heat generator requires that an additional diaphragm expansion vessel is installed. Heat pumps are protected to EN 12828.

In systems operated without a buffer cylinder, always ensure the minimum heat pump circulation volume on the water side.

Structure-borne noise transfer

Preferably, flexible pressure hoses (anti-vibration) are used to connect the machine to the pipework of the building. These will minimise the transfer of oscillations, vibrations and other structure-borne noise.

Use anti-vibration mounts for all pipe fittings.

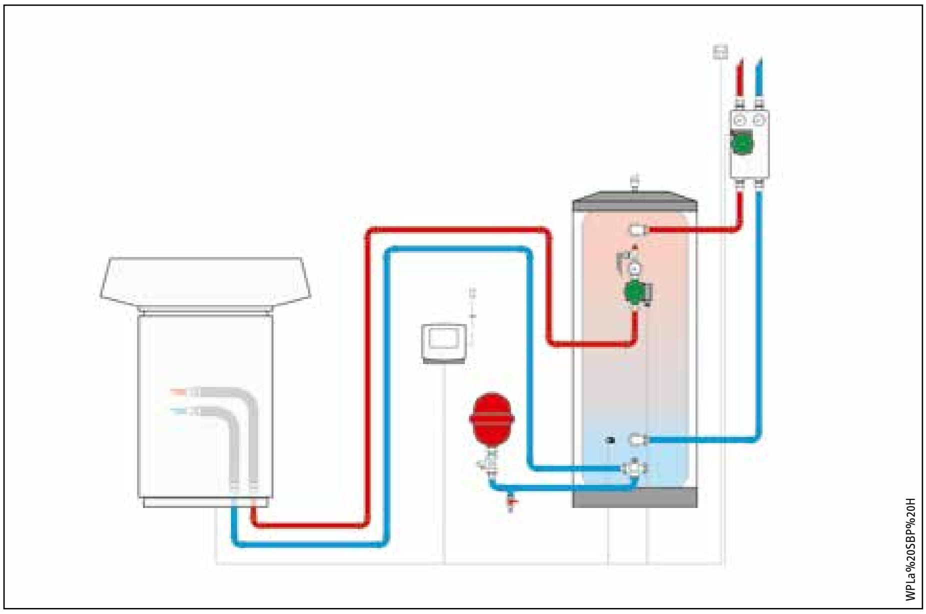
Circulation pumps in the heat pump circuit

Use a suitable buffer charging pump subject to buffer cylinder and compact installation.

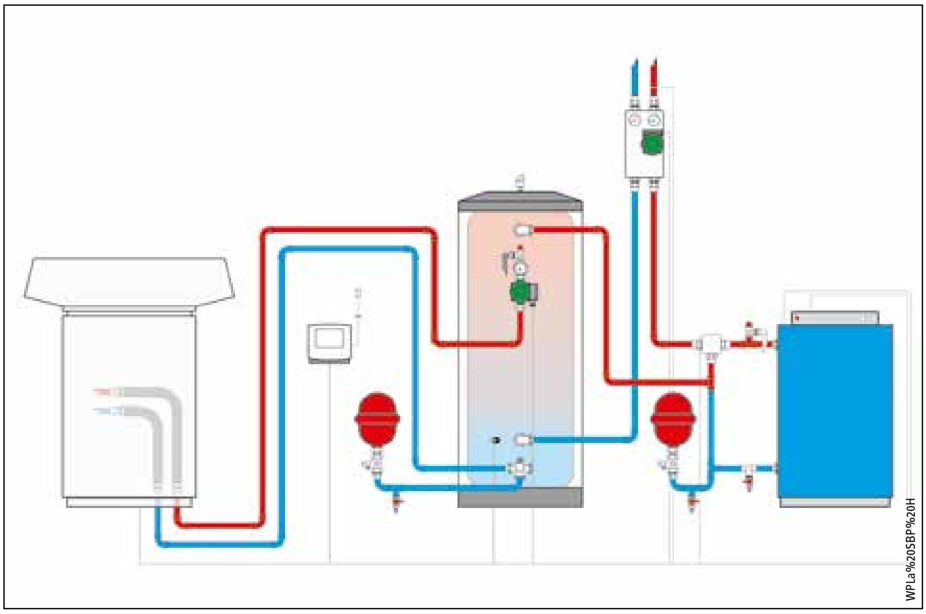
Second heat source

For dual mode systems, always connect the heat pump into the return of the second heat source. The second heat source may be an existing oil or gas boiler, for example.

Mono energetic heat pump system



Dual mode heat pump system



Circulation pumps for the heat pumps with WPKI 5

The pipe run between the heat pump and the buffer cylinder may be up to 10 m.

Heat pump	Flow rate m³/h	Pressure differential hPa	Circulation pump	Copper pipe DN
WPL 10 I/IK	0,8	195	UP 25/7.5 E	22 x 1,0
WPL 10 AC	0,8	195	UP 25/7.5 E	22 x 1,0
WPL 13 cool	1,5	105	UP 25/7.5 E	28 x 1,5
WPL 18 cool	2,0	145	UP 25/7.5 E	28 x 1,5
WPL 23 cool	2,8	190	UP 25/7.5 E	35 x 1,5
WPL 33 HT	1,7	190	UP 25/7.5 E	28 x 1,5

Buffer cylinder with peak load heat generator

For buildings with a heat load of approx. 30 kW to 60 kW, the dual mode combination of two fuel types can also be provided by means of a heat pump buffer cylinder with integrated gas condensing unit.

In addition to the hydraulic separation of the heating distribution system and heat generator, the peak load heat generator is incorporated at the same time. This can be used for both room heating and DHW heating. Since the peak load boiler is regulated by the heat pump control unit with modulating and output-dependent control, the planned coverages of both fuel types can be set and achieved perfectly.

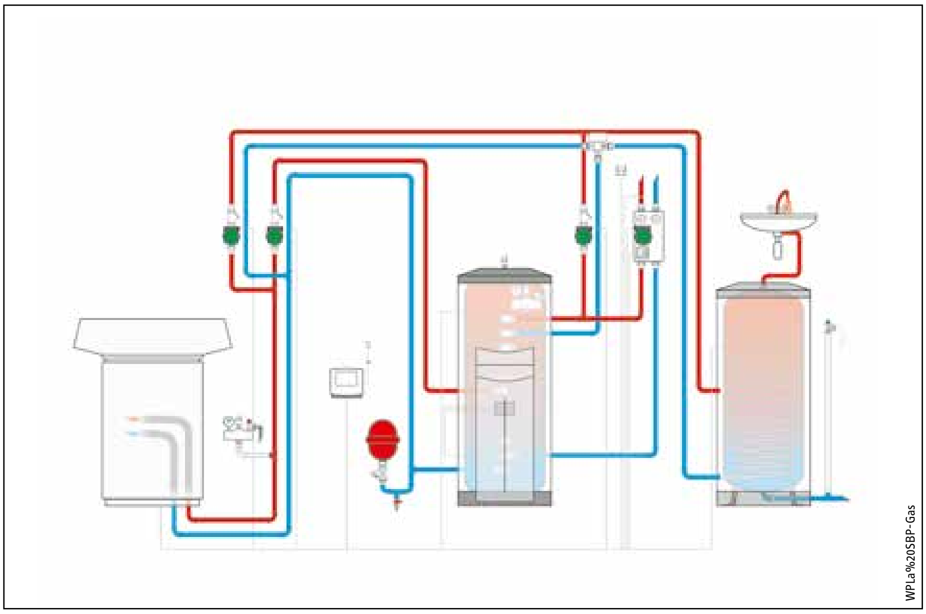
The peak load heat generator is installed in the upper third of the cylinder. At all times, only as much heat load is introduced as is required for the operating state.

The control variables are the outside temperature, the set dual mode temperatures for heating or DHW heating and the flow temperature at the buffer cylinder output to the heating circuit.

The design engineer and installer of the system benefits from space and time saving installation. The buffer cylinder normally required is replaced by the combi appliance, complex pipework with several components is no longer needed and fault susceptibility is reduced.

This buffer cylinder should preferably be combined with heat pumps without output-dependent control. An overview of possible types and cylinder sizes is shown below.

Buffer cylinder with integrated peak load heat generator



Air | water heat pumps

	SBP 750 G	SBP 950 G
WPL 10 AC	•	
WPL 10 I	•	
WPL 10 IK3	•	
WPL 13 E	•	
WPL 18 E	•	
WPL 23 E	•	
WPL 34		•
WPL 47		•
WPL 57		•
2 x WPL 23 E		•

Brine | water heat pumps

	SBP 750 G	SBP 950 G
WPF 10 M	•	
WPF 13 M	•	
WPF 16 M	•	
WPF 20 Set		•
WPF 23 Set		•
WPF 26 Set		•
WPF 29 Set		•
WPF 32 Set		•
WPF 20		•
WPF 27		•

Heat pumps without buffer cylinder

Installation without buffer cylinder

A constant heat pump minimum flow rate is required to enable the heat pump to function correctly.

Additional measures must be taken if the minimum flow rate is not guaranteed via the heat distribution system, e.g. keeping open parts of the heat distribution system. In this case, for some types of heat pumps it is essential to provide the connection for the integrated electric emergency/booster heater.

Refer to the following pages and tables for specific recommendations for action and the necessary minimum flow rate depending on the heat pump type.

Attention must be paid to this as early as the planning stage for heating distribution and transfer systems in order to ensure the minimum flow rate for the heat pump system.

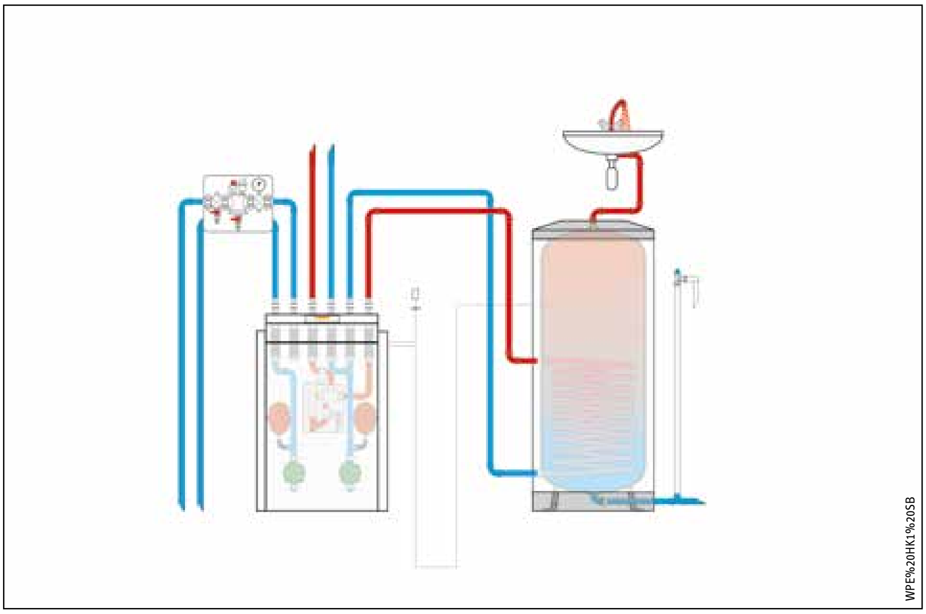
For example, the number and distribution of area heating systems, their nominal diameter and control technology or individual room control have a decisive influence on the design temperature and the flow rate in partial load operation.

To avoid contravening the Energy Savings Ordinance [Germany], a dispensation must be applied for from the appropriate building authorities if generally no zone valves are to be installed.

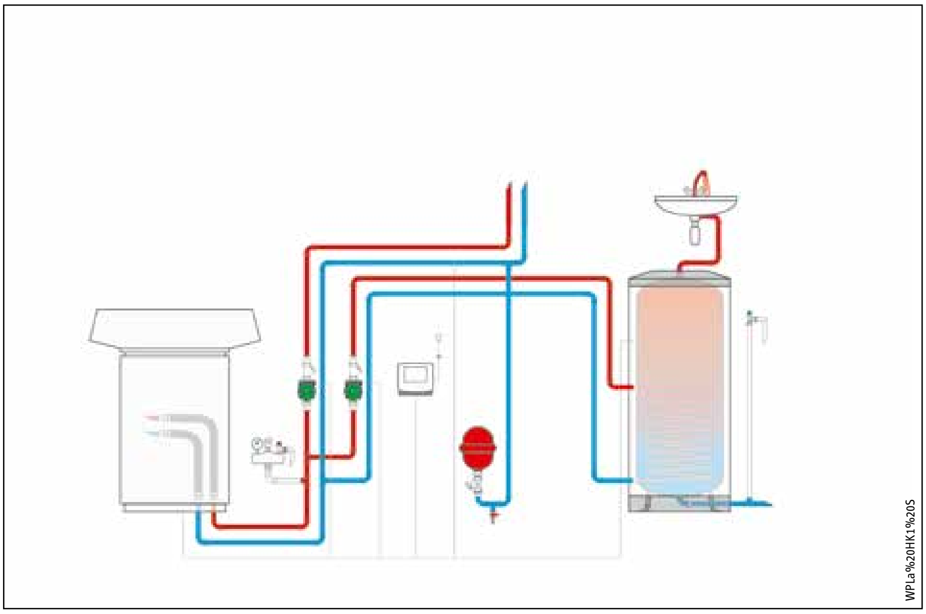
Example: If there are no zone valves in the living room only and if the minimum flow rate is guaranteed with the installed circuits, the room temperature can be measured via the remote of the heat pump control unit.

This will not contravene the Energy Saving Ordinance.

Mono mode brine | water heat pump without buffer cylinder



Mono energetic air | water heat pump without buffer cylinder



Sizing table, buffer cylinders

Heat pumps	Minimum flow rate	Minimum water content of buffer cylinder or open circuits	Composite piping system 16 x 2 mm / clearance 10 cm		Composite piping system 20 x 2.25 mm / clearance 15 cm		Buffer cylinder always required	Recommended buffer cylinder volume, underfloor heating	Recommended buffer cylinder volume, radiators	Activate integral booster heater
			Lead room floor area	Number of circuits	Lead room floor area	Number of circuits				
	l/h	l	m²	n x m	m²	n x m	-	-	-	-
WPL 10 IK	580	15	21	3x70	21	2x70	no	100	200	yes
WPL 10 I	580	15	21	3x70	21	2x70	no	100	200	yes
WPL 10 AC	700	19	21	3x70	21	2x70	no	100	200	yes
WPL 10 ACS	700	19	21	3x70	21	2x70	no	100	200	yes
WPL 15 AS	700	16	21	3x70	21	2x70	no	100	200	yes
WPL 15 ACS	700	16	21	3x70	21	2x70	no	100	200	yes
WPL 15 IS	840	24	28	4x70	21	2x70	no	100	200	yes
WPL 15 IKS	840	24	28	4x70	21	2x70	no	100	200	yes
WPL 20 A/AC	1000	29	28	4x70	32	3x70	no	200	400	yes
WPL 25 AC	1000	29	28	4x70	32	3x70	no	200	400	yes
WPL 25 ACS	1000	29	28	4x70	32	3x70	no	200	400	yes
WPL 25 I	1000	35	-	-	32	3x70	no	200	400	yes
WPL 25 IK	1000	35	-	-	32	3x70	no	200	400	yes
WPL 08 S Trend	830	32	32	4x80	27	2x90	no	100	200	yes
WPL 12 S Trend	1190	36	-	-	32	3x70	no	200	400	yes
WPL 16 S Trend	1550	45	-	-	-	-	yes	200	400	yes
WPL 22 Trend	2230	54	-	-	-	-	yes	200	400	yes
WPL 28 Trend	2500	67	-	-	-	-	yes	200	400	yes
WPL 13 E	1000	62	-	-	-	-	yes	200	400	yes
WPL 18 E	1200	46	-	-	-	-	yes	200	400	yes
WPL 23 E	1400	62	-	-	-	-	yes	400	700	yes
WPL 13 cool	1000	62	-	-	-	-	yes	200	400	yes
WPL 18 cool	1200	48	-	-	-	-	yes	200	400	yes
WPL 23 cool	1400	62	-	-	-	-	yes	400	700	yes
WPL 33 HT	930	20	-	-	21	2x70	no	200	400	yes
WPL 34	2500	43	-	-	-	-	yes	400	700	no
WPL 47	3000	48	-	-	-	-	yes	700	1000	no
WPL 57	3500	36	-	-	-	-	yes	700	1000	no

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Sizing table, buffer cylinders

Heat pumps	Minimum flow rate	Minimum water content of buffer cylinder or open circuits	Composite piping system 16 x 2 mm / clearance 10 cm		Buffer cylinder always required	Recommended buffer cylinder volume, underfloor heating	Recommended buffer cylinder volume, radiators
			Lead room floor area	Number of circuits			
	l/h	l	m²	n x m	-	-	-
WPF 04	400	28	25	3x80	no	100	200
WPF 05	500	28	25	3x80	no	100	200
WPF 07	700	33	30	4x75	no	100	200
WPF 10	900	39	35	5x70	no	100	200
WPF 13	1100	-	-	-	yes	200	400
WPF 16	1500	-	-	-	yes	200	400
WPF 05 basic	500	28	25	3x80	no	100	200
WPF 07 basic	700	33	30	4x75	no	100	200
WPF 10 basic	900	39	35	5x70	no	100	200
WPF 13 basic	1200	-	-	-	yes	200	400
WPF 16 basic	1400	-	-	-	yes	200	400
WPF 10 M	900	39	35	5x70	no	100	200
WPF 13 M	1200	-	-	-	yes	200	400
WPF 16 M	1400	-	-	-	yes	200	400
WPF 20	2650	-	-	-	yes	400	700
WPF 27	3650	-	-	-	yes	400	700
WPF 27HT	3290	-	-	-	yes	400	700
WPF 35	4480	-	-	-	yes	700	1000
WPF 40	5300	-	-	-	yes	1000	1500
WPF 52	6860	-	-	-	yes	1000	1500
WPF 66	8260	-	-	-	yes	1000	1500

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Brazing of refrigerant lines

Note
Work on the refrigerant circuit must only be carried out by qualified contractors. The qualified contractor must be certified acc. to Art. 5 Paragraph 2 of the EC Regulation No. 842/2006.

Note
With regard to all interventions in the refrigerant circuit, [in Germany] observe the ChemKlimaschutzV (Ordinance on climate protection against changes caused by release of certain fluorinated greenhouse gases), which states that the relevant work on the refrigerant circuit may only be performed by a contractor certified in accordance with ChemKlimaschutzV.

» The refrigerant line must not have any flanged pipe fittings. The connection points of the refrigerant lines must be hard soldered.
» The refrigerant line must be filled with nitrogen during soldering.
» For flushing with nitrogen, the flow direction must lead away from components, particularly from filter dryers.

Installation of refrigerant lines

The outdoor unit can be installed higher or lower than the indoor unit. The maximum permissible height differential and the line lengths are specific to the appliance.

» Refrigerant must be topped up according to the refrigerant line length.
» Insulate the entire refrigerant line and junctions with vapour diffusion-proof thermal insulation.
» Secure the pipe assembly to the outside wall.
» The indoor unit and refrigerant lines must be evacuated correctly.
» Separate the refrigerant lines with a suitable pipe cutter.
» No dirt and no moisture must enter the pipework.
» Never kink refrigerant lines.
» The refrigerant lines and the connection points must be checked for leaks.
» Refrigerant lines must be made of copper to DIN 12735-1 and must have robust and UV-resistant insulation of fire protection class 2.
» Seal the wall outlet with suitable sealant.

Recommended solders for hard soldering of refrigerant lines

The solders listed in the table are suitable for hard soldering of refrigerant lines.

Designation	Operating temperature °C	Procedure	Flux Type	Working temperature °C	
L – Ag 45 Sn	670		F-FH 10	550-800	Silver solder
L – Cu P 8	710	Gap soldering	-	-	Copper phosphorus
L – Ag 2 P	740	Gap soldering	-	-	Copper phosphorus

DHW heating with heat pumps

The wide range of applications and the many options of combining heat pumps with cylinders of different sizes and equipment levels require engineering and installation documents, that are tailored to each individual application.

The connections on the power supply and water side of the heat pump are made in line with our technical guide.

DHW cylinders

The size of the DHW cylinder is subject to the daily and the peak consumption, the DHW distribution system and the installed draw-off points.

Apartment buildings and non-residential buildings are sized in accordance with the consumption profiles and guidelines appertaining to the hygiene requirements.

Generally, DHW is heated by means of internal indirect coils or an external heat exchanger.

When using an instantaneous water cylinder, DHW is heated by means of an internal indirect coil according to the instantaneous water heater principle.

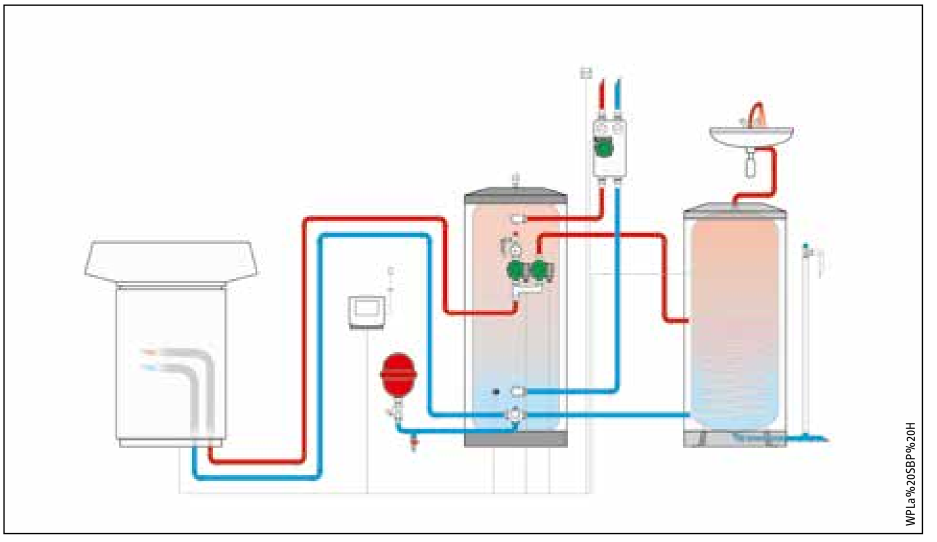
Internal indirect coil

On account of the low temperature differentials, we recommend an internal indirect coil for DHW heating by means of a heating heat pump.

Indirect coils for DHW heating require a heat transfer area of at least 0.25 m² per kW of heating output of the heat pump.

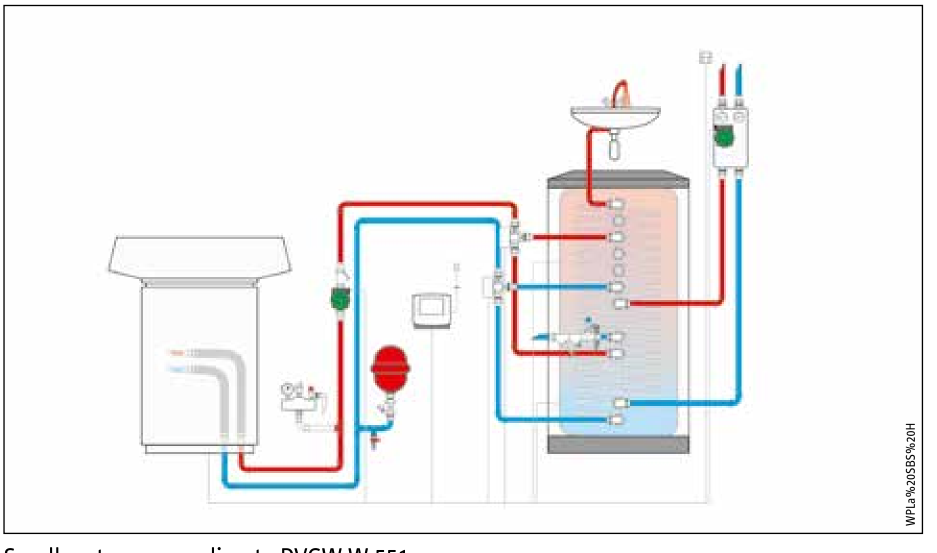
When sized in this way, DHW temperatures of approx. +50 °C can be reached. Where higher temperatures are required, DHW needs to be reheated by a flanged immersion heater; alternatively a high temperature heat pump must be used.

DHW heating with DHW cylinder SBB WP



Small systems according to DVGW W 551

DHW heating with instantaneous water cylinder SBS W



Small systems according to DVGW W 551

External heat exchanger

Internal indirect coils are only suitable for transferring large heating outputs to a limited extent. This is due primarily to the available surface of the indirect coil inside a cylinder.

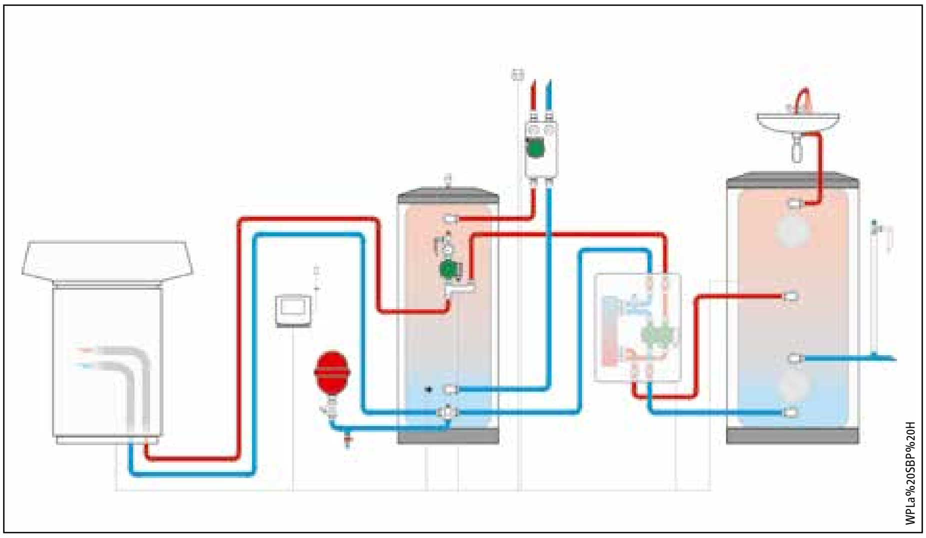
Charging stations can be used for transferring greater outputs into a DHW cylinder. They consist of a plate heat exchanger, a primary charging pump for delivering the charging volume flow through the heat pump system and a secondary pump for delivering the DHW flow rate. Flow through the plate heat exchanger is in countercurrent.

The charging station is sized as a function of the heat pump output. Since heat pumps normally work with a primary spread of 5-10 K, the resulting flow rate and maximum pressure loss as well as the external delivery head of the charging pump must be noted during the engineering.

A small terminal temperature difference of 2-5 K should be ensured, so a high DHW temperature can be attained. The temperature differential between the secondary outlet and the primary inlet is referred to as the terminal temperature difference. The smaller the terminal temperature differential, the larger the surface of the plate heat exchanger.

Ideally, the DHW cylinder is prepared for use with the charging station.

DHW heating with charging station



Sizing table for DHW heating

DHW heating up to 50 °C with a heat pump flow temperature of 60 °C

DHW heating up to 60 °C with a heat pump flow temperature of 70 °C

			SBB WP												SBB WP basic		
			301	302	401	401	501	501	600	600	800	800	1000	1000	300	400	500
Exchanger surface in m²			3,2	4,8	4,0	5,4	5,0	6,4	5,8	7,8	6,2	8,8	6,2	9,8	3,2	5,1	6,1
Connection WT		Bottom	Bottom	Bottom	–	Bottom		Bottom	–	Bottom	–	Bottom		Bottom	Bottom	Bottom	Bottom
		Top	–	–	Top	Top	Top	Top	Top	Top	Top	Top	Top	Top	–	–	–
Heat pump	kW	m²	Achievable DHW temperature °C														
WPL 10 AC	9,3	2,5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 10 I/IK	10,9	2,9	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 13 A basic	12,1	3,3		50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 20 A basic	20,0	5,4				50		50	50	50	50	50	50	50			50
WPL 13 E / cool	12,1	3,3	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 18 E / cool	16,1	4,3		50		50	50	50	50	50	50	50	50	50		50	50
WPL 23 E / cool	20,4	5,5				50		50	50	50	50	50	50	50			50
WPL 08 S Trend	4,0	1,4	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 12 S Trend	4,0	1,4	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 16 S Trend	5,0	1,4	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 22 Trend	10,0	2,7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 28 Trend	12,0	3,2	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 15 I-2/IK-2	10,0	2,7	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 25 I-2/IK-2	12,0	3,2	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 15 AS	7,5	1,9	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 25 A	10,0	2,5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPL 33 HT *	14,0	3,8	55	60	60	60	60	60	60	60	60	60	60	60	55	60	60
WPL 34	28,5	7,7								50		50		50			
WPL 47	39,3	10,6															
WPL 57	46,1	12,4															
WPF 04	5,6	1,5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPF 05	6,8	1,8	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPF 07	8,5	2,3	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPF 10	11,6	3,1	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPF 13	14,7	4,0		50	50	50	50	50	50	50	50	50	50	50		50	50
WPF 16	19,1	5,2				50	50	50	50	50	50	50	50	50		50	50
WPC 04	5,6	1,5	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPC 05	6,8	1,8	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPC 07	8,5	2,3	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPC 10	11,6	3,1	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPC 13	14,7	4,0		50	50	50	50	50	50	50	50	50	50	50		50	50
WPF 10 M	11,6	3,1	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPF 13 M	14,7	4,0		50	50	50	50	50	50	50	50	50	50	50		50	50
WPF 16 M	19,1	5,2				50	50	50	50	50	50	50	50	50		50	50
WPF 20	24,8	6,7								50		50		50			50
WPF 27	33,6	9,1										50		50			
WPF 27 HT *	33,6	9,1				50		52	50	56	51	59	51	60			51
WPF 35	37,6	10,2												50			
WPF 40	51,2	13,8															
WPF 52	63,2	17,1															
WPF 66	78,6	21,2															
WPW 06 SET	6,5	1,8	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPW 07 SET	7,9	2,1	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPW 10 SET	11,3	3,1	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
WPW 13 SET	14,0	3,8		50	50	50	50	50	50	50	50	50	50	50		50	50
WPW 18 SET	19,0	5,1				50	50	50	50	50	50	50	50	50		50	50
WPW 22 SET	23,6	6,4						50		50	50	50	50	50			50

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Sizing table - DHW cylinders for residential buildings

Sizing table for DHW heating

DHW heating up to 50 °C with a heat pump flow temperature of 60 °C

DHW heating up to 60 °C with a heat pump flow temperature of 70 °C

			SBB basic						SBB plus						SBS			
			300	300	400	400	500	500	300	300	400	400	600	600	601	801	1001	1501
Exchanger surface in m²			1,0	2,5	1,0	2,8	1,4	3,3	1,1	2,7	1,3	3,0	1,9	4,4				
Connection WT		Bottom Top	– Top	Bottom Top	– Top	Bottom Top	– Top	Bottom Top	– Top	Bottom Top	– Top	Bottom Top	– Top	Bottom Top	Up to 1,8 m³/h	Up to 2,0 m³/h	Up to 2,4 m³/h	Up to 3,0 m³/h
Heat pump	kW	m²	Achievable DHW temperature °C												Suitable for			
WPL 10 AC	9,3	2,5		50		50		50		50		50		50	•	•		
WPL 10 I/IK	10,9	2,9						50				50		50	•	•		
WPL 13 A basic	12,1	3,3						50						50	•	•	•	
WPL 20 A basic	20,0	5,4												–	•	•	•	•
WPL 13 E / cool	12,1	3,3						50						50	•	•	•	
WPL 18 E / cool	16,1	4,3												50	•	•	•	•
WPL 23 E / cool	20,4	5,5												–	•	•	•	•
WPL 08 S Trend	4,0	1,4		50		50		50		50		50	50	50	•	•		
WPL 12 S Trend	4,0	1,4		50		50		50		50		50	50	50	•	•		
WPL 16 S Trend	5,0	1,4		50		50		50		50		50	50	50	•	•		
WPL 22 Trend	10,0	2,7				50		50		50		50		50			•	
WPL 28 Trend	12,0	3,2						50						50			•	•
WPL 15 I-2/IK-2	7,5	2,7		50		50		50		50		50	48	50	•	•		
WPL 25 I-2/IK-2	10,0	3,2		48		50		50		50		50		50	•	•	•	
WPL 15 AS	7,5	1,9		50		50		50		50		50	48	50	•	•		
WPL 25 A	10,0	2,5		48		50		50		50		50		50	•	•	•	
WPL 33 HT *	14,0	3,8		50		52		56		52		54		60	•	•	•	•
WPL 34	28,5	7,7															•	•
WPL 47	39,3	10,6																•
WPL 57	46,1	12,4																
WPF 04	5,6	1,5		50		50		50		50		50	50	50	•	•		
WPF 05	6,8	1,8		50		50		50		50		50	50	50	•	•		
WPF 07	8,5	2,3		50		50		50		50		50		50	•	•		
WPF 10	11,6	3,1						50						50	•	•	•	
WPF 13	14,7	4,0												50	•	•	•	•
WPF 16	19,1	5,2													•	•	•	•
WPC 04	5,6	1,5		50		50		50		50		50	50	50	•	•		
WPC 05	6,8	1,8		50		50		50		50		50	50	50	•	•		
WPC 07	8,5	2,3		50		50		50		50		50		50	•	•		
WPc 10	11,6	3,1						50						50	•	•	•	
WPC 13	14,7	4,0												50	•	•	•	•
WPF 10 M	11,6	3,1						50						50	•	•	•	
WPF 13 M	14,7	4,0												50	•	•	•	•
WPF 16 M	19,1	5,2													•	•	•	•
WPF 20	24,8	6,7																•
WPF 27	33,6	9,1																
WPF 27 HT *	33,6	9,1																
WPF 35	37,6	10,2																
WPF 40	51,2	13,8																
WPF 52	63,2	17,1																
WPF 66	78,6	21,2																
WPW 06 SET	6,5	1,8		50		50		50		50		50	50	50	•	•	•	
WPW 07 SET	7,9	2,1		50		50		50		50		50		50	•	•		
WPW 10 SET	11,3	3,1						50				50		50	•	•	•	
WPW 13 SET	14,0	3,8												50	•	•	•	•
WPW 18 SET	19,0	5,1													•	•	•	•
WPW 22 SET	23,6	6,4													•	•	•	•

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Sizing table - DHW cylinders for residential buildings

Sizing table for DHW heating

Heat pump	kW	WTS 30 ≤ 30 kW	WTS 40 ≤ 70 kW
WPL 10 AC	9,3	•	
WPL 10 I/IK	10,9	•	
WPL 13 A basic	12,1	•	
WPL 20 A basic	20,0	•	
WPL 13 E / cool	12,1	•	
WPL 18 E / cool	16,1	•	
WPL 23 E / cool	20,4	•	
WPL 08 S Trend	4,0		
WPL 12 S Trend	4,0		
WPL 16 S Trend	5,0		
WPL 22 Trend	10,0	•	
WPL 28 Trend	12,0	•	
WPL 15 I-2/IK-2	10,0	•	
WPL 25 I-2/IK-2	12,0	•	
WPL 15 AS	7,5	•	
WPL 25 A	10,0	•	
WPL 33 HT *	14,0	•	
WPL 34	28,5	•	
WPL 47	39,3		•
WPL 57	46,1		•
WPF 04	5,6		
WPF 05	6,8		
WPF 07	8,5		
WPF 10	11,6		
WPF 13	14,7		
WPF 16	19,1		
WPC 04	5,6		
WPC 05	6,8		
WPC 07	8,5		
WPc 10	11,6		
WPC 13	14,7		
WPF 10 M	11,6		
WPF 13 M	14,7		
WPF 16 M	19,1		
WPF 20	24,8	•	
WPF 27	33,6	•	
WPF 27 HT *	33,6	•	
WPF 35	37,6		•
WPF 40	51,2		•
WPF 52	63,2		•
WPF 66	78,6		•
WPW 06 SET	6,5		
WPW 07 SET	7,9		
WPW 10 SET	11,3		
WPW 13 SET	14,0		
WPW 18 SET	19,0		
WPW 22 SET	23,6		

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Key

* at 70 °C flow temperature

Sizing data for air | water heat pumps: A20/W50, brine | water heat pumps: B7/W50, brine | water heat pumps (groundwater): B10/W50, DHW heating to 50 °C with a heat pump flow temperature of 60 °C, DHW heating to 60 °C with a heat pump flow temperature of 70 °C.

The precondition for achieving the stated DHW temperatures is the maintenance of the minimum flow rates specified in the installation instructions and the pipework in accordance with the technical guides.

The heat pump and DHW cylinder must be no more than 2 m apart. The connecting pipe must not have more than two 90° bends (not elbows).

The achievable DHW temperatures are to be taken as reference values that are subject to normal manufacturing tolerances.

Sizing table - DHW cylinders for residential buildings

Sizing table - DHW cylinders for residential buildings

The table provides an impression of recommended cylinder combinations in residential buildings with typical consumption profiles and concurrency. This overview is no substitute for individual system engineering and matching to the heat source or system solution.

		DHW cylinder with internal indirect coil			with external charging station			
people	Water demand	Memory	Volume	Booster heating	Volume		Memory	Booster heating
Number	litres/day	Number	l	Accessories	l	Number	Type family	Accessories
≤ 5	300	1	300	1 x BGC/45				
6	360	1	300	1 x BGC/45				
8	480	1	400	1 x BGC/45				
10	600	1	500	1 x BGC/45				
12	720	1	600	1 x FCR 28/120				
14	840	2	400	2 x BGC/45	700	1	750	1 x FCR 28/120
16	960	2	400	2 x BGC/45	800	1	750	1 x FCR 28/120
20	1200	1	1000	1 x FCR 28/120	800	1	750	1 x FCR 28/120
25	1500	2	600	2 x FCR 28/120	900	1	1000	1 x FCR 28/120
30	1800				1100	1	1000	1 x FCR 28/120
35	2100				1300	2	750	2 x FCR 28/120
40	2400				1500	2	750	2 x FCR 28/120
50	3000				1800	2	1000	2 x FCR 28/120
60	3600				2200	2	1000	2 x FCR 28/120
70	4200				2600	3	750	3 x FCR 28/120
80	4800				2900	3	1000	3 x FCR 28/120
90	5400				3300	3	1000	3 x FCR 28/120
100	6000				3600	4	1000	4 x FCR 28/120

The data applies to DHW cylinders from our product range and is only to provide an initial overview. Specific system engineering must follow in every case.

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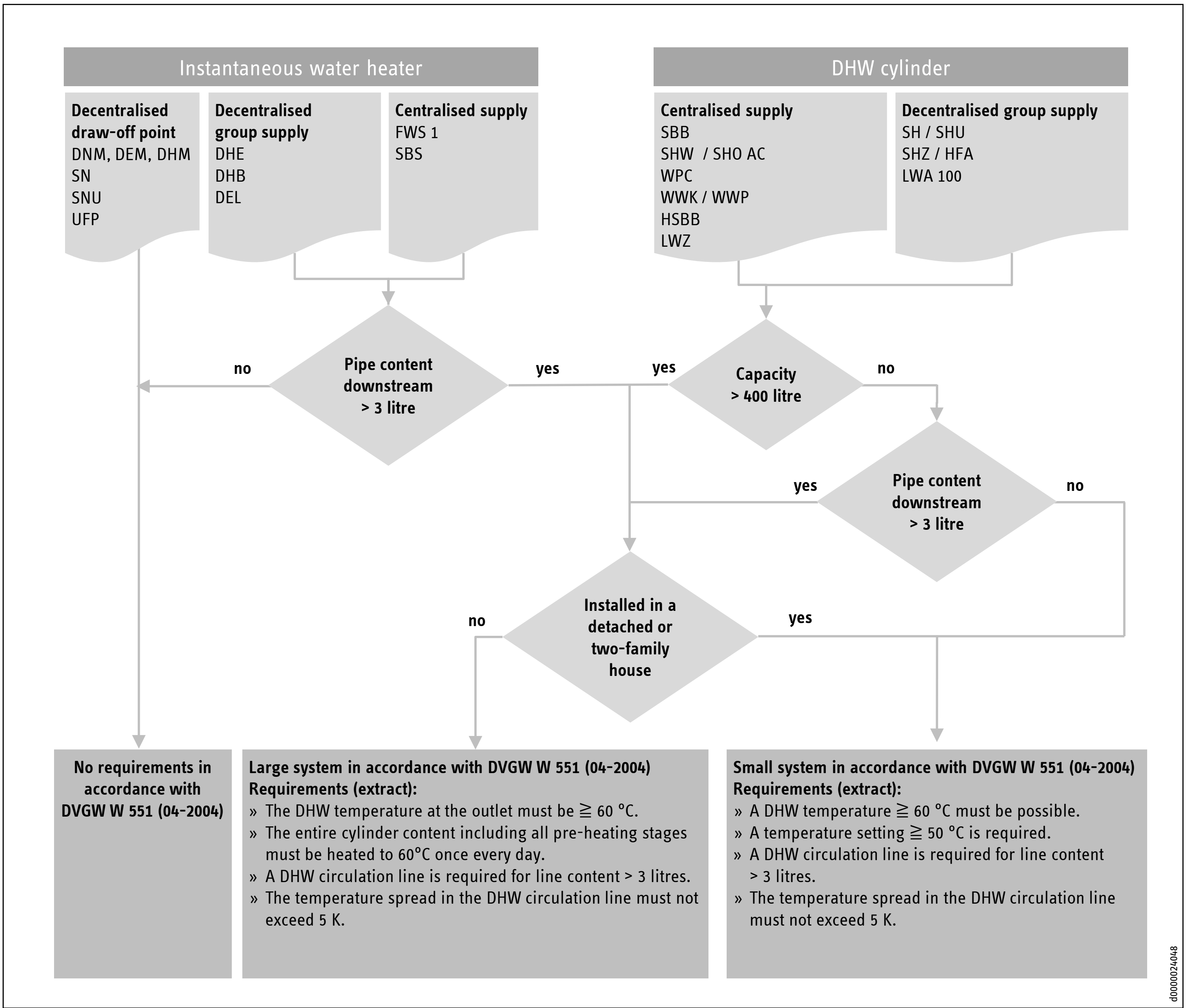
The table does not provide for any assessment of adherence to hygiene regulations, e.g. under DVGW code of practice W 551 or the German drinking water regulations (TrinkwV). These must also be observed.

Requirements of the DVGW W 551 Code of Practice

Requirements of the DVGW W 551 (2004-04) Code of Practice

The following provides an overview of the requirements to DVGW W 551 (2004-04).



Dual mode with an existing boiler

Operation with an existing boiler

The combination of two heat sources (e.g. oil or gas boiler and heating heat pump) in detached or two-family houses is generally not economical.

Dual mode operation is only a temporary solution where the system is to continue in use, for example because the oil tank is well filled.

After using up the stock of oil, the oil boiler should be removed and replaced by the electric booster heater integrated in the heat pump. This requires that the heating heat pump is appropriately sized.

Apart from the space taken up by the oil boiler and oil tanks, economic reasons particularly favour the removal of the old system.

The running costs for maintaining the oil system and the sweeping of the chimney frequently exceed the energy costs of the integral booster heater.

Hydraulic connection

Dual mode systems with an existing heating system are hydraulically linked so that the existing heating system can be removed at a later date without need for draining the entire system.

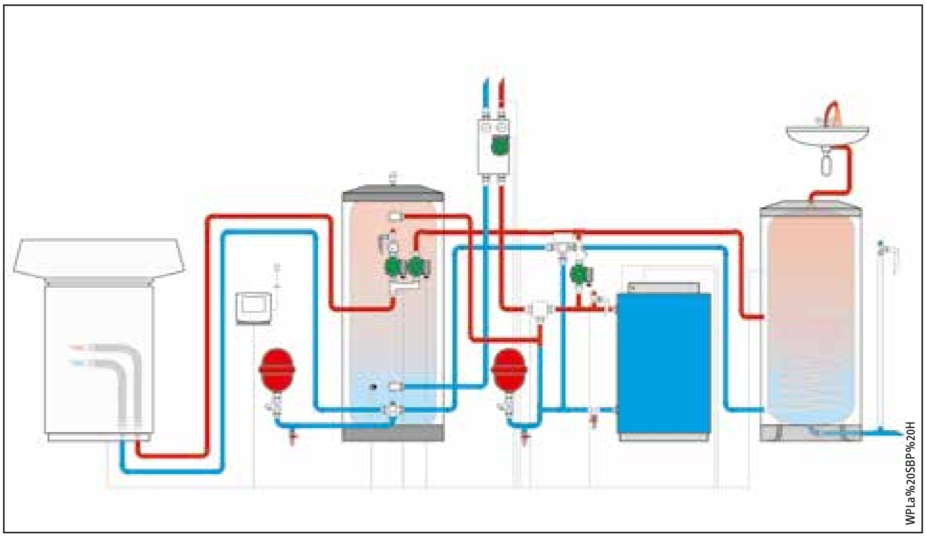
After removal, the heat pump system will be operated in mono energetic mode.

Power supply

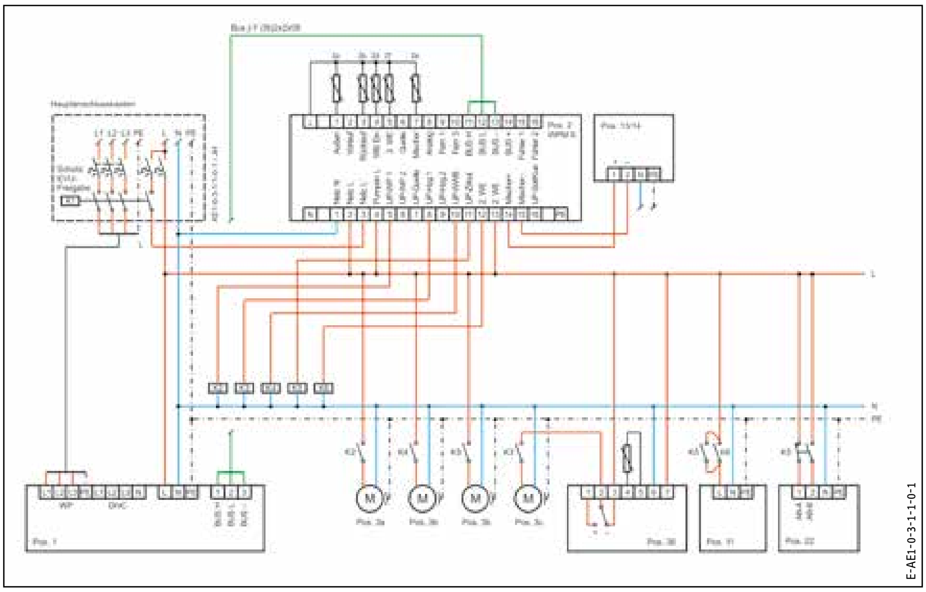
In Germany, heat pumps must be equipped with their own meter and a ripple control receiver. Depending on the power supply utility, one or two additional meter slots are required in the domestic meter cupboard. Technical points and application must be clarified with and granted by the power supply utility.

In most cases, since the existing junction box lacks the required space, allow for it to be replaced with a larger one or supplemented by an additional junction box.

Dual mode air | water heat pump system



Dual mode air | water heat pump system



The diagram shows the layout of a dual mode heat pump system with oil or gas boiler.

Radiator systems and replacement convectors

Radiator heating systems

Generally speaking, heating heat pumps are well suited to heating buildings fitted with existing radiator distribution systems. However, before the heat pump is taken into use it is absolutely necessary to determine the maximum required system flow temperature at the design point, i.e. the standard outside temperature. In principle balancing the system hydraulically is recommended.

The maximum required system temperature should not exceed 55 °C. Sizing to this operating point ensures an economical and comfortable system operation.

However, operation at a higher flow temperature is possible, namely with the high temperature heat pumps developed for this purpose. However, in principle every heat pump system operates all the more economically the lower the required system temperature.

Replacement convector heaters

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Specially developed replacement convector heaters are particularly suitable for modernising individual rooms or when replacing thermally inefficient radiators that require a high flow temperature. The enforced convection permits the transfer, with significantly lower system temperatures and the same dimensions, of at least the same heating output.

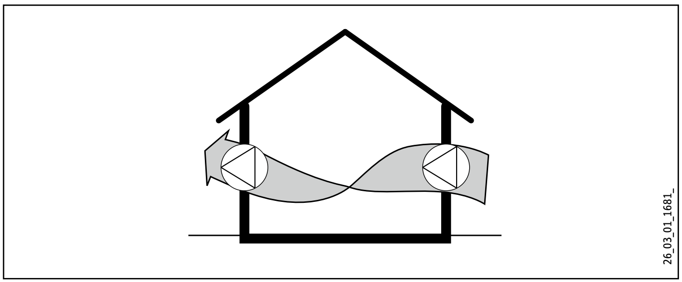
Replacement convector heaters have been developed especially for the replacement of existing radiators, for example in a recess. The standard connection centres and the slim-line design enable a rapid replacement.

Suitable components are included that enable hydronic balancing. Users regulate the required room temperature by means of an integral thermostatic valve and also benefit from a comparatively high heat-up performance. Replacement convector heaters operate with system flow temperatures of 25-55 °C.

Comparison between replacement convector heaters and compact radiators

Replacement convector					Compact radiators					
			Heating output 55/45 °C		Heating output 70/55 °C		Heating output 55/45 °C		Equivalent installed length	
				Fan stage	Equivalent to the AUK		by comparison		by comparison	
Type	Length mm	Height mm	Medium W	High W	Length mm	Type	W	%	mm	mm
AUK 7	690	600	670	800	700	21	474	-29	1000	+310
AUK 14	890	600	1400	1840	900	33	1056	-25	1200	+310
AUK 21	1090	600	1730	2120	1100	33	1291	-25	1600	+510
AUK 28	1290	600	2290	2790	1300	33	1643	-28	2000	+710
AUK 35	1490	600	2880	3500	1500	33	1877	-35	2600	+1110

Passive cooling

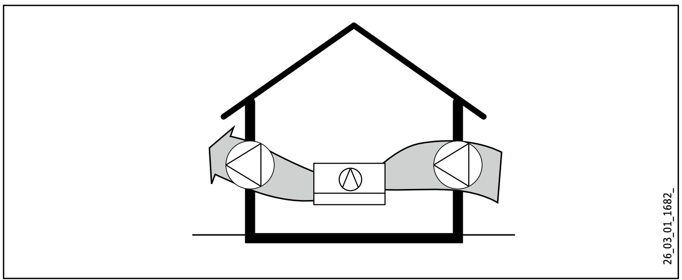


» Utilisation of natural cooling sinks
» Cool ground / cool night air
» Utilisation of storage effects

The low groundwater temperature or that of the ground is transferred to the heating system via a heat exchanger.

The heat pump compressor will not be started. The heat pump remains "passive".

Active cooling



» Utilisation of refrigerators

The cooling capacity of the heat pump (cold side) is transferred to the heating system.

The heat pump compressor will be started. The heat pump is "active".

Procedure for planning passive cooling

» Calculating the cooling load
- to VDI 2078
- in accordance with a standard form
- in accordance with the m² area of the living space (factor)

» Determining the cooling capacity of the heat/cooling source
- Geothermal probe
- Groundwater

» Sizing the distribution system
- Underfloor heating
- Fan convectors

Design information

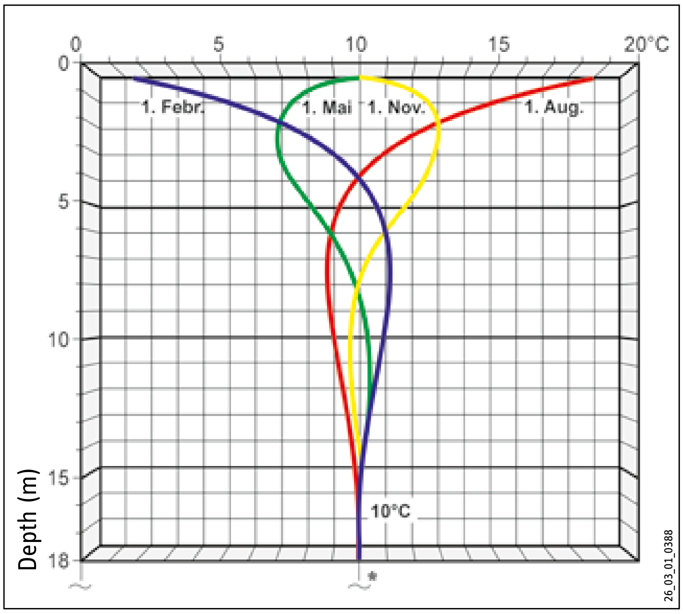
The cooling capacity of the heat source is taken from the "cooling capacity" sizing table.

Example WPL 13 cool: Two geothermal probes with a depth of 94 m transfer heat at a rate of 7.2 kW to the ground.

The heat absorption capability of the heat source must be greater than the building's cooling load (heat emission).The required room temperature cannot be achieved if the cooling load is greater.

If necessary, some rooms must be excluded from the cooling demand to achieve the required room temperature.

Temperature curve under ground



+1 °C temperature rise every 33 m

Average temperatures underground [°C]

Drilling depth [m]	Exposed site	Urban area	High location
0	9,5	9,5	3,2
25	11,3	12,5	8,0
50	12,0	13,5	8,7
75	12,8	14,5	9,5
100	13,5	15,5	10,2
125	14,3	16,5	11,0
150	15,0	17,5	11,7
175	15,8	18,5	12,5
200	16,5	19,5	13,2

Cooling load calculation

Calculate the cooling load in accordance with VDI 2078.

Our cooling load calculation form or our calculating program assist in the simplified determination of the cooling load of a room.

Our empirical values too can assist in achieving an estimated sizing:

Factors	W/m^3
Private homes	30
Offices	40
Sales rooms	50
Glass extensions	200

Simplified cooling load calculation in accordance with the following calculation form

The cooling load calculation form enables a quick and easy calculation of the cooling load of a room.

Sizing basis: Outdoor air temperature +32 °C at a room temperature of +27 °C and constant operation.

Position 1

Split the window areas in accordance with the different points of the compass and multiply them with the respective values. Insert that point of the compass into the addition of the cooling load calculation that results in the highest value. Use the total of both values, if windows are pointed at to two neighbouring points of the compass, i.e. south-west and west. Also take horizontal skylights into consideration (see line "attic windows"). Consider the stated reduction factors for equipment designed to shield against direct sunlight.

Position 2

Standard values to VDI 2078 are used as the basis for walls, as the cooling load is not significantly influenced by walls.

Position 3

Floors below unheated cellars or areas bordering the ground are not taken into account.

Position 4

Multiply the ceiling area less any skylights that may be fitted by the applicable value.

Position 5

The heat given off by electrical equipment and lighting is taken into consideration in line with their connected load and is multiplied by a factor of 0.75.

These appliances must only be taken into consideration if they are switched on during the cooling operation.

Position 6

Multiply the number of occupants by the stated value. In accordance with VDI 2067, the calculation is based on the assumption of occupants at rest or performing light work.

Position 7

Set the outside air proportion of the appliance in accordance with manufacturer's details. The cooling down of the outside air proportion is taken into account at 5 K.

Cooling load

Total of the individual cooling loads for positions 1 to 7.

Appliance sizing

To achieve a room temperature of approx. 5 K below the outside temperature, the equipment cooling capacity must be equal to or greater than the calculated cooling load.

Basics

Apart from the influences stated above, this calculation process also takes into account the storage capacity of the room. This is based on the variables in VDI 2078.

Calculation room 1

(see calculation sheet)

The cooling load is calculated in accordance with the following details:

Room size 5 m wide, 5 m long, 3 m high

Window size 4 m² pointing west

Window with external blinds

Number of occupants: 2

Computer 500 W connected load

Flat roof with 5 cm insulation

External lightly constructed walls.

Result

The calculated cooling capacity of room 1 is 2.2 kW.

Cooling load calculation form

Cooling load calculation form

For estimating the cooling load of a room with reference to the VDI 2078

Address:	**Type of room:**				
Name: **Sample**	**Size of room:**				
Street: **Sample Street**	Length	Width	Height	Area	Volume
Town: **Sample Town**	**5.0**	**5.0**	**3.0**	**25.0**	**75.0**

1. Insolation through windows and external doors	Exposed window			Solar protection reduction factor			Window area	Cooling load, windows
	Single glazing W/m²	Double glazing W/m²	Triple glazing W/m²	Internal blind	Awning	External blind	m²	watts
North	65	60	35					
North-east	80	70	40					
East	310	280	155					
South-east	270	240	135	x 0.7	x 0.3	**x 0.15**		
South	350	300	165					
South-west	310	280	155				**4.0**	**174**
West	320	**290**	160					
North-west	250	240	135					
Attic window	500	380	220					
Total								**174**

Total; only use the maximum value for different points of the compass.

2. Walls minus window and door openings that have already been taken into account	Cooling load W/m²	Wall area m²	Cooling load, walls watts
External walls	10	**26.0**	**260**
Internal walls	10	**15.0**	**150**
Total			**410**

3. Flooring for non-air conditioned room	Cooling load W/m²	Flooring area m²	Cooling load, flooring watts
Total	10	**25.0**	**250.0**

4. Ceiling minus attic windows and skylights that have already been taken into consideration	Flat roof		Pitched roof		Ceiling for non-air. con. room	Ceiling area	Cooling load, ceiling
	Not insulated W/m²	Insulated W/m²	Not insulated W/m²	Insulated W/m²	W/m²	m²	watts
Total	60	**30**	50	25	10	**25.0**	**750**

5. Electrical appliances that operate at the time of cooling	Connection value		Cooling load, equipment
Lighting			
Computer with monitor and printer	**500**	x 0.75	**375**
Machinery			
Data centre and server rooms		x 1.00	
Total			**375**

6. Heat emitted by occupants who are at rest or performing only light work	Cooling load, occupant	Occupants	Cooling load, occupants
Total	120	**2**	**240**

7. Outdoor air for air conditioning units with proportion of outdoor air	Cooling load W/m³	Air volume	Cooling load, supply air
Total	10		

Total cooling load of the room in watts	watts
The cooling load calculation estimates a temperature reduction of approx. 5 °C	**2199**

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Heat sinks for cooling operation

Geothermal probe

Basics

Using a brine | water or water | water heat pump for cooling the building is known to be an exceptionally attractive option. Systems providing passive cooling in particular can be created at reasonable cost, be used efficiently and be operated with hardly any emissions. Possible applications can be found in private homes as well as in apartments and in the public sector.

The increasing demand for cooling in buildings is partially due to higher internal and external loads due to higher comfort demands and substantial changes in construction. The tendency towards large transparent surfaces in building walls as well as legal requirements aimed at increasingly better building envelopes are verification for this trend. It goes without saying that the creation of a thermally comfortable climate must not ignore energy and efficiency. System solutions for heating and cooling are in most cases associated with lower investment costs than is the case with autonomous heating and cooling systems. System solutions are operated efficiently by special control units. The following section showcases and explains selected system solutions for our heat pumps.

Cooling with a geothermal probe

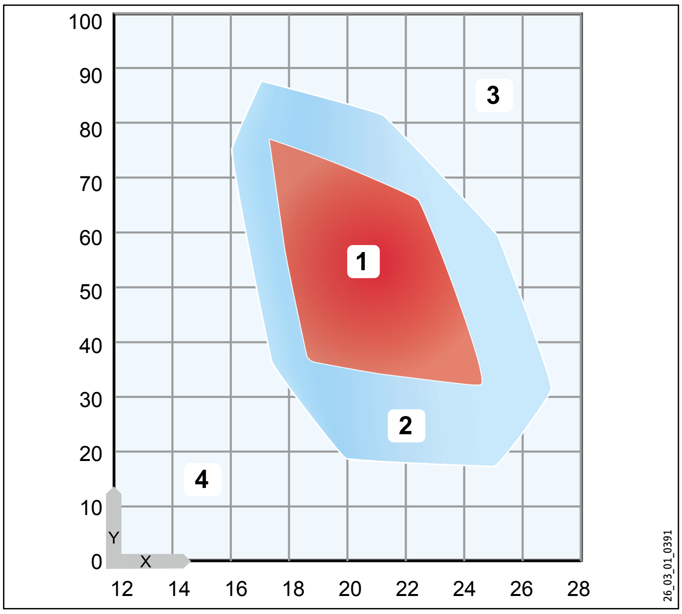
Geothermal probes are suitable for passive and active cooling. Consequently, they offer added value compared to heating only that is economically attractive.

The following applies to probe systems that have been designed for heating mode:

The thermal energy that can be dissipated into the probe system with passive cooling is approximately 70 % of the probe system's heating output.

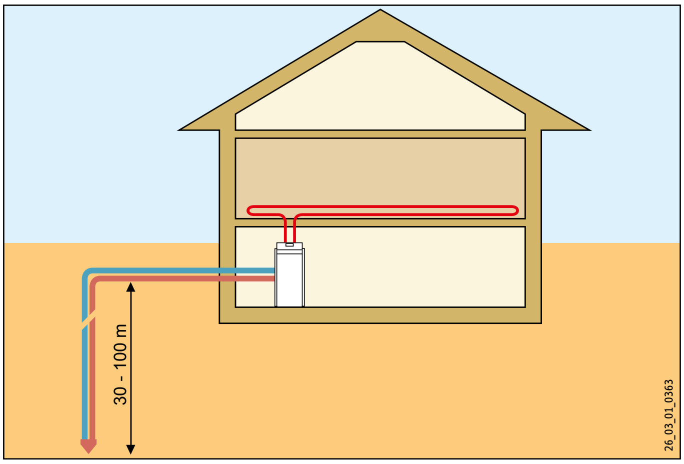
A simulation taking the building cooling capacity into consideration is, however, necessary and safeguards long-term success.

Comfort zone (Leusden & Freymark)



x Room air temperature T_L in °C
y Relative humidity in %
1 Comfortable
2 Just comfortable
3 Uncomfortably humid
4 Uncomfortably dry

Main layout, geothermal probe as heat source



Heat sinks for cooling operation

Geothermal collector and groundwater

Cooling with geothermal collectors

Using geothermal collectors for passive and active cooling is generally possible, but it does require accurate engineering. Collectors are installed near the surface. This fact and high outside temperatures can easily result in passive cooling heating up the ground quite quickly. As a consequence, the cooling capacity dwindles significantly due to the insignificant temperature differentials.

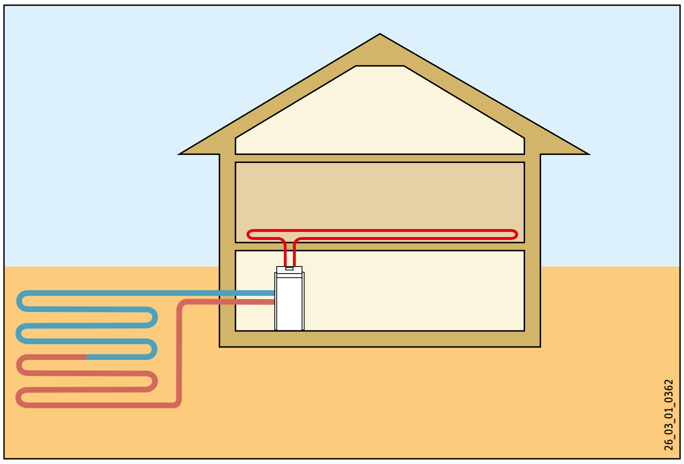
In most cases, passive cooling becomes impossible from a source temperature of > 20 °C.

The local conditions are decisive for the utilisation of the collector for cooling purposes. The geological conditions as well as the availability of water-bearing strata determine the possibility of utilisation. A geological assessment must establish whether the heat flow dissipated by cooling in summer can be compensated for by the surrounding ground, thereby preventing a detrimental drying out.

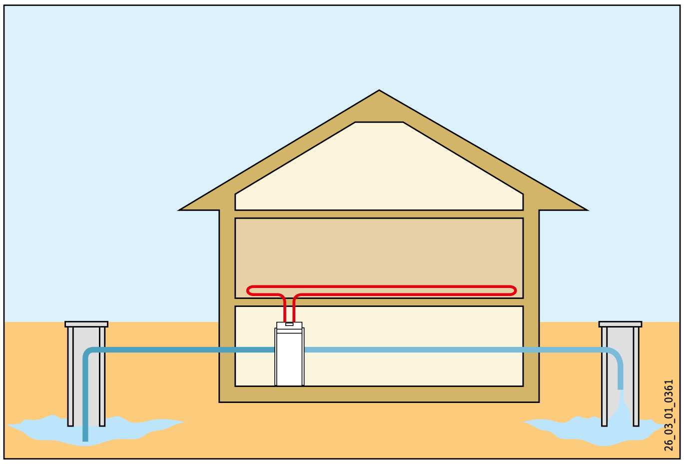
Cooling with groundwater

The utilisation of groundwater for passive and active cooling is possible and highly attractive. The consistent groundwater temperatures of between 8 °C and 12 °C make active cooling unnecessary in most cases, as a high level of heat can be transferred to the well system. When utilising groundwater for cooling ensure that the requirements of the local water authority are not infringed. For this, particularly the temperature level is very important. An intermediate heat exchanger is recommended for system separation. This must be corrosion-resistant and not vulnerable to the constituents of the water discovered during the water analysis.

General layout, geothermal collector as heat source



General layout, groundwater as heat source



Sizing examples

Cooling with a geothermal probe

Geothermal probes are sized in accordance with the heat pump heating output. The heat that must be transferred to the ground with passive cooling is approx. 70 % of the extraction rate (approx. 35 W/m geothermal probe length).

Sizing table, geothermal probe DN 25

For normal solid rock, extraction rate 55 W/m (average value)

	Source temperature 0 °C Flow temperature 35 °C		Geothermal probe 32 * 2,9		Extraction, heating mode	Transfer, cooling mode
	Heating output	Cooling capacity	Number	Depth		
Heat pump	kW	kW	pce	m	kW	kW
WPF / WPC 04 cool	4,6	3,6	1	72	3,6	2,6
WPF / WPC 05 cool	5,8	4,5	1	82	4,5	3,2
WPF / WPC 07 cool	7,8	6,0	1	109	6,0	4,2
WPF / WPC 10 cool	9,9	7,7	2	70	7,7	5,4
WPF / WPC 13 cool	13,4	10,3	2	94	10,3	7,2
WPF 16 cool	16,1	12,5	3	84	13,8	9,6

Example

Heat pump WPF / WPC 10 cool

Required geothermal probe 2 pcs @ 70 metres long

Extraction rate approx. 55 W per metre equates to approx. 7.7 kW.

The transfer to the ground amounts to approx. 5.4 kW.

Cooling with groundwater

The amount of groundwater that can be utilised to remove heat is determined in accordance with the amount of groundwater required by the heat pump. The temperature differential between the groundwater and the cooling water is approx. 5 K.

Sizing table groundwater

Groundwater temperature approx. 15 °C (average value for cooling mode)

	Source temperature 10 °C Flow temperature 35 °C		Groundwater amount	Transfer, cooling mode
	Heating output	Cooling capacity		
Heat pump			m^3/h	kW
WPW 06 Set	6,0	4,98	1,4	7,5
WPW 07 Set	7,4	6,15	1,8	9,8
WPW 10 Set	9,8	8,22	2,5	13,2
WPW 13 Set	13,3	11,0	3,2	16,5
WPW 18 Set	16,4	13,67	4,4	21,2
WPW 22 Set	21,4	17,8	5,3	27,6

Example

Heat pump WPW 13 Set

Required volume of groundwater 3.2 m^3/h

The groundwater can remove 16.5 kW.

Passive cooling with a WPC cool heat pump

Installation information

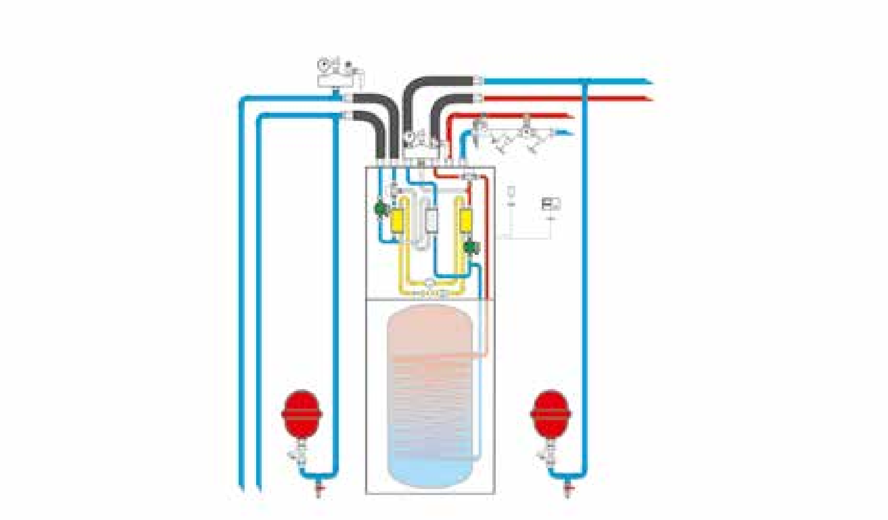
Use only pipes and fittings made from corrosion-resistant materials.

The formation of condensate is safely prevented by additional dew point monitoring in the lead room.

If sensitive areas in the building are crossed, where different dew point temperatures must be expected or where the temperature falls below the dew point temperature, insulate all pipe runs with vapour diffusion-proof material.

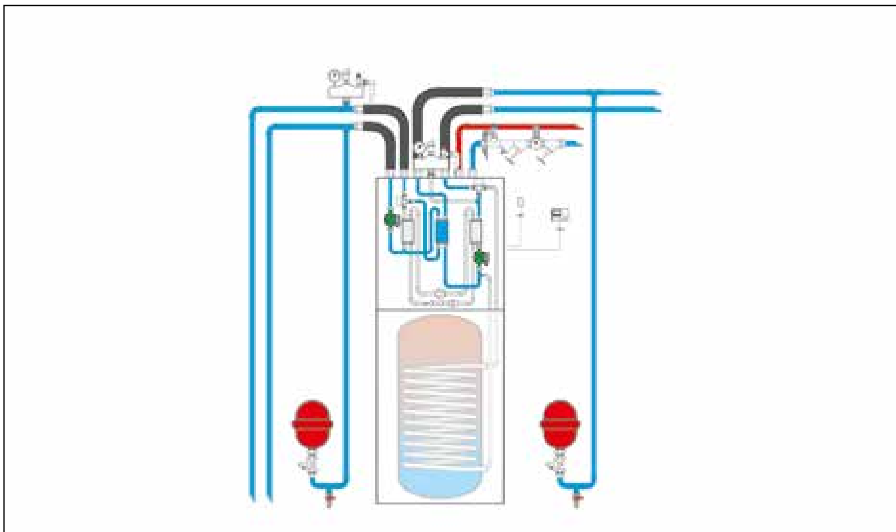
Note
Observe the minimum volume of circulating water on the heating side, which is at least 20 % of the heat pump's nominal flow rate.

Heat pump, mono mode with passive cooling (heating mode)



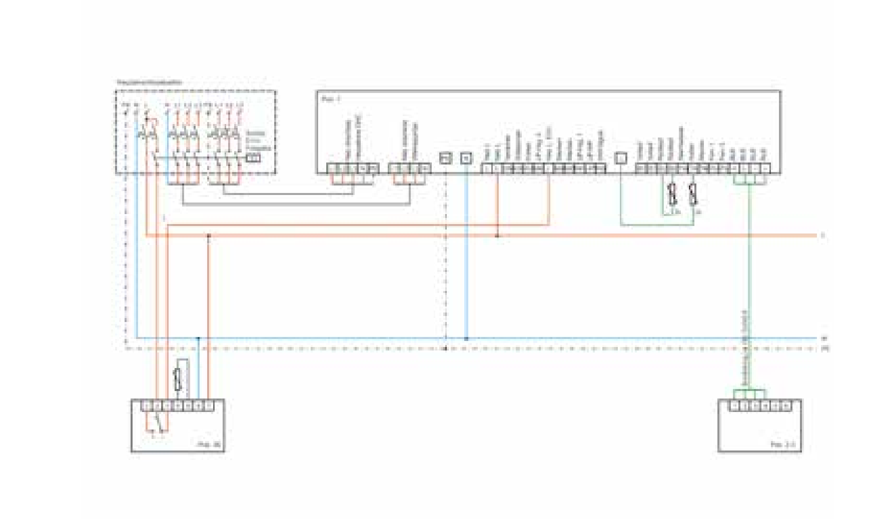
WPC%20passiv%2

Heat pump, mono mode with passive cooling (cooling mode)



WPC%20passiv%2

Heat pump, mono mode with passive cooling



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Passive cooling with a WPF cool heat pump

With brine | water heat pumps, the heat source can also be used for cooling purposes, i.e. as a heat sink.

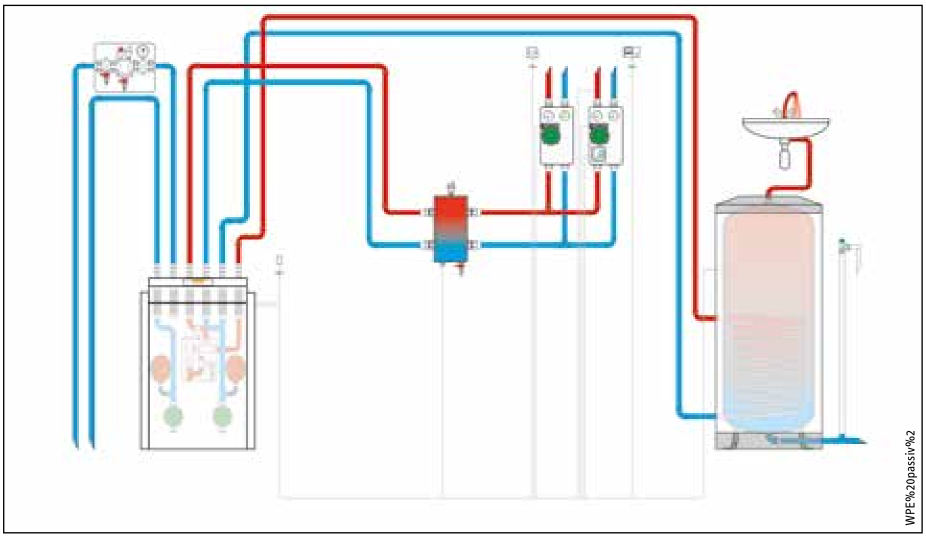
An area heating system or fan convectors is/are required for this function.

The formation of condensate is prevented by additional dew point monitoring in the lead room.

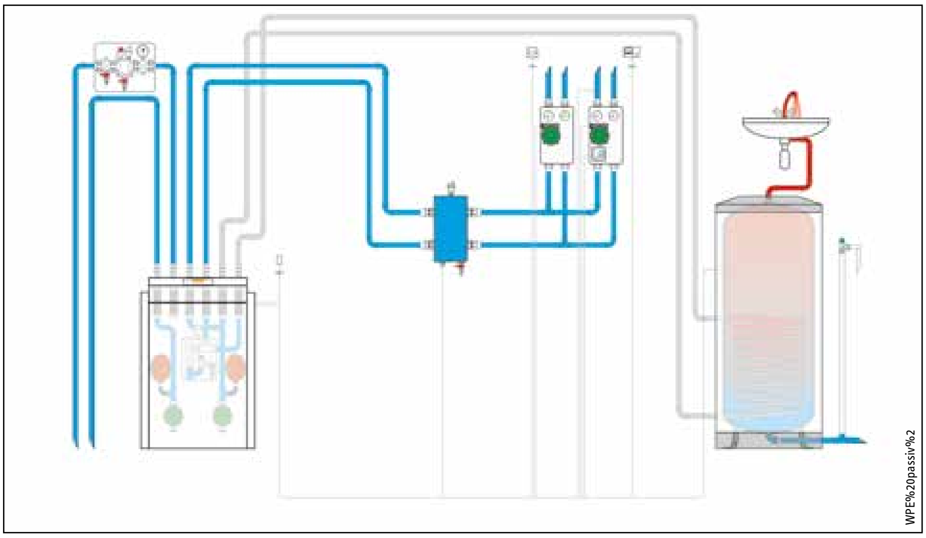
Use only pipes and fittings made from corrosion-resistant materials.

If sensitive areas in the building are crossed, where different dew point temperatures must be expected or where the temperature falls below the dew point temperature, insulate all pipe runs with vapour diffusion-proof material.

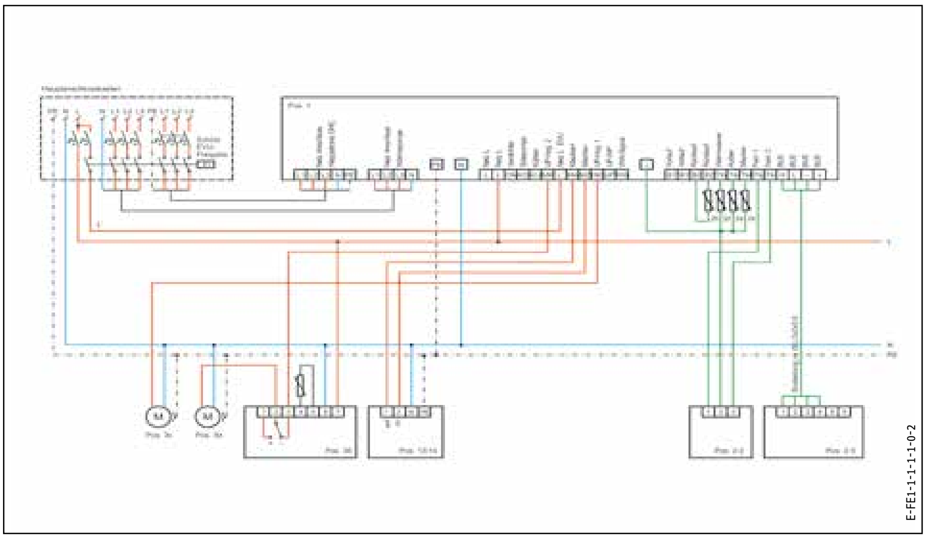
Heat pump, mono mode with passive cooling (heating mode)



Heat pump, mono mode with passive cooling (cooling mode)



Heat pump, mono mode with passive cooling



Active cooling with WPC

Active cooling with a WPC heat pump

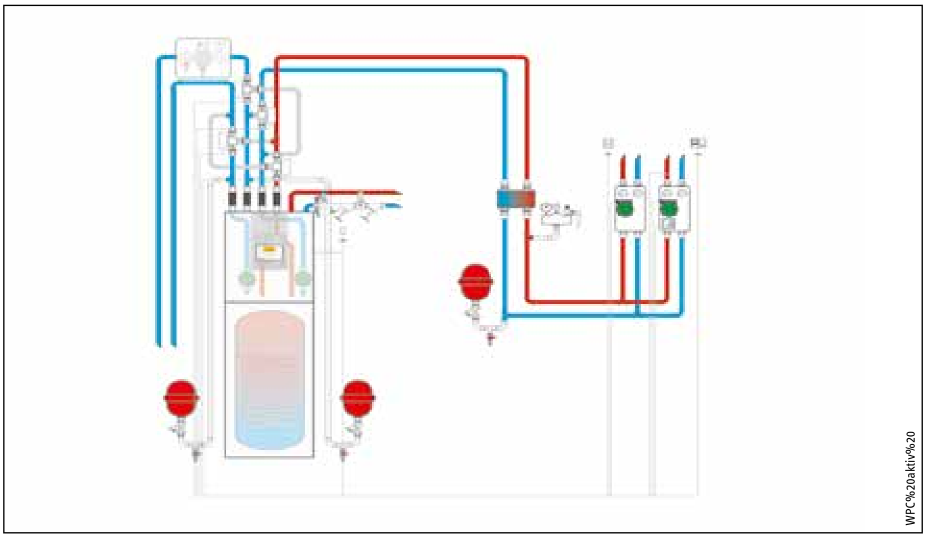
Active cooling is unsuitable exclusively with underfloor heating systems. Active cooling additionally requires fan convector heaters.

The formation of condensate is prevented by additional dew point monitoring in the lead room.

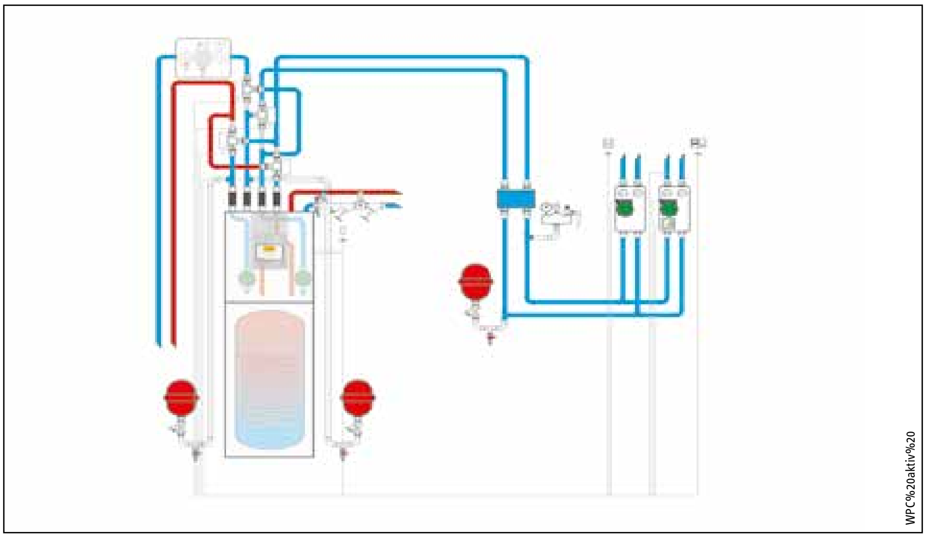
Use only pipes and fittings made from corrosion-resistant materials.

To prevent condensate being created, all hydraulic pipework inside the building must be insulated with vapour diffusion-proof material.

Heat pump, mono mode with active cooling (heating mode)



Heat pump, mono mode with active cooling (cooling mode)



Active cooling with WPF E

Active cooling with a WPF E heat pump

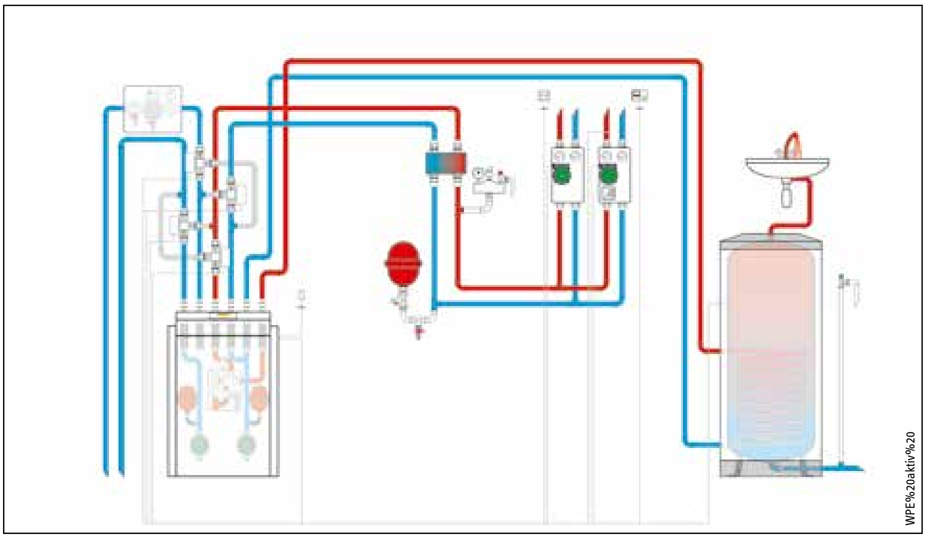
Active cooling is unsuitable exclusively with underfloor heating systems. Active cooling additionally requires fan convector heaters.

The formation of condensate is prevented by additional dew point monitoring in the lead room.

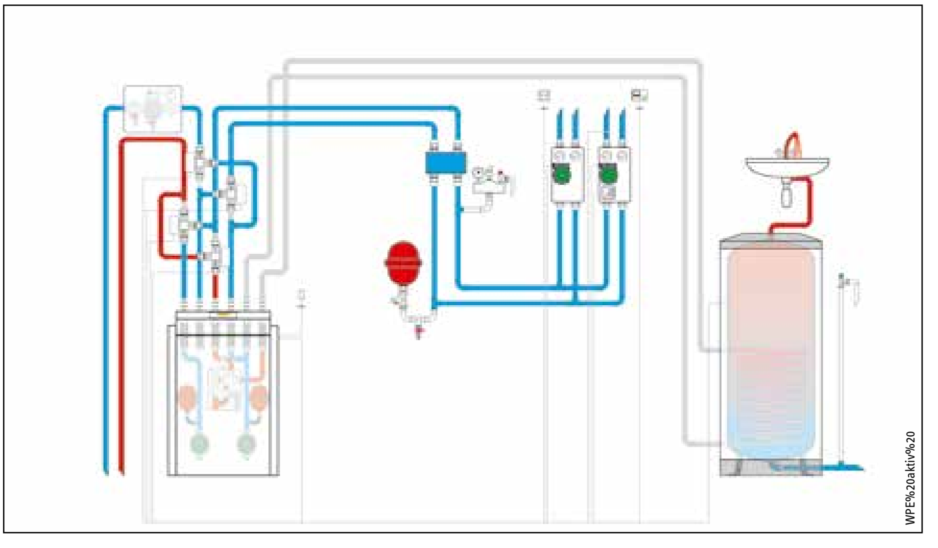
Use only pipes and fittings made from corrosion-resistant materials.

To prevent condensate being created, all hydraulic pipework inside the building must be insulated with vapour diffusion-proof material.

Heat pump, mono mode with active cooling (heating mode)



Heat pump, mono mode with active cooling (cooling mode)



Active cooling with WPL cool

Active cooling with a WPL cool heat pump

Air | water heat pumps can also be used for cooling buildings.

Size the heating heat pump for heating operation in winter.

Matching of the cooling capacity of the heat pump system to the cooling load of the building opens up the possibility of cooling in summer.

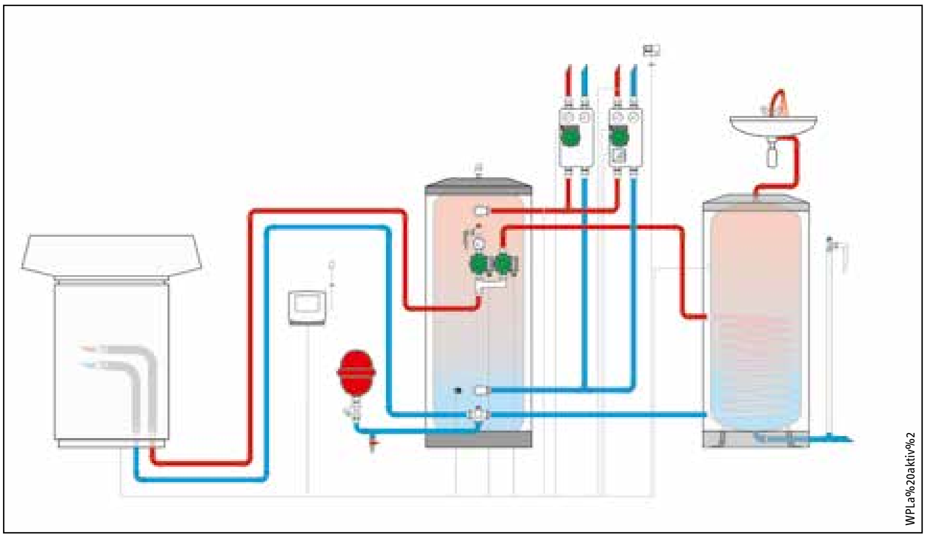
The sizing of the distribution system is crucial for the transfer of thermal loads. Underfloor heating systems are only suitable for the transfer of high loads to a limited degree, e.g. in conjunction with active cooling of buildings, as the transfer rate is low and frequent cycling of the heat pump cannot be prevented. A combination with fan convectors is recommended.

The formation of condensate is prevented by additional dew point monitoring in the lead room.

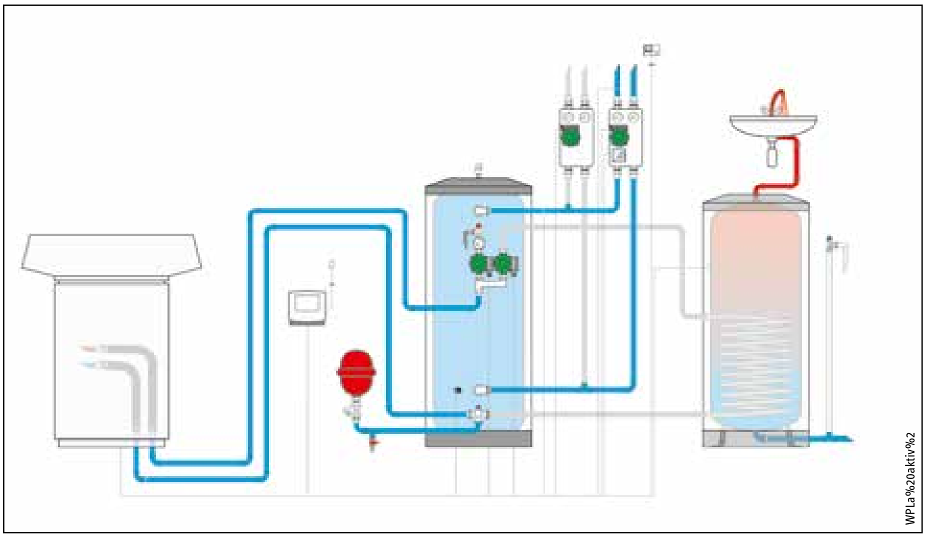
Use only pipes and fittings made from corrosion-resistant materials.

To prevent condensate being created, all hydraulic pipework inside the building must be insulated with vapour diffusion-proof material.

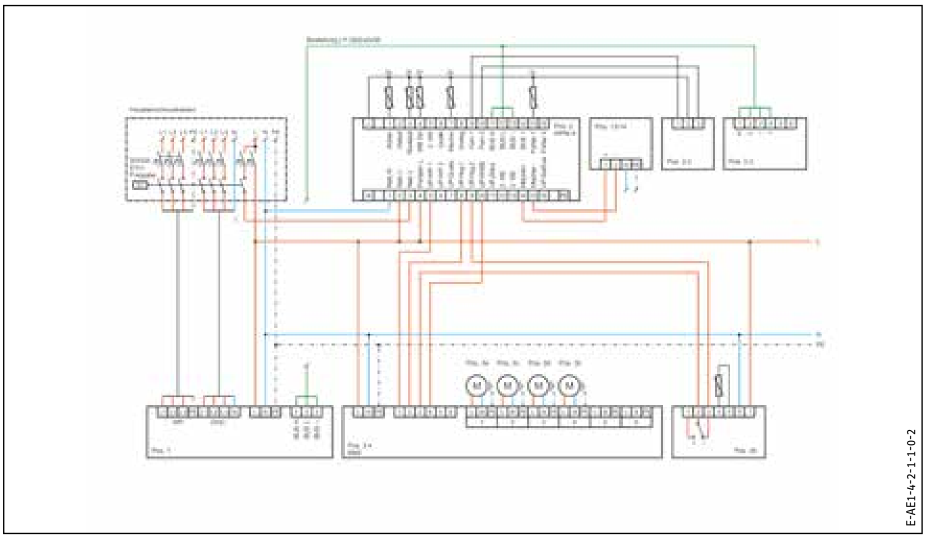
Heat pump, mono energetic with active cooling (heating mode)



Heat pump, mono energetic with active cooling (cooling mode)



Heat pump, mono energetic with active cooling



Underfloor cooling

Distribution systems

As with heating, sizing the cooling distribution system is an essential success factor for cooling applications. The transfer capacities and the associated temperature level are restricted in passive mode in particular. The distribution system must be able to maximise the effectiveness of the system. Apart from thermo-active systems, fan convectors or ceiling cassettes are commonly used.

Thermo-active component systems

Water-bearing pipework that is integrated in ceilings, walls and floors to help create a cosy ambience, generally comes under the umbrella term "Thermo-active component systems". Subject to demand, buildings can be heated or cooled by circulating hot or cold water through the pipework. The large areas that transfer heat or cooling enable an effective energy provision even at minor temperature differentials between the room and the respective surface.

Underfloor cooling

With only little additional control effort and equipment, the underfloor heating system can also be used for cooling during the warmer season. The manufacturer must approve the suitability of the floor construction for cooling, particular that of the installed screed.

Passive cooling always requires that zone valves with changeover facility are used.

The transfer capacity of underfloor heating systems is significantly lower than that of fan convectors or ceiling cassettes. Consequently, the cooling load of a room can frequently not be fully transferred, meaning that the required room temperature cannot be achieved. In that case, the refrigeration distribution system should be limited to essential rooms.

Uponor hook and loop system

Underfloor cooling capacity

A person's capacities suffer severely at room temperatures that are too low or too high. Comfortable room temperatures are therefore essential to our wellbeing.

In most cases, cooling systems can ensure very good room comfort with only little energy expenditure. The energy exchange between a person and the cooling area predominantly takes the form of radiation. The underfloor cooling is therefore a good start for a comfortable ambient climate.

When using an area cooling system, the cooling water temperature must always be safely above the dew point temperature to prevent condensation forming on the cooling surfaces. Subject to room temperature and humidity, the room temperature may only be able to be reduced by a few kelvin. For example, an underfloor heating system with tiled cover and a spacing between pipes of 10 cm has a specific cooling capacity of 22 W/m².

The required room temperature cannot be achieved if the cooling load of the room is greater than the cooling capacity of the underfloor heating system. In such cases, either install fan convectors or limit the use to tempering the room.

Cooling capacity, underfloor heating system

Floor covering		Tiles									
Installation spacing	cm	5	10	15	20	30	5	10	15	20	30
Room temperature	°C	27	27	27	27	27	23	23	23	23	23
Flow temperature	°C	15	15	15	15	15	15	15	15	15	15
Return temperature	°C	20	20	20	20	20	20	20	20	20	20
Cooling capacity	W/m²	52	45	39	34	26	26	22	19	17	13

Underfloor heating system heating output

Floor covering		Tiles					Carpet				
Installation spacing	cm	5	10	15	20	30	5	10	15	20	30
Room temperature	°C	20	20	20	20	20	20	20	20	20	20
Flow temperature	°C	35	35	35	35	35	35	35	35	35	35
Return temperature	°C	30	30	30	30	30	30	30	30	30	30
Heating output	W/m²	65	55	50	45	30	40	37	32	28	24

Ceiling cooling

Chilled ceilings or wall-embedded heating systems are suitable for cooling with heat pumps.

The cooling capacity of cooling ceilings is generally higher than underfloor heating systems used for cooling. This is partially due to the fact that the heat transfer to the room is different, and that the room temperature should not fall below of 21 °C at a height of 0.1 m above floor level (ergo underfloor cooling) for reasons of comfort.

The principle behind cooling a room via pipe banks let into the ceiling is similar to cooling via the underfloor heating system. Cold water circulates through a pipework and thereby extracts heat from the room. Ideal application areas for chilled ceilings are, for example, industrial buildings, shopping centres, libraries, offices or banks.

Commonly, these are buildings with high ceilings where ventilation equipment operates to support the maintenance of hygienic conditions in these rooms.

As a result of the mechanical regulation of the air condition and the independence from minimum air temperatures, chilled ceilings can transfer substantially greater amounts of heat than underfloor cooling. Achievable specific cooling capacities are between 40 and 80 W/m².

One general rule applies: Only unobstructed parts of the ceiling can contribute to the optimisation of the ambient climate, i.e. ceiling covers or suspended ceilings have a negative influence on the cooling effect and should therefore be avoided.

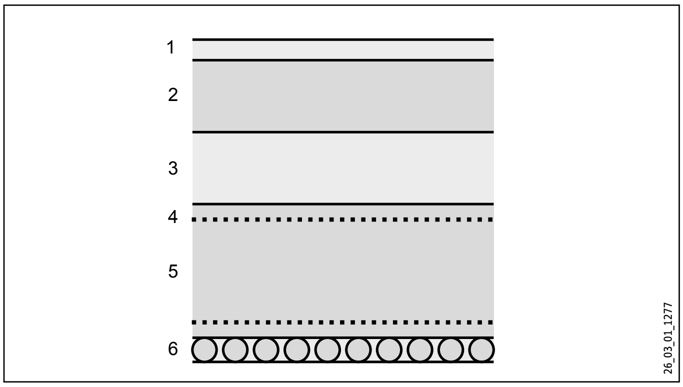
UPONOR Comfort Panel

Uponor Comfort Panels are thermally active ceiling panels with a thermal insulation layer above that are easily and quickly inserted into a visible metal rail substructure in conventional ceiling grids.

The Comfort Panel comprises meander-shaped PE-Xa pipes, surrounded by heat transfer fins and panels made from aluminium that can provide optimum thermal energy transfer to the room or absorption from the room. An appealing fleece cover provides an optimum surface finish; a routed rigid foam panel is located above the heat transfer fins to provide thermal insulation. Detachable plug-in connectors are factory-fitted to the panels to enable the connection of flow and return.

An Uponor dummy panel with the same visual appeal made from mineral fibre is available for edge areas and areas with outlets, etc.

Chilled ceiling (thermo-active structural component)



1 Floor covering
2 Screed
3 Insulation
4 Reinforcement
5 Ceiling
6 Plaster

UPONOR Comfort Panel

UPONOR Comfort Panel

Concrete core activation

Concrete core activation

If buildings are designed and constructed to be architecturally and physically energy optimised, conventional refrigeration equipment for cooling the building will not be required. Instead, cooling can utilise natural heat sinks, such as the ground or groundwater. Prerequisite for this is that the inherent storage capacity of the building can be utilised for balancing temperatures.

The pipe banks are generally located in the statically neutral zones of the surfaces surrounding the room, and are cast straight into the concrete core in meander or spiral form to provide core cooling. Frequently used materials are plastic or multi-layered composite pipes made from PE or aluminium. The pipes have a diameter of 15 to 20 mm and are laid at centres between 10 and 30 cm. The water flowing through the pipe bank can be used for heating or cooling purposes, depending on its temperature.

The pre-requisite for a good heat or cooling transfer is low resistance to the thermal transfer of the layers above the pipe banks. Transferable cooling capacities lie between 30 and 40 W/m², and these are limited upwards for underfloor and ceiling cooling by the dew point of the room temperature.

Heating and cooling via core cooling can contribute to the thermal comfort inside the building. Improvements in the ambient air quality or even a specific control of the relative humidity inside the room are not feasible. Compared to underfloor and ceiling heating systems, core cooling is a very inert system.

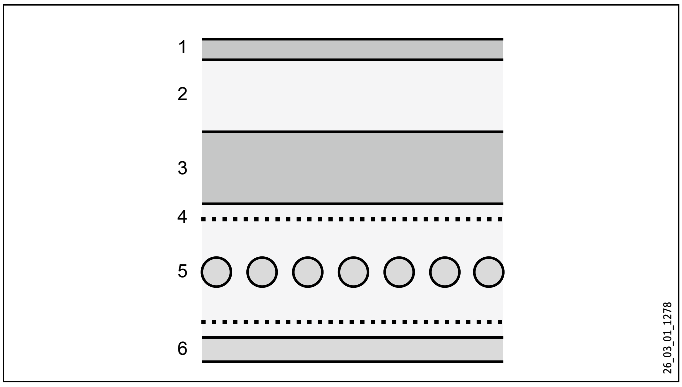
Suitable storage and load management is required to safeguard the optimum capability of the system.

Summary:

Benefits of thermo-active structural systems

» Heating and cooling operation with one system
» Optional utilisation of renewable energy sources
» Affordable and energy efficient operation
» Maintenance free
» Unrestricted interior design
» No sensations of draughts and quiet operation
» No renovation or cleaning effort required for the heating and cooling surfaces
» High degree of thermal comfort because of low surface temperatures

Concrete core activation



1 Floor covering
2 Screed
3 Insulation
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5 Ceiling
6 Plaster

Disadvantages of thermo-active structural systems

» Limited cooling capacity due to restricted flow temperatures (dew point monitoring)
» Control to a precise room temperature is impossible because of the large thermal mass and the inertia of core cooling.
» Core cooling cannot be used as part of modernisation projects.
» No control over the room air quality and relative humidity.
» The following applies to ceiling heating systems and concrete core activation (concrete ceilings) alike: Covering ceilings or suspended ceilings should be avoided to safeguard the optimum heating and cooling capacity.

Fan convectors and cassette units

Apart from thermo-active systems, fan convectors or ceiling cassettes are commonly used for cooling buildings. The coolant temperatures lie between +7 °C and +20 °C.

With fan convectors and cassette units, the cooling water temperatures can be reduced to below the dew point. Sensible heat as well as latent heat can be extracted from the room air through the condensate removal.

The cooling capacity of a fan convector or a cassette unit is subject to the size, the air flow rate and the coolant temperature.

Where sizing to meet the requirements of DIN 1946 in Germany, specific cooling capacities of 30 to 60 W/m² heat exchanger surface can be achieved.

The normal equipment sizing for average fan stages offers users the option of regulating quickly, even when heat loads fluctuate severely (high fan stage).

Fan convectors and ceiling cassettes are equipped with a condensate drain and can therefore be used for cooling water temperatures below the dew point.

It is possible to extract sensible and latent heat (condensate will be created) from the room to be cooled. In that case, distribution lines and components must be insulated with vapour diffusion-proof materials.

Fan convector

PIC00001229-00

Cassette unit

PIC00001255-00

Outdoor installation

Engineering information on outdoor installation

» Keep the line length between the heat pump and the building as short as possible to prevent heat loss.

» Avoid reverberating surroundings to prevent creating a noise nuisance. If required, allow for structural barriers.

» Provide suitable weather-resistant foundations.

» The hydraulic interconnections must be provided with thermal insulation and be routed inside a conduit at a depth free from the risk of frost.

» Provide a wall inlet of adequate size for routing the interconnecting lines into the building.

» Ensure a frost-protected condensate drain or a soakaway in the ground.

» Check whether the installation requires notification or Planning Permission.

» The unrestricted air throughput must be assured at all times.

» Prevent thermal "short circuit" between the air intake and air discharge apertures.

» Observe clearances required for the installation.

» Use flexible hoses for the hydraulic connection.

» Observe the frost protection of the heating circuit.

» Take the power connection and wiring into account.

Sound emissions

In operation, any air | water heat pump will generate some noise. To avoid discussions with users and neighbours, site conditions should be ascertained prior to selecting a product. The correct calculation of the expected noise development is of equal importance. This calculation is relatively easy to accomplish if the principles of acoustic engineering are known and are applied correctly.

A sound, tone or noise are all described as sound. A tone is a single constant vibration, whilst a sound is several tones laid over each other. A noise on the other hand is an irregular vibration with many frequencies.

Sound spreads in the form of mechanical waves. This can be compared with the spread of waves in water. Like on calm waters when hit by a stone, waves spread in circular motion for as long as there is no barrier in the way. The speed of sound waves depends on the mechanical properties of the carrier medium.

If a sound wave transmits through the air and hits an obstacle, the sound wave reflects at the same angle as that with which it hit the obstacle. How much of the sound energy is absorbed by the obstacle and is converted into frictional heat, for example, depends on the material the obstacle is made of. Concrete is a hard material that absorbs sound energy poorly. Soft, open pored materials, on the other hand, convert a much larger proportion of this energy into frictional heat. The reflections of sound waves and the absorption of sound energy are also used when isolating sound sources.

If two sound waves collide, for example through the reflection off an obstacle, these sound waves can overlay each other. In the best case, the sound waves will be weakened or cancelled out. However, the overlaying can also result in the opposite effect and cause an increase in the sound waves.

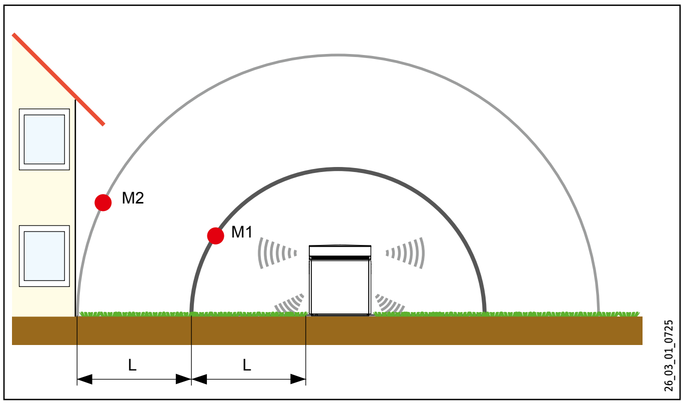
Law of Distance

The sound pressure level is reduced by approx. 6 dB if distance d doubles in length.

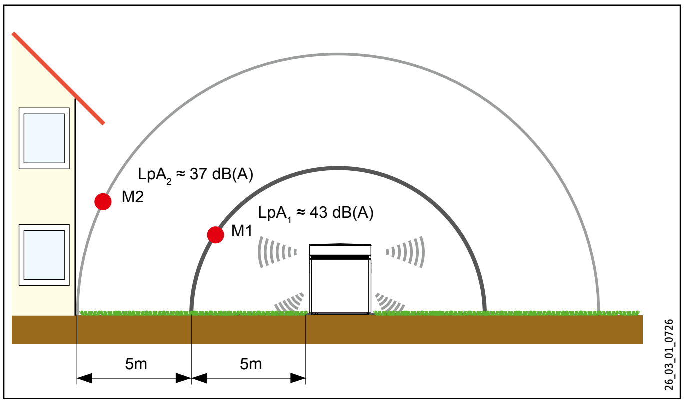
$$\Delta d = d_2 - d_1 = \left[10\ log_{10}\left(\frac{P_2}{P_0}\right)^2 - 10\ log_{10}\left(\frac{P_1}{P_0}\right)^2\right] dB$$

Law of Distance

Law of Distance: The sound pressure level is reduced by approx. 6 dB(A) if distance L doubles in length.



Law of Distance using the WPL 23 A as an example



Sound power level L_WA = 65 dB(A)
Sound pressure level L_PA1 (5 m distance) = 43 dB(A)
Sound pressure level L_PA2 (10 m distance) = 37 dB(A)

Sound emissions

Sound power level

The sound power level is a fundamental acoustic parameter of an appliance or machine. It depends neither on a specific distance nor on the directional characteristics of the source or that of the test ambience. Consequently, the sound power level is not subject to environmental influences or the test distance and is only influenced by the operating state of the sound source (in the wider sense). As a result, the sound power level is ideal for comparing different appliances or machines accurately with one another when it comes to acoustics.

The sound power level of a sound source can be determined by different means, so for example the enveloping surface method or the intensity method. With the sound intensity method, for example, the sound intensity is measured in specified intervals on all sides around the sound source. That means that not only the amount of sound energy flow but also its direction is taken into account, in other words whether the sound leaves the enveloping surface or re-enters it. The total of the actual test results represents the sound power level. The sound power unit is expressed in watts.

However, as generally only small values result – almost always reference is made to micro watts – the logarithmic magnitude of the sound power level is frequently referred to in decibels (dB) in order to make the values more "tangible".

$$L_W = 10\, log_{10} \left(\frac{P}{P_o}\right) dB$$

L_W = sound power level in dB
P = sound power in W
P_0 = standardised reference value in W

These test procedures are involved and must be carried out under laboratory conditions. However, since the results are independent of ambient influences and test distances, the sound power level is the ideal comparative value for appliances and machines when it comes to volume of noise.

Frequency weighting

The sound power level is subjected to a frequency weighting in order to take the frequency response of human hearing into account. In various guidelines (e.g. TA-Lärm [Germany] as well as in general noise protection measures or in statutes, A-weighting is the most frequently applied method. dB(A)

Sound pressure level

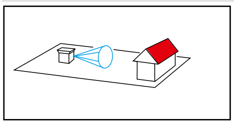
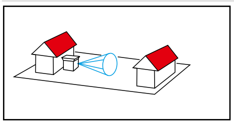
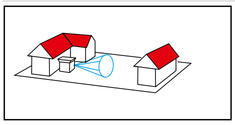
Sound pressure describes the pressure fluctuations (positive and negative pressure, changeable pressure) of a sound transfer medium. The sound pressure level is lower than the static air pressure by a multiple factor and is expressed in Pascals. Here too values are so low that reference is almost exclusively made to Micropascals. For that reason, the dB scale is also used here: This is the logarithmic ratio of the squared effective value of the sound pressure level to the square of a reference value.

$$L_P = 10\, log_{10} \left(\frac{\tilde{p}^2}{P_o{}^2}\right) dB = 20\, log_{10} \left(\frac{\tilde{p}}{P_o}\right) dB$$

L_p = sound pressure level in dB
p = effective sound pressure level in Pa
p_0 = standardised reference value in Pa

When measuring the sound pressure level, the distance from the sound source as well as structural or measuring conditions must always be taken into consideration. For this, the background sound level in the test vicinity must also be taken into account – otherwise there would be a risk of traffic noise on a main thoroughfare being louder than the actual sound source to be examined. This could result in a false reading.

Differential to the sound power level subject to the distance and the installation conditions

Clearance		Freestanding installation Q = 2 dB(A)		Installation against a wall Q = 4 dB(A)		Installation in a corner Q = 8 dB(A)	
							
1	m	8,0	dB(A)	5,0	dB(A)	2,0	dB(A)
2	m	14,0	dB(A)	11,0	dB(A)	8,0	dB(A)
3	m	17,0	dB(A)	15,0	dB(A)	12,0	dB(A)
4	m	20,0	dB(A)	17,0	dB(A)	14,0	dB(A)
5	m	22,0	dB(A)	19,0	dB(A)	16,0	dB(A)
7	m	25,0	dB(A)	22,0	dB(A)	19,0	dB(A)
10	m	28,0	dB(A)	25,0	dB(A)	22,0	dB(A)
15	m	32,0	dB(A)	29,0	dB(A)	26,0	dB(A)
20	m	34,0	dB(A)	31,0	dB(A)	28,0	dB(A)

In addition, the sound pressure level can also be calculated directly from the sound power level using the following formula:

$$L_PA = L_WA + 10log_{10}\left[\frac{Q}{(4*\pi + d^2)}\right]$$

L_pA = A - weighted sound pressure level in dB(A)
L_WA = A - weighted sound power level in dB(A)
Q = Korrekturfaktor
d = Abstand in m

For this, observe clearance (d) as well as ambient conditions (Q). Three correction values are applied when considering the ambient conditions:

Correction values	Q
Freestanding installation	2
Installation against a wall	4
Installation in a corner	8

Human perception

If a noise is perceived to be twice as loud, that corresponds to an increase of approx. 10 dB (from a sound pressure level of 40 dB).

Two sound sources of the same volume (cascade)

Two identical sound sources result in an increase of the sound power level of 3 dB compared to the sound power level of a single sound source.

In Germany, TA-Lärm applies in case of disagreements.

The Technische Anleitung zum Schutz gegen Lärm (TA-Lärm) [Germany] is a general administrative regulation. It is designed to protect the general public and neighbourhood against detrimental environmental influences through noise. The TA-Lärm builds the foundation for approval processes for commercial and industrial plant. It is not compulsory for detached houses or apartment buildings, it is nevertheless used as the basis for assessments in cases of dispute. If a heat pump system or an air conditioning unit is sited in the garden, a specific limit value must not be exceeded at the "place of immission" - for example a neighbour's window - subject to the category applied to the district (residential area). In built-up areas, select a test point that lies 0.5 m outside the centre of the open window of the area most affected by the noise that is to be protected (e.g. bedrooms).

The following values must not be exceeded at the neighbours' windows (place of immission):

Commercial residential areas	dB(A)
06:00 - 22:00	60
22:00 - 06:00	45

General residential areas	dB(A)
06:00 - 22:00	55
22:00 - 06:00	40

Exclusively residential areas	dB(A)
06:00 - 22:00	50
22:00 - 06:00	35

Country comparison

In France, regulation N° 2006-1099 dated 31 August 2006 applies to anti-noise measures in neighbourhoods. This regulation specifies limits between ambient noise and the residual noise, comprising normal interior and exterior noise in a given location.

Limits	max. dB(A)
07:00 - 22:00	5
22:00 - 07:00	3

Note
Observe the standards and regulations applicable in your country.

What are the implications for siting heat pumps outdoors?

The simplest option of determining whether to site a heat pump externally in accordance with the local conditions is to carry out your own calculation of the sound pressure level at the required distance. As fundamental information, this requires only the sound power level of the selected heat pump and the corresponding correction factor for the ambient conditions. This way, the calculated sound pressure level can be determined for any required distance from the heat pump. Statements on sound pressure level at certain distances, as can be found frequently in technical datasheets, are of little help as these cannot take local conditions into consideration.

Sound emissions

Air routing

When siting air | water heat pumps externally, there are generally no problems with routing the airways. However, prevent the discharge of cold air towards neighbouring properties (patios, balconies).

Prevent air being discharged directly towards house or garage walls. Pay particular attention to noise pollution. Prior to installation, consider the sound propagation, whether towards neighbouring properties or towards your own home.

Never install the heat pump immediately adjacent to living rooms or bedrooms.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

Our heat pumps are characterised by particularly quiet operation. Nevertheless, incorrect siting can, under unfavourable conditions, lead to an unwanted increase in sound power levels.

Engineering information on outdoor installation

- Plants can reduce reflections that may occur, for example when siting the appliance between two wall plates as the sound has to travel through several obstacles.
- Avoid setting up the appliance on strongly reverberating surfaces.
- Installation between two closed walls as well as in corners and niches can lead to high noise levels. These surfaces can act as reflectors and should therefore be avoided.
- Reductions in noise levels can be achieved through on-site deflectors.

Acoustic measures

Lawn areas and shrubs can contribute to the reduction of noise. Avoid setting up the appliance on strongly reverberating surfaces. Large floor areas off which sound can bounce can act as reflectors and can raise sound levels by up to 3 dB(A) compared with an installation on insulated floors.

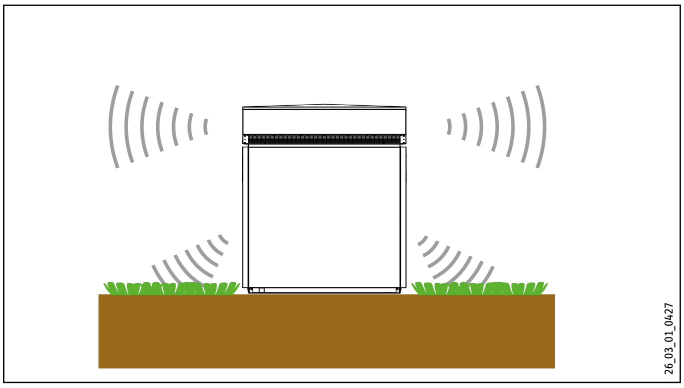
Direct sound spread

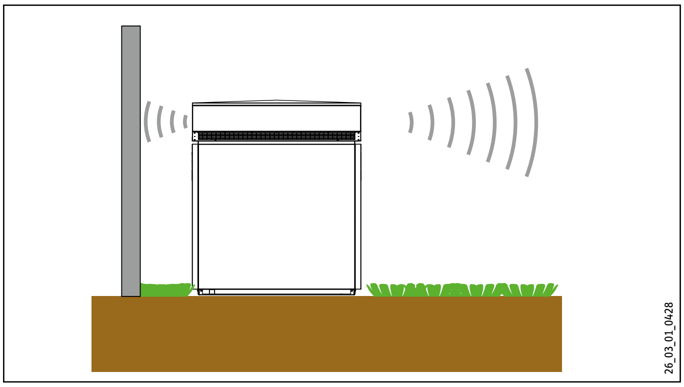
Direct noise spread when installing a freestanding heat pump can be reduced by structural obstacles. Noise levels can be reduced by walls, fences, palisades etc.

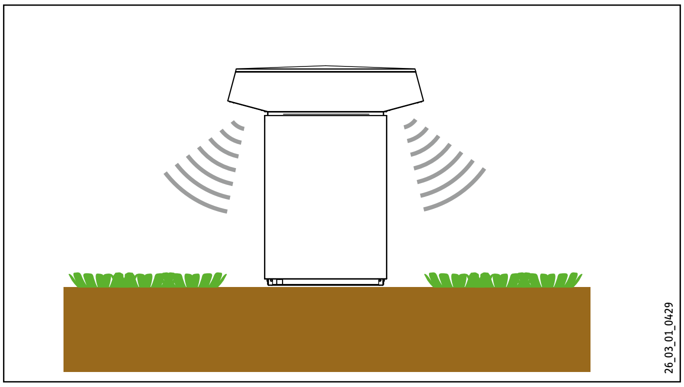
A sound reduction of 2 dB(A) can be achieved with the WPL 13/18/23/33 by using a duct silencer.

Structure-borne noise

As for all heating systems, the transfer of structure-borne noise through heating pipes to brickwork and radiators should be prevented. Heat pumps should therefore be connected to the heat distribution system via flexible hoses, flexible connections of pipework to walls and ceilings and flexible routing of pipework through walls and floors.







Condensate drain

Air | water heat pumps take moisture from the drawn-in outdoor air that precipitates either in the form of hoarfrost on the cold evaporator or flows off as condensate directly into a condensate pan.

An evaporator with hoarfrost is defrosted cyclically so that the condensate occurs in phases.

The condensate is drained out of the condensate pan with a hose.

The following points must be observed for the engineering and installation of the condensate drain:

» Route the condensate drain hose out of the heat pump with a steady fall.

» Route the condensate via a frost-free drain or allow it to drain into a coarse gravel soakaway.

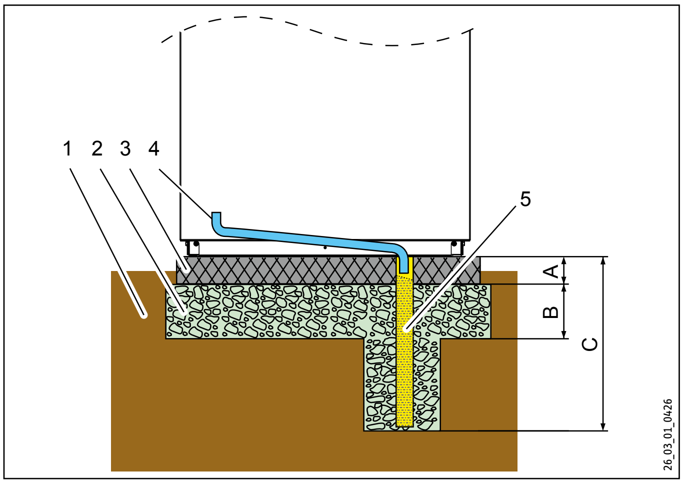
» Maintain the recommended sizes such as for the foundation and gravel bed thicknesses.

» If the condensate drain pipe is not laid frost-free or if a T-support or wall mounting bracket is used, consider the use of a ribbon heater.

» Lay the ribbon heater directly in the condensate drain pipe.

» Check whether the planned product and accessories include a ribbon heater.

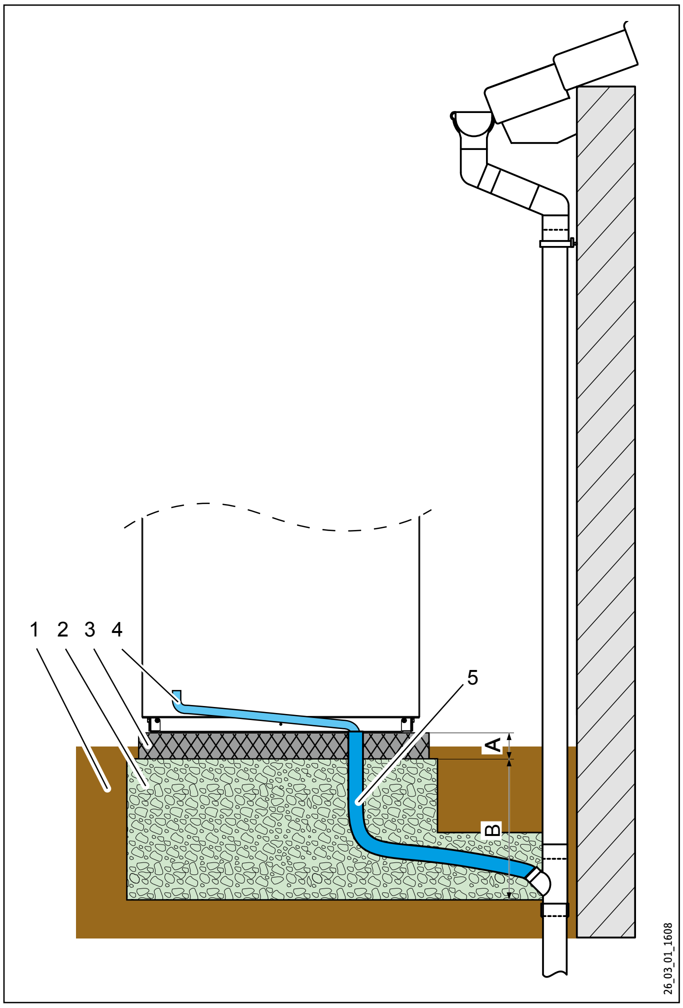
Condensate drain



1 Ground
2 Coarse gravel back filling
3 Concrete slab
4 Condensate drain pipe
5 Condensate drain pipe

A ≈ 10 cm
B ≈ 30 cm
C ≈ 80 cm

Condensate drain into a downpipe or into a sewer



1 Ground
2 Coarse gravel back filling
3 Concrete slab
4 Condensate drain hose
5 Condensate drain

A ≈ 10 cm
B ≈ 80 cm

Indoor installation

Engineering information for indoor installation

» Observe the special requirements for installation rooms.
» Allow for appropriate wall clearances for service purposes.
» Observe the requirements for the installation surface.
» Provide a condensate drain from the evaporator.
» Prevent a thermal "short circuit" between the air intake and discharge.
» Connect the heating system flow and return to the heat pump with flexible hoses.
» Protect air intake and discharge and the vent aperture against the ingress of leaves and snow.
» Where necessary, cover the interior walls of the installation room with low reflecting sound-absorbing material.
» Take the power connection and wiring into account.
» Carefully insulate brickwork around the air intake and discharge.
» Insulate wall outlets.

Air routing

For indoor installations, connect the air side with flexible air hoses or via air ducts and flexible connections routed to the outdoors. Observe previous information regarding sound emissions. Limit the velocity at the air intake and air discharge relative to the unobstructed cross-section of the air grille (noise development).

Max. air velocity	m/s	4

Always prevent an air "short-circuit" between the air intake and air discharge. It would be practical to draw in air from around the corner or crosswise. If the intake and discharge openings are at the same level, ensure a minimum distance between them.

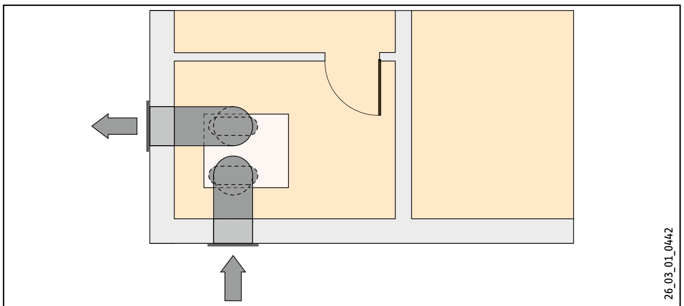
Minimum clearance	m	3

If necessary, provide a separating wall or suitable plantings between the air intake and the air discharge. The weather or bird protection grilles should be easily removable for cleaning purposes.

Sound emissions

Never install the heat pump immediately below or adjacent to bedrooms. On strongly reverberating floors, such as on tiles, we recommend putting the heat pump on a suitable rubber mat. Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the equipment. Insulate pipe outlets through walls and ceilings against structure-borne noise transmission. Our compact heat pumps are characterised by particularly quiet operation. Nevertheless, incorrect siting can, under unfavourable conditions, lead to an unwanted increase in sound power levels.

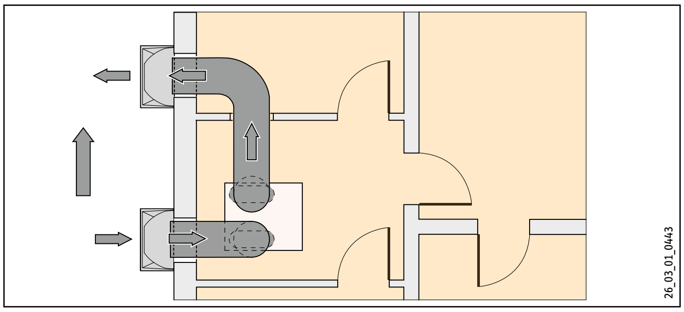
Cellar – in a corner



The example shows the installation of a compact heat pump in a cellar corner. Routing the air around a building corner effectively prevents air "short-circuits" between discharge and intake air.

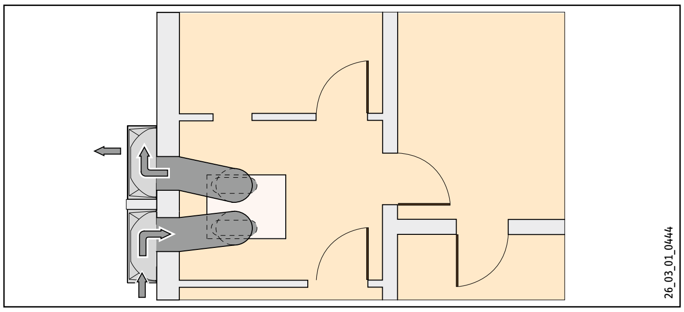
Size the intake and discharge grilles so that the unrestricted cross-section of the vent is large enough.

Cellar – separate ducts



When installing a compact heat pump in a cellar, connection of air ducts to two cellar light wells on the same side of the building is possible, subject to the distance between the light wells being sufficient to prevent a thermal "short-circuit". Protect the air intake and air discharge ducts by means of a cover against leaves and snowfall.

Cellar – common duct



When installing a compact heat pump in the cellar, connection of air ducts to a common cellar light well is possible, subject to thermal short-circuits being reliably prevented. In this example the inlet flow is diverted. A dividing wall between the air intake and air discharge inside the light well and a deflector outside the light well largely prevent a thermal "short-circuit".

Note

Observe the following points for this installation method:

» Avoid thermal short-circuits.

» Ensure the reliable drainage of condensate.

» Provide an unrestricted cross-section of adequate size for the intake and discharge grilles.

Distributing the external pressure

When sizing air ducts and grilles, observe the external pressure of the fan. At least 20 % of the total external fan pressure must additionally be taken into account for the air discharge side.

Condensate drain

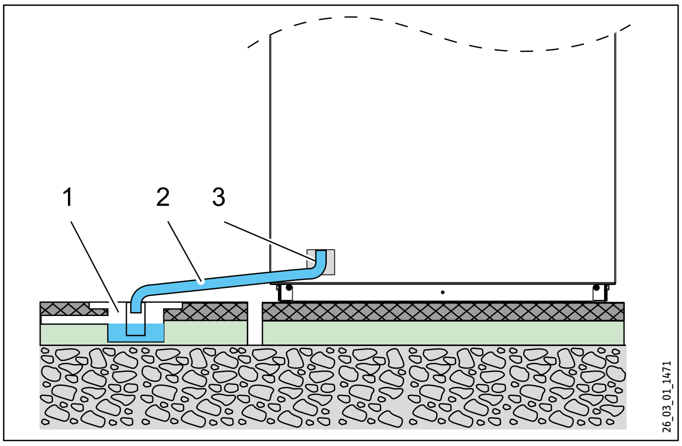
Use a suitable hose as condensate drain that should be connected to the defrost pan connector of the heat pump.

Route the condensate drain hose with a steady fall or out to the side of the heat pump.

For heat pumps installed internally, route the condensate into a sewer.

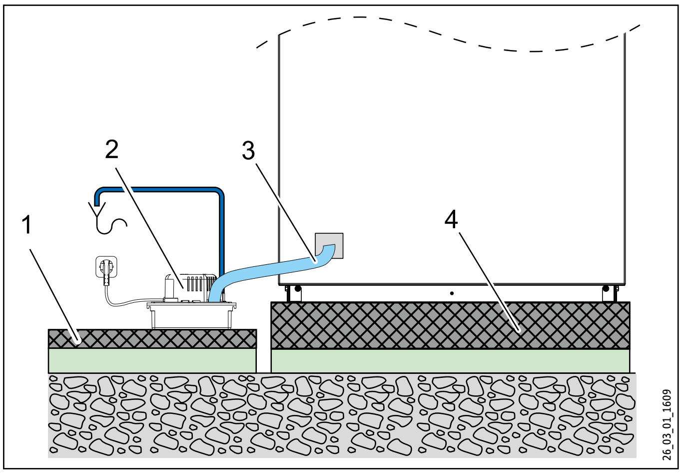
If a condensate pump is used to drain off the condensate, set the heat pump approx. 100 mm higher, alternatively set the condensate pump mounting area approx. 100 mm lower.

Condensate drain



1 Drain with stench trap
2 Drain hose with a steady slope
3 Condensate drain connection

Condensate drain with condensate pump into a sewer



1 Screed and cover
2 Impact sound insulation
3 Condensate drain
4 Plinth

Engineering checklist

Air | water heat pumps

- » What is the purpose of the heat pump?
- » What heat source supplies the heat pump?
- » How are the heating surfaces designed? Low temperature heating systems are recommended.
- » What is the required heating output? Calculate the heat load.
- » Obtain approval from the power supply utility.
- » Determine the operating mode of the heat pump according to the heating system.
- » How can the heat pump be integrated easily into the heating pipework?
- » Should DHW be heated by the heating heat pump?
- » How do I make the power connection?
- » Observe general requirements and guidelines.
- » Observe conditions on site.

Outdoor installation

- » Where can the heat pump be located? Provide foundations.
- » Observe the air routing. Ideally, the air discharge direction should be in line with the main wind direction.
- » Ensure that neighbouring properties are not disturbed by noise.
- » Maintain minimum clearances to the periphery, if necessary check whether planning permission is required.
- » Ensure short line runs.
- » Can the condensate be routed free from the risk of frost and with a natural slope?

Indoor installation

- » Is a suitable location for the installation of the heat pump available?
- » Choose an installation location, where the equipment has sufficient room to allow for operation and maintenance.
- » Provide foundations for the installation of the heat pump.
- » Are there air intake and air discharge apertures present? Avoid thermal short-circuits.
- » Can the air hoses be installed easily?
- » Is the total length of the air pipes less than 8 m?
- » Can the condensate be drained off with a natural slope or is the installation of a condensate pump required?
- » Insulate wall outlets.

Product overview

Appliance types and applications

Appliance types and applications

	WPL 15/20/25 AC/ACS	WPL 15 IKS-2 / WPL 25 IK-2	WPL 15 IS-2 / WPL 25 I-2	WPL 08-28 Trend	WPL HT	WPL 10 AC(S)	WPL 10 I/WPL 10 IK 3	WPL E	WPL cool	WPL 34/47/57
Intended for the following:										
Detached and semi-detached houses	•	•	•	•	•	•	•	•	•	
Apartment building				•	•			•	•	•
non-residential buildings										•
Suitable for the following building projects:										
New build	•	•	•	•	•	•	•	•	•	•
Modernisation, heating flow temperature < 55 °C		•	•	•	•	•		•	•	•
Modernisation, heating flow temperature < 70 °C					•					
With the following function and feature:										
Heating	•	•	•	•	•	•	•	•	•	•
Cooling	•			•		•			•	
Inverter (demand-dependent compressor control)		•	•	•	•					
DHW heating with a floorstanding cylinder	•	•	•		•	•	•	•	•	•
DHW heating with a cylinder module	•	•		•						
Mono mode DHW heating > 60 °C					•					
Integral emergency/booster heater for mono energetic operation	•	•	•	•	•	•	•	•	•	
Appliance installation										
External installation	•	•	•	•	•	•	•	•	•	•
Internal installation					•		•	•	•	
Internal compact installation		•	•				•			
Split design installation		•	•							
Little installation effort, compact	•	•	•	•		•				
Flexible system solution for the following:										
Heat pump and solar thermal system combination	•			•	•	•	•	•	•	•
Combination of several heat pumps (cascade)						•		•	•	•
Installation in tight spaces	•	•	•			•				
Swimming pool water heating	•				•	•	•	•	•	•
Mono mode operation	•	•	•	•	•	•	•	•	•	•
Mono energetic operation	•	•	•	•	•	•	•	•	•	•
Combination with other heat sources (dual mode)	•			•	•	•	•	•	•	•

At a glance

- Inverter technology: Variable speed compressor for perfectly matched heating output
- Active cooling by reversing the refrigerant cycle for a comfortable room climate
- Enhanced vapour/saturated vapour injection for a high flow temperature even at low outside temperatures
- Low operating noise thanks to infinitely adjustable fan speed and encapsulated refrigerant circuit
- High efficiency all year round for low running costs
- Suitable for mono mode DHW heating for low running costs
- Can be integrated into a home network and controlled via smartphone

Safety and quality

Required accessories

232980 WPMW 3

233622 AS-WP 1

233623 AS-WP 2

APPLICATION: Inverter air | water heat pump with output-dependent control, designed as a mono block appliance for compact outdoor installation. Can be used for central heating and DHW operation; the AC version also allows circuit reversal for efficient cooling. Suitable for new build and modernisation due to the high flow temperatures. **EQUIPMENT / CONVENIENCE:** Optimum noise reduction due to encapsulated refrigerant circuit and isolated compressor. The wide gaps between the evaporator fins create low air resistance and, in combination with the modulating fan, result in a low sound power level. The combined enhanced vapour/saturated vapour injection cools the scroll compressor at low outside temperatures, enabling a higher heating output/flow temperature to be achieved. In combination with the ISG (optional accessory), the heat pump controller (accessories) can be used to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. An emergency/booster heater enables mono energetic operation. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A. **EFFICIENCY:** The waste heat from the inverter is used to raise the return temperature, thereby increasing the overall efficiency of the system. Demand-dependent and energy efficient defrosting by reversing the circuit. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. **INSTALLATION**: Integral anti-vibration coupling for direct connection to the heating system. Pivoting electrical connection field for better accessibility. Quick access to the condensate tray via cleaning aperture at the rear. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. The fan grille, moulded recesses and cover are made from weather-proof and UV-resistant plastic in Aluminium white.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. The heat pump manager and output regulation match the heat pump heating output variably to the actual heat demand.

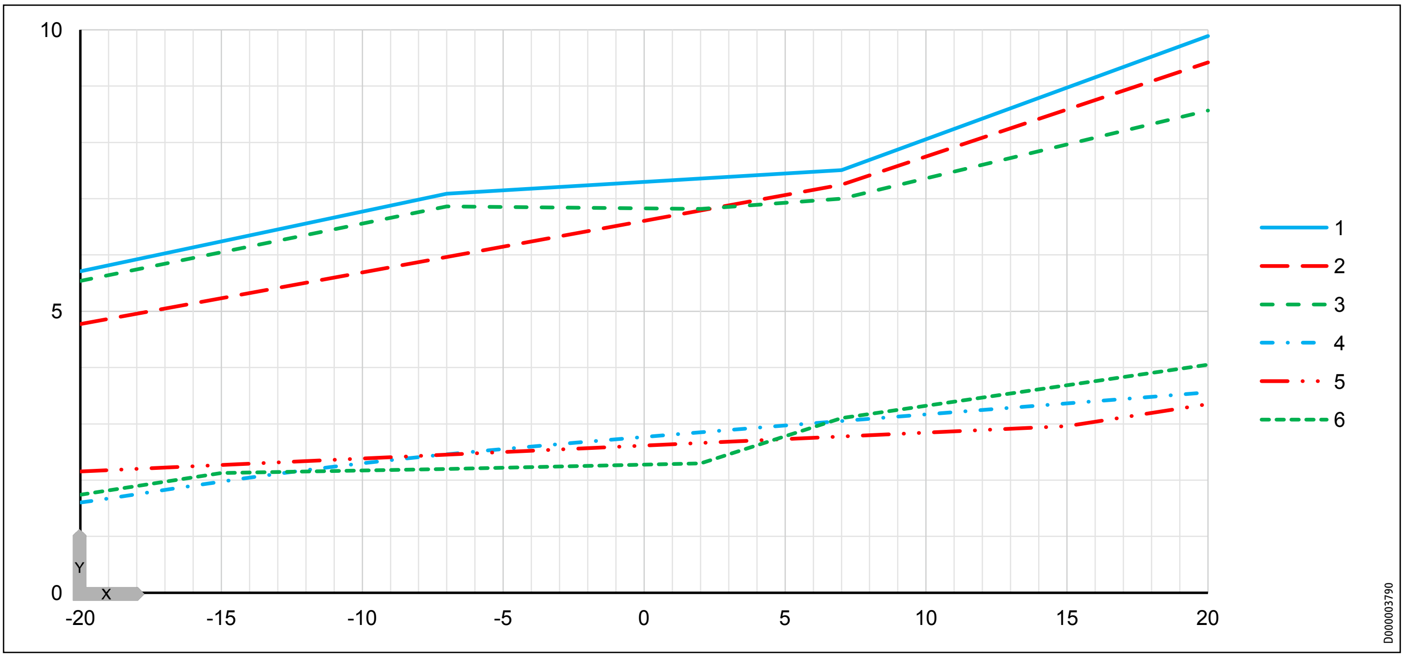
Specification

		WPL 15 AS	WPL 15 ACS	WPL 20 A	WPL 20 AC	WPL 25 A	WPL 25 AC
		232491	234759	236006	236007	232493	234760
Heating output							
Heating output at A7/W35 (min./max.)	kW	3,50/7,40	3,50/7,40	6.13/11.19	6.13/11.19	6,20/14,00	6.13/14.00
Heating output at A2/W35 (min./max.)	kW	3,10/7,09	3,10/7,09	4.59/10.71	4.59/10.71	4,59/13,64	4,59/13,64
Heating output at A-7/W35 (min./max.)	kW	2,50/6,86	2,50/6,86	4.40/9.54	4.40/9.54	4,40/12,86	4,40/12,86
Heating output to EN 14511							
Heating output at A7/W35 (EN 14511)	kW	4,28	4,28	6,13	6,13	7,84	7,84
Heating output at A2/W35 (EN 14511)	kW	4,23	4,23	6,83	6,83	8,33	8,33
Heating output at A-7/W35 (EN 14511)	kW	6,86	6,86	9,54	9,54	12,86	12,86
Heating output at A-7/W55 (EN 14511)	kW	7,09	7,09	10,73	10,73	13,93	13,93
Heating output at A-15/W35 (EN 14511)	kW	6,16	6,16	8,51	8,51	12,05	12,05
Cooling capacity at A35/W7 max.	kW		7,5		11,49		14,88
Cooling capacity at A35/W7 partial load	kW		2,15		4,80		4,80
Cooling capacity at A35/W18 max.	kW		7,5		15,26		17,06
Cooling capacity at A35/W18 partial load	kW		3,25		6,76		6,76
Power consumption							
Power consumption, fan heating max.	kW	0,1	0,1	0,2	0,2	0,2	0,2
Power consumption, emergency/booster heater	kW	6,2	6,2	8,8	8,8	8,8	8,8
Power consumption to EN 14511							
Power consumption at A2/W35 (EN 14511)	kW	1,09	1,09	1,71	1,71	2,00	2,00
Power consumption at A7/W35 (EN 14511)	kW	0,94	0,94	1,37	1,37	1,54	1,54
Power consumption at A-7/W35 (EN 14511)	kW	2,42	2,42	2,93	2,93	4,16	4,16
Power consumption at A-7/W55 (EN 14511)	kW	3,38	3,38	4,10	4,10	5,76	5,76
Power consumption at A-15/W35 (EN 14511)	kW	2,45	2,45	2,91	2,91	4,48	4,48
COP to EN 14511							
COP at A7/W35 (EN 14511)		4,55	4,55	4,48	4,48	5,09	5,09
COP at A2/W35 (EN 14511)		3,88	3,88	4,00	4,00	4,17	4,17
COP at A-7/W35 (EN 14511)		2,83	2,83	3,26	3,26	2,93	2,93
COP at A-7/W55 (EN 14511)		2,10	2,10	2,62	2,62	2,42	2,42
COP at A-15/W35 (EN 14511)		2,51	2,51	2,92	2,92	2,69	2,69
Cooling capacity factor at A35/W7 max.			2,41		2,53		2,38
Cooling capacity factor at A35/W7 partial load			2,39		2,84		2,84
Cooling capacity factor at A35/W18 max.			2,87		3,12		2,83
Cooling capacity factor at A35/W18 partial load			3,78		3,76		3,76
Sound data							
Sound power level (EN 12102)	dB(A)	55	55	56	56	56	56
Sound pressure level at 5 m distance in a free field	dB(A)	33	33	34	34	34	34
Sound power level, outdoor installation (EHPA, A7/W65)	dB(A)	58	58	56	56	56	56
Max. sound power level, outdoor installation	dB(A)	65	65	67	67	67	67
Max. sound power level, silent mode	dB(A)	58	58	60	60	60	60

		WPL 15 AS	WPL 15 ACS	WPL 20 A	WPL 20 AC	WPL 25 A	WPL 25 AC
Application limits							
Min. application limit, heat source	°C	-20	-20	-20	-20	-20	-20
Max. application limit, heat source	°C	40	40	40	40	40	40
Min. application limit on the heating side	°C	15	15	15	15	15	15
Max. application limit on the heating side	°C	65	65	65	65	65	65
Application limit heat source at W60	°C	-12	-12	-15	-15	-15	-15
Application limit heat source at W65	°C	-4	-4	-4	-4	-4	-4
Min. application limit, outside temperature, cooling mode	°C	15	15	15	15	15	15
Max. application limit, outside temperature, cooling mode	°C	40	40	40	40	40	40
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100
Chloride	mg/l	<30	<30	<30	<30	<30	<30
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Energy data							
Energy efficiency class		A+/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Electrical data							
Rated voltage, compressor	V	230	230	400	400	400	400
Rated voltage, controller	V	230	230	230	230	230	230
Rated voltage, emergency/booster heater	V	230	230	400	400	400	400
Phases, compressor		1/N/PE	1/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Phases, emergency/booster heater		2/N/PE	2/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Compressor fuse/MCB	A	1 x C 20	1 x C 20	3 x C 16	3 x C 16	3 x C 16	3 x C 16
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
MCB/fuse protection, emergency/booster heater	A	2 x B 16	2 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16
starting current	A	7	7	5	5	5	5
Versions							
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	4,2	4,2	5,5	5,5	5,5	5,5
IP rating		IP14B	IP14B	IP14B	IP14B	IP14B	IP14B
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Dimensions							
Height	mm	900	900	1045	1045	1045	1045
Width	mm	1270	1270	1490	1490	1490	1490
Depth	mm	593	593	593	593	593	593
Weights							
Weight	kg	140	140	175	175	175	175
Connection							
Connection, heating flow/return		28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
Values							
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,7	0,7	1,4	1,4	1,4	1,4
Permissible operating pressure, heating circuit	MPa	0,3	0,3	0,3	0,3	0,3	0,3
Flow rate, heat source side	m³/h	2300	2300	4000	4000	4000	4000
Min heating flow rate	m³/h	0,7	0,7	1,0	1,0	1,0	1,0
Internal pressure differential	hPa	60	60	110	110	110	110

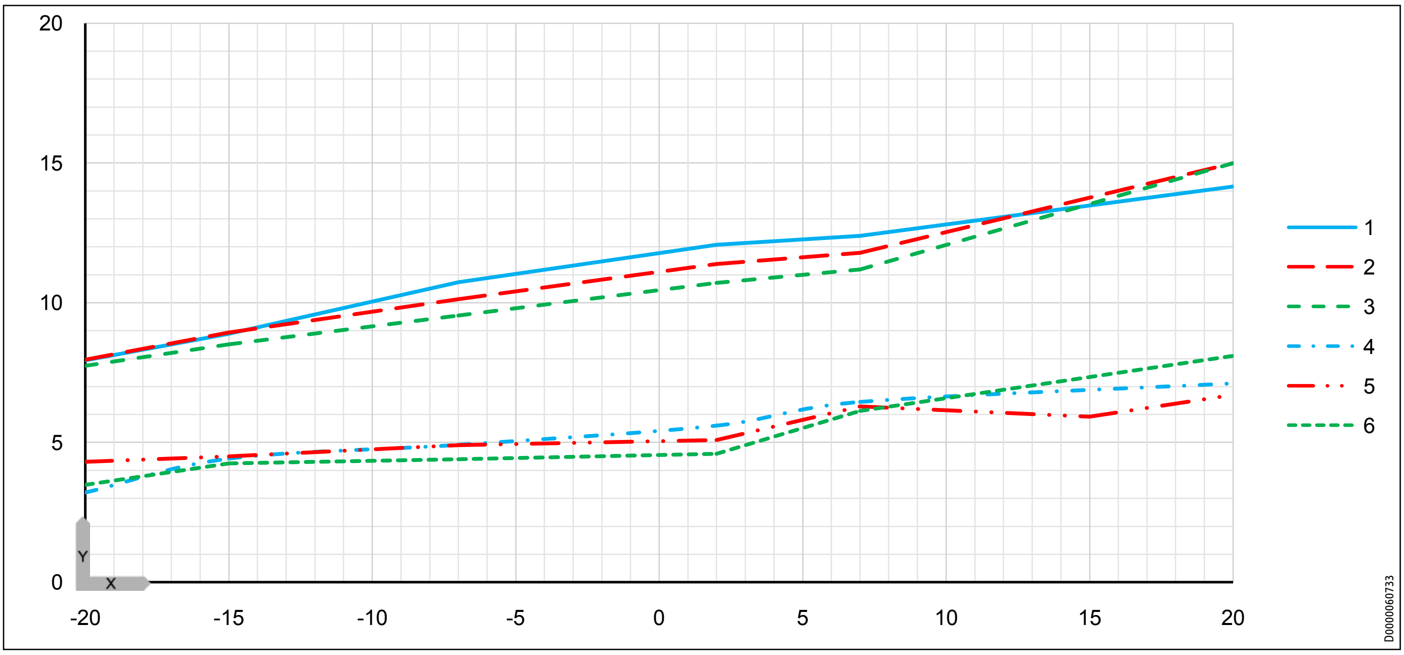
Output data

WPL 15



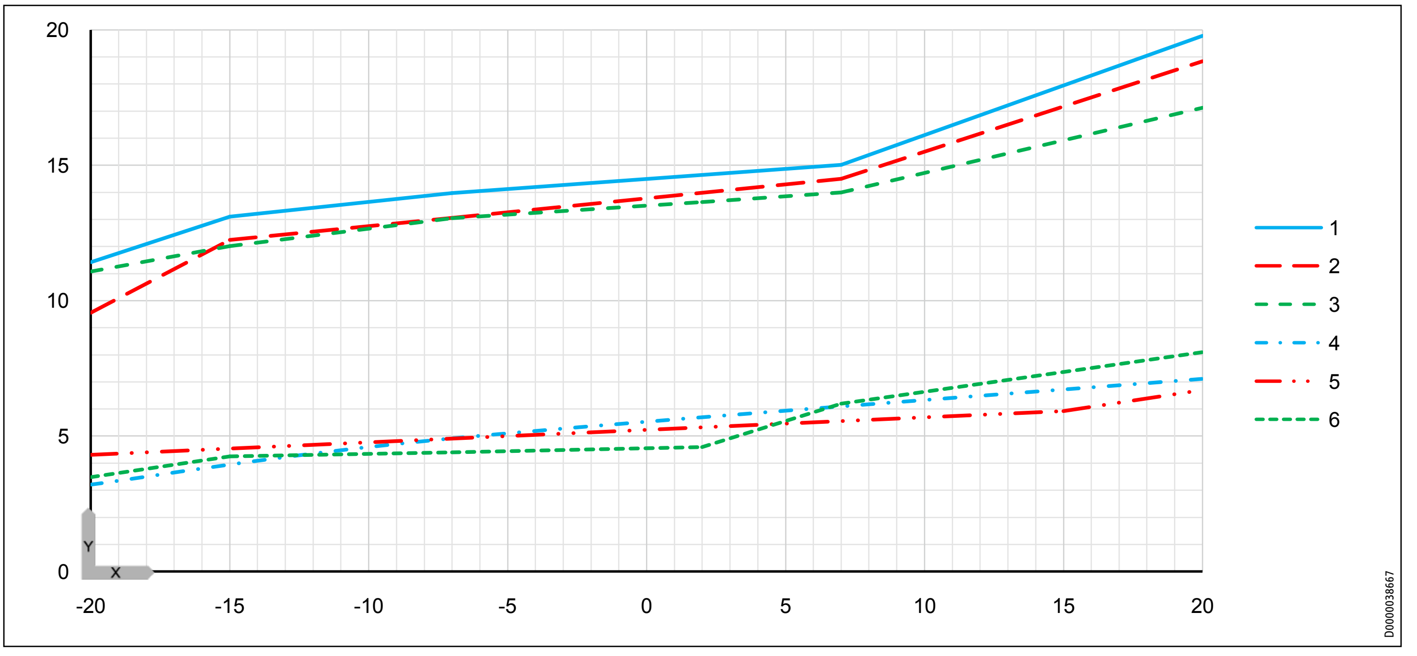
X	Outside temperature [°C]	3	max. W35
Y	Heating output [kW]	4	min. W55
1	max. W55	5	min. W45
2	max. W45	6	min. W35

WPL 20



X	Outside temperature [°C]	3	max. W35
Y	Heating output [kW]	4	min. W55
1	max. W55	5	min. W45
2	max. W45	6	min. W35

WPL 25

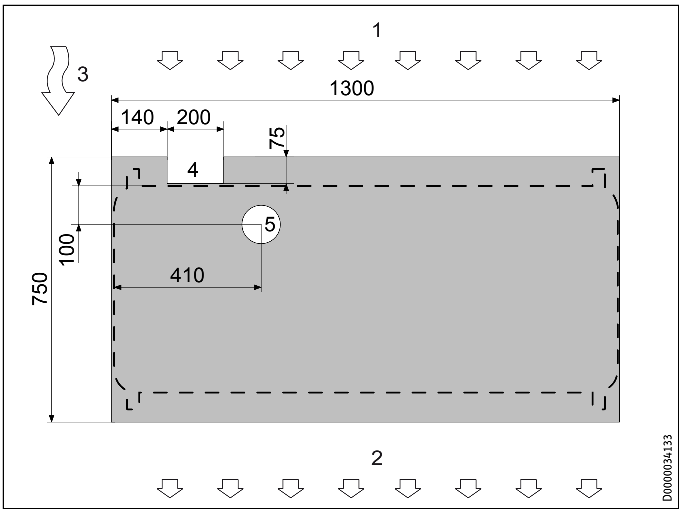


X	Outside temperature [°C]	3	max. W35
Y	Heating output [kW]	4	min. W55
1	max. W55	5	min. W45
2	max. W45	6	min. W35

Installation location requirements

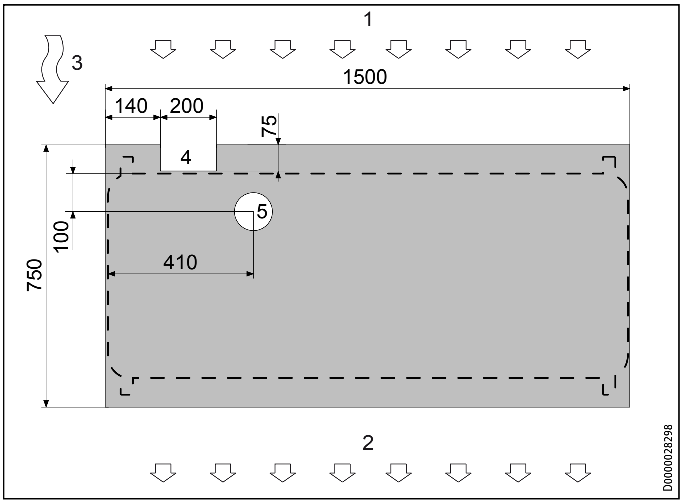
» Maintain minimum clearances towards buildings
» Never install the appliance inside a shaft.
» The heat pump module must be level (horizontal).
» The main wind direction must not be towards the fan.
» When selecting the installation site, remember that the appliance generates noise during operation.
» Maintain as small a clearance as possible between the heat pump module and the hydraulic module in order to keep line losses to a minimum.
» In winter, the heat pump module must not be covered with snow or be submerged if there is heavy rainfall.
» Ensure access to the connection space under the plastic cover.
» Condensate must be able to freely drain underneath the appliance, even during frosty weather.
» The appliance must be firmly attached to the mounting rail which in turn must be secured with the foundation/curbstones.

WPL 15



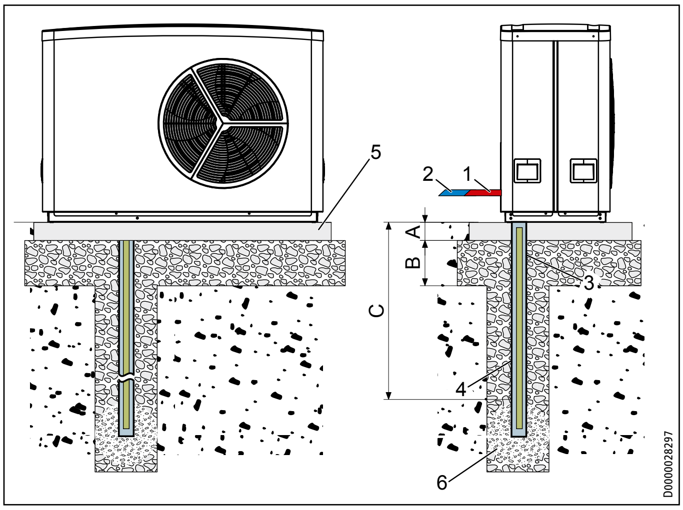
1 Air intake
2 Air discharge
3 Main wind direction
4 Supply line recess
5 Condensate drain recess

WPL 20, WPL 25



1 Air intake
2 Air discharge
3 Main wind direction
4 Supply line recess
5 Condensate drain recess

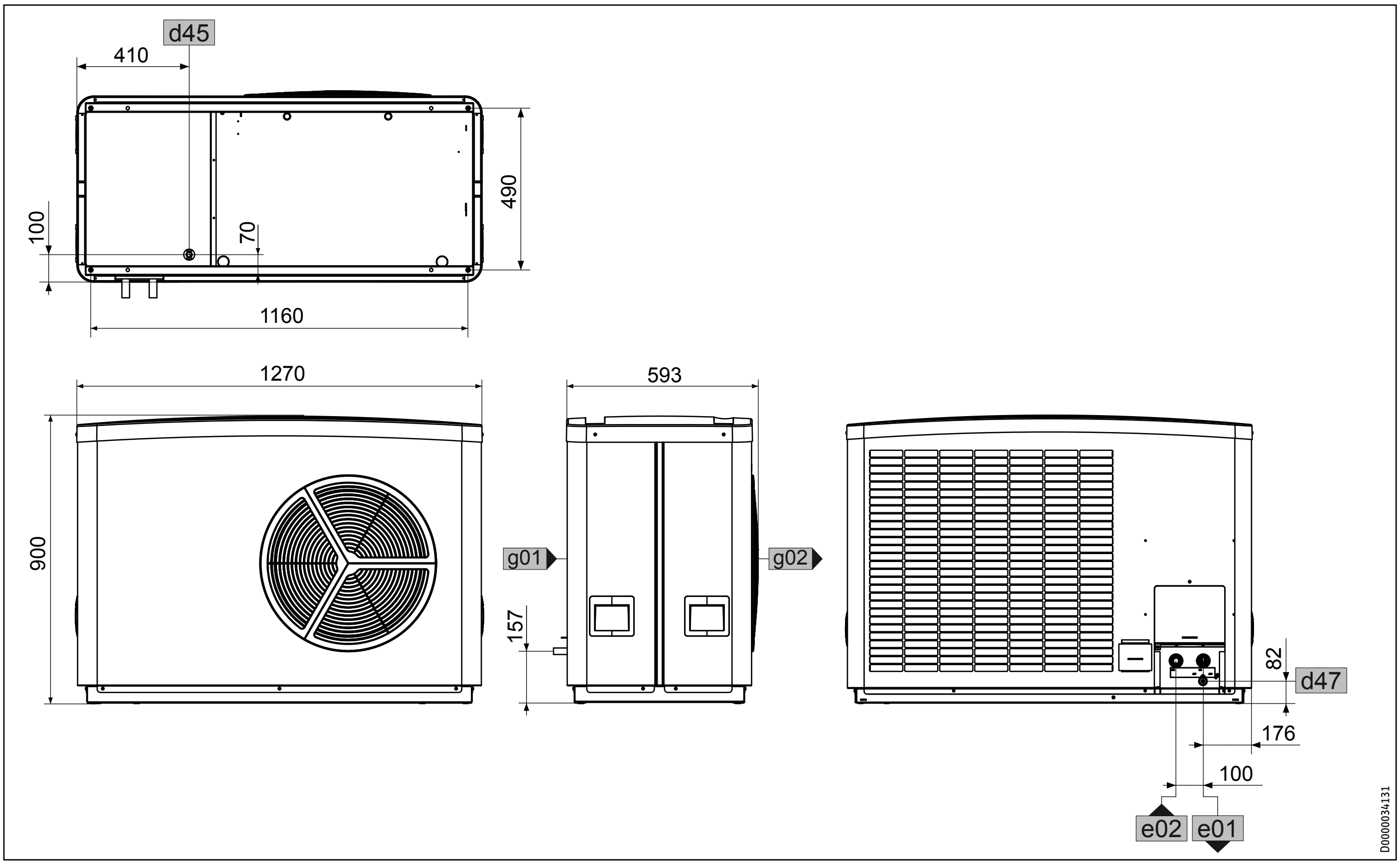
Example: Laying pipes above ground



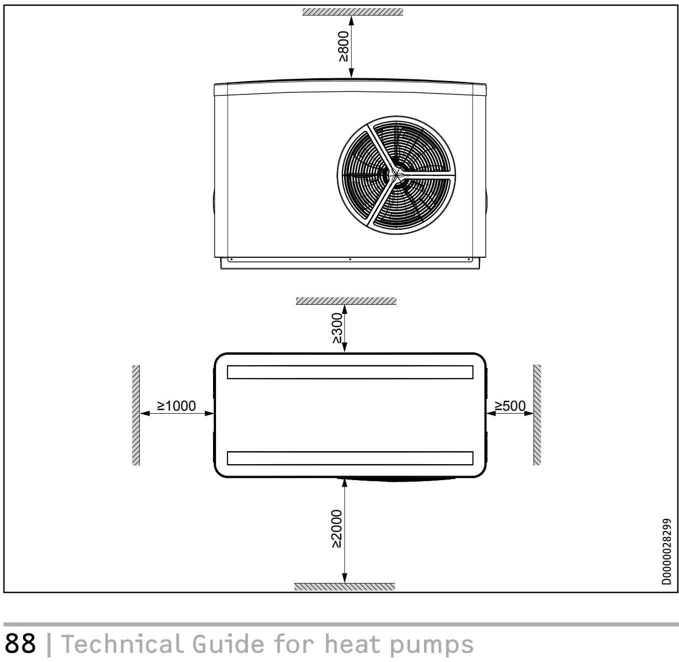
A 100
B 300
C Depth of frost line
1 Heating flow
2 Heating return
3 Condensate drain
4 Condensate drain pipe
5 Foundation
6 Gravel bed

Siting

WPL 15

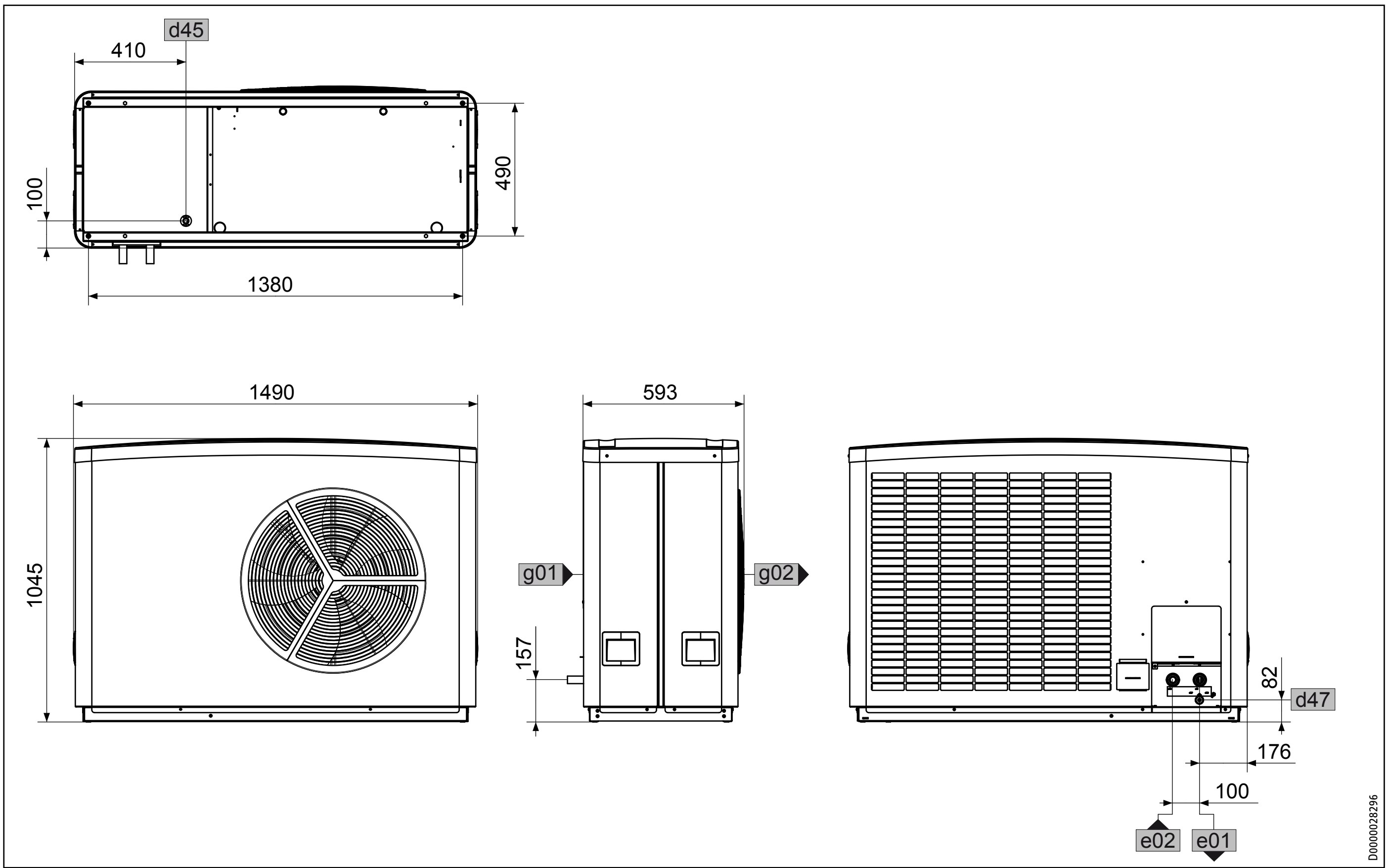


				WPL 15 ACS	WPL 15 AS
e01	Heating flow	Terminal type			Plug-in connection
e01	Heating flow	Diameter	mm	28	
e02	Heating return	Terminal type			Plug-in connection
		Diameter	mm	28	
d45	Condensate drain	Diameter	mm	22	
d47	Drain				
g01	Air intake				
g02	Air discharge				

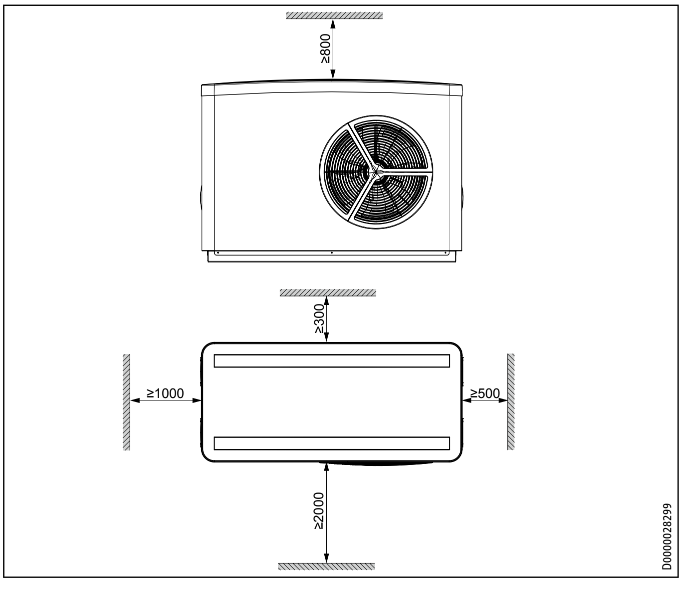


Siting

WPL 20, WPL 25



				WPL 20 A	WPL 20 AC	WPL 25 A	WPL 25 AC
e01	Heating flow	Terminal type		Plug-in connection	Plug-in connection	Plug-in connection	Plug-in connection
e01	Heating flow	Diameter	mm	28	28	28	28
e02	Heating return	Terminal type		Plug-in connection	Plug-in connection	Plug-in connection	Plug-in connection
		Diameter	mm	28	28	28	28
d45	Condensate drain	Diameter	mm	22	22	22	22
d47	Drain						
g01	Air intake						
g02	Air discharge						



Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

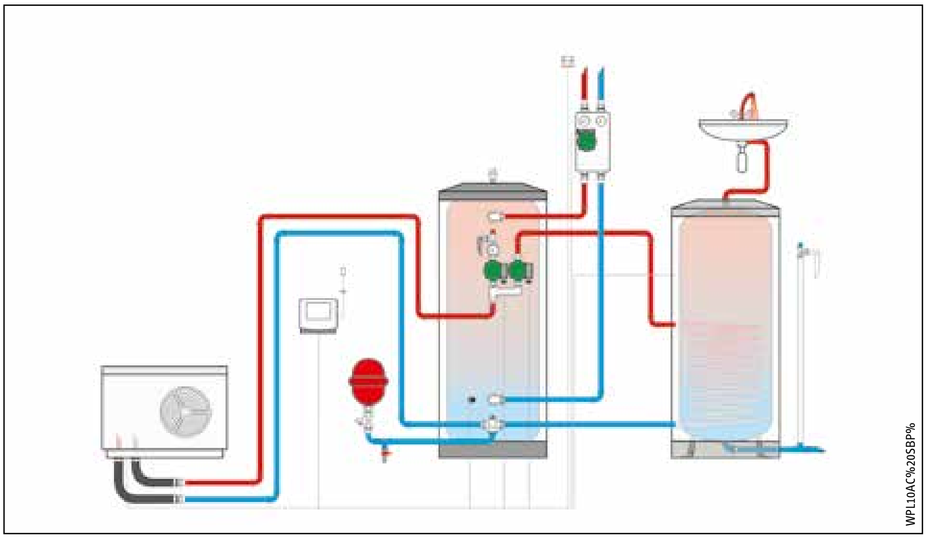
Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Anti-vibration mounts are built into the appliance to reduce structure-borne sound on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Heat pump with buffer cylinder and DHW heating



Heat pump circulation pump

Heat pump Type	Flow rate m^3/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 15 ACS	0,7	195	UP 25/7.5 E	28 x 1,0
WPL 20	1,0	195	UP 25/7.5 E	28 x 1,0
WPL 25 AC	1,0	195	UP 25/7.5 E	28 x 1,0

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager and possibly further accessories used.

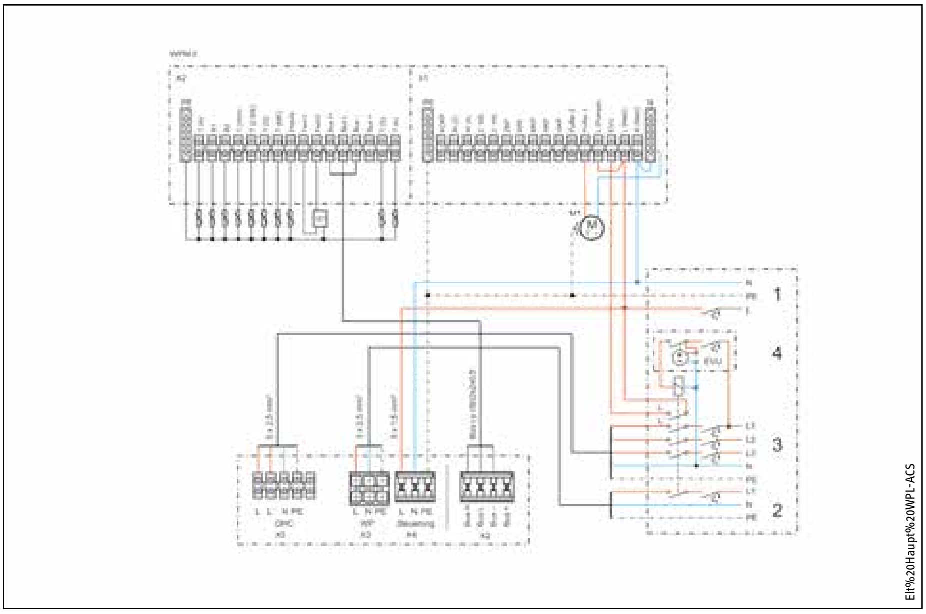
Note
Observe the standards and regulations applicable in your country.

Energy efficient pumps

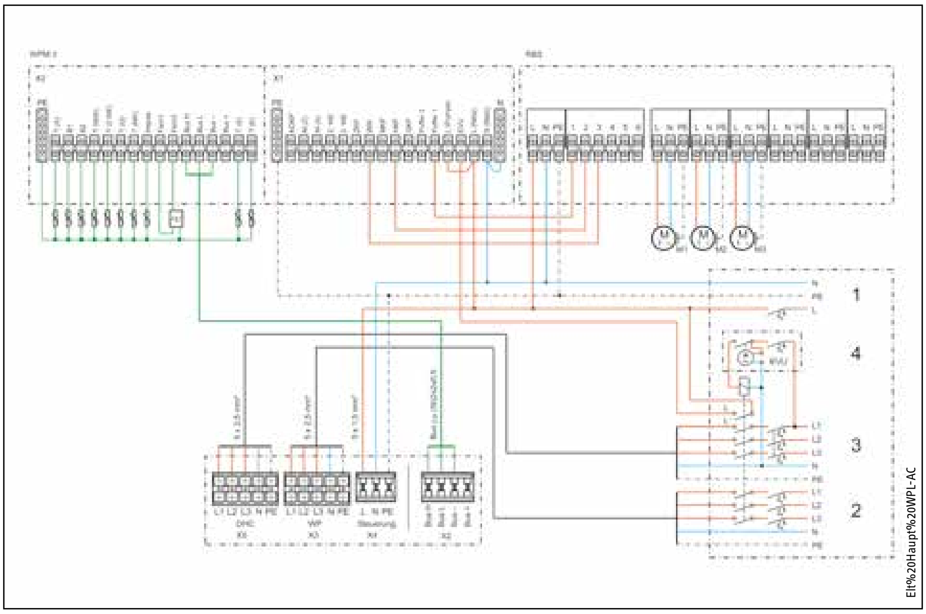
Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

WPL 15 ACS



WPL 25 AC



B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS-High
L	BUS-Low
-	BUS earth
+	BUS (not connected)
L	Power supply
MKP	Mixer circuit pump
EVU	Power enable signal
M(A)	Mixer open
M(Z)	Mixer closed
HKP	Heating circuit pump
QKP	Source circuit pump
Buffer	Buffer charging pump
1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump Heat pump meter
3	Load circuit, booster heater; 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

WPL 15/25 I(S)-2

At a glance

- Inverter technology: Variable speed compressor for perfectly matched heating output
- Very low sound emissions in the outdoor area thanks to split outdoor unit without compressor
- Easy installation thanks to laying split refrigerant lines and high level of integration
- Enhanced vapour/saturated vapour injection for a high flow temperature even at low outside temperatures
- Low operating noise thanks to infinitely adjustable fan speed
- High efficiency all year round for low running costs
- Suitable for mono mode DHW heating for low running costs
- Can be integrated into a home network and controlled via smartphone

Further accessories

232963	WK 1
232047	Split line 10x1 10 m
232050	Split line 16x1 10 m
232053	Split line 18x1 10 m
232048	Split line 10x1 15 m
232051	Split line 16x1 15 m
232054	Split line 18x1 15 m
232049	Split line 10x1 25 m
232052	Split line 16x1 25 m
232055	Split line 18x1 25 m

APPLICATION: Inverter air | water heat pump with output-dependent control, split version comprising an evaporator module for outdoor installation and a refrigeration module for indoor installation. Low sound emissions in the outdoor area make it ideal for densely built-up areas. Can be used to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. Compact internal module for easy installation, space saving with built-in controller. **EQUIPMENT / CONVENIENCE:** The compressor in the indoor unit does not transfer any noise to the outdoor air. The wide gap between the evaporator fins creates low air resistance and, in combination with the modulating fan in the outdoor unit, results in a very low sound power level. The combined enhanced vapour/saturated vapour injection cools the scroll compressor at low outside temperatures, enabling a higher heating output/flow temperature to be achieved. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The heating circuit pump is included. **EFFICIENCY:** The waste heat from the inverter is used to raise the return temperature, thereby increasing the overall efficiency of the system. Demand-dependent and energy efficient defrosting by reversing the circuit. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. **INSTALLATION**: Integral anti-vibration coupling for direct connection to the heating system. Indoor and outdoor units connected via split refrigerant lines (accessories). Quick access to the condensate tray via cleaning aperture at the rear. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. The fan grille, moulded recesses and cover are made from weather-proof and UV-resistant plastic in Aluminium white.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. The heat pump manager and output regulation match the heat pump heating output variably to the actual heat demand.

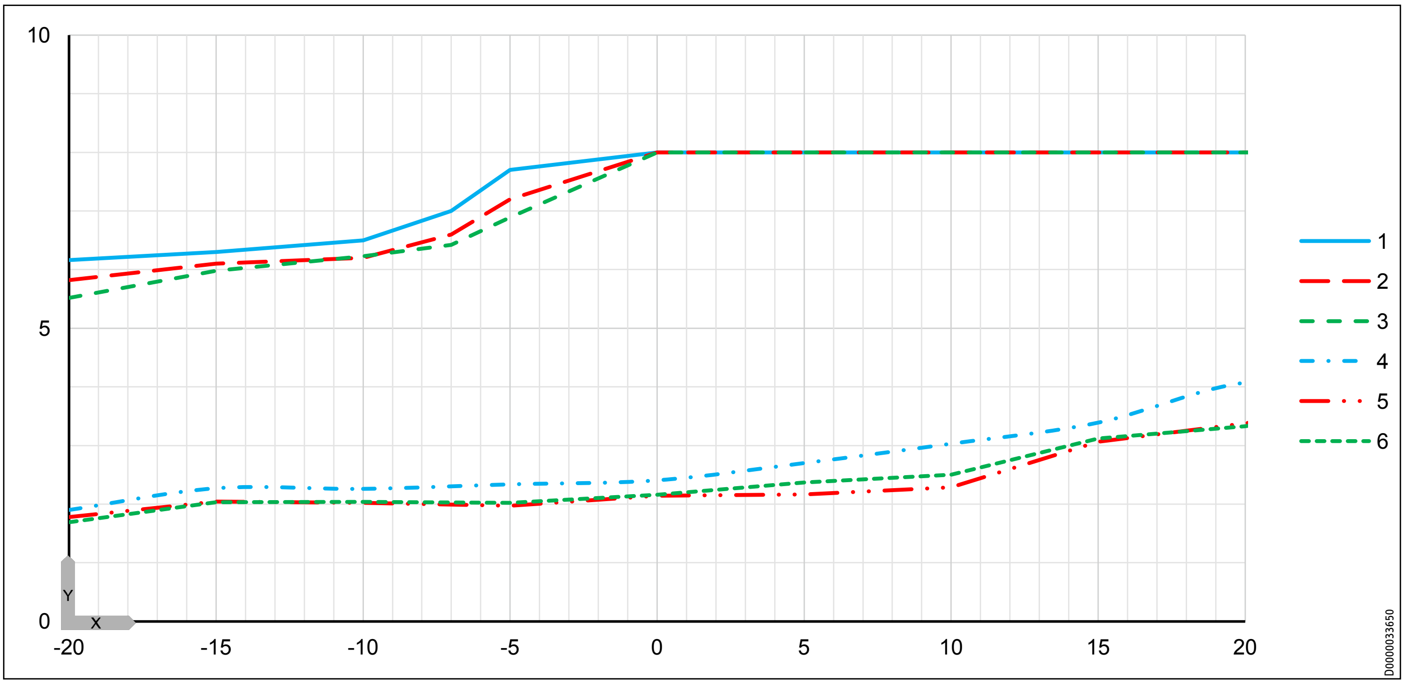
Specification

		WPL 15 IS-2	WPL 25 I-2
		231888	231889
Heating output			
Heating output at A2/W35 (min./max.)	kW	2,24/8,19	4,58/15,20
Heating output at A-7/W35 (min./max.)	kW	2,03/6,89	4,23/12,64
Heating output to EN 14511			
Heating output at A2/W35 (EN 14511)	kW	4,75	8,14
Heating output at A-7/W35 (EN 14511)	kW	6,42	11,80
Heating output at A-7/W55 (EN 14511)	kW	7,21	12,70
Power consumption			
Power consumption, emergency/booster heater	kW	6,2	8,8
Power consumption, fan heating max.	kW	0,15	0,15
Max. power consumption, circulation pump on the heating side	W	70	70
Power consumption to EN 14511			
Power consumption at A2/W35 (EN 14511)	kW	1,18	2,09
Power consumption at A-7/W35 (EN 14511)	kW	2,20	3,87
Power consumption at A-7/W55 (EN 14511)	kW	3,20	5,52
COP to EN 14511			
COP at A2/W35 (EN 14511)		4,01	3,89
COP at A-7/W35 (EN 14511)		2,92	3,05
COP at A-7/W55 (EN 14511)		2,25	2,30
Sound data			
Sound power level indoor installation (EN 12102)	dB(A)	49	51
Sound power level, indoor installation max.	dB(A)	62	62
Sound power level outdoor installation (EN 12102)	dB(A)	54	53
Sound pressure level at 5 m distance in a free field	dB(A)	32	31
Sound power level, outdoor installation (EHPA, A7/W65)	dB(A)	54	53
Max. sound power level, outdoor installation	dB(A)	62	67
Max. sound power level, outdoor installation, silent mode	dB(A)	57	63
Application limits			
Min. application limit, heat source	°C	-20	-20
Max. application limit, heat source	°C	40	40
Application limit, heat source at W55	°C	-20	-20
Application limit heat source at W60	°C	-12	-12
Application limit heat source at W65	°C	-4	-4
Min. application limit on the heating side	°C	15	15
Max. application limit on the heating side	°C	65	65
Water hardness	°dH	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1
Energy data			
Energy efficiency class		A++/A++	A++/A++

		WPL 15 IS-2	WPL 25 I-2
Electrical data			
Power supply		1/N/PE ~ 230 V	3/N/PE ~ 400 V
Starting current (with/without starting current limiter)	A	-/7	-/5
Rated voltage, compressor	V	230	400
Rated voltage, controller	V	230	230
Rated voltage, emergency/booster heater	V	230	400
Phases, compressor		1/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE
Phases, emergency/booster heater		2/N/PE	3/N/PE
Frequency	Hz	50	50
Compressor fuse/MCB	A	1 x C 20	3 x C 20
MCB/fuse protection, controller	A	1 x B 16	1 x B 16
MCB/fuse protection, emergency/booster heater	A	2 x B 16	3 x B 16
Versions			
Refrigerant		R410 A	R410 A
Compressor oil		Emkarate RL 32 3MAF / MOBIL EAL Arctic 22 CC	Emkarate RL 32 3MAF / MOBIL EAL Arctic 22 CC
Condenser material		1.4401/Cu	1.4401/Cu
Protection (IP) outdoor unit		IP14B	IP14B
Protection (IP) indoor unit		IP20	IP20
Refrigerant charge	kg	4,5	6
Dimensions			
Height of the outdoor unit	mm	920	1104
Width of the outdoor unit	mm	1097	1271
Depth of the outdoor unit	mm	515	515
Height of the indoor unit	mm	1319	1319
Width of the indoor unit	mm	598	598
Depth of the indoor unit	mm	658	658
Max. permissible split line length	m	25	25
Weights			
Weight of the outdoor unit	kg	78	93
Weight of the indoor unit	kg	150	175
Connection			
Connection, heating flow/return		28 mm	28 mm
Pipe diameter, suction gas line	mm	16 x 1	18 x 1
Connection, liquid line	mm	10 x 1	10 x 1
Values			
Heat loss		1,9	1,9
Oil quantity	l	1,18	1,18
Internal volume, heating side	l	4,35	5,99
Pre-filled for split line length	m	25	25
Max. height differential, external unit higher than internal unit	m	5	5
Max. height differential, external unit lower than internal unit	m	5	5
Min heating flow rate	m³/h	0,84	1
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,84	1
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,87	1,23
Internal pressure differential	hPa	300	160

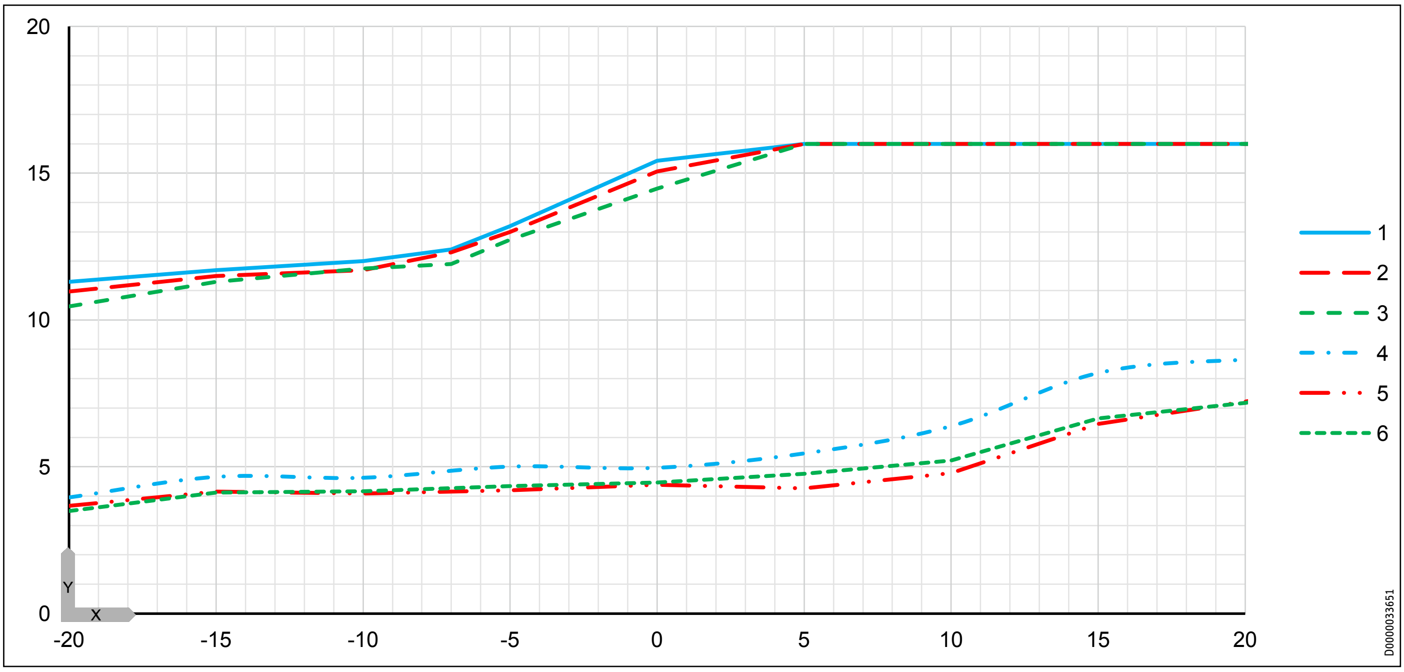
Output data

WPL 15 IS-2



X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55
5 min. W45
6 min. W35

WPL 25 I-2

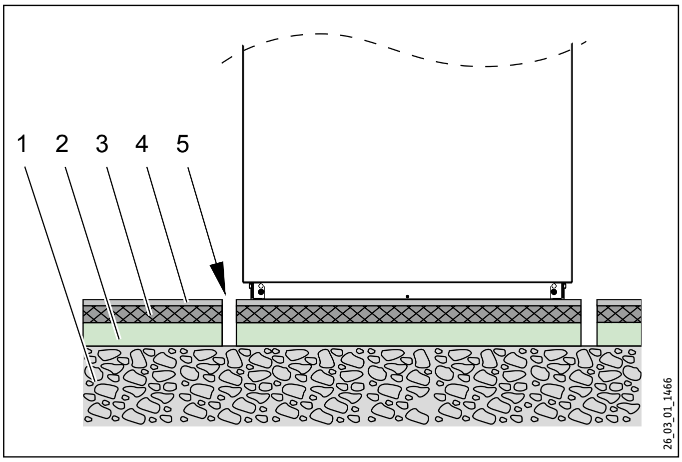


X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55
5 min. W45
6 min. W35

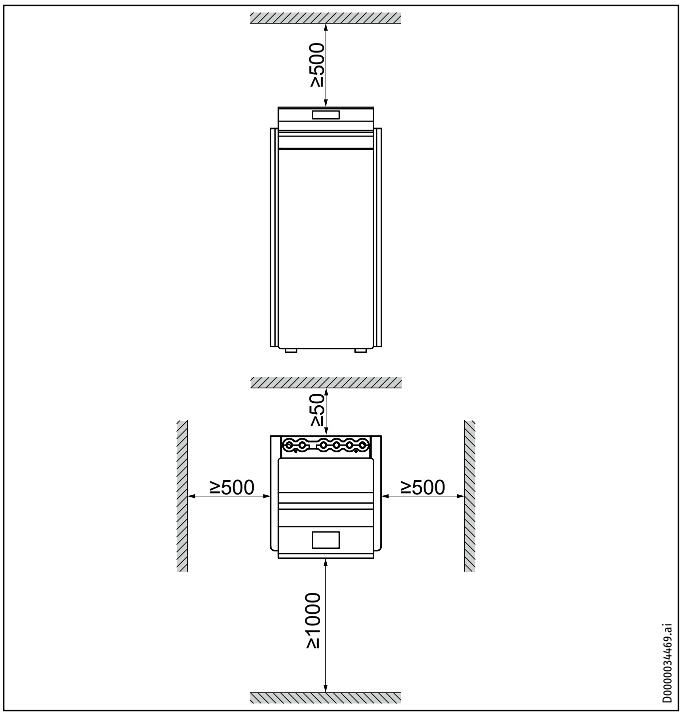
Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

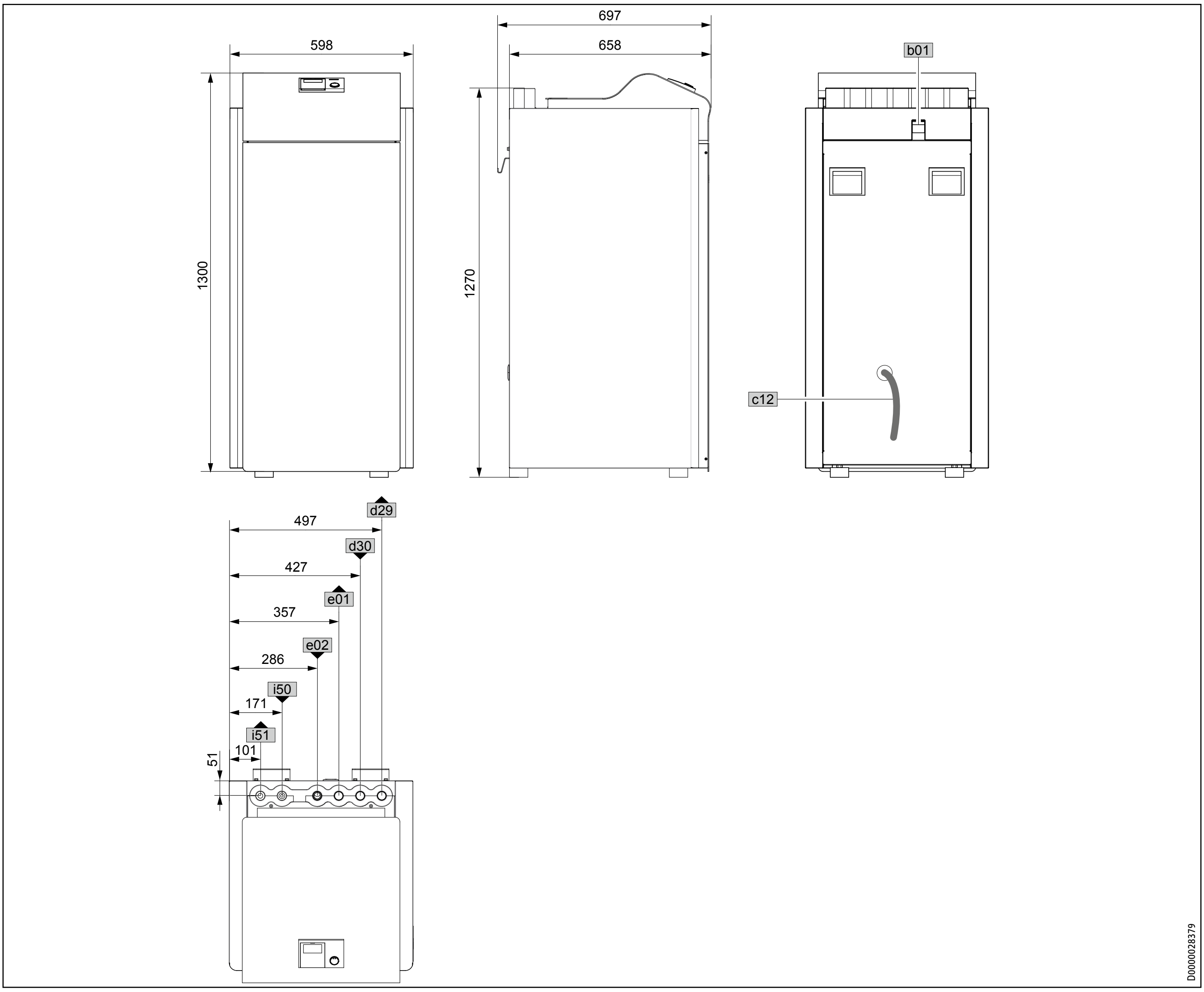
» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Indoor unit

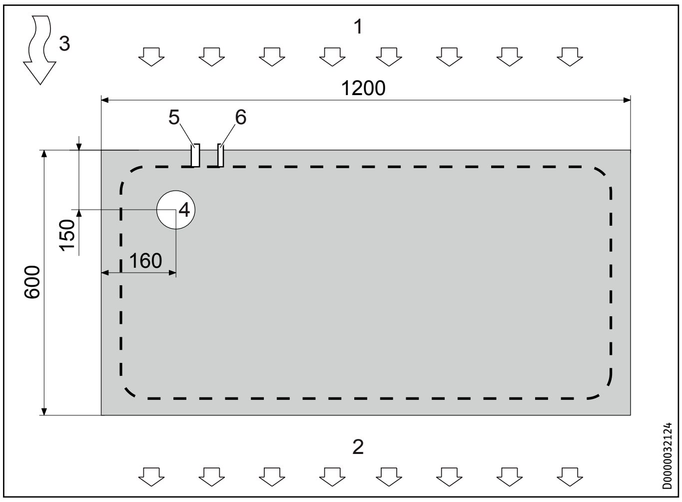


				WPL 15 IS-2 IE	WPL 25 I-2 IE
b01	Entry electrical cables				
c12	Safety valve drain				
d29	Heat exchanger flow	Diameter	mm	28	28
d30	Heat exchanger return	Diameter	mm	28	28
e01	Heating flow	Diameter	mm	28	28
e02	Heating return	Diameter	mm	28	28
i50	Refrigerant suction gas line	Diameter	mm	16	18
i51	Refrigerant liquid line	Diameter	mm	10	10

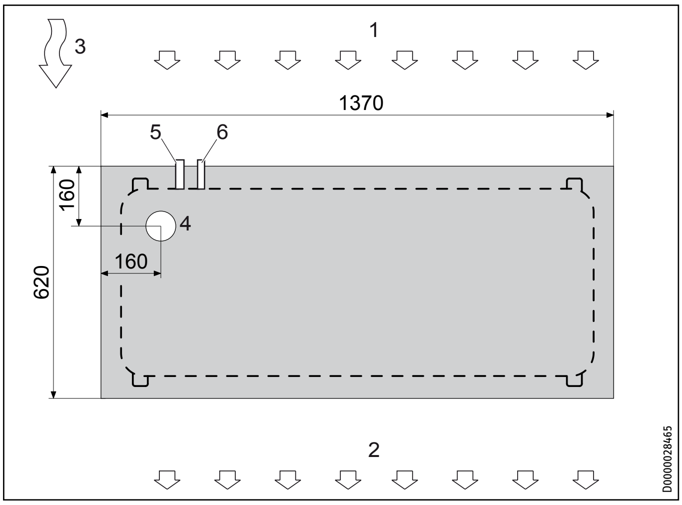
Installation location requirements

- Maintain minimum clearances towards buildings
- Never install the appliance inside a shaft.
- The outside part must be level (horizontal).
- The main wind direction must not be towards the fan.
- When selecting the installation site, remember that the appliance generates noise during operation.
- In winter, the outside part must not be covered with snow or be submerged if there is heavy rainfall.
- Ensure access to the connection space under the plastic cover.
- Condensate must be able to freely drain underneath the appliance, even during frosty weather.
- The appliance must be securely fitted to the bracket, the pillar or the kerb.
- Observe the static limits of the T-support used.
- Observe the static limits of the building wall and the wall mounting bracket.

