Installation and operating instructions

Split air/water heat pump

Integrated system log book

BWL-1S -05/230 V
BWL-1SB -05/230 V
BWL-1S -07/230 V
BWL-1SB -07/230 V
BWL-1SB -10/230 V
BWL-1SB -14/230 V

BWL-1S -10/400 V
BWL-1SB -10/400 V
BWL-1S -14/400 V
BWL-1SB -14/400 V
BWL-1S -16/400 V
BWL-1SB -16/400 V

From:
2016 appliance version
HCM-3 FW 1.70
AM FW 1.60
BM-2 FW 2.30

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Doc. no.: 3064298_201805 Subject to modifications

GB

Table of contents

1 Safety instructions / standards and regulations

1.1 Safety information

The following symbols are used in this description to highlight important information concerning personal and operational safety:

Denotes instructions with which you must strictly comply to prevent risk or injury to individuals, faults or damage to the appliance.

Danger through 'live' electrical components.
Please note: Turn OFF the ON/OFF switch before removing the casing.
Never touch electrical components or contacts when the ON/OFF switch is in the ON position. There is a danger of electrocution, resulting in a risk to health or death. The main terminals are 'live', even when the ON/OFF switch is in the OFF position.

Please note

"Please note" designates technical instructions which must be observed to prevent the appliance from malfunctioning or being damaged.

This appliance is not intended to be operated by persons (including children) with restricted physical, sensory or mental capacities or who lack the necessary experience and/or knowledge, unless they are supervised by a person responsible for their safety or have received instructions on how to use the appliance from this person.

Certificate of competence

The handling of refrigerant and work on the refrigerant circuit must be carried out by a refrigeration engineer or other suitably qualified person, such as a heating system installer with a certificate of competence (to para 5, section 3 of the ChemKlimaschutzV [or local regulations] in conjunction with (EC) Regulation No. 303/2008 Category I). Applicable standards and regulations and recognised engineering standards must be observed.

1.2 Standards / regulations

Observe all standards and guidelines applicable to the installation and operation of this heating system in your country.

Observe the information on the heat pump type plate.

The following local regulations must be complied with during installation and operation of the heating system:

- Siting conditions
- Electrical connection to the power supply
- The regulations and standards regarding the safety equipment of the water heating system
- DHW installation

The following general regulations, rules and guidelines must be observed for installation in particular:

- EN 806 Specifications for installations inside buildings conveying potable water
- EN 1717 Protection against pollution of potable water installations
- EN 12831 Heating systems in buildings - Method for calculation of the design heat load
- EN 12828 Heating systems in buildings - Design for water-based heating systems
- VDE 0470/EN 60529 Degrees of protection provided by enclosures (IP rating)
- VDI 2035 Prevention of damage in hot water heating systems
  - Scale formation (Sheet 1)
  - Corrosion by water (Sheet 2)

The following also apply to installation and operation in Germany:

- DIN 8901
- DIN 1988 Drinking water supply systems
- VDE 0100 Erection of power installations with rated voltages below 1000 V
- VDE 0105 Operation of high voltage systems, general stipulations

- Energy Savings Act (EnEG) and related ordinances:
  Energy Saving Ordinance (EnEV) (currently applicable version)

The following apply to installation and operation in Austria in particular:

- ÖVE regulations
- Provisions of the ÖVGW and the corresponding Austrian standards
- Regulations and requirements of the local power supply utility (PSU)
- Provisions of regionally applicable building regulations
- Minimum heating water requirements in accordance with ÖNORM H5195-1 must be observed

The following apply to installation and operation in Switzerland in particular:

- SVGW regulations
- BUWAL and local regulations must be observed
- NEV (SR 743.26)

1.3 The following regulations and directives must be observed when carrying out installation, commissioning, maintenance and repair work:

The heat pump system must be sited, installed, set up and commissioned by a qualified contractor, in compliance with the applicable statutory regulations, ordinances and directives and the installation instructions.

The tilting angle of the heat pump during transport must be no greater than 45°.

Under no circumstances must the components and pipework of the refrigerant circuit, the heating circuit or the heat source side be used to transport the appliance.

The heat pump must only be operated with outdoor air as the heat source.
The air-conducting sides must not be constricted or obstructed.

For safety reasons, the power supply to the heat pump and the control unit must not be interrupted, even outside the heating season.
Reason: No monitoring of heating circuit pressure, no frost protection, no anti-seizing pump protection.

The appliance may only be opened by a qualified contractor.
Before opening the appliance, all electrical circuits must be isolated from the power supply. Take precautions to prevent the fan from starting up unintentionally. Starting up the fan with the outdoor unit open can result in serious injury. The system must be isolated from the power supply across all poles and safeguarded against reconnection.

Work on the refrigerant circuit must only be carried out by a qualified contractor.

Do not use Teflon sealant in the heating circuit, as this may result in leaks.

Never treat appliance surfaces with scouring agents or cleaning agents containing acid or chlorine.

When siting the heat pump, position and install it securely, to prevent it slipping or sliding during operation.

The outdoor unit may only be installed outdoors.

Only replace faulty components with original WOLF spare parts.

Observe specified electrical fuse ratings (see specification).

Any damage or loss resulting from technical modifications to WOLF control units is excluded from our warranty.

Risk of water damage and faulty operation through freezing.
The heat pump is automatically protected from frost when it is switched ON.

Please note

The local power supply utility must be notified when a heat pump is installed.

2 Documentation information

2.1 Other applicable documents

- ▶ Installation and operating instructions for BM-2 programming unit
- ▶ Installation and operating instructions for AM display module
- ▶ Installation and operating instructions for all accessory modules and further accessories used

2.2 Safekeeping of these documents

The system operator or user should ensure the safekeeping of all documentation.

- ▶ Hand over these installation and operating instructions, along with all other applicable documents, to the system operator or user.

2.3 Applicability of these instructions

These installation and operating instructions apply to the BWL-1 S(B) split air/water heat pump

From:

- − 2016 appliance version
- − HCM-3 PCB: FW 1.70
- − AM display module: FW 1.60
- − BM-2 programming unit: FW 2.30

2.4 Handover to the user

The user of the heating system must be instructed in the handling and functions of their heating system.

- ▶ Hand over all applicable documents to the system operator and/or user.
- ▶ Make the system user aware that the instructions should be stored near the appliance.
- ▶ Make the system user aware that they should hand over the applicable documents to the next user (e.g. if moving house).

Instructions on using the heating system

- ▶ Instruct the system user how to set the temperatures and thermostatic valves in an energy efficient manner.
- ▶ Instruct the system operator and/or user on maintenance of the heating system.

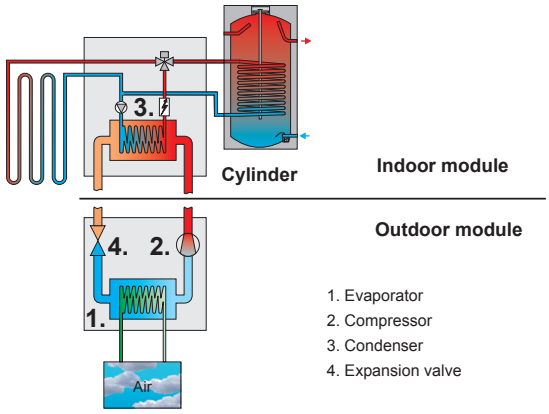
3 Information on the heat pump

Application range

The split air/water heat pump for heating water temperatures up to 55 °C and air temperatures down to -20 °C is designed exclusively to heat heating water and domestic hot water. The heat pump can be used in new or existing heating systems, provided the application limits are taken into consideration (see "Specification").

Operating principle of a heat pump

The heat pump converts the low temperature heat contained in the outdoor air into high temperature heat. To achieve this, air is drawn in by the fan and routed over the evaporator (1).
The evaporator contains liquid heat transfer medium. This boils and evaporates at low temperatures and low pressures. The required evaporation heat is extracted from the air, which cools down in the process. The air is then released back into the atmosphere.
The evaporated heat transfer medium is drawn in by a compressor (2) and compressed to a higher pressure. The compressed, gaseous heat transfer medium is pushed into the condenser (3), where it condenses at high pressure and high temperature. The condensation heat is transferred to the heating water, causing the water temperature to rise.
The energy transferred to the heating water corresponds to the energy that was previously extracted from the outdoor air, plus the small amount of electrical energy required for compression.
The pressure in the condenser and upstream of the expansion valve (4) is high. Via the expansion valve, a temperature-sensitive pressure reduction occurs, causing the pressure and temperature to drop. The cycle then starts again.



Frost protection

Please note

The heat pump is automatically protected against frost only when it is switched ON. The use of antifreeze is not permissible. Risk of water damage and faulty operation through freezing.

Energy efficient use of the heat pump heating system

By choosing a heat pump heating system, you are helping to protect the environment through low emissions and efficient use of primary energy. To ensure that your new heating system operates at maximum efficiency, please bear in mind the following points:

Please note

The heat pump heating system must be carefully sized and installed.
Avoid unnecessarily high flow temperatures. The lower the flow temperature on the heating water side, the more efficiently the heat pump operates. Ensure that the controller is adjusted correctly.
Intermittent ventilation is preferable. Compared to airing with the windows permanently tilted open, this method of ventilation reduces energy consumption and saves you money.

Corrosion protection

Do not use (for cleaning, polishing, etc.) or store sprays, solvents, chlorinated cleaning agents, paints, lacquers, adhesives, salts, etc. on or in the vicinity of the heat pump.
Under unfavourable conditions, these materials may cause corrosion in the heat pump and other heating system components.

Other equipment features

The appliance is equipped with sensors that monitor the heating circuit and the refrigerant circuit.

DHW cylinders

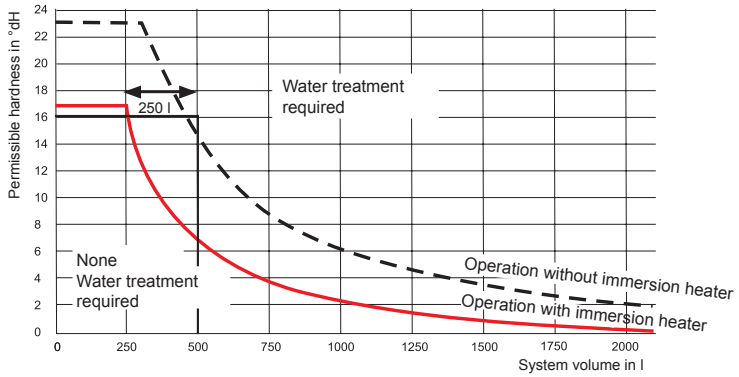
Please note

WOLF heat pumps require special DHW cylinders for heating the domestic hot water; these are available from the WOLF range of accessories.
The indirect coil surface area in the DHW cylinders must be at least 0.25 m² per kW of heating output.

Heating water quality in WOLF heat pumps

Please note

VDI 2035 Part 1 lists recommendations for the prevention of scaling in heating systems. Part 2 deals with corrosion on the water side.
When screed drying using the electric immersion heater particular care should be taken to ensure that the permissible total hardness is complied with, otherwise there is a risk of scaling and immersion heater failure. The permissible water hardness is 16.8 °dH for system volumes of up to 250 litres during operation with the electric immersion heater.
In the case of high volume systems or those where large top-up water volumes (e.g. due to water losses) are required, the following values should be observed.



If the limit curve is exceeded, an appropriate portion of the system water must be treated.
Example: Total hardness of the domestic hot water: 16 °dH
System volume:500 l; i.e. at least 250 l must be treated.

Additional heating water quality requirements:
- pH value of between 6.5 and 9.0
- Electrical conductivity < 800 µS/cm; better < 100 µS/cm

Low salt operation (conductivity < 100 µS/cm to VDI 2035) is always preferable in order to minimise the risk of corrosion. Water parameters stabilise or change during a period of up to 12 weeks after commissioning (filling).

Inhibitors are not permissible.
Alkalising additives may be used by a water treatment specialist to stabilise the pH value. For example, in order to meet the requirements of VDI 2035 regarding pH value in mixed installations (8.2-9.0).

Potable water

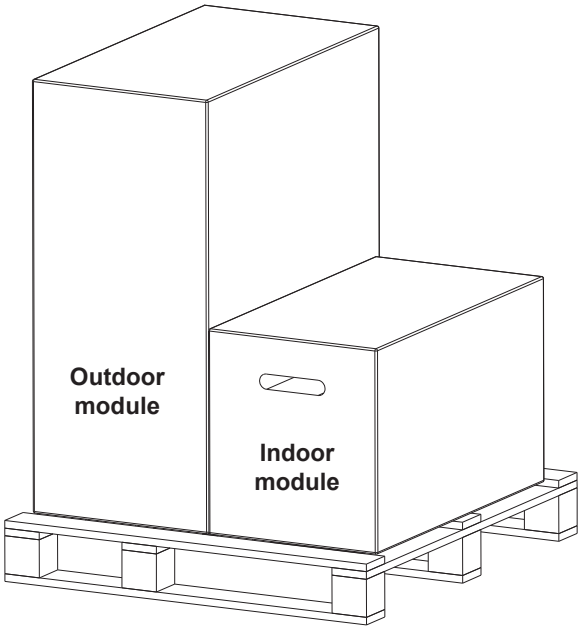
To protect against scaling, the DHW temperature must be set to max. 50 °C if the total water hardness is 15 °dH (2.5 mol/m³) or above. If the total hardness is 16.8 °dH or above, we recommend using a water treatment facility in the cold water supply line when heating DHW, in order to prolong the maintenance intervals. Even if the water hardness is below 16.8 °dH, a higher risk of scaling may occur locally, necessitating suitable softening measures. Failure to take such measures will result in premature scaling of the appliance and a reduction in the convenient availability of domestic hot water. The contractor responsible should always check the local conditions.
The adjustable cylinder water temperature can exceed 60 °C. Short term operation at temperatures above 60 °C must be monitored in order to prevent scalding. For permanent operation, appropriate precautions should be taken to prevent draw-off temperatures above 60 °C, e.g. thermostatic valves.

4 Standard delivery

- Outdoor module, fully encased in box

- Indoor module, fully encased in box, containing the following:

  - Installation and operating instructions including system log book and maintenance instructions
  - Commissioning report with checklist
  - Suspension bracket and installation kit for indoor module
  - 3x push-fit pipework for appliance connection, Ø 28, with O-rings and clips
  - Ventilation hose for commissioning
  - Type plate supplement for the outdoor module
  - Union nuts for refrigerant circuit, 2x10 / 2x16
  - For BWL-1S(B)-05, reducer set, refrigerant lines 16/12 mm and 10/6 mm

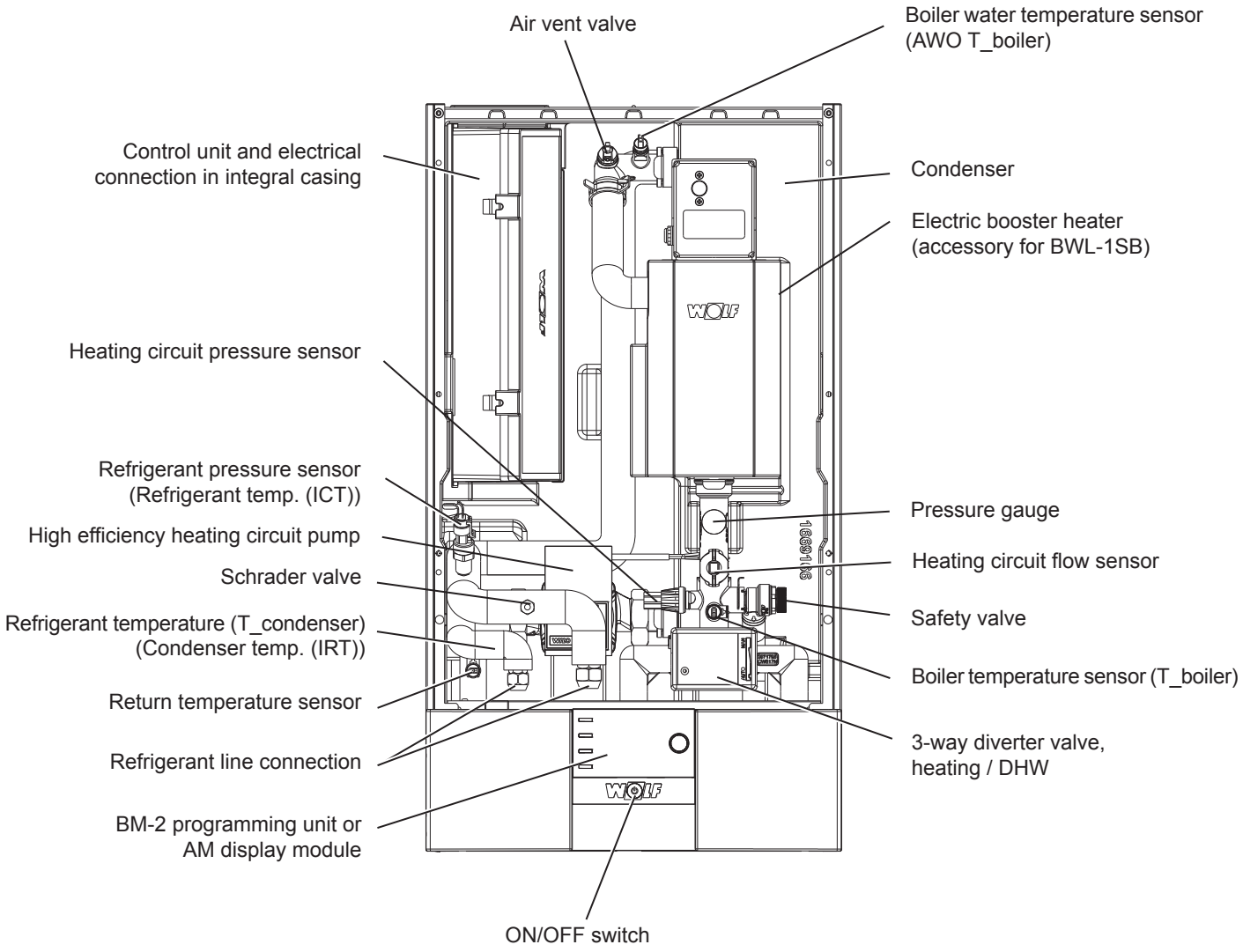


Required accessories

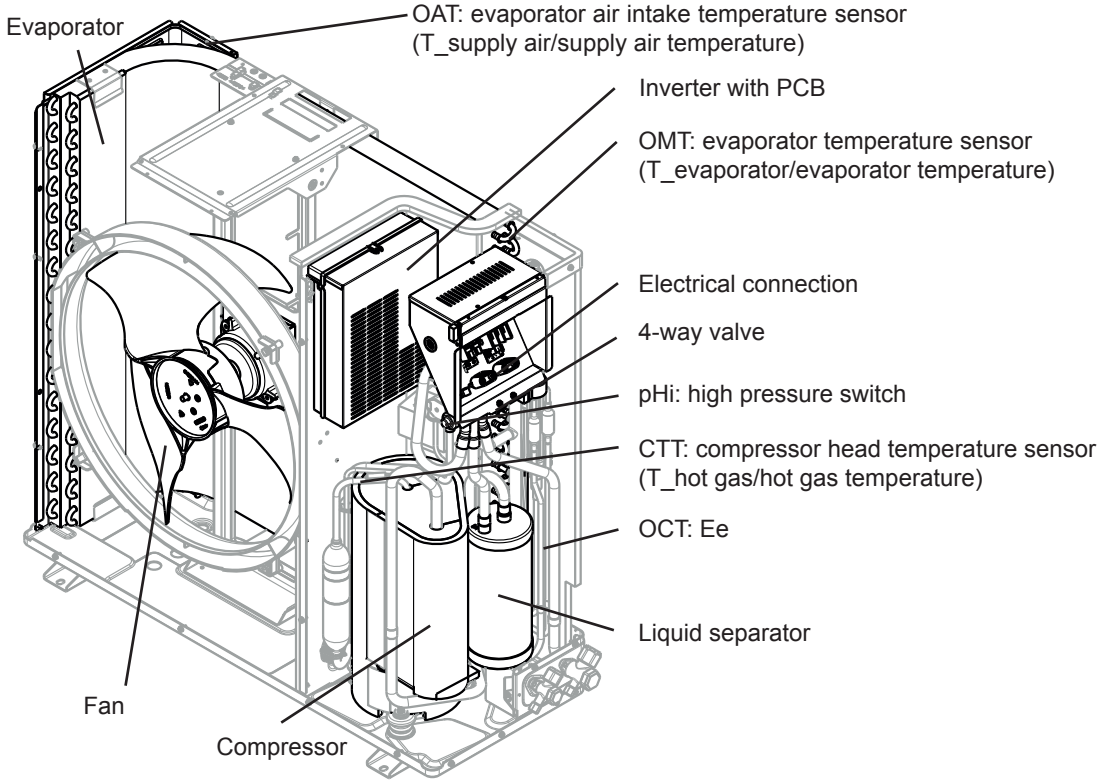
- BM-2 programming unit or AM display module in appliance.
  (If using the BM-2 as a remote control in the wall mounting base, or if using the BM-2 in an extension module, there must be an AM in the appliance.)
- Dew point monitor for systems with active cooling.

5 Structure

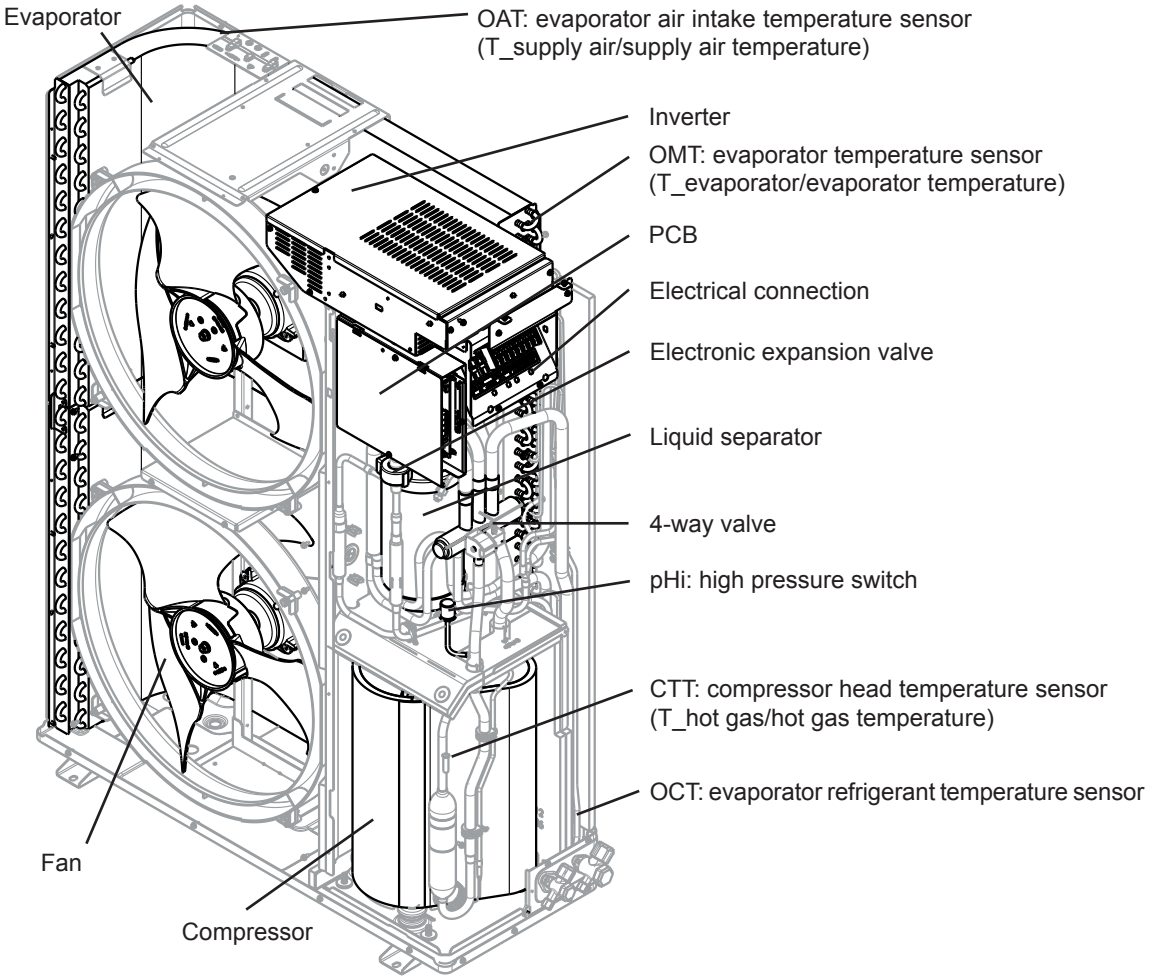
5.1 BWL-1S(B) indoor module



5.2 BWL-1S(B)-05/07 outdoor module



5.3 BWL-1S(B)-10/14/16 outdoor module



6 Equipment features

6.1 Indoor module

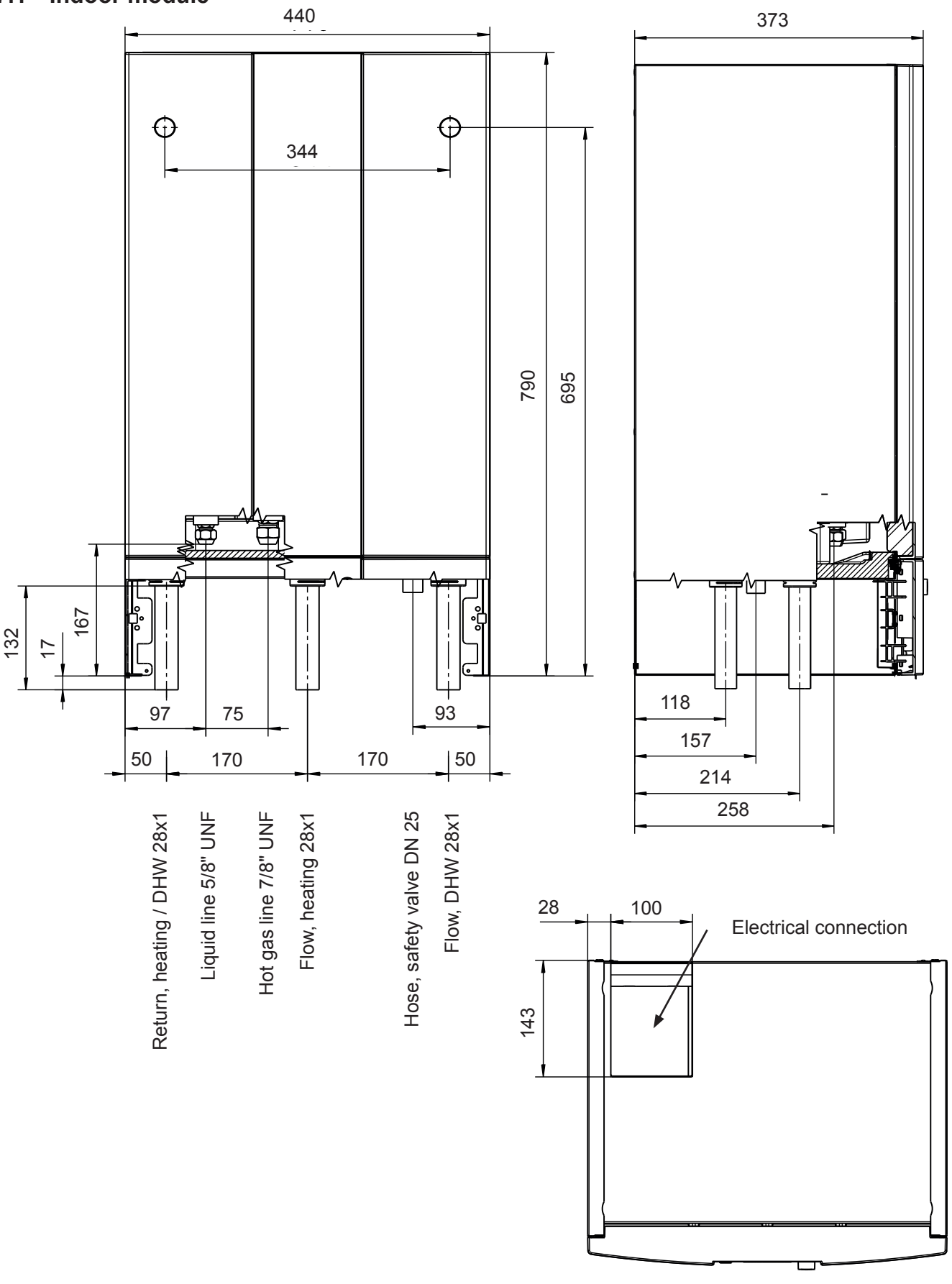
- Demand-controlled electric booster heater
  - o For 2/4/6 kW depending on connection – type BWL-1S
  - o For covering peak loads
  - o Adjustable for emergency mode or for screed drying
  - o Screed drying also possible without outdoor module
- Control unit and electrical connection in integral casing
- Slot for BM-2 programming unit or AM display module
- External control option via 0-10 V or floating contact
- Slot for ISM7i LAN/WLAN interface or ISM8i Ethernet interface
- Thermally insulated condenser made from stainless steel plates
- Variable speed high efficiency pump for the heating circuit
- 3-way diverter valve for heating/DHW heating;
  pressure gauge and safety valve installed
- Pressure and flow sensors, plus flow/return temperature sensors
- Refrigerant lines with thermal insulation, Schrader valve and temperature sensor;
  heating circuit connections 28 x 1
- Sound and heat insulated; sealed against formation of condensate
- Components secured in EPP; plug-in system for fast installation
- "Smart Grid Ready" for integration into Smart Grids
- EHPA Quality Label
- Heating/DHW temperatures can be increased externally, e.g. by Smart Grid or PV system

6.2 Outdoor module

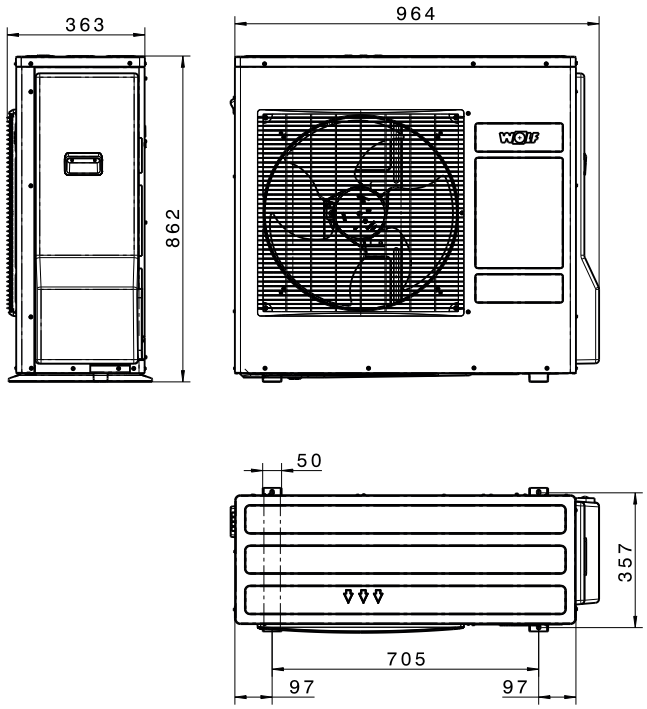
- Version with one EC axial fan for BWL-1S(B)-05/07
- Version with 2 EC axial fans for BWL-1S(B)-10/14/16
  - o Variable speed control, energy saving, powerful
- Evaporator with protective coating for long service life
- Sound-insulated compressor
- Inverter compressor for modulating electronic output control
- 4-way diverter valve for heating and cooling modes
  combined with energy efficient electronic expansion valve
- Flared connections for refrigerant lines
- Refrigerant charge (R410A) for single line lengths up to 12 m
  (max. 25 m possible)
- Flexible siting using floor or wall mounting brackets

7 BWL-1S(B) dimensions

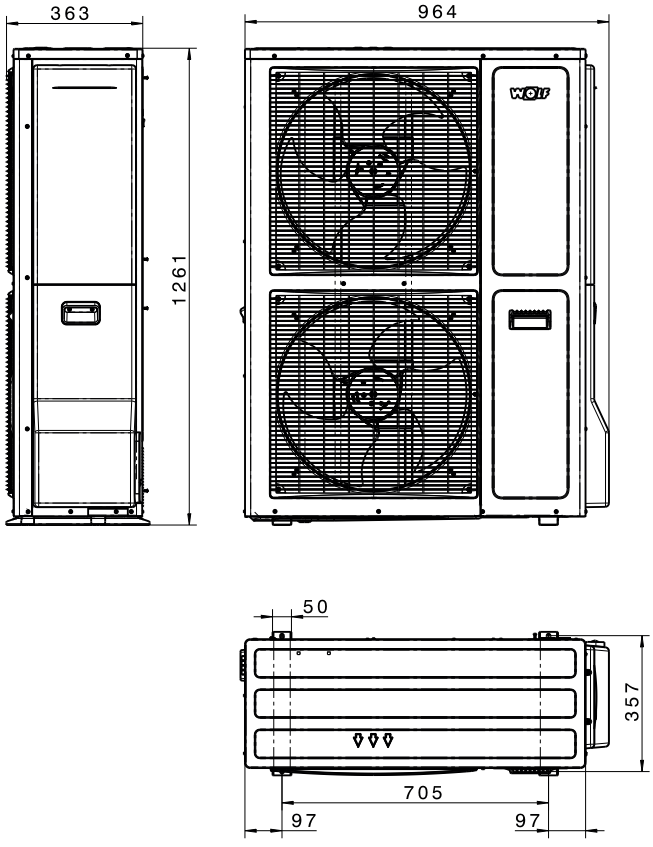
7.1 Indoor module



7.2 BWL-1S(B)-05/07 outdoor module



7.3 BWL-1S(B)-10/14/16 outdoor module



8 Siting the BWL-1S(B)

8.1 Siting instructions

When selecting the installation site, observe the following points:

- The heat pump must be accessible on all sides The intake area should preferably be on a wall.
- The air discharge side must be free from obstruction. Since the air being discharged is around 8 K colder than the ambient temperature, premature ice formation should be expected. Therefore do not discharge the air directly onto walls, patios or footpaths. There should be at least 3 m clearance between the heat pump discharge and walls, patios, footpaths, etc.
- To prevent air short circuits and sound reflection, avoid installation in recesses or between two walls.
- Installation in a depression is not permitted as the cold air will sink and no air exchange will take place.
- To avoid causing disturbance, bear in mind the sound levels and distance from neighbouring properties when selecting a site.
- Do not position the heat pump directly in the prevailing wind direction / avoid air short circuits
- The condensate should drain away into the gravel bed.
- Protect air intake/discharge from leaves and snow.
- Provide thermal insulation for underground pipes.

Do not site the air source heat pump for outdoor installation in an environment that is polluted with corrosive gases, such as acids or alkaline gases.

Do not install in a location directly exposed to onshore winds, as this will result in a risk of corrosion from the saline air, particularly on the evaporator fins. In locations with strong winds it may be necessary to construct wind protection to divert the onshore wind.

Strong winds may interfere with evaporator ventilation.

When the outdoor module is installed on flat roofs there may occur considerable wind loads, depending on bulding height and wind load zone. We recommend to get the substructure planned by a specialist consultant or a structural engineer, taking into account the carrying capacity of the roof and the wind loads, in accordance with the specific standards and regulations of each country.

In areas with high snowfall or in very cold places, protective measures must be taken to ensure that the heat pump operates correctly.

If necessary, incorporate the system into the lightning and overvoltage protection systems.

Do not install the heat pump with the discharge side facing the prevailing wind direction.

Refrigerant lines, insulating materials, connecting cables, installation ducts or tubes, etc., must be weatherproof, UV-resistant and protected from mechanical damage.

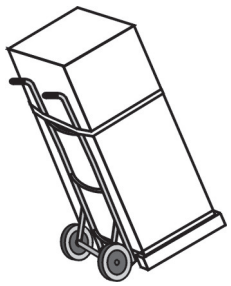
8.2 Minimum room volume

When siting the heat pump in occupied/communal areas, as opposed to a separate plant room, the minimum room volume in relation to the refrigerant charge weight must be complied with. In accordance with EN 378-1, the following limit applies to R410A refrigerant: 0.44 kg/m³ refrigerant per cubic metre room volume.
For refrigerant lines less than 12 m, the refrigerant charge weight provided is sufficient. For refrigerant lines between 12 m and a maximum of 25 m long, an additional 0.06 kg/m of R410A needs to be added; consequently, a larger room volume is required for the indoor module (see table).

Type	Refrigerant line < 12 m		Refrigerant line 12 m - 25 m	
	Charge weight	Room volume	Charge weight up to	Room volume
BWL-1S(B)-05	2.15 kg	> 4.9 m³	2.93 kg	> 6.7 m³
BWL-1S(B)-07	2.15 kg	> 4.9 m³	2.93 kg	> 6.7 m³
BWL-1S(B)-10	2.95 kg	> 6.7 m³	3.73 kg	> 8.5 m³
BWL-1S(B)-14	2.95 kg	> 6.7 m³	3.73 kg	> 8.5 m³
BWL-1S(B)-16	3.50 kg	> 8.0 m³	4.28 kg	> 9.7 m³

8.3 Transport to the installation site

To prevent damage during transport, the heat pump must remain packaged whilst being transported to the final installation site by pallet truck.



Only transport the heat pump by pallet truck in its packaging. Please note: Risk of tipping.

To prevent damage to the appliance, the heat pump outdoor module must not be tilted by more than 45° during transport.

The components, in particular the plastic casings and the pipework for the refrigerant circuit and heating side, must not be used to transport the appliance. Only use the grab handles provided when transporting the heat pump.

Bear in mind the weight of the heat pump.

Please note

Observe the instructions on the packaging.

9 Siting the outdoor module

Minimum clearances for the outdoor module

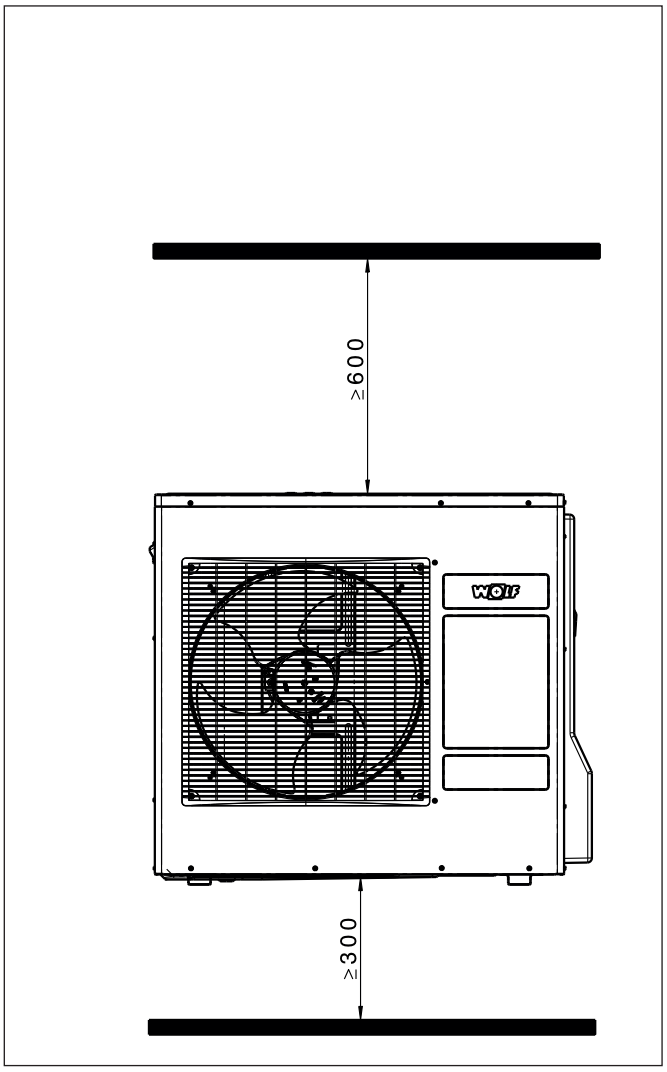


Fig.: Front view of outdoor module BWL-1S(B)-05/07

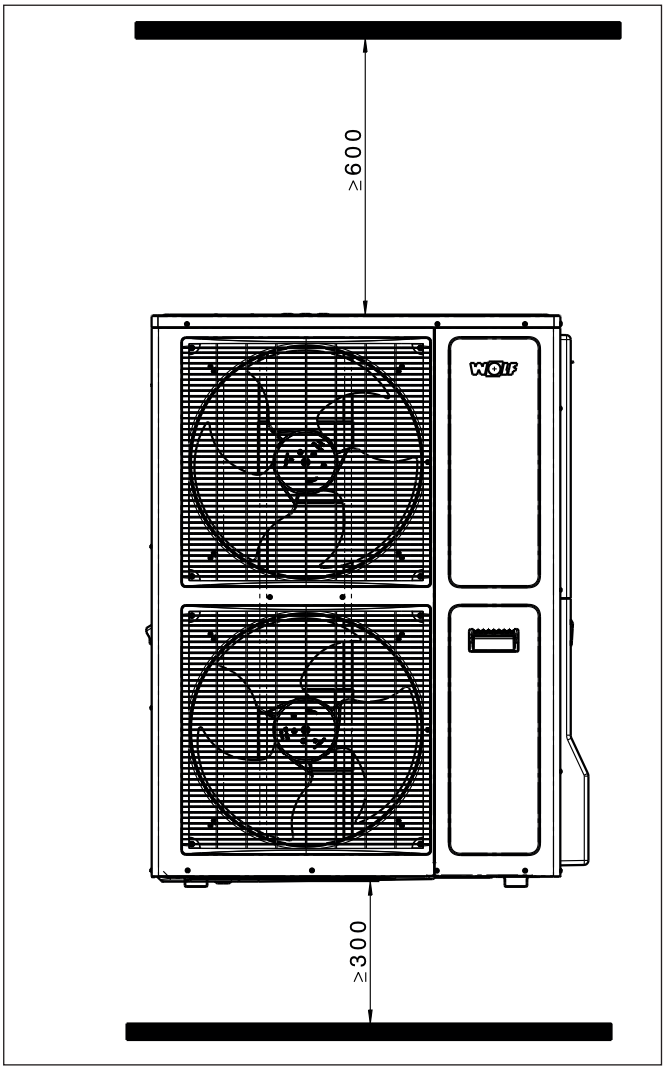


Fig.: Front view of outdoor module BWL-1S(B)-10/14/16

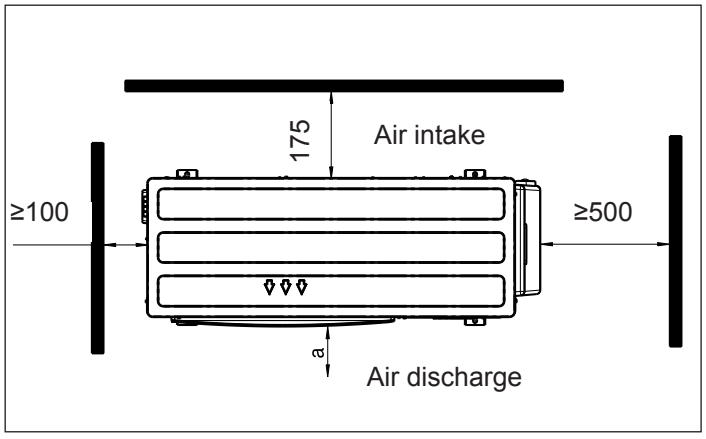


Fig.: Plan view of outdoor module BWL-1S(B)-05/07

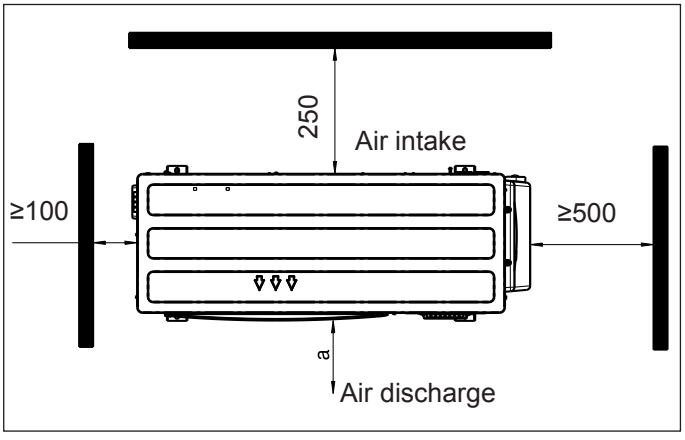


Fig.: Plan view of outdoor module BWL-1S(B)-10/14/16

Air discharge
a ≥ 1000 to obstacles obstructing the air discharge;
a ≥ 3000 to footpaths and patios due to the formation of ice, even when outside temperatures are above 0 °C.

Clearance between outdoor module and ground
In areas with heavy snowfall, the minimum installation height must be increased or a canopy must be constructed over the outdoor module.

10 Siting the indoor module

10.1 Minimum clearances for the indoor module

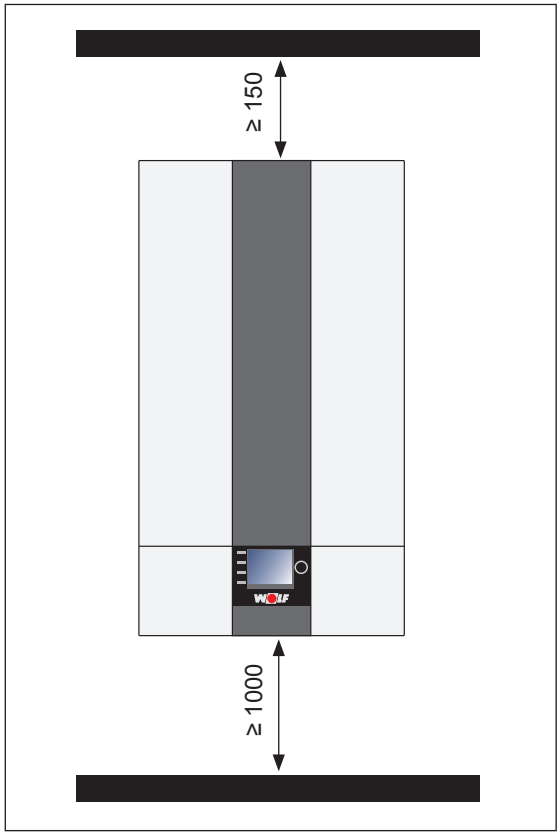


Fig.: Front view of indoor module

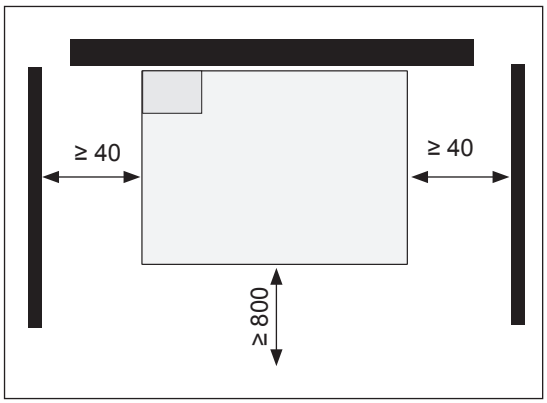


Fig.: Plan view of indoor module

10.2 Securing the appliance with the suspension bracket

When installing the appliance, ensure that the fixings have sufficient load bearing capacity. In addition, take into account the condition of the wall, otherwise refrigerant and water could escape, resulting in a risk of flooding.

1. Mark the Ø12 holes to be drilled for the suspension bracket, taking into account the minimum clearances.
2. Insert the rawl plugs and fit the suspension bracket using the screws supplied.
3. Hang the indoor module into the suspension bracket using the mounting stay.

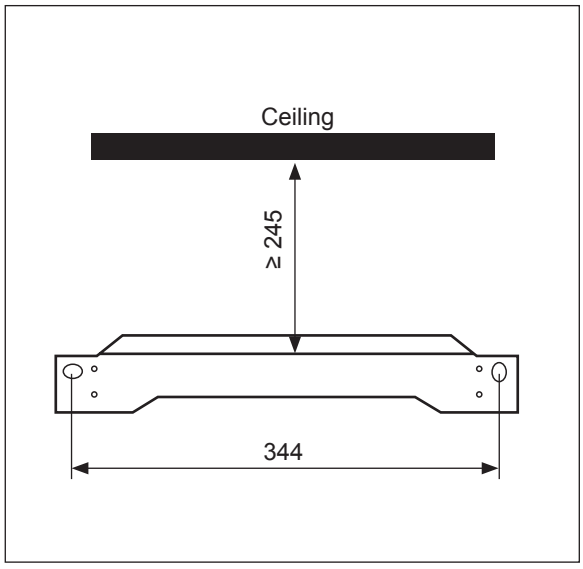


Fig.: Suspension bracket

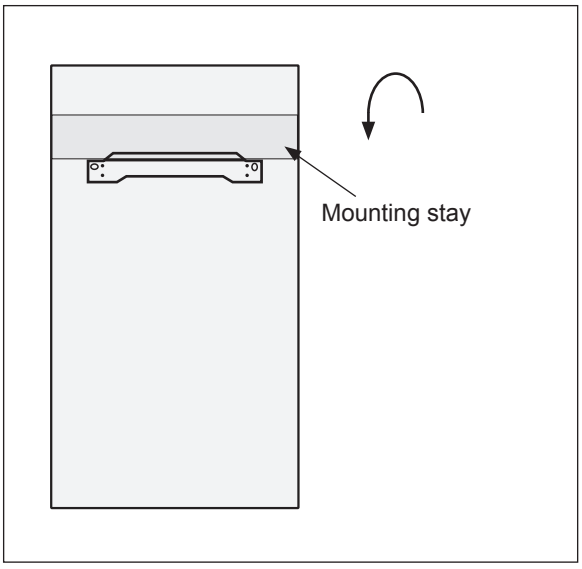
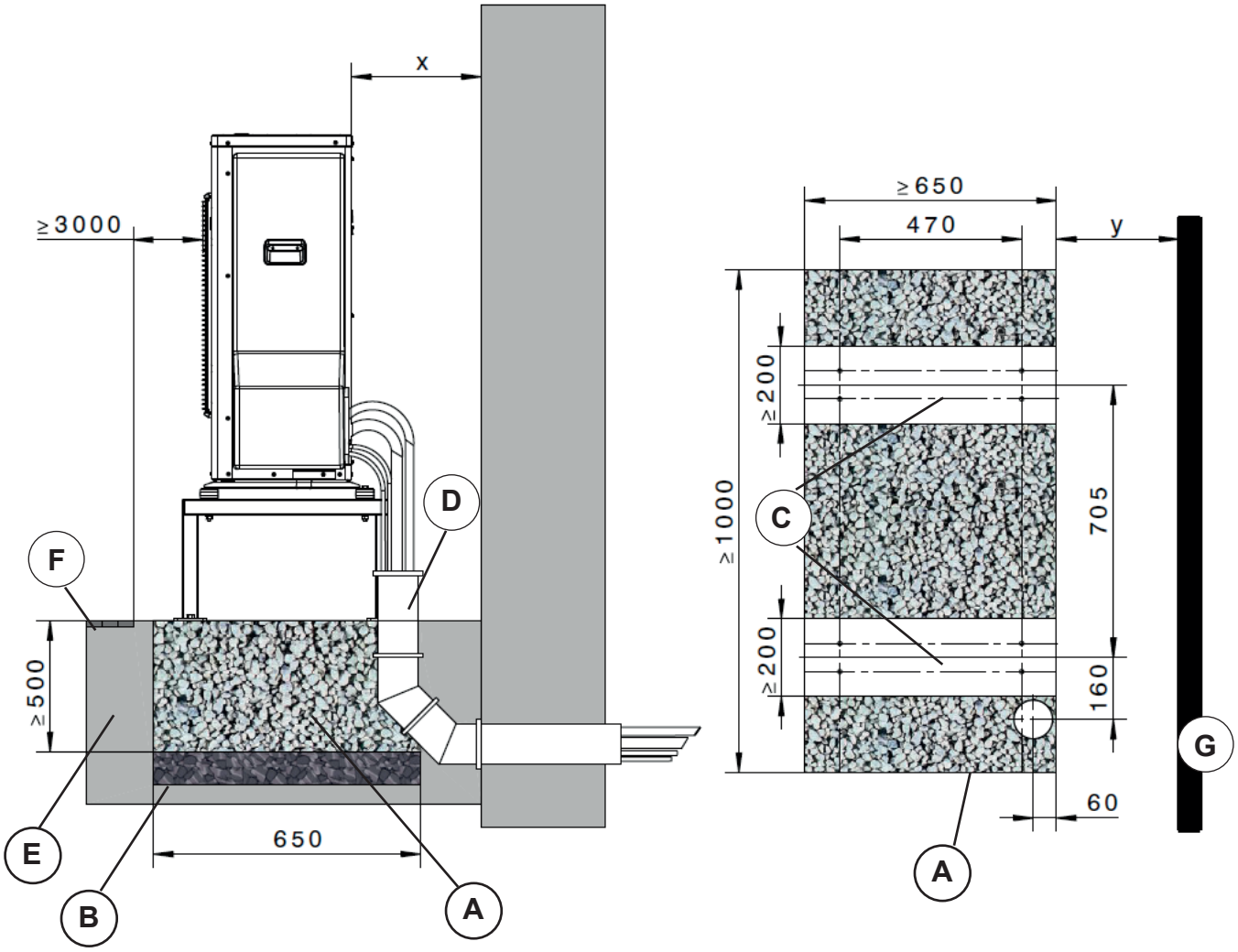


Fig.: Rear view of indoor module

11 Gravel bed and foundation diagram

Base for floorstanding installation



	X	Y
BWL-1S(B)-05/07	175 mm	30 mm
BWL-1S(B)-10/14/16	250 mm	105 mm

(A) Gravel bed as condensate soakaway

(B) Frost protection base for foundation (compressed gravel, e.g. 0 – 32/56 mm), layer thickness in accordance with local conditions and applicable building regulations

(C) Foundation strip

(D) KG pipe DN 100 with 2 pipe bends 45° (instead of 1x 90°), for refrigerant lines and electrical cables to the indoor module, pipe requires sealing on-site (only required if routing the lines below ground level)

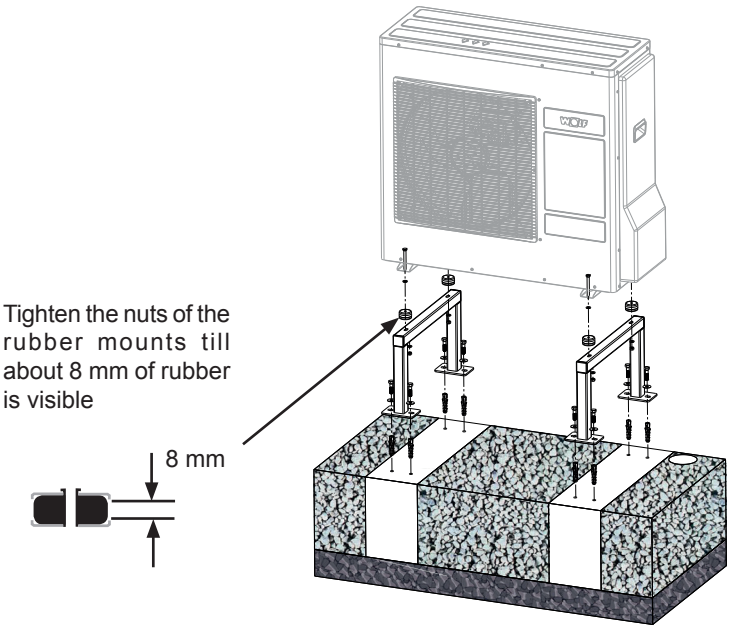
(E) Ground

(F) Footpath or similar

(G) External wall (final dimensions)

12 Anchorage and anti-vibration mounts

12.1 Concrete foundation

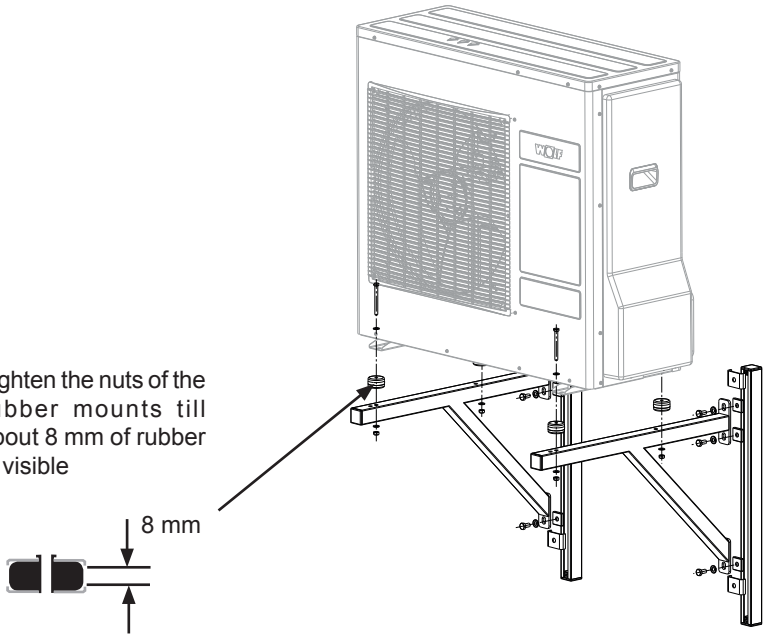


Cast, level plinth of concrete with gravel base providing sufficient frost protection, cut-out for cable/line entry, see foundation diagram

Please note

Secure in accordance with structural characteristics, taking into account the appliance weight.