WPL 15 IS-2



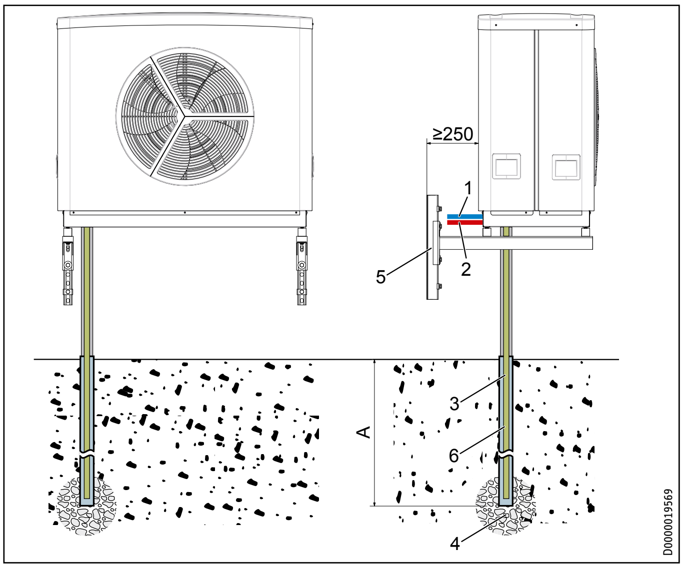
WPL 25 I-2



1 Air intake side
2 Air discharge side
3 Main wind direction
4 Condensate drain
5 Refrigerant suction gas line
6 Refrigerant LPG

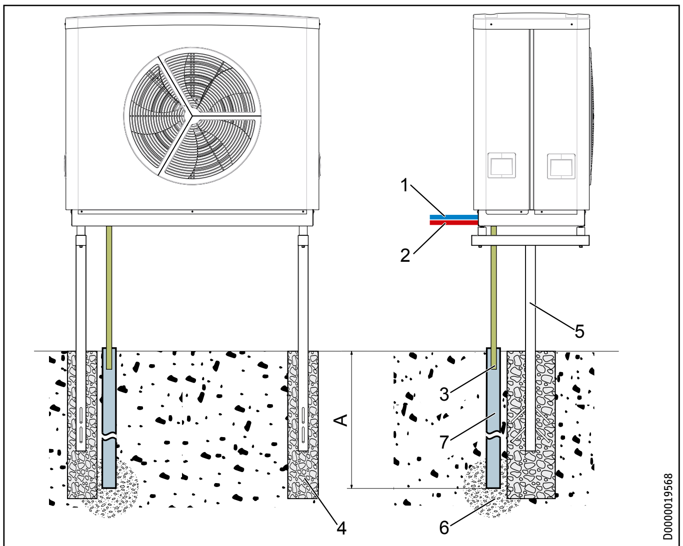
External unit

Example: Wall mounting bracket



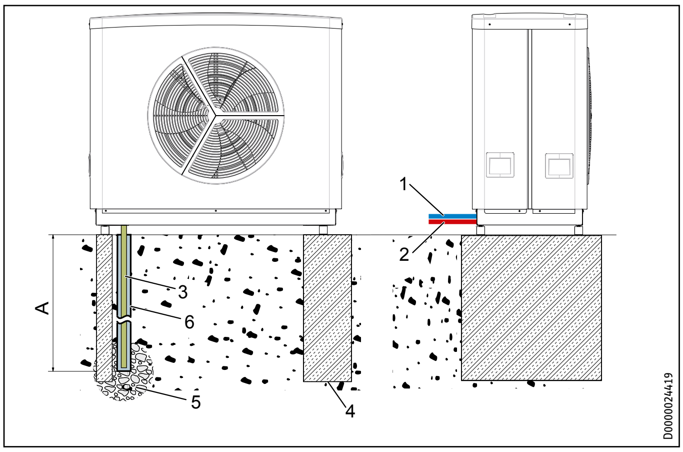
A	Depth of frost line	4	Gravel bed
1	Refrigerant suction gas line	5	Wall mounting bracket
2	Refrigerant liquid gas line	6	Condensate drain pipe
3	Condensate drain		

Example: T-support



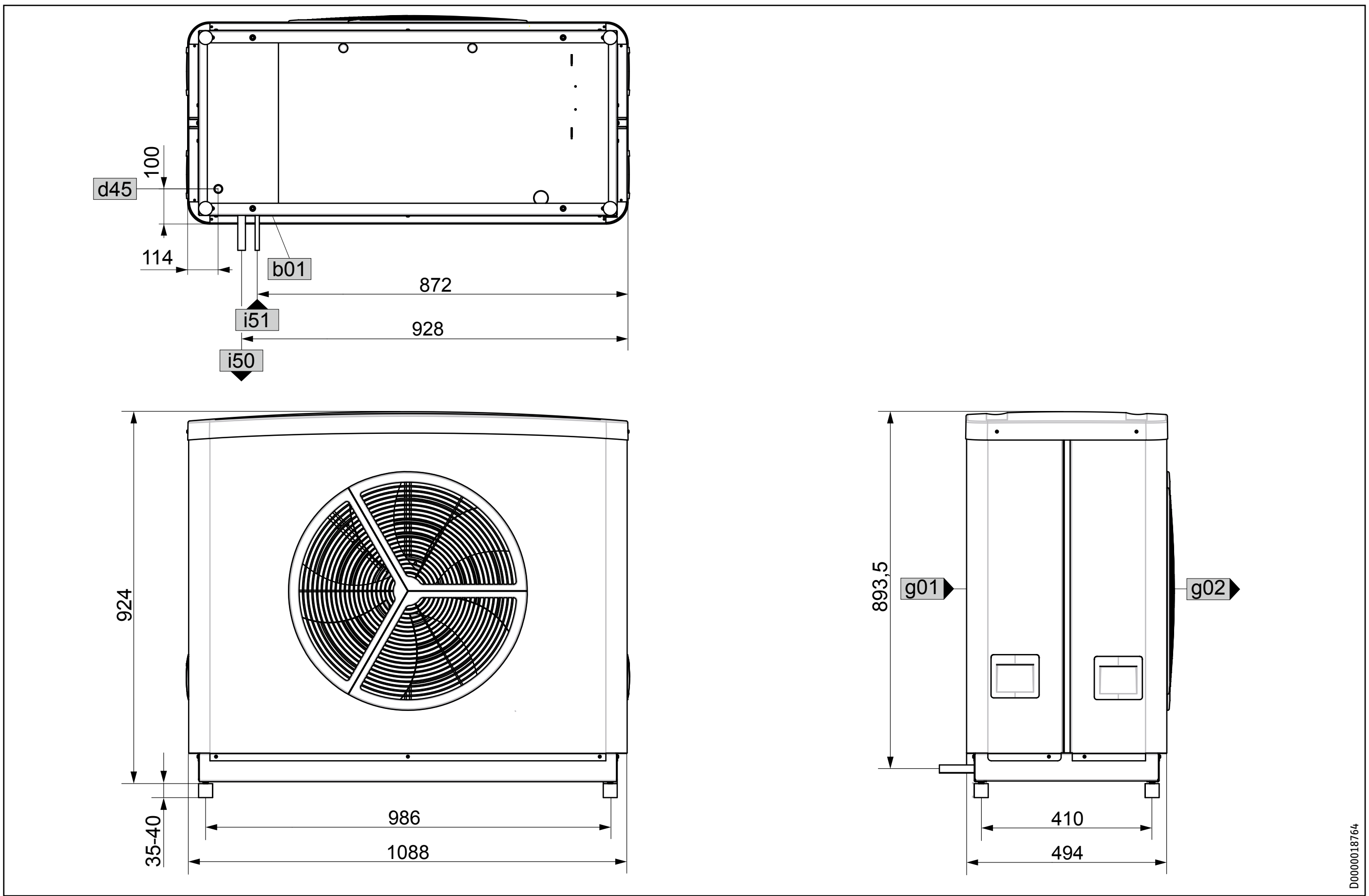
A	Depth of frost line	4	Foundation
1	Refrigerant suction gas line	5	T-support
2	Refrigerant liquid gas line	6	Gravel bed
3	Condensate drain	7	Condensate drain pipe

Example: Strip foundation

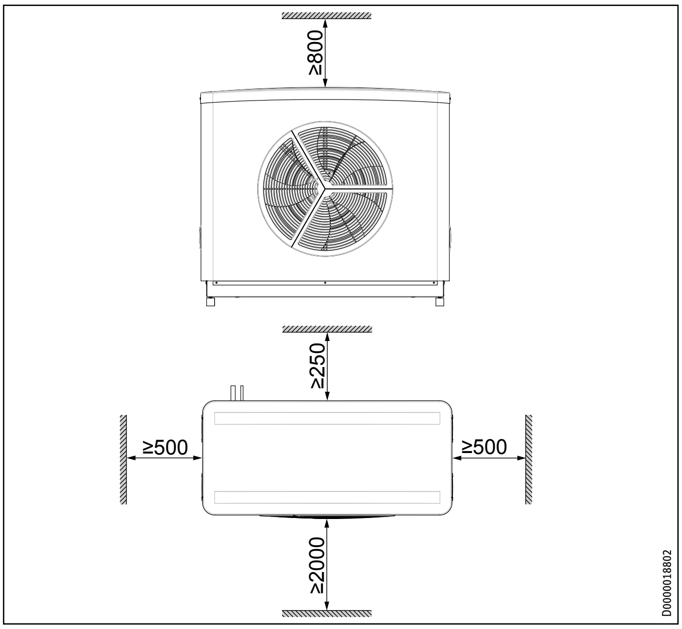


A	Depth of frost line	4	Foundation
1	Refrigerant suction gas line	5	Gravel bed
2	Refrigerant liquid gas line	6	Condensate drain pipe
3	Condensate drain		

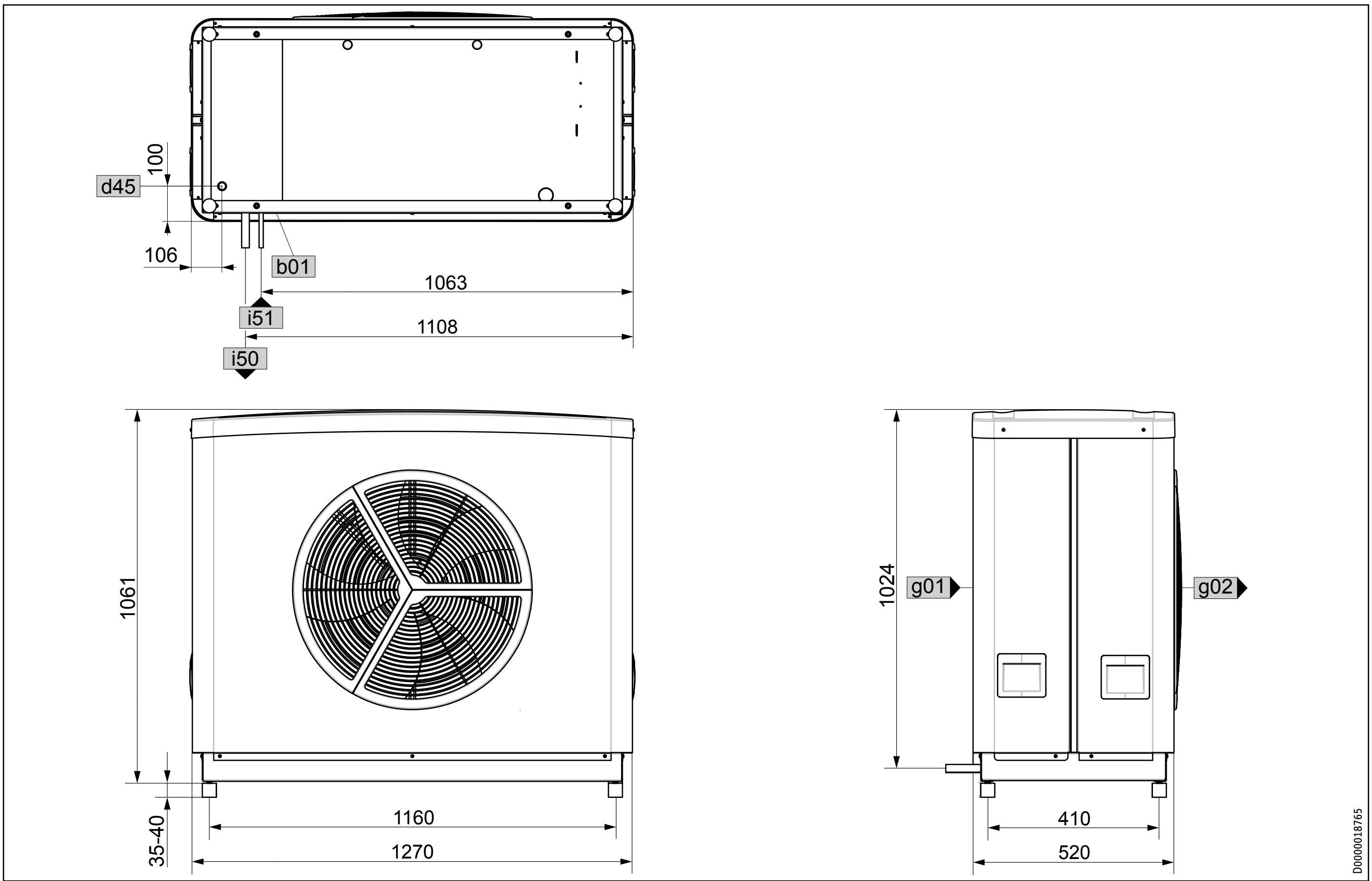
WPL 15 IS-2



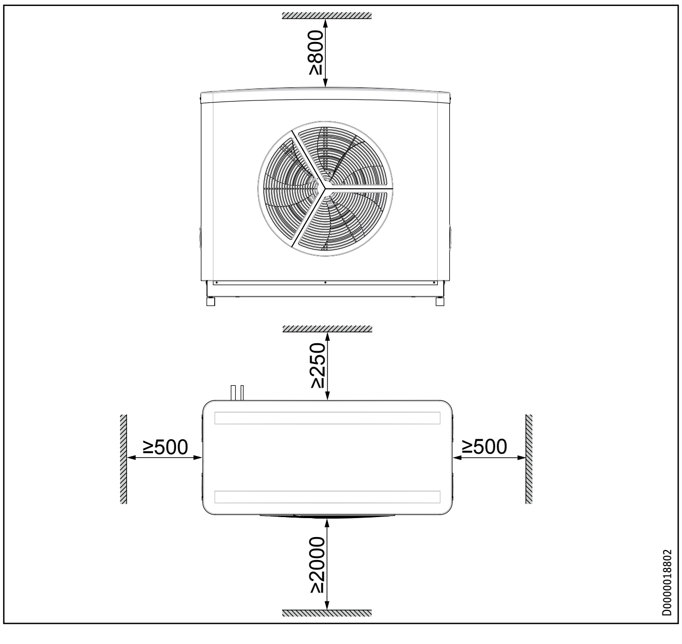
			WPL 15-2 AE
b01 Entry electrical cables			
d45 Condensate drain			
g01 Air intake			
g02 Air discharge			
i50 Refrigerant suction gas line	Diameter	mm	16
i51 Refrigerant liquid line	Diameter	mm	10



WPL 25 I-2



			WPL 25-2 AE
b01 Entry electrical cables			
d45 Condensate drain			
g01 Air intake			
g02 Air discharge			
i50 Refrigerant suction gas line	Diameter	mm	18
i51 Refrigerant liquid line	Diameter	mm	10



Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

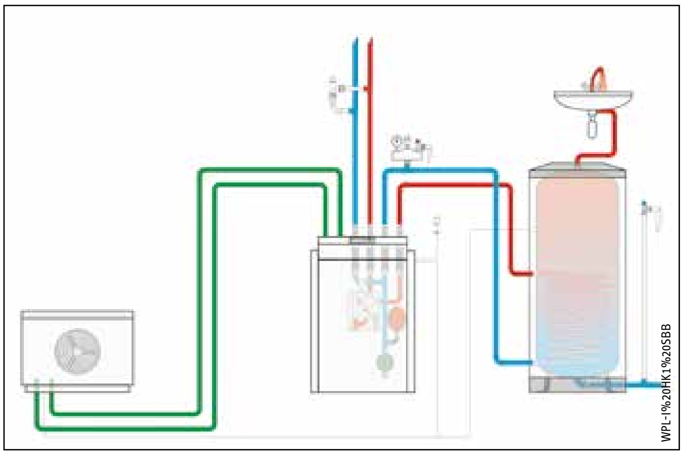
Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Anti-vibration mounts are integrated into the indoor unit in order to reduce structure-borne sound on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Note
Work on the refrigerant circuit must only be carried out by qualified contractors. The qualified contractor must be certified acc. to Art. 5 Paragraph 2 of the EC Regulation No. 842/2006.

Heat pump with DHW heating



Installation of refrigerant lines

The outdoor unit can be installed higher or lower than the indoor unit. The maximum permissible height differential and the line lengths are specific to the appliance.

» Refrigerant must be topped up according to the refrigerant line length.

» Insulate the entire refrigerant line and junctions with vapour diffusion-proof thermal insulation.

» Secure the pipe assembly to the outside wall.

» The indoor unit and refrigerant lines must be evacuated correctly.

» Separate the refrigerant lines with a suitable pipe cutter.

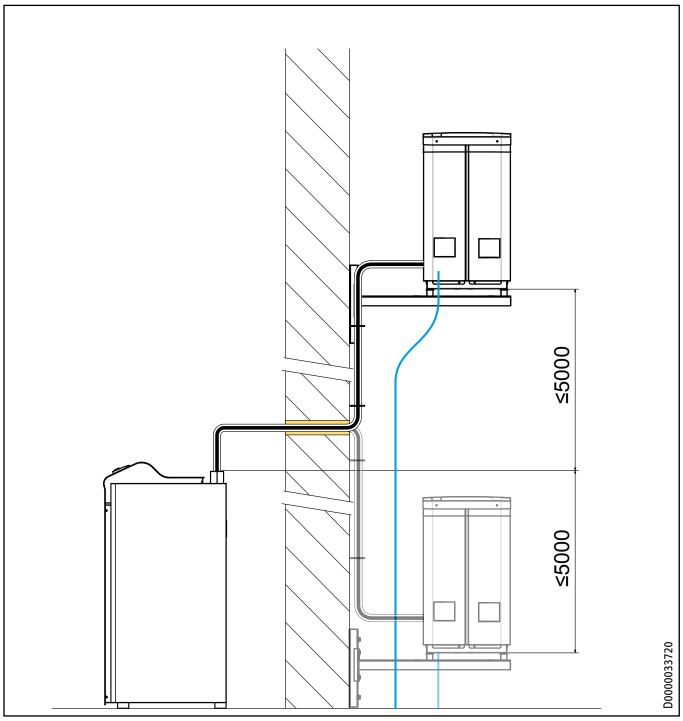
» No dirt and no moisture must enter the pipework.

» Never kink refrigerant lines.

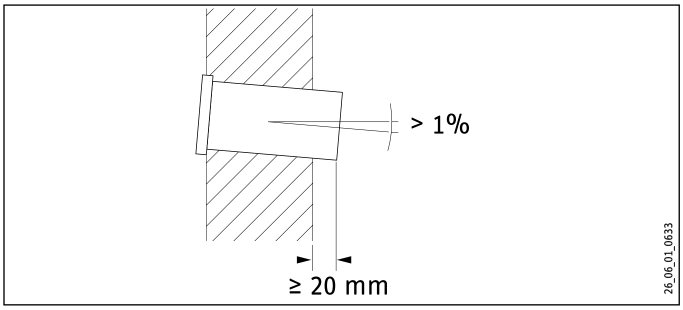
» The refrigerant lines and the connection points must be checked for leaks.

» Refrigerant lines must be made of copper to DIN 12735-1 and must have robust and UV-resistant insulation of fire protection class 2.

» Seal the wall outlet with suitable sealant.



1 Outdoor unit higher than indoor unit
2 Outdoor unit lower than indoor unit



Power supply

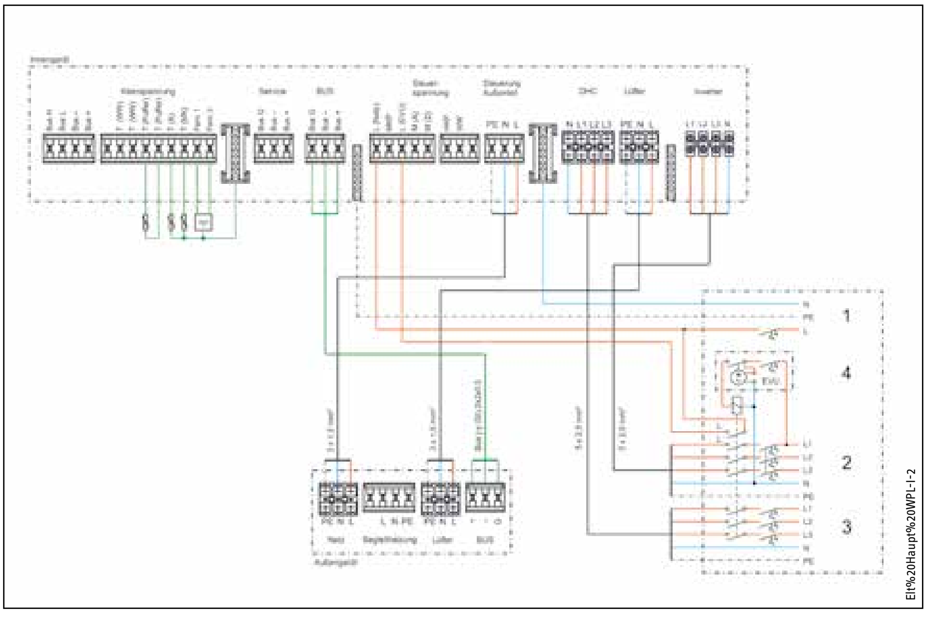
Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

WPL I-2



T (WW)	Temperature sensor, DHW	2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
T (A)	Outside temperature sensor	3	Load circuit, booster heater; 3/N/PE 230V 50Hz Heat pump meter
T (MK)	Temperature sensor, mixer circuit	4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period
Fern1	Remote control		
Fern3	Remote control		
L EVU	Power enable signal		
MKP	Mixer circuit pump		
M(A)	Mixer open		
L (Netz)	Power supply		
1	Control circuit 1/N/PE 230V 50Hz Domestic meter		

WPL 15/25 IK(S)-2

At a glance

- Inverter technology: Variable speed compressor for perfectly matched heating output
- Very low sound emissions in the outdoor area thanks to split outdoor unit without compressor
- Easy installation thanks to laying split refrigerant lines and high level of integration
- Enhanced vapour/saturated vapour injection for a high flow temperature even at low outside temperatures
- Low operating noise thanks to infinitely adjustable fan speed
- High efficiency all year round for low running costs
- Suitable for mono mode DHW heating for low running costs
- Can be integrated into a home network and controlled via smartphone

Parts of the set

Heat pump module

Hydraulic module

APPLICATION: Compact inverter air | water heat pump with output-dependent control, split version comprising an evaporator module for outdoor installation and a refrigeration module with integral DHW cylinder for indoor installation. Low sound emissions in the outdoor area make it ideal for densely built-up areas. Can be used to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. Compact internal module for easy installation, space saving with built-in controller. **EQUIPMENT / CONVENIENCE:** The compressor in the indoor unit does not transfer any noise to the outdoor air. The wide gap between the evaporator fins creates low air resistance and, in combination with the modulating fan in the outdoor unit, results in a very low sound power level. The combined enhanced vapour/saturated vapour injection cools the scroll compressor at low outside temperatures, enabling a higher heating output/ flow temperature to be achieved. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The heating circuit pump is included. **EFFICIENCY:** The waste heat from the inverter is used to raise the return temperature, thereby increasing the overall efficiency of the system. Demand-dependent and energy efficient defrosting by reversing the circuit. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. **INSTALLATION**: Integral anti-vibration coupling for direct connection to the heating system. Indoor and outdoor units connected via split refrigerant lines (accessories). Quick access to the condensate tray via cleaning aperture at the rear. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. The fan grille, moulded recesses and cover are made from weather-proof and UV-resistant plastic in Aluminium white.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. The heat pump manager and output regulation match the heat pump heating output variably to the actual heat demand.

Specification

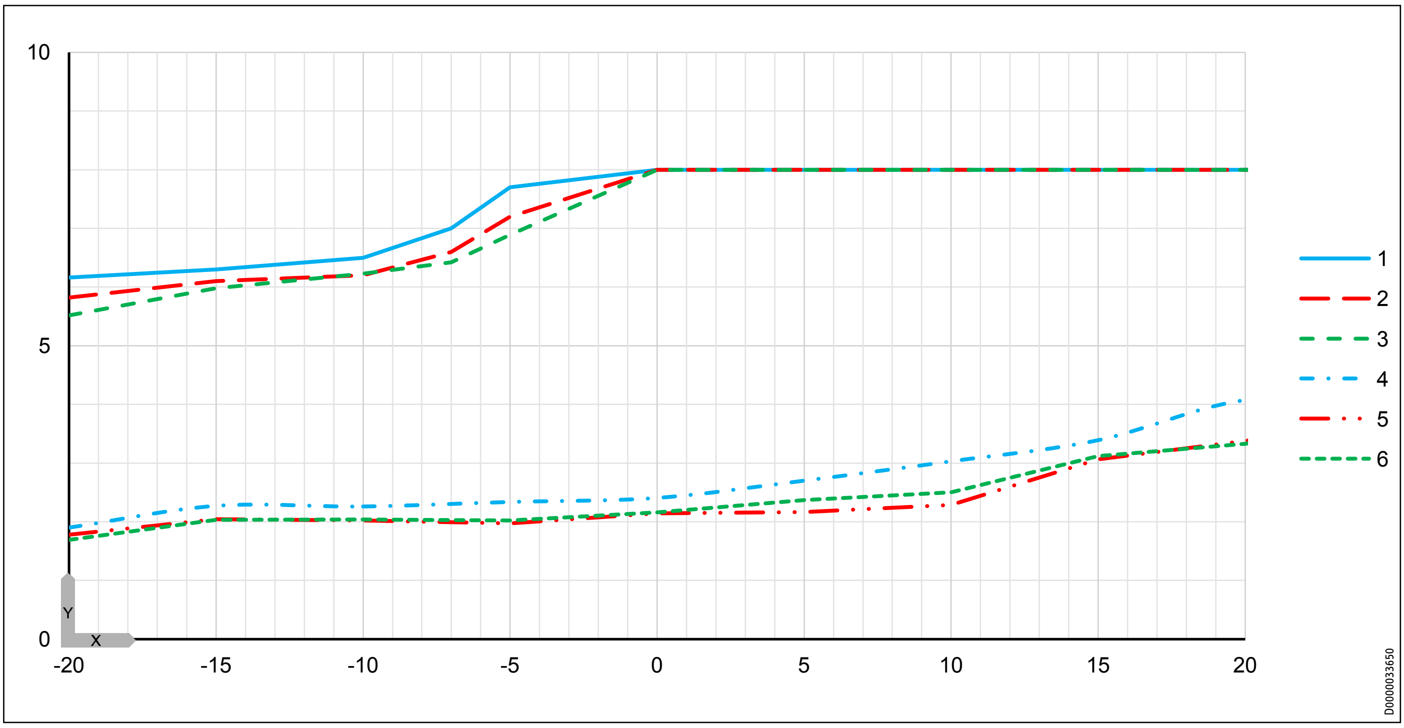
		WPL 15 IKS-2	WPL 25 IK-2
		231886	231887
Heating output to EN 14511			
Heating output at A2/W35 (EN 14511)	kW	4,75	8,14
Heating output at A-7/W35 (EN 14511)	kW	6,42	11,80
Heating output at A-7/W55 (EN 14511)	kW	7,21	12,70
Heating output			
Heating output at A2/W35 (min./max.)	kW	2,24/8,19	4,58/15,20
Heating output at A-7/W35 (min./max.)	kW	2,03/6,89	4,23/12,64
Power consumption			
Power consumption, emergency/booster heater	kW	6,2	8,8
Power consumption, fan heating max.	kW	0,15	0,15
Max. power consumption, circulation pump on the heating side	W	70	70
Power consumption to EN 14511			
Power consumption at A2/W35 (EN 14511)	kW	1,18	2,09
Power consumption at A-7/W35 (EN 14511)	kW	2,20	3,87
Power consumption at A-7/W55 (EN 14511)	kW	3,20	5,52
COP to EN 14511			
COP at A2/W35 (EN 14511)		4,01	3,89
COP at A-7/W35 (EN 14511)		2,92	3,05
COP at A-7/W55 (EN 14511)		2,25	2,30
Sound data			
Sound power level indoor installation (EN 12102)	dB(A)	48	49
Sound power level, indoor installation max.	dB(A)	62	62
Sound power level outdoor installation (EN 12102)	dB(A)	54	53
Sound pressure level at 5 m distance in a free field	dB(A)	32	31
Sound power level, outdoor installation (EHPA, A7/W65)	dB(A)	54	53
Max. sound power level, outdoor installation	dB(A)	62	67
Max. sound power level, outdoor installation, silent mode	dB(A)	57	63
Application limits			
Min. application limit, heat source	°C	-20	-20
Max. application limit, heat source	°C	40	40
Application limit, heat source at W55	°C	-20	-20
Application limit heat source at W60	°C	-12	-12
Application limit heat source at W65	°C	-4	-4
Min. application limit on the heating side	°C	15	15
Max. application limit on the heating side	°C	65	65
Water hardness	°dH	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1
Values			
Heat loss		1,9	1,9
Oil quantity	l	1,18	1,18
Internal volume, heating side	l	4,35	4,6
Pre-filled for split line length	m	25	25
Max. height differential, external unit higher than internal unit	m	5	5
Max. height differential, external unit lower than internal unit	m	5	5
Min heating flow rate	m³/h	0,84	1
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,84	1
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,87	1,23
Permissible operating pressure, DHW	MPa	1	1
Internal pressure differential	hPa	300	160

WPL 15/25 IK(S)-2

		WPL 15 IKS-2	WPL 25 IK-2
Hydraulic data			
Nominal capacity	l	162	162
Electrical data			
Power supply		1/N/PE ~ 230 V	3/N/PE ~ 400 V
Starting current (with/without starting current limiter)	A	-/7	-/5
Rated voltage, compressor	V	230	400
Rated voltage, controller	V	230	230
Rated voltage, emergency/booster heater	V	230	400
Phases, compressor		1/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE
Phases, emergency/booster heater		2/N/PE	3/N/PE
Frequency	Hz	50	50
Compressor fuse/MCB	A	1 x C 20	3 x C 20
MCB/fuse protection, controller	A	1 x B 16	1 x B 16
MCB/fuse protection, emergency/booster heater	A	2 x B 16	3 x B 16
Energy data			
Energy efficiency class		A++/A++	A++/A++
Energy efficiency class, DHW heating with load profile XL		A	A
Versions			
Refrigerant		R410 A	R410 A
Compressor oil		Emkarate RL 32 3MAF / MOBIL EAL Arctic 22 CC	Emkarate RL 32 3MAF / MOBIL EAL Arctic 22 CC
Condenser material		1.4401/Cu	1.4401/Cu
Protection (IP) outdoor unit		IP14B	IP14B
Protection (IP) indoor unit		IP20	IP20
Refrigerant charge	kg	4,5	6
Dimensions			
Height of the outdoor unit	mm	920	1104
Width of the outdoor unit	mm	1097	1271
Depth of the outdoor unit	mm	515	515
Height of the indoor unit	mm	1319	1960
Width of the indoor unit	mm	598	600
Depth of the indoor unit	mm	658	650
Height when tilted	mm	2100	2100
Max. permissible split line length	m	25	25
Weights			
Weight of the outdoor unit	kg	78	93
Weight of the indoor unit	kg	150	326
Connection			
Connection, heating flow/return		28 mm	22 mm
Pipe diameter, suction gas line	mm	16 x 1	18 x 1
Connection, liquid line	mm	10 x 1	10 x 1

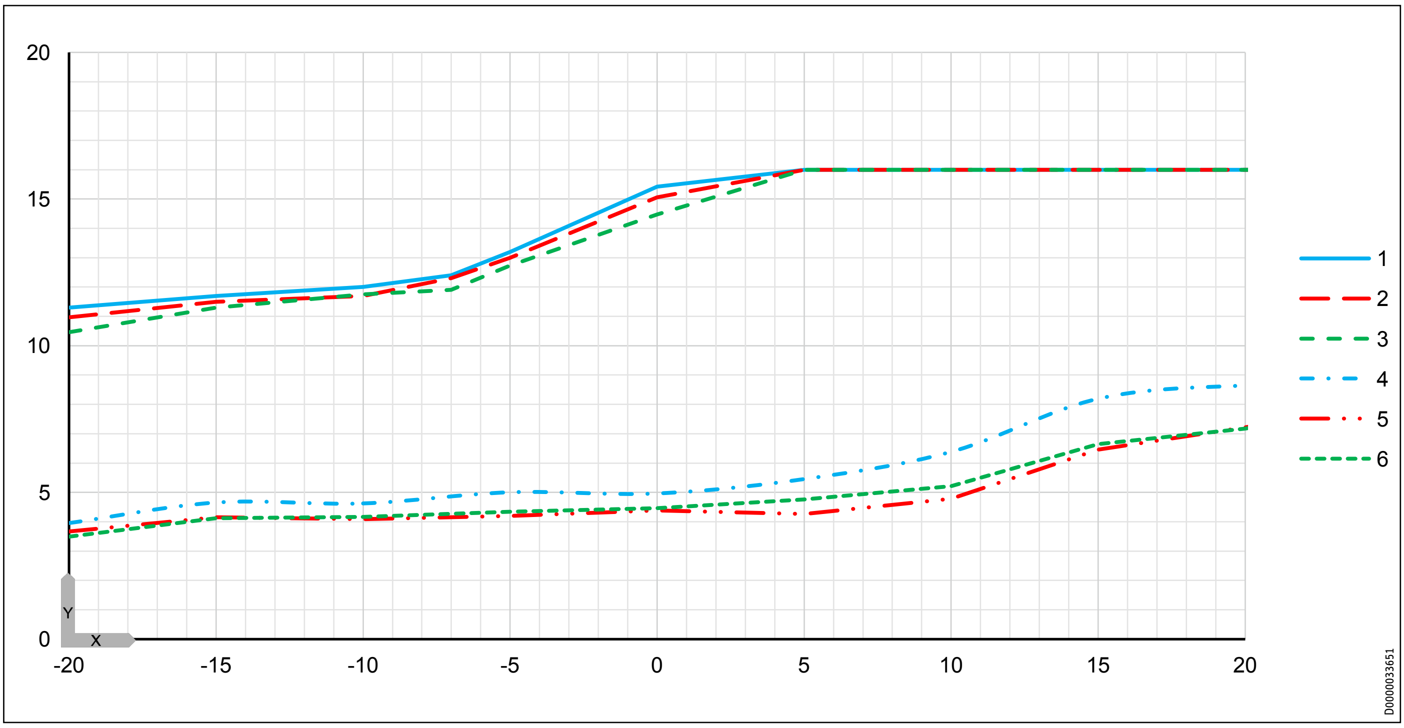
Output data

WPL 15 IKS-2



X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55
5 min. W45
6 min. W35

WPL 25 IK-2



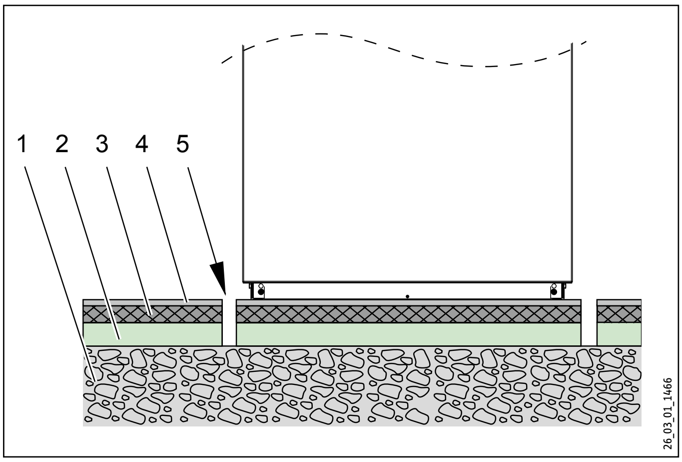
X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55
5 min. W45
6 min. W35

Indoor unit

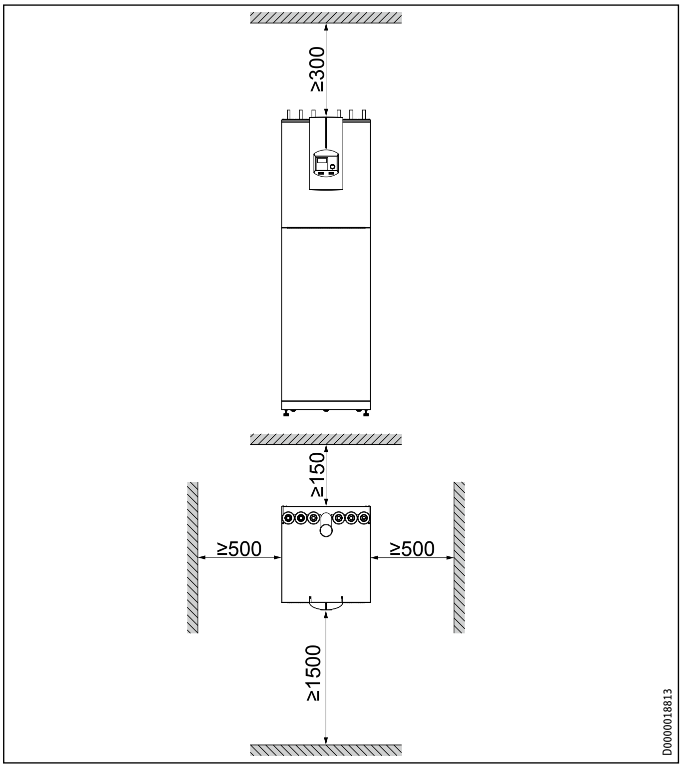
Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

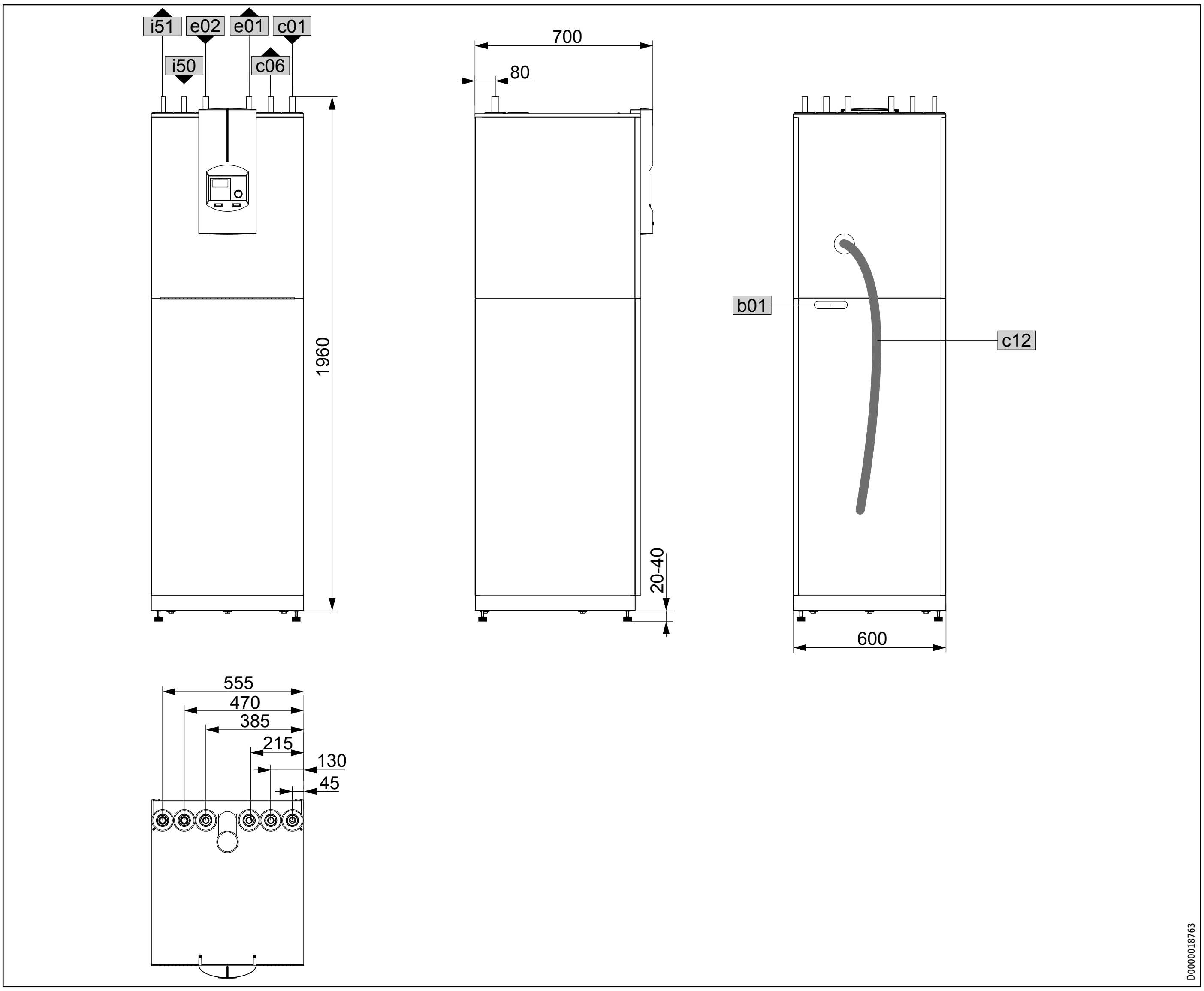
» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Indoor unit



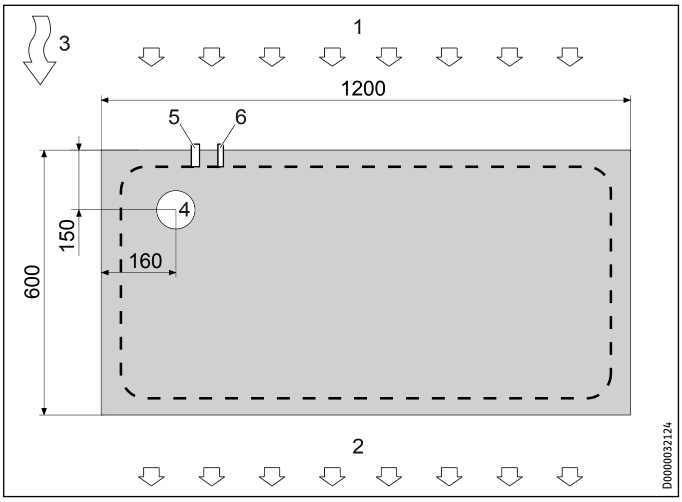
				WPL 15 IKS-2 IE	WPL 25 IK-2 IE
b01	Entry electrical cables				
c01	Cold water inlet	Diameter	mm	22	22
c06	DHW outlet	Diameter	mm	22	22
c12	Safety valve drain				
e01	Heating flow	Diameter	mm	22	22
e02	Heating return	Diameter	mm	22	22
i50	Refrigerant suction gas line	Diameter	mm	16	18
i51	Refrigerant liquid line	Diameter	mm	10	10

External unit

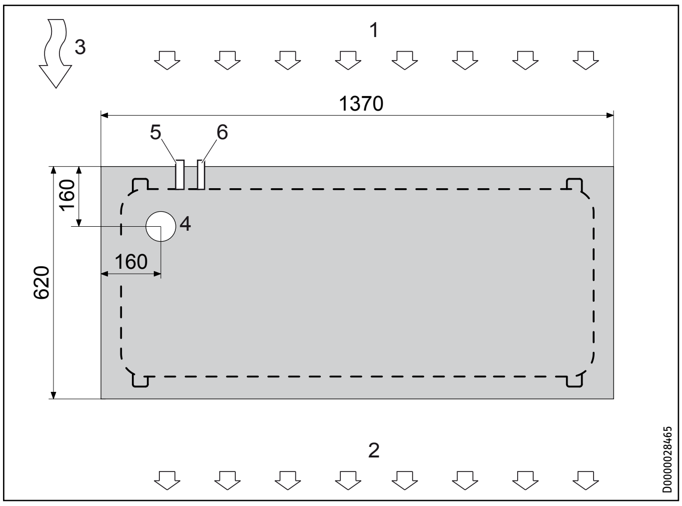
Installation location requirements

» Maintain minimum clearances towards buildings
» Never install the appliance inside a shaft.
» The outside part must be level (horizontal).
» The main wind direction must not be towards the fan.
» When selecting the installation site, remember that the appliance generates noise during operation.
» In winter, the outside part must not be covered with snow or be submerged if there is heavy rainfall.
» Ensure access to the connection space under the plastic cover.
» Condensate must be able to freely drain underneath the appliance, even during frosty weather.
» The appliance must be securely fitted to the bracket, the pillar or the kerb.
» Observe the static limits of the T-support used.
» Observe the static limits of the building wall and the wall mounting bracket.

WPL 15 IKS-2



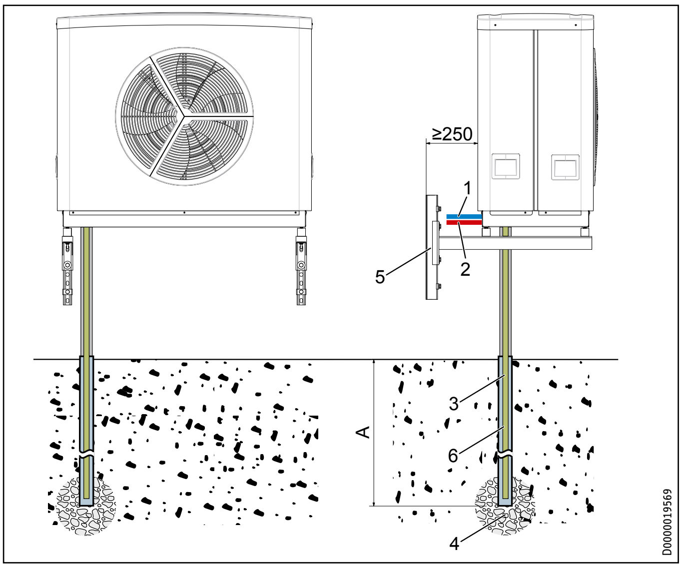
WPL 25 IK-2



1 Air intake side
2 Air discharge side
3 Main wind direction
4 Condensate drain
5 Refrigerant suction gas line
6 Refrigerant liquid gas line

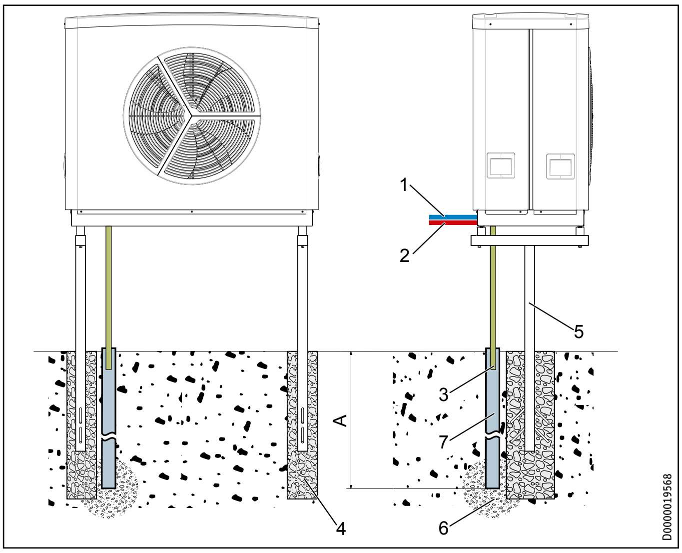
External unit

Example: Wall mounting bracket



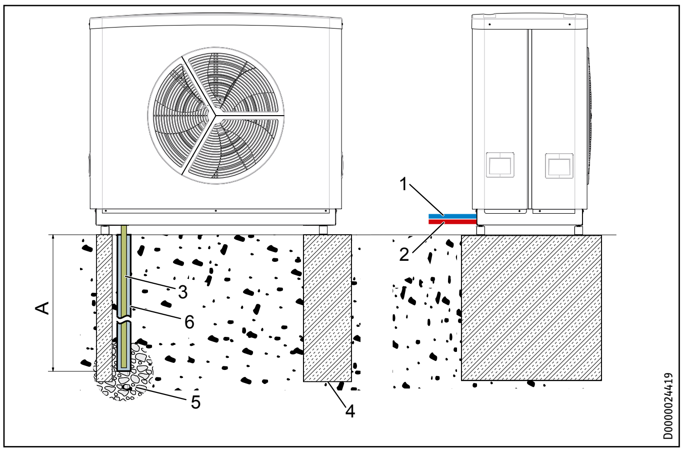
A	Depth of frost line	4	Gravel bed
1	Refrigerant suction gas line	5	Wall mounting bracket
2	Refrigerant liquid gas line	6	Condensate drain pipe
3	Condensate drain		

Example: T-support



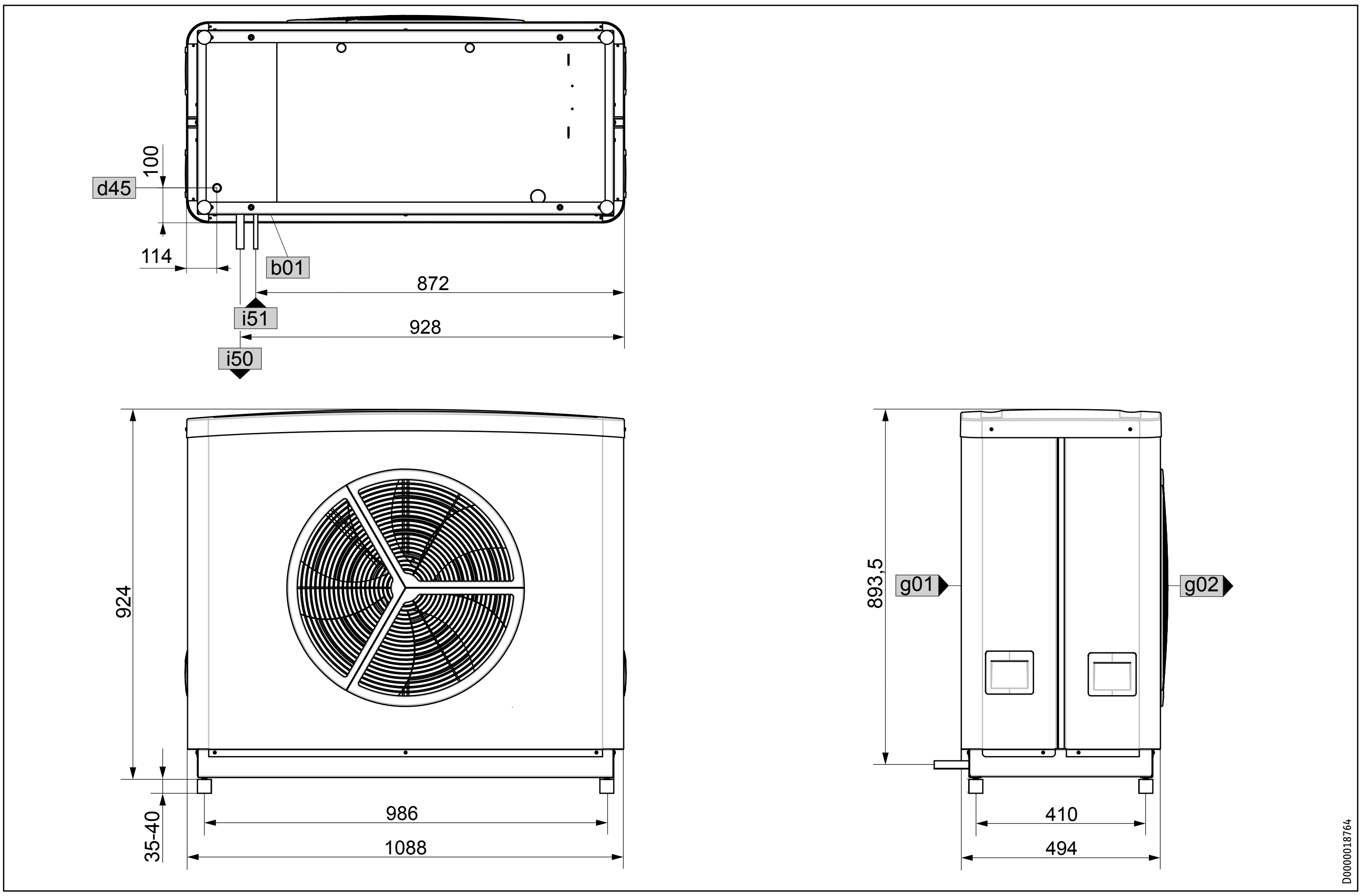
A	Depth of frost line	4	Foundation
1	Refrigerant suction gas line	5	T-support
2	Refrigerant liquid gas line	6	Gravel bed
3	Condensate drain	7	Condensate drain pipe

Example: Strip foundation

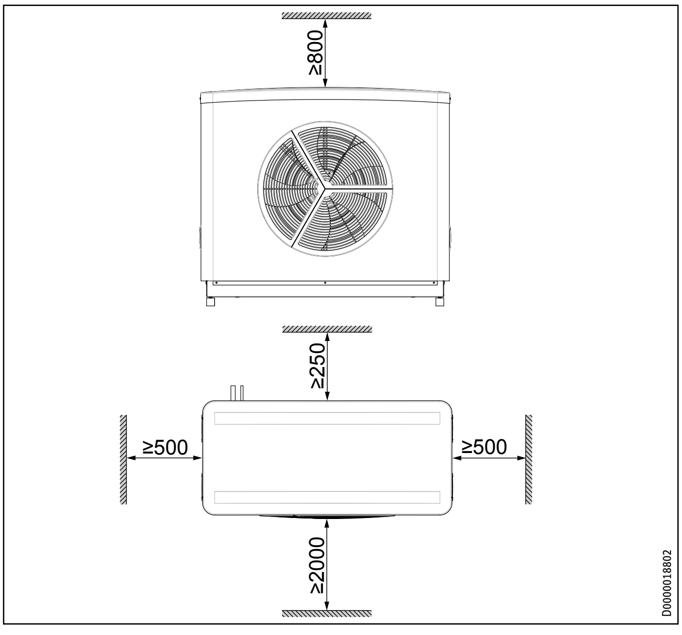


A	Depth of frost line	4	Foundation
1	Refrigerant suction gas line	5	Gravel bed
2	Refrigerant liquid gas line	6	Condensate drain pipe
3	Condensate drain		

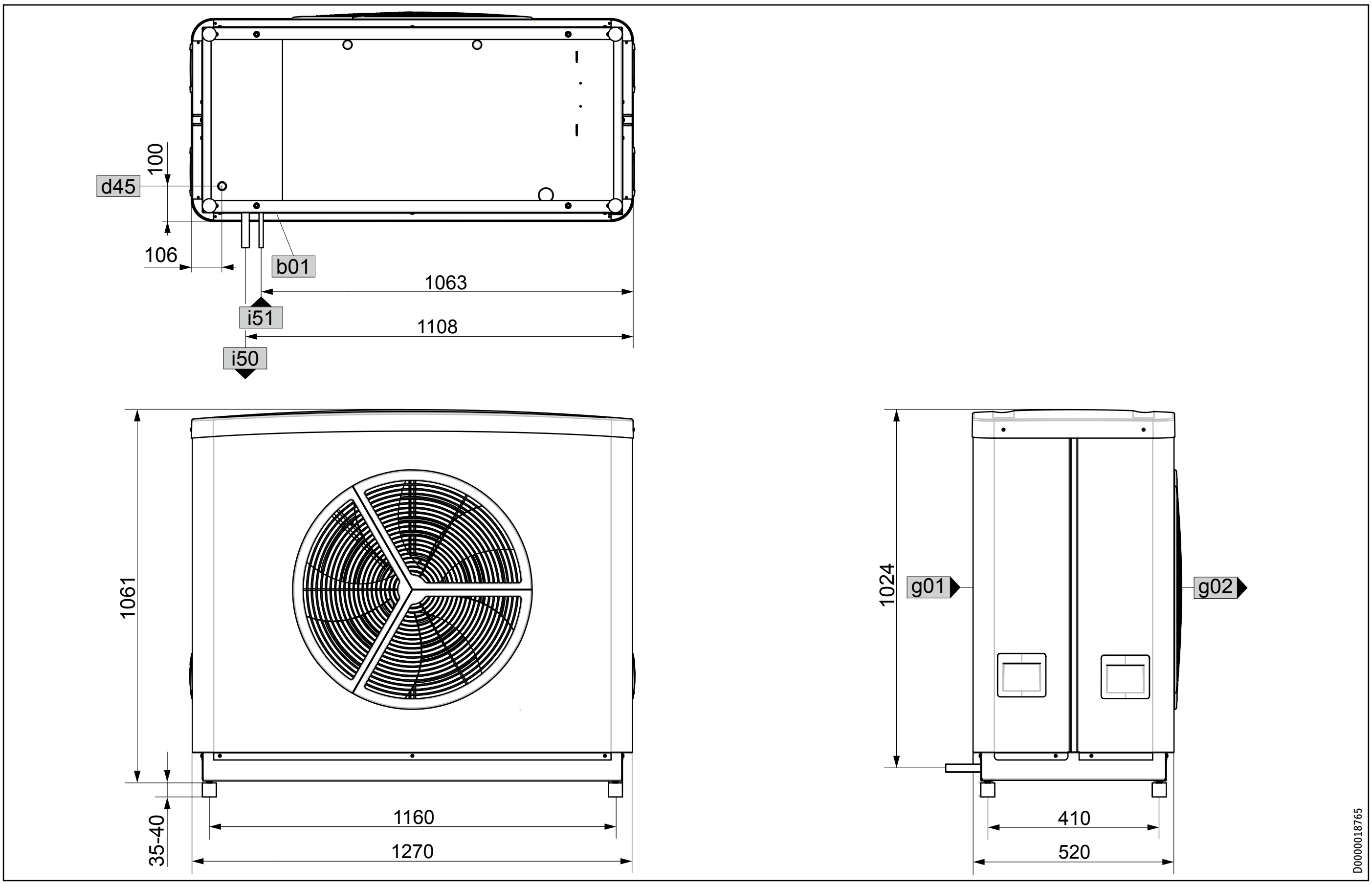
WPL 15 IKS-2



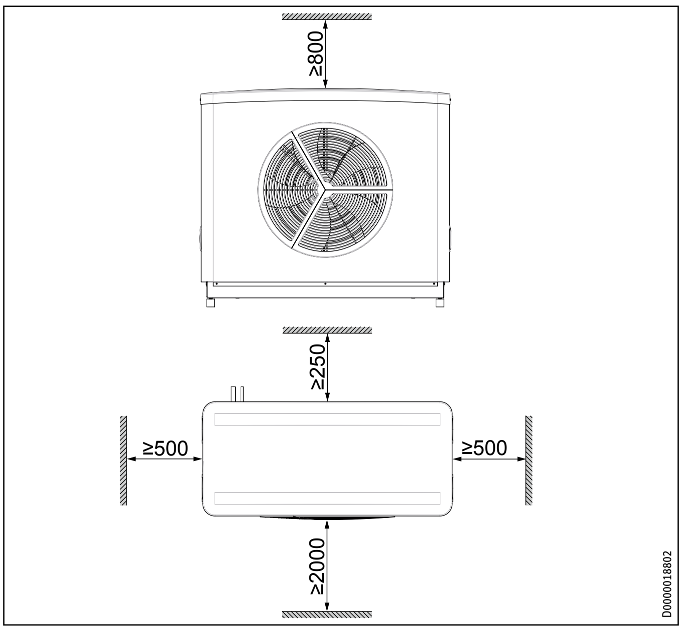
			WPL 15-2 AE
b01 Entry electrical cables			
d45 Condensate drain			
g01 Air intake			
g02 Air discharge			
i50 Refrigerant suction gas line	Diameter	mm	16
i51 Refrigerant liquid line	Diameter	mm	10



WPL 25 IK-2



			WPL 25-2 AE
b01 Entry electrical cables			
d45 Condensate drain			
g01 Air intake			
g02 Air discharge			
i50 Refrigerant suction gas line	Diameter	mm	18
i51 Refrigerant liquid line	Diameter	mm	10



Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

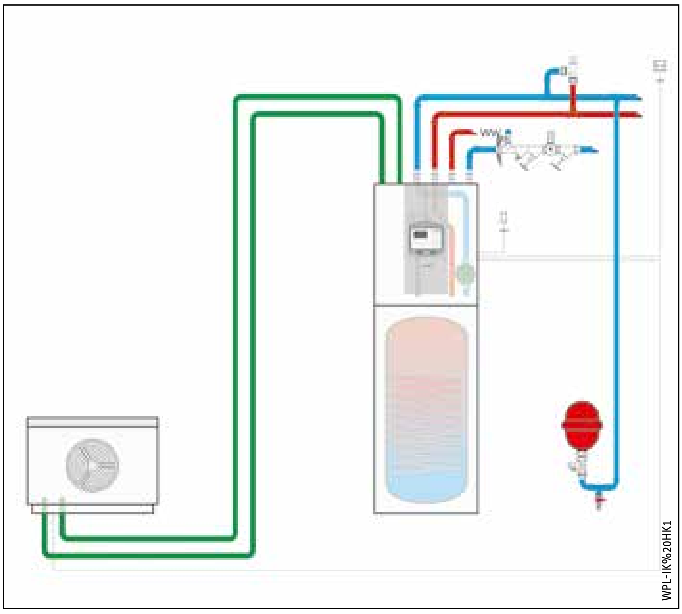
Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

The reduction of structure-borne sound requires a connection with pressure hoses.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Note
Work on the refrigerant circuit must only be carried out by qualified contractors. The qualified contractor must be certified acc. to Art. 5 Paragraph 2 of the EC Regulation No. 842/2006.

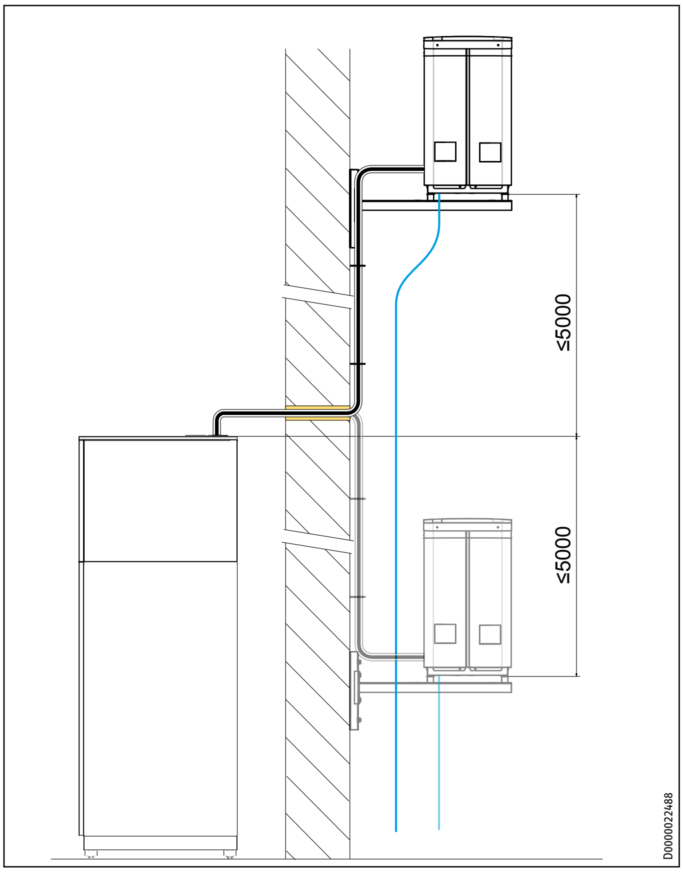
Heat pump module with evaporator module



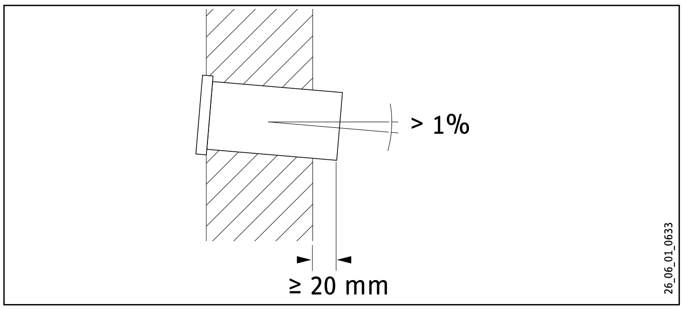
Installation of refrigerant lines

The outdoor unit can be installed higher or lower than the indoor unit. The maximum permissible height differential and the line lengths are specific to the appliance.

- Refrigerant must be topped up according to the refrigerant line length.
- Insulate the entire refrigerant line and junctions with vapour diffusion-proof thermal insulation.
- Secure the pipe assembly to the outside wall.
- The indoor unit and refrigerant lines must be evacuated correctly.
- Separate the refrigerant lines with a suitable pipe cutter.
- No dirt and no moisture must enter the pipework.
- Never kink refrigerant lines.
- The refrigerant lines and the connection points must be checked for leaks.
- Refrigerant lines must be made of copper to DIN 12735-1 and must have robust and UV-resistant insulation of fire protection class 2.
- Seal the wall outlet with suitable sealant.



1 Outdoor unit higher than indoor unit
2 Outdoor unit lower than indoor unit



Power supply

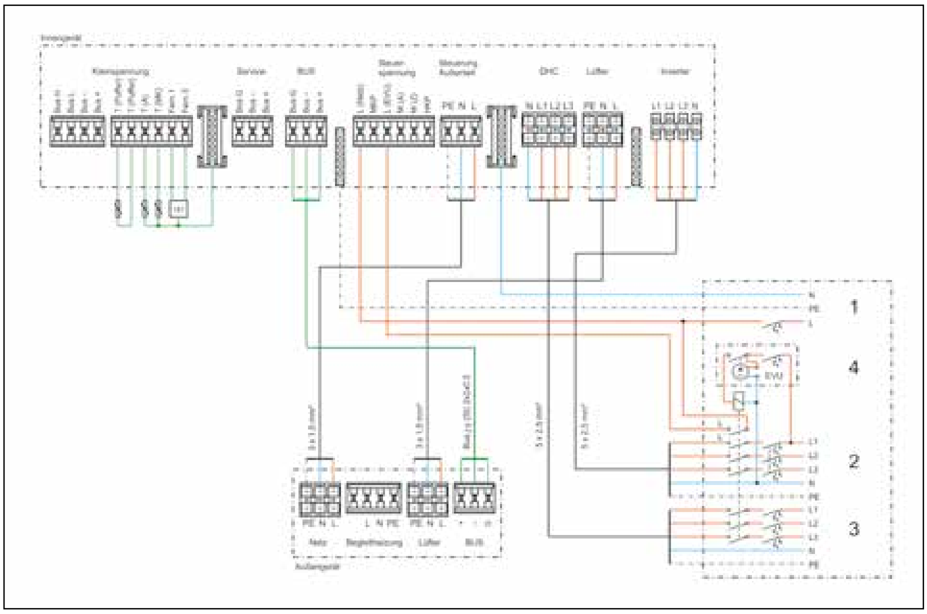
Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

WPL IK-2



T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
L EVU	Power enable signal
MKP	Mixer circuit pump
M(A)	Mixer open
L (Netz)	Power supply

1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater; 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

Notes

WPL 08/12/16/22/28 Trend

At a glance

- Sale of heat pumps in fully compatible sets
- Efficient 3-stage defrosting
- Easy to handle
- Active cooling through circuit reversal
- Quiet operation

Further accessories

232978	HZB-1
232979	HZB-2
235097	BSV 08-16

Inverter air | water heat pump for compact outdoor installation for heating and cooling. Standard heat pump appliance made from EPP for reduced weight and easy handling. Metal casing components are contained in a separate packing unit for easy installation onto the standard unit. The wide spacing of the evaporator fins ensures low air resistance and, in combination with the modulating fan of the outdoor unit, results in a low sound power level. The inverter compressor is regulated subject to demand and ensures a high level of efficiency. The 4/2-way valve enables circuit reversal defrosting, as well as switching from heating to cooling mode. The refrigerant circuit is filled with safety refrigerant R410A. All safety equipment is included. Operation requires an external emergency/booster heater and the WPM heat pump manager for control. These functions are covered in conjunction with the hydraulic module or the cylinder modules.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. The heat pump manager and output regulation match the heat pump heating output variably to the actual heat demand.

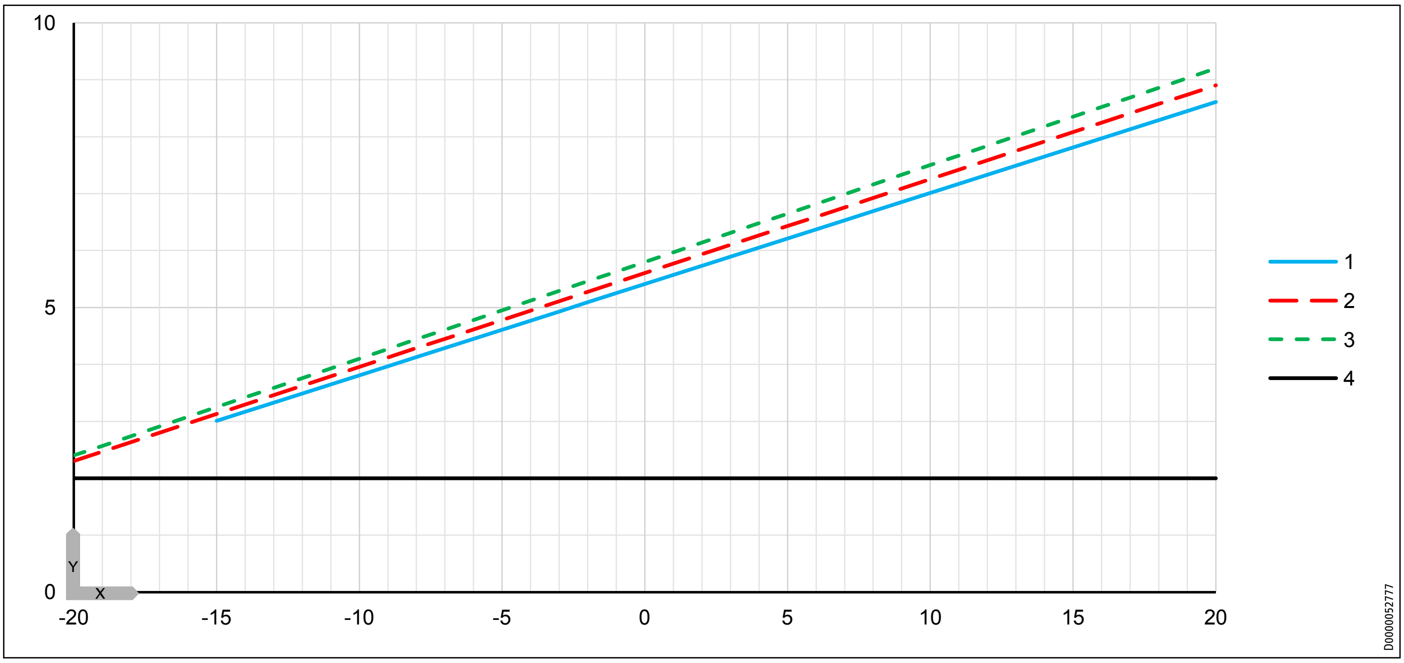
Specification

		WPL 08 S Trend	WPL 12 S Trend	WPL 16 S Trend	WPL 22 Trend	WPL 28 Trend
Heating output to EN 14511						
Heating output at A7/W35 (EN 14511)	kW	2,03	2,96	3,32	5,11	4,80
Heating output at A2/W35 (EN 14511)	kW	2,79	3,90	5,05	7,11	7,42
Heating output at A-7/W35 (EN 14511)	kW	4,61	6,18	8,44	10,99	12,45
Cooling capacity at A35/W7	kW	4,12	4,83	6,32	8,86	10,17
Cooling capacity at A35/W18	kW	5,86	6,71	9,25	11,12	11,92
Power consumption to EN 14511						
Power consumption at A7/W35 (EN 14511)	kW	0,44	0,61	0,68	1,04	1,00
Power consumption at A2/W35 (EN 14511)	kW	0,70	0,94	1,18	1,76	1,84
Power consumption at A-7/W35 (EN 14511)	kW	1,58	2,19	2,86	3,86	4,88
Power consumption, cooling at A35/W7	kW	1,33	1,55	2,18	3,26	3,50
Power consumption, cooling at A35/W18	kW	1,39	1,84	2,54	3,44	3,63
COP to EN 14511						
COP at A7/W35 (EN 14511)		4,57	4,84	5,09	4,90	4,82
COP at A2/W35 (EN 14511)		3,89	4,13	4,29	4,05	4,03
COP at A-7/W35 (EN 14511)		2,89	2,82	2,96	2,85	2,55
Cooling capacity factor at A35/W7		3,09	3,12	2,90	2,72	2,91
Cooling capacity factor at A35/W18		4,23	3,65	3,64	3,23	3,28
Sound data						
Sound power level (EN 12102)	dB(A)	54	53	56	55	53
Max. sound power level, outdoor installation	dB(A)	62	65	64	68	67
Max. sound power level, silent mode	dB(A)	59	62	61	65	64
Application limits						
Min. application limit on the heating side	°C	20	20	20	20	20
Max. application limit on the heating side	°C	62	62	62	62	62
Min. application limit, heat source	°C	-20	-20	-20	-20	-20
Max. application limit, heat source	°C	35	35	35	35	35
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100
Chloride	mg/l	<30	<30	<30	<30	<30
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1
Energy data						
Energy efficiency class		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Electrical data						
Rated voltage, compressor	V	230	230	230	400	400
Rated voltage, controller	V	230	230	230	230	230
Phases, compressor		1/N/PE	1/N/PE	1/N/PE	3/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Compressor fuse/MCB	A	1 x C16	1 x C16	1 x C16	3 x C16	3 x C16
MCB/fuse protection, controller	A	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16
Max. power consumption	kW	3,2	3,2	3,6	7,2	7,2
Versions						
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	1,7	1,75	2,35	3,3	4,0
Dimensions						
Height	mm	1370	1370	1370	1680	1680
Width	mm	930	930	930	1112	1112
Depth	mm	480	480	480	552	552
Weights						
Weight	kg	67	71	75	130	132

		WPL 08 S Trend	WPL 12 S Trend	WPL 16 S Trend	WPL 22 Trend	WPL 28 Trend
Connection						
Connection, heating flow/return		G 1 A	G 1 A	G 1 A	G 1 A	G 1 A
Values						
Flow rate, heat source side	m³/h	4500	4500	4500	7300	7300
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,83	1,19	1,55	2,23	2,5
Internal pressure differential	hPa	70	78	105	158	229

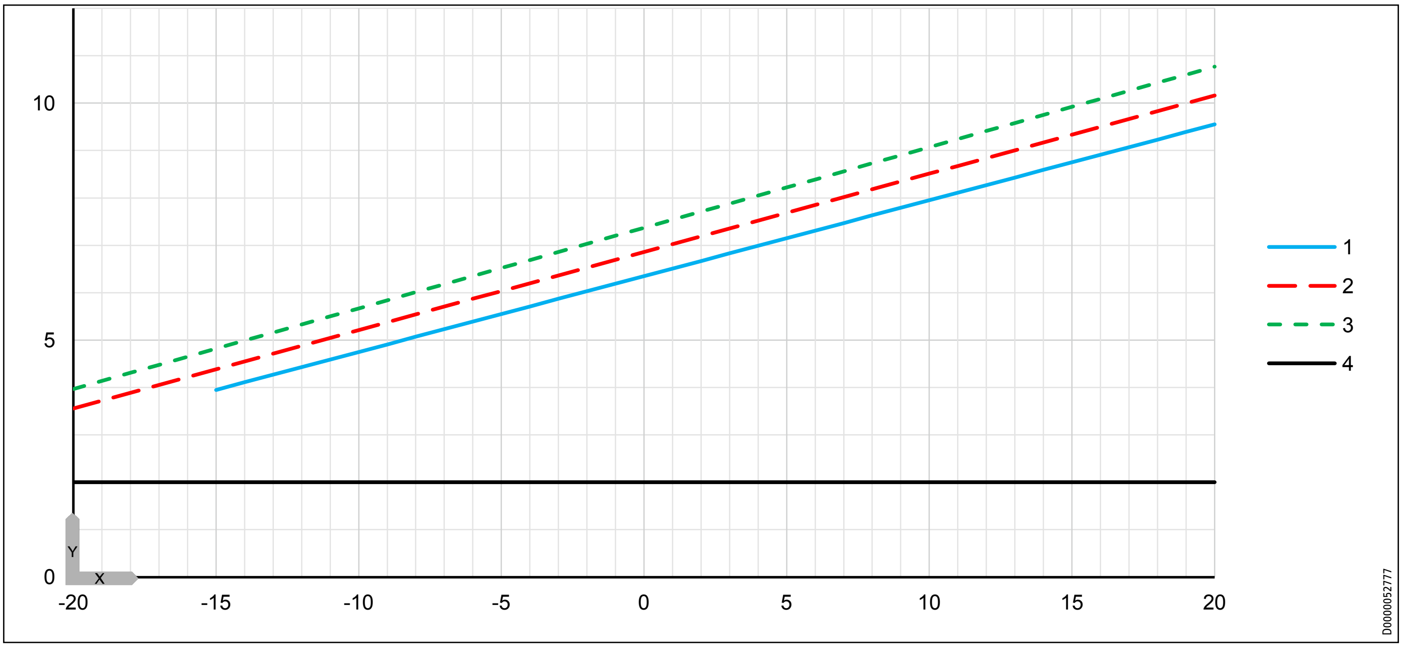
Output data

WPL 08 S Trend



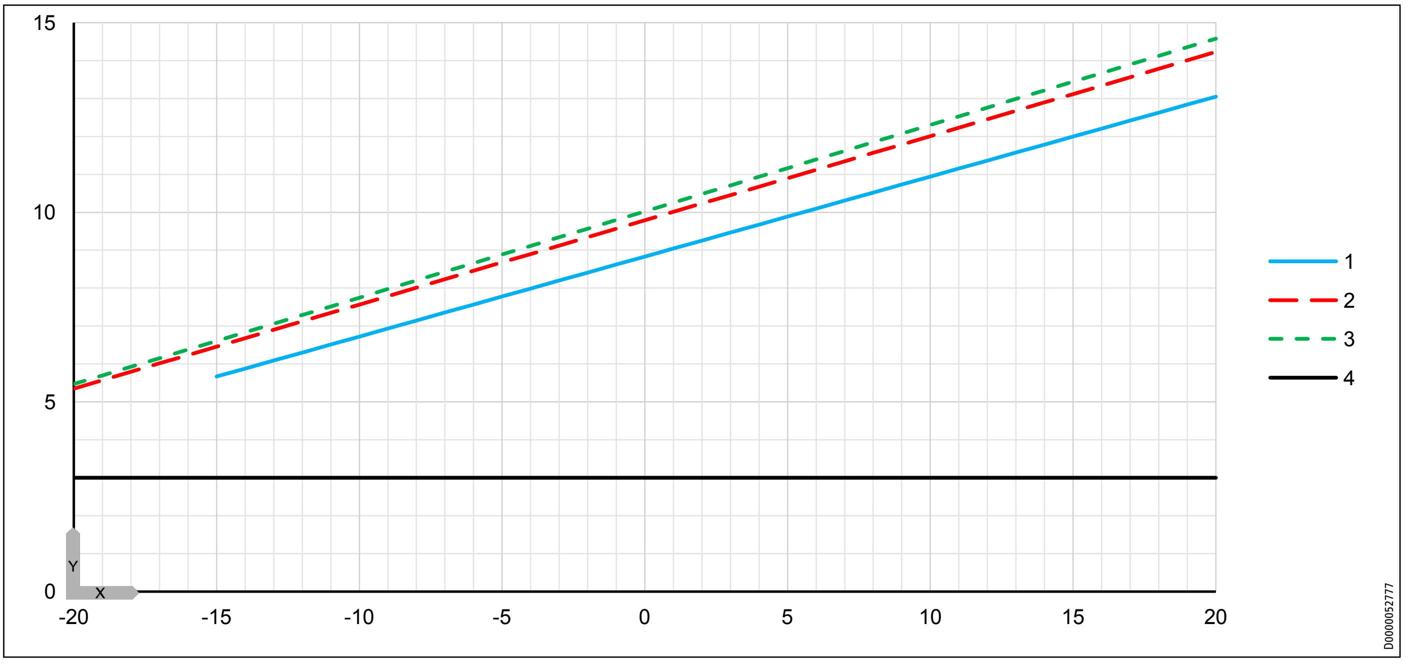
X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55/W45/W35

WPL 12 S Trend



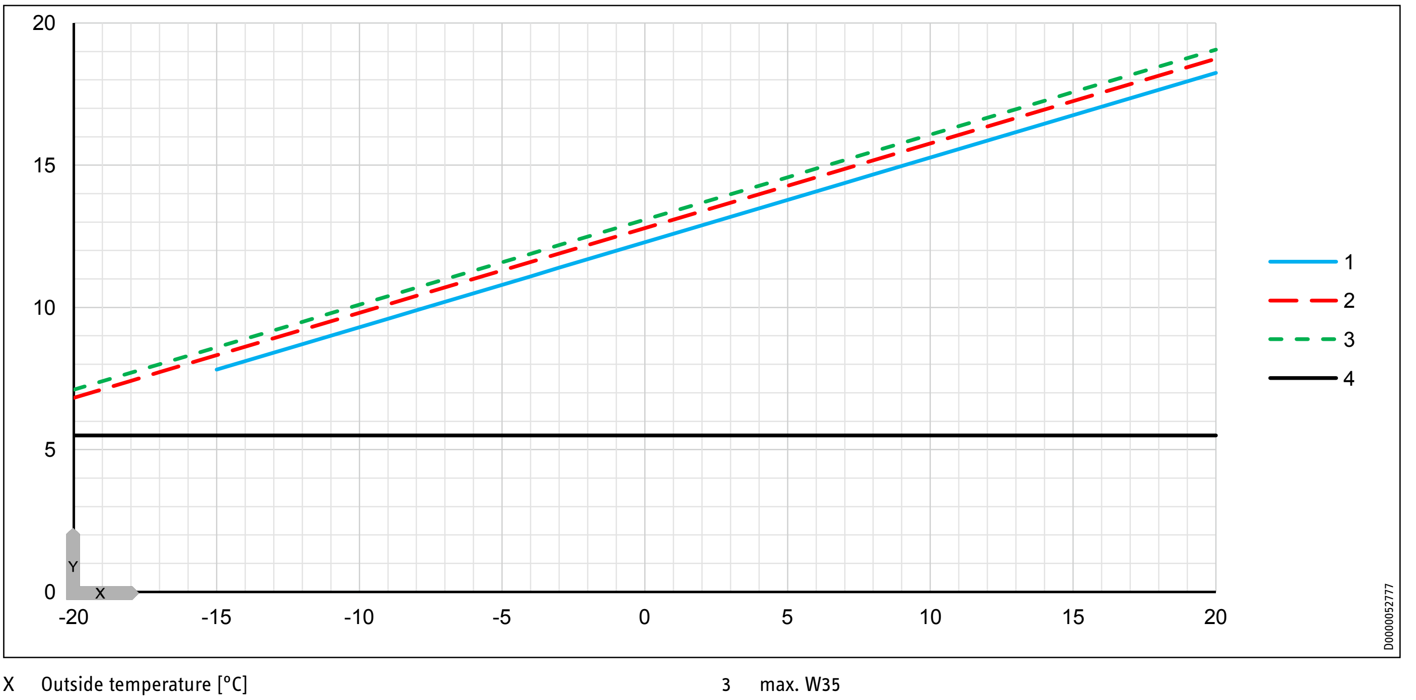
X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55/W45/W35

WPL 16 S Trend



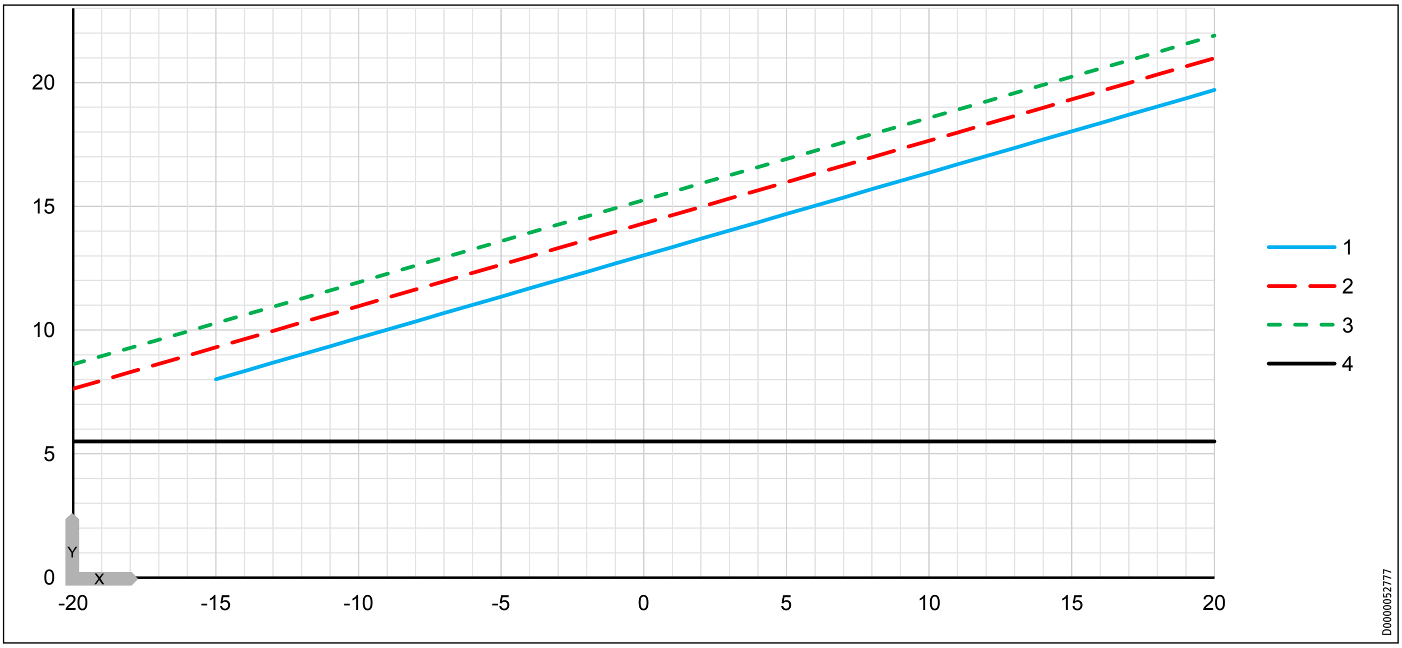
X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55/W45/W35

WPL 22 Trend



X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55/W45/W35

WPL 28 Trend

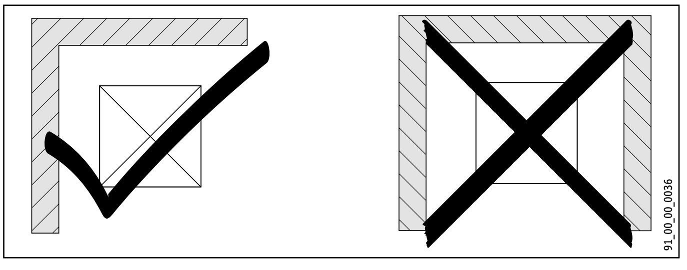


X Outside temperature [°C]
Y Heating output [kW]
1 max. W55
2 max. W45
3 max. W35
4 min. W55/W45/W35

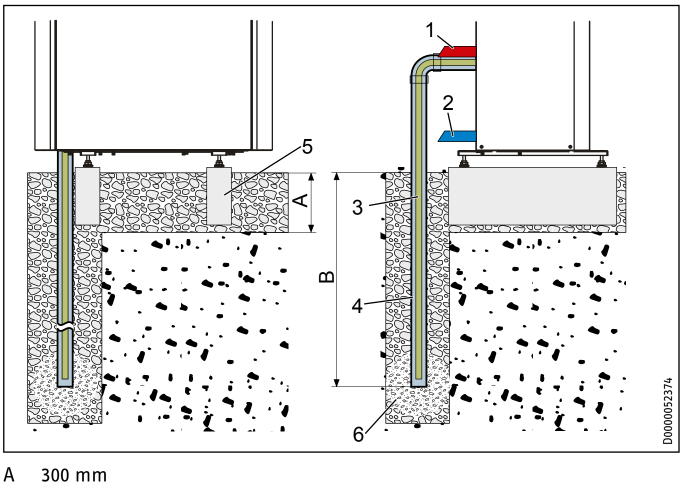
Siting

Installation location requirements

- » The substrate must be horizontal, level, solid and permanent.
- » If you wish to route the supply lines below ground, check the foundation layout to determine whether a corresponding recess in the foundation will be necessary.
- » Never install the appliance in noise-sensitive rooms. Never direct the air intake or discharge towards noise-sensitive rooms of the house, such as bedrooms.
- » Installation in corners of buildings or areas surrounded by walls can result in an elevated noise level. Never install the appliance in recesses that are surrounded by three walls.
- » Reflecting building walls can increase the noise level. Never install the appliance between reflecting building walls.
- » Never install the appliance on large, echoing floor areas, such as tiled floors.
- » Thick palisading and/or lawns and plantings can reduce the sound propagation.

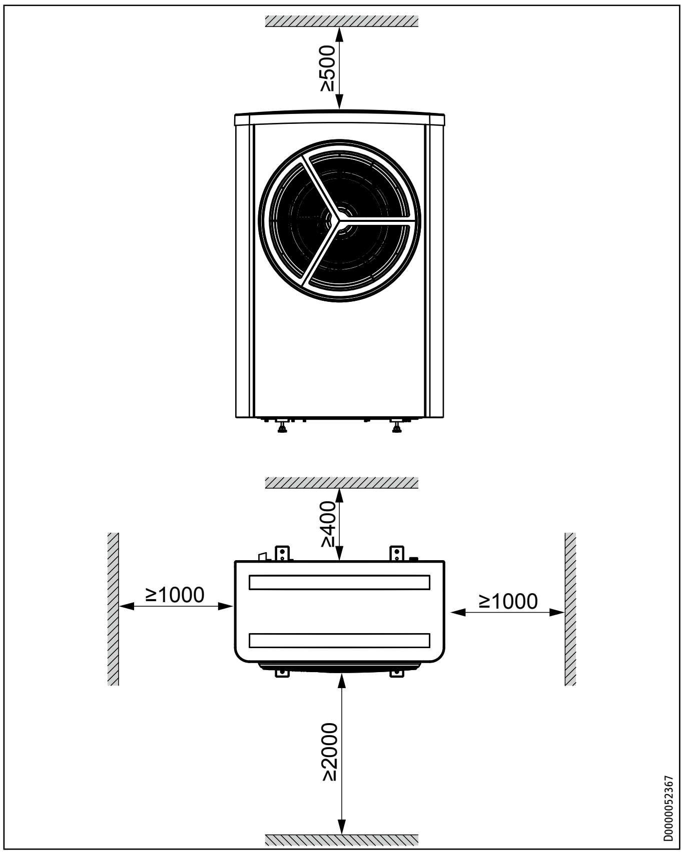


Example: Laying pipes below ground

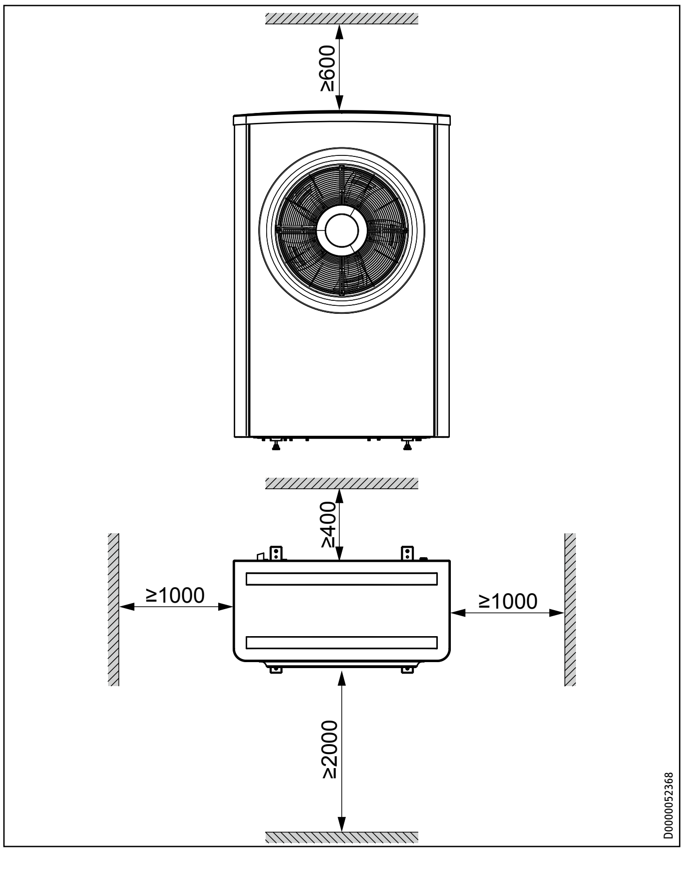


A 300 mm
B Depth of frost line
1 Heating flow
2 Heating return
3 Condensate drain 40 mm
4 Condensate drain pipe
5 Concrete foundations
6 Gravel bed

WPL 08 S Trend | WPL 12 S Trend | WPL 16 S Trend

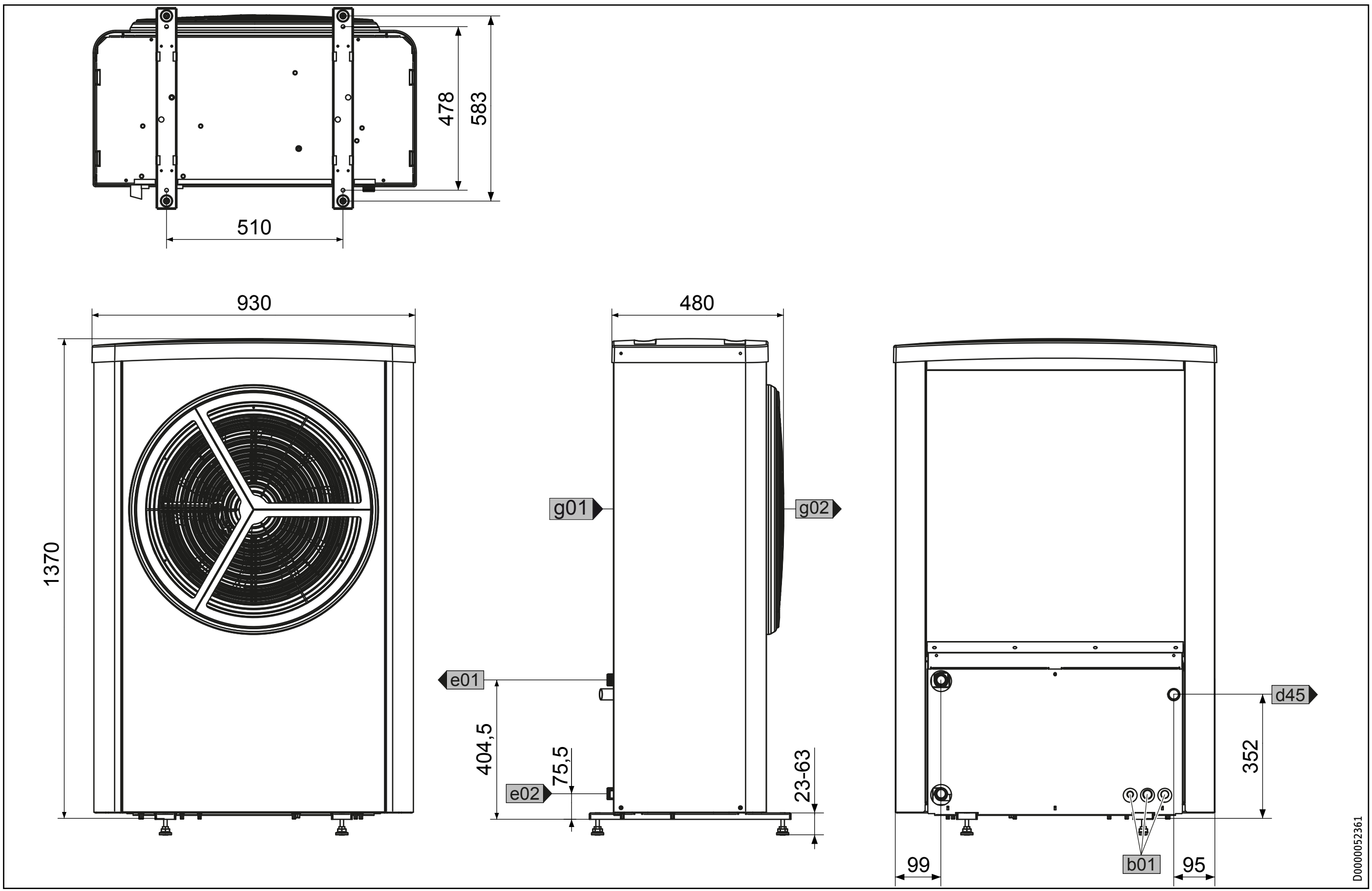


WPL 22 Trend | WPL 28 Trend



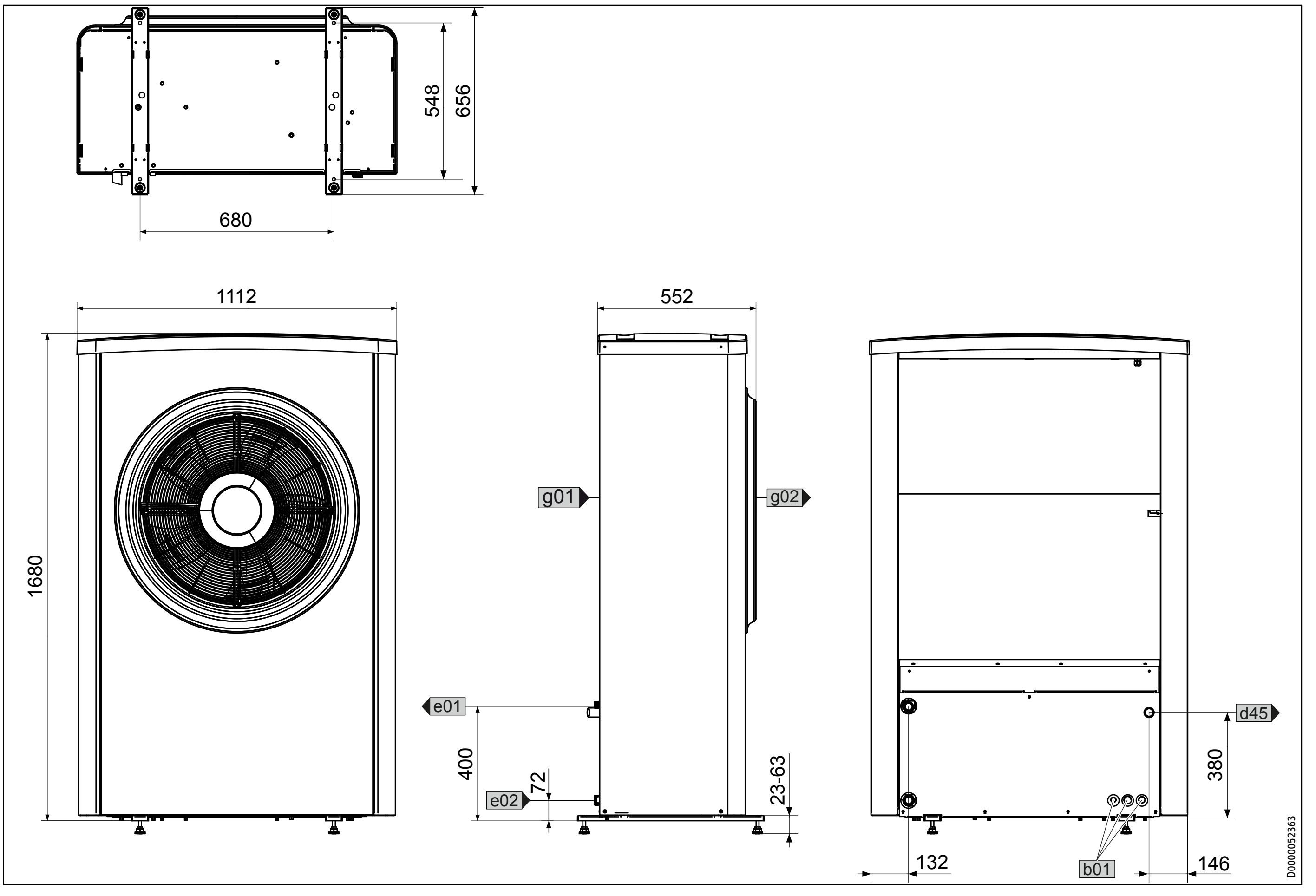
Siting

WPL 08 S Trend | WPL 12 S Trend | WPL 16 S Trend



				WPL 08 S Trend	WPL 12 S Trend	WPL 16 S Trend
b01	Entry electrical cables					
d45	Condensate drain	Diameter	mm	30	30	30
e01	Heating flow	Male thread		G 1 A	G 1 A	G 1 A
e02	Heating return	Male thread		G 1 A	G 1 A	G 1 A
g01	Air intake					
g02	Air discharge					

WPL 22 Trend | WPL 28 Trend



				WPL 22 S Trend	WPL 22 Trend	WPL 28 Trend
b01	Entry electrical cables					
d45	Condensate drain	Diameter	mm	30	30	30
e01	Heating flow	Male thread		G 1 A	G 1 A	G 1 A
e02	Heating return	Male thread		G 1 A	G 1 A	G 1 A
g01	Air intake					
g02	Air discharge					

Power supply

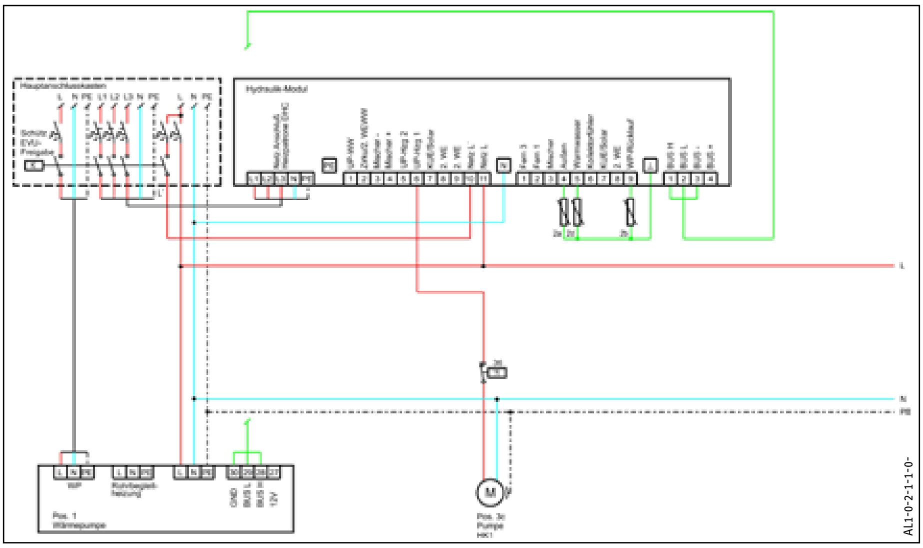
Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

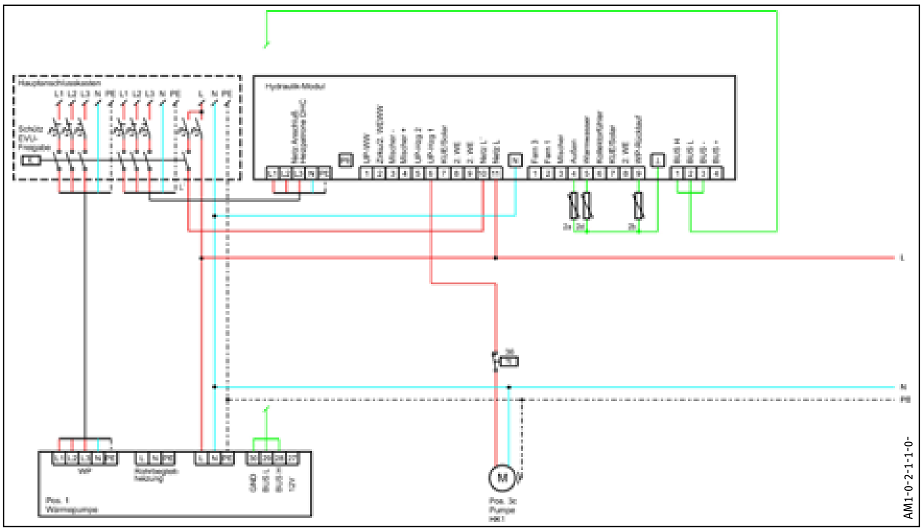
The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

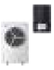
WPL 08-16 Trend

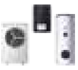


WPL 22-28 Trend

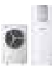


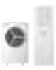
Set combinations

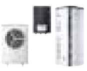
Product	Type	Description	Part no.
	WPL 08 S Trend Set 1	Heat pump, hydraulic module	233878
	WPL 12 S Trend Set 1	Heat pump, hydraulic module	233879
	WPL 16 S Trend Set 1	Heat pump, hydraulic module	233880
	WPL 22 Trend Set 1	Heat pump, hydraulic module	233883
	WPL 28 Trend Set 1	Heat pump, hydraulic module	233884

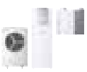
Product	Type	Description	Part no.
	WPL 08 S Trend Set 2	Heat pump, hydraulic module, DHW cylinder	233885
	WPL 12 S Trend Set 2	Heat pump, hydraulic module, DHW cylinder	233886
	WPL 16 S Trend Set 2	Heat pump, hydraulic module, DHW cylinder	233887
	WPL 22 Trend Set 2	Heat pump, hydraulic module, DHW cylinder	233890
	WPL 28 Trend Set 2	Heat pump, hydraulic module, DHW cylinder	233891

Product	Type	Description	Part no.
	WPL 08 S Trend Set 3	Heat pump, hydraulic module, DHW cylinder, buffer cylinder	234729
	WPL 12 S Trend Set 3	Heat pump, hydraulic module, DHW cylinder, buffer cylinder	234730
	WPL 16 S Trend Set 3	Heat pump, hydraulic module, DHW cylinder, buffer cylinder	234731
	WPL 22 Trend Set 3	Heat pump, hydraulic module, DHW cylinder, buffer cylinder	234733
	WPL 28 Trend Set 3	Heat pump, hydraulic module, DHW cylinder, buffer cylinder	234734

Product	Type	Description	Part no.
	WPL 08 S Trend Set 4	Heat pump, cylinder and hydraulic module	234735
	WPL 12 S Trend Set 4	Heat pump, cylinder and hydraulic module	234736
	WPL 16 S Trend Set 4	Heat pump, cylinder and hydraulic module	234737
	WPL 22 Trend Set 4	Heat pump, cylinder and hydraulic module	234739

Product	Type	Description	Part no.
	WPL 08 S Trend Set 5	Heat pump, integral cylinder	234741
	WPL 12 S Trend Set 5	Heat pump, integral cylinder	234742
	WPL 16 S Trend Set 5	Heat pump, integral cylinder	234743
	WPL 22 Trend Set 5	Heat pump, integral cylinder	234745
	WPL 28 Trend Set 5	Heat pump, integral cylinder	234746

Product	Type	Description	Part no.
	WPL 08 S Trend Set 6	Heat pump, hydraulic module, instantaneous water cylinder	234747
	WPL 12 S Trend Set 6	Heat pump, hydraulic module, instantaneous water cylinder	234748
	WPL 16 S Trend Set 6	Heat pump, hydraulic module, instantaneous water cylinder	234749
	WPL 22 Trend Set 6	Heat pump, hydraulic module, instantaneous water cylinder	234751
	WPL 28 Trend Set 6	Heat pump, hydraulic module, instantaneous water cylinder	234752

Product	Type	Description	Part no.
	WPL 08 S Trend Set 7	Heat pump, hydraulic module, central ventilation unit	234753
	WPL 12 S Trend Set 7	Heat pump, hydraulic module, central ventilation unit	234754
	WPL 16 S Trend Set 7	Heat pump, hydraulic module, central ventilation unit	234755
	WPL 22 Trend Set 7	Heat pump, hydraulic module, central ventilation unit	234757

WPL 08/12/16/22/28 Trend

		WPL Trend Set 1 08 - 28	WPL Trend Set 2 08 - 28	WPL Trend Set 3 08 - 28	WPL Trend Set 4 08 - 22	WPL Trend Set 5 08 - 28	WPL Trend Set 6 08 - 28	WPL Trend Set 7 08 - 22
232805	HM Trend	1x	1x	1x			1x	
233750	AS-HM Trend	1x	1x	1x			1x	
235096	SD 25-1 Trend	2x	2x	2x	2x	2x	2x	2x
235096	SBB 300 WP Trend		1x (08 - 16)	1x (08 - 16)				
233488	SBB 400 WP Trend		1x (22 - 28)	1x (22 - 28)				
227590	SBP 200 E cool			1x				
234644	WPKI 6			1x				
234963	ISOL WPKI 6			1x				
234264	HSBB 3				1x			1x
233510	HSBC 200					1x		
229981	SBS 801 W						1x	
231926	WDH 801 SBS						1x	
227420	HUV 1						1x	
233850	LWZ 170 E plus							1x (08 - 16)
232033	LWZ 370 plus							1x (22)
234866	ZLWZ 4 S							1x

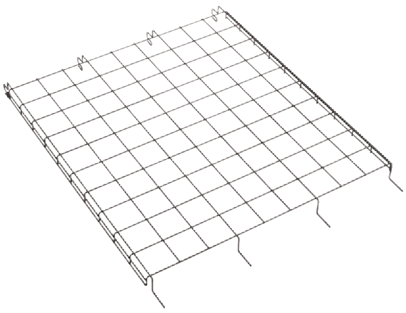
d0000057736

HZB

Self-limiting ribbon heater to keep the condensate connection for air | water heat pumps free of ice. Both versions have a 2 m connecting cable. Heated length: HZB-1: 1 m, HZB-2: 2 m.

		HZB-1	HZB-2
		232978	232979
Rated output per metre at 10 °C outdoor air temperature	W	10	10
Max. ambient temperature	°C	65	65
Min. handling/installation temperature	°C	-45	-45
Min. bending radius	cm	2,5	2,5
Outer jacket material		TPE-O	TPE-O
Width	mm	5,5	5,5
Height	mm	8,0	8,0
Weight	kg	0,200	0,240

BSV



Contact protection for the evaporator on the outdoor unit.

		BSV 08-16	BSV 22-28
		235097	235098
Width	mm	725	886
Height	mm	897	1158

WPL 33 HT outdoor installation

At a glance

- Patented refrigerant circuit
- One refrigerant circuit with two inverter compressors
- Enhanced vapour injection
- Electronic expansion valve
- Mono mode heating operation possible
- Ideal for use in older buildings
- Heating flow temperature up to 75 °C
- DHW temperature with SBB > 60 °C possible
- Use at outside temperatures from +30 °C to -20 °C
- Very quiet operation
- High DHW convenience
- Minimised reconstruction of the existing heat distribution system
- High heating output at low outside temperatures through inverter-controlled compressor and enhanced vapour injection
- Extended application range with thermodynamic boost
- Operation possible without buffer cylinder

Safety and quality

Required accessories

232980 WPMW 3

Air | water heat pump inverter with enhanced vapour injection. Available as an outdoor or indoor installation version with corresponding accessories. The sound power level can be kept low by regulating the fan and the two inverter compressors. The robust metal casing is made from galvanised, powder-coated and stove-enamelled sheet steel. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. A refrigerant circuit with two inverter compressors, which are regulated subject to demand and to optimise the COP, ensure high efficiency. Enhanced vapour injection cools the scroll compressors at low outside temperatures, thereby achieving a higher heating output. The wide fin spacing of the evaporator provides low air resistance, resulting in reduced noise and improved defrosting. The 4/2-way valve enables defrosting by reversing the circuit. Equipped with electronic biflow expansion valve with separate control unit and switching via the internal heat pump control unit (IWS), for optimised overheating protection resulting in an improved COP. Time-optimised and energy efficient defrosting by circuit reversal. Heating of condensate pan via refrigerant circuit ensures efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. Heat pump manager (accessories) required for providing control.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle.

WPL 33 HT indoor installation

At a glance

- » Patented refrigerant circuit
- » One refrigerant circuit with two inverter compressors
- » Enhanced vapour injection
- » Electronic expansion valve
- » Mono mode heating operation possible
- » Ideal for use in older buildings
- » Heating flow temperature up to 75 °C
- » DHW temperature with SBB > 60 °C possible
- » Use at outside temperatures from +30 °C to -20 °C
- » Very quiet operation
- » High DHW convenience
- » Minimised reconstruction of the existing heat distribution system
- » High heating output at low outside temperatures through inverter-controlled compressor and enhanced vapour injection
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Safety and quality

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Specification

		WPL 33 HT
		229938
Heating output		
Heating output at A2/W35 (min./max.)	kW	6,02/17,20
Heating output at A-7/W35 (min./max.)	kW	4,90/15,47
Heating output at A10/W35 (EN 14511)	kW	6,02
Heating output at A7/W35 (EN 14511)	kW	5,61
Heating output at A2/W35 (EN 14511)	kW	7,45
Heating output at A-7/W35 (EN 14511)	kW	12,38
Heating output at A-15/W35 (EN 14511)	kW	12,18
Heating output at A10/W55 (EN 14511)	kW	6,05
Heating output at A7/W55 (EN 14511)	kW	5,06
Heating output at A2/W55 (EN 14511)	kW	7,38
Heating output at A-7/W55 (EN 14511)	kW	12,9
Heating output at A-15/W55 (EN 14511)	kW	14,03
Heating output at A-15/W75 (EN 14511)	kW	14,69
Power consumption		
Power consumption, emergency/booster heater	kW	8,8
Power consumption, fan heating max.	kW	0,26
Power consumption at A10/W35 (EN 14511)	kW	1,24
Power consumption at A7/W35 (EN 14511)	kW	1,27
Power consumption at A2/W35 (EN 14511)	kW	2,15
Power consumption at A-7/W35 (EN 14511)	kW	5,01
Power consumption at A-15/W35 (EN 14511)	kW	5,48
Power consumption at A10/W55 (EN 14511)	kW	2,27
Power consumption at A7/W55 (EN 14511)	kW	2,02
Power consumption at A2/W55 (EN 14511)	kW	3,44
Power consumption at A-7/W55 (EN 14511)	kW	6.37
Power consumption at A-15/W55 (EN 14511)	kW	8,21
Power consumption at A-15/W75 (EN 14511)	kW	9,83
Coefficient of performance		
COP at A10/W35 (EN 14511)		4,85
COP at A7/W35 (EN 14511)		4,41
COP at A2/W35 (EN 14511)		3,47
COP at A-7/W35 (EN 14511)		2,47
COP at A-15/W35 (EN 14511)		2,22
COP at A10/W55 (EN 14511)		2,66
COP at A7/W55 (EN 14511)		2,50
COP at A2/W55 (EN 14511)		2,30
COP at A-7/W55 (EN 14511)		2,03
COP at A-15/W55 (EN 14511)		1,71
COP at A-15/W75 (EN 14511)		1,49
Sound data		
Sound power level (EN 12102)	dB(A)	58
Max. sound power level, outdoor installation, silent mode	dB(A)	57
Sound power level outdoor installation (EN 12102)	dB(A)	58
Sound power level indoor installation, air intake/discharge (EN 12102)	dB(A)	55
Sound power level indoor installation (EN 12102)	dB(A)	53

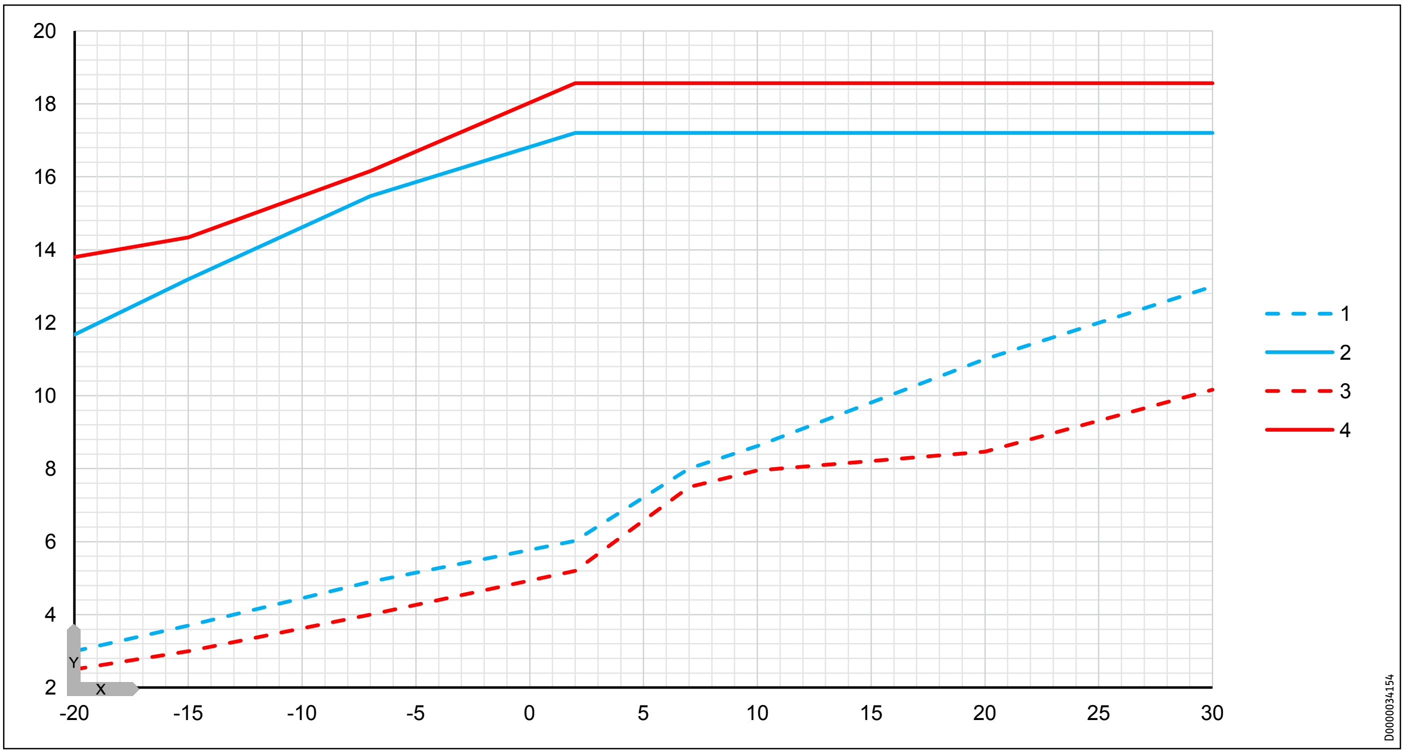
WPL 33 HT

		WPL 33 HT
Application limits		
Min. application limit on the heating side	°C	15
Max. application limit on the heating side	°C	75
Min. application limit, heat source	°C	-20
Max. application limit, heat source	°C	30
Water hardness	°dH	≤3
pH value (with aluminium compounds)		8,0-8,5
pH value (without aluminium compounds)		8,0-10,0
Chloride	mg/l	<30
Conductivity (softening)	μS/cm	<1000
Conductivity (desalination)	μS/cm	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1
Energy data		
Energy efficiency class		A+/A+
Electrical data		
Compressor fuse/MCB	A	3 x C32
MCB/fuse protection, controller	A	1 x B 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16
Frequency	Hz	50
Phases, compressor		3/N/PE
Phases, controller		1/N/PE
Phases, emergency/booster heater		3/N/PE
Rated voltage, compressor	V	400
Rated voltage, controller	V	230
Rated voltage, emergency/booster heater	V	400
Starting current (with/without starting current limiter)	A	18/-
Max. operating current	A	30
Versions		
Refrigerant		R407 C
Refrigerant charge	kg	5,8
CO2 equivalent	t	10,29
Greenhouse potential of refrigerant (GWP)	kg CO2 equiv.	1774
Defrost type		Circuit reversal
IP rating		Miscellaneous
Frost protection		X
Dimensions		
Height	mm	1116
Width	mm	784
Depth	mm	1332
Height (outdoor installation)	mm	1434
Width (outdoor installation)	mm	1280
Depth (outdoor installation)	mm	1390
Height (indoor installation)	mm	1182
Width (indoor installation)	mm	800
Depth (indoor installation)	mm	1390
Weights		
Weight	kg	240
Total weight - outdoor installation	kg	400
Total weight - internal installation	kg	330
Connection		
Connection on the heating side		G 1 1/4 A
Torque, flow meter, return	Nm	10
Air hose intake and discharge connectors		DN 560

WPL 33 HT

Values		WPL 33 HT
Min heating flow rate	m³/h	0,7
Pressure differential, heating side	hPa	115
Flow rate on the heating side	m³/h	0,93
Flow rate, heat source side	m³/h	3500
Max. available external pressure differential, heat source side, intake side	hPa	0,8
Max. available external pressure differential, total on heat source side	hPa	1
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,94
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,94

Output data



X Outside temperature [°C]
Y Heating output [kW]

1 min. W35
2 max. W35
3 min. W55
4 max. W55

Siting

Ensure that the surface on which the heat pump is to be installed, is horizontal, level, solid and permanent. The entire heat pump frame should be in contact with the substrate. Uneven substrates can increase the noise emissions of the heat pump. The heat pump must be accessible from all sides.

Recommended substrate:

» Cast concrete foundation

» Kerb stones

» Stone slabs

Provide a recess (space) underneath the heat pump to enable water and electrical pipes/cables to be connected from below.

Protection of heating water lines against frost and moisture

In outdoor installations protect the flow and return lines against frost by means of adequate thermal insulation and by routing them inside conduits to protect them against moisture. Insulation thickness in accordance with the Energy Saving Ordinance.

The frost stat inside the heat pump that automatically starts the circulation pump in the heat pump circuit at <+10 °C and thereby safeguards DHW circulation in all water-bearing components, offers additional frost protection.

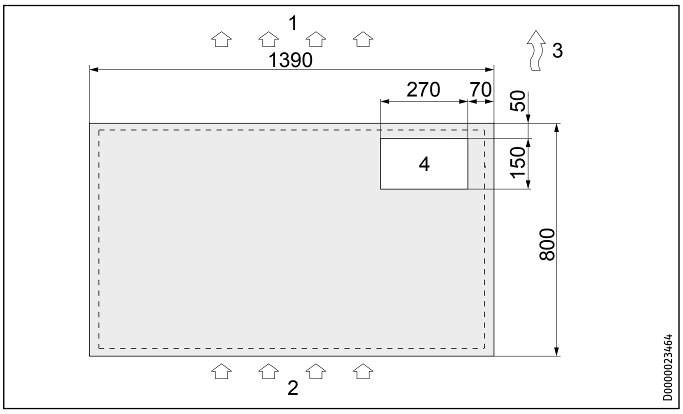
Fill the heating system with antifreeze if the power supply cannot be guaranteed for a longer period of time.

Condensate drain

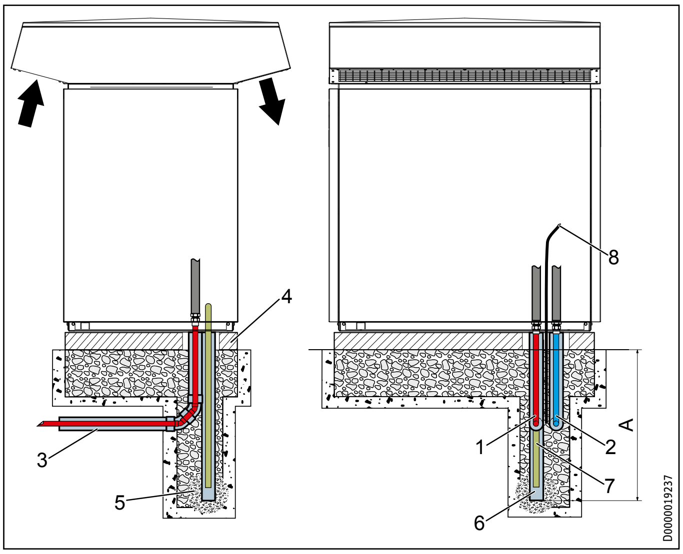
Route the condensate drain hose with a steady fall or to the side out of the heat pump.

With outdoor installation, route the condensate to an existing drain or into a coarse gravel soakaway. For this, ensure an installation that is free from the risk of frost.

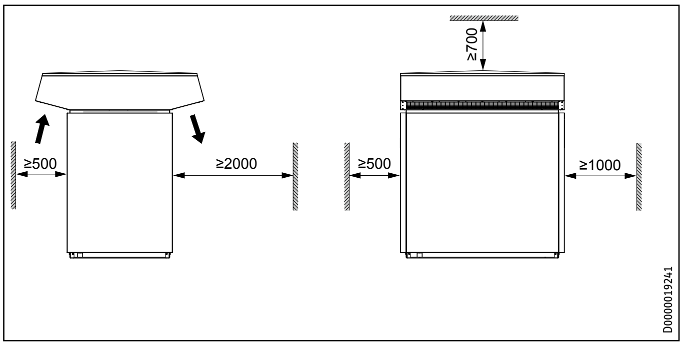
Foundation



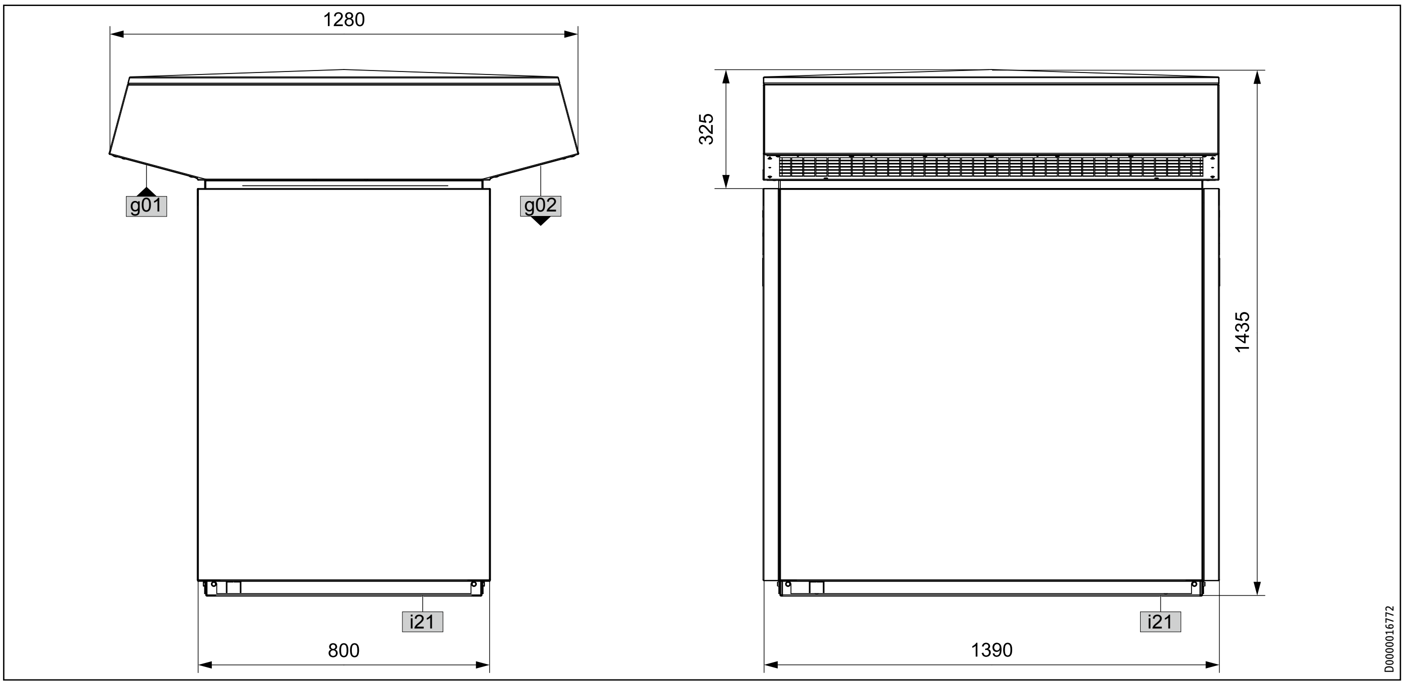
1 Air discharge
2 Air intake
3 Main wind direction
4 Supply line outlet



A Depth of frost line
1 Heating flow
2 Heating return
3 Conduit for supply lines
4 Foundation
5 Gravel bed
6 Condensate drain pipe
7 Condensate drain
8 Electric power cable



WPL 33 HT outdoor installation



		WPL 33 HT A
g01 Air intake		
g02 Air discharge		
i21 Entry supply line		

Air routing with hoses

The total length of hoses on the air intake and discharge sides must not exceed 8 m. Never incorporate more than four 90° bends.

The hose will tend to sag because of its flexibility; therefore secure it approx. every 1 m.

Special hoses are used to route the inlet air from the outside to the heat pump and discharge air from the heat pump to the outdoors. These hoses are highly flexible, thermally insulated and are self-extinguishing in case of fire.

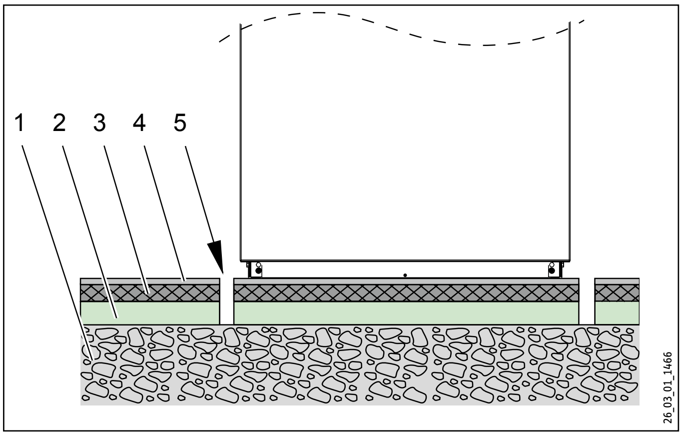
Air routing with air ducts

With air routes longer than 8 m, air ducts can also be connected to the heat pump. The cross-section of the air duct varies according to the air flow rate and according to the externally available, static pressure differential of the heat pump.

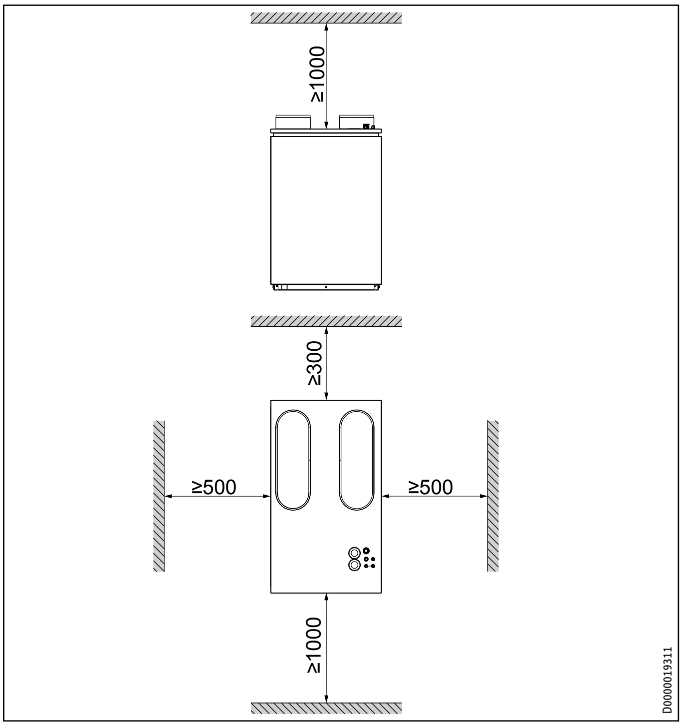
To reduce the transfer of structure-borne sound to the building, an air hose or canvas flange must be installed between the heat pump and air ducts. When sizing air ducts and grilles, observe the external pressure of the fan. At least 20 % of the total external fan pressure must additionally be taken into account for the air discharge side.

If the heat pump is installed in an enclosed room also containing a combustion appliance that draws its combustion air directly from the room, a vent to the installation room with 250 cm² diameter must be provided to prevent the heat pump from influencing the operation of the combustion equipment.

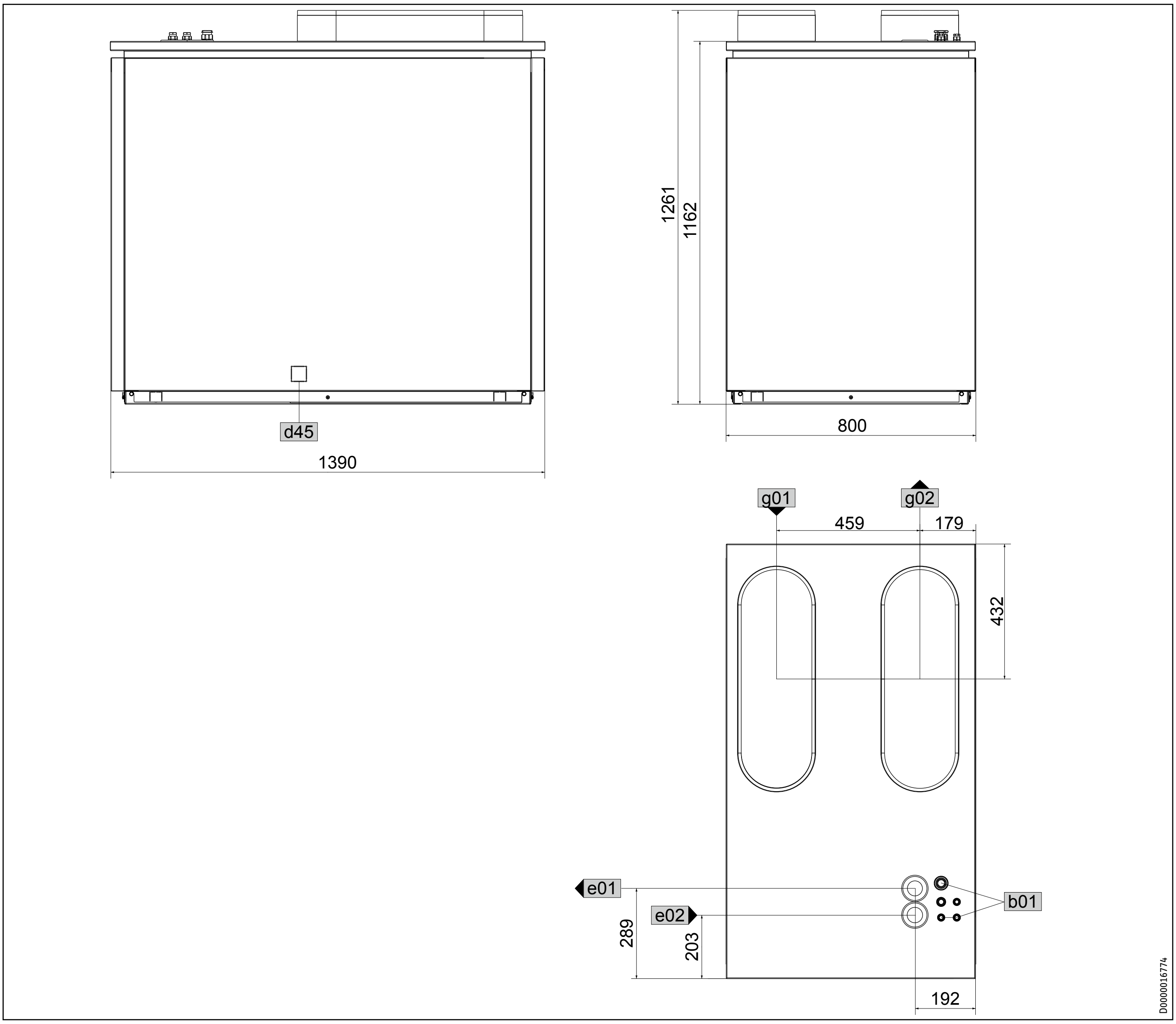
Without this additional vent, small, unavoidable leaks on the air intake side, e.g. at hose connectors or at the heat pump, will reduce the air pressure in the enclosed room to unacceptable levels.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

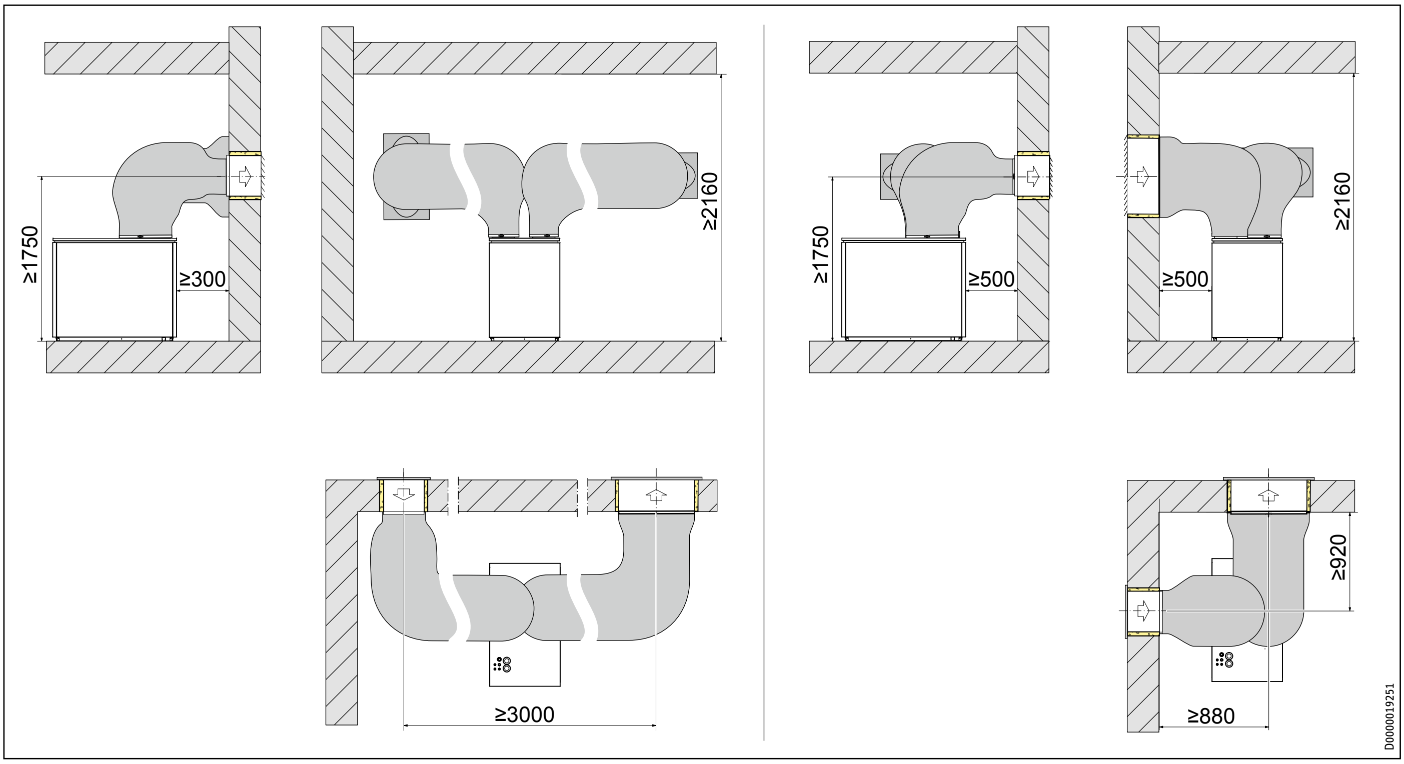


WPL 33 HT indoor installation

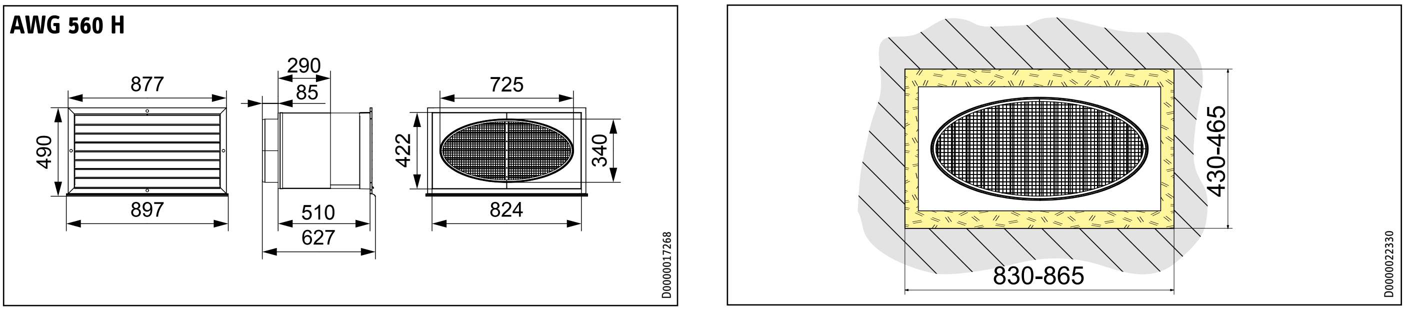


				WPL 33 HT I
b01	Entry electrical cables			
d45	Condensate drain			
e01	Heating flow	Male thread		G 1 1/4 A
e02	Heating return	Male thread		G 1 1/4 A
g01	Air intake	Diameter	mm	DN 560 (474x 248)
g02	Air discharge	Diameter	mm	DN 560 (474x 248)

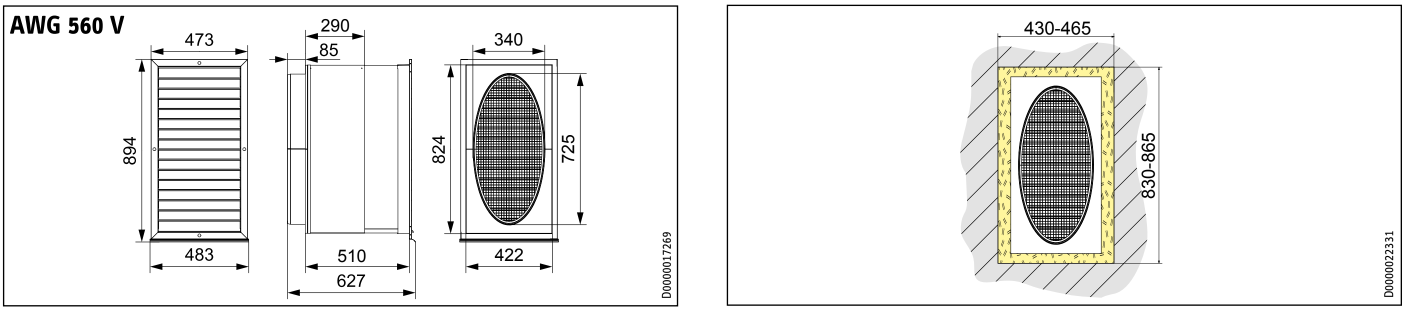
Air routing without a shaft: Through an exterior wall | Through two exterior walls over a corner



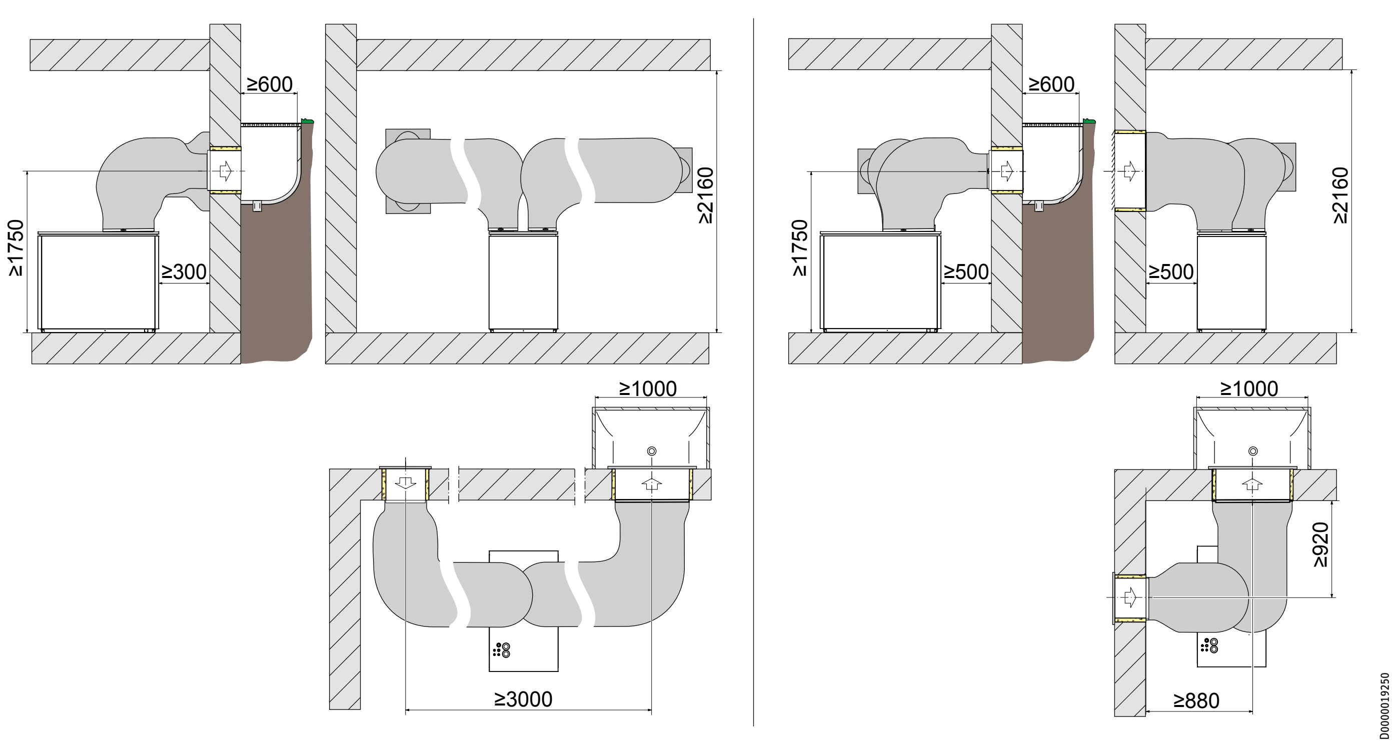
Method: Through an exterior wall to the outdoors with a horizontal wall outlet



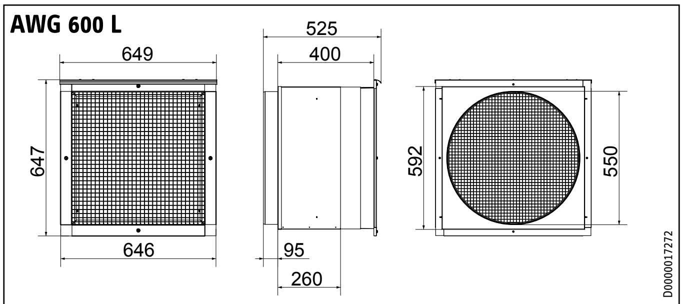
Method: Through an exterior wall to the outdoors with a vertical wall outlet

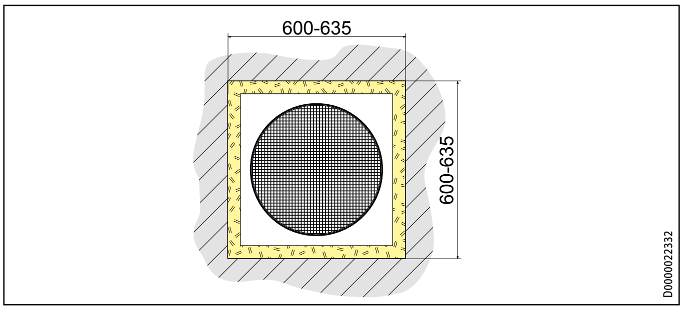


Air routing with a shaft: Through an exterior wall | Through two exterior walls over a corner

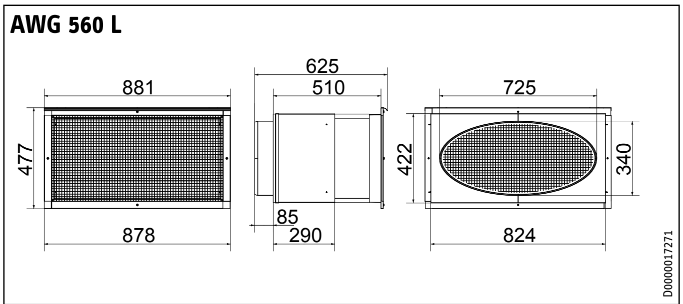


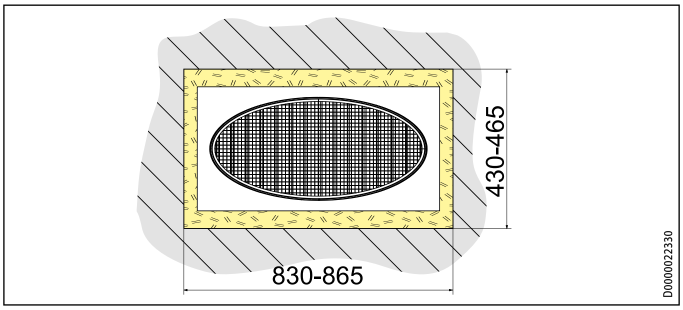
Method: Through a cellar wall in a shaft with a wall outlet





Method: Through a cellar wall in a shaft with a horizontal wall outlet





Heating system connection

Install the heat consumer system (WNA) in accordance with the engineering documentation.

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

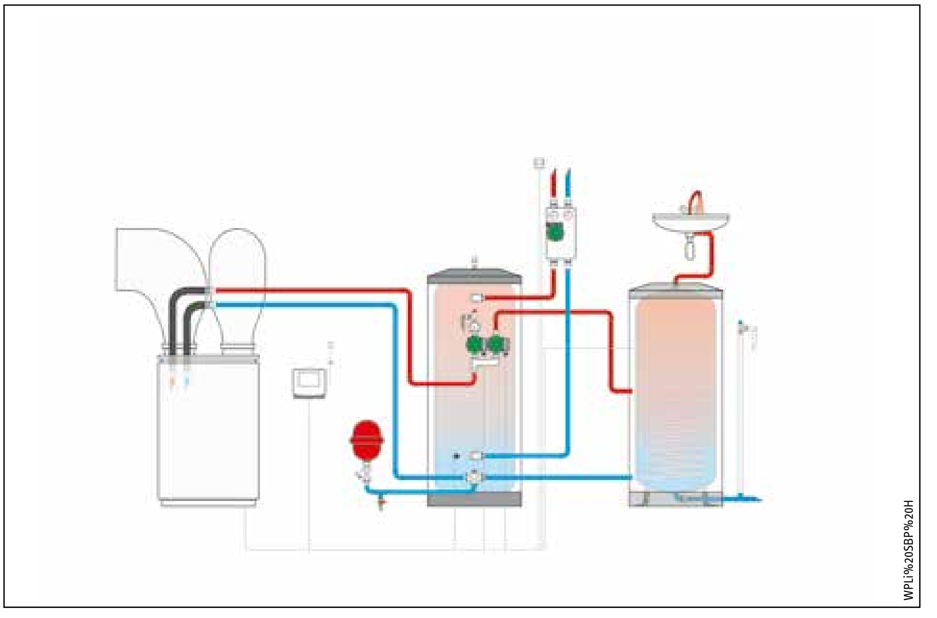
Use flexible pressure hoses to reduce structure-borne noise on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

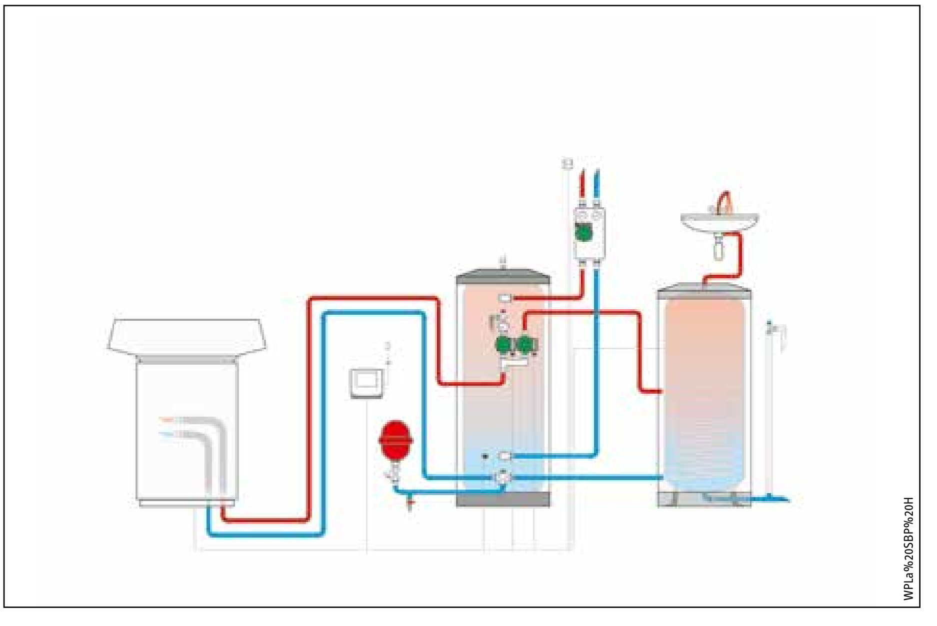
Heat pump compact installation and circulation pump

When using a heat pump compact installation, select the circulation pump that suits the heat pump.

Heat pump with buffer cylinder and DHW heating, indoor installation



Heat pump with buffer cylinder and DHW heating, outdoor installation



Circulation pump for the heat pump with WPKI 5

Heat pump Type	Flow rate m^3/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 33 HT	1,7	190	UP 25/7.5 E	28 x 1,5

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

Outdoor installation

Weather-resistant electrical cables conforming to VDE 0100 must be used.

Route such cables through a conduit (protective pipe); entry into the heat pump only from below.

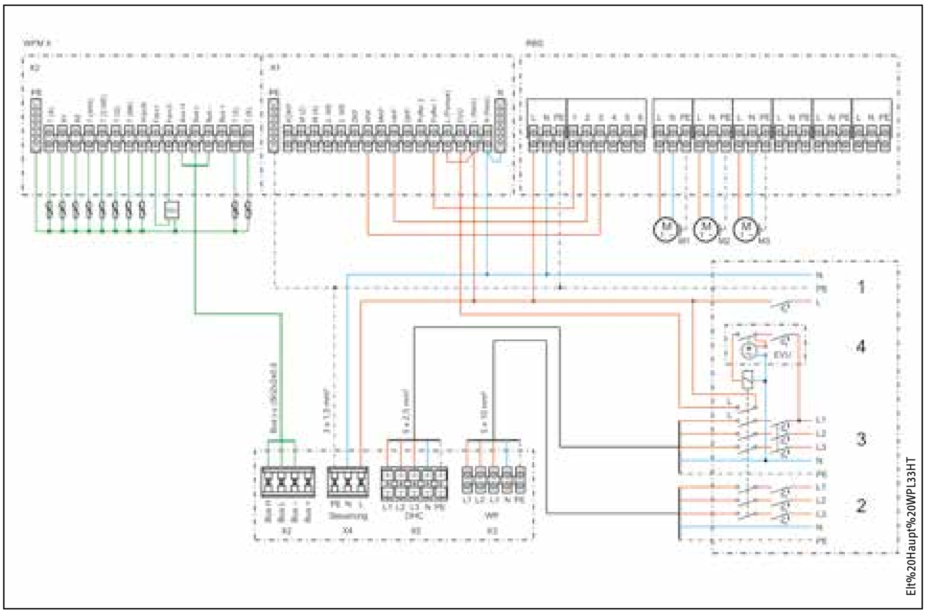
Indoor installation

Route cables through the top installation aperture in the heat pump.

Energy efficient pumps

Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.



T (A)	Outside temperature sensor
B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (2.WE)	Temperature sensor heat source 2
T (Q)	Heat source temperature sensor
T (MK)	Temperature sensor, mixer circuit
Pulse	Pulse heat metering
Fern1	Remote control
Fern3	Remote control
H	BUS-High
L	BUS-Low
-	BUS earth
+	BUS (not connected)
T (S)	Temperature sensor, solar/cooling
T (K)	Solar temperature sensor
L (Netz)	Power supply
N (grid)	Power supply
EVU	Power enable signal
Buffer 1	Buffer charging pump
Buffer 2	Buffer charging pump
QKP	Source circuit pump

HKP	Heating circuit pump
MKP	Mixer circuit pump
DHW	DHW charging pump
ZKP	DHW circulation pump
2.WE	Heat source 2
M(A)	Mixer open
M(Z)	Mixer closed
KOKP	Collector circuit pump
M1	Circulation pump
L	Power supply
1	Control circuit 1/N/PE 230 V 50 Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

WPL 10 AC

APPLICATION: Air | water heat pump designed as a mono block appliance for compact outdoor installation. Can be used for central heating and DHW operation, also provides efficient cooling via circuit reversal. Ideal for use in new builds or buildings with a low system temperature, as well as for dual mode integration into existing heating systems. **EQUIPMENT / CONVENIENCE:** Optimum noise reduction thanks to the internal air routing and integral axial fan. The wide gaps between the evaporator fins create low air resistance and, in combination with the modulating fan, result in a low sound power level. Enhanced vapour injection allows high system temperatures even at low outside temperatures. In combination with the ISG (optional accessory), the heat pump controller (accessories) can be used to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. An emergency/booster heater enables mono energetic operation. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A. **EFFICIENCY:** Demand-dependent and energy efficient defrosting by reversing the circuit. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. **INSTALLATION**: Quick access to the condensate tray via cleaning aperture at the rear. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. The fan grille, moulded recesses and cover are made from weather-proof and UV-resistant plastic in Aluminium white.

At a glance

- The compact design and low heating output makes it ideally suited for new builds
- Optimised air routing for quiet operation
- Active cooling by reversing the refrigerant cycle for a comfortable room climate
- Suitable for mono mode DHW heating for low running costs
- Can be integrated into a home network and controlled via smartphone
- Can be operated in dual mode with a second heat source

Safety and quality

Required accessories

232980 WPMW 3

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. In cooling mode, heat is extracted from the heating water via the heat exchanger on the heating side. The heating water is heated further by electrical energy (compressor) and gives off this heat to the outdoor air via the heat exchanger on the air side.

Specification

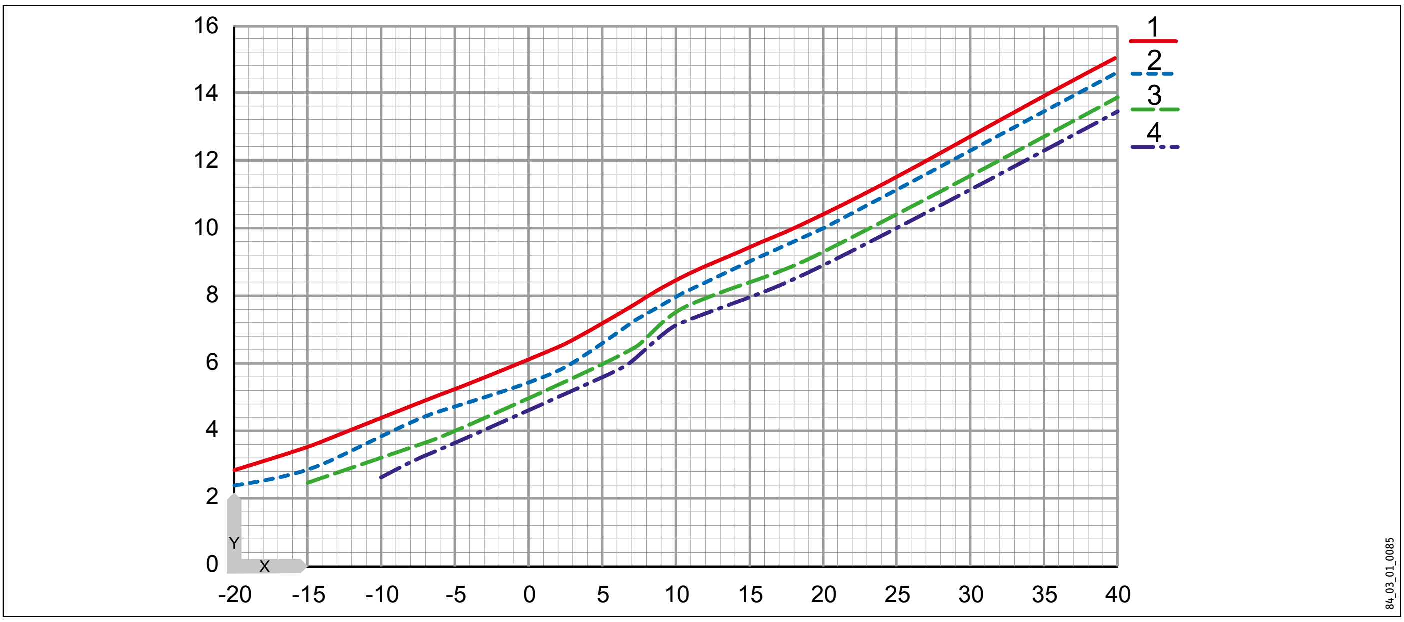
		WPL 10 AC
		230236
Heating output to EN 14511		
Heating output at A-7/W35 (EN 14511)	kW	5,11
Heating output at A2/W35 (EN 14511)	kW	6,74
Heating output at A7/W35 (EN 14511)	kW	7,83
Heating output at A10/W35 (EN 14511)	kW	8,29
Heating output at A7/W45 (EN 14511)	kW	7,26
Cooling capacity at A35/W7	kW	6,22
Cooling capacity at A35/W18	kW	9,12
Power consumption		
Power consumption, emergency/booster heater	kW	8,8
Power consumption, fan heating max.	kW	0,11
Power consumption to EN 14511		
Power consumption at A-7/W35 (EN 14511)	kW	1,67
Power consumption at A2/W35 (EN 14511)	kW	1,92
Power consumption at A7/W35 (EN 14511)	kW	2,03
Power consumption at A10/W35 (EN 14511)	kW	2,06
Power consumption at A7/W45 (EN 14511)	kW	2,25
Power consumption, cooling at A35/W18	kW	3,16
Power consumption, cooling at A35/W7	kW	2,56
COP to EN 14511		
COP at A-7/W35 (EN 14511)		3,06
COP at A2/W35 (EN 14511)		3,51
COP at A7/W35 (EN 14511)		3,86
COP at A10/W35 (EN 14511)		4,02
COP at A7/W45 (EN 14511)		3,22
Cooling capacity factor at A35/W18		2,95
Sound data		
Sound power level outdoor installation (EN 12102)	dB(A)	59
Sound pressure level at 5 m distance in a free field	dB(A)	37
Sound pressure level at 10 m distance in a free field	dB(A)	31
Max. sound power level, silent mode	dB(A)	57
Application limits		
Min. application limit on the heating side	°C	15
Max. application limit on the heating side	°C	60
Min. application limit, heat source	°C	-20
Max. application limit, heat source	°C	40
Water hardness	°dH	≤3
pH value (with aluminium compounds)		8,0-8,5
pH value (without aluminium compounds)		8,0-10,0
Chloride	mg/l	<30
Conductivity (softening)	μS/cm	<1000
Conductivity (desalination)	μS/cm	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1
Energy data		
Energy efficiency class		A+/A+

WPL 10 AC

		WPL 10 AC
Electrical data		
Starting current (with/without starting current limiter)	A	25/39
Compressor fuse/MCB	A	C16
MCB/fuse protection, emergency/booster heater	A	B16
MCB/fuse protection, controller	A	B16
Frequency	Hz	50
Rated voltage, compressor	V	400
Rated voltage, emergency/booster heater	V	400
Rated voltage, controller	V	230
Phases, compressor		3/N/PE
Phases, controller		1/N/PE
Phases, emergency/booster heater		3/N/PE
Versions		
Refrigerant		R407 C
Refrigerant charge	kg	2,5
Flow/return connection		G 1 1/4 A
Defrost type		Circuit reversal
IP rating		IP14B
Frost protection		X
Dimensions		
Height	mm	900
Width	mm	1270
Depth	mm	593
Values		
Flow rate on the heating side	m³/h	1,4
Min heating flow rate	m³/h	0,7
Flow rate, heat source side	m³/h	2300
Internal pressure differential	hPa	180

WPL 10 AC

Output data



X Outside temperature [°C]
Y Heating output [kW]

1 Flow temperature 35 °C
2 Flow temperature 45 °C
3 Flow temperature 55 °C
4 Flow temperature 60 °C

Heating output

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-20	2,90	2,40			1,30	1,30			2,23	1,85		
-15	3,83	2,89	2,54		1,39	1,44	1,50		2,76	2,01	1,69	
-10	4,63	3,88	3,47	2,64	1,61	1,68	1,72	1,51	2,87	2,31	2,01	1,75
-7	5,11	4,47	4,02	3,30	1,67	1,74	1,78	1,72	3,06	2,57	2,26	1,92
2	6,74	5,80	5,41	5,03	1,92	2,09	2,30	2,22	3,51	2,78	2,35	2,27
7	7,83	7,26	7,24	7,23	2,03	2,25	2,51	2,64	3,86	3,23	2,88	2,74
10	8,29	8,00	7,57	7,52	2,06	2,40	2,62	2,73	4,02	3,33	2,89	2,76
15	9,38	9,03	8,08	7,97	2,28	2,61	2,79	2,86	4,11	3,46	2,90	2,79
20	10,46	10,05	8,58	7,85	2,22	2,55	2,74	2,84	4,71	3,94	3,19	2,77
40	16,13	15,72	14,25	13,51	3,04	3,37	3,56	3,65	5,31	4,67	4,19	3,70

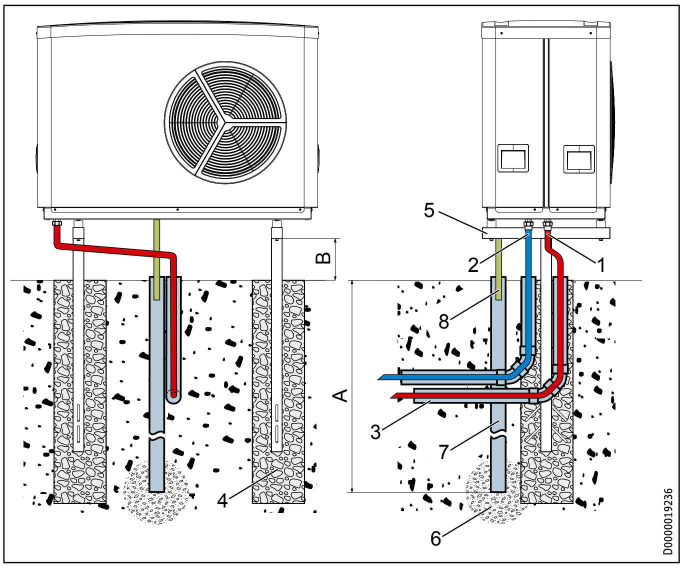
Cooling capacity

	Cooling capacity		Power consumption		Coefficient of performance (COP)	
WQA [°C]	7 °C [kW]	18 °C [kW]	7 °C [kW]	18 °C [kW]	7 °C	18 °C
27	7,11	10,24	2,41	2,93	2,95	3,49
35	6,22	9,12	2,56	3,16	2,43	2,89
40	5,55	8,35	2,66	3,32	2,09	2,52
46	4,80		2,71		1,77	

Installation location requirements

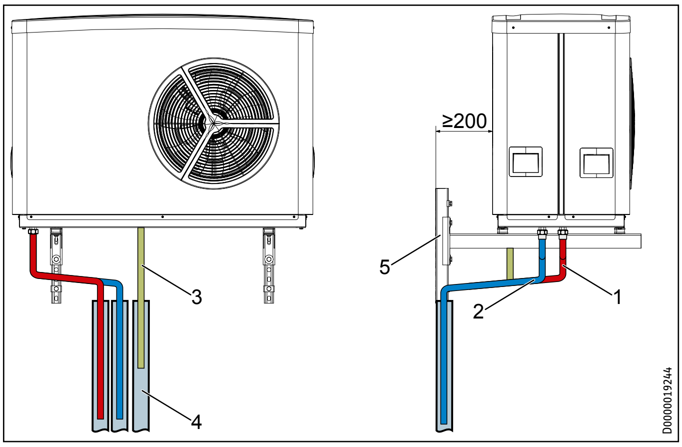
- Maintain minimum clearances towards buildings
- Never install the appliance inside a shaft.
- The heat pump module must be level (horizontal).
- The main wind direction must not be towards the fan.
- When selecting the installation site, remember that the appliance generates noise during operation.
- Maintain as small a clearance as possible between the heat pump module and the hydraulic module in order to keep line losses to a minimum.
- In winter, the heat pump module must not be covered with snow or be submerged if there is heavy rainfall.
- Ensure access to the connection space under the plastic cover.
- Condensate must be able to freely drain underneath the appliance, even during frosty weather.
- The appliance must be firmly attached to the mounting rail which in turn must be secured with the foundation/curbstones.
- Observe the static limits of the T-support used.
- Observe the static limits of the building wall and the wall mounting bracket.

Example: T-support



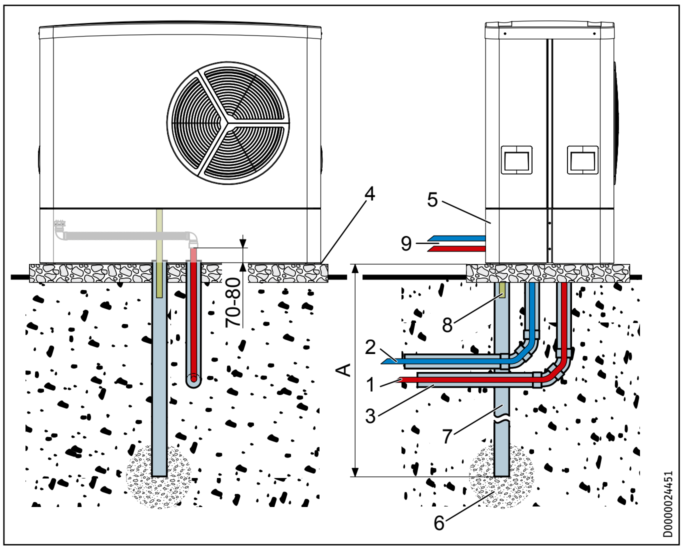
A Depth of frost line
B 300 mm
1 Heating flow
2 Heating return
3 Conduit for supply lines
4 Foundation
5 T-support
6 Gravel bed
7 Condensate drain pipe
8 Condensate drain

Example: Wall mounting bracket



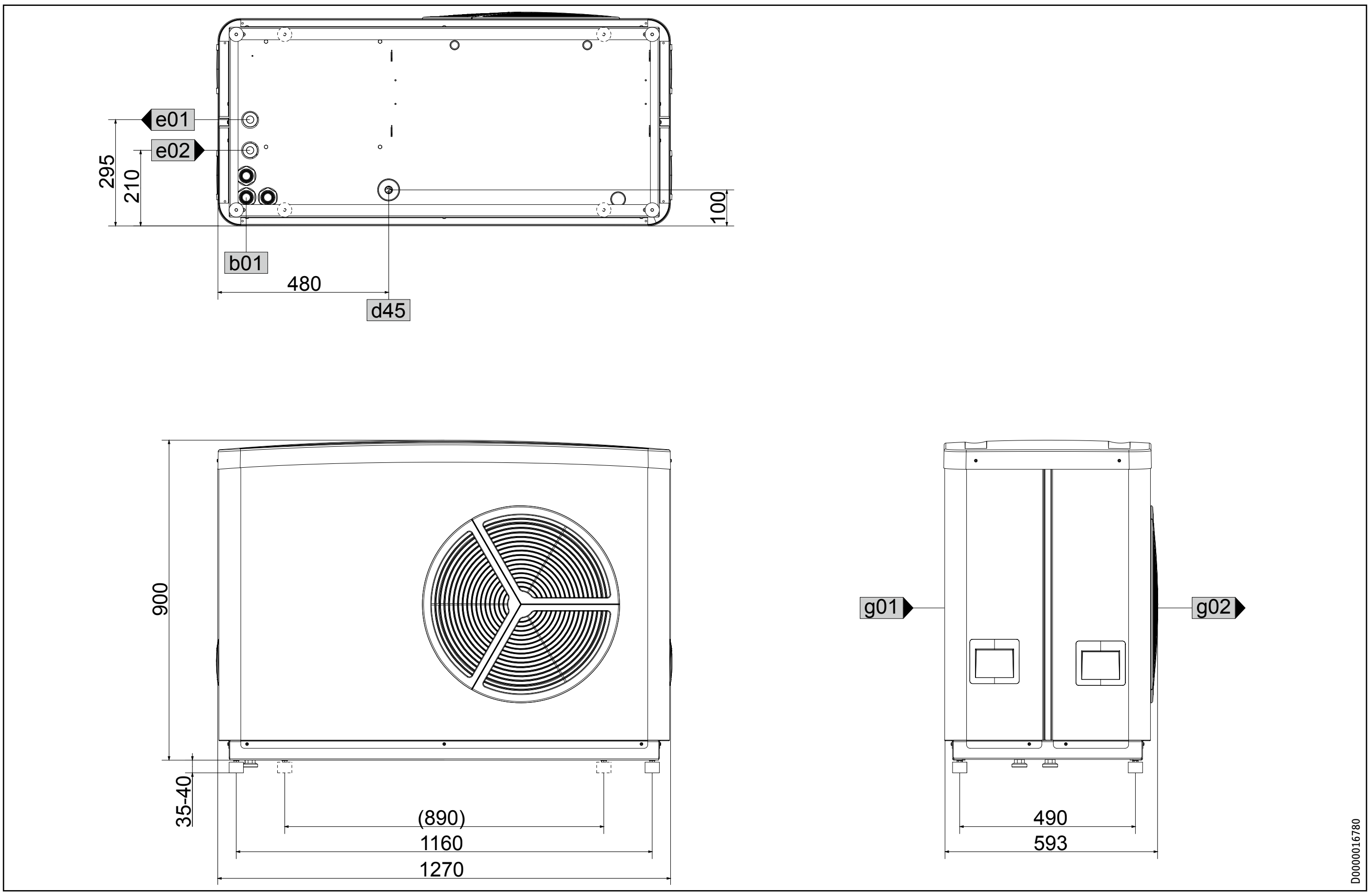
1 Heating flow
2 Heating return
3 Condensate drain
4 Condensate drain pipe
5 Wall mounting bracket

Example: T-support MK-WPL

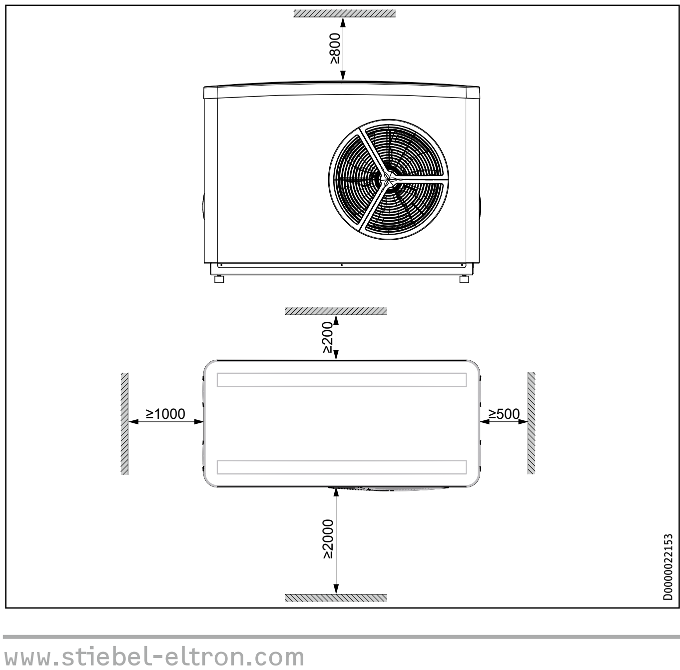


1 Heating flow
2 Heating return
3 Conduit for supply lines
4 Foundation
5 T-support
6 Gravel bed
7 Condensate drain pipe
8 Condensate drain

Siting



			WPL 10 AC
b01 Entry electrical cables			
d45 Condensate drain	Diameter	mm	22
e01 Heating flow	Male thread		G 1 1/4
e02 Heating return	Male thread		G 1 1/4
g01 Air intake			
g02 Air discharge			



Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

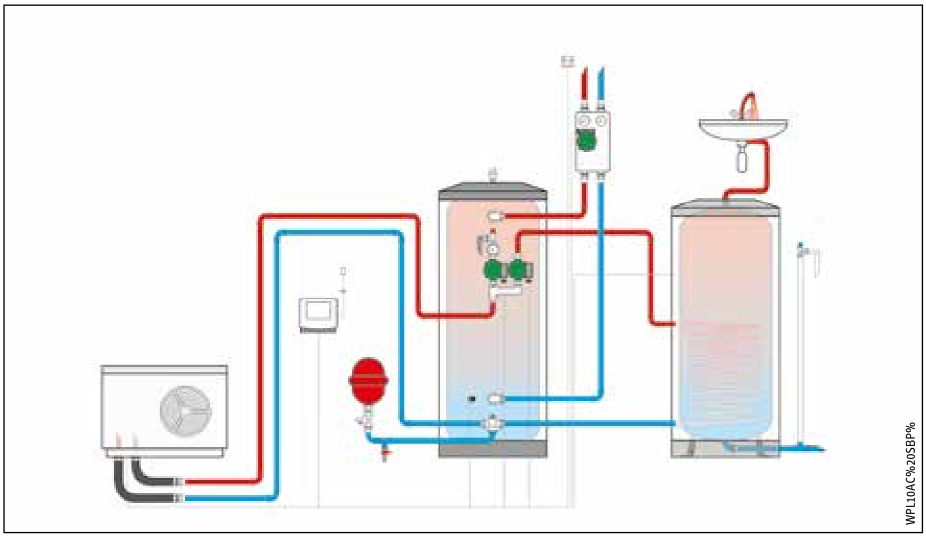
Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Use pressure hoses to reduce the transfer of structure-borne sound on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Heat pump with buffer cylinder for building cooling and DHW heating

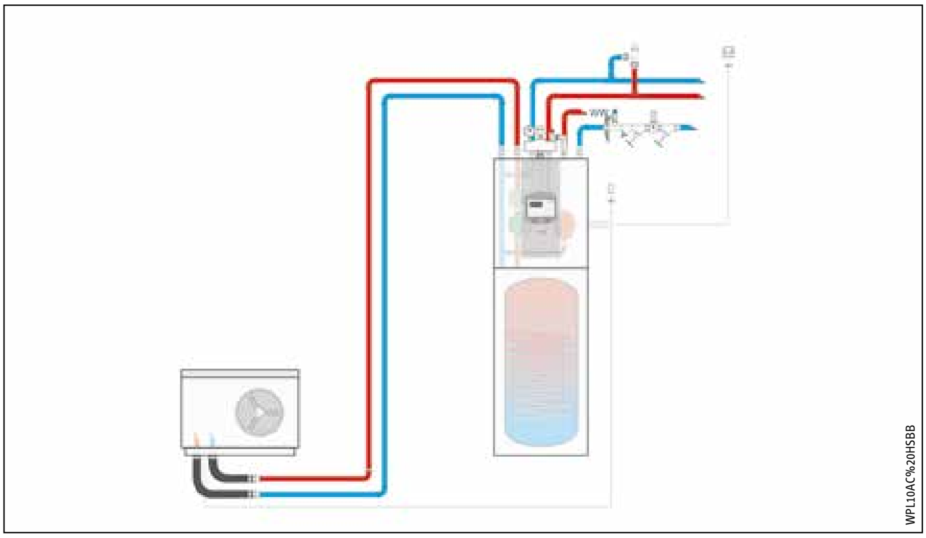


Heat pump circulation pump

Heat pump Type	Flow rate m^3/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 10 AC	0,8	195	UP 25/7.5 E	22 x 1,0

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Heat pump with hydraulic module



Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager and possibly further accessories used.

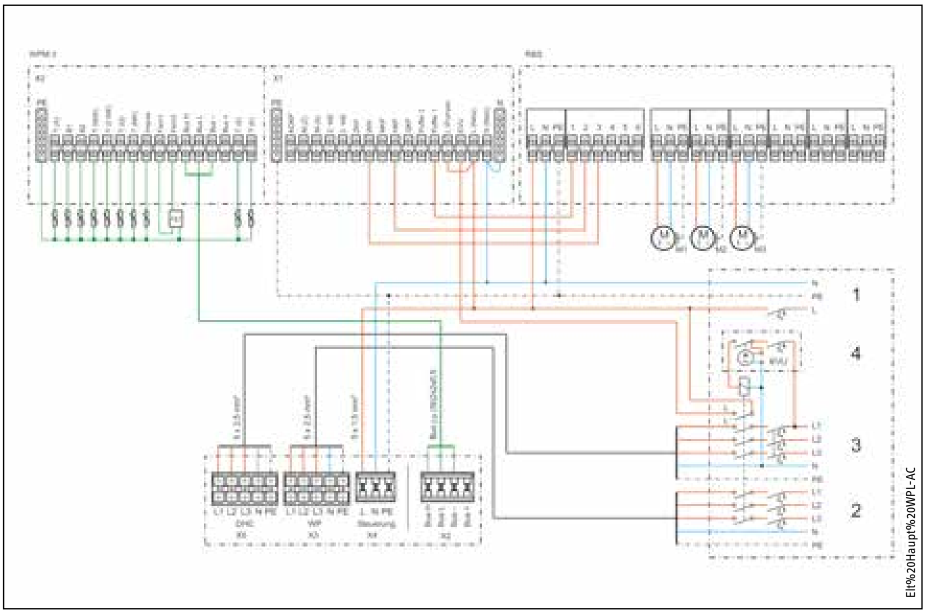
Note
Observe the standards and regulations applicable in your country.

Energy efficient pumps

Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

Heat pump



B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS-High
L	BUS-Low
-	BUS earth
+	BUS (not connected)
L	Power supply
MKP	Mixer circuit pump
EVU	Power enable signal
M(A)	Mixer open
M(Z)	Mixer closed

HKP	Heating circuit pump
QKP	Source circuit pump
Buffer	Buffer charging pump
1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater; 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

WPL 10 I

Compact air | water heat pump for indoor installation. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel with an Alpine White stove enamel finish. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. Generously sized evaporator for greater efficiency. The wide gap between fins improves defrosting. The 4/2-way valve enables defrosting by reversing the circuit. Time-optimised and energy efficient defrosting by circuit reversal. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. WPM 3 (accessory) required for control.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle.

At a glance

- Ideally suited to new build
- Little space required
- Time and energy efficient defrosting by reversing the circuit
- Heating flow temperature up to 60 °C, from -10 °C outside temperature
- Heating flow temperature up to 50 °C at -20 °C outside temperature
- Application range at outside temperatures from 30 °C to -20 °C
- With integrated heat and electricity meters
- Circulation pump with energy efficiency category A (WPL 10 IK)
- Refrigerant circuit heating of the defrost pan

Safety and quality

Awards

DESIGNPREIS 2008 NOMINIERT

DESIGN PLUS

SG Ready

Required accessories

232980 WPMW 3

WPL 10 IK 3

Compact air | water heat pump for indoor installation. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel with an Alpine White stove enamel finish. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. Generously sized evaporator for greater efficiency. The wide gap between fins improves defrosting. The 4/2-way valve enables defrosting by reversing the circuit. Time-optimised and energy efficient defrosting by circuit reversal. The condensate pan is heated by the refrigerant circuit to enable efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. The WPM heat pump manager is integrated as standard.

At a glance

- Ideally suited to new build
- Little space required
- Time and energy efficient defrosting by reversing the circuit
- Heating flow temperature up to 60 °C, from -10 °C outside temperature
- Application range at outside temperatures from 30 °C to -20 °C
- With integrated heat and electricity meters
- Refrigerant circuit heating of the defrost pan
- Heating flow temperature up to 50 °C at -20 °C outside temperature
- Circulation pump energy efficiency class A

Safety and quality

Awards

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. In cooling mode, heat is extracted from the heating water via the heat exchanger on the heating side. The heating water is heated further by electrical energy (compressor) and gives off this heat to the outdoor air via the heat exchanger on the air side.

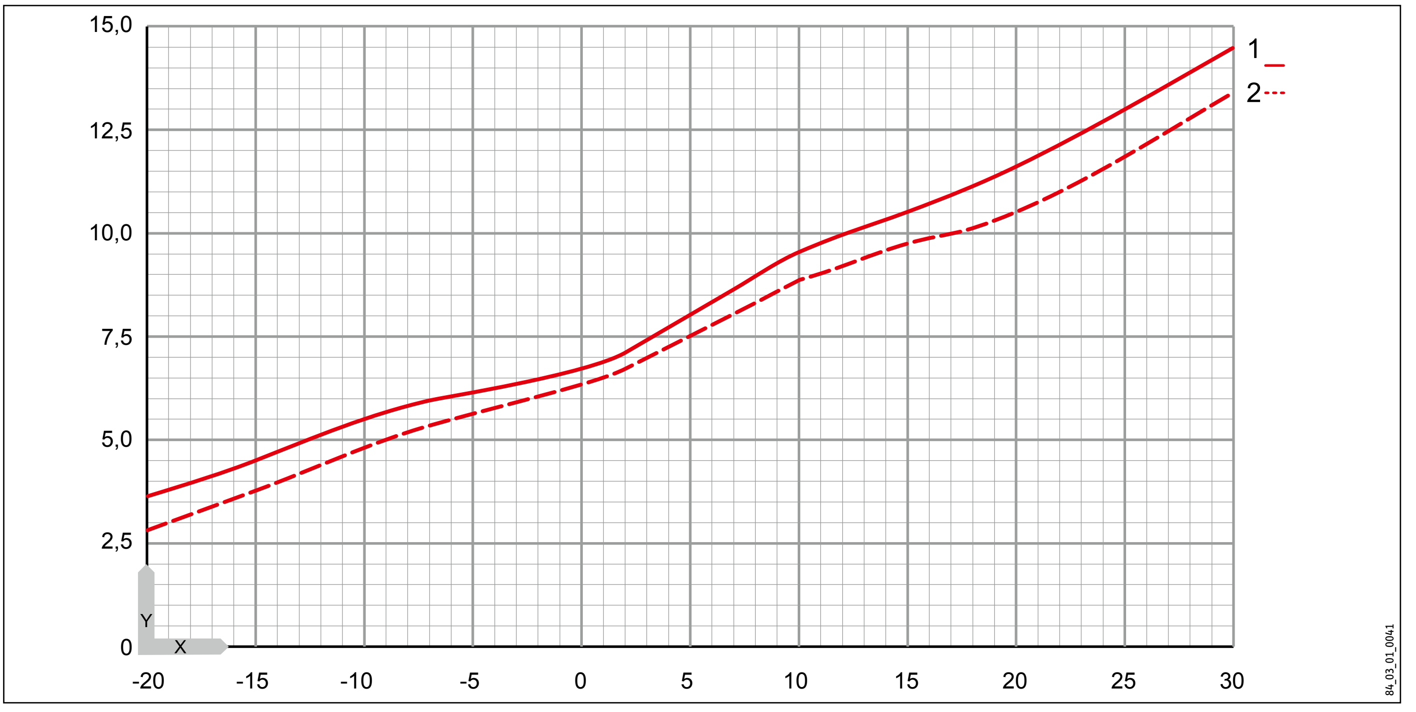
WPL 10 I/IK 3

		WPL 10 I	WPL 10 IK 3
		220811	234655
Heating output to EN 14511			
Heating output at A-7/W35 (EN 14511)	kW	5,4	5,4
Heating output at A2/W35 (EN 14511)	kW	6,7	6,7
Heating output at A7/W35 (EN 14511)	kW	7,8	7,8
Heating output at A10/W35 (EN 14511)	kW	8,7	8,7
Heating output to NF-PAC			
Heating output at A-7/W35 (NF-PAC)	kW	5	5
Heating output at A-7/W45 (NF-PAC)	kW	4,46	4,46
Heating output at A-7/W55 (NF-PAC)	kW	4,04	4,04
Heating output at A7/W35 (NF-PAC)	kW	7,8	7,8
Heating output at A7/W45 (NF-PAC)	kW	7,33	7,33
Heating output at A7/W55 (NF-PAC)	kW	7,04	7,04
Power consumption			
Power consumption, emergency/booster heater	kW	8,8	8,8
Power consumption, fan heating max.	kW	0,12	0,12
Power consumption to EN 14511			
Power consumption at A-7/W35 (EN 14511)	kW	1,8	1,8
Power consumption at A2/W35 (EN 14511)	kW	2,1	2,1
Power consumption at A7/W35 (EN 14511)	kW	2,2	2,2
Power consumption at A10/W35 (EN 14511)	kW	2,2	2,2
Power consumption to NF-PAC			
Power consumption at A-7/W35 (NF-PAC)	kW	1,8	1,80
Power consumption at A-7/W45 (NF-PAC)	kW	1,93	1,93
Power consumption at A-7/W55 (NF-PAC)	kW	1,98	1,98
Power consumption at A7/W35 (NF-PAC)	kW	2,2	2,20
Power consumption at A7/W45 (NF-PAC)	kW	2,4	2,40
Power consumption at A7/W55 (NF-PAC)	kW	2,53	2,53
COP to EN 14511			
COP at A-7/W35 (EN 14511)		2,9	2,9
COP at A2/W35 (EN 14511)		3,27	3,27
COP at A7/W35 (EN 14511)		3,6	3,6
COP at A10/W35 (EN 14511)		4	4
COP to NF-PAC			
COP at A-7/W35 (NF-PAC)		2,78	2,78
COP at A-7/W45 (NF-PAC)		2,31	2,31
COP at A-7/W55 (NF-PAC)		2,04	2,04
COP at A7/W35 (NF-PAC)		3,55	3,55
COP at A7/W45 (NF-PAC)		3,05	3,05
COP at A7/W55 (NF-PAC)		2,78	2,78
Sound data			
Sound power level indoor installation, air intake/discharge (EN 12102)	dB(A)	62	62
Sound power level indoor installation (EN 12102)	dB(A)	57	57
Sound pressure level at 5 m distance in a free field	dB(A)	40	40
Sound pressure level at 10 m distance in a free field	dB(A)	34	34

WPL 10 I/IK 3

		WPL 10 I	WPL 10 IK 3
Application limits			
Min. application limit on the heating side	°C	15	15
Max. application limit on the heating side	°C	60	60
Min. application limit, heat source	°C	-20	-20
Max. application limit, heat source	°C	30	30
Water hardness	°dH	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1
Electrical data			
Starting current (with/without starting current limiter)	A	<25 / -	<25/-
Compressor fuse/MCB	A	3 x C 16	3 x C 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16
MCB/fuse protection, controller	A	1 x B 16	1 x B 16
Frequency	Hz	50	50
Phases, controller		1/N/PE	1/N/PE
Phases, emergency/booster heater		3/N/PE	3/N/PE
Phases, compressor		3/PE	3/PE
Rated voltage, emergency/booster heater	V	400	400
Rated voltage, compressor	V	400	400
Rated voltage, controller	V	230	230
Energy data			
Energy efficiency class		A+/A+	A+/A+
Versions			
Refrigerant		R407 C	R407 C
Defrost type		Circuit reversal	Circuit reversal
IP rating		IP14B	IP14B
Frost protection		X	X
Refrigerant charge	kg	2,7	2,7
Dimensions			
Height	mm	1010	1668
Width	mm	758	778
Depth	mm	856	925
Weights			
Weight	kg	166	212
Connection			
Heating flow/return push-fit connection		22 mm	22 mm
Air hose intake and discharge connectors		DN 315	DN 315
Values			
Expansion vessel volume	l		12
Expansion vessel - pre-charge pressure	MPa		0,15
Min heating flow rate	m³/h	0,58	0,58
Flow rate on the heating side	m³/h	1,4	1,4
Flow rate, heat source side	m³/h	1200	1200
Internal pressure differential	hPa	195	195
Total available external pressure differential	hPa	1,0	1,0

Output data



X Outside temperature [°C]
Y Heating output [kW]

1 Flow temperature 35 °C
2 Flow temperature 50 °C

WPL 10

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-20	2,6	2,0	1,6	1,4	1,3	1,4	1,4	1,3	2,0	1,4	1,1	1,1
-15	3,5	3,0	2,3	1,8	1,5	1,6	1,5	1,4	2,3	1,9	1,5	1,3
-7	5,0	4,5	3,8	3,4	1,8	1,9	1,9	1,8	2,8	2,4	2,0	1,9
2	6,3	6,0	5,4	4,9	2,1	2,2	2,3	2,3	3,0	2,7	2,3	2,1
7	7,8	7,3	7,0	6,8	2,2	2,4	2,5	2,5	3,5	3,0	2,8	2,7
10	8,7	8,2	7,7	7,4	2,2	2,5	2,7	2,8	4,0	3,3	2,9	2,6
15	9,8	9,2	8,6	8,2	2,3	2,6	2,9	3,0	4,3	3,5	3,0	2,7
20	10,9	10,1	9,4	9,0	2,3	2,6	3,0	3,1	4,7	3,9	3,1	2,9

Siting

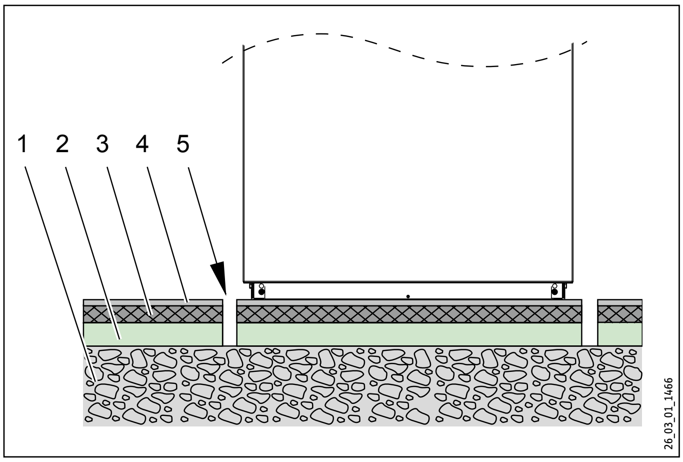
Air routing with hoses

The total length of hoses on the air intake and discharge sides must not exceed 8 m. Never incorporate more than four 90° bends. The hose will tend to sag because of its flexibility; therefore secure it approx. every 1 m. Special hoses are used to route the inlet air from the outside to the heat pump and discharge air from the heat pump to the outdoors. These hoses are highly flexible, thermally insulated and are self-extinguishing in case of fire.

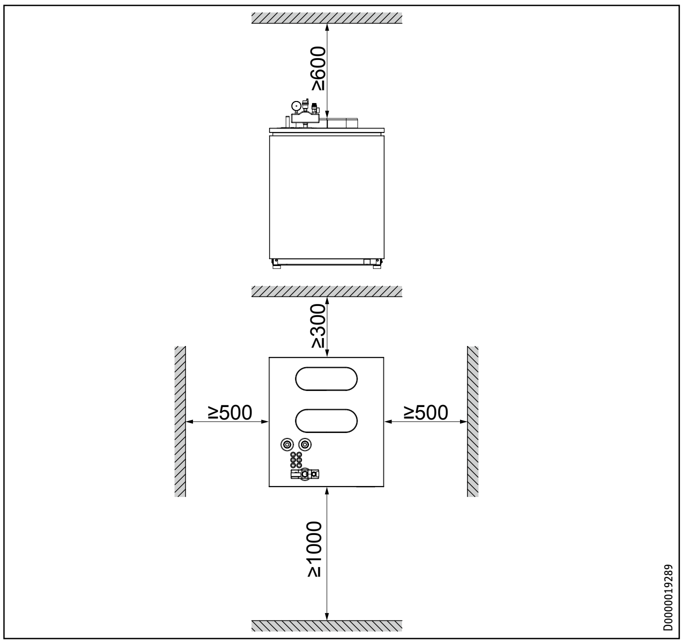
Air routing with air ducts

With air routes longer than 8 m, air ducts can also be connected to the heat pump. The cross-section of the air duct varies according to the air flow rate and according to the externally available, static pressure differential of the heat pump. To reduce the transfer of structure-borne sound to the building, an air hose or canvas flange must be installed between the heat pump and air ducts. When sizing air ducts and grilles, observe the external pressure of the fan. At least 20 % of the total external fan pressure must additionally be taken into account for the air discharge side.

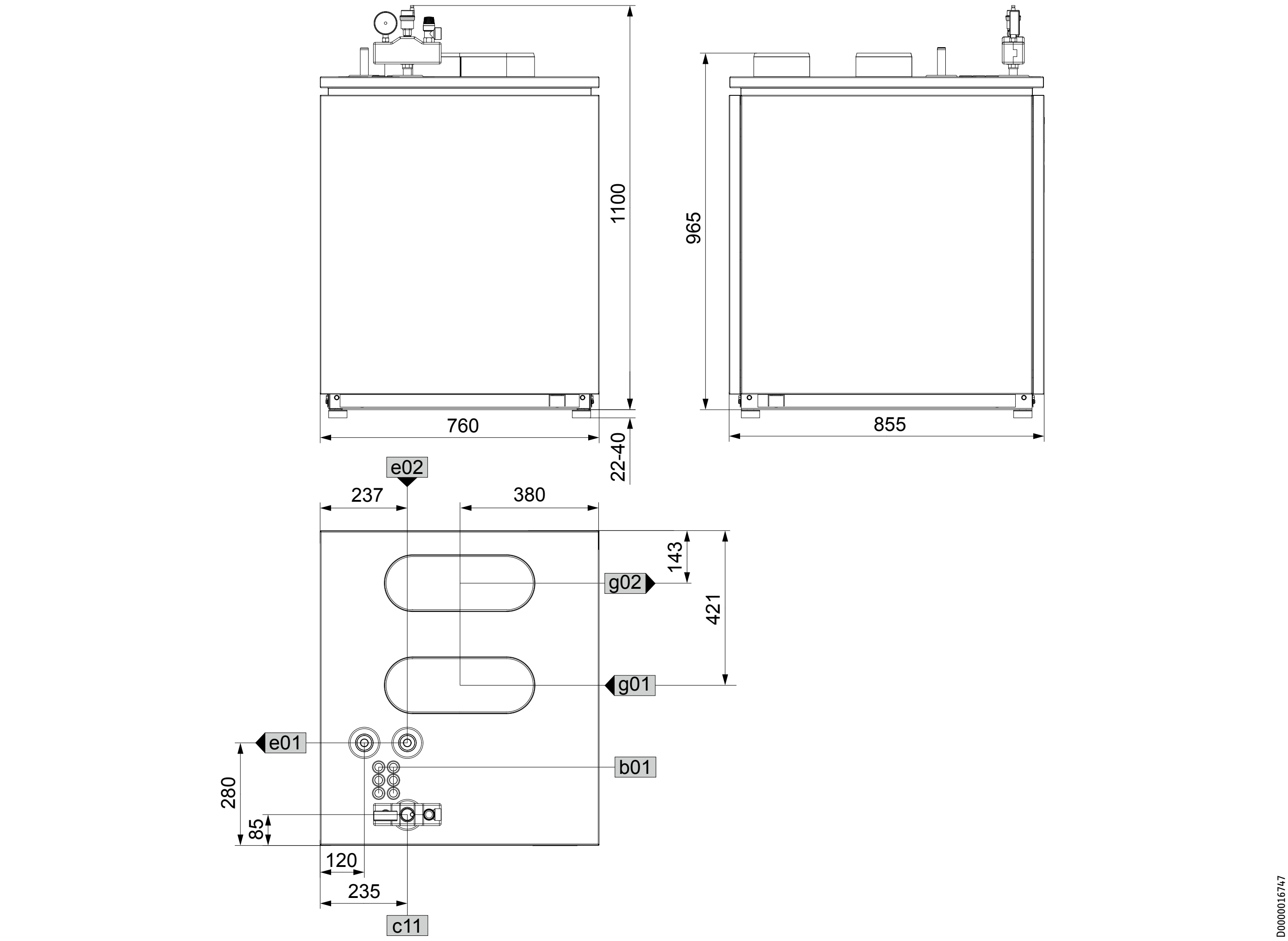
If the heat pump is installed in an enclosed room also containing a combustion appliance that draws its combustion air directly from the room, a vent to the installation room with 250 cm² diameter must be provided to prevent the heat pump from influencing the operation of the combustion equipment. Without this additional vent, small, unavoidable leaks on the air intake side, e.g. at hose connectors or at the heat pump, will reduce the air pressure in the enclosed room to unacceptable levels.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



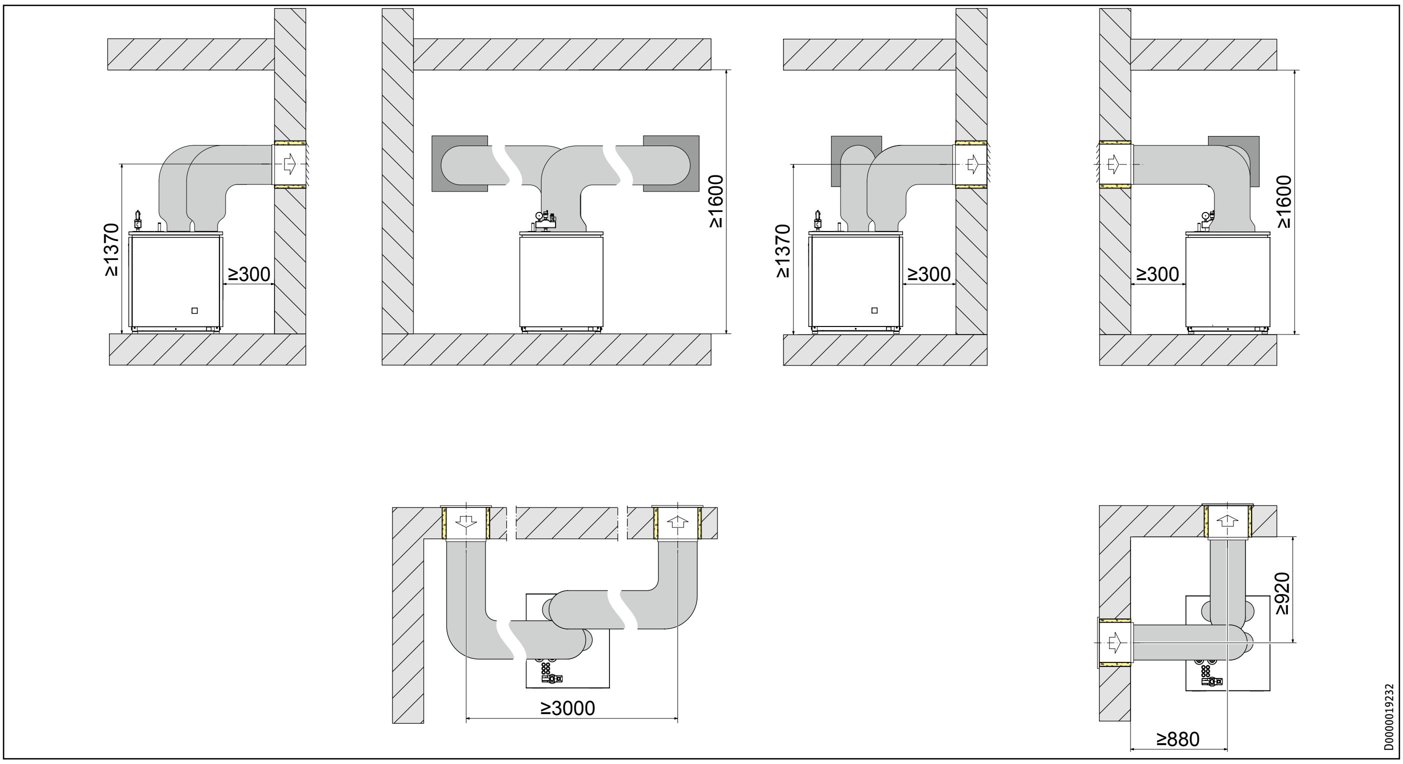
Siting



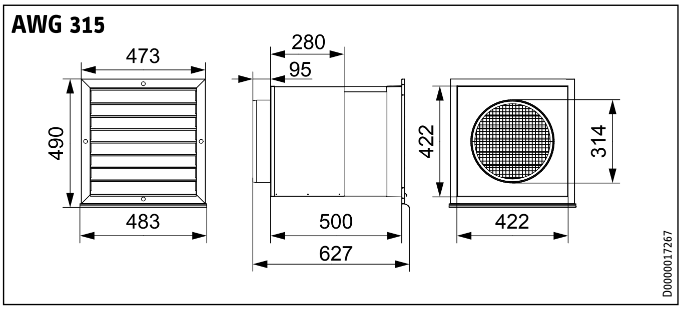
			WPL 10 I
b01 Entry electrical cables			
c11 Safety assembly			
e01 Heating flow	Diameter	mm	22
e02 Heating return	Diameter	mm	22
g01 Air intake	Nominal diameter		DN 315
g02 Air discharge	Nominal diameter		DN 315

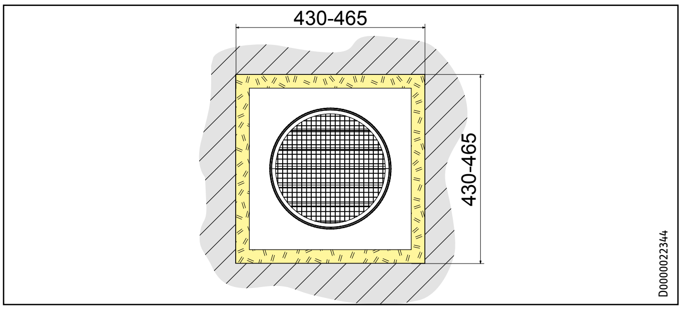
Siting

Air routing without a shaft: Through an exterior wall | Through two exterior walls over a corner

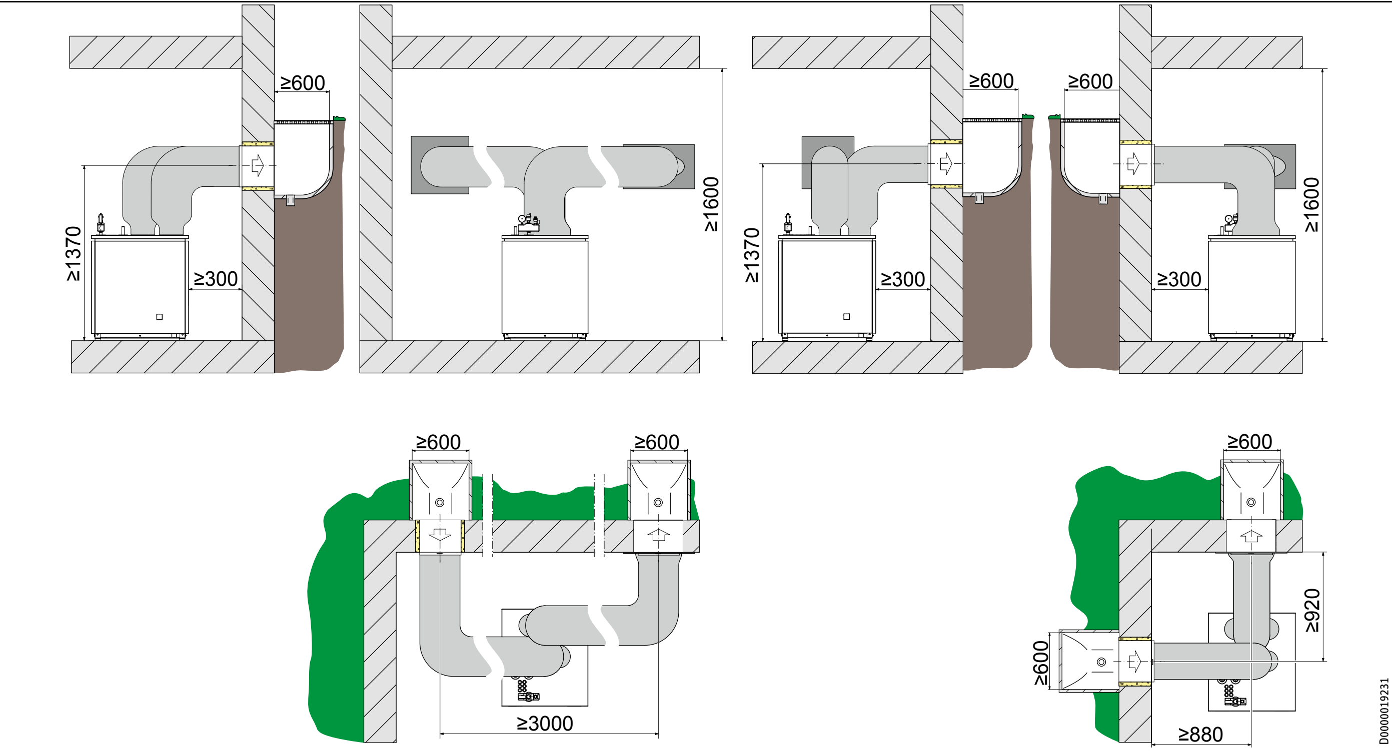


Method: Through an exterior wall to the outdoors with a wall duct

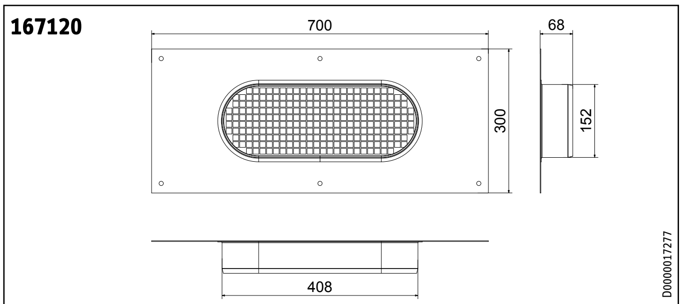


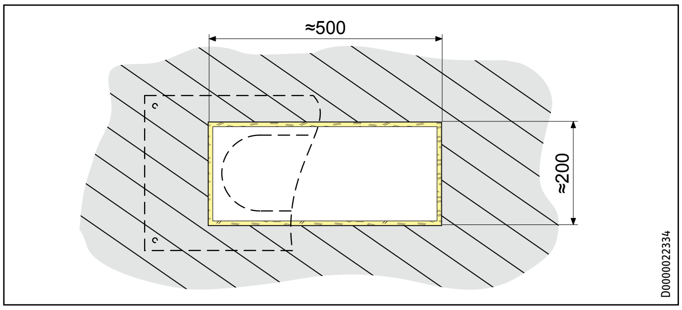


Air routing with a shaft: Through an exterior wall | Through two exterior walls over a corner

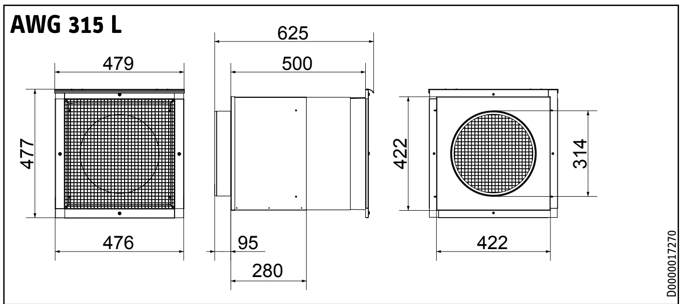


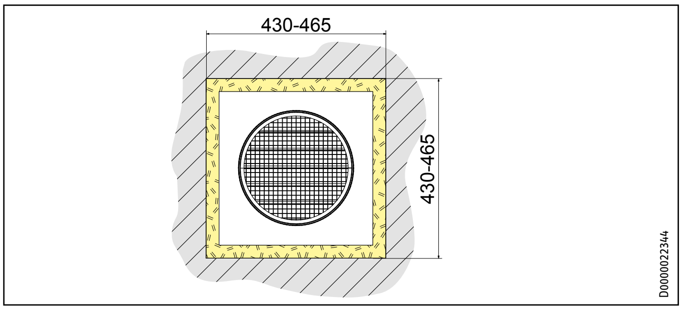
Method: Through a cellar wall in a shaft with a hose connection panel





Method: Through a cellar wall in a shaft with a wall duct





Siting

Air routing with hoses

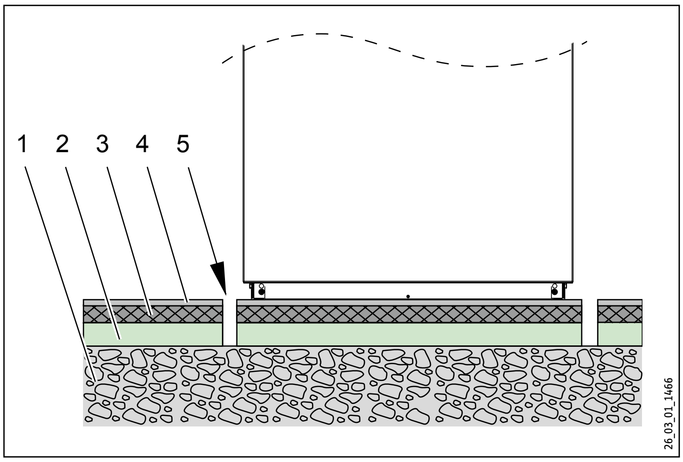
The total length of hoses on the air intake and discharge sides must not exceed 8 m. Never incorporate more than four 90° bends. The hose will tend to sag because of its flexibility; therefore secure it approx. every 1 m. Special hoses are used to route the inlet air from the outside to the heat pump and discharge air from the heat pump to the outdoors. These hoses are highly flexible, thermally insulated and are self-extinguishing in case of fire.

Air routing with air ducts

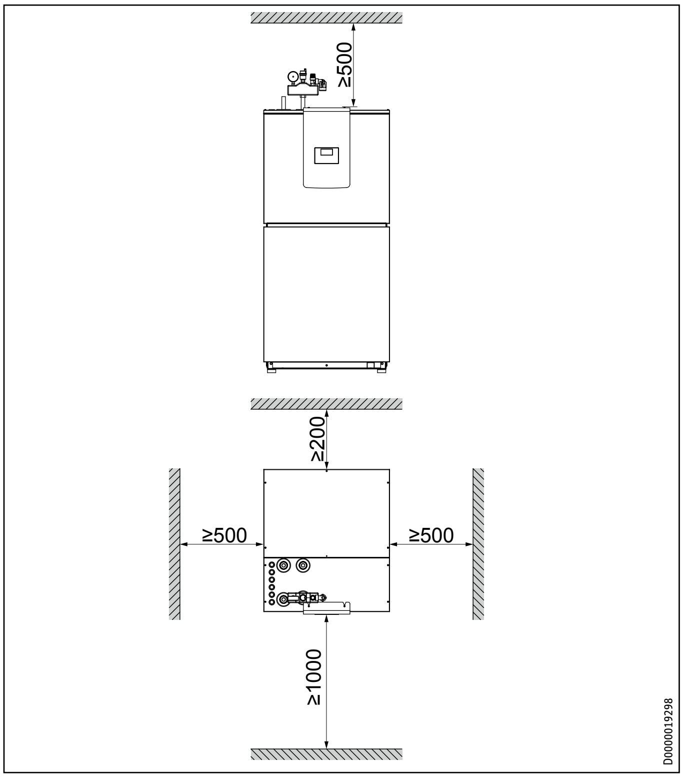
With air routes longer than 8 m, air ducts can also be connected to the heat pump. The cross-section of the air duct varies according to the air flow rate and according to the externally available, static pressure differential of the heat pump. To reduce the transfer of structure-borne sound to the building, an air hose or canvas flange must be installed between the heat pump and air ducts. When sizing air ducts and grilles, observe the external pressure of the fan. At least 20 % of the total external fan pressure must additionally be taken into account for the air discharge side.

Special features

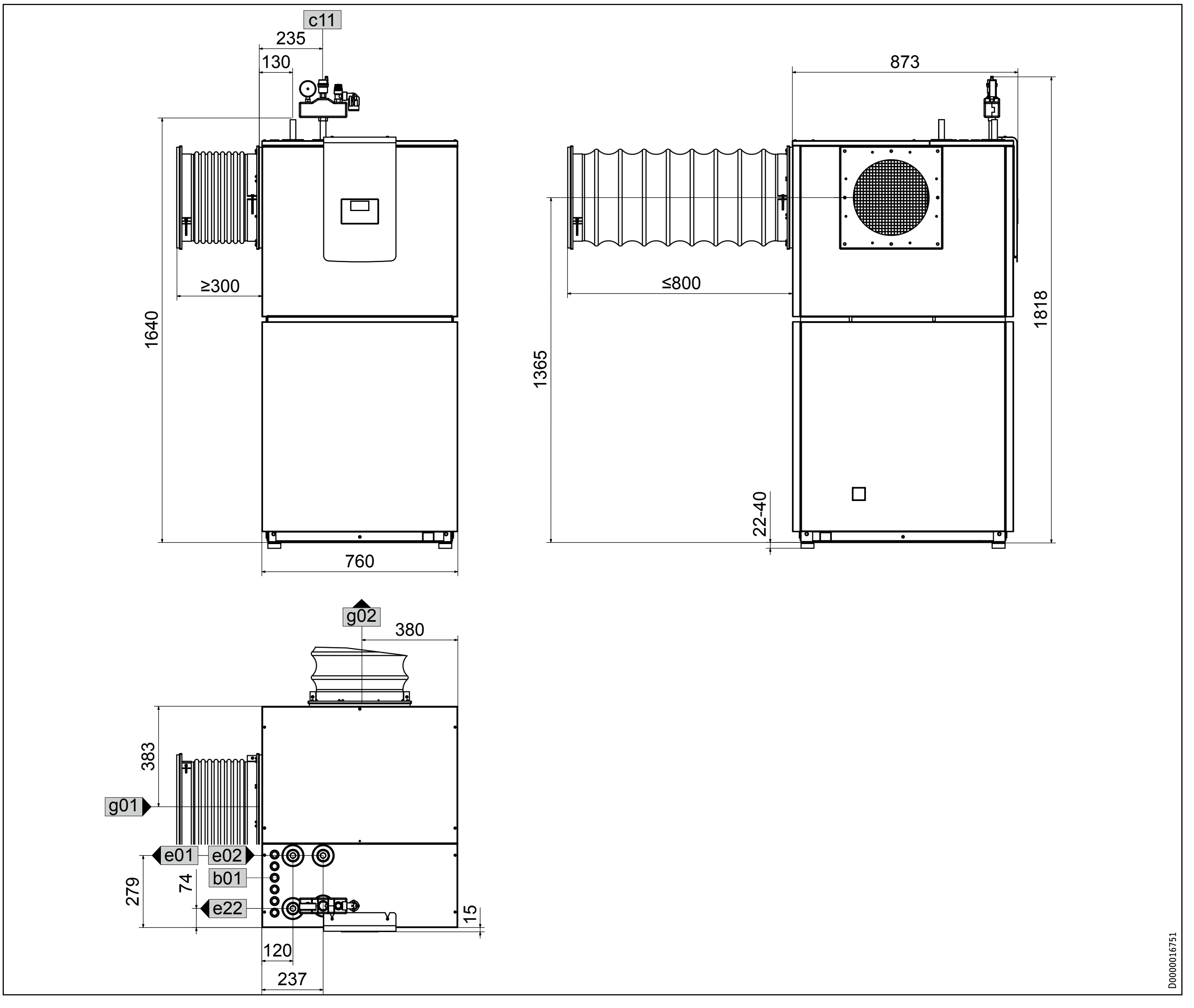
If the heat pump is installed in an enclosed room also containing a combustion appliance that draws its combustion air directly from the room, a vent to the installation room with 250 cm² diameter must be provided to prevent the heat pump from influencing the operation of the combustion equipment. Without this additional vent, small, unavoidable leaks on the air intake side, e.g. at hose connectors or at the heat pump, will reduce the air pressure in the enclosed room to unacceptable levels.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

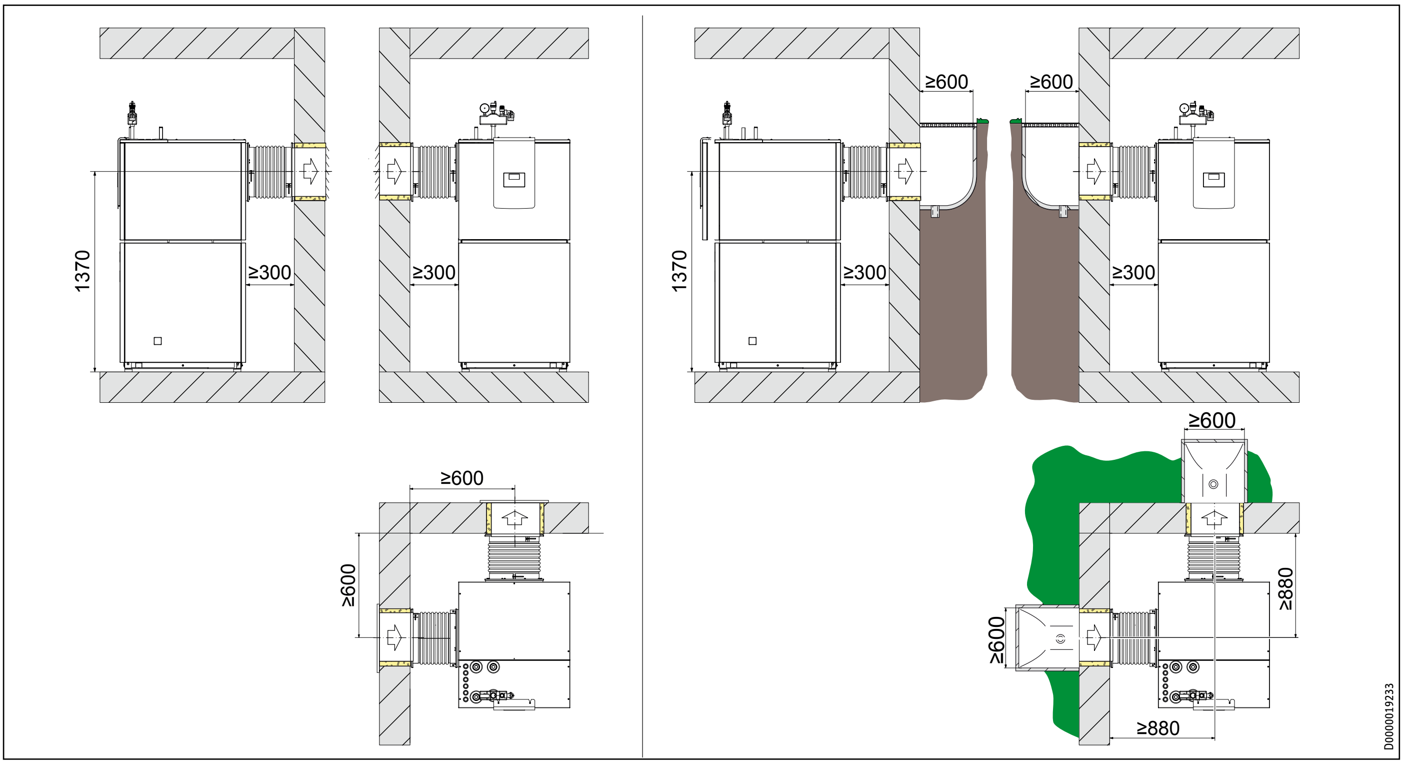


Siting

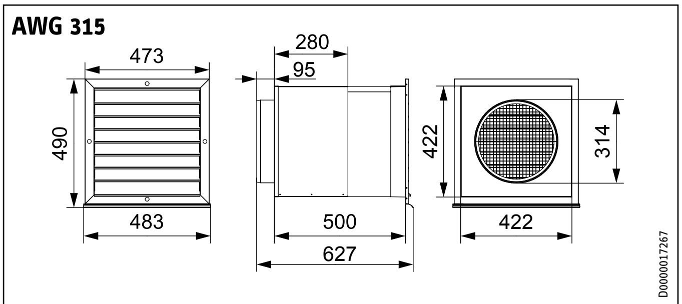


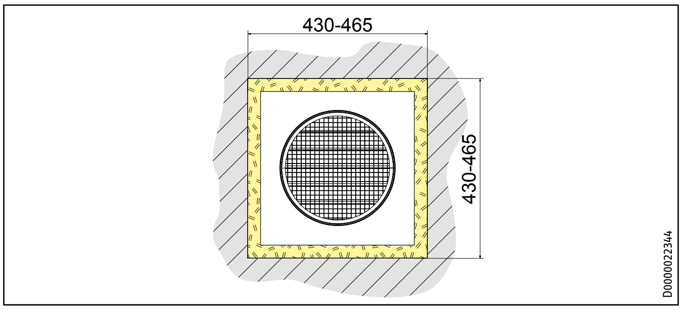
			WPL 10 IK 3
b01 Entry electrical cables			
c11 Safety assembly			
e01 Heating flow	Diameter	mm	22
e02 Heating return	Diameter	mm	22
e22 Cylinder flow	Diameter	mm	22
g01 Air intake	Nominal diameter		DN 315
g02 Air discharge	Nominal diameter		DN 315

Air routing without a shaft over a corner / air routing with a shaft over a corner

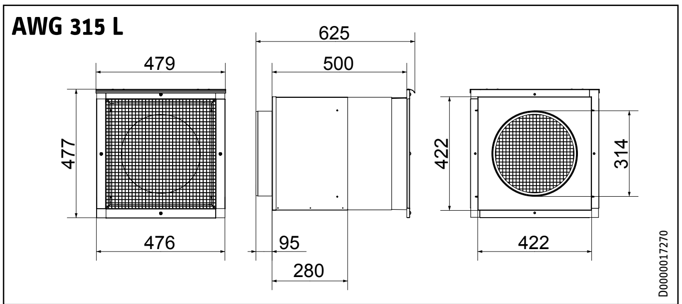


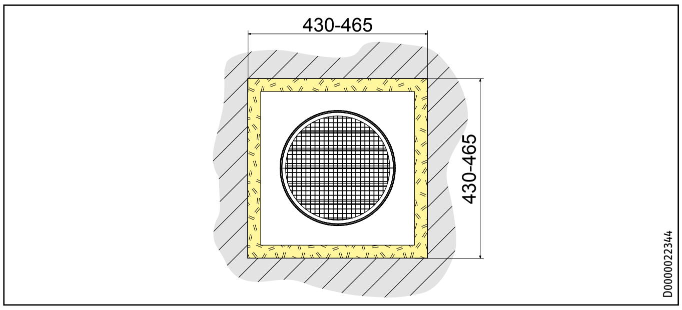
Method: Through an exterior wall to the outdoors with a wall outlet





Method: Through a cellar wall in a shaft with a wall duct





Heating system connection

Install the heat consumer system (WNA) in accordance with the engineering documentation.

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

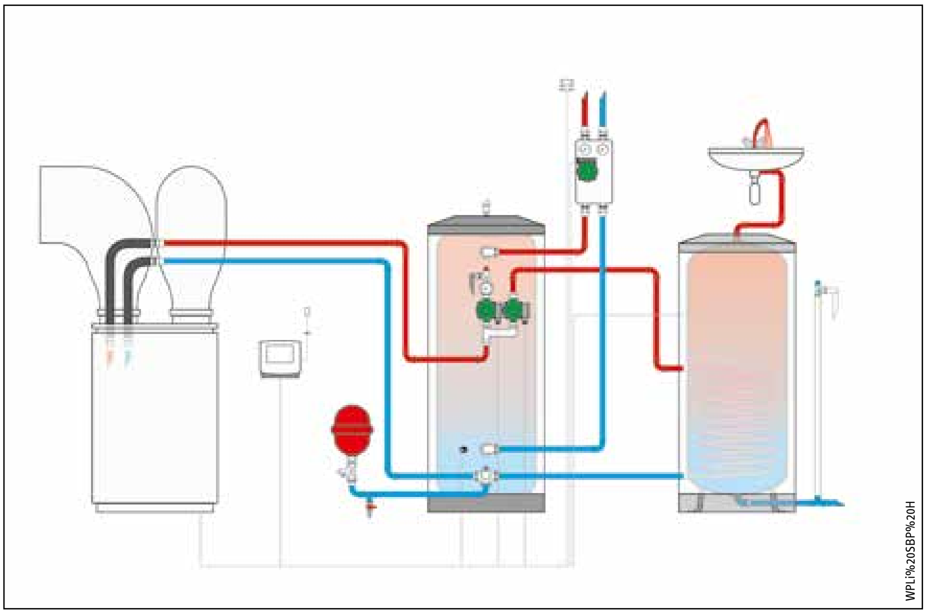
Use flexible pressure hoses to reduce structure-borne noise on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

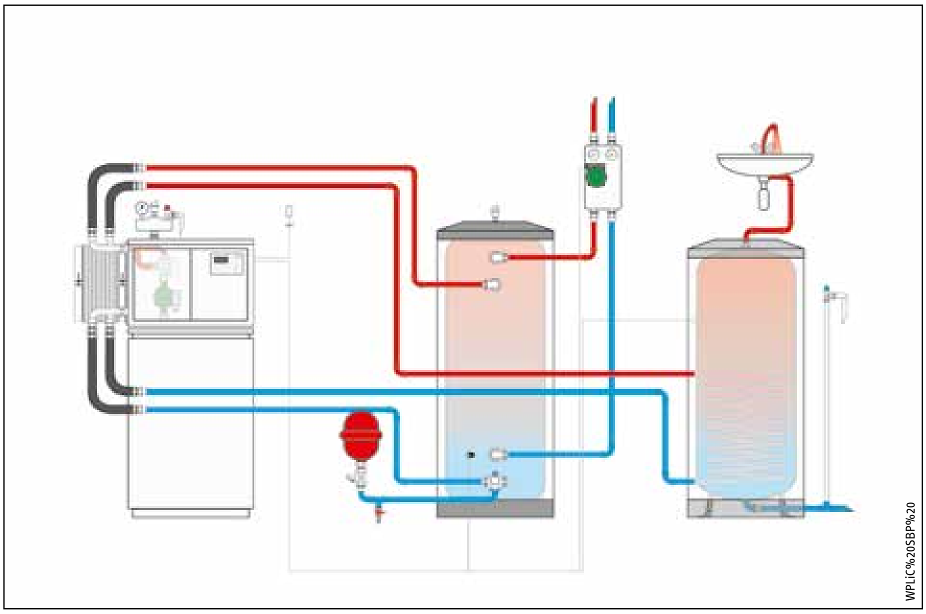
Heat pump compact installation and circulation pump

When using a heat pump compact installation, select the circulation pump that suits the heat pump.

Heat pump with buffer cylinder and DHW heating, indoor installation



Heat pump with buffer cylinder and DHW heating. Indoor installation



Heat pump circulation pump

Heat pump Type	Flow rate m³/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 10	0,8	195	UP 25/7.5 E	22 x 1,0

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

For outdoor installation

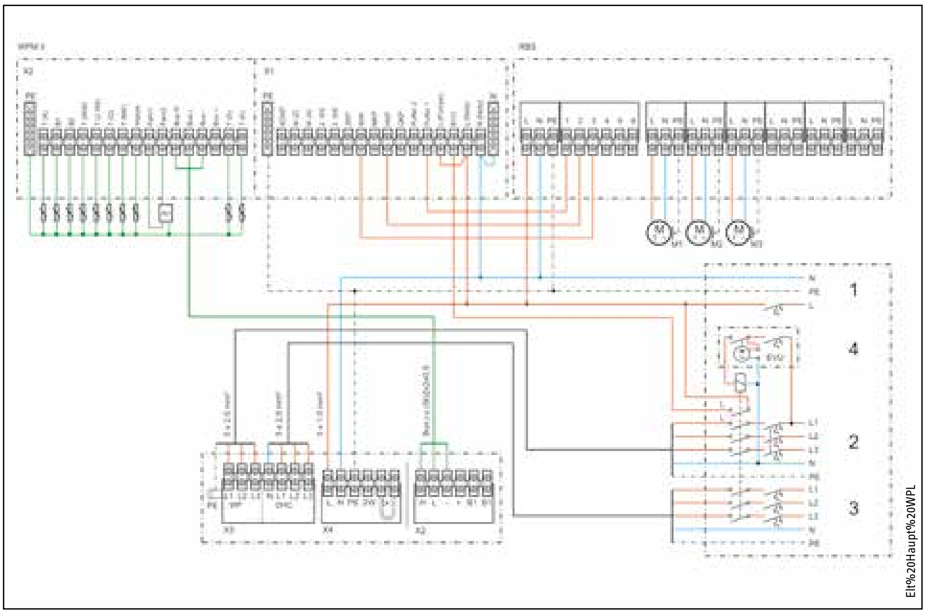
Weather-resistant electrical cables conforming to VDE 0100 must be used.

Route such cables through a conduit (protective pipe); entry into the heat pump only from below.

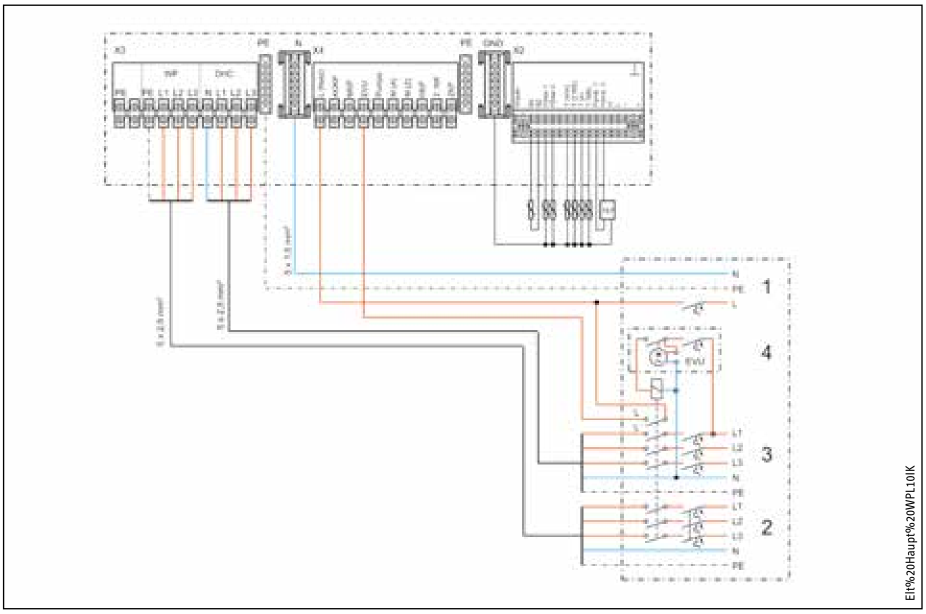
For internal installation

Route cables through the top installation aperture in the heat pump.

WPL



WPL IK 3



Pulse	Pulse input HP
B2	Temperature sensor, heat pump return
Sensor 1	Temp. sensor, heat meter/solar
Sensor 2	Temp. sensor, heat meter/solar
T (WW)	Temperature sensor, DHW
T (2.WE)	Temperature sensor heat source 2
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
L (Netz)	Power supply
MKP	Mixer circuit pump
EVU	Power enable signal
M(A)	Mixer open
M(Z)	Mixer closed
HKP	Heating circuit pump

2.WE	Heat source 2
ZKP	DHW circulation pump
M1	Circulation pump (max. 2A gl)
1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

WPL E cool - outdoor installation

Air | water heat pump with enhanced vapour injection for heating and cooling. Available as an outdoor or indoor installation version with corresponding accessories. The robust metal casing is made from galvanised, powder-coated and stove-enamelled sheet steel. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. Equipped with twin anti-vibration compressor mounts for reduced sound power level. Enhanced vapour injection cools the scroll compressor at low outside temperatures, thereby achieving a higher heating output. The wide fin spacing of the evaporator provides low air resistance, resulting in reduced noise and improved defrosting. The 4/2-way valve enables defrosting by circuit reversal, as well as switching the refrigerant circuit from heating to cooling mode. Equipped with electronic biflow expansion valve with separate control unit and switching via the internal heat pump control unit (IWS), for optimised overheating protection resulting in an improved COP. Time-optimised and energy efficient defrosting by circuit reversal. Heating of condensate pan via refrigerant circuit ensures efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. WPM 3 heat pump manager (accessory) required to provide control.

At a glance

- High heating output at low outside temperatures through enhanced vapour injection
- Quiet operation
- Active cooling through circuit reversal
- Enhanced vapour injection
- Electronic expansion valve
- High performance
- Can be used at outside temperatures from +40 °C to -20 °C
- Time and energy efficient defrosting by reversing the circuit
- Heating flow temperature up to 60 °C
- Cascade possible
- With integrated heat and electricity meters

Safety and quality

Required accessories

185450	WPMW II
232980	WPMW 3
074413	Accessories – outdoor installation
231890	Accessories, outdoor installation, silver

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. In cooling mode, heat is extracted from the heating water via the heat exchanger on the heating side. The heating water is heated further by electrical energy (compressor) and gives off this heat to the outdoor air via the heat exchanger on the air side.

WPL E cool - indoor installation

Air | water heat pump with enhanced vapour injection for heating and cooling. Available as an outdoor or indoor installation version with corresponding accessories. The robust metal casing is made from galvanised, powder-coated and stove-enamelled sheet steel. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. Equipped with twin anti-vibration compressor mounts for reduced sound power level. Enhanced vapour injection cools the scroll compressor at low outside temperatures, thereby achieving a higher heating output. The wide fin spacing of the evaporator provides low air resistance, resulting in reduced noise and improved defrosting. The 4/2-way valve enables defrosting by circuit reversal, as well as switching the refrigerant circuit from heating to cooling mode. Equipped with electronic biflow expansion valve with separate control unit and switching via the internal heat pump control unit (IWS), for optimised overheating protection resulting in an improved COP. Time-optimised and energy efficient defrosting by circuit reversal. Heating of condensate pan via refrigerant circuit ensures efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. WPM 3 heat pump manager (accessory) required to provide control.

At a glance

- » High heating output at low outside temperatures through enhanced vapour injection
- » Quiet operation
- » Active cooling through circuit reversal
- » Enhanced vapour injection
- » Electronic expansion valve
- » High performance
- » Can be used at outside temperatures from +40 °C to -20 °C
- » Time and energy efficient defrosting by reversing the circuit
- » Heating flow temperature up to 60 °C
- » Cascade possible
- » With integrated heat and electricity meters

Safety and quality

Required accessories

232980	WPMW 3
074412	Accessories WPL 13/18/23 indoor installation

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. In cooling mode, heat is extracted from the heating water via the heat exchanger on the heating side. The heating water is heated further by electrical energy (compressor) and gives off this heat to the outdoor air via the heat exchanger on the air side.

WPL E cool - indoor installation, compact

At a glance

- » High heating output at low outside temperatures through enhanced vapour injection
- » Quiet operation
- » Active cooling through circuit reversal
- » Enhanced vapour injection
- » Electronic expansion valve
- » High performance
- » Can be used at outside temperatures from +40 °C to -20 °C
- » Time and energy efficient defrosting by reversing the circuit
- » Heating flow temperature up to 60 °C
- » Cascade possible
- » With integrated heat and electricity meters

Safety and quality

Required accessories

187909 WPIC

Air | water heat pump with enhanced vapour injection. May be used as compact internal model with appropriate accessories. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel with a stove enamel finish. The refrigerant circuit is hermetically sealed, tested for leaks at the factory and filled with safety refrigerant R407C. Equipped with twin anti-vibration compressor mounts for reduced sound power level. Enhanced vapour injection cools the scroll compressor at low outside temperatures, thereby achieving a higher heating output. The wide fin spacing of the evaporator provides low air resistance, resulting in reduced noise and improved defrosting. The 4/2-way valve enables defrosting by reversing the circuit. Equipped with electronic biflow expansion valve with separate control unit and switching via the internal heat pump control unit (IWS), for optimised overheating protection resulting in an improved COP. Time-optimised and energy efficient defrosting by circuit reversal. Heating of condensate pan via refrigerant circuit ensures efficient defrosting. With integral heat and electricity metering via refrigerant circuit data. All safety equipment is included. WPM II heat pump manager plus heating circuit pump and DHW primary pump are already integrated in the function module.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle. In cooling mode, heat is extracted from the heating water via the heat exchanger on the heating side. The heating water is heated further by electrical energy (compressor) and gives off this heat to the outdoor air via the heat exchanger on the air side.

Specification

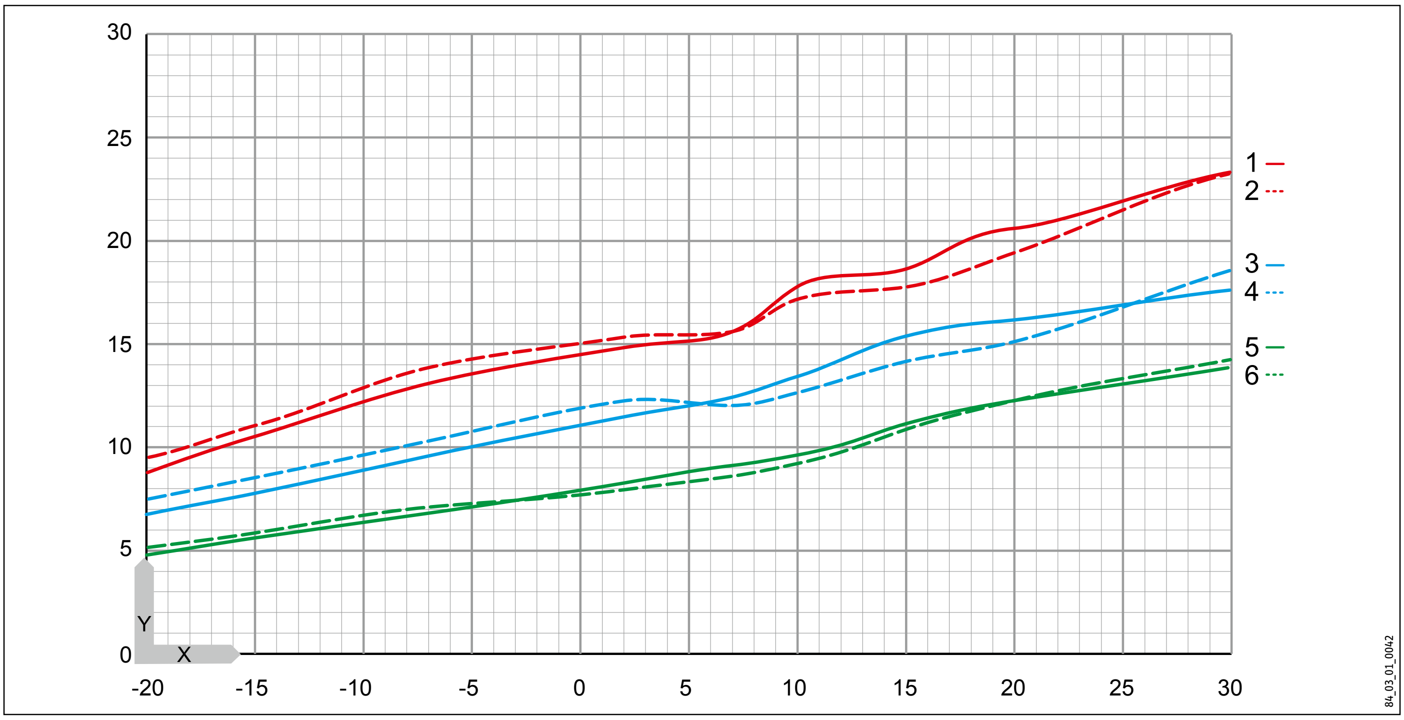
		WPL 13 E	WPL 13 cool	WPL 18 E	WPL 18 cool	WPL 23 E	WPL 23 cool
		227756	223400	227757	223401	227758	223402
Heating output to EN 14511							
Heating output at A-7/W35 (EN 14511)	kW	6,77	6,6	9,72	9,72	13,21	13,21
Heating output at A2/W35 (EN 14511)	kW	8,09	8,1	11,3	11,3	15,73	15,73
Heating output at A7/W35 (EN 14511)	kW	8,93	9,01	12,9	12,9	16,56	16,56
Heating output at A10/W35 (EN 14511)	kW	9,5	9,5	13,4	13,4	18,5	18,5
Cooling capacity at A35/W20	kW		9,7		13,5		15,8
Cooling capacity at A35/W7	kW		6,7		9,2		12,5
Power consumption							
Power consumption, emergency/booster heater	kW	8,8	8,8	8,8	8,8	8,8	8,8
Power consumption, fan heating max.	kW	0,29	0,29	0,29	0,29	0,29	0,29
Power consumption to EN 14511							
Power consumption at A-7/W35 (EN 14511)	kW	2,11	2,11	2,97	2,97	4,21	4,21
Power consumption at A2/W35 (EN 14511)	kW	2,15	2,15	3,03	3,03	4,35	4,35
Power consumption at A7/W35 (EN 14511)	kW	2,05	2,05	2,89	2,89	4,15	4,15
Power consumption at A10/W35 (EN 14511)	kW	2,1	2,1	2,9	2,9	4,15	4,15
Power consumption, cooling at A35/W20	kW		3,3		4,5		7,2
Power consumption, cooling at A35/W7	kW		2,8		3,9		5,9
COP to EN 14511							
COP at A-7/W35 (EN 14511)		3,2	3,2	3,27	3,27	3,14	3,14
COP at A2/W35 (EN 14511)		3,76	3,4	3,73	3,7	3,62	3,5
COP at A7/W35 (EN 14511)		4,35	4,35	4,46	4,46	3,99	3,99
COP at A10/W35 (EN 14511)		4,5	4,5	4,6	4,6	4,4	4,4
Cooling capacity factor at A35/W20			2,9		3		2,5
Cooling capacity factor at A35/W7			2,4		2,4		2,1
Sound data							
Sound power level outdoor installation (EN 12102)	dB(A)	64	64	65	65	65	65
Max. sound power level, outdoor installation, silent mode	dB(A)			63		63	63
Sound power level indoor installation (EN 12102)	dB(A)	56	56	57	57	58	58
Sound power level indoor installation, air intake/discharge (EN 12102)	dB(A)	62	62	62	62	62	62
Sound pressure level at 1 m distance in a free field	dB(A)	54	54	54	54	54	54
Sound pressure level at 5 m distance in a free field	dB(A)	42	42	43	43	43	43
Sound pressure level at 10 m distance in a free field	dB(A)	34	34	34	34	34	34
Application limits							
Min. application limit, heat source	°C	-20	-20	-20	-20	-20	-20
Max. application limit, heat source	°C	40	40	40	40	40	40
Application limit cooling heat source min.	°C		20		20		20
Application limit cooling heat source max.	°C		40		40		40
Min. application limit on the heating side	°C	15	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	60	60	60	60
Min. application limit - cooling on the heating side	°C		7		7		
Max. application limit cooling on the heating side	°C		25		25		
Application limit cooling on the heating side 35 °C	°C						20
Application limit cooling on the heating side 40 °C	°C						12
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1

WPL E cool

		WPL 13 E	WPL 13 cool	WPL 18 E	WPL 18 cool	WPL 23 E	WPL 23 cool
Electrical data							
Frequency	Hz	50	50	50	50	50	50
Starting current (with/without starting current limiter)	A	24/-	24/-	26/-	26/-	30/-	30/-
Compressor fuse/MCB	A	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, emergency/booster heater		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Rated voltage, emergency/booster heater	V	400	400	400	400	400	400
Rated voltage, compressor	V	400	400	400	400	400	400
Rated voltage, controller	V	230	230	230	230	230	230
Energy data							
Energy efficiency class		A+/A++	A+/A+	A+/A++	A+/A++	A+/A+	A+/A++
Versions							
Flow/return connection		G 1 1/4 A	G 1 1/4 A	G 1 1/4 A	G 1 1/4 A	G 1 1/4 A	G 1 1/4 A
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Refrigerant		R407 C	R407 C	R407 C	R407 C	R407 C	R407 C
Refrigerant charge	kg	3,2	5,9	3,4	5,2	3,4	3,4
Frost protection		X	X	X	X	X	X
Defrost type		Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal
IP rating		IP14B	IP14B	IP14B	IP14B	IP14B	IP14B
Dimensions							
Height	mm	1116	1116	1116	1116	1116	1116
Width	mm	784	784	784	784	784	784
Depth	mm	1182	1182	1182	1182	1182	1182
Height (outdoor installation)	mm	1434	1434	1434	1434	1434	1434
Width (outdoor installation)	mm	1240	1240	1240	1240	1240	1240
Depth (outdoor installation)	mm	1280	1280	1280	1280	1280	1280
Height (indoor installation)	mm	1182	1182	1182	1182	1182	1182
Width (indoor installation)	mm	800	800	800	800	800	800
Depth (indoor installation)	mm	1240	1240	1240	1240	1240	1240
Weights							
Weight	kg	205	210	212	214	211	220
Total weight - outdoor installation	kg	331	336	338	340	337	346
Total weight - internal installation	kg	292	297	299	301	298	307
Connection							
Air hose intake and discharge connectors		DN 560	DN 560	DN 560	DN 560	DN 560	DN 560
Values							
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	1,45	1,55	2,22	2,12	2,85	2,64
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	1	1	1,39	1,39	1,94	1,82
Min heating flow rate	m³/h	1	1	1,2	1,2	1,4	1,4
Flow rate, heat source side	m³/h	3500	3500	3500	3500	3500	3500
Total available external pressure differential	hPa	1,0	1,0	1,0	1,0	1,0	
Max. available external pressure differential, inlet side	hPa	0,8	0,8	0,8	0,8	0,8	
Internal pressure differential	hPa	70	70	110	110	200	200

Output data

WPL 13 E / WPL 18 E / WPL 23 E



X Outside temperature [°C]
Y Heating output [kW]

1 Flow temperature 35 °C, WPL 23 E
2 Flow temperature 50 °C, WPL 23 E
3 Flow temperature 35 °C, WPL 18 E
4 Flow temperature 50 °C, WPL 18 E
5 Flow temperature 35 °C, WPL 13 E
6 Flow temperature 50 °C, WPL 13 E

WPL 13 E cool, heating mode

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-20	4,50	4,60	4,70	4,80	2,00	2,60	3,00	3,20	2,30	1,80	1,60	1,50
-15	5,40	5,50	5,70	5,80	2,10	2,70	3,10	3,30	2,60	2,00	1,80	1,80
-7	6,60	6,70	7,00	7,10	2,20	2,70	3,20	3,50	3,00	2,50	2,20	2,00
2	8,10	8,00	8,00	8,00	2,40	2,70	3,30	3,70	3,40	3,00	2,40	2,20
7	9,00	8,70	8,60	8,60	2,30	2,80	3,30	3,50	3,90	3,10	2,60	2,50
10	9,50	9,00	8,90	8,90	2,30	2,60	3,10	3,40	4,10	3,50	2,90	2,60
15	11,00	10,80	10,40	10,10	2,50	2,80	3,30	3,50	4,40	3,90	3,20	2,90
20	12,10	12,00	11,70	11,30	2,50	2,90	3,40	3,60	4,80	4,10	3,40	3,10

WPL 13 E cool, cooling mode

WQA [°C]	Cooling capacity 7 °C [kW]	15 °C [kW]	Power consumption 7 °C [kW]	15 °C [kW]	Coefficient of performance (COP) 7 °C	15 °C
30	7,00	8,60	2,50	2,80	2,80	3,10
35	6,60	8,30	2,80	3,00	2,40	2,80

WPL 18 E cool, heating mode

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-20	6,70	7,00	7,60	7,80	2,80	3,50	4,40	4,90	2,40	2,00	1,70	1,60
-15	7,70	8,00	8,50	8,70	2,90	3,60	4,40	4,90	2,70	2,20	1,90	1,80
-7	9,60	9,90	10,30	10,50	3,00	3,70	4,60	5,00	3,20	2,70	2,20	2,10
2	11,30	11,70	11,80	11,60	3,00	3,70	4,60	5,00	3,80	3,20	2,60	2,30
7	12,30	11,80	11,40	11,20	2,90	3,50	4,20	4,50	4,20	3,40	2,70	2,50
10	13,30	12,80	12,30	12,00	2,90	3,50	4,20	4,60	4,60	3,70	2,90	2,60
15	15,20	14,50	13,90	13,60	3,00	3,60	4,30	4,70	5,10	4,00	3,20	2,90
20	16,10	15,50	14,90	14,60	3,00	3,60	4,30	4,70	5,40	4,30	3,50	3,10

WPL 18 E cool, cooling mode

WQA [°C]	Cooling capacity 7 °C [kW]	15 °C [kW]	Power consumption 7 °C [kW]	15 °C [kW]	Coefficient of performance (COP) 7 °C	15 °C
30	9,70	12,10	3,50	3,90	2,80	3,10
35	9,20	11,80	3,90	4,10	2,40	2,90

WPL 23 E cool, heating mode

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-20	8,70	9,20	9,70	10,10	3,80	4,70	5,80	6,30	2,30	2,00	1,70	1,60
-15	10,40	10,90	11,40	11,70	3,90	4,80	6,00	6,70	2,70	2,30	1,90	1,70
-7	13,00	13,50	13,90	14,10	4,20	5,10	6,20	6,80	3,10	2,60	2,20	2,10
2	14,80	15,10	15,40	15,50	4,20	5,20	6,30	6,90	3,50	2,90	2,40	2,20
7	15,30	15,40	15,60	15,70	4,10	4,90	5,80	6,30	3,70	3,10	2,70	2,50
10	17,80	17,40	17,00	16,70	4,20	4,90	5,80	6,30	4,20	3,60	2,90	2,70
15	18,40	17,90	17,60	17,40	4,30	5,10	6,10	6,70	4,30	3,50	2,90	2,60
20	20,40	19,70	19,10	18,90	4,30	5,20	6,30	6,90	4,70	3,80	3,00	2,70

WPL 23 E cool, cooling mode

	Cooling capacity		Power consumption		Coefficient of performance (COP)	
WQA [°C]	7 °C [kW]	15 °C [kW]	7 °C [kW]	15 °C [kW]	7 °C	15 °C
30	12,70	16,00	5,50	6,10	2,30	2,60
35	11,40	14,90	5,80	6,50	2,00	2,30

Outdoor installation

General information

Ensure that the surface on which the heat pump is to be installed, is horizontal, level, solid and permanent. The entire heat pump frame should be in contact with the substrate. Uneven substrates can increase the noise emissions of the heat pump. The heat pump must be accessible from all sides.

Recommended substrate:

» Cast concrete foundation

» Kerb stones

» Stone slabs

Provide a recess (space) underneath the heat pump to enable water and electrical pipes/cables to be connected from below.

Protection of heating water lines against frost and moisture

In outdoor installations protect the flow and return lines against frost by means of adequate thermal insulation and by routing them inside conduits to protect them against moisture. Insulation thickness in accordance with the Energy Saving Ordinance.

The frost stat inside the heat pump that automatically starts the circulation pump in the heat pump circuit at <+10 °C and thereby safeguards DHW circulation in all water-bearing components, offers additional frost protection.

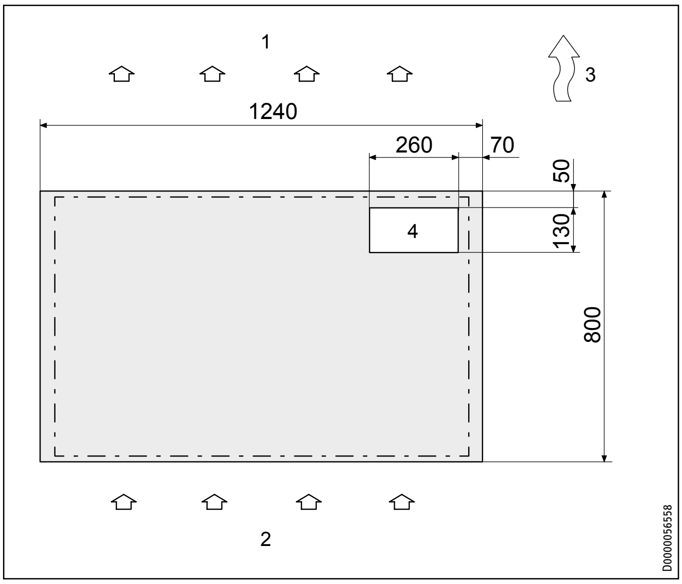
Fill the heating system with antifreeze if the power supply cannot be guaranteed for a longer period of time.

Condensate drain

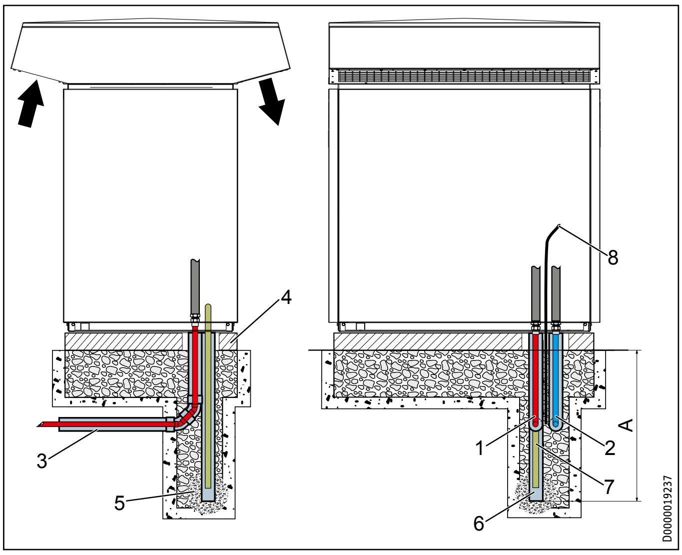
Route the condensate drain hose with a steady fall or to the side out of the heat pump.

With outdoor installation, route the condensate to an existing drain or into a coarse gravel soakaway. For this, ensure an installation that is free from the risk of frost.

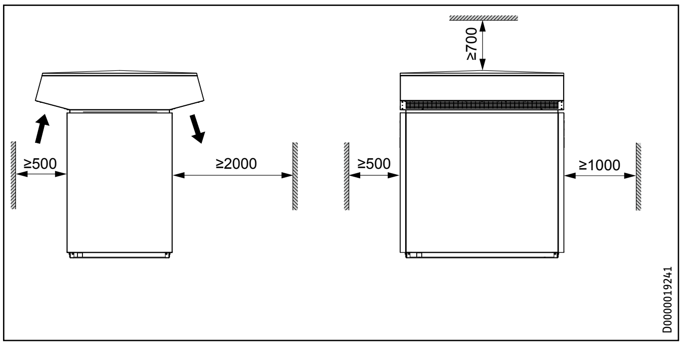
Foundation



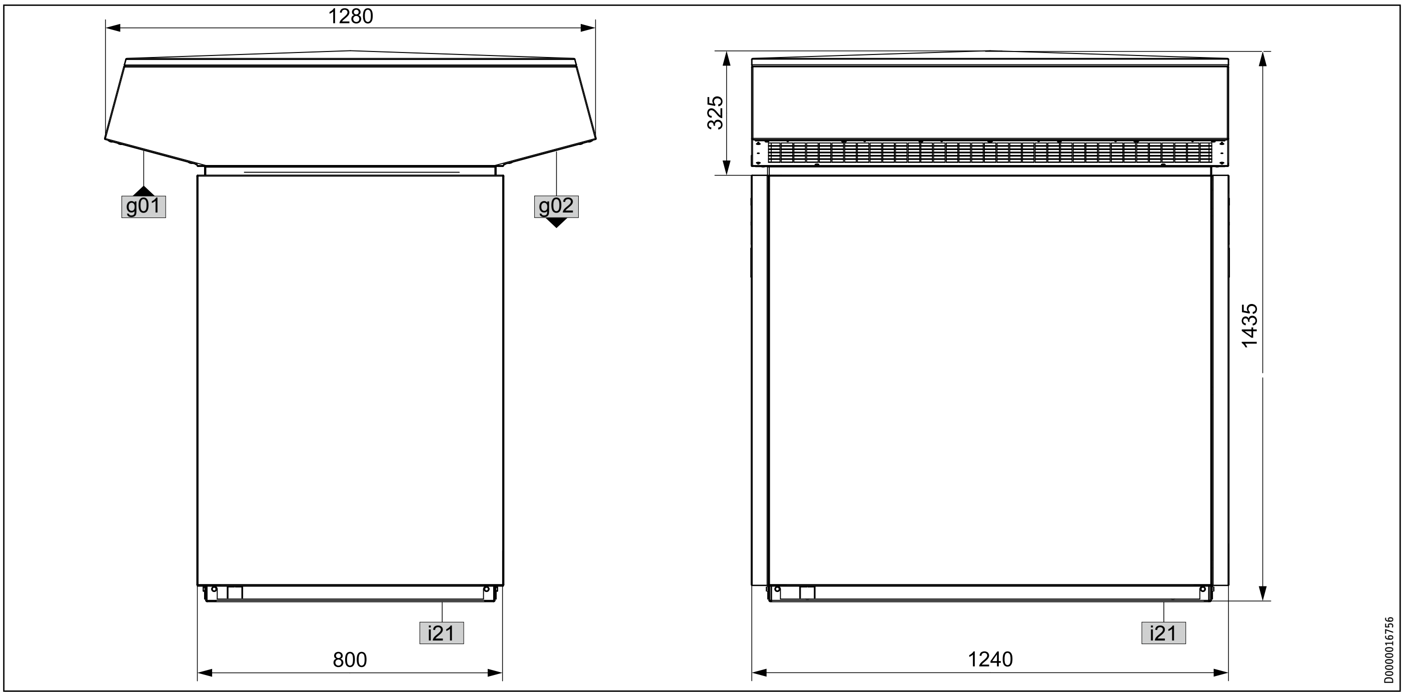
1 Air discharge
2 Air intake
3 Main wind direction
4 Cable/line entry



A Depth of frost line
1 Heating flow
2 Heating return
3 Conduit for supply lines
4 Foundation
5 Gravel bed
6 Condensate drain pipe
7 Condensate drain
8 Electric power cable



Outdoor installation



			WPL 13 E A	WPL 18 E A	WPL 23 E A
i21	Entry supply line				
g01	Air intake				
g02	Air discharge				

Indoor installation

Air routing with hoses

The total length of hoses on the air intake and discharge sides must not exceed 8 m. Never incorporate more than four 90° bends.

The hose will tend to sag because of its flexibility; therefore secure it approx. every 1 m.

Special hoses are used to route the inlet air from the outside to the heat pump and discharge air from the heat pump to the outdoors. These hoses are highly flexible, thermally insulated and are self-extinguishing in case of fire.

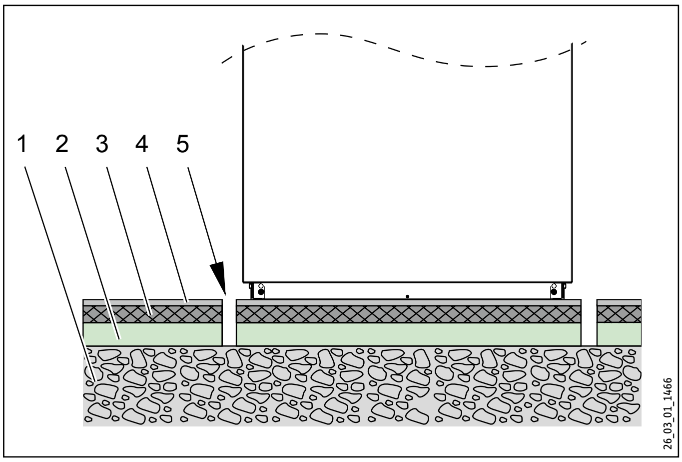
Air routing with air ducts

With air routes longer than 8 m, air ducts can also be connected to the heat pump. The cross-section of the air duct varies according to the air flow rate and according to the externally available, static pressure differential of the heat pump.

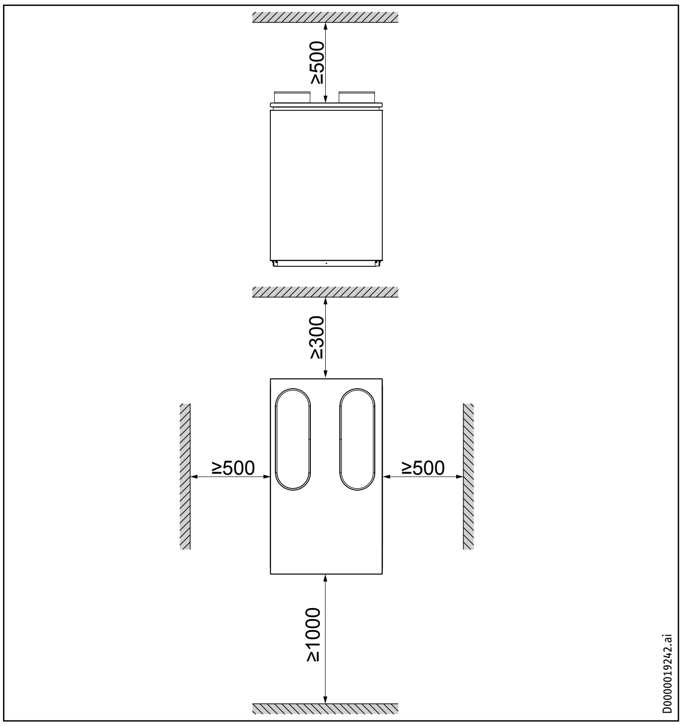
To reduce the transfer of structure-borne sound to the building, an air hose or canvas flange must be installed between the heat pump and air ducts. When sizing air ducts and grilles, observe the external pressure of the fan. At least 20 % of the total external fan pressure must additionally be taken into account for the air discharge side.

If the heat pump is installed in an enclosed room also containing a combustion appliance that draws its combustion air directly from the room, a vent to the installation room with 250 cm² diameter must be provided to prevent the heat pump from influencing the operation of the combustion equipment.

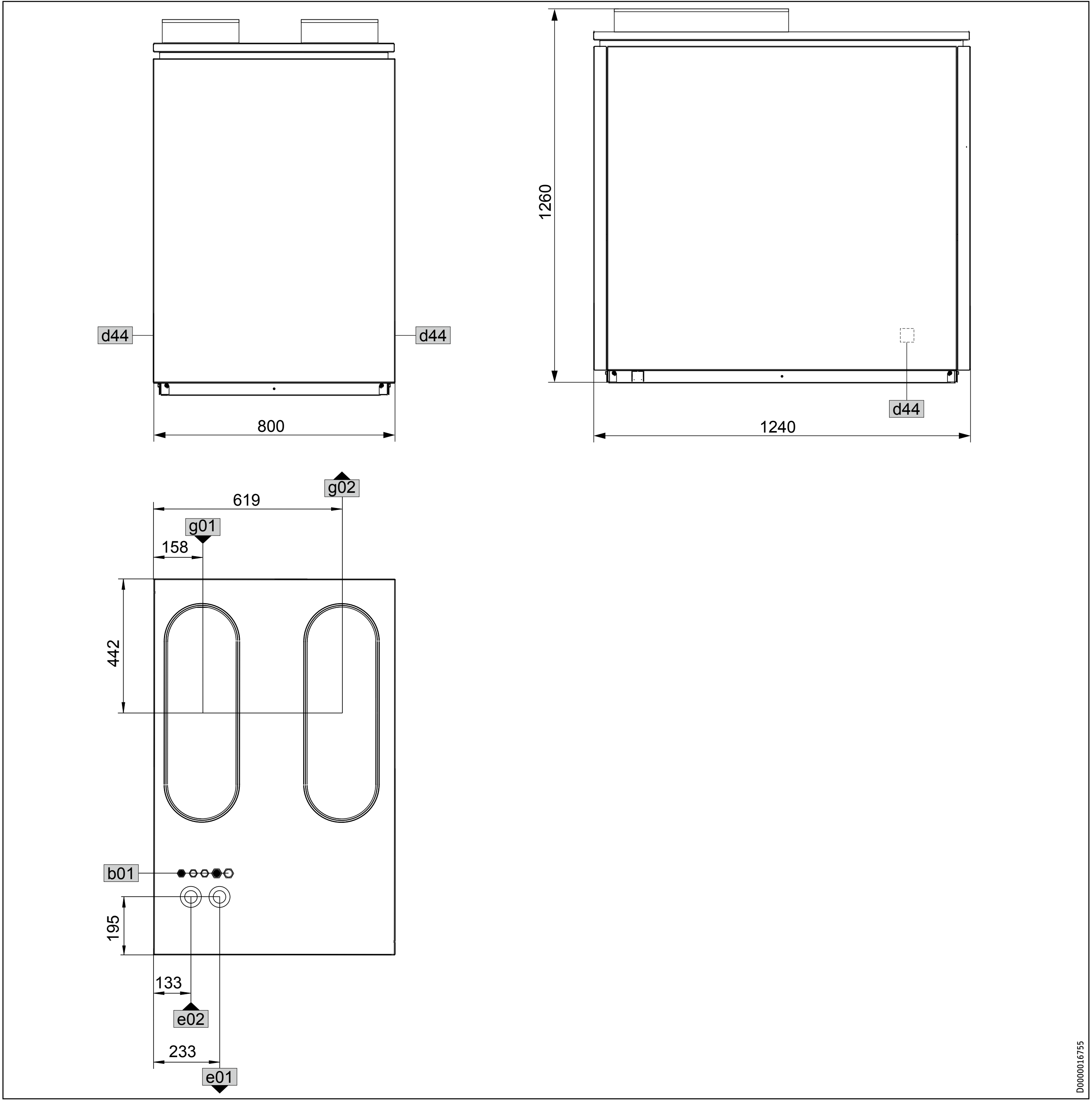
Without this additional vent, small, unavoidable leaks on the air intake side, e.g. at hose connectors or at the heat pump, will reduce the air pressure in the enclosed room to unacceptable levels.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

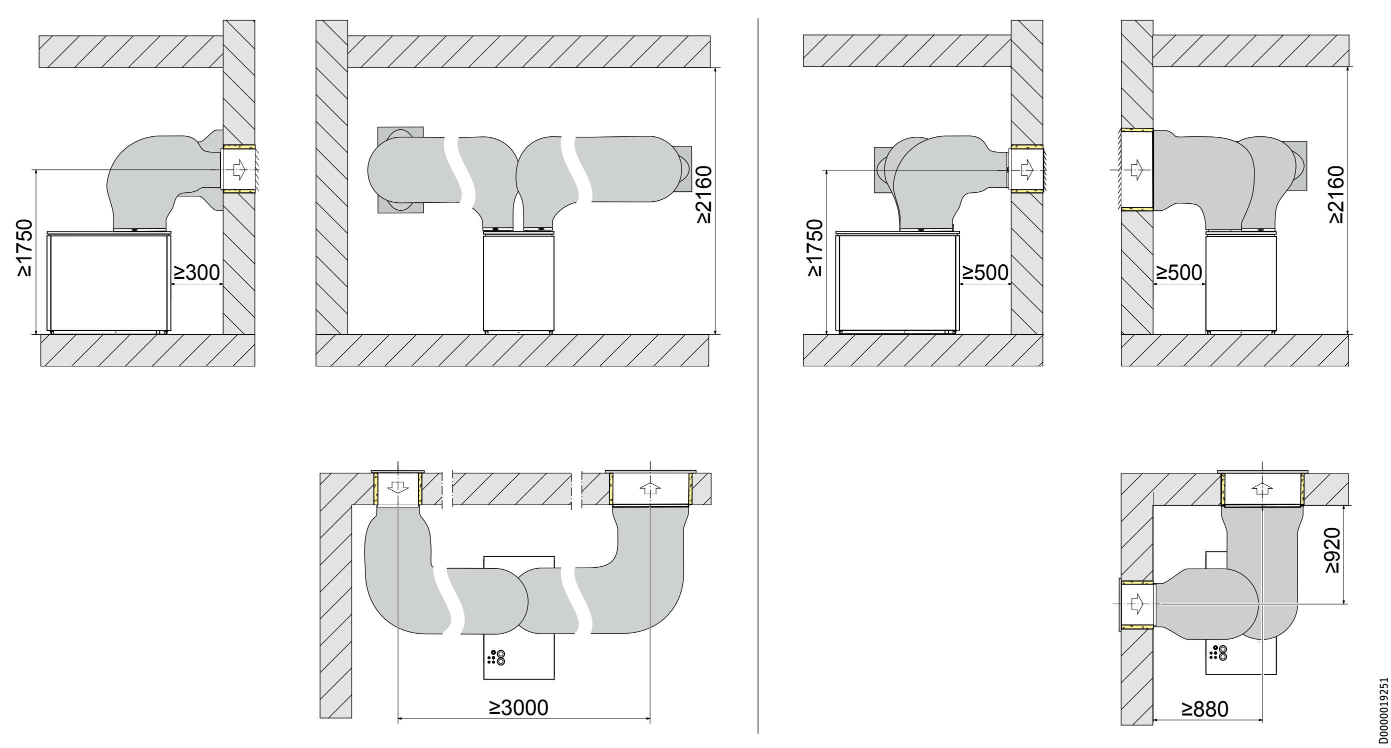


Indoor installation



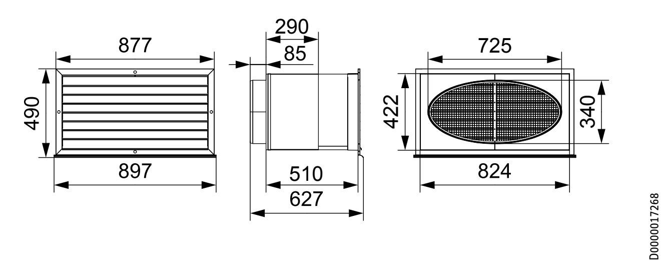
			WPL 13 cool	WPL 18 cool	WPL 23 cool
b01	Entry electrical cables				
d44	Outlet condensate drain				
e01	Heating flow	Male thread	G 1 1/4 A	G 1 1/4 A	G 1 1/4 A
e02	Heating return	Male thread	G 1 1/4 A	G 1 1/4 A	G 1 1/4 A
g01	Air intake				
g02	Air discharge				

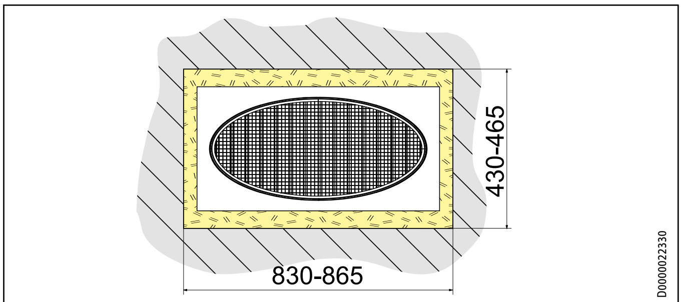
Air routing without a shaft: Through an exterior wall | Through two exterior walls over a corner



Method: Through an exterior wall to the outdoors with a horizontal wall outlet

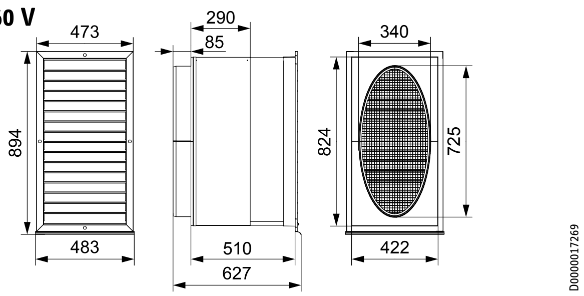
AWG 560 H

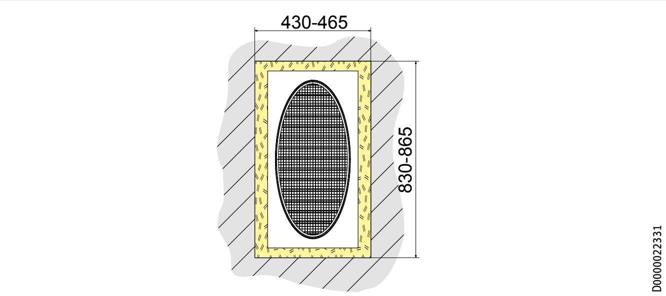




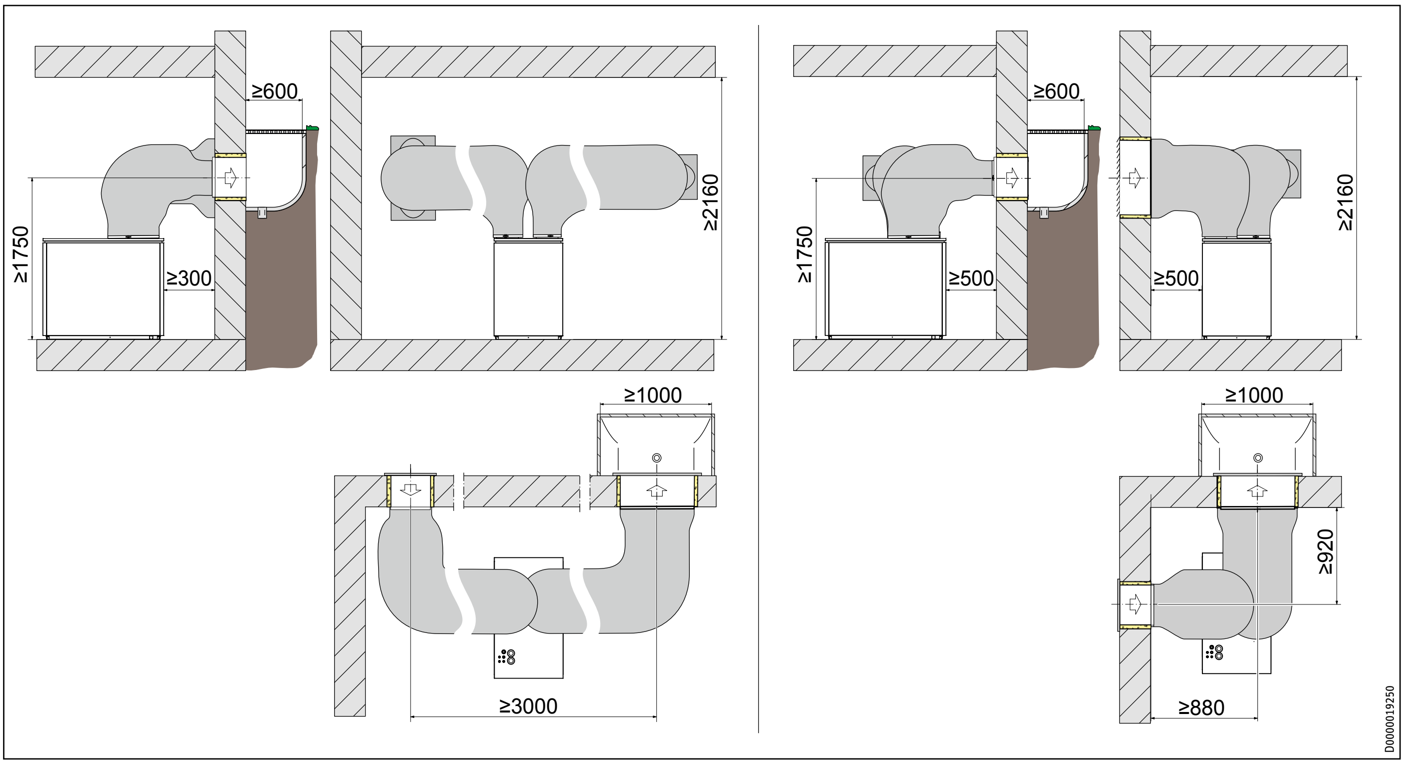
Method: Through an exterior wall to the outdoors with a vertical wall outlet

AWG 560 V

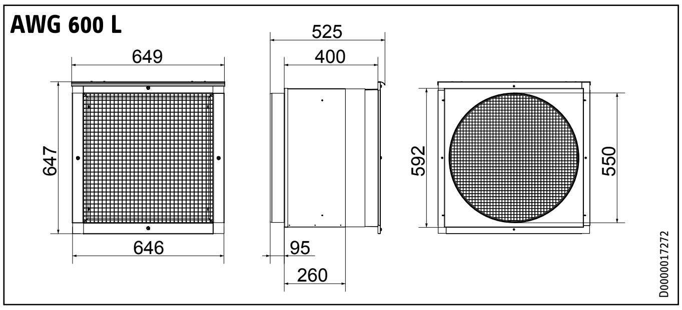


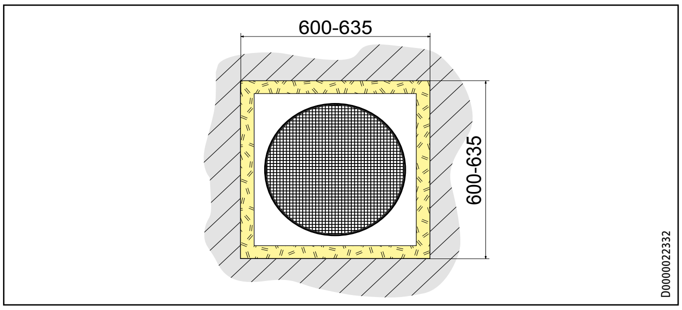


Air routing with a shaft: Through an exterior wall | Through two exterior walls over a corner

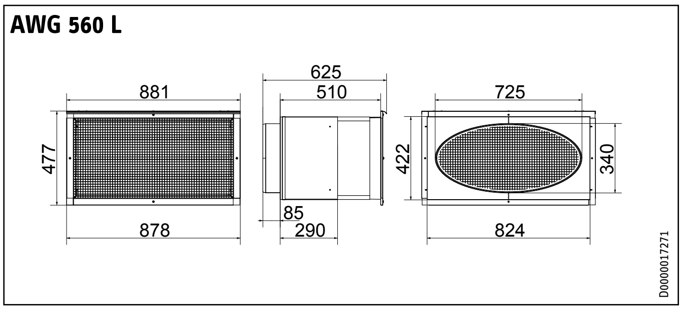


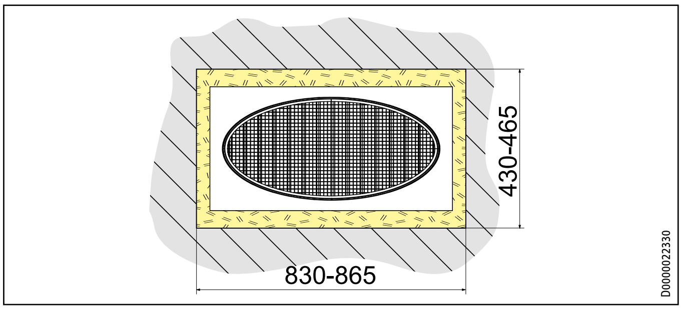
Method: Through a cellar wall in a shaft with a wall outlet





Method: Through a cellar wall in a shaft with a horizontal wall outlet

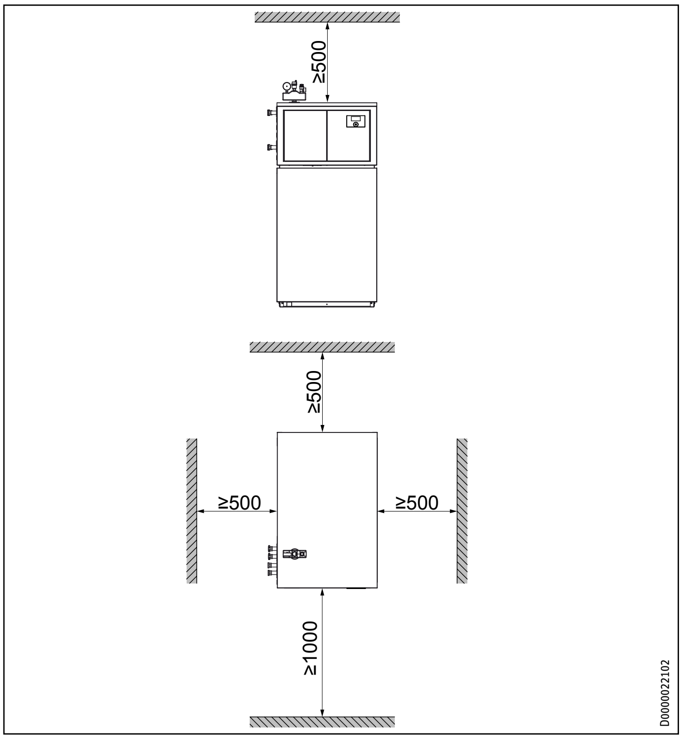




Indoor installation with WPIC 3

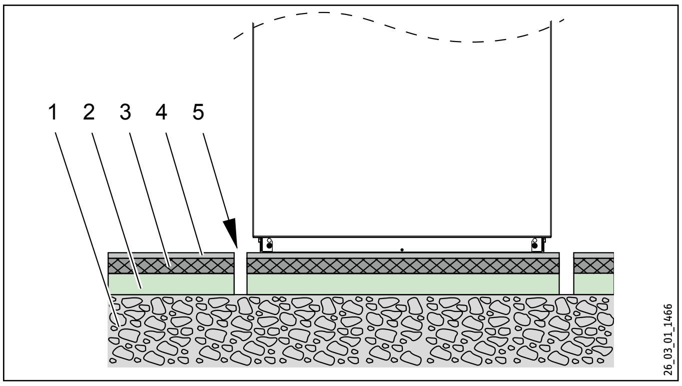
At a glance

- Pre-assembled thermally insulated air hoses included in the pack.
- Integral heat pump manager WPM 3
- Anti-vibration mounts DN 32: 40 cm in the pack
- Anti-vibration mounts DN 32: 100 cm in the pack
- Safety assembly packed separately
- Integral central heating/DHW diverter valve



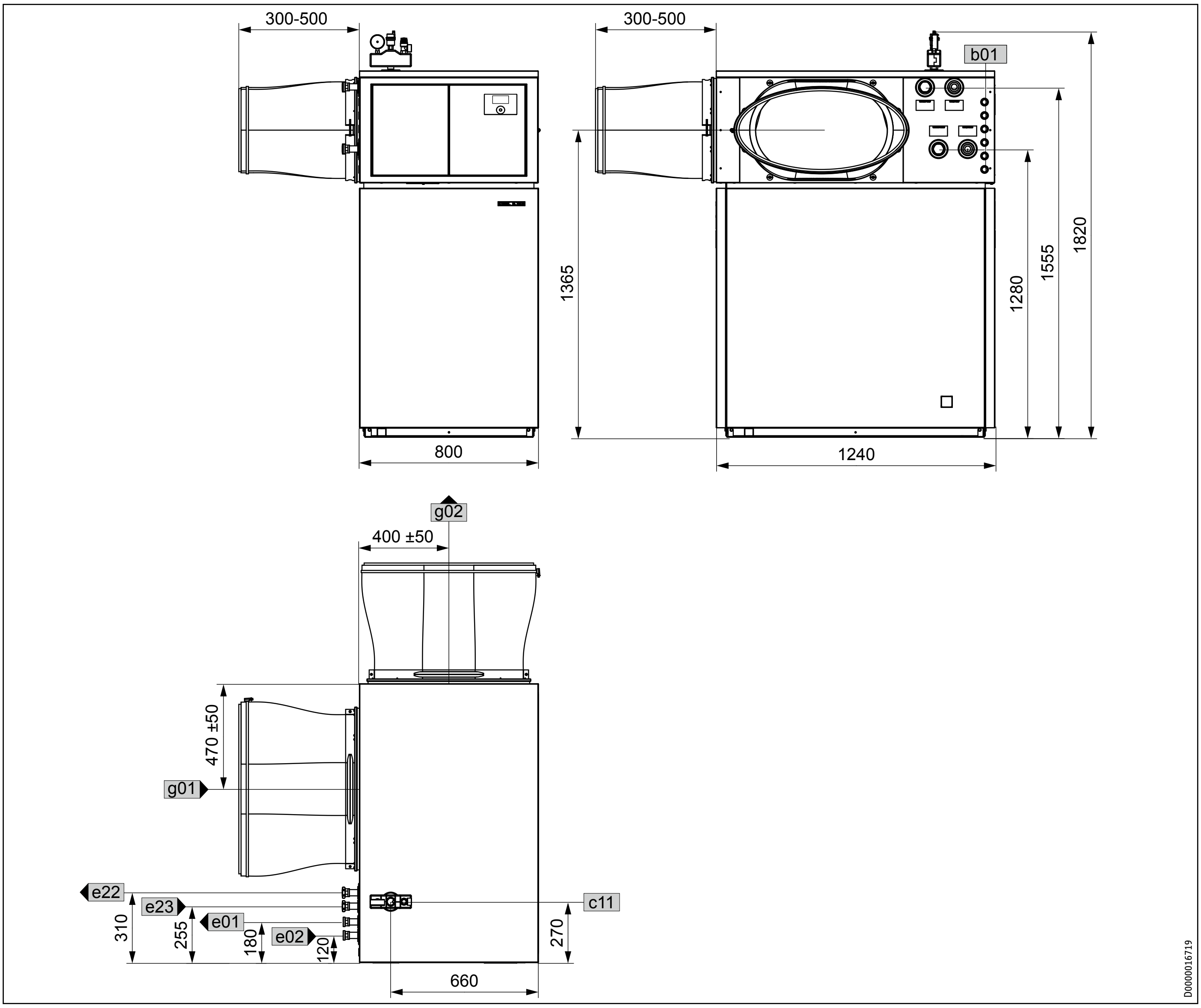
The compact air handling module enables easy, neat connection of the air ducts to the external walls. The buffer cylinder, DHW primary cylinder and heat pump manager are already integrated and pre-installed. The module is supplied with a safety assembly for the heating circuit. The WPIC module comprises all casing parts required for an indoor heat pump.

		WPIC 3
		235874
Height	mm	637
Width	mm	1240
Depth	mm	800
External available pressure differential at 1.0 m³/h	hPa	420
External available pressure differential at 1.2 m³/h	hPa	345
External available pressure differential at 1.4 m³/h	hPa	265
Rated voltage, controller	V	230
Phases, controller		1/N/PE
MCB/fuse protection, controller	A	16
Frequency	Hz	50
Max. power consumption, circulation pump on the heating side	W	130
Diameter, air hose	mm	560
IP rating		IP1XB
Circulation pump type		Integral high efficiency circulation pump



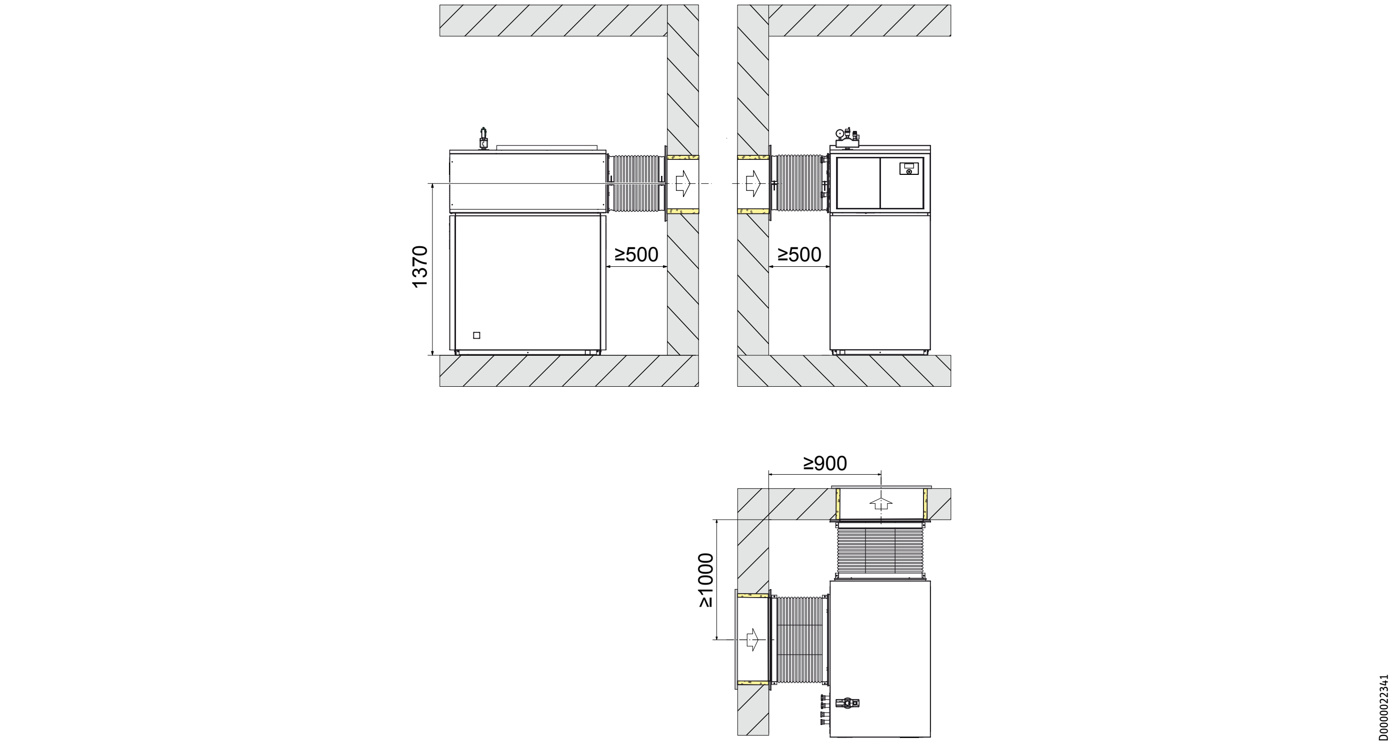
1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

Indoor installation with WPIC 3



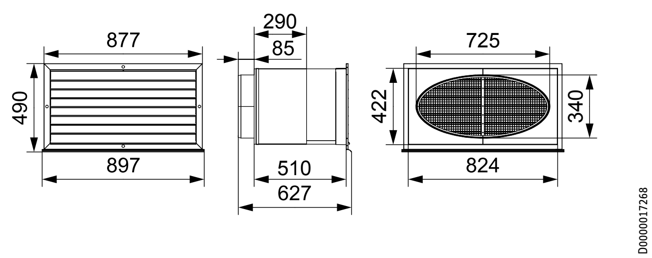
			WPIC 3
b01	Entry electrical cables		
c11	Safety assembly		
e01	Heating flow	Male thread	G 1 1/4
e02	Heating return	Male thread	G 1 1/4
e22	Cylinder flow	Male thread	G 1 1/4
e23	Cylinder return	Male thread	G 1 1/4
g01	Air intake		
g02	Air discharge		

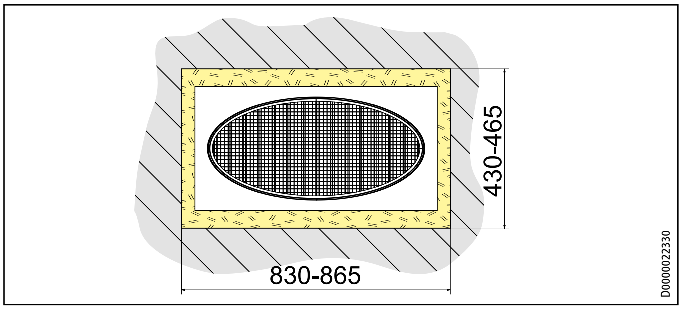
Air routing without a shaft: Through two outside walls over a corner



Method: Through an exterior wall to the outdoors with a horizontal wall outlet

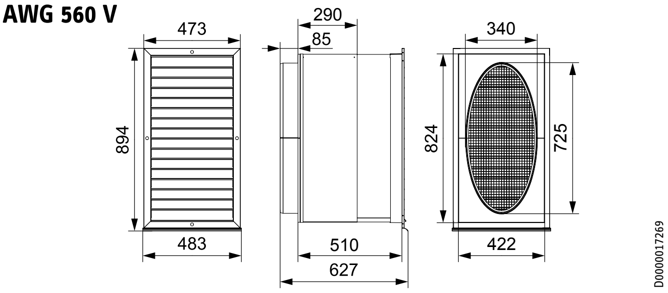
AWG 560 H

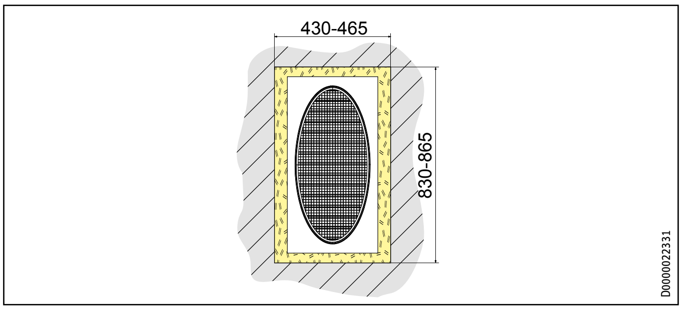




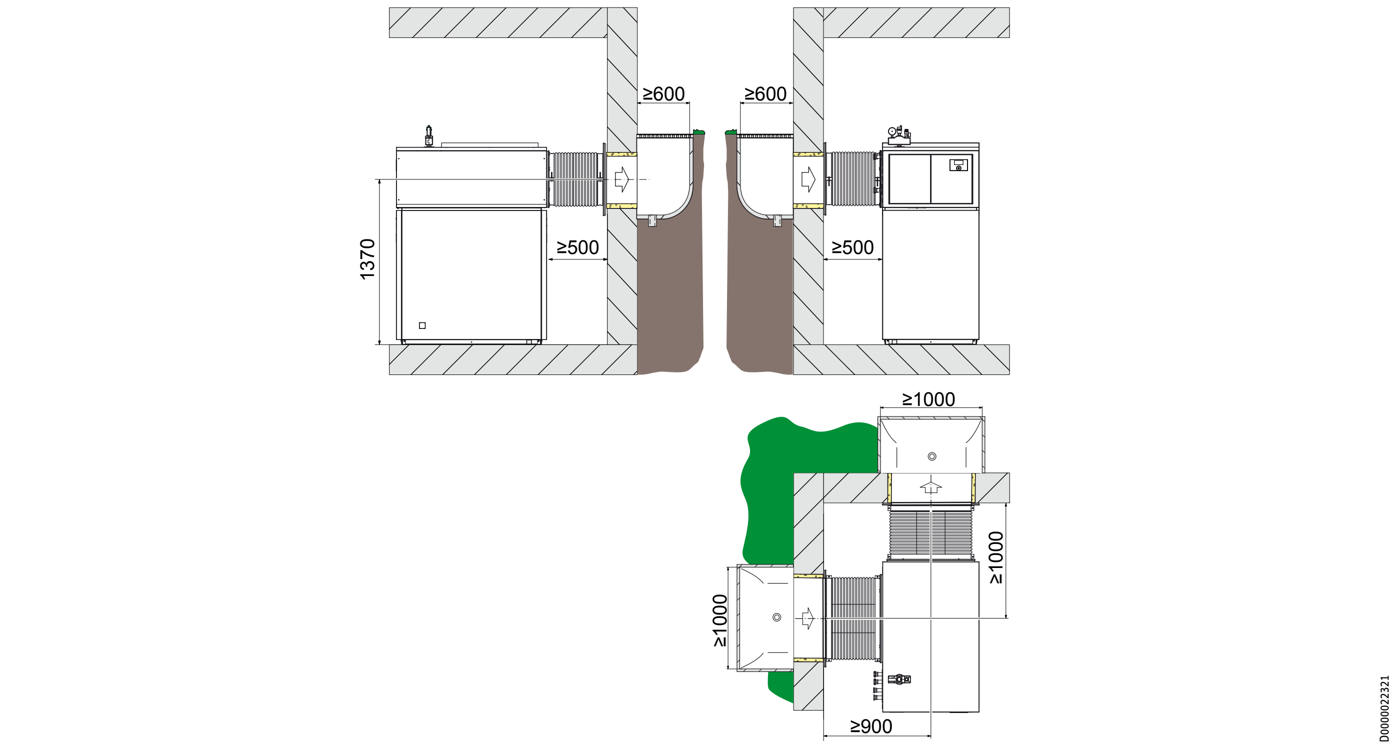
Method: Through an exterior wall to the outdoors with a vertical wall outlet

AWG 560 V

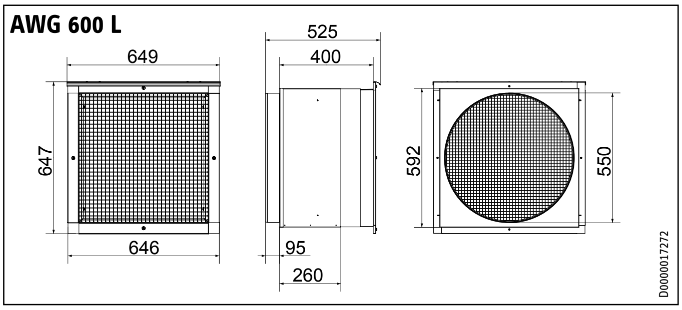


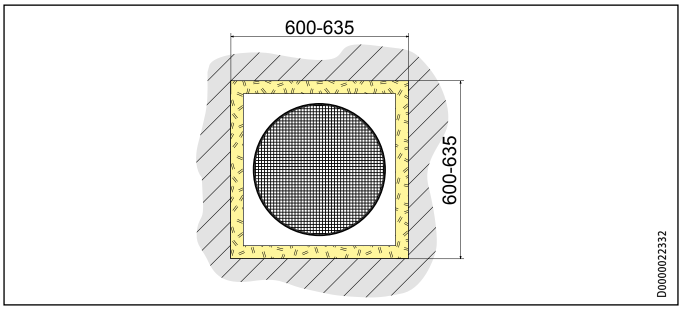


Air routing with a shaft: Through two outside walls over a corner

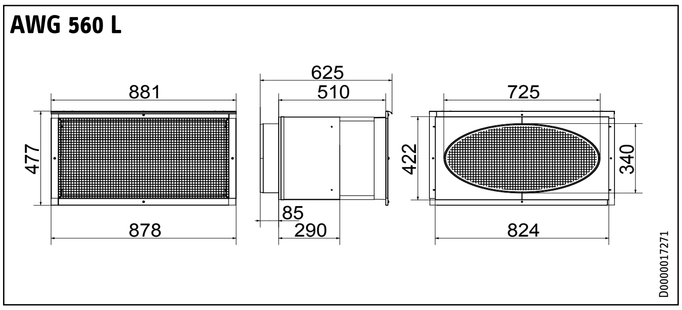


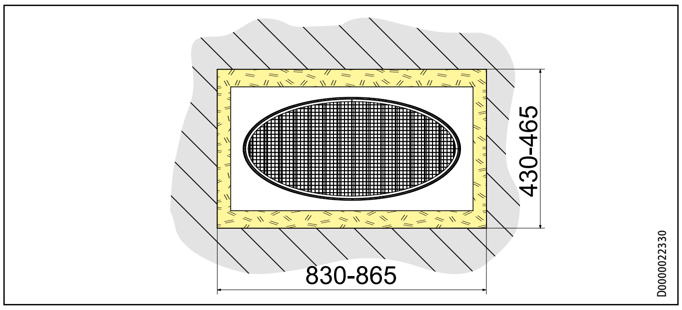
Method: Through a cellar wall in a shaft with a wall outlet





Method: Through a cellar wall in a shaft with a horizontal wall outlet





Heating system connection

Install the heat consumer system (WNA) in accordance with the engineering documentation.

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

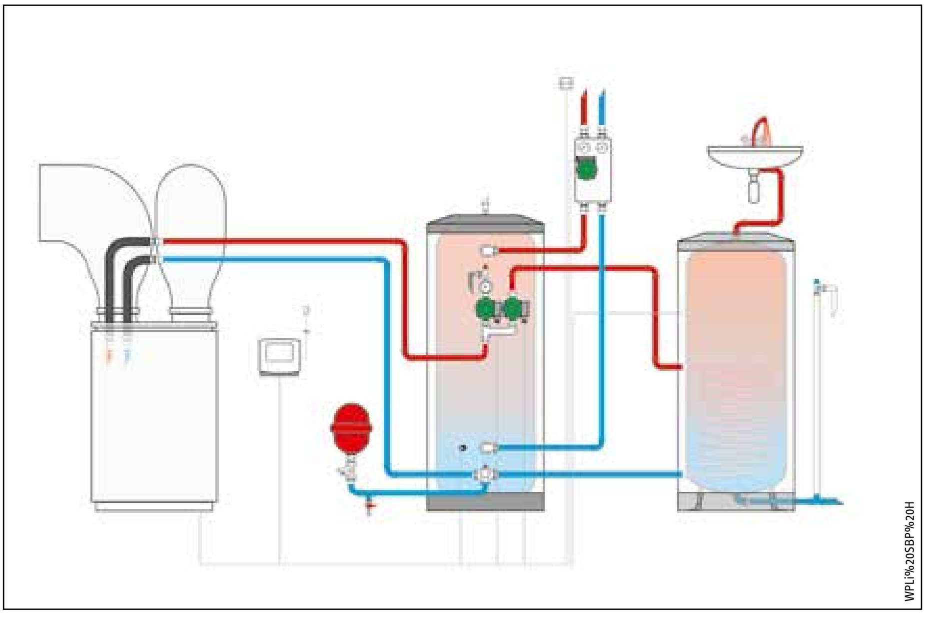
Use flexible pressure hoses to reduce structure-borne noise on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

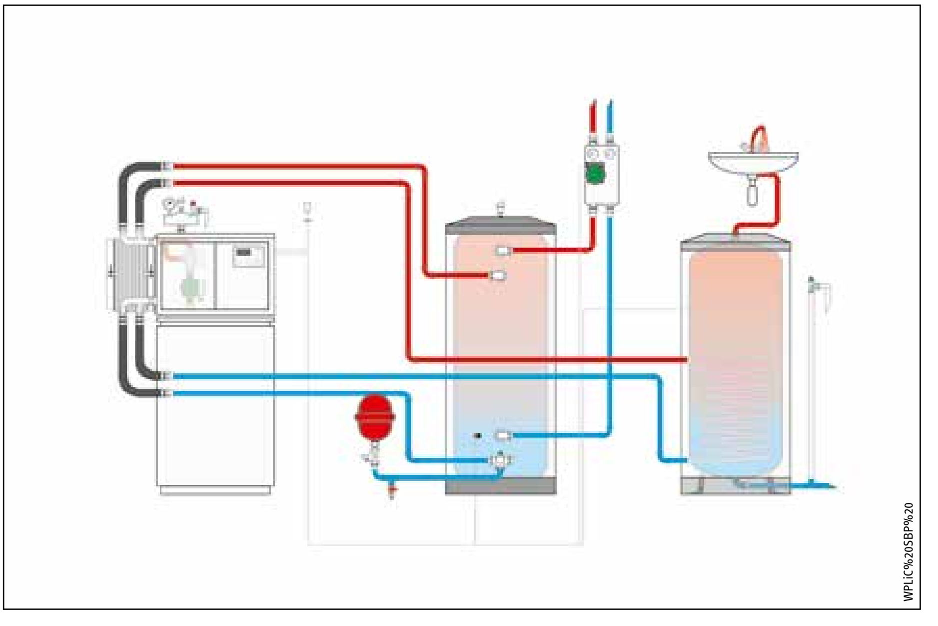
Heat pump compact installation and circulation pump

When using a heat pump compact installation, select the circulation pump that suits the heat pump.

Heat pump with buffer cylinder and DHW heating, indoor installation



Heat pump with buffer cylinder and DHW heating, indoor installation



Circulation pump for the heat pump with WPKI 5

Heat pump Type	Flow rate m^3/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 13 E	1,1	40	UP 25/7.5 E	28 x 1,5
WPL 13 cool	1,1	40	UP 25/7.5 E	28 x 1,5
WPL 18 E	1,4	80	UP 25/7.5 E	28 x 1,5
WPL 18 cool	1,4	80	UP 25/7.5 E	28 x 1,5
WPL 23 E	1,9	130	UP 25/7.5 E	35 x 1,5
WPL 23 cool	1,9	130	UP 25/7.5 E	35 x 1,5

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

For outdoor installation

Weather-resistant electrical cables conforming to VDE 0100 must be used.

Route such cables through a conduit (protective pipe); entry into the heat pump only from below.

For internal installation

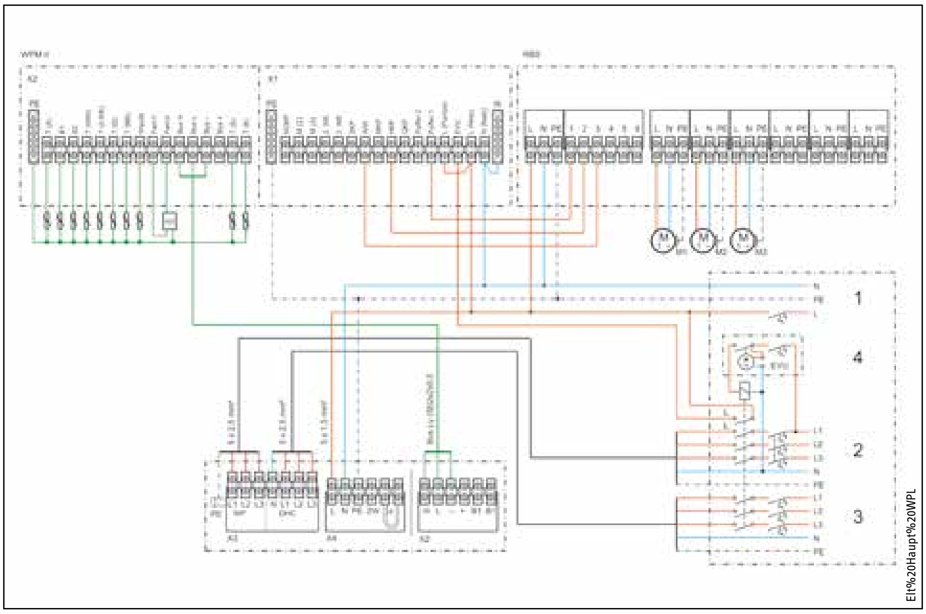
Route cables through the installation aperture in the side of the heat pump.

Energy efficient pumps

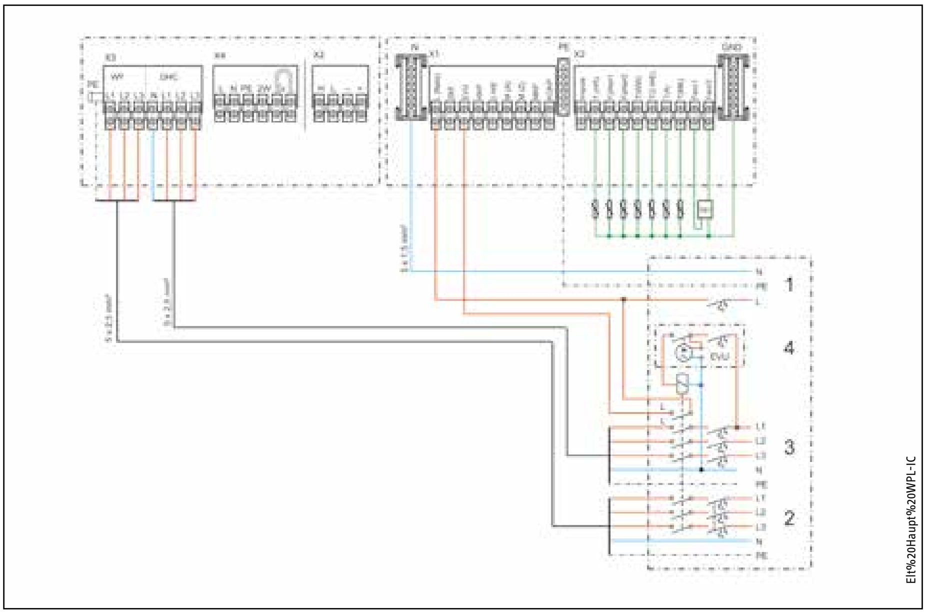
Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

WPL



WPL/WPIC 3



Pulse	Pulse input HP
T (HR)	Temperature sensor, heat pump return
Sensor 1	Temp. sensor, heat meter/solar
Sensor 2	Temp. sensor, heat meter/solar
T (WW)	Temperature sensor, DHW
2.WE	Heat source 2
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
L (Netz)	Power supply
ZKP	DHW circulation pump
EVU	Power enable signal
HKP	Heating circuit pump
T(2.WE)	Temperature sensor heat source 2
M(A)	Mixer open
M(Z)	Mixer closed
MKP	Mixer circuit pump
KOKP	Collector circuit pump
M1	Circulation pump (max. 2A gl)
1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater; 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L´ with power-OFF period

WPL 34/47/57

Heating heat pump for outdoor installation. The heat pump unit is equipped with a hermetically sealed compressor, a soft starter, a condenser, an evaporator, safety equipment such as a high/low pressure limiter, and frost protection. The electronic expansion valve optimises the COP over the entire application range. Corrosion-resistant casing. The heat pump operates with the safety refrigerant R 407C.

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. Water created from this defrosting process collects in the defrost pan and is drained off via a hose. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle.

At a glance

» Electronic expansion valve for optimised matching of heating output to heat demand
» Low height
» Modular units can be cascaded for a higher output
» Can be used at outside temperatures from +40 °C to -20 °C
» Up to 60 °C flow temperature
» With integrated heat and electricity meters
» Dual mode operation with heat pump manager WPM 3 possible

Safety and quality

Required accessories

232980 WPMW 3

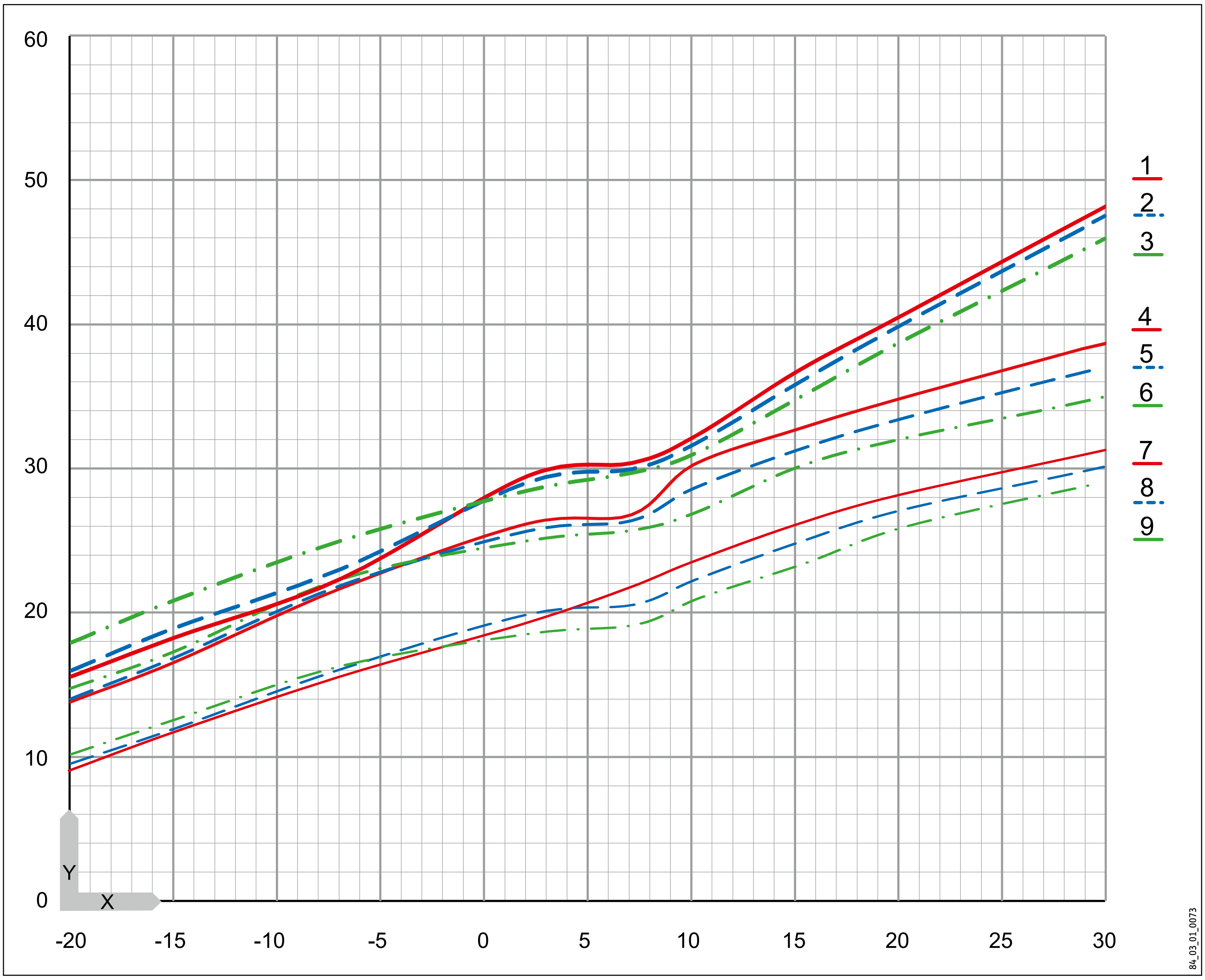
Specification

		WPL 34	WPL 47	WPL 57	WPL 34 A SR	WPL 47 A SR	WPL 57 A SR
		228835	228836	228837	232124	232125	232126
Heating output to EN 14511							
Heating output at A10/W35 (EN 14511)	kW	23,40	30,50	33,6	23,40	30,50	33,6
Heating output at A7/W35 (EN 14511)	kW	20,16	26,83	31,01	20,16	26,83	31,01
Heating output at A2/W35 (EN 14511)	kW	18,32	24,82	29,81	18,32	24,82	29,81
Heating output at A-7/W35 (EN 14511)	kW	15,22	21,68	24,02	15,22	21,68	24,02
Power consumption							
Power consumption, fan heating max.	kW	0,65	0,65	0,65	0,65	0,65	0,65
Power consumption to EN 14511							
Power consumption at A7/W35 (EN 14511)	kW	5,54	6,80	8,64	5,54	6,80	8,64
Power consumption at A2/W35 (EN 14511)	kW	5,83	7,24	9,03	5,83	7,24	9,03
Power consumption at A-7/W35 (EN 14511)	kW	5,47	7,10	8,46	5,47	7,10	8,46
COP to EN 14511							
COP at A7/W35 (EN 14511)		3,64	3,94	3,59	3,64	3,94	3,59
COP at A2/W35 (EN 14511)		3,14	3,43	3,30	3,14	3,43	3,30
COP at A-7/W35 (EN 14511)		2,78	3,05	2,84	2,78	3,05	2,84
Sound data							
Sound power level (EN 12102)	dB(A)	67	67	69	67	67	69
Max. sound power level, silent mode	dB(A)			67			67
Sound pressure level at 1 m distance in a free field	dB(A)	59	59	61	59	59	61
Sound pressure level at 5 m distance in a free field	dB(A)	45	45	47	45	45	47
Sound pressure level at 10 m distance in a free field	dB(A)	39	39	41	39	39	41
Application limits							
Max. permissible pressure	MPa	0,3	0,3	0,3	0,3	0,3	0,3
Min. application limit on the heating side	°C	15	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	60	60	60	60
Min. application limit, heat source	°C	-20	-20	-20	-20	-20	-20
Max. application limit, heat source	°C	40	40	40	40	40	40
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Electrical data							
Max. power consumption	kW	10,8	13,4	15,1	10,8	13,4	15,1
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
Compressor fuse/MCB	A	3 x C 32	3 x C 32	3 x C 32	3 x C 32	3 x C 32	3 x C 32
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Rated voltage, controller	V	230	230	230	230	230	230
Rated voltage, compressor	V	400	400	400	400	400	400
Frequency	Hz	50	50	50	50	50	50
Starting current (with/without starting current limiter)	A	64/-	70/-	78/-	64/-	70/-	78/-
Max. operating current	A	20	22	23	20	22	23
Energy data							
Energy efficiency class		A+/A+	A+/A++	A+/A+	A+/A+	A+/A++	A+/A+

WPL 34/47/57

		WPL 34	WPL 47	WPL 57	WPL 34 A SR	WPL 47 A SR	WPL 57 A SR
Versions							
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Refrigerant		R407 C	R407 C	R407 C	R407 C	R407 C	R407 C
Defrost type		Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal	Circuit reversal
IP rating		IP14B	IP14B	IP14B	IP14B	IP14B	IP14B
Refrigerant charge	kg	6,7	7,3	7,5	6,7	7,3	7,5
Dimensions							
Height (outdoor installation)	mm	1485	1485	1485	1485	1485	1485
Width (outdoor installation)	mm	1860	1860	1860	1860	1860	1860
Depth (outdoor installation)	mm	2040	2040	2040	2040	2040	2040
Weights							
Weight	kg	480	540	600	480	540	600
Connection							
Connection, heating flow/return		G 2	G 2	G 2	G 2	G 2	G 2
Values							
Pressure differential, heating side	hPa	100	100	100	100	100	100
Min heating flow rate	m³/h	2,5	3	3,5	2,5	3	3,5
Flow rate on the heating side	m³/h	4,0	5	5,5	4,0	5	5,5
Flow rate, heat source side	m³/h	7000	7000	7300	7000	7000	7300

Specification



X Outside temperature [°C]
Y Heating output [kW]
1 Flow temperature 35 °C, WPL 57
2 Flow temperature 45 °C, WPL 57
3 Flow temperature 55 °C, WPL 57
4 Flow temperature 35 °C, WPL 47
5 Flow temperature 45 °C, WPL 47
6 Flow temperature 55 °C, WPL 47
7 Flow temperature 35 °C, WPL 34
8 Flow temperature 45 °C, WPL 34
9 Flow temperature 55 °C, WPL 34

WPL 34

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-20	9,00	9,50	10,10	10,40	5,20	6,20	7,60	8,30	1,70	1,50	1,3	1,3
-15	11,60	11,90	12,50	12,80	5,30	6,20	7,70	8,50	2,20	1,90	1,6	1,5
-7	15,50	16,00	16,20	16,30	5,60	6,60	7,90	8,60	2,80	2,40	2,1	1,9
2	19,20	19,80	18,40	17,70	5,80	6,90	7,90	8,40	3,30	2,90	2,3	2,1
7	21,70	20,50	19,00	18,30	5,50	6,40	7,20	7,60	3,90	3,20	2,6	2,4
10	23,40	22,20	20,80	20,10	5,60	6,50	7,40	7,90	4,20	3,40	2,8	2,6
15	26,00	24,80	23,20	22,40	5,70	6,60	7,50	8,00	4,60	3,80	3,1	2,8
20	28,10	27,00	25,80	25,20	5,80	6,60	7,70	8,30	4,80	4,10	3,4	3,1

WPL 47

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-20	14,40	14,60	15,40	15,80	6,60	7,70	9,20	10,00	2,20	1,90	1,70	1,60
-15	17,10	17,40	17,90	18,20	6,90	7,90	9,30	10,00	2,50	2,20	1,90	1,80
-7	22,10	22,30	22,80	23,10	7,40	8,60	10,20	11,00	3,00	2,60	2,20	2,10
2	26,50	26,00	25,40	25,10	7,50	8,70	10,50	11,40	3,50	3,00	2,40	2,20
7	27,10	26,70	26,10	25,80	7,10	8,30	9,70	10,40	3,80	3,20	2,70	2,50
10	30,50	28,90	27,30	26,50	7,10	8,40	9,80	10,50	4,30	3,40	2,80	2,50
15	32,90	31,50	30,40	29,90	7,20	8,50	10,00	10,80	4,60	3,70	3,00	2,80
20	35,00	33,60	32,30	31,70	7,40	8,50	10,20	11,10	4,70	4,00	3,20	2,90

WPL 57

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-20	16,50	17,00	18,90	19,90	7,90	9,20	11,30	12,40	2,10	1,80	1,70	1,60
-15	19,90	20,50	21,50	22,00	8,40	9,80	11,60	12,50	2,40	2,10	1,90	1,80
-7	23,90	24,70	25,40	25,80	8,90	10,50	12,30	13,20	2,70	2,40	2,10	2,00
2	29,90	30,90	31,50	31,80	9,20	11,10	13,30	14,40	3,30	2,80	2,40	2,20
7	29,90	28,40	27,10	26,50	8,80	10,10	11,50	12,20	3,40	2,80	2,40	2,20
10	33,60	30,20	31,40	32,00	8,90	10,00	11,80	12,70	3,80	3,00	2,70	2,50
15	37,10	35,00	35,10	35,20	9,00	10,50	12,20	13,10	4,10	3,30	2,90	2,70
20	40,60	39,80	38,00	37,10	9,10	11,10	12,50	13,20	4,50	3,60	3,00	2,80

Siting

Ensure that the surface on which the heat pump is to be installed, is horizontal, level, solid and permanent. The entire heat pump frame should be in contact with the substrate. Uneven substrates can increase the noise emissions of the heat pump. The heat pump must be accessible from all sides.

Recommended substrate:

» Cast concrete foundation

» Kerb stones

» Stone slabs

Provide a recess (space) underneath the heat pump to enable water and electrical pipes/cables to be connected from below.

Protection of heating water lines against frost and moisture

In outdoor installations protect the flow and return lines against frost by means of adequate thermal insulation and by routing them inside conduits to protect them against moisture. Insulation thickness in accordance with the Energy Saving Ordinance.

The frost stat inside the heat pump that automatically starts the circulation pump in the heat pump circuit at <+10 °C and thereby safeguards DHW circulation in all water-bearing components, offers additional frost protection.

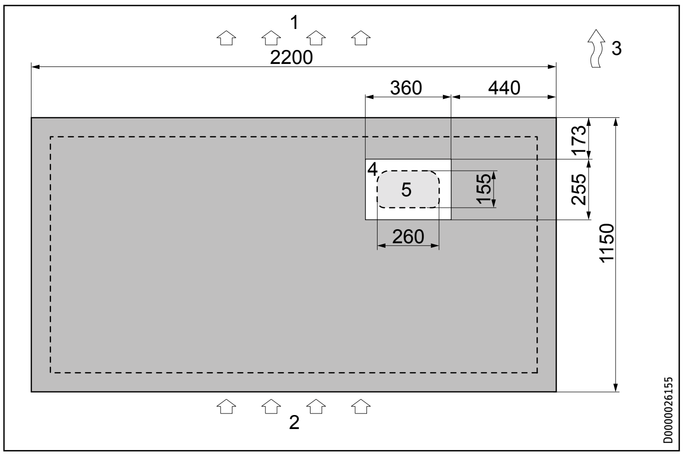
Fill the heating system with antifreeze if the power supply cannot be guaranteed for a longer period of time.

Condensate drain

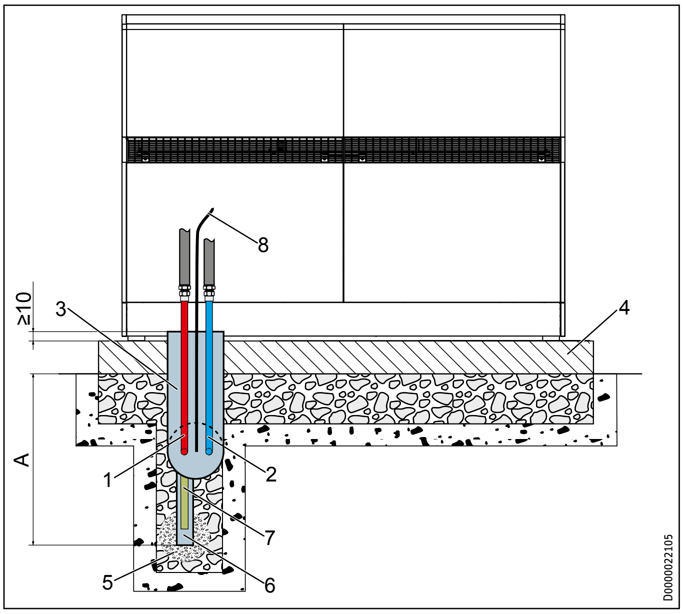
Route the condensate drain hose with a steady fall or to the side out of the heat pump.

With outdoor installation, route the condensate to an existing drain or into a coarse gravel soakaway. For this, ensure an installation that is free from the risk of frost.

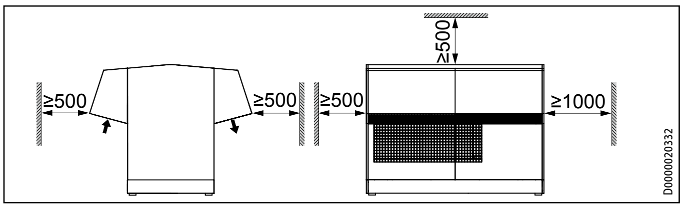
Foundation



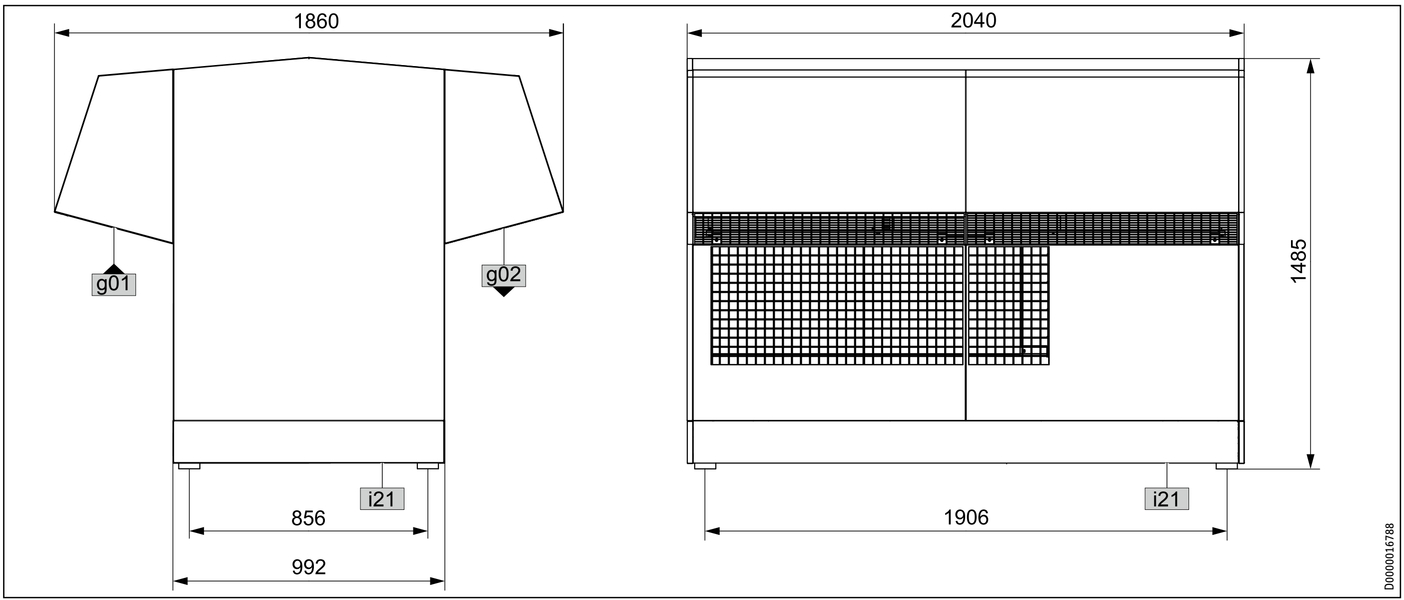
1 Air discharge
2 Air intake
3 Main wind direction
4 Supply line outlet



A Depth of frost line
1 Heating flow
2 Heating return
3 Conduit for supply lines
4 Foundation
5 Gravel bed
6 Condensate drain pipe
7 Condensate drain
8 Electric power cable



Siting



			WPL 34	WPL 47	WPL 57
g01	Air intake				
g02	Air discharge				
i21	Entry supply line				

Heating system connection

Implement the heat consumer system (WNA) in accordance with the engineering documentation.

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

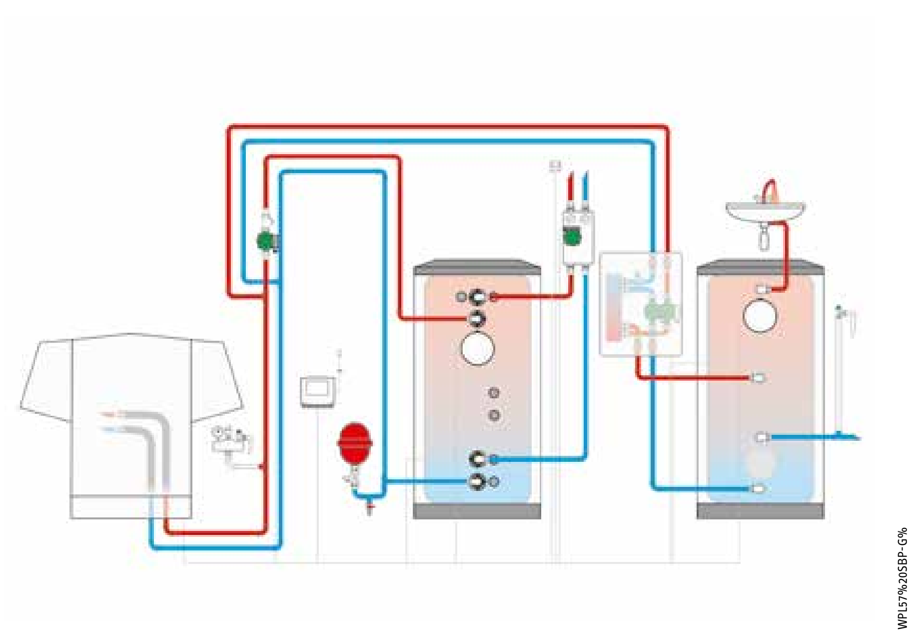
Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Use flexible pressure hoses to reduce structure-borne noise on the water side.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Heat pump with buffer cylinder and DHW heating



Heat pump circulation pump

Heat pump Type	Flow rate m^3/h	Pressure differential hPa	Circulation pump Type	Copper pipe DN
WPL 34	2,4	200	UP 30/1-8 E	35 x 1,5
WPL 47	3,3	200	UP 30/1-8 E	42 x 1,5
WPL 57	3,7	200	UP 30/1-8 E	42 x 1,5

The sizing refers to a single pipe length of 10 m, to the stated heating circulation pump and to the pipe diameter. A different heating circulation pump must be used for longer pipelines.

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility..

The connection must comply with the power connection diagram. For this, also observe the installation instructions for the heat pump manager.

Note
Observe the standards and regulations applicable in your country.

Weather-resistant electrical cables conforming to VDE 0100 must be used.

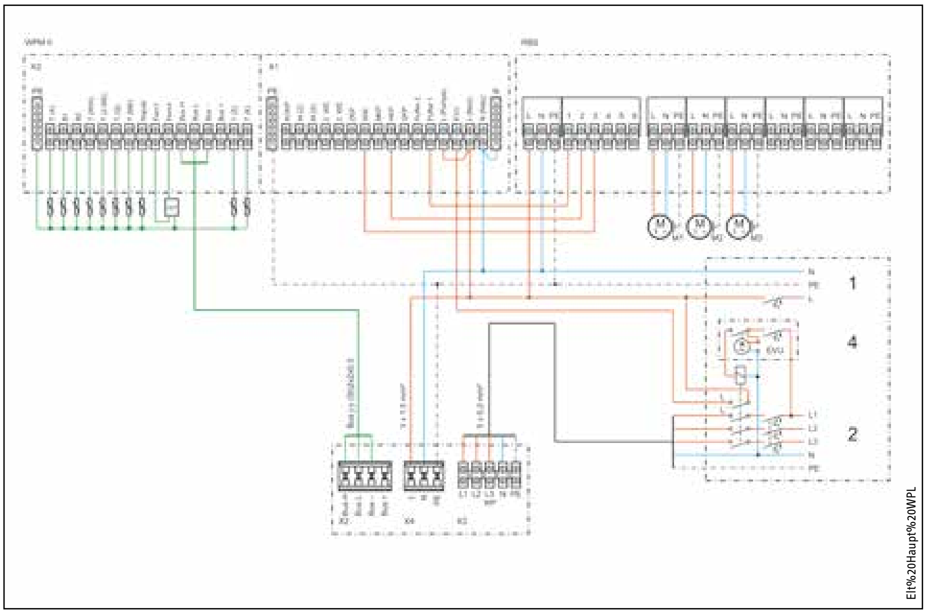
Route such cables through a conduit (protective pipe); entry into the heat pump only from below.

Energy efficient pumps

Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

WPL 34-57



T (WW)	Temperature sensor, DHW	1	Control circuit 1/N/PE 230 V 50 Hz
T (A)	Outside temperature sensor		Domestic meter
T (MK)	Temperature sensor, mixer circuit	2	Load circuit, heat pump
Fern1	Remote control		3/N/PE 400V 50Hz
Fern3	Remote control		Heat pump meter
MKP	Mixer circuit pump	4	Power supply utility control
M(A)	Mixer open		Control phase L w/o power-OFF period
L (Netz)	Power supply		Control phase L’ with blocking time

WPL 44/60/130 AC

APPLICATION: Air | water heat pump, split version comprising an evaporator module for outdoor installation and a refrigeration module for indoor installation. Low sound emissions in the outdoor area make it ideal for densely built-up areas. Can be used for central heating and DHW operation, also provides efficient cooling via circuit reversal. Ideally suited for use in apartment buildings and commercial operations due to high output and high flow temperatures. Possible to site on flat roofs for optimum use of space.
EQUIPMENT / CONVENIENCE: The compressor in the indoor unit does not transfer any noise to the outdoor air. The horizontal design of the evaporator ensures that sound propagates primarily upwards and, in combination with the modulating fan, results in a low sound power level. Further reductions in noise levels of up to 3 dB are possible with the “dB” version. The integral heat pump controller enables fully automatic weather-compensated control of the heating system. With integral heat and electricity metering via refrigerant circuit data.
EFFICIENCY: Demand-dependent and energy efficient defrosting by reversing the circuit.
INSTALLATION: Indoor and outdoor units connected via split refrigerant lines. Laying and subsequent commissioning is carried out by the service department.

At a glance

- High output and flow temperature make it ideally suited for residential and non-residential buildings
- Very low sound emissions in the outdoor area thanks to split outdoor unit in a horizontal configuration without compressor
- Active cooling through circuit reversal
- High efficiency all year round for low running costs
- Cascade compatible for very high outputs

Parts of the set

Heat pump module

Evaporator module

Required accessories

236012	SD 40-1 E
232972	SD 50-1 E
232972	SD 50-1 E

Function

Heat is extracted from the outdoor air via the heat exchanger (evaporator) on the air side across the entire application range (see specification). The heating water is heated to the flow temperature in the heat exchanger on the water side (condenser) using electrical energy (compressor). At low air temperatures, the humidity in the air precipitates as hoarfrost on the evaporator fins. Any hoarfrost is automatically defrosted. The energy required for defrosting is drawn from the heating system. The heat pump automatically reverts to heating mode at the end of the defrost cycle.

Specification

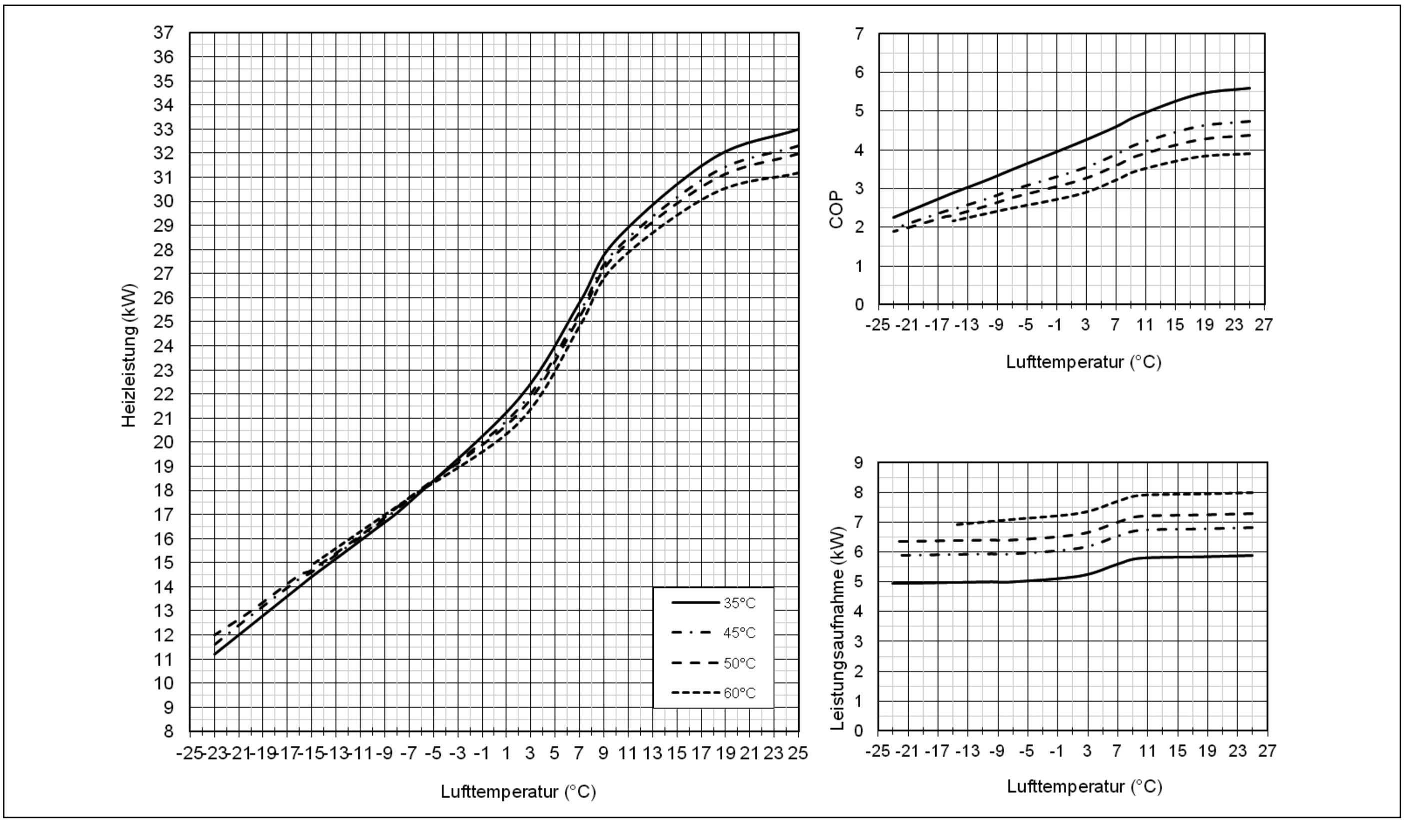
		WPL 44 AC	WPL 44 AC ANT	WPL 60 AC	WPL 60 AC ANT	WPL 130 AC	WPL 130 AC ANT	WPL 44 AC dB	WPL 44 AC dB ANT	WPL 60 AC dB	WPL 60 AC dB ANT
		235108	235344	235109	235345	235110	235346	235882	235886	235883	235887
Heating output to EN 14511											
Heating output at A7/W35 (EN 14511)	kW	25,8	25,8	37,2	37,2	75,6	75,6	25,8	25,8	37,2	37,2
Heating output at A2/W35 (EN 14511)	kW	21,8	21,8	30,3	30,3	65,1	65,1	21,8	21,8	30,3	30,3
Heating output at A-7/W35 (EN 14511)	kW	17,5	17,5	25,1	25,1	47,3	47,3	17,5	17,5	25,1	25,1
Cooling capacity at A30/W18	kW	17,9	17,9	27,2	27,2	66,8	66,8	17,9	17,9	27,2	27,2
Power consumption to EN 14511											
Power consumption at A7/W35 (EN 14511)	kW	5,6	5,6	8,1	8,1	18,9	18,9	5,6	5,6	8,1	8,1
Power consumption at A2/W35 (EN 14511)	kW	5,2	5,2	7,4	7,4	18,1	18,1	5,2	5,2	7,4	7,4
Power consumption at A-7/W35 (EN 14511)	kW	5,0	5,0	7,4	7,4	16,3	16,3	5,0	5,0	7,4	7,4
Power consumption, cooling at A30/W18	kW	5,7	5,7	8,4	8,4	20,9	20,9	5,7	5,7	8,4	8,4
COP to EN 14511											
COP at A7/W35 (EN 14511)		4,6	4,6	4,6	4,6	4,0	4,0	4,6	4,6	4,6	4,6
COP at A2/W35 (EN 14511)		4,2	4,2	4,1	4,1	3,6	3,6	4,2	4,2	4,1	4,1
COP at A-7/W35 (EN 14511)		3,5	3,5	3,4	3,4	2,9	2,9	3,5	3,5	3,4	3,4
Cooling capacity factor at A30/W18		3,1	3,1	3,2	3,2	3,2	3,2	3,1	3,1	3,2	3,2
Sound data											
Sound power level indoor installation (EN 12102)	dB(A)	56	56	56	56	76	76	56	56	56	56
Sound power level outdoor installation (EN 12102)	dB(A)	58	58	61	61	74	74	55	55	58	58
Sound power level, silent mode	dB(A)	54	54	57	57	71	71	51	51	54	54
Sound pressure level at 10 m distance in a free field	dB(A)	30	30	33	33	46	46	27	27	30	30
Application limits											
Min. application limit, heat source	°C	-24	-24	-24	-24	-22	-22	-24	-24	-24	-24
Max. application limit, heat source	°C	40	40	40	40	40	40	40	40	40	40
Min. application limit on the heating side	°C	25	25	25	25	20	20	25	25	25	25
Max. application limit on the heating side	°C	65	65	65	65	65	65	65	65	65	65
Application limit, heat source at W55	°C	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
Application limit heat source at W65	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-1000	20-1000	20-1000	20-1000	20-1000	20-1000	20-1000	20-1000	20-1000	20-1000
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Energy data											
Energy efficiency class		A++/A++	A++/A++	A++/A++	A++/A++	A+/A+	A+/A+	A++/A++	A++/A++	A++/A++	A++/A++
Electrical data											
Max. starting current	A	49,5	49,5	63,5	63,5	124	124	49,5	49,5	63,5	63,5
Power supply		3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V	3/PE ~400 V
Frequency	Hz	50	50	50	50	50	50	50	50	50	50
Max. operating current	A	18,3	18,3	23,2	23,2	64,0	64,0	18,3	18,3	23,2	23,2
Rated voltage, compressor	V	400	400	400	400	400	400	400	400	400	400
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Compressor fuse/MCB	A	3 x C25	3 x C25	3 x C25	3 x C25	3 x C80	3 x C80	3 x C25	3 x C25	3 x C25	3 x C25
Rated voltage, controller	V	230	230	230	230	230	230	230	230	230	230
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
MCB/fuse protection, controller	A	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16	1 x B16

WPL 44/60/130 AC

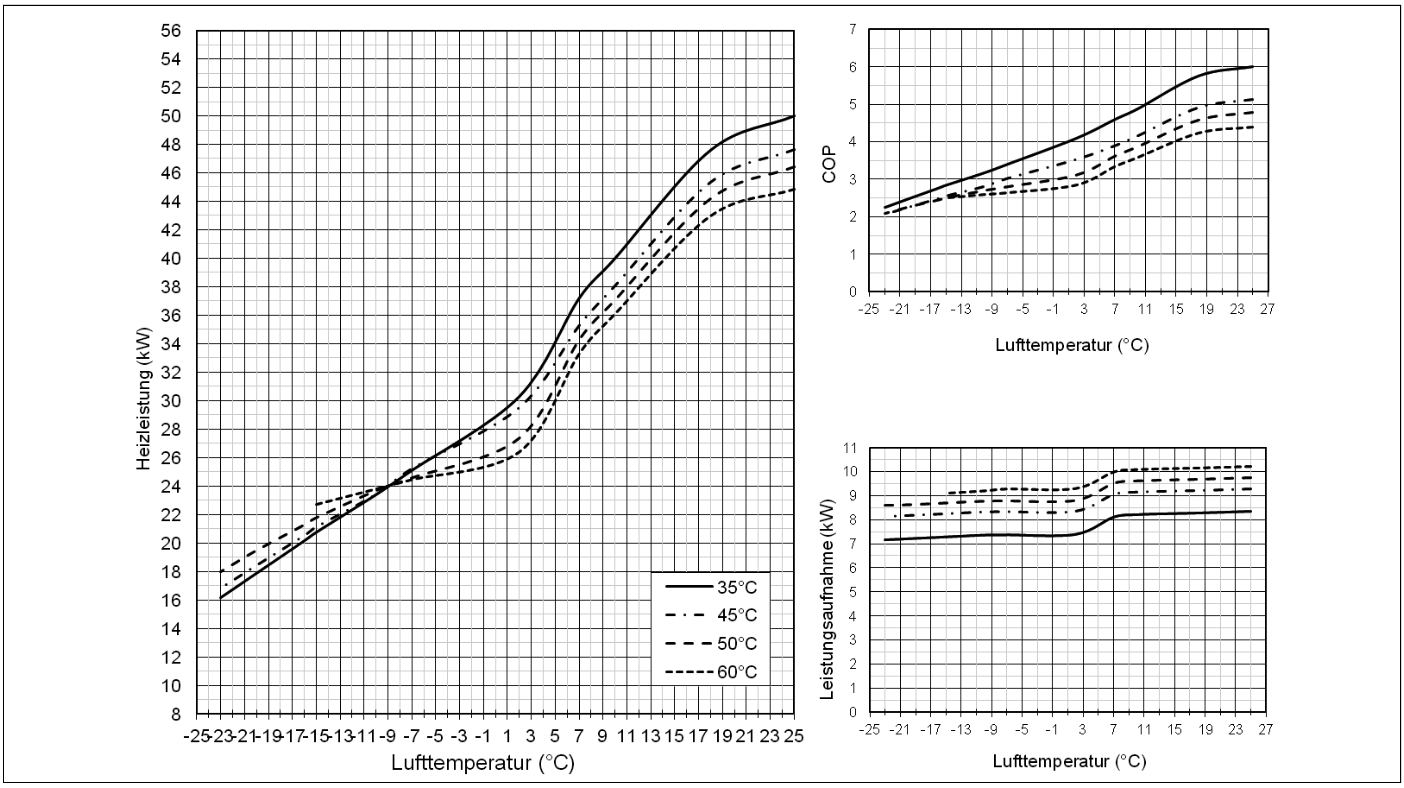
		WPL 44 AC	WPL 44 AC ANT	WPL 60 AC	WPL 60 AC ANT	WPL 130 AC	WPL 130 AC ANT	WPL 44 AC dB	WPL 44 AC dB ANT	WPL 60 AC dB	WPL 60 AC dB ANT
Versions											
Protection (IP) indoor unit		IP 2X	IP 2X	IP 2X	IP 2X	IP 2X	IP 2X	IP 2X	IP 2X	IP 2X	IP 2X
Compressor type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Refrigerant		R407C	R407C	R407C	R407C	R410A	R410A	R407C	R407C	R407C	R407C
Refrigerant charge	kg	15	15	16	16	28,5	28,5	15	15	16	16
Colour of external unit		White	anthracite	White	anthracite	White	anthracite	White	anthracite	White	anthracite
Dimensions											
Height of the indoor unit	mm	1150	1150	1150	1150	1850	1850	1150	1150	1150	1150
Width of the indoor unit	mm	600	600	600	600	695	695	600	600	600	600
Depth of the indoor unit	mm	650	650	650	650	585	585	650	650	650	650
Height of the outdoor unit	mm	1080	1080	1080	1080	1149	1149	1080	1080	1080	1080
Width of the outdoor unit	mm	2220	2220	2220	2220	2965	2965	2220	2220	2220	2220
Depth of the outdoor unit	mm	960	960	960	960	1288	1288	960	960	960	960
Max. permissible split line length	m	20	20	16	16	16	16	20	20	16	16
Max. permissible height differential	m	10	10	5	5	5	5	10	10	5	5
Height when tilted	mm	1320	1320	1320	1320	1940	1940	1320	1320	1320	1320
Weights											
Weight of the indoor unit	kg	160	160	164	164	305	305	160	160	164	164
Weight of the outdoor unit	kg	175	175	180	180	348	348	175	175	180	180
Connection											
Connection		G 1 1/2	G 1 1/2	G 2	G 2	G 2	G 2	G 1 1/2	G 1 1/2	G 2	G 2
Values											
Application limit	°C	-24	-24	-24	-24	-22	-22	-24	-24	-24	-24
Nominal flow rate	l/h	4400	4400	6000	6000	13000	13000	4400	4400	6000	6000
Internal pressure differential	hPa	170	170	220	220	100	100	170	170	220	220
Max. flow temperature	°C	65	65	65	65	65	65	65	65	65	65

Output data

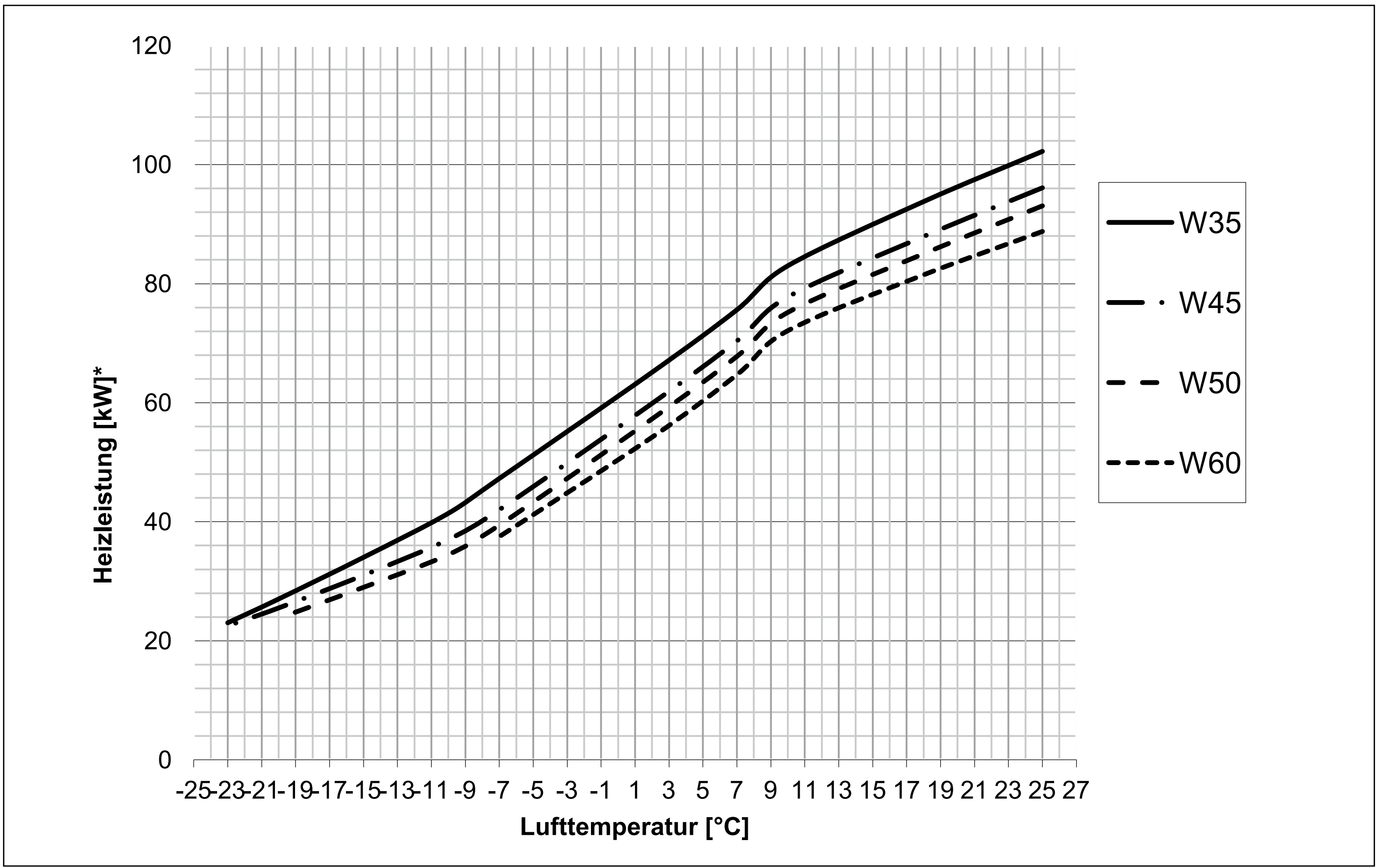
WPL 44 AC



WPL 60 AC



WPL 130 AC


120
100
80
60
40
20
0
Heizleistung [kW]*
-25 -23 -21 -19 -17 -15 -13 -11 -9 -7 -5 -3 -1 1 3 5 7 9 11 13 15 17 19 21 23 25 27
Lufttemperatur [°C]
W35
W45
W50
W60

Indoor unit

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

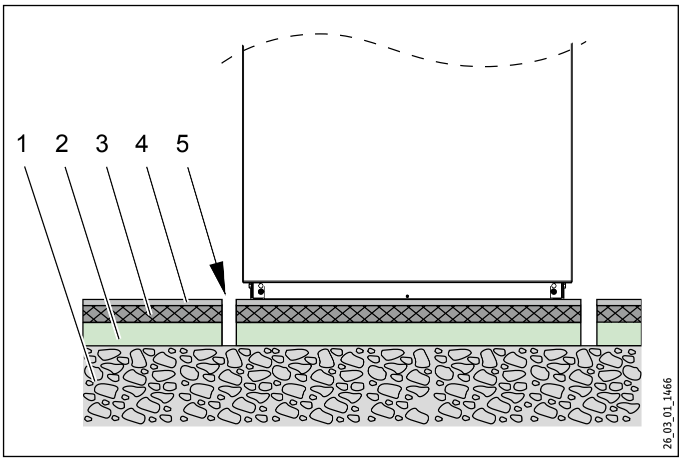
» No risk from frost

» Load-bearing floor

» Level, even and firm base

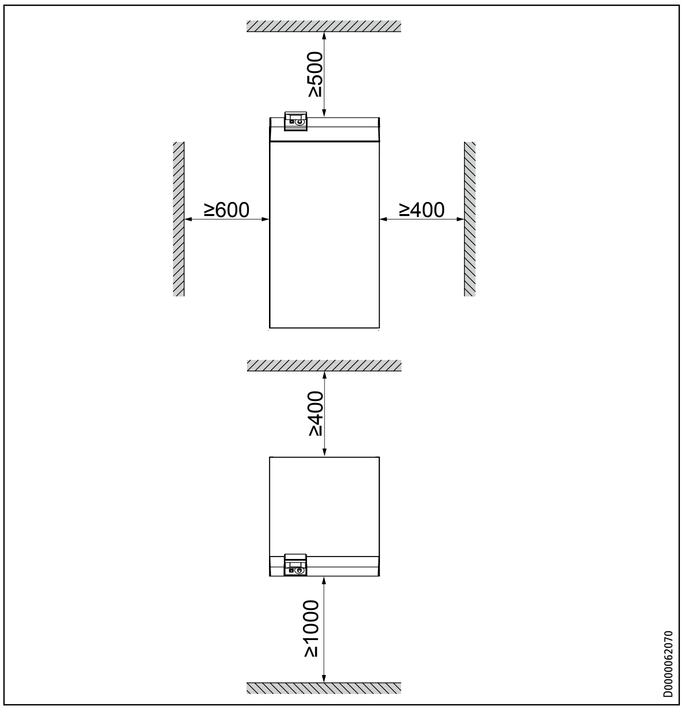
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.

» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.

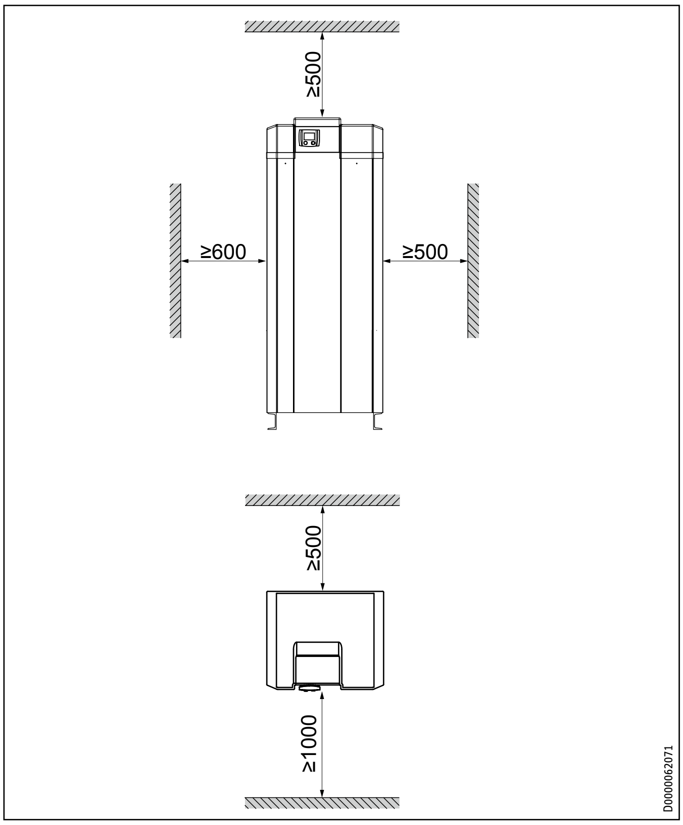


1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

WPL 44-60

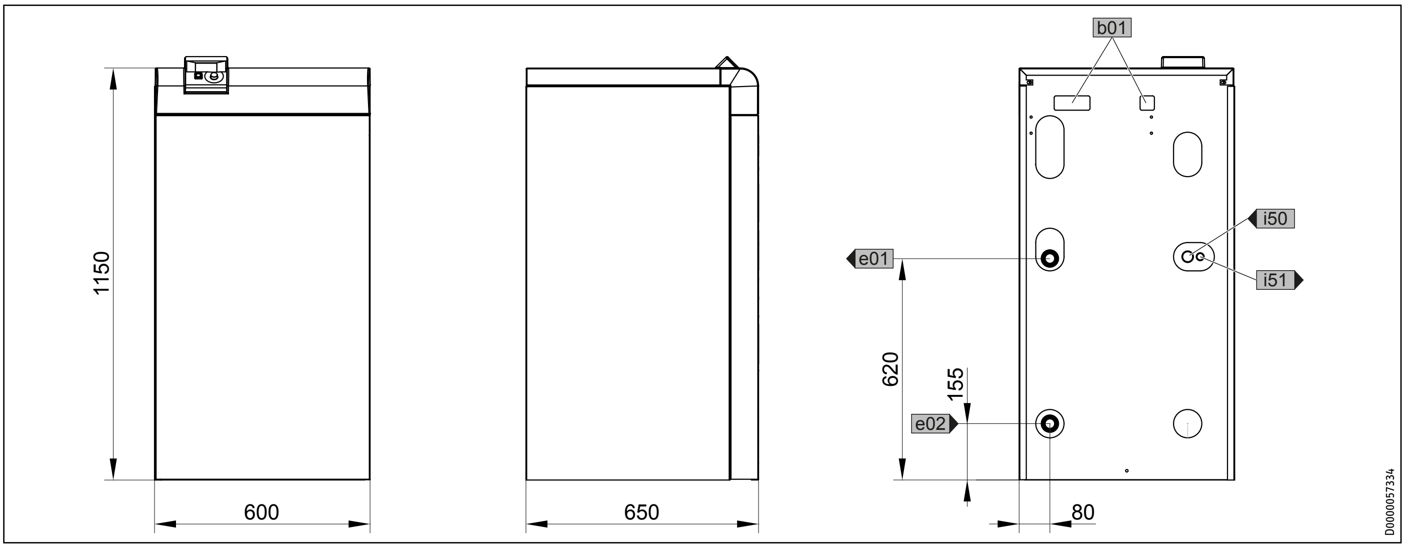


WPL 130



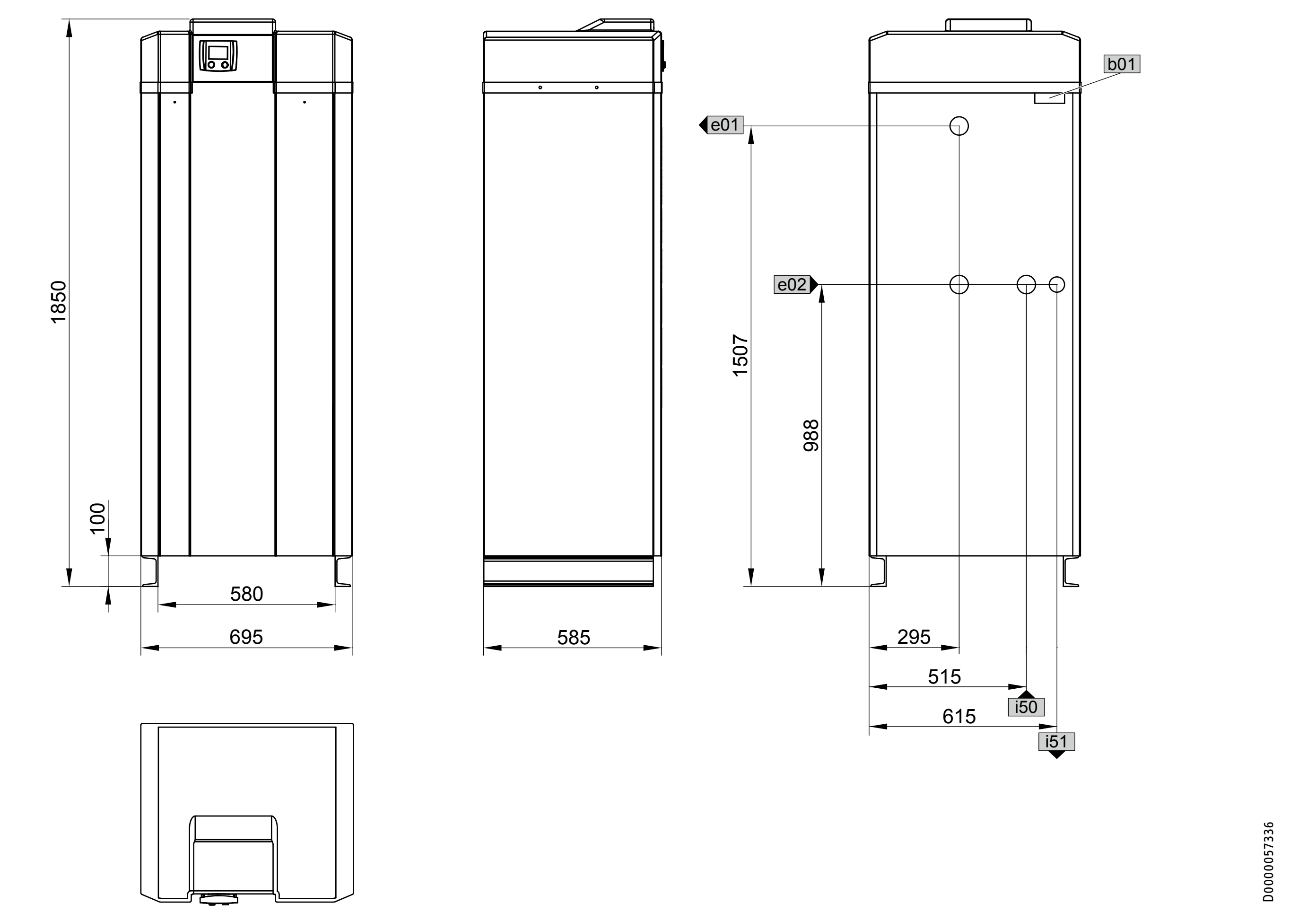
Indoor unit

WPL 44 AC | WPL 60 AC



			WPL 44 AC	WPL 60 AC
b01	Entry electrical cables			
e01	Heating flow	Male thread	G 1 1/2	G 2
e02	Heating return	Male thread	G 1 1/2	G 2
i50	Refrigerant suction gas line			
i51	Refrigerant liquid line			

WPL 130 AC



		WPL 130 AC
b01 Entry electrical cables		
e01 Heating flow	Male thread	G 2
e02 Heating return	Male thread	G 2
i50 Refrigerant suction gas line		
i51 Refrigerant liquid line		

External unit

Installation location requirements

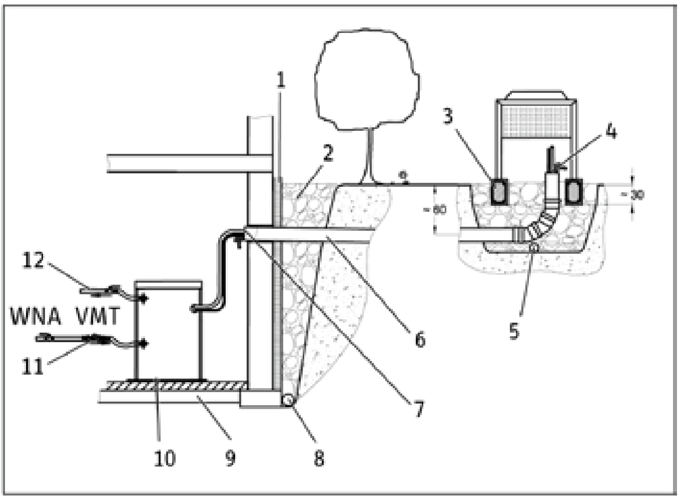
» Never install the appliance inside a shaft or trough.
» The outdoor unit must be level (horizontal).
» The air discharge must not be covered by snow in winter.
» Condensate must be able to freely drain underneath the appliance, even during frosty weather.
» Do not install the appliance outside noise sensitive rooms such as bedrooms.
» Installation in corners of buildings or areas surrounded by walls can result in an elevated noise level. Never install the appliance in recesses that are surrounded by three walls.
» Reflecting building walls can increase the noise level. Never install the appliance between reflecting building walls.
» The appliance must be accessible all year round. Suitable precautions must be taken for roof installation.
» The appliance may only be sited outdoors. The air flow must not be hindered on any side.
» Siting in niches and corners is not permissible.

The following guidelines must be followed for siting the appliance in coastal areas:

» The evaporator can be used from a distance of at least 1 km between the sea and the installation site, and it can be sited on the leeward side of the building without further protective measures.

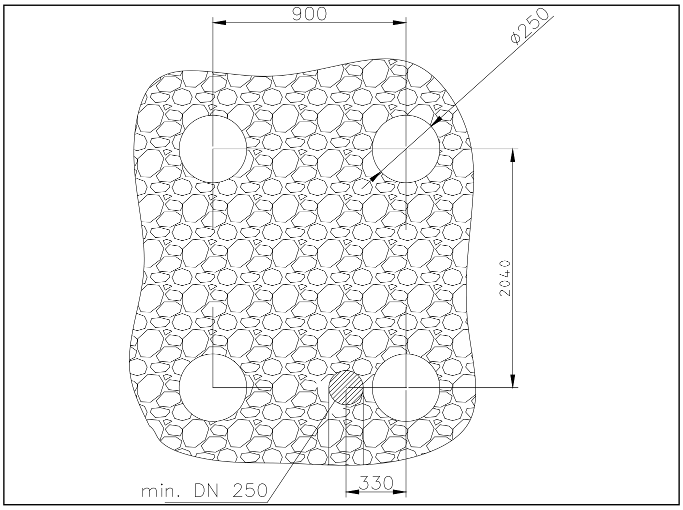
WPL 44/60

Siting with underground connection line



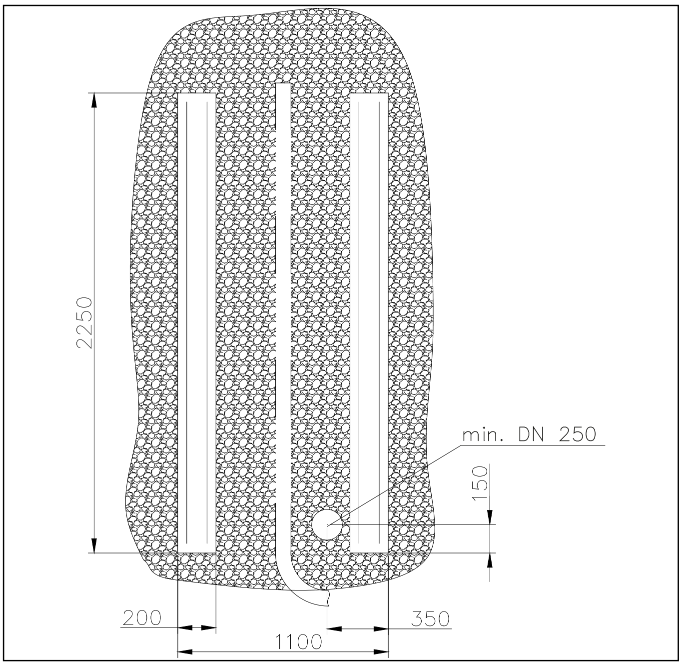
1	Insulation	7	Seal (it is essential to choose a proper seal if there is infiltrating groundwater or a risk of flooding)
2	Gravel	8	Drainage
3	Reinforced strip foundation	9	Foundation
4	Seal	10	Sound insulation mat
5	Drainage pipe below frost depth	11	Return
6	Pipe liner with min. 1 % fall	12	Flow

Point foundation



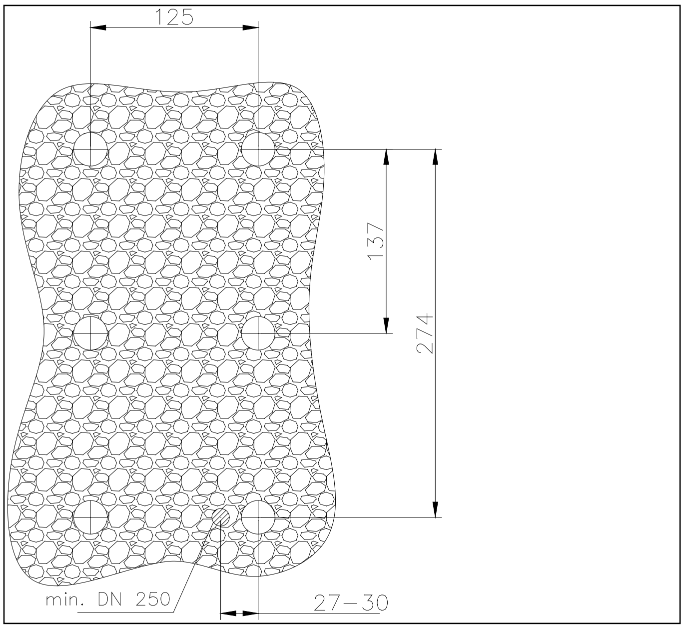
Foundation depth min. 80 cm, provide drainage pipe below frost depth

Strip foundation



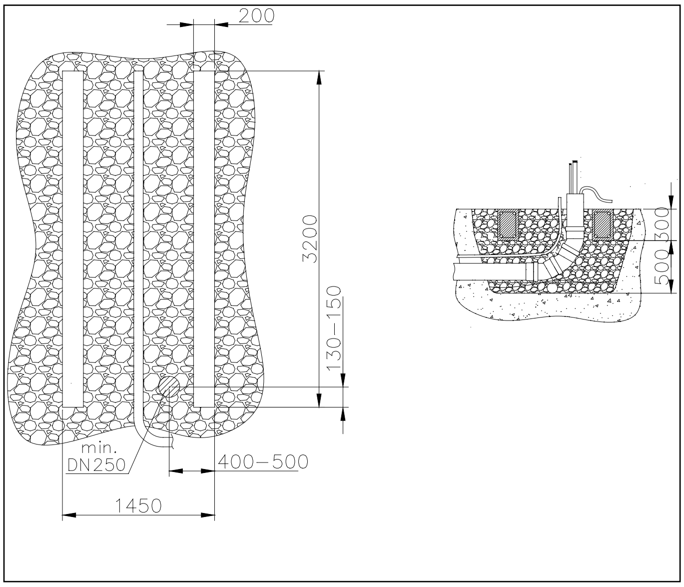
WPL 130

Point foundation

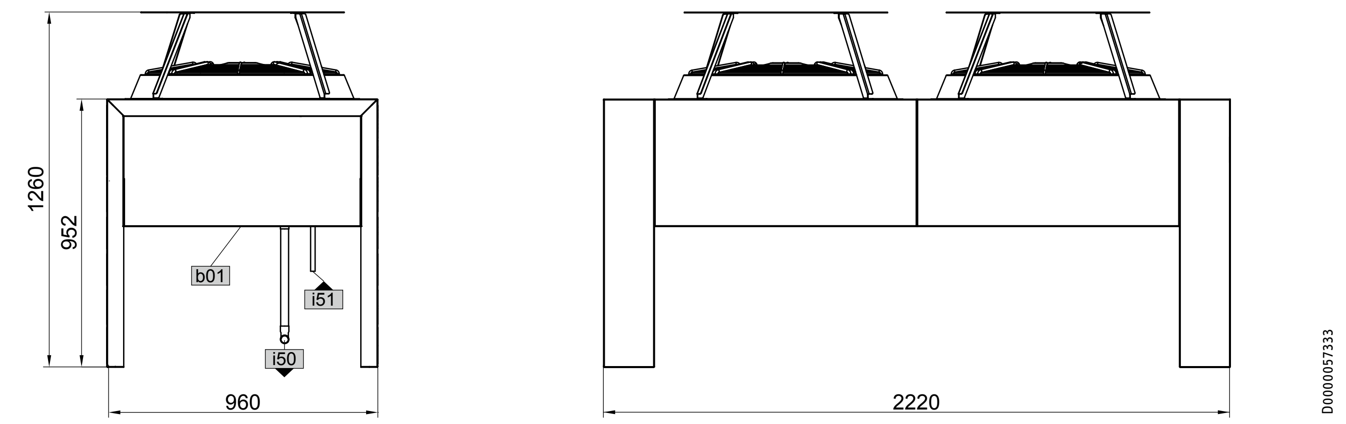


Foundation depth min. 80 cm, provide drainage pipe below frost depth

Strip foundation

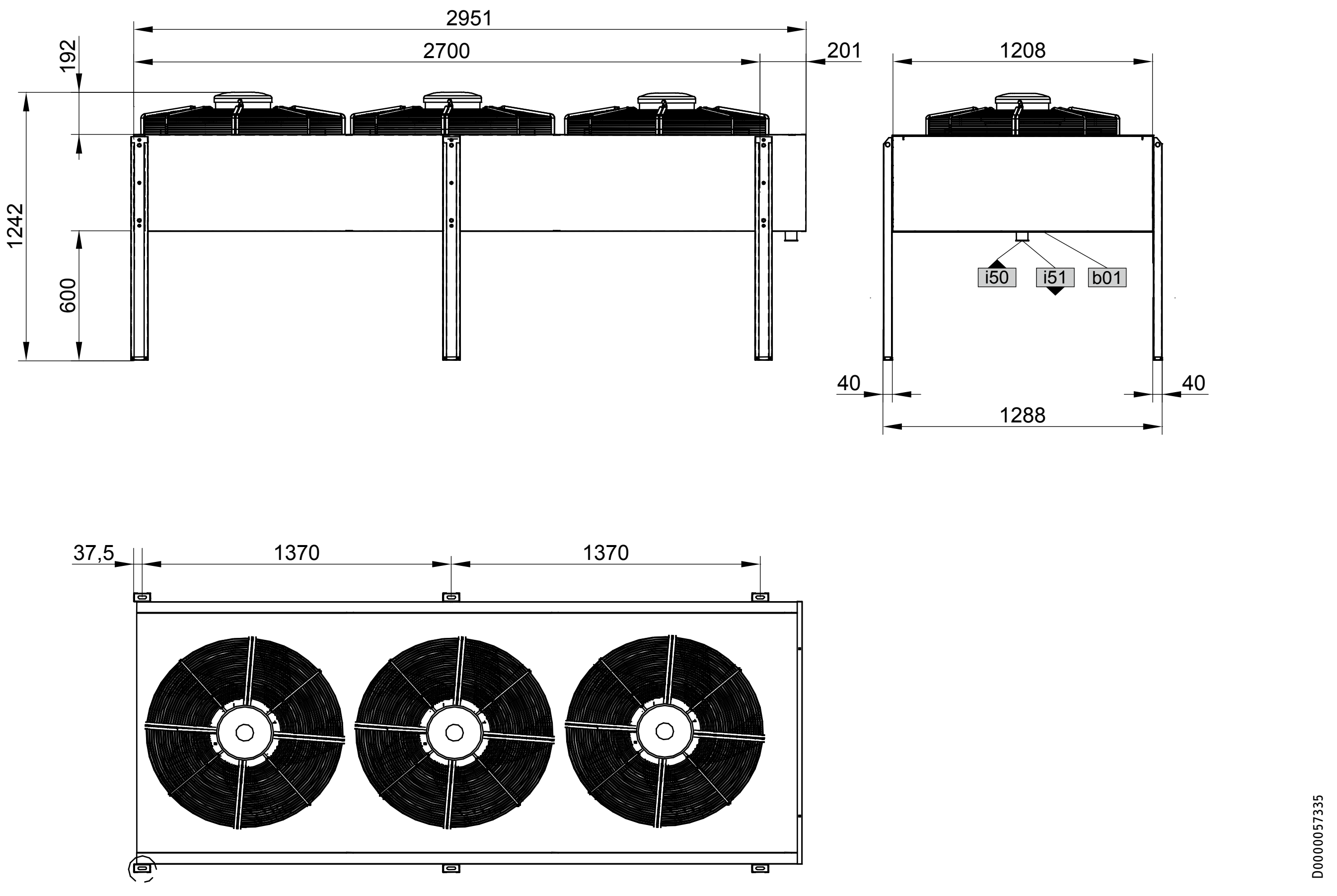


WPL 44/60



		WPL 44 AC	WPL 60 AC
b01 Entry electrical cables			
i50 Refrigerant suction gas line			
i51 Refrigerant liquid line			

WPL 130



			WPL 130 AC
b01	Entry electrical cables		
i50	Refrigerant suction gas line		
i51	Refrigerant liquid line		

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

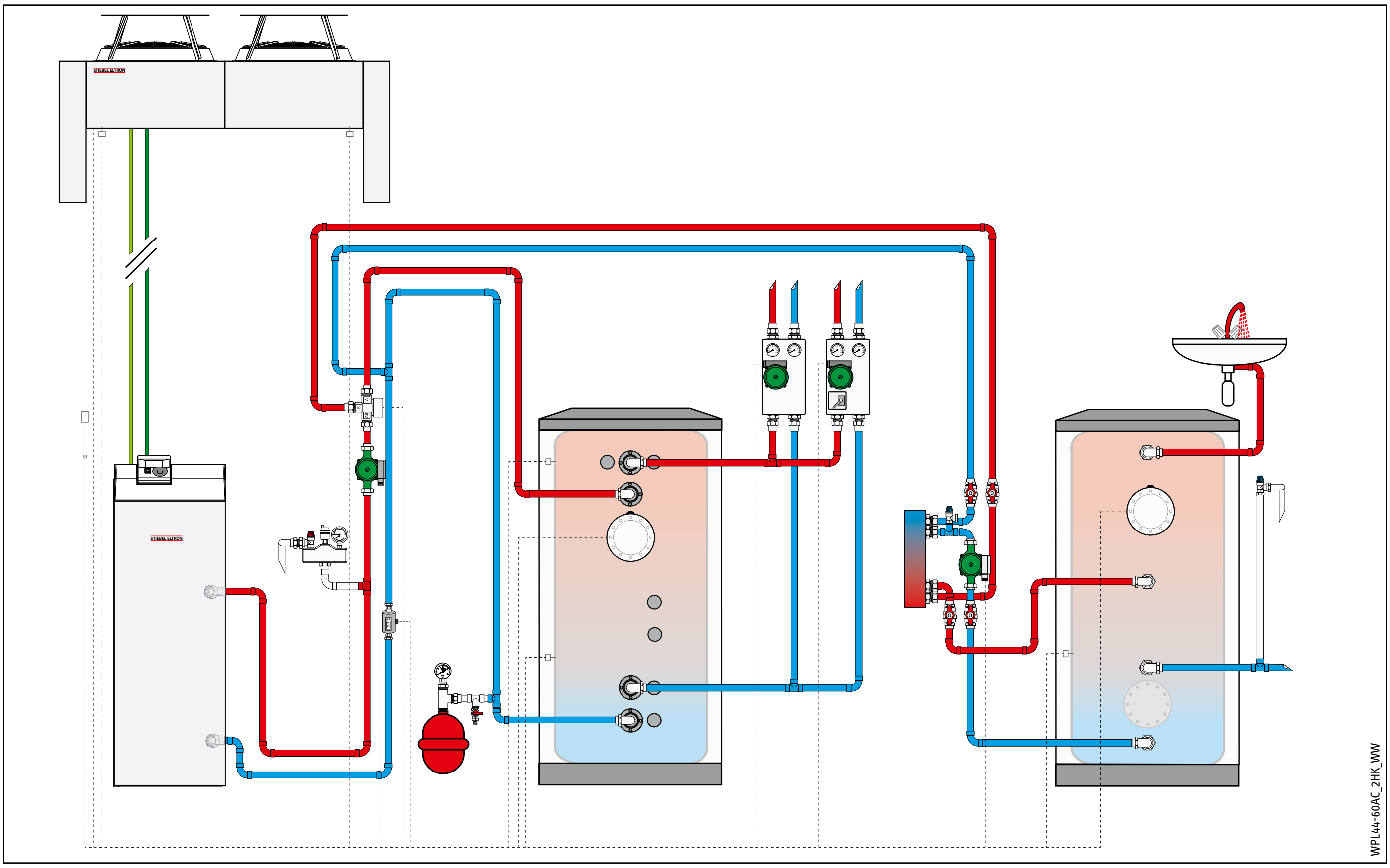
Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

The reduction of structure-borne sound requires a connection with pressure hoses.