12.2 Wall mounting



Please note

Secure in accordance with structural characteristics, taking into account the appliance weight.

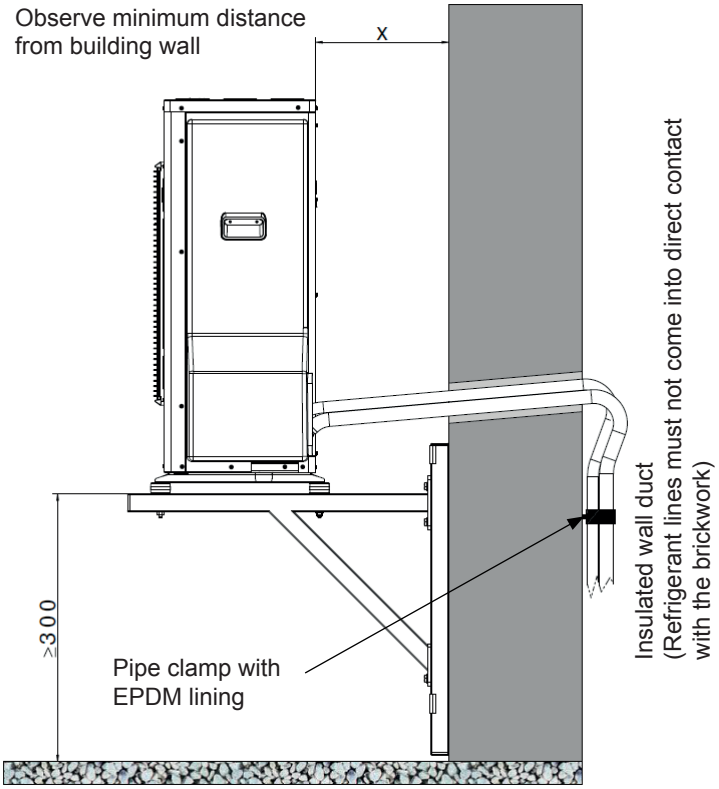
13 Routing the wall duct

13.1 Wall duct above ground level

Please note:

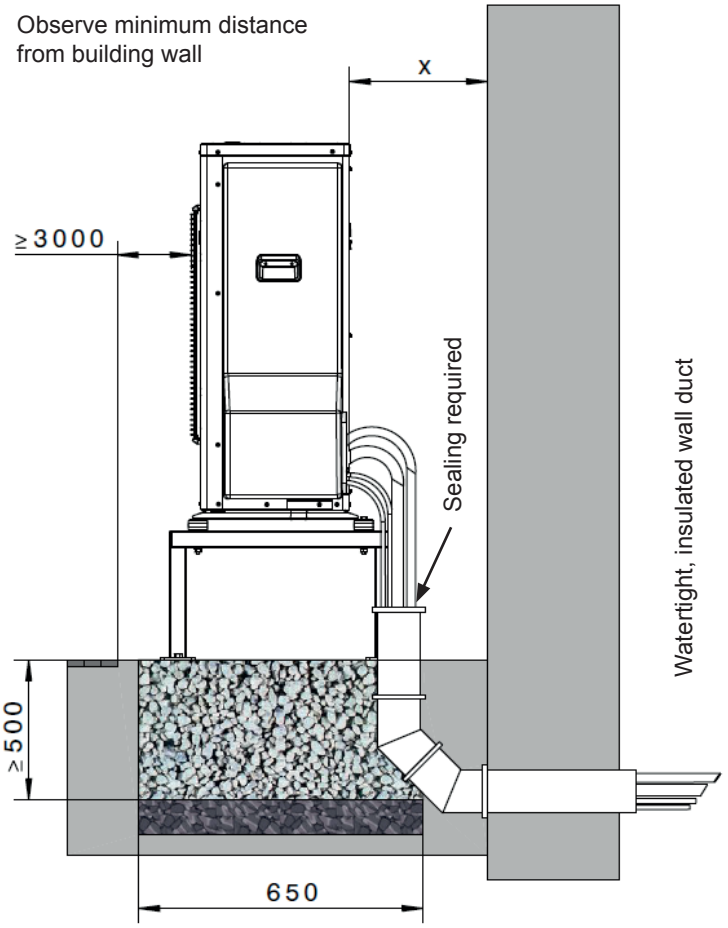
The wall mounting bracket can only be used on walls with a high mass per unit area (> 250 kg/m²).
Lightweight walls or stud walls are not permitted.

	X
BWL-1S(B)-05/07	175 mm
BWL-1S(B)-10/14/16	250 mm



13.2 Wall duct below ground level

	X
BWL-1S(B)-05/07	175 mm
BWL-1S(B)-10/14/16	250 mm



14 Routing the refrigerant lines

The outdoor module is pre-charged with refrigerant R410A.
No additional charge is required for lines up to 12 m in length.

Minimum line length 3 m, maximum line length 25 m.
Max. height differential between indoor and outdoor unit 15 m.
For 12 – 25 m line length, top up with 60 g/m of refrigerant R410A.

Use only copper pipes suitable for refrigerants to EN-12735-1, and thermal insulation with a temperature resistance of up to 120 °C. (For internal diameter, see "Specification" chapter.)

Suction gas lines and liquid lines must have separate thermal insulation. Closed cell, diffusion-proof thermal insulation, min. thickness 6 mm.

Extended refrigerant lines are not permitted for outdoor use. Junctions must remain accessible for leak testing, as they are potential leak sources.

Risk of injury from incorrectly routed pipework
Route pipework in such a way as to avoid any danger to persons.

Before routing pipework, please note:

- Where pipework is routed via ducts with other supply lines, for example, hot flue pipes, a reciprocal effect can result. Insulate supply lines where necessary.
- Do not route pipework through lift shafts.
- In public stairways and passageways, route pipework at a minimum height of 2.20 m.
- Pipework routed through fire-resistant walls and ceilings must have fireproof seals.
- Protect pipework from excessive stress.
- Protect pipework from environmental influences, such as dirt, waste, and water.

Please note

Damage from impurities in the refrigerant circuit
Moisture or dirt, for example metal swarf, can get into the refrigerant circuit.

- Never reuse refrigerant lines.
- Use only closed refrigerant lines.
- Pipes in wall ducts must be plugged.

Please note

Pipework damaged by kinking
Copper pipes kink easily and can then no longer be used.

- Never step on copper pipes.
- Always choose an adequately large bending radius; use a pipe bender.
- Install pipe supports every 2 m.
- Use protective piping for ground routing.

Please note

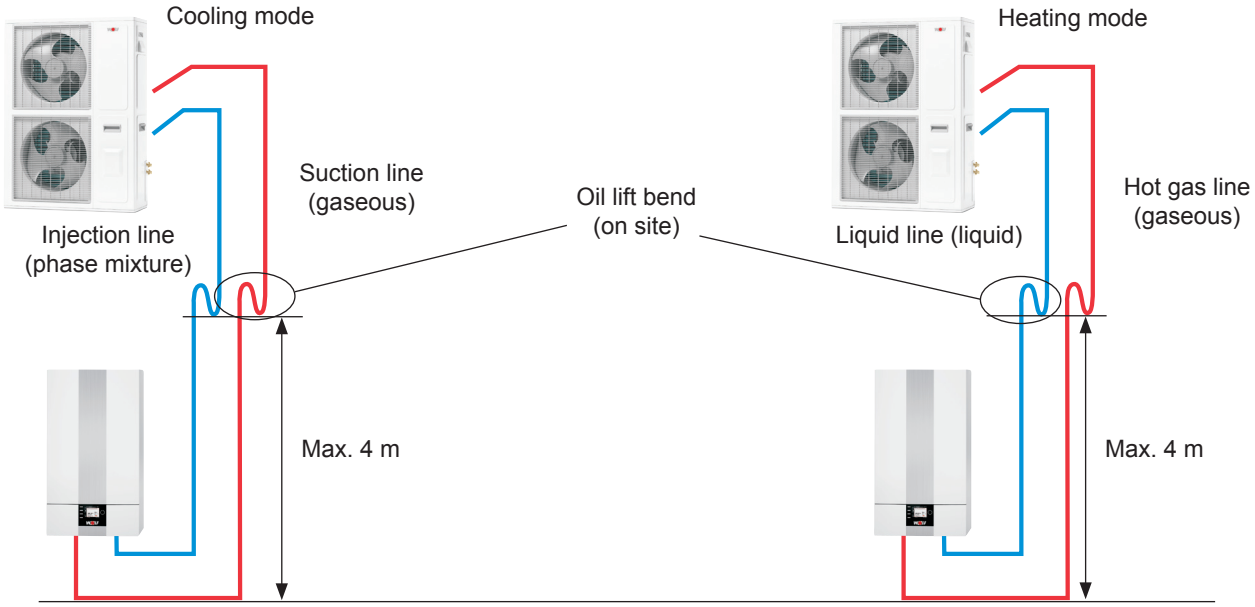
Structural damage from condensate
Where pipework is not insulated or its thermal insulation is damaged, condensate forms.

- Thermally insulate all pipework.
- Check that the pipework is fully insulated and that all junctions are lagged with insulating tape.
- Lag damaged thermal insulation using insulating tape (accessory).
- Seal wall ducts on site.

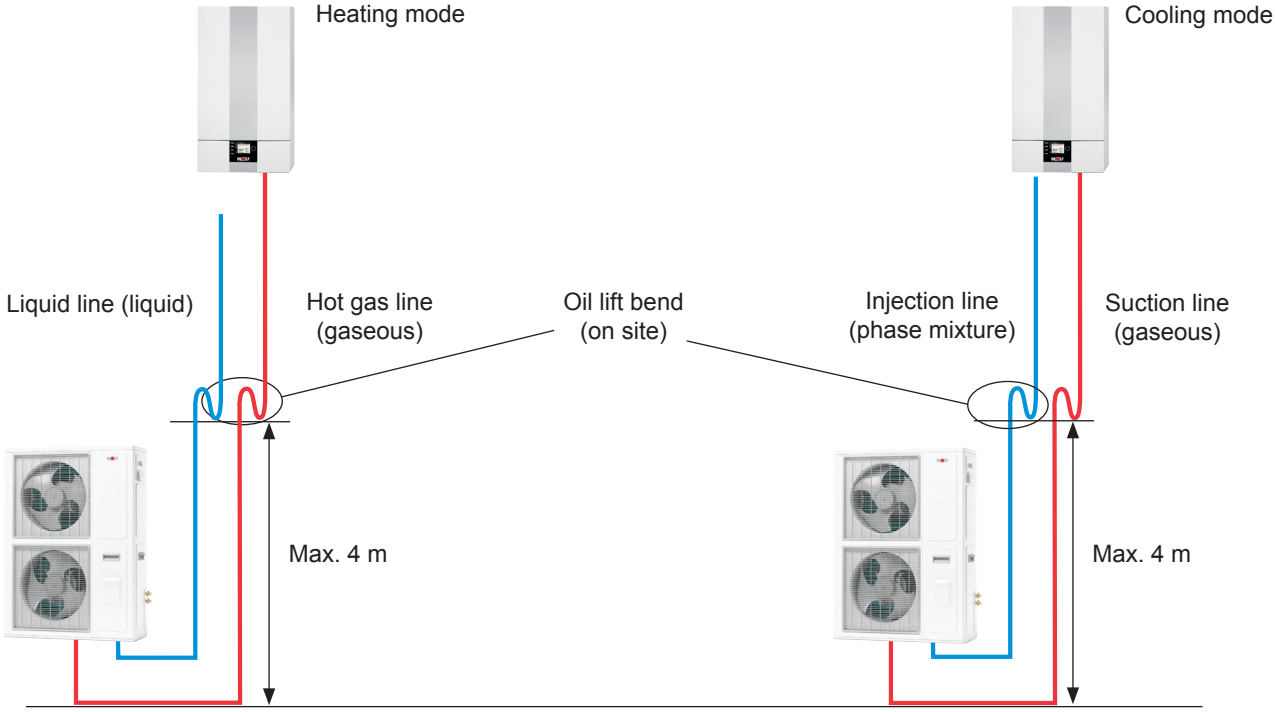
Height differentials

If the height differential between the indoor and the outdoor units is > 4 m, both refrigerant lines will require oil lift bends to prevent oil shortages in the compressor.

Outdoor module higher than indoor module



Indoor module higher than outdoor module



15 Connecting the refrigerant lines

15.1 Shape of flare

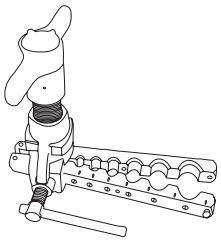
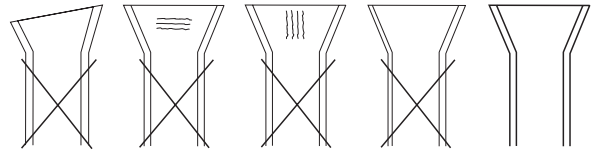
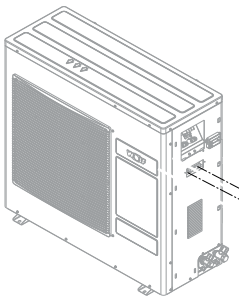
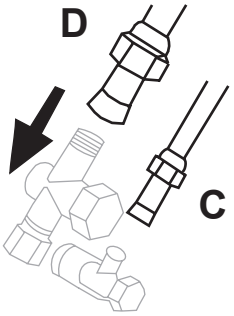


Fig.: Example of a flaring tool



15.2 Connecting the refrigerant line to the outdoor module





Use of metric refrigerant lines

- Remove the union nuts on the outdoor unit from refrigerant line connections C (liquid line) and D (hot gas line).
- Replace nuts with the union nuts supplied (indoor unit) (7/16 UNF or 5/8 UNF for liquid lines; 3/4 UNF or 7/8 UNF for hot gas line).
- Flare the pipe ends.
- Tighten the nuts.

Use of imperial refrigerant lines

- Use the union nuts on the outdoor unit from refrigerant line connections C (liquid line) and D (hot gas line).
- Flare the pipe ends.
- Tighten the nuts.

Tighten nuts with the following torque:

Device	Cable	Connection to outdoor unit	Torque in Nm
BWL-1S(B)-05	Liquid line Ø 6 mm or 1/4 inch	7/16 UNF	16 ± 2
	Hot gas line Ø 12 mm or 1/2 inch	3/4 UNF	56 ± 6
BWL-1S(B)-07/10/14/16	Liquid line Ø 10 mm or 3/8 inch	5/8 UNF	37 ± 4
	Hot gas line Ø 16 mm or 5/8 inch	7/8 UNF	70 ± 7

Euro flanged adaptor connection kit for Ø 10 and 16 mm

Alternatively, the refrigerant lines can also be connected using the Euro flanged adaptor connection kit for hard-soldering on refrigerant lines (lines must be flushed with nitrogen), available from the WOLF range of accessories.

15.3 Connecting the refrigerant line to the indoor module

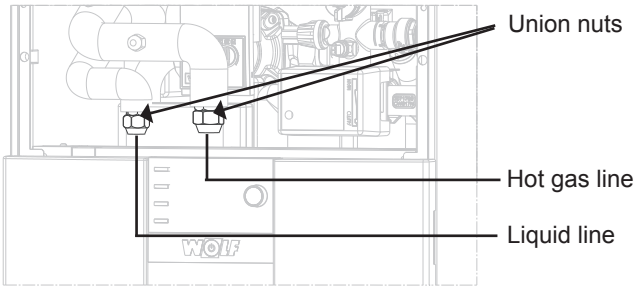


Fig.: Connecting the refrigerant lines to the indoor module

Use of metric refrigerant lines

- Remove the nuts from the liquid line and hot gas line connections of the refrigerant lines.
- Slide the supplied nuts over the copper pipes.
- Flare the copper pipes.
- The Euro flanged adaptor connection kit, available from the WOLF range of accessories, can be used as an alternative to flaring for the Ø 10 mm and Ø 16 mm lines.
- Do not allow any contaminants (e.g. metal swarf or moisture) to enter the copper pipes.
- Connect the copper pipes.

Use of imperial refrigerant lines

- Use appropriate union nuts for imperial refrigerant lines.
- Flare the copper pipes.
- Connect the copper pipes.

Tighten nuts with the following torque:

Device	Cable	Connection to indoor unit	Torque in Nm
BWL-1S(B)-05	Liquid line Ø 6 mm or 1/4 inch	5/8 UNF	37 ± 4
	Hot gas line Ø 12 mm or 1/2 inch	7/8 UNF	70 ± 7
BWL-1S(B) -07/10/14/16	Liquid line Ø 10 mm or 3/8 inch	5/8 UNF	37 ± 4
	Hot gas line Ø 16 mm or 5/8 inch	7/8 UNF	70 ± 7

15.4 Leak and pressure testing

Carry out the leak and pressure test using dry nitrogen.

Note: Certificate of competence

The handling of refrigerant and work on the refrigerant circuit must be carried out by a refrigeration engineer or other suitably qualified person, such as a heating system installer with a certificate of competence (to para 5, section 3 of the ChemKlimaschutzV [or local regulations] in conjunction with (EC) Regulation No. 303/2008 Category I). Applicable standards and regulations and recognised engineering standards must be observed.

Suitable personal protective equipment must be used when handling refrigerant.

Refrigerant R410A used in WOLF split heat pumps is an air-displacing, non-toxic gas.
Uncontrolled release of refrigerant may result in breathing difficulties and asphyxiation.
Observe the corresponding regulations and guidelinesfor handling this refrigerant.

Ensure adequate ventilation in enclosed spaces.
Observe the regulations and guidelines for handling R410A.

Direct contact with refrigerant can be harmful to skin.
Wear protective goggles and gloves.

Please note

When filling the refrigerant lines, adding refrigerant or drawing it off from the system, the water carrying side of the plate heat exchanger in the indoor unit must have water flowing through it or be drained completely. Otherwise, the plate heat exchanger may be damaged by freezing water.

The installed refrigerant lines and all necessary connectors must have suitable thermal insulation.

16 Filling the refrigerant lines

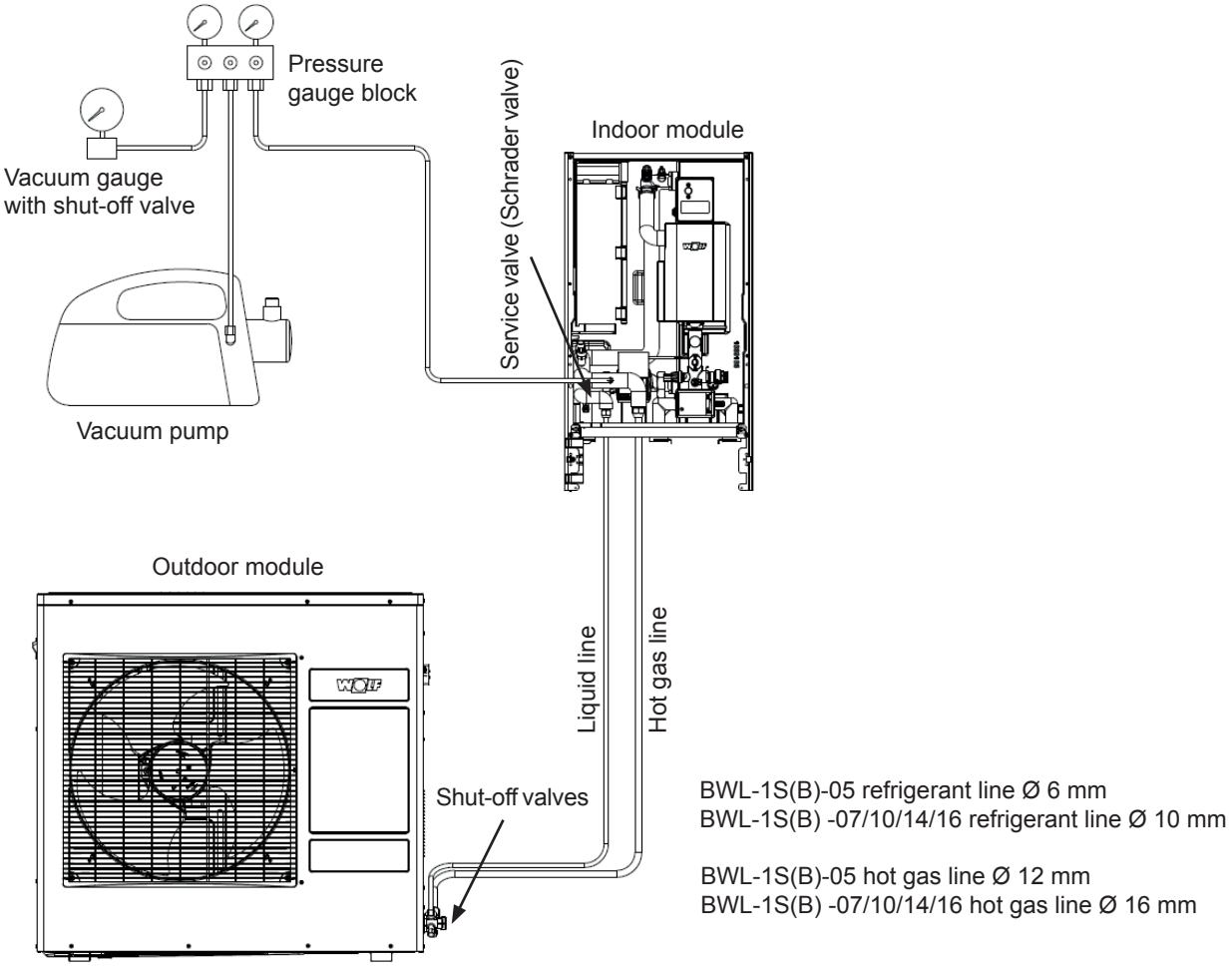
16.1 Filling the indoor module and refrigerant lines

Single refrigerant line length < 12 m

The pre-filled quantity of refrigerant in the outdoor module is sufficient for a single line length of 3 to 12 m.

Single refrigerant line length > 12 m

Line lengths of 12 - 25 m must be topped up with an additional 60 g/m of refrigerant R410A.
The additional refrigerant can be added after evacuating the refrigerant lines and before opening the shut-off valves on the outdoor module.



BWL-1S(B)-05 refrigerant line Ø 6 mm
BWL-1S(B) -07/10/14/16 refrigerant line Ø 10 mm

BWL-1S(B)-05 hot gas line Ø 12 mm
BWL-1S(B) -07/10/14/16 hot gas line Ø 16 mm

16.2 Checking the refrigerant circuit for leaks

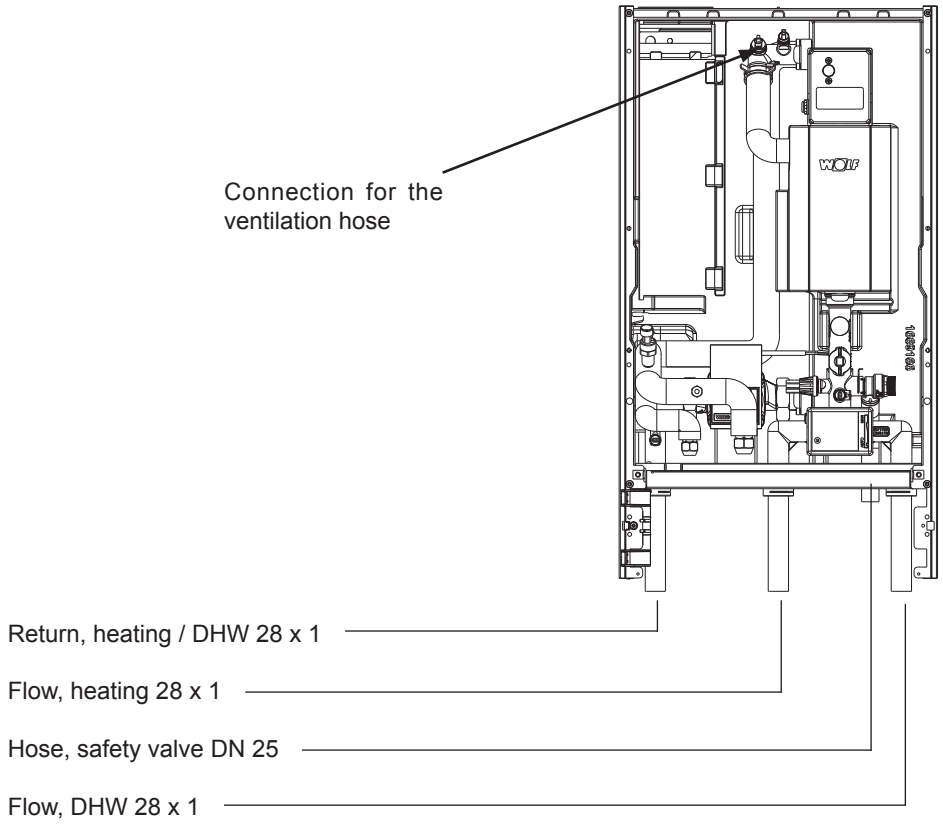
R410A is an air-displacing, non-toxic gas. Uncontrolled release of refrigerant may result in breathing difficulties and asphyxiation.

Check the connections for refrigerant leaks:

- All flared connections on the refrigerant lines between the indoor and outdoor unit.
- All soldered joints and screw connections on the refrigerant lines in the indoor and outdoor module.
- Carry out the leak and pressure test using dry nitrogen.

17 Connecting the heating/DHW circuit

17.1 Observe the following points for the heating/DHW circuit



17.1.1 Air vent valve

An air vent valve must be installed at the highest point in the system.

17.1.2 Flushing the heating system

The following points must be observed for the heating side:

- To prevent any existing dirt in the heating system from causing malfunctions in the heat pump, the heating system must be thoroughly cleaned and flushed before the heat pump is connected. This applies to new systems and in particular when replacing an appliance.
- The flow and return on the heat pump side must be equipped with shut-off systems and 2 BDF valves so that the condenser can be flushed when required.

17.1.3 Filling the heating system

Before commissioning, the system must be filled and vented.

- Open the locking cap on the air vent valve in the indoor module by one revolution.
- Open all heating circuits.
- Slowly fill the entire heating system while cold via the BDF valve at the return, up to approx. 2 bar pressure (observe pressure gauge).
- Move the 3-way diverter valve manually from heating mode to DHW mode and back again.
- Check the entire system for water leaks.
- Slowly open the expansion vessel.
- Switch the heat pump ON.
- Vent the heating circuits completely by going to the contractor level and selecting the required pump under "Relay test". Then switch the pump ON for 5 seconds and OFF for 5 seconds, five times in succession.
- When the system pressure drops below 1.5 bar, top up the water.

17.1.4 Draining the heating system

- Shut down the system.
  Risk of scalding
  Hot water can cause severe scalding. Before working on water-seated parts, allow the appliance to cool to below 40 °C, shut off all valves and, if necessary, drain the appliance.
  Risk of burns
  Hot components can cause burns. Before working on the opened up appliance, allow it to cool to below 40 °C or wear suitable gloves.
  Danger from overpressure on the water side
  Overpressure on the water side can cause severe injuries. Before working on water-seated parts, allow the appliance to cool to below 40 °C, shut off all valves and, if necessary, drain the appliance.
  Note: Sensors can be water-based and therefore pressurised.
- Safeguard the heating system against accidental reconnection of the power supply.
- Open the drain & fill valve (BDF valve), for example on the indoor module.
- Open the air vent valves in the heating circuits.
- Drain off the heating water.