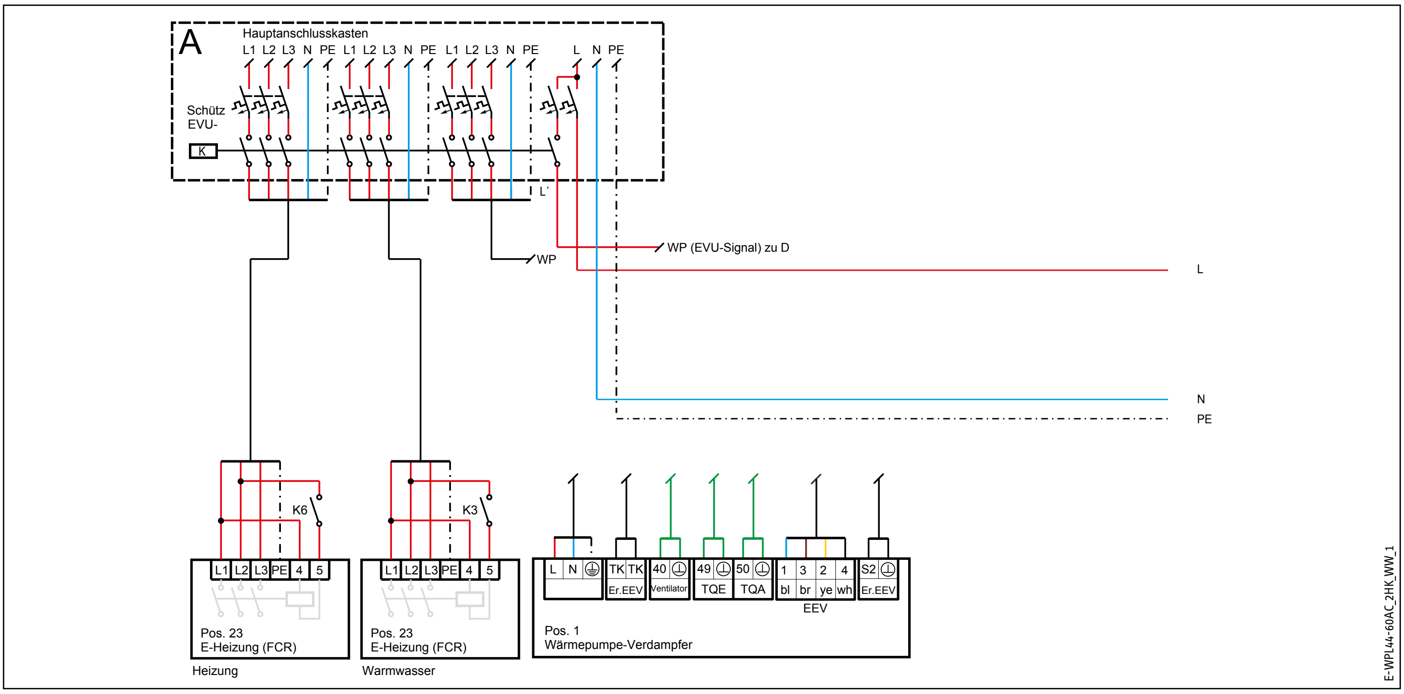
Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

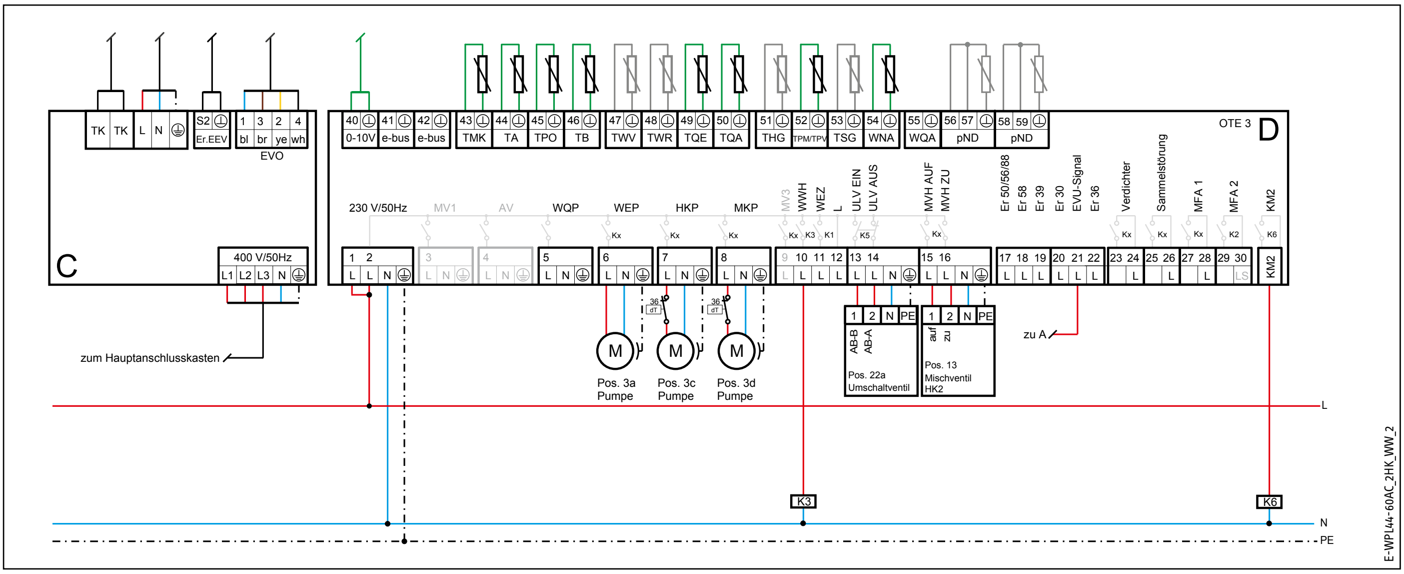
Note
Work on the refrigerant circuit must only be carried out by qualified contractors. The qualified contractor must be certified acc. to Art. 5 Paragraph 2 of the EC Regulation No. 842/2006.

WPL 44-60, heating with 2 heating circuits and DHW heating



Power supply

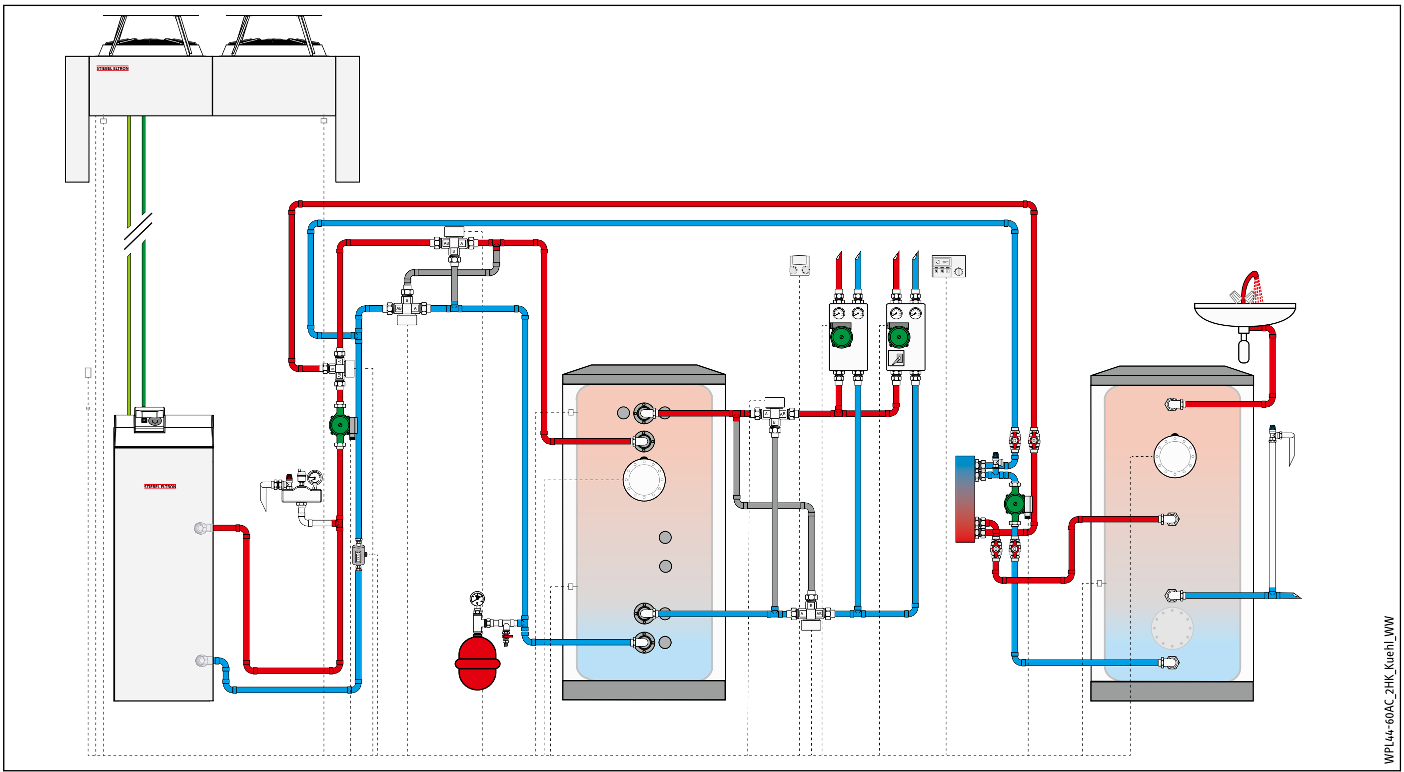




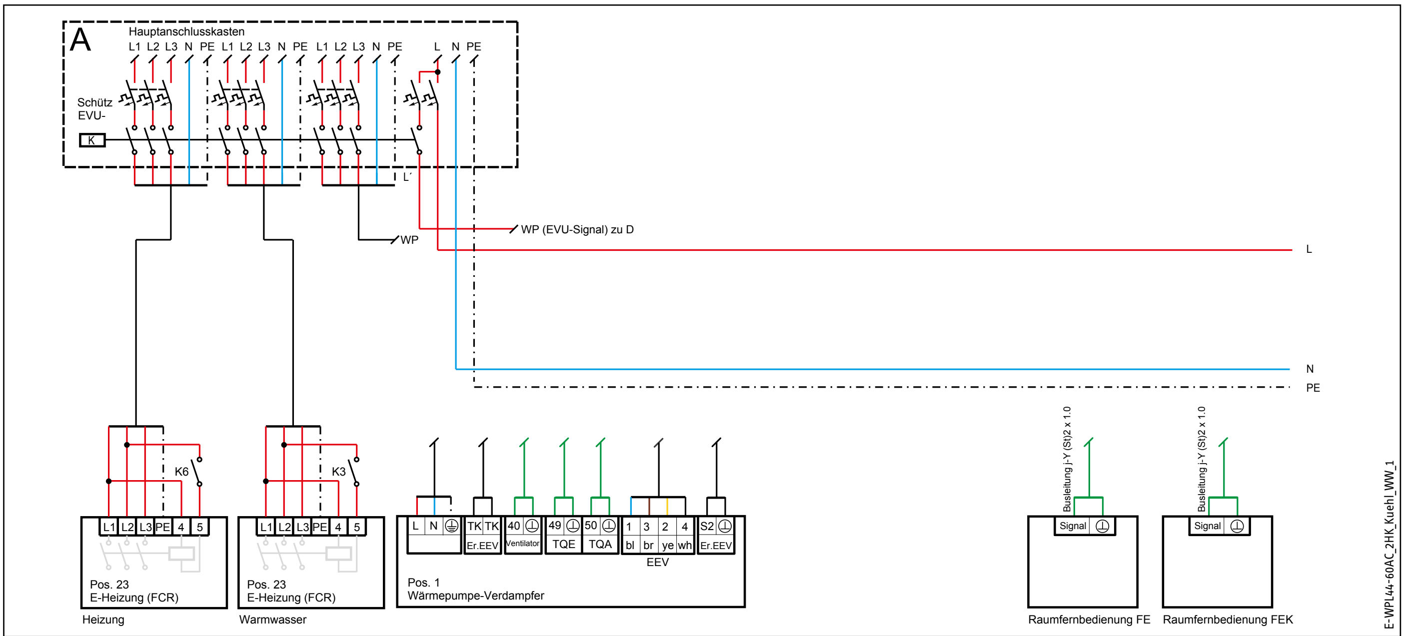
Pos. A Main connection box
Pos. B Terminal box 400 V (on site)
Pos. C WPL
Pos. D OTE controller
Pos. E Terminal box (on site)
Pos. F OGZ controller

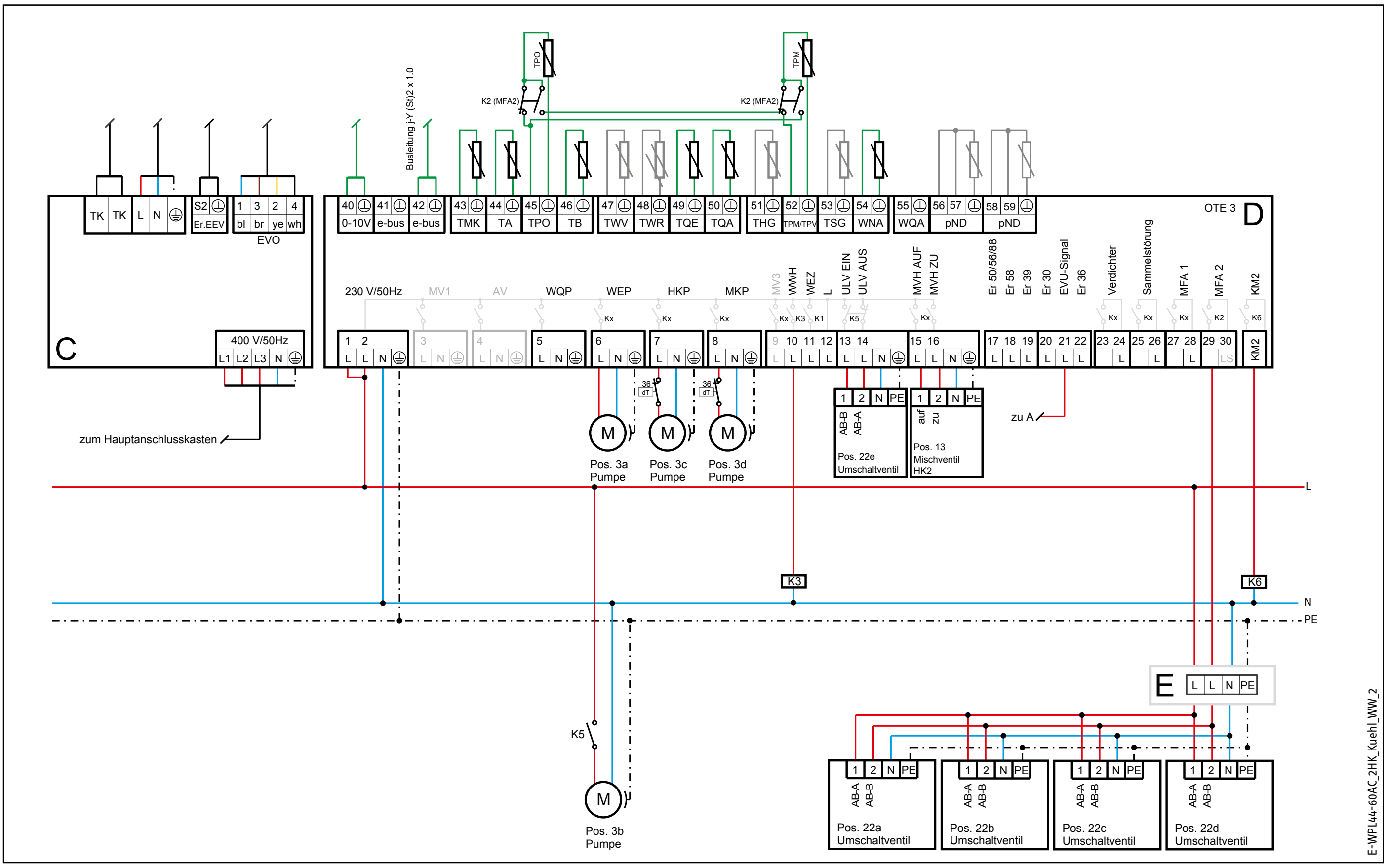
Terminal
40 Speed, heat source pump / fan 0-10 VDC
41/42 eBus
43 Mixer sensor (TMK)
44 Outside temperature sensor (TA)
45 Buffer sensor, top (TPO)
46 DHW sensor (TB)
47 HP flow sensor (TWV)
48 HP return sensor (TWR)
49 Sensor, heat source inlet / VdTemp. 1 (TQE)
50 Sensor, heat source inlet / VdTemp. 2 (TQA)
51 Hot gas sensor (THG)
52 Buffer sensor, bottom / flow sensor, passive cooling (TPM/TPV)
53 Suction gas sensor (TSG)
54 Flow sensor, heat consumption (WNA)
55 Flow sensor, heat source (WNA)
56/57 Low pressure sensor (pND)
58/59 High pressure sensor (pHD)

WPL 44-60, heating and cooling with 2 heating circuits and DHW heating



Power supply



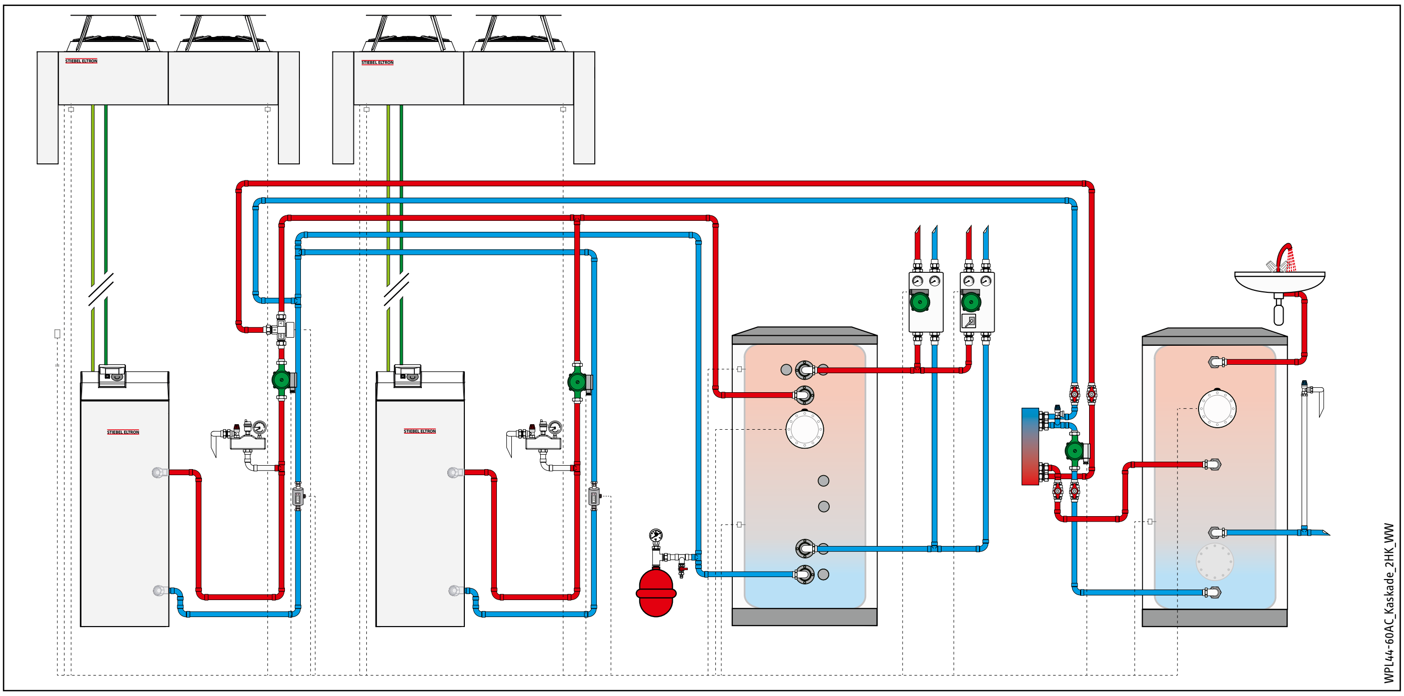


Pos. A	Main connection box
Pos. B	Terminal box 400 V (on site)
Pos. C	WPL
Pos. D	OTE controller
Pos. E	Terminal box (on site)
Pos. F	OGZ controller

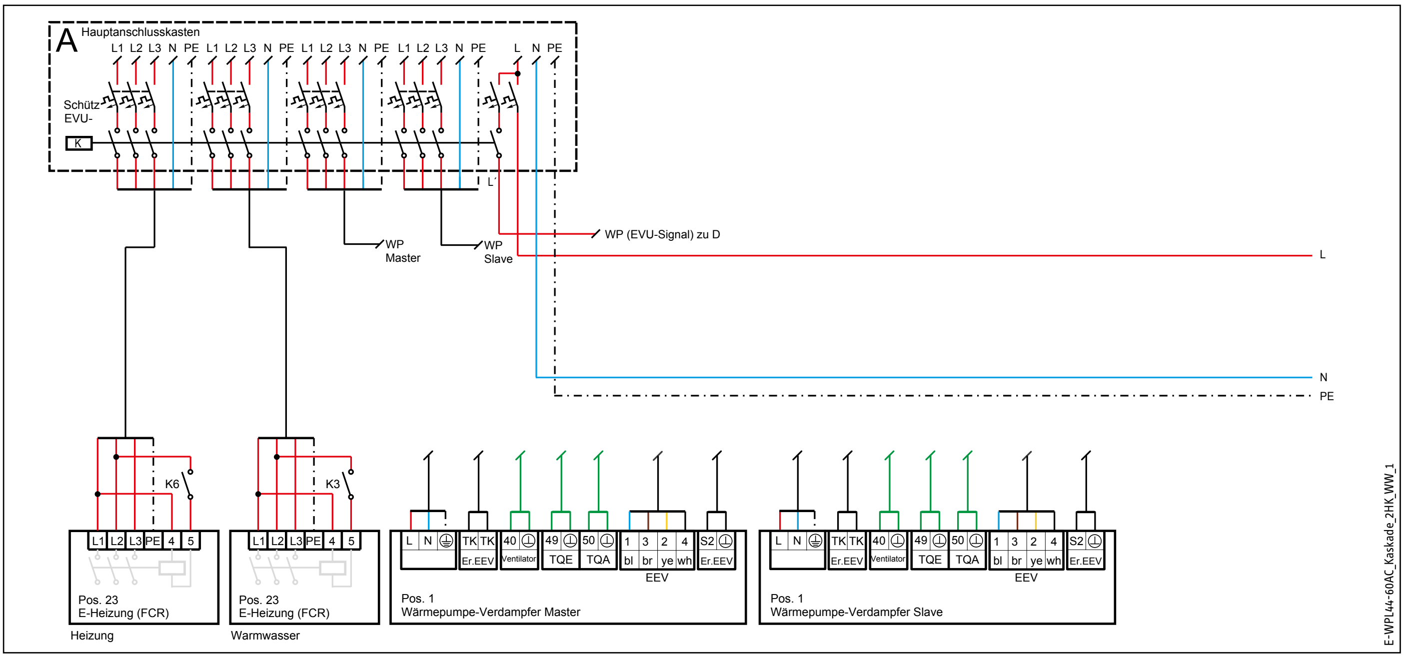
Terminal

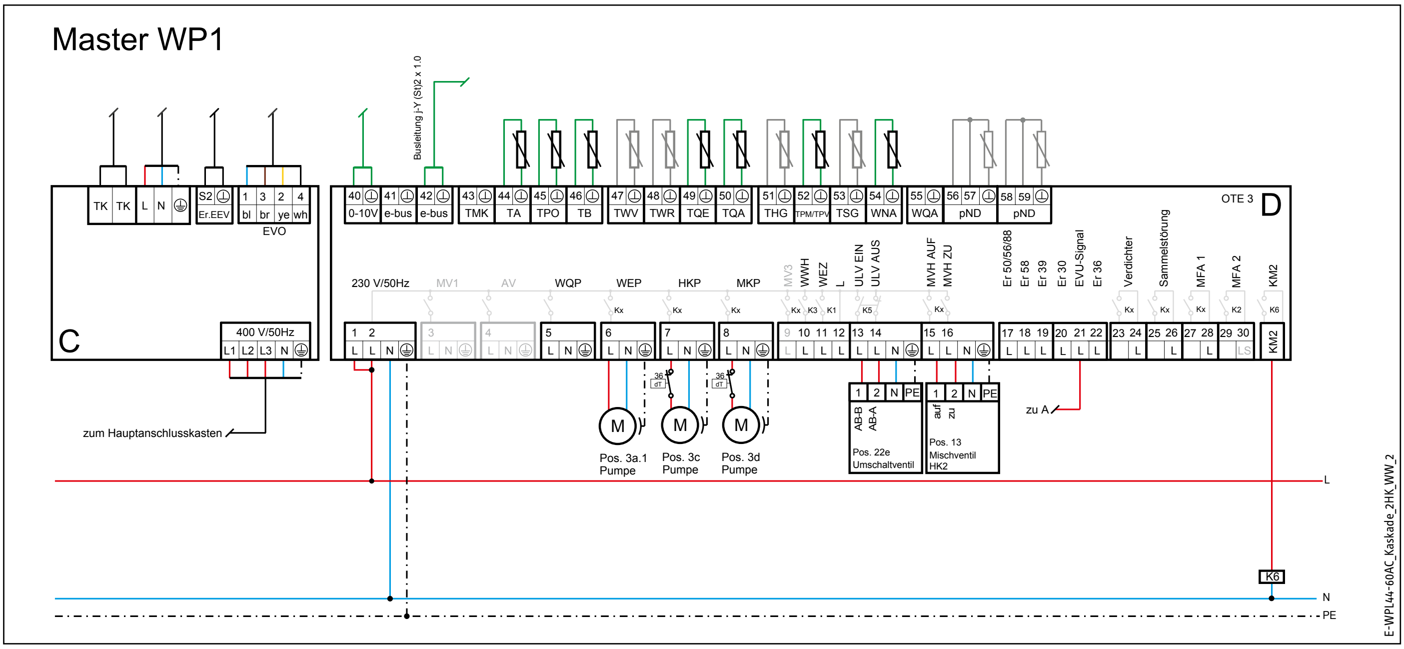
40	Speed, heat source pump / fan 0-10 VDC
41/42	eBus
43	Mixer sensor (TMK)
44	Outside temperature sensor (TA)
45	Buffer sensor, top (TPO)
46	DHW sensor (TB)
47	HP flow sensor (TWV)
48	HP return sensor (TWR)
49	Sensor, heat source inlet / VdTemp. 1 (TQE)
50	Sensor, heat source inlet / VdTemp. 2 (TQA)
51	Hot gas sensor (THG)
52	Buffer sensor, bottom / flow sensor, passive cooling (TPM/TPV)
53	Suction gas sensor (TSG)
54	Flow sensor, heat consumption (WNA)
55	Flow sensor, heat source (WNA)
56/57	Low pressure sensor (pND)
58/59	High pressure sensor (pHD)

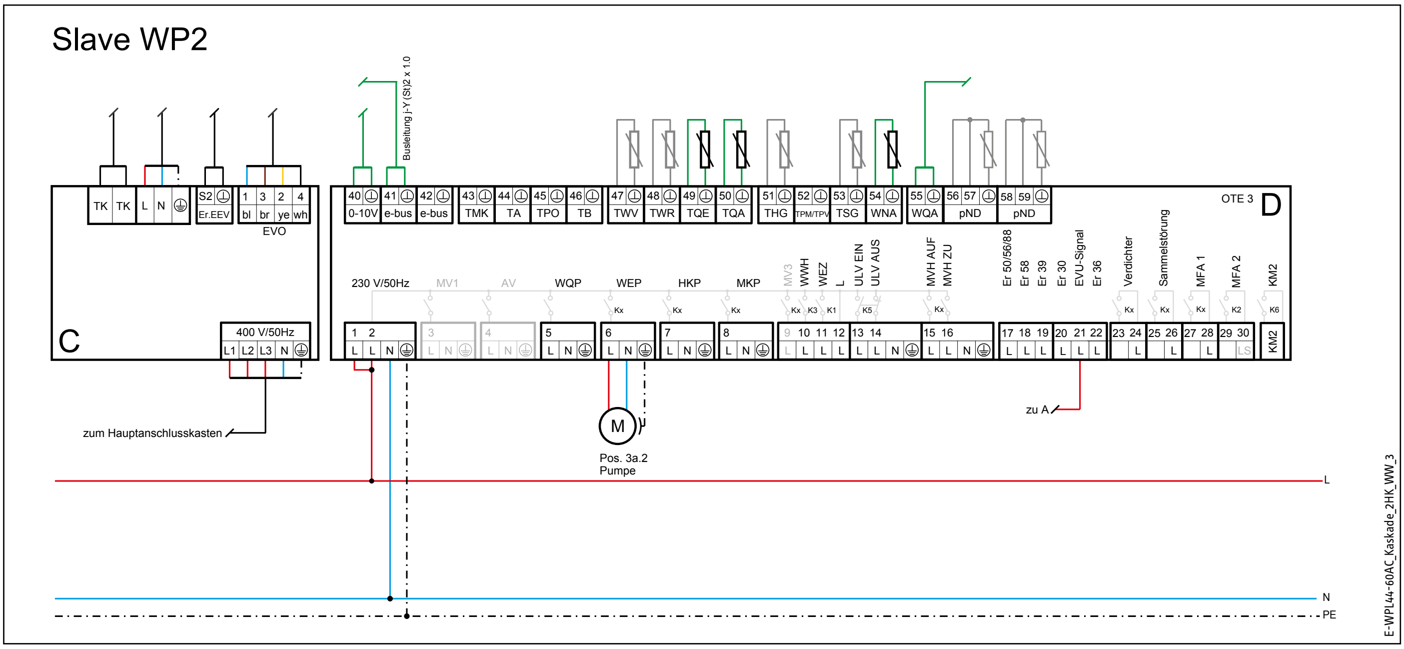
WPL 44-60, cascade, heating with 2 heating circuits and DHW heating



Power supply





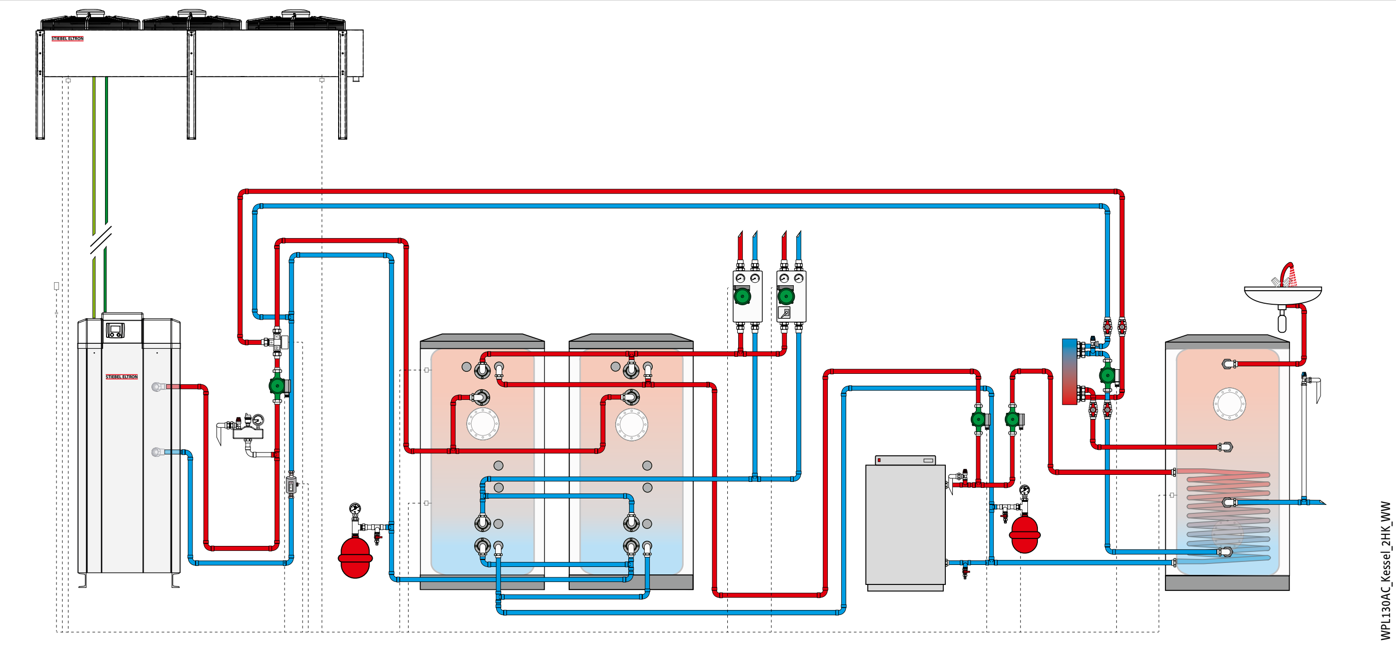


Pos. A	Main connection box
Pos. B	Terminal box 400 V (on site)
Pos. C	WPL
Pos. D	OTE controller
Pos. E	Terminal box (on site)
Pos. F	OGZ controller

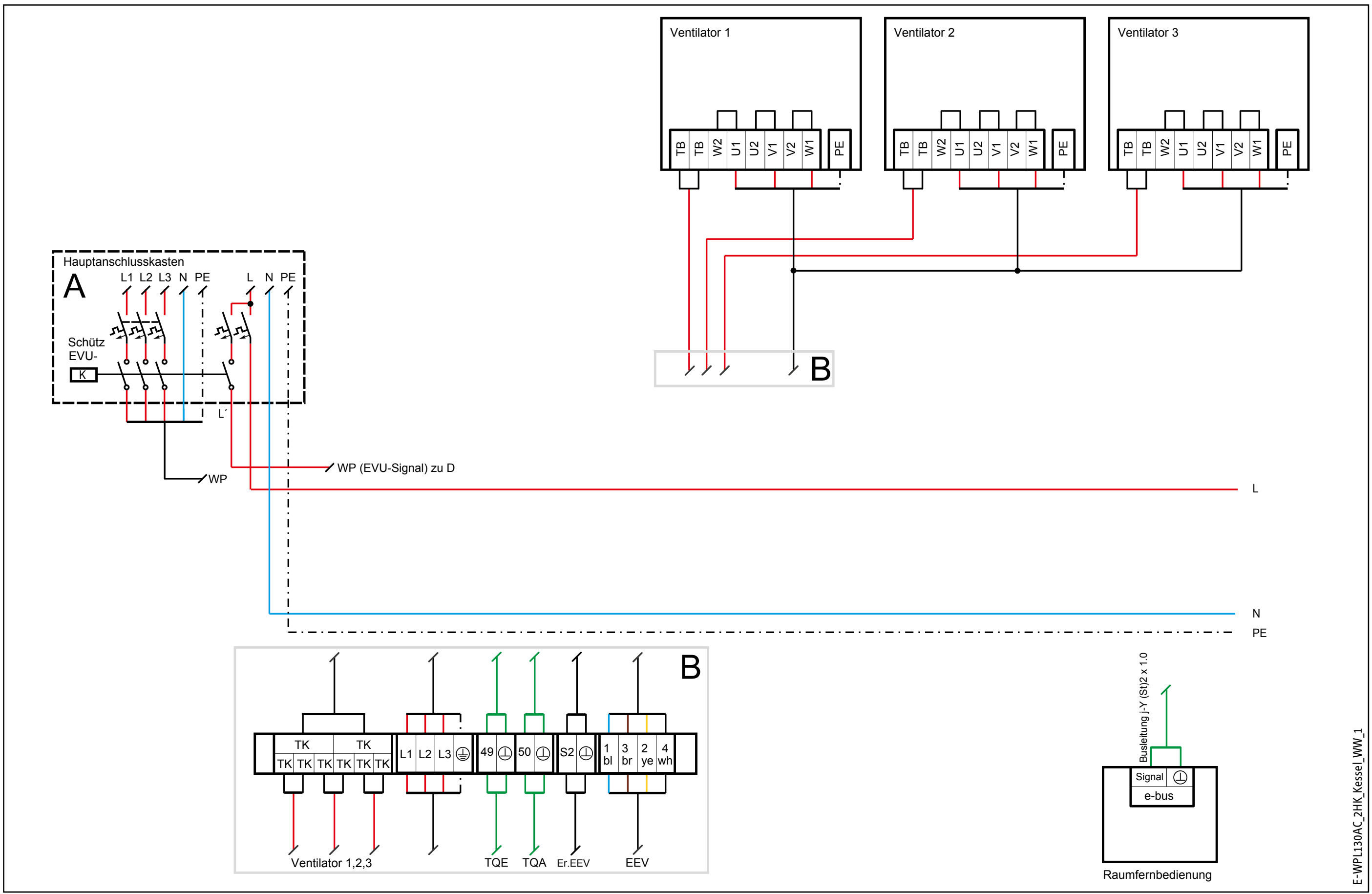
Terminal

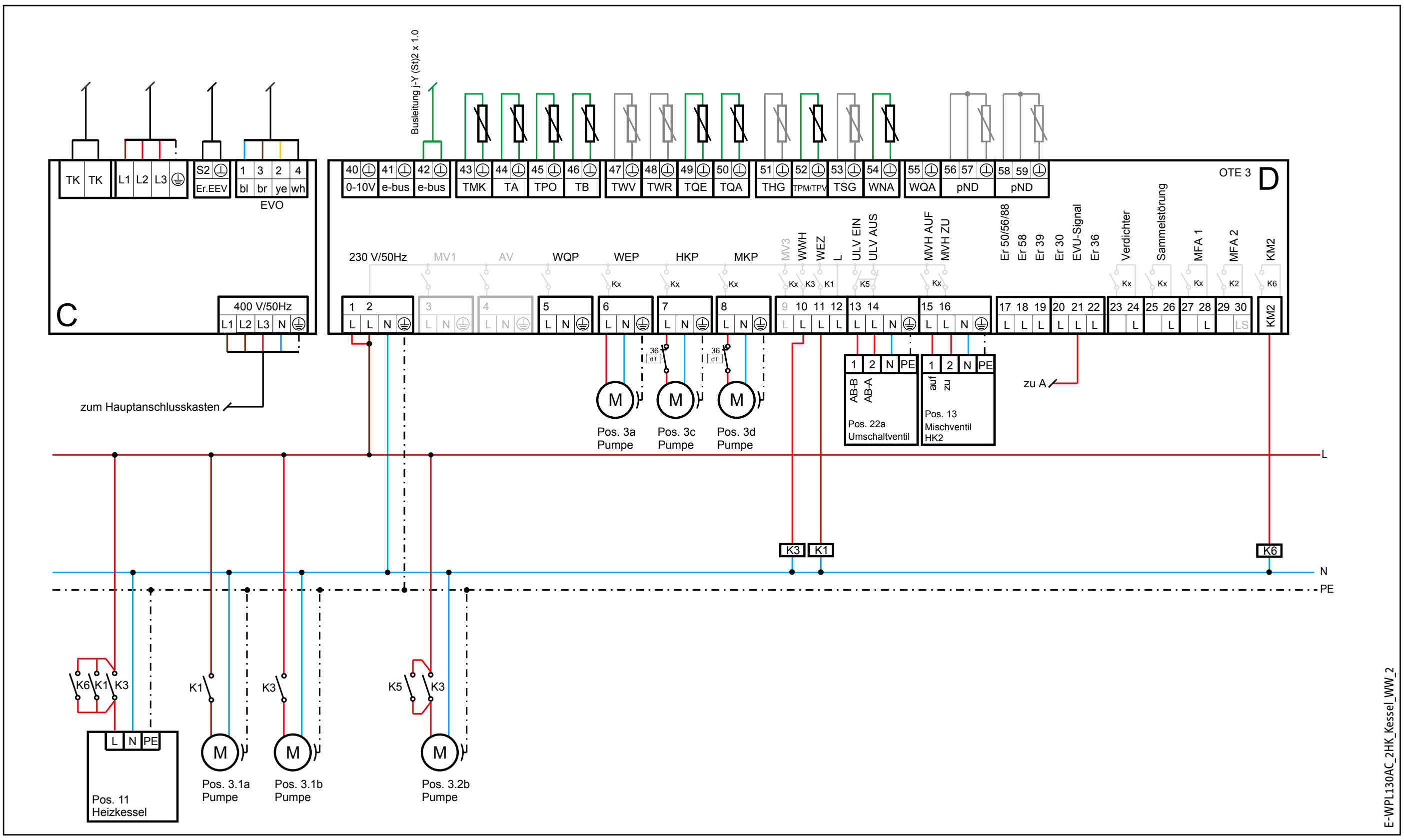
40	Speed, heat source pump / fan 0-10 VDC
41/42	eBus
43	Mixer sensor (TMK)
44	Outside temperature sensor (TA)
45	Buffer sensor, top (TPO)
46	DHW sensor (TB)
47	HP flow sensor (TWV)
48	HP return sensor (TWR)
49	Sensor, heat source inlet / VdTemp. 1 (TQE)
50	Sensor, heat source inlet / VdTemp. 2 (TQA)
51	Hot gas sensor (THG)
52	Buffer sensor, bottom / flow sensor, passive cooling (TPM/TPV)
53	Suction gas sensor (TSG)
54	Flow sensor, heat consumption (WNA)
55	Flow sensor, heat source (WNA)
56/57	Low pressure sensor (pND)
58/59	High pressure sensor (pHD)

WPL 130 cascade, heating with 2 heating circuits and DHW heating with additional gas/oil boiler



Power supply





Pos. A Main connection box
Pos. B Terminal box 400 V (on site)
Pos. C WPL
Pos. D OTE controller
Pos. E Terminal box (on site)
Pos. F OGZ controller

Terminal

40	Speed, heat source pump / fan 0-10 VDC
41/42	eBus
43	Mixer sensor (TMK)
44	Outside temperature sensor (TA)
45	Buffer sensor, top (TPO)
46	DHW sensor (TB)
47	HP flow sensor (TWV)
48	HP return sensor (TWR)
49	Sensor, heat source inlet / VdTemp. 1 (TQE)
50	Sensor, heat source inlet / VdTemp. 2 (TQA)
51	Hot gas sensor (THG)
52	Buffer sensor, bottom / flow sensor, passive cooling (TPM/TPV)
53	Suction gas sensor (TSG)
54	Flow sensor, heat consumption (WNA)
55	Flow sensor, heat source (WNA)
56/57	Low pressure sensor (pND)
58/59	High pressure sensor (pHD)

Installation of refrigerant lines

The outdoor unit can be installed higher or lower than the indoor unit. The maximum permissible height differential and the line lengths are specific to the appliance.

» Refrigerant must be topped up according to the refrigerant line length.

» Insulate the entire refrigerant line and junctions with vapour diffusion-proof thermal insulation.

» Secure the pipe assembly to the outside wall.

» The indoor unit and refrigerant lines must be evacuated correctly.

» Separate the refrigerant lines with a suitable pipe cutter.

» No dirt and no moisture must enter the pipework.

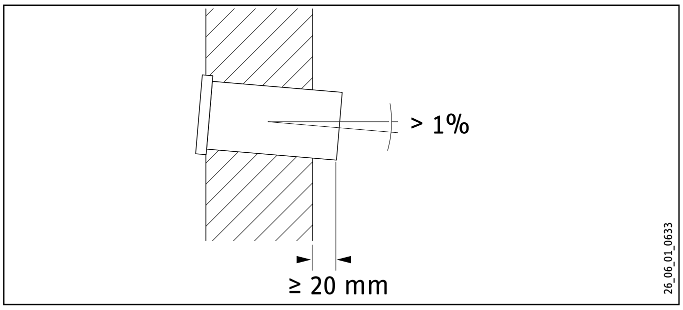
» Never kink refrigerant lines.

» The refrigerant lines and the connection points must be checked for leaks.

» Refrigerant lines must be made of copper to DIN 12735-1 and must have robust and UV-resistant insulation of fire protection class 2.

» Seal the wall outlet with suitable sealant.

Wall outlet



WSD

Weather cover WSD as extension to WPL 44/60 AC. The weather cover offers protection from the elements, including rain, snow and leaves.

EVL

Wiring harness in protective pipe, for connecting the table-top evaporator. Labelled cable ends for straightforward connection.

FE 44/60/130

Remote control with integral sensor for capturing the room temperature. For adjusting the set room temperature by +/- 5 K and for changing operating modes: day mode, setback mode and program operation. Exclusively for use with the WPL 44/60/130 AC.

		FE 44/60/130
		235212
IP rating		IP40

FEK 44/60/130

Digital remote control for WPL 44/60/130 AC. Enables convenient inputting and display of system parameters (e.g. operating modes, outside temperature, relative humidity and heating circuit parameters). For cooling via an area heating system, install the FEK in a reference room. It measures the relative humidity and room temperature for dew point monitoring.

		FEK 44/60/130
		235213
Type of connection, electrical		Via bus cable
Control cable	mm^2	2 x 1
Operating temperature range	°C	0 ... +50
IP rating		IP40

RTF 44/60/130

Room temperature sensor to capture the current room temperature for controlling the WPL 44/60/130 AC.

ZM 44/60/130

Auxiliary module for extended control functions. Enclosure for installation on finished walls. The auxiliary module only works in combination with an OTE master controller (part of heat pump standard delivery). The auxiliary module is required for the following applications: Control of Smart Grid functions (SG Ready). Control of a second and third mixer circuit for heating and cooling. Swimming pool water heating demand. Control of an additional water heater. Control of an additional heat pump in a cascade. Control of a boiler. Included in the standard delivery are the 2 contact sensors and 1 immersion sensor NTC 5000. Connection to controller via 2-wire bus. 0-10 V set value input, non-floating.

		ZM 44/60/130
		235215
Power supply		1/N ~ 230 V 50 Hz
Max. power consumption	W	12
Rated voltage, controller	V	12
MCB/fuse rating	A	3,15
Control cable	mm^2	2 x 1
Operating temperature range	°C	0 ... +50
Storage and transport temperature	°C	-20 ... +60
Relay breaking capacity	A	6 (2)
Clock power reserve		min. 12 h
IP rating		IP40

WP-RBS

Switching relay for cooling mode. Required for systems with buffer cylinder heating and buffer cylinder cooling.

WPL slave

Can optionally be ordered for controller matching in cascade systems. This option must be ordered with every additional heat pump in the cascade.

HM/HM Trend

Hydraulic module for indoor installation; quick and simple to install due to high level of integration. Hydraulic connection between the heat pumps WPL 10 AC(S), WPL 13/18 E, WPL 15/20/25 AC(S), WPL 33 HT, WPL Trend series and the hydraulic module of the HM or HM Trend series. The HM is equipped with a robust metal casing made from galvanised, powder-coated and stove-enamelled sheet steel. The casing of the HM-Trend series consists of an insulated EPP appliance cover. All relevant heating components, such as the highly efficient circulation pump for the heating and DHW side, a multi stage electric emergency/booster heater for mono energetic operation and pasteurisation, 24 litre heating expansion vessel, safety valve, quick action air vent valve and the 3/2-way diverter valve for DHW heating are already integrated. The system is controlled via the integral WPM 3 heat pump manager with illuminated symbol and plain text display, which enables fully automated, weather-compensated control of the heating system. An optional ASL-HM insulated connector block can be used, which simplifies hydraulic connection.

At a glance

- High grade casing made from sheet steel with EPP insulation core
- Connector block available as an accessory
- Integral heat pump manager WPM 3
- High level of integration
- Circulation pump energy efficiency class A
- For wall mounting
- Hydraulic connection between heat pump and heating system
- Integral central heating/DHW diverter valve
- With 24 l heating expansion vessel
- Integral emergency/booster heater
- Can be used in conjunction with heat pumps with cooling ability

Function

The hydraulic modules in the HM and HM Trend series simplify integration of air | water heat pumps into the system hydraulics. Connection to the water side of the wall mounted hydraulic module is from below. The heat transfer medium is distributed for heating or DHW heating by the built-in circulation pump via the likewise integrated 3-2 way diverter valve. Control is via the integral heat pump manager WPM 3 and enables fully automatic weather-compensated control of the heating system. An emergency/booster heater is already integrated in the module to enable mono energetic operation of the heat pump system.

Safety and quality

Further accessories

232806 ASL-HM

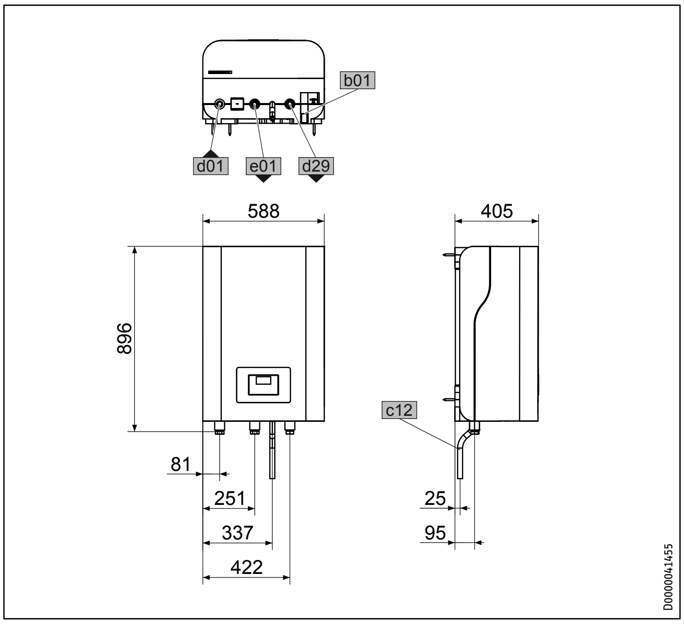
233750 AS-HM Trend

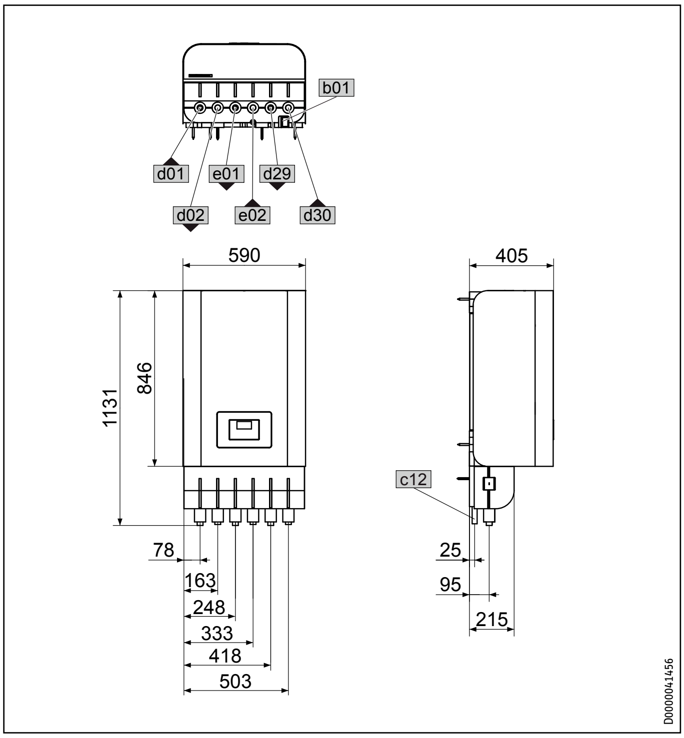
HM/HM Trend

Specification

		HM	HM Trend
		233010	232805
Power consumption, emergency/booster heater	kW	8,8	8,8
Max. permissible pressure	MPa	0,3	0,3
Min. application limit on the heating side	°C	7	7
Max. application limit cooling on the heating side	°C	70	70
Water hardness	°dH	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0
Conductivity (softening)	μS/cm	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100
Chloride	mg/l	<30	<30
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1
External available pressure differential at 1.5 m³/h	hPa	661	661
Weight	kg	45	27
External available pressure differential at 2.5 m³/h	hPa	300	300
External available pressure differential at 2 m³/h	hPa	468	468
Frequency	Hz	50	50
Rated voltage, controller	V	230	230
Rated voltage, emergency/booster heater	V	400	400
Phases, controller		1/N/PE	1/N/PE
Phases, emergency/booster heater		3/N/PE	3/N/PE
MCB/fuse protection, controller	A	1 x B 16	1 x B 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16
Power consumption, circulation pump	W	3-76	3-76
Circulation pump type		Yonos PARA 25/7.5 highly efficient circulation pump	Yonos PARA 25/7.5 highly efficient circulation pump
IP rating		IP20	IP20
Suitable for		WPL 10 AC(S), WPL 13/18 E, WPL 13/18 S basic, WPL 13 basic, WPL 15/20/25 AC(S), WPL 08/12/16/22/28 Trend, WPL 33 HT(S)	WPL 10 AC(S), WPL 13/18 E, WPL 13/18 S basic, WPL 13 basic, WPL 15/20/25 AC(S), WPL 08/12/16/22/28 Trend, WPL 33 HT(S)
Height	mm	896	896
Height incl. connector block	mm	1131	1131
Width	mm	590	590
Depth	mm	405	405
Connection		G 1	G 1
Expansion vessel volume	l	24	24

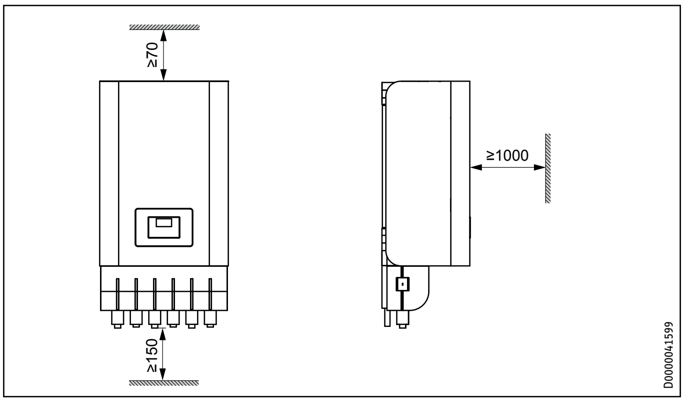
HM/HM Trend



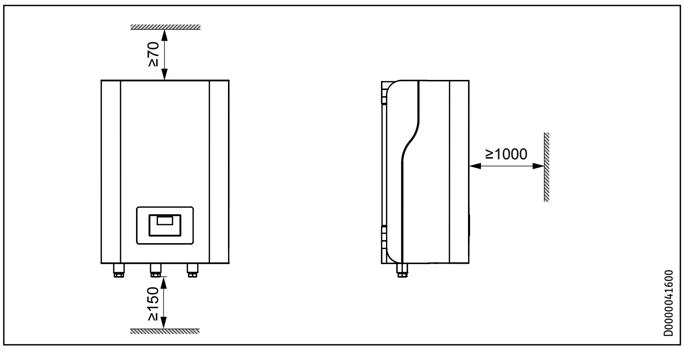


				HM	HM Trend
b01	Entry electrical cables				
c12	Safety valve drain				
d01	Heat pump flow	Diameter	mm	28	
		Female thread			G 1
d02	Heat pump return	Diameter	mm	28	
d29	Heat exchanger flow	Diameter	mm	28	
		Female thread			G 1
d30	Heat exchanger return	Diameter	mm	28	
e01	Heating flow	Diameter	mm	28	
		Female thread			G 1
e02	Heating return	Diameter	mm	28	

HM with ASL-HM



HM Trend



- ▶ Maintain the minimum clearances to enable maintenance work on the appliance.

If the appliance is not installed in a recess, we recommend leaving 400 mm clearance on the right-hand side for the electrical connection.

ZVK

The painted sheet steel casings are required accessories for air|water heat pumps.

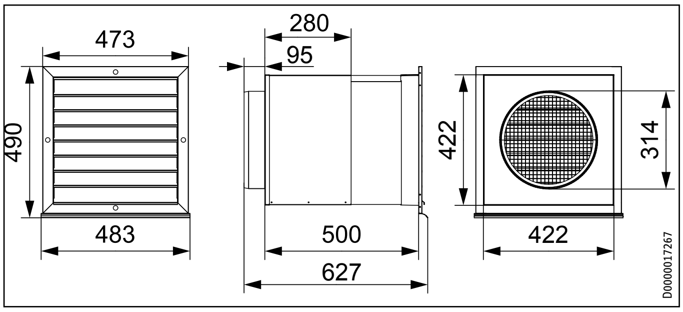
		ZVK-WPL 13/18/23 I	ZVK-WPL 13/18/23 A	ZVK-WPL 13/18/23 A SR	ZVK-WPL 33 HT A	ZVK-WPL 33 HT A SR	ZVK-WPL 33 HT I
		235875	235876	235877	230207	232021	230206
Suitable for		WPL 13/18/23	WPL 13/18/23	WPL 13/18/23	WPL 33 HT	WPL 33 HT	WPL 33 HT
Application		internal	external	external	external	external	internal
Weight	kg	78	118	188	133	133	90
Colour		White	White	Silver	White	Silver	White

Wall outlets

AWG 315 GL

Thermally insulated wall duct for routing air from air | water heat pumps installed indoors, with oval connection for DN 560.

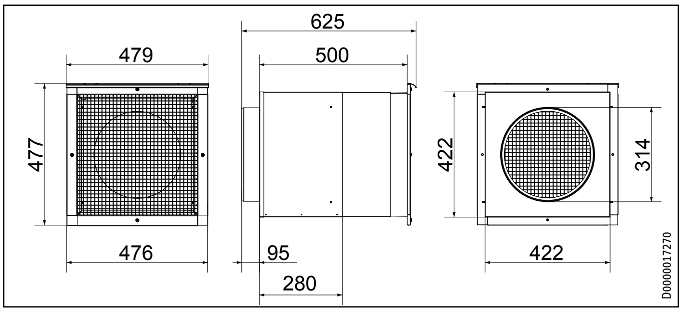
		AWG 315 GL	AWG 315 SR
		232955	233836
Height	mm	490	490
Width	mm	483	483
Depth	mm	627	627
Weight	kg	12	12
Wall thickness	mm	280 - 500	280 - 500
Pressure drop at 1000 m³/h	Pa	16	16
Min. outlet aperture	mm	430x430	430x430
Max. air volume	m³/h	1500	1500
Colour		RAL 9006	Silver metallic



AWG 315 L

Thermally insulated external wall outlet for routing air from air | water heat pumps and integrated systems installed indoors, with connection for DN 315 – light shaft version with rodent guard.

		AWG 315 L
		231039
Height	mm	477
Width	mm	479
Depth	mm	625
Weight	kg	12
Wall thickness	mm	280 - 500
Pressure drop at 1000 m³/h	Pa	2
Min. outlet aperture	mm	430x430
Max. air volume	m³/h	1500
Colour		Aluminium, anodised

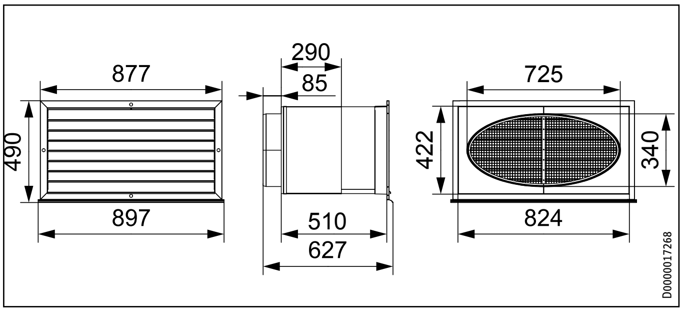


Wall outlets

AWG 560 H-GL

Thermally insulated wall duct for routing air from air | water heat pumps installed indoors, with oval connection for DN 560.

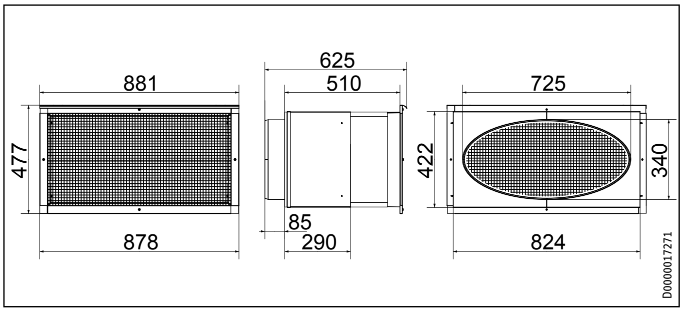
		AWG 560 H-GL	AWG 560 H-SR
		232956	233837
Height	mm	490	490
Width	mm	897	897
Depth	mm	627	627
Weight	kg	19	19
Wall thickness	mm	280 - 500	280 - 500
Pressure drop at 3000 m³/h	Pa	26	26
Min. outlet aperture	mm	830x430	830x430
Max. air volume	m³/h	3500	3500
Colour		RAL 9006	Silver metallic



AWG 560 L

Thermally insulated wall duct for routing air from air | water heat pumps installed indoors, with oval connection for DN 560.

		AWG 560 L
		231041
Height	mm	477
Width	mm	878
Depth	mm	625
Weight	kg	19
Wall thickness	mm	280 - 500
Pressure drop at 3000 m³/h	Pa	4
Min. outlet aperture	mm	830x430
Max. air volume	m³/h	3500
Colour		Aluminium, anodised

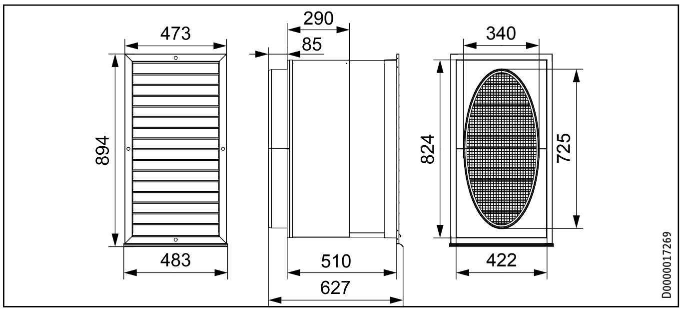


Wall outlets

AWG 560 V-GL

Thermally insulated wall duct for routing air from air | water heat pumps installed indoors, with oval connection for DN 560.

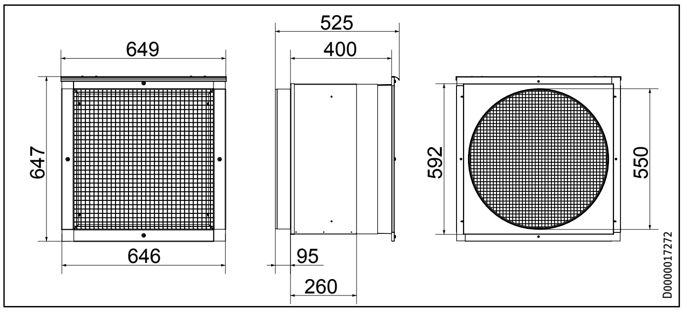
		AWG 560 V-GL	AWG 560 V-SR
		232957	233838
Height	mm	894	894
Width	mm	483	483
Depth	mm	627	627
Weight	kg	19	19
Wall thickness	mm	280 - 500	280 - 500
Pressure drop at 3000 m³/h	Pa	24	24
Min. outlet aperture	mm	430x830	430x830
Max. air volume	m³/h	3500	3500
Colour		RAL 9006	Silver metallic



AWG 600 L

Thermally insulated wall duct for routing air from air | water heat pumps installed indoors, with oval connection for DN 560.

		AWG 600 L
		231044
Height	mm	647
Width	mm	649
Depth	mm	525
Weight	kg	19
Wall thickness	mm	260 - 400
Pressure drop at 3000 m³/h	Pa	4
Min. outlet aperture	mm	600x600
Max. air volume	m³/h	3500
Colour		Aluminium, anodised



Air routing

LSWP 315-4 AL

Thermally insulated air hose for routing outdoor and exhaust air. The exterior casing consists of fibre-strengthened aluminium/polyester laminate and the inner casing of polyamide fibre. The hose ends can be shaped into ovals for easier fitting. The mineral wool intermediate layer provides thermal insulation and the option of sound insulation.

		LSWP 315-4 AL	LSWP 560-4 AL	LSWP 315-4 S	LSWP 560-4 S
		231835	231836	234646	234647
Length	m	4	4	4	4
Internal diameter	mm	315	560	315	560
External diameter	mm	365	610	415	660
Application limit	°C	-20 to +70	-20 to 70	-20 to 70	-20 to 70
Wall thickness	mm	25	25	50	50
Attenuation ratio at 63 Hz	dB	0,2	1,7	19,6	27,2
Attenuation ratio at 125 Hz	dB	0	1,8	35,4	29,4
Attenuation ratio at 250 Hz	dB	2,7	4,6	32,0	22,7
Attenuation ratio at 500 Hz	dB	5,1	11,1	29,6	23,6
Attenuation ratio at 1000 Hz	dB	14,2	16,1	36,0	29,3
Attenuation ratio at 2000 Hz	dB	12,4	7,6	38,3	13,6
Attenuation ratio at 4000 Hz	dB	7,0	4,9	29,2	11,6
Attenuation ratio at 8000 Hz	dB	7,7	6,8	21,0	11,9

LLB AWG 315 L

The deflector directs expelled air streaming from a building away from the exterior wall, thereby reducing the formation of moisture from condensation on exterior walls.

		LLB AWG 315 L	LLB AWG 560 L
		232341	232342
Suitable for		AWG 315 L	AWG 560 L
Depth	mm	80	80

LWF SF 315-1

Silencer, comprising an external pipe, a perforated internal pipe and 2 connection ends with wrap connector. Space filled with noise-attenuating material. Glass fibre fleece between the internal pipe and the insulation to protect the air flow.

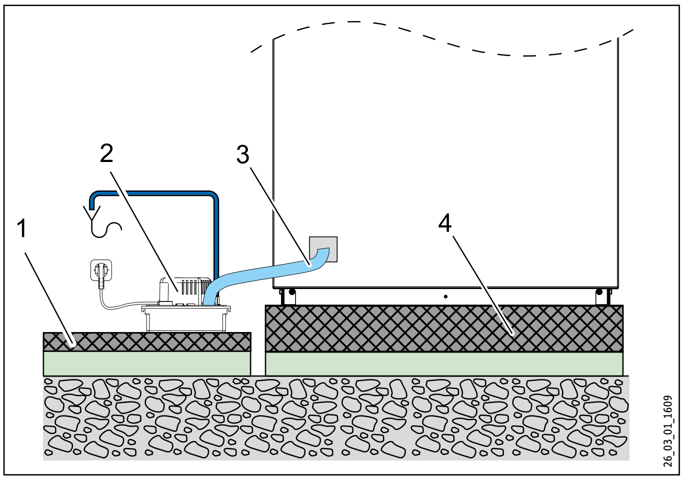
		LWF SF 315-1
		170018
Internal diameter	mm	315
External diameter	mm	415
Length	mm	1000
Weight	kg	3

PK 10

Condensate pump for use with heat pumps and ventilation units with integral condensate collecting vessel, 5 m pressure hose and power cable.

		PK 10
		229286
Rated voltage	V	230
Phases		1/N/PE
Frequency	Hz	50
Power consumption	W	70
Rated current	A	0,6
Operating mode		S3: 30 % ED
Max. pump rate	l/h	500
Max. head	m	5
Sound pressure level at a distance of 1 m	dB(A)	45
Alarm ON/OFF switching points	mm	54/43/27
High limit safety cut-out	°C	105
Permissible condensate temperature	°C	<80
pH value		>2.5
Condensate tank volume	l	2
Condensate drain	mm	10
Condensate inlet	mm	30
Cable length	m	1,90
Height	mm	171
Width	m	279
Depth	mm	130
Weight	kg	2
IP rating		IP20

Condensate drain with condensate pump into a sewer



1 Screed
2 Condensate pump
3 Condensate drain connection
4 Plinth

KSD 13/18/23

Duct silencer for intake and discharge apertures for reducing sound emissions. Subject to appliance, this will reduce the sound pressure level by up to 3 dB.

		KSD 13/18/23	KSD 33
		185325	185370
Height	mm	870	870
Width	mm	1240	1390
Depth	mm	240	240

Mounting panel

WK 1

Corrosion-protected wall mounting support made from zinc-plated steel for on-site installation. Height adjustments can be made on the wall rail, while the appliance rail provides the possibility to align the appliance. Standard delivery includes: 2 pce, incl. anti-vibration mounts and 2 m ribbon heater.

		WK 1
		232963
Support length	mm	740
Weight	kg	10
Weight	kg	120
Suitable for		10 AC(S), 15/25 I(S)-2, 15/25 IK(S)-2

WK 2

Corrosion-protected wall mounting support made from zinc-plated steel for on-site installation. Height adjustments can be made on the wall rail, while the appliance rail provides the possibility to align the appliance. Standard delivery includes: 2 pce, incl. anti-vibration mounts.

		WK 2
		234722
Support length	mm	950
Weight	kg	175
Suitable for		15/20/25 AC(S)

SK-WPL

Stainless steel, T-shaped mounting bracket for floorstanding, concrete-embedded installation. Standard delivery includes: 2 pce incl. installation aid for a defined clearance dimension, anti-vibration mounts, plus 1 m ribbon heater.

		SK-WPL
		232964
Height	mm	950
Depth	mm	570
Weight	kg	120
Suitable for		10 AC(S), 15/25 I(S)-2, 15/25 IK(S)-2 and 15/20/25 AC(S)

MK-WPL 10 AC(S)

Corrosion-proof bracket for floor mounting in matching design, including anti-vibration mounts. For weather-proof connection of the heat pump.

		MK-WPL 10 AC(S)
		233047
Height	mm	254
Width	mm	1260
Depth	mm	575
Suitable for		10 AC(S)

AS-WP 1

AS-WP 1

The connection set with painted cover is specifically designed for on-site connection of air | water heat pumps of the 15/20/25 AC(S) series. Only suitable for system configurations with supply lines coming from the ground.

	AS-WP 1
	233622
Connection	32 x 2.9 mm

AS-WP 2

The connection set with painted cover is specifically designed for on-site connection of air | water heat pumps of the 15/20/25 AC(S) series. Only suitable for system configurations with supply lines coming from the ground.

	AS-WP 2
	233623
Connection	G 1 1/4

Split systems

Split line 10x1 10 m

Liquid line with thermal insulation to connect the indoor and outdoor unit; copper pipe (DIN 12735-1) with robust and UV-resistant insulation (10 mm), fire protection class B2. Note: Liquid and suction gas lines are required for operation.

		Split line 10x1 10 m	Split line 10x1 15 m	Split line 10x1 25 m
		232047	232048	232049
Length	m	10	15	25
Diameter	mm	10	10	10

Split line 16x1 10 m

Suction gas line with thermal insulation to connect the internal and external unit; copper pipe (DIN 12735-1) with robust and UV-resistant insulation (10 mm), fire safety category B2. Note: Liquid and suction gas lines are required for operation.

		Split line 16x1 10 m	Split line 16x1 15 m	Split line 16x1 25 m
		232050	232051	232052
Length	m	10	15	25
Diameter	mm	16	16	16

Split line 18x1 10 m

Suction gas line with thermal insulation to connect the internal and external unit; copper pipe (DIN 12735-1) with robust and UV-resistant insulation (10 mm), fire safety category B2. Note: Liquid and suction gas lines are required for operation.

		Split line 18x1 10 m	Split line 18x1 15 m	Split line 18x1 25 m
		232053	232054	232055
Length	m	10	15	25
Diameter	mm	18	18	18

Thermal insulation tape

Self-adhesive thermal insulation tape on a roll for covering joints.

		Thermal insulation tape
		227557
Length	m	10
Width	mm	50
Thickness	mm	3

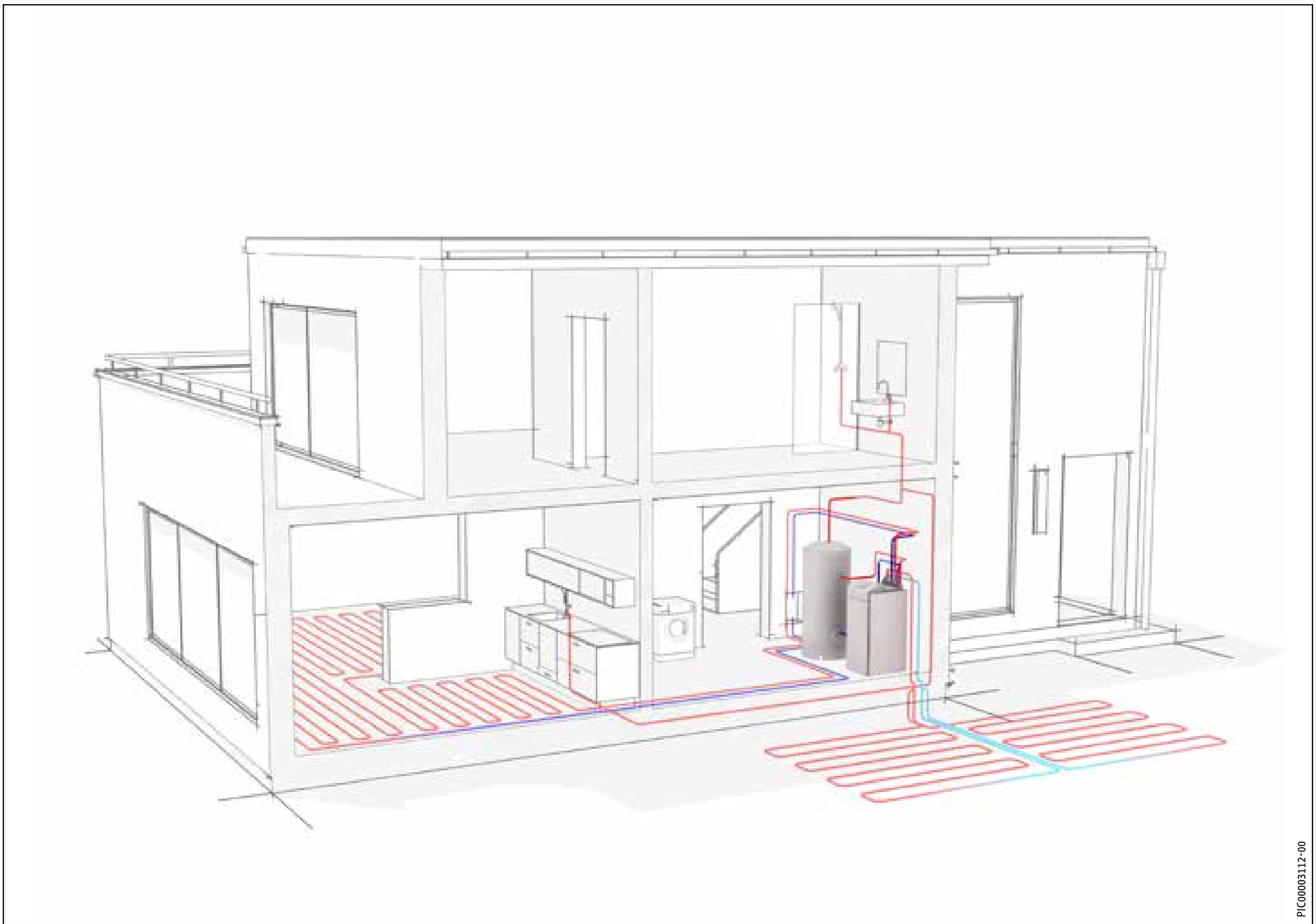
Ribbon heater for condensate connection
HZB

HZB

Self-limiting ribbon heater to keep the condensate connection for air | water heat pumps free of ice. Both versions have a 2 m connecting cable. Heated length: HZB-1: 1 m, HZB-2: 2 m.

		HZB-1	HZB-2
		232978	232979
Rated output per metre at 10 °C outdoor air temperature	W	10	10
Max. ambient temperature	°C	65	65
Min. handling/installation temperature	°C	-45	-45
Min. bending radius	cm	2,5	2,5
Outer jacket material		TPE-O	TPE-O
Width	mm	5,5	5,5
Height	mm	8,0	8,0
Weight	kg	0,200	0,240

Design information

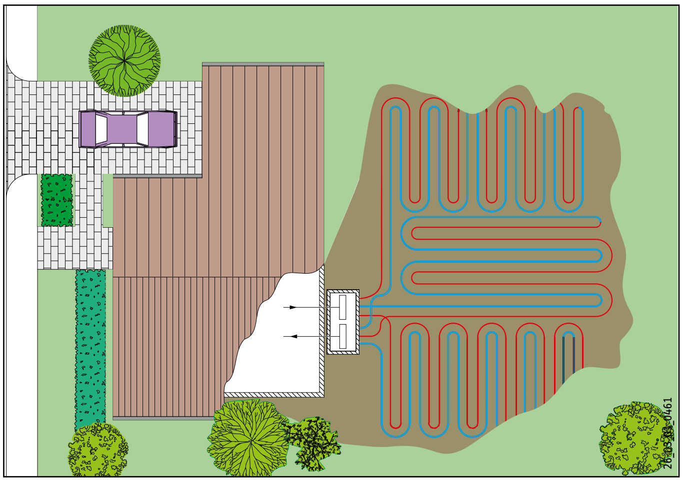


Design information for geothermal collectors in Germany

- » A sufficiently large piece of land without buildings must be available for the geothermal collector.
- » The flow and return manifolds of the heat source system should be outside the building and set into a cellar light well, wherever possible.
- » Insulate all pipework of the heat source system inside the building with vapour diffusion-proof material.
- » Provide a wall inlet of adequate size for routing the interconnecting lines into the building.
- » Observe clearances required for the installation.
- » Requirements of the heat pump installation point
- » Use flexible hoses for the hydraulic connection.
- » Take the power connection and wiring into account.
- » In Germany, the permission of the power supply utility must be obtained.
- » In Germany, VDI 4640 (thermal utilisation of the ground) must be observed.

Sizing

Geothermal collector



In Central Europe, the ground as heat source in this context is the upper layer of the earth down to a depth of 2 m.

Heat is yielded via a heat exchanger that is buried horizontally in an area, where no buildings are located, near the building to be heated.

The heat relevant to the extraction from the ground is stored solar energy that is transferred to the ground through direct irradiation, air-borne heat transfers and precipitation. This is also the energy source for the rapid regeneration of the supercooled ground at the end of the heating season.

The heat rising from lower strata upwards amounts to only 0.05 to 0.12 W/m² and can therefore be ignored as a heat source for the upper strata.

The available heat and therefore the size of the required area is largely dependent on the thermo-physical properties of the ground and the irradiation energy, that is the climatic conditions.

The thermal properties, such as the volumetric thermal capacity and thermal conductivity are largely dependent on the consistency and condition of the ground. The control variables that are of particular relevance are the proportion of water, the proportion of mineral constituents, such as quartz and feldspar as well as the proportion and size of pores filled with air.

To put it simply, the storage characteristics and thermal conductivity are higher the more the ground is enriched with water, the higher the proportion of mineral constituents and the lower the proportion of pores.

The extraction rate depends on the soil quality, the installation spacing and the depth.

Experience-based values [Germany]

Geothermal collector		
Extraction rate	W/m²	10 - 40
Installation spacing	m	0,6 - 1,0
Installation depth	m	1,2 - 1,5

To be able to utilise the ground as heat source, plastic pipe loops (geothermal collectors) are buried under ground. The heat transfer medium circulates through these pipes. The mixture transfers the heat extracted from the ground to the heat pump. The heat transfer medium must provide adequate frost protection. In addition, the medium must not damage the groundwater in case of a leak. Our antifreeze based on ethylene glycol offers these properties. It was specifically developed for the heat transfer and the frost/corrosion protection in heat pump systems.

Extraction rate (VDI 4640)

Ground	qE [W/m²]
Dry, non-binding soil	10 - 15
Moist, binding soil	15 - 20
Very moist, binding soil	20 - 25
Water-saturated soil	25 - 30
Ground with groundwater seam	30 - 40

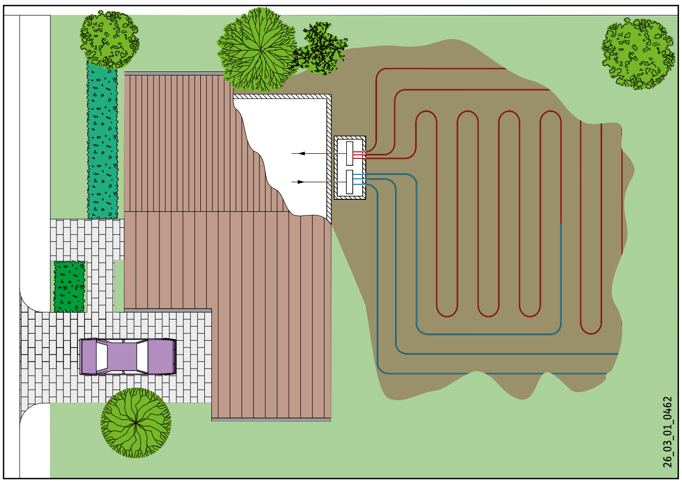
Surface area (ground)

A corresponding surface area results, subject to the heat load of the house and the consistency of the ground. The required area of ground is determined on the basis of the cooling load Q_K of the heat pump.

The cooling load of the heat pump is the difference between the heating output Q_{HP} and the power consumption P_{HP}.

$$Q_K = Q_{WP} - P_{WP}$$

Example



At a heat source temperature of 0 °C and a heating flow temperature of +35 °C, the heat pump WPF 10 / WPF 10 cool delivers a heating output of 9.9 kW and its power consumption is 2.2 kW.

QK = 9.9 kW – 2.2 kW

QK = 7.7 kW

Surface area (ground):

A specific extraction rate qE of 25 W/m² results in the following area A:

$$A = \frac{Q_K}{qE}$$

Area A = 7700 W / 25 W/m²

Area A = 308 m² ground

Pipe spacing:

A pipe spacing of 0.6 m results in the following pipe length:

308 m² / 0.6 m = 513 m pipe, which equals five pipe circles of 100 m length each.

Laying of pipes

The plastic pipes are buried at a depth of 1.2 to 1.5 m in several circuits. For this, individual pipe circles should not exceed 100 m in length, otherwise larger circulation pumps with a higher power consumption would be required.

The spacing between pipes is subject to the soil condition and should be between 0.6 and 1.0 m. This prevents any ice radii from joining up to allow rain water to soak away.

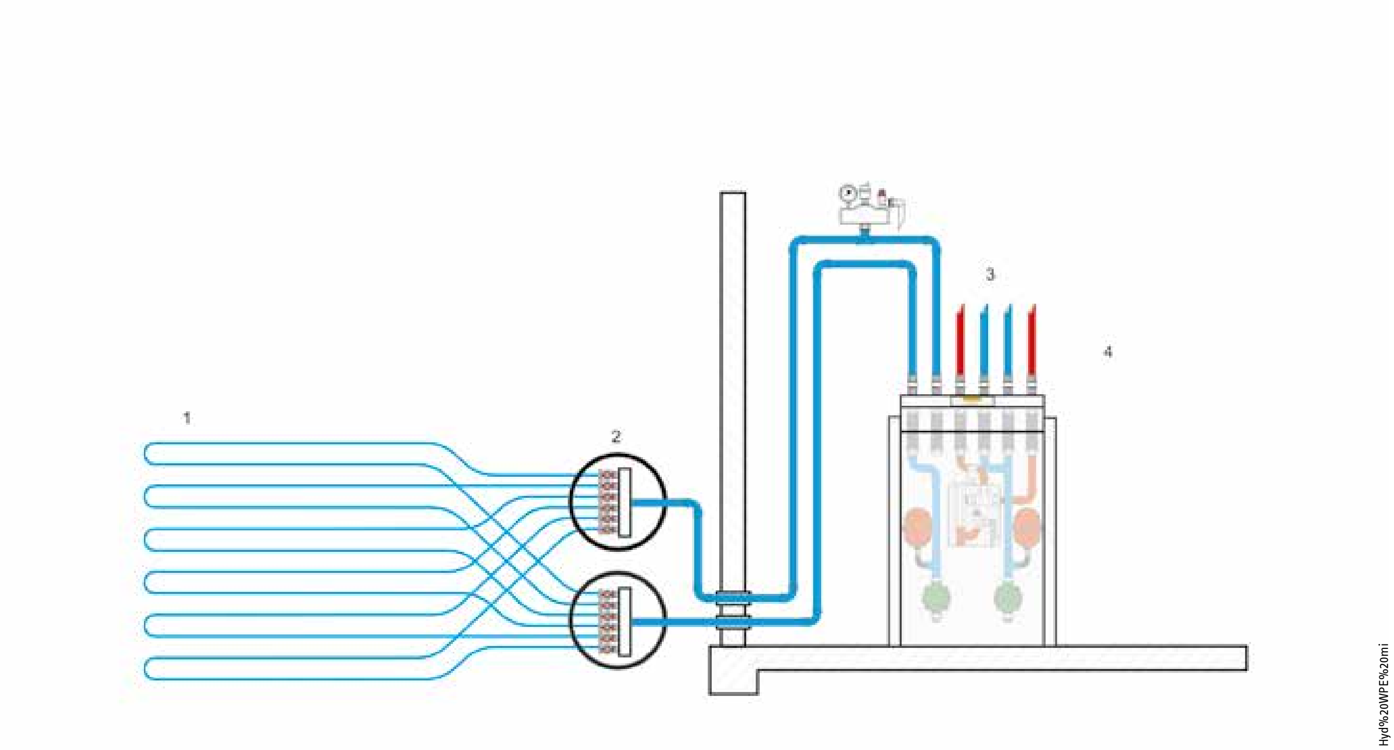
The pipes can be buried as part of the general groundwork when building a new house. In existing systems, excavators can be used.

Regulations

The installation of geothermal collectors may have to be notified to, or permitted by, the relevant water board [check local regulations].

Installation

Geothermal collector made from PE pipes

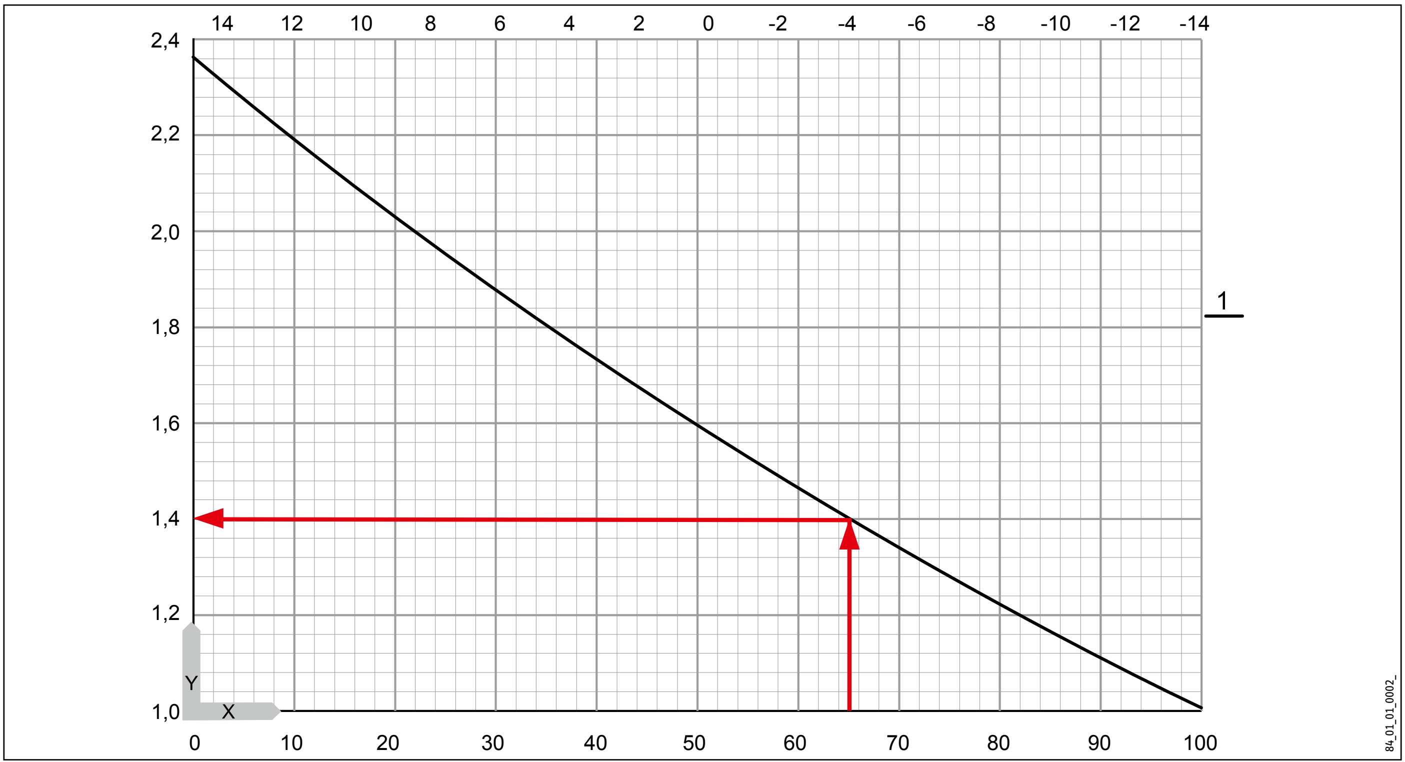


1 Geothermal collector
2 Shaft with distributor
3 Heating circuit
4 Room

Design information

- » Distributors and collectors must be arranged so that they are accessible for inspection work. This may be provided in distribution shafts or cellar window shafts, for example.
- » Use only pipes and fittings made from corrosion-resistant materials.
- » Insulate all pipework inside the building and the wall ducts with vapour diffusion-proof material to prevent condensation. Flow and return lines from/to the ground carry cold brine.
- » Provide appropriate facilities for filling the system.
- » First mix the brine concentrate with water, then fill the mixture into the heat source system.
- » Use exclusively brine solutions we have tested and approved.
- » Route the geothermal collector pipes with a steady rise to the distributor and collectors so they can be vented.
- » Install safety valves and expansion vessels with reference to DIN 4751, part 2, to be able to compensate for changes in brine volume at different temperatures.
- » Pressure test the geothermal collector incl. distributor and connection lines with brine mixture prior to backfilling soil and commissioning.
- » In Germany, the installation and operation of a geothermal collector require notification and permission.
- » Adding antifreeze to water changes the viscosity of the heat transfer medium. The brine becomes more viscous with an increasing proportion of antifreeze. This has implications for the sizing of the circulation pump and the brine flow rate. Viscosity has a strong influence on the pressure drop (via the coefficient of friction); take this into account when sizing the pump (correction factor 1.5).
- » When selecting the circulation pump, ensure that only cast circulation pumps (formation of condensate between the casing and the stator) or centrifugal pumps are used.

Increasing the size of the heat source



X Heating output / heat load [%] / dual mode point [°C]

Y Increase in heat source size * f_Q [-]

1 Curve, increase in heat source size

Increase in heat source size

The extraction rates relative to area shown above refer to heat pump runtimes of 1800 to 2400 h/a.These runtimes apply to mono mode heat pump operation.

The annual hours run, and therefore the size of the required geothermal collector, change if the heat pump is to be used in dual mode parallel operation.

On account of the higher extraction rate, the geothermal collector and the geothermal collector area must be increased accordingly.

Calculation example for dual mode parallel operation

The heat pump acts as base load heat generator and covers approx. 65 % of the heat load.

The maximum required heating flow temperature is 55 °C.

The system switches over to the second heat source at an outside temperature of approx. -4 °C.

Factor f_Q for the increase in heat source size is determined using the diagram.

The factor for increasing the heat source size is 1.4.

Sizing table 20 W/m²

Type	Source temperature 0 °C			Ground area	PE pipe sections	Antifrogen concentrate	Brine circulation pump	Distributor		Brine circuit expansion vessel	Supply line	
	Flow temperature 35 °C							Type WPSV			WP-WPSV	
Heat pump	Heating output	Power consumption	Cooling capacity	m²	@ 100 m	litres		25-4	25-6		mm	m
WPC 04	4,60	1,00	3,60	180	3	40	built-in	1		AG 12/1,5	32 x 2,9	60
WPC 05	5,90	1,30	4,60	230	4	50	built-in	1		AG 12/1,5	32 x 2,9	39
WPC 07	7,40	1,70	5,70	285	5	60	built-in		1	AG 12/1,5	40 x 3,7	71
WPC 10	10,00	2,20	7,80	390	6	80	built-in		1	AG 12/1,5	40 x 3,7	34
WPC 13	12,80	3,00	9,80	490	8	100	built-in	2		AG 12/1,5	50 x 4,6	55
WPF 04	4,60	1,00	3,60	180	3	40	built-in	1		built-in	32 x 2,9	60
WPF 05	5,90	1,30	4,60	230	4	50	built-in	1		built-in	32 x 2,9	39
WPF 07	7,40	1,70	5,70	285	5	60	built-in		1	built-in	40 x 3,7	71
WPF 10	10,00	2,20	7,80	390	6	80	built-in		1	built-in	40 x 3,7	34
WPF 13	12,80	3,00	9,80	490	8	100	built-in	2		built-in	50 x 4,6	55
WPF 16	16,90	3,90	13,00	650	10	130	built-in	1	1	built-in	50 x 4,6	43
WPF 5 basic	5,90	1,30	4,60	230	4	50	WPSB 308 E	1		AG 12/1,5	32 x 2,9	39
WPF 7 basic	7,40	1,70	5,70	285	5	60	WPSB 308 E		1	AG 12/1,5	40 x 3,7	71
WPF 10 basic	10,00	2,20	7,80	390	6	80	WPSB 308 E		1	AG 12/1,5	40 x 3,7	34
WPF 13 basic	12,80	3,00	9,80	490	8	100	WPSB 308 E	2		AG 12/1,5	50 x 4,6	55
WPF 16 basic	16,90	3,90	13,00	650	10	130	WPSB 312 E	1	1	AG 25/1,5	50 x 4,6	43
WPF 10 M	9,90	2,20	7,70	385	6	80	UPF30/1-8E		1	AG 12/1,5	32 x 2,9	15
WPF 13 M	13,40	3,00	10,40	520	8	100	UPF30/1-8E	2		AG 12/1,5	40 x 3,7	17
WPF 16 M	16,30	3,50	12,80	640	10	130	UPF30/1-8E	1	1	AG 25/1,5	50 x 4,6	22
SET 20	19,80	4,40	15,40	770	12	160	2 UPF30/1-8E		2	AG 25/1,5	50 x 4,6	32
SET 23	23,30	5,30	18,00	900	14	180	2 UPF30/1-8E	2	1	AG 25/1,5	63 x 5,8	48
SET 26	26,80	6,20	20,60	1030	16	210	2 UPF30/1-8E	1	2	AG 25/1,5	63 x 5,8	38
SET 29	29,70	6,60	23,10	1155	18	230	2 UPF30/1-8E		3	AG 50/1,5	63 x 5,8	21
SET 32	32,60	7,00	25,60	1280	20	260	2 UPF30/1-8E	2	2	AG 50/1,5	75 x 6,8	38
3 x WPF 16 M	48,90	10,50	38,40	1920	31	380	3 UPF30/1-8E			AG 50/1,5	75 x 6,8	18
4 x WPF 16 M	65,20	14,00	51,20	2560	41	510	4 UPF30/1-8E			2 AG 50/1,5	90 x 8,2	23
5 x WPF 16 M	81,50	17,50	64,00	3200	51	660	5 UPF30/1-8E			2 AG 50/1,5	125 x 11,4	62
6 x WPF 16 M	97,80	21,00	76,80	3840	61	780	6 UPF30/1-8E			2 AG 50/1,5	125 x 11,4	44
WPF 20	21,90	4,50	17,40	870	14	180	UPF40/1-8E	2	1	AG 25/1,5	63 x 5,8	79
WPF 27	29,70	6,10	23,60	1180	19	240	UPF40/1-8E	2	2	AG 50/1,5	63 x 5,8	46
WPF 35	38,00	8,00	30,00	1500	24	300	UPF40/1-8E		4	AG 50/1,5	75 x 6,8	63
WPF 40	43,10	9,10	34,00	1700	27	340	UPF50/1-12E			AG 50/1,5	75 x 6,8	54
WPF 52	55,80	11,60	44,20	2210	35	440	UPF50/1-12E			AG 50/1,5	90 x 8,2	45
WPF 66	67,10	14,20	52,90	2645	42	520	UPF50/1-12E			2 AG 50/1,5	90 x 8,2	21
WPF 80 SET	86,20	18,20	68,00	3400	54	690	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	133
WPF 92 SET	98,90	20,70	78,20	3910	63	790	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	63
WPF 104 SET	111,60	23,20	88,40	4420	71	880	2 UPF50/1-12E			3 AG 50/1,5	125 x 11,4	50
WPF 118 SET	122,90	25,80	97,10	4855	78	960	2 UPF50/1-12E			3 AG 50/1,5	125 x 11,4	28
WPF 132 SET	134,20	28,40	105,80	5290	85	1040	2 UPF50/1-12E			3 AG 50/1,5	125 x 11,4	24
3 x WPF 66	201,30	42,60	158,70	7935	127	1570	3 UPF50/1-12E			4 AG 50/1,5	160 x 14,6	31
4 x WPF 66	268,40	56,80	211,60	10580	169	2090	4 UPF50/1-12E			5 AG 50/1,5	180 x 16,4	29
5 x WPF 66	335,50	71,00	264,50	13225	212	2610	5 UPF50/1-12E			7 AG 50/1,5	200 x 18,2	29
6 x WPF 66	402,60	85,20	317,40	15870	254	3140	6 UPF50/1-12E			8 AG 50/1,5	225 x 20,5	34

For dry, non-binding soil, extraction rate 20 watt/m²

Type PE pipe, geothermal collector: 25 x 2,3 PE-HD 25 x 2,3 PN 16

Extraction rate in Watt per m² ground: 20

Depth at which the pipes are laid: 1.2 to 1.5 m

Pipe spacing: 0.6 m

Fill mixture, geothermal collector: 33 % by vol. Antifrogen N (Tyfocor), 67 % by vol. water

Time in use: Up to 1800 hours p.a. (mono mode operation)

Geothermal collector size for dual mode parallel operation

Enlargement by a factor of 1.6 Up to 3000 operating hours annually, changeover point to the second heat generator at approx. +2 °C outside temperature

Enlargement by a factor of 2.0 Up to 4000 operating hours annually, changeover point to the second heat generator at approx. +7 °C outside temperature

Sizing table 25 W/m²

Type Heat pump	Source temperature 0 °C Flow temperature 35 °C Heating output	 Power consumption	 Cooling capacity	Ground area m²	PE pipe sections @ 100 m	Antifrogen concentrate litres	Brine circulation pump	Distributor Type WPSV 25-4	 25-6	Brine circuit expansion vessel	Supply line WP-WPSV mm	 m
WPC 04	4,60	1,00	3,60	144	2	30	built-in			AG 12/1,5	32 x 2,9	50
WPC 05	5,90	1,30	4,60	184	3	40	built-in	1		AG 12/1,5	32 x 2,9	32
WPC 07	7,40	1,70	5,70	228	4	50	built-in	1		AG 12/1,5	40 x 3,7	59
WPC 10	10,00	2,20	7,80	312	5	70	built-in		1	AG 12/1,5	40 x 3,7	28
WPC 13	12,80	3,00	9,80	392	6	80	built-in		1	AG 12/1,5	50 x 4,6	43
WPF 04	4,60	1,00	3,60	144	2	30	built-in			built-in	32 x 2,9	50
WPF 05	5,90	1,30	4,60	184	3	40	built-in	1		built-in	32 x 2,9	32
WPF 07	7,40	1,70	5,70	228	4	50	built-in	1		built-in	40 x 3,7	59
WPF 10	10,00	2,20	7,80	312	5	70	built-in		1	built-in	40 x 3,7	28
WPF 13	12,80	3,00	9,80	392	6	80	built-in		1	built-in	50 x 4,6	43
WPF 16	16,90	3,90	13,00	520	8	110	built-in	2		built-in	50 x 4,6	36
WPF 5 basic	5,90	1,30	4,60	184	3	40	WPSB 308 E	1		AG 12/1,5	32 x 2,9	32
WPF 7 basic	7,40	1,70	5,70	228	4	50	WPSB 308 E	1		AG 12/1,5	40 x 3,7	59
WPF 10 basic	10,00	2,20	7,80	312	5	70	WPSB 308 E		1	AG 12/1,5	40 x 3,7	28
WPF 13 basic	12,80	3,00	9,80	392	6	80	WPSB 308 E		1	AG 12/1,5	50 x 4,6	43
WPF 16 basic	16,90	3,90	13,00	520	8	110	WPSB 312 E	2		AG 12/1,5	50 x 4,6	36
WPF 10 M	9,90	2,20	7,70	308	5	60	UPF30/1-8E		1	AG 12/1,5	32 x 2,9	13
WPF 13 M	13,40	3,00	10,40	416	7	80	UPF30/1-8E	2		AG 12/1,5	40 x 3,7	13
WPF 16 M	16,30	3,50	12,80	512	8	110	UPF30/1-8E	2		AG 12/1,5	50 x 4,6	15
SET 20	19,80	4,40	15,40	616	10	130	2 UPF30/1-8E	1	1	AG 25/1,5	50 x 4,6	27
SET 23	23,30	5,30	18,00	720	12	150	2 UPF30/1-8E		2	AG 25/1,5	63 x 5,8	38
SET 26	26,80	6,20	20,60	824	13	170	2 UPF30/1-8E	2	1	AG 25/1,5	63 x 5,8	29
SET 29	29,70	6,60	23,10	924	15	190	2 UPF30/1-8E	1	2	AG 25/1,5	63 x 5,8	14
SET 32	32,60	7,00	25,60	1024	16	210	2 UPF30/1-8E	1	2	AG 50/1,5	75 x 6,8	26
3 x WPF 16 M	48,90	10,50	38,40	1536	25	310	3 UPF30/1-8E			AG 50/1,5	75 x 6,8	12
4 x WPF 16 M	65,20	14,00	51,20	2048	33	420	4 UPF30/1-8E			AG 50/1,5	90 x 8,2	16
5 x WPF 16 M	81,50	17,50	64,00	2560	41	540	5 UPF30/1-8E			2 AG 50/1,5	125 x 11,4	42
6 x WPF 16 M	97,80	21,00	76,80	3072	49	640	6 UPF30/1-8E			2 AG 50/1,5	125 x 11,4	30
WPF 20	21,90	4,50	17,40	696	11	150	UPF40/1-8E		2	AG 25/1,5	63 x 5,8	68
WPF 27	29,70	6,10	23,60	944	15	190	UPF40/1-8E	1	2	AG 25/1,5	63 x 5,8	40
WPF 35	38,00	8,00	30,00	1200	19	250	UPF40/1-8E	2	2	AG 50/1,5	75 x 6,8	54
WPF 40	43,10	9,10	34,00	1360	22	280	UPF50/1-12E		4	AG 50/1,5	75 x 6,8	47
WPF 52	55,80	11,60	44,20	1768	28	360	UPF50/1-12E			AG 50/1,5	90 x 8,2	35
WPF 66	67,10	14,20	52,90	2116	34	430	UPF50/1-12E			AG 50/1,5	90 x 8,2	15
WPF 80 SET	86,20	18,20	68,00	2720	44	570	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	116
WPF 92 SET	98,90	20,70	78,20	3128	50	640	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	49
WPF 104 SET	111,60	23,20	88,40	3536	57	720	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	39
WPF 118 SET	122,90	25,80	97,10	3884	62	780	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	19
WPF 132 SET	134,20	28,40	105,80	4232	68	850	2 UPF50/1-12E			2 AG 50/1,5	125 x 11,4	16
3 x WPF 66	201,30	42,60	158,70	6348	102	1280	3 UPF50/1-12E			3 AG 50/1,5	160 x 14,6	21
4 x WPF 66	268,40	56,80	211,60	8464	135	1700	4 UPF50/1-12E			4 AG 50/1,5	180 x 16,4	20
5 x WPF 66	335,50	71,00	264,50	10580	169	2130	5 UPF50/1-12E			5 AG 50/1,5	200 x 18,2	20
6 x WPF 66	402,60	85,20	317,40	12696	203	2560	6 UPF50/1-12E			7 AG 50/1,5	225 x 20,5	23

For very damp, binding soil, extraction rate 25 Watt/m²

Type PE pipe, geothermal collector: 25 x 2,3 PE-HD 25 x 2,3 PN 16

Extraction rate in Watt per m² ground: 25

Depth at which the pipes are laid: 1.2 to 1.5 m

Pipe spacing: 0.6 m

Fill mixture, geothermal collector: 33 % by vol. Antifrogen N (Tyfocor), 67 % by vol. water

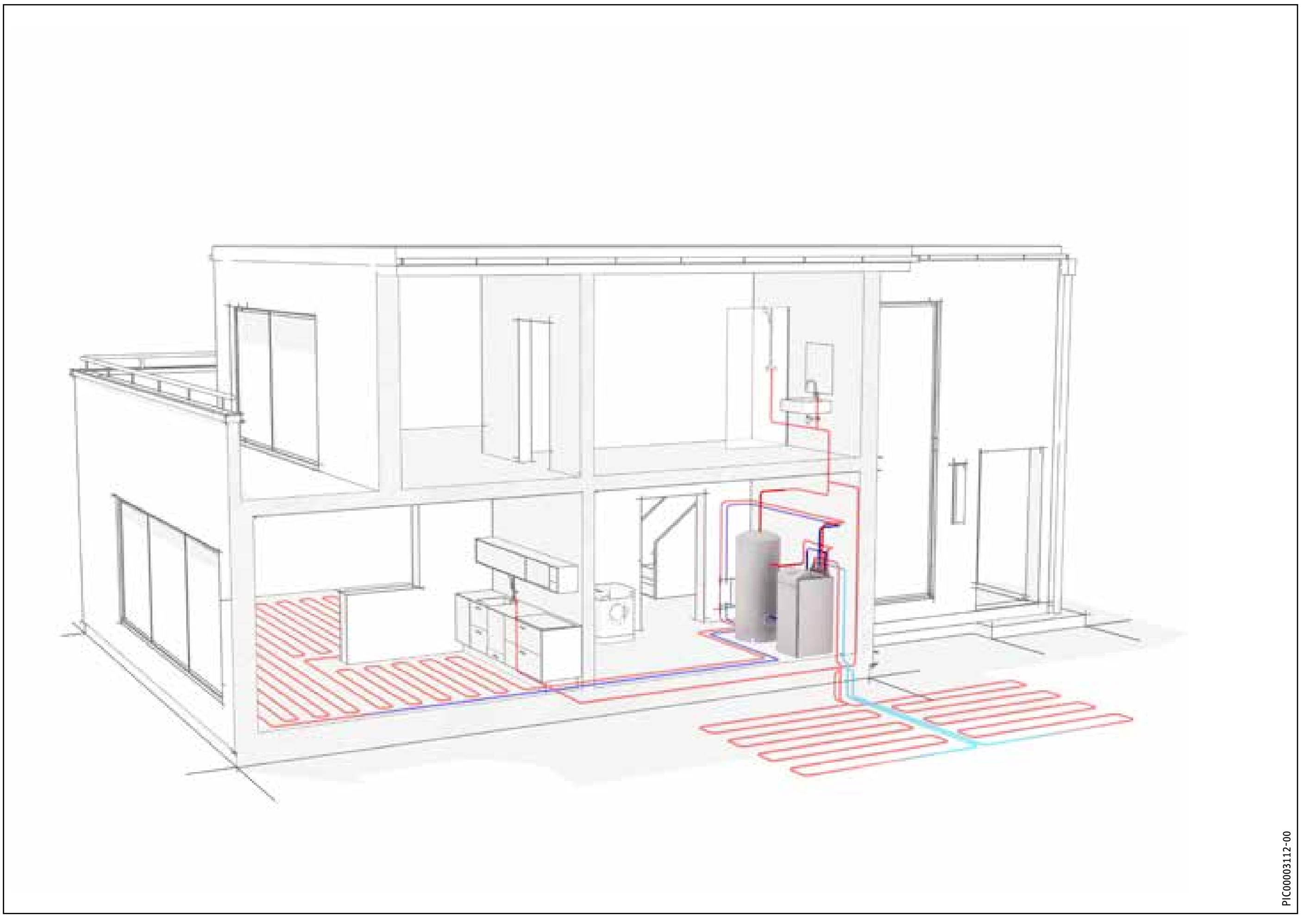
Time in use: Up to 1800 hours p.a. (mono mode operation)

Geothermal collector size for dual mode parallel operation

Enlargement by a factor of 1.6 Up to 3000 operating hours annually, changeover point to the second heat generator at approx. +2 °C outside temperature

Enlargement by a factor of 2.0 Up to 4000 operating hours annually, changeover point to the second heat generator at approx. +7 °C outside temperature

Geothermal probe



Design information for geothermal probes in Germany

» Obtain the permission of the lower water board [check local regulations].

» Install the flow and return collectors of the heat source system outside the building and into a cellar light well, wherever possible.

» Insulate all pipework of the heat source system inside the building with vapour diffusion-proof material.

» Provide a wall inlet of adequate size for routing the interconnecting lines into the building.

» Observe clearances required for the installation.

» Requirements of the heat pump installation site.

» Use flexible hoses for the hydraulic connection.

» Take the power connection and wiring into account.

» Obtain the permission of your local power supply utility.

» Observe the VDI 4640 (thermal utilisation of the ground).

Engineering and drilling for geothermal probes

Drilling equipment utilisation and space requirement

Various drilling equipment and methods will be required, subject to the heat source system and the prevailing geology.

The table provides information on the type and size of drilling equipment and its use under various ground conditions.

Engineering and development of a probe system

The following sequence describes the engineering and implementation of a geothermal probe system.

1. Calculation of sizing principles

» Determining the building's rated heat load
» Specifying the system temperatures
» Heat pump definition
» Determining the cooling capacity of the heat pumps
» Defining the heat pump operating mode
» Calculating the heat pump's full utilisation hours

2. Assessment of the heat source system location

» Geological evaluation
» Environmental protection requirements
» Feasibility analysis
» Requirements of the authorities
» Space required for the heat source system
» Space required for drilling equipment

3. Engineering and type of heat source system

» Preparing the locally appropriate application and/or registration documents
» Obtaining approvals, notification of start of drilling
» Carrying out drilling and probe removal
» Hydraulic connection of source system and heat pump
  • Laying connecting lines, in a distributor shaft if necessary
  • Wall duct manufacture
  • Connection to the heat pump
» Initial start-up and inspection
» Drafting inspection documents / final documents

Drilling equipment

		Rotomax M	Rotomax L	Rotomax XL-GTC	Hütte Casagrande HBR 205
Weight	t	2,5	4,5	13	24
Clearance width	min. m	1,5	1,0 - 1,5	2,5	2,5
Clearance height	min. m	1,4		2,6	3,0
Drilling depth in loose ground	max. m	30	50	80	180
Drilling depth in firm ground	max. m	99	140	150	500


PIC00003149

Left: Rotomax M
Right: Hütte HBR 205


PIC00003150

Geothermal probe

General information

Geothermal probes comprise a probe foot and endless, vertical probe pipes. The pipe diameter is:

Tube diameter		Depth	
25 x 2,3	mm	60	m
32 x 3	mm	100	m

Specialist drilling contractors install these probes.

One 50 m long geothermal probe comprising 200 m PE pipe: 2 x 50 m flow line and 2 x 50 m return line.

This probe is inserted into a drilled hole in the ground. After inserting the pipes, the holes are filled under pressure with a suspension, e.g. bentonite. After curing, this must provide a dense, permanent and physically stable connection between the geothermal probe and the surrounding rock. That ensures a good thermal transfer.

Sizing

The system is sized in accordance with the flow of groundwater and the thermal conductivity of the ground.

In larger systems, several probes are connected in parallel to extract the required cooling capacity from the ground.

Extraction rate of geothermal probes

(Specific extraction rate per metre of geothermal probe).

Without knowing the soil condition, an average specific extraction rate (cooling capacity) of 55 W/m can be used as a basis for calculation.

Extraction rate (VDI 4640)

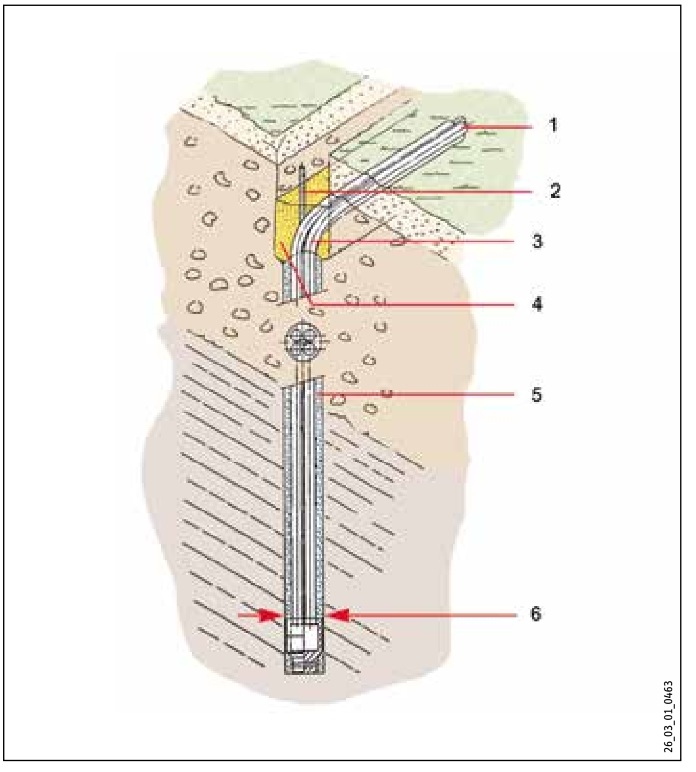
Ground	[W/m]
Substrate with high groundwater flow	100
Solid rock with high thermal conductivity	80
Solid rock with normal substrate	55
Poor substrate, dry sediments	30

Note
Accurate assessments are subject to soil condition and the water-bearing ground strata and can therefore only be made in situ by the installing contractor.

Regulations

Geothermal probe systems with a depth of up to 100 m must be notified to and possibly be permitted by your local water board. At depths > 100 m, a higher mining authority may need to give its permission.

U-tube probe with welded foot



1 4 pipes
2 Injection pipe
3 Minimum bending radius 40 cm
4 Layer of sand = 20 cm
5 Cement-Opalit suspension
6 Hole diameter 110 - 133 mm

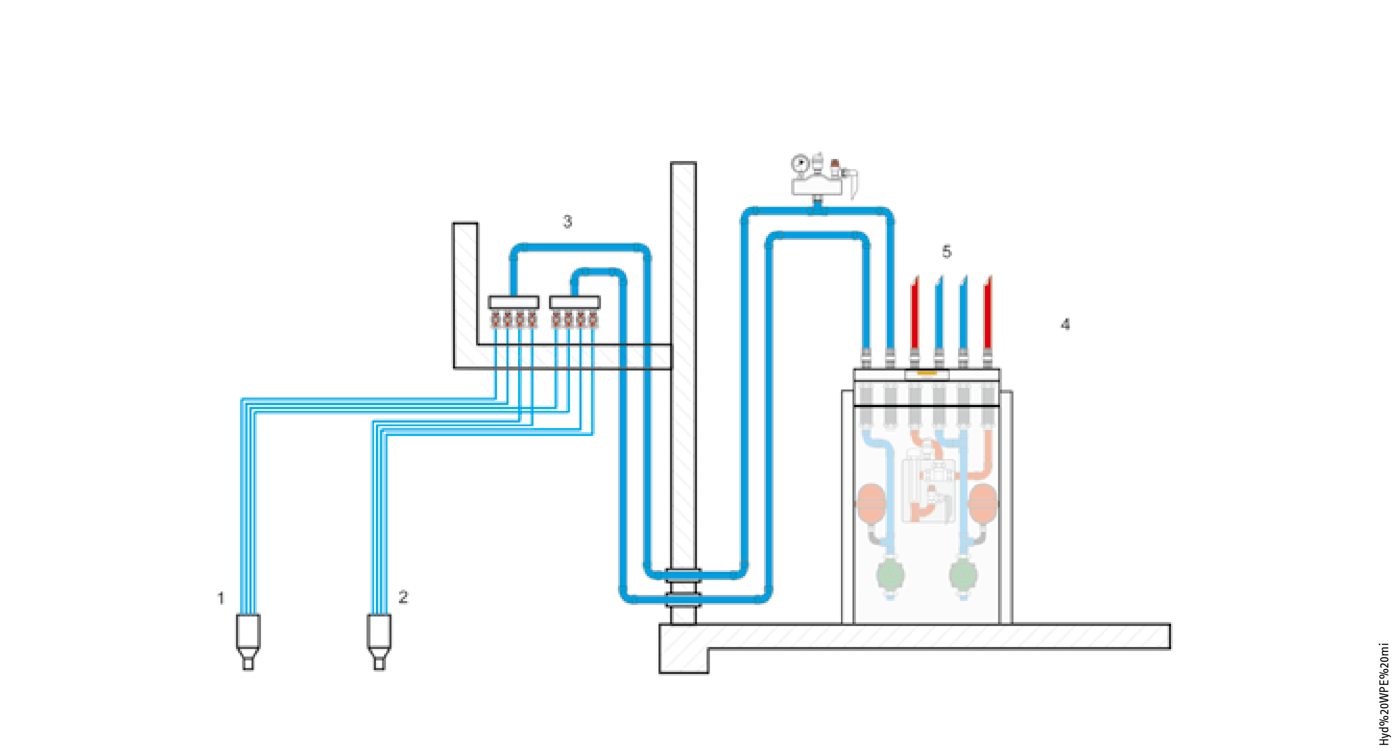
Country comparison

In France, any depth of >10 m requires a prior permit (Art. 131 of the "Code Minier"). At depths >100 m, a permit is required (Ordinance 79-48 dated 28 March 1978).

Note
Observe the standards and regulations applicable in your country.

Installation

Heat source, geothermal probe



1 Geothermal probe 1
2 Geothermal probe 2
3 Shaft with distributor
4 Room
5 Heating circuit

Design information

» Distributors and collectors must be arranged so that they are accessible for inspection work. This may be provided in distribution shafts or cellar window shafts, for example.

» Use only pipes and fittings made from corrosion-resistant materials.

» Insulate all pipework inside the building and the wall ducts with vapour diffusion-proof material to prevent condensation. Flow and return lines from/to the ground carry cold brine.

» Provide appropriate facilities for filling the system.

» First mix the brine concentrate with water, then fill the mixture into the heat source system.

» Use exclusively brine solutions we have tested and approved.

» Route the pipes with a steady rise to the distributor and collector so they can be vented.

» Install safety valves and expansion vessels with reference to DIN 4751, part 2, to be able to compensate for changes in brine volume at different temperatures.

» Pressure test the geothermal collector incl. distributor and connection lines with brine mixture prior to backfilling soil and commissioning.

» In Germany, the installation and operation of a geothermal probe system requires notification and permission.

» Adding antifreeze to water changes the viscosity of the heat transfer medium. The brine becomes more viscous with an increasing proportion of antifreeze. This has implications for the sizing of the brine circulation pump and the brine flow rate. Viscosity has a strong influence on the pressure drop (via the coefficient of friction); take this into account when sizing the pump (correction factor 1.5).

» When selecting the circulation pump, ensure that only cast circulation pumps (formation of condensate between the casing and the stator) or centrifugal pumps are used.

Geothermal probes size DN 25

Type Heat pump	Source temperature 0 °C, Flow temperature 35 °C: Heating output	Power consumption	Cooling capacity	Probe length m	No. of probes pce	Probe depth m	Antifrogen concentrate litres	Brine circulation pump	Distributor Type WPSV 32-4	Distributor Type WPSV 32-6	Brine circuit expansion vessel	Supply line WP-WPSV mm	Supply line WP-WPSV m
WPC 04	4,60	1,00	3,60	72	1	72	60	built-in			AG 12/1,5	32 x 2,9	67
WPC 05	5,90	1,30	4,60	92	1	92	80	built-in			AG 12/1,5	32 x 2,9	34
WPC 07	7,40	1,70	5,70	114	2	57	90	built-in	1		AG 12/1,5	40 x 3,7	89
WPC 10	10,00	2,20	7,80	156	2	78	130	built-in	1		AG 25/1,5	40 x 3,7	36
WPC 13	12,80	3,00	9,80	196	2	98	160	built-in	1		AG 25/1,5	50 x 4,6	40
WPF 04	4,60	1,00	3,60	72	1	72	60	built-in			built-in	32 x 2,9	67
WPF 05	5,90	1,30	4,60	92	1	92	80	built-in			built-in	32 x 2,9	34
WPF 07	7,40	1,70	5,70	114	2	57	90	built-in	1		built-in	40 x 3,7	89
WPF 10	10,00	2,20	7,80	156	2	78	130	built-in	1		built-in	40 x 3,7	36
WPF 13	12,80	3,00	9,80	196	2	98	160	built-in	1		built-in	50 x 4,6	40
WPF 16	16,90	3,90	13,00	260	3	87	210	built-in		1	built-in	50 x 4,6	41
WPF 5 basic	5,90	1,30	4,60	92	1	92	80	WPSB 308 E			AG 12/1,5	32 x 2,9	34
WPF 7 basic	7,40	1,70	5,70	114	2	57	90	WPSB 308 E	1		AG 12/1,5	40 x 3,7	89
WPF 10 basic	10,00	2,20	7,80	156	2	78	130	WPSB 308 E	1		AG 25/1,5	40 x 3,7	36
WPF 13 basic	12,80	3,00	9,80	196	2	98	160	WPSB 308 E	1		AG 25/1,5	50 x 4,6	40
WPF 16 basic	16,90	3,90	13,00	260	3	87	210	WPSB 312 E		1	AG 25/1,5	50 x 4,6	41
WPF 10 M	9,90	2,20	7,70	154	2	77	120	UPF30/1-8E	1		AG 12/1,5	32 x 2,9	16
WPF 13 M	13,40	3,00	10,40	208	2	104	170	UPF30/1-8E	1		AG 25/1,5	40 x 3,7	10
WPF 16 M	16,30	3,50	12,80	256	3	85	210	UPF30/1-8E		1	AG 25/1,5	50 x 4,6	21
SET 20	19,80	4,40	15,40	308	3	103	250	2 UPF30/1-8E		1	AG 50/1,5	50 x 4,6	23
SET 23	23,30	5,30	18,00	360	4	90	290	2 UPF30/1-8E	2		AG 50/1,5	63 x 5,8	42
SET 26	26,80	6,20	20,60	412	4	103	330	2 UPF30/1-8E	2		AG 50/1,5	63 x 5,8	23
SET 29	29,70	6,60	23,10	462	5	92	370	2 UPF30/1-8E	1	1	AG 50/1,5	63 x 5,8	16
SET 32	32,60	7,00	25,60	512	6	85	410	2 UPF30/1-8E		2	AG 50/1,5	75 x 6,8	35
3 x WPF 16 M	48,90	10,50	38,40	768	9	85	610	3 UPF30/1-8E		3	2 AG 50/1,5	75 x 6,8	17
4 x WPF 16 M	65,20	14,00	51,20	1024	12	85	810	4 UPF30/1-8E		4	2 AG 50/1,5	90 x 8,2	21
5 x WPF 16 M	81,50	17,50	64,00	1280	16	80	1040	5 UPF30/1-8E			3 AG 50/1,5	125 x 11,4	65
6 x WPF 16 M	97,80	21,00	76,80	1536	20	77	1230	6 UPF30/1-8E			3 AG 50/1,5	125 x 11,4	49
WPF 20	21,90	4,50	17,40	348	4	87	280	UPF40/1-8E	2		AG 50/1,5	63 x 5,8	75
WPF 27	29,70	6,10	23,60	472	5	94	380	UPF40/1-8E	1	1	AG 50/1,5	63 x 5,8	40
WPF 35	38,00	8,00	30,00	600	7	86	480	UPF40/1-8E	2	1	2 AG 50/1,5	75 x 6,8	61
WPF 40	43,10	9,10	34,00	680	8	85	540	UPF50/1-12E	1	2	2 AG 50/1,5	75 x 6,8	53
WPF 52	55,80	11,60	44,20	884	10	88	700	UPF50/1-12E	2	2	2 AG 50/1,5	90 x 8,2	41
WPF 66	67,10	14,20	52,90	1058	12	88	840	UPF50/1-12E		4	2 AG 50/1,5	90 x 8,2	19
WPF 80 SET	86,20	18,20	68,00	1360	16	85	1100	2 UPF50/1-12E			3 AG 50/1,5	125 x 11,4	130
WPF 92 SET	98,90	20,70	78,20	1564	18	87	1250	2 UPF50/1-12E			3 AG 50/1,5	125 x 11,4	58
WPF 104 SET	111,60	23,20	88,40	1768	20	88	1410	2 UPF50/1-12E			4 AG 50/1,5	125 x 11,4	45
WPF 118 SET	122,90	25,80	97,10	1942	22	88	1540	2 UPF50/1-12E			4 AG 50/1,5	125 x 11,4	24
WPF 132 SET	134,20	28,40	105,80	2116	25	85	1670	2 UPF50/1-12E			4 AG 50/1,5	125 x 11,4	22
3 x WPF 66	201,30	42,60	158,70	3174	37	86	2510	3 UPF50/1-12E			6 AG 50/1,5	160 x 14,6	28
4 x WPF 66	268,40	56,80	211,60	4232	50	85	3350	4 UPF50/1-12E			8 AG 50/1,5	180 x 16,4	28
5 x WPF 66	335,50	71,00	264,50	5290	62	85	4180	5 UPF50/1-12E				200 x 18,2	27
6 x WPF 66	402,60	85,20	317,40	6348	74	86	5020	6 UPF50/1-12E				225 x 20,5	31

For normal solid rock, extraction rate 55 W/m (average value)

Type PE pipe, geothermal probe: 32 x 2,9 PE-HD 32 x 2,3 PN 16

Extraction rate in watts per continuous metre of probe: 50

Probe spacing: 5.0 metre

Fill mixture, geothermal probe: 25 % by vol. Antifrogen N (Tyfocor), 75 % by vol. water

Time in use: Up to 1800 hours p.a. (mono mode operation)

Geothermal probe size for dual mode parallel operation

Enlargement by a factor of 1.6 Up to 3000 operating hours annually, changeover point to the second heat generator at approx. +2 °C outside temperature

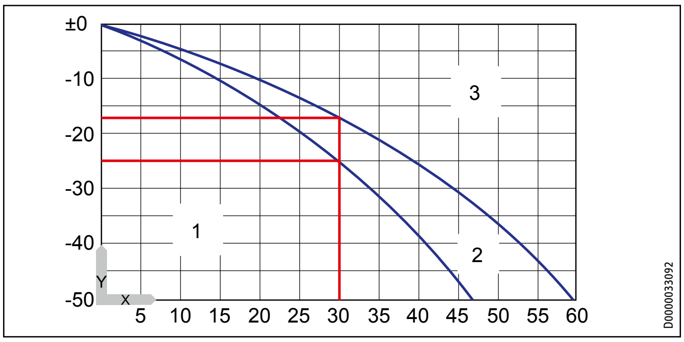
Enlargement by a factor of 2.0 Up to 4000 operating hours annually, changeover point to the second heat generator at approx. +7 °C outside temperature

Heat transfer medium

Frost protection and mixing ratio

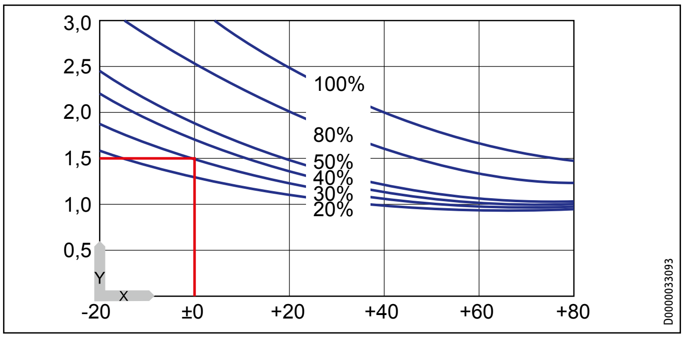
Ethylene glycol was developed for use as a heat and cooling transfer medium. The frost protection is subject to its mixing ratio with water. The frost protection curve illustrates that, with a mixing ratio of 25 % ethylene glycol and 75 % water, the medium remains liquid down to -18 °C and the bursting effect starts at -25 °C. Subject to the mixing ratio, the system pressure drop will also alter. The pressure drop curve indicates that the pressure drop of a 25/75 mixture increases, compared to water, by a factor of 1.5. Take this into account when sizing the circulation pump.

Frost protection of the brine mixture



x Based on %: Ethylene glycol
y Frost protection (°C)
1 Burst direction when the frost protection limit is exceeded (fixed)
2 Icy mush
3 Liquid

Increase in pressure drop of the brine mixture



x °C
y Pressure increase factor
% Based on: Ethylene glycol

Permissible heat transfer media

The following heat transfer medium is permissible for our heat pump systems.

» Heat transfer medium as concentrate on an ethylene glycol base

Note
When using the heat transfer medium as a ready-mixed solution, never seal the heat source system with hemp.

Circulation pump and required flow rate

Use a brine circulation pump with cast windings for brine handling. Size the circulation pump in accordance with the system-specific conditions, i.e. the nominal flow rate and pressure drop need to be taken into account. At all possible brine temperatures, an adequate flow rate must be assured, i.e. nominal flow rate at 0 °C brine temperature with a tolerance of +10 %.

Total volume

The overall volume equals that of the required amount of brine that should be mixed from undiluted ethylene glycol and water.

Mixing ratio

The brine concentration varies depending on whether a ground collector or a geothermal probe is used as the heat source. The table shows the respective mixing ratios.

Checking the brine concentration:

» With a hydrometer, establish the density of the ethylene glycol mixture.

» Using the actual density and the brine temperature, check the concentration in the diagram.

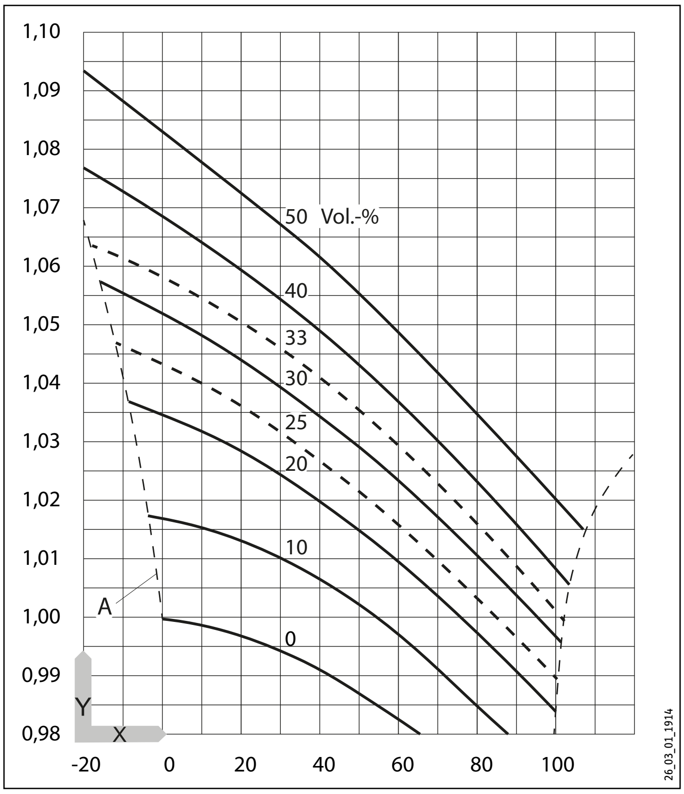
Heat pump performance details

The stated performance details refer to ethylene glycol.

These details will differ slightly when using propylene glycol and when using the heat transfer medium as a ready-mixed solution.

Heat transfer medium

Frost protection



X Temperature [°C]

Y Density [g/cm³]

A Frost protection [°C]

Collector type		Ethylene glycol	Water
Geothermal probe	%	25	75
Geothermal collector	%	33	67

Application limits for water		
Chloride content of the water	max. ppm	300

Design information

- » The heat source system for brine | water heat pumps must be in full accordance with our technical guides.
- » Thermally insulate all brine pipes with diffusion-proof material.
- » To prevent the transmission of noise, connect the heat source circuit to the heat pump with flexible pressure hoses.
- » Prior to connecting the heat pump, check the heat source circuit for possible leaks, and flush thoroughly.

Engineering checklist

Engineering and installation

» What is the purpose of the heat pump?

» What heat source supplies the heat pump?

» How are the heating surfaces designed? Low temperature heating systems are recommended.

» What is the required heating output? Calculate the heat load.

» Obtain approval from the power supply utility.

» Determine the operating mode of the heat pump according to the heating system.

» How can the heat pump be integrated easily into the heating pipework?

» Should DHW be heated by the heating heat pump?

» Is a suitable location that is free from the risk of frost available for the installation of the heat pump?

» Where can the heat pump be located? Provide foundations.

» How do I make the power connection?

» Observe general requirements and guidelines.

» Observe conditions on site.

Geothermal collector

» Must your local water board be notified?

» Is sufficient floor area available for the installation of a geothermal collector?

» Can the geothermal collector be installed at a depth of 1.2 to 1.5 metres?

» Can the pipe circles be split and buried equally?

» Can the flow and return distributor be installed outside the building?

» All lines and fittings/valves must be made from corrosion resistant material.

» Can the geothermal collector pipes be routed with a gradient to the distributor?

» Insulate the heat source lines inside the building with vapour diffusion-proof material.

» First mix the brine concentrate with water, then fill the mixture into the heat source system.

» Prior to commissioning, fill the system with brine and pressure test it.

» Use a circulation pump that is resistant to brine and condensate.

» The brine increases the pressure drop. Take this into consideration when sizing the pump.

» The change in volume requires the installation of a brine resistant diaphragm expansion vessel.

Geothermal probes

» Is a permit required from your local water board?

» Is sufficient space available for the geothermal probe hole?

» Can the probe lines to the distributor be split equally?

» Can the flow and return distributor be installed outside the building?

» All lines and fittings/valves must be made from corrosion resistant material.

» Can the geothermal probe pipes be routed with a gradient to the distributor?

» Insulate the heat source lines inside the building with vapour diffusion-proof material.

» First mix the brine concentrate with water, then fill the mixture into the heat source system.

» Prior to commissioning, fill the system with brine and pressure test it.

» Use a circulation pump that is resistant to brine and condensate.

» The brine increases the pressure drop. Take this into consideration when sizing the pump.

» The change in volume requires the installation of a brine resistant diaphragm expansion vessel.

Product overview

Appliance types and applications

Compact convenience

A brine | water heat pump is an ideal heat pump solution where a sufficiently large property is available. The plastic pipes of for example a geothermal collector buried underground or of a geothermal probe, in which the heat transfer medium circulates, deliver energy to the heat pump. The heat pump is installed in rooms that are free from the risk of frost. The WPF 20-66 series heat pumps are also suitable for outdoor installation.

The heating heat pump is regulated by means of the heat pump manager. The heat pump manager can be installed inside the building, e.g. in a utility room. The heat pump manager is already integrated in some heat pumps.

Several appliances can be linked together to cover even higher heat loads with standard heating heat pumps. This is achieved with the aid of heat pump sets comprising two heat pumps and appropriate accessories.

Appliance types and applications

	WPC	WPC cool	WPF	WPF cool	WPF basic	WPF M	WPF Set	WPF 20-66	WPF 27 HT
Intended for the following:									
Detached and semi-detached houses	•	•	•	•	•	•	•		
Apartment building	•	•	•	•	•	•	•	•	•
non-residential buildings							•	•	•
Suitable for the following building projects:									
New build	•	•	•	•	•	•	•	•	•
Modernisation, heating flow temperature < 55 °C	•	•	•	•	•	•	•	•	•
With the following function and feature:									
Heating	•	•	•	•	•	•	•	•	•
Cooling		•		•					
DHW heating with a floorstanding cylinder			•	•	•	•	•	•	•
Mono mode DHW heating > 60 °C									•
Diverter valve for the DHW heating integrated in the heat pump	•	•	•	•	•				
Integral emergency/booster heater for mono energetic operation	•	•	•	•	•				
Heating circulation pump integrated in the heat pump	•	•	•	•	•				
Heating expansion vessel integrated in the heat pump			•	•					
Heating safety assembly integrated in the heat pump	•	•	•	•					
Pressure hoses integrated in the heat pump			•	•					
Brine circulation pump integrated in the heat pump	•	•	•	•					
Brine expansion vessel integrated in the heat pump			•	•					
Appliance installation									
External installation								•	•
Internal installation	•	•	•	•	•	•	•	•	•
Internal compact installation	•	•							
Little installation effort, compact	•	•	•	•	•				
Flexible system solution for the following:									
Heat pump and solar thermal system combination			•	•	•	•	•	•	•
Combination of several heat pumps (cascade)						•	•	•	•
Installation in tight spaces	•	•	•	•	•	•	•		
Swimming pool water heating						•	•	•	•
Mono mode operation	•	•	•	•	•	•	•	•	•
Mono energetic operation	•	•	•	•	•	•	•	•	•
Combination with other heat sources (dual mode)						•	•	•	•

At a glance

- High COP all year round enables low running costs
- Easy and space-saving installation thanks to integral DHW cylinder and high level of integration
- Extremely quiet operation thanks to multiple anti-vibration coupling
- Easier handling through split design and handles
- Flow temperatures up to 65 °C ensure high level of DHW convenience

Safety and quality

APPLICATION: Compact brine | water heat pump for indoor installation with integral DHW cylinder and high level of integration. Can be used in mono mode to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. The compact design requires only a very small installation area. **EQUIPMENT / CONVENIENCE:** To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration mounting plate. The consistent source temperature guarantees unchanging heating output all year round, with flow temperatures up to 65 °C. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. One HE circulation pump each is provided for the brine side and the heating side. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A. **EFFICIENCY:** The heat pump unit is equipped with a scroll compressor with a soft starter and optimised heat exchangers for improved efficiency. **INSTALLATION**: The supplied pressure hoses enable direct hydraulic connection to the heating side and source side. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. To facilitate heat pump handling, the refrigerant circuit can be separated from the cylinder module with little effort. Carrying handles at the top and bottom make it easier to transport the appliance.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

WPC 04/05/07/10/13 cool

At a glance

» High COP all year round enables low running costs

» Passive cooling function via geothermal probe system with minimal running costs

» Easy and space-saving installation thanks to integral DHW cylinder and high level of integration

» Extremely quiet operation thanks to multiple anti-vibration coupling

» Easier handling through split design and handles

» Flow temperatures up to 65 °C ensure high level of DHW convenience

Safety and quality

APPLICATION: Compact brine | water heat pump for indoor installation with integral DHW cylinder and high level of integration. Can be used in mono mode to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. The compact design requires only a very small installation area. **EQUIPMENT / CONVENIENCE:** To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration mounting plate. The consistent source temperature guarantees unchanging heating output all year round, with flow temperatures up to 65 °C. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. One HE circulation pump each is provided for the brine side and the heating side. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A. **EFFICIENCY:** The heat pump unit is equipped with a scroll compressor with a soft starter and optimised heat exchangers for improved efficiency. **INSTALLATION**: The supplied pressure hoses enable direct hydraulic connection to the heating side and source side. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. To facilitate heat pump handling, the refrigerant circuit can be separated from the cylinder module with little effort. Carrying handles at the top and bottom make it easier to transport the appliance.

Function

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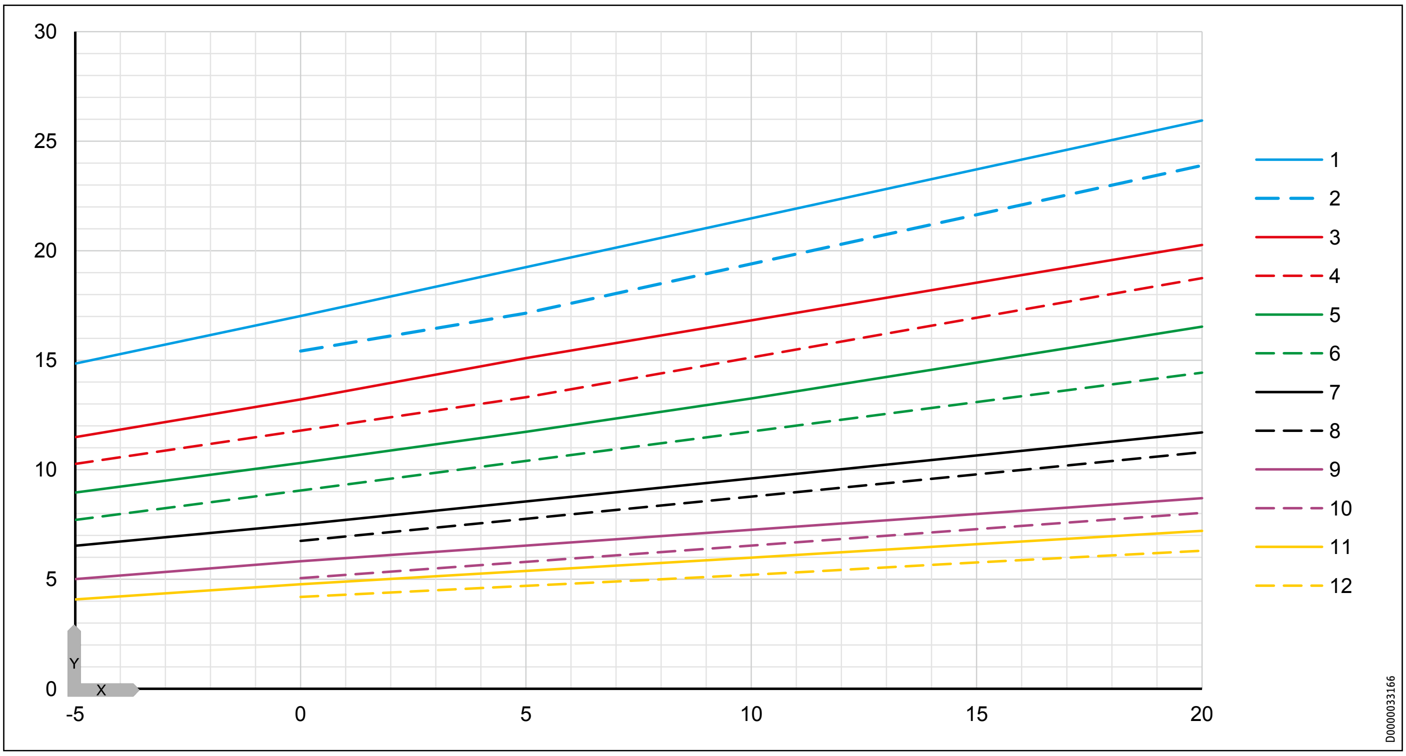
Specification

		WPC 04	WPC 05	WPC 07	WPC 10	WPC 13	WPC 04 cool	WPC 05 cool	WPC 07 cool	WPC 10 cool	WPC 13 cool
		232926	232927	232928	232929	232930	232931	232932	232933	232934	232935
Heating output to EN 14511											
Heating output at B0/W35 (EN 14511)	kW	4,77	5,82	7,50	10,31	13,21	4,77	5,82	7,50	10,31	13,21
Cooling capacity at B15/W23	kW						3,0	3,8	5,2	6,0	8,5
Heating output at B0/W65 (EN 14511)	kW	4,1	5	6,6	8,6	11,3	4,1	5	6,6	8,6	11,3
Heating output at B10/W65 (EN 14511)	kW	5,35	6,4	8,4	11,1	14,4	5,35	6,4	8,4	11,1	14,4
Power consumption											
Power consumption, emergency/booster heater	kW	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8
Max. power consumption, circulation pump on the heat source side	W	76	76	130	130	130	76	76	130	130	130
Max. power consumption, circulation pump on the heating side	W	45	45	45	72	72	45	45	45	72	72
Power consumption to EN 14511											
Power consumption at B0/W35 (EN 14511)	kW	1,06	1,21	1,55	2,05	2,74	1,06	1,21	1,55	2,05	2,74
Power consumption at B0/W65 (EN 14511)	kW	2,05	2,38	3,0	3,82	5,14	2,05	2,38	3,0	3,82	5,14
Power consumption at B10/W65 (EN 14511)	kW	2,1	2,46	3,05	3,96	5,14	2,1	2,46	3,05	3,96	5,14
COP to EN 14511											
COP at B0/W35 (EN 14511)		4,50	4,80	4,84	5,02	4,82	4,50	4,80	4,84	5,02	4,82
COP at B0/W65 (EN 14511)		2,0	2,1	2,2	2,25	2,2	2,0	2,1	2,2	2,25	2,2
COP at B10/W65 (EN 14511)		2,55	2,6	2,75	2,8	2,8	2,55	2,6	2,75	2,8	2,8
Sound data											
Sound power level (EN 12102)	dB(A)	43	43	44	48	50	43	43	44	48	50
Sound pressure level at a distance of 1 m	dB(A)	32	32	33	37	39	32	32	33	37	39
Application limits											
Permissible operating pressure, cylinder	MPa	1	1	1	1	1	1	1	1	1	1
Min. application limit on the heating side	°C	15	15	15	15	15	15	15	15	15	15
Max. application limit on the heating side	°C	65	65	65	65	65	65	65	65	65	65
Min. application limit, heat source	°C	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Max. application limit, heat source	°C	20	20	20	20	20	20	20	20	20	20
Shutdown pressure, brine pressure switch (positive pressure)	MPa	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Conductivity (softening)	µS/cm	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	µS/cm	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35
Hydraulic data											
Cylinder capacity	l	175	175	175	162	162	175	175	175	162	162
Energy data											
Energy efficiency class, DHW heating with load profile XL		A	A	A	A	A	A	A	A	A	A
Energy efficiency class		A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++	A++/ A++
Standby energy consumption/24 h at 65 °C	kWh	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9

		WPC 04	WPC 05	WPC 07	WPC 10	WPC 13	WPC 04 cool	WPC 05 cool	WPC 07 cool	WPC 10 cool	WPC 13 cool
Electrical data											
Rated voltage, compressor	V	400	400	400	400	400	400	400	400	400	400
Rated voltage, controller	V	230	230	230	230	230	230	230	230	230	230
Rated voltage, emergency/booster heater	V	400	400	400	400	400	400	400	400	400	400
Frequency	Hz	50	50	50	50	50	50	50	50	50	50
Compressor fuse/MCB	A	3x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16
MCB/fuse protection, controller	A	1x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16
Phases, emergency/booster heater		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Starting current (with/without starting current limiter)	A	27/-	27	20/-	23/-	23/-	27/-	27/-	20/-	23/-	23/-
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Versions											
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	1,05	1,40	1,72	2,03	2,30	1,05	1,40	1,72	2,03	2,30
Compressor oil		Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Evaporator material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Circulation pump type, heating side		Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.5	Yonos PARA 25/7.5	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.5	Yonos PARA 25/7.5
Circulation pump type, heat source side		Yonos PARA RS 25/7.5 PWM GT	Yonos PARA RS 25/7.5 PWM GT	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Yonos PARA RS 25/7.5 PWM GT	Yonos PARA RS 25/7.5 PWM GT	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-8
Dimensions											
Height	mm	1917	1917	1917	1917	1917	1917	1917	1917	1917	1917
Width	mm	600	600	600	600	600	600	600	600	600	600
Depth	mm	703	703	703	703	703	703	703	703	703	703
Height when tilted	mm	2020	2020	2020	2020	2020	2020	2020	2020	2020	2020
Weights											
Weight, empty	kg	243	246	259	277	283	248	251	264	283	288
Weight, full	kg	418	421	434	439	445	423	426	439	445	450
Connection											
Heat source flow/return push-fit connection		28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
DHW flow/return push-fit connection		22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
Heating flow/return push-fit connection		22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm	22 mm
DHW circulation connection		G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A	G 1/2 A
Values											
Flow rate, heat source side	m³/h	1,15	1,41	1,82	2,61	3,22	1,15	1,41	1,82	2,61	3,22
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,58	0,71	0,92	1,26	1,64	0,58	0,71	0,92	1,26	1,64
Min heating flow rate	m³/h	0,47	0,57	0,75	1,00	1,29	0,47	0,57	0,75	1,00	1,29
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,78	1,04	1,28	1,78	2,28	0,78	1,04	1,28	1,78	2,28
Permissible operating pressure, heating circuit	MPa	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Available external pressure differential, heat source	hPa	610	630	755	660	395	610	630	755	660	395
Available external pressure differential, heating system	hPa	690	525	465	440	180	690	525	465	440	180

Output data



Performance details to EN 14511

X Source temperature [°C]

Y Heating output [kW]

3 Flow temperature 35 °C, WPC 13, WPC 13 cool

4 Flow temperature 60 °C, WPC 13, WPC 13 cool

5 Flow temperature 35 °C, WPC 10, WPC 10 cool

6 Flow temperature 60 °C, WPC 10, WPC 10 cool

7 Flow temperature 35 °C, WPC 07, WPC 07 cool

8 Flow temperature 60 °C, WPC 07, WPC 07 cool

9 Flow temperature 35 °C, WPC 05, WPC 05 cool

10 Flow temperature 60 °C, WPC 05, WPC 05 cool

11 Flow temperature 35 °C, WPC 04, WPC 04 cool

12 Flow temperature 60 °C, WPC 04, WPC 04 cool

WPC 04, WPC 04 cool

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	4,08	3,87	3,70		1,05	1,29	1,57		3,89	3,00	2,35	
0	4,77	4,36	4,25	4,20	1,06	1,30	1,56	1,69	4,52	3,36	2,72	2,48
5	5,38	5,00	4,80	4,70	1,05	1,31	1,58	1,72	5,12	3,81	3,04	2,74
10	5,99	5,64	5,35	5,23	1,04	1,32	1,60	1,75	5,76	4,27	3,34	3,00
15	6,60	6,28	5,90	5,77	1,03	1,33	1,62	1,78	6,41	4,72	3,64	3,24
20	7,21	6,92	6,45	6,30	1,02	1,34	1,64	1,81	7,07	5,16	3,93	3,48

WPC 05, WPC 05 cool

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	5,01	4,74	4,50		1,22	1,52	1,84		4,10	3,11	2,45	
0	5,82	5,47	5,19	5,05	1,21	1,52	1,85	2,02	4,79	3,60	2,81	2,51
5	6,54	6,23	5,94	5,80	1,22	1,54	1,86	2,02	5,36	4,06	3,19	2,87
10	7,26	6,99	6,69	6,39	1,23	1,56	1,87	2,07	5,90	4,48	3,58	3,08
15	7,98	7,75	7,44	6,98	1,24	1,58	1,88	2,13	6,44	4,91	3,96	3,28
20	8,70	8,51	8,19	7,57	1,25	1,60	1,89	2,18	6,96	5,32	4,33	3,47

WPC 07, WPC 07 cool

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	6,53	6,20	6,01		1,54	1,90	2,33		4,25	3,26	2,58	
0	7,50	7,11	6,91	6,19	1,55	1,94	2,35	2,52	4,85	3,67	2,94	2,45
5	8,55	7,98	7,90	7,34	1,56	1,93	2,38	2,53	5,48	4,14	3,32	2,91
10	9,60	9,05	8,89	8,50	1,57	1,92	2,39	2,53	6,11	4,71	3,72	3,36
15	10,65	10,12	9,88	9,65	1,58	1,91	2,40	2,54	6,74	5,30	4,12	3,81
20	11,70	11,19	10,95	10,80	1,59	1,90	2,41	2,54	7,36	5,89	4,54	4,26

WPC 10, WPC 10 cool

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	8,93	8,54	8,04	7,67	2,04	2,57	3,18	3,61	4,38	3,32	2,53	2,12
0	10,31	9,72	9,10	8,90	2,05	2,59	3,22	3,65	5,02	3,76	2,83	2,44
5	11,71	11,04	10,33	10,13	2,02	2,60	3,19	3,70	5,79	4,25	3,24	2,74
10	13,25	12,36	11,64	11,47	1,99	2,61	3,16	3,74	6,67	4,74	3,68	3,07
15	14,89	13,68	12,95	12,81	1,99	2,62	3,13	3,79	7,50	5,22	4,14	3,38
20	16,53	15,00	14,26	14,15	1,99	2,63	3,10	3,83	8,31	5,70	4,60	3,65

WPC 13, WPC 13 cool

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	11,49	11,05	10,53	10,27	2,73	3,32	3,77	4,35	4,21	3,33	2,72	2,36
0	13,21	12,47	11,99	11,79	2,73	3,34	3,93	4,41	4,83	3,74	3,04	2,67
5	15,10	14,34	13,98	13,31	2,73	3,38	3,94	4,47	5,54	4,24	3,40	2,98
10	16,82	16,21	15,77	15,12	2,73	3,42	3,95	4,53	6,16	4,74	3,99	3,34
15	18,54	18,08	17,56	16,94	2,73	3,46	3,96	4,59	6,79	5,23	4,43	3,69
20	20,26	19,95	19,35	18,75	2,73	3,50	3,97	4,65	7,42	5,70	4,87	4,03

d0000033166

Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.
» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.

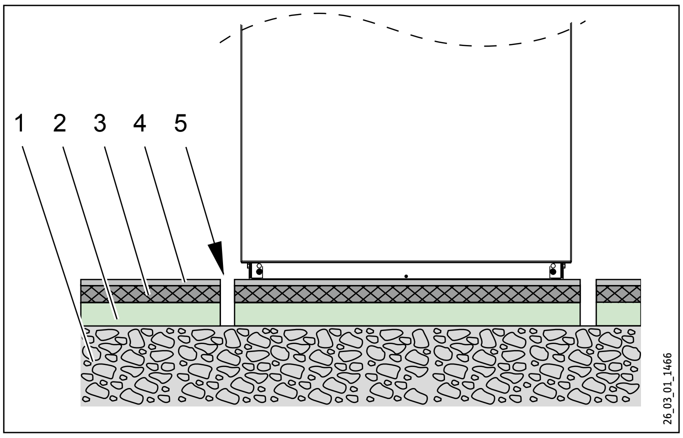
Sound emissions

Never install the heat pump immediately below or adjacent to bedrooms.

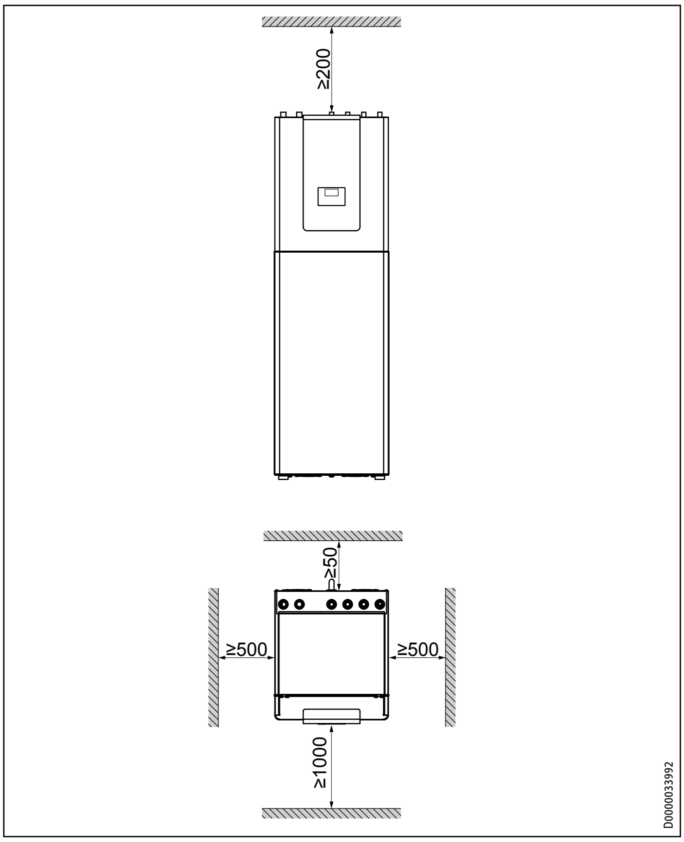
Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

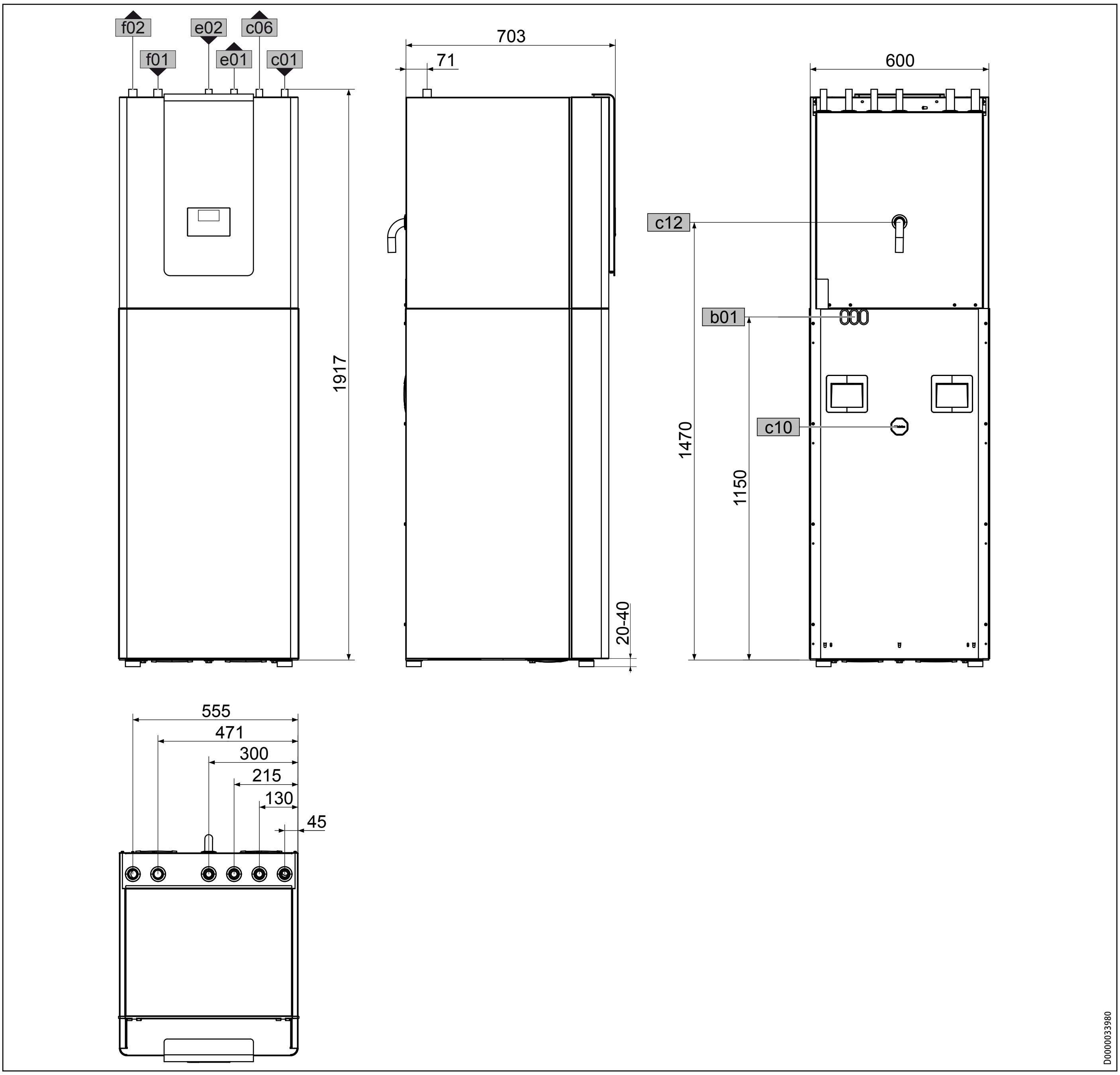
Use flexible hoses for the hydraulic connection.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Siting



				WPC 04	WPC 05	WPC 07	WPC 10	WPC 13	WPC 04 cool	WPC 05 cool	WPC 07 cool	WPC 10 cool	WPC 13 cool
b01	Entry electrical cables												
c01	Cold water inlet	Diameter	mm	22	22	22	22	22	22	22	22	22	22
c06	DHW outlet	Diameter	mm	22	22	22	22	22	22	22	22	22	22
c10	DHW circulation												
c12	Safety valve drain												
e01	Heating flow	Diameter	mm	22	22	22	22	22	22	22	22	22	22
e02	Heating return	Diameter	mm	22	22	22	22	22	22	22	22	22	22
f01	Heat source flow	Diameter	mm	28	28	28	28	28	28	28	28	28	28
f02	Heat source return	Diameter	mm	28	28	28	28	28	28	28	28	28	28

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

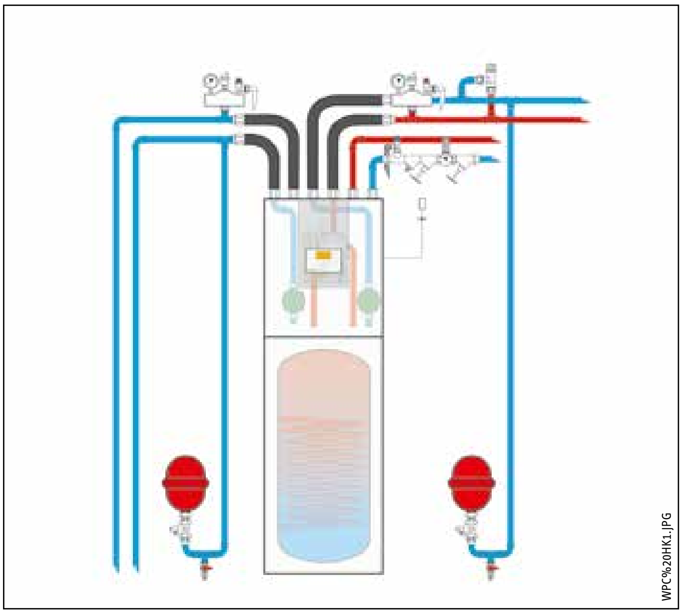
The required circulation pump is integrated into the heat pump.

See the adjacent table for pipe cross-sections.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Note
Observe the minimum volume of circulating water on the heating side, which must be at least 20 % of the heat pump's nominal flow rate.

Heat pump with DHW heating



Heat pump with integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Residual head hPa	Copper pipe DN
WPC 04	0,6	350	22 x 1,0
WPC 04 cool			
WPC 05, WPC 05 cool	0,7	350	22 x 1,0
WPC 07	0,9	350	22 x 1,0
WPC 07 cool			
WPC 10, WPC 10 cool	1,2	260	28 x 1,5
WPC 13, WPC 13 cool	1,6	170	28 x 1,5

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, observe the installation instructions.

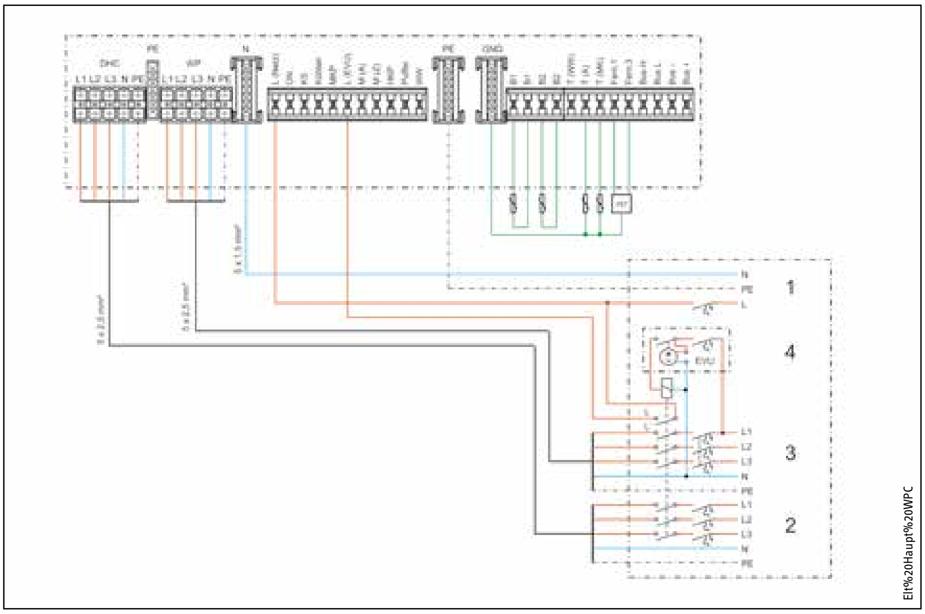
Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Electric emergency/booster heater power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Heating circuit pump
» Mixing valve
» Sensors and remote adjuster

Note
Observe the standards and regulations applicable in your country.

WPC



B1	Temperature sensor, heat pump flow	M(Z)	Mixer close
B2	Temperature sensor, heat pump return	HKP	Heating circuit pump
T (WW)	Temperature sensor, DHW	QKP	Source circuit pump
T (A)	Outside temperature sensor	1	Control circuit
T (MK)	Temperature sensor, mixer circuit		1/N/PE 230V 50Hz
Fern1	Remote control		Domestic meter
Fern3	Remote control	2	Load circuit, heat pump
H	BUS High		3/N/PE 400V 50Hz
L	BUS Low		Heat pump meter
-	BUS earth	3	Load circuit, booster heater;
+	BUS (not connected)		3/N/PE 230V 50Hz
L	Power supply		Heat pump meter
ON	Compressor signal	4	Power supply utility control
KS	Brine pump signal		Control phase L w/o power-OFF period
Kuehlen	Cooling mode		Control phase L' with blocking time
MKP	Mixer circuit pump		
EVU	Enable signal		
M(A)	Mixer open		

At a glance

- Straightforward installation
- High COP all year round enables low running costs
- Integrated brine and heating expansion vessels
- Easy and time-saving installation with high level of integration
- Integral high efficiency circulation pumps for the brine and heating side
- Extremely quiet operation thanks to multiple anti-vibration coupling
- Transport aid on appliance back panel
- Flow temperatures up to 65 °C ensure high level of DHW convenience
- Integral pressure hoses for direct connection to the pipework
- Use WQA from -5 °C to +20 °C
- Heating flow temperature up to 60 °C
- Integral 3-stage reheating
- Extremely quiet operation thanks to anti-vibration coupling
- With integrated heat and electricity meters

Safety and quality

APPLICATION: Brine | water heat pump for indoor installation with a high level of integration. Can be used in mono mode to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. Also suitable for apartment buildings, depending on the heat load of the building.
EQUIPMENT / CONVENIENCE: To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration mounting plate. The consistent source temperature guarantees unchanging heating output all year round, with flow temperatures up to 65 °C. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. One HE circulation pump and one expansion vessel are provided for the brine and heating sides respectively. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A.
EFFICIENCY: The heat pump unit is equipped with a scroll compressor with a soft starter and optimised heat exchangers for improved efficiency.
INSTALLATION: Internal pressure hoses enable direct hydraulic connection to the heating and brine circuits. For easy installation, the hydraulic connections are equipped with quick-release fittings and are already thermally insulated. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. Carrying handles on the back panel facilitate appliance handling.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

At a glance

- Straightforward installation
- High COP all year round enables low running costs
- Additional plate heat exchanger for passive cooling function
- Passive cooling function via geothermal probe system with minimal running costs
- Integrated brine and heating expansion vessels
- Easy and time-saving installation with high level of integration
- Integral high efficiency circulation pumps for the brine and heating side
- Extremely quiet operation thanks to multiple anti-vibration coupling
- Integral pressure hoses for direct connection to the pipework
- Flow temperatures up to 65 °C ensure high level of DHW convenience
- Use WQA from -5 °C to +20 °C
- Heating flow temperature up to 60 °C
- Integral 3-stage reheating
- Extremely quiet operation thanks to anti-vibration coupling
- With integrated heat and electricity meters

Safety and quality

APPLICATION: Brine | water heat pump for indoor installation with a high level of integration. Additionally equipped with integral heat exchanger for energy efficient passive cooling via area heating system. Can be used in mono mode to provide DHW and central heating in new build and modernisation projects due to the high flow temperatures. Also suitable for apartment buildings, depending on the heat load of the building. **EQUIPMENT / CONVENIENCE:** To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration mounting plate. The consistent source temperature guarantees unchanging heating output all year round, with flow temperatures up to 65 °C. The integral heat pump controller enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. With integral heat and electricity metering via refrigerant circuit data. One HE circulation pump and one expansion vessel are provided for the brine and heating sides respectively. An electric emergency/booster heater for mono mode operation and pasteurisation, a diverter valve for DHW heating and a safety valve with discharge hose are integrated as standard. The refrigerant circuit is hermetically sealed, tested for tightness at the factory and filled with safety refrigerant R410A. **EFFICIENCY:** The heat pump unit is equipped with a scroll compressor with a soft starter and optimised heat exchangers for improved efficiency. **INSTALLATION**: Internal pressure hoses enable direct hydraulic connection to the heating and brine circuits. For easy installation, the hydraulic connections are equipped with quick-release fittings and are already thermally insulated. The metal casing is corrosion-protected and made from galvanised and powder-coated sheet steel, with an Alpine white stove enamel finish. Carrying handles on the back panel facilitate appliance handling.

Function

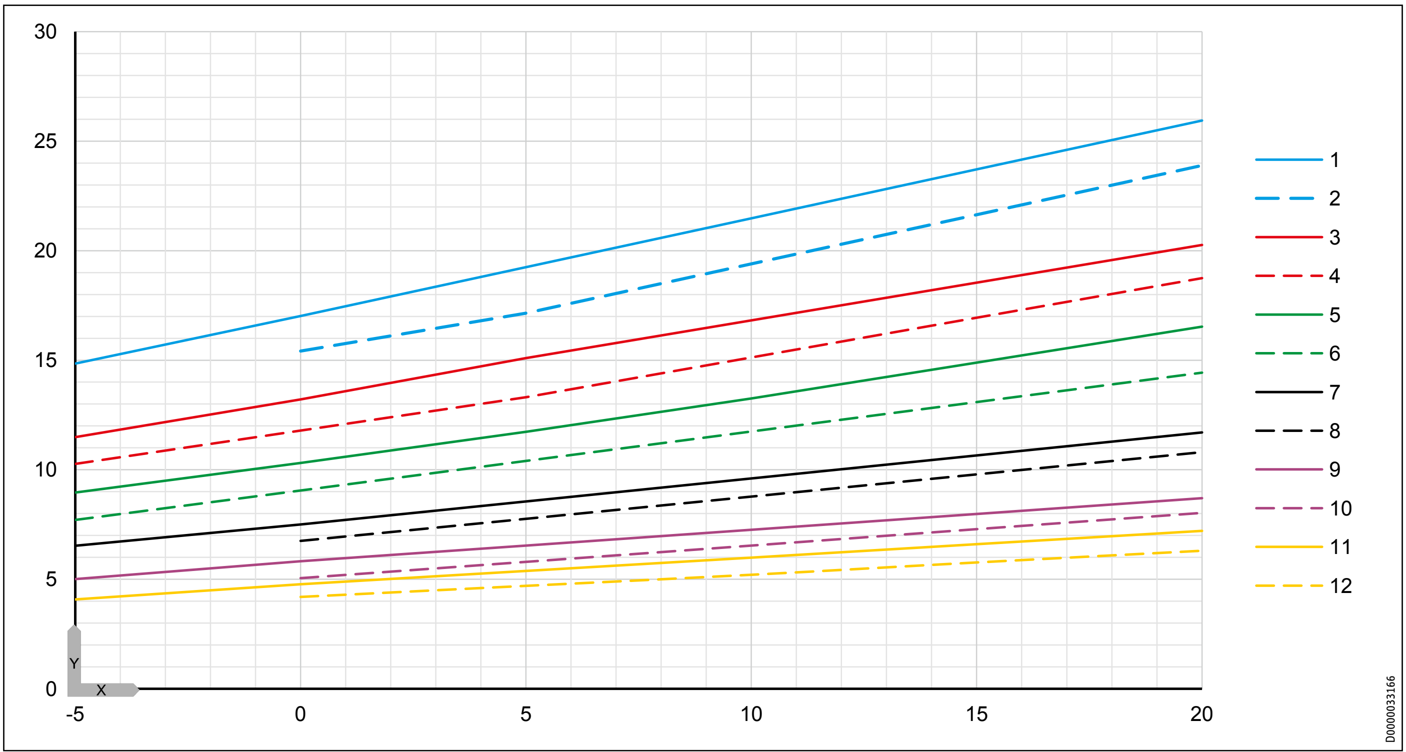
Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The DHW is heated via the internal indirect coil inside the DHW cylinder. To cool the living space, the brine is pumped through a heat exchanger, where heat is extracted from the heating circuit to be released into the cooler zones underground via the geothermal probe. The correct and professional implementation of the heat source system is a must for perfect operation.

Specification

		WPF 04	WPF 05	WPF 07	WPF 10	WPF 13	WPF 16	WPF 04 cool	WPF 05 cool	WPF 07 cool	WPF 10 cool	WPF 13 cool	WPF 16 cool
		232909	232910	232911	232912	232913	232914	232915	232916	232917	232918	232919	232920
Heating output to EN 14511													
Heating output at B0/W35 (EN 14511)	kW	4,77	5,82	7,50	10,31	13,21	17,02	4,77	5,82	7,50	10,31	13,21	17,02
Cooling capacity at B15/W23	kW							3,0	3,8	5,2	6,0	8,5	11
Heating output at B0/W65 (EN 14511)	kW	4,1	5	6,6	8,6	11,3	15	4,1	5	6,6	8,6	11,3	15
Heating output at B10/W65 (EN 14511)	kW	5,35	6,4	8,4	11,1	14,4	19,6	5,35	6,4	8,4	11,1	14,4	19,6
Power consumption													
Power consump. emergency/booster heater	kW	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8	8,8
Max. power consumption, circulation pump on the heating side	W	45	45	45	72	72	130	45	45	45	72	72	130
Max. power consumption, circulation pump on the heat source side	W	76	76	130	130	130	310	76	76	130	130	130	310
Power consumption to EN 14511													
Power consumption at B0/W35 (EN 14511)	kW	1,06	1,21	1,55	2,05	2,74	3,75	1,06	1,21	1,55	2,05	2,74	3,75
Power consumption at B0/W65 (EN 14511)	kW	2,05	2,38	3,0	3,82	5,14	6,82	2,05	2,38	3,0	3,82	5,14	6,82
Power consumption at B10/W65 (EN 14511)	kW	2,1	2,46	3,05	3,96	5,14	7,13	2,1	2,46	3,05	3,96	5,14	7,13
COP to EN 14511													
COP at B0/W35 (EN 14511)		4,50	4,80	4,84	5,02	4,82	4,54	4,50	4,80	4,84	5,02	4,82	4,54
COP at B0/W65 (EN 14511)		2,0	2,1	2,2	2,25	2,2	2,2	2,0	2,1	2,2	2,25	2,2	2,2
COP at B10/W65 (EN 14511)		2,55	2,6	2,75	2,8	2,8	2,75	2,55	2,6	2,75	2,8	2,8	2,75
Sound data													
Sound power level (EN 12102)	dB(A)	43	43	44	48	50	53	43	43	44	48	50	53
Sound pressure level at 1 m distance in a free field	dB(A)	35	35	36	40	42	44,8	35	35	36	40	42	44,8
Sound pressure level at 5 m distance in a free field	dB(A)	20	21	22	26	28	31	20	21	22	26	28	30,8
Application limits													
Max. permissible pressure	MPa	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3	4,3
Min. application limit on the heating side	°C	15	15	15	15	15	15	15	15	15	15	15	15
Max. application limit on the heating side	°C	65	65	65	65	65	65	65	65	65	65	65	65
Min. application limit, heat source	°C	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
Max. application limit, heat source	°C	20	20	20	20	20	20	20	20	20	20	20	20
Shutdown press. brine pr. switch (pos. press.)	MPa	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35	25-35
Energy data													
Energy efficiency class		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Electrical data													
Frequency	Hz	50	50	50	50	50	50	50	50	50	50	50	50
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
Compressor fuse/MCB	A	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16
Rated voltage, emergency/booster heater	V	400	400	400	400	400	400	400	400	400	400	400	400
Rated voltage, controller	V	230	230	230	230	230	230	230	230	230	230	230	230
Rated voltage, compressor	V	400	400	400	400	400	400	400	400	400	400	400	400

		WPF 04	WPF 05	WPF 07	WPF 10	WPF 13	WPF 16	WPF 04 cool	WPF 05 cool	WPF 07 cool	WPF 10 cool	WPF 13 cool	WPF 16 cool
Phases, emergency/booster heater		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Starting current (with/without starting current limiter)	A	27	27	20	23	23	25	27	27	20	23	23	25
Max. operating current	A	3,5	4,1	4,8	7	8,3	12,1	3,5	4,1	4,8	7	8,3	12,1
Versions													
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	1,05	1,40	1,72	2,03	2,30	2,35	1,05	1,40	1,72	2,03	2,30	2,35
Compressor oil		Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Evaporator material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Circulation pump type, heating side		Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.5	Yonos PARA 25/7.5	Stratos PARA 25/1-8	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.0	Yonos PARA 25/7.5	Yonos PARA 25/7.5	Stratos PARA 25/1-8
Circulation pump type, heat source side		Yonos PARA RS 25/7.5 PWM GT	Yonos PARA RS 25/7.5 PWM GT	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-12	Yonos PARA RS 25/7.5 PWM GT	Yonos PARA RS 25/7.5 PWM GT	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-8	Stratos PARA 25/1-12
IP rating		IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20	IP20
Dimensions													
Height	mm	1319	1319	1319	1319	1319	1319	1319	1319	1319	1319	1319	1319
Width	mm	598	598	598	598	598	598	598	598	598	598	598	598
Depth	mm	658	658	658	658	658	658	658	658	658	658	658	658
Weights													
Weight	kg	150	152	157	169	171	181	158	160	165	177	182	192
Connection													
DHW flow/return push-fit connection		28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
Heat source flow/return push-fit connection		28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
Heating flow/return push-fit connection		28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm	28 mm
Values													
Available external pressure differential, heating system	hPa	690	525	465	440	180	300	690	525	465	440	180	300
Available external pressure differential, heat source	hPa	610	630	755	660	395	920	610	630	755	660	395	920
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,58	0,71	0,92	1,26	1,64	2,09	0,58	0,71	0,92	1,26	1,64	2,09
Min heating flow rate	m³/h	0,47	0,57	0,75	1,00	1,29	1,62	0,47	0,57	0,75	1,00	1,29	1,62
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,78	1,04	1,28	1,78	2,28	2,91	0,78	1,04	1,28	1,78	2,28	2,91
Flow rate, heat source side	m³/h	1,15	1,41	1,82	2,61	3,22	4,20	1,15	1,41	1,82	2,61	3,22	4,20
Internal volume, heating side	l	5,4	6,1	6,1	6,7	7,3	7,3	6,4	7,1	7,1	7,7	8,3	8,3
Internal volume, heat source side	l	9,1	9,7	10,5	11,3	11,8	12,3	10,3	10,9	11,7	12,2	13,0	13,5
Expansion vessel pre-charge pressure, heating side	MPa	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15	0,15
Expansion vessel volume, heating side	l	24	24	24	24	24	24	24	24	24	24	24	24
Expansion vessel pre-charge pressure, heat source side	MPa	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05	0,05
Expansion vessel volume, heat source side	l	24	24	24	24	24	24	24	24	24	24	24	24

Output data



Performance details to EN 14511

X Source temperature [°C]

Y Heating output [kW]

1 Flow temperature 35 °C, WPF 16, WPF 16 cool

2 Flow temperature 60 °C, WPF 16, WPF 16 cool

3 Flow temperature 35 °C, WPF 13, WPF 13 cool

4 Flow temperature 60 °C, WPF 13, WPF 13 cool

5 Flow temperature 35 °C, WPF 10, WPF 10 cool

6 Flow temperature 60 °C, WPF 10, WPF 10 cool

7 Flow temperature 35 °C, WPF 07, WPF 07 cool

8 Flow temperature 60 °C, WPF 07, WPF 07 cool

9 Flow temperature 35 °C, WPF 05, WPF 05 cool

10 Flow temperature 60 °C, WPF 05, WPF 05 cool

11 Flow temperature 35 °C, WPF 04, WPF 04 cool

WPF 04, WPF 04 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	4,08	3,87	3,70		1,05	1,29	1,57		3,89	3,00	2,35	
0	4,77	4,36	4,25	4,20	1,06	1,30	1,56	1,69	4,52	3,36	2,72	2,48
5	5,38	5,00	4,80	4,70	1,05	1,31	1,58	1,72	5,12	3,81	3,04	2,74
10	5,99	5,64	5,35	5,23	1,04	1,32	1,60	1,75	5,76	4,27	3,34	3,00
15	6,60	6,28	5,90	5,77	1,03	1,33	1,62	1,78	6,41	4,72	3,64	3,24
20	7,21	6,92	6,45	6,30	1,02	1,34	1,64	1,81	7,07	5,16	3,93	3,48

WPF 05, WPF 05 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	5,01	4,74	4,50		1,22	1,52	1,84		4,10	3,11	2,45	
0	5,82	5,47	5,19	5,05	1,21	1,52	1,85	2,02	4,79	3,60	2,81	2,51
5	6,54	6,23	5,94	5,80	1,22	1,54	1,86	2,02	5,36	4,06	3,19	2,87
10	7,26	6,99	6,69	6,39	1,23	1,56	1,87	2,07	5,90	4,48	3,58	3,08
15	7,98	7,75	7,44	6,98	1,24	1,58	1,88	2,13	6,44	4,91	3,96	3,28
20	8,70	8,51	8,19	7,57	1,25	1,60	1,89	2,18	6,96	5,32	4,33	3,47

WPF 07, WPF 07 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	6,53	6,20	6,01		1,54	1,90	2,33		4,25	3,26	2,58	
0	7,50	7,11	6,91	6,19	1,55	1,94	2,35	2,52	4,85	3,67	2,94	2,45
5	8,55	7,98	7,90	7,34	1,56	1,93	2,38	2,53	5,48	4,14	3,32	2,91
10	9,60	9,05	8,89	8,50	1,57	1,92	2,39	2,53	6,11	4,71	3,72	3,36
15	10,65	10,12	9,88	9,65	1,58	1,91	2,40	2,54	6,74	5,30	4,12	3,81
20	11,70	11,19	10,95	10,80	1,59	1,90	2,41	2,54	7,36	5,89	4,54	4,26

WPF 10, WPF 10 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	8,93	8,54	8,04	7,67	2,04	2,57	3,18	3,61	4,38	3,32	2,53	2,12
0	10,31	9,72	9,10	8,90	2,05	2,59	3,22	3,65	5,02	3,76	2,83	2,44
5	11,71	11,04	10,33	10,13	2,02	2,60	3,19	3,70	5,79	4,25	3,24	2,74
10	13,25	12,36	11,64	11,47	1,99	2,61	3,16	3,74	6,67	4,74	3,68	3,07
15	14,89	13,68	12,95	12,81	1,99	2,62	3,13	3,79	7,50	5,22	4,14	3,38
20	16,53	15,00	14,26	14,15	1,99	2,63	3,10	3,83	8,31	5,70	4,60	3,65

WPF 13, WPF 13 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	11,49	11,05	10,53	10,27	2,73	3,32	3,77	4,35	4,21	3,33	2,72	2,36
0	13,21	12,47	11,99	11,79	2,73	3,34	3,93	4,41	4,83	3,74	3,04	2,67
5	15,10	14,34	13,98	13,31	2,73	3,38	3,94	4,47	5,54	4,24	3,40	2,98
10	16,82	16,21	15,77	15,12	2,73	3,42	3,95	4,53	6,16	4,74	3,99	3,34
15	18,54	18,08	17,56	16,94	2,73	3,46	3,96	4,59	6,79	5,23	4,43	3,69
20	20,26	19,95	19,35	18,75	2,73	3,50	3,97	4,65	7,42	5,70	4,87	4,03

WPF 16, WPF 16 cool

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	14,90	14,66	14,06		3,71	4,57	5,40		4,02	3,20	2,60	
0	17,02	16,45	15,76	15,42	3,75	4,63	5,45	5,86	4,54	3,55	2,89	2,63
5	19,25	18,50	17,60	17,15	3,77	4,70	5,54	5,96	5,11	3,93	3,18	2,88
10	21,48	20,79	20,09	19,40	3,79	4,77	5,63	6,19	5,67	4,36	3,57	3,14
15	23,71	23,02	22,33	21,64	3,81	4,84	5,72	6,41	6,22	4,76	3,90	3,37
20	25,94	25,26	24,57	23,89	3,83	4,91	5,81	6,64	6,77	5,14	4,23	3,60

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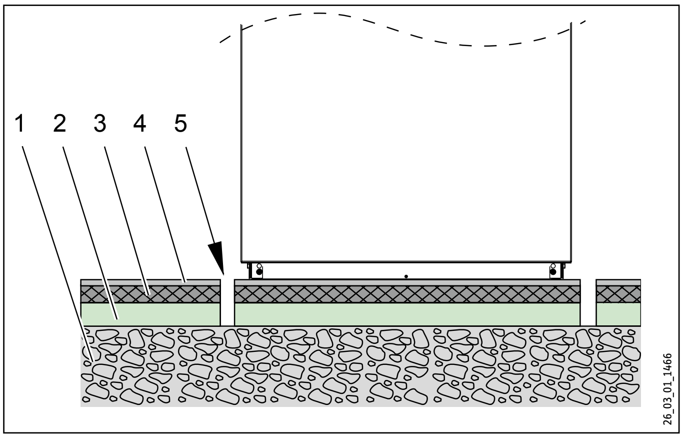
Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.
» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.