17.1.5 Overflow valve

If no separating cylinder is being used, the minimum heating water flow rate can be ensured by means of an overflow valve.

17.1.6 DHW heating

Do not operate via the buffer cylinder.

17.1.7 Circulation pump

An electronically regulated high efficiency pump is integrated into the indoor module.

17.1.8 Hydraulic separating cylinder (low loss header)

Used when there are several heating circuits.

17.1.9 Maximum thermostat (MaxTh)

To protect area heating systems (e.g. underfloor heating circuits) from excessively high flow temperatures, temperature limiters or maximum thermostats are required.
The floating contacts of maximum thermostats and, where applicable, dew point monitors, can be connected in series and connected to the programmable input E1.
When the contact opens, the heat generator and heating circuit pump are switched OFF.

17.1.10 The following parameters are critical for the transfer of the heat pump output to the heating system:

- The **heating water flow rate ($\dot{m}$)** in m^3/h (nominal flow rate)
- The **temperature differential between the flow and return (Δt)**
- The **specific heat content of the water (c)**

$$\dot{Q}_{HP} = \dot{m} \times c \times \Delta t \text{ (kW)}$$

17.1.11 Pipe dimensions

- The pipe dimensions must be matched to the nominal flow rate.
- Ensure that the system is vented correctly.
- Flush the system.

17.1.12 Dirt trap

To protect the heat pump, a dirt trap must be installed in the heating return. Installing dirt traps or carrying out any other modifications in the supply line to the safety valve is not permitted. WOLF recommends a sludge separator with magnetite separator to protect the appliance and the high efficiency pump from dirt/sludge and magnetite.

17.1.13 Dew point monitor (DPM)

A dew point monitor (accessory) is required for area cooling systems (e.g. underfloor heating circuit, cooling ceiling). If the cooling circuit serves several rooms with different relative humidities, several dew point monitors must be installed and connected in series. The monitors are fitted to the cooling circuit flow in the room to be cooled. Remove the thermal insulation from this area.
You can set the dew point monitor switching point to between 75 % and 100 % relative humidity using a potentiometer (factory setting is 90 % rh).
If required, the dew point monitor can be installed directly on the indoor unit. In this case, the switching point must be reduced slightly, e.g. 85 % rh instead of 90 % rh.

17.1.14 DHW cylinder

- The DHW cylinder must be equipped with an internal indirect coil suitable for the heating output of the heat pump.
- The internal indirect coil should have a surface area of at least 0.25 m² per kW of heating output.
- The pipework must be sufficiently large (> DN 25).

17.1.15 Buffer cylinders

Since variable flow rates can arise on the heat draw-off side depending on the load, the minimum flow rate must be ensured to enable fault-free heat pump operation. This is usually achieved by installing a separating buffer cylinder or a low loss header.

A buffer cylinder is essential for all systems with radiators, individual room control (thermostatic valves), multiple heat generators or heating circuits. This also applies to systems with the auxiliary PV increase function or Smart Grid for heating mode.
For correct operation, defrost energy is required from the heating system. This is ensured using a buffer cylinder with a capacity of at least 35 l. If insufficient defrost energy is available, system faults occur and increased use of the electric immersion heater results, in order to successfully complete defrosting.

For air/water heat pumps with output-dependent control in connection with 100 % underfloor heating, there is no need to use a buffer cylinder, provided the following conditions are met:

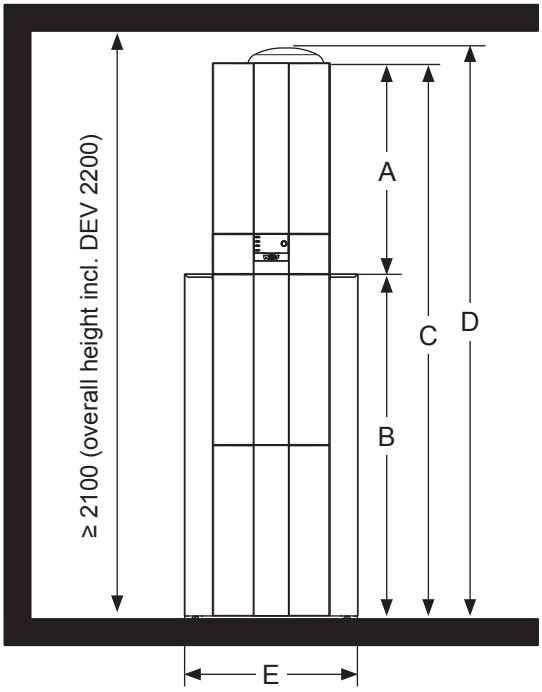
The minimum flow rate via the heating system must be ensured permanently by fully opening multiple lines (written user consent required). For this, the minimum flow rate must be verified by means of a pressure drop calculation.
If necessary, multiple heated heating circuits can be specifically opened fully via output A1 during defrost mode. The valve opening time must be < 20 sec.

18 CHC Split / 200 heat pump centre

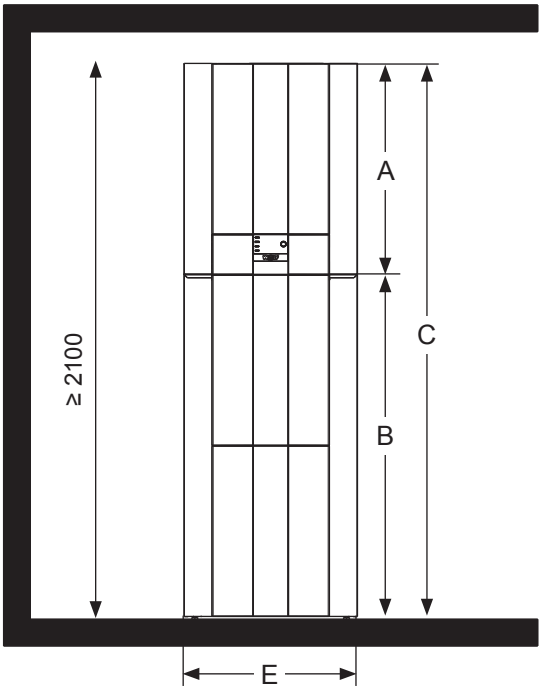
18.1 CHC Split / 200

The BWL-1S-05/07/10/14/16 can be combined with the CEW-2-200 DHW cylinder and PU-35 buffer cylinder to form a heat pump centre. The series buffer cylinder ensures the necessary defrost energy is available.

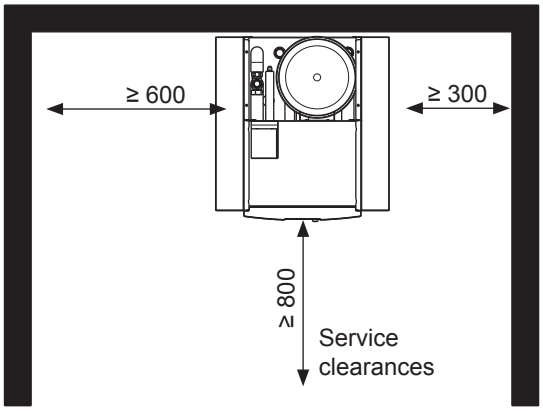
18.2 Dimensions / minimum clearances



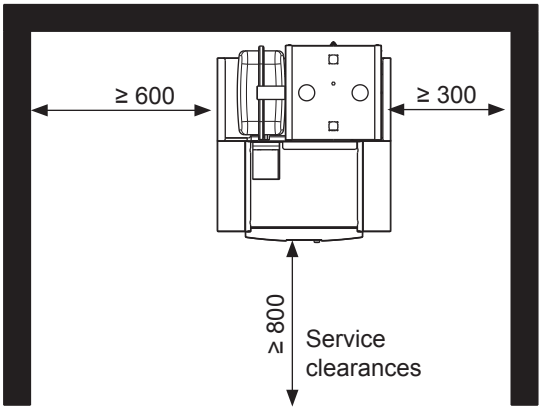
CHC Split / 200 front view



CHC Split / 200-35 front view



CHC Split / 200 plan view



CHC Split / 200-35 plan view

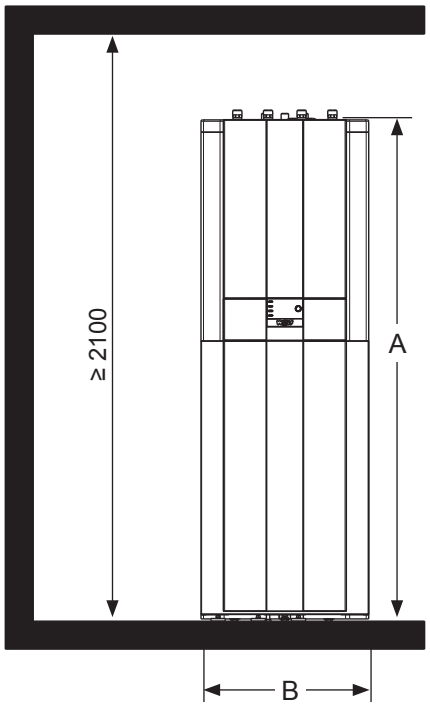
		CHC Split / 200	CHC Split / 200-35
Height of indoor module	A mm	790	790
Height of CEW-2-200	B mm	1290	1290
Total height	C mm	2080	2080
Overall height with expansion vessel (DEV)	D mm	2160	-
Width	E mm	650	650
Depth	mm	685	740

19 CHC Split / 300 heat pump centre

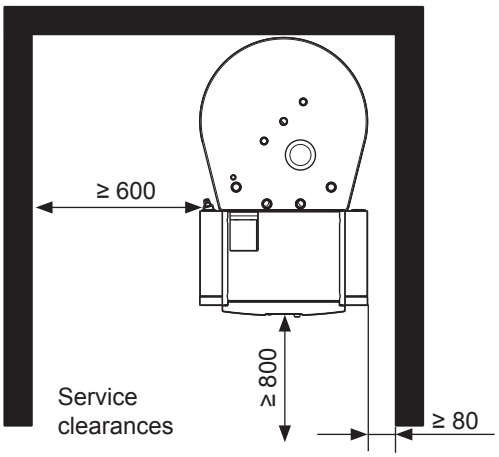
19.1 CHC Split / 300

The BWL-1S-05/07/10/14/16 can be combined with the SEW-2-300 DHW cylinder and PU-50 buffer cylinder to form a heat pump centre.
The PU-50 buffer cylinder can be installed as a series or separating buffer and ensures the necessary defrost energy is available

19.2 Dimensions / minimum clearances



CHC Split / 300 front view



CHC Split / 300 plan view

Total height	A mm	1785
Width	B mm	604
Depth	mm	997

20 Electrical connection

20.1 General information

The installation may be carried out only by an approved electrical contractor. Observe VDE regulations [Germany] and all local regulations of your power supply utility.

An omnipolar isolator with at least 3 mm contact separation must be integrated in the power cable upstream of the appliance.

If using residual current protection (ground fault circuit interrupter or RCD), use a type B AC/DC-sensitive residual current protective device, as this is the only type suited to DC residual currents.
Type A residual current protective devices are not suitable.

Do not route sensor leads alongside 230 V or 400 V cables.

Danger through 'live' electrical components.
Please note: Turn OFF the ON/OFF switch before removing the casing.

Never touch electrical components or contacts when the ON/OFF switch is in the ON position. There is a danger of electrocution, resulting in a risk to health or death.

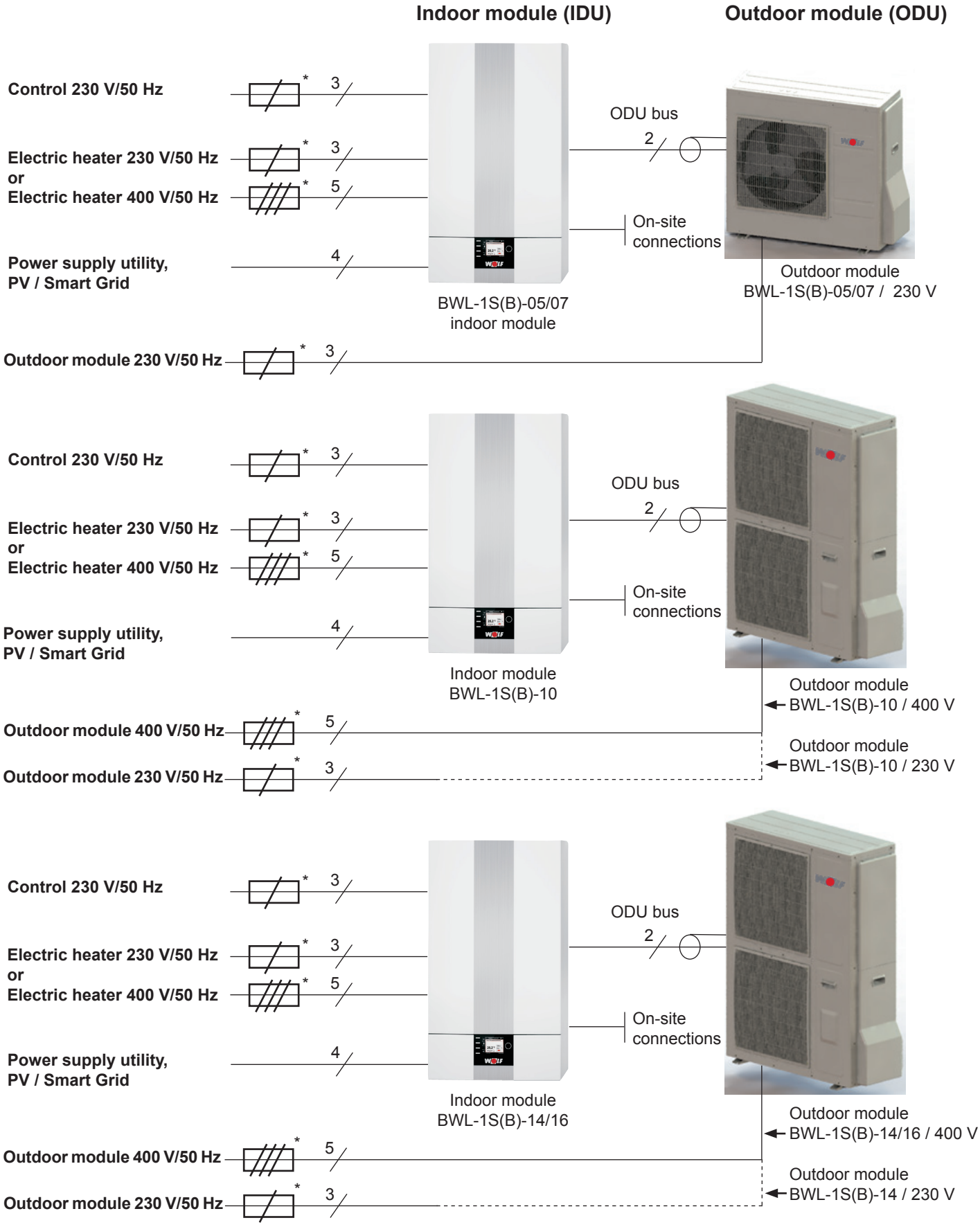
The main terminals are "live", even when the ON/OFF switch is in the OFF position.

During servicing and installation work, isolate the entire system from the power supply across all poles, otherwise there will be a risk of electrocution.

Before connecting the appliance to the power supply, ensure that all electrical covers and protective devices are fully installed.

Connecting cables, installation ducts or tubes, etc., must be weatherproof, UV-resistant and protected from mechanical damage.

20.2 Mains feed / connection

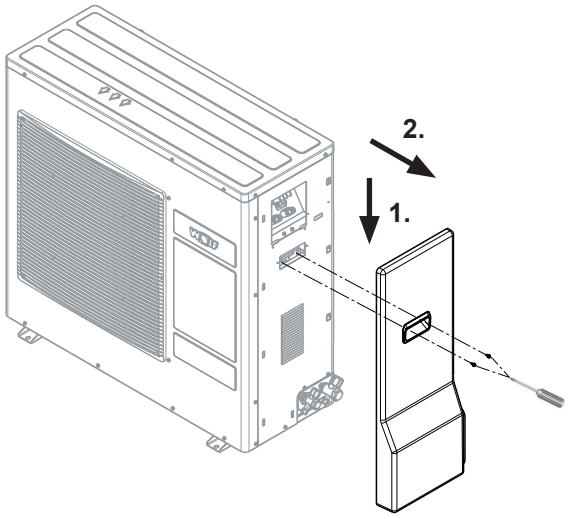


* See "Specification" for fuse protection values

21 Outdoor module electrical connection

21.1 Opening the BWL-1S(B)-05/07 outdoor module casing

BWL-1S(B)-05/07



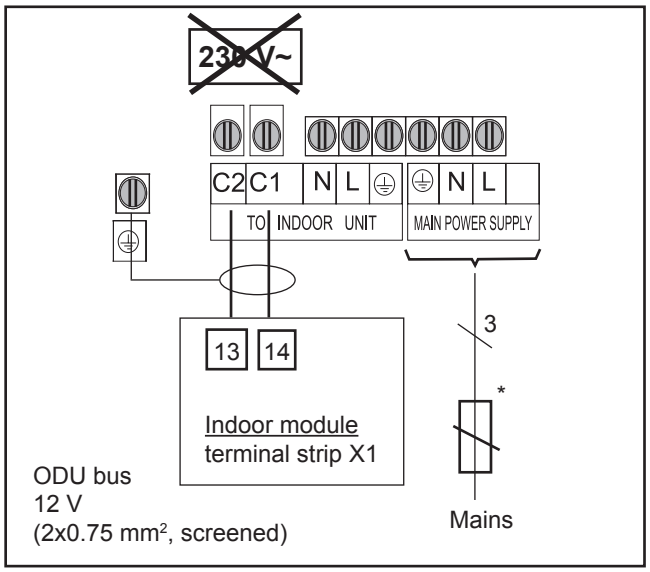
21.2 BWL-1S(B)-05/07 outdoor module electrical connection

* See "Specification" for fuse protection values.

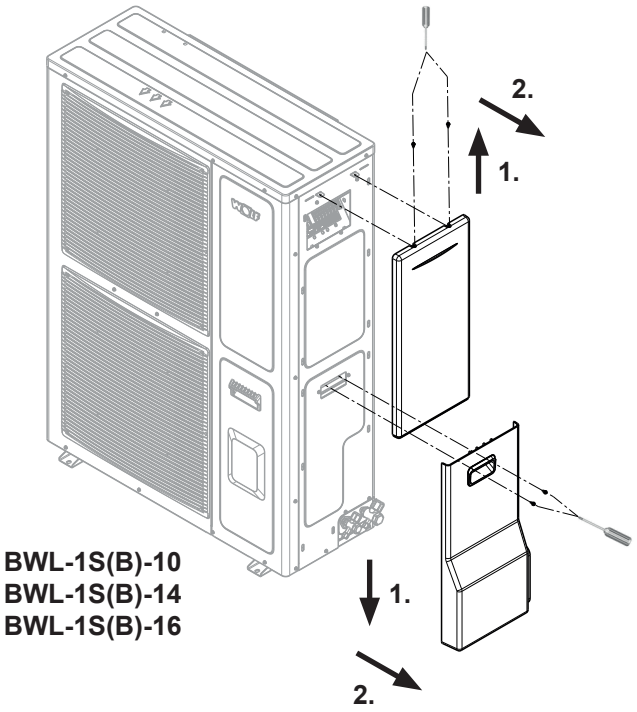
The ODU bus connection (12 V) must be routed separately from 230 V/400 V cables.

Only one bus may be connected.

BWL-1S(B)-05/07/230 V



21.3 Opening the BWL-1S(B)-10/14/16 outdoor module casing



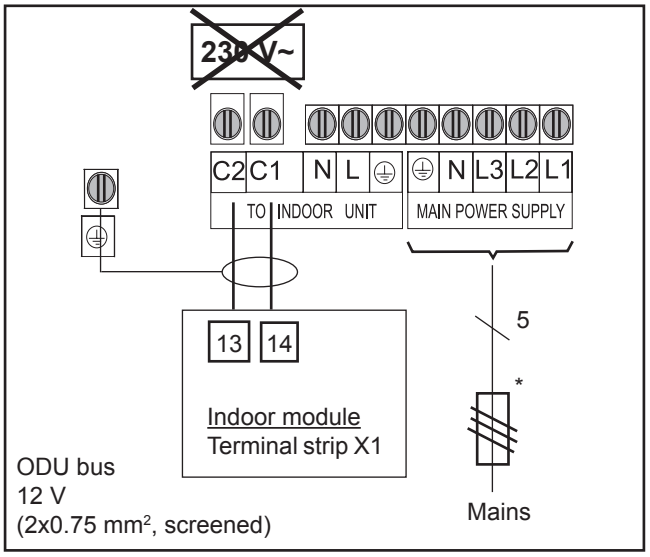
21.4 BWL-1S(B)-10/14/16 outdoor module electrical connection

* See "Specification" for fuse protection values.

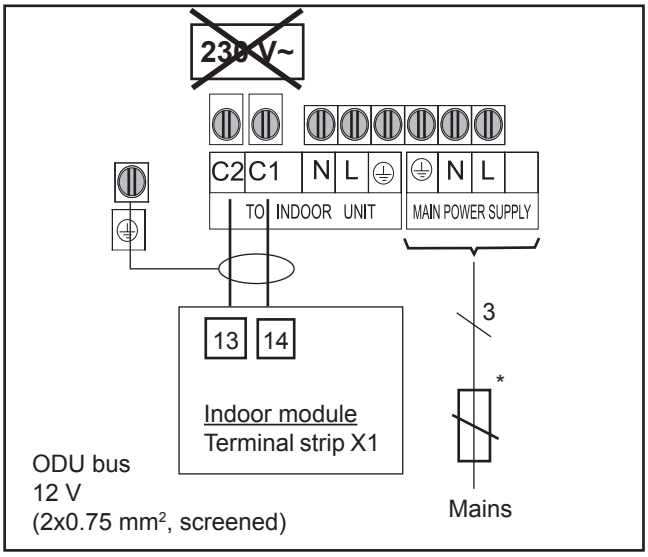
The ODU bus connection (12 V) must be routed separately from 230 V/400 V cables.

Only one bus may be connected.

BWL-1S(B)-10/400 V
BWL-1S(B)-14/400 V
BWL-1S(B)-16/400 V

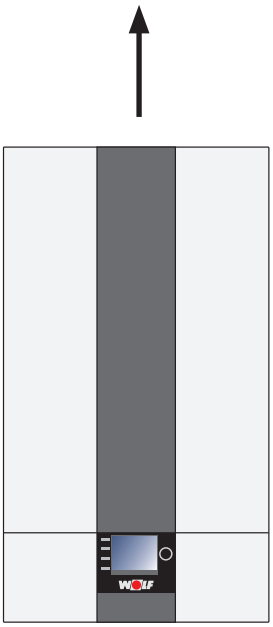


BWL-1S(B)-10/230 V
BWL-1S(B)-14/230 V

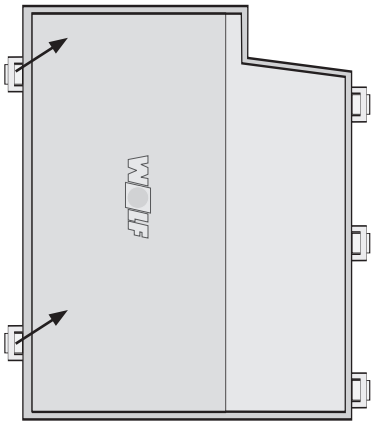


22 Indoor module electrical connection

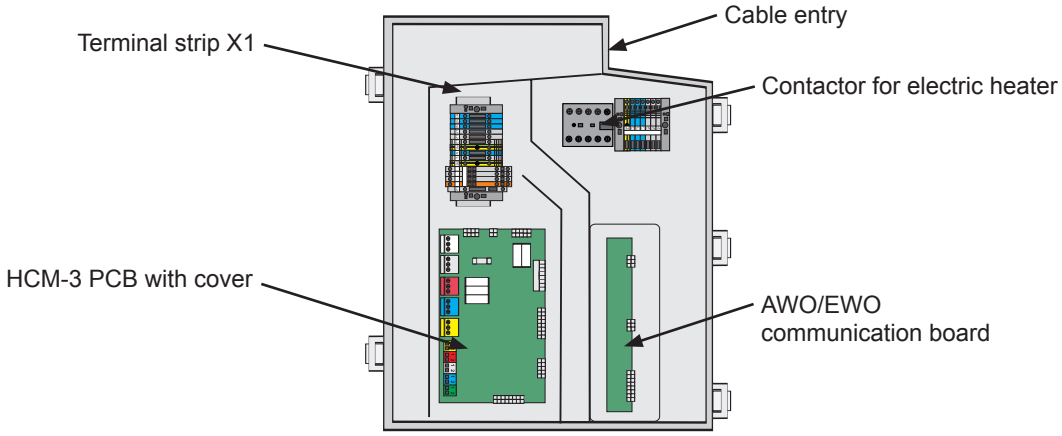
22.1 Opening / unhooking the indoor module casing



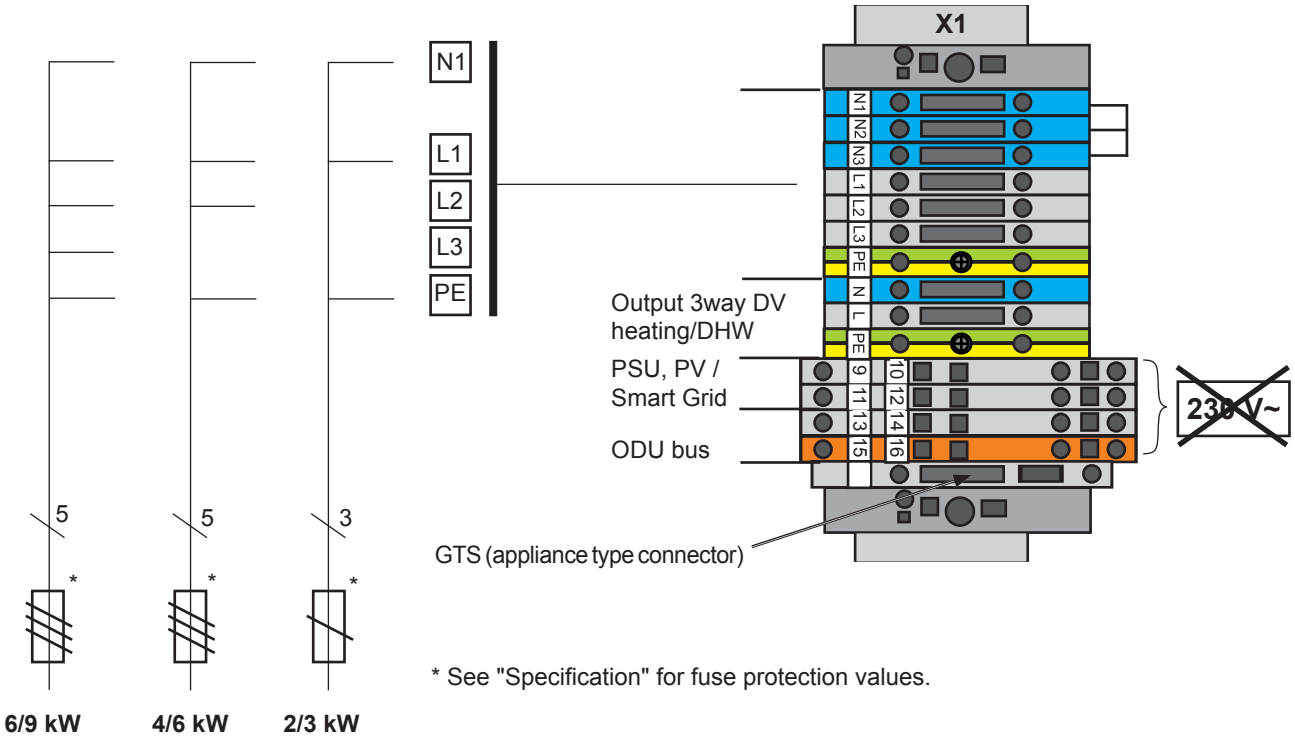
Opening the integral casing cover



Cable entry / electrical connection



22.2 Electric heater connection



* See "Specification" for fuse protection values.

On the BWL-1S with integral 3-phase electric heater, the heater connection can be either single phase, 2-phase or 3-phase. Depending on demand, the control unit activates the electric heater via a contactor.

6 kW heating element connection:

L1, N, PE	=	2 kW
L1, L2, N, PE	=	4 kW
L1, L2, L3, N, PE	=	6 kW

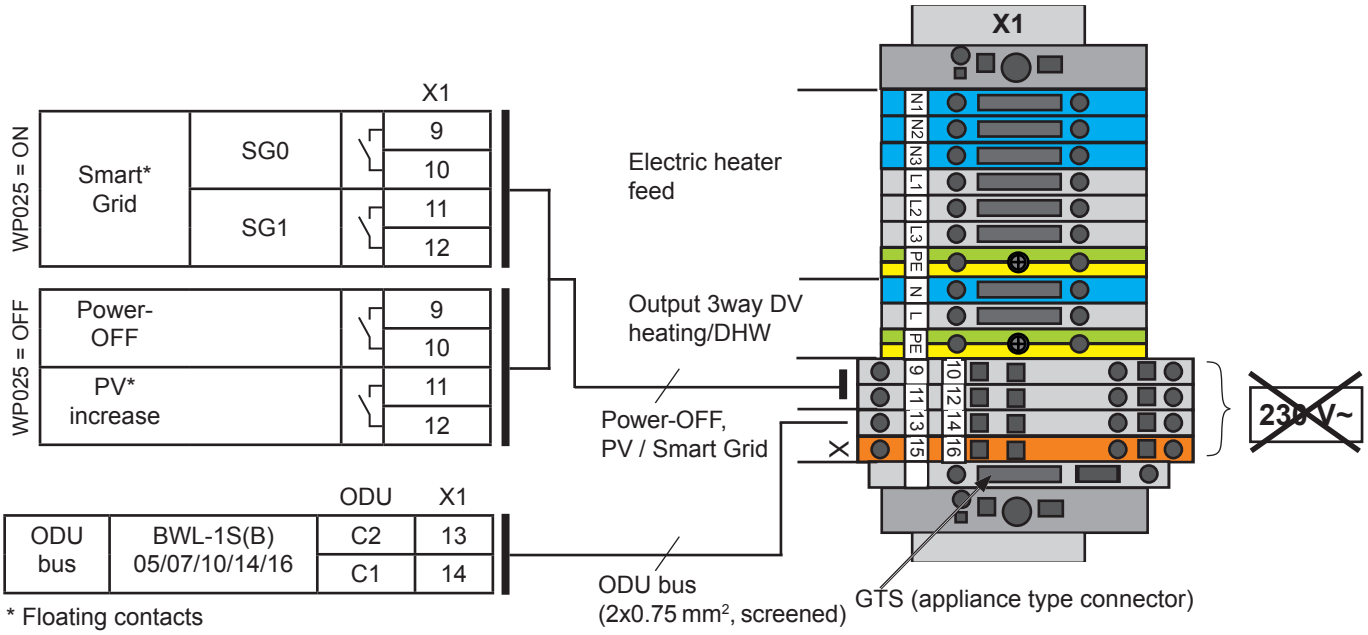
9 kW heating element connection (optional):

L1, N, PE	=	3 kW
L1, L2, N, PE	=	6 kW
L1, L2, L3, N, PE	=	9 kW

Note: **Depending on the connected output of the electric heater, parameter WP094 (electric heater type) must be adjusted (factory setting WP094 = 6 kW).**

22.3 PSU / PV / Smart Grid / ODU bus connection

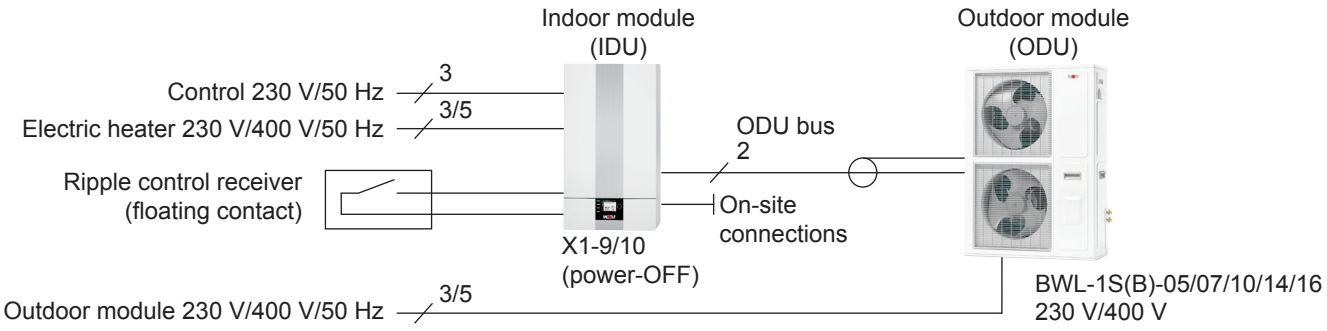
(See also "Additional functions" chapter.)



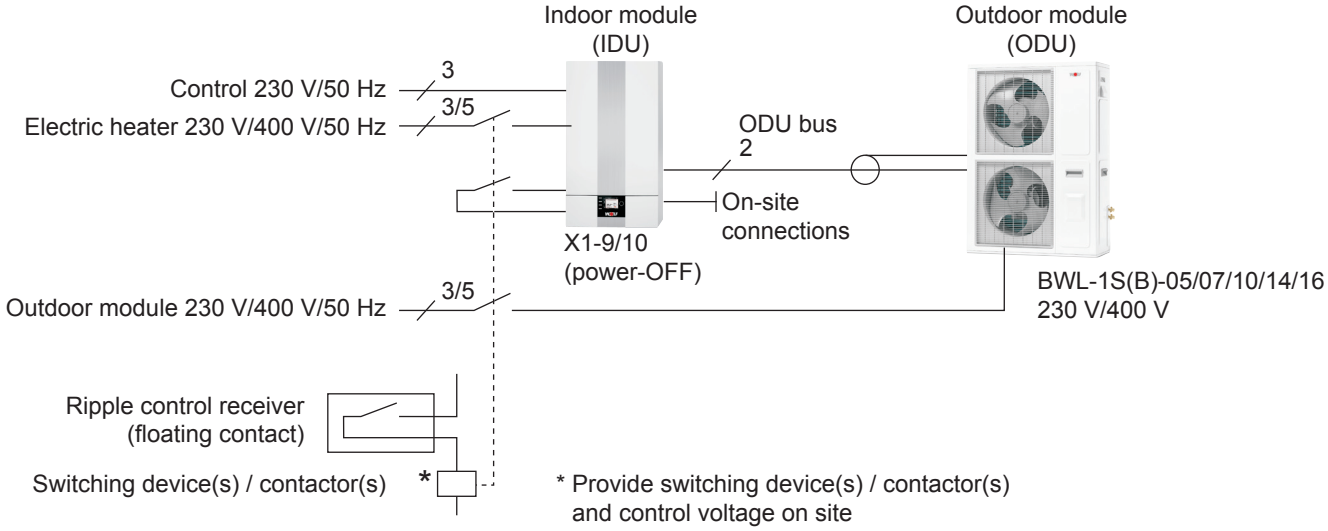
Notes:

- For systems that can be temporarily blocked/shut down by the power supply utility (power-OFF), a corresponding switching signal (floating contact) of the energy supply utility must be connected to terminal X1-9/10 in order to signal the power-OFF period to the control unit of the BWL-1S(B).
- If the power-OFF function is not used, insert a jumper at terminal X1-9/10.
- The electrical connection of the Smart Grid and power-OFF function must be made in accordance with the stipulations of the local power supply utility.

Example 1: Power supply with power-OFF, without on-site load disconnection



Example 2: Power supply with power-OFF, <u>with</u> on-site load disconnection



Notes:

- Observe the specifications and technical connection conditions of the local power supply utility.
- Size switching devices/contactors in accordance with the specification.
- Provide fuse protection in accordance with the specification.

22.4 HCM-3 PCB connection

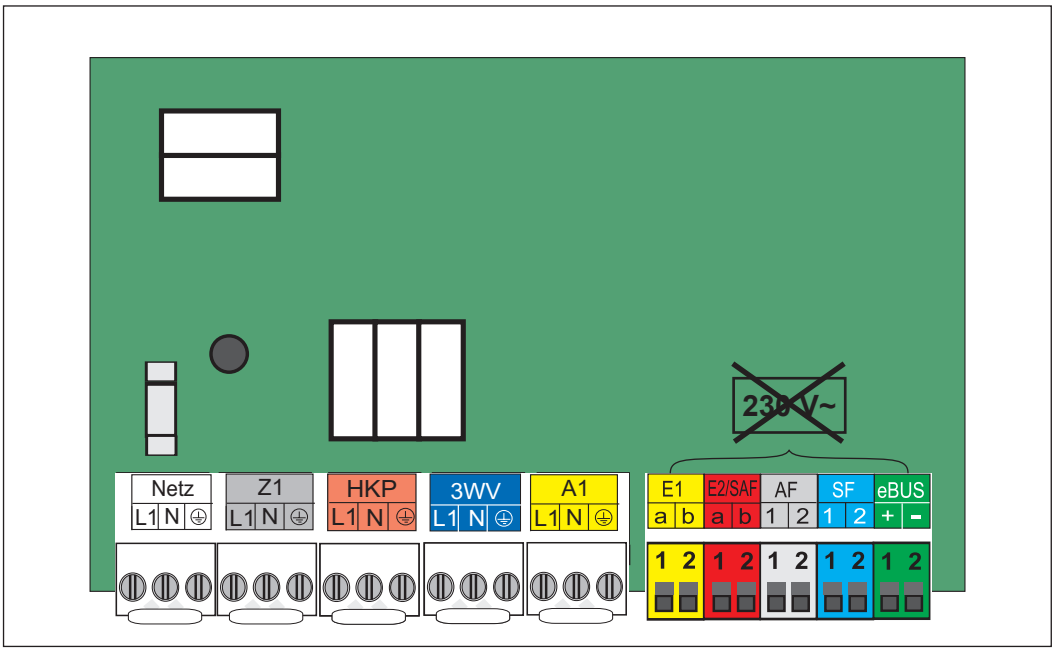
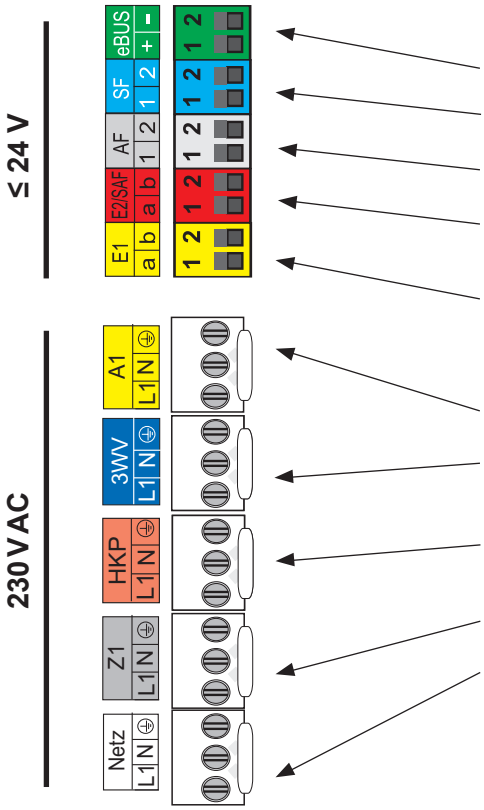


Figure: HCM-3 PCB



eBUS 1(+), 2(-) WOLF control accessories

SF (5 k NTC cylinder sensor)

AF (5 k NTC outside sensor)

E2/SAF (5 k NTC header sensor SAF; alternatively 0-10 V activation by e.g. BMS or activation via floating contact)

E1 (programmable input)

* A1 (programmable output 230 V AC)

* 3-way diverter valve, heating/cooling
(output for 3-way diverter valve for heating/cooling mode)

* HCP (heating circuit pump activation of a direct heating circuit.
Note: only possible with specific configurations)

* Z1 (230 V output when ON/OFF switch is ON)

Power supply control

* Max. 1.5 A / 345 VA per output; sum of all outputs no more than 600 VA

Please note

Only one external voltage of max. 10 V may be connected to input E2/SAF, otherwise the PCB will be destroyed.
1(a) = 10 V, 2(b) = GND

Please note

When installing the appliance in places where there is a risk of increased electromagnetic interference, it is advisable to fit screened sensor leads and eBUS cables. The screen should be terminated at one end to the PE potential in the control unit.

22.5 Electrical connection (230 V)

230 V mains connection

The control and safety devices are fully wired and tested. You only need to connect the power supply and the external accessories.
Create a permanent connection for the power supply.

Provide the power supply via a mains isolator (e.g. heating system emergency stop switch) that ensures at least 3 mm contact separation for all poles.

No other consumers may be connected to the cable. In rooms with a bathtub or shower, the appliance may only be connected via an RCD.

The indoor module power supply must not have power-OFF or a shutdown tariff.

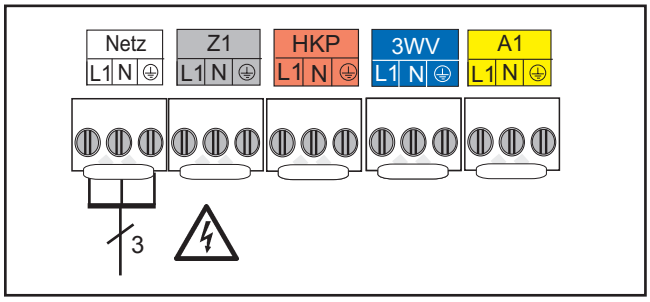


Figure: Mains connection

Installation information – electrical connection

- Isolate the system from the power supply before opening.
- Remove the front casing.
- Open the integral casing cover.
- Check that the appliance is isolated from the power supply.
- Push the cable through the cable entry.
- Pull out the Rast5 plug.
- Terminate the appropriate cores at the Rast5 plug.

Connecting output Z1 (230 V AC; max. 1.5 A) *

Push connecting cable through cable entry.
Connect the cable to terminals L1, N and ⏚ .

* Max. 1.5 A / 345 VA per output; sum of all outputs no more than 600 VA

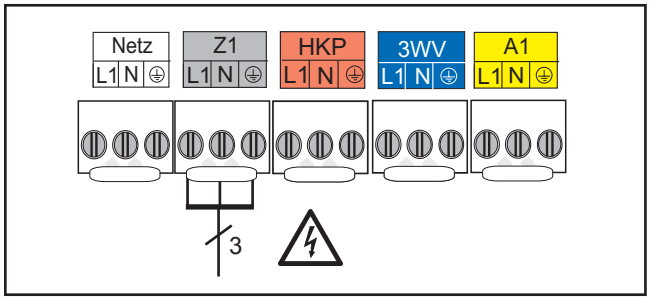


Figure: Output Z1 connection

Connecting the HCP (230 V AC; max. 1.5 A) *

Push connecting cable through cable entry.
Connect the cable to terminals L1, N and ⏚.

* Max. 1.5 A / 345 VA per output; sum of all outputs no more than 600 VA

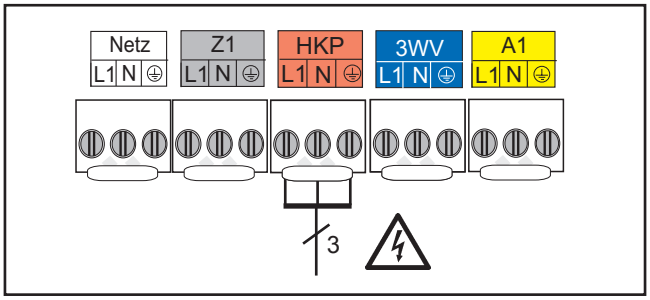


Figure: HCP connection

Connection, 3-way diverter valve, heating/cooling (230 V AC; max. 1.5 A) *

Push connecting cable through cable entry.
Connect the cable to terminals L1, N and ⏚.

* Max. 1.5 A / 345 VA per output; sum of all outputs no more than 600 VA

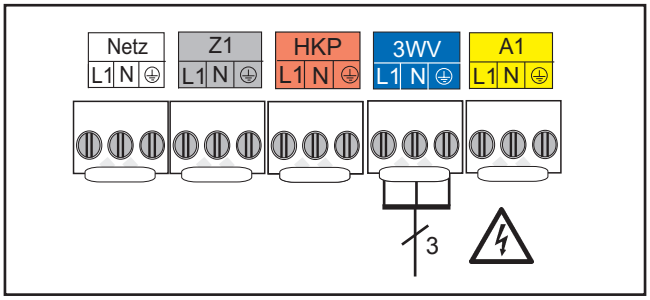


Fig: 3-way diverter valve connection

Connecting output A1 (230 V AC; max. 1.5 A) *

Push connecting cable through cable entry.
Connect the cable to terminals L1, N and ⏚.

* Max. 1.5 A / 345 VA per output; sum of all outputs no more than 600 VA

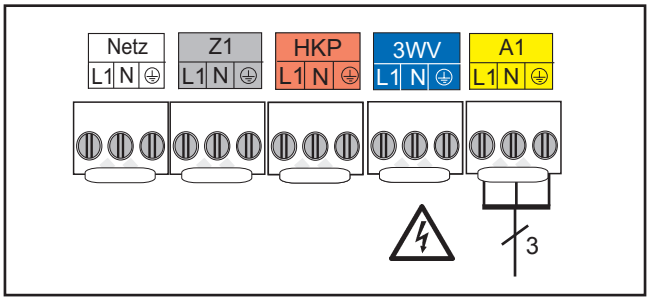


Figure: Output A1 connection

Changing a fuse

Isolate the heating appliance from the power supply prior to changing a fuse.
The ON/OFF switch on the appliance does not provide isolation from the power supply.
The F1 and F2 fuses are located on the PCB (HCM-3).

F1: fine wire fuse (5x20 mm) 4 A (medium)
F2: micro fuse 1.25 A (slow)

Danger through 'live' electrical components. Never touch electrical components or contacts if the heating appliance has not been isolated from the power supply. Danger to life!

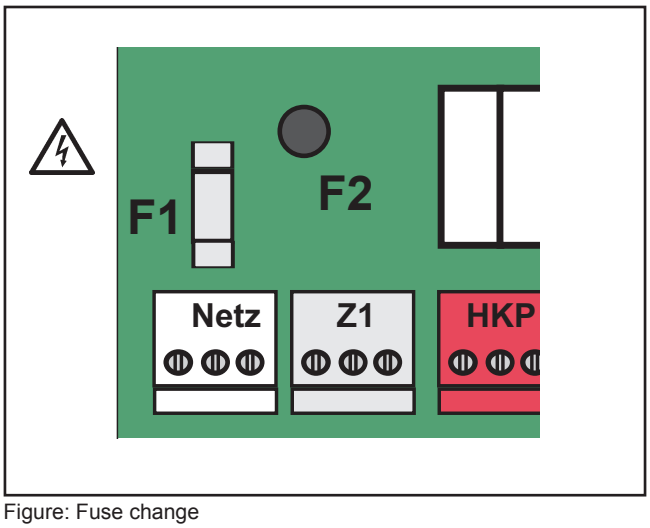


Figure: Fuse change

22.6 Electrical connection (low voltages)

Connecting input E1

Push connecting cable through cable entry.
Connect the connection cable for input E1 to terminals E1.

Please note

No external voltage may be connected to input E1, as this could destroy the component.

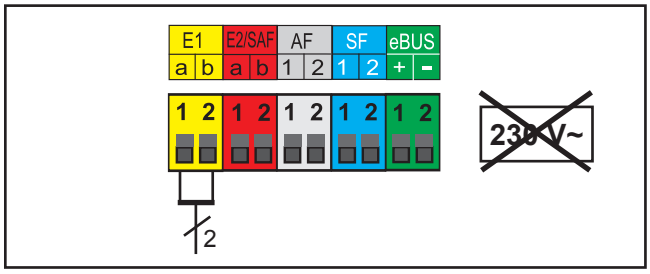


Figure: Input E1 connection

Connecting input E2/SAF

Push connecting cable through cable entry.
Connect the connection cable for input E2/SAF to terminals E2/SAF.

Please note

Only one external voltage of max. 10 V may be connected to input E2/SAF, otherwise the PCB will be destroyed.
1(a) = 10 V, 2(b) = GND

5 k NTC header sensor SAF; alternatively 0-10 V or floating contact

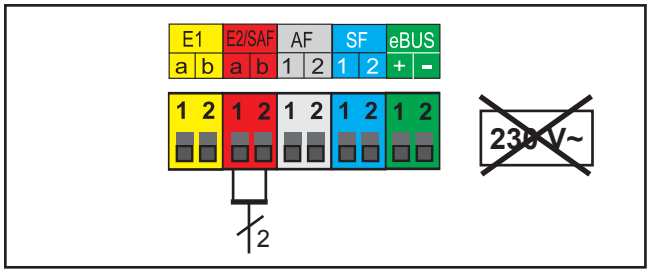


Figure: Input E2/SAF connection

Connecting the outside sensor

The outside sensor can be connected to the terminal strip of the heat pump at connection AF, or to the terminal strip of the control accessories.

Please note

No external voltage may be connected to input AF, as this will destroy the component.

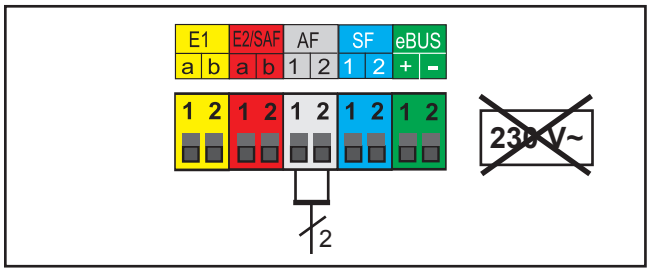


Figure: Outside sensor AF connection

Connecting the cylinder sensor

Push connecting cable through cable entry.
Connect the lead for the SF cylinder sensor to the SF terminals.

Please note

No external voltage may be connected to input SF, as this will destroy the component.

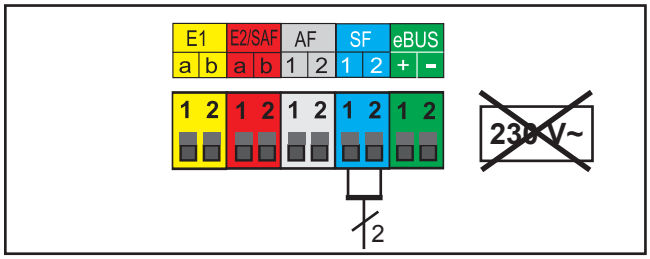


Figure: Cylinder sensor SF connection

Connecting digital WOLF control accessories (e.g. BM-2, MM, KM, SM1, SM2)

Only controllers from the WOLF range of accessories may be connected. Each accessory is supplied with its own connection diagram.
Use a two-core cable (cross-section > 0.5 mm²) as the connecting cable between the control accessory and the BWL-1S (1 is + and 2 is -).

Please note

When installing the appliance in places where there is a risk of increased electromagnetic interference, it is advisable to fit screened sensor leads and eBUS cables. The cable shield should be connected at one end to the PE potential in the control unit.

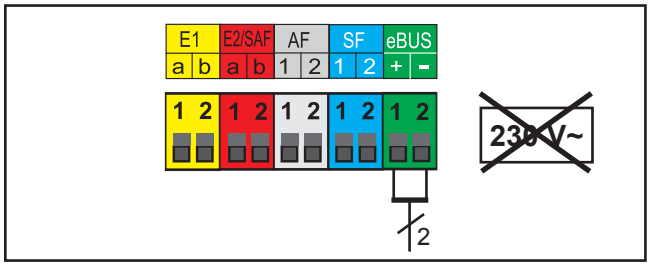
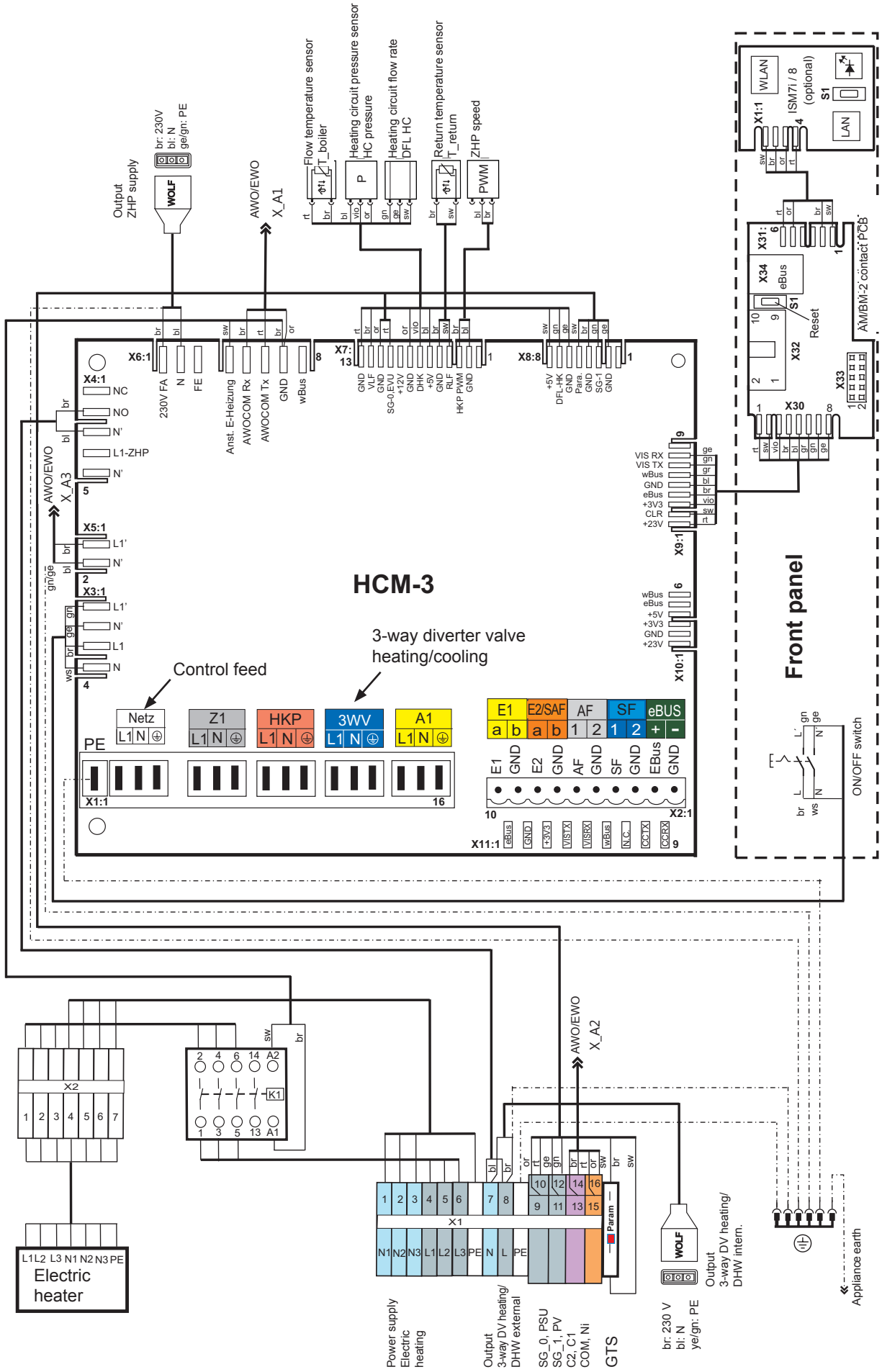
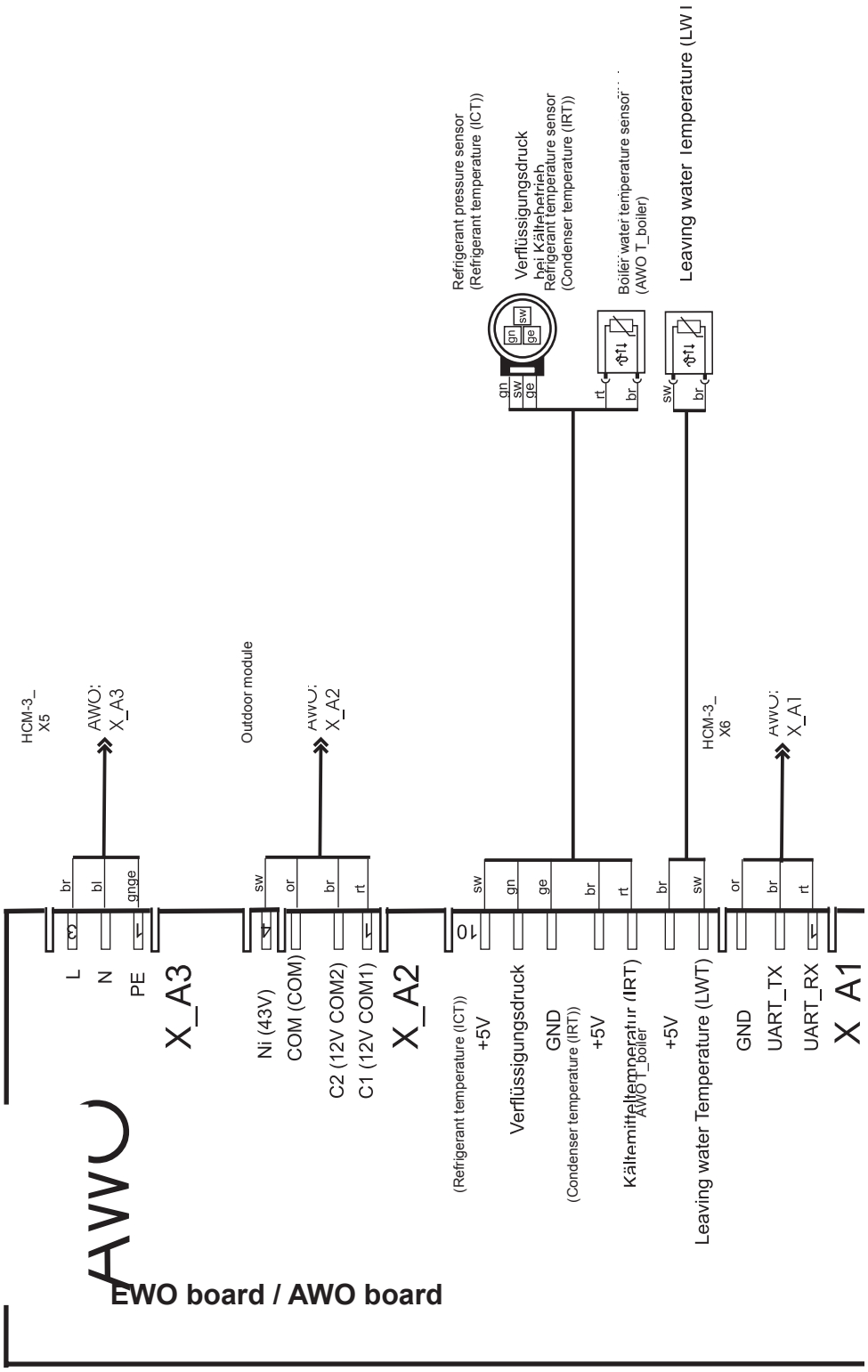


Figure: Connecting digital WOLF control accessories (eBUS interface)

22.7 Indoor module HCM-3 PCB wiring diagram



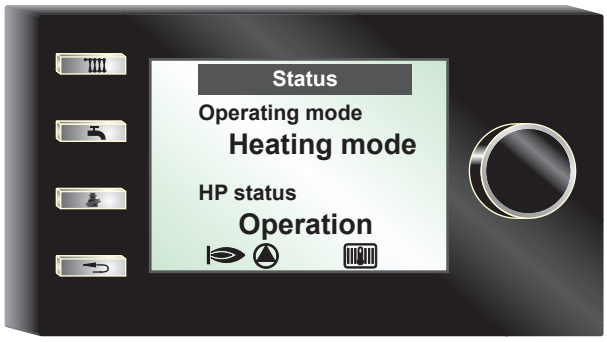
22.8 Indoor module EWO board / AWO board wiring diagram



23 AM display module / BM-2 programming unit

To operate the split air/water heat pump, an AM display module or a BM-2 programming unit is required.