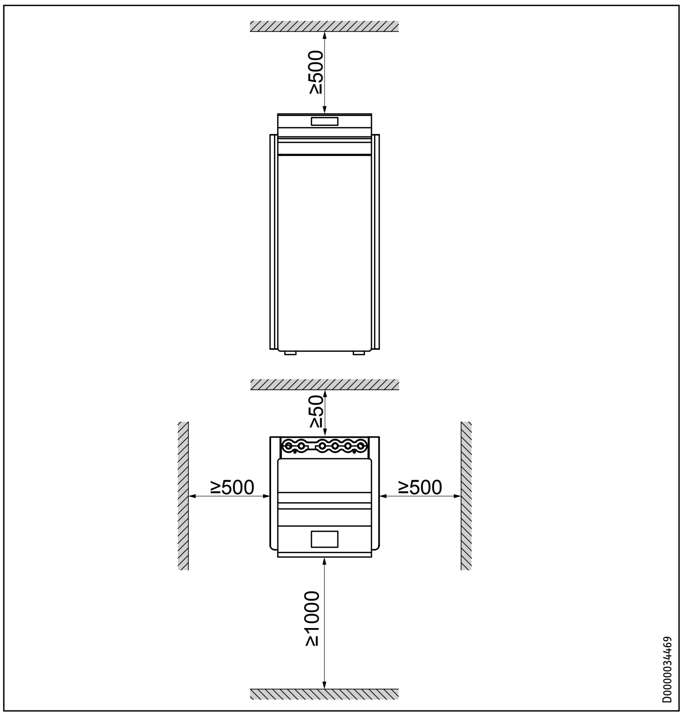
1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

Sound emissions

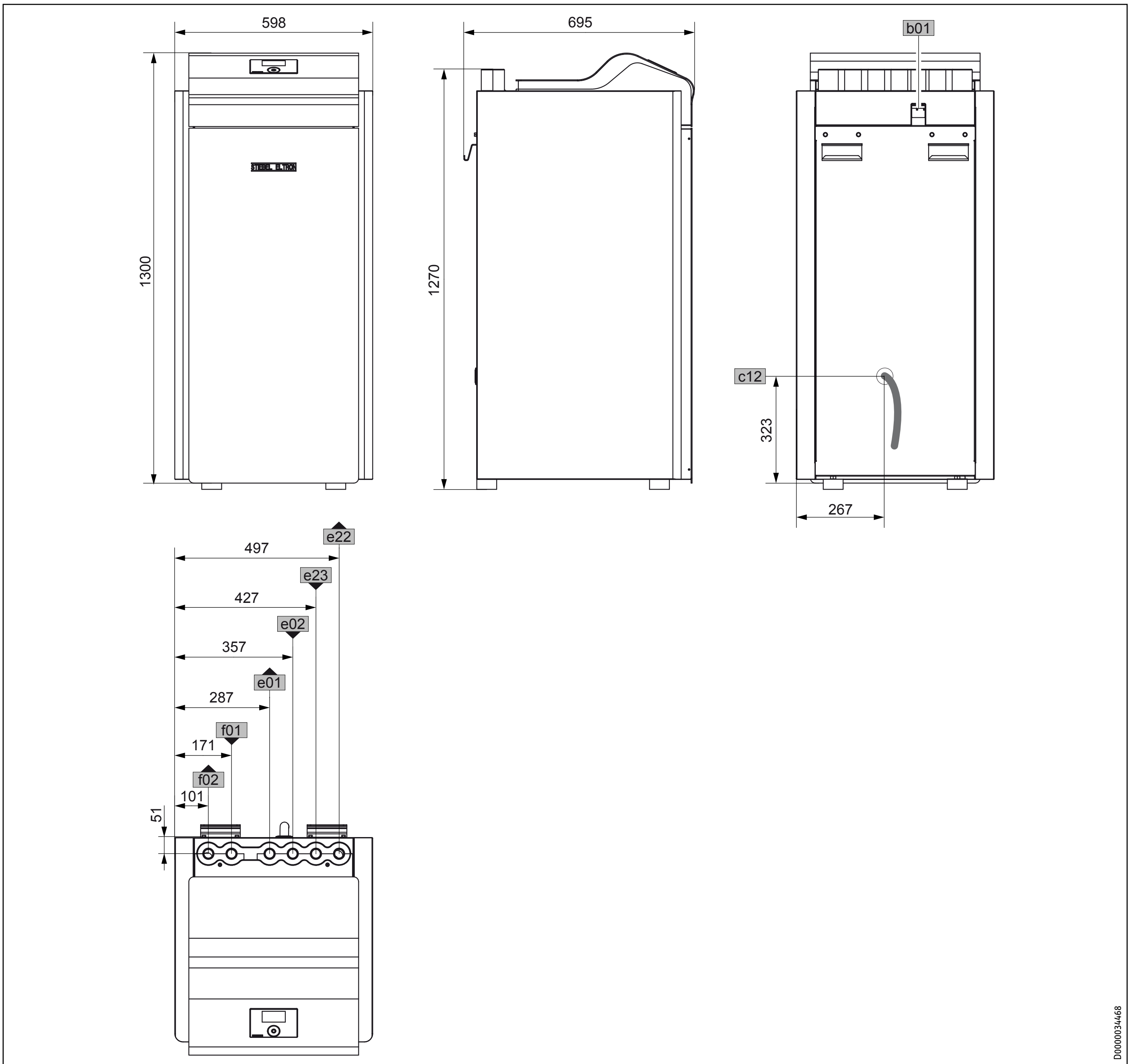
Never install the heat pump immediately below or adjacent to bedrooms.

Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.



Siting



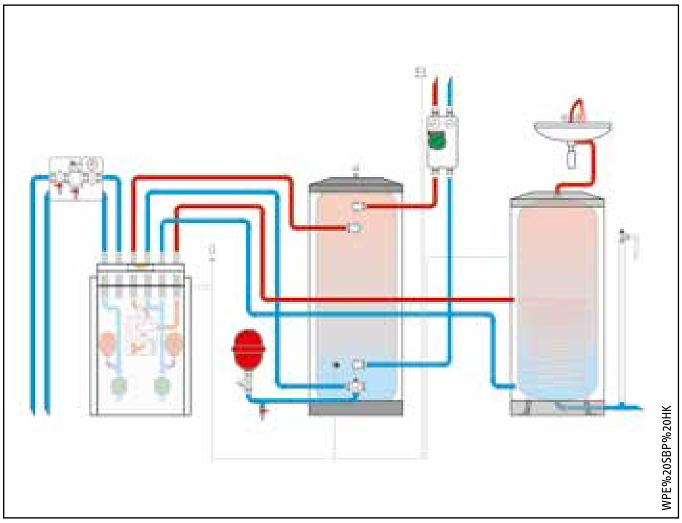
				WPF 04	WPF 05	WPF 07	WPF 10	WPF 13	WPF 16	WPF 04 cool	WPF 05 cool	WPF 07 cool	WPF 10 cool	WPF 13 cool	WPF 16 cool
b01	Entry electrical cables														
c12	Safety valve drain														
d29	Heat exchanger flow	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28
d30	Heat exchanger return	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28
e01	Heating flow	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28
e02	Heating return	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28
f01	Heat source flow	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28
f02	Heat source return	Diameter	mm	28	28	28	28	28	28	28	28	28	28	28	28

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram. Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it. Observe the correct connection of heating flow and return as well as the correct pipework cross-section. The required circulation pump is integrated into the heat pump. See the adjacent table for pipe cross-sections. Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Check the expansion volume of the heat source and the heating system relative to the size of the integral diaphragm expansion vessel. If necessary install additional diaphragm expansion vessels.

Heat pump with buffer cylinder and DHW heating



Heat pump with integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Residual head hPa	Copper pipe DN
WPF 04, WPF 04 cool	0,6	350	22 x 1,0
WPF 05, WPF 05 cool	0,7	350	22 x 1,0
WPF 07, WPF 07 cool	0,9	350	22 x 1,0
WPF 10, WPF 10 cool	1,2	260	28 x 1,5
WPF 13, WPF 13 cool	1,6	170	28 x 1,5
WPF 16, WPF 16 cool	2,1	350	35 x 1,5

Power supply

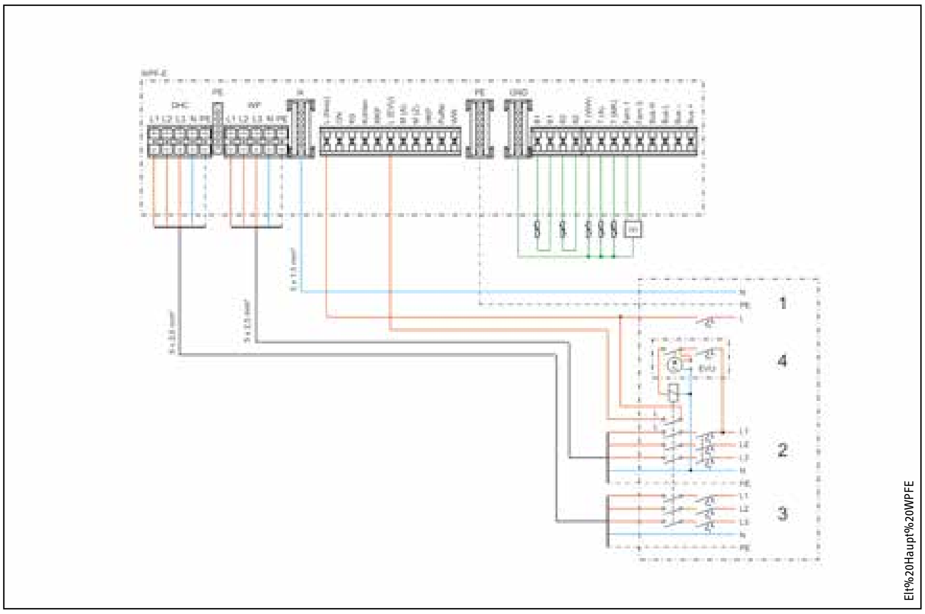
Notify your local power supply utility of the heat pump connection. All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility. The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Electric emergency/booster heater power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Heating circuit pump
» Mixing valve
» Sensors and remote adjuster

Note
Observe the standards and regulations applicable in your country.



B1	Temperature sensor, heat pump flow
B1	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS High
L	BUS Low
-	BUS earth
+	BUS (not connected)
L	Power supply
ON	Compressor signal
KS	Brine pump signal
Kuehlen	Cooling mode
EVU	Enable signal
MKP	Mixer circuit pump
M(A)	Mixer open
M(Z)	Mixer close
HKP	Heating circuit pump
QKP	Source circuit pump
Buffer	Buffer charging pump
1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L' with blocking time

WPF 5/7/10/13/16 basic

Compact heat pump for indoor installation for DHW and central heating. Corrosion-protected casing components, made from white powder-coated, galvanised sheet steel. Integral HE heating circuit pump, starting current limiter and safety assembly for the heating circuit. Electric booster heater for mono energetic operation and pasteurisation integrated as standard. Optimum control via the integral heat pump manager. The heat pump is filled with safety refrigerant R410A.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

At a glance

» Integrated heat pump control unit
» Application limit WQA from – 5 °C to + 20 °C
» Heating flow temperature up to 60 °C
» Integral 3-stage reheating

Safety and quality

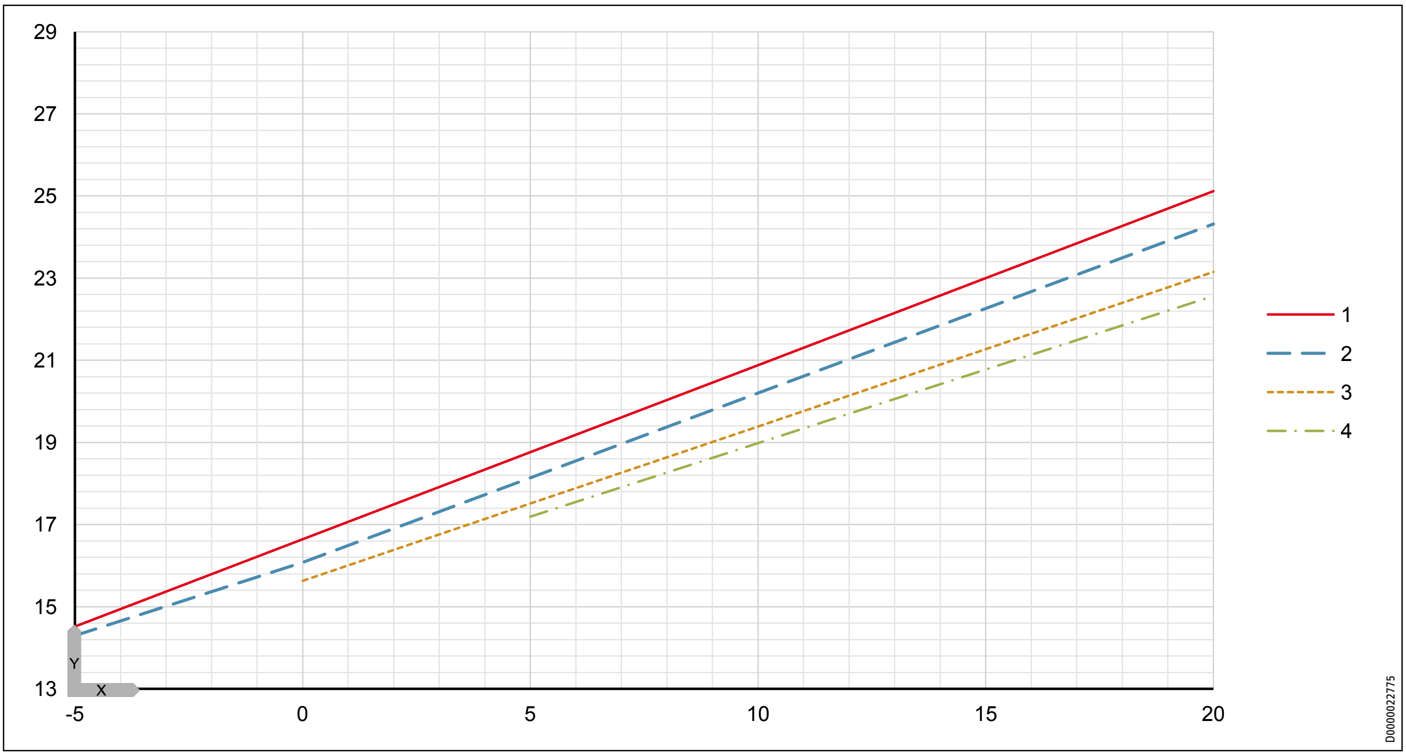
Specification

		WPF 5 basic	WPF 7 basic	WPF 10 basic	WPF 13 basic	WPF 16 basic
		230944	230945	230946	230947	230948
Heating output to EN 14511						
Heating output at B0/W35 (EN 14511)	kW	5,88	7,64	9,7	12,59	16,64
Power consumption						
Power consumption, emergency/booster heater	kW	8,8	8,8	8,8	8,8	8,8
Max. power consumption, circulation pump on the heating side	W	70	70	70	70	70
Power consumption to EN 14511						
Power consumption at B0/W35 (EN 14511)	kW	1,36	1,70	2,22	2,85	4,00
COP to EN 14511						
COP at B0/W35 (EN 14511)		4,33	4,50	4,37	4,42	4,16
Sound data						
Sound power level (EN 12102)	dB(A)	46	47	51	53	53
Sound pressure level at 1 m distance	dB(A)	38	39	43	45	45
in a free field						
Sound pressure level at 5 m distance in a free field	dB(A)	24	25	29	31	31
Application limits						
Max. permissible pressure	MPa	0,3	0,3	0,3	0,3	0,3
Min. application limit on the heating side	°C	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	60	60	60
Min. application limit, heat source	°C	-5	-5	-5	-5	-5
Max. application limit, heat source	°C	20	20	20	20	20
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35	25-35	25-35
Energy data						
Energy efficiency class		A+/A++	A+/A++	A+/A++	A+/A++	A+/A++
Electrical data						
Frequency	Hz	50	50	50	50	50
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
Compressor fuse/MCB	A	3 x C 16	3 x C 16	3 x C 16	3 x C 16	3 x C 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16	3 x B 16	3 x B 16	3 x B 16	3 x B 16
Rated voltage, controller	V	230	230	230	230	230
Rated voltage, compressor	V	400	400	400	400	400
Rated voltage, emergency/booster heater	V	400	400	400	400	400
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Phases, compressor		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Phases, emergency/booster heater		3/N/PE	3/N/PE	3/N/PE	3/N/PE	3/N/PE
Starting current (with/without starting current limiter)	A	26/-	30/-	27/-	28/-	29/-
Versions						
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	1,73	2	2,6	2,5	2,6
Compressor oil		Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF
Evaporator material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Circulation pump type, heating side		Stratos PARA 25/1-7	Stratos PARA 25/1-7	Stratos PARA 25/1-7	Stratos PARA 25/1-7	Stratos PARA 25/1-7
IP rating		IP20	IP20	IP20	IP20	IP20

WPF 5/7/10/13/16 basic

		WPF 5 basic	WPF 7 basic	WPF 10 basic	WPF 13 basic	WPF 16 basic
Dimensions						
Height	mm	960	960	960	960	960
Width	mm	510	510	510	510	510
Depth	mm	680	680	680	680	680
Weights						
Weight	kg	107	113	120	128	131
Connection						
Connection on the heating side		G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
Connection on the heat source side		G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
Values						
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	0,71	0,91	1,22	1,58	2,08
Min heating flow rate	m³/h	0,5	0,64	0,86	1,1	1,45
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	0,99	1,27	1,71	2,21	2,91
Flow rate, heat source side	m³/h	1,4	1,9	2,2	3,1	3,8
Internal volume, heating side	l	2,4	2,8	3,4	3,4	3,4
Internal volume, heat source side	l	2,9	3,5	4,1	4,1	4,1
Pressure differential, heating side	hPa					
Available external pressure differential, heating system	hPa	350	350	260	167	63
Pressure differential on the heat source side	hPa	100	110	120	230	340

Output data



Performance details to EN 14511

X Source temperature [°C]

Y Heating output [kW]

1 Flow temperature 35 °C, WPF 16 basic

2 Flow temperature 60 °C, WPF 16 basic

3 Flow temperature 35 °C, WPF 13 basic

4 Flow temperature 60 °C, WPF 13 basic

5 Flow temperature 35 °C, WPF 10 basic

6 Flow temperature 60 °C, WPF 10 basic

7 Flow temperature 35 °C, WPF 7 basic

8 Flow temperature 60 °C, WPF 7 basic

9 Flow temperature 35 °C, WPF 5 basic

10 Flow temperature 60 °C, WPF 5 basic

WPF 5 basic

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C
[°C]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]				
-5	5,01	4,90	4,55	4,38	1,36	1,74	2,16	2,37	3,68	2,82	2,11	1,85
0	5,88	5,56	5,30	5,17	1,36	1,72	2,16	2,38	4,32	3,23	2,45	2,17
5	6,75	6,37	6,05	5,89	1,36	1,71	2,16	2,39	4,96	3,73	2,80	2,47
10	7,62	7,18	6,80	6,61	1,36	1,70	2,16	2,39	5,60	4,22	3,15	2,77
15	8,49	7,99	7,55	7,33	1,36	1,69	2,16	2,40	6,24	4,73	3,50	3,06
20	9,36	8,80	8,30	8,05	1,36	1,68	2,16	2,40	6,88	5,24	3,84	3,35

WPF 7 basic

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C
[°C]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]				
-5	6,55	6,30	5,82		1,71	2,15	2,69		3,83	2,93	2,16	
0	7,64	7,23	6,76		1,70	2,13	2,67		4,49	3,39	2,53	
5	8,73	8,25	7,70	7,43	1,69	2,12	2,65	2,92	5,17	3,89	2,91	2,55
10	9,82	9,27	8,64	8,33	1,68	2,11	2,63	2,89	5,85	4,39	3,29	2,88
15	10,91	10,29	9,58	9,23	1,67	2,10	2,61	2,87	6,53	4,90	3,67	3,22
20	12,00	11,31	10,52	10,13	1,66	2,09	2,59	2,84	7,23	5,41	4,06	3,57

WPF 10 basic

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C
[°C]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]				
-5	8,33	8,02			2,25	2,86			3,70	2,80		
0	9,70	9,46	8,57	8,13	2,22	2,87	3,67	4,07	4,37	3,30	2,34	2,00
5	11,07	10,56	9,78	9,39	2,19	2,81	3,61	4,01	5,05	3,76	2,71	2,34
10	12,44	11,66	10,99	10,66	2,16	2,75	3,55	3,95	5,76	4,24	3,10	2,70
15	13,81	12,76	12,20	11,92	2,13	2,69	3,49	3,89	6,48	4,74	3,50	3,06
20	15,18	13,86	13,41	13,19	2,10	2,63	3,43	3,83	7,23	5,27	3,91	3,44

WPF 13 basic

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C
[°C]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]				
-5	10,70	10,60	9,95		2,88	3,60	4,54		3,72	2,94	2,19	
0	12,59	12,17	11,60	11,32	2,85	3,57	4,52	5,00	4,42	3,41	2,57	2,27
5	14,48	13,81	13,25	12,97	2,82	3,61	4,50	4,95	5,13	3,83	2,94	2,62
10	16,37	15,45	14,90	14,63	2,79	3,65	4,48	4,90	5,87	4,23	3,33	2,99
15	18,26	17,09	16,55	16,28	2,76	3,69	4,46	4,85	6,62	4,63	3,71	3,36
20	20,15	18,73	18,20	17,94	2,73	3,73	4,44	4,80	7,38	5,02	4,10	3,74

WPF 16 basic

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C	35 °C	45 °C	55 °C	60 °C
[°C]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]				
-5	14,52	14,30			3,97	4,96			3,66	2,88		
0	16,64	16,08	15,63		4,00	5,01	6,31		4,16	3,21	2,48	
5	18,76	18,14	17,51	17,20	4,03	5,04	6,41	7,10	4,66	3,60	2,73	2,42
10	20,88	20,20	19,39	18,99	4,06	5,07	6,51	7,23	5,14	3,98	2,98	2,63
15	23,00	22,26	21,27	20,78	4,09	5,10	6,61	7,37	5,62	4,36	3,22	2,82
20	25,12	24,32	23,15	22,57	4,12	5,13	6,71	7,50	6,10	4,74	3,45	3,01

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Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.
» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.

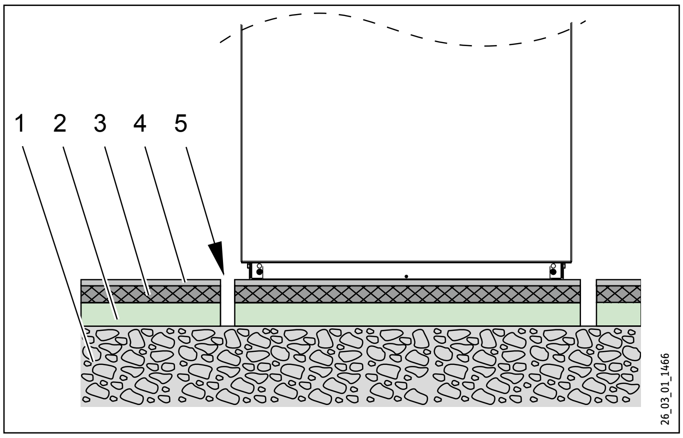
Sound emissions

Never install the heat pump immediately below or adjacent to bedrooms.

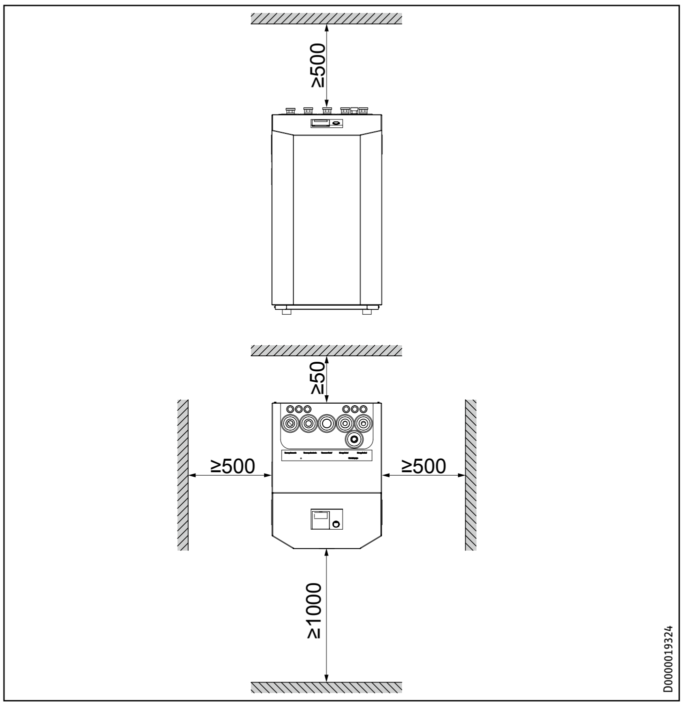
Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

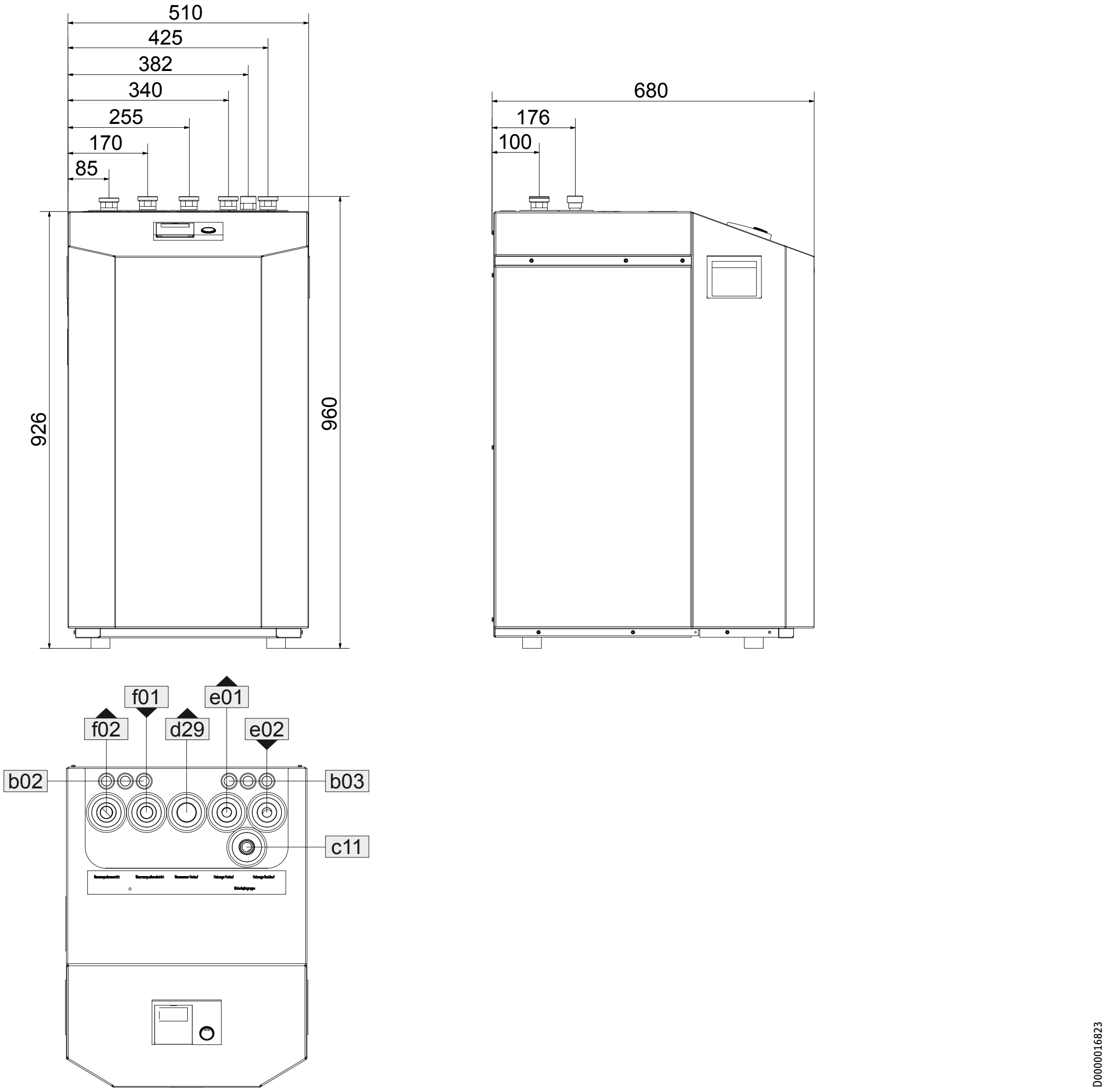
Use flexible hoses for the hydraulic connection.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Siting



			WPF 5 basic	WPF 7 basic	WPF 10 basic	WPF 13 basic	WPF 16 basic
b02	Entry cables I						
b03	Entry cables II						
c06	DHW outlet	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
c11	Safety assembly						
e01	Heating flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
e02	Heating return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
f01	Heat source flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
f02	Heat source return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

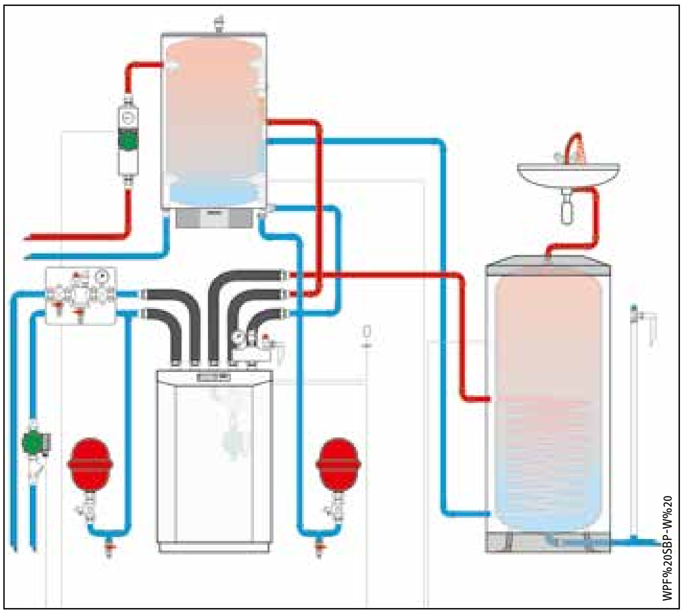
Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

The required circulation pump is integrated into the heat pump.

See the adjacent table for pipe cross-sections.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Heat pump with 100 l buffer cylinder and DHW heating



Heat pump with integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Residual head hPa	Copper pipe DN
WPF 5 basic	0,7	280	22 x 1,0
WPF 7 basic	1,0	280	22 x 1,0
WPF 10 basic	1,2	280	22 x 1,0
WPF 13 basic	1,6	280	28 x 1,5
WPF 16 basic	2,0	210	35 x 1,5

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

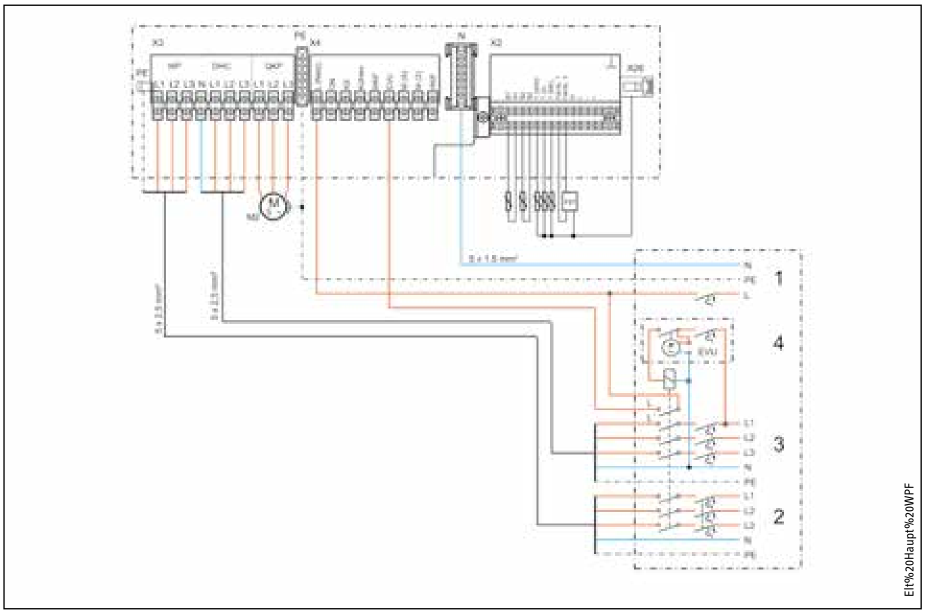
The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Electric emergency/booster heater power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Brine pump
» Heating circuit pump
» Mixing valve
» sensors and remote control units

Note
Observe the standards and regulations applicable in your country.



B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS High
L	BUS Low
–	BUS earth
+	BUS (not connected)
L	Power supply
ON	Compressor signal
KS	Brine pump signal
Kuehlen	Cooling mode
MKP	Mixer circuit pump
EVU	Enable signal

M(A)	Mixer open
M(Z)	Mixer close
HKP	Heating circuit pump
QKP	Source circuit pump
1	Control circuit
	1/N/PE 230V 50Hz
	Domestic meter
2	Load circuit, heat pump
	3/N/PE 400V 50Hz
	Heat pump meter
3	Load circuit, booster heater
	3/N/PE 230V 50Hz
	Heat pump meter
4	Power supply utility control
	Control phase L w/o power-OFF period
	Control phase L' with blocking time

WPF 10/13/16 M

Heat pump for indoor installation as combination set. Corrosion-protected casing components, made from white powder-coated, galvanised sheet steel. Integral starting current limiter and safety assembly for the heating circuit. Optimum control via the heat pump manager. The heat pump is filled with safety refrigerant R410A.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

At a glance

- Modular units can be cascaded for a higher output
- Application limit WQA from − 5 °C to + 20 °C
- Heating flow temperature up to 60 °C
- With integrated heat and electricity meters

Safety and quality

Required accessories

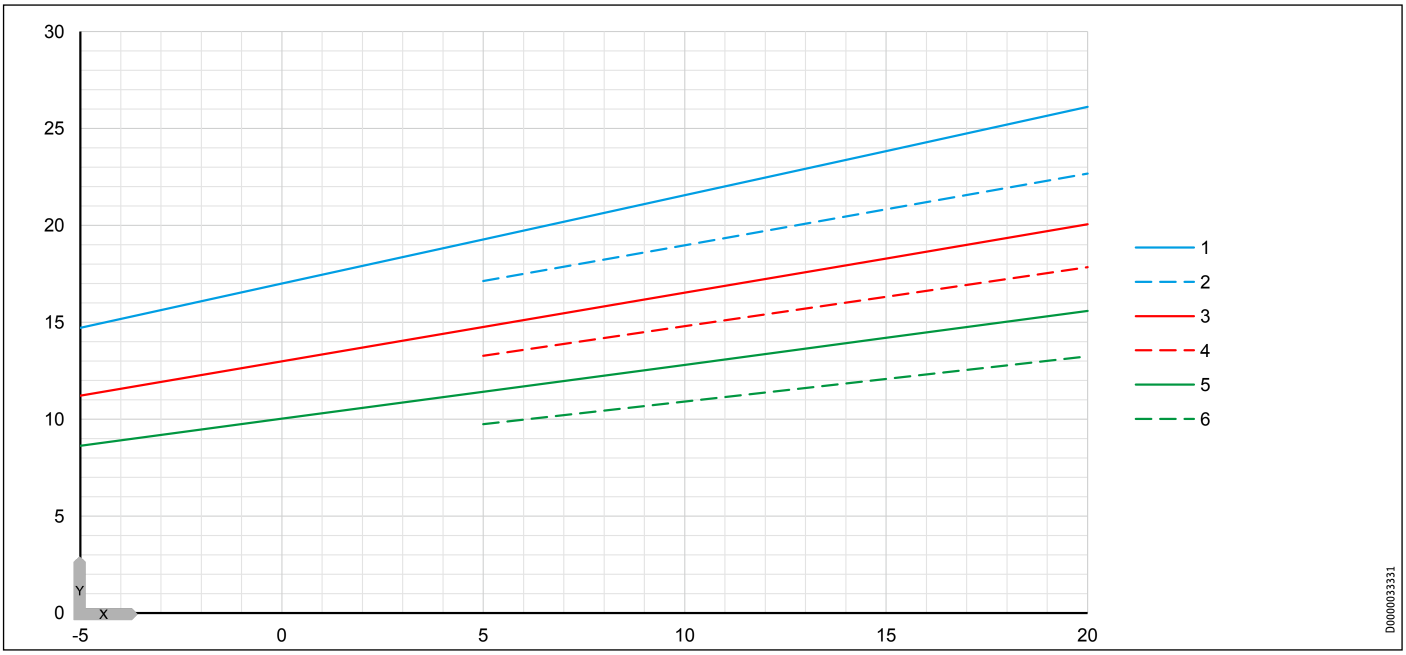
232980 WPMW 3

Specification

		WPF 10 M	WPF 13 M	WPF 16 M
		185349	182135	220894
Heating output to EN 14511				
Heating output at B0/W35 (EN 14511)	kW	10,02	12,98	16,99
Power consumption to EN 14511				
Power consumption at B0/W35 (EN 14511)	kW	2,23	2,84	3,91
COP to EN 14511				
COP at B0/W35 (EN 14511)		4,49	4,57	4,35
Sound data				
Sound power level (EN 12102)	dB(A)	51	51	51
Sound pressure level at 1 m distance	dB(A)	43	43	43
in a free field				
Sound pressure level at 5 m distance in a free field	dB(A)	29	29	29
Application limits				
Max. permissible pressure	MPa	0,3	0,3	0,3
Min. application limit on the heating side	°C	15	15	15
Max. application limit on the heating side	°C	60	60	60
Min. application limit, heat source	°C	-5	-5	-5
Max. application limit, heat source	°C	20	20	20
Water hardness	°dH	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35
Energy data				
Energy efficiency class, average climate, W55/W35		A+/A++	A++/A++	A+/A++
Energy efficiency class		A+/A++	A++/A++	A+/A++
Electrical data				
Frequency	Hz	50	50	50
MCB/fuse protection, controller	A	1 x B 16	1 x B 16	1 x B 16
Compressor fuse/MCB	A	3 x C 16	3 x C 16	3 x C 16
Rated voltage, controller	V	230	230	230
Rated voltage, compressor	V	400	400	400
Phases, controller		1/N/PE	1/N/PE	1/N/PE
Phases, compressor		3/PE	3/PE	3/PE
Starting current (with/without starting current limiter)	A	27/-	28/-	29/-
Versions				
Refrigerant		R410 A	R410 A	R410 A
Refrigerant charge	kg	2,6	2,5	3,35
Compressor oil		Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF
Evaporator material		1.4401/Cu	1.4401/Cu	1.4401/Cu
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu
Dimensions				
Height	mm	960	960	960
Width	mm	510	510	510
Depth	mm	680	680	680
Weights				
Weight	kg	112	120	125
Connection				
Connection on the heating side		G 1 1/4	G 1 1/4	G 1 1/4
Connection on the heat source side		G 1 1/4	G 1 1/4	G 1 1/4

		WPF 10 M	WPF 13 M	WPF 16 M
Values				
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	1,22	1,65	2,01
Min heating flow rate	m³/h	0,85	1,15	1,4
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	1,71	2,31	2,81
Flow rate, heat source side	m³/h	2,2	3,1	3,8
Internal volume, heating side	l	3,4	3,4	4,4
Internal volume, heat source side	l	4,1	4,1	4,8
Pressure differential, heating side	hPa	100	100	100
Pressure differential on the heat source side	hPa	120	230	250

Output data



Performance details to EN 14511
X Source temperature [°C]
Y Heating output [kW]

1 Flow temperature 35 °C, WPF 16 M
2 Flow temperature 60 °C, WPF 16 M
3 Flow temperature 35 °C, WPF 13 M
4 Flow temperature 60 °C, WPF 13 M
5 Flow temperature 35 °C, WPF 10 M
6 Flow temperature 60 °C, WPF 10 M

WPF 10 M

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	8,63	8,15	7,66		2,24	2,84	3,63		3,85	2,87	2,11	
0	10,02	9,46	8,87		2,23	2,84	3,61		4,49	3,33	2,46	
5	11,41	10,76	10,08	9,74	2,22	2,83	3,59	3,97	5,14	3,80	2,81	2,45
10	12,80	12,06	11,29	10,91	2,21	2,82	3,61	4,01	5,79	4,28	3,13	2,72
15	14,19	13,36	12,50	12,07	2,20	2,81	3,63	4,04	6,45	4,75	3,44	2,99
20	15,58	14,66	13,71	13,24	2,19	2,80	3,65	4,08	7,11	5,24	3,76	3,25

WPF 13 M

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	11,21	10,68	10,43		2,86	3,60	4,60		3,92	2,97	2,27	
0	12,98	12,49	11,99		2,84	3,59	4,57		4,57	3,48	2,62	
5	14,75	14,12	13,55	13,27	2,82	3,60	4,54	5,01	5,23	3,92	2,98	2,65
10	16,52	15,75	15,11	14,79	2,80	3,61	4,51	4,96	5,90	4,36	3,35	2,98
15	18,29	17,38	16,67	16,32	2,78	3,62	4,48	4,91	6,58	4,80	3,72	3,32
20	20,06	19,01	18,23	17,84	2,76	3,63	4,45	4,86	7,27	5,24	4,10	3,67

WPF 16 M

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	14,71	14,21	13,68		3,89	5,02	6,36		3,78	2,83	2,15	
0	16,99	16,31	15,62		3,91	5,02	6,34		4,35	3,25	2,46	
5	19,27	18,43	17,56	17,13	3,93	5,03	6,32	6,97	4,90	3,66	2,78	2,46
10	21,55	20,55	19,50	18,98	3,95	5,04	6,30	6,93	5,46	4,08	3,10	2,74
15	23,83	22,67	21,44	20,83	3,97	5,05	6,28	6,90	6,00	4,49	3,41	3,02
20	26,11	24,79	23,38	22,68	3,99	5,06	6,26	6,86	6,54	4,90	3,73	3,31

Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost

» Load-bearing floor

» Level, even and firm base

» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.

» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.

» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.

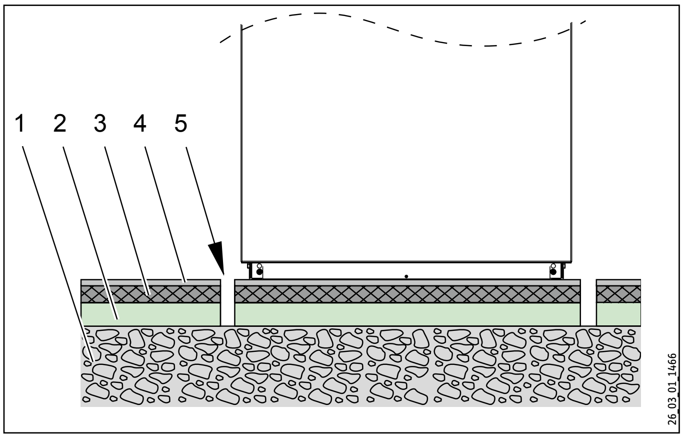
Sound emissions

Never install the heat pump immediately below or adjacent to bedrooms.

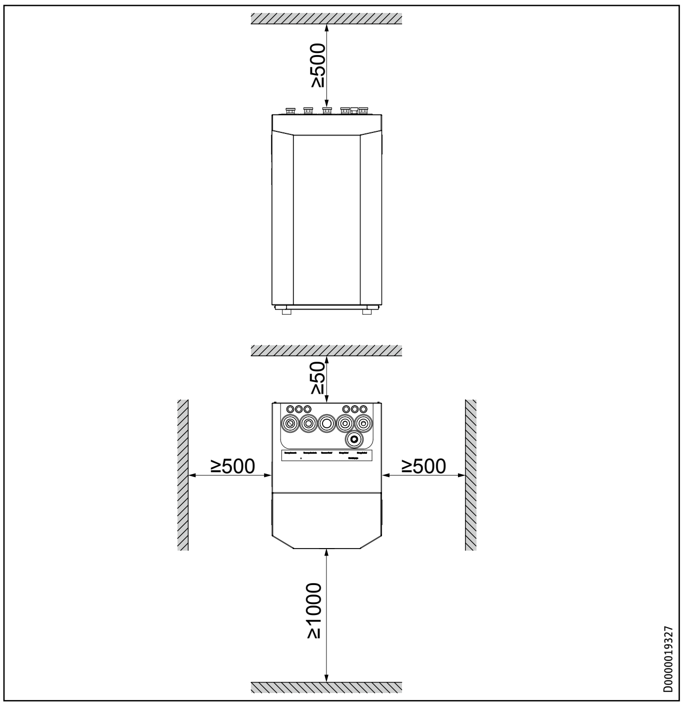
Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

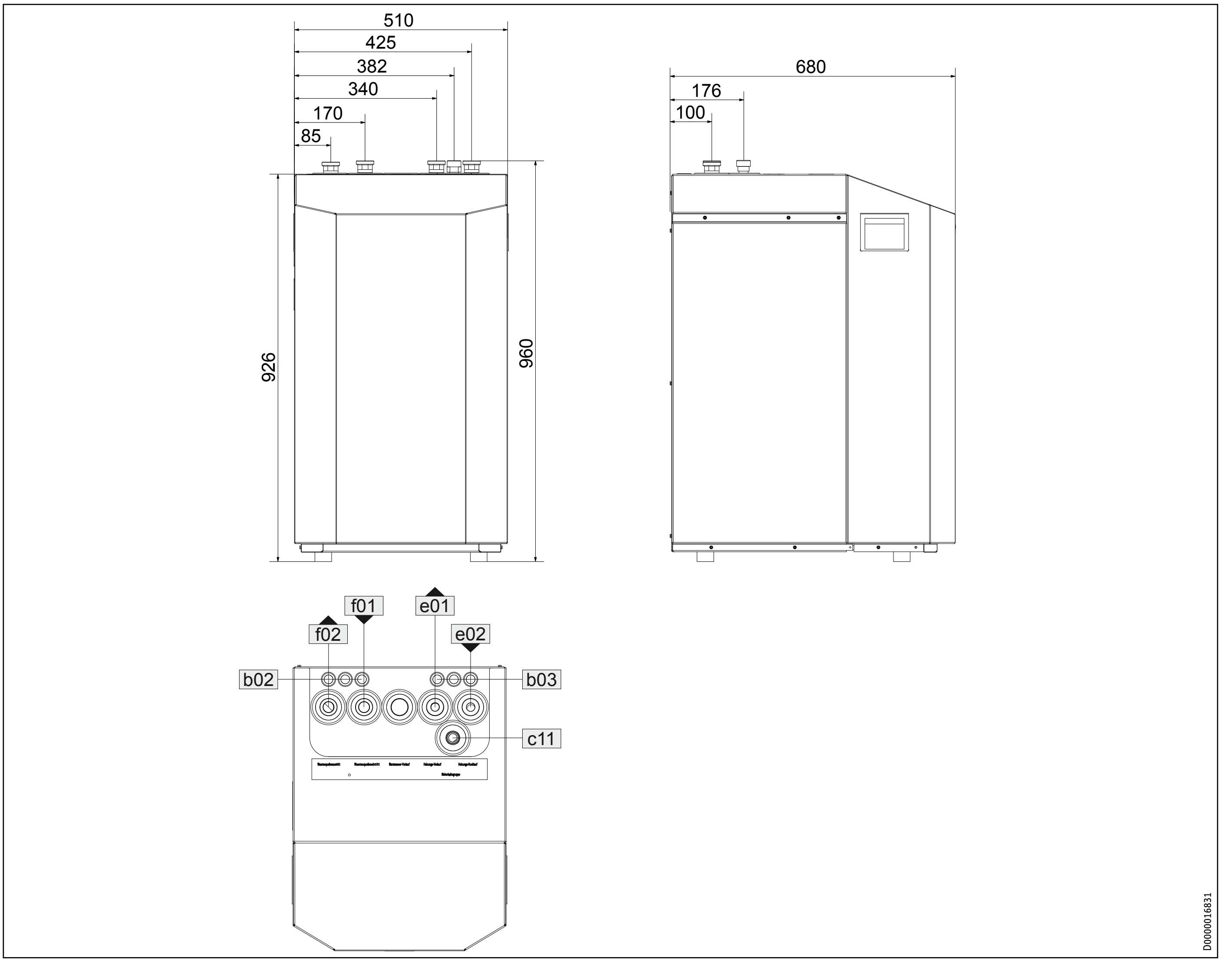
Use flexible hoses for the hydraulic connection.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Siting



			WPF 10 M	WPF 13 M	WPF 16 M
b02	Entry cables I				
b03	Entry cables II				
c11	Safety assembly				
e01	Heating flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4
e02	Heating return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4
f01	Heat source flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4
f02	Heat source return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

The required circulation pump is integrated into the heat pump.

See the adjacent table for pipe cross-sections.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Power supply

Notify your local power supply utility of the heat pump connection.

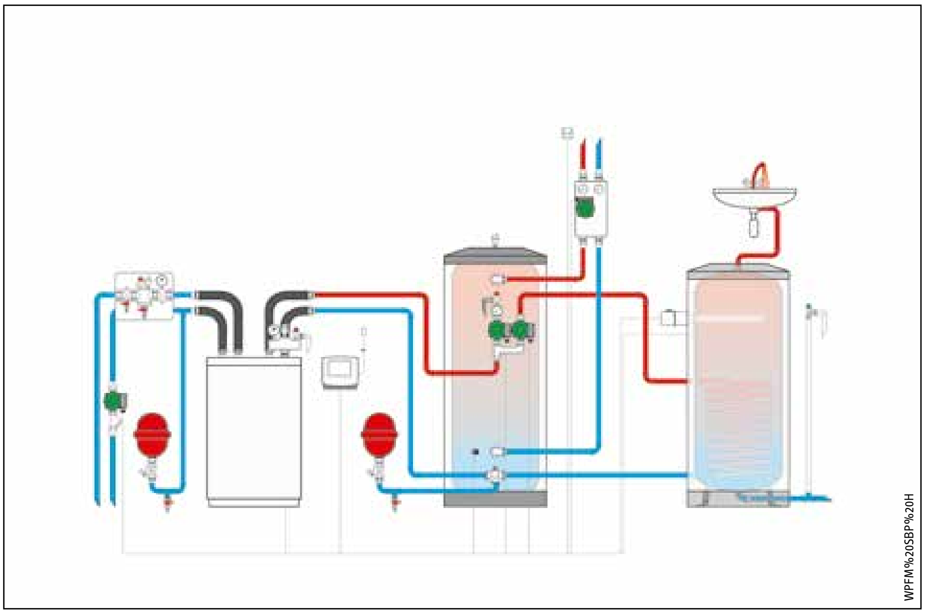
All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

Note
Observe the standards and regulations applicable in your country.

Heat pump with buffer cylinder and DHW heating



Heat pump without integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Circulation pump Type	Copper pipe DN
WPF 10 M	1,2	UP 25/7.5 E	28 x 1,5
WPF 13 M	1,6	UP 25/7.5 E	28 x 1,5
WPF 16 M	2,0	UP 25/7.5 E	35 x 1,5

WPF 20/23/26/29/32 Set

At a glance

- » Application limit WQA from − 5 °C to + 20 °C
- » Heating flow temperature up to 60 °C
- » Pipework set for heating and heat source included
- » Heat pump manager included in the pack
- » With integrated heat and electricity meters
- » A joint brine circulation pump or separate brine circulation pumps can be installed

Safety and quality

The heat pump sets each comprise two WPF M heat pumps, the pipework set for heating and heat source, and the heat pump manager. The modular design enables sizing in line with the heat demand, as well as 2-stage output matching subject to outside temperature. The heat pumps are equipped with a hermetically sealed compressor, a starting current limiter, a condenser, an evaporator, safety equipment such as high and low pressure limiters, and frost protection. The heat pump is filled with safety refrigerant R410A.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

WPF 20/23/26/29/32 Set

Specification

		WPF 20 Set	WPF 23 Set	WPF 26 Set	WPF 29 Set	WPF 32 Set
		185365	185366	182139	220896	220897
Heating output to EN 14511						
Heating output at B0/W35 (EN 14511)	kW	20,04	23,00	25,96	29,94	33,98
Power consumption to EN 14511						
Power consumption at B0/W35 (EN 14511)	kW	4,46	5,07	5,68	6,75	7,82
COP to EN 14511						
COP at B0/W35 (EN 14511)		4,49	4,54	4,57	4,44	4,35
Application limits						
Max. application limit on the heating side	°C	60	60	60	60	60
Min. application limit on the heating side	°C	15	15	15	15	15
Min. application limit, heat source	°C	-5	-5	-5	-5	-5
Max. application limit, heat source	°C	20	20	20	20	20
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35	25-35	25-35
Energy data						
Energy efficiency class		A+/A++	A+/A++	A+/A++	A+/A++	A+/A++
Energy efficiency class, average climate, W55/W35		A+/A++	A+/A++	A+/A++	A+/A++	A+/A++
Versions						
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A
Dimensions						
Height	mm	960	960	960	960	960
Width	mm	1240	1240	1240	1240	1240
Depth	mm	680	680	680	680	680
Weights						
Weight	kg	224	232	240	245	250
Values						
Min heating flow rate	m³/h	1,7	2	2,3	2,54	2,78
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	2,44	2,87	3,3	3,63	3,96
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m³/h	3,42	4,02	4,62	5,08	5,54
Flow rate, heat source side	m³/h	4,4	5,4	6,2	7,2	8,2
Available external pressure differential, heating system	hPa	280	280	280	240	240
Pressure differential on the heat source side	hPa	120	230	230	250	250

Set components

185365	WPF 20 Set	
Type	pce	Part no.
WPF 10 M	2	185349
WPMW 3	1	232980
WPKI- Set	1	232744

185366	WPF 23 Set	
Type	pce	Part no.
WPF 10 M	1	185349
WPF 13 M	1	182135
WPMW 3	1	232980
WPKI- Set	1	232744

182139	WPF 26 Set	
Type	pce	Part no.
WPF 13 M	2	182135
WPMW 3	1	232980
WPKI- Set	1	232744

220896	WPF 29 Set	
Type	pce	Part no.
WPF 13 M	1	182135
WPF 16 M	1	220894
WPMW 3	1	232980
WPKI- Set	1	232744

220897	WPF 32 Set	
Type	pce	Part no.
WPF 16 M	2	220894
WPMW 3	1	232980
WPKI- Set	1	232744

Heat pump sets

When the heating output of the largest heating heat pump becomes insufficient, two additional heat pumps are linked to form a set.

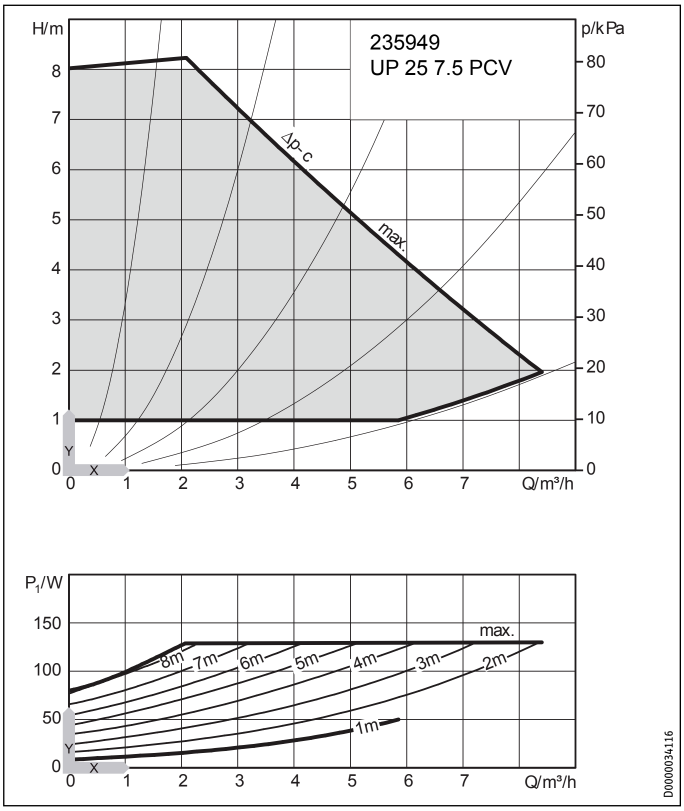
Sets can comprise heat pumps of the same output or those with different ratings.

Sets are comprised of two heat pumps, one heat pump manager in a wall mounted enclosure, two buffer charging pumps and a compact installation for the hydraulic connection of the heat pumps.

WPKI-SET

The WPKI set includes two buffer charging pumps.

» UP 30/7.5 E

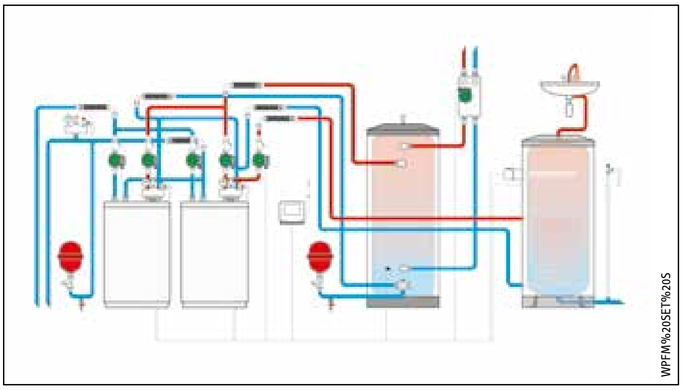


X m³/h

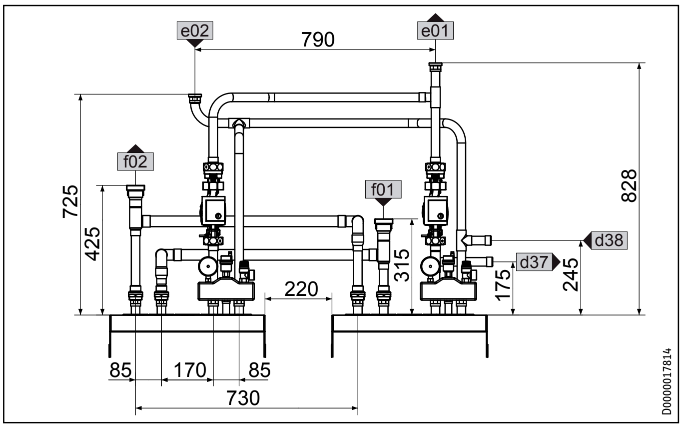
Y m

Z W

Heat pump set with 700 l buffer cylinder and DHW heating



WPKI-Set



		WPKI-Set
d37	Heat source DHW flow	
d38	Heat source DHW return	
e01	Heating flow	G 1 1/4 A
e02	Heating return	G 1 1/4 A
f01	Heat source flow	G2
f02	Heat source return	G2

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Brine pump
» Heating circuit pump
» Mixing valve
» sensors and remote control units
» Optional oil or gas boiler

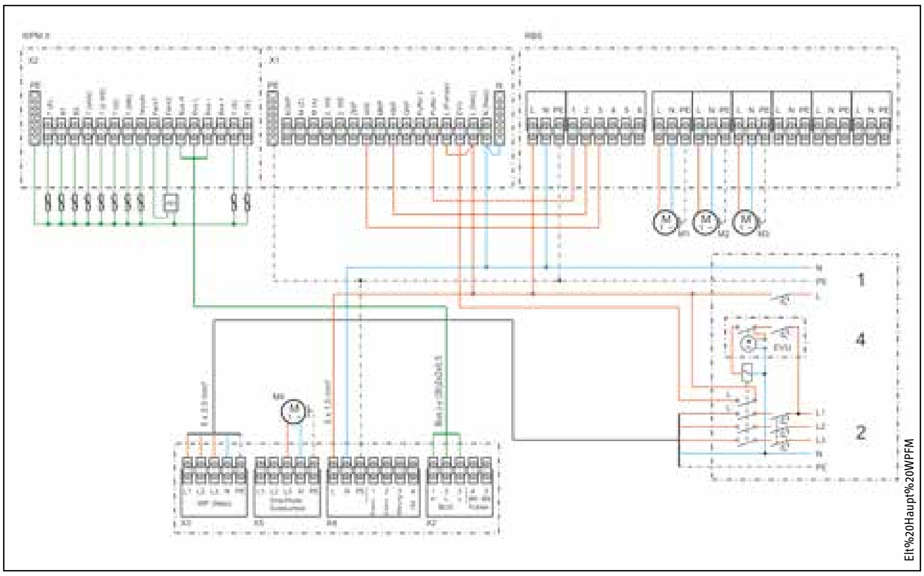
Note
Observe the standards and regulations applicable in your country.

Energy efficient pumps

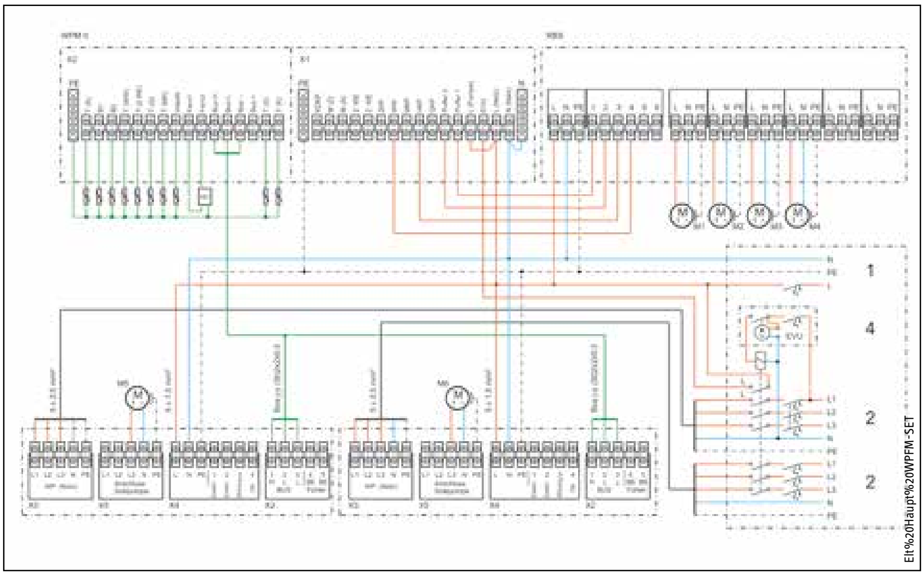
Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

Heat pump



Heat pump set



T (A)	Outside temperature sensor
B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (2.WE)	Temperature sensor for HS 2
T (Q)	Heat source temperature sensor
T (MK)	Temperature sensor, mixer circuit
T (S)	Temperature sensor, solar/cooling
T (K)	Solar temperature sensor
Pulse	Pulse heat metering
Fern1	Remote control
Fern3	Remote control
H	BUS High
L	BUS Low
-	BUS earth
+	BUS (not connected)
L/N	Power supply
EVU	Enable signal
L UP	Pumps L

Buffer 1/2	Buffer charging pump
QKP	Source circuit pump
MKP	Mixer circuit pump
HKP	Heating circuit pump
DHW	DHW primary pump
ZKP	DHW circulation pump
2.WE	Heat source 2
KOKP	Solar/cooling
M(A)	Mixer open
M(Z)	Mixer close
1	Control circuit
	1/N/PE 230V 50Hz
	Domestic meter
2	Load circuit, heat pump
	3/N/PE 400V 50Hz
	Heat pump meter
3	Power supply utility control
	Control phase L w/o power-OFF period
	Control phase L' with blocking time

WPF 20/27/35/40/52/66

At a glance

» Modular units can be cascaded for a higher output
» Two appliances may be stacked where space is at a premium
» High reliability through robust single compressor design
» High performance
» Very quiet operation
» Application limit WQA from – 5 °C to + 20 °C
» Heating flow temperature up to 60 °C
» With integrated heat and electricity meters

Safety and quality

Awards

reddot design award
winner 2008

DESIGN PLUS

SG Ready

product design award

DESIGNPREIS 2008
NOMINIERT

Required accessories

232980 WPMW 3

Appliance series as a single module with output up to 66 kW, and as a cascade up to 400 kW heating output. Sound-optimised casing design with the option of installing two appliances in stacked formation (requires WPVB accessory). Optional indoor installation or weather-protected outdoor installation. May be moved by pallet truck or hoist using lifting eyes. Robust single compressor heat pump unit with scroll compressor and stainless steel plate heat exchangers. Integral safety equipment, such as high/low pressure switch and frost protection. The heat pump is filled with safety refrigerant R410A. Corrosion-protected casing, made from white powder-coated, galvanised sheet steel and aluminium designer fascia are part of the standard delivery. Control is provided by the WPM heat pump manager, available as an accessory. Passive and active cooling is possible with the heat pump manager and additional accessories, plus a specific system design.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

WPF 27 HT

At a glance

- » Heating flow temperature up to 75 °C
- » Ideal for use for DHW heating in a WPF cascade
- » Ideal for use in older buildings
- » Two appliances may be stacked where space is at a premium
- » High reliability through robust single compressor design
- » Very quiet operation
- » High performance
- » Heat source application limits from −5 °C to 20 °C
- » With integrated heat and electricity meters

Safety and quality

Required accessories

232980 WPMW 3

High temperature brine | water heat pump for indoor installation or weather-protected outdoor installation. Up to 75 °C heating flow temperature in pure heat pump mode. DHW heating with temperatures of 60 °C without electric reheating is possible. Sound-optimised casing design with the option of installing two appliances in stacked formation (requires WPVB accessories). Robust single compressor heat pump unit with scroll compressor and stainless steel plate heat exchangers. Integral safety equipment, such as high/low pressure switch and frost protection. The heat pump is filled with safety refrigerant R134A. Corrosion-protected casing, made from white powder-coated, galvanised sheet steel and aluminium designer fascias are part of the standard delivery. Control is provided by the WPM heat pump manager, available as an accessory.

Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

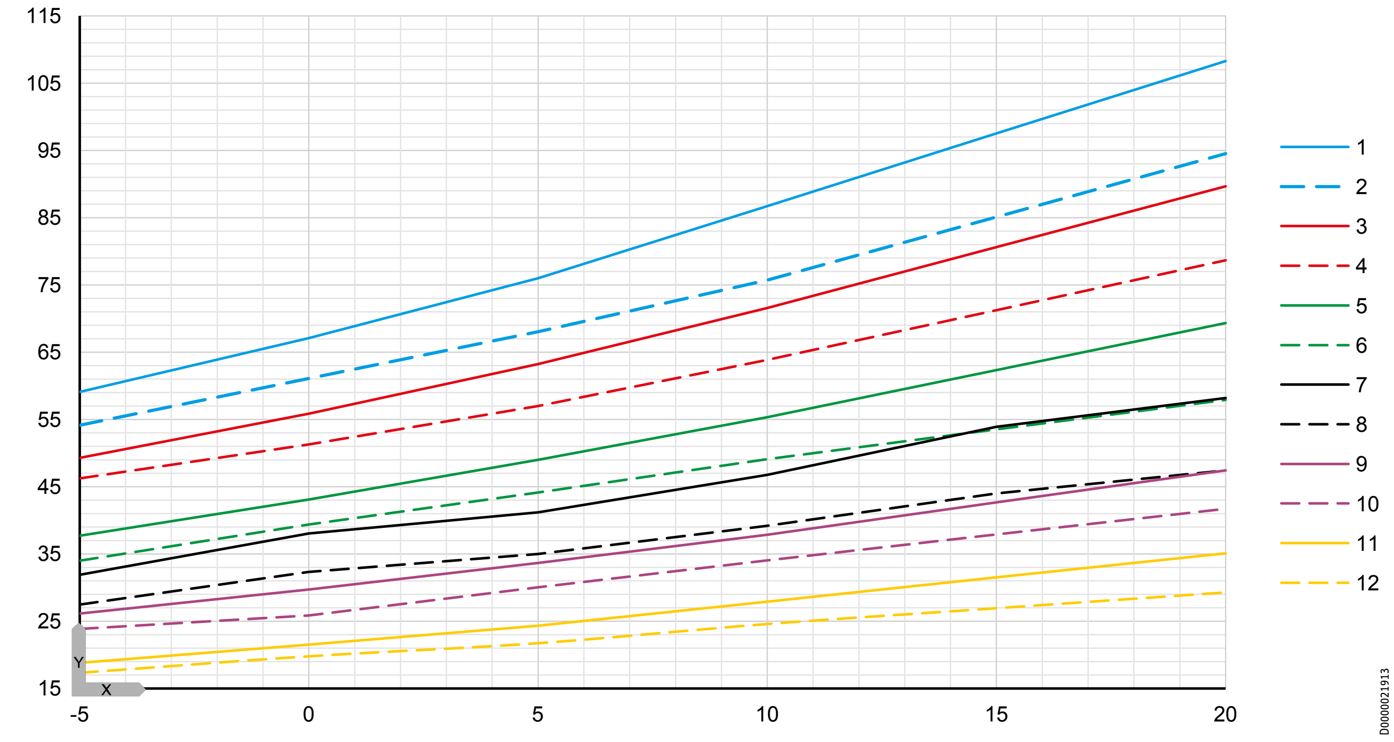
WPF 20/27/35/40/52/66

Specification

		WPF 20	WPF 27	WPF 27 HT	WPF 35	WPF 40	WPF 52	WPF 66
		233003	233004	233009	233005	233006	233007	233008
Heating output to EN 14511								
Heating output at B0/W35 (EN 14511)	kW	21,5	29,69	27,41	38,04	43,1	55,83	67,10
Power consumption to EN 14511								
Power consumption at B0/W35 (EN 14511)	kW	4,61	6,12	6,32	7,96	9,23	11,61	14,71
COP to EN 14511								
COP at B0/W35 (EN 14511)		4,66	4,85	4,34	4,78	4,67	4,81	4,56
Sound data								
Sound power level (EN 12102)	dB(A)	54	55	55	56	58	58	61
Sound pressure level at 1 m distance	dB(A)	47	47	47	48	49,9	50	53,5
in a free field								
Sound pressure level at 5 m distance in a free field	dB(A)	33	33	33	34	35,9	36	39,5
Application limits								
Min. installation room volume	m³	14	16	24	20	23	27	33
Max. permissible pressure	MPa	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Min. application limit on the heating side	°C	15	15	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	75	60	60	60	60
Min. application limit, heat source	°C	-5	-5	-5	-5	-5	-5	-5
Max. application limit, heat source	°C	20	20	20	20	20	20	20
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Concentration, mono ethylene glycol refrigerant	% vol.	25-35	25-35	25-35	25-35	25-35	25-35	25-35
Energy data								
Energy efficiency class		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Energy efficiency class, average climate, W55/W35		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Electrical data								
Frequency	Hz	50	50	50	50	50	50	50
MCB/fuse protection, controller	A	1x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16	1 x B 16
Compressor fuse/MCB	A	3 x C 32	3 x C 32	3 x C 32	3 x C 32	3 x C 35	3 x C 50	3 x C 50
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Phases, compressor		3/PE	3/PE	3/PE	3/PE	3/PE	3/PE	3/PE
Rated voltage, controller	V	230	230	230	230	230	230	230
Rated voltage, compressor	V	400	400	400	400	400	400	400
Starting current (with/without starting current limiter)	A	55/-	60/-	90/-	60/-	60/-	65/-	80/-
Max. operating current	A	15	19	23,3	23,5	30	32	41
Max. phase angle cos(phi)		0,83	0,83	0,82	0,82	0,79	0,87	0,88
Versions								
Refrigerant		R410 A	R410 A	R134a	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	5,99	7,2	5,99	10,0	10	12	14,5
Compressor oil		Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF	Emkarate RL 32 3MAF
Condenser material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Evaporator material		1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
IP rating		IP34 D	IP34 D	IP34 D	IP34 D	IP34 D	IP34 D	IP34 D
Dimensions								
Height	mm	1154	1154	1154	1154	1154	1154	1154
Width	mm	1242	1242	1242	1242	1242	1242	1242
Depth	mm	860	860	860	860	860	860	860

		WPF 20	WPF 27	WPF 27 HT	WPF 35	WPF 40	WPF 52	WPF 66
Weights								
Weight	kg	345	367	409	391	415	539	655
Connection								
Connection on the heating side		G 2	G 2	G 2	G 2	G 2	G 2	G 2
Connection on the heat source side		G 2	G 2	G 2	G 2	G 2	G 2	G 2
Connecting cable	mm^2	5 x 6,0	5 x 6,0	5 x 6,0	5 x 6,0	5 x 6,0	5 x 10,0	5 x 10,0
Values								
Permissible refrigerant pressure	MPa	4,3	4,3	2,4	4,3	4,3	4,3	4,3
Brine volume	l	11,2	13	13	16,6	16,6	20,2	23,8
Pressure differential on the heat source side	hPa	150	140	140	160	160	150	160
Pressure differential, heating side	hPa	60	52	52	80	80	60	80
Flow rate, heat source side	m^3/h	5	7	6,75	8,8	10,5	13	16,1
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m^3/h	2,65	3,65	3,29	4,48	5,3	6,86	8,26
Min heating flow rate	m^3/h	1,85	2,56	2,3	3,14	3,71	4,81	5,78
Heating flow rate (EN 14511) at A7/W35, B0/W35 and 5 K	m^3/h	3,7	5,12	4,61	6,5	7,42	9,61	11,56

Output data



Performance details to EN 14511

X Source temperature [°C]
Y Heating output [kW]
1 Flow temperature 35 °C, WPF 66
2 Flow temperature 60 °C, WPF 66
3 Flow temperature 35 °C, WPF 52
4 Flow temperature 60 °C, WPF 52
5 Flow temperature 35 °C, WPF 40
6 Flow temperature 60 °C, WPF 40
7 Flow temperature 35 °C, WPF 35
8 Flow temperature 60 °C, WPF 35
9 Flow temperature 35 °C, WPF 27
10 Flow temperature 60 °C, WPF 27
11 Flow temperature 35 °C, WPF 20
12 Flow temperature 60 °C, WPF 20

WPF 20

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	18,80	18,50	17,70	17,30	4,60	5,73	7,14	8,22	4,09	3,23	2,48	2,11
0	21,50	20,80	20,10	19,75	4,61	5,70	7,08	8,11	4,66	3,65	2,84	2,44
5	24,30	23,50	22,30	21,70	4,60	5,70	7,06	8,10	5,28	4,12	3,16	2,68
10	27,90	26,50	25,20	24,55	4,74	5,86	7,28	8,38	5,88	4,52	3,46	2,93
15	31,50	30,20	28,00	26,90	4,79	5,90	7,29	8,41	6,58	5,12	3,84	3,20
20	35,10	33,90	30,80	29,25	4,82	5,93	7,30	8,43	7,28	5,72	4,22	3,47

WPF 27

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
-5	26,14	25,23	24,30	23,84	6,09	7,49	9,53	11,14	4,29	3,37	2,55	2,14
0	29,69	28,44	26,69	25,82	6,12	7,50	9,57	11,27	4,85	3,79	2,79	2,29
5	33,63	32,03	30,68	30,01	6,15	7,54	9,47	10,97	5,47	4,25	3,24	2,74
10	37,83	36,12	34,73	34,04	6,15	7,56	9,46	10,93	6,15	4,78	3,67	3,12
15	42,63	40,67	38,80	37,87	6,19	7,56	9,46	10,94	6,89	5,38	4,10	3,46
20	47,43	45,22	42,87	41,70	6,22	7,56	9,46	10,96	7,63	5,98	4,53	3,81

WPF 35

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	31,88	30,43	28,95	28,21	8,09	9,85	12,22	13,41	3,94	3,09	2,37	2,10
0	38,04	34,39	33,62	33,24	7,96	9,91	12,09	13,18	4,78	3,47	2,78	2,52
5	41,15	39,09	37,03	36,00	8,20	10,00	12,30	13,45	5,02	3,91	3,01	2,68
10	46,73	44,23	41,70	40,44	8,20	10,08	12,30	13,41	5,70	4,39	3,39	3,02
15	53,90	50,43	47,20	45,59	8,33	10,11	12,39	13,53	6,47	4,99	3,81	3,37
20	58,16	54,67	51,03	49,21	8,37	10,20	12,43	13,55	6,95	5,36	4,11	3,63

WPF 40

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	37,70	37,20	35,60	34,80	9,22	11,34	13,80	15,61	4,09	3,28	2,58	2,23
0	43,10	41,90	40,20	39,35	9,23	11,36	13,96	15,90	4,67	3,69	2,88	2,48
5	49,00	47,30	45,20	44,15	9,32	11,43	13,99	15,91	5,26	4,14	3,23	2,78
10	55,30	52,40	50,20	49,10	9,79	11,80	14,38	16,29	5,65	4,44	3,49	3,02
15	62,30	59,20	55,40	53,50	10,06	11,96	14,50	16,44	6,19	4,95	3,82	3,26
20	69,30	66,00	60,60	57,90	10,30	12,09	14,60	16,57	6,73	5,46	4,15	3,50

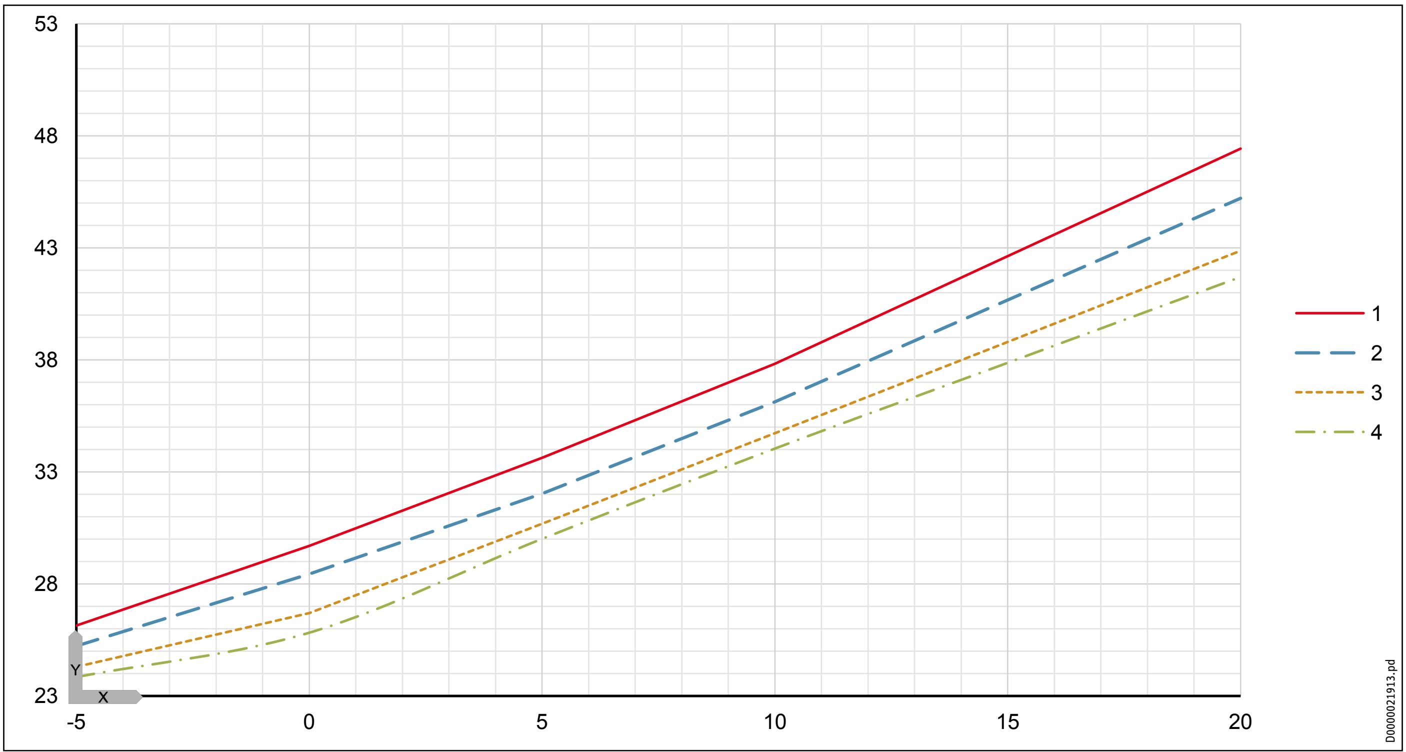
WPF 52

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	49,29	47,93	46,79	46,22	11,54	14,14	17,59	20,14	4,27	3,39	2,66	2,30
0	55,83	54,01	52,18	51,27	11,61	14,21	17,45	19,83	4,81	3,80	2,99	2,59
5	63,24	60,73	58,25	57,01	11,71	14,32	17,55	19,93	5,40	4,24	3,32	2,86
10	71,57	68,55	65,40	63,83	11,85	14,46	17,72	20,17	6,04	4,74	3,69	3,17
15	80,61	77,23	73,24	71,25	12,18	14,57	17,82	20,27	6,62	5,30	4,11	3,52
20	89,65	85,91	81,08	78,67	12,45	14,66	17,90	20,35	7,20	5,86	4,53	3,87

WPF 66

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
-5	59,10	57,00	55,10	54,15	14,56	17,87	22,04	25,13	4,06	3,19	2,50	2,16
0	67,10	64,70	62,30	61,10	14,71	17,97	22,09	25,14	4,56	3,60	2,82	2,43
5	76,00	73,00	69,70	68,05	14,81	18,16	22,20	25,20	5,13	4,02	3,14	2,70
10	86,70	82,90	78,10	75,70	15,54	18,80	22,97	26,15	5,58	4,41	3,40	2,90
15	97,50	92,90	87,70	85,10	15,83	19,00	23,20	26,39	6,16	4,89	3,78	3,23
20	108,30	102,90	97,30	94,50	16,07	19,16	23,39	26,58	6,74	5,37	4,16	3,56

Output data



X Source temperature [°C]
Y Heating output [kW]

WPF 27 HT

	Heating output					Power consumption					Coefficient of performance (COP)				
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	70 °C [kW]	75 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	70 °C [kW]	75 °C [kW]	35 °C	45 °C	55 °C	70 °C	75 °C
-5	23,10	22,30	21,40	20,50	19,60	5,90	6,90	7,90	8,90	9,90	3,92	3,23	2,71	2,30	1,98
0	26,80	25,80	24,60	23,40	22,20	6,10	7,80	8,20	8,60	9,00	4,39	3,31	3,00	2,72	2,47
5	30,90	29,80	28,40	27,00	25,60	6,40	7,40	8,60	9,80	11,00	4,83	4,03	3,30	2,76	2,33
10	35,30	34,20	32,70	31,20	29,70	6,60	7,70	9,00	10,30	11,60	5,35	4,44	3,63	3,03	2,56
15	40,30	39,00	37,30	35,60	33,90	6,80	8,00	9,40	10,80	12,20	5,93	4,88	3,97	3,30	2,78
20	46,00	44,30	42,30	40,30	38,30	7,00	8,30	9,70	11,10	12,50	6,57	5,34	4,36	3,63	3,06

Indoor installation

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

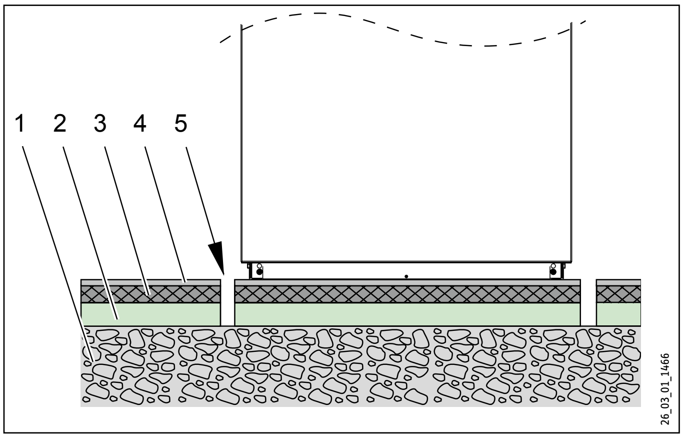
» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.
» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.

Sound emissions

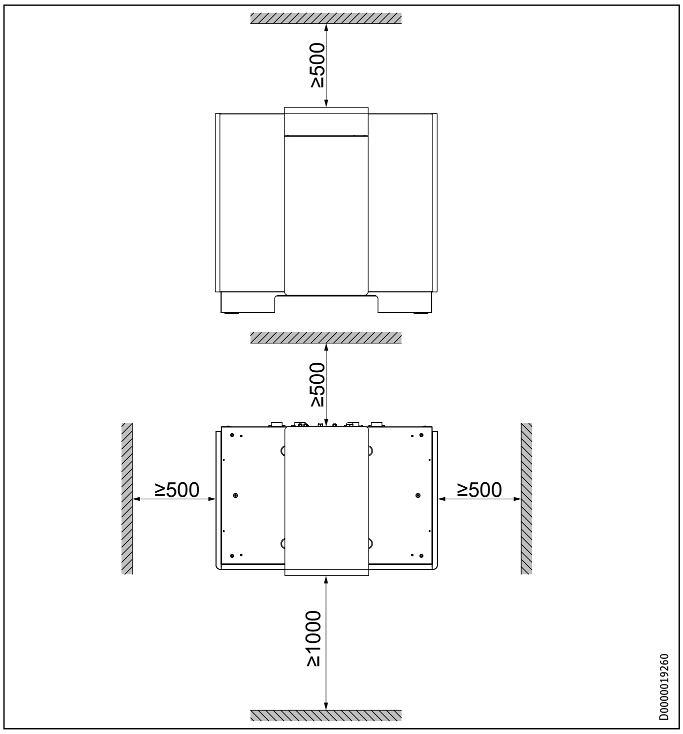
Never install the heat pump immediately below or adjacent to bedrooms.

Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess



Outdoor installation

Installation location requirements

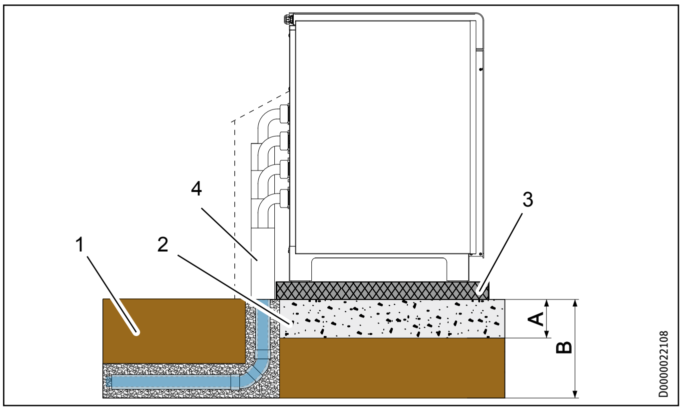
To prevent the heat pump from being damaged by frost in the case of outdoor installation, fit and electrically connect the contact sensor AVF 6 as a frost protection facility into the heating return of the heat pump.

» The foundation slab must be level and even.

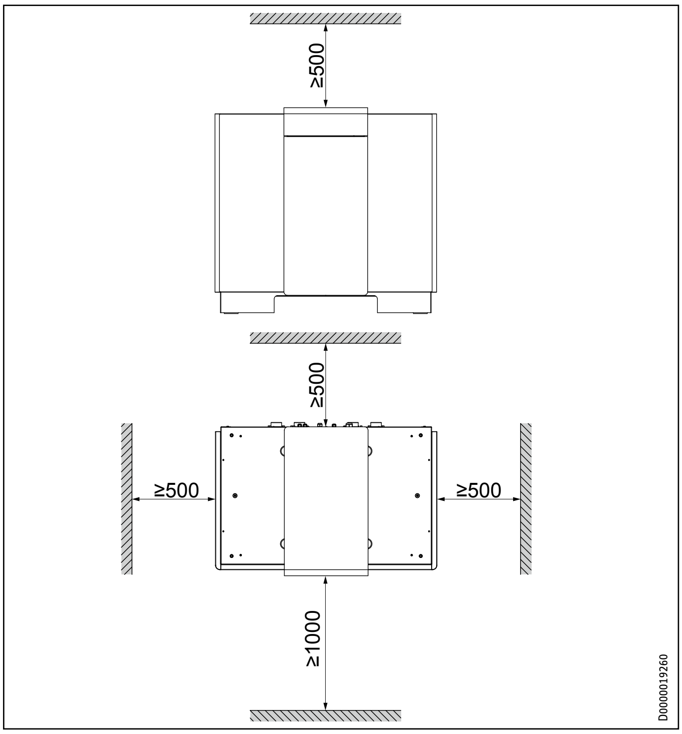
» Route all supply lines inside conduits.

» Ensure that all hydraulic lines are free from the risk of frost.

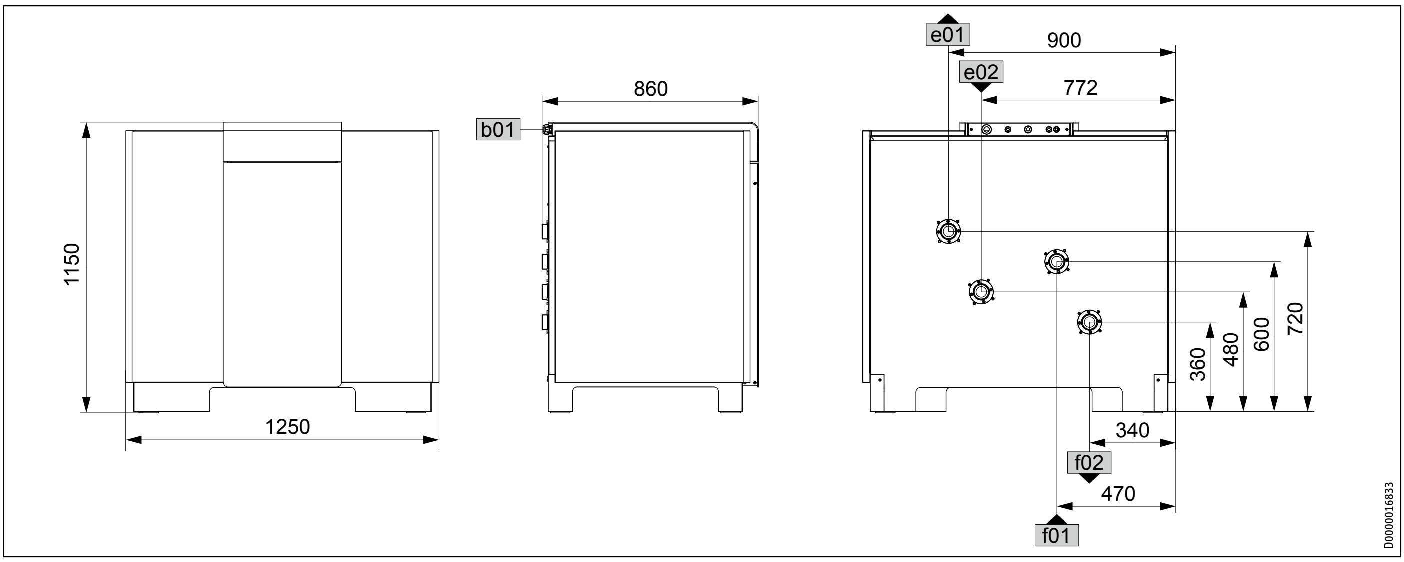
» Protect the connection area at the back panel of the heat pump against all weather and insolation.



1 Ground
2 Coarse gravel back filling
3 Concrete slab
4 Supply lines
A ≈ 200
B ≈ 800



Siting



		WPF 20	WPF 27	WPF 35	WPF 40	WPF 52	WPF 66
b01 Entry electrical cables							
e01 Heating flow	Male thread	G 2	G 2	G 2	G 2	G 2	G 2
e02 Heating return	Male thread	G 2	G 2	G 2	G 2	G 2	G 2
f01 Heat source flow	Male thread	G 2	G 2	G 2	G 2	G 2	G 2
f02 Heat source return	Male thread	G 2	G 2	G 2	G 2	G 2	G 2

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

See the adjacent table for pipe cross-sections.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

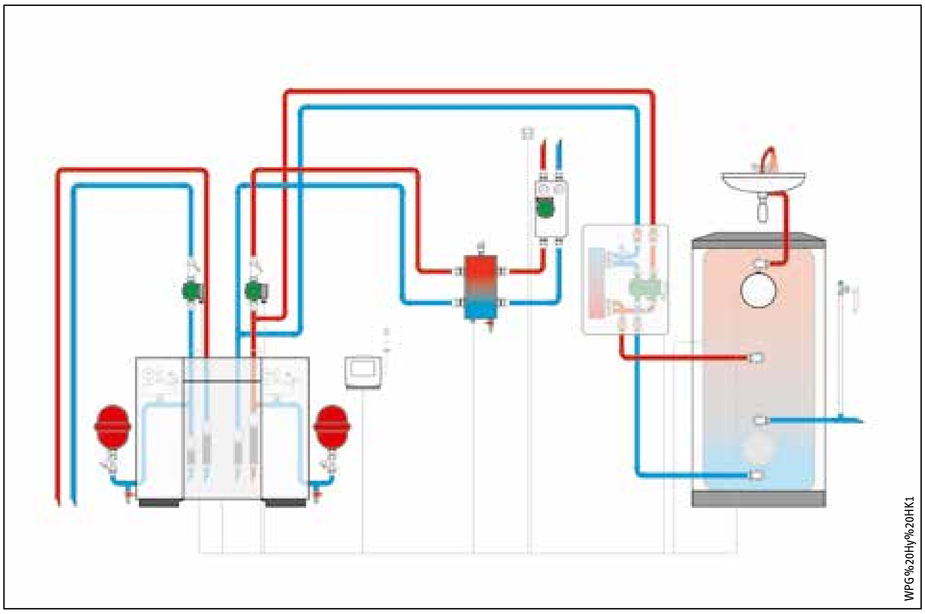
DHW heating

WPF 27 HT

Given correct engineering and installation of the system, the high heat pump flow temperatures of up to 75 °C enable the DHW cylinder to be heated up to 65 °C.

Electric reheating of the DHW for pasteurisation purposes is therefore not required.

Heat pump with low loss header and DHW heating



Heat pump without integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Circulation pump Type	Copper pipe mm
WPF 20	2,6	UP 40/1-8E	35 x 1,5
WPF 27 / WPF 27 HT	3,6	UP 40/1-8E	42 x 1,5
WPF 35	4,6	UP 40/1-8E	54 x 2,0
WPF 40	5,3	UP 50/1-12E	54 x 2,0
WPF 52	6,9	UP 50/1-12E	54 x 2,0
WPF 66	8,2	UP 50/1-12E	76 x 2,5

Heat pump Type	Flow rate m^3/h	Circulation pump Type	Copper pipe mm
WPF 80 Set	10,6	2 x UP 50/1-12E	76 x 2,5
WPF 92 Set	12,1	2 x UP 50/1-12E	76 x 2,5
WPF 104 Set	13,7	2 x UP 50/1-12E	76 x 2,5
WPF 118 Set	15,1	2 x UP 50/1-12E	89 x 2,5
WPF 132 Set	16,5	2 x UP 50/1-12E	89 x 2,5

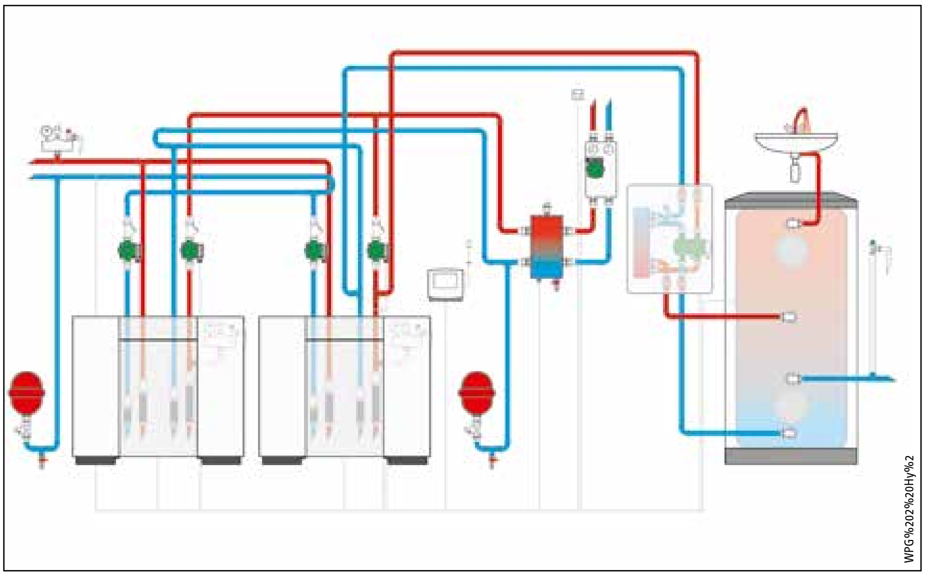
Heating system connection

Heat pump sets

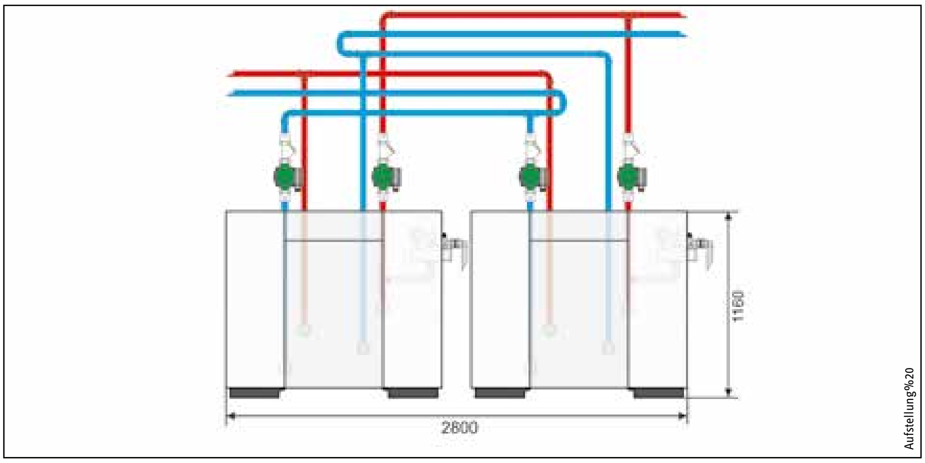
When the heating output of the largest heating heat pump becomes insufficient, two additional heat pumps are linked to form a set. Sets can comprise heat pumps of the same output or those with different ratings.

WPF 80 Set	2	WPF 40
WPF 92 Set	1	WPF 40
	1	WPF 52
WPF 104 Set	2	WPF 52
WPF 118 Set	1	WPF 52
	1	WPF 66
WPF 132 Set	2	WPF 66

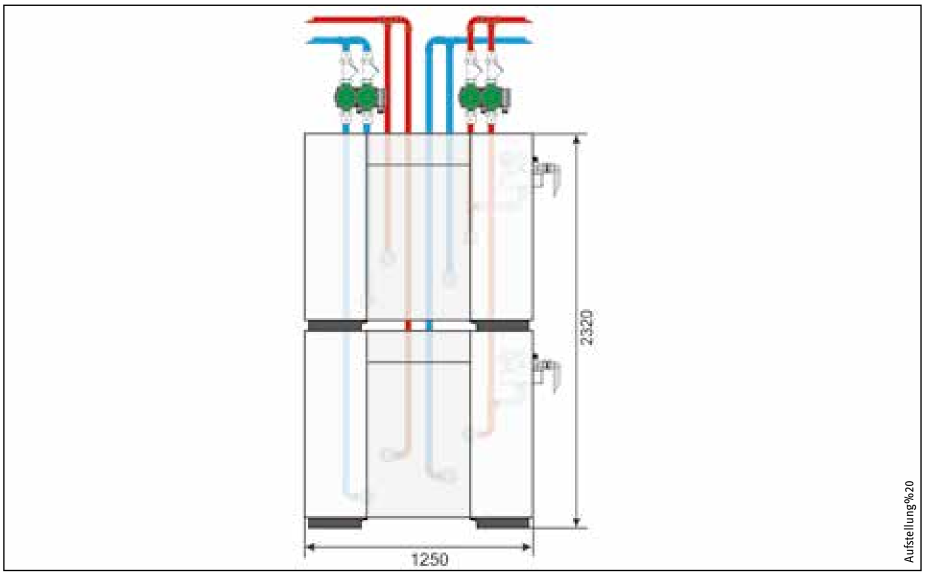
Heat pump set with low loss header and DHW heating



Siting adjacent to each other



Siting one above the other



Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the cover.

The following are connected there:

» Heat pump power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Brine pump
» Heating circuit pump
» Mixing valve
» sensors and remote control units
» Optional oil or gas boiler

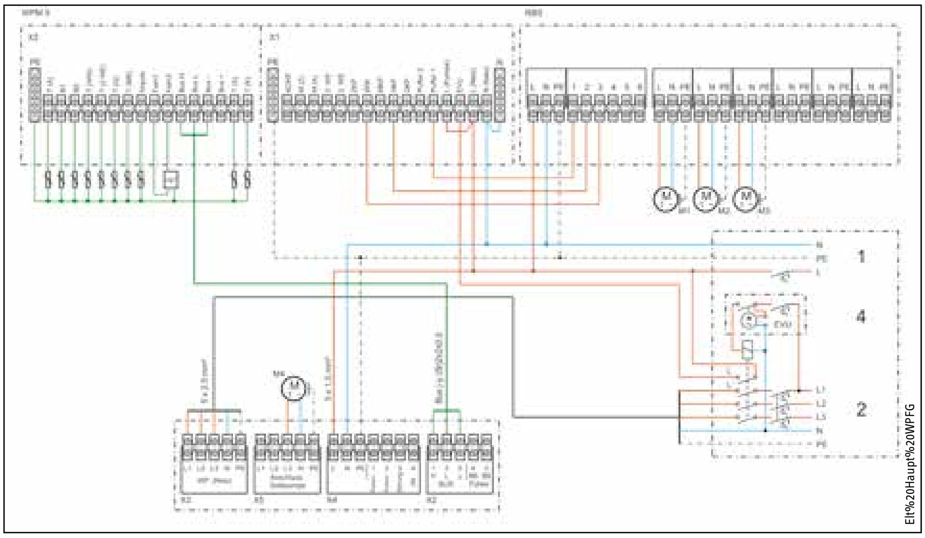
Note
Observe the standards and regulations applicable in your country.

Energy efficient pumps

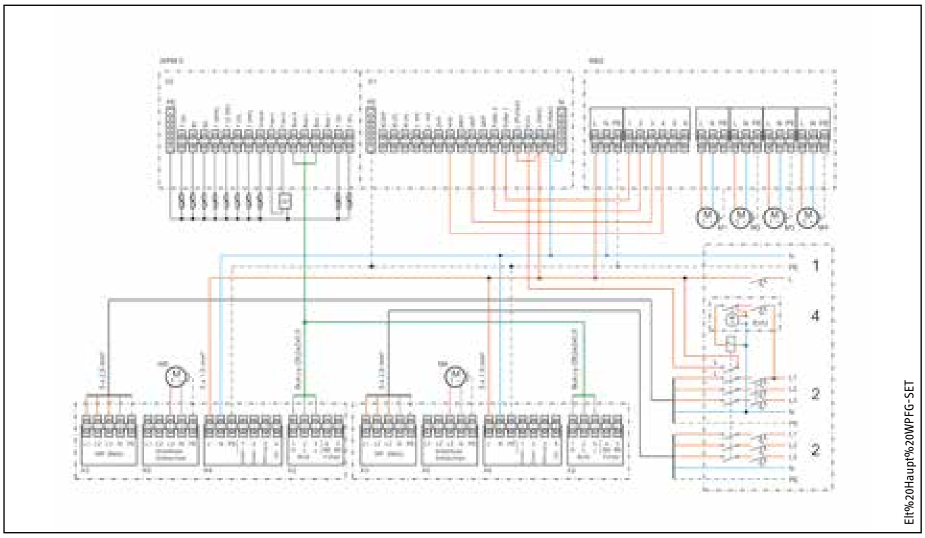
Before using energy efficient pumps, check whether they can be connected directly to the WPM or if a WPM-RBS must be used.

The energy efficienct pumps that we supply as accessories can be connected directly to the WPM.

Heat pump

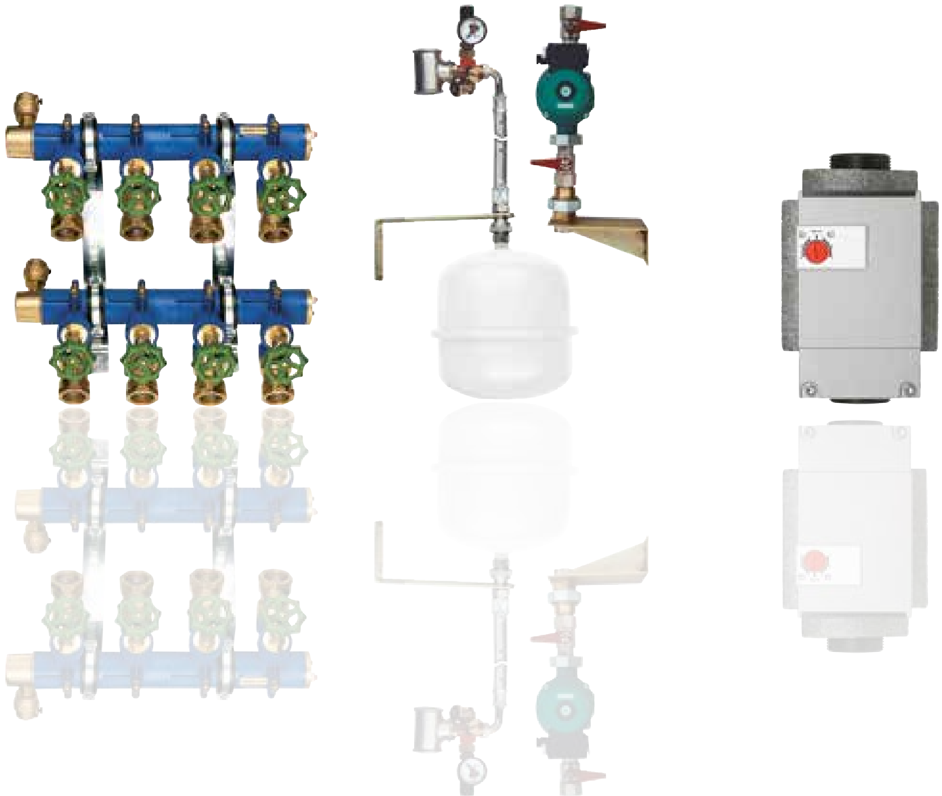


Heat pump set



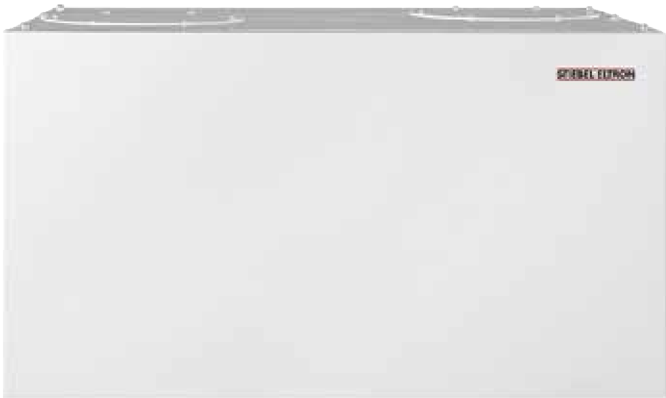
T (A)	Outside temperature sensor	MKP	Mixer circuit pump
B1	Temperature sensor, heat pump flow	HKP	Heating circuit pump
B2	Temperature sensor, heat pump return	DHW	DHW primary pump
T (WW)	Temperature sensor, DHW	ZKP	DHW circulation pump
T (2.WE)	Temperature sensor for HS 2	2.WE	Heat source 2
T (Q)	Heat source temperature sensor	KOKP	Solar/cooling
T (MK)	Temperature sensor, mixer circuit	M(A)	Mixer open
T (S)	Temperature sensor, solar/cooling	M(Z)	Mixer close
T (K)	Solar temperature sensor	1	Control circuit
Pulse	Pulse heat metering		1/N/PE 230V 50Hz
Fern1	Remote control		Domestic meter
Fern3	Remote control	3	Load circuit, heat pump
H	BUS High		3/N/PE 400V 50Hz
L	BUS Low		Heat pump meter
-	BUS earth	4	Power supply utility control
+	BUS (not connected)		Control phase L w/o power-OFF period
L/N	Power supply		Control phase L' with blocking time
EVU	Enable signal	M1	Circulation pump (max. 2 A gL); supply from the HP electricity meter
L UP	Pumps L	M2	Circulation pump (3-phase); supply from the HP electricity meter
Buffer 1/2	Buffer charging pump		
QKP	Source circuit pump		

Notes



LWM 250

LWM 250



At a glance

- Improvement of the seasonal performance factor by approx. 10 %
- Remote control with filter change indicator is part of the standard delivery
- Constant flow rate fan with low energy consumption
- High heat recovery from the extract air to save 700 W heat source output per 100 m² ventilated living area
- As option, air ducts can also be connected at the top or side
- Replaceable filter (G2)
- Wall mounting panel part of the standard delivery
- Weight: 31 kg
- Air connections: Diameter 160 mm
- Air flow rate: 250 m³/h at 200 Pa

The central extract air module can be used for heat recovery with a brine | water heat pump. When combined with a brine | water heat pump, the heat recovered from the extract air is transferred to the brine circuit. The seasonal performance factor can be improved in this way by approx. 10 %. The extract air module can be installed directly above or next to the WPC/WPF with the use of a wall mounting support. With the control unit supplied, a convenient ventilation program with three ventilation stages and the operating modes can be adjusted. A red LED signals that the filter has become contaminated and should be replaced.

Function

The appliance can be used as a central extract air module for heat recovery together with a brine | water heat pump. When combined with a brine | water heat pump, the heat recovered from the extract air is transferred to the brine circuit. Per 100 m² ventilated living space, the heat source can be reduced by approx. 700 W extraction rate. The appliance can be installed directly on the heat pump or on a wall mounting bracket. With the control unit supplied, a complete ventilation program with three ventilation stages and the operating modes can be adjusted. An LED signals that the filter has become contaminated and should be replaced.

Further accessories

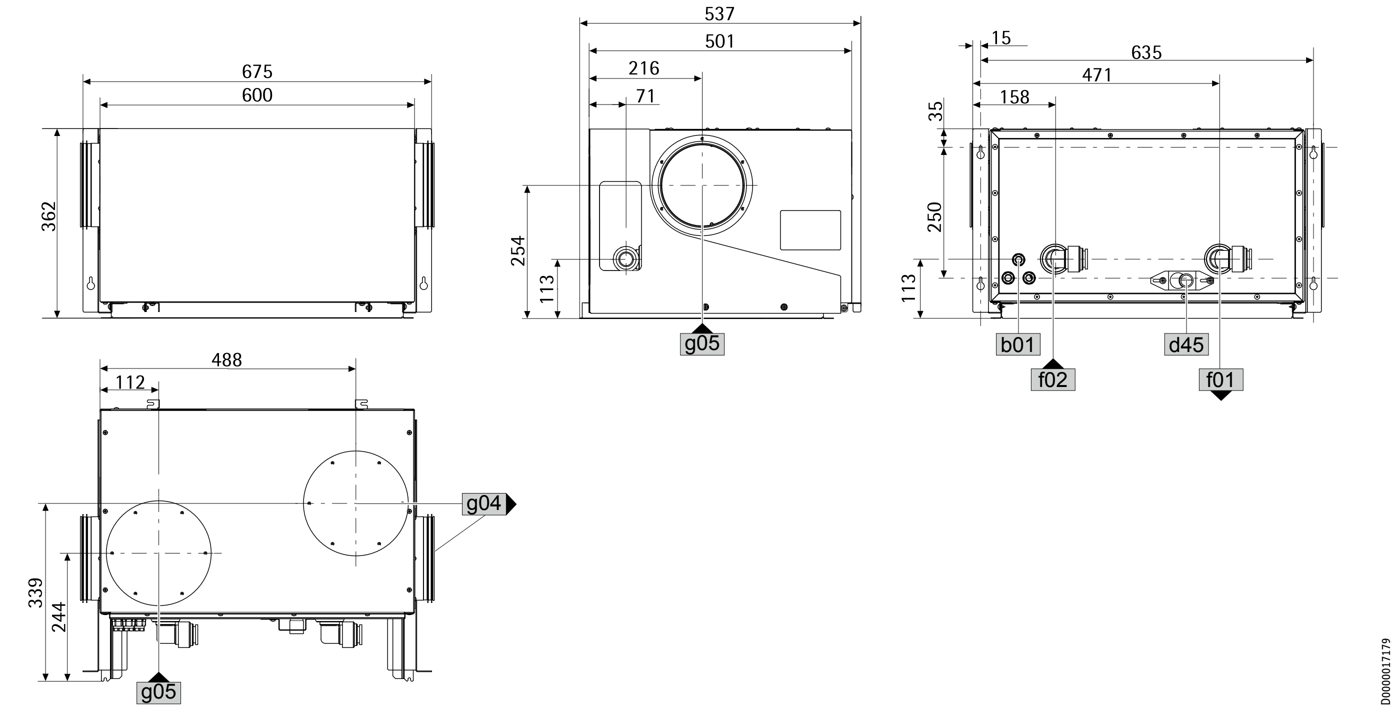
220343 FMS LWM 250

Specification

		LWM 250
		189999
Dimensions		
Height	mm	360
Width	mm	600
Depth	mm	420
Weights		
Weight	kg	31
Electrical data		
Power supply		1/N/PE ~ 230 V 50 Hz
Frequency	Hz	50
Rated voltage	V	230
MCB/fuse rating	A	C 16
Connection		
Connection		G 1 1/4
Exhaust air / extract air connection		DN 160
Condensate connection	mm	22
Values		
Available external pressure, ventilation	Pa	200
Air flow rate	m³/h	50 - 250
Extract air application range	°C	15 - 35
Sound data		
Sound power level (EN 12102)	dB(A)	43
Versions		
IP rating		IP40
Filter class		G2

LWM 250

Siting



			LWM 250
b01 Entry electrical cables			
d45 Condensate drain			
f01 Heat source flow	Diameter	mm	28
f02 Heat source return	Diameter	mm	28
g04 Exhaust air	Nominal diameter		DN 160
g05 Extract air	Nominal diameter		DN 160

Heating system connection

Install the appliance return between the heat source and the brine circuit pump.

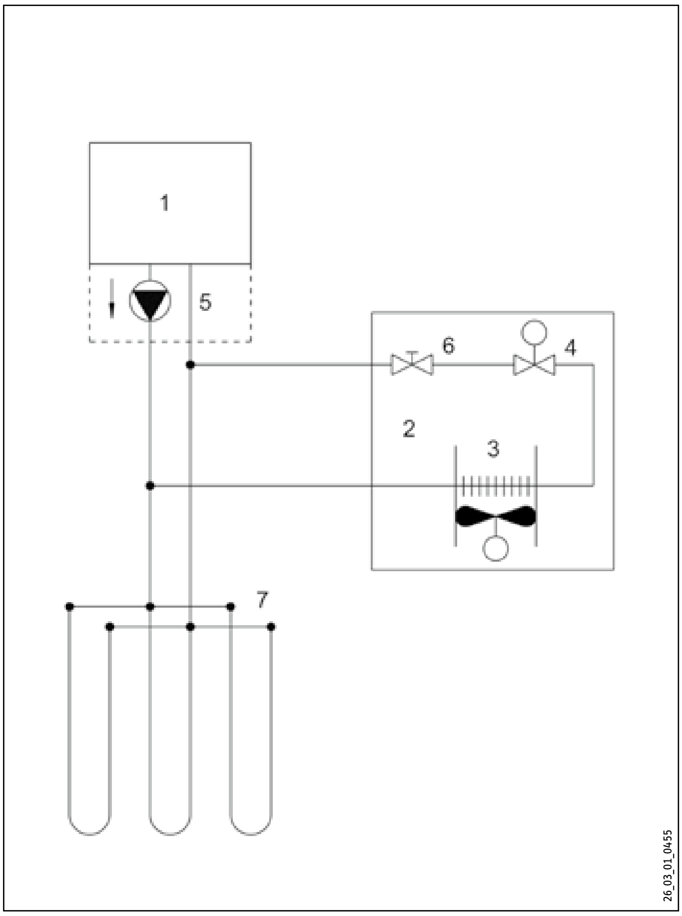
Hydronic balancing

The extract module features an integral flow regulating valve with display that enables the easy adjustment of the brine flow rate through the heat exchanger. The adjustment is subject to the extract air flow rate in standard mode.

Extract air m^3/h	Regulating valve Position
100	4
150	6
200	8
250	10
300	10

Condensate connection

A condensate drain hose has already been fitted to the appliance. Never kink the hose, to ensure the condensate drains perfectly. Upstream and downstream of the stench trap, the hose must have a steady fall of at least 10 %. Ensure the equipment is level after installation.



1 Heat pump
2 Extract air module
3 Indirect coils
4 Defrost valve
5 Brine circuit pump*
6 Flow regulating valve
7 Heat source

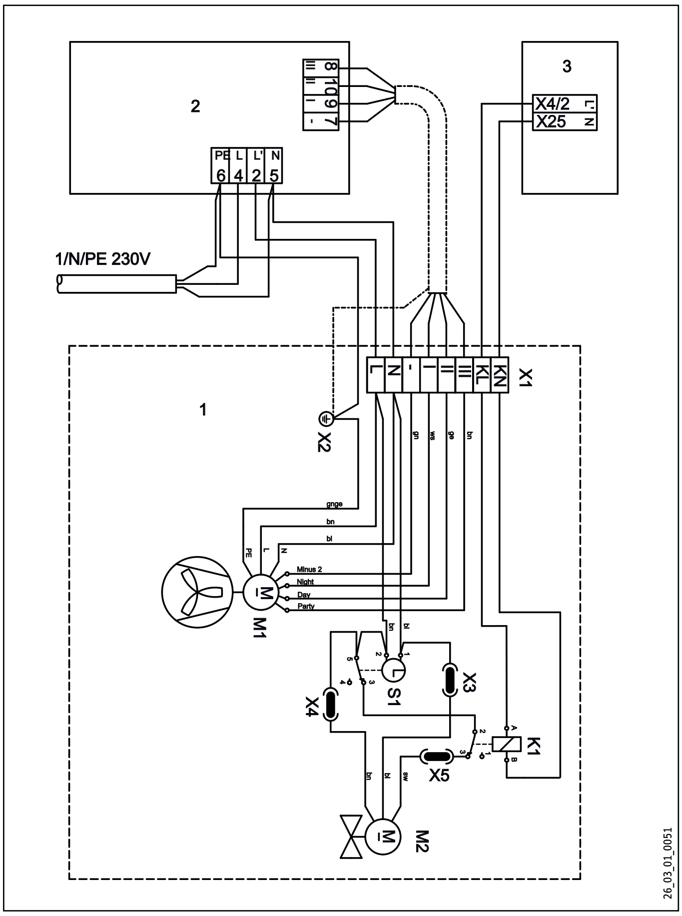
LWM 250

Power supply

Route power supply and control cables separately. The appliance must be able to be separated from the mains power supply by an additional isolator that disconnects all poles with at least 3 mm contact separation. Contactors, circuit breakers or fuses/MCB, etc. can be used for this purpose, which must be installed on site. The terminals are located beneath the lower front fascia, top right hand side.

Air routing

Engineering and installation in accordance with our technical guides.



1 Extract air module
2 FEM control unit
3 Heat pump, "cooling" output
M1 Fan motor
M2 Motorised valve
K1 "Cooling" relay
S1 Time switch
X1 Terminal
X2 Earth block

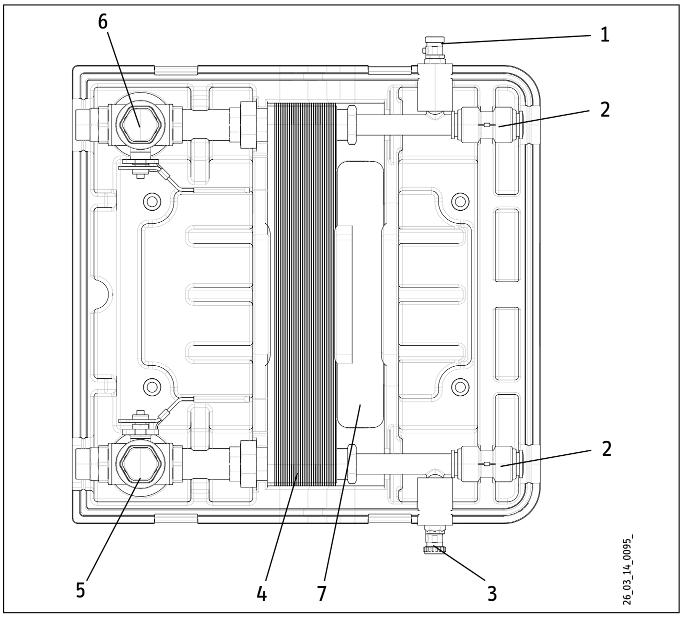
At a glance

- » For the use of groundwater as a heat source
- » For connection to brine | water heat pumps
- » Thermally insulated casing
- » High operational reliability

Module with intermediate heat exchanger for the use of groundwater as a heat source. The groundwater station can be connected to all brine | water heat pumps, with the exception of large modules. The groundwater station comprises a stainless steel plate heat exchanger with 34 plates (GWS 1) or 60 plates (GWS 2), two 3-way diverter valves as shut-off valves with drain & fill valves and a duplex casing made from thermally insulating plastic.

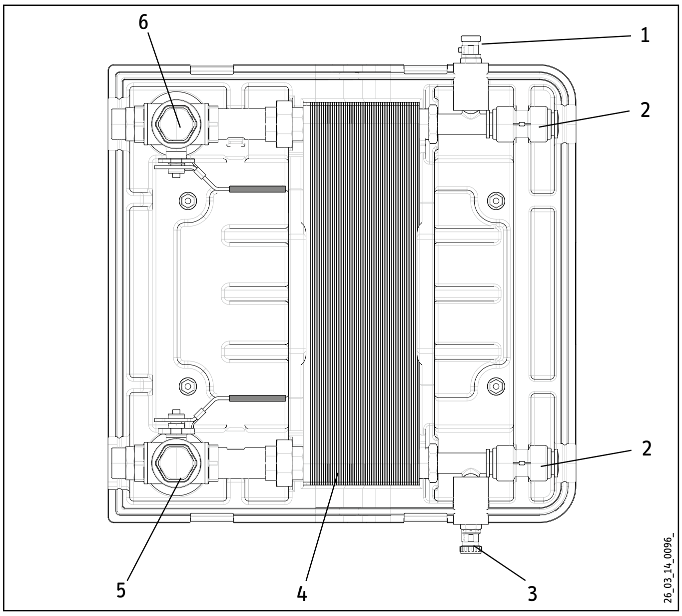
		GWS 1	GWS 2
		230659	230660
Height	mm	630	630
Width	mm	640	640
Depth	mm	230	230
Weight	kg	20,5	26,5
Connection on the heat source side		G 1 1/4	G 1 1/4
Heat pump connection		28 mm	28 mm
Max. application limit, heat source	°C	20	20
Min. application limit, heat source	°C	7	7
Max. permissible pressure	MPa	0,3	0,3

GWS 1

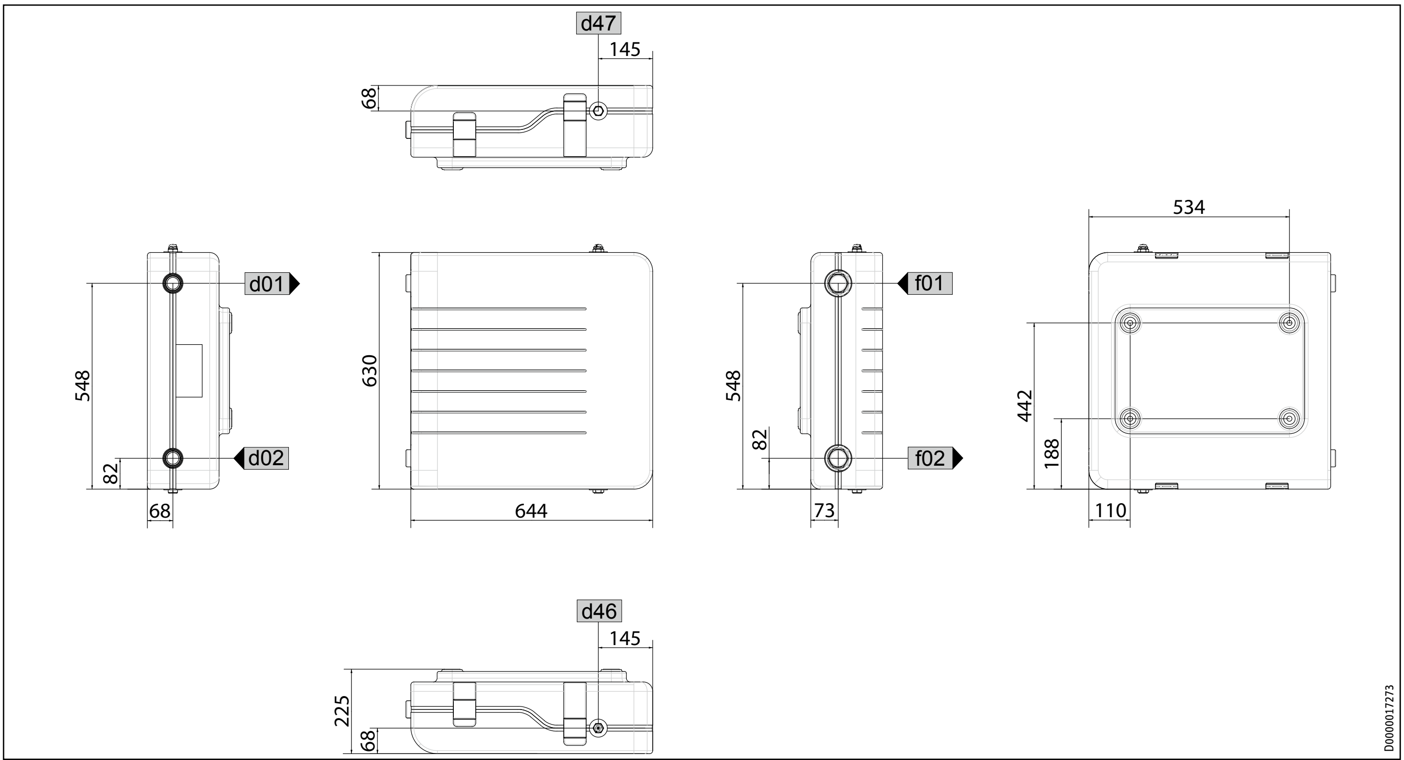


1 Air vent valve
2 Plug-in connector
3 Drain & fill valve
4 Indirect coils
5 3-way ball valve with flushing facility
6 3-way ball valve with flushing facility
7 Intermediate piece made from EPP

GWS 2

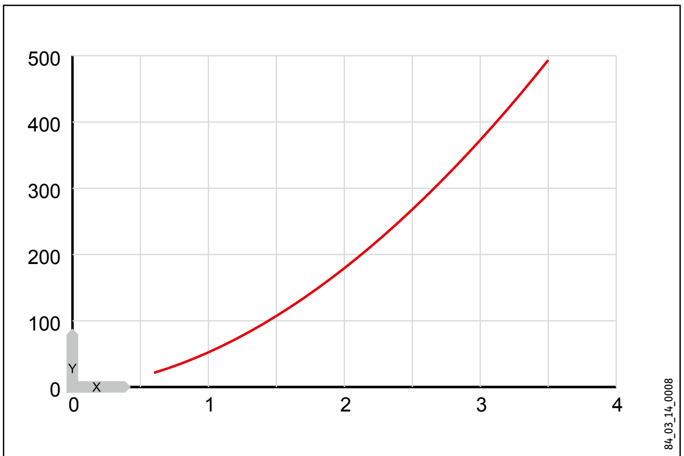


1 Air vent valve
2 Plug-in connector
3 Drain & fill valve
4 Indirect coils
5 3-way ball valve with flushing facility
6 3-way ball valve with flushing facility



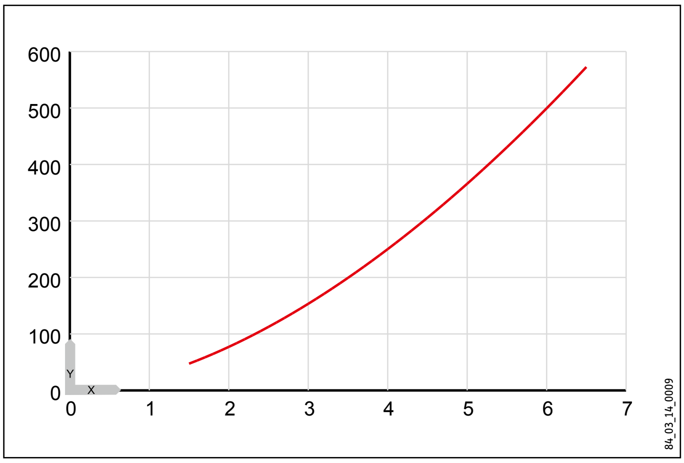
			GWS 1	GWS 2
d01 Heat pump flow	Diameter	mm	28	28
d02 Heat pump return	Diameter	mm	28	28
d46 Ventilation				
d47 Drain				
f01 Heat source flow	Male thread		G 1 1/4	G 1 1/4
f02 Heat source return	Male thread		G 1 1/4	G 1 1/4

GWS1



x Flow rate [m³/h]
Y Pressure drop [mbar]
1 Pressure drop curve, heat source system
2 Pressure drop curve, heat consumer system

GWS2



x Flow rate [m³/h]
Y Pressure drop [mbar]
1 Pressure drop curve, heat source system
2 Pressure drop curve, heat consumer system

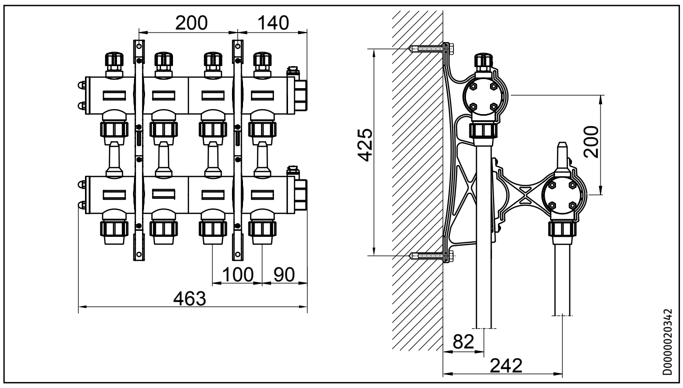
WPSV 25-4

WPSV 25-4

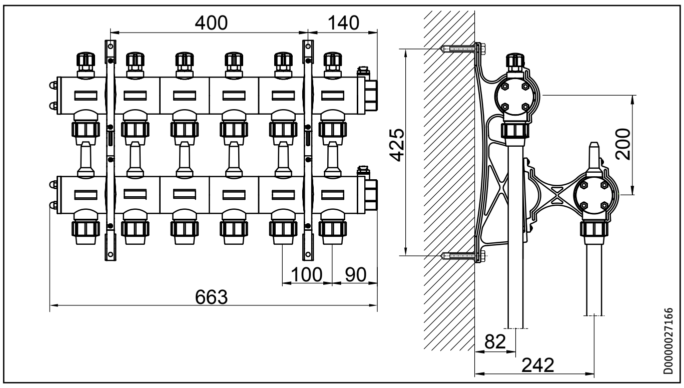
Plastic flow and return distributor for the brine circuits. Every brine circuit is fitted with shut-off devices (ball valves with clamp fittings); connections at the flow and return R 1 1/4, incl. wall mounting brackets and air vent valves for each distributor.

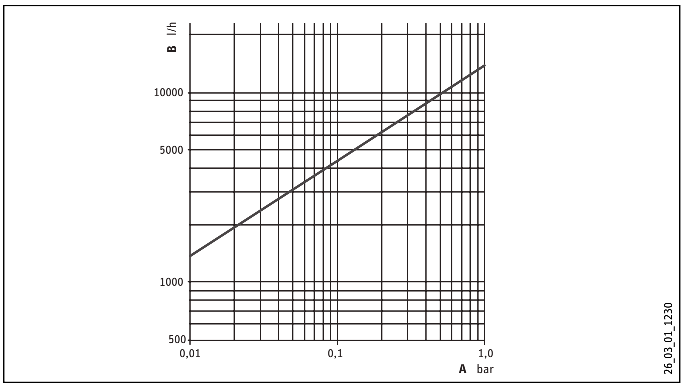
		WPSV 25-4	WPSV 25-6	WPSV 32-4	WPSV 32-6	WPSV 40-4	WPSV 40-6
		232460	232461	232462	232463	232464	232465
Number of brine circuits		4	6	4	6	4	6
Max. operating pressure	MPa	0,6	0,6	0,6	0,6	0,6	0,6
Nominal diameter DN		DN20	DN20	DN25	DN25	DN 32	DN 32
Distributor length	mm	463	663	463	663	463	663
Heat pump connection		R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4
Flow/return connection		R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4	R 1 1/4
Flow meter, indicator red marking 1	l/h	100	100	100	100		
Flow meter, indicator red marking 2	l/h	250	250	250	250		
Flow meter, indicator red marking 3	l/h	350	350	350	350		
Flow meter, indicator red marking 4	l/h	450	450	450	450		
Flow meter, indicator red marking 5	l/h	600	600	600	600		
Flow meter, indicator black marking 1	l/h					500	500
Flow meter, indicator black marking 2	l/h					800	800
Flow meter, indicator black marking 3	l/h					1100	1100
Flow meter, indicator black marking 5	l/h					1400	1400
Flow meter, indicator black marking 4	l/h					1780	1780

WPSV 25-4/32-4/40-4

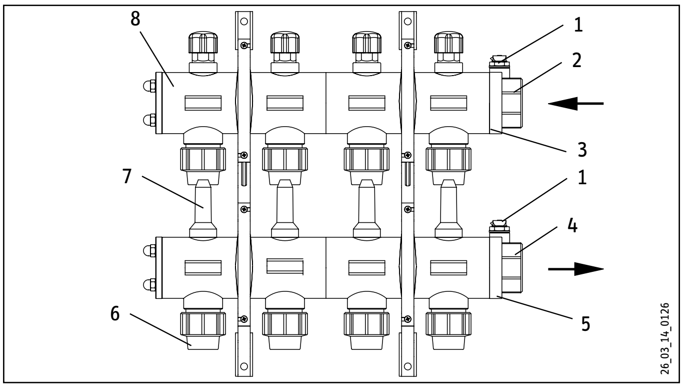


WPSV 25-6/32-6/40-6





A Pressure drop
B Throughput



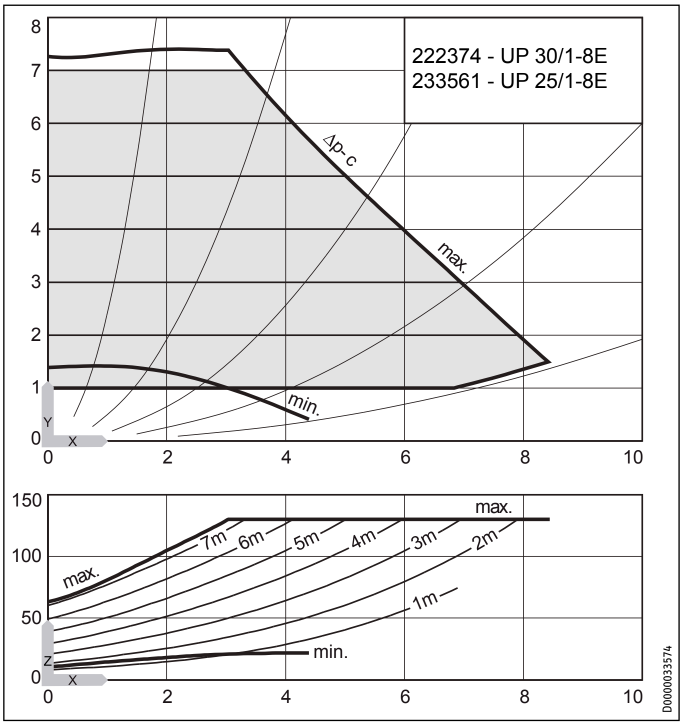
1 Air vent valve
2 Heat pump return
3 Brine return distributor
4 Heat pump flow
5 Brine flow distributor
6 Locking ring fitting
7 Flow meter
8 Shut-off valve

WPSB 308 E

WPSB 308 E

Compact assembly with wall mounting bracket for the heat source system (brine) for quick and easy installation. Comprises a high efficiency brine circulation pump, incl. shut-off valves, brine-resistant 25 litre expansion vessel with wall mounting bracket, pressure gauge, safety valve, drain & fill valve and insulation shell for the high efficiency brine circulation pump.

		WPSB 308 E
		222375
Expansion vessel	l	25
Pre-charge pressure	MPa	0,15
Safety valve	bar	2,5
Heat pump connection		G 1 1/4
Connection on the heat source side		G 1 1/4
Flow rate	m³/h	2,0
Max. head	m	7,0
Rated voltage	V	230
Phases		1/N/PE
Frequency	Hz	50
Circulation pump type		Stratos PARA 30/1-8 E



X = Delivery flow rate in m³/h

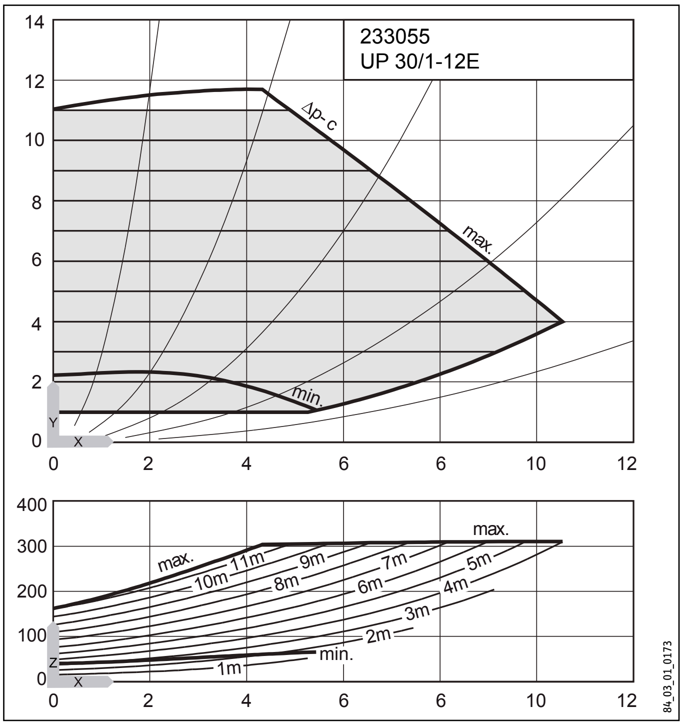
Y = delivery head in m

Z = power consumption in W

WPSB 312 E

Compact assembly with wall mounting bracket for the heat source system (brine) for quick and easy installation. Comprises a high efficiency brine circulation pump, incl. shut-off valves, brine-resistant 25 litre expansion vessel with wall mounting bracket, pressure gauge, safety valve, drain & fill valve and insulation shell for the high efficiency brine circulation pump.

		WPSB 312 E
		232883
Expansion vessel	l	25
Pre-charge pressure	MPa	0,15
Safety valve	bar	2,5
Heat pump connection		G 1 1/4
Connection on the heat source side		G 1 1/4
Flow rate	m³/h	2,0
Max. head	m	11,0
Rated voltage	V	230
Phases		1/N/PE
Frequency	Hz	50
Circulation pump type		Stratos PARA 30/1-12 E



X = Delivery flow rate in m³/h

Y = delivery head in m

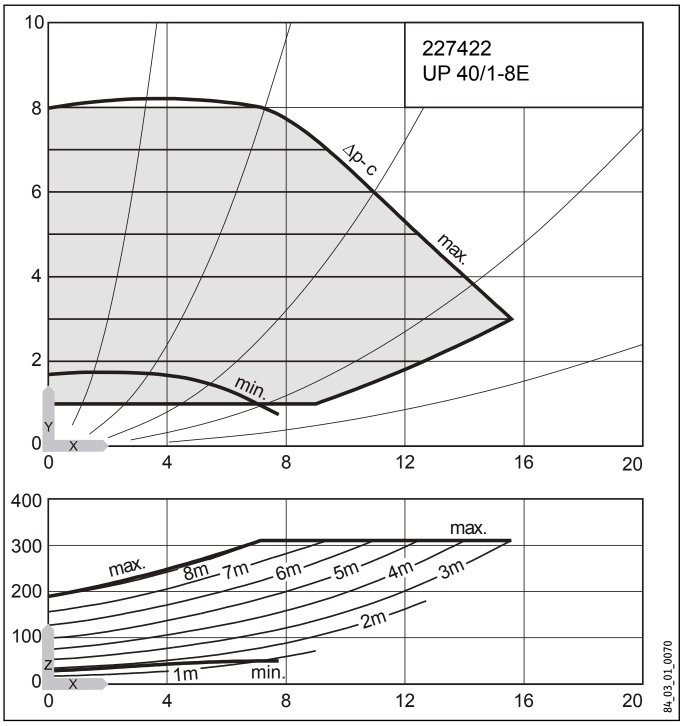
Z = power consumption in W

WPSB 408 E

WPSB 408 E

Compact assembly with wall mounting bracket for the heat source system (brine) for quick and easy installation. Comprises a high efficiency brine circulation pump, incl. shut-off valves, brine-resistant 25 litre expansion vessel with wall mounting bracket, pressure gauge, safety valve, drain & fill valve and insulation shell for the high efficiency brine circulation pump.

		WPSB 408 E
		232884
Expansion vessel	l	25
Pre-charge pressure	MPa	0,15
Safety valve	bar	2,5
Heat pump connection		G 1 1/4
Connection on the heat source side		G 2
Flow rate	m³/h	4,0
Max. head	m	8
Rated voltage	V	230
Phases		1/N/PE
Frequency	Hz	50
Circulation pump type		Stratos 40/1-8 E



X = Delivery flow rate in m³/h
Y = delivery head in m
Z = power consumption in W

WPSF

Multifunction brine filling unit, including vapour diffusion-proof insulation for filling and flushing the brine circuit, for straightforward and quick installation on the heat source side. Suitable for brine | water heat pumps with a heating output of up to 16 kW. Other equipment includes a brine safety valve, pressure gauge, filter, quick-action air vent valve and microbubble separator.

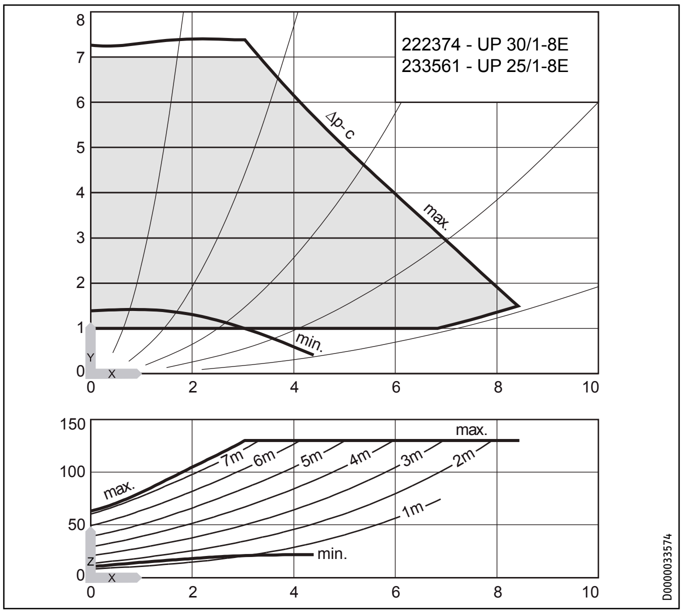
		WPSF
		233307
Height	mm	239
Width	mm	337
Weight	kg	3,2
Max. operating pressure	MPa	0,6
Safety valve response pressure	MPa	0,3
Connection on the heat source side		G 1 1/4 A
Flow capacity with filter	m³/h	8,55
Flow capacity without filter	m³/h	13,22
Min. application limit, heat source	°C	-5
Max. application limit, heat source	°C	40

UPF 30/1-8 E

UPF 30/1-8 E

Energy efficient brine circuit pump (EEI ≤ 0.23), electronic control, with vapour diffusion-proof thermal insulation.

		UPF 30/1-8 E
		232532
Rated voltage	V	230
Connection		G 2
Phases		1/N/PE
Frequency	Hz	50
Power consumption	W	8-130
Installed length (gauge)	mm	180
IP rating		IP44
Energy Efficiency Index EEI		0,23
Head	m	8
Max. flow rate	m³/h	8,0

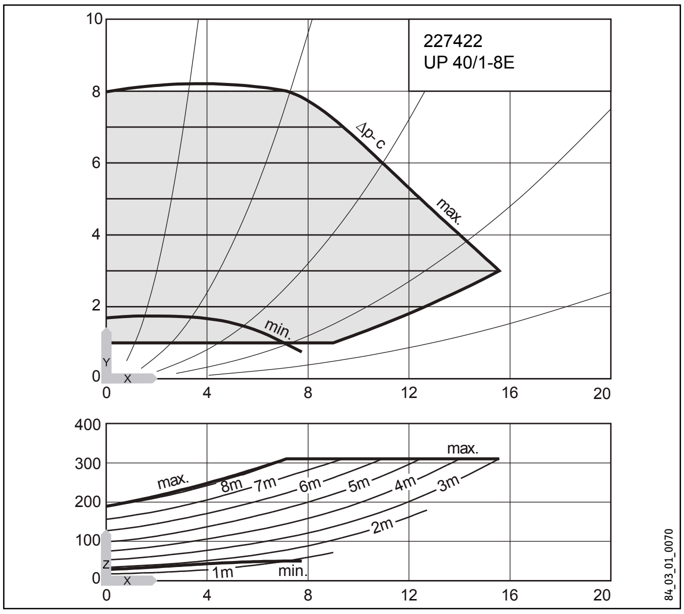


X = Delivery flow rate in m^3/h
Y = delivery head in m
Z = power consumption in W

UPF 40/1-8 E

Energy efficient brine circuit pump (EEI ≤ 0.23), electronic control, with vapour diffusion-proof thermal insulation.

		UPF 40/1-8 E
		227413
Rated voltage	V	230
Connection		DN 40
Phases		1/N/PE
Frequency	Hz	50
Power consumption	W	12-310
Installed length (gauge)	mm	180
IP rating		IP44
Energy Efficiency Index EEI		0,23
Head	m	8,0
Max. flow rate	m³/h	15,0



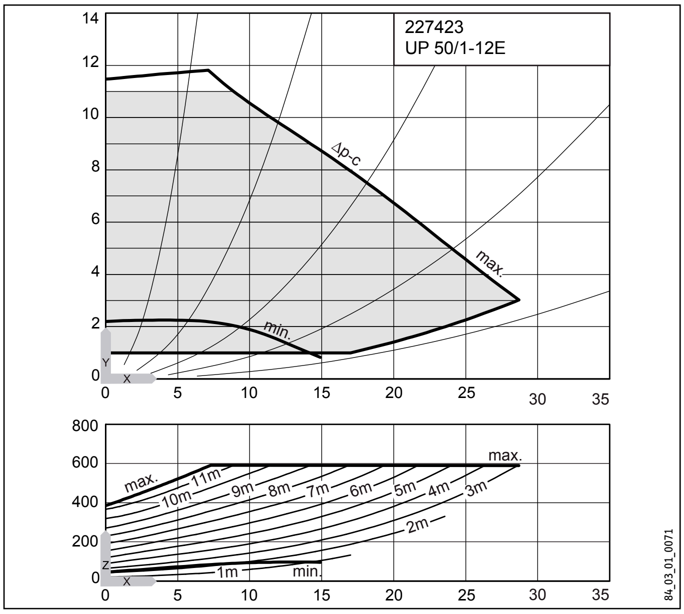
X = Delivery flow rate in m^3/h
Y = delivery head in m
Z = power consumption in W

UPF 50/1-12 E

UPF 50/1-12 E

Energy efficient brine circuit pump (EEI ≤ 0.23), electronic control, with vapour diffusion-proof thermal insulation.

		UPF 50/1-12 E
		227414
Rated voltage	V	230
Connection		DN 50
Phases		1/N/PE
Frequency	Hz	50
Power consumption	W	25-590
Installed length (gauge)	mm	180
IP rating		IP44
Energy Efficiency Index EEI		0,23
Head	m	11,0
Max. flow rate	m³/h	29,0



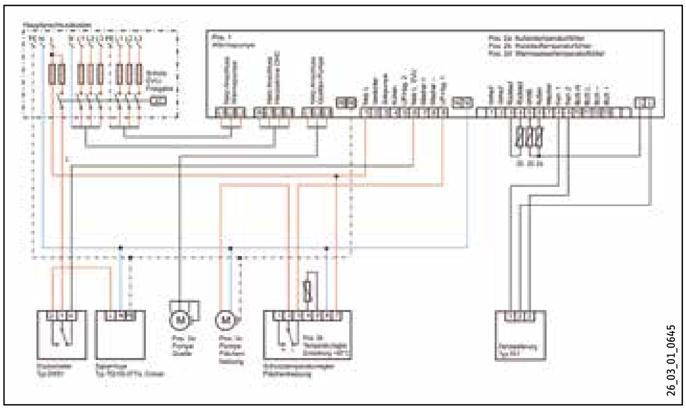
X = Delivery flow rate in m³/h
Y = delivery head in m
Z = power consumption in W

DWS1

DWS1

Brine pressure switch for the geothermal collectors and probes in accordance with VDI 4640 for leak detection.

	DWS1
	221382
Suitable for	Brine | water heat pumps



DEV

Brine-resistant expansion vessel for the heat source system of a brine | water heat pump

		MAG 12	MAG 18	MAG 25	MAG 50
		235218	235219	235220	235221
Contents	l	12	18	25	50
Pre-charge pressure	MPa	0,05	0,05	0,05	0,05
Connection		R 3/4	R 3/4	R 3/4	R 3/4

MEG 30

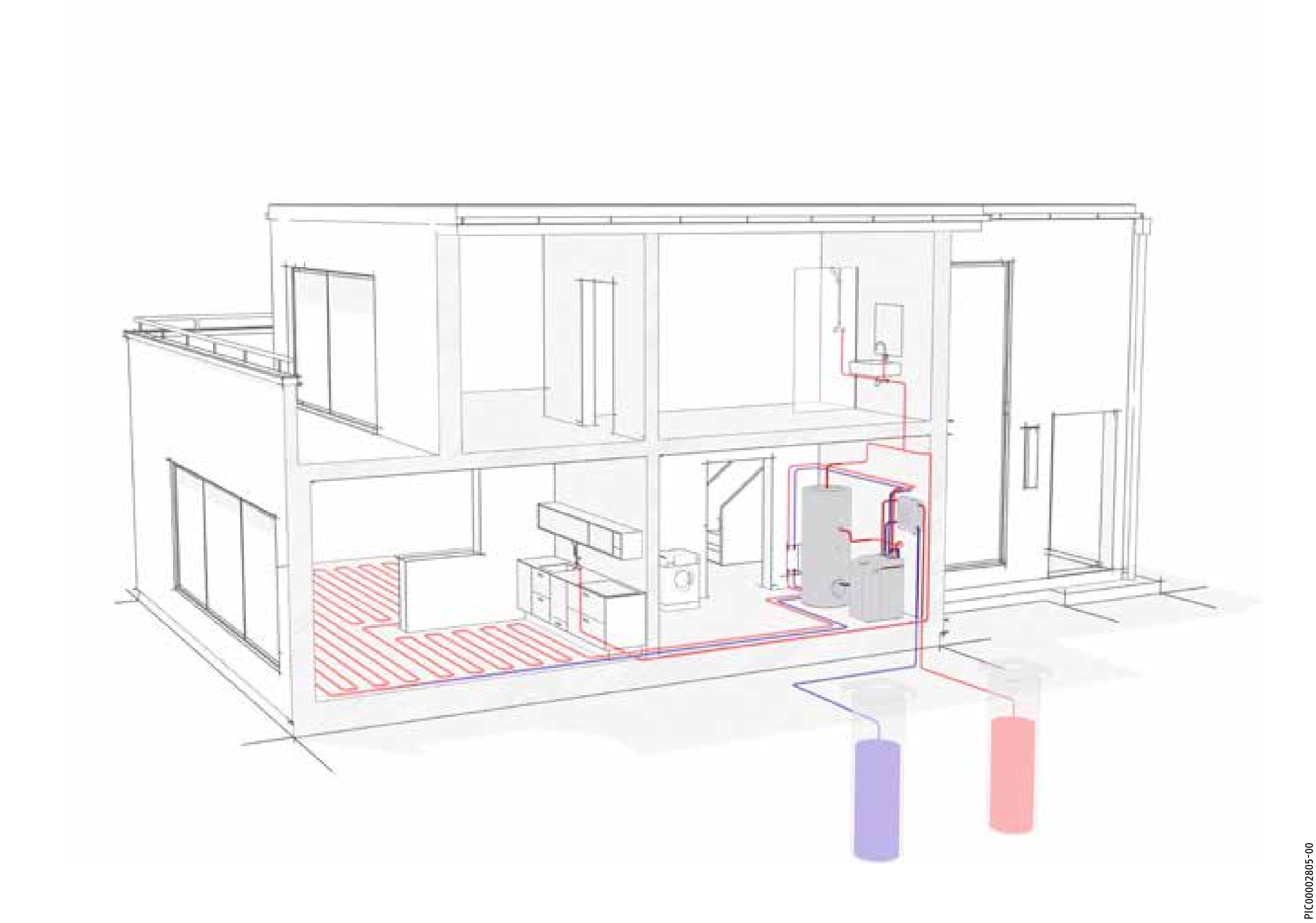
Heat transfer medium for brine | water heat pump systems as frost and corrosion protection. The concentrate must be mixed with water prior to filling the heat source system. Observe the mixing ratio shown in the heat pump instructions.

		MEG 30	MEG 10
		161696	231109
Frost-resistant to		-18	-18
Contents	l	30	10
Mixture		33%	33%
Suitable for		Brine | water heat pumps	Brine | water heat pumps

Brine | water heat pumps with water as heat source

Well installation

Design information



Heat source system

A supply well and a return well are required for utilising groundwater as a heat source.

Ahead of installation, establish the available water quality by means of a water analysis.

The required flow rate (water volume of the WQA) must meet the heat pump requirements.

A pump test lasting several days must ascertain whether the water volume required by the heat pump is available.

The dirt trap with a mesh size of 0.6 mm that is part of the standard delivery of the heat pump protects the heat pump evaporator against foreign matter that could settle. Install it immediately at the heat pump inlet.

As the volume and quality of the water remain unchanged, the heat pump process will not interfere as regards the Water Household Act [Germany]. However, the heat pump operator must apply to the relevant authority for usage of the water [if applicable].

Well construction

The wells must be at least 15 m apart. The return well returns the extracted water volume to the groundwater. When constructing wells, it must be ensured that the cooled water that enters the return well will not re-enter the area of the supply well.

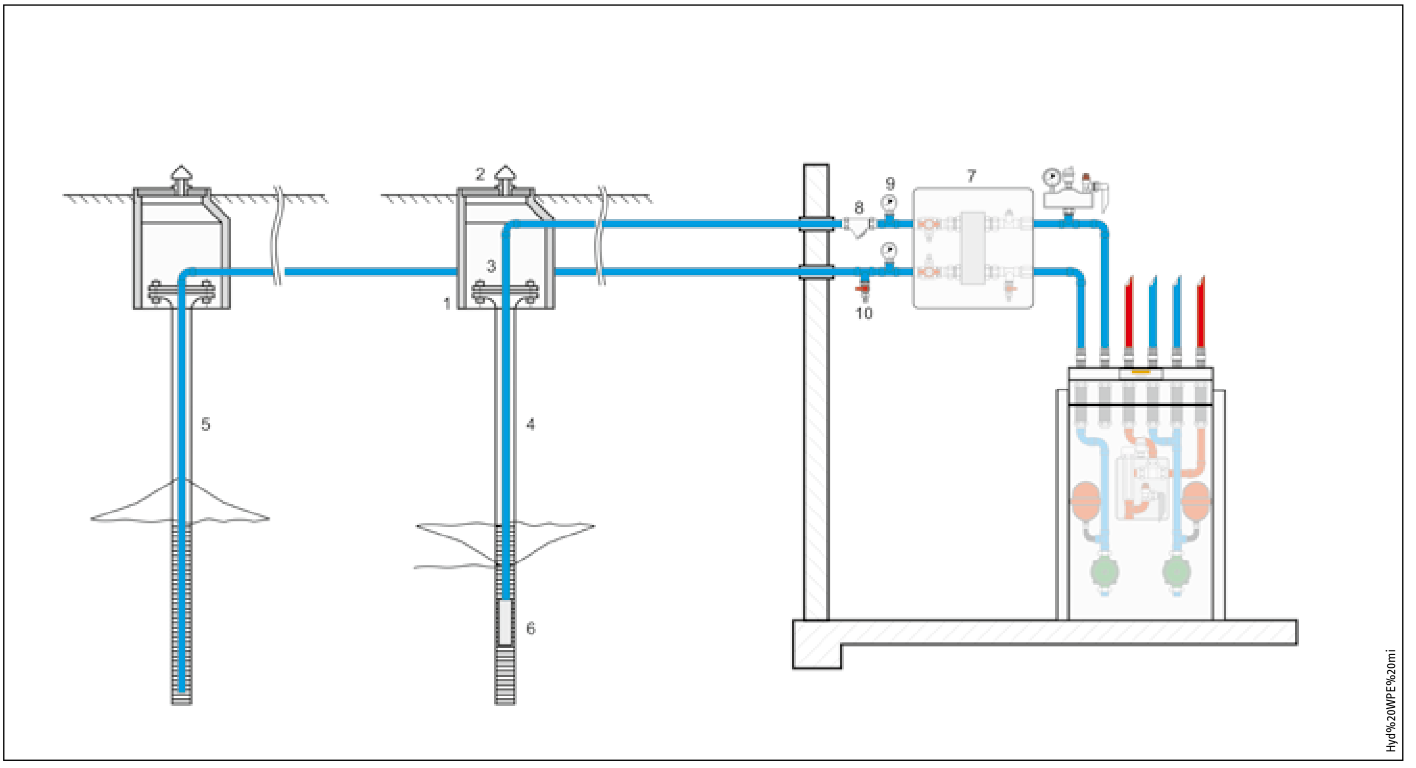
The depth of the well drilling depends on the groundwater level. Experience has shown that most wells for heat pumps require a depth of between 5 m and 15 m.

Pipework

Always route the pipelines with a fall towards the wells.

Well installation with brine | water heat pump

Groundwater as heat source (well installation)



1 Pilot shaft, well
2 Duct cover, well
3 Connection head, well
4 Supply pipe
5 Downpipe
6 Submersible pump
7 Indirect coils
8 Dirt filter
9 Thermometer/pressure gauge combination
10 Draw-off valves

Intermediate circuit

Brine | water heat pumps can be operated with groundwater as the heat source by installing an intermediate circuit.

The heat source temperature for heat pumps with an intermediate heat exchanger is approx. 1-2 K lower than the groundwater temperature. This must be taken into account when selecting the heat pump and the design point.

We recommend plate heat exchangers for the separation between the well circuit and the heat source circuit. Fill the intermediate circuit of the brine | water heat pump with antifreeze and with safety valves as well as a circulation pump.

GWS

In standard systems, it is recommended to use a GWS1 or GWS2. The product includes all the necessary components and equipment for trouble-free system separation of groundwater and heat pump

Required water quality

Common problems when using groundwater as a heat source include:

» Erosion of heat exchanger and water supply lines.

» Heat exchanger corrosion.

» Sludge contamination or blockages in heat exchanger and supply lines.

» Sedimentation (blocking) of the return well.

To prevent such problems, the quality of the groundwater used as heat source must meet the following standards:

» The water must not contain any matter which might settle.

» Never use surface water or saline water.

» The iron and manganese content must be less than 0.5 mg/l.

In pertinent individual cases, e.g. wells near salt mining areas or regions with a great prevalence of livestock, the following water content needs to be taken into consideration:

Chloride	mg/l	< 300
Chlorine	mg/l	< 0,5

If one of the specified limits is exceeded, operation of the groundwater station is not permissible.

Well pump

Size the circulation pump of the heat source system in accordance with the system-specific conditions. The well pump must be sized based on the following details:

» Heat pump flow rate on the heat source side

» Heat pump pressure differential on the heat source side

» Pressure differential in the line between the supply well and the return well

» Pressure differential in the valves, e.g. check valve Supplement approx. 30 % on top of pipe pressure differential

» Pressure drop in the return well; experience-based value: approx. 200 hPa

» Geodetic head for systems sealed at the well side

The total of all pressure differentials and the heat pump flow rate enables the selection of the well pump from the manufacturer's diagram.

Water temperature

The heating heat pump can, when used as water | water heat pump, be used down to a minimum heat source temperature of 7 °C.

Checking the flow rate

Check the flow rate on the heat source side as part of the heat pump commissioning.

For this, check the flow temperature and return temperature on the heat source side.

Determine the temperature differential from both actual values and calculate the flow rate.

Hydraulic connection

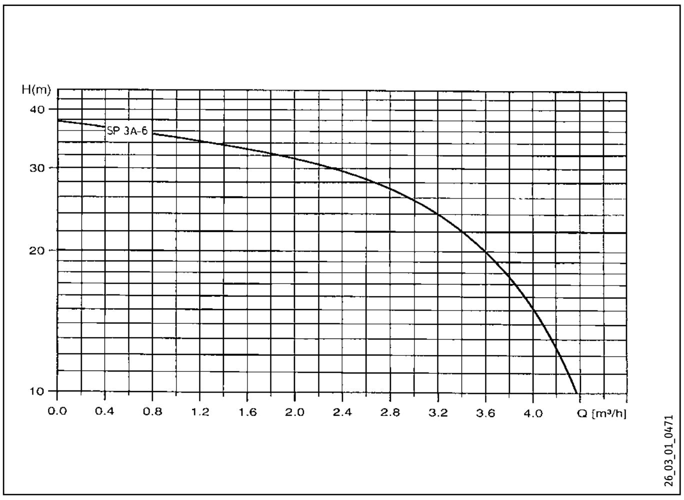
To prevent the transmission of noise as far as possible, connect the heat source circuit with flexible pressure hoses.

Proportion of solid particles in the well water

Solid particles suspended in the well water, such as sand and fine sludge, can result in the heat exchangers becoming blocked.

Allow for and install additional settlement basins when the well water contains a high proportion of solid particles.

Well pump SP 3A-6



Well installation with brine | water heat pump

Intermediate heat exchanger for brine | water heat pumps

Note: Observe the groundwater quality.

The well pump sizing refers to a well depth of up to approx. 12 metres (geodetic head).

Heat pump	Indirect coils	Well pump Grundfos **	Brine circuit pump
WPW 06 Set	GWS 1	SP 3A-3	Integrated
WPW 07 Set	GWS 1	SP 3A-3	Integrated
WPW 10 Set	GWS 1	SP 3A-3	Integrated
WPW 13 Set	GWS 1	SP 3A-3	Integrated
WPW 18 Set	GWS 2	SP 3A-3	Integrated
WPW 22 Set	GWS 2	SP 5A-4	Integrated
WPW 07 basic Set	GWS 1	SP 3A-3	UPF 40/1-8E
WPW 10 basic Set	GWS 1	SP 3A-3	UPF 40/1-8E
WPW 13 basic Set	GWS 1	SP 3A-3	UPF 40/1-8E
WPW 18 basic Set	GWS 2	SP 3A-3	UPF 40/1-8E
WPW 22 basic Set	GWS 2	SP 5A-4	UPF 40/1-8E
WPF 10 M	GWS 1	SP 3A-3	UPF 40/1-8E
WPF 13 M	GWS 2	SP 3A-3	UPF 40/1-8E
WPF 16 M	GWS 2	SP 5A-4	UPF 40/1-8E
WPF 20 SET	GWS 2	SP 3A-3	UPF 40/1-8E
WPF 23 SET	T5-BFG 40	SP 8A-5	UPF 40/1-8E
WPF 26 SET	T5-BFG 44	SP 8A-5	UPF 40/1-8E
WPF 29 SET	T5-BFG 50	SP 8A-5	UPF 40/1-8E
WPF 32 SET	T5-BFG 56	SP 8A-5	UPF 40/1-8E
WPF 20	GWS2	SP 8A-5	UPF 40/1-8E
WPF 27	T5-BFG 82	SP 8A-5	UPF 40/1-8E
WPF 35	M6 FG 60	SP 8A-5	UPF 40/1-8E
WPF 40	M6 FG 48	SP 17A-2	UPF 50/1-12E
WPF 52	M6 FG 60	SP 17A-2	UPF 50/1-12E
WPF 66	M6 FG 75	SP 17A-2	UPF 50/1-12E
WPF 80 SET	M10 BFM 63	SP 30A-2	2 x UPF 50/1-12E
WPF 92 SET	M10 BFM 71	SP 30A-2	2 x UPF 50/1-12E
WPF 104 SET	M10 BFM 77	SP 60A-2	2 x UPF 50/1-12E
WPF 118 SET	M10 BFM 87	SP 60A-2	2 x UPF 50/1-12E
WPF 132 SET	M10 BFM 95	SP 60A-2	2 x UPF 50/1-12E

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Engineering checklist

Design information for well systems in Germany

- The permission of the regional water authority must be obtained.
- The availability of groundwater and its suitability must be checked and demonstrated by a water analysis.
- The ability to use the heat pump must be checked based on the water analysis.
- One supply well and one return well must be created approximately 15 m apart.
- The well installation must be compliant with DIN regulations.
- Dirt traps must be installed for the well installation to DIN 4660.
- Observe the special requirements for installation rooms.
- Install wall sealing flanges for the well installation.
- Allow for appropriate wall clearances for service purposes.
- Observe the requirements for the installation surface.
- Connect the heating system flow and return to the heat pump with flexible hoses.
- Where necessary, cover the interior walls of the installation room with low reflecting sound-absorbing material.
- Take the power connection and wiring into account.

Engineering and installation

- Has the permit for the utilisation of groundwater been granted by your local water board?
- Is sufficient groundwater available for the operation of the heat pump (pump test)?
- Has the water quality been tested? Analyse the water.
- Can a minimum distance between supply and return well of 15 metres be maintained?
- All lines and fittings/valves must be made from corrosion resistant material.
- Insulate the heat source lines inside the building with vapour diffusion-proof material.
- Prior to connecting it to the heat pump, let the well pump run for several days to flush out sand and drilling residues.
- Use submersible pumps for lifting the groundwater.

Product overview

Appliance types and applications

Appliance types and applications

	WPW Set	WPW basic Set
Intended for the following:		
Detached and semi-detached houses	•	•
Apartment building	•	•
non-residential buildings		
Suitable for the following building projects:		
New build	•	•
Modernisation, heating flow temperature < 55 °C	•	•
Modernisation, heating flow temperature > 55 °C		
With the following function and feature:		
Heating	•	•
Cooling		
Inverter (demand-dependent compressor control)		
DHW heating with a floorstanding cylinder	•	•
DHW heating with a cylinder module		
Diverter valve for the DHW heating integrated in the heat pump	•	•
Integral emergency/booster heater for mono energetic operation	•	•
Heating circulation pump integrated in the heat pump	•	•
Heating expansion vessel integrated in the heat pump	•	
Heating safety assembly integrated in the heat pump	•	
Pressure hoses integrated in the heat pump	•	
Brine/intermediate circuit pump integrated in the heat pump	•	
Brine expansion vessel integrated in the heat pump	•	
Appliance installation		
External installation		
Internal installation	•	•
Little installation effort, compact	•	•
Flexible system solution for the following:		
Heat pump and solar thermal system combination		
Combination of several heat pumps (cascade)		
Swimming pool water heating		
Mono mode operation	•	•
Mono energetic operation	•	•
Combination with other heat sources (dual mode)		

WPW 06/07/10/13/18/22 Set

Heat pump set for the use of groundwater as a heat source. The set includes one WPF series brine | water heat pump, one GWS groundwater station and 10 litres MEG heat transfer medium. The GWS can be installed either on the left or right hand side of the heat pump. The groundwater station comprises a stainless steel plate heat exchanger specifically developed for the high demands of this application. This transfers the groundwater energy to the intermediate brine circuit. The WPF heat pump connected to this station is suitable for indoor installation and offers a high degree of integration. It includes not only the WPM 3i heat pump manager, but also HE pumps, expansion vessels and an electric booster heater for mono mode operation and pasteurisation. The heat pump drive unit is equipped with a hermetically sealed compressor, a soft starter and heat exchangers with optimised heat transfer for improved efficiency. Safety equipment, such as high/low pressure limiters, safety valve and frost protection are already included. To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration mounting plate. Internal pressure hoses enable the direct connection of the heating and brine circuits to the appliance.

At a glance

» For the use of groundwater as a heat source
» Application limit heat source from +7 °C to +20 °C
» Heating flow temperature up to 60 °C
» Connection from GWS to brine | water heat pump via plug-in connector
» Corrosion-resistant stainless steel plate heat exchanger in GWS
» High operational reliability

Safety and quality

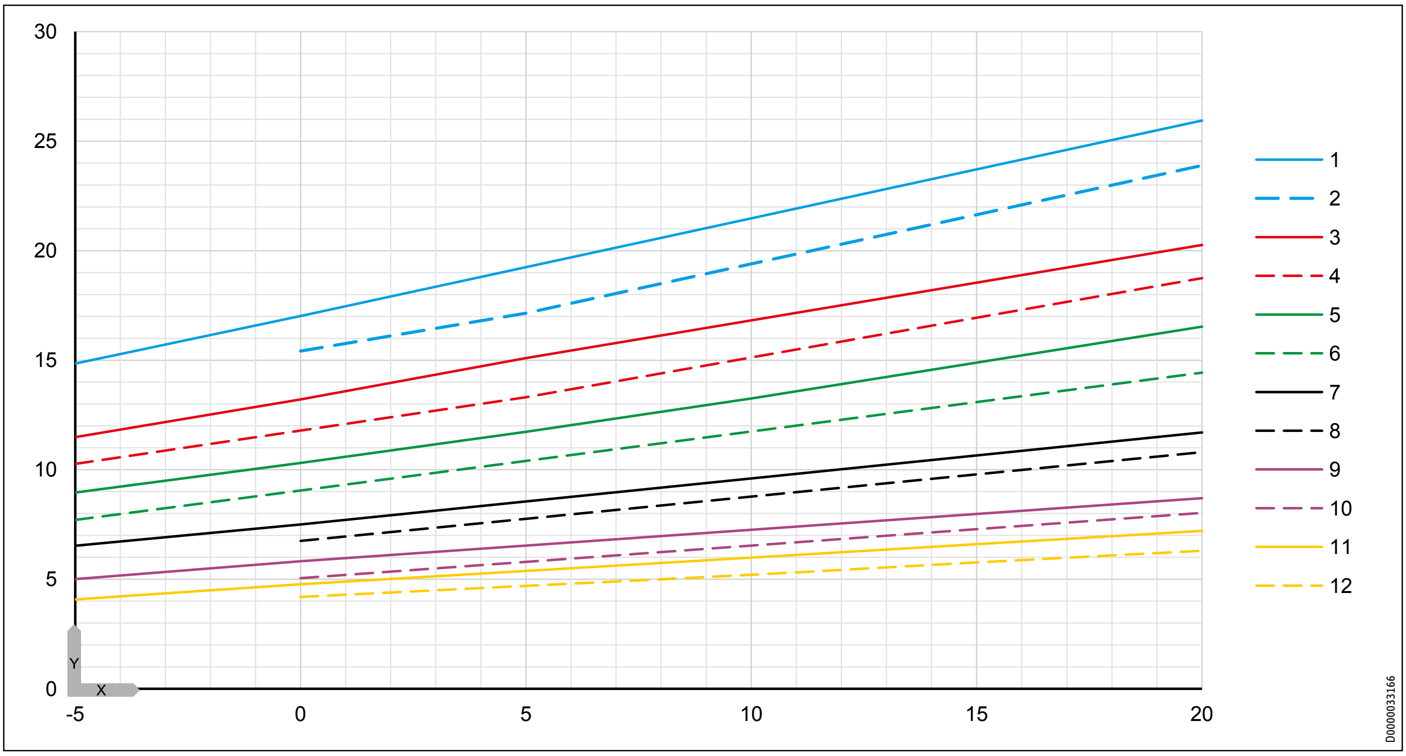
Function

Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

Specification

		WPW 06 Set	WPW 07 Set	WPW 10 Set	WPW 13 Set	WPW 18 Set	WPW 22 Set
		232948	232949	232950	232951	232952	232953
Dimensions							
Height	mm	1319	1319	1319	1319	1319	1319
Width	mm	598	598	598	598	598	598
Depth	mm	658	658	658	658	658	658
Weights							
Weight	kg	150	152	157	169	171	181
Versions							
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A	R410 A
Refrigerant charge	kg	1,05	1,40	1,90	2,25	2,30	2,32
Heating output to EN 14511							
Heating output at B7/W35	kW	5,62	6,82	8,97	12,33	15,79	20,14
Heating output at W10/W35 (EN 14511)	kW	5,99	7,26	9,60	13,25	16,82	21,48
Power consumption to EN 14511							
Power consumption at B7/W35	kW	1,05	1,22	1,56	2,01	2,73	3,78
Power consumption at W10/W35 (EN 14511)	kW	1,04	1,23	1,57	1,99	2,73	3,79
COP to EN 14511							
COP at B7/W35		5,38	5,58	5,74	6,14	5,78	5,33
COP at W10/W35 (EN 14511)		5,76	5,90	6,11	6,67	6,16	5,67
Power consumption							
Power consumption, emergency/booster heater	kW	8,8	8,8	8,8	8,8	8,8	8,8
Electrical data							
Starting current (with/without starting current limiter)	A	27	27	20	23	23	25
Values							
Internal volume, heating side	l	5,4	6,1	6,1	6,7	7,3	7,3
Internal volume, heat source side	l	9,1	9,7	10,5	11,3	11,8	12,3
Application limits							
Min. application limit on the heating side	°C	15	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	60	60	60	60
Min. application limit, heat source	°C	7	7	7	7	7	7
Max. application limit, heat source	°C	20	20	20	20	20	20
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1	<0,1
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02	<0,02
Energy data							
Energy efficiency class		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++
Energy efficiency class, average climate, W55/W35		A++/A++	A++/A++	A++/A++	A++/A++	A++/A++	A++/A++

Output data



Performance details to EN 14511

X Source temperature [°C]
Y Heating output [kW]
1 Flow temperature 35 °C, WPW 22 Set
2 Flow temperature 60 °C, WPW 22 Set
3 Flow temperature 35 °C, WPW 18 Set
4 Flow temperature 60 °C, WPW 18 Set
5 Flow temperature 35 °C, WPW 13 Set
6 Flow temperature 60 °C, WPW 13 Set
7 Flow temperature 35 °C, WPW 10 Set
8 Flow temperature 60 °C, WPW 10 Set
9 Flow temperature 35 °C, WPW 07 Set
10 Flow temperature 60 °C, WPW 07 Set
11 Flow temperature 35 °C, WPW 06 Set
12 Flow temperature 60 °C, WPW 06 Set

WPW 06 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	5,30	5,01	4,72	4,49	0,99	1,20	1,54	1,73	5,35	4,17	3,06	2,60
10	6,00	5,64	5,28	5,06	1,02	1,21	1,56	1,76	5,90	4,66	3,39	2,87
15	6,70	6,27	5,94	5,60	0,94	1,21	1,56	1,78	6,45	5,18	3,80	3,15
20	7,40	7,01	6,64	6,29	0,95	1,22	1,58	1,79	7,00	5,76	4,19	3,50

WPW 07 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	6,60	6,32	5,95	5,66	1,23	1,52	1,94	2,18	5,35	4,16	3,06	2,60
10	7,40	7,11	6,65	6,38	1,25	1,53	1,96	2,23	5,90	4,66	3,39	2,87
15	8,20	7,91	7,49	7,06	1,27	1,53	1,97	2,24	6,45	5,18	3,80	3,15
20	9,00	8,84	8,37	7,93	1,29	1,54	2,00	2,26	7,00	5,76	4,19	3,50

WPW 10 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	8,70	8,08	7,56	7,29	1,55	1,92	2,41	2,72	5,60	4,21	3,14	2,68
10	9,80	9,16	8,54	8,20	1,58	1,91	2,41	2,71	6,20	4,80	3,55	3,02
15	10,90	10,24	9,56	9,18	1,60	1,91	2,41	2,70	6,80	5,36	3,97	3,41
20	12,00	11,26	10,56	10,18	1,62	1,95	2,44	2,73	7,40	5,79	4,32	3,72

WPW 13 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	11,85	11,11	10,13	9,54	2,12	2,68	3,43	3,94	5,60	4,14	2,96	2,42
10	13,30	12,76	11,73	10,92	2,15	2,66	3,42	3,91	6,20	4,79	3,43	2,80
15	15,05	14,44	13,26	12,50	2,21	2,64	3,44	3,88	6,80	5,46	3,86	3,22
20	16,80	16,22	14,90	14,07	2,27	2,64	3,45	3,92	7,40	6,13	4,31	3,59

WPW 18 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	14,60	13,87	12,97	12,49	2,70	3,34	4,30	4,72	5,40	4,15	3,01	2,65
10	16,40	15,61	14,67	14,10	2,73	3,33	4,21	4,68	6,00	4,69	3,48	3,01
15	18,20	17,36	16,31	15,54	2,76	3,32	4,20	4,66	6,60	5,23	3,88	3,34
20	20,00	19,22	18,37	17,31	2,78	3,33	4,17	4,63	7,20	5,78	4,41	3,74

WPW 22 Set

	Heating output				Power consumption				Coefficient of performance (COP)			
WQA [°C]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	35 °C	45 °C	55 °C	60 °C
5	19,10	18,07	17,23	16,64	3,57	4,41	5,53	6,27	5,35	4,10	3,11	2,66
10	21,40	20,21	19,16	18,48	3,63	4,48	5,57	6,23	5,90	4,52	3,44	2,97
15	23,70	22,61	21,51	20,61	3,67	4,51	5,60	6,25	6,45	5,01	3,84	3,30
20	26,00	24,97	23,85	22,86	3,71	4,55	5,65	6,25	7,00	5,49	4,22	3,66

Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost

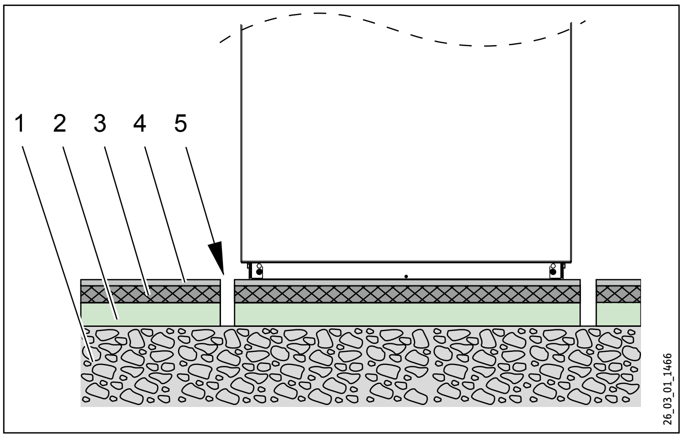
» Load-bearing floor

» Level, even and firm base

» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.

» When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.

» In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.



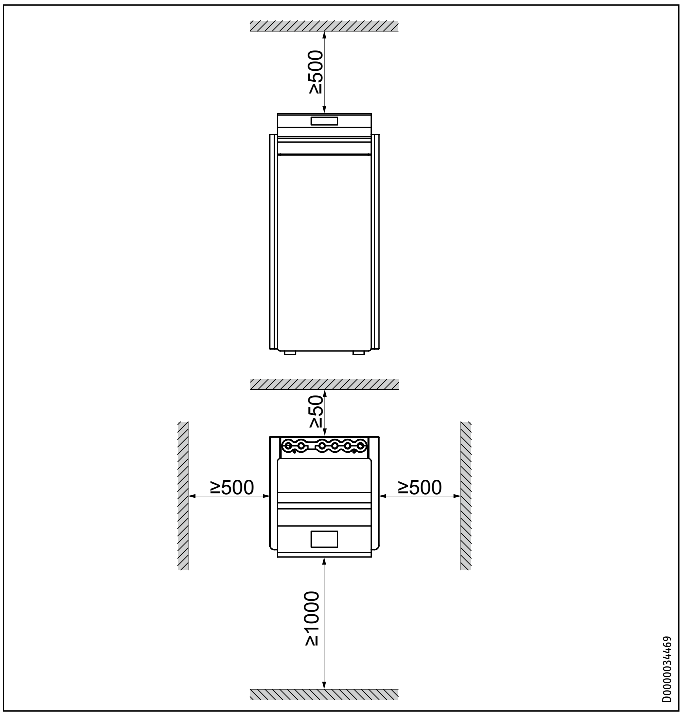
1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

Sound emissions

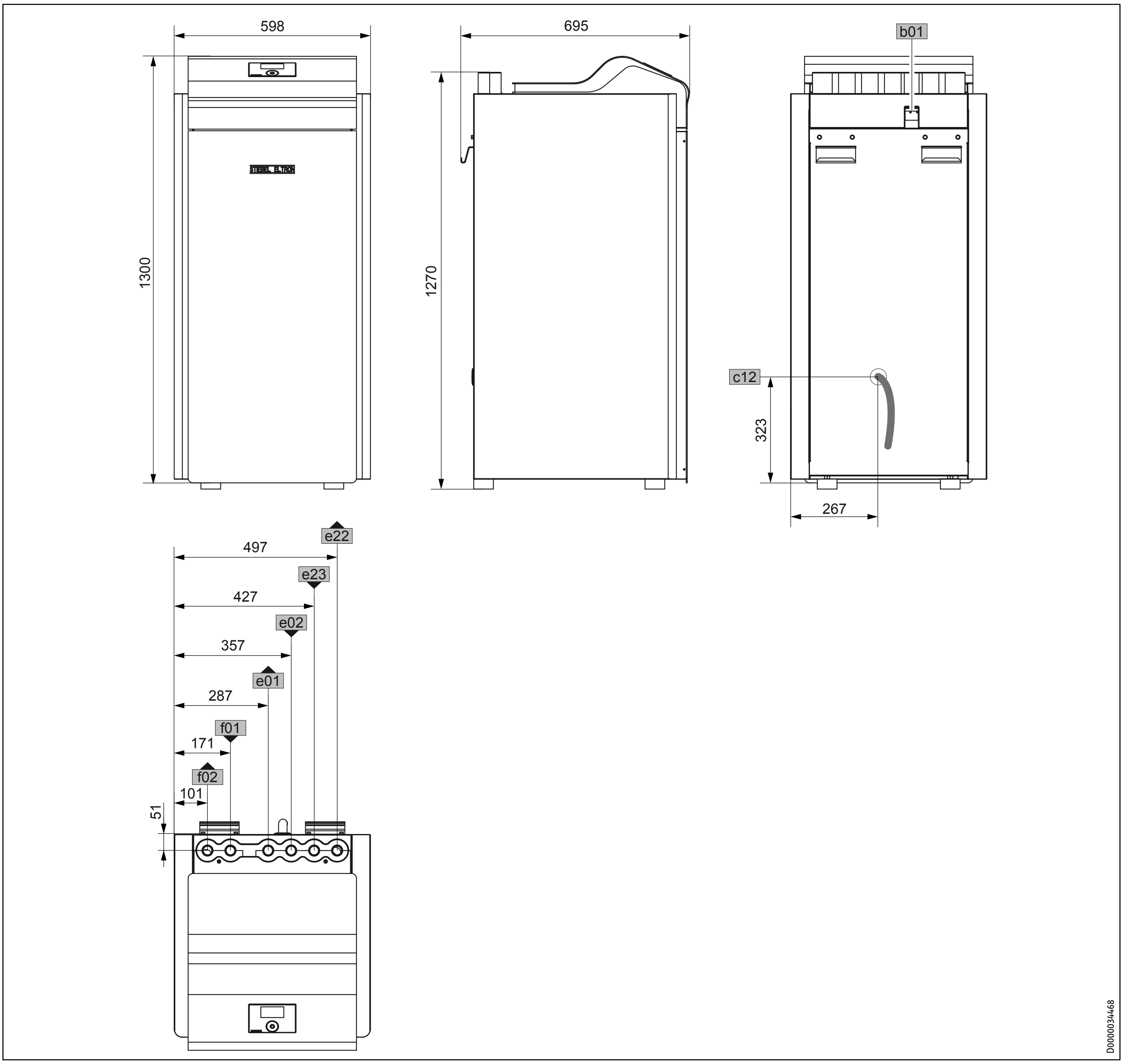
Never install the heat pump immediately below or adjacent to bedrooms.

Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.



Siting



				WPW 06 Set	WPW 07 Set	WPW 10 Set	WPW 13 Set	WPW 18 Set	WPW 22 Set
b01	Entry electrical cables								
c12	Safety valve drain								
e01	Heating flow	Diameter	mm	28	28	28	28	28	28
e02	Heating return	Diameter	mm	28	28	28	28	28	28
e22	Cylinder flow	Diameter	mm	28	28	28	28	28	28
e23	Cylinder return	Diameter	mm	28	28	28	28	28	28
f01	Heat source flow	Diameter	mm	28	28	28	28	28	28
f02	Heat source return	Diameter	mm	28	28	28	28	28	28

Groundwater module

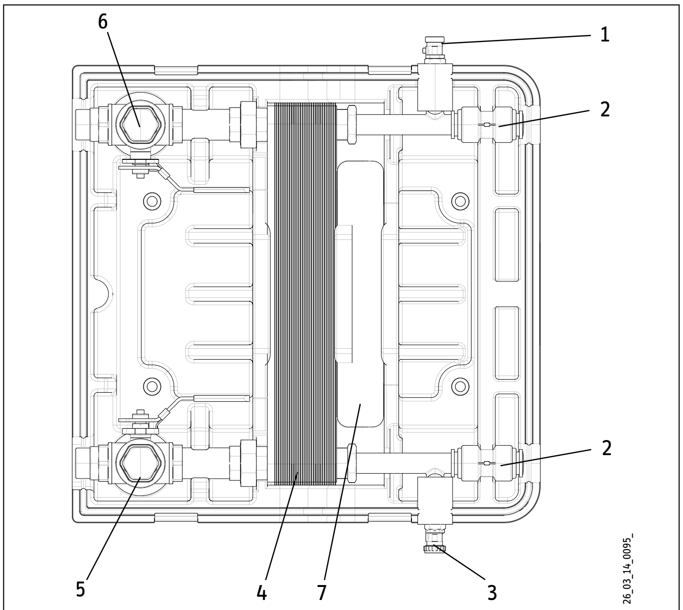
At a glance

- » For the use of groundwater as a heat source
- » For connection to brine | water heat pumps
- » Thermally insulated casing
- » High operational reliability

Module with intermediate heat exchanger for the use of groundwater as a heat source. The groundwater station can be connected to all brine | water heat pumps, with the exception of large modules. The groundwater station comprises a stainless steel plate heat exchanger with 34 plates (GWS 1) or 60 plates (GWS 2), two 3-way diverter valves as shut-off valves with drain & fill valves and a duplex casing made from thermally insulating plastic.