AM

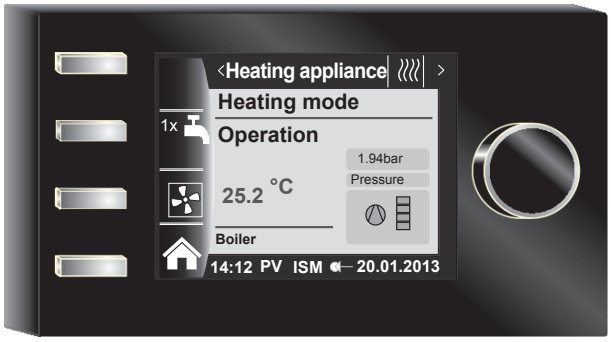


The AM serves as a display and programming unit for the split air/water heat pump. Parameters and values specific to the split air/water heat pump can be programmed and displayed.

Specification:
- 3" LCD screen
- 4 quick start keys
- 1 rotary selector with pushbutton function

Please note:
- Use when BM2 is deployed as a remote control or in a cascade circuit
- AM is always in the heating appliance

BM-2

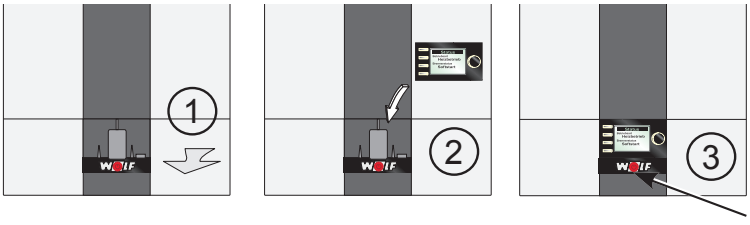


The BM-2 (programming unit) communicates with the split air/water heat pump and all connected extension modules via eBUS.

Specification:
- 3.5" colour display screen, 4 function keys, 1 rotary selector with pushbutton function
- Micro SD card slot for software update
- Central programming unit with weather-compensated flow temperature control
- Time program for heating, cooling, DHW and DHW circulation

Installation

Insert the AM display module or BM-2 programming unit in the slot above the ON/OFF switch (WOLF logo).



Switch ON power supply / MCB and switch ON/OFF switch to ON.

Notes:

From **software version FW 1.40***, the BWL-1S(B) split air/water heat pumps can be operated directly using a BM-2 programming unit **(from software version FW 2.10**)** installed in the indoor unit.
An AM display module is therefore no longer strictly required.

* FW 1.40 consecutively from indoor unit production number 438450 (last 6 digits of indoor unit serial number)

** FW 2.10 identification on BM-2 rear and packaging

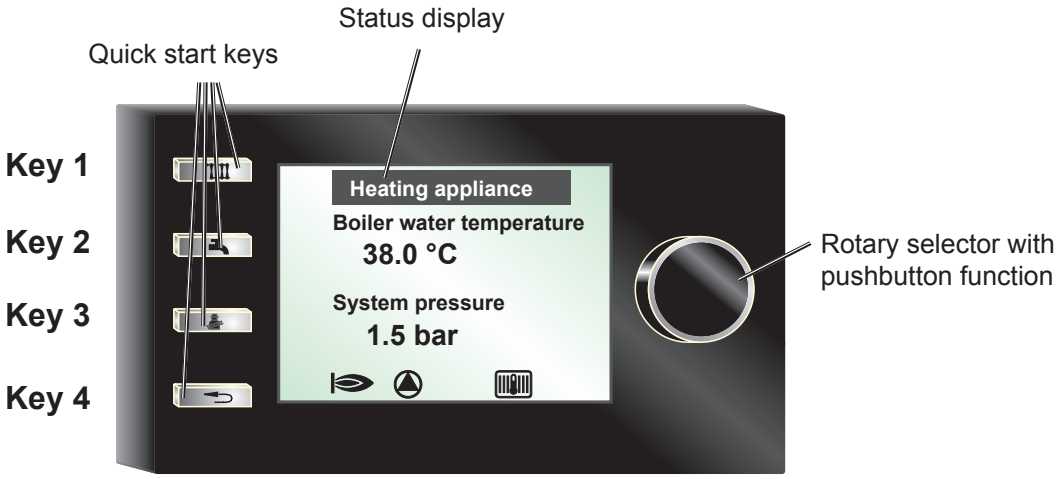
The following operating modes are possible:

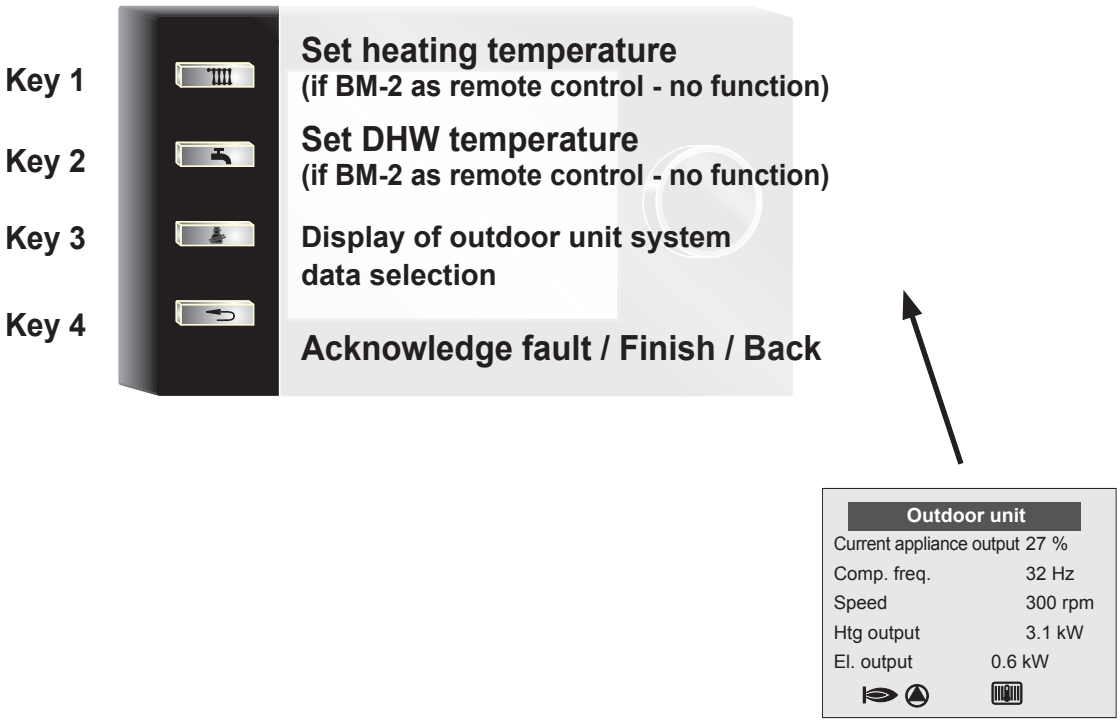
- BM-2 programming unit (FW 2.10 and higher) in the indoor unit
- AM display module in the indoor unit with BM-2 programming unit in the wall mounting base or extension module
- AM display module in the indoor unit

24 AM display module

24.1 Overview

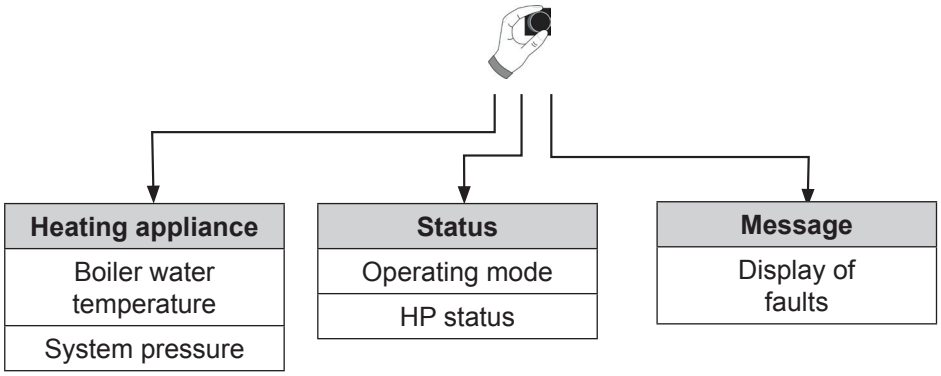
Note:
Other functions and descriptions can be found in the installation instructions for contractors or the user operating instructions for the AM display module.

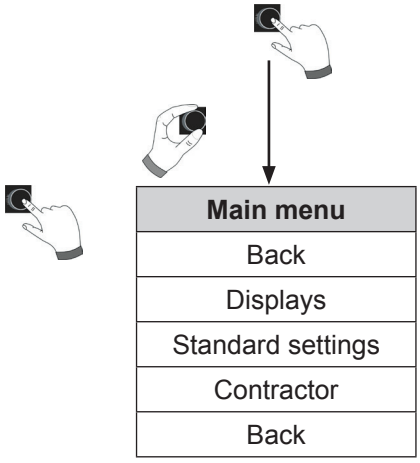




24.2 Menu structure

Only those menu items are shown that are relevant to the system concerned.





24.3 Displays

In the AM "Displays" submenu, the following real-time statuses and measured values, as well as statistical system data, can be retrieved. Values are displayed according to system type and configuration.

Designation	Unit	Meaning
T_boiler	°C	Flow temperature
T_boiler set	°C	Flow temperature (set value)
System pressure	bar	Secondary pressure/heating circuit pressure
T_outside	°C	Outside temperature
T_return	°C	Return temperature
T_return, set	°C	Return temperature (set value)
T_DHW	°C	DHW cylinder temperature
T_header	°C	Header/separating/buffer cylinder temperature
T_header, set	°C	Header/separating/buffer cylinder temperature (set value)
E1		E1 input status
Fan speed	rpm	Fan speed (rpm)
ZHP speed	%	PWM activation of the feed/heating circuit pump (ZHP)
Electric heater status		Electric heater status
Add HG status		Status of additional heat generator
AWO T_boiler	°C	Flow temperature (AWO/EWO board temperature sensor)
T_refrigerant (ICT)	°C	Refrigerant temperature (via AWO/EWO board pressure sensor)
Heating circuit flow rate	l/min	Heating circuit flow rate
Power consumption	kW	Electrical power consumption
Heating output	kW	Thermal output in heating/DHW mode
Cooling capacity	kW	Thermal output in cooling mode
Compressor frequency	Hz	Compressor speed (rps)
T_evaporator	°C	Evaporator temperature
T_condenser	°C	Condenser temperature (AWO/EWO board temperature sensor)
T_hot gas	°C	Hot gas temperature
T_supply air	°C	Supply air temperature
Htg energy amount	kWh	Amount of thermal energy in heating mode
DHW energy amount	kWh	Amount of thermal energy in DHW mode
Coolg energy amount	kWh	Amount of thermal energy in cooling mode
Compressor hrs run	hrs	No. of compressor hours run
Hrs run, boost. htr	hrs	No. of electric heater hours run
No. of compr starts	pce	No. of compressor starts
PV status		PV input status (PV increase)
Smart grid status		SG inputs status (Smart Grid function)
HCM-3 firmware		HCM-3 PCB software version

24.4 Standard settings

In the "Standard settings" submenu of the AM, the following standard system settings can be configured.

Designation	Setting range	Factory setting
Language	German, ...	German
Key lock	OFF, ON	OFF
DHW op mode	ECO, Comfort	ECO
DHW quick htg	OFF, ON	OFF
Active cooling	OFF, ON	OFF
Night mode → AM FW1.70 → contractor parameter WP066	OFF, ON	ON

24.5 Description

(Selection and more details in the AM display module instructions.)

24.5.1 DHW operating mode

Comfort setting:
In the Comfort setting, the heat pump tries to reach the set DHW temperature.
After the delay period (WP013/WP023) has elapsed, the electric heater/additional heat generator is activated.
When the compressor's application limit is reached (FL/RTN > max.), the electric heater/additional heat generator continues the heating process until the set DHW temperature is reached.
If the maximum cylinder heating time is exceeded, DHW mode is interrupted for the duration of the set maximum cylinder heating time (WP022).

ECO setting:
In the ECO setting, the heat pump tries to reach the selected set DHW temperature or set minimum DHW temperature.
After the delay period (WP013/WP023) has elapsed, the electric heater/additional heat generator is activated.
When the compressor's application limit is reached (FL/RTN > max.), the electric heater/additional heat generator continues the heating process until the set minimum DHW temperature is achieved.
If the maximum cylinder heating time is exceeded, DHW mode is terminated, provided the set minimum DHW temperature has already been achieved.
Otherwise DHW mode is interrupted for the duration of the set maximum cylinder heating time (WP022).

24.5.2 DHW quick heat-up

If the DHW quick heat-up standard setting is on, the DHW temperature is regulated once to the set DHW temperature configured on the AM/BM-2, using all available heat generators. The standard setting is then automatically reset.

24.6 Energy saving mode

No function.

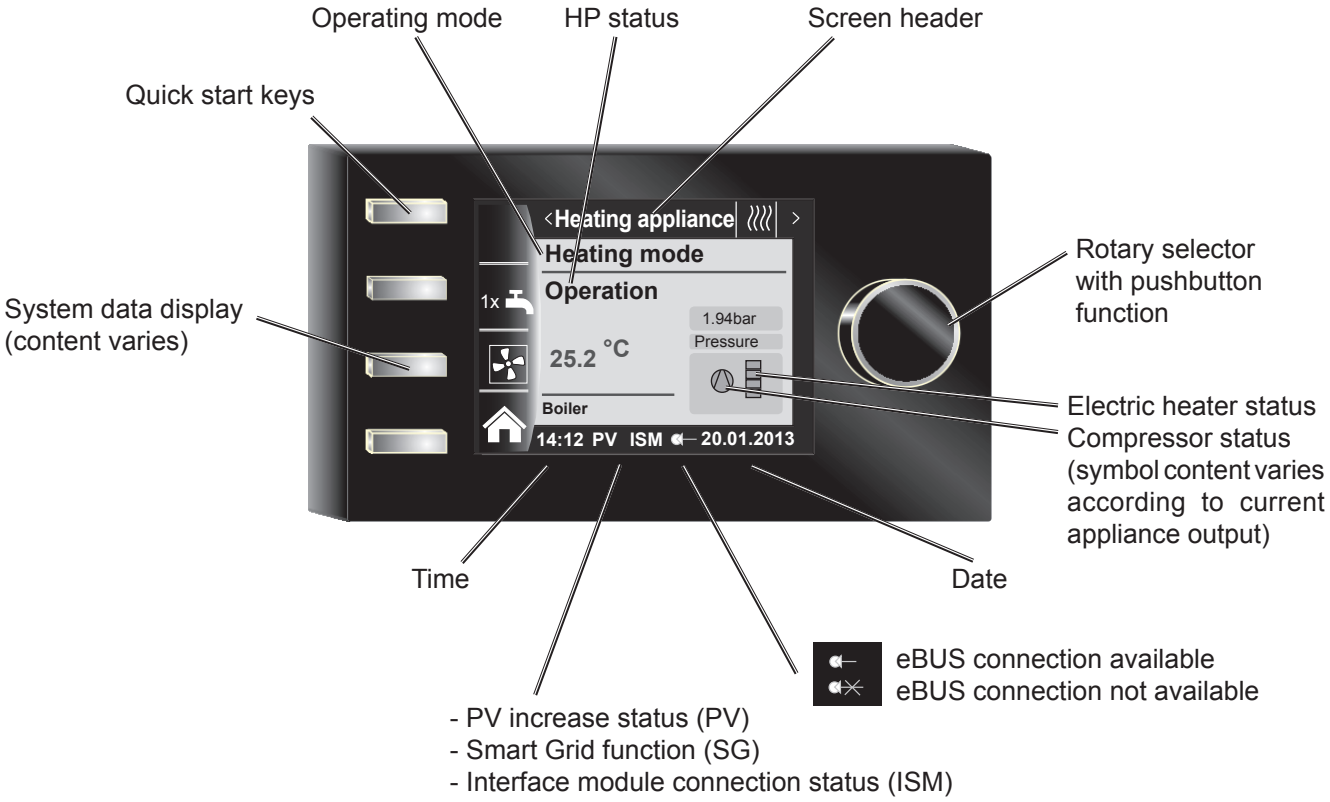
24.6.1 Active cooling

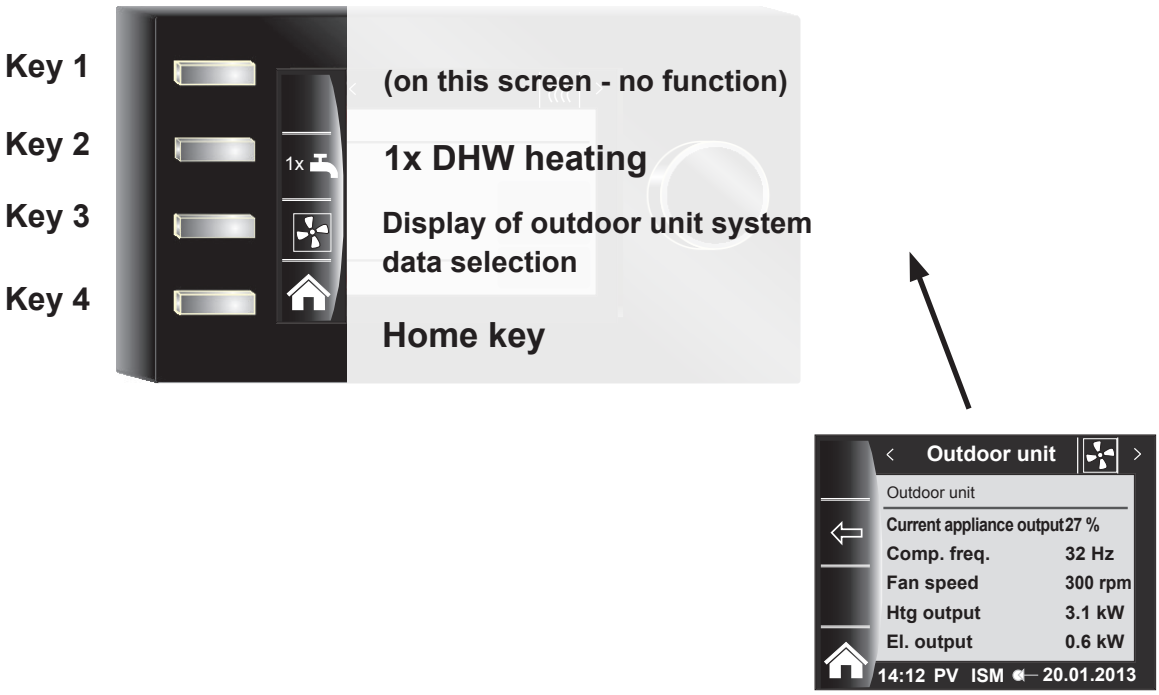
Enables the user to activate/deactivate active cooling.
This requires, amongst other things, that the system is configured with active cooling and that active cooling is enabled via contractor parameter WP058 (factory setting: OFF).
(See chapter "Additional functions".)

25 BM-2 programming unit

25.1 Overview

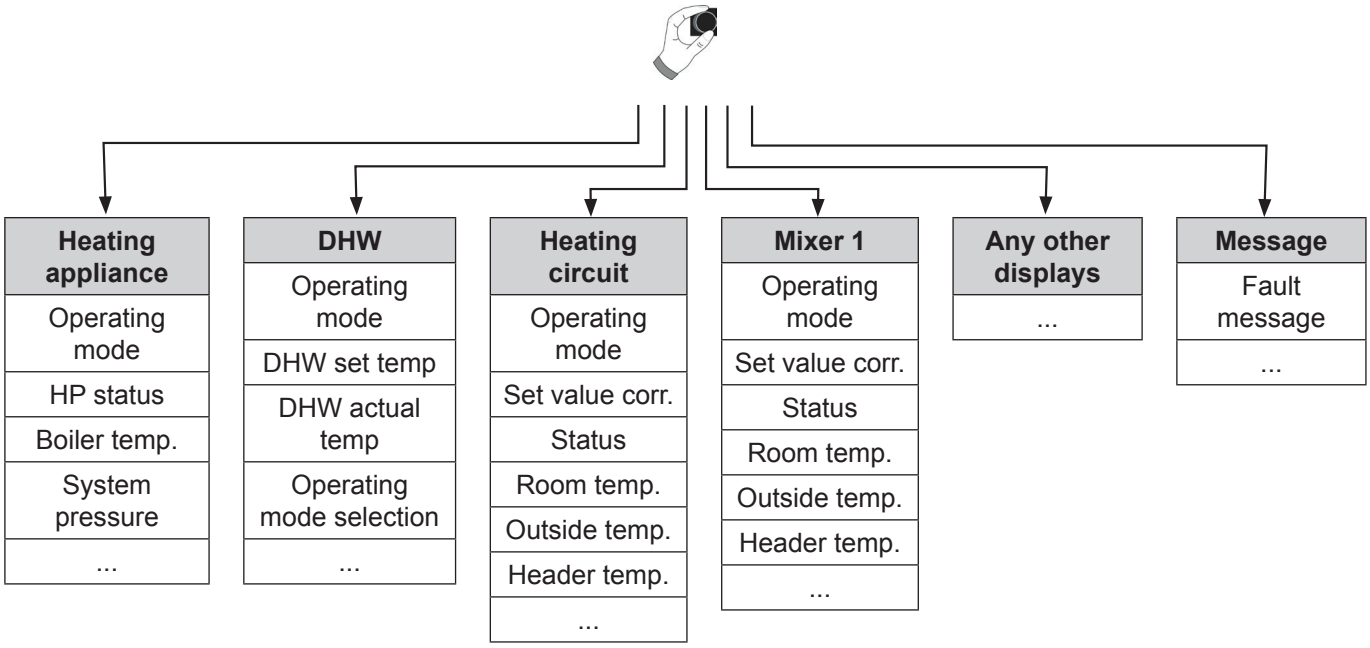
Note:
Further functions and descriptions can be found in the installation instructions for contractors
or the user operating instructions for the BM-2 programming unit.

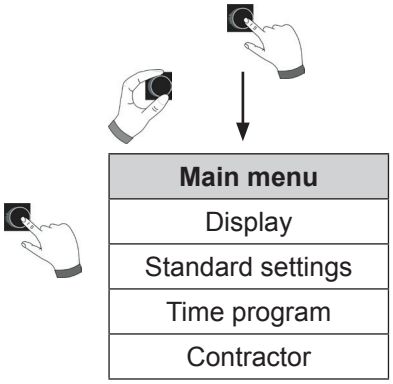




25.2 Menu structure

Displays depend on the available extension modules and appliances.
Only those menu items are shown that are relevant to the system concerned.





25.3 Display

In the BM-2 "Display" submenu, the following real-time statuses and measured values, as well as statistical system data, can be retrieved. Values are displayed according to system type and configuration.

Designation		Unit	Meaning
Heating appliance 1	Boiler water temperature [set/actual]	°C	Flow temperature (set/actual value)
	Header temperature [set/actual]	°C	Header/separating/buffer cylinder temp. (set/actual value)
	Return temperature [set/actual]	°C	Return temperature (set/actual value)
	Pressure	bar	Secondary pressure/heating circuit pressure
	DHW temperature [set/actual]	°C	DHW cylinder temperature
	Outside temperature	°C	Outside temperature
	Input E1		E1 input status
	Current appliance output	%	Current appliance output demand
	Pump speed	%	PWM activation of the feed/heating circuit pump (ZHP)
	Electric heater status		Electric heater status
	Add HG status		Status of additional heat generator
	Refrigerant temp. (ICT)	°C	Refrigerant temp. (via AWO/EWO board pressure sensor)
	Boiler temp. AWO	°C	Flow temperature (AWO/EWO board temperature sensor)
	Heating circuit flow rate	l/min	Heating circuit flow rate
	Power consumption	kW	Electrical power consumption
	Heating output	kW	Thermal output in heating/DHW mode
	Cooling capacity	kW	Thermal output in cooling mode
	Compressor frequency	Hz	Compressor speed (rps)
	Evaporator temp.	°C	Evaporator temperature
	Condenser temp. (IRT)	°C	Condenser temperature (AWO/EWO board temperature sensor)
	Hot gas temperature	°C	Hot gas temperature
	Supply air temperature	°C	Supply air temperature
	Htg energy amount	kWh	Amount of thermal energy in heating mode
	DHW energy amount	kWh	Amount of thermal energy in DHW mode
	Coolg energy amount	kWh	Amount of thermal energy in cooling mode
	Fan speed	rpm	Fan speed (rpm)
	Compressor hrs run	hrs	No. of compressor hours run
	Hrs run, el. booster htr	hrs	No. of electric heater hours run
	No. of compr starts	pce	No. of compressor starts
	PV status		PV input status (PV increase)
	Smart grid status		SG inputs status (Smart Grid function)
	ZHP		Status of feed/heating circuit pump (ZHP)
	HCP		Heating circuit pump status (HCP)
	3way DV HTG/DHW		Status of 3-way diverter valve for heating/DHW
	3way DV HTG/Coolg		Status of 3-way diverter valve for heating/cooling
	A1		Output A1 status
	Electric heater		Electric heater status
	Compressor		Compressor status
	Software version		HCM-3 PCB software version
Heating appliance 2, ...	…		See BM-2 and heating appliance instructions
Solar	…		See BM-2 and SM1/SM2 solar module instructions
Direct heating circuit	Flow [set/actual]	°C	Flow temperature (set/actual value)
	Heating circuit pump		Heating circuit pump status (HCP)
	Room [set/actual]	°C	Room temperature (set/actual value)
	Outside	°C	Outside temperature
Mixer module 1, ...	Flow [set/actual]	°C	Circuit with mixer flow temperature (set/actual value)
	Room [set/actual]	°C	Room temperature (set/actual value)
	Outside	°C	Outside temperature
	Mixer circuit pump		Status of mixer circuit pump (MCP)
Outside temp. averaged		°C	Outside temperature (averaged according to system parameter A04)
Outside temp. not averaged		°C	Outside temperature (current)

25.4 Standard settings

In the "Standard settings" submenu of the BM-2, the following standard system settings can be configured.

Designation		Setting range	Factory setting
Heating appliance	Active cooling	OFF, ON	ON
	Night mode → BM FW2.30 → contractor parameter WP066	OFF, ON	ON
	DHW quick heat-up	OFF, ON	OFF
	DHW operating mode	ECO, Comfort	ECO
Heating circuit, mixer 1, ...	Economy factor	0.0 ... 10.0	4.0
	Winter-summer changeover	0.0 ... 40.0 °C	20.0 °C
	ECO ABS	-10.0 ... 40.0 °C	10.0 °C
	Day temperature	5.0 °C ... (day temperature cooling - 2 K)	20.0 °C
	Room influence	OFF, ON	OFF
	Day temperature, cooling	(Day temp. + 2K) … 35.0 °C	24.0 °C
Language		English, etc.	German
Time		00:00 ... 23:59	
Date		01/01/2000 … 31/12/2099	
Winter/summertime		Auto, manual	Auto
Min. backlighting		0 ... 15 %	10 %
Screensaver		OFF, ON	ON
Key lock		OFF, ON	OFF
User interface		Extended, simplified	Extended

25.5 Description

(Selection and more details in the BM-2 programming unit installation instructions.)

25.5.1 Active cooling

Enables the user to activate/deactivate active cooling.
This requires, amongst other things, that the system is configured with active cooling and that active cooling is enabled via contractor parameter WP058 (factory setting: OFF).
(See chapter "Additional functions".)

25.5.2 DHW quick heat-up

If the DHW quick heat-up standard setting is on, the DHW temperature is regulated once to the set DHW temperature configured on the AM/BM-2, using all available heat generators. The standard setting is then automatically reset.

25.5.3 DHW operating mode

Comfort setting:
In the Comfort setting, the heat pump tries to reach the set DHW temperature.
After the delay period (WP013/WP023) has elapsed, the electric heater/additional heat generator is activated.

When the compressor's application limit is reached (FL/RTN > max.), the electric heater/additional heat generator continues the heating process until the set DHW temperature is reached.
If the maximum cylinder heating time is exceeded, DHW mode is interrupted for the duration of the set maximum cylinder heating time (WP022).

ECO setting:
In the ECO setting, the heat pump tries to reach the selected set DHW temperature or set minimum DHW temperature.
After the delay period (WP013/WP023) has elapsed, the electric heater/additional heat generator is activated.
When the compressor's application limit is reached (FL/RTN > max.), the electric heater/additional heat generator continues the heating process until the set minimum DHW temperature is achieved.
If the maximum cylinder heating time is exceeded, DHW mode is terminated, provided the set minimum DHW temperature has already been achieved.
Otherwise DHW mode is interrupted for the duration of the set maximum cylinder heating time (WP022).

25.5.4 Day temperature

Day temperature is only enabled if the room influence is enabled for this heating/mixer circuit and the BM-2 is installed in the wall mounting base.
Use the day temperature to set the required room temperature in heating mode, party function mode and the heating phases during automatic mode.
In setback mode, economy mode and during the setback phase in automatic mode, the room temperature is only regulated to the day temperature less the economy factor.

25.5.5 Room influence

Room influence is only active if the BM-2 programming unit is installed as a remote control.
Room influence can be used to compensate for fluctuations in room temperature due to external sources of heat and cold (e.g. insolation, woodburning stoves or open windows).
ON = room influence enabled
OFF = room influence disabled
When room influence is on, the standard setting "Day temperature" (for heating mode) is available and, for systems with active cooling, the standard setting "Day temperature, cooling" (for cooling mode).

25.5.6 Day temperature, cooling

"Day temperature, cooling" is only enabled if the room influence is enabled for this heating/mixer circuit and the BM-2 is installed in the wall mounting base.
"Day temperature, cooling" allows you to set the required room temperature in active cooling operating mode during automatic operation.

26 Operating mode / HP status

26.1 Operating mode

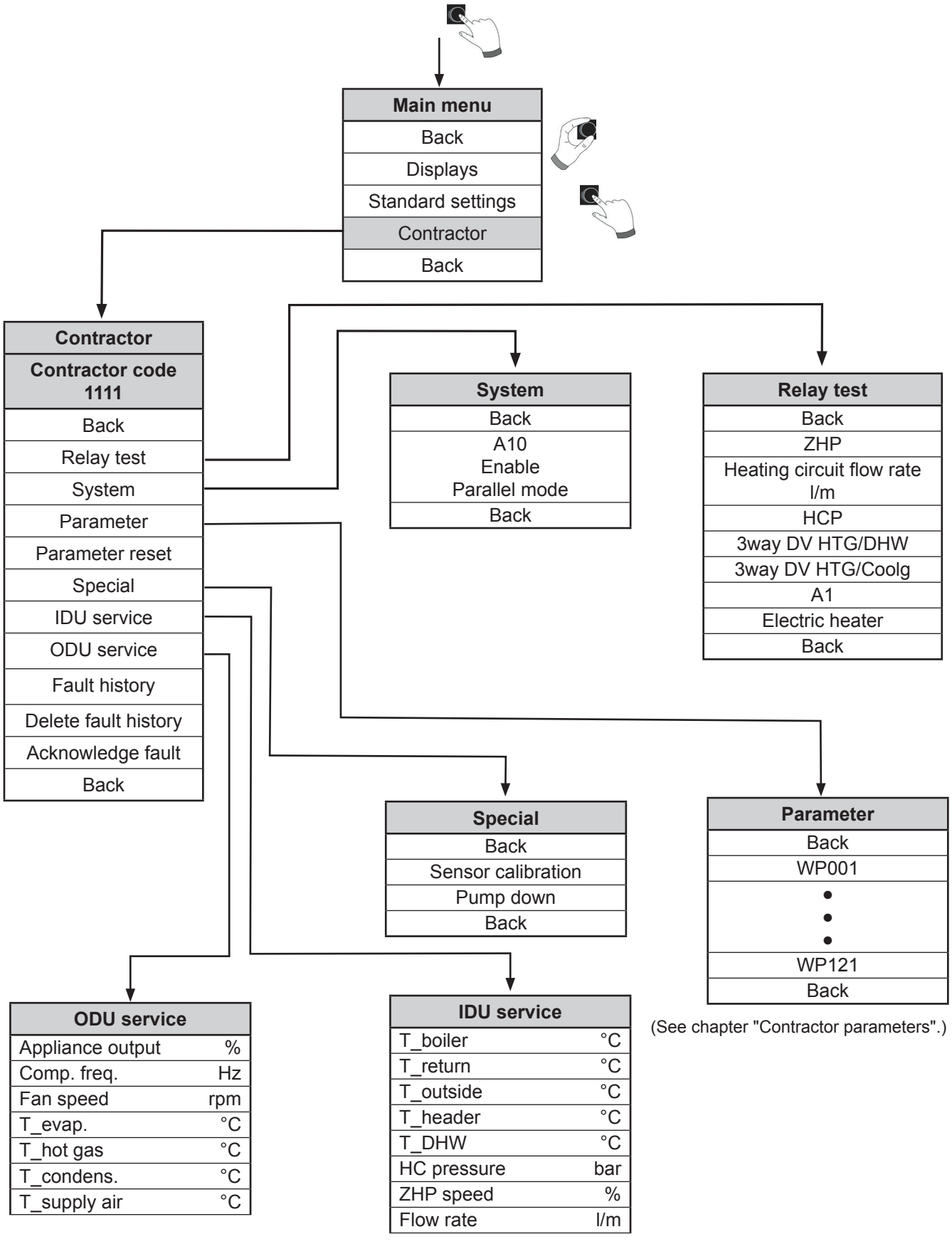
No.	Display	Meaning
0	ODU test	ODU test
1	Test	Relay test active (IDU)
2	Frost prot htg	Heat pump frost protection function, heating circuit temperature below frost protection limit (T_boiler, T_return, T_header)
3	Frost prot DHW	Heat pump frost protection function, DHW cylinder temperature below frost protection limit
4	DFL low	Blocking of heat pump/electric heating until the flow rate is back within valid limits
5	-	-
6	Defrost mode	ODU defrost function
7	Pasteurisation	Heating of DHW cylinder to 65 °C
8	DHW heating	DHW heating with cylinder; cylinder sensor temperature below set value
9	DHW run-on	Heat generator switched OFF; ZHP runs on
10	Heating mode	At least one heating circuit is demanding heat
11	HTG run-on	Heat generator switched OFF; ZHP runs on
12	Active cooling	Cooling mode active
13	Cascade	Cascade module in system active
14	BMS	Heat pump is controlled by building management system
15	Standby	No heating or DHW demand
16	Pump down	Refrigerant circuit drain function

26.2 HP status

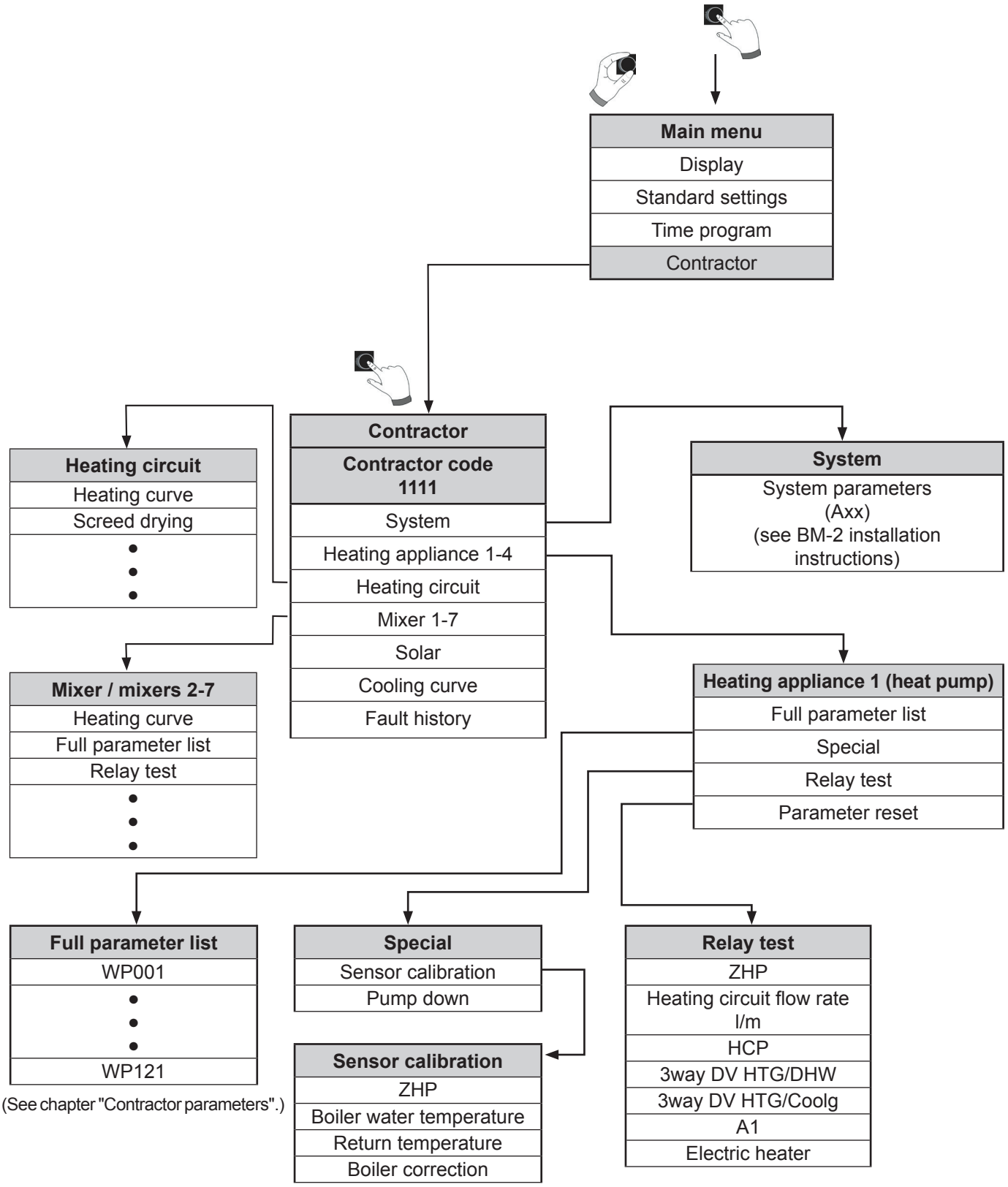
No.	Display	Meaning
0	Fault	There is a fault in the heat pump/electric heater
1/2	Deactivated	Heat pump/electric heater/additional heat generator was deactivated via contractor parameter
3	Standby	No demand
4	Pre-flush	Sensors are brought to same temperature level without heat generator. Flow sensor is exposed to flow.
5	Operation	Heat pump in control mode
6	Defrost mode	Heat pump in defrost mode
7	Post-flush	Feed/heating circuit pump (ZHP) runs on without heat generator
8/9	Blocking time	A blocking time is present for the heat pump
10	Power-OFF	The heat pump is blocked by the power supply utility/via power supply utility contact
11	OT shutdown	Heat generator in shutdown due to outside temperature
12	FL/RTN > max.	Heat generator in shutdown as maximum flow/return temperature exceeded (application limit reached)
13	Active cooling	Heat pump in cooling mode
14	Spply air<min	Supply air temperature is below the minimum level
15/17	DPM / MaxTh	Dew point monitor or maximum thermostat triggered
16	-	-

27 Contractor level

27.1 AM menu structure, contractor level



27.2 BM-2 menu structure, contractor level



27.3 Description

(Selection and more details in the AM display module/BM-2 programming unit installation instructions.)

27.3.1 System

In the "System" submenu, the contractor can make advanced system settings using system parameters (see AM display module/BM-2 programming unit instructions).

27.3.2 Parameters / full parameter list

In the "Heating appliance" / "Parameters" / "Full parameter list" submenu, the contractor can make advanced system settings using contractor parameters (see "Contractor parameters" chapter).

27.3.3 Special (sensor calibration, pump down)

Sensor calibration

The sensor calibration function serves to balance out any deviation in the measurements from the flow (boiler temperature) and return temperature sensors. The temperature sensors are calibrated at the factory; sensor calibration is required after replacing a sensor or carrying out a parameter reset.

Procedure:

Activation of the feed/heating circuit pump (ZHP) and correction of the flow temperature sensor value to the value of the return temperature sensor by setting the correction value.
For calibration, switch ON the feed/heating circuit pump (ZHP), wait 10 minutes for the temperature to equalise, then perform corrections if necessary.

AM designation	BM-2 designation	Meaning	Setting range	Factory setting
ZHP	ZHP	Feed/heating circuit pump (ZHP)	OFF, ON	OFF
Boiler water temperature	T_boiler	Flow temperature display (0.0 ... 99.9 °C)	-	-
Return temperature	T_return	Return temperature display (0.0 ... 99.9 °C)	-	-
Boiler correction	Boiler corr.	Flow temperature correction value	-3.0 ... 3.0 °C	0.0 °C

Pump down

Drain function for work carried out on the refrigerant circuit by the service or refrigeration engineer.

Designation	Setting range	Factory setting
Pump down	OFF, ON	OFF

Please note

Indoor unit must have water flowing through it.

27.3.4 Relay test

The "Heating appliance" / "Relay test" submenu allows various outputs or actuators to be manually actuated.
On exiting this submenu, the original states, i.e., the states before the "Heating appliance" / "Relay test" submenu was called up, are restored.
The various outputs and actuators are displayed according to system type and configuration.

Designation	Meaning	Setting range	Factory setting
ZHP	Feed/heating circuit pump (ZHP)	OFF, ON	OFF
Heating circuit flow rate	Heating circuit flow display (0.0 ... x.x l/min)	-	-
HCP	Heating circuit pump HCP	OFF, ON	OFF
3way DV HTG/DHW	3-way diverter valve for heating/DHW	OFF, ON	OFF (= HTG)
3way DV HTG/Coolg	3-way diverter valve for heating/cooling	OFF, ON	OFF (= HTG)
A1	Output A1	OFF, ON	OFF
Electric heater	Electric heater	OFF, ON	OFF

27.3.5 Parameter reset

If a parameter reset is carried out, all settings and statistical data are reset to factory settings.

Notes:

Before a parameter reset, make a note of the settings and statistical data.
After the parameter reset, carry out a sensor calibration.

27.3.6 IDU service

Function of the AM display module to show selection of indoor module (IDU) system data.

Designation	Unit	Meaning
T_boiler	°C	Flow temperature
T_return	°C	Return temperature
T_outside	°C	Outside temperature
T_header	°C	Header/separating/buffer cylinder temperature
T_DHW	°C	DHW cylinder temperature
HC pressure	bar	Secondary pressure/heating circuit pressure
ZHP speed	%	PWM activation of the feed/heating circuit pump (ZHP)
Flow rate	l/min	Heating circuit flow rate

27.3.7 ODU service

AM display module functions to display a selection of outdoor module (ODU) system data.

Designation	Unit	Meaning
Appliance output	%	Current appliance output demand
Comp. freq.	Hz	Compressor speed (rps)
Fan speed	rpm	Fan speed (rpm)
T_evap.	°C	Evaporator temperature
T_hot gas	°C	Hot gas temperature
T_condens.	°C	Condenser temperature (AWO/EWO board temperature sensor)
T_supply air	°C	Supply air temperature

27.3.8 Heating curve

Function of the BM-2 programming unit to set a heating curve (sep. adjustable for direct heating circuit and circuits with mixer 1-7) for heating mode (see BM-2 programming unit instruction manual).

Note:
For the heat pump BWL-1S(B) to run efficiently in heating mode, a maximum flow temperature of < 40 °C should be set.

27.3.9 Cooling curve

Function of BM-2 programming unit to set a cooling curve for active cooling mode, as for setting a heating curve (see BM-2 programming unit instructions).

Notes:

- **The "Cooling curve" submenu is displayed only when the "Active cooling" standard setting is enabled.**
- **Temperature selection from -4 to +4 (parallel offset) and economy factor 0...10 (reduction in economy mode); no effect in active cooling mode.**

27.3.10 Fault history

Function to display the last 20 fault messages.

27.3.11 Delete fault history

Function to reset the fault history.

27.3.12 Acknowledge fault

Function to acknowledge fault messages.
Corresponds to fault acknowledgement via the 4th AM display module/BM-2 programming unit quick start key.

28 Contractor parameters

28.1 Overview

Contractor Parameter	BM-2 designation	AM designation	Setting range	Factory setting
System				
WP001	System config.	System configuration	01, 02, 05, 11, 12, 14, 15, 33, 34, 51, 52	01
WP002	Function E1	Function input E1	None	None
			RT	
			DHW	
			RT/DHW	
			Zirkomat	
			DPM / MaxTh	
WP003	Function A1	Function output A1	None	None
			Zirk20	
			Zirk50	
			Zirk100	
			Alarm	
			Zirkomat	
			Defrost	
			Add HG	
			Comp. on	
Heating HTG				
WP010	Set spread	Set spread / offset	0.0 ... 10.0 °C	5.0 °C
WP011	Heating hysteresis	Heating hysteresis	0.5 ... 3.0 °C	2.0 °C
WP012	ZHP run-on	ZHP run-on	0 min ... 30 min	1 min
WP013	Add HG delay	Delay for htg by add HG	1 min ... 180 min	60 min
WP014	HCP run-on	HCP run-on	0 min ... 30 min	5 min
WP015	HC pump rate	Maximum HC pump rate	30 % ... 100 %	100 %
WP016	Enable spread	Enable spread control	OFF, ON	ON
WP017	Max. boiler temp HTG	Max. boiler temp HTG TV-max	30.0 ... 70.0 °C	55 °C
WP018	Min. boiler temp.	Min. boiler temp. T-boiler min	10.0 ... 70.0 °C	20 °C
Domestic hot water DHW				
WP020	Cylinder hysteresis	Cylinder hysteresis	1.0 ... 10.0 °C	2.0 °C
WP021	Enable cyl chrg. time	Enable max. cyl. charging time	OFF, ON	ON
WP022	Max. cyl. heat. time	Max. cylinder heating time	30 min ... 240 min	120 min
WP023	Add HG DHW delay	Delay for htg by add HG, DHW	1 min ... 180 min	60 min
WP024	Min. DHW temp.	Minimum DHW temperature	10.0 °C ... 55.0 °C	45.0 °C
Smart Grid				
WP025	Smart Grid mode	Smart Grid	OFF, ON	OFF
WP026	SG increase, heating	External raising, HTG	0.0 ... 20.0 °C	0.0 °C
WP027	SG increase, DHW	External raising, DHW	0.0 ... 40.0 °C	0.0 °C
WP028	External activation	External activation	OFF, HP, HP + el HTG, elec. heater	HP+el HTG
WP031	Bus address	Bus address	1, 2, 3, 4, 5	1
WP032	Heating with PV/SG	Heating with PV/SG	OFF, ON	ON

Contractor Parameter	BM-2 designation	AM designation	Setting range	Factory setting
WP033	Cooling with PV/SG	Cooling with PV/SG	OFF, ON	OFF
Active cooling				
WP053	T_outs. enable Coolg	Outside temp. to enable cooling	15.0 ... 40.0 °C	25.0 °C
WP054	Min flow t cooling	Min. flow temp. for cooling	5.0 ... 25.0 °C	20.0 °C
WP055	Offset set flow Coolg	Offset for set flow temp., cooling	5.0 ... 40.0 °C	15.0 °C
WP058	Enable act. cooling	Enable active cooling	OFF, ON	OFF
Night mode				
WP061	Night mode end	Night mode end	00:00 ... 23:59	06:00
WP062	Night mode start	Night mode start	00:00 ... 23:59	22:00
WP064	Night mode limit	Night mode limitation	75 %, 65 %, 55 %, 45 %	75 %
WP066	Night mode	Night mode	OFF, ON	OFF
Compressor				
WP080	Comp. dual mode pt	Compressor dual mode point	-20.0 °C ... 45.0 °C	-20.0 °C
		Electric heater/add HG		
WP090	Enable elec heating	Enable electric heater (heating mode)	OFF, ON	ON
WP091	Dual mode pt el htg	Elec heater dual mode pt (heating mode)	-20.0 °C ... 45.0 °C	-5.0 °C
WP092	Power-OFF elec htg	Power-OFF for elec. heater	OFF, ON	ON
WP093	Temp. deact. WP091	Temporary deactivation of WP091	0 to 40 days	0 days
WP094	Electric heater type	Electric heater type	None, 2 kW, 3 kW, 4 kW, 6 kW, 9 kW	6 kW
WP101	Dual md pt, add HG	Add HG dual mode point (heating mode)	-20.0 °C ... 45.0 °C	0.0 °C
WP104	Add HG eBUS	Add HG via eBUS	OFF, ON	OFF
Other				
WP121	Max. compressor starts/h	Max. compressor starts per hour	3 ... 10 / h	6 / h

28.2 Contractor parameters description

<table>
<tr><th>Contractor parameter</th><th>Description</th></tr>
<tr><td>WP001</td><td>For setting a pre-configured system version subject to heat pump design and application (see "Overview of system configurations").</td></tr>
<tr><td>WP002</td><td>For optionally assigning one of the following functions to programmable input E1:
<table>
<tr><th>Setting</th><th>Function input E1</th></tr>
<tr><td>None</td><td>No function</td></tr>
<tr><td>RT</td><td>Heating block (room thermostat)
Contact open - blocked
Contact closed - heating mode enabled</td></tr>
<tr><td>DHW</td><td>DHW block
Contact open - blocked
Contact closed - DHW mode enabled</td></tr>
<tr><td>RT/DHW</td><td>Heating and DHW block
Contact open - blocked
Contact closed - heating mode and DHW mode enabled</td></tr>
<tr><td>Zirkomat</td><td>Zirkomat (DHW circulation remote control)
When input E1 is configured to "Zirkomat", output A1 is automatically set to "Zirkomat" and blocked for further settings. When input E1 is closed, output A1 is activated for 5 minutes. When input E1 has switched OFF and 30 minutes have elapsed, the remote control function is re-enabled for the next operation.</td></tr>
<tr><td>DPM/MaxTh</td><td>Dew point monitor/maximum thermostat contact open –
Cooling mode/heating mode/DHW mode blocked
Contact closed -
Cooling mode/heating mode/DHW mode enabled</td></tr>
</table></td></tr>
<tr><td>WP003</td><td>For optionally assigning one of the following functions to programmable output A1:
<table>
<tr><th>Setting</th><th>Function output A1</th></tr>
<tr><td>None</td><td>No function</td></tr>
<tr><td>Zirk20</td><td>DHW circulation pump activation 20 % (2 mins ON, 8 mins OFF)</td></tr>
<tr><td>Zirk50</td><td>DHW circulation pump activation 50 % (5 mins ON, 5 mins OFF)</td></tr>
<tr><td>Zirk100</td><td>DHW circulation pump activation 100 % (continuous operation)</td></tr>
<tr><td>Alarm</td><td>Alarm output
Is set if a fault is present.</td></tr>
<tr><td>Zirkomat</td><td>Zirkomat (DHW circulation pump)
Output A1 is activated for 5 minutes when input E1 closes. If output A1 is configured to "Zirkomat", input E1 is automatically set to "Zirkomat" and blocked for further settings. When input E1 has switched OFF and 30 minutes have elapsed, the remote control function is re-enabled for the next operation.</td></tr>
<tr><td>Defrost</td><td>ODU in defrost mode
Is set if the heat pump is defrosting.
E.g. for use with the 51/52 (BMS) configuration</td></tr>
<tr><td>Add HG</td><td>Additional heat generator
Is set if a demand is issued to the additional heat generator.
(Only possible with configurations 33 and 34.)
Note:
The electric heater is deactivated for configurations 33 and 34 as long as the compressor and additional heat generator are operational.</td></tr>
<tr><td>Compressor ON</td><td>Is set if the compressor is active.</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Contractor parameter</th><th>Description</th></tr>
<tr><td>WP010</td><td>WP016 = ON:
For setting the set spread between the flow and return temperatures
(heating mode).
WP016 = OFF:
For setting the offset for the deactivation point in heating mode.
For this, the temperatures at the return sensor and the header sensor are monitored.