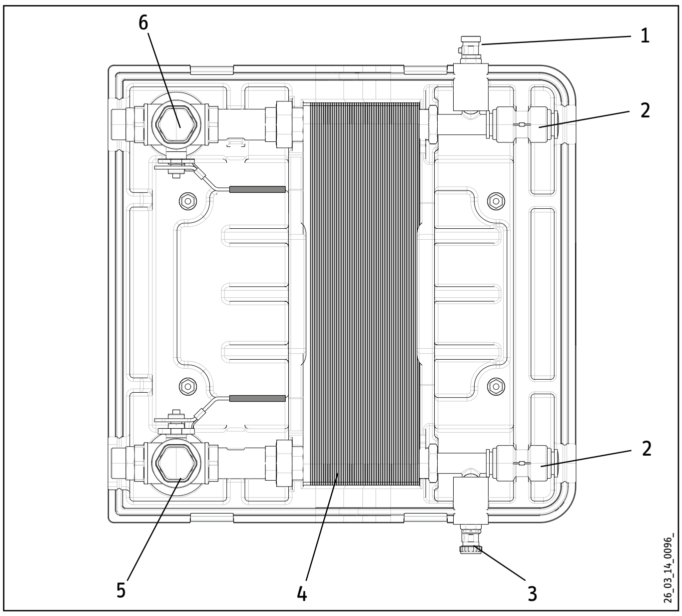
		GWS 1	GWS 2
		230659	230660
Height	mm	630	630
Width	mm	640	640
Depth	mm	230	230
Weight	kg	20,5	26,5
Connection on the heat source side		G 1 1/4	G 1 1/4
Heat pump connection		28 mm	28 mm
Max. application limit, heat source	°C	20	20
Min. application limit, heat source	°C	7	7
Max. permissible pressure	MPa	0,3	0,3

GWS 1



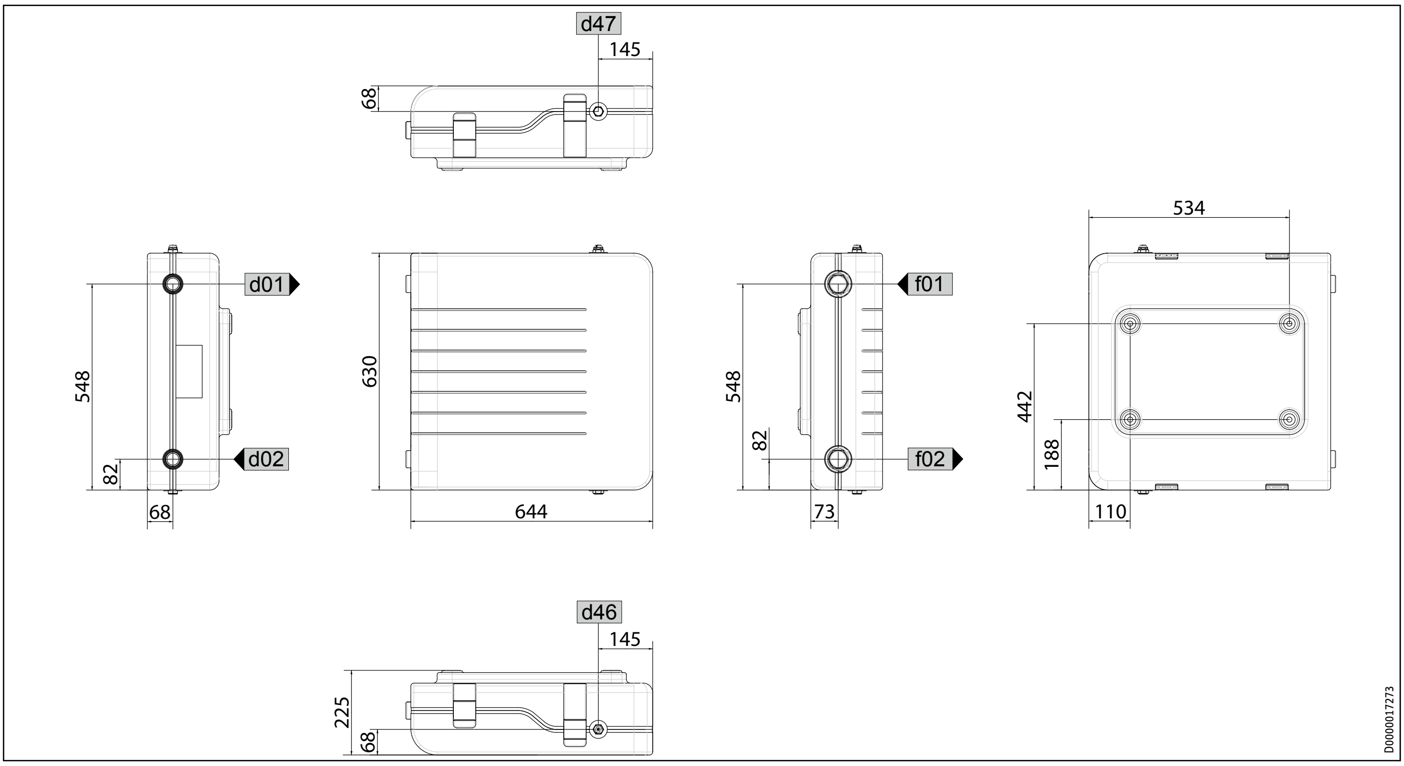
1 Air vent valve
2 Plug-in connector
3 Drain & fill valve
4 Indirect coils
5 3-way ball valve with flushing facility
6 3-way ball valve with flushing facility
7 Intermediate piece made from EPP

GWS 2



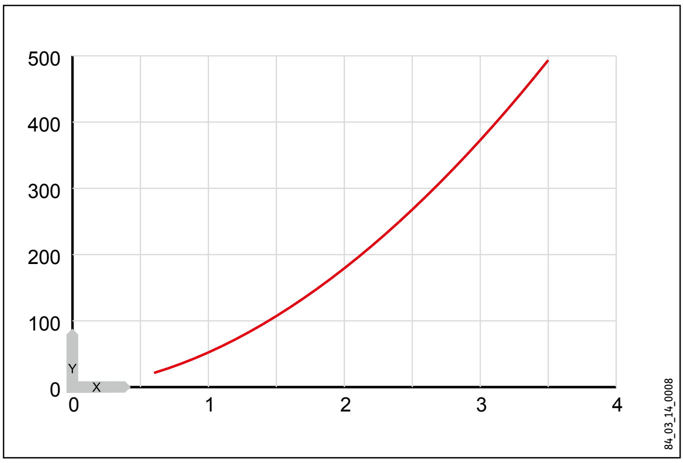
1 Air vent valve
2 Plug-in connector
3 Drain & fill valve
4 Indirect coils
5 3-way ball valve with flushing facility
6 3-way ball valve with flushing facility

WPW 06/07/10/13/18/22 Set



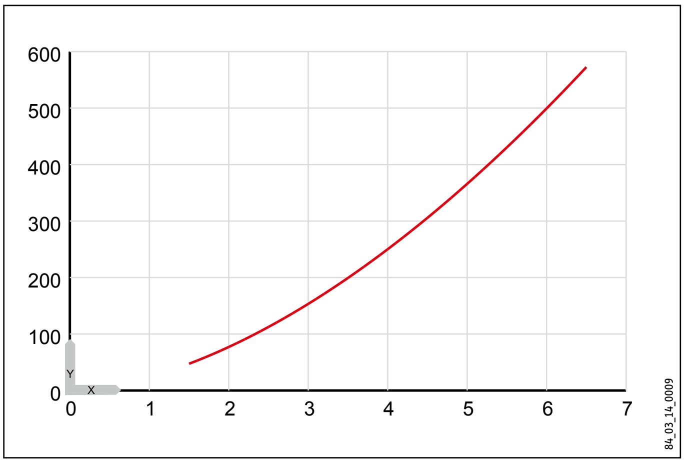
				GWS 1	GWS 2
d01	Heat pump flow	Diameter	mm	28	28
d02	Heat pump return	Diameter	mm	28	28
d46	Ventilation				
d47	Drain				
f01	Heat source flow	Male thread		G 1 1/4	G 1 1/4
f02	Heat source return	Male thread		G 1 1/4	G 1 1/4

GWS1



x Flow rate [m³/h]
Y Pressure drop [mbar]
1 Pressure drop curve, heat source system
2 Pressure drop curve, heat consumer system

GWS2



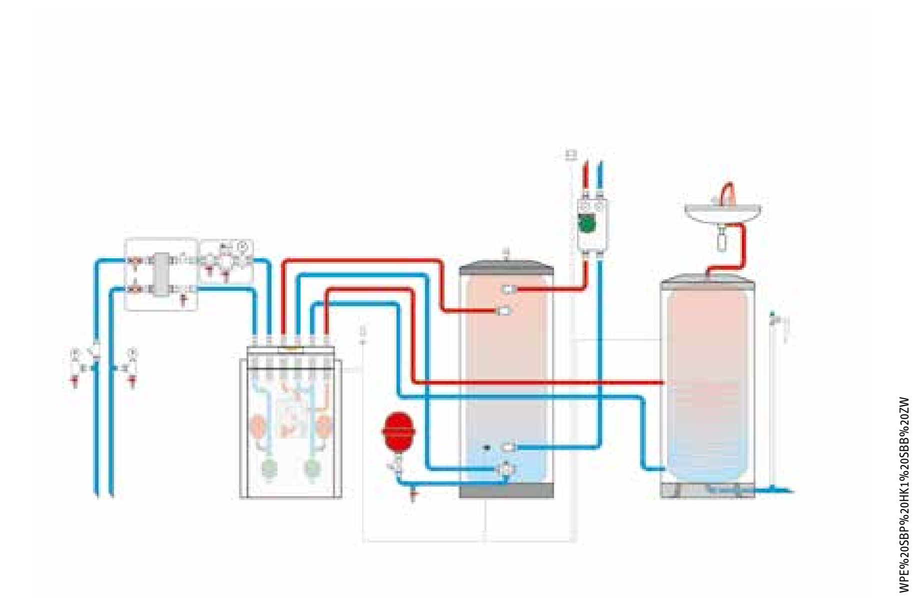
x Flow rate [m³/h]
Y Pressure drop [mbar]
1 Pressure drop curve, heat source system
2 Pressure drop curve, heat consumer system

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram. Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it. Observe the correct connection of heating flow and return as well as the correct pipework cross-section. The required circulation pump is integrated into the heat pump. See the adjacent table for pipe cross-sections. Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

The expansion volume of the heat source and of the heating system relative to the size of the integral diaphragm expansion vessel must be checked. If necessary install additional diaphragm expansion vessels.

Heat pump with buffer cylinder and DHW heating



Heat pump with integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Residual head hPa	Copper pipe DN
WPW 06 Set	0,7	350	22 x 1,0
WPW 07 Set	0,7	350	22 x 1,0
WPW 10 Set	0,9	350	22 x 1,0
WPW 13 Set	1,2	260	28 x 1,5
WPW 18 Set	1,6	170	28 x 1,5
WPW 22 Set	2,1	70	35 x 1,5

Power supply

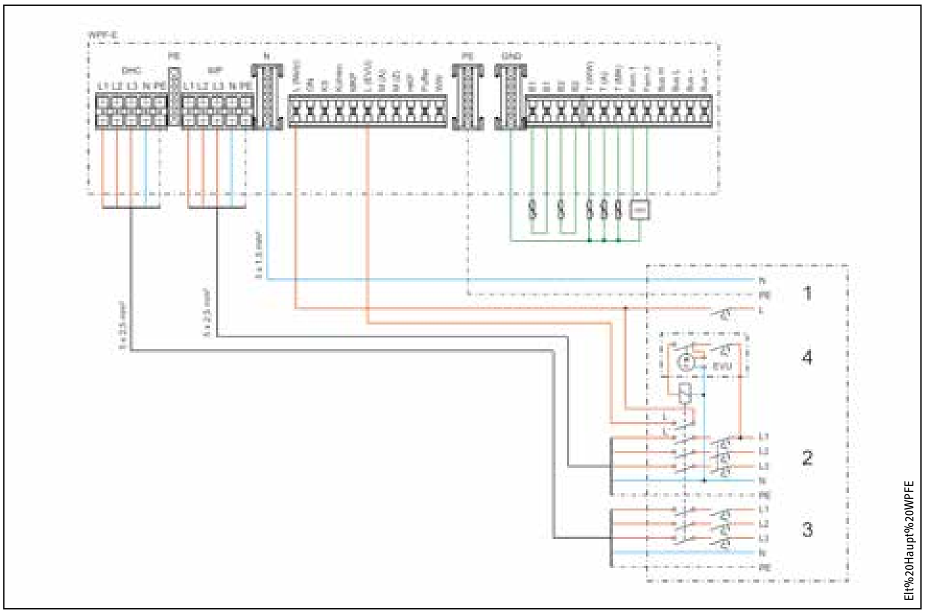
Notify your local power supply utility of the heat pump connection. All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility. The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Electric emergency/booster heater power supply
» Heat pump controller power supply
» Power-OFF enable signal
» Heating circuit pump
» Mixing valve
» Sensors and remote adjuster

Note
Observe the standards and regulations applicable in your country.



B1	Temperature sensor, heat pump flow
B1	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS High
L	BUS Low
-	BUS earth
+	BUS (not connected)
L	Power supply
ON	Compressor signal
KS	Brine pump signal
Kuehlen	Cooling mode
EVU	Enable signal
MKP	Mixer circuit pump
M(A)	Mixer open
M(Z)	Mixer close
HKP	Heating circuit pump
QKP	Source circuit pump
Buffer	Buffer charging pump

1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L' with blocking time

WPW 06/07/10/13/18/22 Set

WPW 06 Set

Product	Type	Description	pce	Part no.
	WPF 04		1	232909
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232948

WPW 07 Set

Product	Type	Description	pce	Part no.
	WPF 05		1	232910
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232949

WPW 10 Set

Product	Type	Description	pce	Part no.
	WPF 07		1	232911
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232950

WPW 13 Set

Product	Type	Description	pce	Part no.
	WPF 10		1	232912
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232951

WPW 18 Set

Product	Type	Description	pce	Part no.
	WPF 13		1	232913
	GWS 2	Groundwater module	1	230660
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232952

WPW 22 Set

Product	Type	Description	pce	Part no.
	WPF 16		1	232914
	GWS 2	Groundwater module	1	230660
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
				232953

WPW 7/10/13/18/22 basic Set

At a glance

» For the use of groundwater as a heat source
» Application limit heat source from +7 °C to +20 °C
» Heating flow temperature up to 60 °C
» Connection from GWS to brine | water heat pump via plug-in connector
» Corrosion-resistant special stainless steel heat exchanger for well water
» Brine assembly part of the standard delivery
» High operational reliability

Safety and quality

The heat pump set for the use of groundwater as a heat source comprises: Brine | water heat pumps from the WPF basic series, groundwater module GWS, brine assembly, heat transfer medium MEG 10 litres and the heat pump manager. The groundwater module GWS was developed specifically for the high requirements that groundwater poses and comprises a stainless steel plate heat exchanger. It can be installed either on the left or right hand side next to the heat pump.

Function

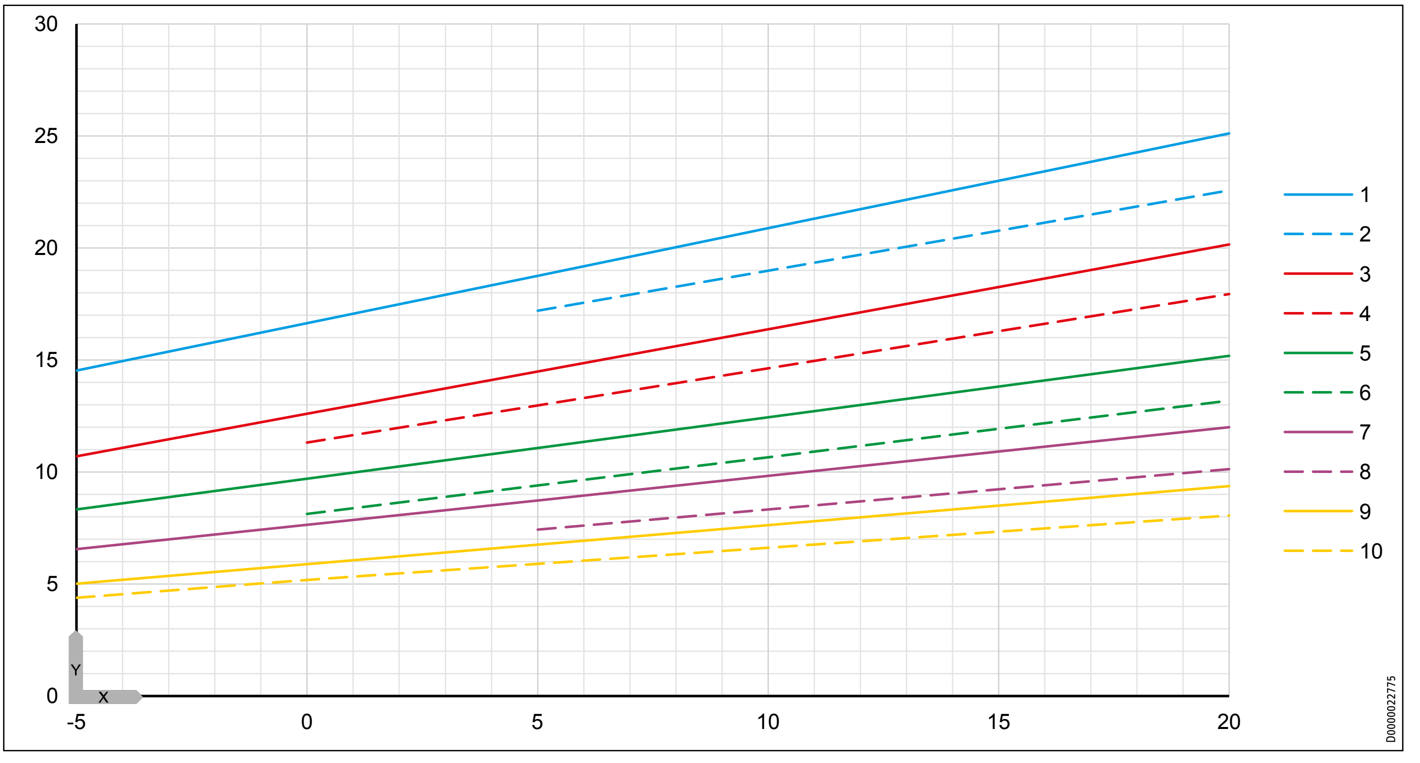
Environmental energy is extracted by the heat exchanger on the heat source side (evaporator). This extracted energy and the energy drawn by the compressor drive is transferred to the heating water by the heat exchanger on the heating side (condenser). The heating water is heated to the required flow temperature, subject to the outside temperature and the stored heating curve. The correct and professional implementation of the heat source system is a must for perfect operation. For this, observe the heat pump cooling capacity.

WPW 7/10/13/18/22 basic Set

Specification

		WPW 7 basic Set	WPW 10 basic Set	WPW 13 basic Set	WPW 18 basic Set	WPW 22 basic Set
		230915	230916	230917	230918	230919
Heating output to EN 14511						
Heating output at B7/W35	kW	7,10	9,17	11,62	15,24	19,61
Heating output at W10/W35 (EN 14511)	kW	7,62	9,82	12,44	16,37	20,88
Power consumption to EN 14511						
Power consumption at B7/W35	kW	1,36	1,69	2,18	2,81	4,04
Power consumption at W10/W35 (EN 14511)	kW	1,36	1,68	2,16	2,79	4,06
COP to EN 14511						
COP at B7/W35		5,22	5,44	5,34	5,43	4,85
COP at W10/W35 (EN 14511)		5,6	5,85	5,76	5,87	5,14
Sound data						
Sound power level (EN 12102)	dB(A)	43	44	48	50	52.8
Application limits						
Min. application limit on the heating side	°C	15	15	15	15	15
Max. application limit on the heating side	°C	60	60	60	60	60
Min. application limit, heat source	°C	7	7	7	7	7
Max. application limit, heat source	°C	20	20	20	20	20
Water hardness	°dH	≤3	≤3	≤3	≤3	≤3
pH value (with aluminium compounds)		8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5	8,0-8,5
pH value (without aluminium compounds)		8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0	8,0-10,0
Chloride	mg/l	<30	<30	<30	<30	<30
Conductivity (softening)	μS/cm	<1000	<1000	<1000	<1000	<1000
Conductivity (desalination)	μS/cm	20-100	20-100	20-100	20-100	20-100
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1	<0,1	<0,1	<0,1	<0,1
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02	<0,02	<0,02	<0,02	<0,02
Energy data						
Energy efficiency class		A+/A++	A+/A++	A+/A++	A+/A++	A+/A++
Energy efficiency class, average climate, W55/W35		A+/A++	A+/A++	A+/A++	A+/A++	A+/A++
Electrical data						
Starting current (with/without starting current limiter)	A	23/-	25/-	28/-	30/-	29/-
Versions						
Refrigerant		R410 A	R410 A	R410 A	R410 A	R410 A
Dimensions						
Height	mm	960	960	960	960	960
Width	mm	510	510	510	510	510
Depth	mm	680	680	680	680	680
Weights						
Weight	kg	107,5	113,5	120,5	128,5	131

Output data



Performance details to EN 14511

X Source temperature [°C]

Y Heating output [kW]

1 Flow temperature 35 °C, WPW 22 basic Set

2 Flow temperature 60 °C, WPW 22 basic Set

3 Flow temperature 35 °C, WPW 18 basic Set

4 Flow temperature 60 °C, WPW 18 basic Set

5 Flow temperature 35 °C, WPW 13 basic Set

6 Flow temperature 60 °C, WPW 13 basic Set

7 Flow temperature 35 °C, WPW 10 basic Set

8 Flow temperature 60 °C, WPW 10 basic Set

9 Flow temperature 35 °C, WPW 7 basic Set

10 Flow temperature 60 °C, WPW 7 basic Set

WPW 7 basic Set

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
5	6,75	6,37	6,05	5,89	1,36	1,71	2,16	2,39	4,96	3,73	2,80	2,47
10	7,62	7,18	6,80	6,61	1,36	1,70	2,16	2,39	5,60	4,22	3,15	2,77
15	8,49	7,99	7,55	7,33	1,36	1,69	2,16	2,40	6,24	4,73	3,50	3,06
20	9,36	8,80	8,30	8,05	1,36	1,68	2,16	2,40	6,88	5,24	3,84	3,35

WPW 10 basic Set

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
5	8,73	8,25	7,70	7,43	1,69	2,12	2,65	2,92	5,17	3,89	2,91	2,55
10	9,82	9,27	8,64	8,33	1,68	2,11	2,63	2,89	5,85	4,39	3,29	2,88
15	10,91	10,29	9,58	9,23	1,67	2,10	2,61	2,87	6,53	4,90	3,67	3,22
20	12,00	11,31	10,52	10,13	1,66	2,09	2,59	2,84	7,23	5,41	4,06	3,57

WPW 13 basic Set

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
5	11,07	10,56	9,78	9,39	2,19	2,81	3,61	4,01	5,05	3,76	2,71	2,34
10	12,44	11,66	10,99	10,66	2,16	2,75	3,55	3,95	5,76	4,24	3,10	2,70
15	13,81	12,76	12,20	11,92	2,13	2,69	3,49	3,89	6,48	4,74	3,50	3,06
20	15,18	13,86	13,41	13,19	2,10	2,63	3,43	3,83	7,23	5,27	3,91	3,44

WPW 18 basic Set

WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
5	14,48	13,81	13,25	12,97	2,82	3,61	4,50	4,95	5,13	3,83	2,94	2,62
10	16,37	15,45	14,90	14,63	2,79	3,65	4,48	4,90	5,87	4,23	3,33	2,99
15	18,26	17,09	16,55	16,28	2,76	3,69	4,46	4,85	6,62	4,63	3,71	3,36
20	20,15	18,73	18,20	17,94	2,73	3,73	4,44	4,80	7,38	5,02	4,10	3,74

WPW 22 basic Set

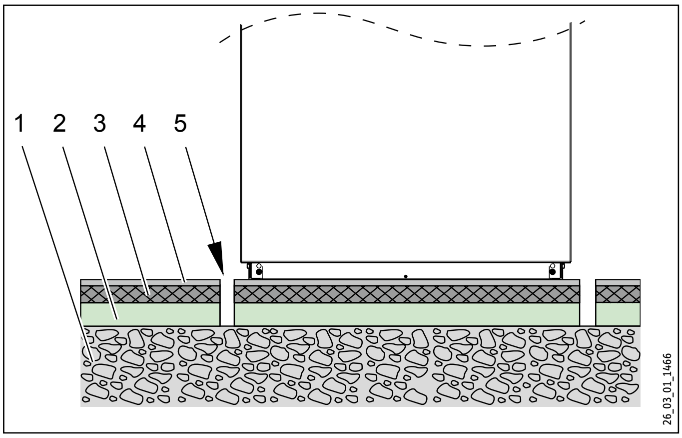
WQA [°C]	Heating output 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Power consumption 35 °C [kW]	45 °C [kW]	55 °C [kW]	60 °C [kW]	Coefficient of performance (COP) 35 °C	45 °C	55 °C	60 °C
5	18,76	18,14	17,51	17,20	4,03	5,04	6,41	7,10	4,66	3,60	2,73	2,42
10	20,88	20,20	19,39	18,99	4,06	5,07	6,51	7,23	5,14	3,98	2,98	2,63
15	23,00	22,26	21,27	20,78	4,09	5,10	6,61	7,37	5,62	4,36	3,22	2,82
20	25,12	24,32	23,15	22,57	4,12	5,13	6,71	7,50	6,10	4,74	3,45	3,01

Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

- No risk from frost
- Load-bearing floor
- Level, even and firm base
- The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
- When siting the appliance in a room together with other heating equipment, ensure that operation of the other heating appliances will not be impaired.
- In the case of floating screeds, recess the screed and the impact sound insulation around the installation site of the heat pump.



1 Concrete
2 Impact sound insulation
3 Floating screed
4 Floor covering
5 All-round recess

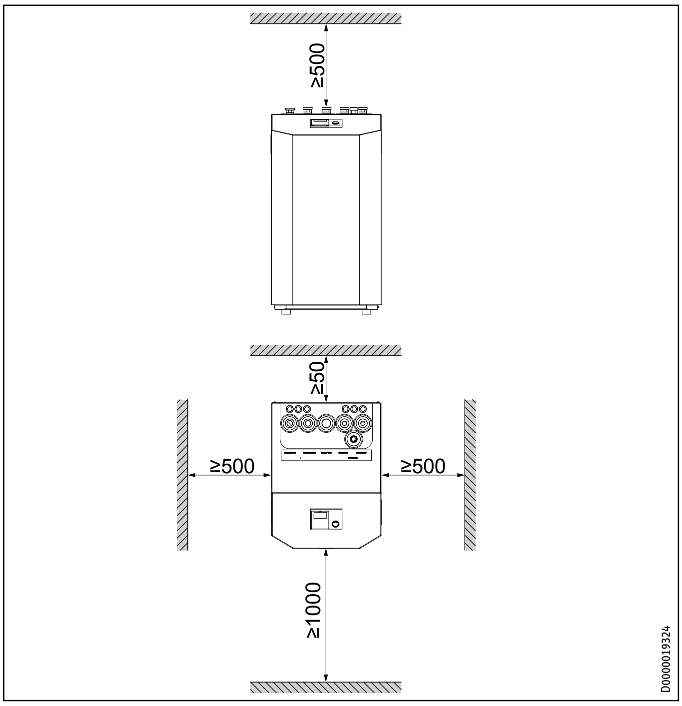
Sound emissions

Never install the heat pump immediately below or adjacent to bedrooms.

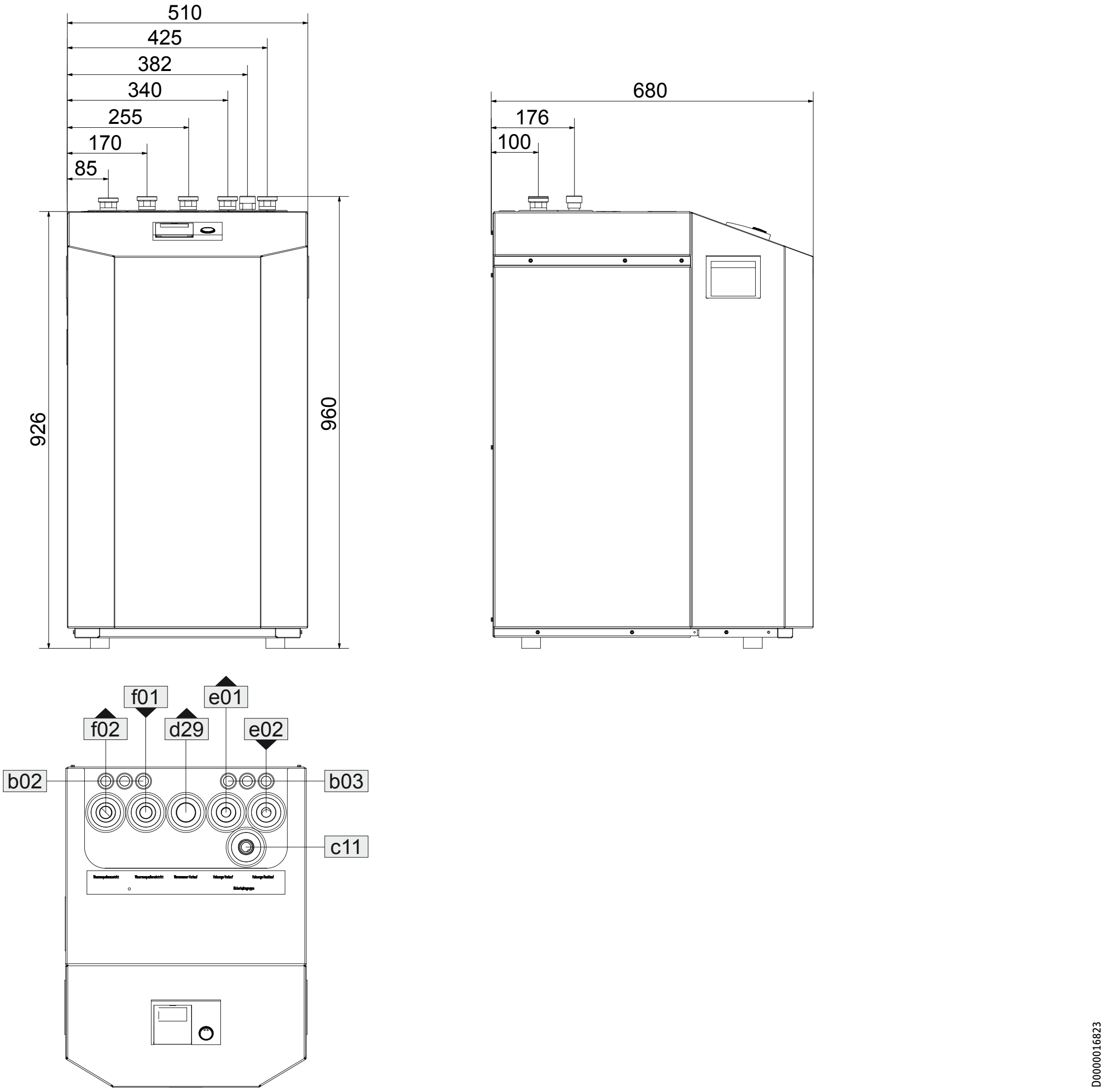
Good sound insulation can be achieved by using a concrete plinth with a rubber mat underneath the appliance.

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

Use flexible hoses for the hydraulic connection.



Siting



			WPW 7 basic Set	WPW 10 basic Set	WPW 13 basic Set	WPW 18 basic Set	WPW 22 basic Set
b02	Entry cables I						
b03	Entry cables II						
c06	DHW outlet	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
c11	Safety assembly						
e01	Heating flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
e02	Heating return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
f01	Heat source flow	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
f02	Heat source return	Male thread	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4

WPW 7/10/13/18/22 basic Set

Heating system connection

Connect the heat pump into the heating water side of heating systems in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

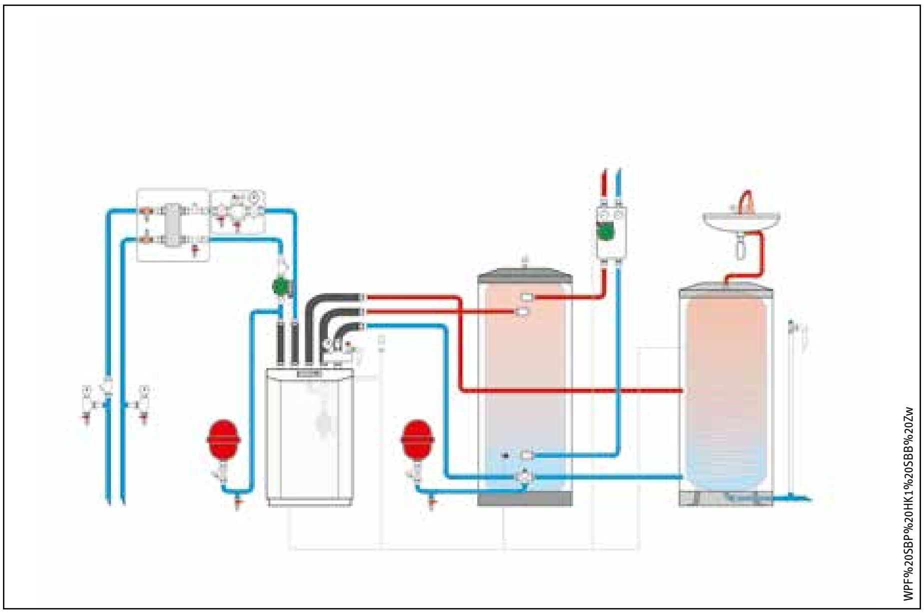
Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

The required circulation pump is integrated into the heat pump.

See the adjacent table for pipe cross-sections.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

Heat pump with buffer cylinder and DHW heating



Heat pump without integral heating circulation pump

Heat pump Type	Flow rate m^3/h	Residual head hPa	Copper pipe DN
WPW 7 basic Set	0,7	280	22 x 1,0
WPW 10 basic Set	1,0	280	22 x 1,0
WPW 13 basic Set	1,2	280	22 x 1,0
WPW 18 basic Set	1,6	280	28 x 1,5
WPW 22 basic Set	2,0	210	35 x 1,5

Power supply

Notify your local power supply utility of the heat pump connection.

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

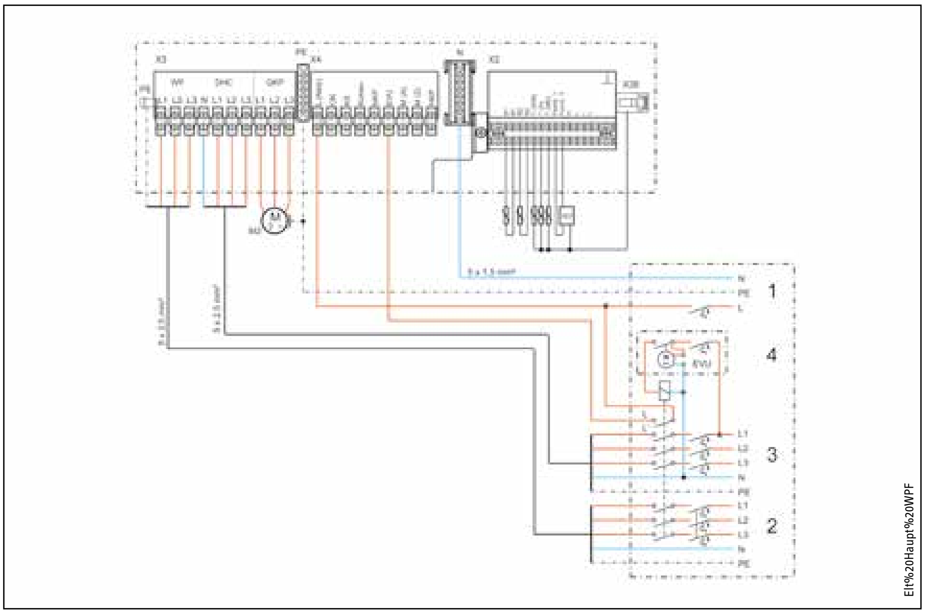
The connection must comply with the power connection diagram. For this, observe the installation instructions.

Terminals are located inside the heat pump control panel and become accessible by removing the front cover.

The following are connected there:

» Heat pump power supply
» Electric emergency/booster heater power supply
» Heat pump controller power supply
» Power-OFF enable signal
» The brine pump / groundwater station
» Heating circuit pump
» Mixing valve
» sensors and remote control units

Note
Observe the standards and regulations applicable in your country.



B1	Temperature sensor, heat pump flow
B2	Temperature sensor, heat pump return
T (WW)	Temperature sensor, DHW
T (A)	Outside temperature sensor
T (MK)	Temperature sensor, mixer circuit
Fern1	Remote control
Fern3	Remote control
H	BUS High
L	BUS Low
-	BUS earth
+	BUS (not connected)
L	Power supply
ON	Compressor signal
KS	Brine pump signal
Kuehlen	Cooling mode
MKP	Mixer circuit pump
EVU	Enable signal
M(A)	Mixer open
M(Z)	Mixer close
HKP	Heating circuit pump
QKP	Source circuit pump

1	Control circuit 1/N/PE 230V 50Hz Domestic meter
2	Load circuit, heat pump 3/N/PE 400V 50Hz Heat pump meter
3	Load circuit, booster heater 3/N/PE 230V 50Hz Heat pump meter
4	Power supply utility control Control phase L w/o power-OFF period Control phase L' with blocking time

WPW 7/10/13/18/22 basic Set

WPW 7 basic Set

Product	Type	Description	pce	Part no.
	WPF 5 basic		1	230944
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
	UP 30/1-8 E	Circulation pump	1	222374
	Insulation UPF 30/1-8 E		1	232531
	Brine set 308/312 E		1	233057
				230915

WPW 10 basic Set

Product	Type	Description	pce	Part no.
	WPF 7 basic		1	230945
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
	UP 30/1-8 E	Circulation pump	1	222374
	Insulation UPF 30/1-8 E		1	232531
	Brine set 308/312 E		1	233057
				230916

WPW 13 basic Set

Product	Type	Description	pce	Part no.
	WPF 10 basic		1	230946
	GWS 1	Groundwater module	1	230659
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
	UP 30/1-8 E	Circulation pump	1	222374
	Insulation UPF 30/1-8 E		1	232531
	Brine set 308/312 E		1	233057
				230917

WPW 18 basic Set

Product	Type	Description	pce	Part no.
	WPF 13 basic		1	230947
	GWS 2	Groundwater module	1	230660
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
	UP 30/1-8 E	Circulation pump	1	222374
	Insulation UPF 30/1-8 E		1	232531
	Brine set 308/312 E		1	233057
				230918

WPW 22 basic Set

Product	Type	Description	pce	Part no.
	WPF 16 basic		1	230948
	GWS 2	Groundwater module	1	230660
	Heat transfer medium MEG 10 l	Heat transfer medium concentrate for brine | water heat pump (based on ethyl glycol) 10 litres	1	231109
	UP 30/1-12 E		1	233055
	Insulation UPF 30/1-12 E		1	233054
	Brine set 308/312 E		1	233057
				230919


SERVICEWELT

WPM

The main controller of the new, expandable WPM system. The WPM assists the control of one direct heating circuit and two heating circuits with mixer. Two heat pumps can be operated in a cascade, with additional heat pumps being connected via the WPM system extension. The WPM provides a 230 V fault contact for external pick-up of system faults. High-efficiency circulation pumps can be connected directly via relay outputs or PWM outputs. The PCB of the WPM is located in a drip-proof wall mounting enclosure which can also accommodate other components such as the relay for the top-hat rail. The entire system is operated via the integral programming unit with state-of-the-art touch wheel. A well-designed cable layout and the large installation area for the electrics ensure easy, fail-safe connection. An internet interface and Smart Home interfaces are available as options.

At a glance

- WPM system compatible
- Wall mounting enclosure unaffected by dripping water
- Integral FES2 system control
- Management of a 2-stage heat pump cascade
- Control of one direct heating circuit and two heating circuits with mixer
- Integral heat metering
- PWM recirculation pump management
- Fault output 230 V
- Screed drying program
- Updates via SD card
- Internet interface (option)
- KNX Smart Home compatible (option)
- EMI energy management compatible (option)

Function

The heat pump manager is suitable for heating heat pumps that have no built-in control unit. A BUS cable that enables the communication between the heating heat pump and the WPM is routed on site between the components. All the necessary functions that heat pump systems require are guaranteed via the WPM. The heat pump control panels incorporate the IWS (integral heat pump controller) that regulates the heat pump functions.

Further accessories

234725	WPE
235995	TAF PT 5m
235996	TAF PT 2 m
235997	AF PT
234723	FET
185579	FE 7

		WPM
		234727
Versions		
Suitable for		Wall mounting
Dimensions		
Height	mm	400
Width	mm	310
Depth	mm	100

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

WPE

At a glance

- » WPM system compatible
- » Wall mounting enclosure unaffected by dripping water
- » Operation and adjustment via programming unit in WPM
- » Management of a further 4 heat pump stages
- » Control of two additional heating circuits with mixer
- » Swimming pool management
- » Universal differential controller
- » DHW circulation pump management

The WPE extends the WPM system with numerous functions. The extension provides two additional heating circuits with mixer and enables the incorporation of a second DHW cylinder with separate DHW program, the installation of a swimming pool controller for primary and secondary integration of a swimming pool, and also cascades of up to 6 heat pumps. It also expands the basic functions of the WPM controller, adding options for connection of a BMS. Two additional 0...10 V interfaces, a differential controller and switching outputs are available. The enclosure is simply installed next to the WPM on the right or left-hand side and connected to the power supply and bus. The module's additional functions can be adjusted from the programming unit of the WPM.

Function

The WPE supplements the WPM with additional functions. A BUS cable that enables the communication between the two is routed on site between the WPE and WPM. The WPE is used on heat pump systems for two further heating circuits with mixer and/or in cascade systems with more than two heat pumps and/or for a swimming pool controller. The WPE also has numerous special functions. The WPE is operated via the display of the WPM. The main controller WPM is always required.

Further accessories

234723 FET

235995 TAF PT 5m

235996 TAF PT 2 m

		WPE
		234725
Versions		
Suitable for		Wall mounting
Dimensions		
Height	mm	400
Width	mm	310
Depth	mm	100

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

Accessories

FET

The digital remote control FET enables convenient operation of one heating zone. The remote control measures the relative humidity and room temperature.

		FET
		234723
Height	mm	96
Width	mm	145
Depth	mm	31

FE 7

Analogue remote control with integral sensor for capturing the room temperature. For adjusting the set room temperature by +/- 5 K and for changing operating modes: day mode, setback mode and program operation. This remote control may be used in connection with WPM 3, WPM II, WPM 2.1 and WPMi for both heating circuits.

		FE 7
		185579
Height	mm	80
Width	mm	80
Depth	mm	30
Setting range	K	± 5

TAF PT 5m

PT 1000 sensor with a 5 m long cable and a diameter of 6 mm, for use as an immersion sensor or contact sensor in heat pump systems.

		TAF PT 5m
		235995
Diameter	mm	6
Cable length	m	5

TAF PT 2 m

PT 1000 sensor with a 2 m long cable and a diameter of 6 mm, for use as an immersion sensor or contact sensor in heat pump systems.

		TAF PT 2 m
		235996
Diameter	mm	6
Cable length	m	2

AF PT

PT 1000 sensor for use as an outside temperature sensor. Without power cable.

		AF PT
		235997
Cable length	m	0

WPMW 3

WPMW 3

At a glance

- Version for wall mounting
- Easy installation with spatial separation of electrical connection and system operation
- Programming unit for wall mounting, with backlit LCD and graphic capability
- Operation via touch-sensitive touch wheel
- Integral heat metering via refrigerant circuit data, subject to heat pump type
- Integral solar control unit, heat meter or passive-active cooling function
- Pasteurisation
- Screed drying program
- Hours run meter
- Heating and DHW programs

Heat pump manager WPM 3 available for wall mounting or for mounting inside a control panel. Comprising a controller unit for the connection of actuators and sensors, and a separate programming unit with backlit LCD with graphics capability. Up to six heat pump stages can be controlled in conjunction with the MSM (accessory). Control of one direct heating circuit and one mixer circuit with separate seven-day heating programs. DHW heating is regulated via a freely adjustable individual seven-day program. Option to connect a second heat generator. Optional activation of a solar controller, heat meter or passive-active cooling function. The Internet Service Gateway (accessory) is required for connection to a home network / internet and SERVICEWELT.

Function

The heat pump manager WPM3 is suitable for heating heat pumps. A BUS cable that enables the communication between the heating heat pump, WPM3 and the programming unit is routed on site between the components. All necessary functions required by two single compressor or two twin compressor heat pump systems are guaranteed by the WPM3. The heat pump control panels incorporate the IWS (integral heat pump controller) that regulates the heat pump functions.

Further accessories

165339	Outside temperature sensor AFS 2
165341	AVF 6
165342	TF 6
185579	FE 7
074519	MSMW
229336	ISG web
233493	ISG plus
230381	WPM-RBS
220193	FEK

WPMS 3

WPMS 3

At a glance

» Version for installation in the control panel
» Easy installation with spatial separation of electrical connection and system operation
» Programming unit for wall mounting, with backlit LCD and graphic capability
» Operation via touch-sensitive touch wheel
» Integral solar control unit, heat meter or passive-active cooling function
» Pasteurisation
» Screed drying program
» Hours run meter
» Heating and DHW programs

Heat pump manager WPM 3 available for wall mounting or for mounting inside a control panel. Comprising a controller unit for the connection of actuators and sensors, and a separate programming unit with backlit LCD with graphics capability. Up to six heat pump stages can be controlled in conjunction with the MSM (accessory). Control of one direct heating circuit and one mixer circuit with separate seven-day heating programs. DHW heating is regulated via a freely adjustable individual seven-day program. Option to connect a second heat generator. Optional activation of a solar controller, heat meter or passive-active cooling function. The Internet Service Gateway (accessory) is required for connection to a home network / internet and SERVICEWELT.

Function

The heat pump manager WPM3 is suitable for heating heat pumps. A BUS cable that enables the communication between the heating heat pump, WPM3 and the programming unit is routed on site between the components. All necessary functions required by two single compressor or two twin compressor heat pump systems are guaranteed by the WPM3. The heat pump control panels incorporate the IWS (integral heat pump controller) that regulates the heat pump functions.

Standard delivery

Controller, 2x immersion sensors, 1x contact sensor, 1x outside sensor

Further accessories

230381	WPM-RBS
165341	AVF 6
165342	TF 6
185579	FE 7
233493	ISG plus
229336	ISG web
220193	FEK
165339	Outside temperature sensor AFS 2

WPM 3 heat pump manager

Specification

		WPMW 3	WPMS 3
		232980	232981
Power consumption	VA	8	8
Relay breaking capacity	A	2	2
IP rating		IP21	IP20
Sensor resistance	Ω	2000	2000
Communication system		RS 232 (optical), CAN	RS 232 (optical), CAN
Max. breaking capacity of relay output, buffer charging pumps	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, heating circuit pump	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, mixer circuit pump	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, DHW charging pump	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, DHW circulation pump	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, source pump	A	2 (1,5)	2 (1,5)
Max. relay output breaking capacity HS 2 contact	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, mixer	A	2 (1,5)	2 (1,5)
Max. breaking capacity of relay output, solar circuit pump	A	2 (1,5)	2 (1,5)
Calculation surge voltage	V	4000	4000
Max. total breaking capacity of all relay outputs	A	10 (10)	10 (10)
Number of automatic cycles		100000	100000
Level of contamination		2	2
Mode of operation		1.B	1.B
Suitable for		Wall mounting enclosure	Control panel version
Height	mm	215	72
Width	mm	246	146
Depth	mm	140	96
Height of programming unit	mm	96	96
Width of programming unit	mm	145	145
Depth of programming unit	mm	31	31
Controller height	mm	215	72
Controller width	mm	246	146
Controller depth	mm	140	96
Weight	kg	1,7	0,65
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

Required temperature sensors

	Outside temperature sensor	Heat pump flowtemperature	Heat pumpreturn temperature	DHW temperature	Heat source 2	Heatsource temperature	Mixer flow temperature	Cooling flow temperature
WPF M mono mode	•		•			•	•	
WPF M mono energetic	•		•		•	•	•	
WPF M dual mode with boiler	•		•		•	•	•	
WPL mono-mode	•		•					
WPL mono energetic with emergency/booster heater	•		•					
WPL dual-mode with boiler	•		•		•			
Additional sensor for								
DHW heating with the heat pump		•		•				
Additional controlled heating circuit							•	
Cooling mode								•

WPM 3 heat pump manager

Power supply

Make the power connection in accordance with the relevant power connection diagram. The supply voltage at terminal L and phase L´ switched by the power supply utility must be routed via the same RCD. The appliance must be able to be separated from the mains power supply by an additional isolator that disconnects all poles with at least 3 mm contact separation. The cable entries in the wall mounting enclosure are suitable for rigid and flexible cables with an outside diameter of between 6 mm and 12 mm. Secure all electric cables to the wall immediately below the wall mounting enclosure using strain relief fittings. The red wedges supplied are designed to secure the electric cables inside the enclosure.

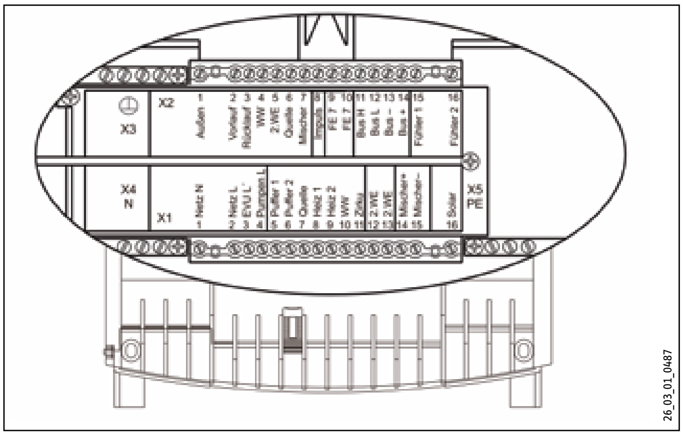
BUS connection

The BUS cable enables the communication with the system and enables the allocation of appliance-specific addresses for controlling the heat pump. Connect the BUS cable no sooner than during commissioning.

Outside temperature sensor AFS 2

Install the outside temperature sensor on a north or north-eastern wall behind a heated room 2.5 m above ground level and 1 m away from windows and doors. The outside temperature sensor should have full and unprotected exposure to the weather but at no time to direct insolation.

Connection array



X1 Mains voltage area
1 N
2 L
3 L‘ Power supply utility enable signal
4 Pumps L
5-6 Buffer cylinder charging pumps
7 Source pump
8-9 Heating circuit pumps
10 DHW charging pump
11 DHW circulation pump
12-13 Heat source 2
14 Mixer open
15 Mixer close
16 Solar circuit pump
X2 LV area
1 Sensor outside temperature
2 Sensor, heat pump flow temperature
3 Sensor, heat pump return temperature
4 DHW temperature sensor
5 Sensor, heat source 2
6 Heat source temperature sensor
7 Mixer flow temperature sensor
9 Terminal 1 of the FE7 remote control
10 Terminal 3 of the FE7 remote control
11-13 BUS high, low and ground
14 "+" (not connected)
15 Sensor solar cylinder return heat metering
16 Sensor, solar collector, cooling Flow heat metering
X3 Earth
X4 N
X5 PE

WPM-RBS

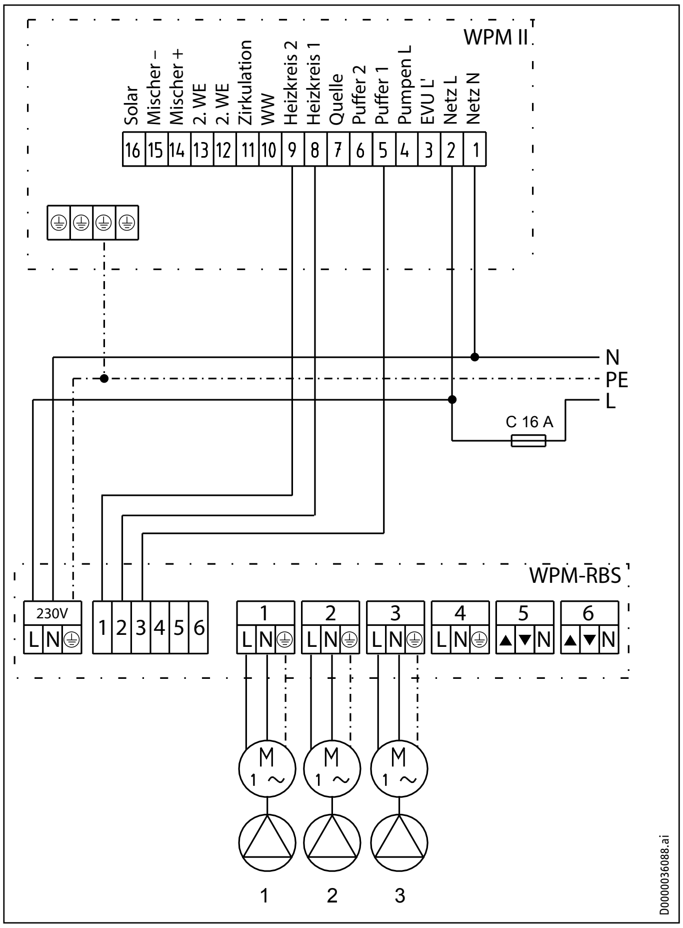
WPM-RBS

At a glance

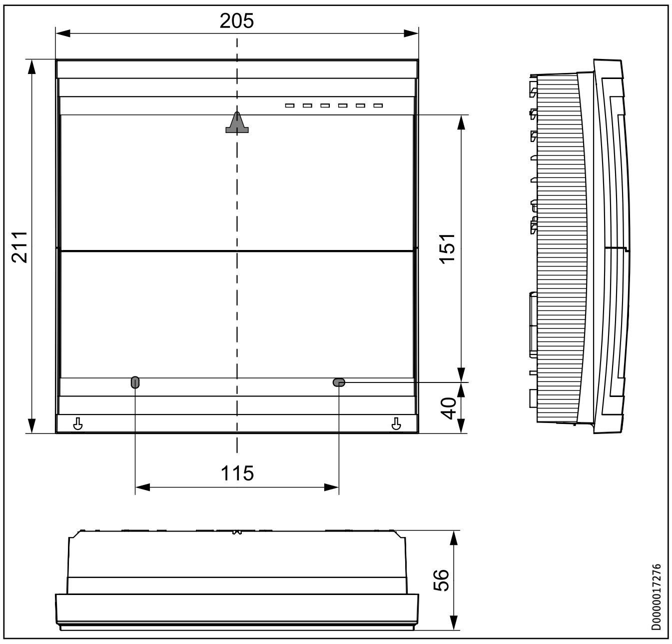
» Relay set for connecting high efficiency pumps
» Integral relay PCB for up to 6 inputs and outputs
» Connection via Rast5 plug-in connector with screw terminal
» When using the Yonos UP 25/7.5 E (235949) circulation pump series the relay set is not required.

Generally required for heat pump systems with separate HE pumps in conjunction with the WPM heat pump manager or the MSM mixer module. Wall mounting enclosure with integral relay PCB for up to six 230 V inputs and six MSR relay outputs. All inputs and outputs via encoded Rast5 plug-in connectors with screw terminal. When using the UP 25/7.5 PCV (235949) circulation pump series the relay set is not required.

		WPM-RBS
		230381
Power supply		1/N/PE ~ 230 V
Power consumption	VA	5
Relay breaking capacity	A	2
Max. relay output breaking capacity	A	2 (2)
Max. peak load current	A	65
Max. power across terminal "Netz-L" [mains L]	A	10
IP rating		IP31
Ambient temperature	°C	0 - 50
Height	mm	211
Width	mm	205
Depth	mm	56
Weight	kg	0,3



1 Heating circuit 2
2 Heating circuit 1
3 Buffer 1



Additional controller for mixer and swimming pool

MSMW

MSMW

At a glance

» Version for wall mounting
» Swimming pool control unit
» Additional mixer circuit control unit
» Control of four single compressor or two twin compressor heat pumps
» Fault output 230 V

The MSM mixer module is used as an extension to the WPM for systems with more than two heat pumps. An additional four single compressors or one twin compressor heat pump(s) and an additional mixer circuit with heating and setback times can be controlled. For both versions, a contact sensor is part of the standard delivery.

Function

The MSM supplements the WPM with additional functions. A BUS cable that enables the communication between the two is routed on site between the MSM and WPM. The MSM is used on heat pump systems with a second mixer circuit, and/or in cascade systems with more than two heat pumps and/or for a swimming pool controller. The MSM can also be used as an independent mixer control. In this case, there is no communication with the WPM.

Further accessories

185579 FE 7

		MSMW
		074519
Power consumption	VA	8
Relay breaking capacity	A	2
IP rating		IP20
Ambient temperature	°C	15-30
Clock power reserve, day	h	10
Sensor resistance	Ω	2000
Communication system		RS 232 (optical), CAN
Max. breaking capacity of relay output, buffer charging pumps	A	2 (1,5)
Max. breaking capacity of relay output, mixer circuit pump	A	2 (1,5)
Max. breaking capacity of relay output, mixer	A	2 (1,5)
Max. load swimming pool pump	A	2 (1,5)
Max. total breaking capacity of all relay outputs	A	10 (1,5)
Suitable for		Wall mounting enclosure
Height	mm	215
Width	mm	246
Depth	mm	140
Weight	kg	1,5
Power supply		1/N/PE ~ 230 V 50 Hz

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

Power supply

Make the power connection in accordance with the relevant power connection diagram. The supply voltage at terminal L and phase L´ switched by the power supply utility must be routed via the same RCD. The appliance must be able to be separated from the mains power supply by an additional isolator that disconnects all poles with at least 3 mm contact separation. For this, use contactors, mains isolators, fuses etc. The cable entries in the wall mounting enclosure are suitable for rigid and flexible cables with an outside diameter of between 6 mm and 12 mm. Secure all cables to the wall immediately below the wall mounting enclosure using strain relief fittings. The red wedges supplied are designed to secure the electric cables inside the enclosure.

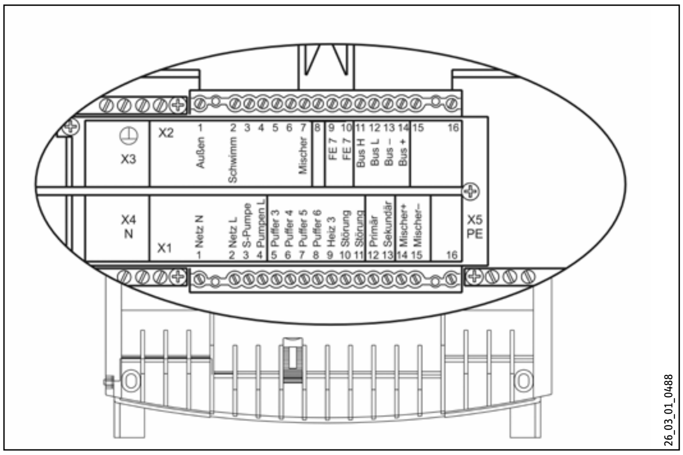
BUS connection

The BUS cable enables the communication with the system and enables the allocation of appliance-specific addresses for controlling the heat pump. Connect the BUS cable no sooner than during commissioning.

Outside temperature sensor AFS 2

Install the outside temperature sensor on a north or north-eastern wall behind a heated room 2.5 m above ground level and 1 m away from windows and doors. The outside temperature sensor should have full and unprotected exposure to the weather but at no time to direct insolation.

Connection array



X1 Mains voltage area
1 N
2 L
3 Swimming pool input (230 V)
4 Pumps L
5-8 Buffer cylinder charging pumps
9 Heating circuit pumps
10-11 Fault, floating
12 Swimming pool pump, primary
13 Swimming pool pump, secondary
14 Mixer open
15 Mixer close
X2 LV area
1 Sensor outside temperature
2 Swimming pool sensor
7 Mixer flow temperature sensor
9 Terminal 1 of the FE7 remote control
10 Terminal 3 of the FE7 remote control
11-13 BUS high, low and ground
14 "+" (is not connected)
X3 Earth
X4 N
X5 PE

FE 7

Analogue remote control with integral sensor for capturing the room temperature. For adjusting the set room temperature by +/- 5 K and for changing operating modes: day mode, setback mode and program operation. This remote control may be used in connection with WPM 3, WPM II, WPM 2.1 and WPMi for both heating circuits.

		FE 7
		185579
Height	mm	80
Width	mm	80
Depth	mm	30
Setting range	K	± 5

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

FEK

Digital remote control for the WPM II and WPM 3. Enables convenient inputting and display of system parameters (e.g. operating modes, outside temperature, relative humidity and heating circuit parameters). For cooling via an area heating system, install the FEK in a reference room. It measures the relative humidity and room temperature for dew point monitoring.

		FEK
		220193
Height	mm	97
Width	mm	147
Depth	mm	33
Setting range	K	± 5

BUS cable: LIYCY (TP) Y 2 x 2 x 0.75 mm^2

BUS cable, installation in or on finished walls: J-Y(ST)Y 2 x 2 x 0.75 mm^2

AVF 6

AVF 6

Additional sensor for the heat pump system.

		AVF 6
		165341
Diameter	mm	6
Cable length	m	1

TF 6

The TF 6 is an additional immersion sensor for the heat pump system.

		TF 6
		165342
Diameter	mm	6
Cable length	m	1

Outside temperature sensor AFS 2

Outside temperature sensor in weather-resistant casing for finished walls, for installing on a north or north-easterly facing wall, approx. 2.5 m above ground level and at a lateral distance of 1 m from windows and doors. The outside temperature sensor should have full and unprotected exposure to the weather but at no time to direct sunlight. Accessories necessary for optional night cooling.

		Outside temperature sensor AFS 2
		165339
Cable length	m	0

Internet service gateway
ISG

ISG web

Ethernet gateway in wall mounting enclosure to connect the WPM and LWZ controllers to the internet. Automatic transfer of appliance data to the STIEBEL ELTRON Internet Service Portal. Data transfer via DSL. Controller operation via computer, notebook or tablet browser. Connectable to the heat pump manager for compatible heat pump types and LWZ integral units.

		ISG web
		229336
Height	mm	95
Width	mm	158
Depth	mm	37
Max. power consumption	A	1,5
Application range min./max.	°C	0...60
CAN		RJ 45
RS232		RJ 12
10/100 Ethernet		RJ 45

ISG plus

Ethernet gateway in wall mounting enclosure to connect the WPM and LWZ controllers to the internet. Automatic transfer of appliance data to the STIEBEL ELTRON Internet Service Portal. Data transfer via DSL. Controller operation via computer, notebook or tablet browser. Integral interface extension for SG Ready function or for optimising on-site consumption of power generated by PV systems. Connectable to the heat pump manager for compatible heat pump types and to the LWZ integral units.

		ISG plus
		233493
Height	mm	95
Width	mm	158
Depth	mm	37
Max. power consumption	A	1,5
Application range min./max.	°C	0...60
CAN		RJ 45
RS232		RJ 12
10/100 Ethernet		RJ 45
Control input		Round pin plug

KNX IP software

The KNX IP software allows the heat pump to be integrated into a KNX-System. Customer Service loads the software extension onto a standard ISG web by means of a remote update. The ISG web (part no. 229336), an internet connection and a 'Servicewelt' contract are required for the software update. Please observe the compatibility requirements for the KNX software on our homepage.

Modbus TCP/IP software

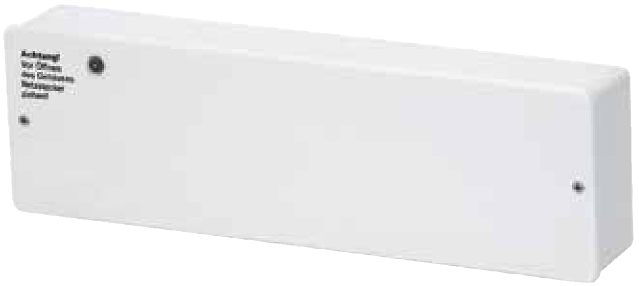
The Modbus TCP/IP software allows compatible heat pumps to be integrated into the building automation system. Customer Service loads the software extension onto a standard ISG web by means of a remote update. The ISG web, an internet connection and a 'Servicewelt' contract are required for the software update. Please observe the compatibility specifications for the Modbus TCP/IP software on our homepage.

EMI

The Energy Management Interface (EMI) is an optional software extension for the ISG Web and, together with the SMA Sunny Home Manager, facilitates the integration of selected heat pumps into an energy management system for the purpose of increasing on-site consumption of PV power. Customer Service loads the software extension onto a standard ISG web by means of a remote update. The ISG web, an internet connection and a 'Servicewelt' contract are required for the software update. Please observe the compatibility specifications for the EMI software on our homepage.

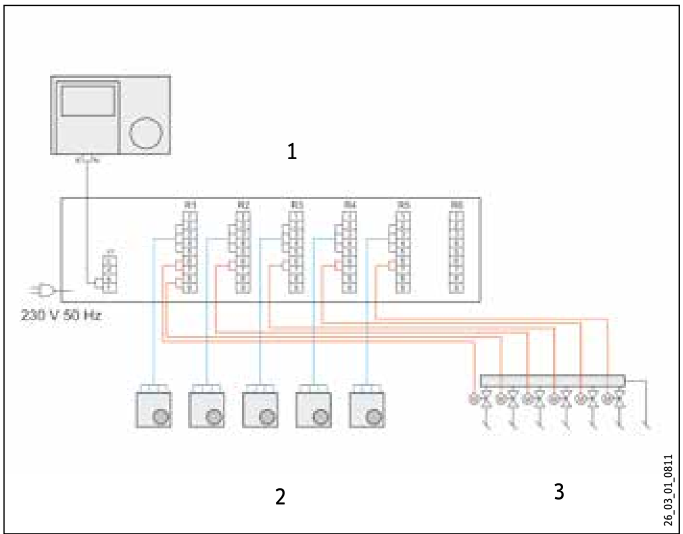
SP cool

SP cool



Electrical distribution bar for connecting heating circuit valves for changeover between heating and cooling mode. Optimised for operation with cooling via the underfloor heating system.

		SP cool
		223358
Height	mm	90
Width	mm	310
Depth	mm	65
Weight	kg	0,7
Operating voltage	V	230
Frequency	Hz	50
Power consumption	VA	3
Calculation surge voltage	V	4000
Voltage for the purpose of EMC emission tests	V	230
Current for the purpose of EMC emission tests	A	0,1
MCB/fuse rating	A	4
Load circuit (total of all currents ≤ 2A)	A	6* 4(2)
Casing material		ABS plastic
Maximum number of actuators (3W) per terminal strip/ room		4
Temperature for (wet/dry) bulb pressure test	°C	75 ± 2
Protection class		II
IP rating		IP40
Maximum number of actuators (3W)		16
Ambient temperature in the installation room min./max.	°C	0...+50
Storage and transport temperature	°C	-20...+60
Level of contamination		2



1 Distributor strip
2 Room temperature controller
3 Heating circuit distributor with zone valves

STB-FB

RE1 B-A temperature controller

Electronic safety temperature controller with remote sensor and adjustment options for the maximum permissible flow temperature.

		RE1 B-A temperature controller
		003554
Ambient temperature	°C	-10...50
Storage and transport temperature	°C	-40...70
Temperature for (wet/dry) bulb pressure test	°C	75+-2
Voltage for the purpose of EMC emission tests	V	230
Current for the purpose of EMC emission tests	A	10
Design peak voltage	KV	4
Power connection		1/N/PE~230 V
Level of contamination		2
Switching hysteresis	K	1

STB-FB

Bi-metal contact thermostat with casing for limiting the maximum permissible flow temperature.

		STB-FB
		233711
Temperature setting range	°C	20-90
IP rating		IP30
Switching hysteresis	K	8±3

SBBE WP SOL

At a glance

- Minimum standby losses with energy efficiency class A (300 l and 400 l) due to optimised insulation concept
- Enamelled steel with directly applied foam insulation and impressed current anode for additional corrosion protection
- Rectangular shape in line with our standard design for system cylinders | heat pumps
- Temperature and heat content indication on the display
- Hydraulic connections arranged at the rear, alternatively at the top
- Can be used for both heating and cooling
- Casing can be removed during handling if required
- Recessed grips to facilitate handling
- Large delivery of domestic hot water due to matched inlet and outlet technology

APPLICATION: DHW cylinder for heat pump operation, for use in detached and semi-detached houses and apartment buildings, depending on the nominal capacity and heat transfer surface area. Optional integration of solar thermal backup is possible with 'SOL' types. **EQUIPMENT:** Enamelled steel cylinder with directly applied foam insulation, equipped with a controlled impressed current anode for additional corrosion protection. One internal indirect coil for connecting a heat pump and another for solar connection in relation to 'SOL' types. With inspection flange inside the cylinder, can be fitted with an optional flanged immersion heater behind the front fascia. Recessed grips to support handling. Equipped with a temperature sensor for connection to the heat pump control unit and an integral sensor for temperature capture as well as a programming unit with display for indicating the available amount of DHW. Hydraulic connections arranged to the rear, may be rerouted to the top using accessory assemblies. Cylinder casing consisting of two plastic side panels and a cylinder cover finished in pure white, plus front fascia in Eloxal silver. Rectangular shaped cylinder. **EFFICIENCY:** Extremely low heat losses thanks to highly effective thermal insulation. Large volume of mixed water due to matched inlet and outlet technology. Current available amount of mixed water or heat content is displayed.

Function

The DHW cylinders are designed for heat pump operation. Large exchanger surfaces of the indirect coil and corresponding nominal diameters of connections ensure a high transfer capacity and low pressure drops. When the actual temperature falls below the selected set temperature, a heat demand coming from the cylinder temperature sensor is captured by the heat pump control unit. The heating medium flows through the indirect coil in the opposite direction to the stratification of the DHW in the cylinder until the setpoint temperature is reached.

The DHW cylinders are designed for heat pump operation. Large exchanger surfaces of the indirect coil and corresponding nominal diameters of connections ensure a high transfer capacity and low pressure drops. When the actual temperature falls below the selected set temperature, a heat demand coming from the cylinder temperature sensor is captured by the heat pump control unit. The heating medium flows through the indirect coil in the opposite direction to the stratification of the DHW in the cylinder until the setpoint temperature is reached. The "WP SOL" version also has a solar indirect coil for connecting a solar thermal system.

Further accessories

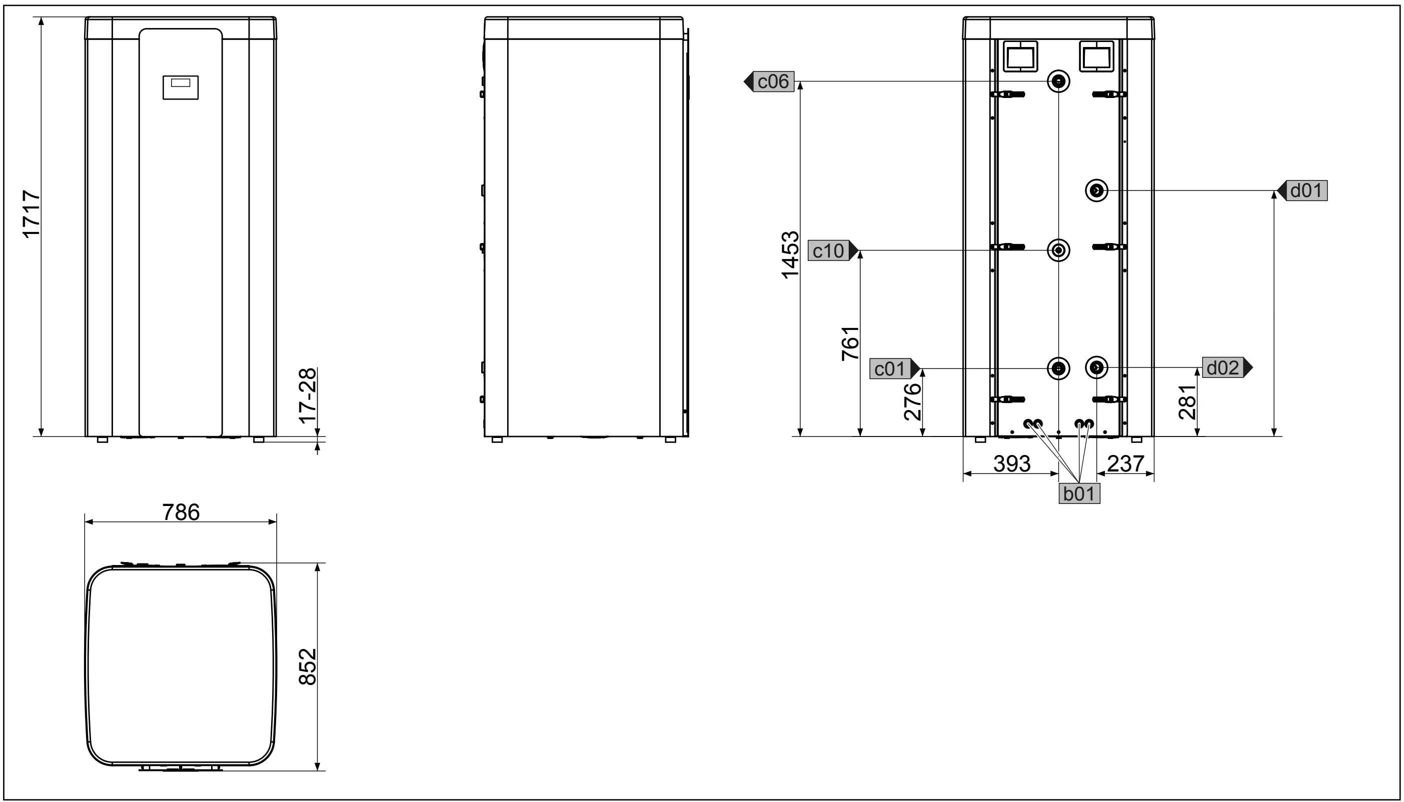
234515	RBS 301
071330	FCR 21/60
071331	FCR 21/120
232030	BGC 2/60
074371	DMV / ZH 1
074370	ZH 1
074375	SV 3/4-10

SBBE WP SOL

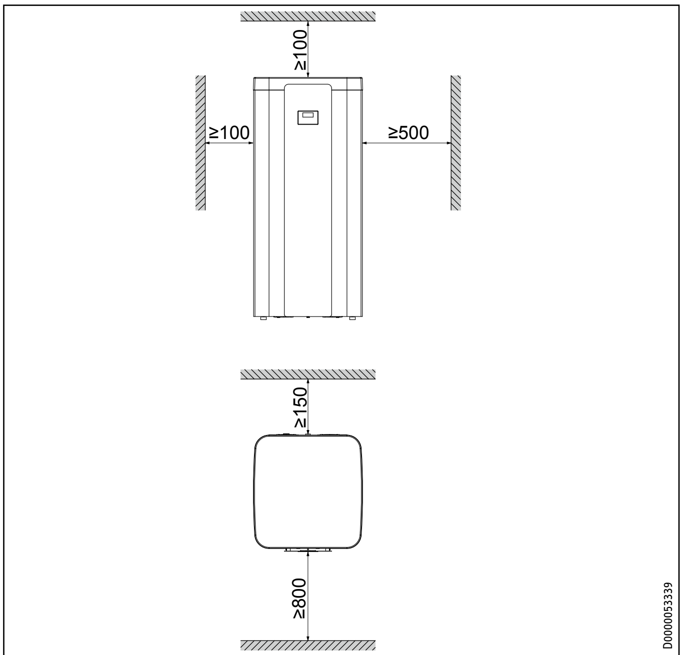
Specification

		SBBE 301 WP	SBBE 302 WP	SBBE 401 WP SOL	SBBE 501 WP SOL
		234348	234349	234350	234351
Hydraulic data					
Nominal capacity	l	301	290	395	495
Capacity, upper indirect coil	l	20,0	28,4	25,2	31,7
Capacity, lower indirect coil	l			9,2	9,2
Surface area, upper indirect coil	m²	3,2	4,8	4,0	5,0
Surface area, lower indirect coil	m²			1,4	1,4
Pressure drop at 1.0 m³/h, upper indirect coil	hPa	37	56	47	58
Pressure drop at 1.0 m³/h, lower indirect coil	hPa			17	17
Mixed water volume at 40 °C (15 °C/60 °C)	l	529	514	681	857
Application limits					
Max. permissible pressure	MPa	1,0	1,0	1,0	1,0
Test pressure	MPa	1,5	1,5	1,5	1,5
Max. permissible temperature	°C	95	95	95	95
Max. flow rate	l/min	38	38	45	50
Max. recommended collector aperture area	m²			8	10
Power consumption					
Max. power consumption, control	W	5	5	5	5
Energy data					
Standby energy consumption/24 h at 65 °C	kWh	1,2	1,2	1,4	1,8
Energy efficiency class		A	A	A	
Electrical data					
Rated voltage, controller	V	230	230	230	230
Phases, controller		1/N/PE	1/N/PE	1/N/PE	1/N/PE
Frequency	Hz	50	50	50	50
MCB/fuse protection, controller	A	B 16	B 16	B 16	B 16
Versions					
IP rating		IP21	IP21	IP21	IP21
Dimensions					
Height	mm	1737	1737	1972	1972
Width	mm	787	787	787	787
Depth	mm	852	852	852	852
Height when tilted	mm	1885	1885	2125	2125
Weights					
Weight, full	kg	509	517	664	766
Weight, empty	kg	206	225	268	270

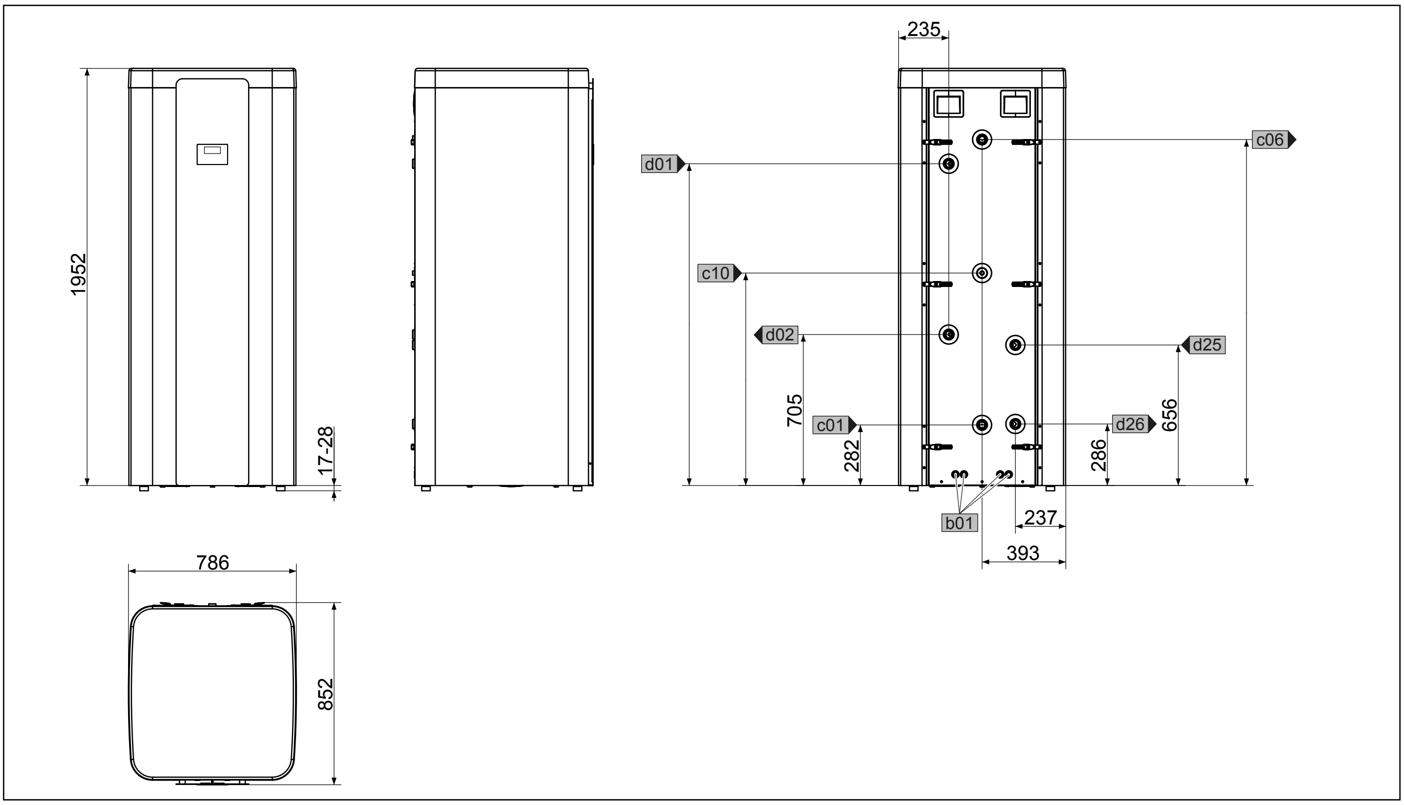
SBBE 301/302 WP



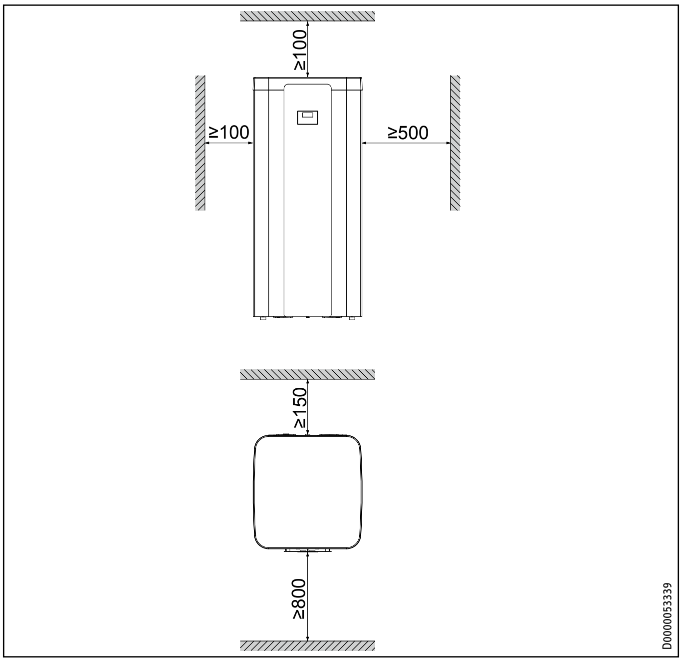
				SBBE 301 WP	SBBE 302 WP
b01	Entry electrical cables				
c01	Cold water inlet	Male thread		G 1	G 1
c06	DHW outlet	Male thread		G 1	G 1
c10	DHW circulation	Male thread		G 1/2	G 1/2
d01	Heat pump flow	Height	mm	1006	1406
		Male thread		G 1 1/4	G 1 1/4
d02	Heat pump return	Male thread		G 1 1/4	G 1 1/4



SBBE 401/501 WP SOL



				SBBE 401 WP SOL	SBBE 501 WP SOL
b01	Entry electrical cables				
c01	Cold water inlet	Male thread		G 1	G 1
c06	DHW outlet	Height	mm	1619	1637
		Male thread		G 1	G 1
c10	DHW circulation	Height	mm	993	1097
		Male thread		G 1/2	G 1/2
d01	Heat pump flow	Height	mm	1505	1610
		Male thread		G 1 1/4	G 1 1/4
d02	Heat pump return	Male thread		G 1 1/4	G 1 1/4
d25	Solar flow	Male thread		G 1 1/4	G 1 1/4
d26	Solar return	Male thread		G 1 1/4	G 1 1/4



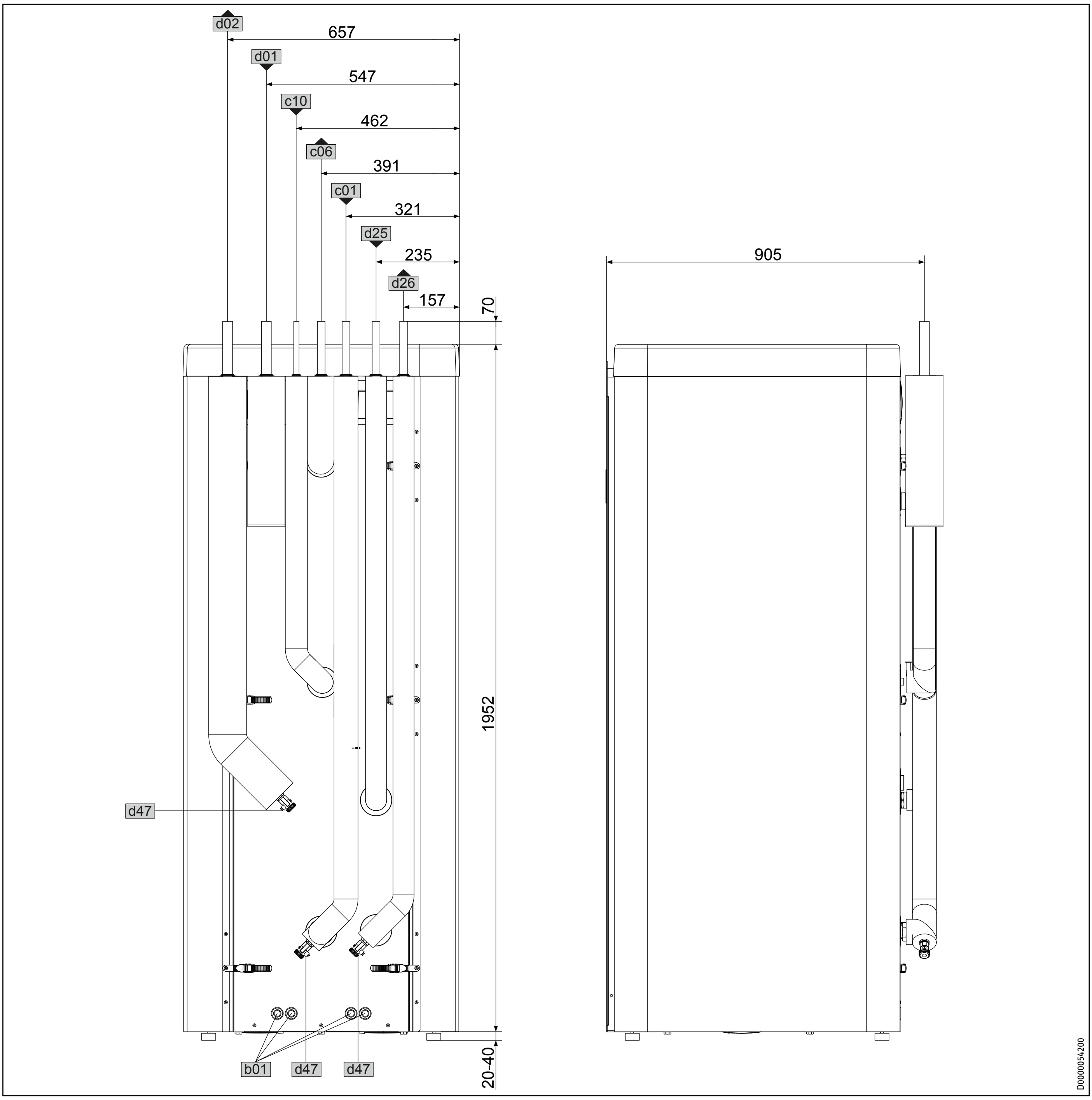
Pipe assembly RBS 301-501, 401.2-501.2

RBS pipe assembly, thermally insulated, for use with floorstanding DHW cylinders E 301 - 501 WP SOL. Available as a set for easy optional relocation of the hydraulic connections of the indirect coils and the DHW connections to the top, behind the cylinder. From there, the on-site connections are made to the copper connectors. One drain valve is included in each of the return connections of the indirect coils. Pipes are run through an installation rail on the cylinder to align the individual pre-assembled connection pipework.

Specification

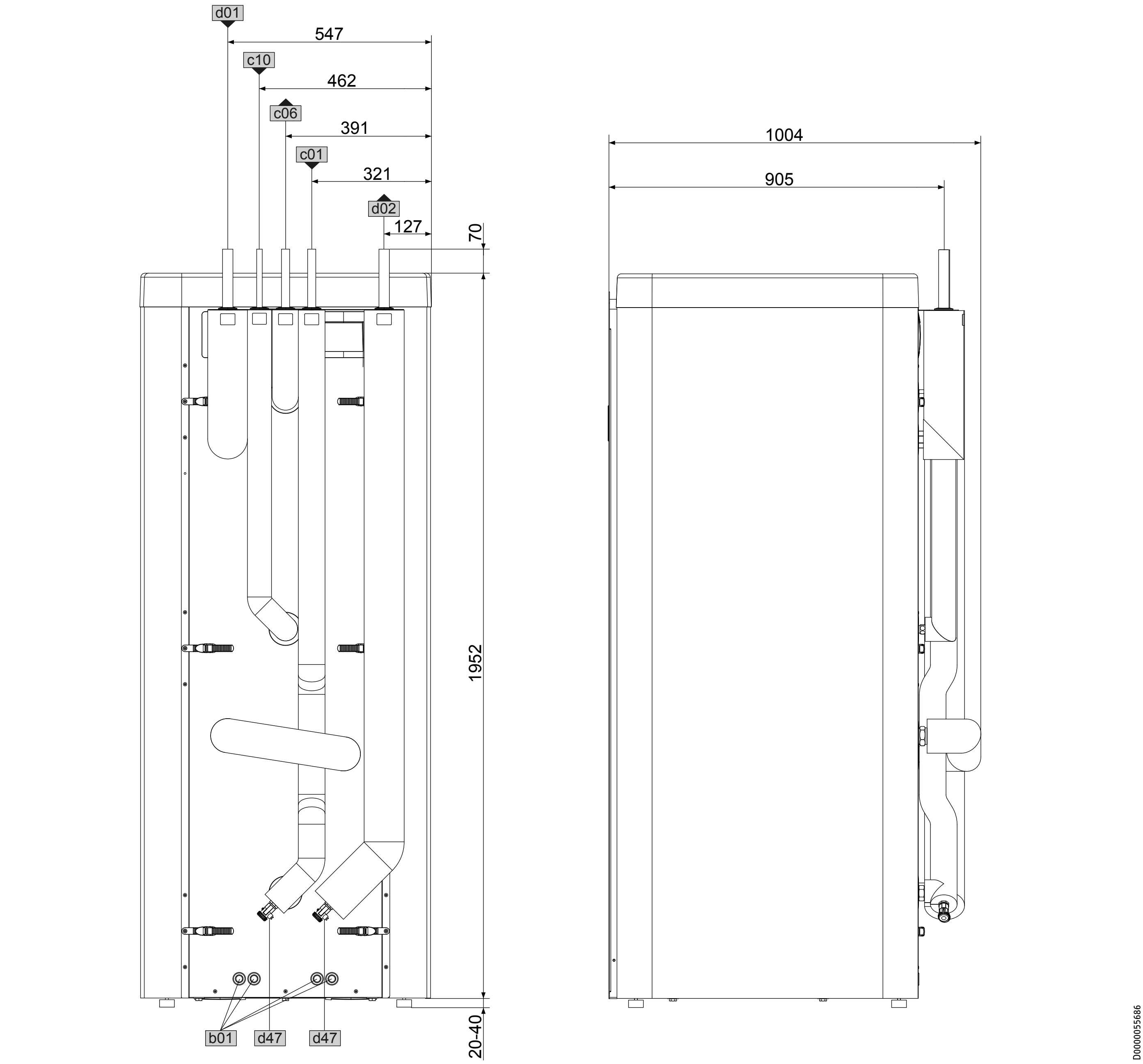
		RBS 301	RBS 302	RBS 401	RBS 401.2	RBS 501	RBS 501.2
		234515	234516	234511	234512	234513	234514
Heat pump connection	mm	28	28	28	28	28	28
Cold water connection	mm	22	22	22	22	22	22
Solar connection	mm	22	22	22	22	22	22
DHW connection	mm	22	22	22	22	22	22
DHW circulation connection	mm	15	15	15	15	15	15
Suitable for		...E 301 WP	...E 302 WP	...E 401 WP SOL	...E 401 WP SOL	...E 501 WP SOL	...E 501 WP SOL

RBS 301 - 501



				RBS 301	RBS 401	RBS 501
c01	Cold water inlet	Diameter	mm	22	22	22
c06	DHW outlet	Diameter	mm	22	22	22
c10	DHW circulation	Diameter	mm	15	15	15
d01	Heat pump flow	Diameter	mm	28	28	28
d02	Heat pump return	Diameter	mm	28	28	28
d25	Solar flow	Diameter	mm		22	22
d26	Solar return	Diameter	mm		22	22
d47	Drain					

RBS 401.2 - 501.2



				RBS 401.2	RBS 501.2
c01	Cold water inlet	Diameter	mm	22	22
c06	DHW outlet	Diameter	mm	22	22
c10	DHW circulation	Diameter	mm	15	15
d01	Heat pump flow	Diameter	mm	28	28
d02	Heat pump return	Diameter	mm	28	28
d47	Drain				

Notes

SBB 301/302/401/501 WP SOL

At a glance

- Low heat losses due to highly effective thermal insulation
- Enamelled steel with directly applied foam insulation and magnesium signal anode for additional corrosion protection
- Cold water inlet pipe for all-round alignment of the connection
- Accessories such as indirect coils, flanged immersion heaters or threaded immersion heaters can be installed
- Casing can be removed during handling if required
- Large delivery of domestic hot water due to matched inlet and outlet technology

APPLICATION: DHW cylinder for heat pump operation, for use in detached and semi-detached houses and apartment buildings, depending on the nominal capacity and heat transfer surface area. Optional integration of solar thermal backup is possible with 'SOL' types.
EQUIPMENT: Enamelled steel cylinder with directly applied foam insulation, equipped with a magnesium signal anode for additional corrosion protection. One internal indirect coil for connecting a heat pump and another for solar connection in relation to 'SOL' types. With inspection flange inside the cylinder, can optionally be fitted with a further heat exchanger or flanged immersion heater. Temperature sensor for connection to the heat pump control unit, plug-in dial thermometer and cold water inlet pipe for all-round connection alignment included in standard delivery. Cylinder casing consisting of outer plastic jacket in pure white, plus cylinder cover and plinth trim in grey.
EFFICIENCY: Low heat losses due to highly effective thermal insulation. Large volume of mixed water due to matched inlet and outlet technology.

Function

The DHW cylinders are designed for heat pump operation. Large exchanger surfaces of the indirect coil and corresponding nominal diameters of connections ensure a high transfer capacity and low pressure drops. When the actual temperature falls below the selected set temperature, a heat demand coming from the cylinder temperature sensor is captured by the heat pump control unit. The heating medium flows through the indirect coil in the opposite direction to the stratification of the DHW in the cylinder until the setpoint temperature is reached.

Further accessories

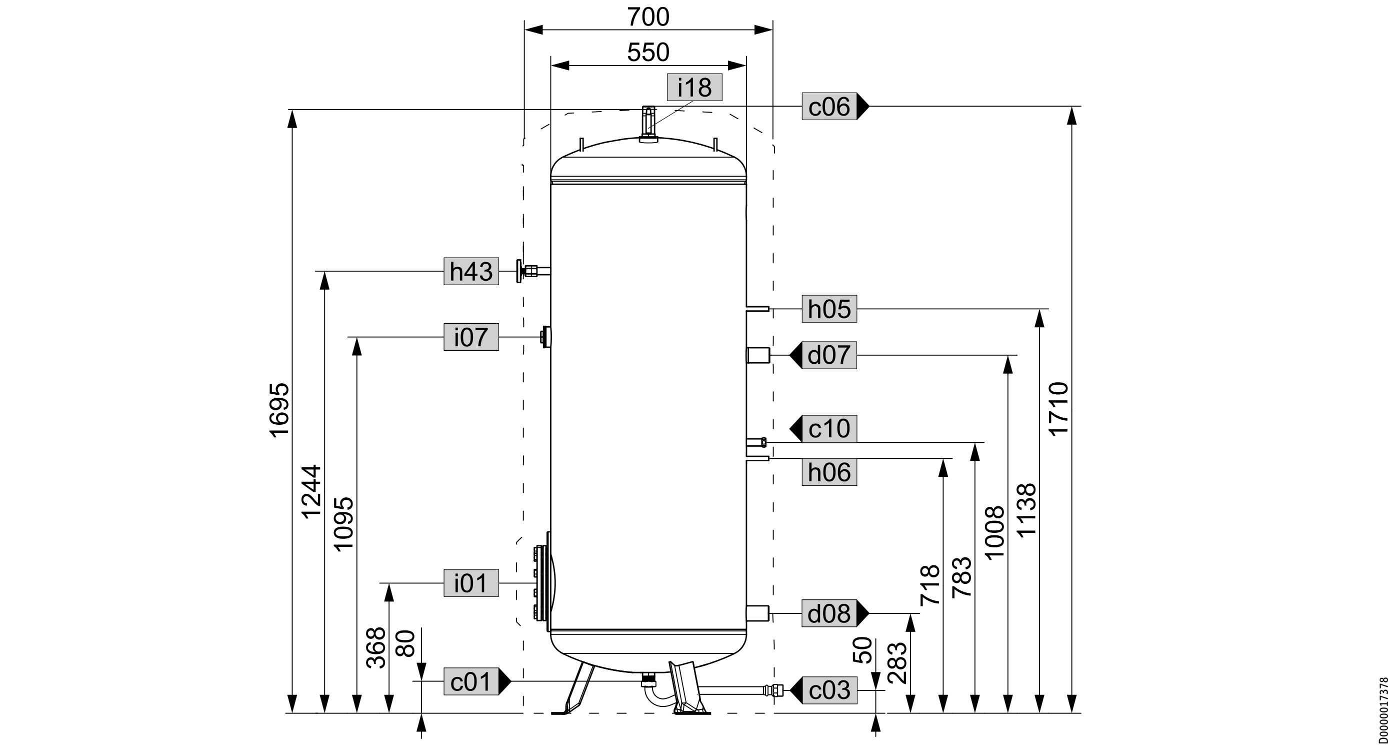
071330	FCR 21/60
071331	FCR 21/120
075115	BGC/45
232030	BGC 2/60
074371	DMV / ZH 1
074370	ZH 1
074375	SV 3/4-10
231932	FCR 21/60 CrNi
233719	UPZ
076062	WTW 21/13
072119	WTFS 21/13

SBB 301/302/401/501 WP SOL

Specification

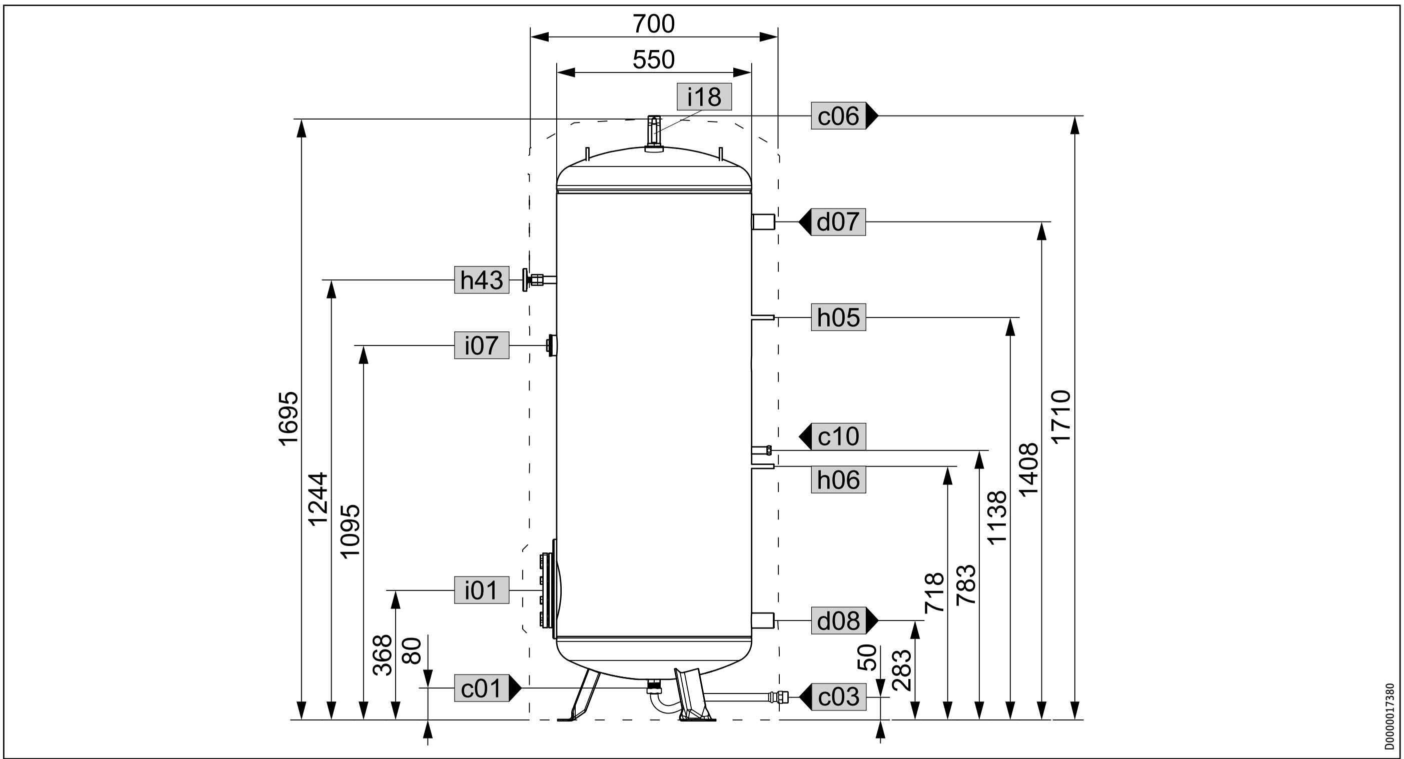
		SBB 301 WP	SBB 302 WP	SBB 401 WP SOL	SBB 501 WP SOL
		221360	221361	221362	227534
Hydraulic data					
Nominal capacity	l	301	290	395	495
Capacity, upper indirect coil	l	20	28,4	25,2	31,7
Capacity, lower indirect coil	l			9,2	9,2
Surface area, upper indirect coil	m²	3,2	4,8	4,0	5,0
Surface area, lower indirect coil	m²			1,4	1,4
Pressure drop at 1.0 m³/h, upper indirect coil	hPa	37	56	47	58
Pressure drop at 1.0 m³/h, lower indirect coil	hPa			17	17
Mixed water volume at 40 °C (15 °C/60 °C)	l	529	514	681	857
Application limits					
Max. permissible pressure	MPa	1	1	1	1
Test pressure	MPa	1,5	1,5	1,5	1,5
Max. permissible temperature	°C	95	95	95	95
Max. flow rate	l/min	38	38	45	50
Max. recommended collector aperture area	m²			8	10
Energy data					
Standby energy consumption/24 h at 65 °C	kWh	2,1	2,1	2,4	2,4
Energy efficiency class		C	C	C	
Dimensions					
Height	mm	1710	1710	1880	1988
Diameter	mm	700	700	750	810
Height when tilted	mm	1750	1750	1930	2035
Weights					
Weight, full	kg	445	457	595	730
Weight, empty	kg	142	184	189	222

SBB 301 WP



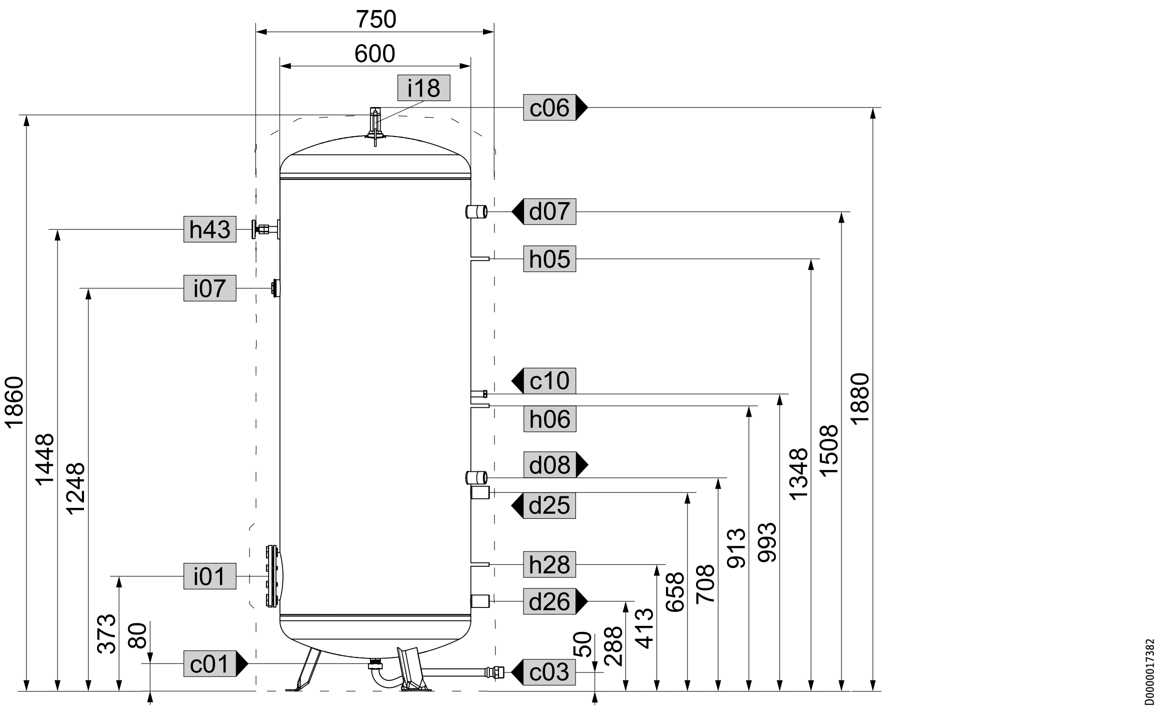
				SBB 301 WP
c01	Cold water inlet	Male thread		G 1 A
c03	Cold water inlet pipe	Male thread		G 1 A
		Torque	Nm	100
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d07	Heat pump heating flow	Female thread		G 1 1/2
d08	Heat pump heating return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	210
		Pitch circle diameter	mm	180
		Screws		M 12
		Torque	Nm	55
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

SBB 302 WP



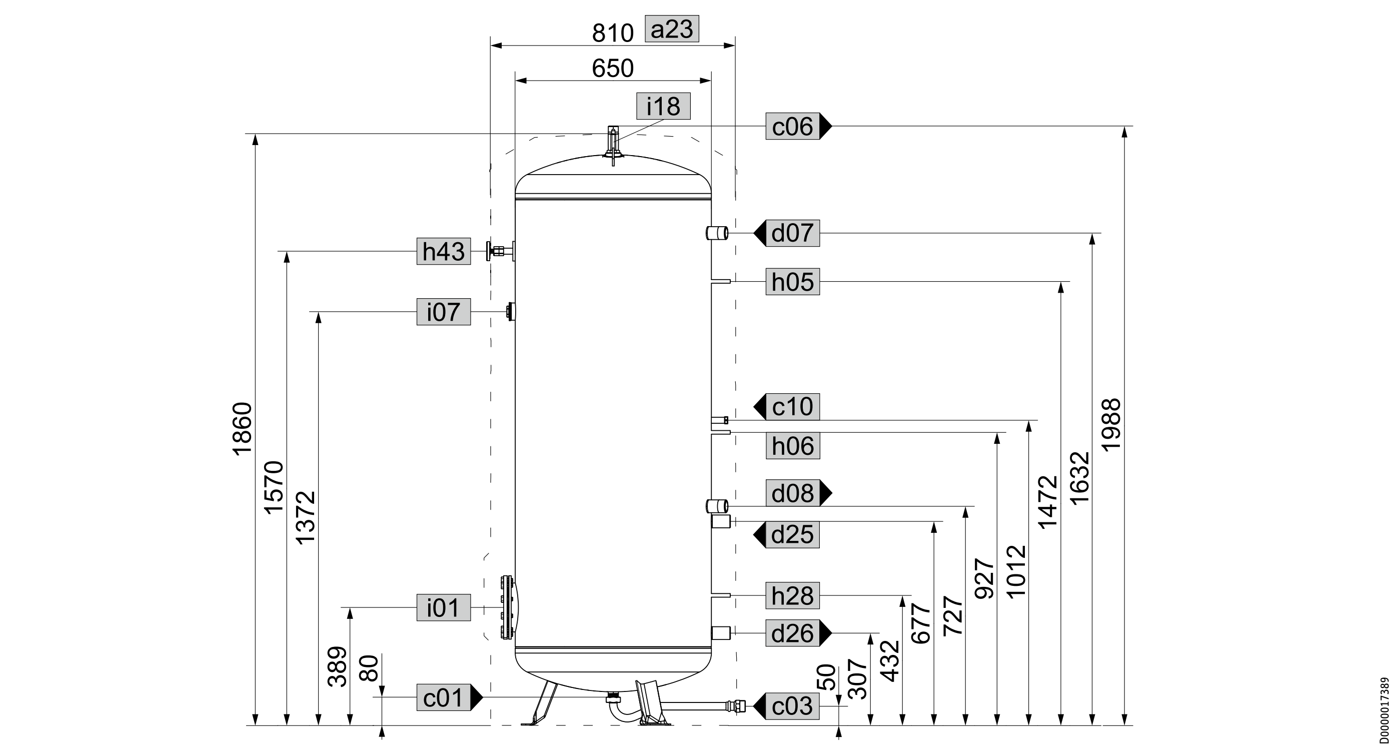
				SBB 302 WP
c01	Cold water inlet	Male thread		G 1 A
c03	Cold water inlet pipe	Male thread		G 1 A
		Torque	Nm	100
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d07	Heat pump heating flow	Female thread		G 1 1/2
d08	Heat pump heating return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	210
		Pitch circle diameter	mm	180
		Screws		M 12
		Torque	Nm	55
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

SBB 401 WP SOL



			SBB 401 WP SOL
c01 Cold water inlet	Male thread		G 1 A
c03 Cold water inlet pipe	Male thread		G 1 A
	Torque	Nm	100
c06 DHW outlet	Male thread		G 1 A
c10 DHW circulation	Male thread		G 1/2 A
d07 Heat pump heating flow	Female thread		G 1 1/2
d08 Heat pump heating return	Female thread		G 1 1/2
d25 Solar flow	Female thread		G 1 1/2
d26 Solar return	Female thread		G 1 1/2
h05 Sensor heat pump DHW	Diameter	mm	9,5
h06 Sensor heat pump DHW optional	Diameter	mm	9,5
h28 Sensor solar cylinder	Diameter	mm	9,5
h43 Thermometer	Diameter	mm	9,5
i01 Flange	Diameter	mm	210
	Pitch circle diameter	mm	180
	Screws		M 12
	Torque	Nm	55
i07 Electric emergency/booster heater	Female thread		G 1 1/2
i18 Protective anode	Female thread		G 1 1/4

SBB 501 WP SOL



				SBB 501 WP SOL
a23	Appliance	Width excl. side insulation sections	mm	690
c01	Cold water inlet	Male thread		G 1 A
c03	Cold water inlet pipe	Male thread		G 1 A
		Torque	Nm	100
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d07	Heat pump heating flow	Female thread		G 1 1/2
d08	Heat pump heating return	Female thread		G 1 1/2
d25	Solar flow	Female thread		G 1 1/2
d26	Solar return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	210
		Pitch circle diameter	mm	180
		Screws		M 12
		Torque	Nm	55
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

Corrugated pipe connector, heat exchanger
WRV 32

WRV 32

Corrugated connection pipe with union nut and threaded end for optional linking of the lower and upper indirect coils.

SBB 300/400/500 WP Trend

At a glance

- Slimline design due to simple insulation concept
- Enamelled steel with directly applied foam insulation and protective magnesium anode for additional corrosion protection
- Accessories such as threaded immersion heaters can be installed
- Casing can be removed during handling if required

APPLICATION: DHW cylinder for heat pump operation, for use in detached and semi-detached houses and apartment buildings, depending on the nominal capacity and heat transfer surface area.
EQUIPMENT: Enamelled steel cylinder with directly applied foam insulation, equipped with an inspection flange and a protective magnesium anode for additional corrosion protection. One internal indirect coil for connecting a heat pump. Temperature sensor for connection to the heat pump control unit and plug-in dial thermometer included in standard delivery. Cylinder casing consisting of outer plastic jacket in white and cylinder cover in black.

Function

The DHW cylinders are designed for heat pump operation. Large exchanger surfaces of the indirect coil and corresponding nominal diameters of connections ensure a high transfer capacity and low pressure drops. When the actual temperature falls below the selected set temperature, a heat demand coming from the cylinder temperature sensor is captured by the heat pump control unit. The heating medium flows through the indirect coil in the opposite direction to the stratification of the DHW in the cylinder until the setpoint temperature is reached.

Further accessories

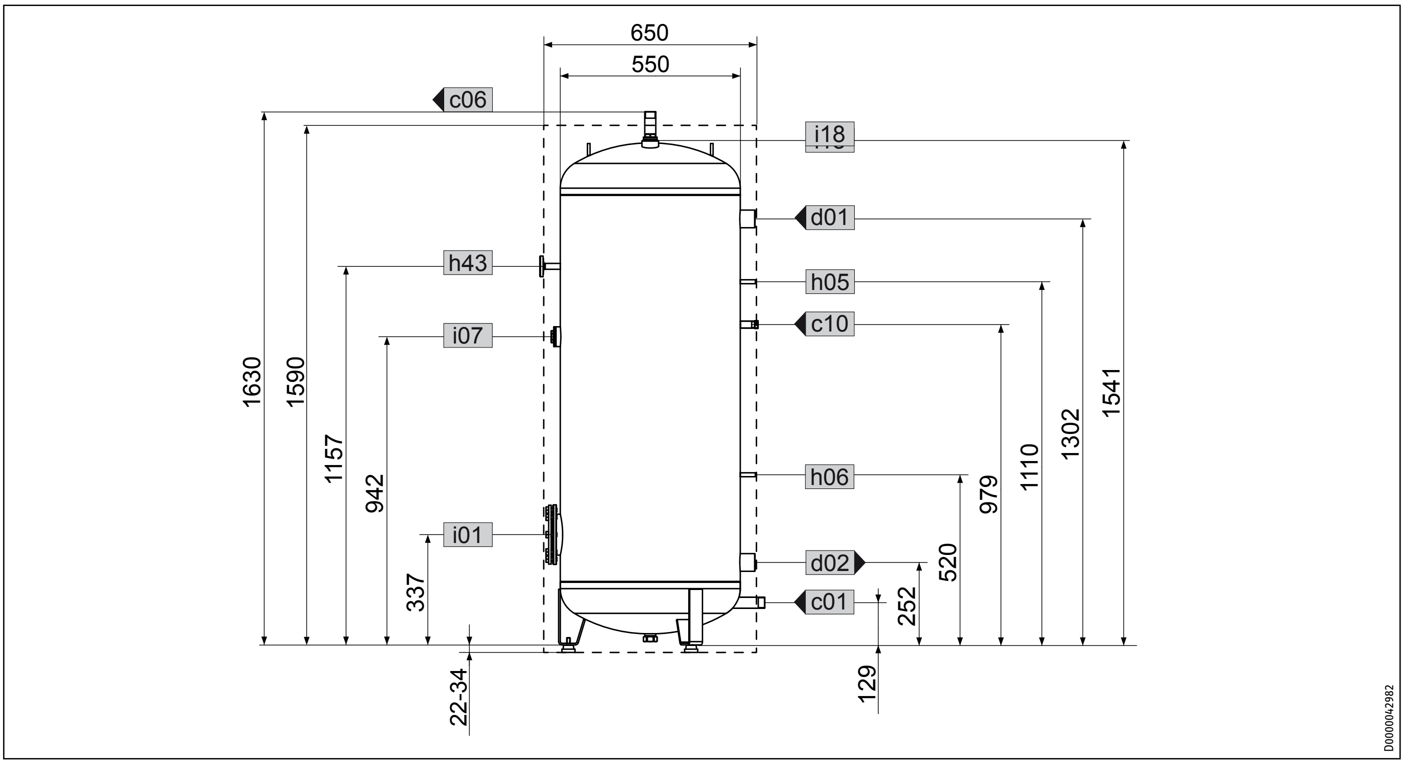
075115	BGC/45
074371	DMV / ZH 1
074370	ZH 1
074375	SV 3/4-10
233719	UPZ

SBB 300/400/500 WP Trend

Specification

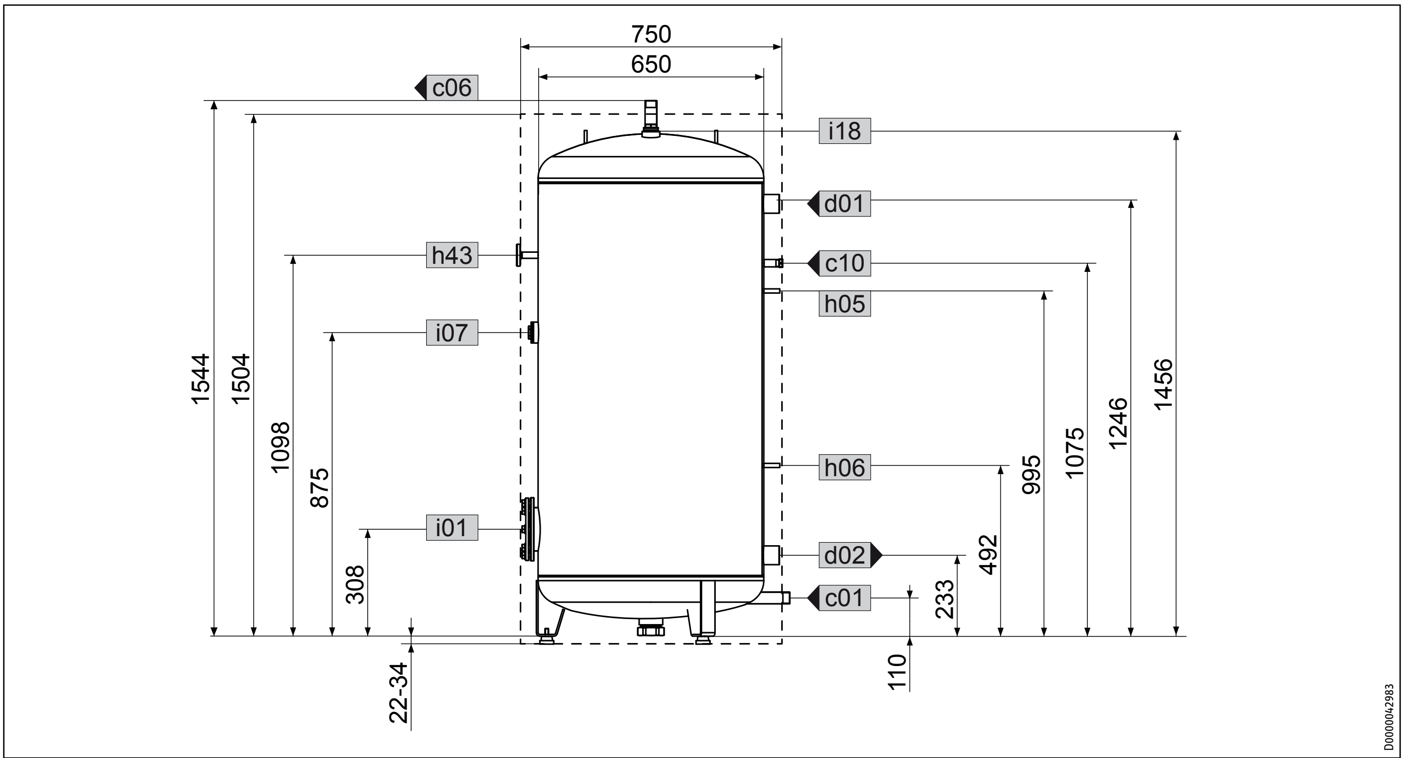
		SBB 300 WP Trend	SBB 400 WP Trend	SBB 500 WP Trend
		233487	233488	233489
Hydraulic data				
Nominal capacity	l	287	390	481
Capacity, upper indirect coil	l	25,5	25,0	31,0
Surface area, upper indirect coil	m²	3,2	5,1	6,1
Pressure drop at 1.0 m³/h, upper indirect coil	hPa	39	60	72
Mixed water volume at 40 °C (15 °C/60 °C)	l	519	669	818
Application limits				
Max. permissible pressure	MPa	1	1	1
Test pressure	MPa	1,5	1,5	1,5
Max. permissible temperature	°C	95	95	95
Max. flow rate	l/min	38	45	50
Energy data				
Standby energy consumption/24 h at 65 °C	kWh	2,4	2,7	2,9
Energy efficiency class		C	D	
Dimensions				
Height	mm	1652	1565	1871
Diameter	mm	650	750	750
Height when tilted	mm	1730	1700	1970
Weights				
Weight, full	kg	435	581	706
Weight, empty	kg	146	195	230

SBB 300 WP Trend



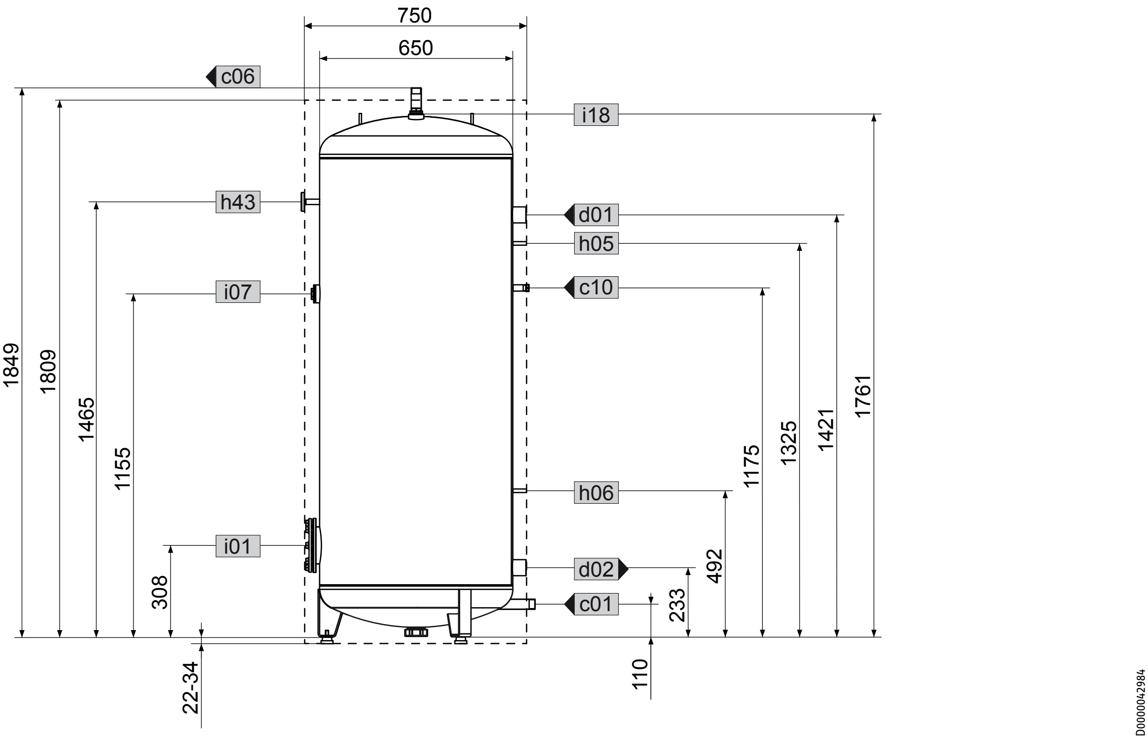
				SBB 300 WP Trend
c01	Cold water inlet	Male thread		G 1 A
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d01	Heat pump flow	Female thread		G 1 1/2
d02	Heat pump return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	180
		Pitch circle diameter	mm	150
		Screws		M 12
		Torque	Nm	25
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

SBB 400 WP Trend



				SBB 400 WP Trend
c01	Cold water inlet	Male thread		G 1 A
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d01	Heat pump flow	Female thread		G 1 1/2
d02	Heat pump return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	180
		Pitch circle diameter	mm	150
		Screws		M 12
		Torque	Nm	25
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

SBB 500 WP Trend



				SBB 500 WP Trend
c01	Cold water inlet	Male thread		G 1 A
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d01	Heat pump flow	Female thread		G 1 1/2
d02	Heat pump return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	9,5
i01	Flange	Diameter	mm	180
		Pitch circle diameter	mm	150
		Screws		M 12
		Torque	Nm	25
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

HSBC 200

At a glance

- DHW cylinder and buffer cylinder in a single appliance for space saving installation
- Hydraulic connection between heat pump module and DHW cylinder and heating circuit
- High level of integration – Minimal installation effort
- Equipment matched to recommended heat pump types
- Integral heat pump manager WPM 3

APPLICATION: Integral cylinder for heat pump operation for DHW heating, also for simultaneous integration into heating systems for hydraulic connection and for propulsion and separation of the heat pump/heating circuit flow. For use in detached houses.
EQUIPMENT / CONVENIENCE: DHW cylinder, enamelled steel with directly applied foam insulation, equipped with internal indirect coil and magnesium signal anode for additional corrosion protection. Buffer cylinder, steel with directly applied foam insulation. Separable cylinders arranged one above the other, with recessed grips to facilitate handling. Hydraulic connections at the top. Equipped with WPM 3 heat pump manager with a backlit symbol and plain text display, cylinder charging pump, heating circuit pump, 3/2-way diverter valve, safety valve with drain routed out of the rear of the appliance and electric emergency/booster heater. Prepared for optional extension with a heating circuit with mixer. Cylinder casing consisting of plastic jacket in pure white, permanently attached at the sides and rear, and removable front panel made of sheet metal in white with designer fascia in Eloxal silver.
EFFICIENCY: Low standby losses due to high-grade thermal insulation and an optimised cylinder capacity appropriate to the application.

Function

The integral cylinder is used for DHW heating in conjunction with air | water heat pumps and simplifies their hydraulic connection to the heating system with pre-installed matched components. The integrated charging pump delivers the heat transfer medium from the heat pump to the integral cylinder and provides DHW heating or room heating via the 3-2 way diverter valve, subject to demand. DHW heating takes place via the indirect coil integrated in the cylinder. For room heating, the heating medium is provided via the buffer cylinder. Downstream of the buffer cylinder which provides hydraulic separation of the heat pump and heating circuit, the heat is transferred to the system by the integrated heating circuit pump.

Further accessories

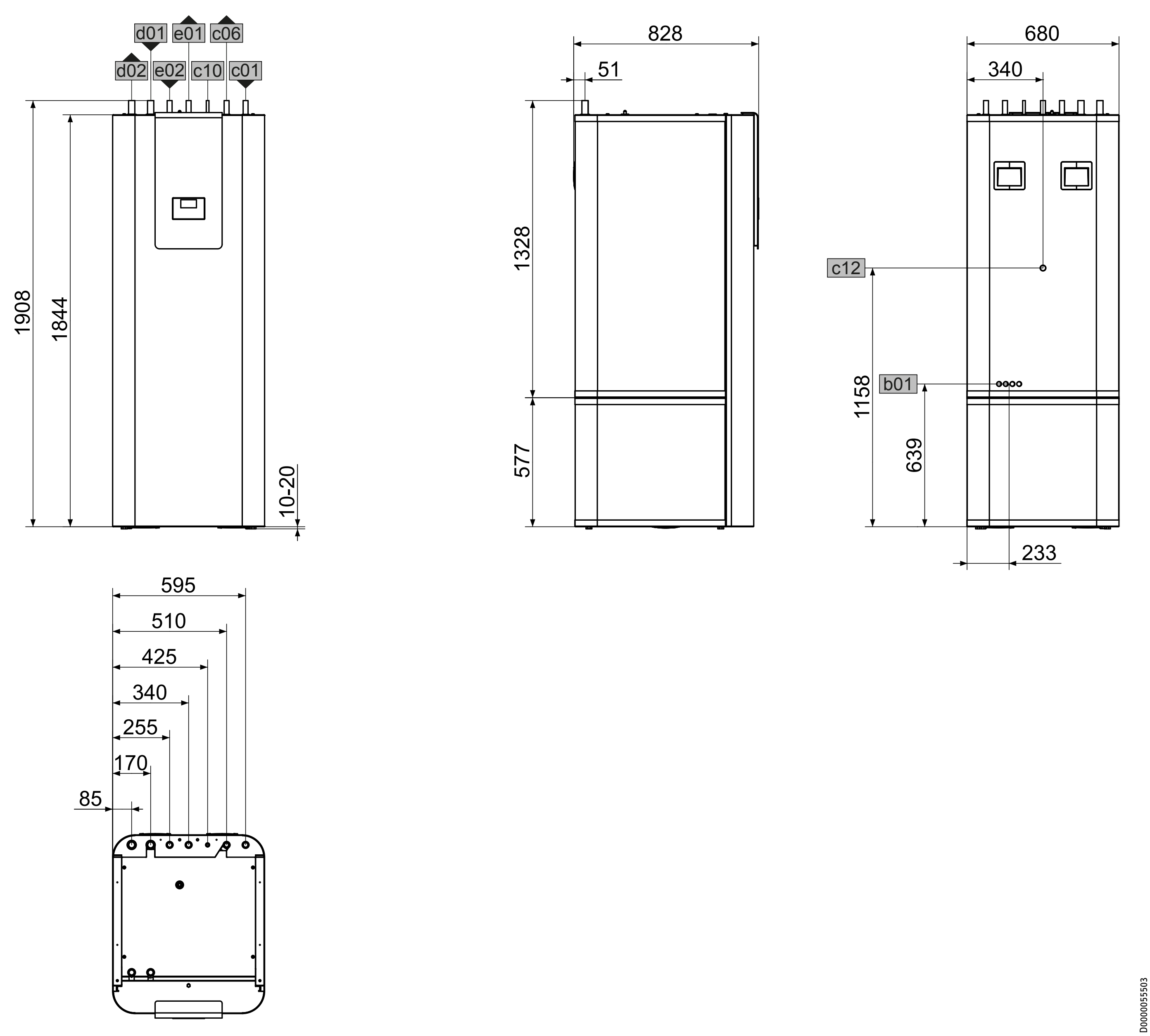
234648 HSBC-HKM

HSBC 200

Specification

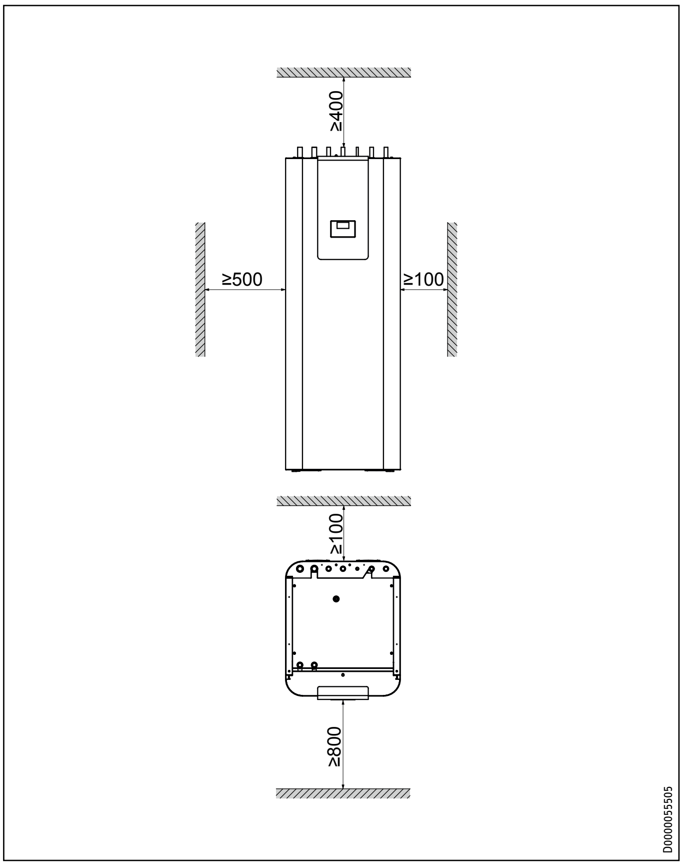
		HSBC 200
		233510
Hydraulic data		
Nominal capacity, DHW cylinder	l	168
Nominal capacity, buffer cylinder	l	100
Surface area, indirect coil	m²	3,3
External available pressure differential, circulation pump / heat pump at 1.0 m³/h	hPa	656
External available pressure differential, circulation pump / heat pump at 1.5 m³/h	hPa	527
External available pressure differential, circulation pump / heat pump at 2.0 m³/h	hPa	210
External available pressure differential, circulation pump / heating circuit 1 at 1.0 m³/h	hPa	725
External available pressure differential, circulation pump / heating circuit 1 at 1.5 m³/h	hPa	663
External available pressure differential, circulation pump / heating circuit 1 at 2.0 m³/h	hPa	444
External available pressure differential, circulation pump / heating circuit 2 (optional) at 1.0 m³/h	hPa	665
External available pressure differential, circulation pump / heating circuit 2 (optional) at 1.5 m³/h	hPa	518
External available pressure differential, circulation pump / heating circuit 2 (optional) at 2.0 m³/h	hPa	189
Application limits		
Max. permissible pressure, DHW cylinder	MPa	1,0
Test pressure, DHW cylinder	MPa	1,5
Max. flow rate	l/min	25
Max. permissible pressure, buffer cylinder	MPa	0,3
Test pressure, buffer cylinder	MPa	0,45
Max. permissible temperature	°C	95
Water hardness	°dH	≤3
pH value (with aluminium compounds)		8,0-8,5
pH value (without aluminium compounds)		8,0-10,0
Conductivity (softening)	μS/cm	<1000
Conductivity (desalination)	μS/cm	20-100
Chloride	mg/l	<30
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1
Power consumption		
Power consumption, emergency/booster heater	kW	8,8
Max. power consumption, charging pump	W	72
Max. power consumption, circulation pump on the heating side	W	72
Energy data		
Standby energy consumption/24 h at 65 °C	kWh	2,3
Energy efficiency class		C
Electrical data		
Rated voltage, controller	V	230
Phases, controller		1/N/PE
MCB/fuse protection, controller	A	1 x B 16
Rated voltage, emergency/booster heater	V	400
Phases, emergency/booster heater		3/N/PE
MCB/fuse protection, emergency/booster heater	A	3 x B 16
Frequency	Hz	50
Versions		
IP rating		IP20
Dimensions		
Height	mm	1896
Width	mm	680
Depth	mm	800
Height when tilted	mm	2035
Weights		
Weight, full	kg	471
Weight, empty	kg	203

HSBC 200



				HSBC 200
b01	Entry electrical cables			
c01	Cold water inlet	Diameter	mm	22
c06	DHW outlet	Diameter	mm	22
c10	DHW circulation	Diameter	mm	12
c12	Safety valve drain			
d01	Heat pump flow	Diameter	mm	28
d02	Heat pump return	Diameter	mm	28
e01	Heating flow	Diameter	mm	22
e02	Heating return	Diameter	mm	22

HSBC 200



Power supply

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. The installation instructions for the heat pump manager must be observed for this.

Note
Observe the standards and regulations applicable in your country.

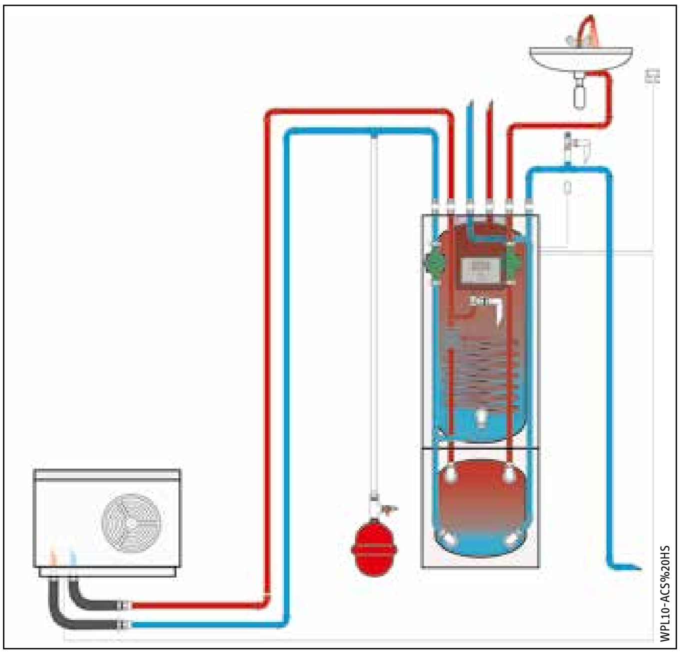
Heating system connection

Connect the appliance into the heating water side of the heating system in accordance with the standard circuit diagram.

Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

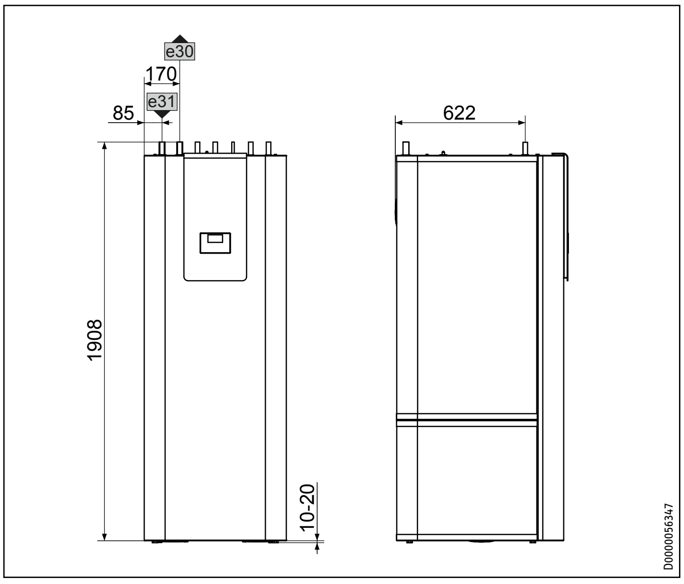


HSBC-HKM

HSBC-HKM

Mixer circuit pump assembly for integral cylinder 200 as set for extending a heating circuit with mixer. The assembly comprises insulated connection pipework, the heating circuit pump and 3-way mixer with servomotor. It is intended for use inside the integral cylinder using the prepared connections.

		HSBC-HKM
		234648
Heating circuit connection	mm	22



			HSBC-HKM
e30 Heating flow, mixed	Diameter	mm	22
e31 Heating return, mixed	Diameter	mm	22

Cylinder and hydraulic module HSBB 3

HSBB 3

APPLICATION: Cylinder and hydraulic module for heat pump operation for DHW heating, also for simultaneous integration into heating systems for hydraulic connection and propulsion of the heat pump/heating circuit flow. For use in detached houses, also suitable for cooling mode. **EQUIPMENT / CONVENIENCE:** DHW cylinder, enamelled steel with directly applied foam insulation, equipped with internal indirect coil and magnesium signal anode for additional corrosion protection. Hydraulic connections at the top. Equipped with WPM 3 heat pump manager with backlit symbol and plain text display, circulation pump, 3/2-way diverter valve, 18 l expansion vessel for central heating, safety valve with drain routed out of the rear of the appliance and electric emergency/booster heater. Cylinder casing made of robust metal with a removable lower appliance door in white. Front panel with designer fascia in Eloxal silver. **EFFICIENCY:** Low standby losses due to high-grade thermal insulation and an optimised cylinder capacity appropriate to the application.

At a glance

- Compact DHW cylinder with integral hydraulic components for connection to heat pump and heating circuit
- High level of integration – Minimal installation effort
- Equipment matched to recommended heat pump types
- Integral heat pump manager WPM 3
- Integral heating expansion vessel
- Integral emergency/booster heater
- Little space required

Function

The cylinder and hydraulic modules simplify integration of air | water heat pumps into the system hydraulics. Connection to the water side of the hydraulic module is from above. The heat transfer medium is distributed for heating or DHW heating by the built-in circulation pump via the likewise integrated 3-2 way diverter valve. Control is via the integral heat pump manager WPM 3 and enables fully automatic weather-compensated control of the heating system. An emergency/booster heater is already integrated in the module to enable mono energetic operation of the heat pump system. The content of the DHW cylinder is heated by means of an additional heat pump module.

HSBB 3

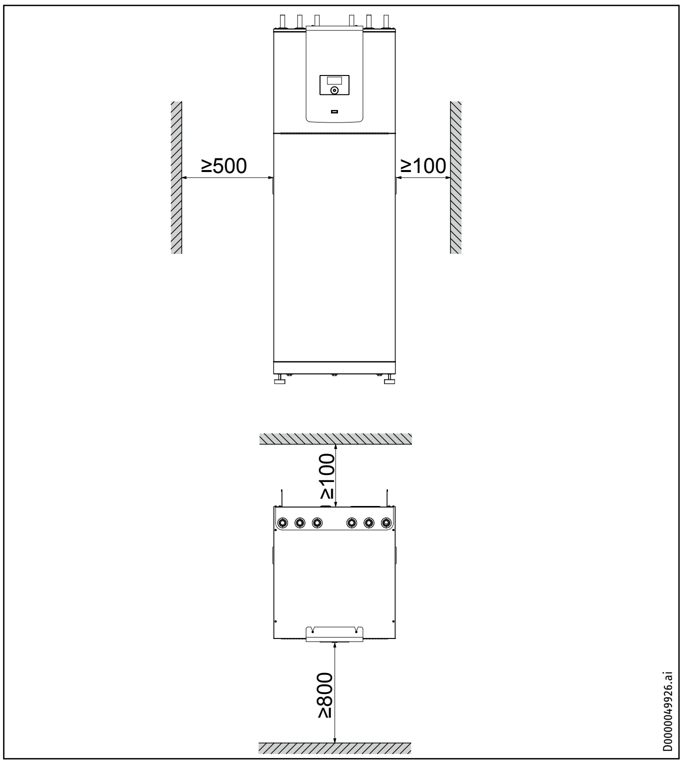
Specification

		HSBB 3
		234264
Energy data		
Energy efficiency class		C
Standby energy consumption/24 h at 65 °C	kWh	1,9
Power consumption		
Max. power consumption, circulation pump on the heating side	W	72
Power consumption, emergency/booster heater	kW	8,8
Application limits		
Water hardness	°dH	≤3
pH value (with aluminium compounds)		8,0-8,5
pH value (without aluminium compounds)		8,0-10,0
Conductivity (softening)	μS/cm	<1000
Conductivity (desalination)	μS/cm	20-100
Chloride	mg/l	<30
Oxygen 8-12 weeks after filling (softening)	mg/l	<0,02
Oxygen 8-12 weeks after filling (desalination)	mg/l	<0,1
Hydraulic data		
Surface area, indirect coil	m²	3,3
External available pressure differential at 1.0 m³/h	hPa	700
External available pressure differential at 1.5 m³/h	hPa	567
External available pressure differential at 2 m³/h	hPa	374
External available pressure differential at 2.5 m³/h	hPa	101
Cylinder capacity	l	168
Nominal capacity	l	168
Electrical data		
Rated voltage, controller	V	230
Rated voltage, emergency/booster heater	V	400
Phases, controller		1/N/PE
Phases, emergency/booster heater		3/N/PE
MCB/fuse protection, controller	A	1 x B 16
MCB/fuse protection, emergency/booster heater	A	3 x B 16
Versions		
Suitable for		Heat pump
Suitable for		WPL 10 AC(S), WPL 13 E, WPL 15/20/25 AC(S), WPL 08-22 Trend
IP rating		IP20
Dimensions		
Height	mm	1780
Width	mm	600
Depth	mm	650
Height when tilted	mm	1810
Heat transfer area	m²	2,4
Weights		
Weight, full	kg	332
Connection		
Connection on the heating side		22 mm
Cold water connection		22 mm
DHW connection		22 mm
Values		
Nominal heating flow rate at A2/W35, B0/W35 and 7 K	m³/h	1,4
Total available external pressure differential	hPa	335
Heat loss	kW/24 h	1,78
Min heating flow rate	m³/h	0,7
Max. operating pressure	MPa	1,0
Permissible operating pressure, heating circuit	MPa	0,3
Permissible operating pressure, DHW	MPa	1,0
Expansion vessel volume	l	18

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost
» Load-bearing floor
» Level, even and firm base



Power supply

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram. The installation instructions for the heat pump manager must be observed for this.

Note
Observe the standards and regulations applicable in your country.

Heating system connection

Connect the appliance into the heating water side of the heating system in accordance with the standard circuit diagram.

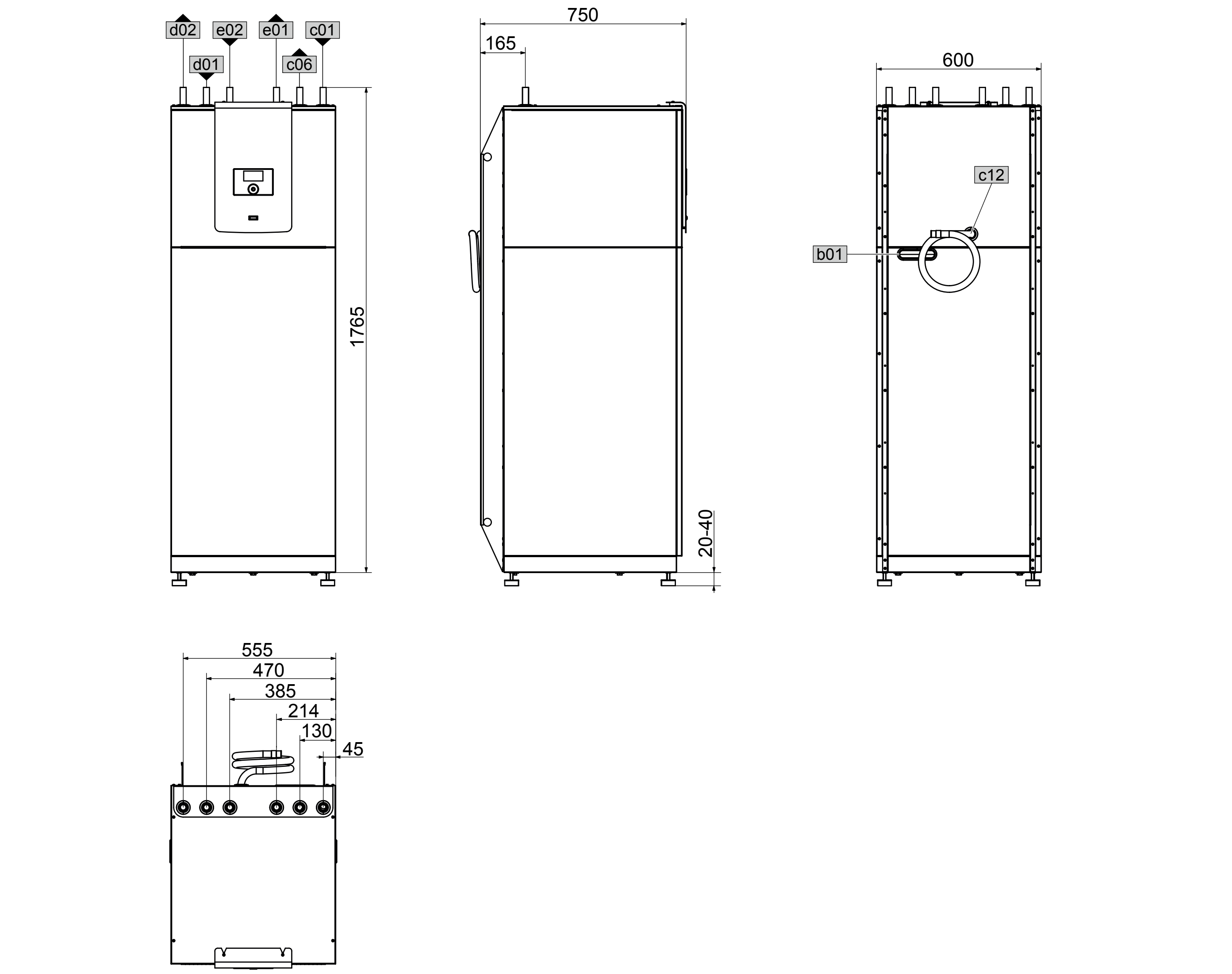
Prior to connecting the heat pump, flush out the heating system, check for tightness and carefully vent it.

Observe the correct connection of heating flow and return as well as the correct pipework cross-section.

Carry out thermal insulation in accordance with the Energy Saving Ordinance [Germany].

HSBB 3

Siting



				HSBB 3
b01	Entry electrical cables			
c01	Cold water inlet	Diameter	mm	22
c06	DHW outlet	Diameter	mm	22
c12	Safety valve drain			
d01	Heat pump flow	Diameter	mm	22
d02	Heat pump return	Diameter	mm	22
e01	Heating flow	Diameter	mm	22
e02	Heating return	Diameter	mm	22

SBB 751/1001 SOL

At a glance

- Protective anode for corrosion protection as standard
- DHW heating in heat pump mode via charging station WTS 30/40 E (accessory)
- Permissible operating pressure 1.0 MPa (10 bar)

Floorstanding, sealed unvented heat pump cylinder (pressure-tested), made from enamelled steel, for combination with the WTS 30 E or WTS 40 E charging station as an accessory for DHW heating. Cylinder for type SBB 751/1001 SOL with smooth tube internal coil to link up a solar thermal system. The thermal insulation WDH SBB as an accessory ensures very low heat losses. Protective anode as standard. Top and bottom flanged apertures are sealed with a blank flange and can be equipped optionally with a flanged immersion heater (type FCR 28).

Function

The large-volume DHW cylinders are intended for combining with large heat pumps in conjunction with an external charging station. Very high flow rates on the primary side with simultaneously low temperature differentials place great demands on the heat transfer process. If the selected set temperature is not reached, a heat demand is issued to the heat pump. The circulation pump on the primary side delivers the heating medium to a highly efficient plate heat exchanger. The DHW is heated in countercurrent and delivered to the cylinder via the DHW charging pump. A radial inlet reduces the mixing up of the temperature profile in the cylinder. The "SOL" version also has a solar indirect coil for connecting a solar thermal system.

Further accessories

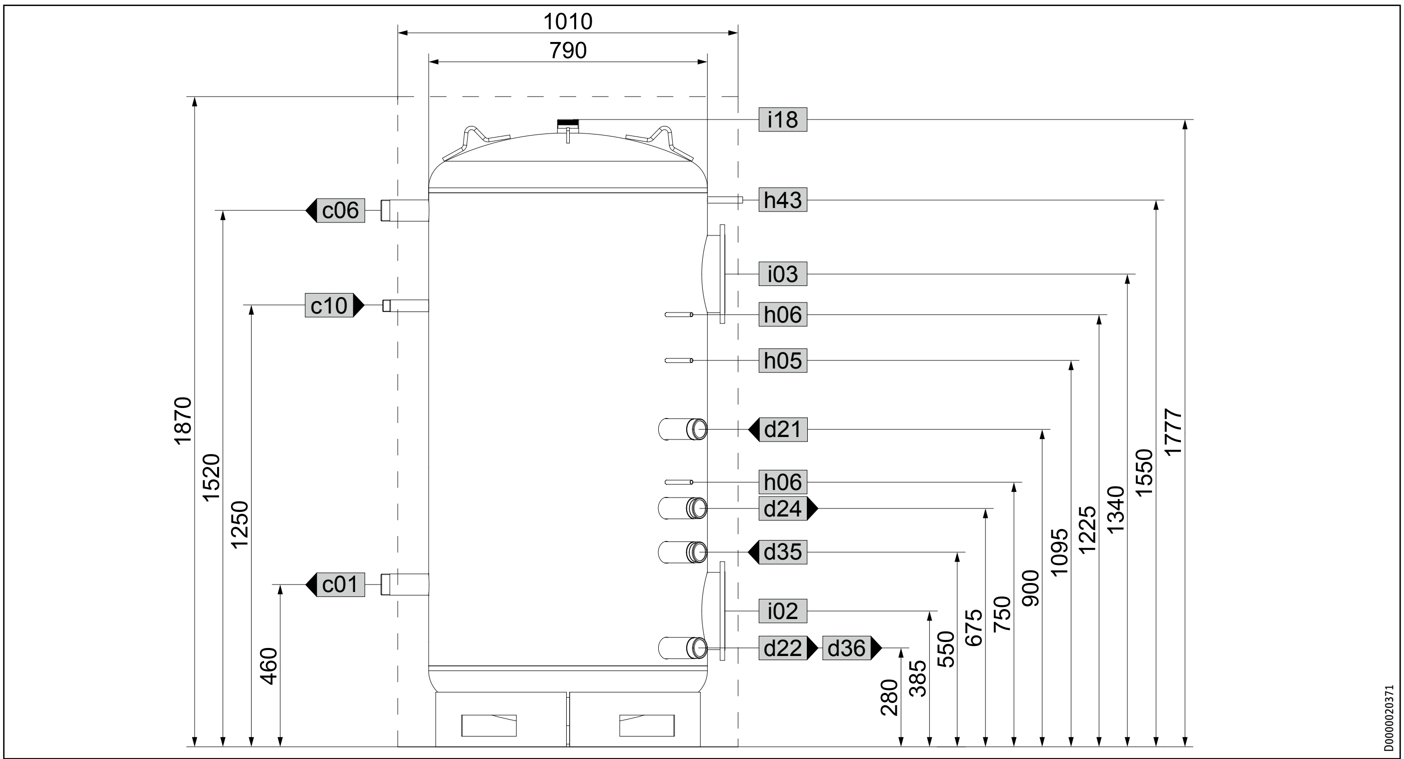
231923	WDH 751 SBB
232907	WTS 30 E
232908	WTS 40 E
232030	BGC 2/60
000694	FCR 28/120
000695	FCR 28/180
000696	FCR 28/270
001502	FCR 28/360
074371	DMV / ZH 1
074370	ZH 1
074375	SV 3/4-10
075124	FCR 28/360 Si
075131	FCR 28/180 Si
075140	FCR 28/120 Si
075141	FCR 28/270 Si
233719	UPZ
071332	FCR 28/120
071333	FCR 28/180
076098	WTW 28/18
076099	WTW 28/23
072118	WTFS 28/23
234503	FCR 28/120 CrNi

SBB 751/1001 SOL

Specification

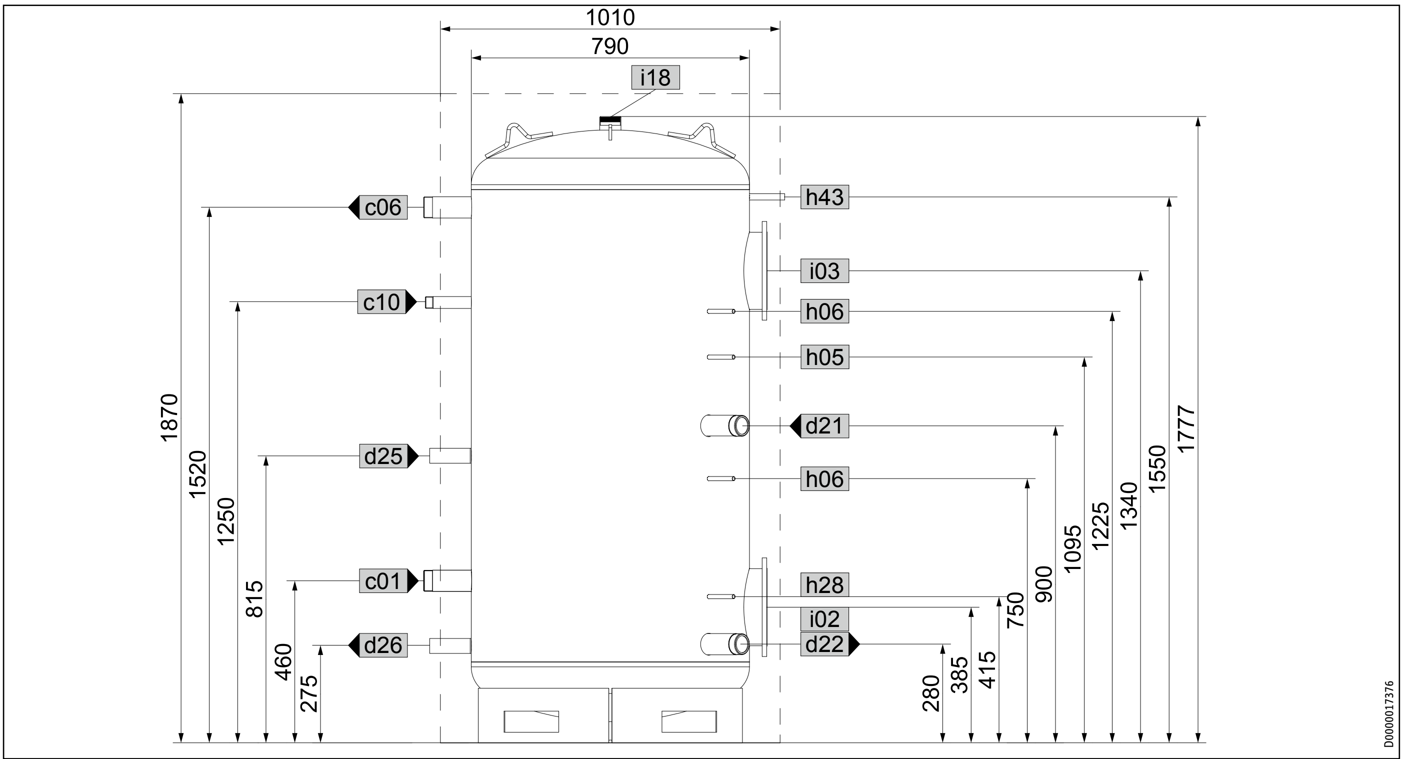
		SBB 751	SBB 751 SOL	SBB 1001	SBB 1001 SOL
		229292	229294	229293	229295
Hydraulic data					
Nominal capacity	l	763	736	1004	971
Capacity, lower indirect coil	l		20,5		25,2
Surface area, lower indirect coil	m²		3		4,0
Pressure drop at 1.0 m³/h, lower indirect coil	hPa		39		52
Mixed water volume at 40 °C (15 °C/60 °C)	l	1264	1230	1650	1599
Application limits					
Max. permissible pressure	MPa	1	1	1	1
Test pressure	MPa	1,5	1,5	1,5	1,5
Max. permissible temperature	°C	95	95	95	95
Max. flow rate	l/min	90	90	90	90
Max. recommended collector aperture area	m²		15		20
Dimensions					
Height	mm	1777	1777	2277	2277
Diameter	mm	790	790	790	790
Diameter incl. thermal insulation	mm	1010	1010	1010	1010
Height when tilted	mm	1840	1840	2335	2335
Weights					
Weight, full	kg	960	971	1267	1296
Weight, empty	kg	210	242	267	296

SBB 751



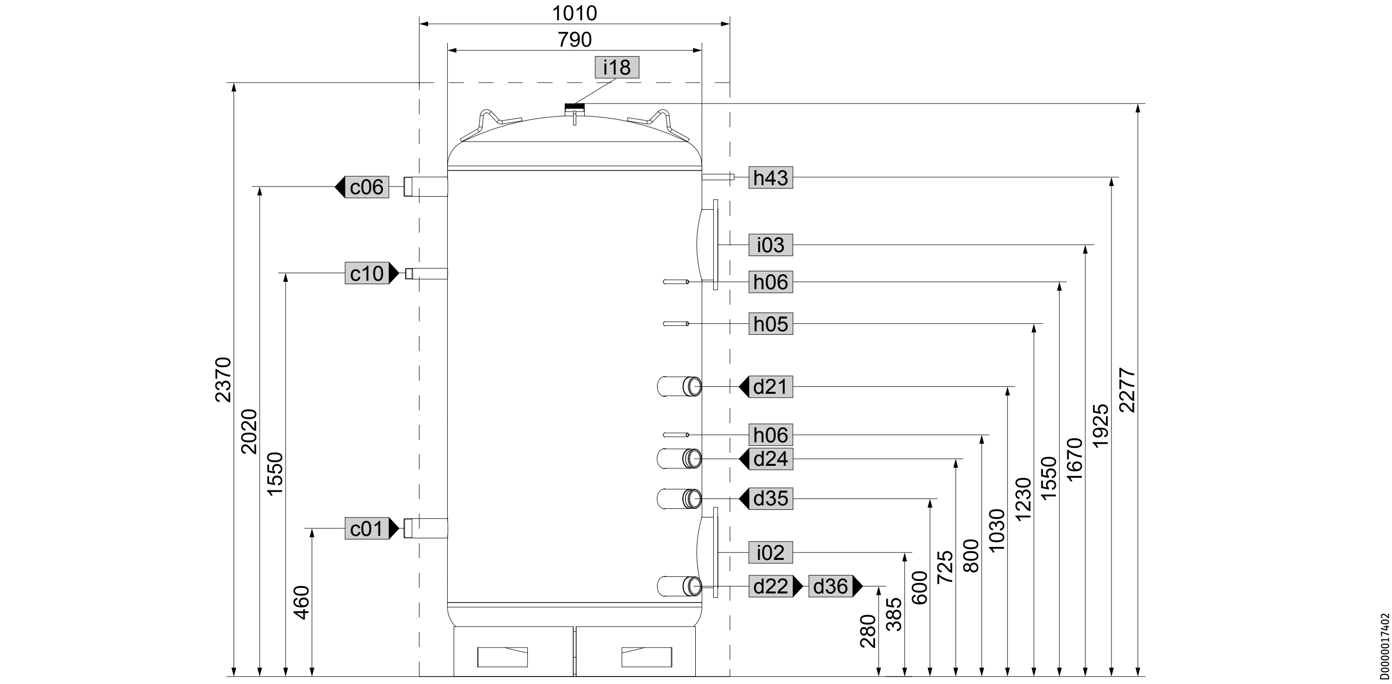
				SBB 751
c01	Cold water inlet	Male thread		G 2 A
c06	DHW outlet	Male thread		G 2 A
c10	DHW circulation	Male thread		G 1 A
d21	Charging station flow	Male thread		G 2 A
d22	Charging station return	Male thread		G 2 A
d24	Charging station return opt.	Male thread		G 2 A
d35	Heat source flow optional	Male thread		G 2 A
d36	Heat source return optional	Male thread		G 2 A
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i02	Flange I	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i03	Flange II	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i18	Protective anode	Female thread		G 1 1/4

SBB 751 SOL



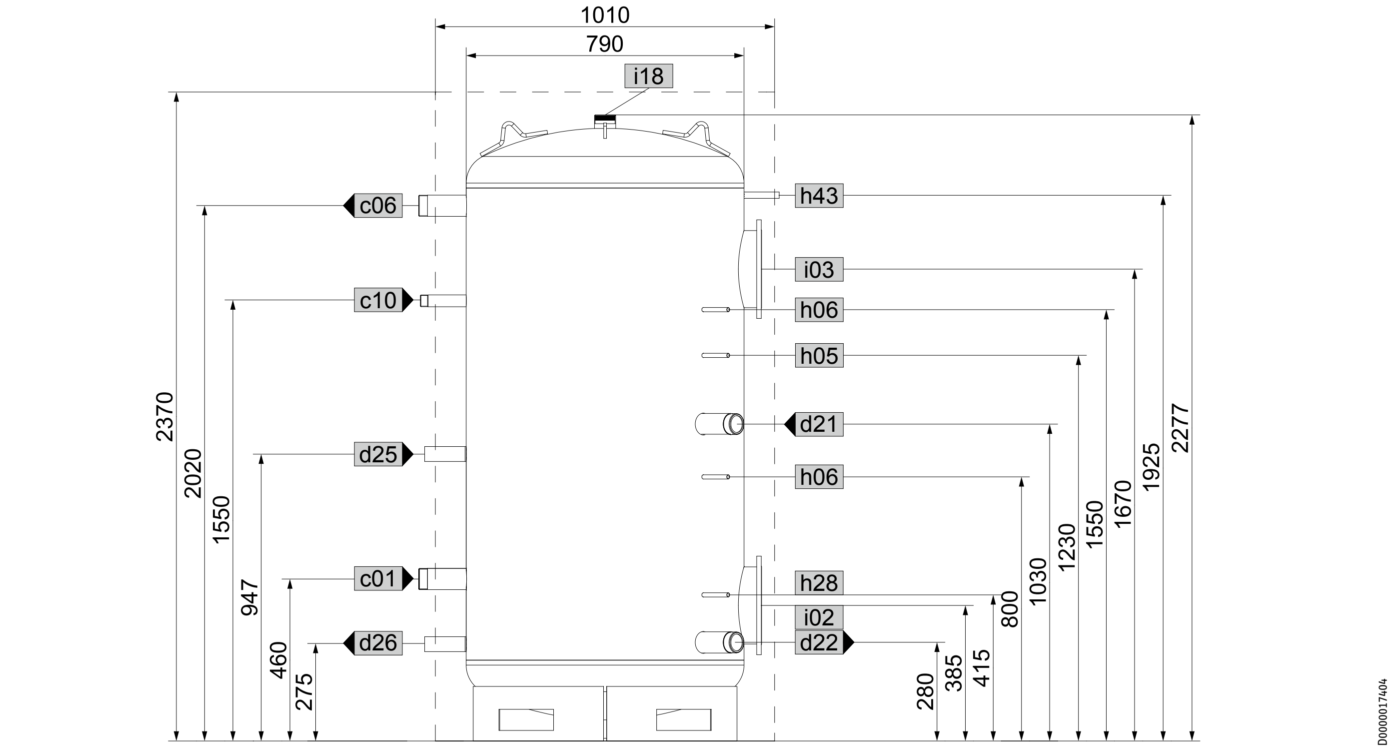
				SBB 751 SOL
c01	Cold water inlet	Male thread		G 2 A
c06	DHW outlet	Male thread		G 2 A
c10	DHW circulation	Male thread		G 1 A
d21	Charging station flow	Male thread		G 2 A
d22	Charging station return	Male thread		G 2 A
d25	Solar flow	Female thread		G 1
d26	Solar return	Female thread		G 1
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i02	Flange I	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i03	Flange II	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i18	Protective anode	Female thread		G 1 A

SBB 1001



				SBB 1001
c01	Cold water inlet	Male thread		G 2 A
c06	DHW outlet	Male thread		G 2 A
c10	DHW circulation	Male thread		G 1 A
d21	Charging station flow	Male thread		G 2 A
d22	Charging station return	Male thread		G 2 A
d24	Charging station return opt.	Male thread		G 2 A
d35	Heat source flow optional	Male thread		G 2 A
d36	Heat source return optional	Male thread		G 2 A
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i02	Flange I	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i03	Flange II	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i18	Protective anode	Female thread		G 1 1/4

SBB 1001 SOL



				SBB 1001 SOL
c01	Cold water inlet	Male thread		G 2 A
c06	DHW outlet	Male thread		G 2 A
c10	DHW circulation	Male thread		G 1 A
d21	Charging station flow	Male thread		G 2 A
d22	Charging station return	Male thread		G 2 A
d25	Solar flow	Female thread		G 1
d26	Solar return	Female thread		G 1
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i02	Flange I	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i03	Flange II	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i18	Protective anode	Female thread		G 1 1/4

WDH SBB

WDH 751 SBB

High-grade EPTS rigid foam thermal insulation with insulation cover and floor disc for floorstanding DHW cylinders SBB 751/1001 and SBB 751/1001 SOL. Graphite inserts in the EPTS and fleece for lowest heat losses. Wedge-shaped cut-outs and fleece layer ensure an optimum match to the cylinder. Prepared adhesive joint in the wedge-shaped cut-outs enables adjustment to the shape prior to installation. External plastic jacket in white; cover in basalt grey. Thermal insulation secured with a quick-release hook strip.

		WDH 751 SBB	WDH 1001 SBB
		231923	231924
Insulation for		SBB 751 and 751 SOL	SBB 1001 and 1001 SOL
Height	mm	1840	2350
Diameter	mm	1010	1010
Thermal insulation thickness	mm	110	110
Standby energy consumption/24 h at 65 °C	kWh	2,9	3,5

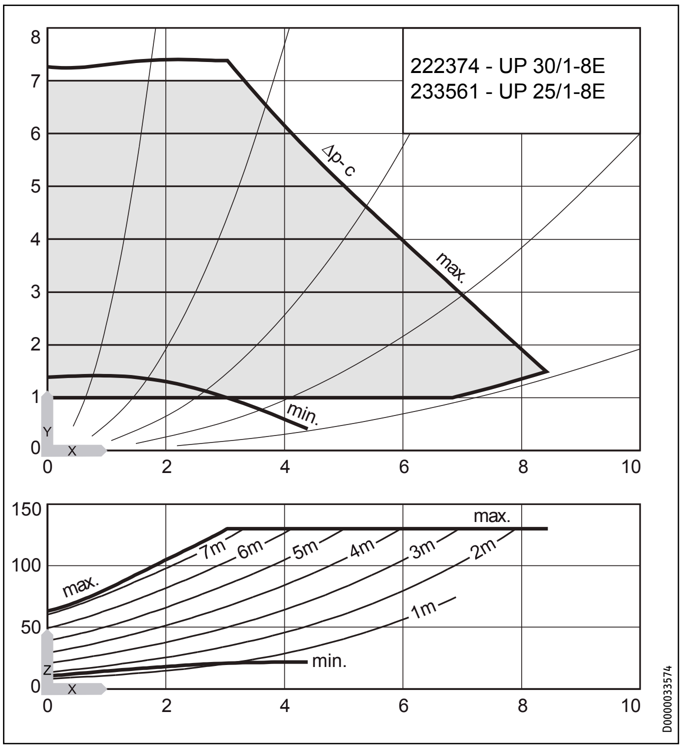
WTS 30 E | WTS 40 E

WTS 30 E

DHW heating by means of a charging station with plate heat exchanger for heating the floorstanding cylinder without integral indirect coil. Equipped on the primary side for heat pump heating with an HE pump and on the secondary side for cylinder heating with a circulation pump. Additionally equipped with shut-off devices, non-return valves and safety valve, all inside a thermally insulated casing. Prefitted on mounting frame for wall mounting.

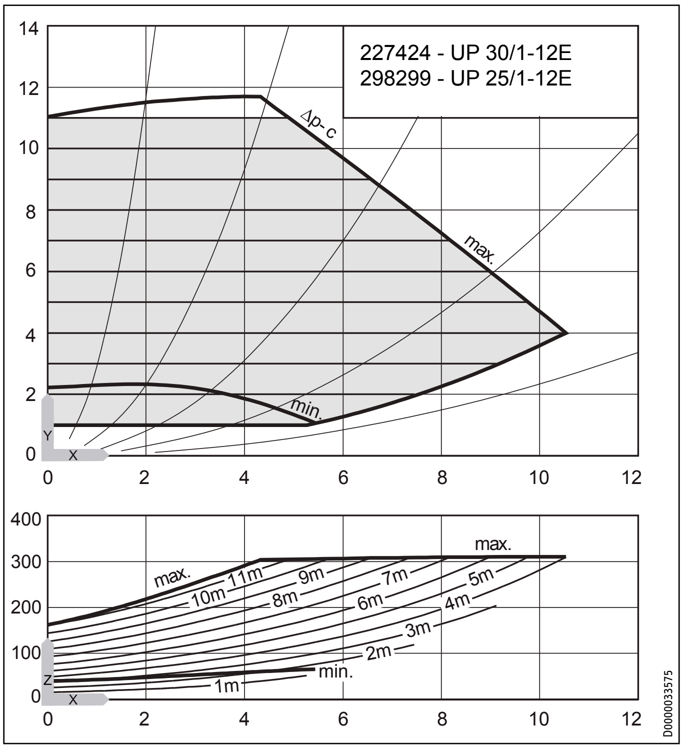
		WTS 30 E	WTS 40 E
		232907	232908
Rated output	kW	30	69
Nominal flow rate, primary side	m³/h	3,5	7,4
Nominal flow rate, secondary side	m³/h	2,8	5,9
Heat exchanger capacity, primary side	l	1,4	3,0
Heat exchanger capacity, secondary side	l	1,5	3,1
Residual head, primary side	hPa	478	476
Residual head, secondary side	hPa	240	263
Max. permissible pressure, primary side	MPa	0,6	0,6
Max. permissible pressure, secondary side	MPa	1,0	1,0
Max. permissible temperature, primary side	°C	90	90
Max. permissible temperature, secondary side	°C	95	95
IP rating		IP20	IP20
Power consumption	W	140	310
Rated voltage	V	230	230
Height	mm	860	1090
Width	mm	500	520
Depth	mm	290	305
Weight	kg	33	53
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz
MCB/fuse rating	A	C16	C16

WTS 30



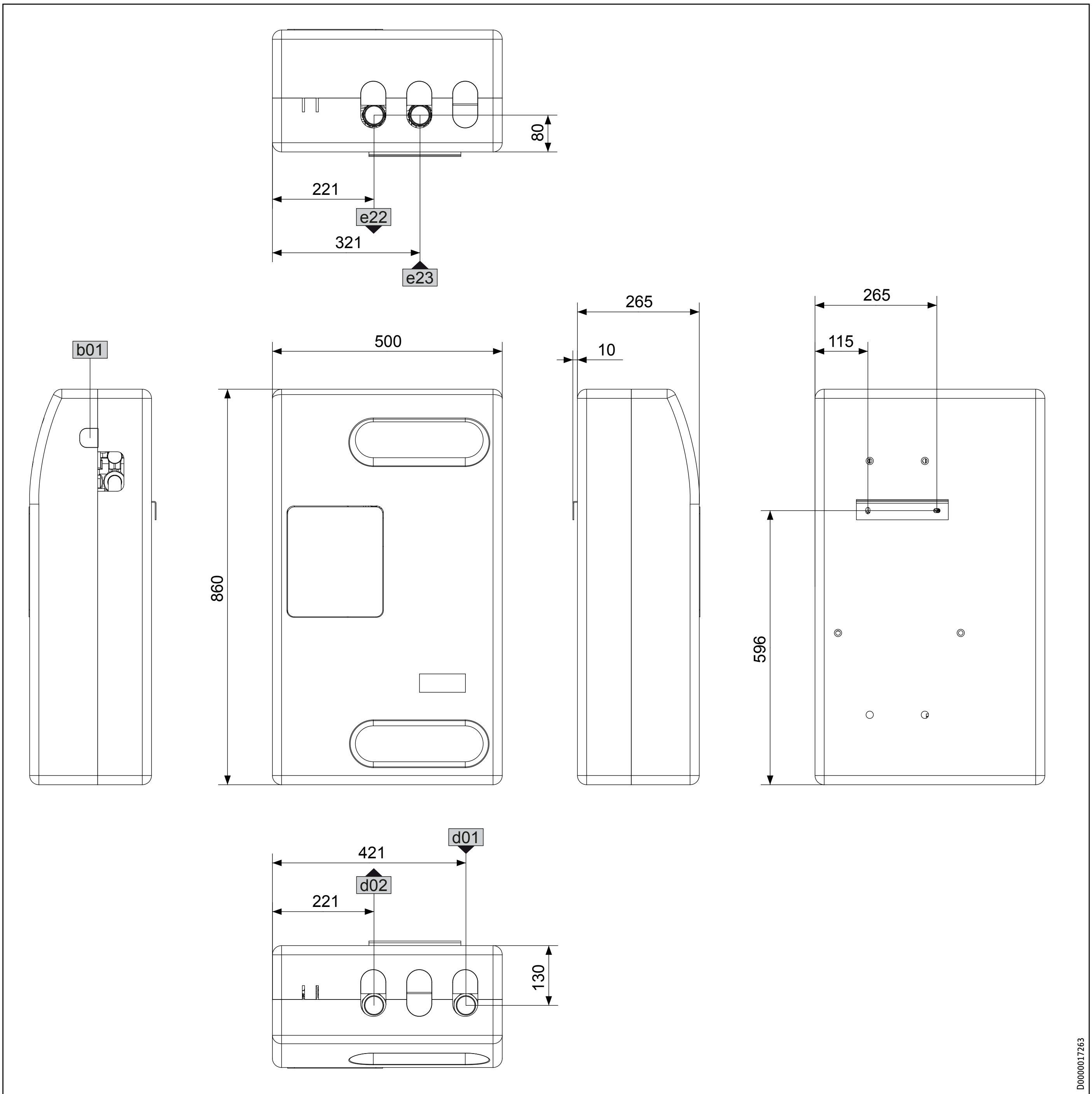
X = Delivery flow rate in m^3/h
Y = delivery head in m
Z = power consumption in W

WTS 40



X = Delivery flow rate in m^3/h
Y = delivery head in m
Z = power consumption in W

WTS 30 E | WTS 40 E



		WTS 30 E	WTS 40 E
d01 Heat pump flow	Male thread	G 1 1/4 A	G 1 1/4 A
d02 Heat pump return	Male thread	G 1 1/4 A	G 1 1/4 A
e22 Cylinder flow	Male thread	G 1 1/4 A	G 1 1/4 A
e23 Cylinder return	Male thread	G 1 1/4 A	G 1 1/4 A

Notes

SBB 600/800/1000 WP SOL

At a glance

» Matched to DHW heating with high heat pump output
» Large transfer area through two integral twin pipe heat exchangers
» Protective anode for corrosion protection as standard
» Permissible operating pressure 1.0 MPa (10 bar)

Floorstanding DHW cylinder, enamelled steel. Models SBB 600-1000 WP SOL are suitable for heat pump operation with optional solar thermal DHW heating. implemented with two internal twin pipe indirect coils, enamelled and resistant to scaling. The lower indirect coil is connected to the solar thermal system; the upper one to the heat pump. With larger heat pumps, both indirect coils can be connected in series. Specifically allocated sensor wells are fitted to the cylinder for connection to the control unit. The thermal insulation WDH SBB as an accessory ensures very low heat losses. Protective anode, thermometer and blank flange for inspection ports included as standard. The flanged apertures can optionally be equipped with flanged immersion heaters (type FCR 28). SBB 600 WP SOL with threaded connector G 1 1/2 in the upper third, for optional fitting of the BGC threaded immersion heater.

Function

The large volume DHW cylinders are designed for heat pump operation. Large exchanger surfaces of the twin pipe indirect coil and corresponding nominal diameters of connections ensure a high transfer capacity and low pressure drops. When the actual temperature falls below the selected set temperature, a heat demand coming from the cylinder temperature sensor is captured by the heat pump control unit. The heating medium flows through the indirect coil in the opposite direction to the stratification of the DHW in the cylinder until the setpoint temperature is reached. As an option, a solar thermal system can be incorporated via the second indirect coil integrated in the cylinder. The two exchanger surfaces are connected in series, thus it is possible to achieve an even higher transfer capacity through use of the heat pump.

Further accessories

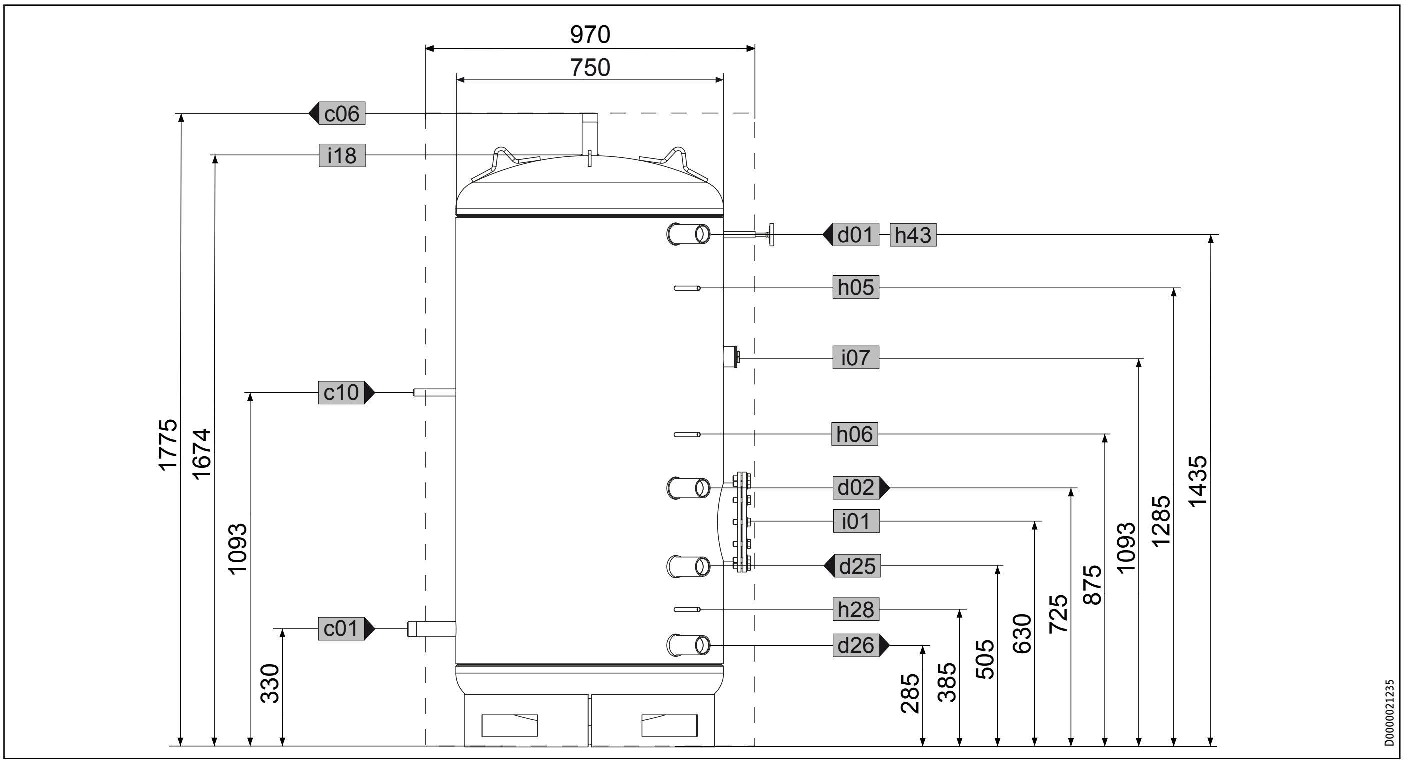
235909	WDH 600 SBB
232030	BGC 2/60
075124	FCR 28/360 Si
075131	FCR 28/180 Si
075140	FCR 28/120 Si
232629	WRV 40
233719	UPZ

SBB 600/800/1000 WP SOL

Specification

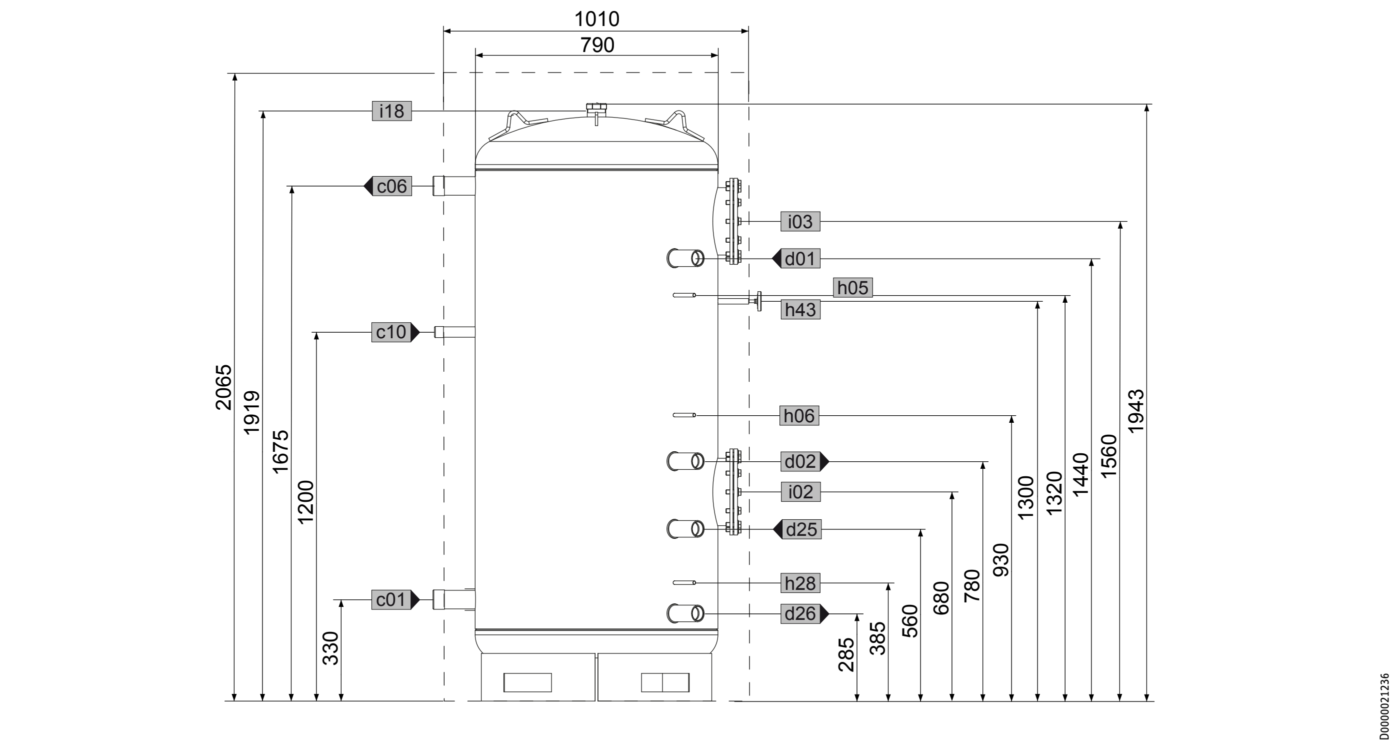
		SBB 600 WP SOL	SBB 800 WP SOL	SBB 1000 WP SOL
		235906	235907	235908
Hydraulic data				
Nominal capacity	l	565	741	836
Capacity, upper indirect coil	l	48	51,5	51,5
Capacity, lower indirect coil	l	16	21,5	30,0
Surface area, upper indirect coil	m²	5,7	6,2	6,2
Surface area, lower indirect coil	m²	2,0	2,6	3,6
Pressure drop at 1.0 m³/h, upper indirect coil	hPa	3,6	3,9	3,9
Pressure drop at 1.0 m³/h, lower indirect coil	hPa	2,4	3,2	3,4
Application limits				
Max. permissible pressure	MPa	1	1	1
Test pressure	MPa	1,5	1,5	1,5
Max. permissible temperature	°C	95	95	95
Max. flow rate	l/min	70	90	90
Max. recommended collector aperture area	m²	12	14	17
Dimensions				
Height	mm	1775	1943	2153
Diameter	mm	750	790	790
Diameter incl. thermal insulation	mm	970	1010	1010
Height when tilted	mm	1813	1990	2185
Weights				
Weight, empty	kg	244	296	321
Weight, full	kg	883	1139	1238

SBB 600 WP SOL



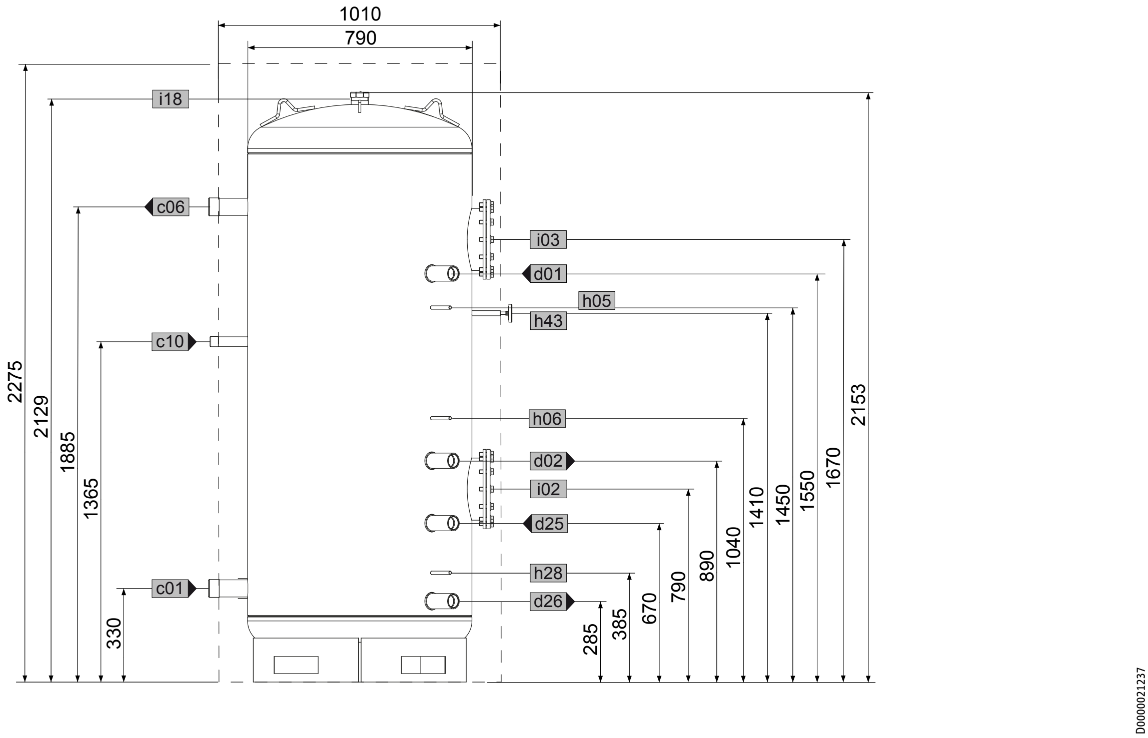
				SBB 600 WP SOL
c01	Cold water inlet	Male thread		G 1 1/4 A
c06	DHW outlet	Male thread		G 1 1/4 A
c10	DHW circulation	Male thread		G 1/2 A
d01	Heat pump flow	Female thread		G 1 1/2
d02	Heat pump return	Female thread		G 1 1/2
d25	Solar flow	Female thread		G 1 1/2
d26	Solar return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i01	Flange	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i07	Electric emergency/booster heater	Female thread		G 1 1/2
i18	Protective anode	Female thread		G 1 1/4

SBB 800 WP SOL



				SBB 800 WP SOL
c01	Cold water inlet	Male thread		G 2 A
c06	DHW outlet	Male thread		G 2 A
c10	DHW circulation	Male thread		G 1 A
d01	Heat pump flow	Female thread		G 1 1/2
d02	Heat pump return	Female thread		G 1 1/2
d25	Solar flow	Female thread		G 1 1/2
d26	Solar return	Female thread		G 1 1/2
h05	Sensor heat pump DHW	Diameter	mm	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i02	Flange I	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i03	Flange II	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
		Torque	Nm	80
i18	Protective anode	Female thread		G 1 1/4

SBB 1000 WP SOL



			SBB 1000 WP SOL
c01 Cold water inlet	Male thread		G 2 A
c06 DHW outlet	Male thread		G 2 A
c10 DHW circulation	Male thread		G 1 A
d01 Heat pump flow	Female thread		G 1 1/2
d02 Heat pump return	Female thread		G 1 1/2
d25 Solar flow	Female thread		G 1 1/2
d26 Solar return	Female thread		G 1 1/2
h05 Sensor heat pump DHW	Diameter	mm	9,5
h06 Sensor heat pump DHW optional	Diameter	mm	9,5
h28 Sensor solar cylinder	Diameter	mm	9,5
h43 Thermometer	Diameter	mm	14,5
i02 Flange I	Diameter	mm	280
	Pitch circle diameter	mm	245
	Screws		M 14
	Torque	Nm	80
i03 Flange II	Diameter	mm	280
	Pitch circle diameter	mm	245
	Screws		M 14
	Torque	Nm	80
i18 Protective anode	Female thread		G 1 1/4

WDH SBB

WDH SBB

High grade EPTS rigid foam thermal insulation with insulation cover and floor disc for floorstanding DHW cylinders SBB 600/800/1000 WP SOL. Graphite inserts in the EPTS and fleece ensure lowest heat losses. Wedge-shaped cut-outs and fleece layer ensure an optimum match to the cylinder. Prepared adhesive joint in the wedge-shaped cut-outs enables adjustment to the shape prior to installation. External plastic jacket in white; cover in basalt grey. Thermal insulation secured with a quick-release hook strip.

		WDH 600 SBB	WDH 800 SBB	WDH 1000 SBB
		235909	235910	235911
Insulation for		SBB 600 WP SOL	SBB 800 WP SOL	SBB 1000 WP SOL
Height	mm	1803	2065	2275
Diameter	mm	970	1010	1010
Thermal insulation thickness	mm	110	110	110
Standby energy consumption/24 h at 65 °C	kWh	2,7	3,0	3,4

WRV 40

Corrugated connection pipe with union nut and threaded end for optional linking of the lower and upper indirect coils.

SBS 601/801/1001/1501 W SOL

At a glance

- Only one cylinder to serve for DHW heating and as heating buffer cylinder
- Inlet device for zoned heating and discharging
- Hydraulic separation between the solar, heating and DHW zones
- Hygienic DHW heating through instantaneous water heater principle
- SOL types with integral solar indirect coil
- 3 thermometers are part of the standard delivery
- Heat pump operation, can be combined with additional heat source and threaded immersion heater (BGC)

Awards

Instantaneous water cylinder SBS 601-1501 W for DHW heating and hydraulic separation of the flow of heat pump and heating circuit. It is designed to provide system separation, to extend the heat pump runtimes and, to an extent, to bridge power-OFF periods. The SBS 601-1501 W SOL for additional solar backup. DHW is heated via a corrugated stainless steel indirect coil that functions like an instantaneous water heater. Optional extension by fitting connectors for an additional heat generator and threaded immersion heater (BGC). The thermal insulation WDH...SBS as an accessory ensures particularly low heat losses.

Function

The instantaneous water cylinders are large heating buffer cylinders and DHW cylinders combined. Generously sized nominal connection diameters and transfer areas of the integral corrugated pipe indirect coil for DHW heating optimise the combination with heating heat pumps. Here, different temperature zones are charged inside the cylinder. The lower to centre section is intended for room heating, and is heated upon a heat demand to the heat pump with the lower temperature level. The upper part of the cylinder is the standby reservoir for DHW heating and is heated when the set temperature is not reached with the higher temperature profile. This ensures that for DHW heating the cold water flows through the stainless steel corrugated pipe indirect coil from the bottom to the top and that there is always a sufficiently high temperature differential between the heating medium in the buffer and the DHW flowing through. The "SOL" version also has a solar indirect coil for connecting a solar thermal system.

Further accessories

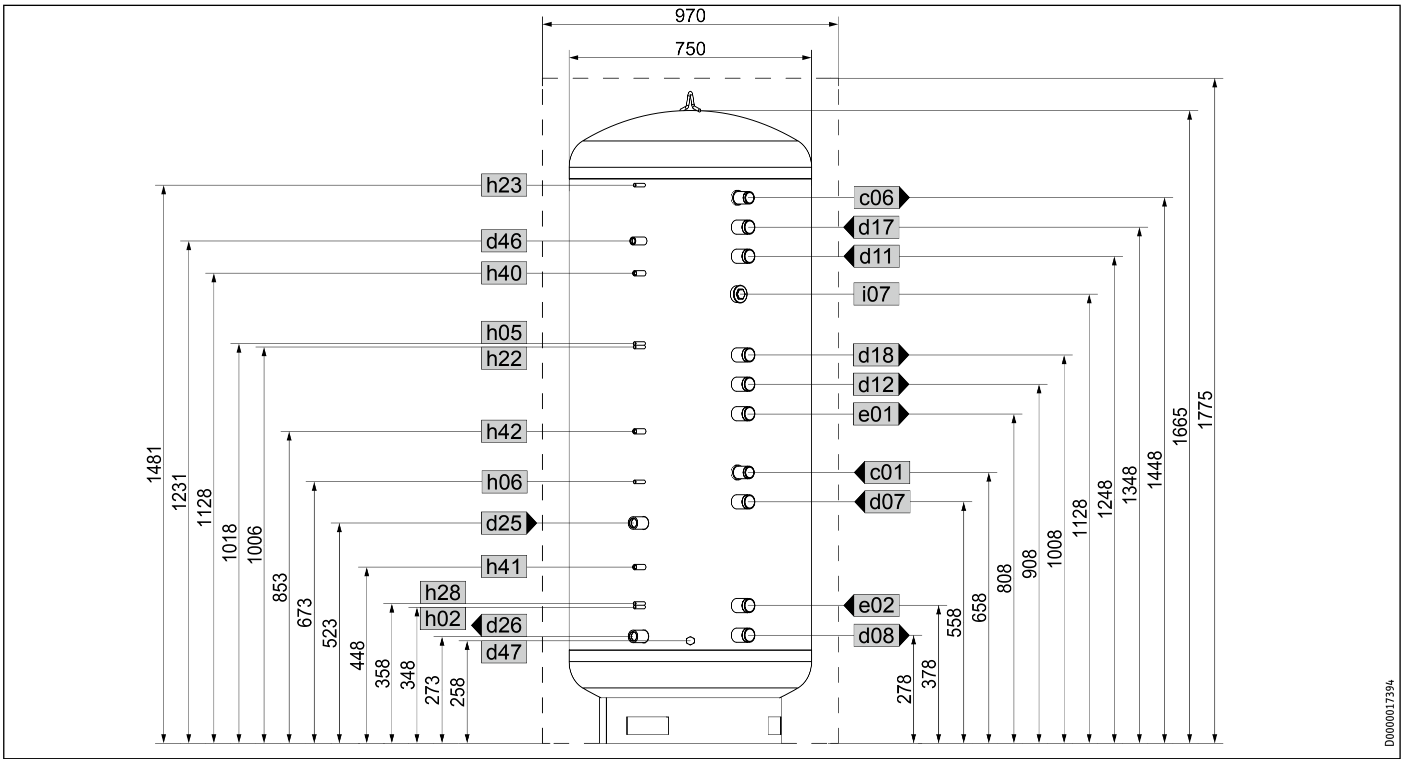
231925	WDH 601 SBS
232030	BGC 2/60
233719	UPZ
230312	ZW 1 1/4

SBS 601/801/1001/1501 W SOL

Specification

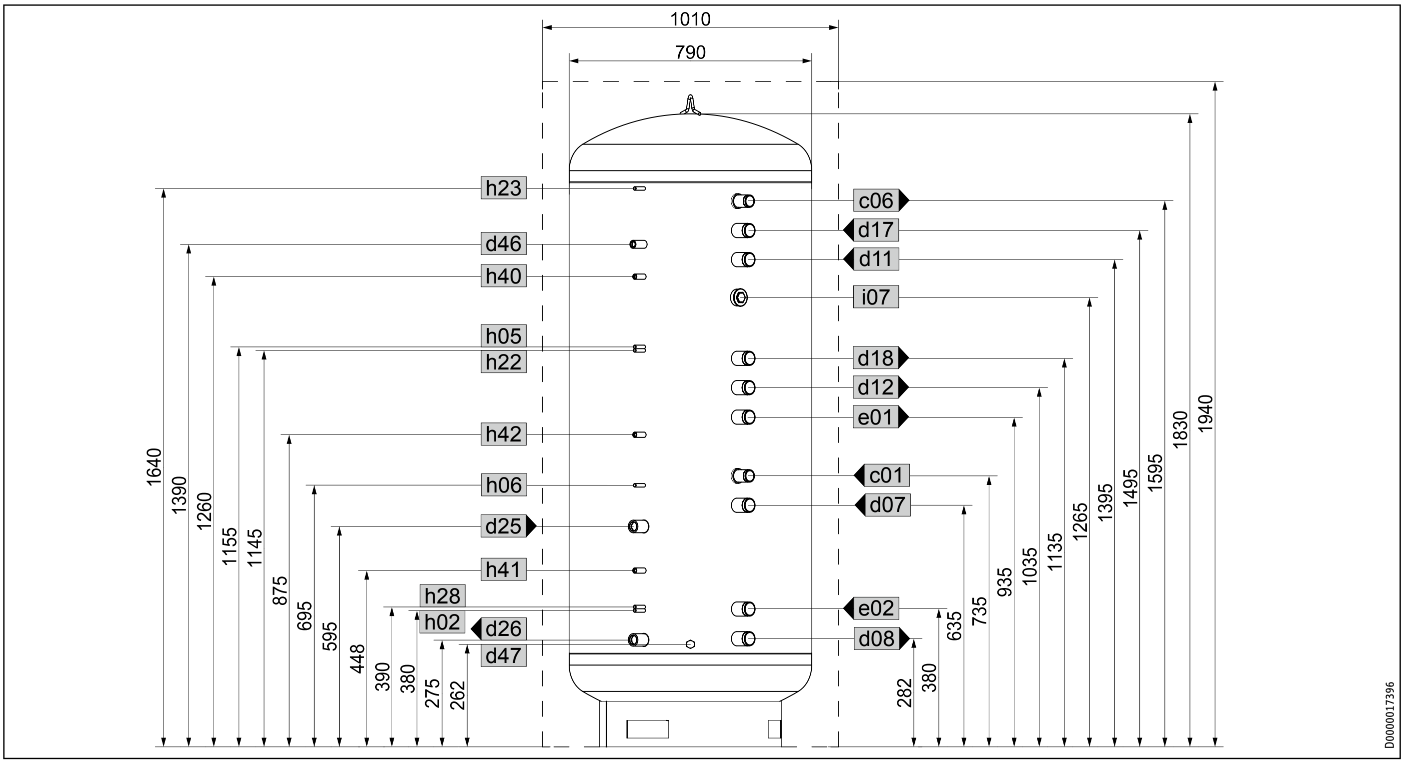
		SBS 601 W	SBS 801 W	SBS 1001 W	SBS 1501 W	SBS 601 W SOL	SBS 801 W SOL	SBS 1001 W SOL	SBS 1501 W SOL
		229980	229981	229982	229983	229984	229985	229986	229987
Hydraulic data									
Nominal capacity	l	613	759	941	1430	599	740	916	1500
Capacity, lower indirect coil	l					11,6	14,9	19,8	22,6
Capacity, DHW indirect coil	l	31,2	33,9	45,4	52,1	31,3	33,9	45,4	65
Surface area, lower indirect coil	m^2					1,5	2,4	3,2	3,6
Surface area, DHW indirect coil	m^2	7	9	11,5	14	7	9	11,5	14
Pressure drop at 1.0 m^3/h, lower indirect coil	hPa					4	28	35	40
Pressure drop at 10/25/40 l/min	hPa	21 / 108/ -	23 / 122/ -	30/ 155/ 399	35 / 186/ 486	21 / 108 / -	23 / 122/ -	30/ 155/ 399	35/ 186/ 486
Application limits									
Maximum charge / discharge flow rate with zoning	m^3/h	1,8	2,0	2,4	3,0	1,8	2,0	2,4	3,0
Maximum charge / discharge flow rate without zoning	m^3/h	5,0	5,0	5,0	8,0	5,0	5,0	5,0	8,0
Max. permissible pressure	MPa	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3
Test pressure	MPa	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45
Max. permissible pressure, DHW	MPa	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Max. permissible temperature	°C	95	95	95	95	95	95	95	95
Max. recommended collector aperture area	m^2					121	16	20	30
Dimensions									
Height	mm	1665	1830	2240	2155	1665	1830	2240	2155
Diameter	mm	750	790	790	1000	750	790	790	1000
Diameter incl. thermal insulation	mm	970	1010	1010	1220	970	1010	1010	1220
Height when tilted	mm	1840	1880	2285	2225	1840	1880	2285	2225
Weights									
Weight, full	kg	735	949	1175	1738	780	1175	1221	1794
Weight, empty	kg	135	150	175	236	180	195	220	291

SBS 601 W | SBS 601 W SOL



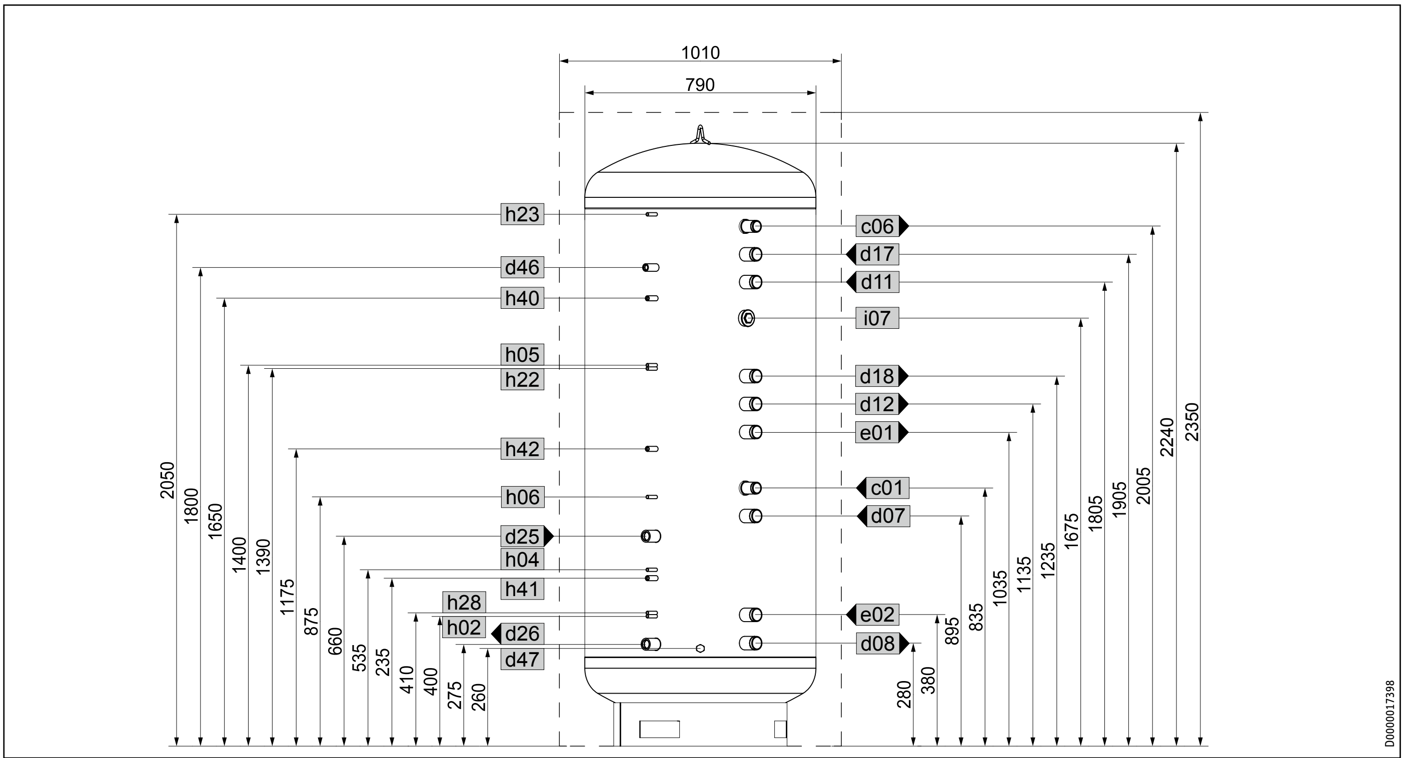
				SBS 601 W	SBS 601 W SOL
c01	Cold water inlet	Male thread		G 1 1/4 A	G 1 1/4 A
c06	DHW outlet	Male thread		G 1 1/4 A	G 1 1/4 A
d07	Heat pump heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
d08	Heat pump heating return	Male thread		G 1 1/2 A	G 1 1/2 A
d11	Heat pump DHW flow	Male thread		G 1 1/2 A	G 1 1/2 A
d12	Heat pump DHW return	Male thread		G 1 1/2 A	G 1 1/2 A
d17	2nd HS flow	Male thread		G 1 1/2 A	G 1 1/2 A
d18	2nd HS return	Male thread		G 1 1/2 A	G 1 1/2 A
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d46	Ventilation	Female thread		G 1 1/2	G 1 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
e02	Heating return	Male thread		G 1 1/2 A	G 1 1/2 A
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h05	Sensor heat pump DHW	Diameter	mm	9,5	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h23	Sensor heat source optional	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm		9,5
h40	Thermometer DHW	Diameter	mm	14,5	14,5
h41	Thermometer solar	Diameter	mm		14,5
h42	Thermometer heating	Diameter	mm	14,5	14,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBS 801 W | SBS 801 W SOL



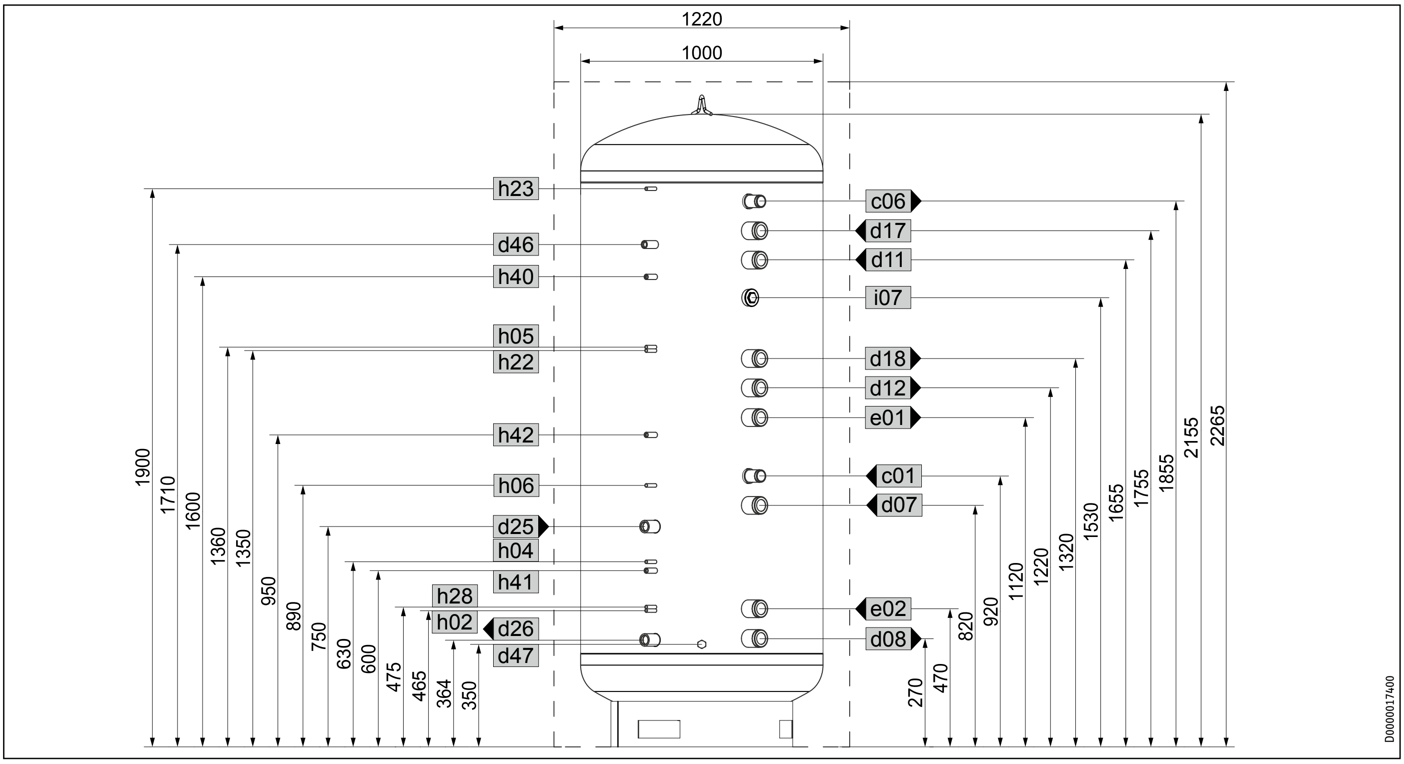
				SBS 801 W	SBS 801 W SOL
c01	Cold water inlet	Male thread		G 1 1/4 A	G 1 1/4 A
c06	DHW outlet	Male thread		G 1 1/4 A	G 1 1/4 A
d07	Heat pump heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
d08	Heat pump heating return	Male thread		G 1 1/2 A	G 1 1/2 A
d11	Heat pump DHW flow	Male thread		G 1 1/2 A	G 1 1/2 A
d12	Heat pump DHW return	Male thread		G 1 1/2 A	G 1 1/2 A
d17	2nd HS flow	Male thread		G 1 1/2 A	G 1 1/2 A
d18	2nd HS return	Male thread		G 1 1/2 A	G 1 1/2 A
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d46	Ventilation	Female thread		G 1 1/2	G 1 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
e02	Heating return	Male thread		G 1 1/2 A	G 1 1/2 A
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h05	Sensor heat pump DHW	Diameter	mm	9,5	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h23	Sensor heat source optional	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm		9,5
h40	Thermometer DHW	Diameter	mm	14,5	14,5
h41	Thermometer solar	Diameter	mm		14,5
h42	Thermometer heating	Diameter	mm	14,5	14,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBS 1001 W | SBS 1001 W SOL



				SBS 1001 W	SBS 1001 W SOL
c01	Cold water inlet	Male thread		G 1 1/4 A	G 1 1/4 A
c06	DHW outlet	Male thread		G 1 1/4 A	G 1 1/4 A
d07	Heat pump heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
d08	Heat pump heating return	Male thread		G 1 1/2 A	G 1 1/2 A
d11	Heat pump DHW flow	Male thread		G 1 1/2 A	G 1 1/2 A
d12	Heat pump DHW return	Male thread		G 1 1/2 A	G 1 1/2 A
d17	2nd HS flow	Male thread		G 1 1/2 A	G 1 1/2 A
d18	2nd HS return	Male thread		G 1 1/2 A	G 1 1/2 A
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d46	Ventilation	Female thread		G 1 1/2	G 1 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Male thread		G 1 1/2 A	G 1 1/2 A
e02	Heating return	Male thread		G 1 1/2 A	G 1 1/2 A
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h04	Sensor heat pump return optional	Diameter	mm	9,5	9,5
h05	Sensor heat pump DHW	Diameter	mm	9,5	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h23	Sensor heat source optional	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm		9,5
h40	Thermometer DHW	Diameter	mm	14,5	14,5
h41	Thermometer solar	Diameter	mm		14,5
h42	Thermometer heating	Diameter	mm	14,5	14,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBS 1501 W | SBS 1501 W SOL



				SBS 1501 W	SBS 1501 W SOL
c01	Cold water inlet	Male thread		G 1 1/4 A	G 1 1/4 A
c06	DHW outlet	Male thread		G 1 1/4 A	G 1 1/4 A
d07	Heat pump heating flow	Male thread		G 2 A	G 2 A
d08	Heat pump heating return	Male thread		G 2 A	G 2 A
d11	Heat pump DHW flow	Male thread		G 2 A	G 2 A
d12	Heat pump DHW return	Male thread		G 2 A	G 2 A
d17	2nd HS flow	Male thread		G 2 A	G 2 A
d18	2nd HS return	Male thread		G 2 A	G 2 A
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d46	Ventilation	Female thread		G 1 1/2	G 1 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Male thread		G 2 A	G 2 A
e02	Heating return	Male thread		G 2 A	G 2 A
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h04	Sensor heat pump return optional	Diameter	mm	9,5	9,5
h05	Sensor heat pump DHW	Diameter	mm	9,5	9,5
h06	Sensor heat pump DHW optional	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h23	Sensor heat source optional	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm		9,5
h40	Thermometer DHW	Diameter	mm	14,5	14,5
h41	Thermometer solar	Diameter	mm		14,5
h42	Thermometer heating	Diameter	mm	14,5	14,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

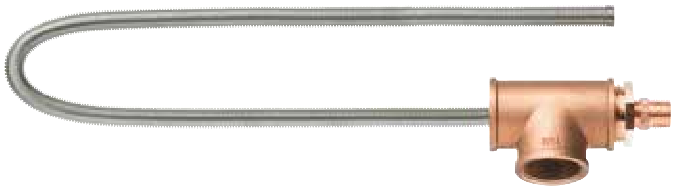
WDH SBS

WDH 601 SBS

High grade EPTS rigid foam thermal insulation with insulation cover and floor disc for SBS 601-1001 W and W SOL instantaneous water cylinders. Graphite inserts in the EPTS and fleece for lowest heat losses. Wedge-shaped cut-outs and fleece layer ensure an optimum match to the cylinder. Prepared adhesive joint in the wedge-shaped cut-outs enables adjustment to the shape prior to installation. External plastic jacket in white; cover in basalt grey. Thermal insulation secured with a quick-release hook strip.

		WDH 601 SBS	WDH 801 SBS	WDH 1001 SBS	WDH 1501 SBS
		231925	231926	231927	231928
Insulation for		SBS 601 W, W SOL	SBS 801 W, W SOL	SBS 1001 W, W SOL	SBS 1501 W, W SOL
Height	mm	1775	1940	2350	2265
Diameter	mm	970	1010	1010	1220
Thermal insulation thickness	mm	110	110	110	110
Standby energy consumption/24 h at 65 °C	kWh	2,6	2,9	3,5	4,1

ZW 1 1/4



DHW circulation set for 601 - 1501, 800 - 1500 W and W SOL instantaneous water cylinders for threading onto the DHW connector. Comprising a tee and a corrugated stainless steel pipe, which routes the DHW circulation return back into the DHW connection.

		ZW 1 1/4
		230312
Connection		G 1 1/4
DHW circulation connection		G 1/2
Length	mm	950

UPZ

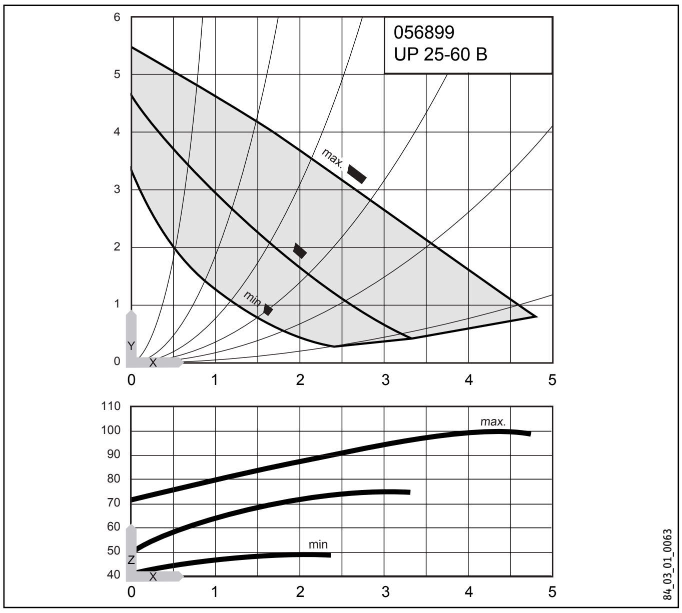
Highly efficient DHW circulation pump with automatic ventilation mode and insulation shell, for use in detached houses and apartment buildings. The DHW circulation pump can be controlled via electronic control thermostat and/or time switch. The rotary selector can be used to select a temperature at which the pump will automatically switch off. This allows the pump run time and the electric energy demand for DHW provision to be reduced to a minimum.

		UPZ
		233719
Max. operating pressure	MPa	10
Max. operating temperature	°C	95
Power connection		1/N/PE~230 V
IP rating		IP44
Installed length (gauge)	mm	65

UP 25-60 B

Drinking water-approved circulation pump for heating an external DHW cylinder.

		UP 25-60 B
		056899
Power supply		1/N/PE ~ 230 V 50 Hz
Connection		G 2
Power consumption	W	46/67/93
Installed length (gauge)	mm	180
IP rating		IP44



X = Delivery flow rate in m^3/h
Y = delivery head in m
Z = power consumption in W

Inlet pipe 200/500 l

Floorstanding cylinder inlet pipe for heating an external DHW cylinder.

		Inlet pipe 200/500 l	Inlet pipe 600/1000 l
		072997	072998
Cylinder connection		G 1	G 2
Length	m	1,25	0,75

WT 10

The plate heat exchanger comprises several hard-soldered stainless steel plates with thermal insulation, and is designed for DHW heating or swimming pool heating. For swimming pool heating, please observe application limits.

		WT 10	WT 20	WT 30	WT 40
		070633	070634	071091	229338
Primary temperature	°C	55 > 45	55 > 45	55 > 45	55 > 45
Secondary temperature	°C	35 < 30	35 < 30	35 < 30	35 < 30
Primary pressure drop	hPa	70	100	90	120
Secondary pressure drop	hPa	50	70	60	200
Primary flow rate	m^3/h	1,1	2,3	3,2	6
Secondary flow rate	m^3/h	0,9	1,9	2,5	4,8
Height	mm	313	313	313	313
Width	mm	113	113	113	113
Depth	mm	99.6	136.5	173.5	219.7
Weight	kg	4,4	6,2	8,0	10,2
Connection		G 1	G 1	G 1	G 1 / G 1 1/4
Liquid content	l	0,9	1,7	2,5	4,0

Effect of water-borne particles in DHW systems on copper-soldered plate heat exchangers (water quality requirements / limits).

pH value		7 - 9
SO_4	ppm	< 100
HCO_3 - SO_4		> 1
Cl	ppm	< 50
PO_4	ppm	< 2
NH_3	ppm	< 0,5
Wall temperature	°C	< 80
Free chlorine	ppm	< 0,5
Fe	ppm	< 0,5
Mn	ppm	< 0,05
CO_2	ppm	< 10
H_4S	ppm	< 50
Conductivity	µS/cm	> 50

Additional factors with an influence on corrosion are water contamination, flow velocity, contamination or deposits inside heat exchangers and mixing installations.

Notes

SBP 100

At a glance

» Buffer cylinder with 100 litres
» For use in detached houses
» Suitable for wall mounting
» Particularly space-saving

Sealed unvented wall mounted cylinder (100 litre capacity) made from sheet steel with directly applied PU foam thermal insulation. Serves as a buffer cylinder for heat pumps and is equipped with an aperture for retrofitting an electric immersion heater (SBP-HF).

Function

The buffer cylinder is the ideal addition to low-output heat pump systems. It acts primarily as a hydraulic separator between the heat pump circuit flow and the heating circuit flow. As a compact wall mounted cylinder, it can be installed directly above the heat pump.

Further accessories

233098 WPKI-H E

074252 SBP-HF Electric booster heater

SBP-HF Electric booster heater

Flanged immersion heater for retrofitting into the SBP 100 with adjustable output of 2, 4 or 6 kW.

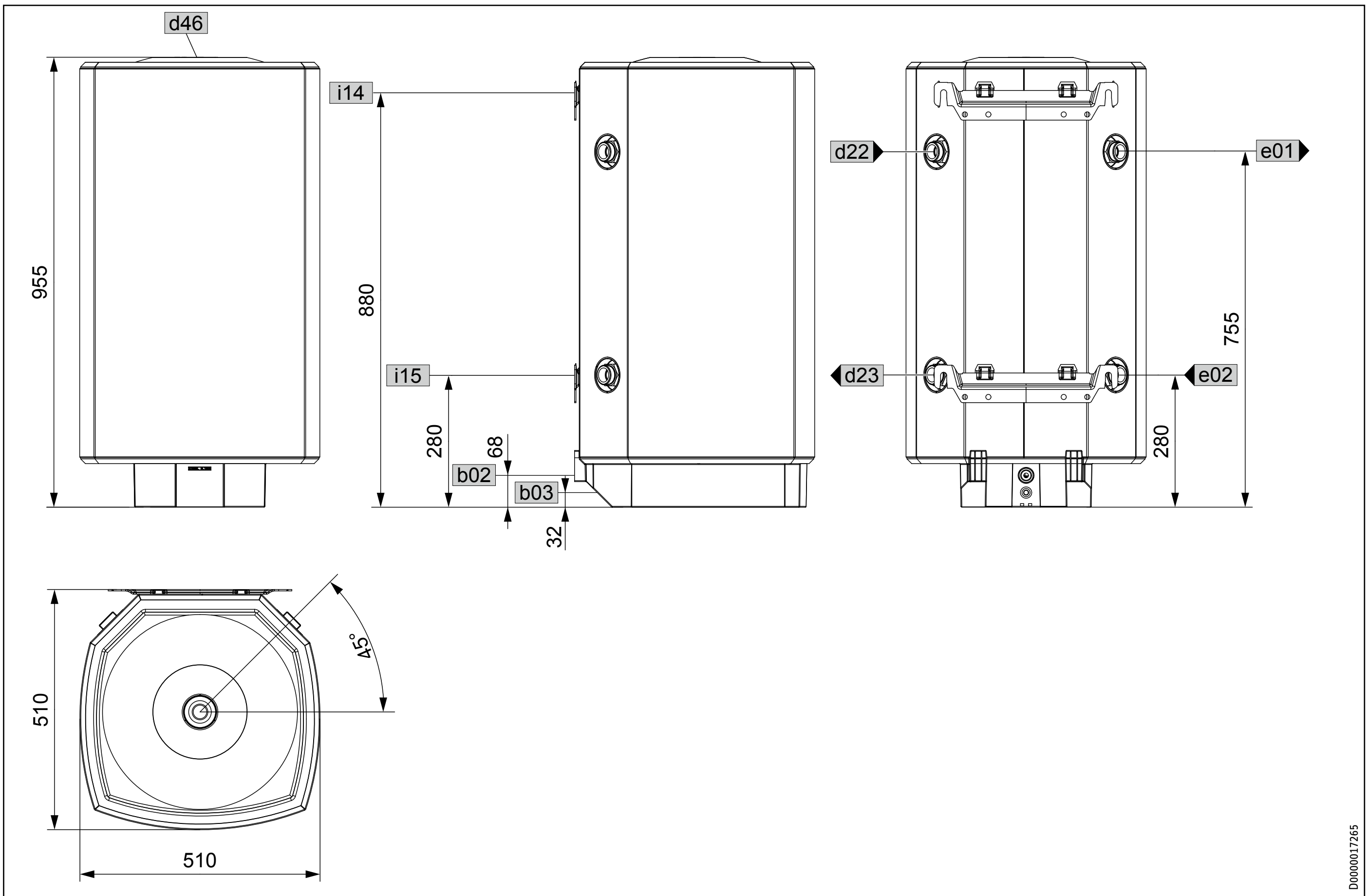
		SBP-HF Electric booster heater
		074252
Power supply		1/N/PE ~ 230 V, 3/N/PE ~ 400 V
Heating output	kW	2/4/6

SBP 100

Specification

		SBP 100
		185443
Energy data		
Energy efficiency class		C
Standby energy consumption/24 h at 65 °C	kWh	1,4
Hydraulic data		
Nominal capacity	l	100
Application limits		
Max. permissible pressure	MPa	0,3
Test pressure	MPa	0,45
Max. permissible temperature	°C	95
Dimensions		
Height	mm	955
Width	mm	510
Depth	mm	510
Weights		
Weight, full	kg	142,5
Weight, empty	kg	42,5

Siting



			SBP 100
b02	Entry cables I	Fitting	PG 21
d22	Charging station return	Male thread	G 1 1/4 A
d23	Charging station flow opt.	Male thread	G 1 1/4 A
e01	Heating flow	Male thread	G 1 1/4 A
e02	Heating return	Male thread	G 1 1/4 A

SBP 200/400 E cool

At a glance

- » Suitable for cooling due to diffusion-proof complete foam application, therefore can be used for heating and cooling
- » Low heat losses due to highly effective thermal insulation
- » Steel cylinder with directly applied foam insulation
- » Accessories such as threaded immersion heaters can be installed
- » Casing can be removed during handling if required

APPLICATION: Buffer cylinder for heat pump heating systems, also suitable for cooling mode. They serve for hydraulic separation of the heat pump flow and the heating/cooling circuit flow, for extending heat pump runtimes and for storing heating energy. For use in detached houses. **EQUIPMENT:** Steel cylinder with directly applied foam insulation, hydraulic connections arranged at the front one above the other, plus connectors on the side for optional fitting of threaded immersion heaters. Diffusion-proof complete foam application. Cylinder casing consisting of outer plastic jacket in pure white, plus cylinder cover and plinth trim in grey. **EFFICIENCY:** Low heat losses due to highly effective diffusion-proof thermal insulation. Designed for connecting heat pumps with high flow rates on the primary side.

Function

The buffer cylinders are designed for heat pump operation with high flow rates and a simultaneously low temperature differential, and store heat for heating mode. When there is a heat demand, the heat pump flow is fed into the upper section of the cylinder, whilst the cooler heat pump return flows from the lower section. The heating circuit flow is fed from the hot section and the heating circuit return is fed back into the colder section. In addition to the amount of heat stored in the cylinder, this also hydraulically separates the primary and secondary circuits. The 'cool' types in diffusion-proof foam-lined cylinders not only store hot water for heating mode, but also store cooled water with the heat pump operating in reverse mode for temperate heating of rooms.

Further accessories

232030	BGC 2/60
234763	WPKI 5
075115	BGC/45

SBP 200/400/700 E SOL

At a glance

» Low heat losses due to highly effective thermal insulation
» Steel cylinder with directly applied foam insulation
» Accessories such as threaded immersion heaters can be installed
» Casing can be removed during handling if required

APPLICATION: Buffer cylinder for heat pump heating systems (... 700 | SOL: can also be used in cooling mode). They serve for hydraulic separation of the heat pump flow and the heating circuit flow, for extending heat pump runtimes and for storing heating energy. For use in detached and two-family houses, depending on nominal capacity. Optional integration of solar thermal backup is possible with 'SOL' types. **EQUIPMENT:** Steel cylinder with directly applied foam insulation, hydraulic connections arranged at the front one above the other, plus connectors for optional fitting of threaded immersion heaters. With 'SOL' types, one internal indirect coil for solar connection. Cylinder casing consisting of outer plastic jacket in pure white, plus cylinder cover and plinth trim in grey. **EFFICIENCY:** Low heat losses due to highly effective thermal insulation. Designed for connecting heat pumps with high flow rates on the primary side.

Function

The buffer cylinders are designed for heat pump operation with high flow rates and a simultaneously low temperature differential, and store heat for heating mode. When there is a heat demand, the heat pump flow is fed into the upper section of the cylinder, whilst the cooler heat pump return flows from the lower section. The heating circuit flow is fed from the hot section and the heating circuit return is fed back into the colder section. In addition to the amount of heat stored in the cylinder, this also hydraulically separates the primary and secondary circuits.

Further accessories

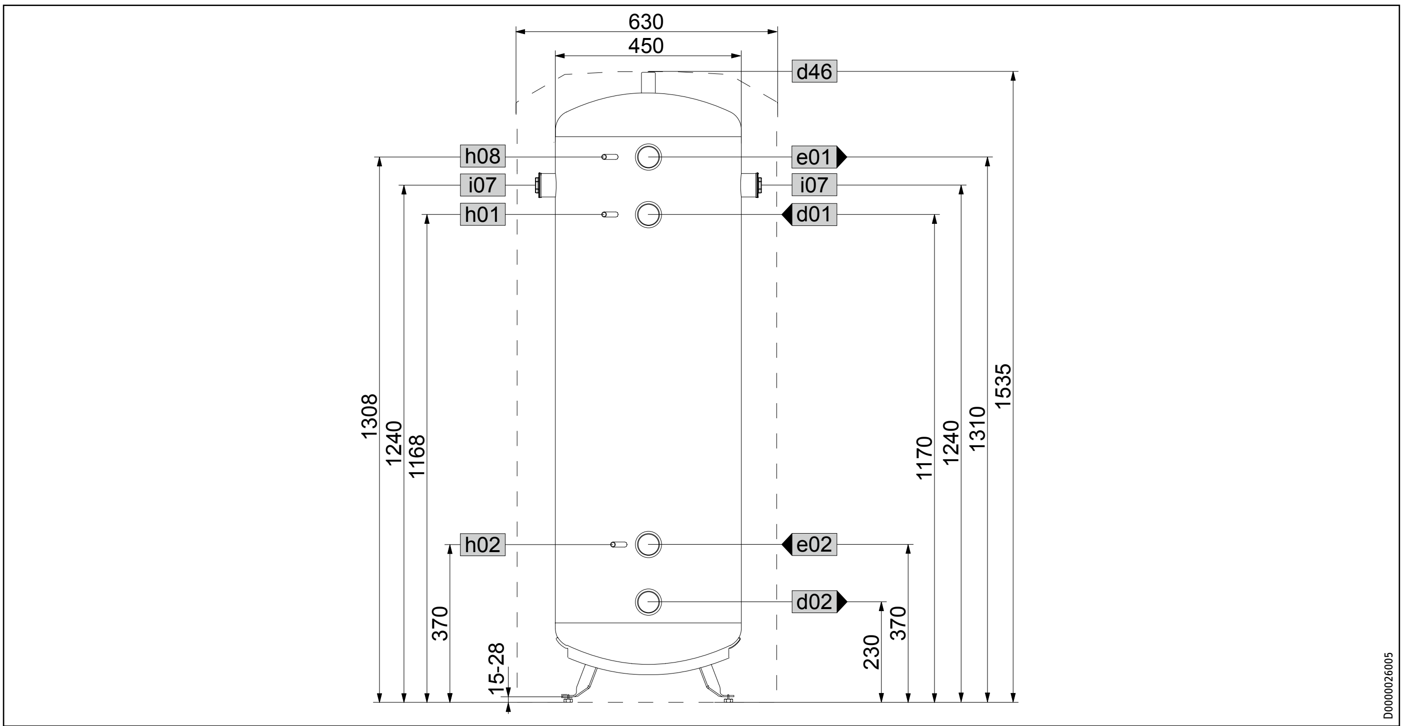
221141	WPKI-RB
232030	BGC 2/60
234763	WPKI 5

SBP 200-700 E cool / SOL

Specification

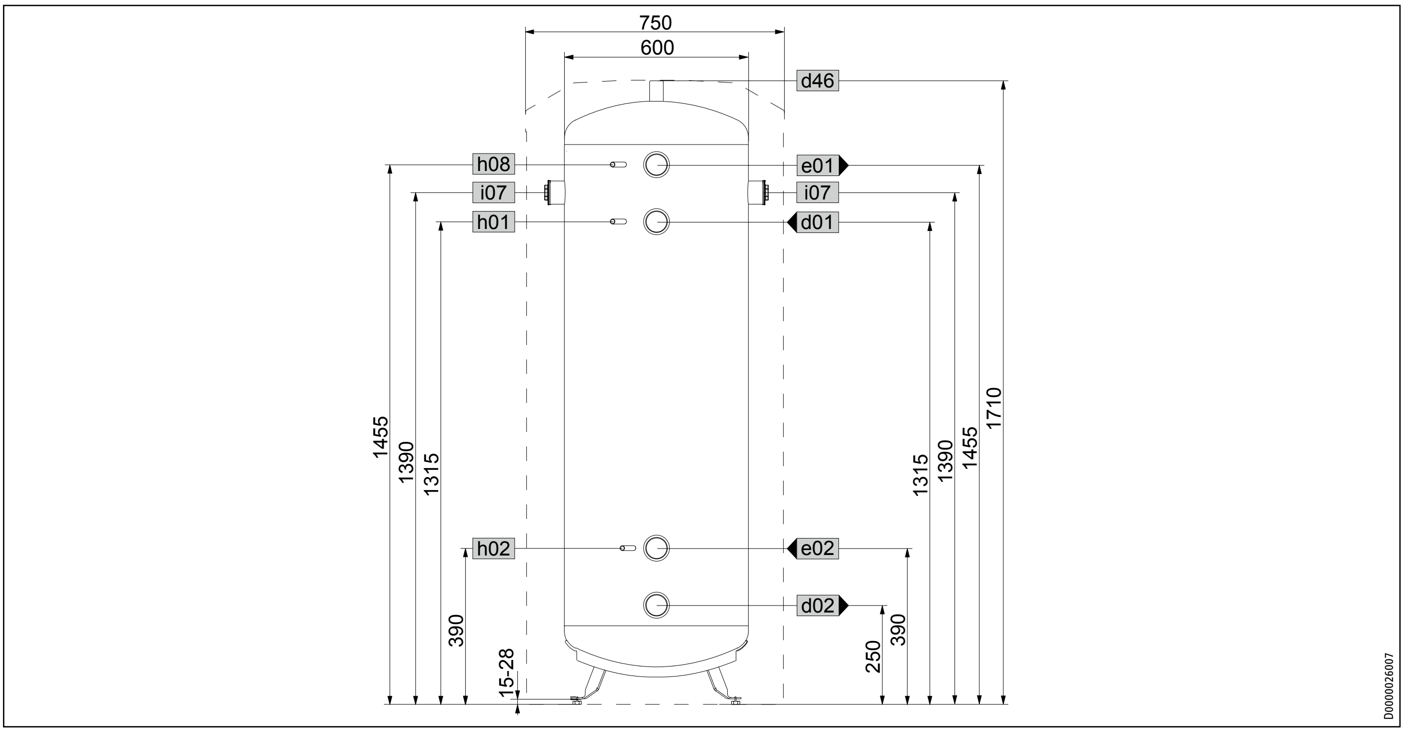
		SBP 200 E	SBP 400 E	SBP 200 E cool	SBP 400 E cool	SBP 700 E	SBP 700 E SOL
		185458	220824	227590	227591	185459	185460
Energy data							
Energy efficiency class		C	C	B	B		
Standby energy consumption/24 h at 65 °C	kWh	1,6	2,0	1,1	1,6	2,2	2,2
Hydraulic data							
Nominal capacity	l	207	415	207	415	720	703
Capacity, lower indirect coil	l						12,2
Surface area, lower indirect coil	m²						2
Pressure drop at 1.0 m³/h, lower indirect coil	hPa						28
Application limits							
Max. permissible pressure	MPa	0,3	0,3	0,3	0,3	0,3	0,3
Test pressure	MPa	0,45	0,45	0,45	0,45	0,45	0,45
Maximum charge / discharge flow rate	m³/h	1,6	3,1	1,6	3,1	5,5	5,5
Max. permissible temperature	°C	95	95	95	95	95	95
Max. recommended collector aperture area	m²						14
Dimensions							
Height	mm	1535	1710	1535	1710	1890	1890
Diameter	mm	630	750	630	750	910	910
Height when tilted	mm	1650	1800	1650	1800	2000	2000
Weights							
Weight, full	kg	256	479	258	481	885	902
Weight, empty	kg	56	79	58	81	185	216

SBP 200 E | SBP 200 E cool



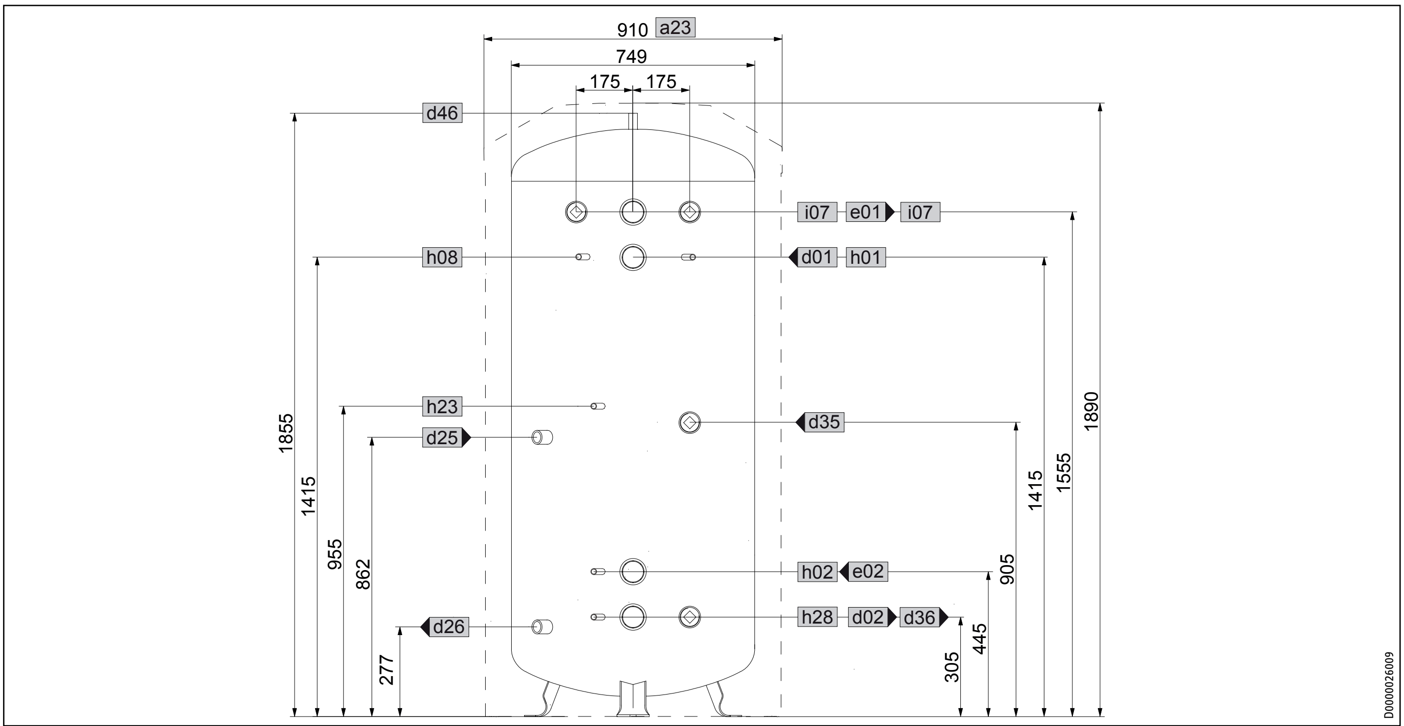
				SBP 200 E	SBP 200 E cool
d01	Heat pump flow	Male thread		G 2 A	G 2 A
d02	Heat pump return	Male thread		G 2 A	G 2 A
d46	Ventilation	Female thread		G 3/4	G 3/4
e01	Heating flow	Male thread		G 2 A	G 2 A
e02	Heating return	Male thread		G 2 A	G 2 A
h01	Sensor heat pump flow	Diameter	mm	9,5	9,5
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h08	Sensor heat pump cooling	Diameter	mm	9,5	9,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBP 400 E | SBP 400 E cool



				SBP 400 E	SBP 400 E cool
d01	Heat pump flow	Male thread		G 2 A	G 2 A
d02	Heat pump return	Male thread		G 2 A	G 2 A
d46	Ventilation	Female thread		G 3/4	G 3/4
e01	Heating flow	Male thread		G 2 A	G 2 A
e02	Heating return	Male thread		G 2 A	G 2 A
h01	Sensor heat pump flow	Diameter	mm	9,5	9,5
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h08	Sensor heat pump cooling	Diameter	mm	9,5	9,5
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBP 700 E | SBP 700 E SOL



				SBP 700 E	SBP 700 E SOL
a23	Appliance	Width excl. side insulation sections	mm	770	770
d01	Heat pump flow	Male thread		G 2 A	G 2 A
d02	Heat pump return	Male thread		G 2 A	G 2 A
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d35	Heat source flow optional	Female thread		G 1 1/2	G 1 1/2
d36	Heat source return optional	Female thread		G 1 1/2	G 1 1/2
d46	Ventilation	Female thread		G 3/4	G 3/4
e01	Heating flow	Male thread		G 2 A	G 2 A
e02	Heating return	Male thread		G 2 A	G 2 A
h01	Sensor heat pump flow	Diameter	mm	9,5	9,5
h02	Sensor heat pump return	Male thread			G 1/2 A
		Diameter	mm	9,5	9,5
h08	Sensor heat pump cooling	Diameter	mm	9,5	9,5
h23	Sensor heat source optional	Diameter	mm	9,5	9,5
		Male thread			G 1/2 A
h28	Sensor solar cylinder	Diameter	mm	9,5	9,5
		Male thread			G 1/2 A
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBP 1000-1500 E cool / SOL

Buffer cylinder for hydraulic separation of the heat pump flow and the heating circuit flow, ... E SOL with additional smooth tube indirect coil for linking a solar thermal system into the heating system. The cylinder is designed to provide system separation, to extend the heat pump runtime and, to an extent, to bridge power-OFF periods. Optional extension through fitting accessories to the flanged aperture and six threaded connectors. The thermal insulation WDH as an accessory ensures very low heat losses.

At a glance

- Flanged connections DN 80 for heat pump and heating circuit
- SBP 1000/1500 E SOL with solar indirect coil
- For use in conjunction with large heat pumps
- Flanged aperture 280 mm with blank flange for the optional use of WTW, WTFS and FCR immersion heater
- May be combined with up to two heat generators and two electric immersion heaters (BGC)

Function

The buffer cylinders are multifunctional cylinders for large, complex heating systems. When there is a heat demand, the heat pump flow is fed into the upper section of the cylinder, whilst the cooler heat pump return flows from the lower section. The heating circuit flow is fed from the hot section and the heating circuit return is fed back into the colder section. In addition to the amount of heat stored in the cylinder, this also hydraulically separates the primary and secondary circuits. The cylinders have flanged connections to cope with the high flow rates. Other heat generators can also be included.

Further accessories

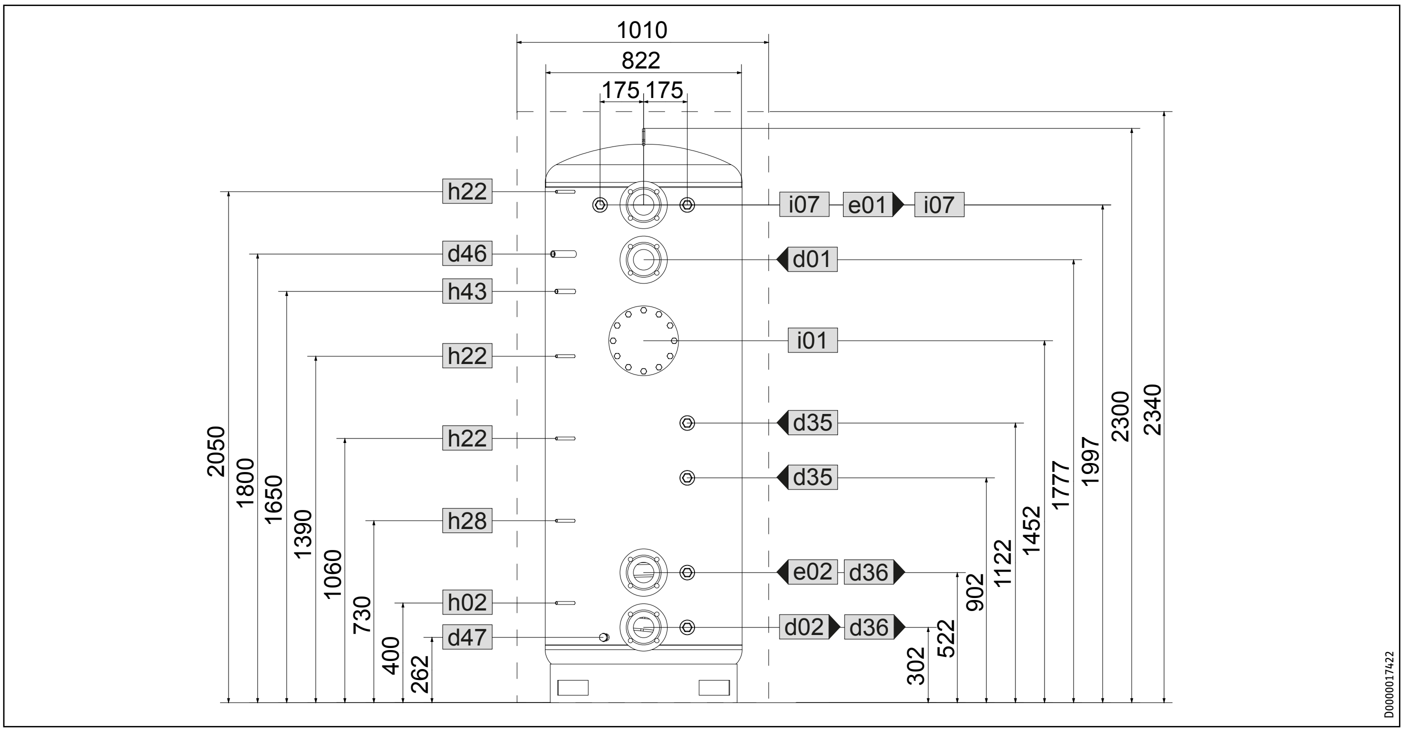
231929	WDH 1000 SBP
232030	BGC 2/60
000694	FCR 28/120
000695	FCR 28/180
000696	FCR 28/270
001502	FCR 28/360
231884	BF 80
231885	FG 80/2
075124	FCR 28/360 Si
075131	FCR 28/180 Si
075140	FCR 28/120 Si
071332	FCR 28/120
234503	FCR 28/120 CrNi
071333	FCR 28/180
076098	WTW 28/18
076099	WTW 28/23
072118	WTFS 28/23

SBP 1000-1500 E cool / SOL

Specification

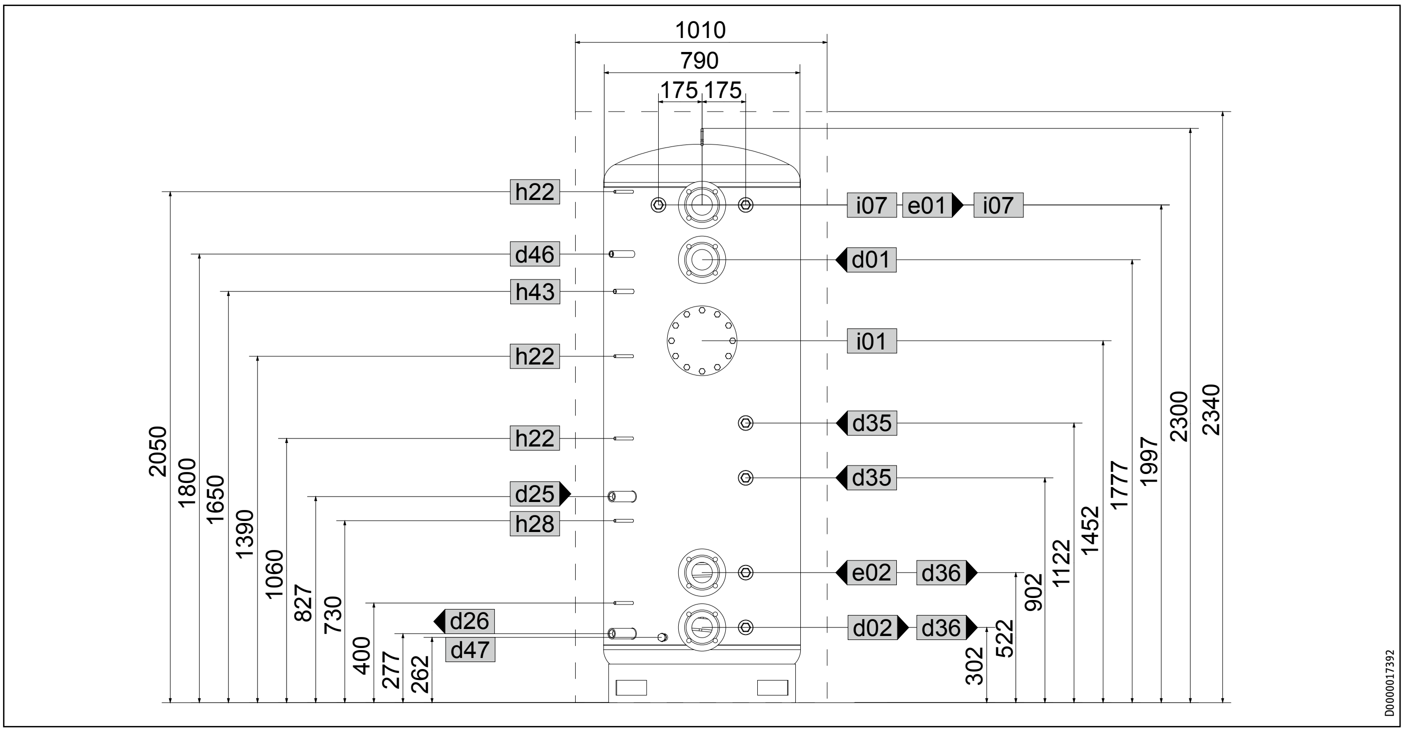
		SBP 1000 E	SBP 1500 E	SBP 1000 E SOL	SBP 1500 E SOL	SBP 1000 E cool	SBP 1500 E cool
		227564	227565	227566	227567	227588	227589
Hydraulic data							
Nominal capacity	l	1006	1503	979	1473	1006	1503
Capacity, lower indirect coil	l			25,9	22,5		
Surface area, lower indirect coil	m²			3	3,6		
Pressure drop at 1.0 m³/h, lower indirect coil	hPa			8	9		
Application limits							
Max. permissible pressure	MPa	0,3	0,3	0,3	0,3	0,3	0,3
Test pressure	MPa	0,45	0,45	0,45	0,45	0,45	0,45
Maximum charge / discharge flow rate	m³/h	12,5	15	12,5	15	12,5	15
Max. permissible temperature	°C	95	95	95	95	95	95
Max. recommended collector aperture area	m²			20	30		
Dimensions							
Height	mm	2300	2220	2300	2220	2300	2220
Diameter	mm	790	1000	790	1000	822	1032
Diameter incl. thermal insulation	mm	1010	1220	1010	1220	1010	1220
Height when tilted	mm	2335	2250	2335	2250	2335	2250
Weights							
Weight, full	kg	1172	1729	1184	1750	1141	1698
Weight, empty	kg	172	229	219	285	173	230

SBP 1000 E cool



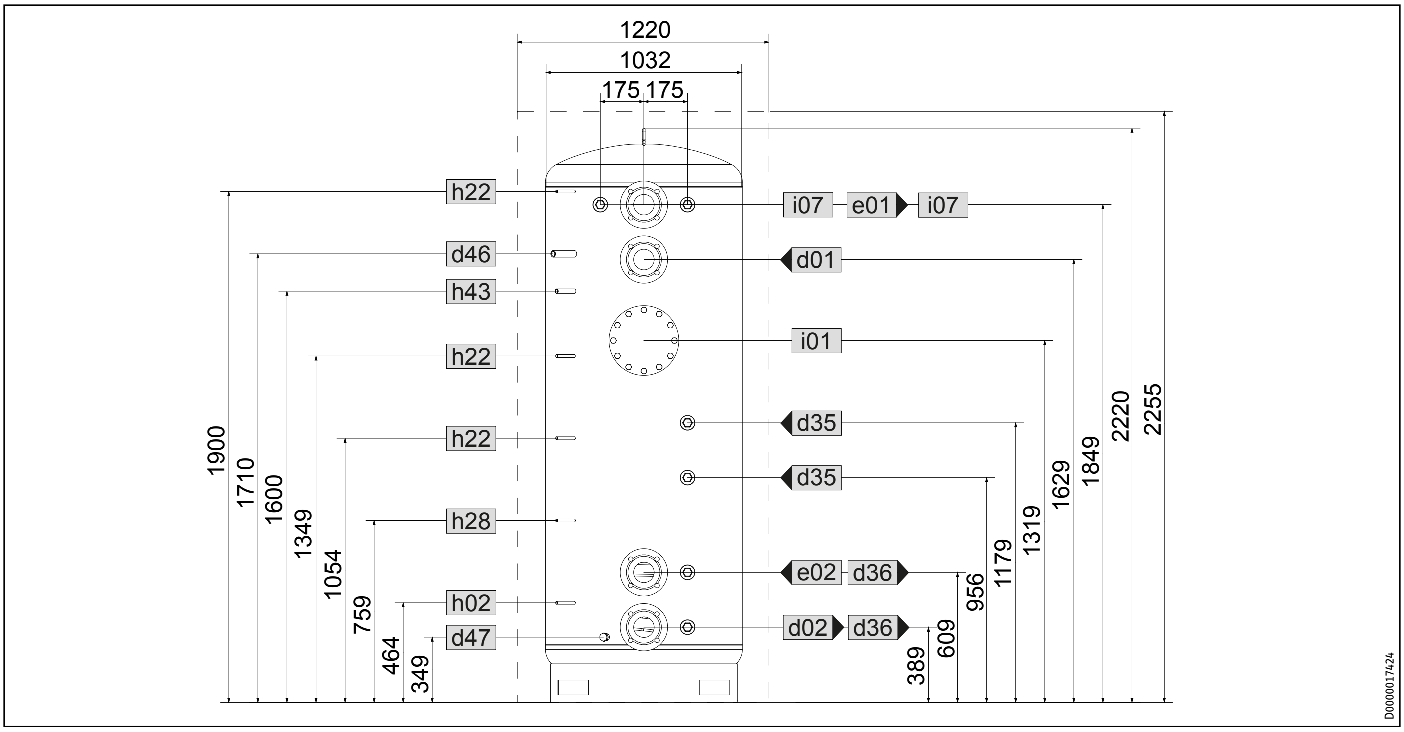
				SBP 1000 E cool
d01	Heat pump flow	Nominal diameter		DN 80
d02	Heat pump return	Nominal diameter		DN 80
d35	Heat source flow optional	Female thread		G 1 1/2
d36	Heat source return optional	Female thread		G 1 1/2
d46	Ventilation	Female thread		G 1/2
d47	Drain	Male thread		G 3/4 A
e01	Heating flow	Nominal diameter		DN 80
e02	Heating return	Nominal diameter		DN 80
h02	Sensor heat pump return	Diameter	mm	9,5
h22	Sensor heat source	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i01	Flange	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
i07	Electric emergency/booster heater	Female thread		G 1 1/2

SBP 1000 E | SBP 1000 E SOL



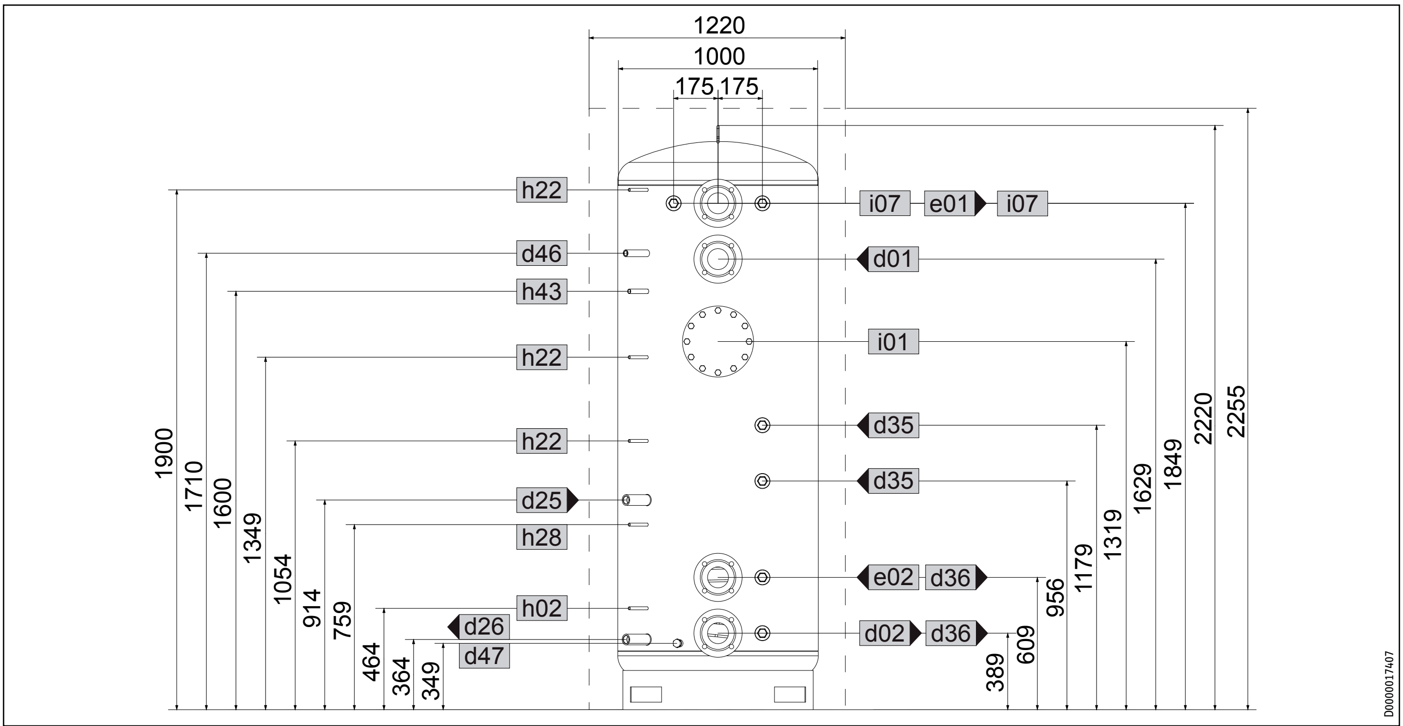
				SBP 1000 E	SBP 1000 E SOL
d01	Heat pump flow	Nominal diameter		DN 80	DN 80
d02	Heat pump return	Nominal diameter		DN 80	DN 80
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d35	Heat source flow optional	Female thread		G 1 1/2	G 1 1/2
d36	Heat source return optional	Female thread		G 1 1/2	G 1 1/2
d46	Ventilation	Female thread		G 1/2	G 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Nominal diameter		DN 80	DN 80
e02	Heating return	Nominal diameter		DN 80	DN 80
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5	9,5
h43	Thermometer	Diameter	mm	14,5	14,5
i01	Flange	Diameter	mm	280	280
		Pitch circle diameter	mm	245	245
		Screws		M 14	M 14
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

SBP 1500 E cool



				SBP 1500 E cool
d01	Heat pump flow	Nominal diameter		DN 80
d02	Heat pump return	Nominal diameter		DN 80
d35	Heat source flow optional	Female thread		G 1 1/2
d36	Heat source return optional	Female thread		G 1 1/2
d46	Ventilation	Female thread		G 1/2
d47	Drain	Male thread		G 3/4 A
e01	Heating flow	Nominal diameter		DN 80
e02	Heating return	Nominal diameter		DN 80
h02	Sensor heat pump return	Diameter	mm	9,5
h22	Sensor heat source	Diameter	mm	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5
h43	Thermometer	Diameter	mm	14,5
i01	Flange	Diameter	mm	280
		Pitch circle diameter	mm	245
		Screws		M 14
i07	Electric emergency/booster heater	Female thread		G 1 1/2

SBP 1500 E | SBP 1500 E SOL



				SBP 1500 E	SBP 1500 E SOL
d01	Heat pump flow	Nominal diameter		DN 80	DN 80
d02	Heat pump return	Nominal diameter		DN 80	DN 80
d25	Solar flow	Female thread			G 1
d26	Solar return	Female thread			G 1
d35	Heat source flow optional	Female thread		G 1 1/2	G 1 1/2
d36	Heat source return optional	Female thread		G 1 1/2	G 1 1/2
d46	Ventilation	Female thread		G 1/2	G 1/2
d47	Drain	Male thread		G 3/4 A	G 3/4 A
e01	Heating flow	Nominal diameter		DN 80	DN 80
e02	Heating return	Nominal diameter		DN 80	DN 80
h02	Sensor heat pump return	Diameter	mm	9,5	9,5
h22	Sensor heat source	Diameter	mm	9,5	9,5
h28	Sensor solar cylinder	Diameter	mm	9,5	9,5
h43	Thermometer	Diameter	mm	14,5	14,5
i01	Flange	Diameter	mm	280	280
		Pitch circle diameter	mm	245	245
		Screws		M 14	M 14
i07	Electric emergency/booster heater	Female thread		G 1 1/2	G 1 1/2

Thermal insulation WDH 1000/1500 SBP and WDH 1000/1500 cool

WDH SBP | WDH cool

WDH 1000 SBP

High grade EPTS rigid foam thermal insulation with insulation cover and floor disc for the SBP 1000-1500 buffer cylinders. Graphite inserts in the EPTS and fleece for lowest heat losses. Wedge-shaped cut-outs and fleece layer ensure an optimum match to the cylinder. Prepared adhesive joint in the wedge-shaped cut-outs enables adjustment to the shape prior to installation. External plastic jacket in white; cover in basalt grey. Thermal insulation secured with a quick-release hook strip.

		WDH 1000 SBP	WDH 1500 SBP
		231929	231930
Insulation for		SBP 1000 E and E SOL	SBP 1500 E and E SOL
Height	mm	2340	2255
Diameter	mm	1010	1220
Thermal insulation thickness	mm	110	110
Standby energy consumption/24 h at 65 °C	kWh	3,6	4,1

WDH 1000 cool

High grade EPTS rigid foam thermal insulation with insulation cover and floor disc for the SBP 1000-1500 buffer cylinders. Graphite inserts in the EPTS and fleece for lowest heat losses. Wedge-shaped cut-outs and fleece layer ensure an optimum match to the cylinder. Prepared adhesive joint in the wedge-shaped cut-outs enables adjustment to the shape prior to installation. External plastic jacket in white; cover in basalt grey. Thermal insulation secured with a quick-release hook strip.

		WDH 1000 cool	WDH 1500 cool
		231921	231922
Insulation for		SBP 1000 E cool	SBP 1500 E cool
Height	mm	2340	2255
Diameter	mm	1010	1220
Thermal insulation thickness	mm	110	110
Standby energy consumption/24 h at 65 °C	kWh	3,5	4,0

Flange
BF 80/FG 80/2

BF 80

Two dummy flanges for optional closing of the flanged connections on the buffer cylinders.

	BF 80
	231884
Flange diameter	DN 80

FG 80/2

Two flanged reducers in connection with the buffer cylinders. The flanged connections are reduced to the threaded connector if necessary.

	FG 80/2
	231885
Flange diameter	DN 80
Threaded connection	G 2 A

SBP 750/950 G

At a glance

» Buffer cylinder and gas condensing boiler in a single appliance
» Small footprint and little installation effort
» Perfect hydraulic and control matched combination of heat pump and dual mode heat generator
» High grade removable thermal insulation and plastic jacket
» Prepared for connection to the heat pump manager
» Ideal for use with a standard building heat load of 20 kW to 60 kW

This appliance is a buffer cylinder for the hydraulic separation of heat pumps and heat distribution systems with an integral gas condensing boiler. Featuring a compact design and optimum component matching, this appliance combines the benefits of a parallel heat pump buffer cylinder with those of a modulating gas condensing boiler for dual mode room heating and DHW heating. The integral gas condensing boiler is controlled in a modulating manner in conjunction with the heat pump manager. Included in the standard delivery are the buffer cylinder with factory-fitted combustion chamber, a pressure-jet gas burner with gas burner control unit and safety equipment, as well as a high grade rigid foam thermal insulation with insulated top cover and a front hood with integral control panel. Generously sized threaded connectors for the connection of the heat pump and heat distribution are arranged on the back of the appliance. All relevant temperature sensors are fitted and prepared for connection to the heat pump manager. This appliance has been designed for combination with our heat pumps and includes matching control technology.

Function

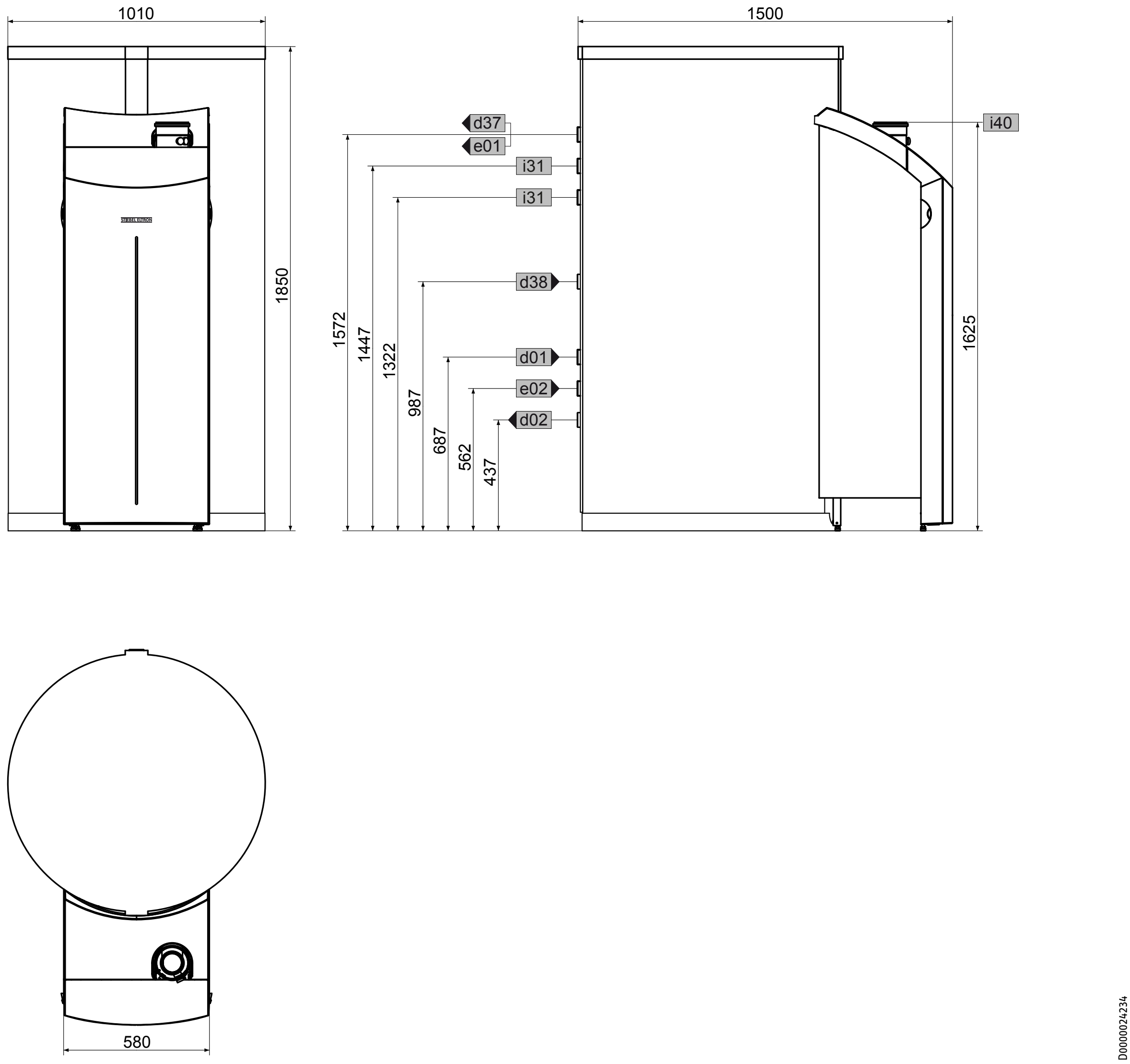
The buffer cylinder provides for an optimum dual mode combination of two fuel types. The base load heat generator heat pump charges the buffer cylinder, hydraulically separated from the heating distribution system. The heat pump manager puts the integrated gas condensing boiler into operation depending on the set outside temperature and the set application limits of the heat pump. The output of the condensing boiler is controlled and matched to the appropriate current requirements. In this way it is possible to attain the required coverage of the respective heat generator. Depending on the system solution, the buffer cylinder can also take over the DHW heating. Here it can once again be determined which fuel type covers what proportion of the total demand.

SBP 750/950 G

Specification

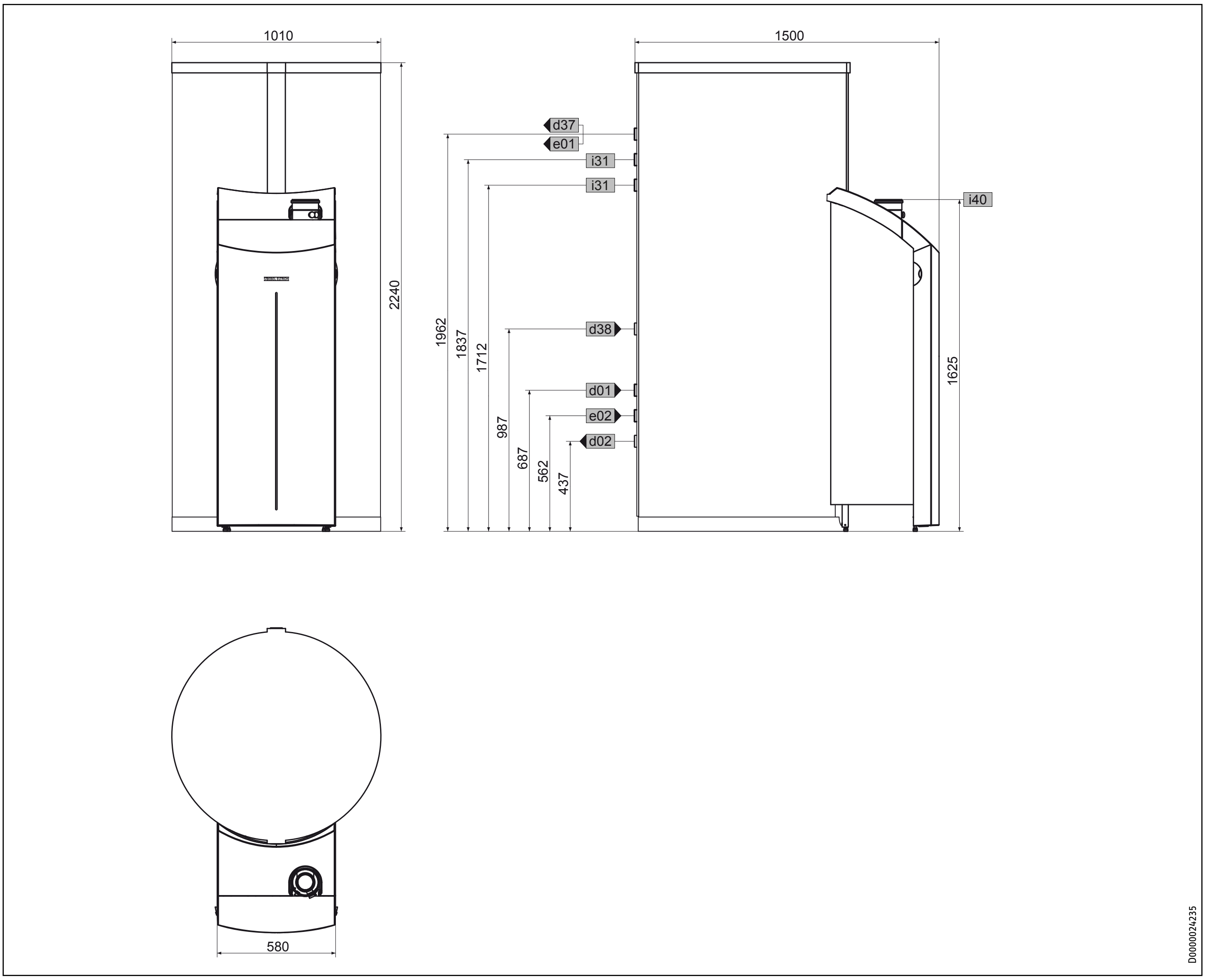
		SBP 750 G	SBP 950 G
		231739	231750
Heating output			
Rated heat input	kW	8-30	8-30
Rated heating output (Pn) at TV/TR 50/30 °C	kW	8,7-32,5	8,7-32,5
Rated heating output (Pn) at TV/TR 80/60 °C	kW	7,9-29,6	7,9-29,6
Coefficient of performance			
Standard seasonal efficiency [to DIN] at 40/30 °C	%	108	108
Standard seasonal efficiency [to DIN] at 75/60 °C	%	104,9	104,9
Sound data			
Min. sound pressure level, burner	dB(A)	<30	<30
Max. sound pressure level, burner	dB(A)	<40	<40
Application limits			
Test pressure	MPa	0,45	0,45
Max. permissible pressure	MPa	0,3	0,3
Max. permissible temperature	°C	95	95
Hydraulic data			
Gross content	l	756	956
Net content	l	740	940
Nominal capacity	l	750	950
Versions			
Fuel		Natural gas	Natural gas
Burner type		Pressure-jet burner	Pressure-jet burner
Appliance category		I_{2ELL}	I_{2ELL}
Types of installation to TRGI		C_{63x}	C_{63x}
Dimensions			
Height	mm	1850	2240
Diameter	mm	790	790
Diameter incl. thermal insulation	mm	1010	1010
Height when tilted	mm	1880	2280
Weights			
Weight, empty	kg	123	145
Weight, full	kg	897	1120
Connection			
Heating connection		G 2 A	G 2 A
Heat pump connection		G 2 A	G 2 A
DHW connection, heat generator		G 2 A	G 2 A
Vent connection, top		G 1 1/2	G 1 1/2
Vent connection, bottom		G 1/2	G 1/2
Sensor connection		3 x 9.5 mm	3 x 9.5 mm
Connection, flue system	mm	80/125	80/125
Combustion data			
Flue gas temperature (TV/TR 75/60 °C), min. output	°C	63	63
Flue gas temperature (TV/TR 75/60 °C), max. output	°C	67	67
Flue gas mass flow rate (TV/TR 75/60 °C), min. output	g/s	2,8	2,8
Flue gas mass flow rate (TV/TR 75/60 °C), max. output	g/s	12	12
Max. draught at flue system inlet	Pa	100	100
CO2 content in flue gas at max. output (natural gas)	%	9,9	9,9
CO_2 content in flue gas at min. output (natural gas)	%	8,5	8,5
CO standard emissions factor	mg/kWh	4,7	4,7
NOx standard emissions factor	mg/kWh	45,4	45,4
Set values			
Gas connection pressure, natural gas (nominal value)	mbar	20-25	20-25
Values			
Flanged aperture	mm	430	430

SBP 750 G



				SBP 750 G
d01	Heat pump flow	Male thread		G 2 A
d02	Heat pump return	Male thread		G 2 A
d37	Heat source DHW flow	Male thread		G 2 A
d38	Heat source DHW return	Male thread		G 2 A
e01	Heating flow	Male thread		G 2 A
e02	Heating return	Male thread		G 2 A
i31	Do not use			
i40	Flue system	Diameter	mm	80/125

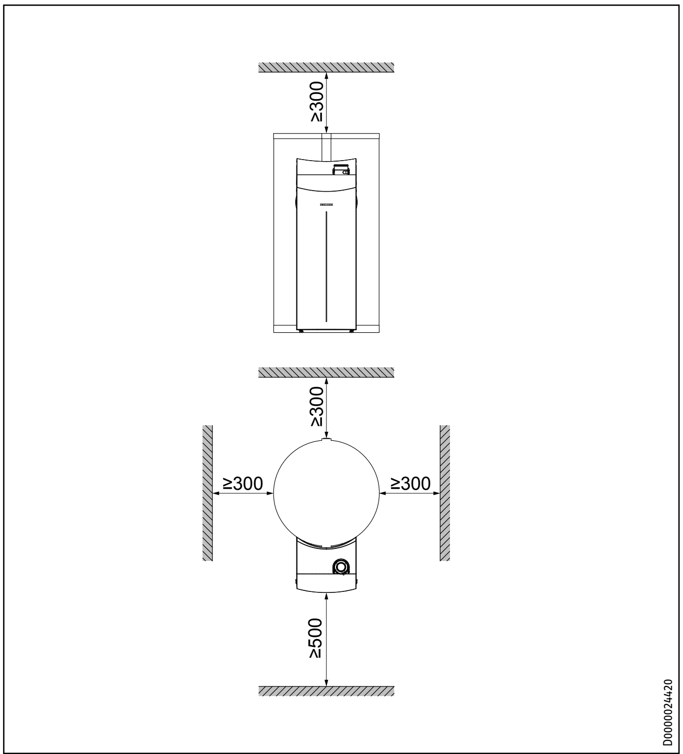
SBP 950 G



				SBP 950 G
d01	Heat pump flow	Male thread		G 2 A
d02	Heat pump return	Male thread		G 2 A
d37	Heat source DHW flow	Male thread		G 2 A
d38	Heat source DHW return	Male thread		G 2 A
e01	Heating flow	Male thread		G 2 A
e02	Heating return	Male thread		G 2 A
i31	Do not use			
i40	Flue system	Diameter	mm	80/125

SBP 750/950 G

Minimum clearances



Notes

UP 25/7.5 PCV

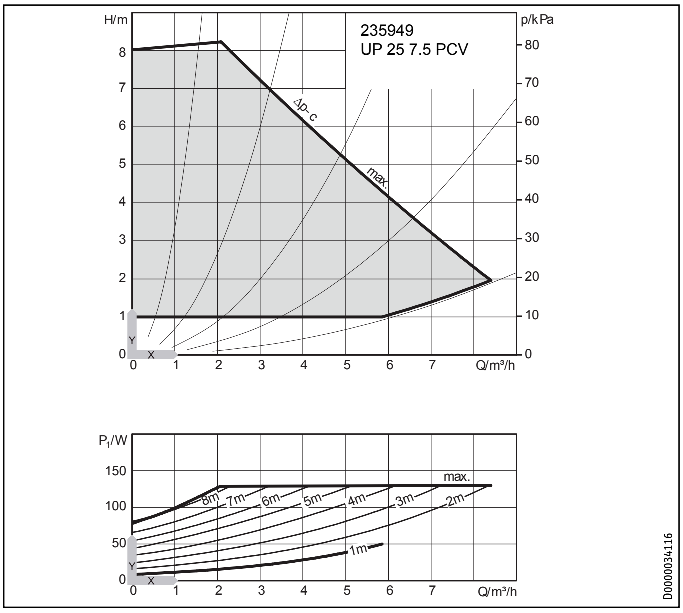
UP 25/7.5 PCV

Energy efficient heating circuit pump (EEI ≤ 0.23), electronically controlled and with thermal insulation, to pump the heat transfer medium. The circulation pumps UP 25/7.5 PCV, UP 25/1-8 PCV and UP 30/1-8 PCV can be controlled via either a PWM signal or differential pressure. The UP 40/1-8 E and UP 50/1-12 E can be controlled via an IF module (accessories) with a 0-10 V signal.

		UP 25/7.5 PCV
		235949
Power supply		1/N/PE ~ 230 V 50 Hz
Connection		G 1 1/2
Power consumption	W	4-75
Installed length (gauge)	mm	180
IP rating		IP44
Energy Efficiency Index EEI		0,21
Max. flow rate	m³/h	4,0
Head	m	7,6
Control via differential pressure		X
Control via PWM signal		X
Controlled via 0-10 V signal with IF module		-
Direct connection to heat pump manager 3		X

UP 25/7.5 PCV

Constant

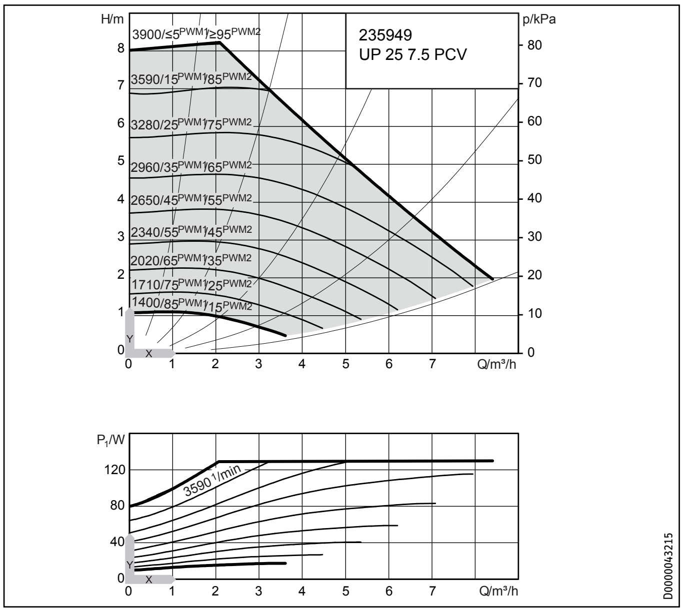


X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

Variable



X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

UP 25/1-8 PCV / 30/1-8 PCV

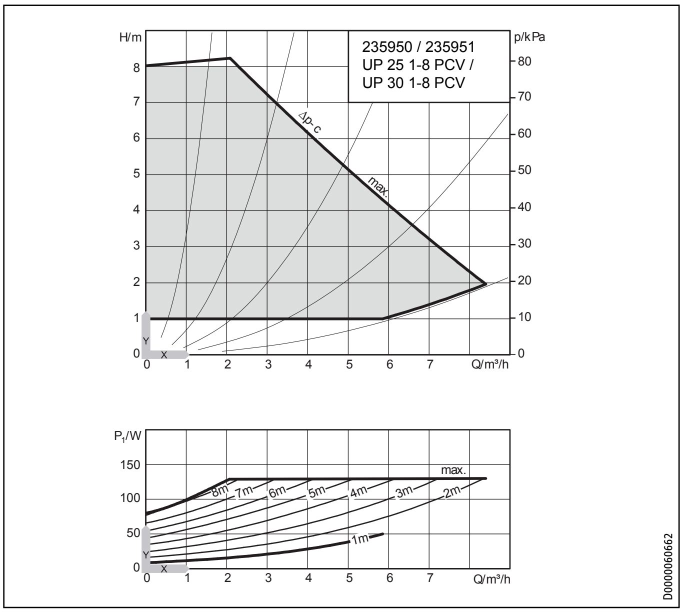
UP 25/1-8 PCV/UP 30/1-8 PCV

Energy efficient heating circuit pump (EEI ≤ 0.23), electronically controlled and with thermal insulation, to pump the heat transfer medium. The circulation pumps UP 25/7.5 PCV, UP 25/1-8 PCV and UP 30/1-8 PCV can be controlled via either a PWM signal or differential pressure. The UP 40/1-8 E and UP 50/1-12 E can be controlled via an IF module (accessories) with a 0-10 V signal.

		UP 25/1-8 PCV	UP 30/1-8 PCV
		235950	235951
Power supply			1/N/PE ~ 230 V 50 Hz
Connection		G 1 1/2	G 2
Power consumption	W	8-130	8-130
Installed length (gauge)	mm	180	180
IP rating		IP44	IP44
Energy Efficiency Index EEI		0,23	0,23
Max. flow rate	m³/h	8,0	8,0
Head	m	8,0	8,0
Control via differential pressure		X	X
Control via PWM signal		X	X
Controlled via 0-10 V signal with IF module		-	-
Direct connection to heat pump manager 3		-	-

UP 25/1-8 PCV/UP 30/1-8 PCV

Constant

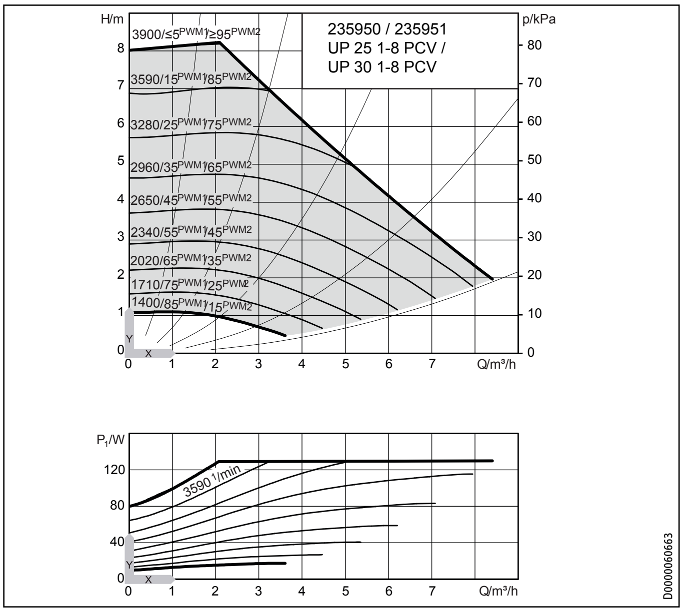


X = Delivery flow rate in m³/h

Y = delivery head in m

Z = power consumption in W

Variable



X = Delivery flow rate in m³/h

Y = delivery head in m

Z = power consumption in W

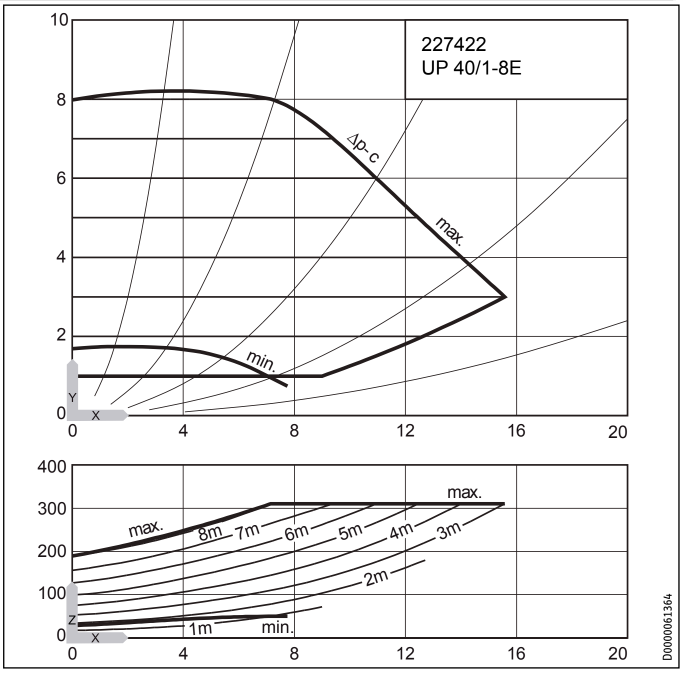
UP 40/1-8 E/UP 50/1-12 E

UP 40/1-8 E/UP 50/1-12 E

Energy efficient heating circuit pump (EEI ≤ 0.23), electronically controlled and with thermal insulation, to pump the heat transfer medium. The circulation pumps UP 25/7.5 PCV, UP 25/1-8 PCV and UP 30/1-8 PCV can be controlled via either a PWM signal or differential pressure. The UP 40/1-8 E and UP 50/1-12 E can be controlled via an IF module (accessories) with a 0-10 V signal.

		UP 40/1-8 E	UP 50/1-12 E
		227422	227423
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz
Connection		DN 40	DN 50
Power consumption	W	12-310	25-590
Installed length (gauge)	mm	220	220
IP rating		IP44	IP44
Energy Efficiency Index EEI		0,23	0,23
Max. flow rate	m³/h	15,0	29,0
Head	m	8,0	11,0
Control via differential pressure		X	X
Control via PWM signal		-	-
Controlled via 0-10 V signal with IF module		X	X
Direct connection to heat pump manager 3		-	-

UP 40/1-8 E

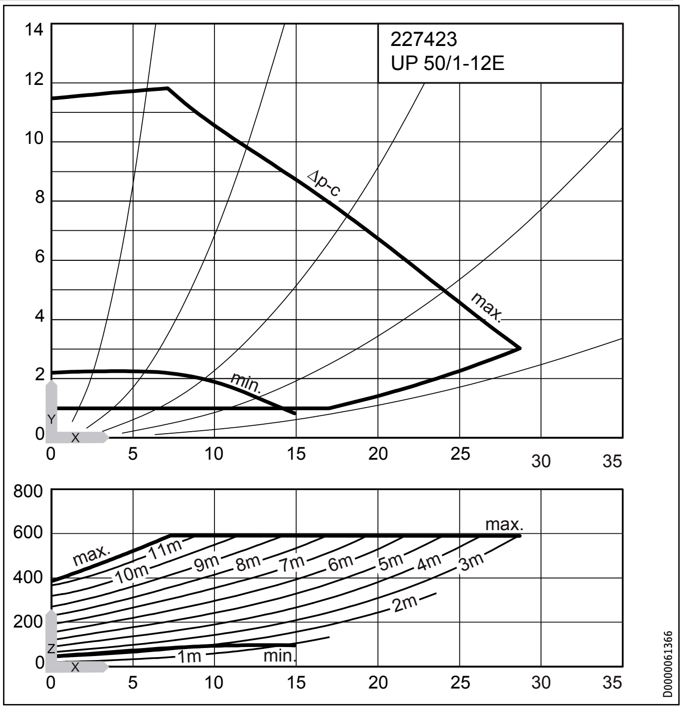


X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

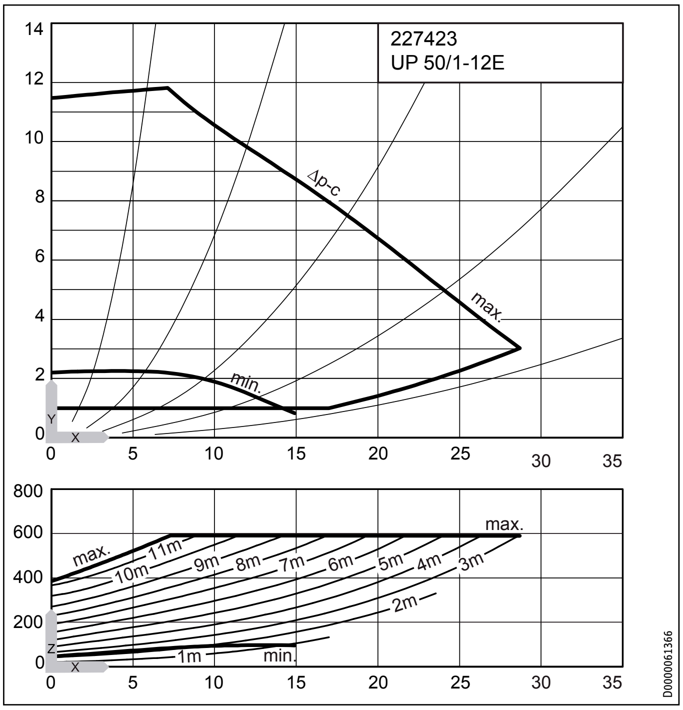
UP 40/1-8 E/UP 50/1-12 E



X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W



X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

Extension module for UP 40 and 50

Stratos IF module

IF module as a retrofittable plug-in to extend the 0-10 V communication interface of UP 40/1-8 E and UP 50/1-12 E pumps

		Stratos IF module
		235952
Terminal cross-section	mm^2	1,5
Contact input version		electrically isolated SELV
Safety to EN 60950		up to 230 V mains voltage, network configuration TN or TT
Contact input, reference earth together with control input		0...10
Contact input, off-load voltage, max.	V	10
Contact input, loop current	mA	approx. 10
Contact output version		floating
Contact output capacity		30 V AC / 60 V DC: 1 A AC1/DC1
Contact output, load, min.		12 V DC, 10 mA
Control input 0-10 V version		electrically isolated SELV
Control input 0-10 V reference earth		together with contact input
Control input 0-10 V input resistance	kΩ	> 100
Control input 0-10 V, accuracy absolute	%	5
Version		Externally off
Control input 0-10 V, dielectric strength DC	V	24
Weight	kg	0,06

WPKI-V

The compact installation contains all required components for the hydraulic connection of a basic series brine | water heat pump to a 100 l buffer cylinder.

		WPKI-V
		074347
Weight	kg	3,0

WPKI-P E

The compact installation contains all required components for the hydraulic connection of the brine | water heat pump (M series) to the 100 l buffer cylinder, such as the safety valve, shut-off valves, check valve, thermometer, pressure gauge and rigid foam thermal insulation. Select and retrofit the required heating circuit pump in DN 25, in accordance with the system.

		WPKI-P E
		233097
Installed length (gauge)	mm	180
Weight	kg	5,1

WPKI-H E

The compact installation contains all the required components for the hydraulic connection of the heating system to the buffer cylinder, such as the shut-off valves, check valve, thermometer and rigid foam thermal insulation. Select and retrofit the required heating circuit pump in DN 25, in accordance with the system.

		WPKI-H E
		233098
Installed length (gauge)	mm	180
Weight	kg	3,5

WPKI-W E

DHW heating with the WPF-M series. The compact installation contains all the required components for the hydraulic connection of the heating heat pump to the DHW cylinder, such as the shut-off valves, check valve, thermometer and rigid foam thermal insulation. Select and retrofit the required heating circuit pump in DN 25, in accordance with the system.

		WPKI-W E
		233099
Installed length (gauge)	mm	180
Weight	kg	3,8

WPKI 5

WPKI 5

The compact installation includes all required components for the hydraulic connection of the heating heat pump to buffer cylinders with 200-700 l capacity. Contains all required components, including safety valve, thermometer/pressure gauge, shut-off valves, non-return valve and optional connector for an expansion vessel, plus assembly for BBI 5 DHW heating. Subject to system, select the required heating circuit pump in DN 25 and retrofit. The WPKI 5 is suitable for heating heat pumps without integrated heating circuit pump.

		WPKI 5
		234763
Max. operating pressure	MPa	0,3
Safety valve, heating	MPa	0,3

BBI 5

The DHW heating set contains all required components for the hydraulic connection of heat pumps to the DHW cylinder. Subject to system, select and retrofit the heating circuit pump in DN 25. BBI 5 is used in connection with WPKI 5.

		BBI 5
		234764
Max. operating pressure	MPa	0,3
Connection		G 1 1/4 / Cu 28 x 1,5
Installed length (gauge)	mm	180
Weight	kg	1,7

WPKI 6

The compact installation includes all required components for the hydraulic connection of the heat pump to a buffer cylinder with 200-700 l capacity. The WPKI 6 is intended for heating heat pumps without integrated heating circuit pump.

		WPKI 6
		234762
Max. operating pressure	MPa	0,3

SBP inserts

One set of adaptor fittings with female threads for the hydraulic connection of the SBP buffer cylinder with 200 - 700 l capacity. Only required if no compact installation is used.

	SBP inserts
	003711
Connection dimensions	R 1 1/4 internal
Packing unit	4

WPKI-HK E

WPKI-HK E

Insulated pump assembly for one heating circuit without mixer, with integral HE circulation pump, shut-off valves with thermometer and gravity brake, including aperture. 1 EPP complete insulation set with white wall mounting bracket cover. Flow on the r.h. side. The pump assembly is suitable for buffer cylinder or wall mounted installation.

		WPKI-HK E
		233602
Height	mm	420
Width	mm	250
Depth	mm	269
Max. permissible temperature	°C	95
Max. permissible pressure	MPa	0,6
Head	m	6,2
Energy Efficiency Index EEI		0,20
Max. flow rate	m³/h	3,3
Connection above		G 1
Connection below		G 1 1/2 A
Circulation pump type		Yonos Para RS 25/6 RKA
Flow capacity	m³/h	9,2
Gravity brake opening pressure	MPa	0,02

WPKI-HKM E

Insulated pump assembly for one heating circuit with mixer, including integral mixer with mixer motor, HE circulation pump, shut-off valves with thermometer and gravity brake, plus aperture. 1 EPP complete insulation set with white wall mounting bracket fascia. Flow on the r.h. side. The pump assembly is suitable for buffer cylinder or wall mounted installation.

		WPKI-HKM E
		233603
Height	mm	420
Width	mm	250
Depth	mm	269
Max. permissible temperature	°C	95
Max. permissible pressure	MPa	0,6
Head	m	6,2
Energy Efficiency Index EEI		0,20
Max. flow rate	m³/h	3,3
Connection above		G 1
Connection below		G 1 1/2 A
Circulation pump type		Yonos Para RS 25/6 RKA
Flow capacity assembly		6,2
Flow capacity mixer		7,4
Gravity brake opening pressure	MPa	0,02

WPKI-HKV

WPKI-HKV

Compact installation for the hydraulic connection of two heating circuit pump assemblies.

	WPKI-HKV
	221142
Suitable for	WPKI-HK E, WPKI-HKM E
Connection	G 1 1/2

WPKI-RB

Pipe assembly for the connection of the WPKI-HK E and WPKI-HKM E to the 400/700 l buffer cylinders.

	WPKI-RB
	221141
Compact installation connection	G 1 1/2
Cylinder connection	G 1 1/4

UP 25/7.5 PCV

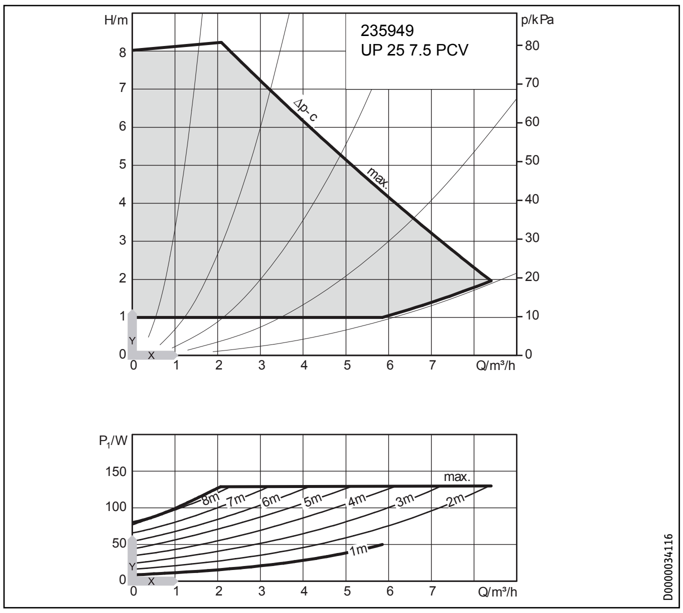
UP 25/7.5 PCV

Energy efficient heating circuit pump (EEI ≤ 0.23), electronically controlled and with thermal insulation, to pump the heat transfer medium. The circulation pumps UP 25/7.5 PCV, UP 25/1-8 PCV and UP 30/1-8 PCV can be controlled via either a PWM signal or differential pressure. The UP 40/1-8 E and UP 50/1-12 E can be controlled via an IF module (accessories) with a 0-10 V signal.

		UP 25/7.5 PCV
		235949
Power supply		1/N/PE ~ 230 V 50 Hz
Connection		G 1 1/2
Power consumption	W	4-75
Installed length (gauge)	mm	180
IP rating		IP44
Energy Efficiency Index EEI		0,21
Max. flow rate	m³/h	4,0
Head	m	7,6
Control via differential pressure		X
Control via PWM signal		X
Controlled via 0-10 V signal with IF module		-
Direct connection to heat pump manager 3		X

UP 25/7.5 PCV

Constant

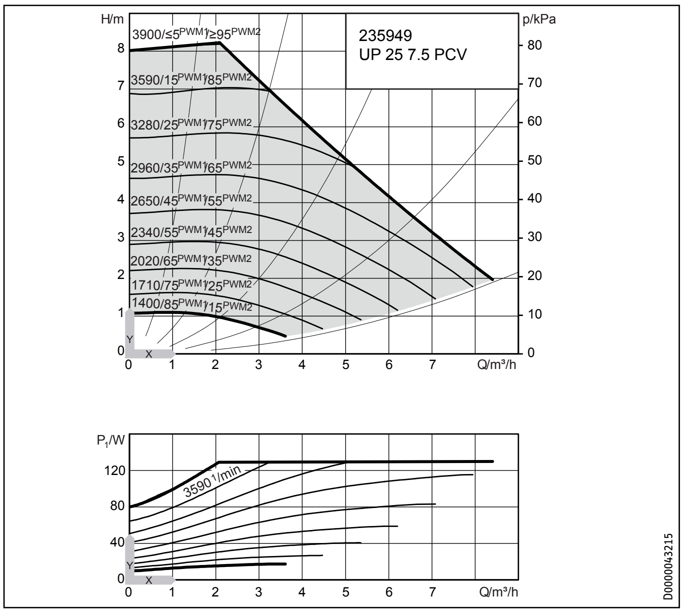


X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

Variable



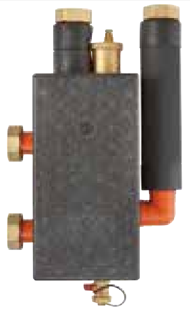
X = Delivery flow rate in m^3/h

Y = delivery head in m

Z = power consumption in W

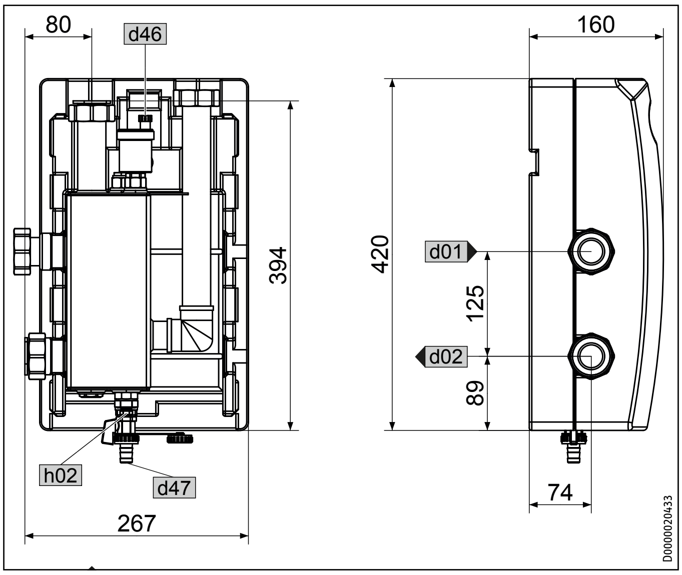
WPHW 25

WPHW 25



For the hydraulic separation of heat pump and heating circuit with air separator and dirt trap. Welded casing with connectors. Fully insulated, with automatic float air vent valves, sensor wells for return sensor and drain valve.

		WPHW 25
		221135
Pump rate	m³/h	2
Max. operating pressure	MPa	0,3
Heating connection		G 1 1/2
Heat pump connection		G 1 1/4
Height	mm	435
Diameter incl. thermal insulation	mm	225



			WPHW 25
d01	Heat pump flow	Female thread	G 1 1/4
d02	Heat pump return	Female thread	G 1 1/4
d46	Ventilation		
d47	Drain		
e01	Heating flow	Female thread	G 1 1/2
e02	Heating return	Female thread	G 1 1/2
h02	Sensor heat pump return		

Suitable for	WPHW 25
WPF 05/07/10/13/16	•
WPF M	•
WPW Set	•
WPL 10/13/18/23/33	•
WPF Set	
WPL 34/47/57	

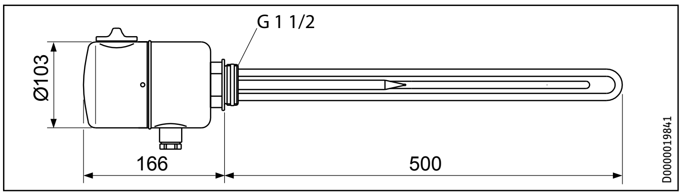
BGC/45

BGC

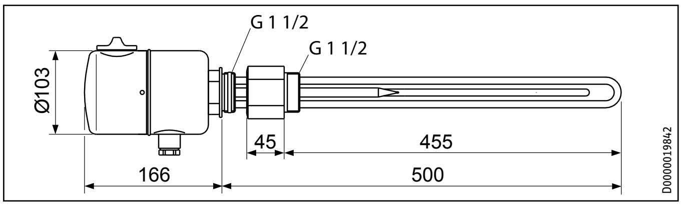
Threaded immersion heater for sealed heating and DHW heating systems. Infinitely variable temperature selection from approx. 10 °C to 80 °C. The temperature may be limited to 45/60/80 °C. Integral temperature controller with high limit safety cut-out. Heating element and protective pipe material: Copper; threaded connection: Brass, thread G 1 1/2 with PTFE gasket.

		BGC	BGC/45	BGC 2	BGC 2/60
		003769	075115	232029	232030
Connected load ~ 230 V	kW	2-5,7	2-5,7	2-5,7	2-5,7
Connected load ~ 400 V	kW	6	6	6	6
Rated voltage	V	230/400	230/400	230/400	230/400
Phases		1/N/PE, 2/ PE, 3/PE	1/N/PE, 2/ PE, 3/PE	1/N/PE, 2/ PE, 3/PE	1/N/PE, 2/ PE, 3/PE
Frequency	Hz	50/60	50/60	50/60	50/60
Single circuit operating mode		X	X	X	X
Temperature setting range	°C	10-80	10-80	10-80	10-80
Max. permissible pressure	MPa	1	1	1	1
Minimum cylinder diameter	mm	450	450	450	450
Minimum cylinder volume	l	50	50	50	50
IP rating		IP44	IP44	IP44	IP44
Immersion depth	mm	500	455	540	480
Weight	kg	2	2,5	2,2	2,8

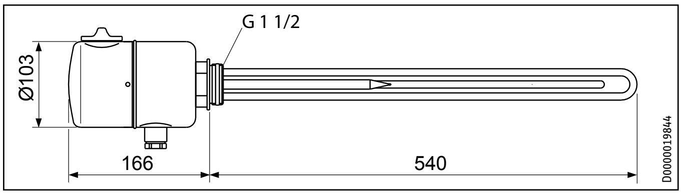
003769



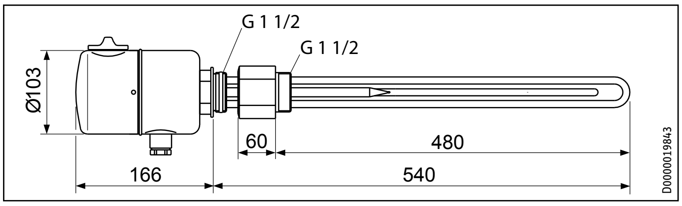
075115



232029



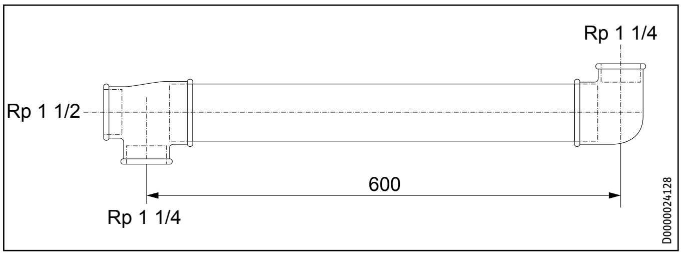
232030



WPRB pipe assembly

Pipe assembly for threaded immersion heater type BGC for electrical reheating.

		WPRB pipe assembly
		074233
Length	mm	600
Connection		Rp 1 1/2
Flow/return connection		Rp 1 1/4



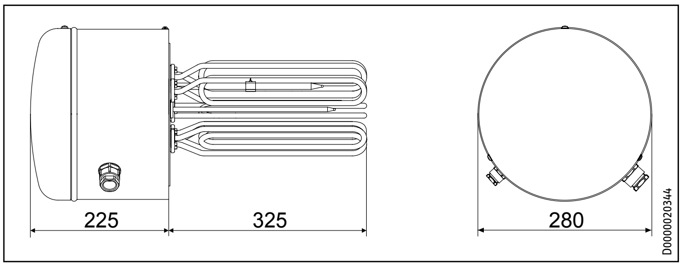
FCR 28/120

FCR 28/120

Flanged immersion heaters for horizontal installation in sealed unvented DHW cylinders with flange connector to DIN 4805, e.g. mating flange GF 28. Observe the details supplied by the cylinder manufacturer and DIN 4753 or 4751. Standard delivery: Temperature controller with frost protection setting, high limit safety cut-out, flange gasket, protective cover with two cable inlets.

		FCR 28/120	FCR 28/180	FCR 28/270	FCR 28/360
		000694	000695	000696	001502
Connected load ~ 400 V	kW	12	18	27	36
Rated voltage	V	400	400	400	400
Phases		3/PE	3/PE	3/PE	3/PE
Frequency	Hz	50	50	50	50/60
Single circuit operating mode		X	X	X	X
Temperature setting range	°C	35-85	35-85	35-85	35-85
Max. permissible pressure	MPa	1,0	1,0	1,0	1,0
Minimum cylinder diameter	mm	450	450	450	550
Minimum cylinder volume	l	200	200	200	300
IP rating		IP24	IP24	IP24	IP24
Flange outside diameter	mm	280	280	280	280
Immersion depth	mm	325	325	325	450
Torque	Nm	80	80	80	80
Weight	kg	12	14	14	15

		FCR 28/120	FCR 28/180
		071332	071333
Connected load ~ 400 V	kW	6/12	9/18
Rated voltage	V	400	400
Phases		3/N/PE	3/N/PE
Frequency	Hz	50	50
Single circuit operating mode		X	X
Dual circuit operating mode		X	X
Temperature setting range	°C	35-85	35-85
Max. permissible pressure	MPa	1,0	1,0
Minimum cylinder diameter	mm	550	550
Minimum cylinder volume	l	300	300
IP rating		IP24	IP24
Flange outside diameter	mm	280	280
Immersion depth	mm	450	450
Torque	Nm	80	80
Weight	kg	12	13



FS-WP 22/28

FS-WP 22

Filter for installation in the heat generator return. To protect the heat pump against contamination.

	FS-WP 22
	233511
Connection	G 1 A / Cu 22 x 1

MFS-WP 22

MFS-WP 22 with backflushing facility, pressure gauge and ball valve

		MFS-WP 22
		235233
Connection		G 1 A / Cu 22 x 1

FS-WP 28

Filter for installation in the heat generator return. To protect the heat pump against contamination.

	FS-WP 28
	233512
Connection	G 1 1/4 A / Cu 28 x 1.5

MFS-WP 28

With removable filter element, pressure gauge and ball valve

		MFS-WP 28
		235234
Connection		G 1 1/4 A / Cu 28 x 1.5

Heating diverter valve
HUV

HUV 1

Three-way heating diverter valve with servomotor for installation in heating systems.

		HUV 1	HUV 2
		227420	223391
Permissible medium		H_2O	H_2O
Permissible medium 2		H2O glycol S	H2O glycol S
Maximum mixing ratio	%	50	50
Permissible additive medium		Glycol	Glycol
Flow capacity	m³/h	26	49
Max. operating temperature	°C	100	100
Max. permissible pressure	MPa	276	276
Differential pressure Δp_{max}	kPa	100	350
Closing pressure Δp_s	kPa	1000	1400
Flow rate, control path A-AB (VDi 2173)	n(gL)	3,9	3,9
Flow rate, bypass B-BA (linear)		kvs * 0.7	kvs * 0.7
Leakage rate bypass B-AB		kvs * 0.01	kvs * 0.01
Leakage rate, control path A-AB (B0.1 Din 3230)		air bubble tight	air bubble tight
Pivoting bracket	°	90	90
Angle of rotation, working area	°	15...90	15...90
Length	mm	84,5	131,5
Weight	kg	1,65	4,8
Rated voltage	V	230	230
Frequency	Hz	50/60	50/60
Power consumption in use	W	1,5	2,5
Power consumption, idle	W	0,4	0,4
Power cable		X	X
Power cable length approx.	mm	1000	1000
Operating mode		parallel	parallel
Torque	Nm	min. 5	min. 20
Runtime		90s / 90°	90s / 90°
Sound power level	dB(A)	35	45
Protection class		II, double insulated	II, double insulated
IP rating		IP54	IP54
Ambient temperature	°C	0 - 50	0 - 50
Permissible relative humidity (non-condensing)	%	95	95

HUV 65

Three-way heating diverter valve with servomotor for installation in heating systems.

		HUV 65	HUV 80
		227425	227426
Permissible medium		H_2O	H_2O
Permissible medium 2		H2O glycol S	H2O glycol S
Maximum mixing ratio	%	50	50
Permissible additive medium		Glycol	Glycol
Flow capacity	m³/h	58	90
Max. operating temperature	°C	100	100
Max. permissible pressure	MPa	60	60
Differential pressure Δp_{max}	kPa	140	80
Closing pressure Δp_s	kPa	140	80
Flow rate, control path A-AB (VDi 2173)	n(gL)	3	3
Leakage rate bypass B-AB		kvs * 0.01	kvs * 0.01
Length	mm	290	310
Weight	kg	16,3	22,5
Rated voltage	V	230	230
Frequency	Hz	50/60	50/60
Power consumption in use	W	2	2
Power consumption, idle	W	1	1
Power consumption, sizing	VA	4,5	4,5
Power cable		X	X
Power cable length approx.	mm	1000	1000
Connecting cable, cable cross-section	mm^2	3 x 0.75	3 x 0.75
Operating mode		parallel	parallel
Runtime		7.5 s/ mm (18mm)	7.5 s/ mm (18mm)
Sound power level	dB(A)	45	35
Protection class		II, double insulated	II, double insulated
IP rating		IP54	IP54
Ambient temperature	°C	0 - 50	0 - 50
Permissible relative humidity (non-condensing)	%	95	95

HMV

HMV 1

3-way heating mixing valve for automatic flow temperature control through admixing return water.

		HMV 3/4	HMV 1
		229644	229645
Differential pressure Δp_{max}	kPa	70	70
Flow capacity	m³/h	4,0	8,0

Servomotor

Heating servomotor for adjusting the heating mixing valves HMV.

		Servomotor
		229646
Rated voltage	V	230
Phases		1/N/PE
Frequency	Hz	50
IP rating		IP20
Height	mm	87
Width	mm	112
Depth	mm	54

STB-FB

STB-FB

Bi-metal contact thermostat with casing for limiting the maximum permissible flow temperature.

		STB-FB
		233711
Temperature setting range	°C	20-90
IP rating		IP30
Switching hysteresis	K	8±3

RE1 B-A temperature controller

Electronic safety temperature controller with remote sensor and adjustment options for the maximum permissible flow temperature.

		RE1 B-A temperature controller
		003554
Ambient temperature	°C	-10...50
Storage and transport temperature	°C	-40...70
Temperature for (wet/dry) bulb pressure test	°C	75+-2
Voltage for the purpose of EMC emission tests	V	230
Current for the purpose of EMC emission tests	A	10
Design peak voltage	KV	4
Power connection		1/N/PE~230 V
Level of contamination		2
Switching hysteresis	K	1

Water softener
HZEA

HZEA

Softening fitting for heating fill and top-up water. The fitting is installed in the cold water line directly downstream of the system separator.

		HZEA
		230013
Max. permissible pressure	MPa	0,8
Max. operating temperature	°C	40
Max. flow rate	m^3/h	0,3
Height	mm	600
Width	mm	260
Depth	mm	130
Weight	kg	3
Connection		Rp 1/2

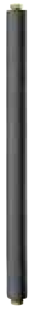
HZEN

Spare cartridge for the heating descaler HZEA.

		HZEN
		230031
Max. operating pressure	MPa	0,8
Max. operating temperature	°C	40
Capacity	l x °dH	6000
Weight	kg	1,2

Pressure hoses for flow and return lines SD..G
Pressure hose

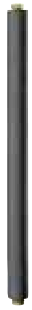
SD 25-1 G



Pressure hoses for flow and return lines (with 19 mm thermal insulation), operating pressure 0.3 MPa with threaded fittings. With straight ends.

		SD 25-1 G	SD 32-1 G
		232976	232977
Length	m	1	1
Connections for the heating and source side		G 1 1/4	G 1 1/4
For pressure hose size DN		25	32
Operating pressure	bar	2,5	2,5
Thermal insulation thickness	mm	19	19
External diameter with insulation	mm	80	86

SD 25-2 GE

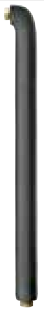


Pressure hoses for flow and return lines (with 30 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings. With straight ends.

		SD 25-2 GE	SD 25-2.5 GE	SD 25-5 GE	SD 25-10 GE	SD 32-2 GE	SD 32-5 GE	SD 32-10 GE
		233828	232971	233829	233830	233831	233832	233833
Length	m	2	2,5	5	10	2	5	10
Connections for the heating and source side		G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4	G 1 1/4
For pressure hose size DN		25	25	25	25	32	32	32
Operating pressure	bar	2,5	2,5		2,5	2,5	2,5	2,5
Thermal insulation thickness	mm	30	30	30	30	30	30	30
External diameter with insulation	mm	99	99	99	99	106	106	106

Pressure hose with bend

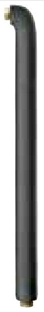
SD 25-1



Pressure hoses for flow and return lines (with 19 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings. With one right angle and one straight end piece.

		SD 25-1	SD 32-1
		074415	074414
Length	m	1	1
Connections for the heating and source side		G 1 1/4	G 1 1/4
For pressure hose size DN		25	32
Operating pressure	bar	2,5	2,5
Thermal insulation thickness	mm	19	19
External diameter with insulation	mm	80	86

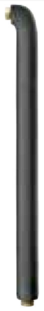
SD 25-1 E



Pressure hoses for flow and return lines (with 30 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings. With one right angle and one straight end piece.

		SD 25-1 E	SD 32-1 E
		232965	232968
Length	m	1	1
Connections for the heating and source side		G 1 1/4	G 1 1/4
For pressure hose size DN		25	32
Operating pressure	bar	2,5	2,5
Thermal insulation thickness	mm	30	30
External diameter with insulation	mm	99	106

SD 50-1 E



Pressure hoses for flow and return lines (with 50 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings. With one right angle and one straight end piece.

		SD 50-1 E
		232972
Length	m	1
Connections for the heating and source side		G 2
For pressure hose size DN		50
Operating pressure	bar	2,5
Thermal insulation thickness	mm	50
External diameter with insulation	mm	134

SD 25-1 KE

SD 25-1 KE

Pressure hoses (can be trimmed) for flow and return lines (with 30 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings.

		SD 25-1 KE
		232974
Length	m	1
Connections for the heating and source side		G 1 1/4
For pressure hose size DN		25
Operating pressure	bar	2,5
Thermal insulation thickness	mm	30
External diameter with insulation	mm	99

SD 32-1 KE

Pressure hoses (can be trimmed) for flow and return lines (with 30 mm thermal insulation), operating pressure 0.25 MPa with threaded fittings.

		SD 32-1 KE
		232975
Length	m	1
Connections for the heating and source side		G 1 1/4
For pressure hose size DN		32
Operating pressure	bar	2,5
Thermal insulation thickness	mm	30
External diameter with insulation	mm	106

Hose fitting DN 25

Hose fittings for trimming the pressure hoses with threaded fittings.

	Hose fitting DN 25
	003713
Connections for the heating and source side	G 1 1/4 A
For pressure hose size DN	25

Welded fitting DN 32

Hose fittings for trimming the pressure hoses with threaded fittings.

	Welded fitting DN 32
	070692
Connections for the heating and source side	G 1 1/4 A
For pressure hose size DN	32

Fan convector for heating
AUK

Fan convector to replace one or more radiators, to reduce the flow temperature. Straightforward installation is possible through adaptation to common radiator connections with a standard connection size of 500 mm between flow and return, as well as the option of connecting to the right or left. The appliance is mounted on the wall, is suitable for heating and has an integral filter. The 4-stage fan ensures quiet operation. The integral control unit allows easy operation at the appliance.

Function

Indoor air is drawn in by a cross-flow fan via the front grille and is routed across an air | water heat exchanger. During this process, the indoor air is heated. The heated air is discharged via the top grille. The air/water heat exchanger is hydraulically connected with the heating system and is supplied with heating water by a heat source.

Further accessories

At a glance

- » To replace one or more radiators
- » Variable connection (right, left or from below)
- » Discreet design
- » Low installation depth
- » Quiet operation
- » Free of refrigerant
- » Very easy installation and operation

Awards

Specification

		AUK 7	AUK 14	AUK 21	AUK 28	AUK 35
		227955	227956	227957	227958	227959
Heating output to EN 14511						
Heating output, low	kW	0,45	0,85	1,2	1,6	2
Heating output, medium	kW	0,65	1,4	1,75	2,1	2,35
Heating output, high	kW	0,65	1,65	2	2,3	2,9
Heating output, max.	kW	0,8	1,85	2,1	2,8	3,5
Sound data						
Sound pressure level low at a distance of 1 m	dB(A)	36	34	34	34	34
Sound pressure level medium at a distance of 1 m	dB(A)	45	40	37	38	37
Sound pressure level high at a distance of 1 m	dB(A)	45	51	48	48	45
Sound pressure level max. at a distance of 1 m	dB(A)	50	55	52	51	50
Application limits						
Max. permissible pressure	MPa	0,6	0,6	0,6	0,6	0,6
Hydraulic data						
Flow capacity	m³/h	1	1	1,6	2,5	2,5
Electrical data						
Rated voltage	V	230	230	230	230	230
Phases		1/N/PE	1/N/PE	1/N/PE	1/N/PE	1/N/PE
Frequency	Hz	50	50	50	50	50
Power consumption	W	32	48	48	50	50
MCB/fuse rating	A	10	10	10	10	10
Versions						
IP rating		IP20	IP20	IP20	IP20	IP20
Dimensions						
Water capacity	l	0,45	0,8	1,44	2,59	4,66
Height	mm	600	600	600	600	600
Width	mm	690	890	1090	1290	1490
Depth	mm	142	142	142	142	142
Weights						
Weight	kg	21	27	34	42	51
Connection						
Heating connection		G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
Values						
Air volume, low	m³/h	70	150	190	190	220
Air volume, medium	m³/h	100	180	230	260	300
Air volume, high	m³/h	100	220	300	350	400
Air volume, max.	m³/h	120	240	320	380	440
Operating range, min./max.	°C	25-55	25-55	25-55	25-55	25-55
Pressure drop, heating	kPa	3,5	18,28	6,65	14,01	25,17

Output data

AUK 7

tv / tr °C	tL1 °C	S1 70 m³/h Q [W]	S1 70 m³/h tL2[°C]	S2 100 m³/h Q [W]	S2 100 m³/h tL2[°C]	S3 100 m³/h Q [W]	S3 100 m³/h tL2[°C]	S4 120 m³/h Q [W]	S4 120 m³/h tL2[°C]
55/50	15	888	52,9	1340	53,3	1340	53,3	1558	52,1
	20	770	52,8	1161	53,2	1161	53,2	1350	52,1
	24	675	52,8	1018	53,1	1018	53,1	1184	52,2
45/40	15	662	43,2	999	43,5	999	43,5	1161	42,6
	20	542	43,1	817	43,3	817	43,3	950	42,6
	24	445	43,0	672	43,2	672	43,2	781	42,6
35/30	15	447	34,1	674	34,3	674	34,3	784	33,7
	20	319	33,6	482	33,8	482	33,8	560	33,3
	22	268	33,4	405	33,6	405	33,6	470	33,2

AUK 14

tv / tr °C	tL1 °C	S1 150 m³/h Q [W]	S1 150 m³/h tL2[°C]	S2 180 m³/h Q [W]	S2 180 m³/h tL2[°C]	S3 220 m³/h Q [W]	S3 220 m³/h tL2[°C]	S4 240 m³/h Q [W]	S4 240 m³/h tL2[°C]
55/50	15	2009	53,3	2322	51,9	2887	52,5	3138	52,4
	20	1741	53,2	2013	51,9	2502	52,5	2720	52,4
	24	1527	53,1	1765	52,0	2194	52,5	2385	52,4
45/40	15	1502	43,6	1737	42,6	2159	43,0	2347	42,9
	20	1229	43,4	1421	42,6	1766	42,9	1920	42,9
	24	1010	43,2	1168	42,5	1452	42,9	1579	42,8
35/30	15	1012	34,3	1171	33,6	1455	33,9	1582	33,8
	20	723	33,8	836	33,3	1455	35,8	1130	33,5
	24	492	33,4	569	33,0	1455	35,8	768	33,1

AUK 21

tv / tr °C	tL1 °C	S1 190 m³/h Q [W]	S1 190 m³/h tL2[°C]	S2 230 m³/h Q [W]	S2 230 m³/h tL2[°C]	S3 300 m³/h Q [W]	S3 300 m³/h tL2[°C]	S4 320 m³/h Q [W]	S4 320 m³/h tL2[°C]
55/50	15	2492	52,5	3074	53,2	3822	51,4	4154	52,1
	20	2160	52,5	2664	53,1	3312	51,5	3600	52,1
	24	1894	52,5	2336	53,0	2904	51,7	3157	52,2
45/40	15	1863	43,0	2297	43,5	2856	42,2	3104	42,7
	20	1524	42,9	1880	43,3	2337	42,3	2540	42,7
	24	1253	42,8	1545	43,2	1921	42,3	2088	42,6
35/30	15	1260	33,9	1554	34,3	1932	33,4	2100	33,8
	20	900	33,5	1110	33,8	1932	36,2	1500	33,4
	24	612	33,2	755	33,4	1932	36,2	1020	33,1

AUK 28

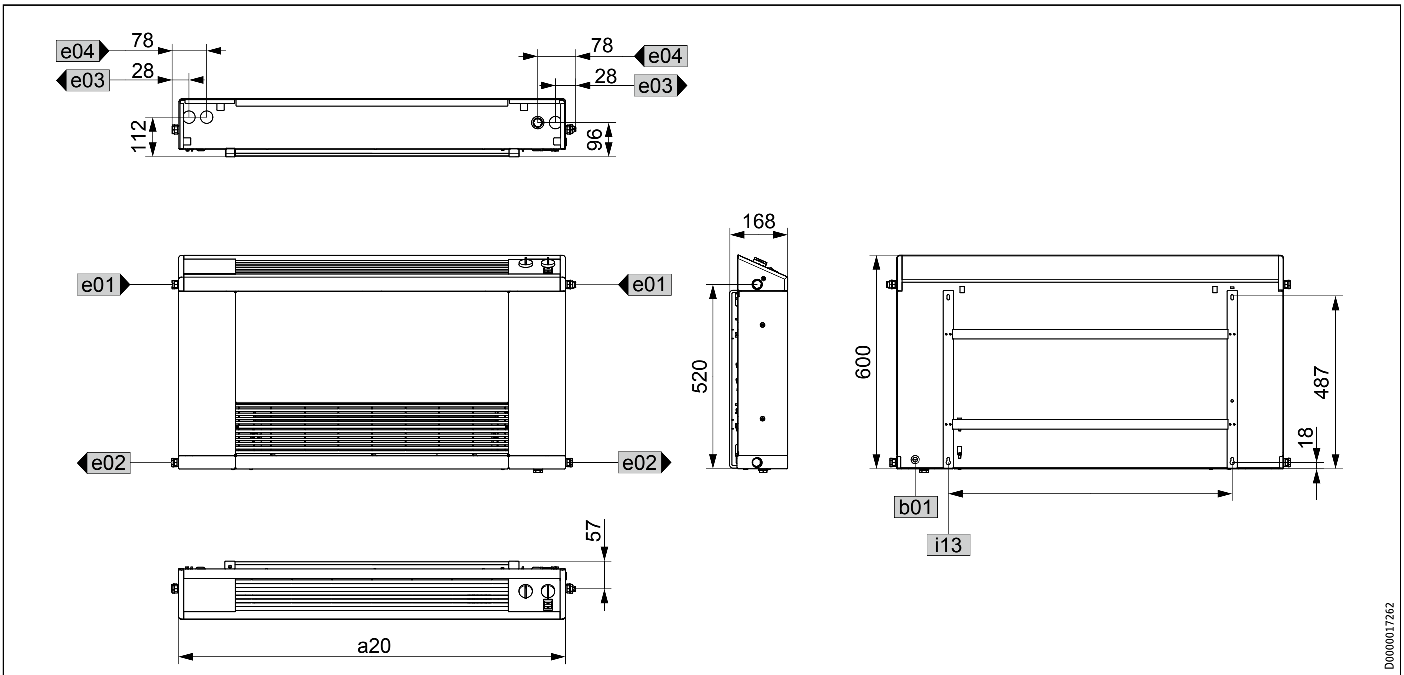
tv / tr °C	tL1 °C	S1 190 m³/h Q [W]	S1 190 m³/h tL2[°C]	S2 260 m³/h Q [W]	S2 260 m³/h tL2[°C]	S3 350 m³/h Q [W]	S3 350 m³/h tL2[°C]	S4 380 m³/h Q [W]	S4 380 m³/h tL2[°C]
55/50	15	2519	52,9	3362	51,9	4543	52,1	4938	52,1
	20	2183	52,8	2914	52,0	3938	52,1	4280	52,2
	24	1914	52,8	2555	52,1	3453	52,2	3753	52,2
45/40	15	1882	43,3	2513	42,6	3396	42,7	3691	42,8
	20	1540	43,2	2056	42,6	2778	42,7	3020	42,7
	24	1266	43,0	1691	42,6	2284	42,6	2483	42,7
35/30	15	1271	34,1	1697	33,6	2293	33,7	2492	33,7
	20	908	33,7	1212	33,3	1638	33,4	1780	33,4
	24	617	33,3	824	33,1	1114	33,1	1210	33,1

AUK 35

tv / tr °C	tL1 °C	S1 220 m³/h Q [W]	S1 220 m³/h tL2[°C]	S2 300 m³/h Q [W]	S2 300 m³/h tL2[°C]	S3 400 m³/h Q [W]	S3 400 m³/h tL2[°C]	S4 440 m³/h Q [W]	S4 440 m³/h tL2[°C]
55/50	15	2931	53,1	3912	52,3	5286	52,8	5746	52,3
	20	2540	53,0	3390	52,3	4582	52,7	4980	52,3
	24	2227	52,9	2973	52,3	4018	52,7	4367	52,4
45/40	15	2194	43,5	2929	42,9	3958	43,3	4302	42,9
	20	1795	43,3	2396	42,8	3238	43,1	3520	42,9
	24	1476	43,2	1970	42,8	2663	43,0	2894	42,8
35/30	15	1478	34,2	1973	33,8	2666	34,0	2898	33,8
	20	1056	33,7	1409	33,4	1904	33,6	2070	33,4
	24	718	33,3	958	33,1	1295	33,2	1408	33,1

S1 Fan stage 1 (low)
S2 Fan stage 2 (medium)
S3 Fan stage 3 (high)
S4 Fan stage 4 (max.)
tv Heating flow temperature [°C]
tr Heating return temperature [°C]
tL1 Air inlet temperature [°C]
tL2 Air outlet temperature [°C]
Q Heating output [W]

Siting



				AUK 7	AUK 14	AUK 21	AUK 28	AUK 35
a20	Appliance	Width	mm	690	890	1090	1290	1490
b01	Entry electrical cables							
e01	Heating flow	Male thread		G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
e02	Heating return	Male thread		G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
e03	Heating flow optional	Male thread		G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
e04	Heating return optional	Male thread		G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
i13	Wall mounting bracket	Horizontal hole spacing	mm	400	600	800	1000	1200

ACKH

At a glance

- Suitable for suspended ceilings in the Euro pattern
- For small, medium sized and large rooms
- For commercial rooms
- Free of refrigerant

Cassette air conditioning unit for cooling and heating, for integration into suspended ceilings. Indoor unit with an attractive design, 3-stage fan, automatic operating mode selection, dirt filter, integral valve assembly and condensate pump, air connection for mixing in fresh air, air connection for cooling an adjacent room, four adjustable air discharge vents, installation dimensions matched to standard ceiling pattern, hard-wired remote control.

Function

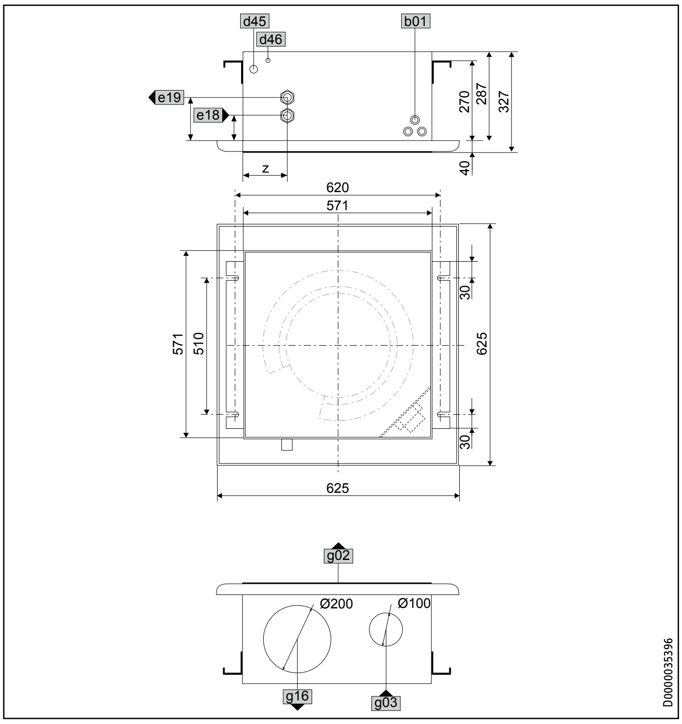
In heating mode, heat is transferred to the indoor air via the heat exchanger. The multi stage fan constantly changes the indoor air, which is cleaned in the process by the integral filter. The air changes ensure a pleasant temperature distribution in the room. In cooling mode, heat is extracted from the indoor air by the heat exchanger and is transferred to the geothermal probe via the pipework. In the process, condensate can be created at the heat exchanger, subject to certain operating conditions; this must be drained off via the condensate drain.

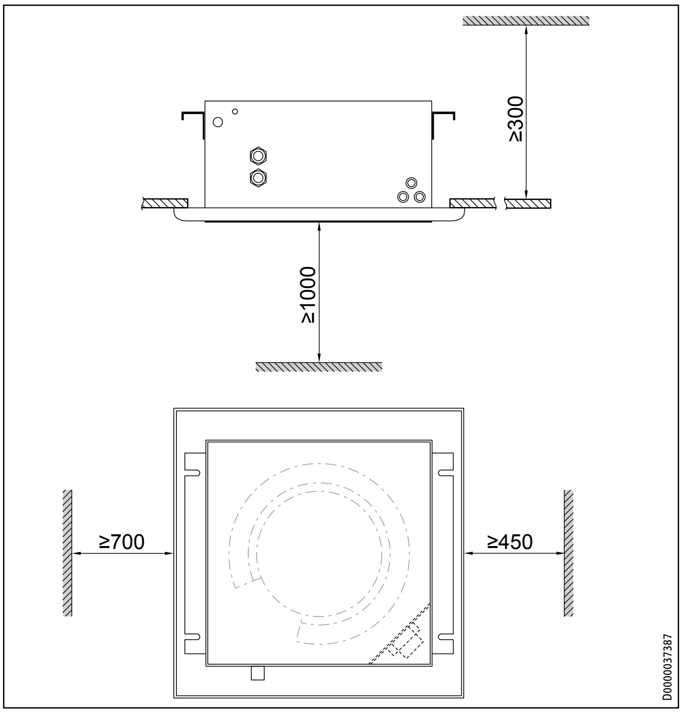
Further accessories

171853 PK 8 condensate pump

Specification

		ACKH 10	ACKH 12	ACKH 18
		223441	223442	223443
Heating output				
Heating output	kW	3,3	4,6	5,9
Heating output to EN 14511				
Cooling capacity	kW	2,2	3,5	5
Sound data				
Sound pressure level, indoor unit, 1 m distance	dB(A)	34/37/50	34/37/50	42/48/57
Electrical data				
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz
MCB/fuse rating	A	10	12	16
Hydraulic data				
Pressure drop	hPa	130	162	150
Flow capacity	m³/h	1,6	1,6	1,6
Versions				
Operating mode		Cooling/heating	Cooling/heating	Cooling/heating
Flow/return connection		G 1/2 A	G 1/2 A	G 3/4 A
Dimensions				
Water capacity	l	1,3	1,3	2
Height	mm	287	287	287
Depth	mm	571	571	571
Width	mm	571	571	571
Weights				
Weight	kg	26	26	30
Connection				
Power supply		3 x 1.5 mm²	3 x 1,5	3 x 1,5
Condensate connection	mm	15	15	15
Values				
Fan output	W	60	80	110
Air volume, indoor unit	m³/h	420/460/700	420/460/700	460/515/760
Water quantity	m³/h	0,38	0,6	0,86
Max. operating pressure	MPa	1,5	1,5	1,5





b01 Entry electrical cables
d45 Condensate drain
d46 Ventilation
e18 Flow
e19 Return
g02 Air discharge
g15 Fresh air
g16 Ancillary room cooling

Cooling mode

Type Fan stage Cooling water temperature	°C	ACKH 10 Small 15/20	 Medium 15/20	 High 15/20	ACKH 12 Small 15/20	 Medium 15/20	 High 15/20	ACKH 18 Small 15/20	 Medium 15/20	 High 15/20
Cooling capacity at 23 °C room temperature	W	413	435	550	656	691	874	868	915	1158
Cooling capacity at 25 °C room temperature	W	563	593	750	894	942	1192	1184	1247	1579
Cooling capacity at 27 °C room temperature	W	713	751	950	1133	1193	1510	1500	1580	2000
Cooling capacity at 29 °C room temperature	W	863	909	1115	1371	1444	1828	1816	1913	2421
Cooling capacity at 31 °C room temperature	W	1013	1067	1350	1609	1695	2146	2132	2245	2842

Heating mode

Type Fan stage Heating water temperature	°C	ACTH 10 Small 50/40	 Medium 50/40	 High 50/40	ACTH 12 Small 50/40	 Medium 50/40	 High 50/40	ACTH 18 Small 50/40	 Medium 50/40	 High 50/40
Heating output at 15 °C room temperature	W	2505	2689	3684	3411	3662	5016	4325	4643	6360
Heating output at 18 °C room temperature	W	2255	2420	3316	3070	3296	4514	3892	4179	5724
Heating output at 20 °C room temperature	W	2088	2241	3070	2842	3051	4180	3604	3869	5300
Heating output at 22 °C room temperature	W	1921	2062	2824	2615	2807	3846	3316	3559	4876
Heating output at 24 °C room temperature	W	1754	1883	2579	2388	2563	3511	3027	3250	4452

Fan convector for heating and cooling
ACTH

Floorstanding ACTH appliance as wall mounted module for cooling, dehumidifying and air cleaning through the integral filter; indoor unit with electric three-way mixing valve, condensate pan and quiet, three-stage fan. The electronic control unit (part of the standard delivery) enables convenient room conditioning.

At a glance
- For small, medium sized and large rooms
- For private and commercial rooms
- Discreet design
- Quiet operation
- Many control options
- Free of refrigerant

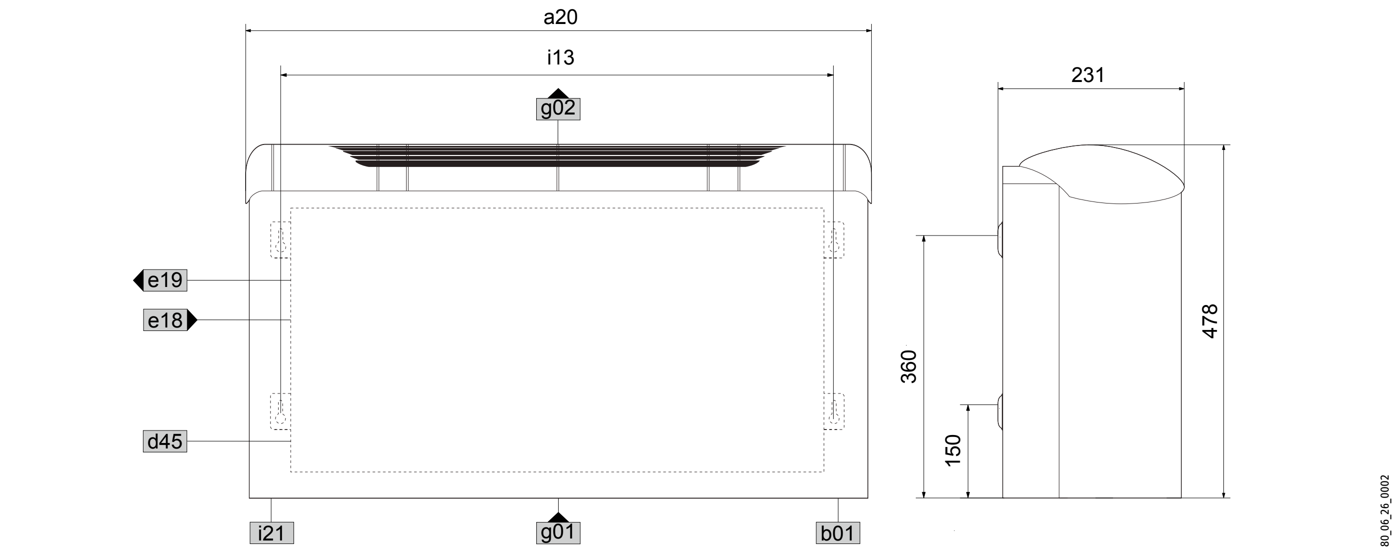
Function
In heating mode, heat is transferred to the indoor air via the heat exchanger. The multi stage fan constantly changes the indoor air, which is cleaned in the process by the integral filter. The air changes ensure a pleasant temperature distribution in the room. In cooling mode, heat is extracted from the indoor air by the heat exchanger and is transferred to the geothermal probe via the pipework. In the process, condensate can be created at the heat exchanger, subject to certain operating conditions; this must be drained off via the condensate drain. A N/C contact can be connected via terminal strip WIN, terminals 5 and 6. With the contact open, the control valve is closed and the fan is switched off.

Further accessories
171853 PK 8 condensate pump

189861 Mounting bracket ACTH

Specification

		ACTH 20	ACTH 40	ACTH 50
		189820	189821	189822
Heating output				
Heating output	kW	3,09	5,63	8,06
Heating output to EN 14511				
Cooling capacity	kW	1,95	3,45	5,17
Sound data				
Sound pressure level, indoor unit, 1 m distance	dB(A)	33/38/45	34/41/47	35/44/52
Electrical data				
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz
Power consumption, ventilation	W	50	100	125
MCB/fuse rating	A	10	10	10
Versions				
Operating mode		Cooling/heating	Cooling/heating	Cooling/heating
Flow/return connection		1/2" male	1/2" male	1/2" male
Casing		Metal	Metal	Metal
Dimensions				
Water capacity	l	0,62	1,18	1,46
Height	mm	478	478	478
Width	mm	768	1138	1323
Depth	mm	231	231	231
Weights				
Weight	kg	20	30	35
Connection				
Connecting cable	mm^2	3 x 1,5	3 x 1,5	3 x 1,5
Condensate connection	mm	16	16	16
Values				
Operating range, indoor unit, heating min./max.	°C	16/30	16/30	16/30
Operating range, cooling min./max.	°C	16/30	16/30	16/30
Pressure drop, cooling	kPa	45,1	34,9	25,9
Pressure drop, heating	kPa	59,9	32,4	20,3
Nominal flow rate, cooling, low	l/h	202	400	565
Nominal flow rate, cooling, medium	l/h	266	544	780
Nominal flow rate, cooling, high	l/h	335	591	886
Nominal flow rate, heating, low	l/h	191	389	595
Nominal flow rate, heating, medium	l/h	261	554	720
Nominal flow rate, heating, high	l/h	338	620	892



				ACTH 20	ACTH 40	ACTH 50
a20	Appliance	Width	mm	758	1128	1313
b01	Entry electrical cables					
d45	Condensate drain					
e18	Flow					
e19	Return					
g01	Air intake					
g02	Air discharge					
i13	Wall mounting bracket	Horizontal hole spacing	mm	498	868	1053
i21	Entry supply line					

Cooling mode

Type		ACTH 20			ACTH 40			ACTH 50		
Part No.		189820			189821			189822		
Fan stage		Small	Medium	High	Small	Medium	High	Small	Medium	High
Cooling water temperature	°C	15/20	15/20	15/20	15/20	15/20	15/20	15/20	15/20	15/20
Cooling capacity at 23 °C room temperature	W	285	367	532	532	588	662	680	799	969
Cooling capacity at 25 °C room temperature	W	373	510	577	764	865	1036	940	1168	1505
Cooling capacity at 27 °C room temperature	W	459	647	747	974	1137	1402	1180	1495	2037
Cooling capacity at 29 °C room temperature	W	609	828	968	1291	1370	1747	1583	1947	2551
Cooling capacity at 31 °C room temperature	W	833	1121	1289	1786	2054	2464	2186	2712	3564

Heating mode

Type		ACTH 20			ACTH 40			ACTH 50		
Part No.		189820			189821			189822		
Fan stage		Small	Medium	High	Small	Medium	High	Small	Medium	High
Heating water temperature	°C	50/40	50/40	50/40	50/40	50/40	50/40	50/40	50/40	50/40
Heating output at 15 °C room temperature	W	1600	2185	2780	3255	4570	5065	4955	6270	7250
Heating output at 18 °C room temperature	W	1475	2015	2565	3000	4215	4675	4570	5780	6685
Heating output at 20 °C room temperature	W	1405	1915	2440	2855	4015	4450	4350	5500	6365
Heating output at 22 °C room temperature	W	1315	1795	2285	2675	3760	4165	4075	5155	5960
Heating output at 24 °C room temperature	W	1230	1675	2130	2495	3505	3885	3800	4805	5560

Mounting panel

Mounting bracket ACTH

For positioning (100 mm) of standalone indoor units in case of non-load-bearing walls.

Type	Description	Part no.
Mounting bracket ACTH	Bracket for non-load-bearing walls	189861

Product overview

Product overview

Appliance types and applications

		WWK 220 electronic	WWK 300 electronic	WWK 300 electronic SOL	WWK 221 electronic	WWK 301 electronic	WWK 301 electronic SOL	WWS 20
Suitable for the following building projects:								
Detached house, depending on the expected individual HW requirement		x	x	x	x	x	x	x
Two-family house, depending on the expected individual DHW requirement			x	x		x	x	x
Suitable for low installation rooms, e.g. cellars in older buildings		x			x			x
Suitable for the operating mode:								
Recirculation air mode in an installation room		x	x	x	x	x	x	x
Air duct mode / outdoor air mode, appliance installed indoors					x	x	x	x
Version:								
Compact appliance. Heat pump unit, including DHW cylinder		x	x	x	x	x	x	
Hydraulic split system. Heat pump unit for combination with suitable external DHW cylinders								x
Possible combinations:								
Can be combined with PV system or controlled via external 230 V signal transmitter		x	x	x	x	x	x	x
Can be combined with PV system via Sunny Home Manger (SMA) energy management system		x	x	x	x	x	x	
Can be combined with solar thermal system or existing heating system				x			x	
Can be combined with solar thermal system or existing heating system with external DHW cylinder								x
Air duct can be connected					x	x	x	x
Integrated connection for DHW circulation line		x	x	x	x	x	x	
DHW circulation line with external DHW cylinder possible								x
Function and equipment:								
Integral electric emergency/booster heater		x	x	x	x	x	x	
Maintenance free impressed current anode		x	x	x	x	x	x	
Power cable with standard plug		x	x	x	x	x	x	x
Electronic control unit with LCD		x	x	x	x	x	x	x
Time switch for defining compressor enable/blocking times								x
Horizontal transport possible for a short time		x	x	x	x	x	x	
Specification								
Nominal volume, integral DHW cylinder	l	220	300	291	200	291	291	
Maximum DHW temperature in heat pump mode	°C	65	65	65	65	65	65	60
Maximum amount of mixed water 40 °C once, at 10 °C KW inlet temperature	°C	370	515	505	370	515	505	
Min./max. application limit, heat source temperature	°C	+6/42	+6/42	+6/42	-8/35	-8/35	-8/35	-5/35

WWK 220/300 electronic SOL

At a glance

- Fully wired compact series for recirculation air mode
- Up to 65 °C in heat pump only mode for hygienic DHW heating and very large amounts of mixed water
- Up to 87 % above the minimum requirement for categorisation in the current highest possible energy efficiency class A for DHW cylinders
- Intelligent interface allows increased use of photovoltaic power generated on site
- Thanks to an integrated smooth-tube indirect coil, the SOL version can be combined with a solar thermal system, oil, gas or solid fuel boiler
- Highly reliable and cost saving due to the impressed current anode integrated as standard
- Electronic controller with LCD indicating the currently available mixed water volume
- Compressor sound-insulated from the air stream for quiet operation
- Spring loaded roll bond heat exchanger for maximum safety and enduring high efficiency over the entire service life of the appliance

Safety and quality

Awards

APPLICATION: Compact DHW heat pump for efficient DHW supply to several draw-off points. For recirculation air mode. Quick and easy installation to use existing waste heat, e.g. from freezers, tumble dryers, heaters or other sources of waste heat in the installation room. **EQUIPMENT AND CONVENIENCE:** Very high level of DHW convenience. Both cylinder sizes easily achieve the highly demanding XL draw-off profile. Up to 65 °C in heat pump only mode for hygienic DHW heating and very large amounts of mixed water. High operating convenience. Electronic controller with LCD indicating the currently available mixed water volume. Electric emergency/booster heater as standard. Compressor sound-insulated from the air stream for quiet operation. Highly compact 220 l version, ideal for installation rooms with a low ceiling height. Highly reliable and cost-saving due to the integral impressed current anode. **COMBINATION OPTIONS:** Intelligent interface for communication with suitable photovoltaic systems as standard (for targeted increase of on-site consumption). SOL version with integrated smooth-tube indirect coil can also be combined with a solar thermal system or an oil, gas or solid fuel boiler (incl. 2 sensor wells giving a choice of heat generator integration). **EFFICIENCY:** Outstanding efficiency. This series exceeds the minimum requirements for categorisation in the highest possible energy efficiency class A by up to 87 %. **SPECIAL FEATURES:** Reliable, high grade equipment. Spring loaded roll bond heat exchanger for maximum safety and enduring high efficiency over the entire service life of the appliance.

Function

Inside the evaporator that extracts heat from the ambient air, the refrigerant changes from its liquid into its gaseous state. A compressor draws the process medium in and compresses it. This increase in pressure raises the refrigerant temperature. That requires electrical energy. The compressed refrigerant enters the condenser downstream. There, the refrigerant transfers heat to the DHW cylinder. An expansion valve then reduces the still prevalent pressure and the cyclical process starts again.

Specification

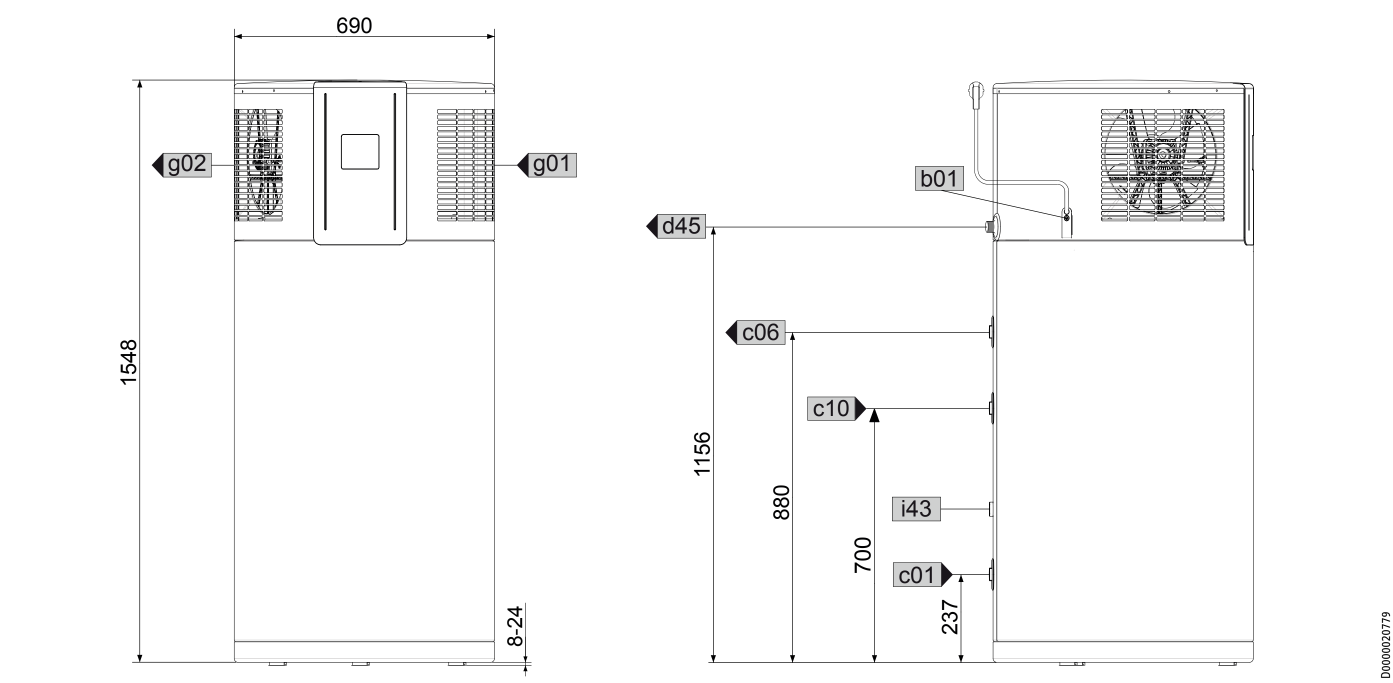
		WWK 220 electronic	WWK 300 electronic	WWK 300 electronic SOL
		231208	231210	233583
Hydraulic data				
Nominal capacity	l	220	302	291
Surface area, indirect coil	m²			1,3
Application limits				
Max. DHW temperature with heat pump only	°C	65	65	65
Maximum DHW temperature with emergency/booster heater	°C	65	65	65
Permissible maximum DHW temperature inside the cylinder	°C			70
Min./max. application limits, heat source	°C	+6/+42	+6/+42	+6/+42
Min. installation room floor area	m²	6	6	6
Min. installation room volume	m³	13	13	13
Maximum permissible operating pressure, cold water/DHW	MPa	0,8	0,8	0,8
Min./max. conductivity, drinking water	μS/cm	100-1500	100-1500	100-1500
Output data to EN 16147				
Nominal DHW temperature (EN 16147)	°C	55 l 65	55	55
Nominal load profile (EN 16147)		L l XL	XL	XL
Reference DHW temperature (EN 16147/A20)	°C	52.6 | N/A	54,4	54,4
Reference DHW temperature (EN 16147 / A15)	°C	52.7 | 63.1	54,1	52,5
Reference DHW temperature (EN 16147 / A7)	°C	53.6 l 63.2	54,2	52,6
Maximum available nominal DHW volume at 40 °C (EN 16147/A20)	l	278 | N/A	395	370
Maximum available nominal amount of DHW at 40 °C (EN 16147 / A15)	l	277 | 365	412	387
Maximum available nominal DHW volume at 40 °C (EN 16147/A7)	l	259 l 365	410	381
Heat-up time (EN 16147/A20)	h	6.07 | N/A	9,05	9,05
Heat-up time (EN 16147 / A15)	h	6.65 | 8.70	8,83	9,36
Heat-up time (EN 16147 / A7)	h	8.52 l 11.97	12,52	12,27
Power consumption, standby period (EN 16147/A20)	kW	0.022 | N/A	0,024	0,024
Power consumption, standby period (EN 16147 / A15)	kW	0.027 | 0.051	0,028	0,032
Power consumption, standby period (EN 16147 / A7)	kW	0.038 l 0.062	0,040	0,044
COP (EN 16147/A20)		3.55 l N/A	3,51	3,51
COP (EN 16147 / A15)		3.21 l 2.95	3,26	3,30
COP (EN 16147 / A7)		2.75 l 2.22	2,79	2,75
Heating output				
Average heating output (EN 16147/A20)	kW	1.75 | N/A	1,75	1,75
Average heating output (EN 16147 / A15)	kW	1.65 l 1.62	1,65	1,65
Average heating output (EN 16147 / A7)	kW	1,23 l 1,17	1,23	1,23
Power consumption				
Average heat pump power consumption (EN 16147 / A20)	kW	0.45 | N/A	0,45	0,45
Average heat pump power consumption (EN 16147 / A15)	kW	0.44 l 0.55	0,44	0,44
Average heat pump power consumption (EN 16147 / A7)	kW	0.42 l 0.53	0,43	0,43
Max. heat pump power consumption (excl. start-up)	kW	0,65	0,65	0,65
Power consumption, emergency/booster heater	kW	1,50	1,50	1,50
Max. power consumption heat pump + emergency/booster heater	kW	2,15	2,15	2,15
Energy data				
DHW heating energy efficiency class (load profile), indoor air		A (L)	A (XL)	A (XL)
Coefficient of performance				
COP at A15/W15-55 (EN 255)		3,42	3,82	3,82
COP at A15/W15-45 (EN 255)		3,78	4,22	4,22
Electrical data				
Power supply		1/N/PE 220-240 V 50/60 Hz	1/N/PE 220-240 V 50/60 Hz	1/N/PE 220-240 V 50/60 Hz
Permissible voltage range, external signal transducer		~ 220-240 V 50/60 Hz	~ 220-240 V 50/60 Hz	~ 220-240 V 50/60 Hz
Max. operating current	A	8,54	8,54	8,54
Max. starting current	A	23,44	23,44	23,44
MCB/fuse rating	A	C16	C16	C16

WWK electronic

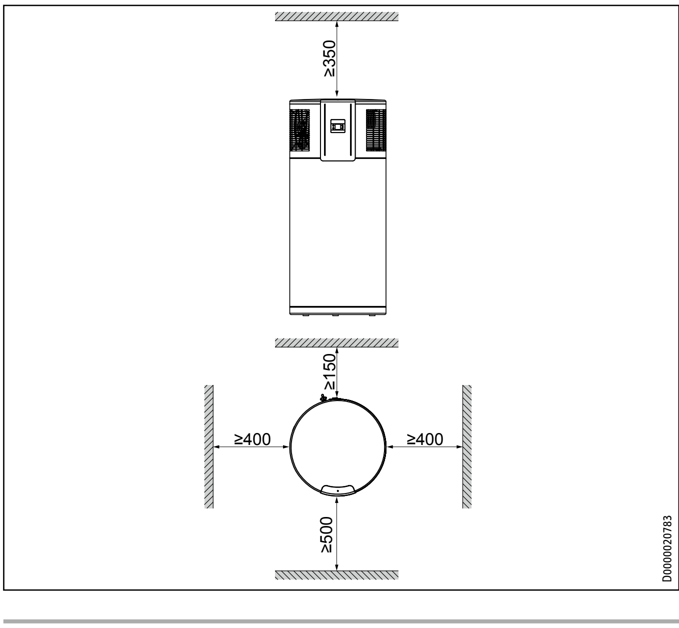
		WWK 220 electronic	WWK 300 electronic	WWK 300 electronic SOL
Sound data				
Sound power level (EN 12102)	dB(A)	60	60	60
Average sound pressure level at 1 m distance, free field	dB(A)	45	45	45
Versions				
IP rating		IP24	IP24	IP24
Refrigerant		R134a	R134a	R134a
Refrigerant charge	kg	0,85	0,85	0,85
Greenhouse potential of refrigerant (GWP)	kg CO2 equiv.	1430	1430	1430
CO2 equivalent	t	1216	1216	1216
Power cable length approx.	mm	2000	2000	2000
Dimensions				
Height	mm	1545	1913	1913
Diameter	mm	690	690	690
Height when tilted	mm	1692	2034	2034
Height when tilted incl. packaging	mm	1895	2230	2230
Packing unit dimensions height/width/depth	mm	1740/740/740	2100/740/740	2100/740/740
Weights				
Weight, empty	kg	120	135	156
Connection				
Condensate connection		G 3/4 A	G 3/4 A	G 3/4 A
DHW circulation connection		G 1/2 A	G 1/2 A	G 1/2 A
Water connection		G 1 A	G 1 A	G 1 A
Indirect coil connection				G 1
Values				
Type of anode		Impressed current anode	Impressed current anode	Impressed current anode
Air flow rate	m^3/h	550	550	550

EN 16147 rated details determined for recirculation air operating mode

Siting

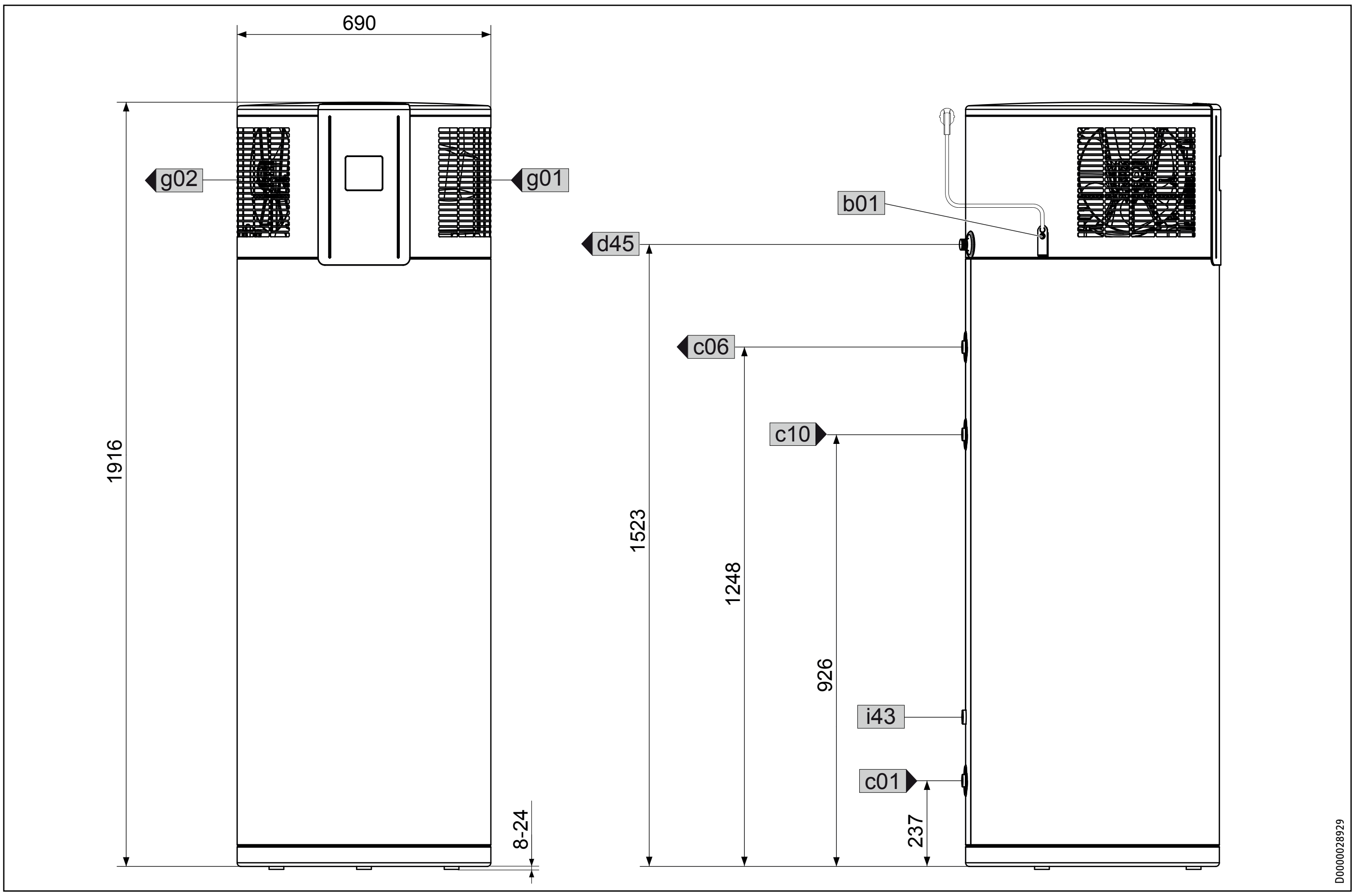


			WWK 220 electronic
b01	Entry electrical cables		
c01	Cold water inlet	Male thread	G 1 A
c06	DHW outlet	Male thread	G 1 A
c10	DHW circulation	Male thread	G 1/2 A
d45	Condensate drain	Male thread	G 3/4 A
g01	Air intake		
g02	Air discharge		
i43	Cover for manufacturing aperture		

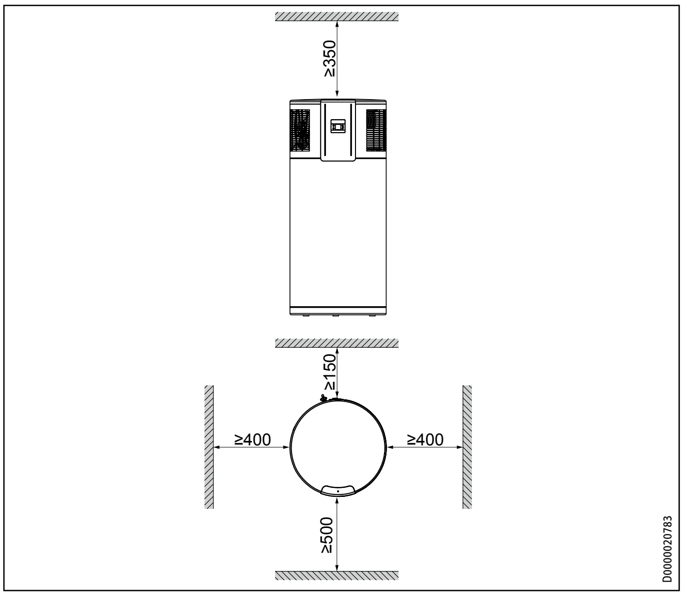


WWK 300 electronic

Siting

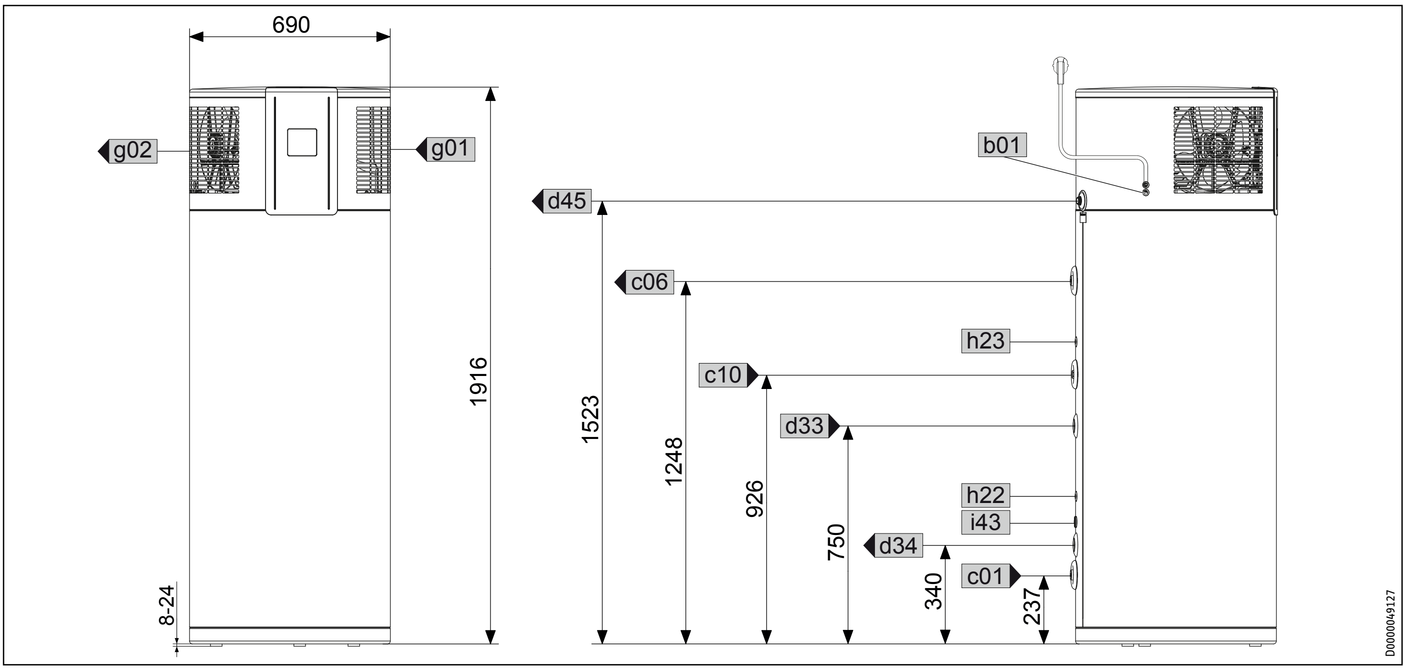


		WWK 300 electronic
b01 Entry electrical cables		
c01 Cold water inlet	Male thread	G 1 A
c06 DHW outlet	Male thread	G 1 A
c10 DHW circulation	Male thread	G 1/2 A
d45 Condensate drain	Male thread	G 3/4 A
g01 Air intake		
g02 Air discharge		
i43 Cover for manufacturing aperture		

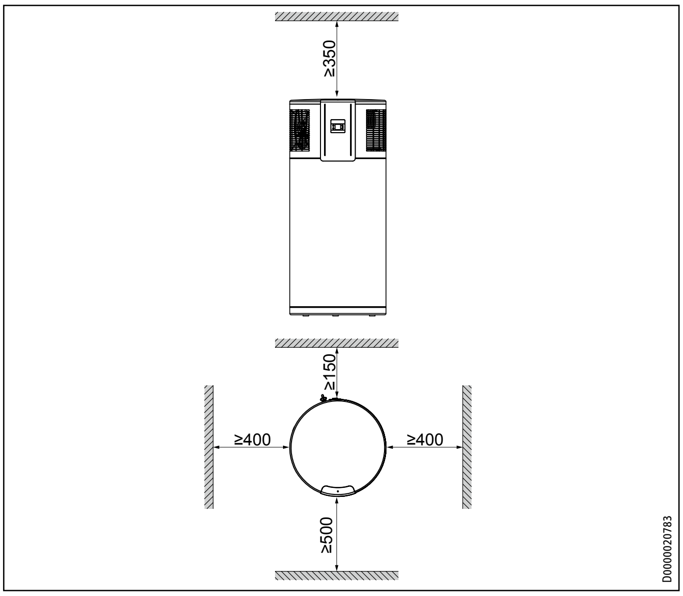


WWK 300 electronic SOL

Siting



				WWK 300 electronic SOL
b01	Entry electrical cables			
c01	Cold water inlet	Male thread		G 1 A
c06	DHW outlet	Male thread		G 1 A
c10	DHW circulation	Male thread		G 1/2 A
d33	Heat source flow	Female thread		G 1
d34	Heat source return	Female thread		G 1
d45	Condensate drain	Male thread		G 3/4 A
g01	Air intake			
g02	Air discharge			
h22	Sensor heat source	Diameter	mm	9,6
h23	Sensor heat source optional	Diameter	mm	9,6
i43	Cover for manufacturing aperture			



Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost

» Load-bearing floor

» Level, even and firm base

» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.

» When siting the appliance in a room together with other heating equipment, ensure that the operation of the other heating appliances will not be impaired.

» The type and size of the installation room must correspond to the appliance application limits.

» To keep the pipe lengths as short as possible, we recommend installing the appliance close to the kitchen or bathroom.

» To prevent adverse effects from operating noise, never install the appliance close to bedrooms.

Non-permissible installation sites

» Places where the ambient air contains chemically aggressive, salty or oily substances, e.g. ambient air containing ammonia or chlorine and thermal water environments.

» Environments that are heavily dust-laden

Sound emissions

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

DHW installation

[In Germany] observe DIN 1988 and the regulations specified by your local water supply utility.

Note on sizing, DHW output

The rated output refers to a defined design point. The heating output is less at the lower application limit and the heat-up time is correspondingly longer.

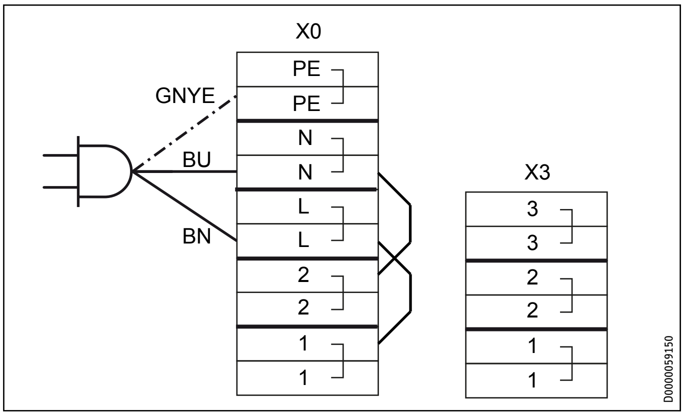
Power connection

The appliances are supplied with a power cable with a standard plug.

Protective anode

The appliances are equipped with an impressed current anode. When the cylinder is full, the control unit must not be isolated from its power supply.

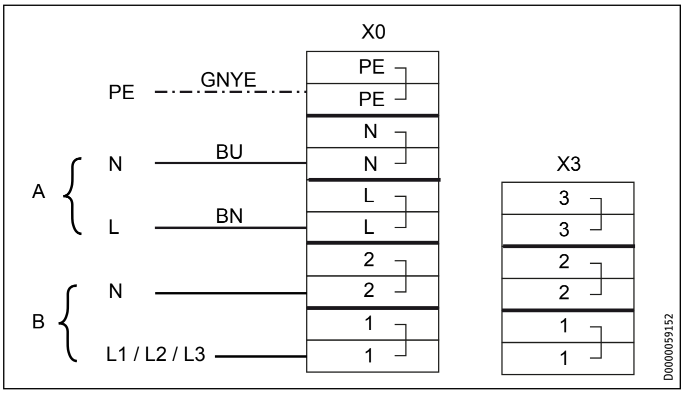
Standard connection without external signal transmitter



BN Brown
BU Blue
GNYE green-yellow

Connection options: Operation with external switching device that interrupts appliance power supply

The impressed current anode must be supplied with power permanently. This also applies when the appliance is operated with external switching equipment that interrupts the power supply. The power supply of the load circuit must be separate to that of the control unit.

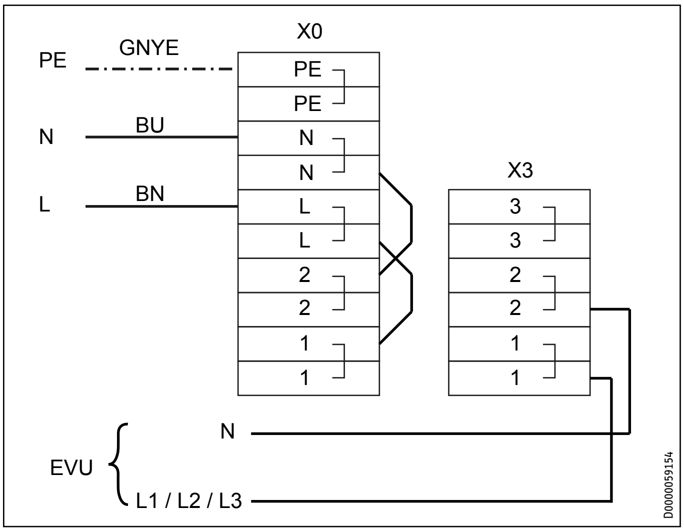


A Power supply for load circuit provided by the external switching device
B Power supply of the control unit
BN Brown
BU Blue
GNYE green-yellow

Connection options: Operation with external signal transmitter

An external signal transmitter for switching a separate second set DHW temperature can be connected.

Example 1: Power-OFF signal with its own phase



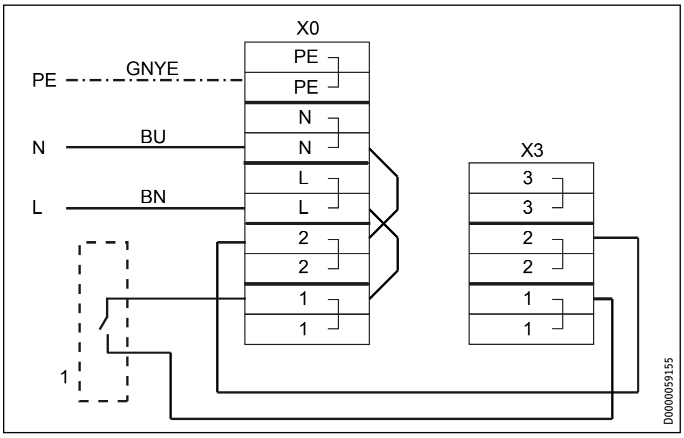
EVU Power supply utility
BN Brown
BU Blue
GNYE green-yellow

Example 2: Photovoltaic signal via on-site relay and phase routed outside the appliance

Inverter relay requirements:

» Potential-free relay (240 V AC / 24 V DC, 1 A) with N/O contact
» In accordance with the safety regulations and standards for safety extra low voltage
» Programmable switching contact. The contact must open or close if certain limits are exceeded or not reached, e.g. switching output of the inverter.

If necessary, check with the inverter manufacturer whether the product meets the stated criteria.



1 Inverter (floating contact)
BN Brown
BU Blue
GNYE green-yellow

The inverter's power feed is normally in the main fuse box.

External heat generator

WWK 300 electronic SOL

The devices have an integrated smooth tube indirect coil to which an external heat generator, e.g. a solar thermal system or a gas/oil boiler, can be connected.

The switching signal for DHW heating via the external heat generator is captured by the sensor of the control unit of the second heat source. The sensor is installed inside the immersion pipe of the heat pump cylinder.

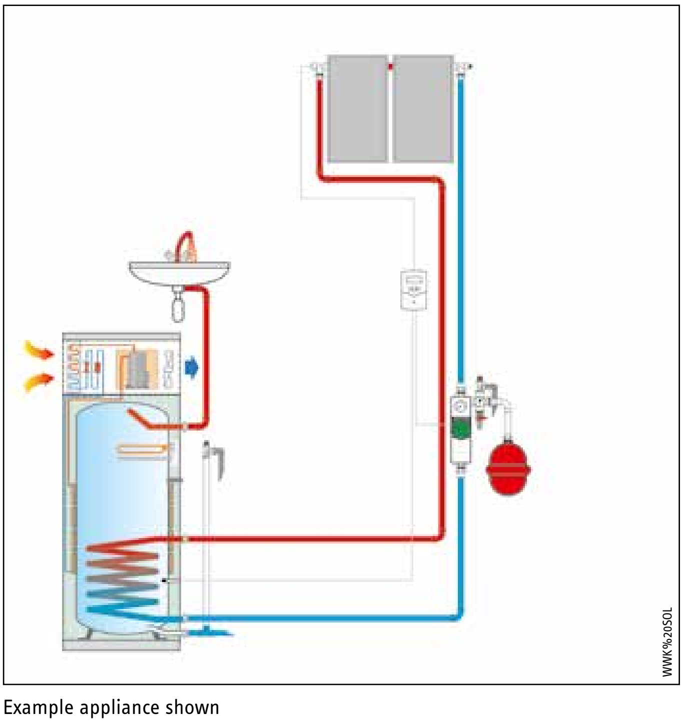
To enable different, alternative connections for the external second heat generator, the cylinder is factory-fitted with a top and a bottom sensor well which can be selected as alternatives.

The integral heat exchanger with flow and return lines, circulation pump and check valve must be connected to the additional heat source. The external heat source control unit must ensure that the maximum cylinder temperature stated in the specification is not exceeded.

Dual mode operation with a second heat source and DHW priority control

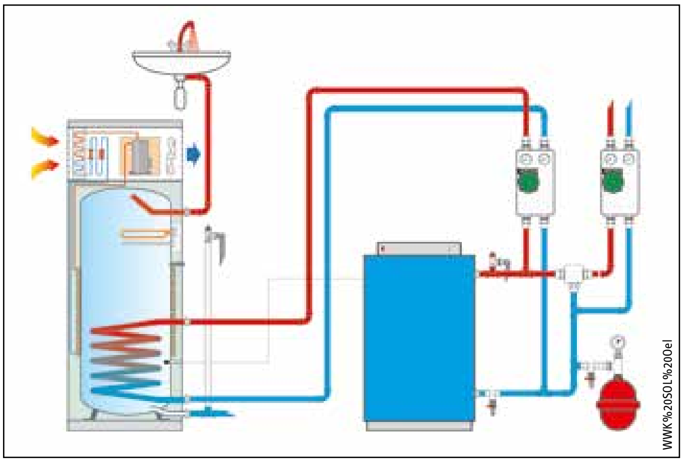
The circulation pump for cylinder heating is switched by the control unit of the second heat source. The switching signal for DHW heating is captured by the sensor of the control unit of the second heat source.

WWK 300 electronic SOL with solar collectors



Example appliance shown

WWK 300 electronic SOL with gas/oil boiler



Example appliance shown

Accessories

Here you will find the accessories available for this product or products. Refer to the corresponding chapters for more detailed product descriptions. A chapter and product index can be found at the start of this document.

Further accessories	
074370	ZH 1
074371	DMV / ZH 1
074374	SV 3/4-6
073864	ZTA 3/4

Notes

WWK 221/301 electronic SOL

At a glance

- Fully wired compact series for recirculation air operation or air duct/outdoor air operation
- Optional air routing to the side and/or to the top of the appliance offers maximum flexibility for siting in the installation room
- Up to 65 °C in heat pump only mode for hygienic DHW heating and very large amounts of mixed water
- Up to 80 % above the minimum rating requirement in the current, highest possible energy efficiency class A for DHW cylinders
- Intelligent interface allows increased use of photovoltaic power generated on site
- Thanks to an integrated smooth-tube indirect coil, the SOL version can be combined with a solar thermal system, oil, gas or solid fuel boiler
- Highly reliable and cost saving due to the impressed current anode integrated as standard
- Electronic controller with LCD indicating the currently available mixed water volume
- Compressor sound-insulated from the air stream for quiet operation
- Spring loaded roll bond heat exchanger for maximum safety and enduring high efficiency over the entire service life of the appliance

Safety and quality

Awards

APPLICATION: Compact DHW heat pump for efficient DHW supply to several draw-off points. For recirculation air or air duct operation, as well as for use with low supply air temperatures. High degree of flexibility regarding positioning and installation due to freely selectable air routing at the appliance (to the side and/or from above). **EQUIPMENT AND CONVENIENCE:** Very high level of DHW convenience. Both cylinder sizes easily achieve the highly demanding XL draw-off profile. Up to 65 °C in heat pump only mode for hygienic DHW heating and very large amounts of mixed water. High operating convenience. Electronic controller with LCD indicating the currently available mixed water volume. Electric emergency/booster heater as standard. Compressor sound-insulated from the air stream for quiet operation. Highly compact 220 l version, ideal for installation rooms with a low ceiling height. Highly reliable and cost-saving due to the integral impressed current anode. **COMBINATION OPTIONS:** Intelligent interface for communication with suitable photovoltaic systems as standard (for targeted increase of on-site consumption). SOL version with integrated smooth-tube indirect coil can also be combined with a solar thermal system or an oil, gas or solid fuel boiler (incl. 2 sensor wells giving a choice of heat generator integration). **EFFICIENCY:** Outstanding efficiency. This series exceeds the minimum requirements for categorisation in the highest possible energy efficiency class A by up to 80 %. **SPECIAL FEATURES:** Reliable, high grade equipment. Spring loaded roll bond heat exchanger for maximum safety and enduring high efficiency over the entire service life of the appliance..

Function

Inside the evaporator that extracts heat from the ambient air, the refrigerant changes from its liquid into its gaseous state. A compressor draws the process medium in and compresses it. This increase in pressure raises the refrigerant temperature. That requires electrical energy. The compressed refrigerant enters the condenser downstream. There, the refrigerant transfers heat to the DHW cylinder. An expansion valve then reduces the still prevalent pressure and the cyclical process starts again.

WWK electronic

Specification

		WWK 221 electronic	WWK 301 electronic	WWK 301 electronic SOL
		230949	230950	233584
Hydraulic data				
Nominal capacity	l	220	302	291
Surface area, indirect coil	m²			1,3
Application limits				
Max. DHW temperature with heat pump only	°C	65	65	65
Maximum DHW temperature with emergency/booster heater	°C	65	65	65
Permissible maximum DHW temperature inside the cylinder	°C			70
Min./max. application limits, heat source for heat pump operation	°C	-8/+35	-8/+35	-8/+35
Min./max. application limits, cylinder ambient temperature	°C	+6/+42	+6/+42	+6/+42
Min. installation room floor area	m²	6	6	6
Min. installation room volume	m³	13	13	13
Maximum permissible operating pressure, cold water/DHW	MPa	0,8	0,8	0,8
Min./max. conductivity, drinking water	µS/cm	100-1500	100-1500	100-1500
Output data to EN 16147				
Nominal DHW temperature (EN 16147)	°C	55 | 61	55	55
Nominal load profile (EN 16147)		L | XL	XL	XL
Reference DHW temperature (EN 16147 / A15)	°C	54.1 | -	53,5	53,5
Reference DHW temperature (EN 16147 / A7)	°C	52.8 | 58.8	52,5	52,5
Maximum available nominal amount of DHW at 40 °C (EN 16147 / A15)	l	283 | -	413	381
Maximum available nominal DHW volume at 40 °C (EN 16147/A7)	l	267 | 311	394	361
Heat-up time (EN 16147 / A15)	h	7.50 | -	9,04	9,04
Heat-up time (EN 16147 / A7)	h	8.65 | 10.42	12,23	12,23
Power consumption, standby period (EN 16147 / A15)	kW	0.028 | -	0,033	0,033
Power consumption, standby period (EN 16147 / A7)	kW	0.021 | 0.034	0,023	0,023
COP (EN 16147 / A15)		3.08 | -	3,22	3,22
COP (EN 16147 / A7)		3.07 | 2.81	2,99	2,99
Heating output				
Average heating output (EN 16147 / A15)	kW	1.56 | -	1,59	1,59
Average heating output (EN 16147 / A7)	kW	1.20 | 1.24	1,19	1,19
Power consumption				
Average heat pump power consumption (EN 16147 / A15)	kW	0.51 | -	0,49	0,49
Average heat pump power consumption (EN 16147 / A7)	kW	0.39 | 0.44	0,39	0,39
Max. heat pump power consumption (excl. start-up)	kW	0,65	0,65	0,65
Max. power consumption heat pump + emergency/booster heater	kW	2,15	2,15	2,15
Energy data				
DHW heating energy efficiency class (load profile), indoor air		A (L)	A (XL)	A (XL)
Energy efficiency class for DHW heating (load profile), outdoor air		A (L)	A (XL)	A (XL)
Electrical data				
Power supply		1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz	1/N/PE ~ 230 V 50 Hz
Permissible voltage range, external signal transducer		~ 230 V 50 Hz	~ 230 V 50 Hz	~ 230 V 50 Hz
Max. operating current	A	8,54	8,54	8,54
Max. starting current	A	23,44	23,44	23,44
MCB/fuse rating	A	C16	C16	C16
Sound data				
Sound power level, indoor, with 4 m air duct (EN 12102)	dB(A)	52	52	52
Indoor sound power level without air duct (EN 12102)	dB(A)	60	60	60
Average indoor sound pressure level at 1 m distance, free field with 4 m air duct	dB(A)	37	37	37
Average indoor sound pressure level at 1 m distance, free field, without air duct	dB(A)	45	45	45

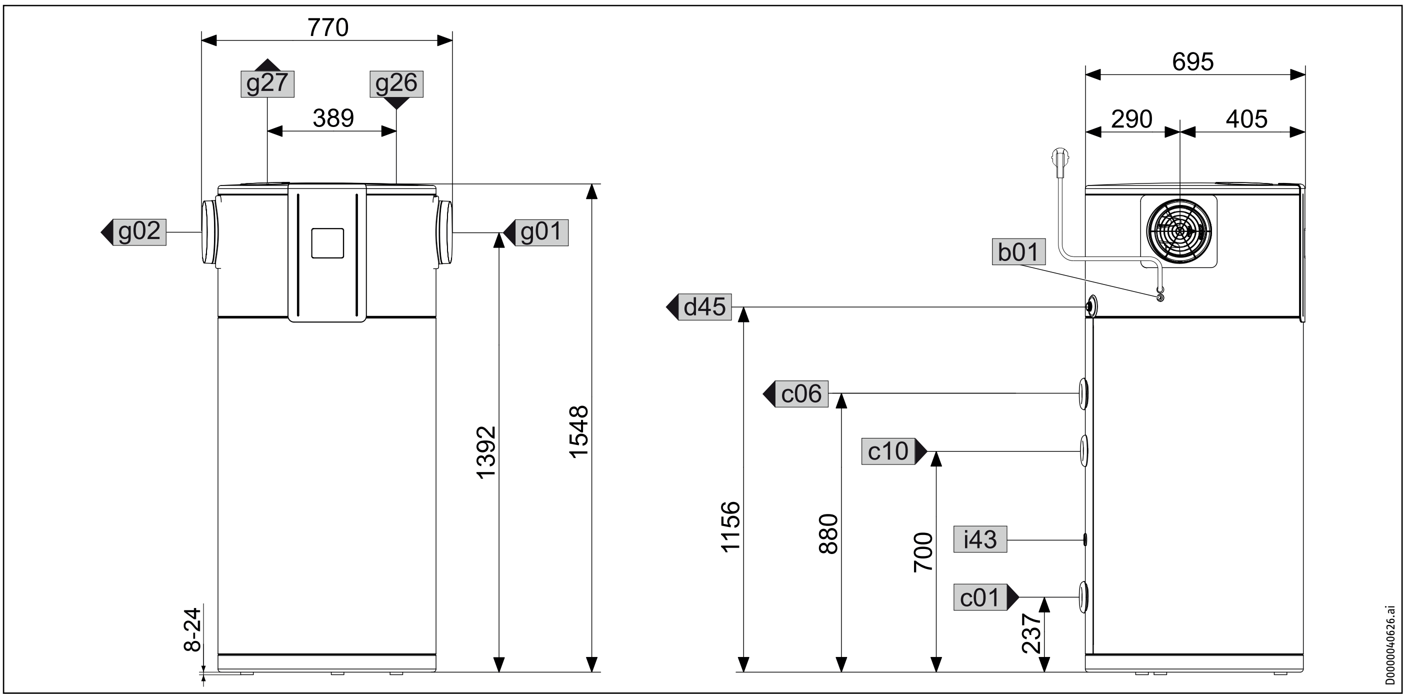
WWK electronic

		WWK 221 electronic	WWK 301 electronic	WWK 301 electronic SOL
Versions				
IP rating		IP24	IP24	IP24
Refrigerant		R134a	R134a	R134a
Refrigerant charge	kg	0,85	0,85	0,85
Power cable length approx.	mm	2000	2000	2000
Dimensions				
Height	mm	1545	1913	1913
Diameter	mm	690	690	690
Height when tilted	mm	1692	2034	2034
Height when tilted incl. packaging	mm	1910	2244	2244
Packing unit dimensions height/width/depth	mm	1740/790/790	2100/790/790	2100/790/790
Weights				
Weight, empty	kg	120	135	156
Connection				
Condensate connection		G 3/4 A	G 3/4 A	G 3/4 A
DHW circulation connection		G 1/2 A	G 1/2 A	G 1/2 A
Water connection		G 1 A	G 1 A	G 1 A
Indirect coil connection				G 1
Air duct connector, side	mm	200/160	200/160	200/160
Air duct connector, top	mm	160	160	160
Values				
Type of anode		Impressed current anode	Impressed current anode	Impressed current anode
Air flow rate	m³/h	350	350	350
Available external pressure	Pa	120	120	120
Max. air duct length at 160/200 mm diameter (including 3 x 90° bends)	m	20/40	20/40	20/40

Nominal data to EN 16147 - A15 = heat source, recirculation air / A7 = heat source, outdoor air (indoor installation)

WWK 221 electronic

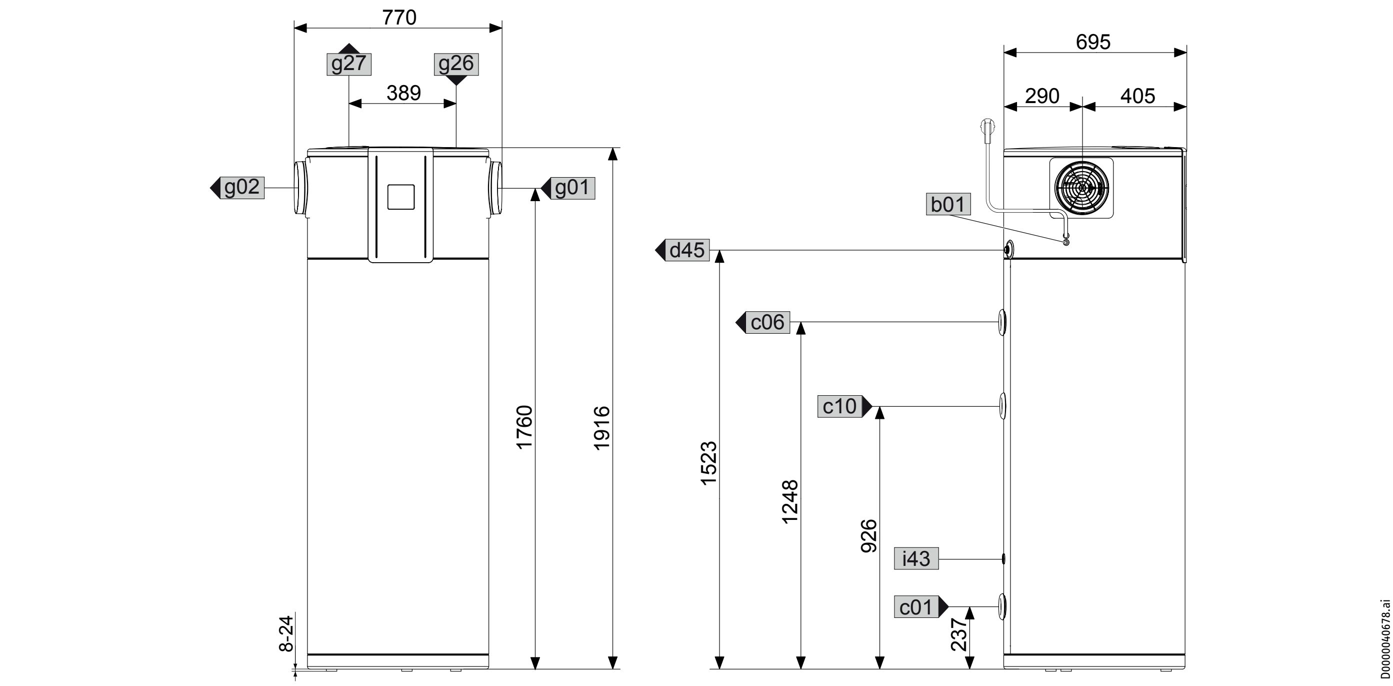
Siting



				WWK 221 electronic
b01	Entry electrical cables			
c01	Cold water inlet	Male thread		G 1
c06	DHW outlet	Male thread		G 1
c10	DHW circulation	Male thread		G 1/2 A
d45	Condensate drain	Male thread		G 3/4
g01	Air intake	Nominal diameter		DN 200
g02	Air discharge	Nominal diameter		DN 200
g26	Air intake optional	Nominal diameter		DN 160
g27	Air discharge optional	Nominal diameter		DN 160
i43	Cover for manufacturing aperture			

WWK 301 electronic

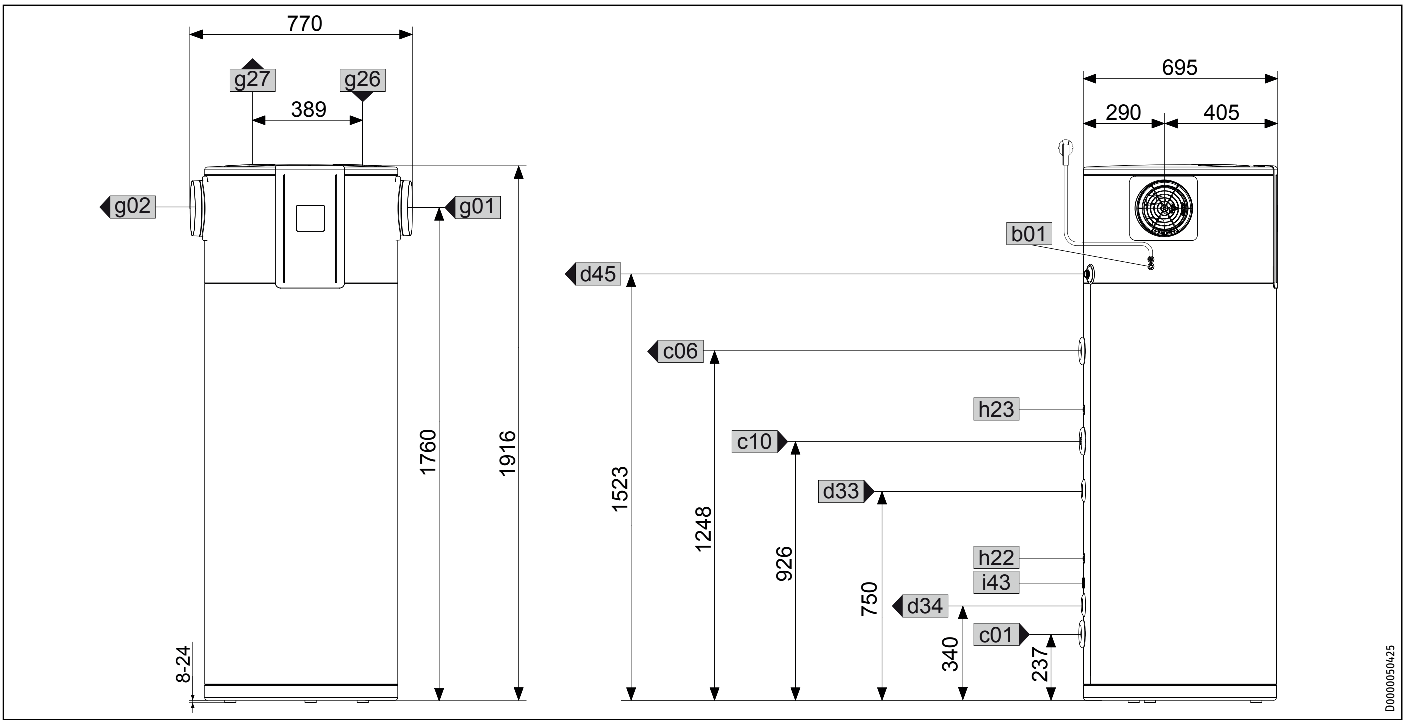
Siting



				WWK 301 electronic
b01	Entry electrical cables			
c01	Cold water inlet	Male thread		G 1
c06	DHW outlet	Male thread		G 1
c10	DHW circulation	Male thread		G 1/2 A
d45	Condensate drain	Male thread		G 3/4
g01	Air intake	Nominal diameter		DN 200
g02	Air discharge	Nominal diameter		DN 200
g26	Air intake optional	Nominal diameter		DN 160
g27	Air discharge optional	Nominal diameter		DN 160
i43	Cover for manufacturing aperture			

WWK 301 electronic SOL

Siting



				WWK 301 electronic SOL
b01	Entry electrical cables			
c01	Cold water inlet	Male thread		G 1
c06	DHW outlet	Male thread		G 1
c10	DHW circulation	Male thread		G 1/2 A
d33	Heat source flow	Female thread		G 1
d34	Heat source return	Female thread		G 1
d45	Condensate drain	Male thread		G 3/4
g01	Air intake	Nominal diameter		DN 200
g02	Air discharge	Nominal diameter		DN 200
g26	Air intake optional	Nominal diameter		DN 160
g27	Air discharge optional	Nominal diameter		DN 160
h22	Sensor heat source	Diameter	mm	9,6
h23	Sensor heat source optional	Diameter	mm	9,6
i43	Cover for manufacturing aperture			

Siting

Installation location requirements

The room in which the appliance is to be installed must meet the following conditions:

» No risk from frost
» Load-bearing floor
» Level, even and firm base
» The installation room must not be subject to a risk of explosions arising from dust, gases or vapours.
» When siting the appliance in a room together with other heating equipment, ensure that the operation of the other heating appliances will not be impaired.
» The type and size of the installation room must correspond to the appliance application limits.
» To keep the pipe lengths as short as possible, we recommend installing the appliance close to the kitchen or bathroom.
» To prevent adverse effects from operating noise, never install the appliance close to bedrooms.

Non-permissible installation sites

» Places where the ambient air contains chemically aggressive, salty or oily substances, e.g. ambient air containing ammonia or chlorine and thermal water environments.
» Environments that are heavily dust-laden

Sound emissions

Insulate pipe outlets through walls and ceilings against structure-borne noise transmission.

DHW installation

[In Germany] observe DIN 1988 and the regulations specified by your local water supply utility.

Note on sizing, DHW output

The rated output refers to a defined design point. The heating output is less at the lower application limit and the heat-up time is correspondingly longer.

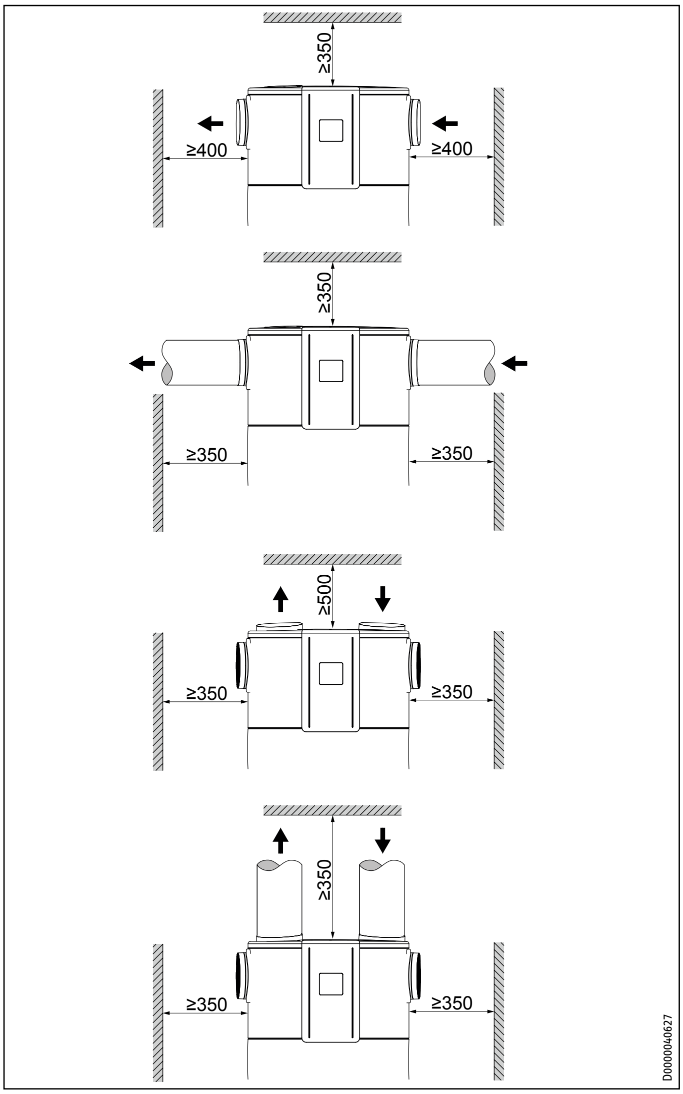
Power connection

The appliances are supplied with a power cable with a standard plug.

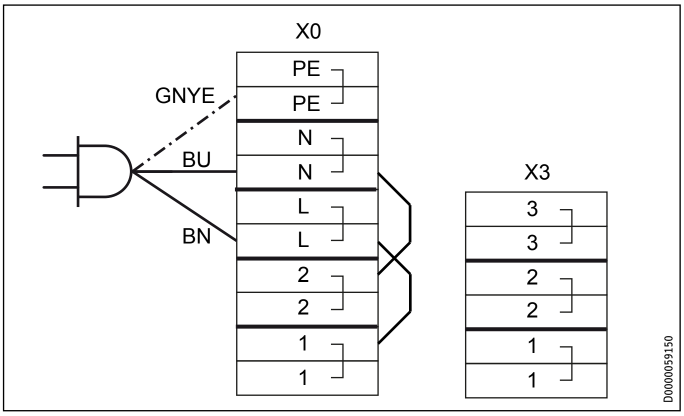
Protective anode

The appliances are equipped with an impressed current anode. When the cylinder is full, the control unit must not be isolated from its power supply.

Minimum clearances



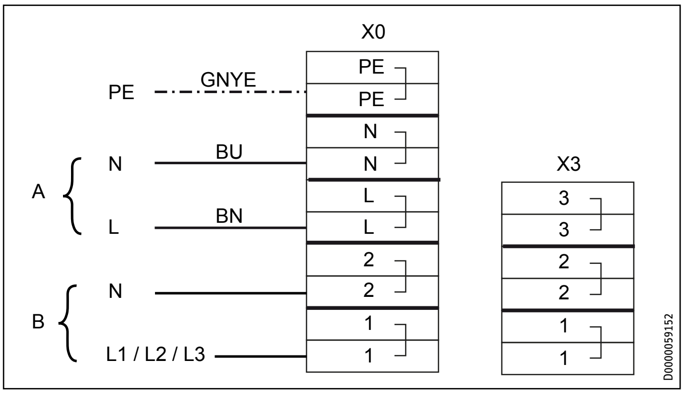
Standard connection without external signal transmitter



BN Brown
BU Blue
GNYE green-yellow

Connection options: Operation with external switching device that interrupts appliance power supply

The impressed current anode must be supplied with power permanently. This also applies when the appliance is operated with external switching equipment that interrupts the power supply. The power supply of the load circuit must be separate to that of the control unit.

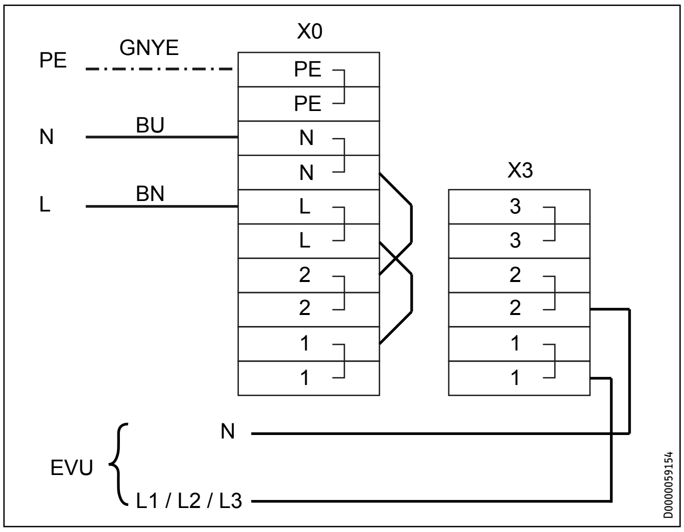


A Power supply for load circuit provided by the external switching device
B Power supply of the control unit
BN Brown
BU Blue
GNYE green-yellow

Connection options: Operation with external signal transmitter

An external signal transmitter for switching a separate second set DHW temperature can be connected.

Example 1: Power-OFF signal with its own phase



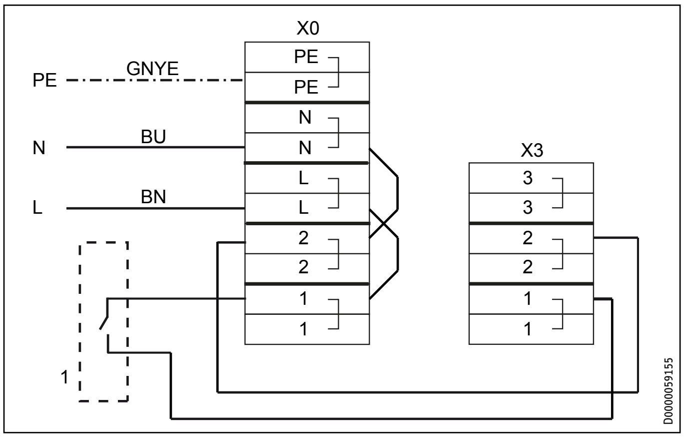
EVU Power supply utility
BN Brown
BU Blue
GNYE green-yellow

Example 2: Photovoltaic signal via on-site relay and phase routed outside the appliance

Inverter relay requirements:

» Potential-free relay (240 V AC / 24 V DC, 1 A) with N/O contact
» In accordance with the safety regulations and standards for safety extra low voltage
» Programmable switching contact. The contact must open or close if certain limits are exceeded or not reached, e.g. switching output of the inverter.

If necessary, check with the inverter manufacturer whether the product meets the stated criteria.



1 Inverter (floating contact)
BN Brown
BU Blue
GNYE green-yellow

The inverter's power feed is normally in the main fuse box.

External heat generator

WWK 301

electronic SOL

The devices have an integrated smooth tube indirect coil to which an external heat generator, e.g. a solar thermal system or a gas/oil boiler, can be connected.

The switching signal for DHW heating via the external heat generator is captured by the sensor of the control unit of the second heat source. The sensor is installed inside the immersion pipe of the heat pump cylinder.

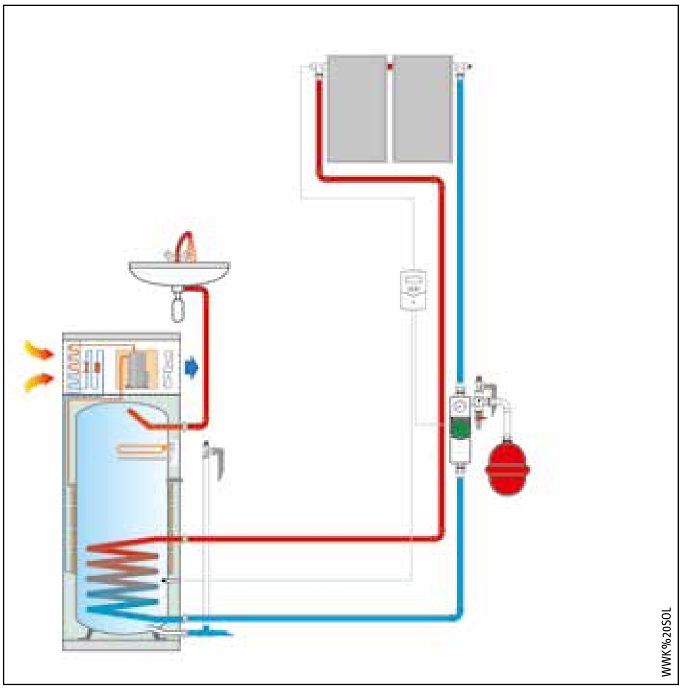
To enable different, alternative connections for the external second heat generator, the cylinder is factory-fitted with a top and a bottom sensor well which can be selected as alternatives.

The integral heat exchanger with flow and return lines, circulation pump and check valve must be connected to the additional heat source. The external heat source control unit must ensure that the maximum cylinder temperature stated in the specification is not exceeded.

Dual mode operation with a second heat source and DHW priority control

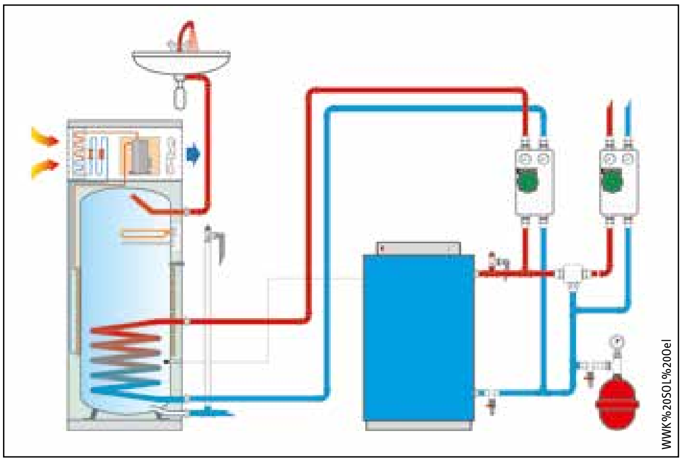
The circulation pump for cylinder heating is switched by the control unit of the second heat source. The switching signal for DHW heating is captured by the sensor of the control unit of the second heat source.

WWK 301 electronic SOL with solar collectors



Example appliance shown

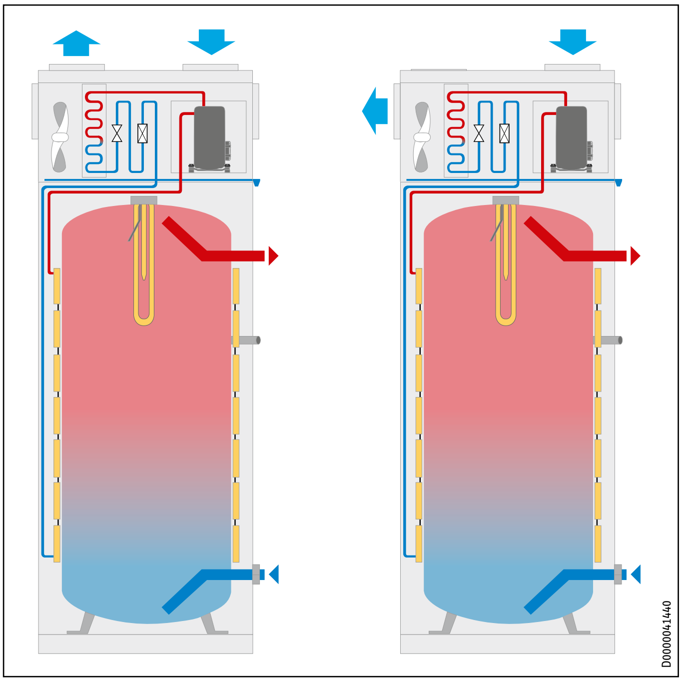
WWK 301 electronic SOL with oil boiler



Example appliance shown

Air routing

The standard air routing is horizontal. The air can be routed as required, with or without ducts, as shown in the illustrations.



Air duct connection

The maximum line lengths and possible nominal diameters are stated in the specification. With a duct connection, the fan output must be set at the appliance programming unit to the corresponding external pressure drop. The fan curve is specified in the operating and installation instructions.

If cold air is drawn in, both the supply air duct and the exhaust air duct must be thermally insulated to prevent condensation on the ducts in the installation room.

Accessories

Here you will find the accessories available for this product or products. Refer to the corresponding chapters for more detailed product descriptions. A chapter and product index can be found at the start of this document.

Further accessories	
074370	ZH 1
074371	DMV / ZH 1
074374	SV 3/4-6
073864	ZTA 3/4
234022	LSWP 160-4 AL
234023	LSWP 200-4 AL
234108	BS LSWP 160-4 AL
234109	BS LSWP 200-4 AL
161096	LWF 160 - 2
159320	LWF N 160
234107	LWF N 200
159326	LWF M 160
234105	LWF M 200
159328	LWF B 160 - 45
159329	LWF B 160 - 90
234104	LWF B 200-90
234106	LWF RS 200-160
233018	LWF LG 160
234505	AWG 160 R

WWS 20

At a glance

- Hydraulic split design for recirculation air or air duct operation, as well as for use with low supply air temperatures
- Split design for straightforward installation and flexible positioning in the installation room
- Little space required. Wall mounting bracket is part of the standard delivery
- Integral circulation pump for cylinder heating
- DN 160 air duct can be connected directly to the appliance, with up to 20 m overall line length
- External signal transmitters with independent DHW set value, or for the control of compressor off periods, can be connected (e.g. photovoltaic system)
- Time programs for DHW operation and fan

Safety and quality

APPLICATION: DHW heat pump in a split design for combination with suitable external DHW cylinders, for providing an efficient DHW supply to several draw-off points. For recirculation air or air duct operation, as well as for use with low supply air temperatures. Hydraulic split design, therefore no intervention is required in the refrigerant circuit, unlike with a split unit. **EQUIPMENT AND CONVENIENCE:** Electronic control with LCD programming unit. Control unit with time program for DHW and fan operation. **COMBINATION OPTIONS:** Optional connection of an electric heater rod. Also optional connection of external signal transmitters with independent set DHW value, or for controlling compressor off periods (e.g. for combination with a photovoltaic system). Depending on cylinder design, the DHW cylinder can be connected either via an inlet pipe (STIEBEL ELTRON accessories), via inlet connectors on the side of the DHW cylinder or via an internal indirect coil inside the DHW cylinder. The conditions and information for a cylinder connection must first be checked in the technical guides. The cylinder size (max. 500 l) must be matched to the heating output of the heat pump, under consideration of the expected heat source temperature and expected DHW demand. **INSTALLATION:** Easy and space saving installation, plus flexible positioning and cylinder combination in the installation room. Wall mounting support included in standard delivery, a circulation pump is already integrated into the appliance. **EFFICIENCY:** Reference energy efficiency class A when combined with a 300 l reference DHW cylinder and load profile XL.

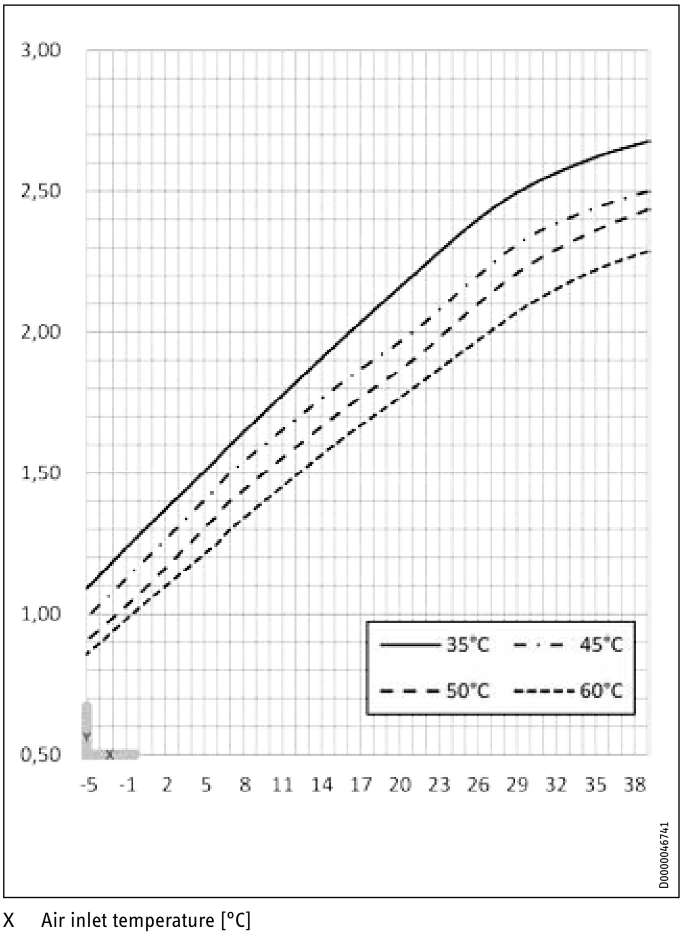
Function

Inside the evaporator that extracts heat from the ambient air, the refrigerant changes from its liquid into its gaseous state. A compressor draws the process medium in and compresses it. This increase in pressure raises the refrigerant temperature. That requires electrical energy. As the compressor is cooled by suction gas, the energy (motor heat) is not lost, but reaches the downstream condenser together with the compressed refrigerant. The heat transfer medium gives off heat to the DHW via the condenser (plate heat exchanger) in an externally connected DHW cylinder. An expansion valve then reduces the still prevalent pressure and the cyclical process starts again. The split design is configured as a hydraulic connection.

Specification

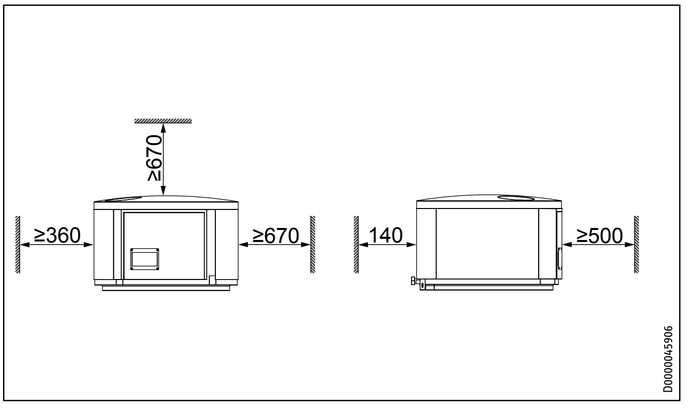
		WWS 20
		233898
Application limits		
Max. DHW temperature with heat pump only	°C	60
Max. permissible temperature, DHW	°C	60
Min./max. application limits, heat source	°C	-5/+40
Minimum installation room volume (recirculation air mode, general domestic use)	m³	20
Maximum permissible operating pressure, cold water/DHW	MPa	1
Output data		
DHW reference temperature (EN 16147)	°C	55
Nominal load profile (EN16147) with reference to 300 l cylinder		XL
Maximum available amount of DHW at 40 °C (EN 16147 / A15) with reference to 300 l cylinder	l	373
Heat-up time (EN 16147 / A15) with reference to 300 l cylinder	h	8,30
Average heating output (EN 16147 / A15) with reference to 300 l cylinder	kW	1,9
Average power consumption of heat pump (EN 16147 / A15) with reference to 300 l cylinder	kW	0,5
COP (EN 16147 / A15) with reference to 300 l cylinder		3,16
Maximum permissible power consumption of optional electric heater rod	kW	2,0
Electrical data		
Power supply		1/N ~ 230 V 50 Hz
Operating current heating	A	2,93
Max. starting current	A	18
MCB/fuse rating	A	C16
Sound data		
Sound power level without air duct	dB(A)	57
Versions		
IP rating		IP 2X
Refrigerant		R134a
Refrigerant charge	kg	0,61
Power cable length approx.	mm	1600
Hydraulic data		
Type internal primary pump		2RS12/2-3 Ku
Max. residual head internal primary pump	m	1,1
Water flow rate	m³/h	0,4
Inlet pipe pressure drop	hPa	16
Dimensions		
Height	mm	432
Width	mm	657
Depth	mm	657
Weights		
Weight	kg	45
Connection		
Heat pump connection		G 3/4
Condensate connection	mm	22
Air duct connector, top	mm	160
In the case of hydraulic action via inlet pipe: DHW connector, cylinder min.		G 1
In the case of hydraulic connection via side inlet connectors: Inlet connector, cylinder min.		G 1
In the case of hydraulic connection via smooth tube indirect coil: Heat transfer surface area (per WWS 20), cylinder min.	m²	1,4
Values		
Air flow rate, free-blowing	m³/h	510
Available external pressure, ventilation	Pa	80
Max air duct length 160 mm (including 3 x 90° bends)	m	20
Reduction max. air duct length per additional 90° bend	m	2,5

Output data

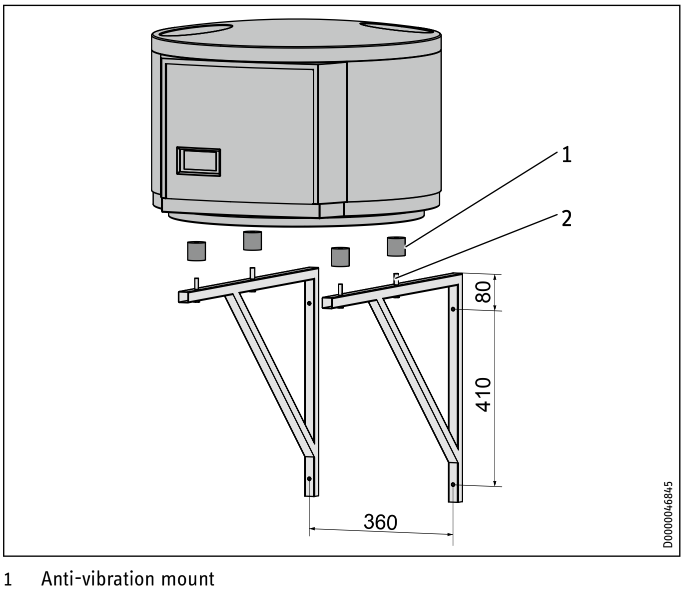


X Air inlet temperature [°C]
Y Heating output [kW]

Minimum clearances

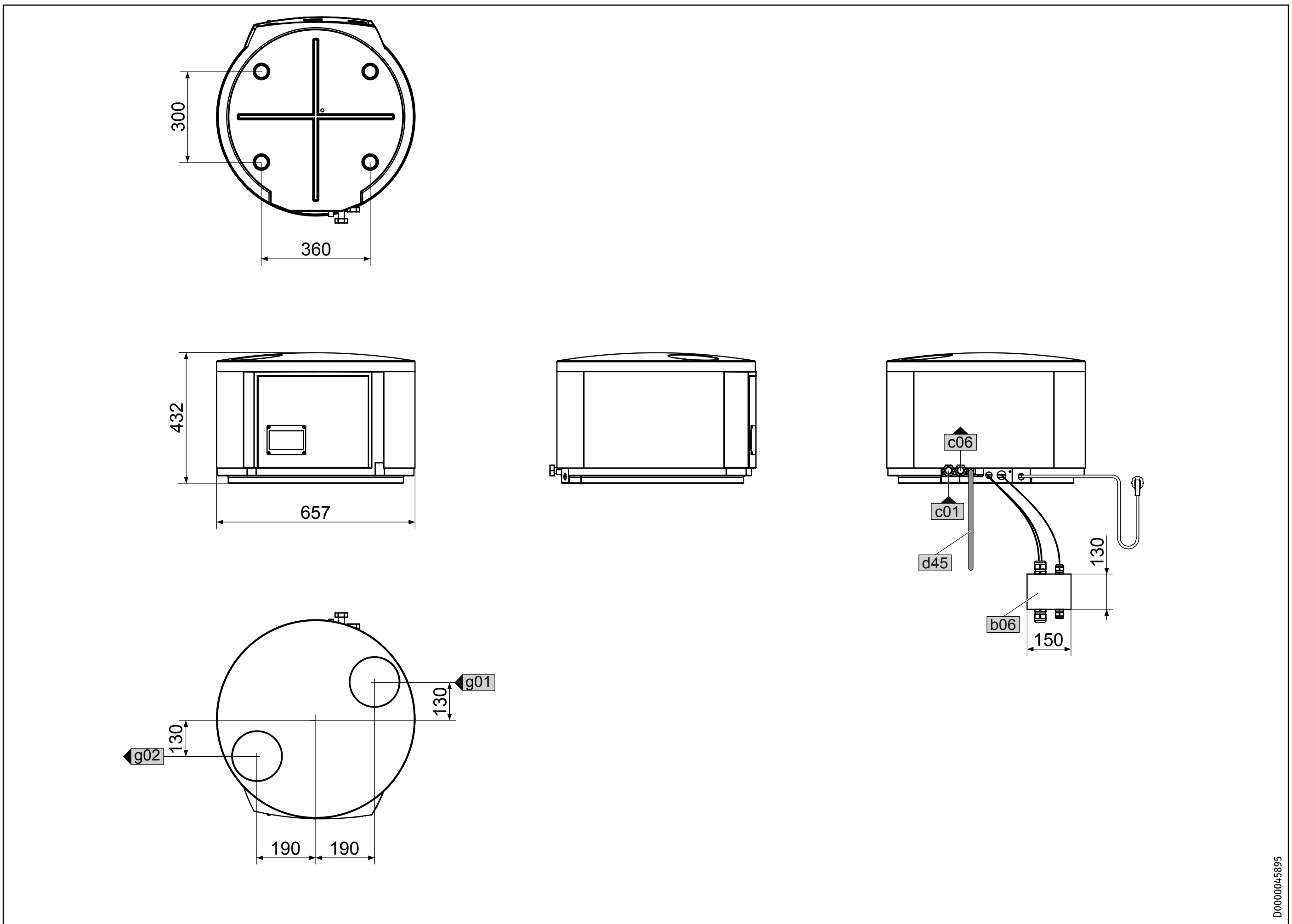


Wall mounting bracket



1 Anti-vibration mount
2 Support points for anti-vibration mounts

Siting



				WWS 20
c01	Cold water inlet	Male thread		G 3/4
c06	DHW outlet	Male thread		G 3/4
d45	Condensate drain	Diameter	mm	20
b06	Junction box			
g01	Air intake	Nominal diameter		DN 160
g02	Air discharge	Nominal diameter		DN 160

Siting

Installation location requirements

The appliance is not designed for outdoor installation.

Further requirements regarding the installation room and appliance positioning:

» The installation location and the air draw-off point must be free from flammable, highly combustible gases or substances, as well as high levels of dust.

» The installation room must be dry and free from the risk of frost.

» The air intake temperature must be within the permissible application limits.

» The appliance must be installed on a even, horizontal surface.

» No high-frequency machines may be operated at the installation location.

» Ensure the appliance is not subjected to shocks or vibrations, e.g. from a washing machine. Use the anti-vibration mounts supplied.

» Always leave sufficient space to provide access for installation, maintenance and cleaning.

» Ensure the operation of other equipment in the installation room is not impaired.

» Lighting equipment and pipes must not be installed directly above the appliance.

» To keep the hydraulic lines as short as possible, install the connected DHW cylinder close to the kitchen or bathroom.

» To prevent adverse effects from operating noise, never install the appliance close to bedrooms.

» Observe the minimum volume for the installation room and the stated heat-up time during normal domestic operation.

» When selecting the type and size of installation room for recirculation air mode, ensure that energy use is balanced over a period of 24 hours and that the lower application limit of the appliance is not undershot. Please also observe the following factors: The expected runtime per day, the resulting cooling energy, existing heat sources in the installation room (e.g. freezer, tumble dryer, central heating) as well as the heat flux from adjoining rooms.

Conditions at the air draw-off point

The following air draw-off points are not permissible:

» Locations where the air is contaminated with oil or grease

» Salty air

» Environments with thermal water

» Places where the air contains ammonia, e.g. sewage works

» Places where the air contains chlorine, e.g. swimming pools

» Generally places where the air is strongly contaminated, e.g. due to dust, or contains aggressive substances

Air connection on the heat source side

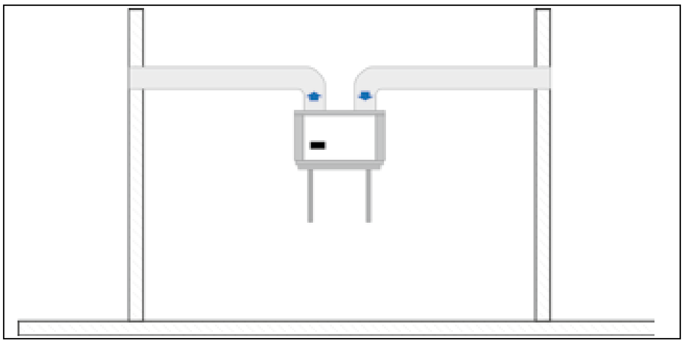
You can increase the efficiency of the appliance by utilising the waste heat from other appliances to heat the DHW cylinder, e.g. boilers, tumble dryers or freezers.

» When selecting the air draw-off point, always factor in the required air volume and air flow rate.

» Install the air ducts in straight lines. Avoid installing ducts along sharp edges or around corners.

» Install the air ducts horizontally and sloping slightly down to the intake and discharge apertures.

Installation of an air duct enables the heat pump to feed in warm air from other rooms.



The cooled extract air can be used for cooling or diverted into another room through an air duct.

Hydraulic connection

The DHW heat pump with its hydraulic split design can be connected to external DHW cylinders in various ways.

A single DHW heat pump is suitable for a DHW cylinder with a capacity of up to 500 litres.

Any use in conjunction with a 500 l DHW cylinder must be checked beforehand by the system installer.

The heating output of the heat pump is sufficient to supply a 5 person household with DHW.The thermal output of the heat pump depends on heat source temperature (supply air) and the set DHW temperature. The appliance output at different air intake temperatures can be seen in the output diagram. The output diagram must be observed for the individual sizing.

Before installing the appliance, check that the existing DHW cylinder is large enough to cover the short-term water consumption. The maximum DHW cylinder volume that can be connected is therefore limited by the thermal output of the appliance and the expected maximum heat-up times.

To determine the maximum length of the hydraulic line between the appliance and DHW cylinder, it may be necessary to subtract further pressure drop values from the residual head of the internal circulation pump, subject to the type of hydraulic connections employed.

Water treatment and application limits

Depending on water temperature and hardness, the following water treatments should be carried out according to DIN 1988-200:2012-05:

dH [°]	DHW temperature < 60 °C	DHW temperature > 60 °C
0-8.4 (soft)	No water treatment necessary	Periodic descaling recommended (see chapter “Descaling the appliance”)
8.4-14 (medium)	No water treatment necessary	Periodic descaling necessary (see chapter “Descaling the appliance”)
14-21 (hard)	Periodic descaling necessary (see chapter “Descaling the appliance”)	Softening
>21	Softening	Use is not recommended
		Reduce the DHW temperature

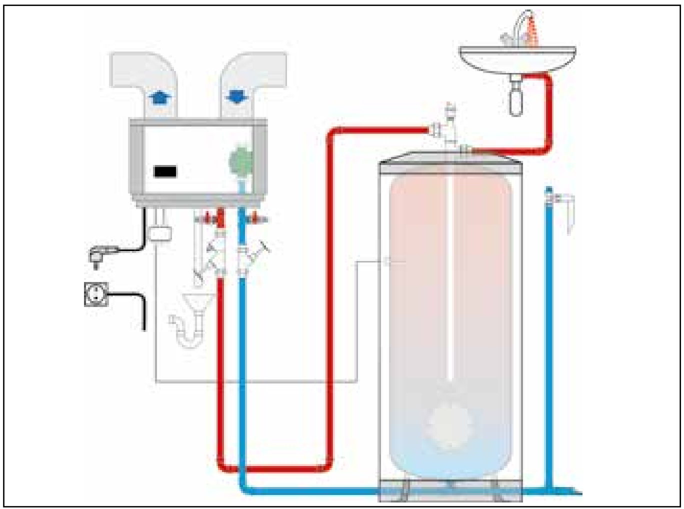
Where water quality fluctuates significantly and the DHW temperatures are high (> 60 °C), we recommend annual inspection by a qualified contractor.

Water constituent	Concentration (mg/l or ppm)		Time limits Investigation time following sampling
Alkalinity (HCO_3^-)	< 70	0	within 24 h
	70-300	+	
	> 300	0	
Sulphate[1] (SO_4^{2-})	< 100	+	No limit
	< 200	0	
	> 200	-	
HCO_3^-/SO_4^{2-}	> 1.0	+	No limit
	< 1.0	-	
Electrical conductivity	< 10 µS/cm	0	No limit
	10-500 µS/cm	+	
	> 500 µS/cm	0	
pH[2]	< 7.0	0	within 24 h
	7.0-9.0	+	
	> 9.0	0	
Ammonium (NH_4^+)	< 2	+	within 24 h
	2-20	0	
	> 20	-	
Chloride (Cl)	< 100	+	No limit
	100-200	0	
	> 200	-	
Free chlorine (Cl_2)	<1	+	within 5 h
	1-5	0	
	>5	-	
Hydrogen sulphide (H_2S)	< 0.05	+	No limit
	> 0.05	-	
Free (aggressive) carbon dioxide (CO_2)	< 5	+	No limit
	5-20	0	
	> 20	-	
Total hardness (°dH)	4-14		No limit (see chapter “Water treatment”)
Nitrate[1]	< 100	+	No limit
	> 200	0	
Iron[3] (Fe)	< 0.2	+	No limit
	> 0.2	0	
Aluminium (Al)	< 0.2	+	No limit
	> 0.2	0	
Manganese[3] (Mn)	< 0.1	+	No limit
	> 0.1	0	

+ Resistance under normal conditions
0 Corrosion may occur, especially if other factors are rated as 0
- Use is not recommended

Version 1

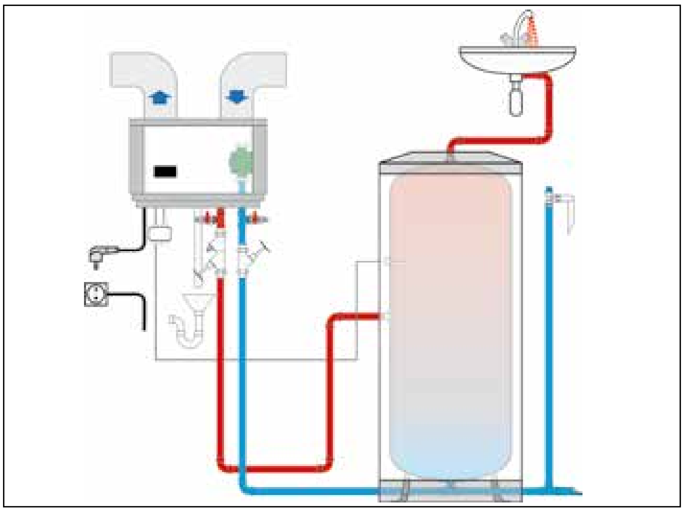
DHW cylinder heating via an inlet pipe



- The DHW cylinder must have a suitable DHW outlet connector with a male thread at top centre.
- The inlet pipe must protrude down to the lower third of the DHW cylinder.
- To prevent thermal DHW circulation, you should install a gravity brake between the appliance and the DHW cylinder.
- Pressure drops from the pipework and inlet pipe must not exceed the residual head of the circulation pump integrated in the appliance.
- Installation of the inlet pipe must not be impaired by integral indirect coils.
- Using an additional threaded immersion heater is not possible in the presence of a hydraulic connection with an inlet pipe.

Version 2

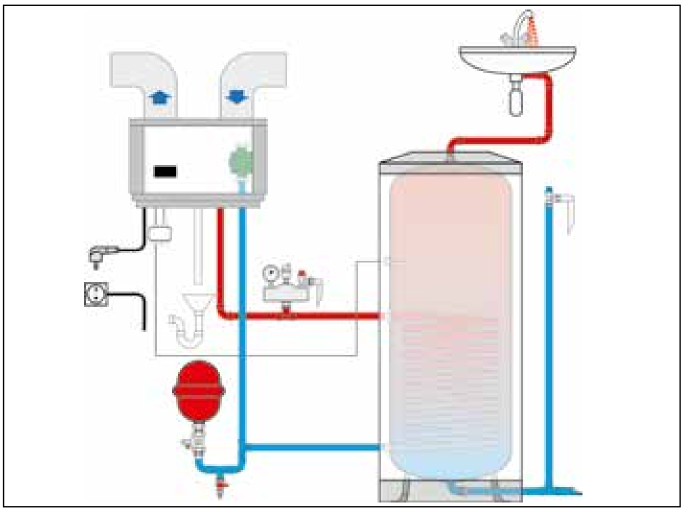
DHW cylinder heating via side inlet connectors



- The connection to the appliance must be on the side about half way up the DHW cylinder.
- To prevent thermal DHW circulation, you should install a gravity brake between the appliance and the DHW cylinder.
- Pressure drops from the pipework and inlet pipe must not exceed the residual head of the circulation pump integrated in the appliance.

Version 3

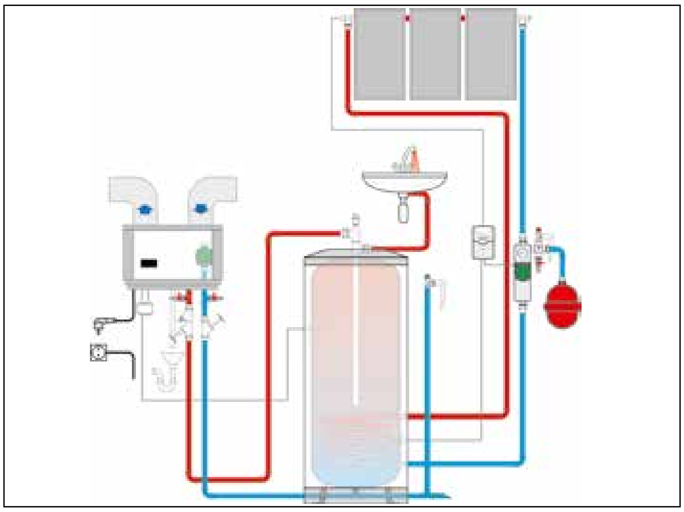
DHW cylinder heating via an integrated smooth tube indirect coil



- To comply with heating system regulations, the appliance and DHW cylinder must be connected with a expansion vessel and a safety valve.
- The indirect coil must have the stated minimum transfer area.
- The thermal output of the appliance must be able to be transferred via the indirect coil with a temperature differential (flow/return) of 5 K.
- Pressure drops from the pipework and smooth tube indirect coil must not exceed the residual head of the appliance circulation pump.

Combination example 1

DHW cylinder heating via an inlet pipe and a solar thermal system



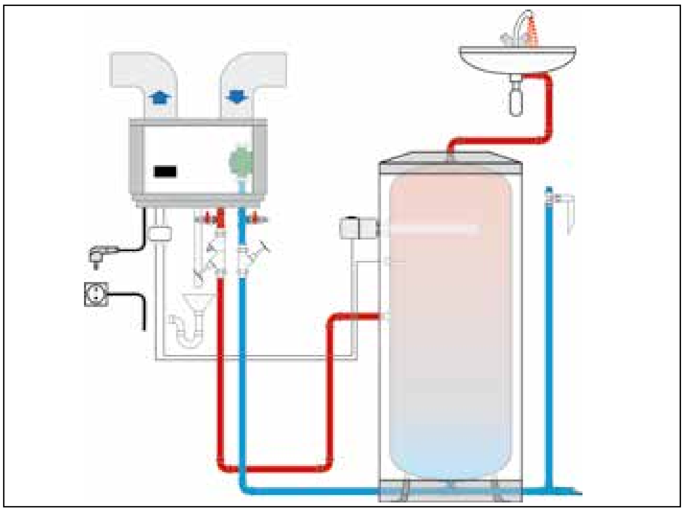
- Direct heating of the DHW cylinder via an inlet pipe and DHW connector at the top of the DHW cylinder.
- Reheating with a solar thermal system via an indirect coil in the bottom third of the cylinder.

Other connection possibilities for the heat pump on the DHW cylinder:

- Direct heating via side connectors on the DHW cylinder.

Combination example 2

DHW cylinder heating with electric reheating



» Direct heating via side connectors on the DHW cylinder.

» Reheating with a threaded immersion heater in the top third of the cylinder, above the heat pump's temperature sensor.

Other connection possibilities for the heat pump on the DHW cylinder:

» Indirect heating via an indirect coil in the bottom part of the DHW cylinder.

» Hydraulic connection with an inlet pipe is not possible if a threaded immersion heater is used.

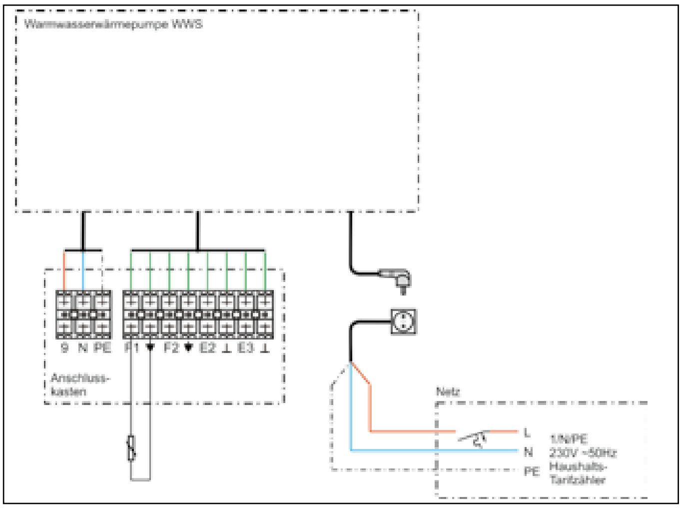
Power connection

All electrical installation work, particularly earthing measures, must be carried out in accordance with the VDE regulations and the requirements of your local power supply utility.

The connection must comply with the power connection diagram.

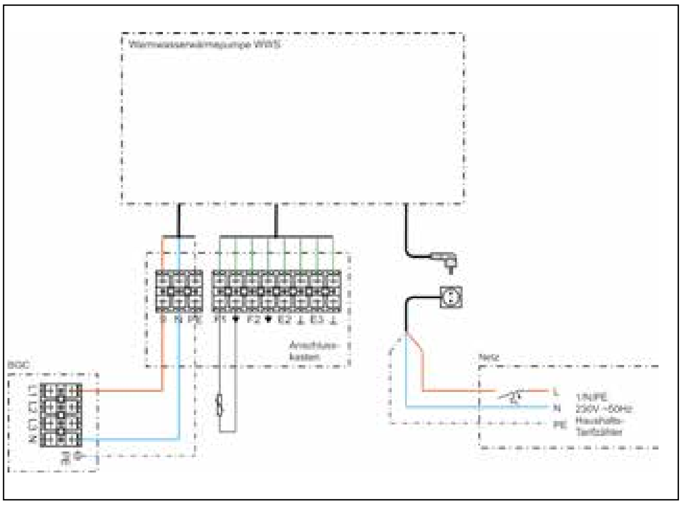
Note
Observe the standards and regulations applicable in your country.

WWS



The DHW temperature sensor must be connected in the appliance control panel.

WWS with additional booster heater

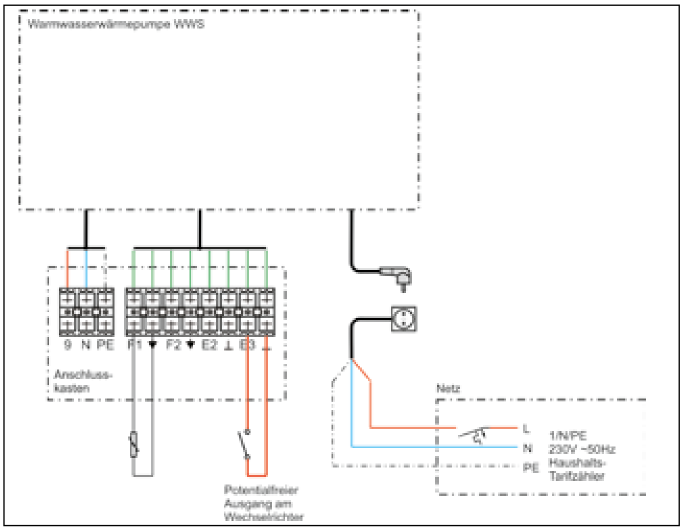


The DHW temperature sensor must be connected in the appliance junction box.

A threaded immersion heater can be connected in the appliance junction box.

If higher outputs are required, the threaded immersion heater must be connected externally and controlled via the integrated temperature controller.

WWS with a photovoltaic system



The DHW temperature sensor must be connected in the appliance control panel.

The setpoint temperature can be raised to a higher level via a floating contact in the appliance control panel. Control is via the PV system inverter.

This connection variant is possible only with selected inverters. The inverter must fulfil the following conditions:

» Floating relay with NO contact, 240 VAC / 24 V DC, 1A
» The relay must be designed so that safety regulations and standards for safety extra low voltage are adhered to.
» The switching output must be programmable so that the relay closes or opens if a certain inverter output level is exceeded or undershot. A second limit value determines the stop time of the relay.

Selection matrix for DHW cylinders

Direct heating via inlet pipe in the DHW cylinder

Memory	Type	SHW 200 S	SHW 300 S	SHW 400 S	SHW 300 WS	SHW 400 WS	HSTP 200	HSTP 300	HSTP 400	SB 302 S	SB 402 S
Contents	litres	200	300	400	300	400	200	300	400	302	402
DHW connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A
Cold water connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A
Pipe Cu	mm	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1
max. pipe length, WP cylinder	m	8	8	8	8	8	8	8	8	8	8

Direct heating via side inlet connectors in the DHW cylinder

Memory	Type	SBB 301 WP	SBB 302 WP	SBB 401 WP	SBB 300 WP basic	SBB 400 WP basic	SBB 300 basic	SBB 400 basic	SBB 300 plus	SBB 400 plus	
Contents	litres	300	300	400	300	400	300	400	300	400	
DHW connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	
Cold water connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	
Connection, side inlet connector	Zoll	G1½	G1½	G1½	G1½	G1½	G1½	G1½	G1½	G1½	
Pipe Cu	mm	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	
max. pipe length, WP cylinder	m	16	35	35	35	35	35	35	35	35	

Indirect heating via smooth tube indirect coil integrated in the DHW cylinder (min. 1,2 m²) in the

Memory	Type	SBB 301 WP	SBB 302 WP	SBB 401 WP	SBB 300 WP basic	SBB 400 WP basic	SBB 300 basic	SBB 400 basic	SBB 300 plus	SBB 400 plus	
Contents	litres	300	300	400	300	400	300	400	300	400	
DHW connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	
Cold water connection	Zoll	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	G1A	
Indirect coil connections	Zoll	G1½	G1½	G1½	G1½	G1½	G1	G1	G1	G1	
Heat exchanger, top	m²	–	–	4,0	–	–	1,0	1,0	1,1	1,3	
Heat exchanger, bottom	m²	3,2	4,8	1,4	3,2	5,1	1,5	1,8	1,5	1,7	
Connection WT		Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	
Pipe Cu	mm	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	22 x 1	
max. pipe length, WP cylinder	m	12	12	12	12	12	12	12	12	12	

* Built-in circulation pump operated in Stage 3 (set at the factory to Stage 2)

d00046473

Inlet pipe 200/500 l

Inlet pipe 200/500 l

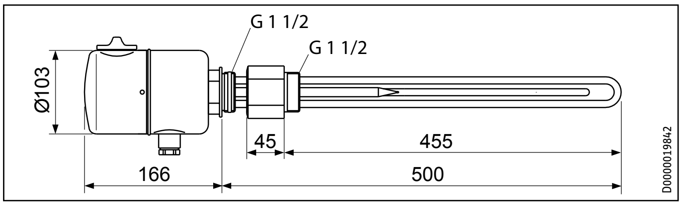
Floorstanding cylinder inlet pipe for heating an external DHW cylinder.

		Inlet pipe 200/500 l
		072997
Cylinder connection		G 1
Length	m	1,25

BGC

Threaded immersion heater for sealed heating and DHW heating systems. Infinitely variable temperature selection from approx. 10 °C to 80 °C. The temperature may be limited to 45/60/80 °C. Integral temperature controller with high limit safety cut-out. Heating element and protective pipe material: Copper; threaded connection: Brass, thread G 1 1/2 with PTFE gasket.

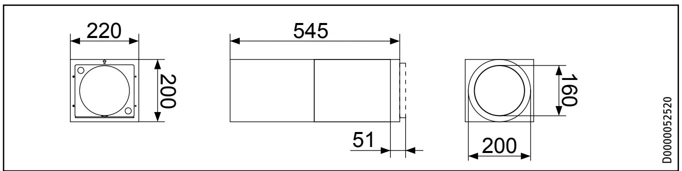
		BGC/45
		075115
Connected load ~ 230 V	kW	2-5,7
Connected load ~ 400 V	kW	6
Rated voltage	V	230/400
Phases		1/N/PE, 2/PE, 3/PE
Frequency	Hz	50/60
Single circuit operating mode		X
Temperature setting range	°C	10-80
Max. permissible pressure	MPa	1
IP rating		IP44
Immersion depth	mm	455
Weight	kg	2,5



AWG 160 R

Thermally-insulating EPS wall outlet for air duct connection DN 160. No additional thermal insulation is required around the pipe when using outdoor air as the heat source. This enables very easy installation even with modest dimensions. Incl. Weather grille made from painted sheet steel in silver grey. Very quiet weather grille with very low pressure drop. Weather grille with drip edge safely prevents run marks on the external wall.

		AWG 160 R
		234505
Height, surround for weather grille	mm	200
Width, surround for weather grille	mm	220
Depth, surround for weather grille (with integral protective cover)	mm	51
Internal pipe diameter	mm	160
External pipe diameter	mm	200
Min. outlet aperture	mm	202
Weight	kg	0,5
Wall thickness	mm	20
Max. air flow rate	m³/h	350
Static pressure differential at 350 m³/h, outflow	Pa	3
Static pressure differential at 350 m³/h, inflow	Pa	22
Condensation limit at: Temperature inside pipe / temperature around the pipe / relative humidity around the pipe		-20 °C / 20 °C / 60 %
Wall outlet material		EPS (grey)
Weather grille material		Painted sheet steel (silver grey)



LSWP

Thermally insulated air hose for routing outdoor and exhaust air. The exterior casing consists of fibre-strengthened aluminium/polyester laminate and the inner casing of polyamide fibre. The hose ends can be shaped into ovals for easier fitting. The mineral wool intermediate layer provides thermal insulation and the option of sound insulation.

		LSWP 160-4 AL	LSWP 200-4 AL
		234022	234023
Length	m	4	4
Internal diameter	mm	160	200
Application limit	°C	-30 to +140	-30 to +140
Wall thickness	mm	50	50

BS-LSWP

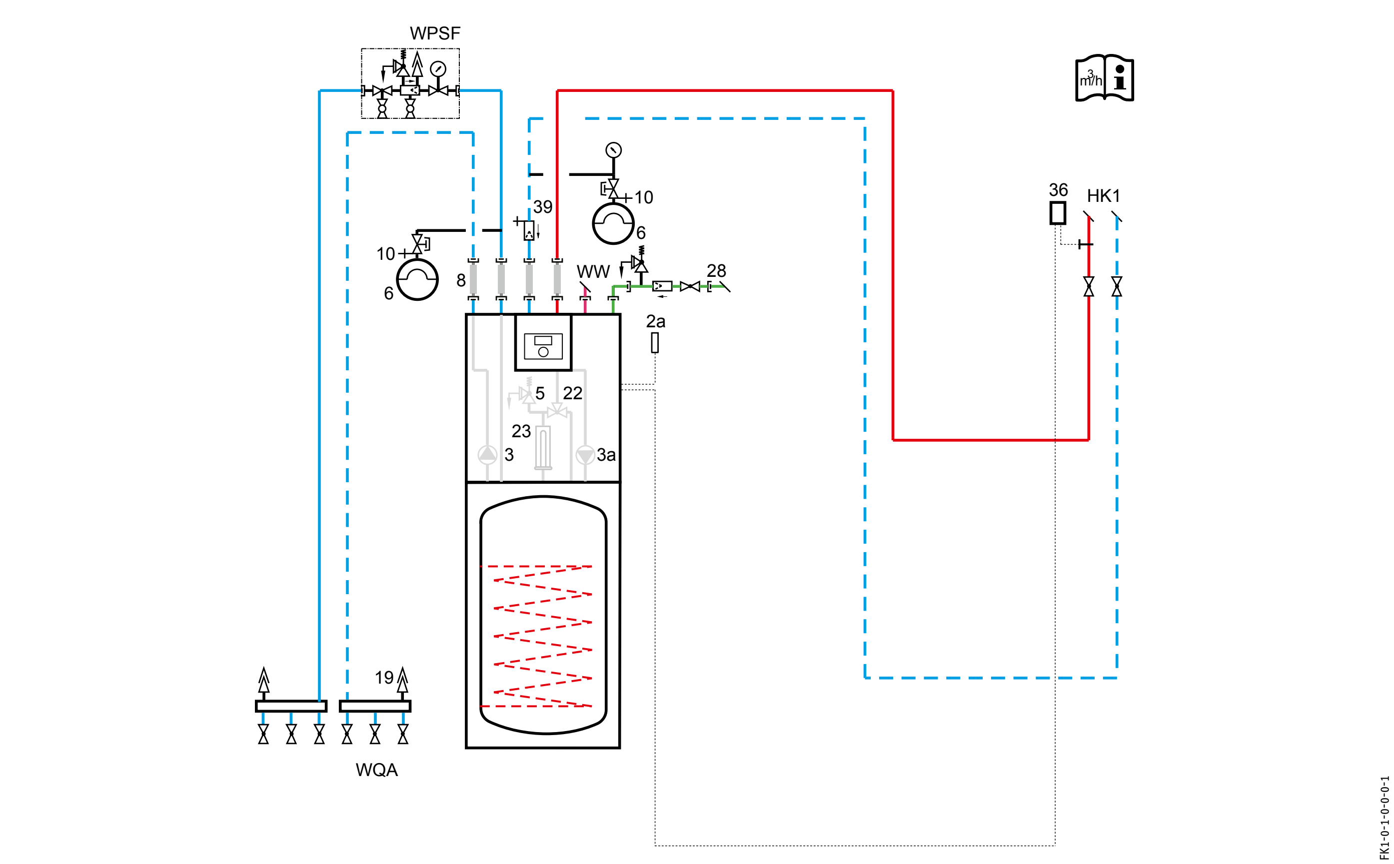
Mounting bracket meets standards of DIN 3017. The band is made of stainless steel (UNI x 8 Cr 17-DIN 1.4016(W2) - AISI 430) and the closure of hardened galvanised steel.

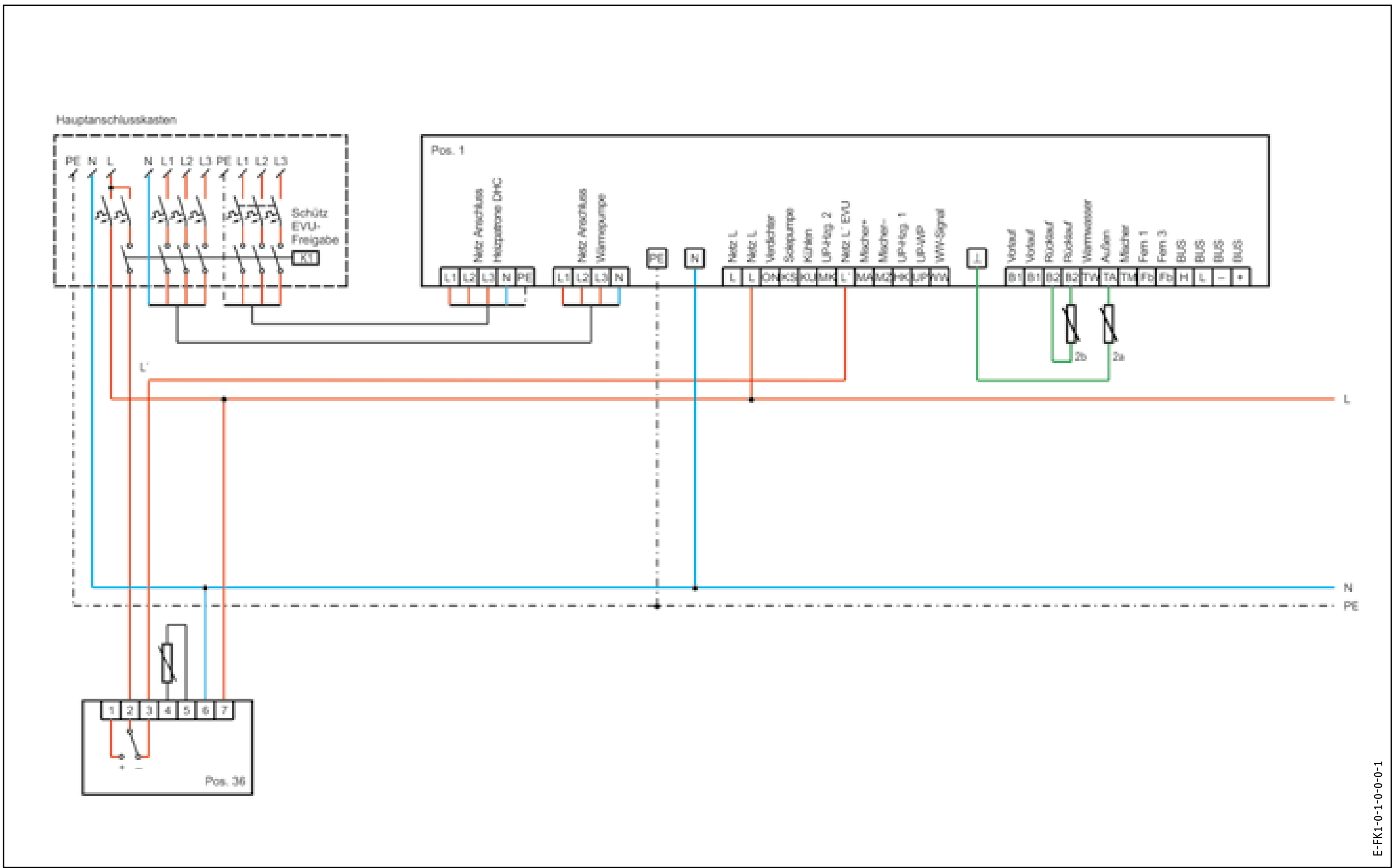
		BS LSWP 160-4 AL	BS LSWP 200-4 AL
		234108	234109
Minimum diameter	mm	60	60
Max. diameter	mm	180	215

Key

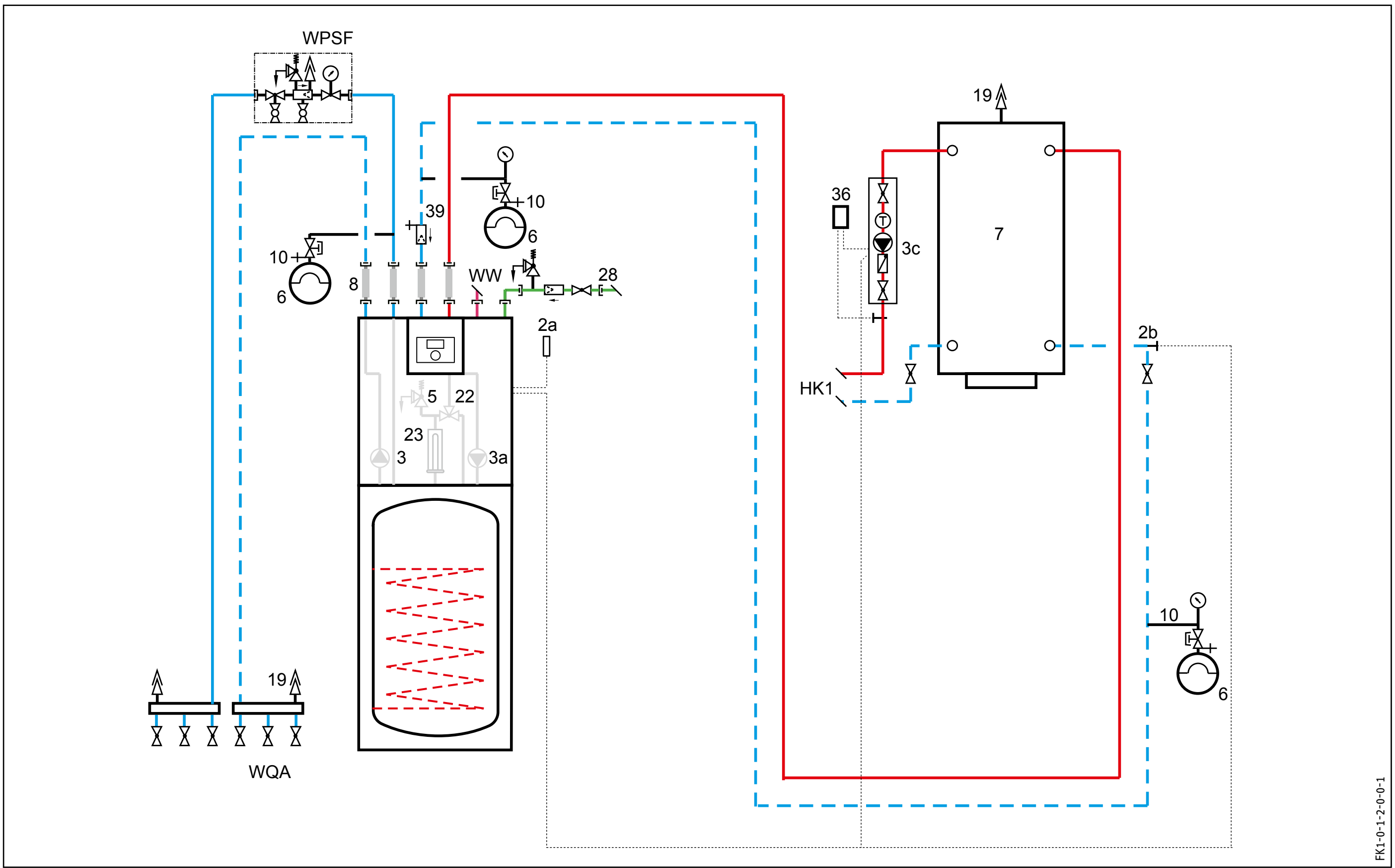
1	Central heating heat pumps
1-1	Air/heating module
1-2	Cooling module
2	Heat pump manager
2-1	Mixer module
2-2	FE 7 remote control
2-3	Remote control unit FEK, cooling
2 a	Outside temperature sensor
2 b	Return temperature sensor, heat pump
2c	Flow temperature sensor, heat pump
2 d	DHW temperature sensor
2 e	Heating circuit temperature sensor for mixer control
2 f	Temperature sensor heat source 2
2 g	Heat source temperature sensor
2 h	Swimming pool temperature sensor
2 k	Solar collector temperature sensor
2 ko	Collector sensor, solar thermal system, east
2 kw	Collector sensor, solar thermal system, west
2 i	Sensor 1, return temperature raising facility
2 m	Sensor 2, return temperature raising facility
2 p	Cylinder sensor, solar thermal system, buffer
2 r	Cylinder sensor, solar thermal system, additional cylinder
2s	Cylinder sensor, solar thermal system, DHW/cooling mode
3	Circulation pump, heat pump (heat source)
3a	Circulation pump, heat pump (heating side)
3b	Circulation pump, DHW heating
3c	Circulation pump, heating circuit 1
3d	Circulation pump, heating circuit 2
3e	Circulation pump, swimming pool water heating
3f	Circulation pump, solar thermal system
3f.1	Circulation pump, solar thermal system, central heating backup
3f.2	Circulation pump, solar thermal system, swimming pool water
3fo	Circulation pump, solar thermal system, array - east
3fw	Circulation pump, solar thermal system, array - west
3g	Circulation pump, solid fuel boiler
3x	Circulation pump, cooling (heating side)
3y	Circulation pump, cooling (heat source)
4	Compact installation, type WPKI
5	Safety valve
6	Expansion vessel
7	Buffer cylinder/low loss header
8	Pressure hose (anti-vibration mount)
9	Non-return valve
10	Drain & fill valve
11	Oil boiler/gas boiler
12	Electric central heating
13	Mixing valve
14	Servomotor, mixing valve
15	Central heating control unit
16	Heating system remote adjuster
17	Outside temperature sensor
18	Flow temperature sensor
19	Ventilation
20	Solid fuel boiler with thermally activated safety valve
21	Solenoid valve
22	Reversing valve
23	Threaded immersion heater BGC
24	Indirect coils
25	Combi cylinder
26	DHW cylinders
27	Central thermostat
28	Cold water safety assembly to DIN 1988
29	Temperature controller for swimming pool water
30	Electronic temperature controller
31	Overflow valve
32	Shut-off gate valve; secure against unintentional closing
33	Line regulating valve
34	Temperature differential controller
35	Flow switch
36	Protective control thermostat for underfloor heating systems
37	Zone valve
38	Inlet pipe
39	Dirt filter
40	Fan convector
41	DHE fully electronic instantaneous water heater
42	Solar collector
43	Flanged immersion heater FCR
I	Heat consumer system (WNA)
II	Heat source system (WQA)
III	Solar thermal system
IV	Cooling system
V	Radiator heating system
VI	Area heating system
VII	Domestic hot water
VIII	Swimming pool water

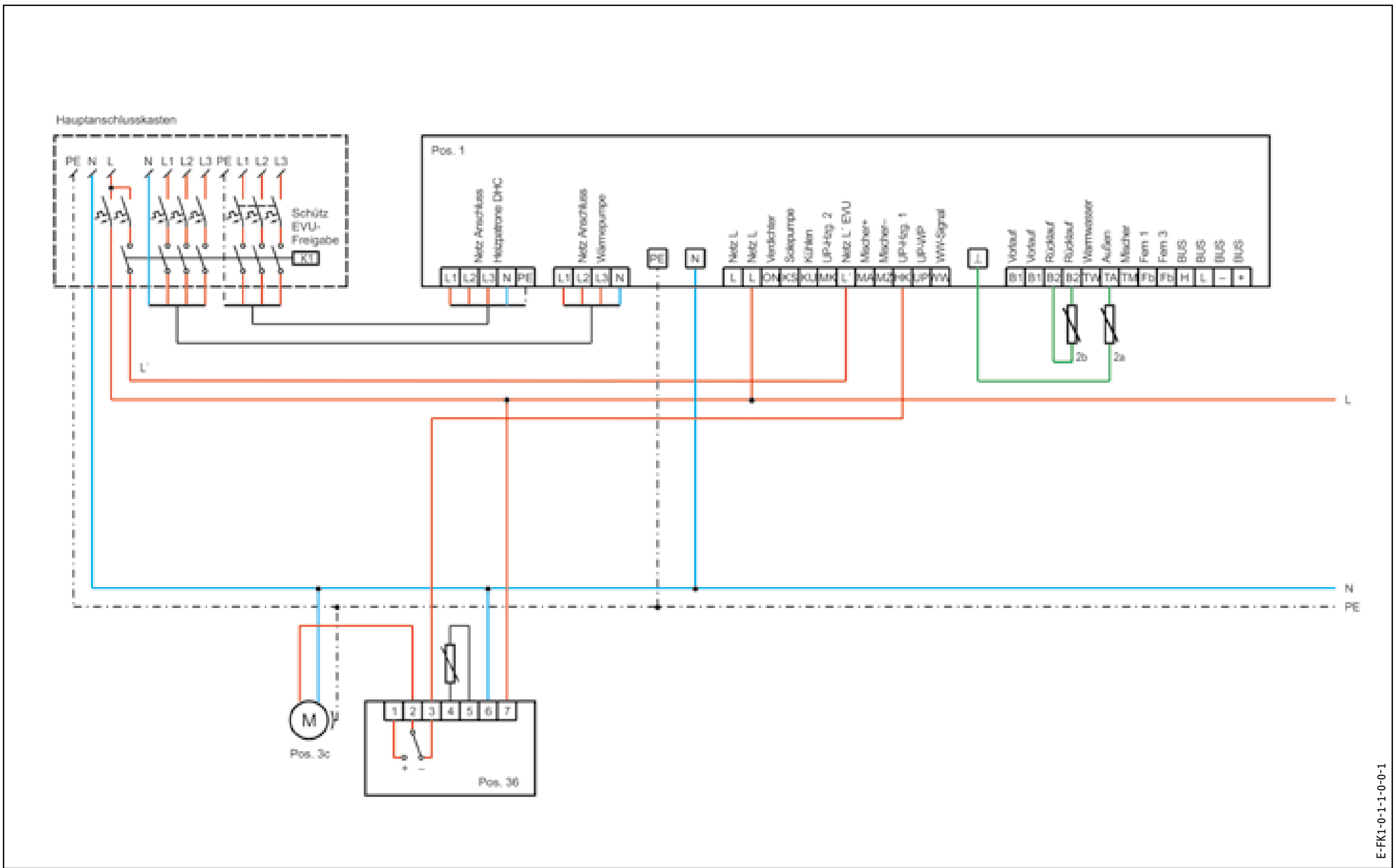
Mono mode without buffer cylinder



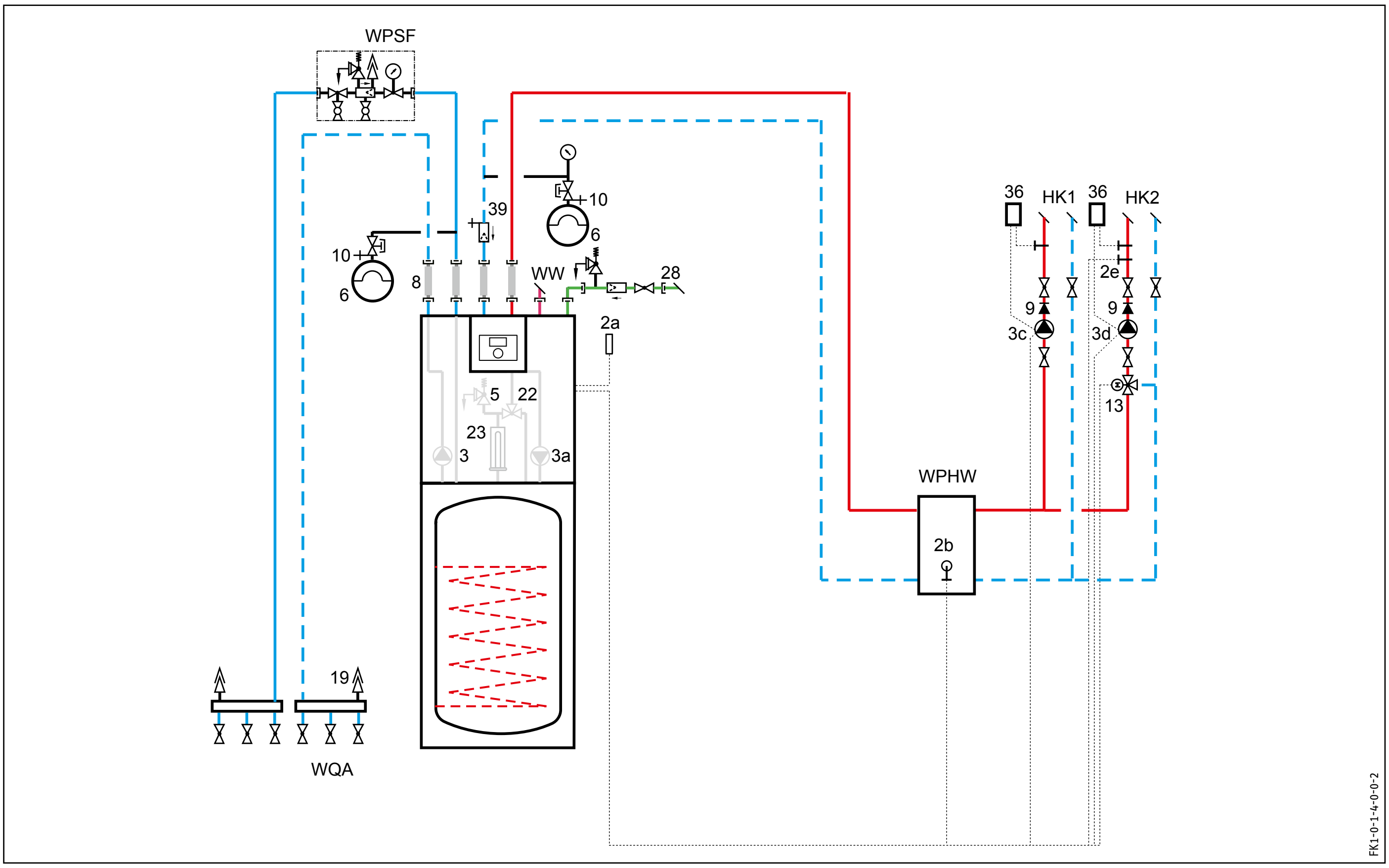


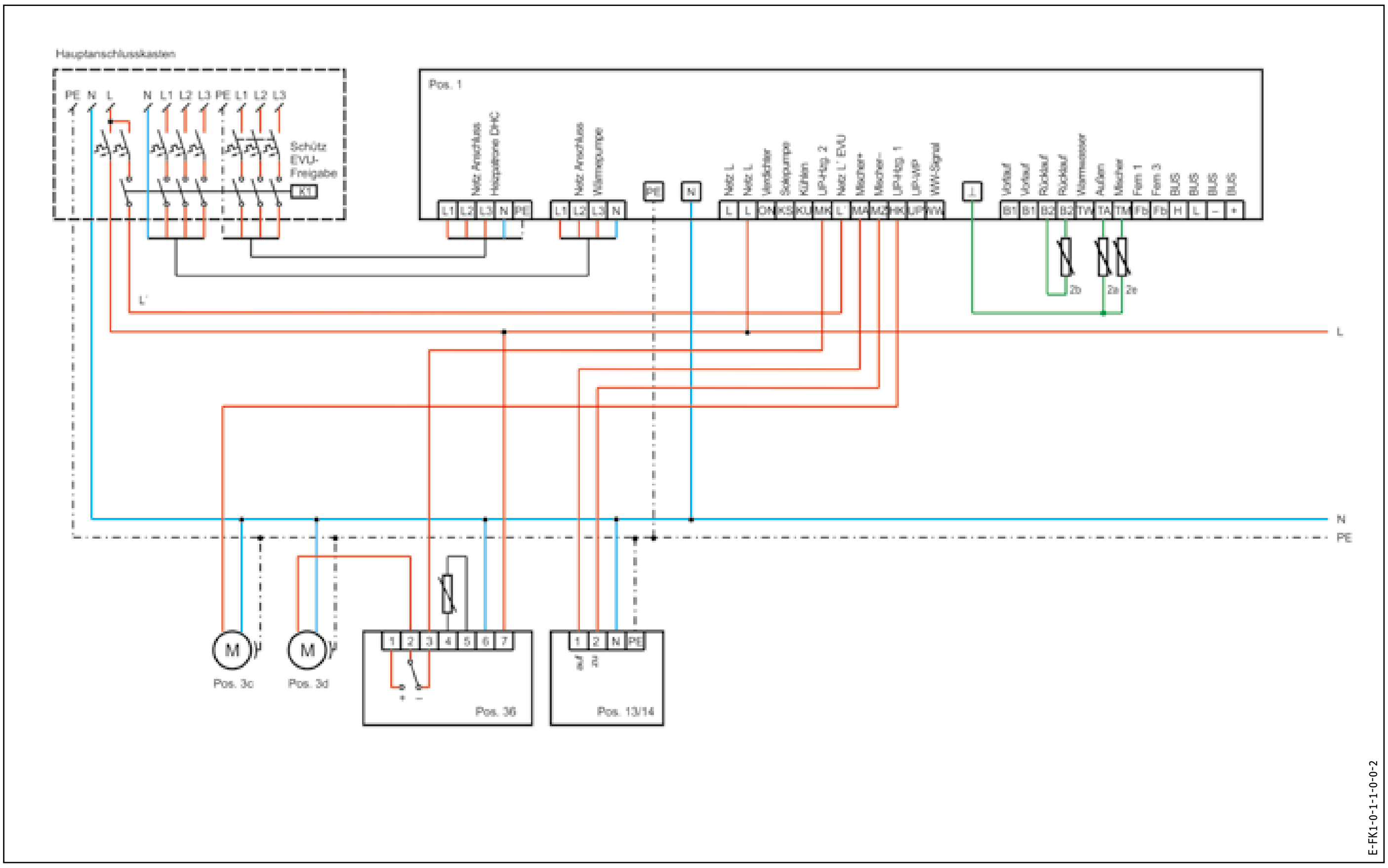
Mono mode with 100 l buffer cylinder and DHW heating



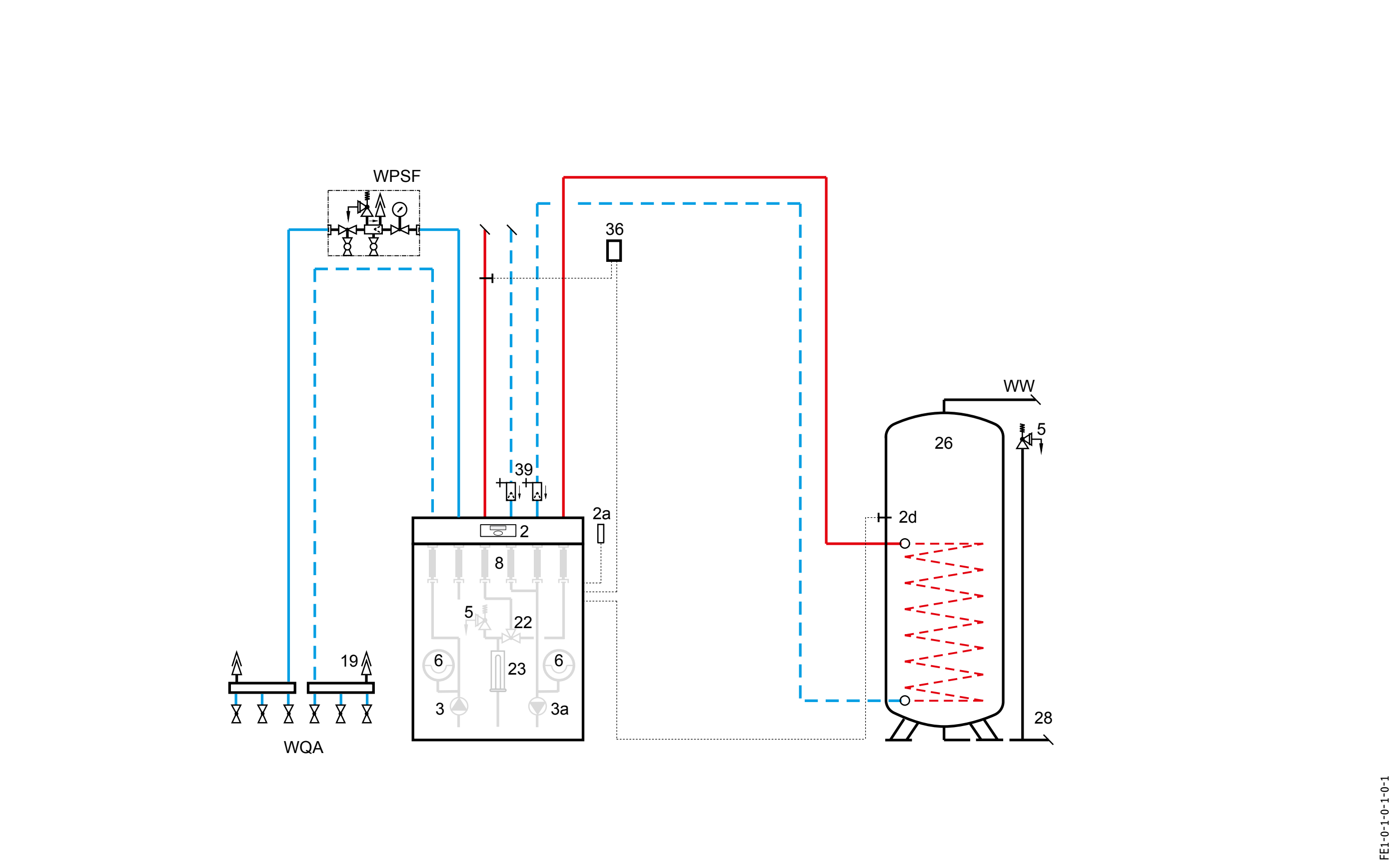


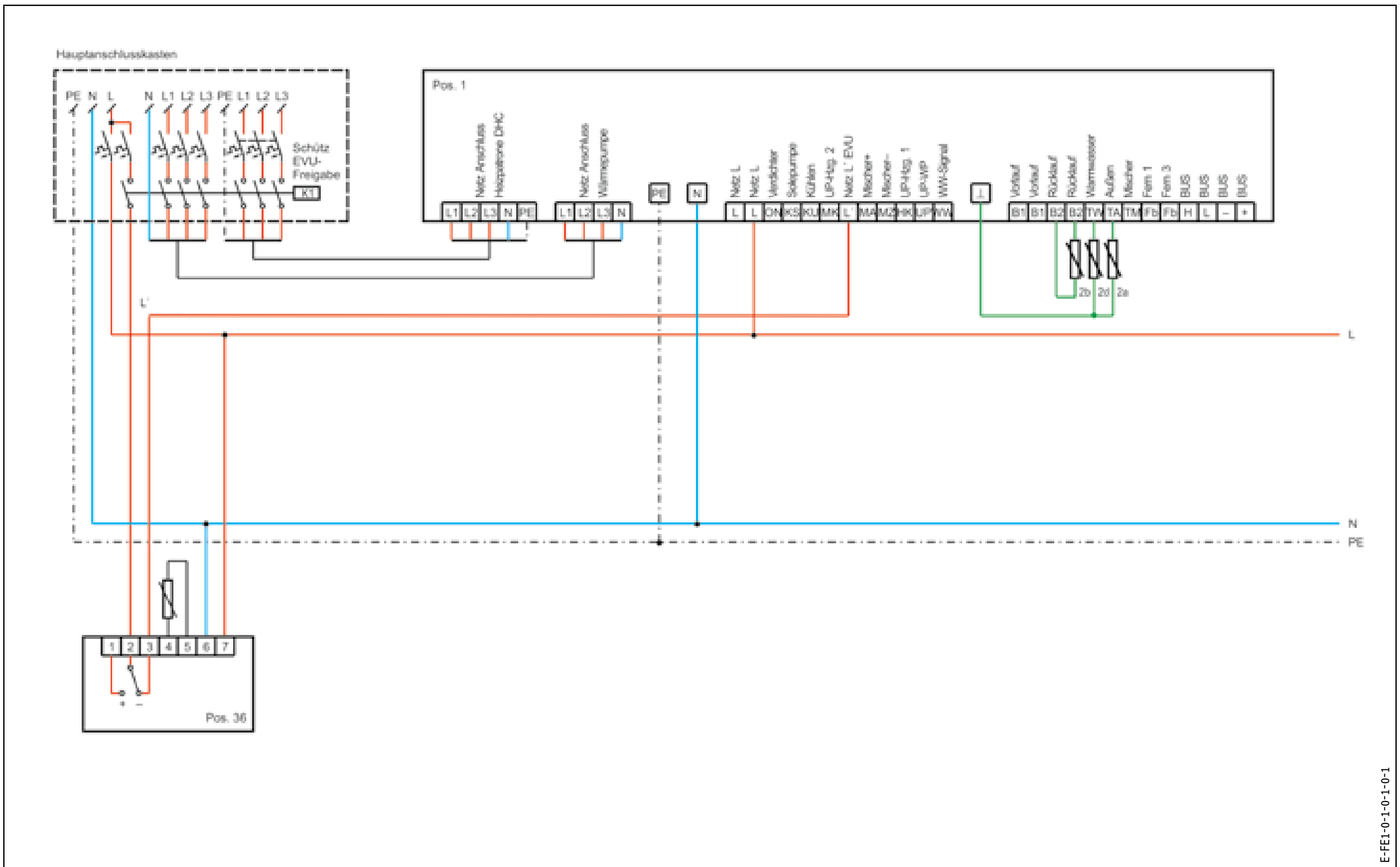
Mono mode with low loss header and DHW heating



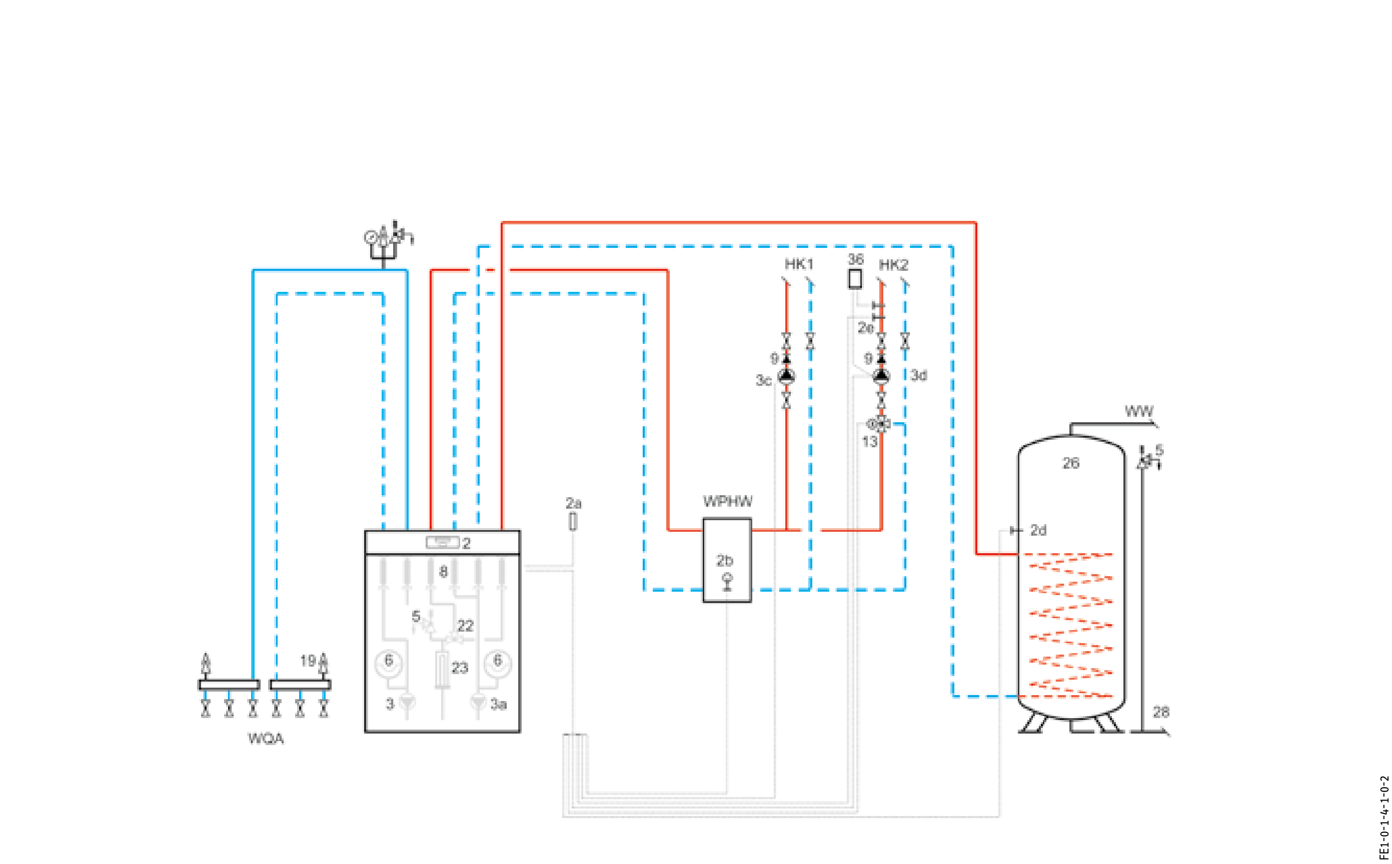


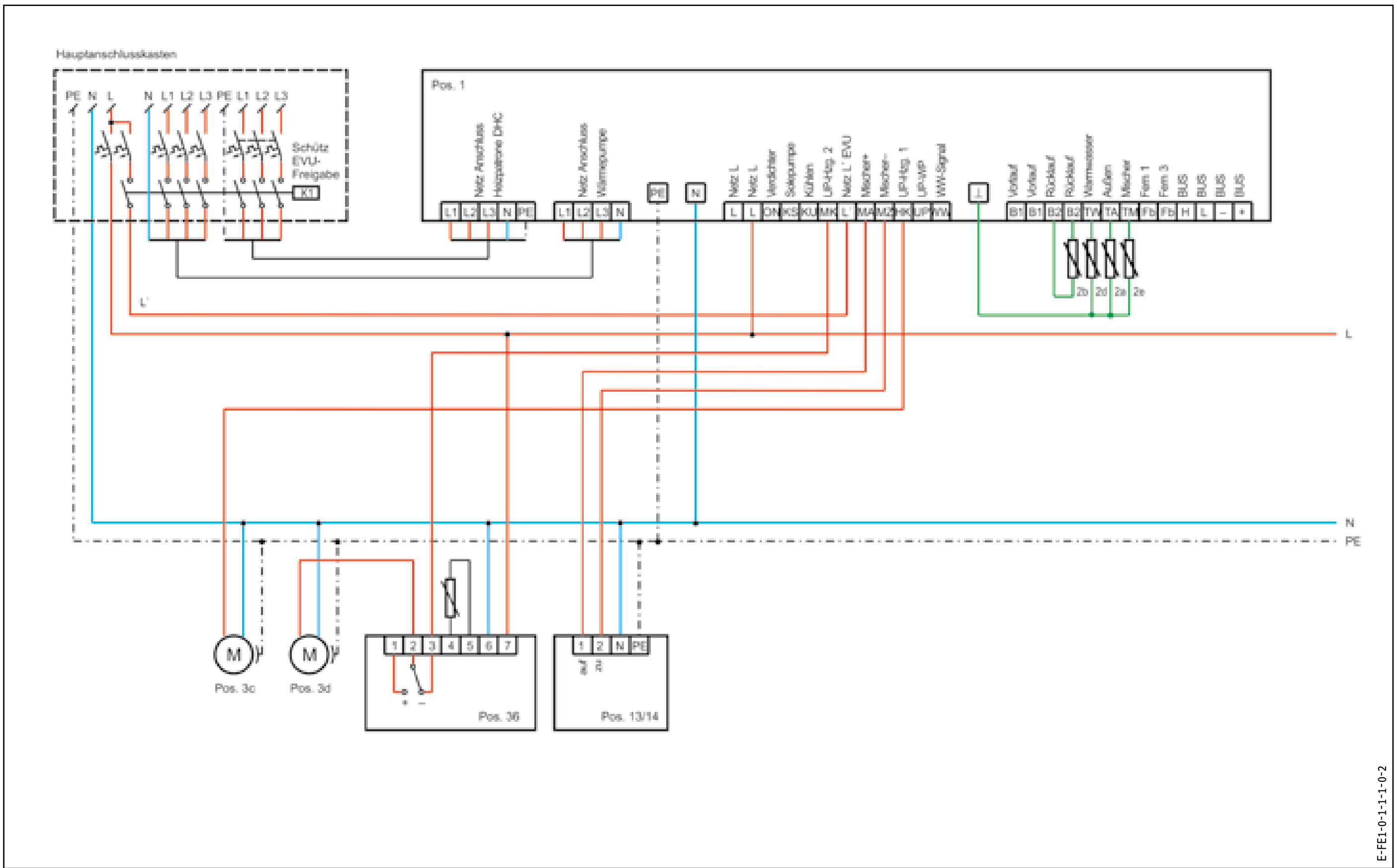
Mono mode without buffer cylinder, with DHW heating



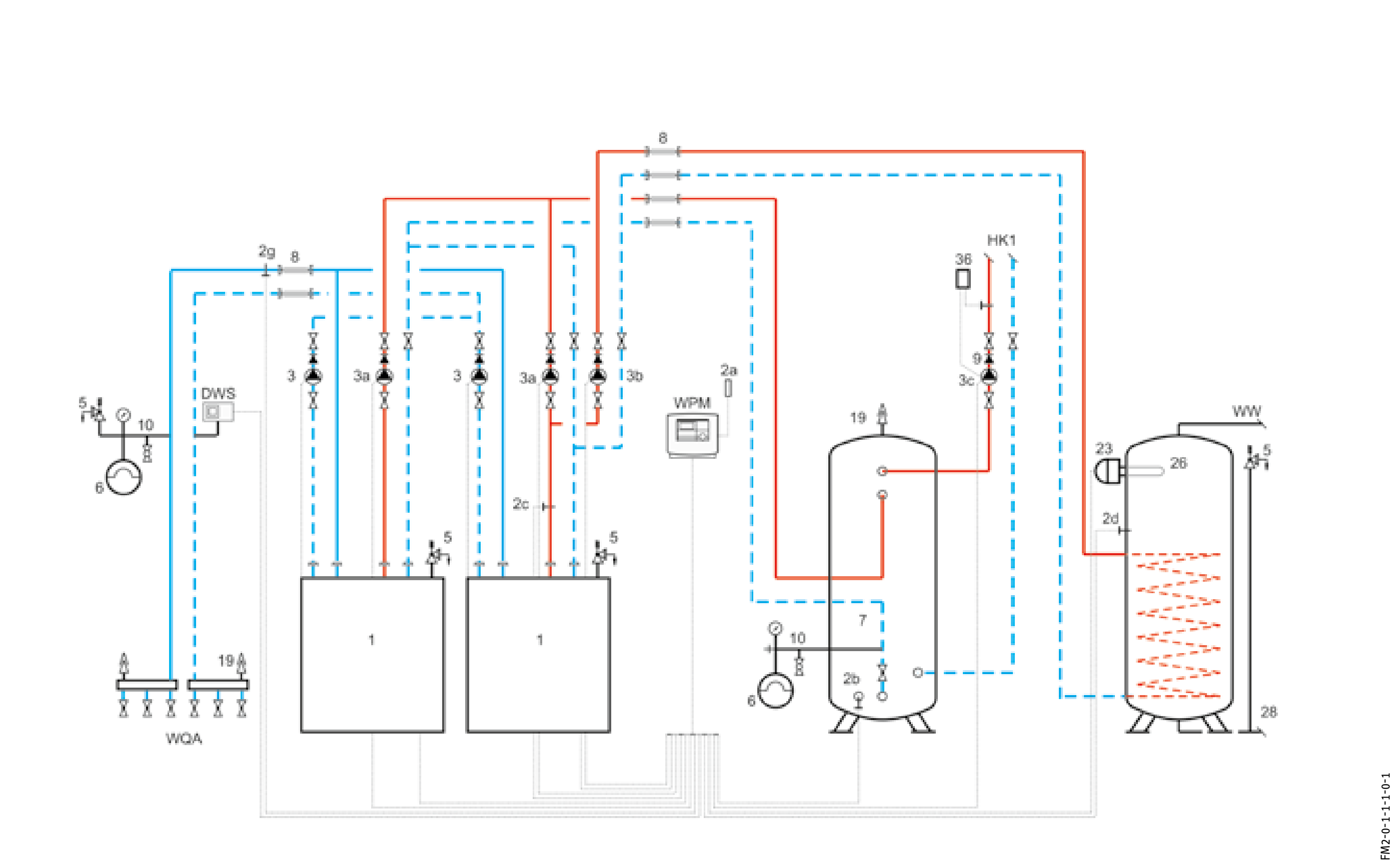


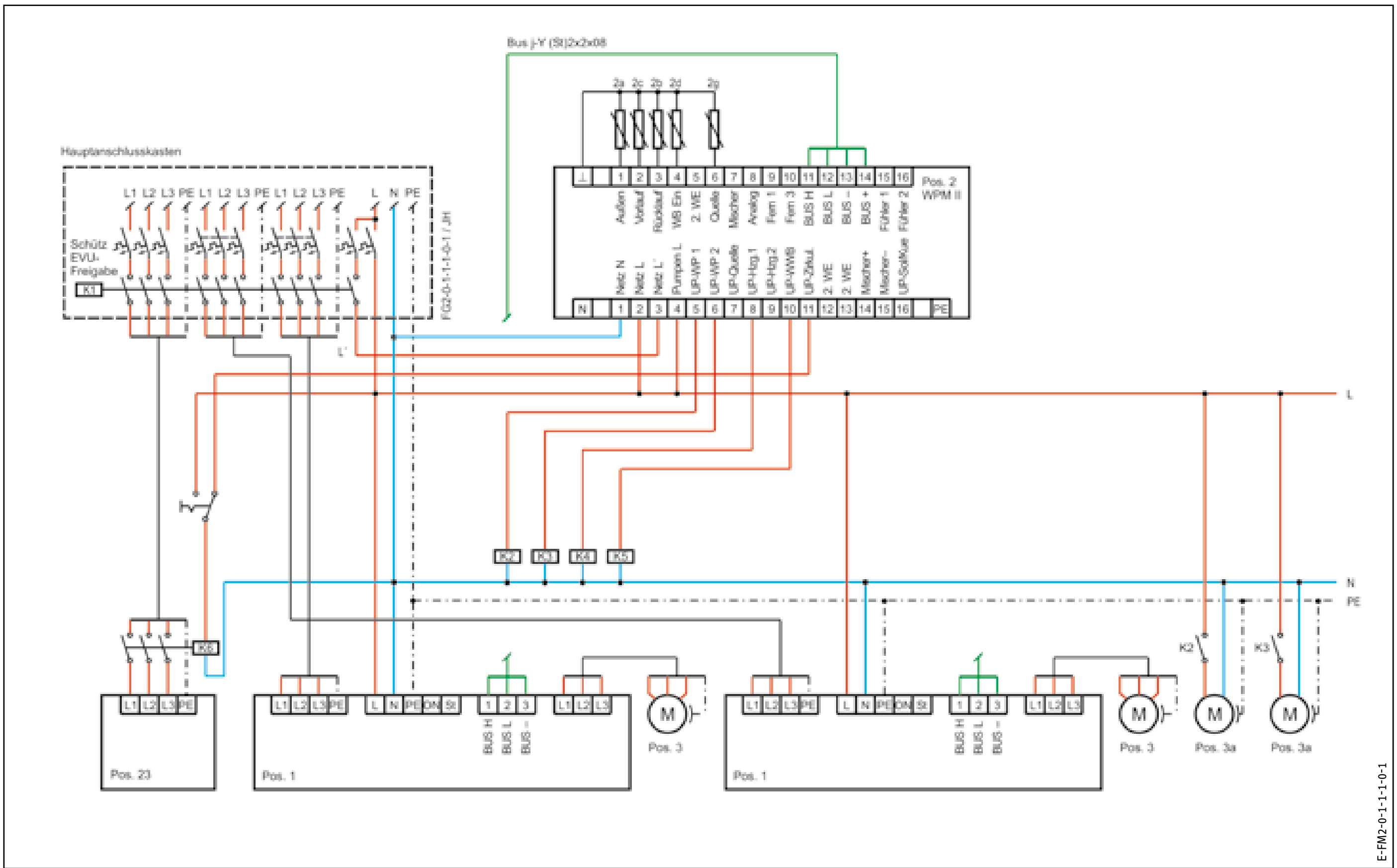
Mono mode with low loss header and DHW heating



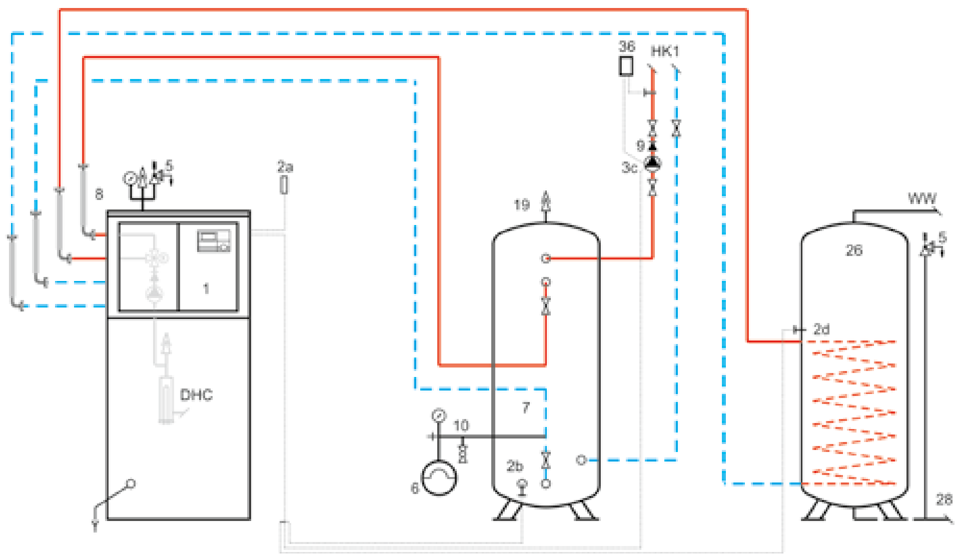


Mono mode with 200-700 l buffer cylinder and DHW heating

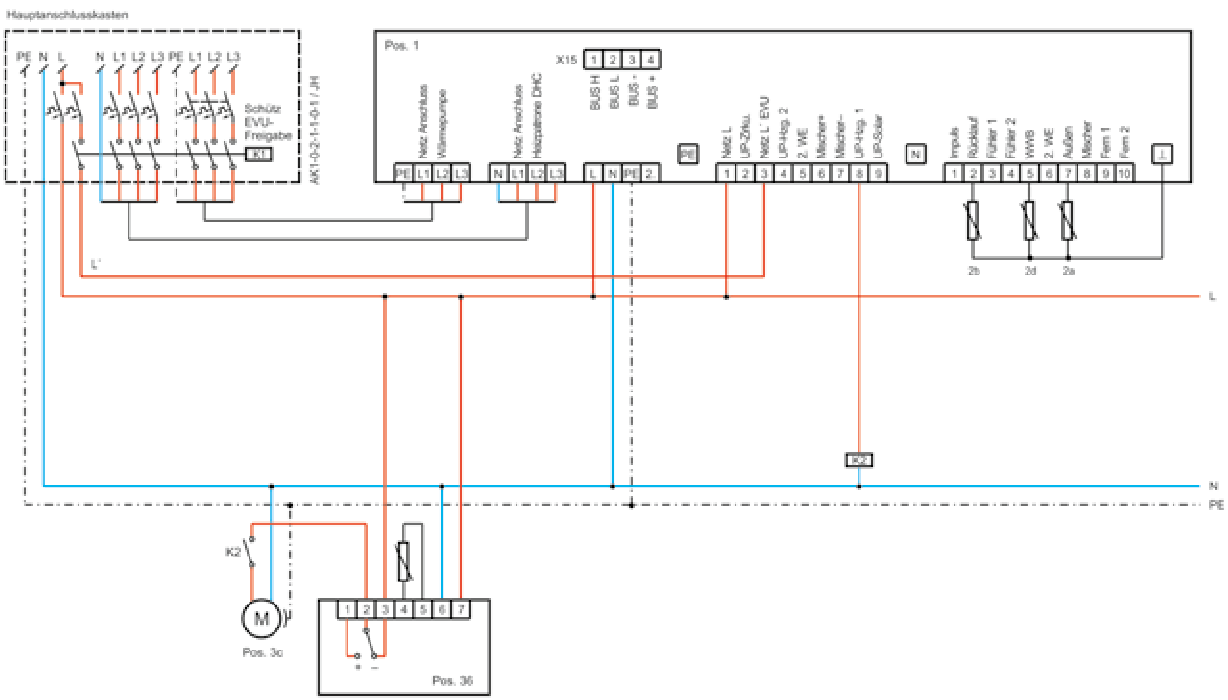




Mono energetic with 200-700 l buffer cylinder and DHW heating

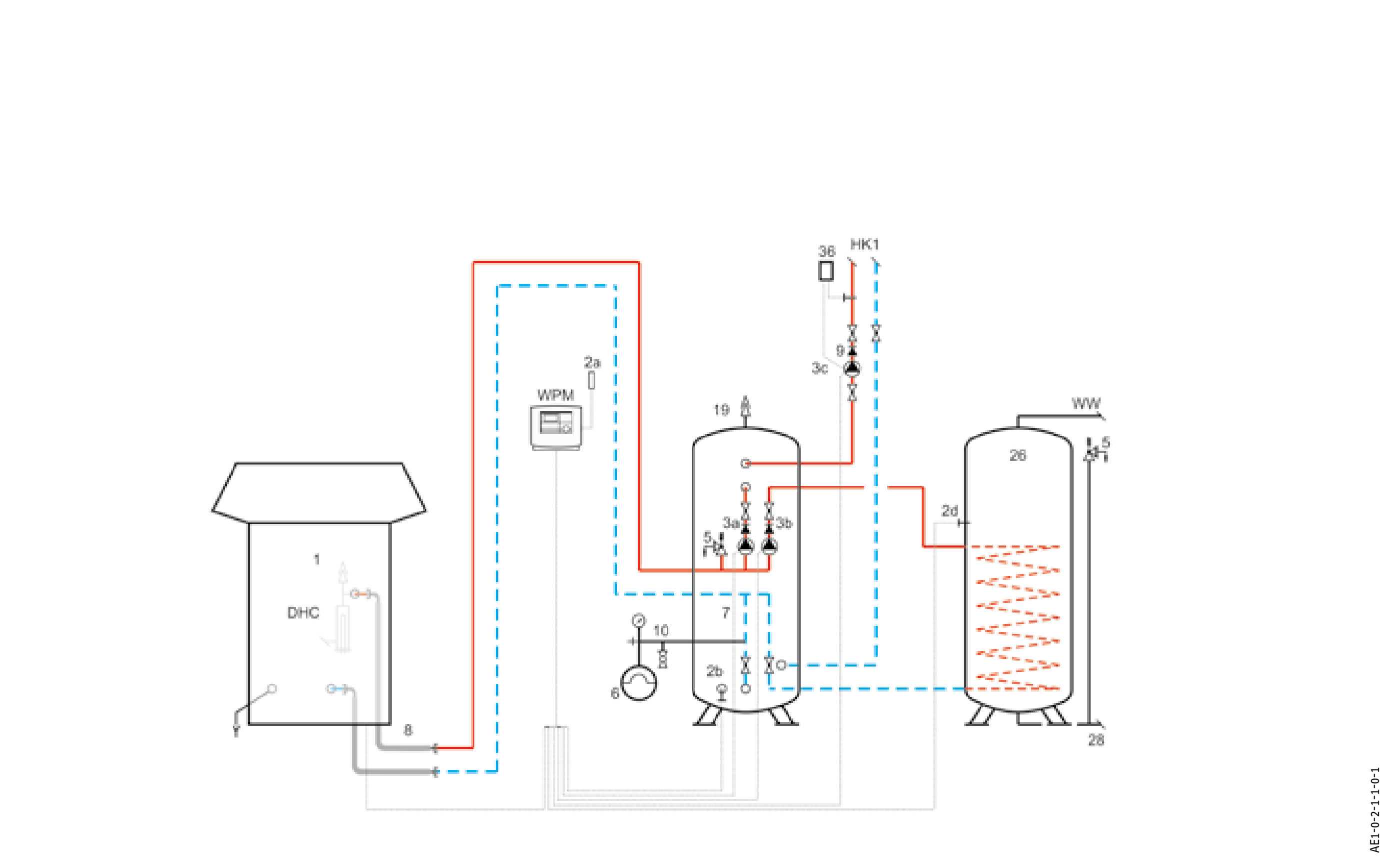


AK1-0-2-1-1-0-1

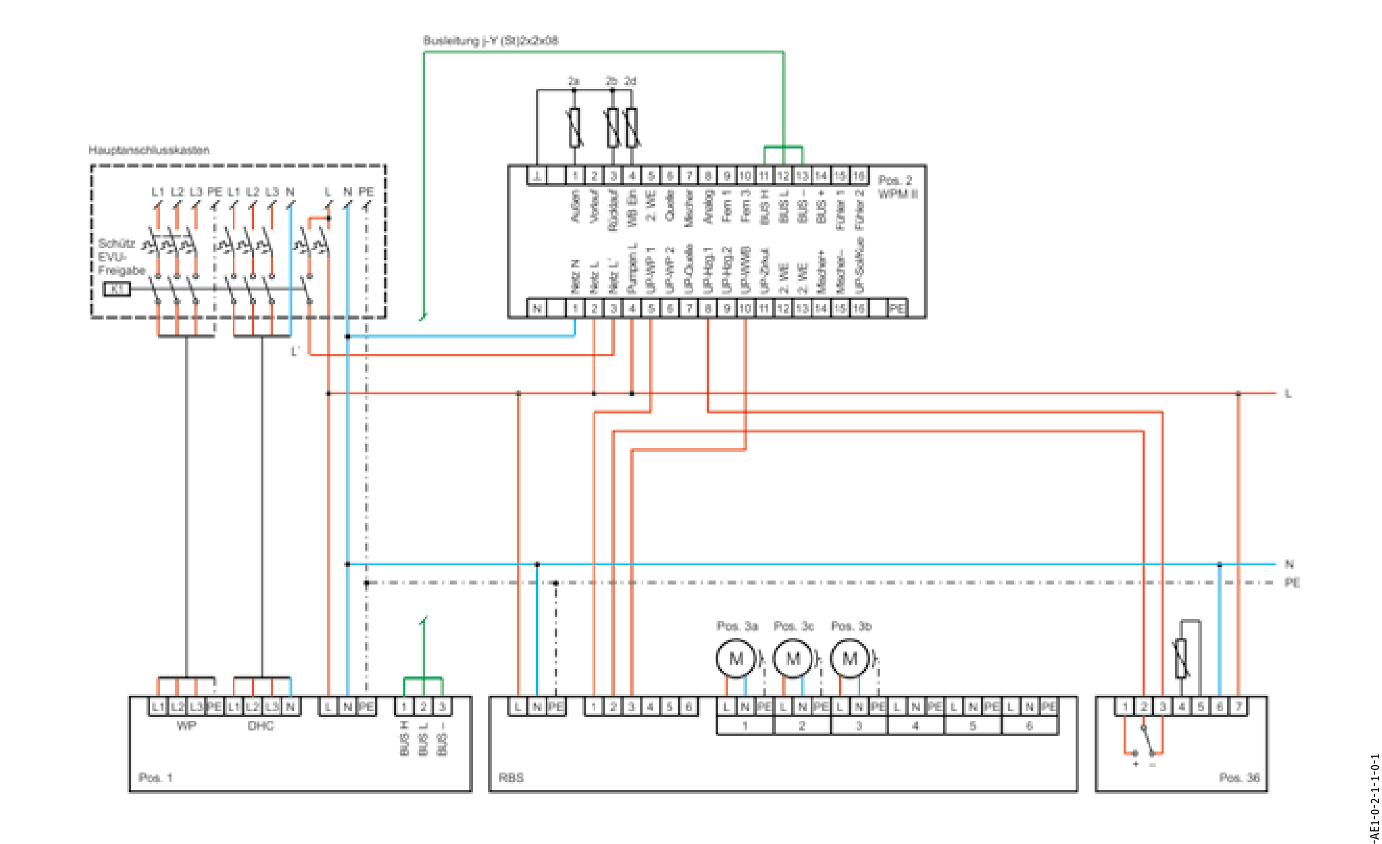


E-AK1-0-2-1-1-0-1

Mono energetic with 200-700 l buffer cylinder and DHW heating

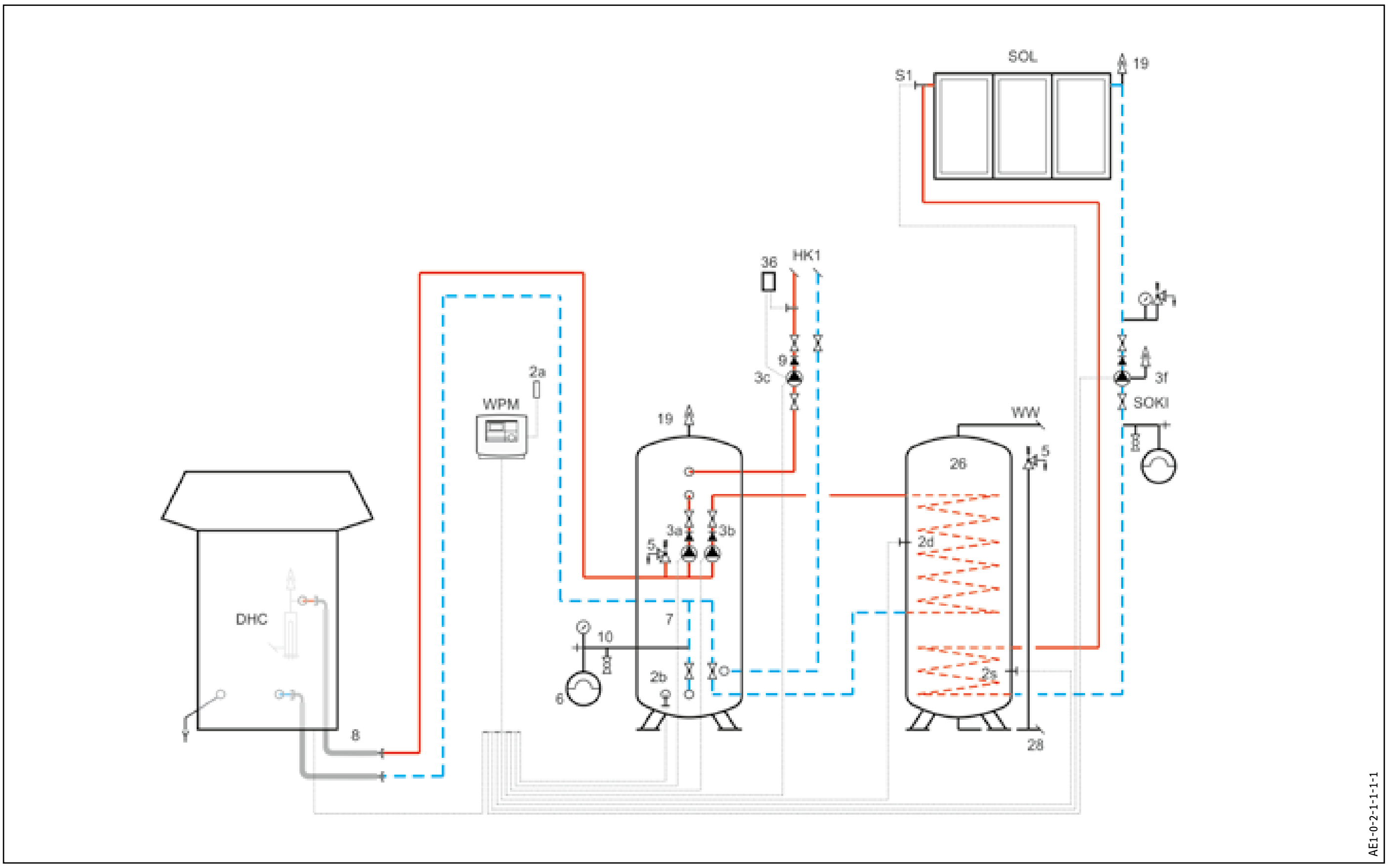


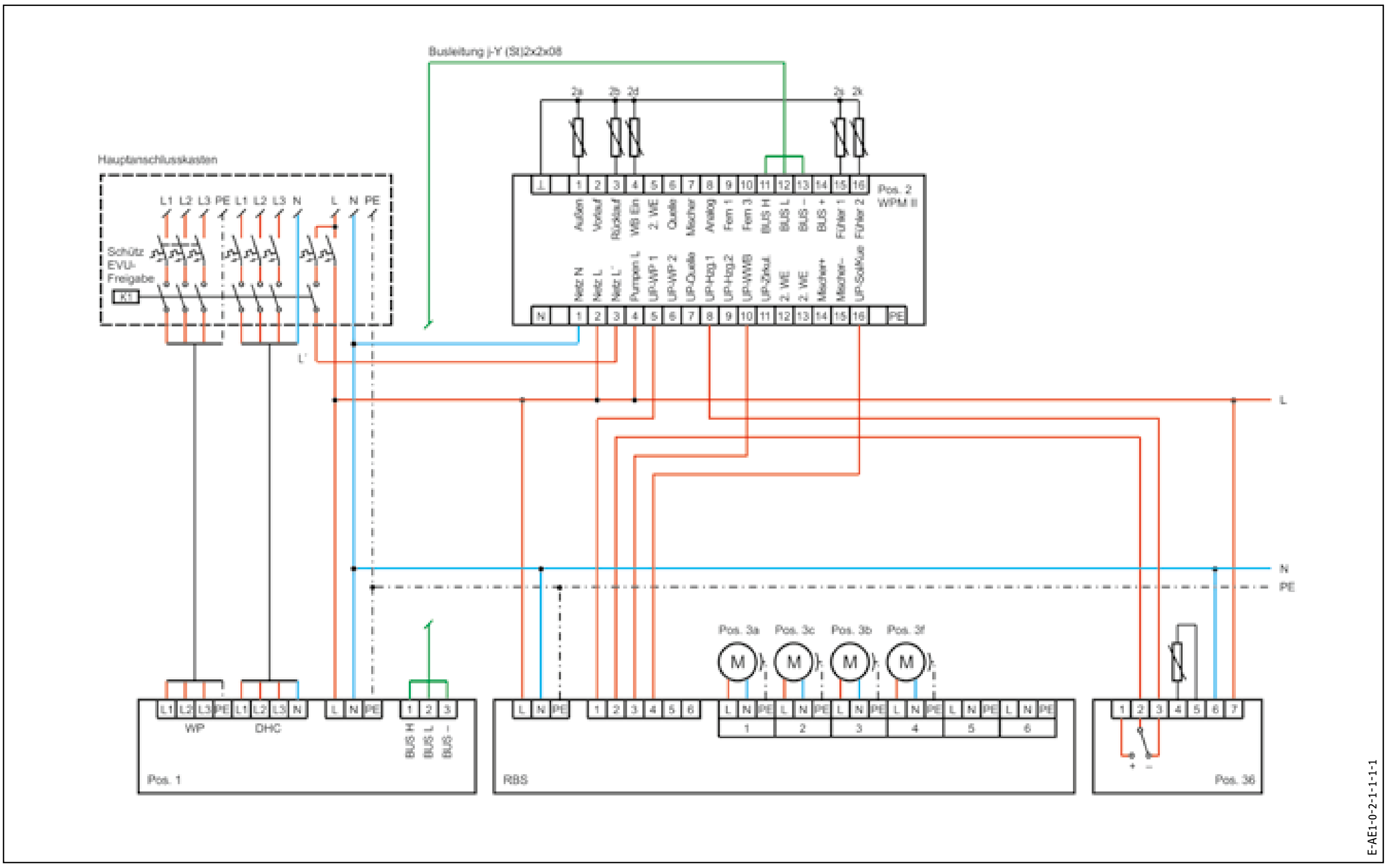
AE1-0-2-1-1-0-1



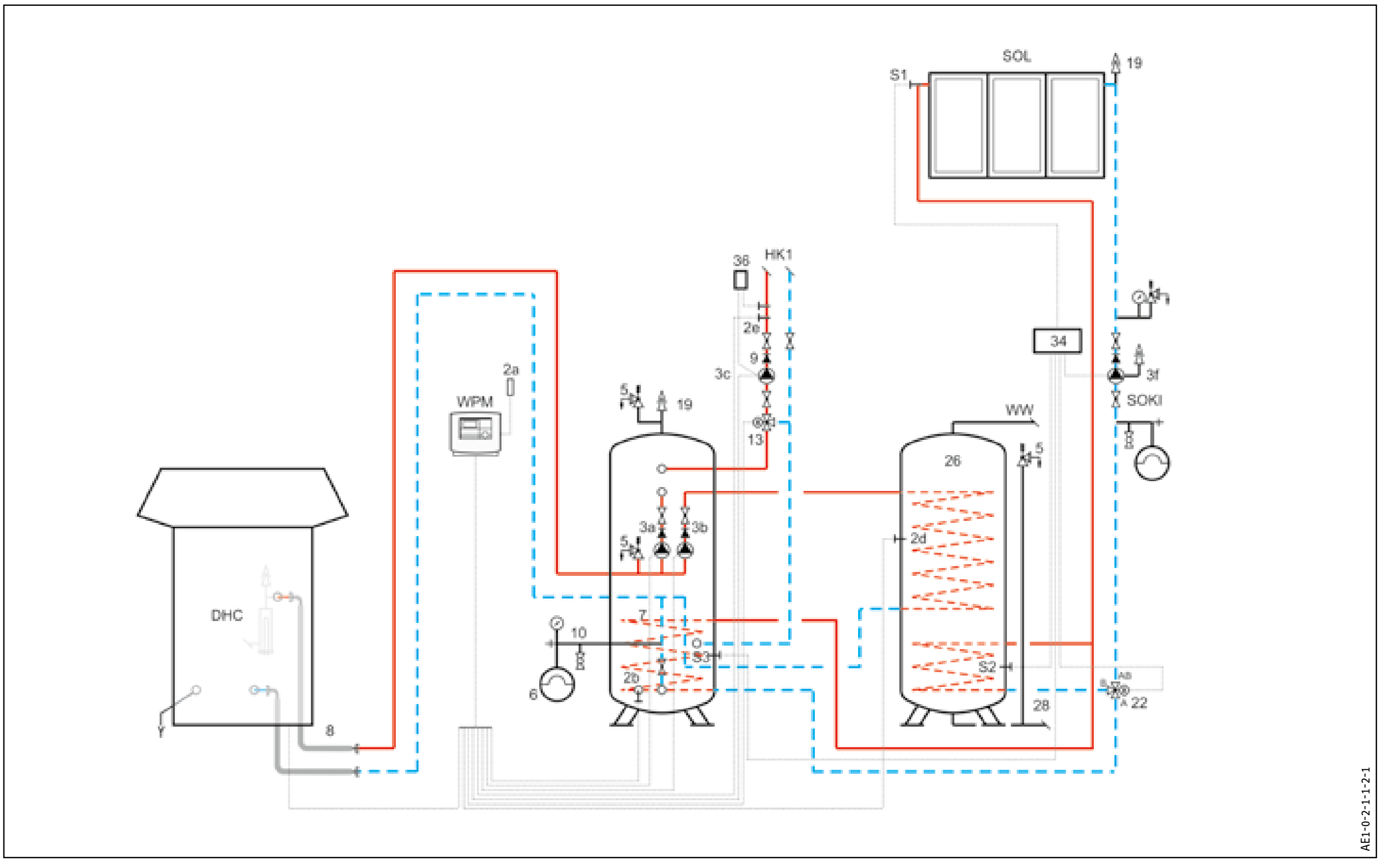
E-AE1-0-2-1-1-0-1

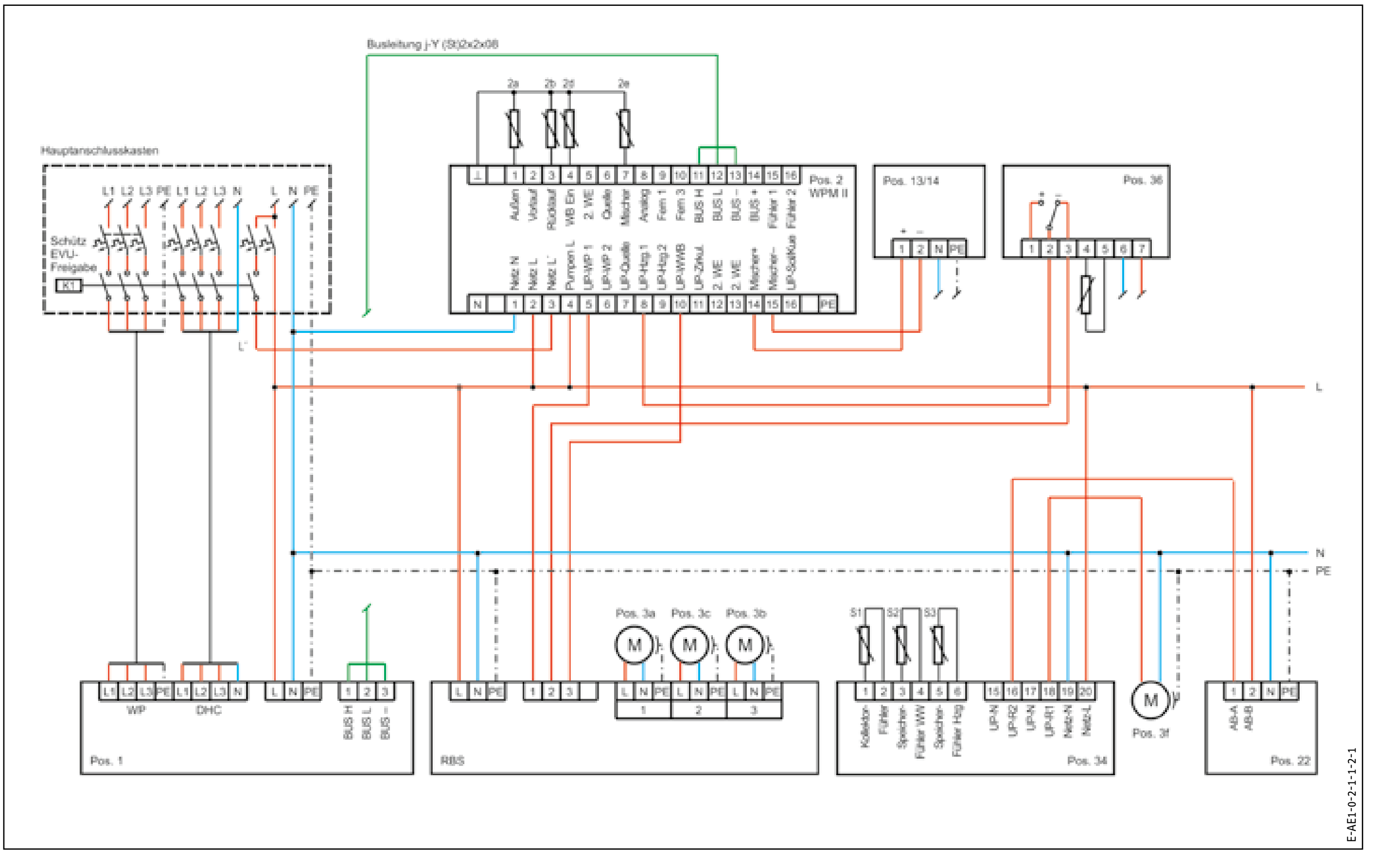
Mono energetic with 200-700 l buffer cylinder, DHW heating and solar collectors



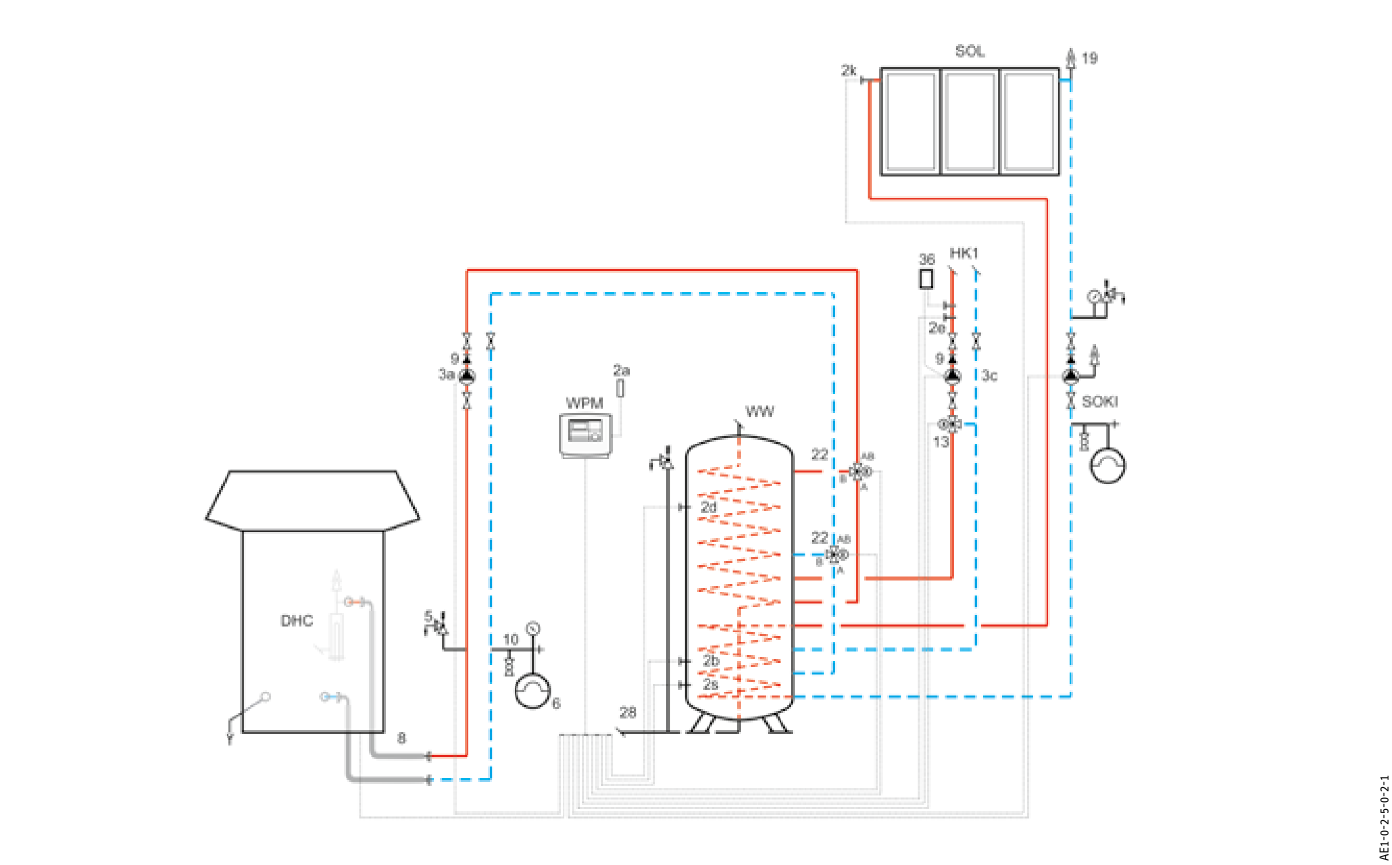


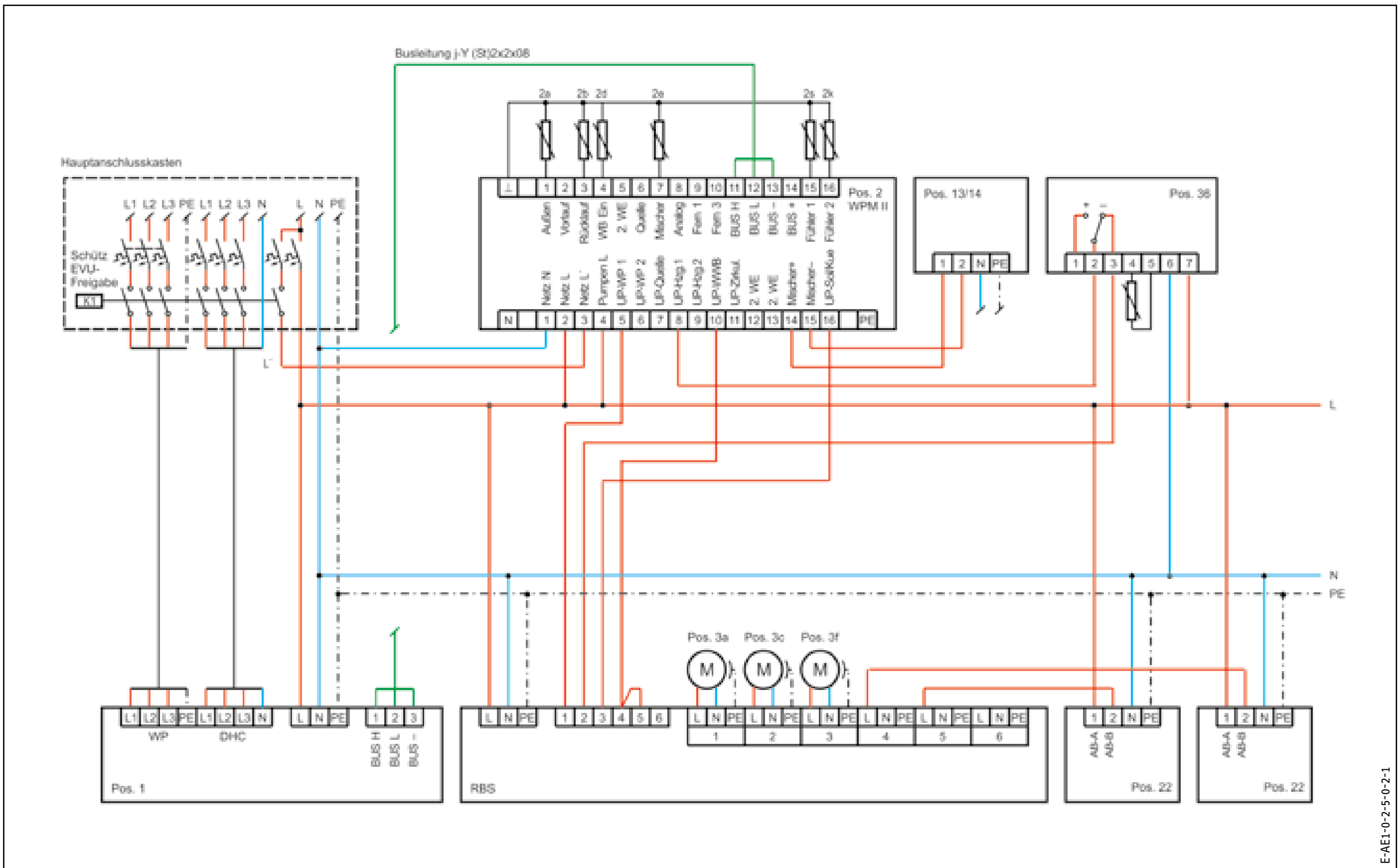
Mono energetic with 700 l buffer cylinder and solar collectors for central heating backup



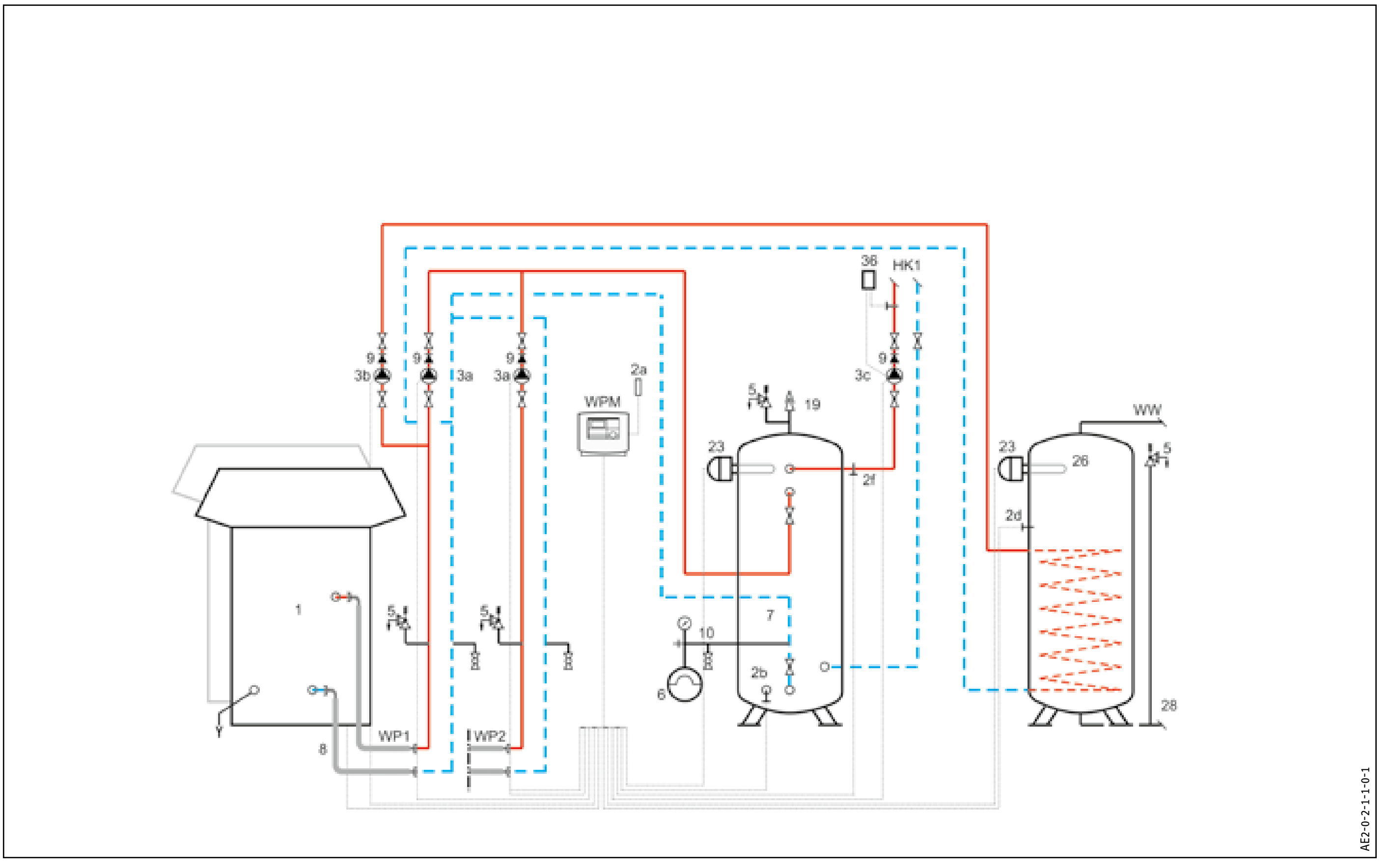


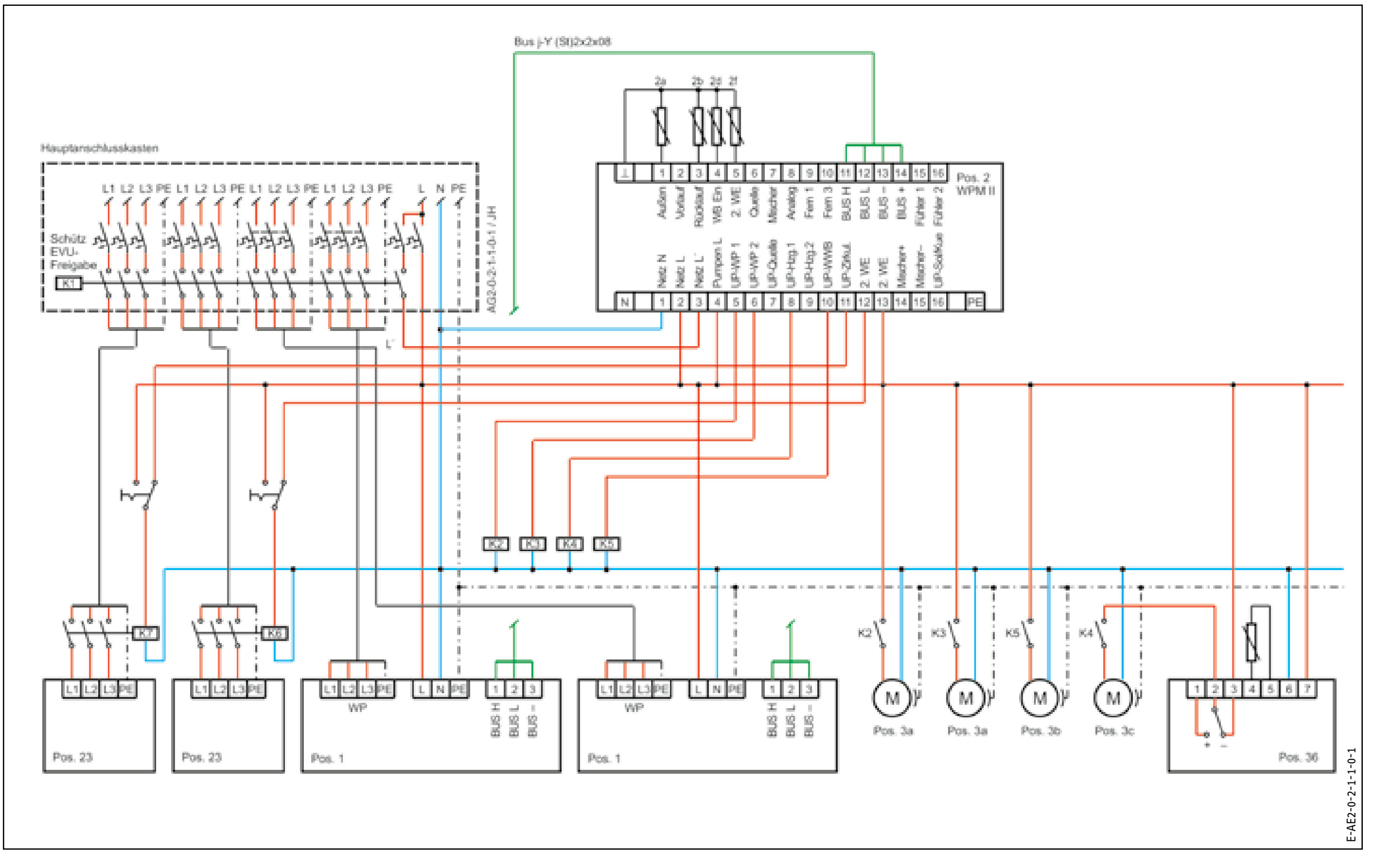
Mono energetic with instantaneous water cylinder and solar collectors for DHW heating



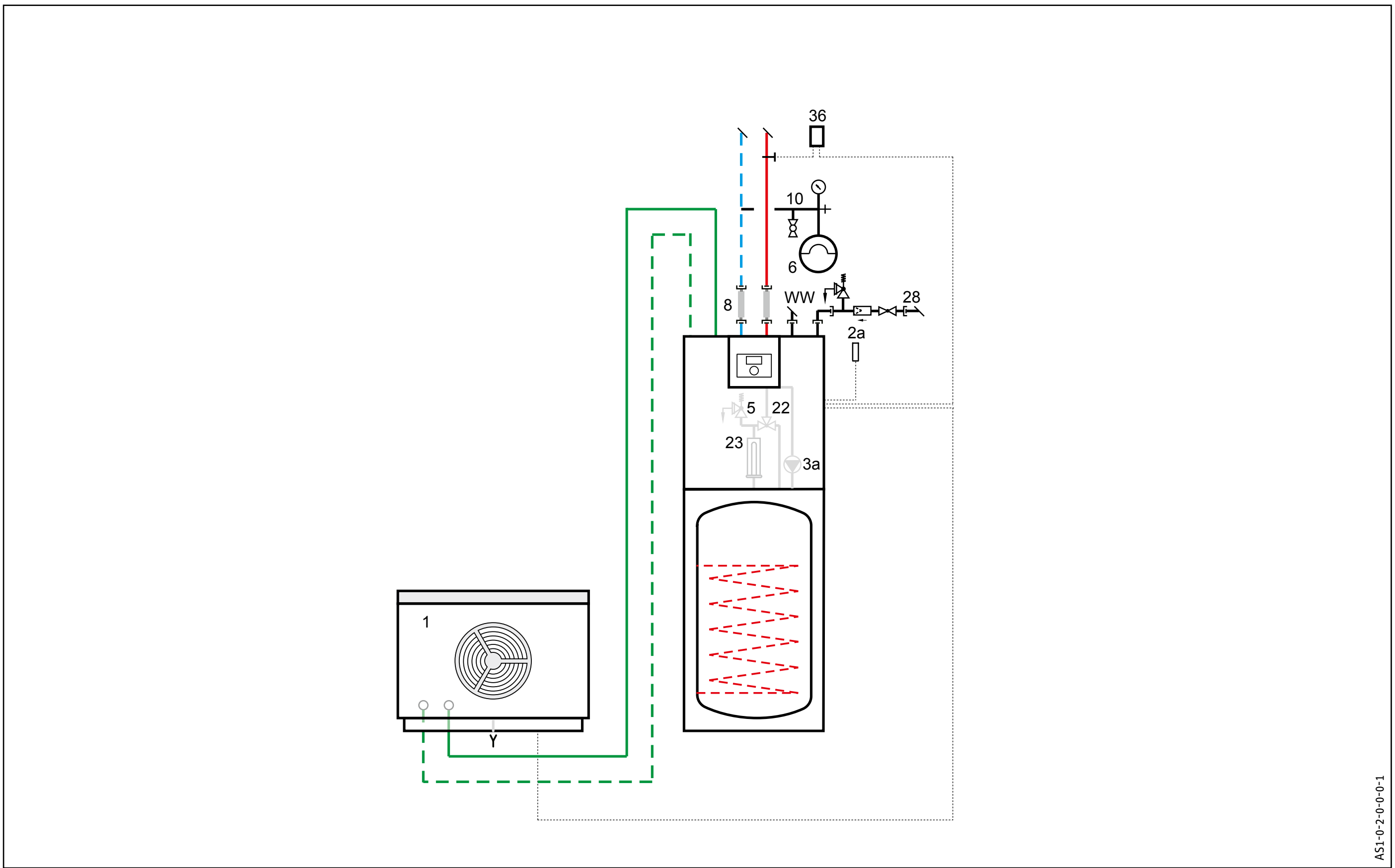


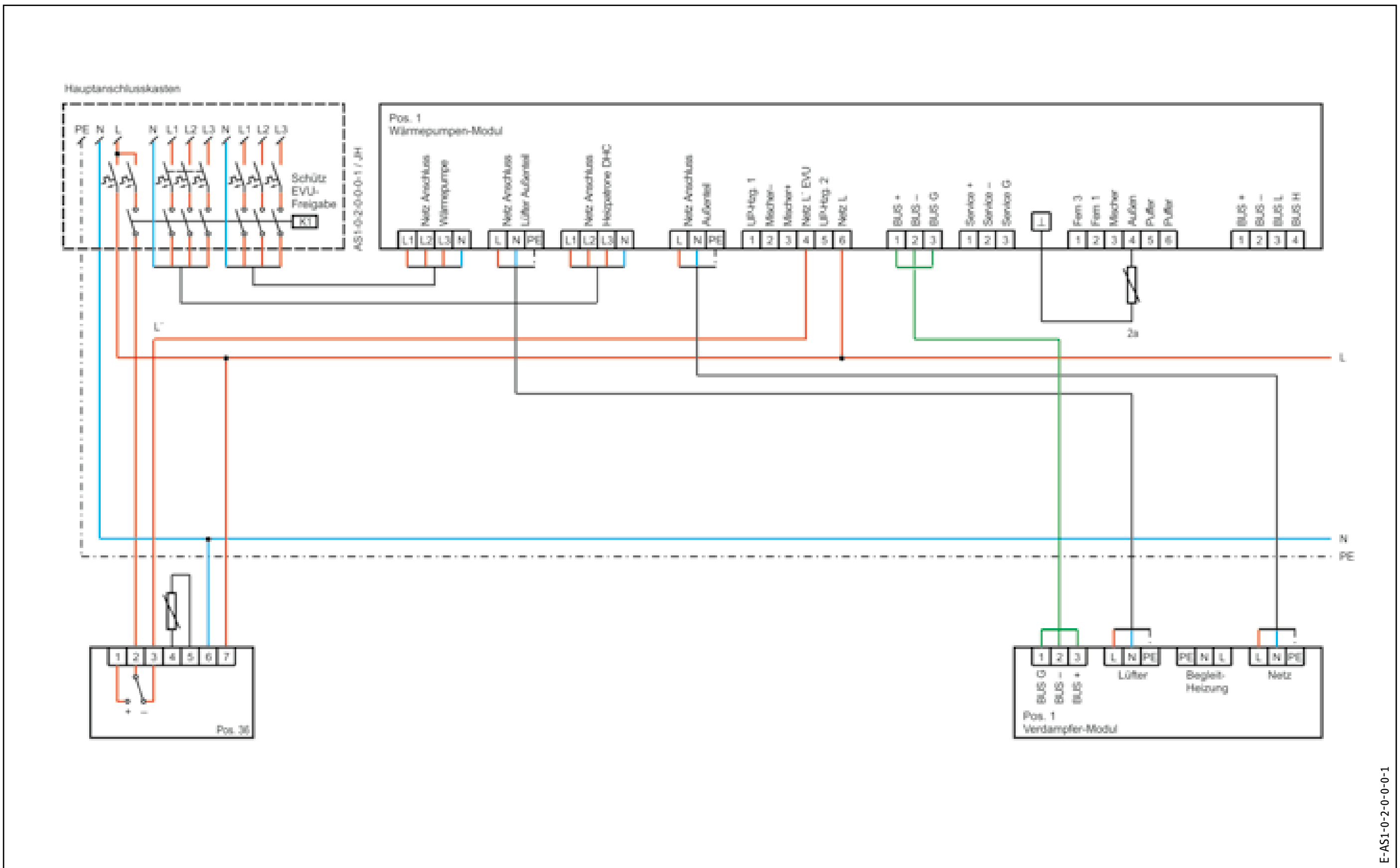
Cascade mono energetic with 700 l buffer cylinder and DHW heating



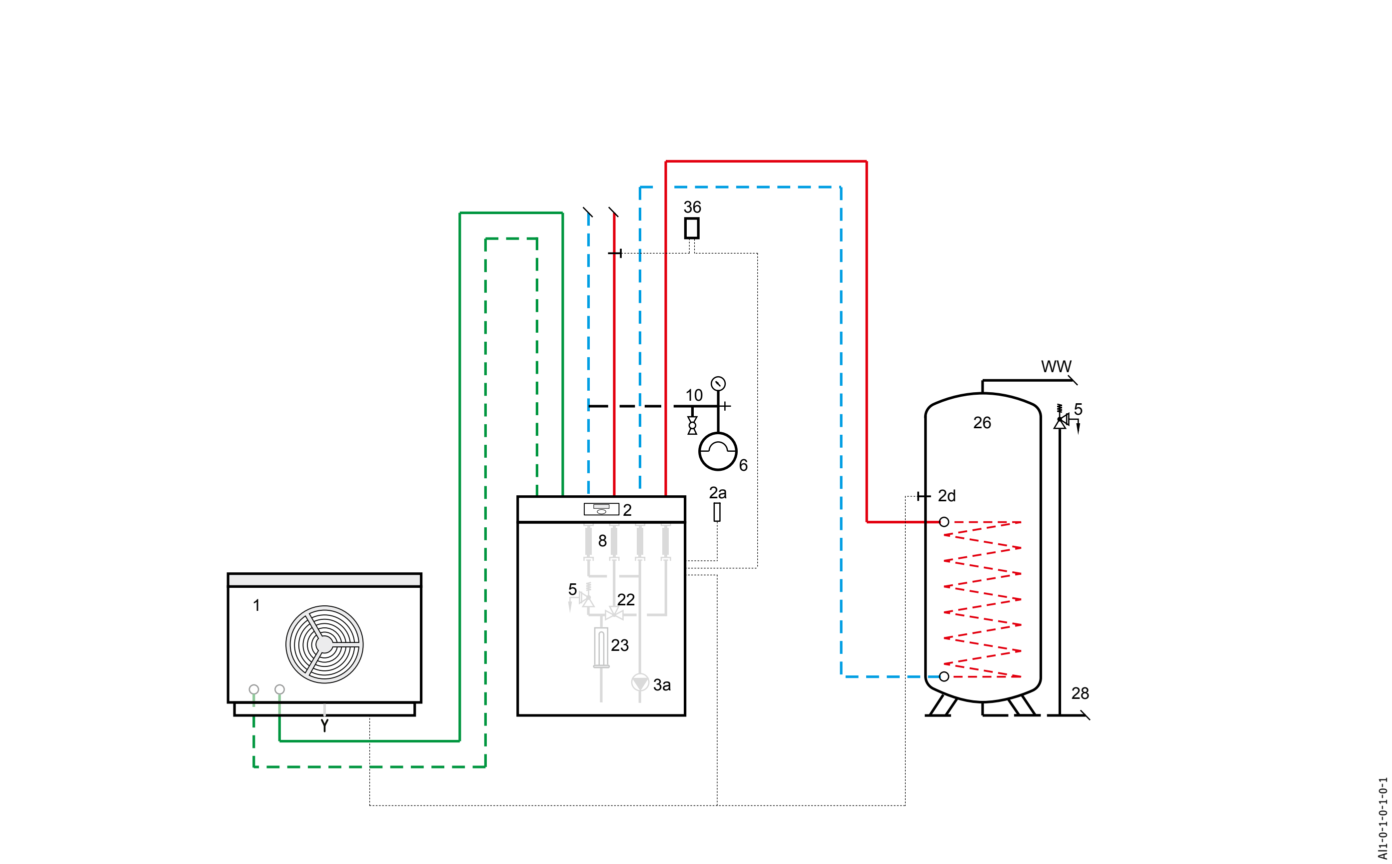


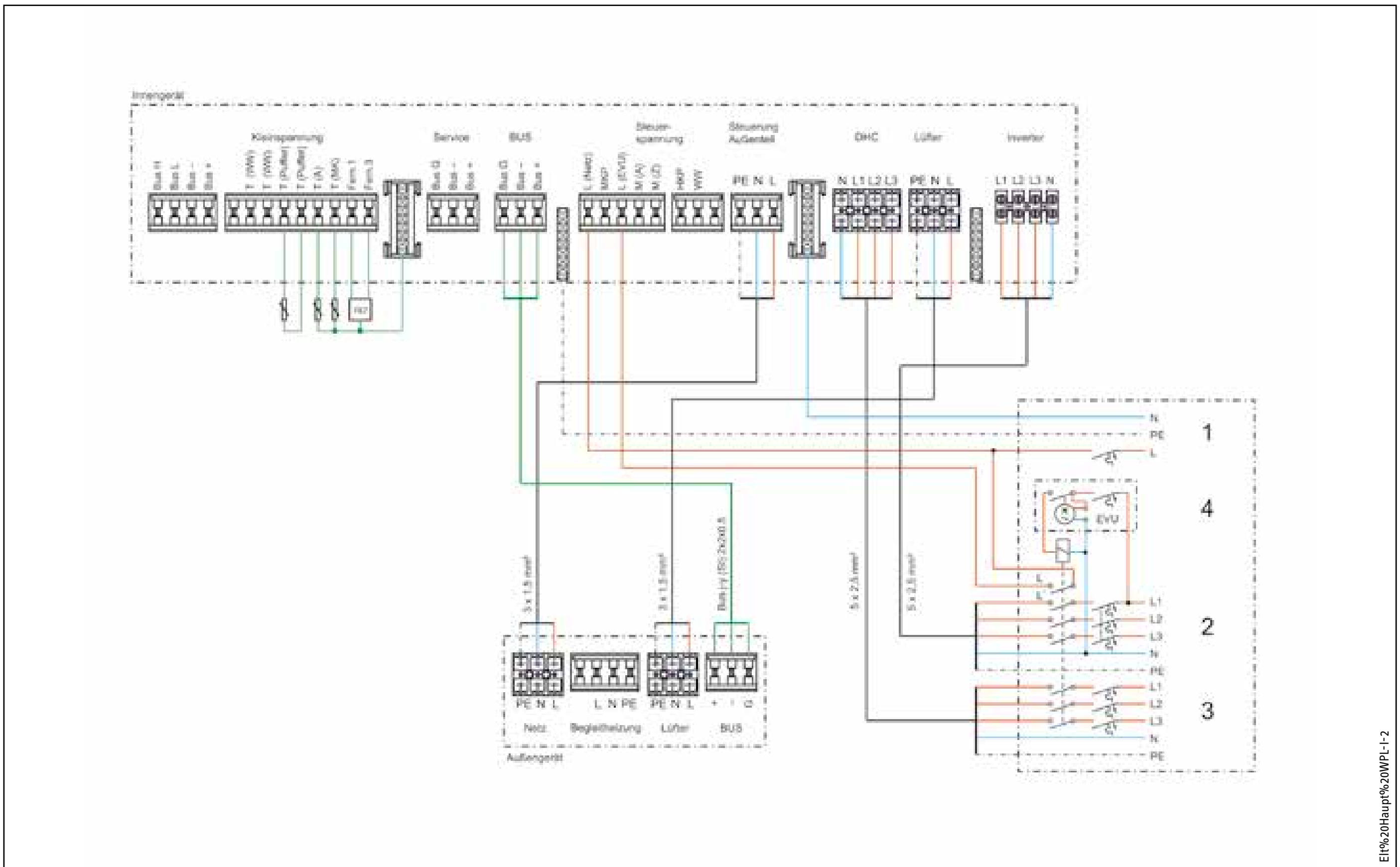
Mono energetic and DHW heating



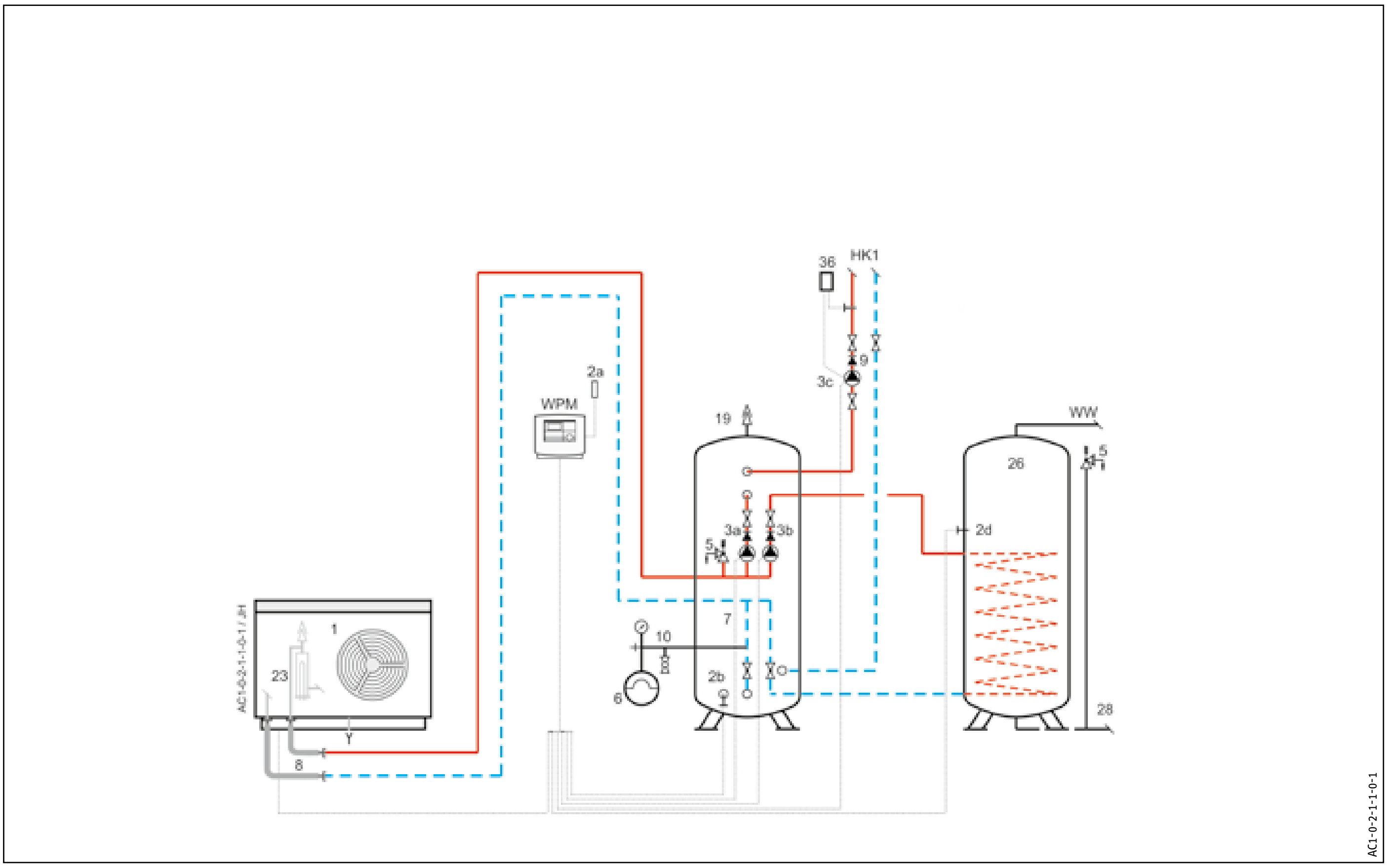


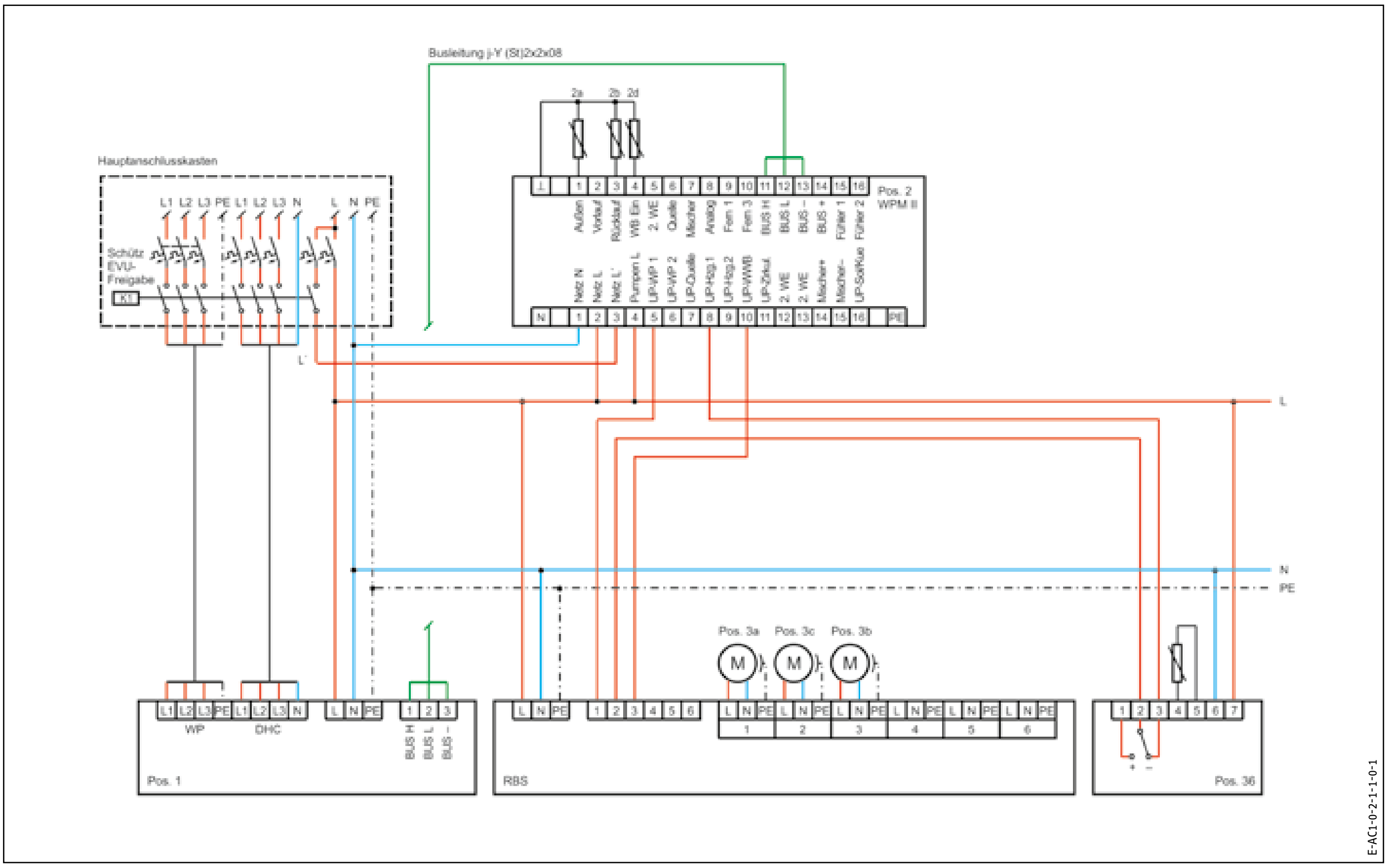
Mono energetic and DHW heating



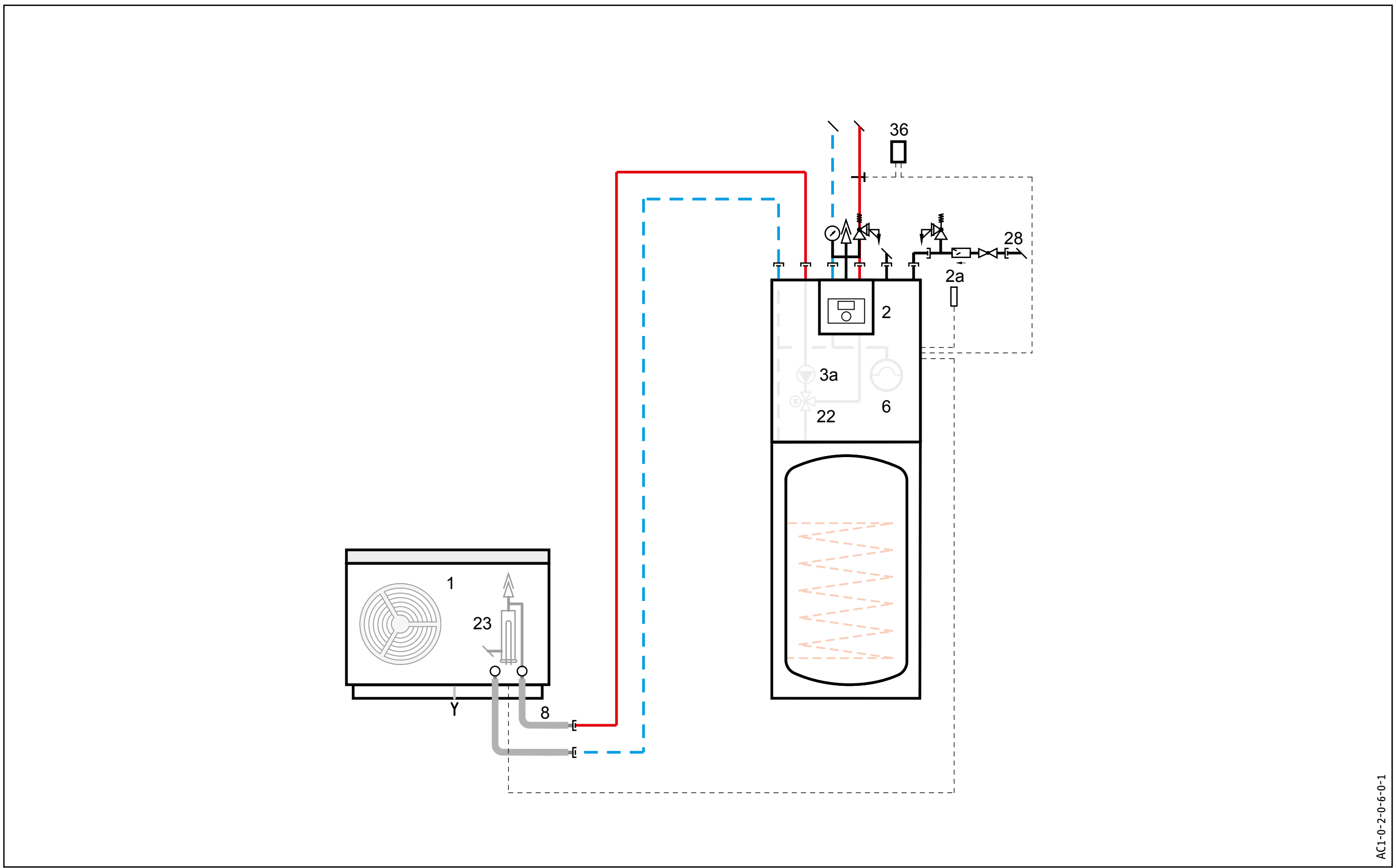


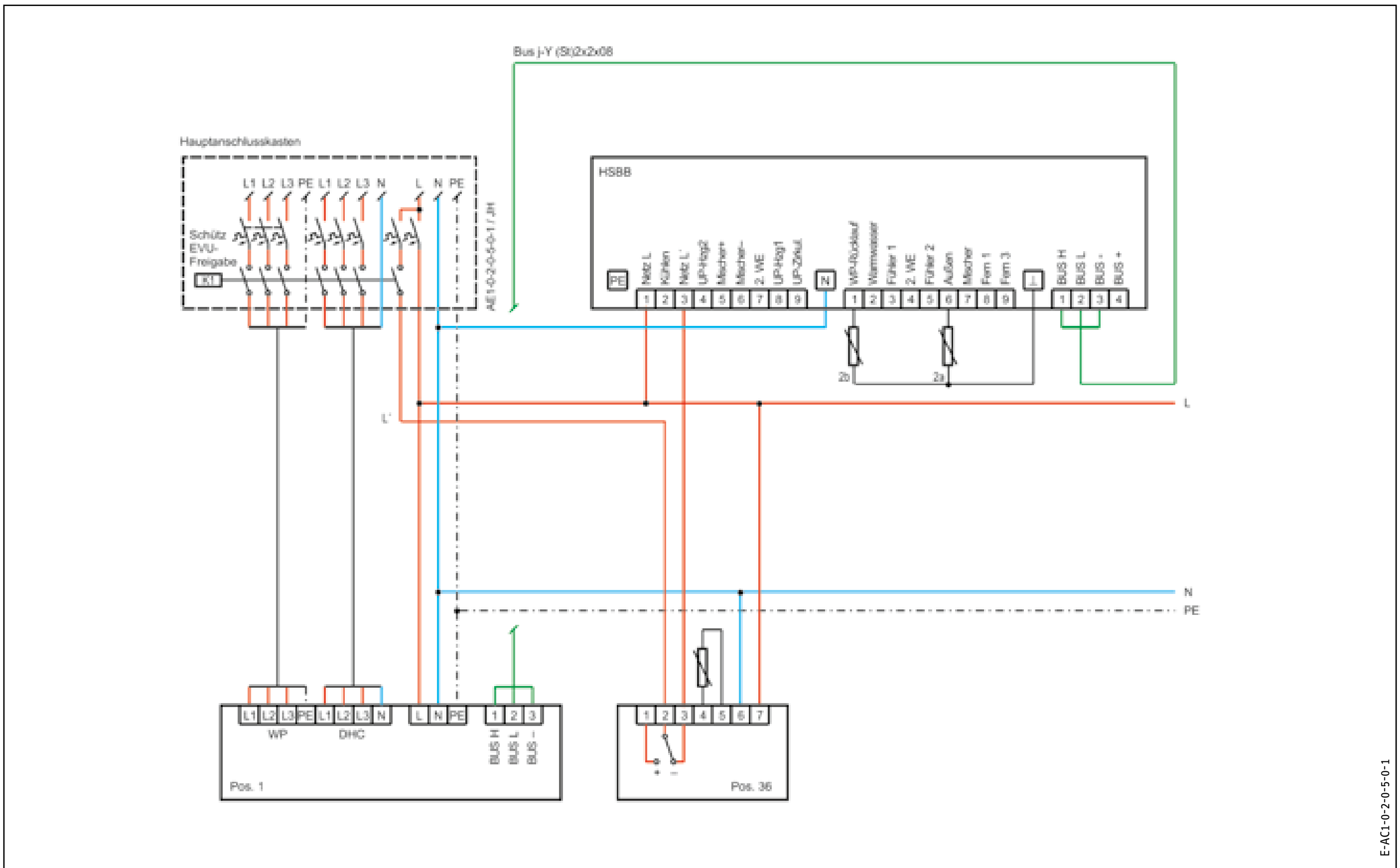
Mono energetic with buffer cylinder and DHW heating





Mono energetic with hydraulic module





Technik zum Wohlfühlen

STIEBEL ELTRON GmbH & Co. KG | Dr.-Stiebel-Straße 33
37603 Holzminden | www.stiebel-eltron.de

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DHW | Renewables | Air conditioning | Room heating

Engineering and installation

Heat pumps

2016

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Heat pumps

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Technik zum Wohlfühlen

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Technik zum Wohlfühlen

Engineering and installation

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Although we have tried to make this technical guide as accurate as possible, we are not liable for any inaccuracies in its content. Information concerning equipment levels and specifications are subject to modification. The equipment features described in this technical guide are non-binding regarding the specification of the final product. Due to our policy of continually improving our products, some features may have subsequently been changed or even removed. Please consult your local dealer for information about the very latest equipment features. The images in this technical guide are for reference only. The illustrations also contain installation components, accessories and special equipment that do not form part of the standard delivery.

Specification

Dimensions in the diagrams are in millimetres unless stated otherwise. Pressure figures may be stated in pascals (MPa, hPa, kPa) or in bars (bar, mbar). The details of threaded connections are given in accordance with ISO 228. Fuse types and sizes are stated in accordance with VDE. Output details apply to new appliances with clean heat exchangers.

DATANORM DOWNLOAD FROM THE INTERNET.

On our homepage on the internet atwww.stiebel-eltron.de
you will find our standard "DATANORM" forms (Version 4.0) in section "Fachpartner-Bereich" under the heading "Produktdaten" as a service to our trade partners.

FAX REQUEST

☐ Please send us the DATANORM set by e-mail:

STIEBEL ELTRON GmbH & Co. KG
Datenservice, Martin Schultze
Dr.-Stiebel-Strasse 33
D-37603 Holzminden
Tel. 05531 702-95139

DATANORM 4.0

To work with the tender documentation you require a text program capable of handling DATANORM.

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CONTACT ______________________

TELEPHONE ______________________

FAX ______________________

YOUR CUSTOMER ______________________
(IF APPLICABLE)