Heat pump OFF:
T_return / T_header > T_boiler set – WP010 + WP011
Heat pump ON:
T_return / T_header < T_boiler set – WP010 – WP011</td></tr>
<tr><td>WP011</td><td>For setting the hysteresis value to WP010.</td></tr>
<tr><td>WP012</td><td>For setting the run-on time of the feed/heating circuit pump (ZHP).</td></tr>
<tr><td>WP013</td><td>For setting the delay time for activation of the electric heating/
additional heat generator in heating mode.</td></tr>
<tr><td>WP014</td><td>For setting the run-on time of the heating circuit pump of the direct heating circuit (HCP).</td></tr>
<tr><td>WP015</td><td>WP016 = ON:
For setting the maximum speed of the feed/heating circuit pump (ZHP).
WP016 = OFF:
For setting the constant speed of the feed/heating circuit pump (ZHP).</td></tr>
<tr><td>WP016</td><td>Enables spread control (control to set spread WP010)
and PWM switching (WP015) of the feed/heating circuit pump (ZHP).</td></tr>
<tr><td>WP017</td><td>Setting to limit the max. set flow temperature (T_boiler_set) in heating mode.
With screed drying function for setting the maximum temperature.</td></tr>
<tr><td>WP018</td><td>Setting to limit the min. set flow temperature (T_boiler_set) in heating mode.
With screed drying function for setting the constant temperature.</td></tr>
<tr><td>WP020</td><td>For setting the hysteresis value for DHW heating or
DHW cylinder heating.</td></tr>
<tr><td>WP021</td><td>Enables a maximum heating time for the DHW cylinder.</td></tr>
<tr><td>WP022</td><td>For setting the maximum heating time for the DHW cylinder.</td></tr>
<tr><td>WP023</td><td>For setting the delay time for activation of the electric heater/
additional heat generator for DHW heating.</td></tr>
<tr><td>WP024</td><td>For setting the minimum DHW temperature for ECO mode.</td></tr>
<tr><td>WP025</td><td>Enables the Smart Grid function</td></tr>
<tr><td>WP026</td><td>Increases set heating mode temperature using the PV increase or Smart Grid function.</td></tr>
<tr><td>WP027</td><td>Increases set DHW mode temperature using the PV increase or Smart Grid function.</td></tr>
<tr><td>WP028</td><td>Used to select the activated heat generator for PV increase or if a requirement is issued via Smart Grid.
<table>
<tr><th>Setting</th><th>Function</th></tr>
<tr><td>OFF</td><td>No additional heat generator</td></tr>
<tr><td>HP</td><td>Operation with compressor only</td></tr>
<tr><td>HP+el htg</td><td>Operation with compressor, plus electric heater once WP013/
WP023 delay expires</td></tr>
<tr><td>Electric heater</td><td>Operation with electric heater only</td></tr>
</table></td></tr>
<tr><td>WP031</td><td>Sets the heating appliance bus address</td></tr>
<tr><td>WP032</td><td>PV increase/Smart Grid effect in heating mode</td></tr>
<tr><td>WP033</td><td>PV increase/Smart Grid effect in cooling mode</td></tr>
<tr><td>WP053</td><td>For setting the minimum outside temperature for active cooling mode</td></tr>
<tr><td>WP054</td><td>For setting the minimum flow temperature (T_boiler) of actively cooled heating circuits.</td></tr>
<tr><td>WP055</td><td>For setting offset value or differential between outside temperature and set flow temperature
(T_boiler set) of actively cooled heating circuits.
(T_boiler set = T_outside - offset (WP055)).</td></tr>
</table>

Contractor parameter	Description
WP058	Enable function for active cooling.
WP061	Sets night mode end time (WP061 must be less than WP062)
WP062	Sets night mode start time (WP061 must be less than WP062)
WP064	Limits maximum possible compressor frequency and fan speed during night mode.
WP066	Night mode Used to enable/disable limitation of the maximum possible fan speed and compressor frequency values within the set duration of night mode. Enabling night mode results in a reduction of the maximum potential heating output/cooling capacity of the appliance.
WP080	Dual mode point for deactivation of the compressor.
WP090	Enables the electric heater for heating mode.
WP091	Dual mode point for activation of the electric heater for heating mode
WP092	For setting power-OFF for the electric heater.
WP093	Deactivation of the dual mode point (WP091) of the electric heater for the set period. Used during the screed drying function to ensure that the electric heater supports the heat pump.
WP094	Sets existing electric heater or currently installed connected load of electric heater.
WP101	Dual mode point for activation of additional heat generator for heating mode.
WP104	Additional heat generator activation via eBUS.
WP121	Serves to limit the compressor start-ups per hour.

29 System configurations

Overview

The following system configurations can be performed for operating the BWL-1S and BWL-1SB.

Contractor Parameter	Meaning	Setting range	Factory setting	Individual setting
System				
WP001	System configuration	01, 02, 05, 11, 12, 14, 15, 33, 34, 51, 52	01	

System config.	Description
01	Cylinder in series, one heating circuit, DHW heating, active cooling possible (in conj. with additional 3-way diverter valve for cooling)
02	Cylinder in series, DHW heating, can be extended with mixer circuits, can be extended with solar circuit
05	Cylinder in series via 3-way valve, one heating circuit, DHW heating, can be extended with solar circuit, active cooling possible
11	Separating cylinder, one heating circuit, DHW heating
12	Solid fuel boiler / TOB, stratification cylinder BSP-W / BSP-W-SL / BSH, DHW heating, can be extended with mixer circuits, can be extended with solar circuit
14	Solid fuel boiler / TOB, stratification cylinder BSP-W / BSP-W-SL / BSH, DHW heating, can be extended with mixer circuits, can be extended with solar circuit, active cooling possible
15	Separating cylinder, one heating circuit, DHW heating, can be extended with mixer circuits, can be extended with solar circuit, active cooling possible
33	Separating cylinder, CGB-2 ..., heating circuit downstream of low loss header, DHW heating, can be extended with mixer circuits, can be extended with solar circuit
34	TOB, stratification cylinder, BSH, BSP-W, BSP-W-SL, DHW heating, can be extended with mixer circuits, can be extended with solar circuit
51	0 - 10 V activation for external demand (e.g. by building management system (BMS)), central heating, DHW heating, active cooling possible
52	ON/OFF activation for external demand (e.g. by building management system (BMS)), central heating, DHW heating

The entire system must be restarted (power off/power on) each time a change is made to the configuration.

Note:

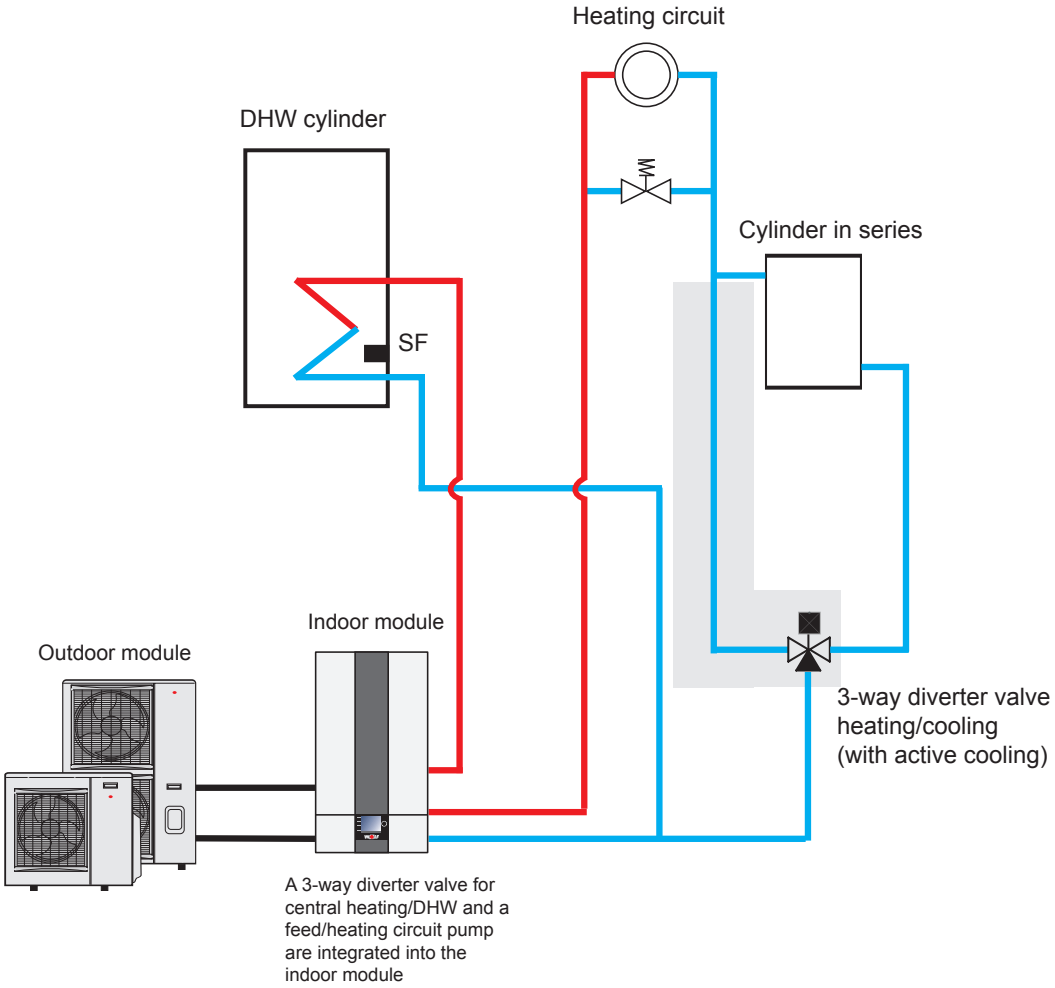
Hydraulic diagrams and electrical details can be found on the WOLF homepage and in the **"Hydraulic System Solutions"** technical guide.

QR code for hydraulic database

29.2.1 System configuration 01

BWL-1S(B)

- **Split air/water heat pump**
- **Cylinder in series**
- **One heating circuit**
- **DHW heating**
- **Active cooling possible (in conj. with additional 3-way diverter valve for cooling)**

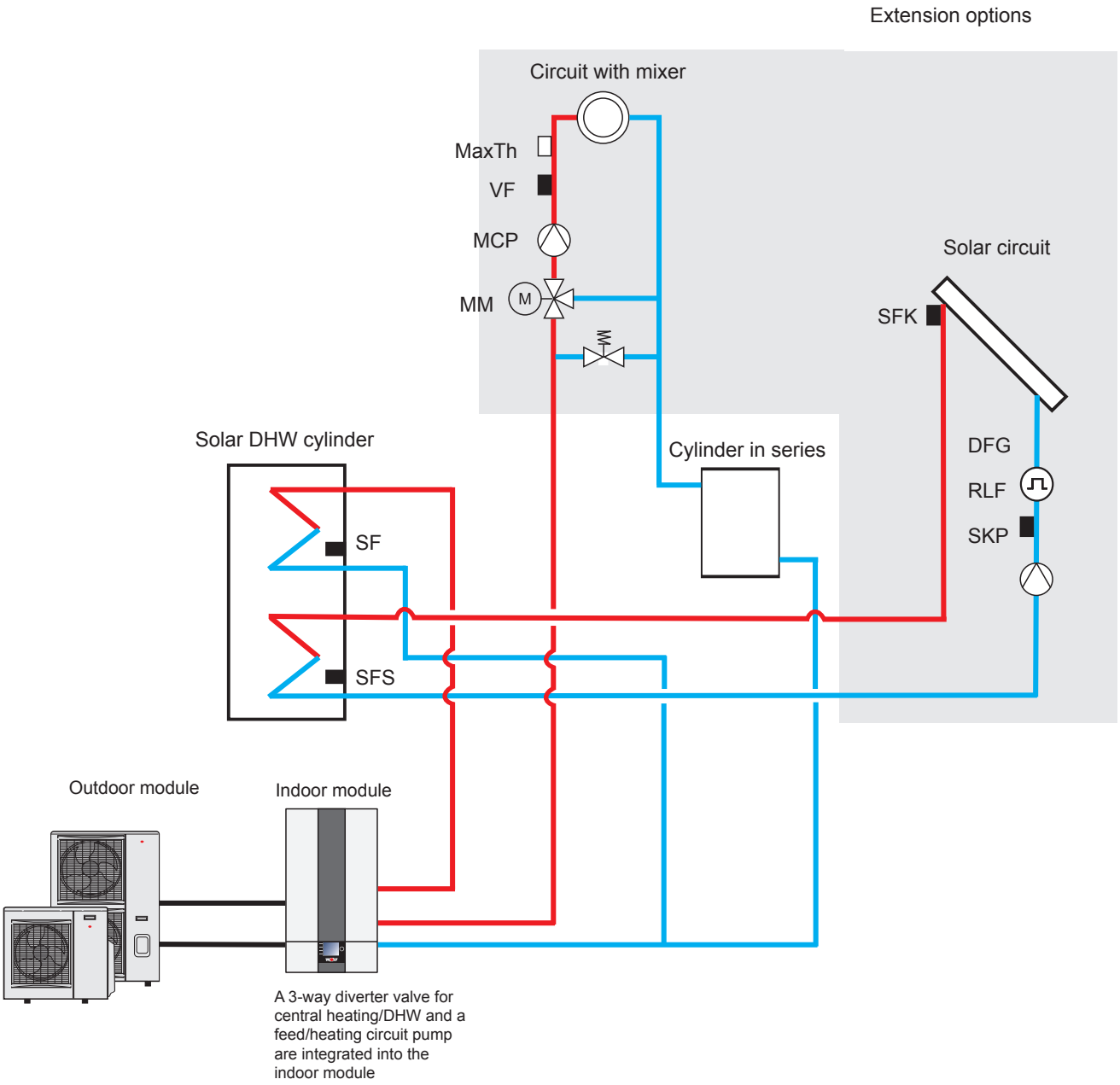


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.2 System configuration 02

BWL-1S(B)

- **Split air/water heat pump**
- **Cylinder in series**
- **Circuit with mixer extension with MM**
- **DHW heating**
- **Solar DHW cylinder**
- **Solar circuit extension with SM1/SM2**

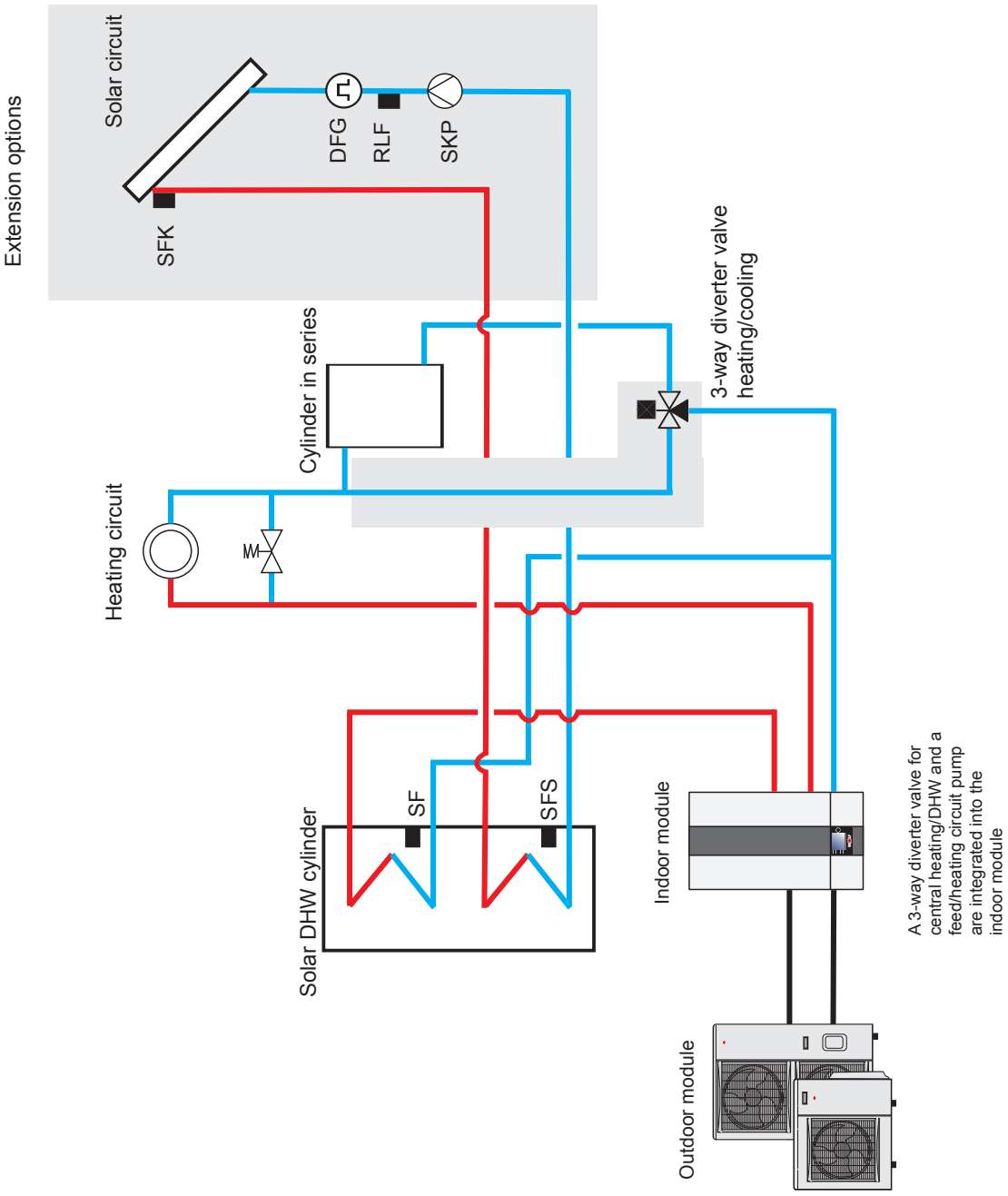


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.3 System configuration 05

BWL-1S(B)

- **Split air/water heat pump**
- **Cylinder in series**
- **One heating circuit**
- **DHW heating**
- **Solar DHW cylinder**
- **Solar circuit extension with SM1**
- **Active cooling possible**

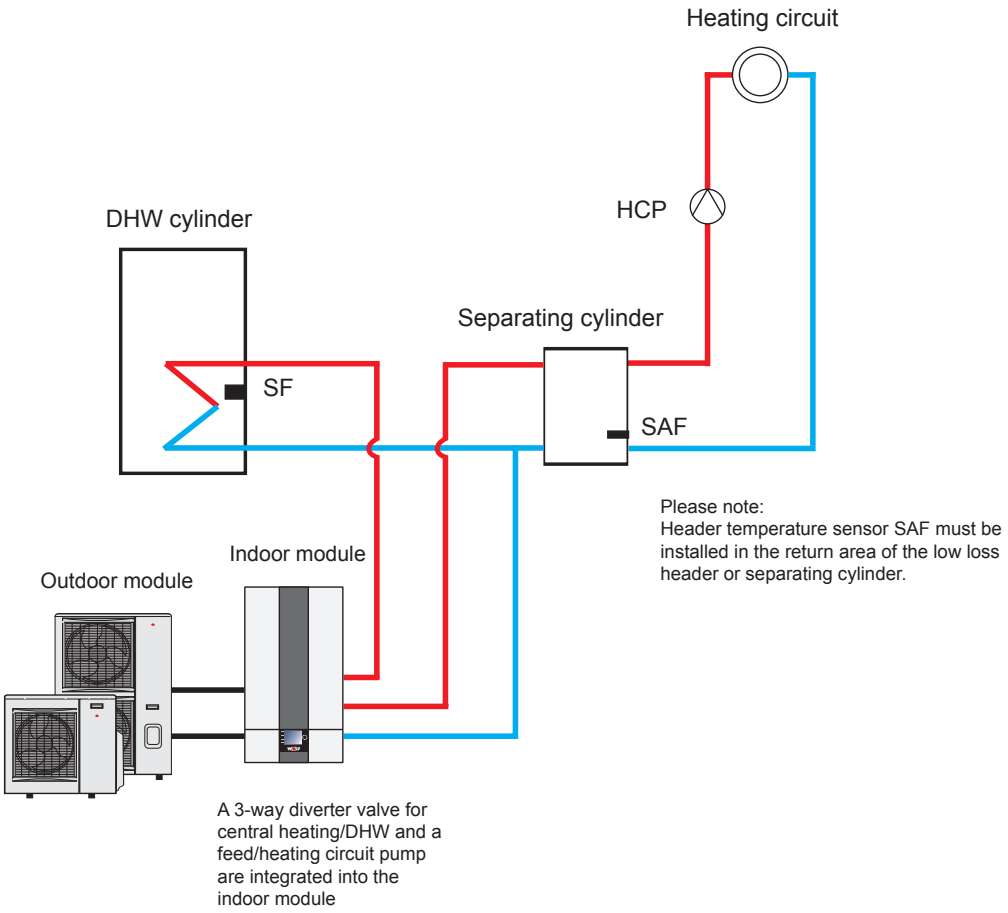


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.4 System configuration 11

BWL-1S(B)

- **Split air/water heat pump**
- **Separating cylinder**
- **One heating circuit**
- **DHW heating**

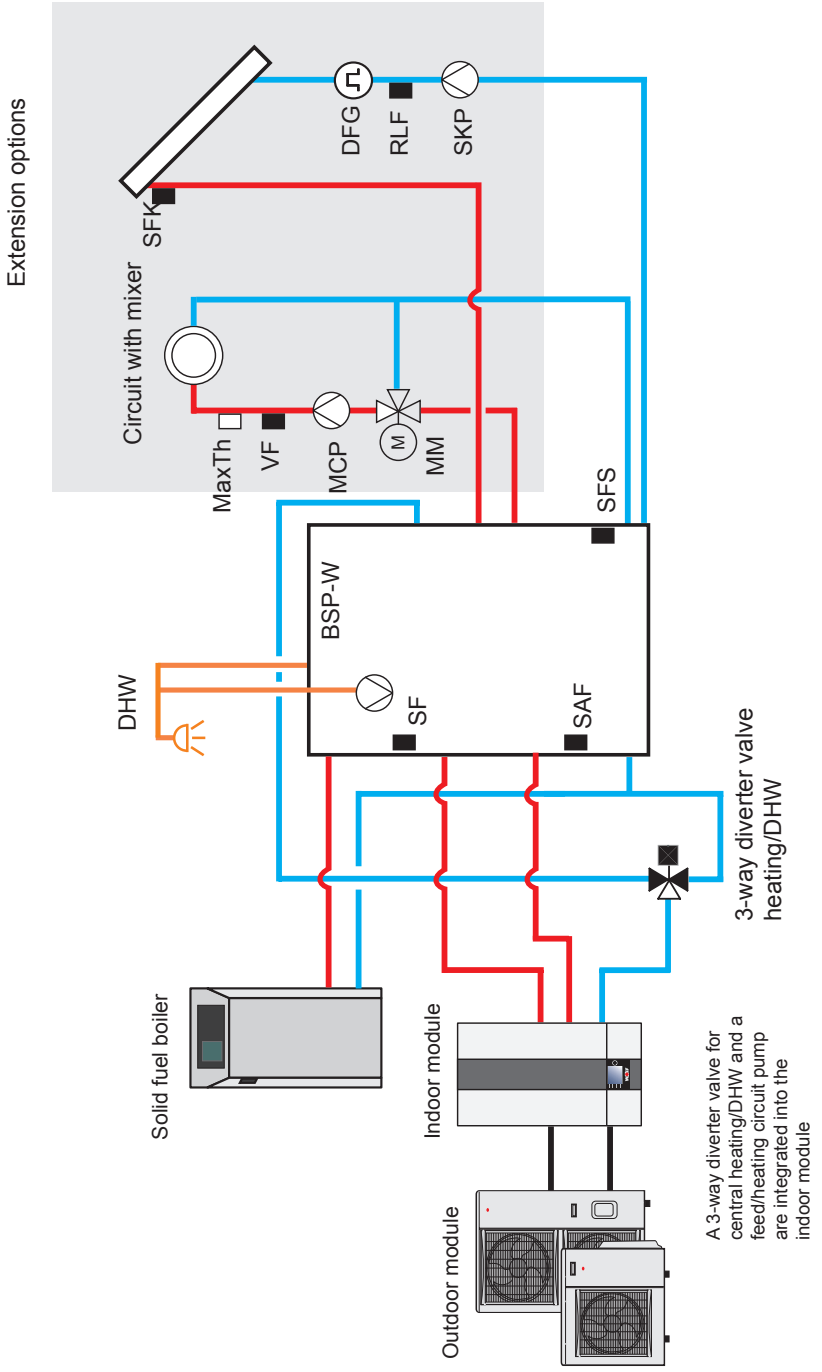


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.5 System configuration 12 (BSP-W)

BWL-1S(B)

- **Split air/water heat pump**
- **BSP-W**
- **Solid fuel boiler**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**

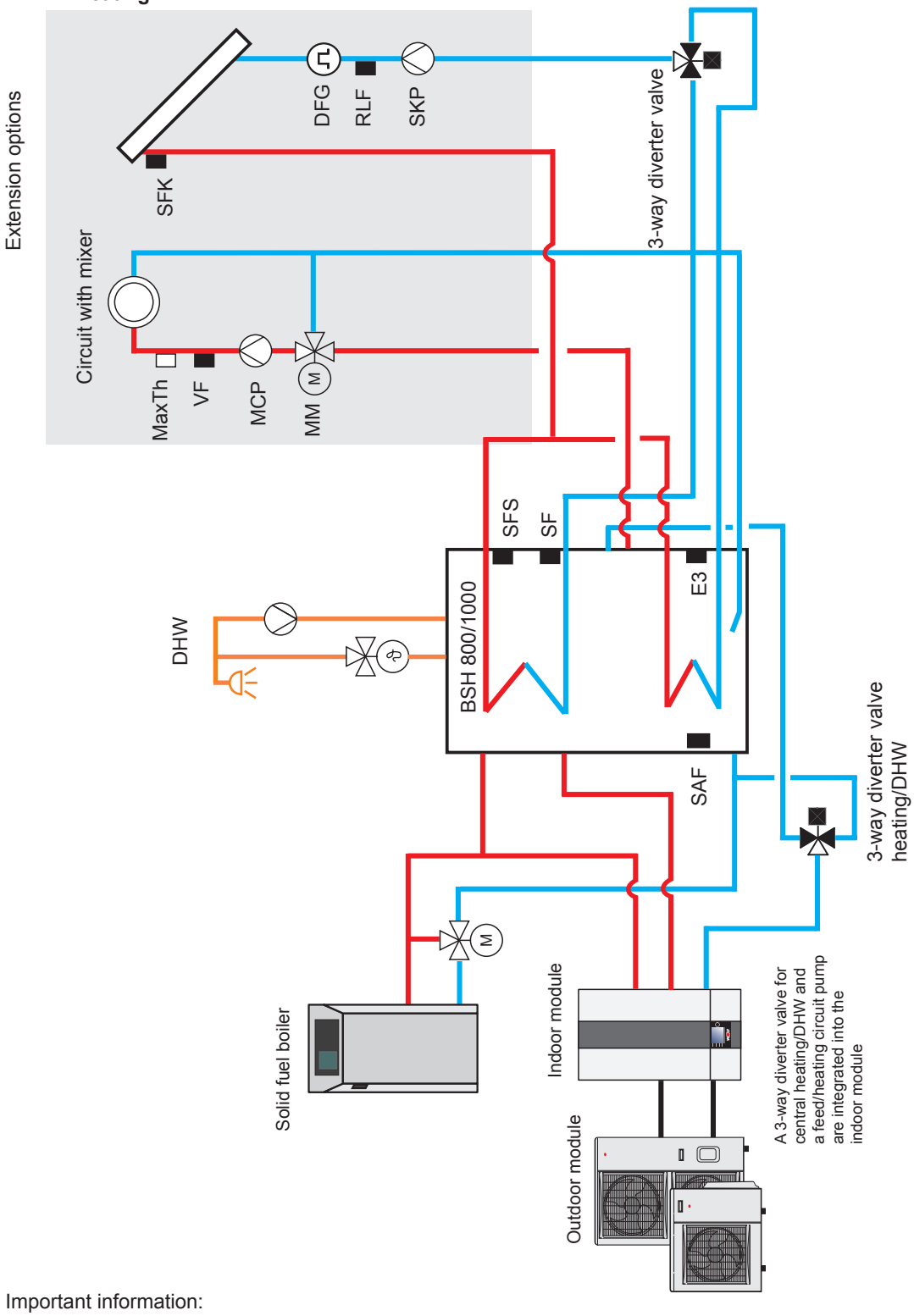


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.6 System configuration 12 (BSH-800/1000)

BWL-1S(B)

- **Split air/water heat pump**
- **BSH-800/1000**
- **Solid fuel boiler**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**

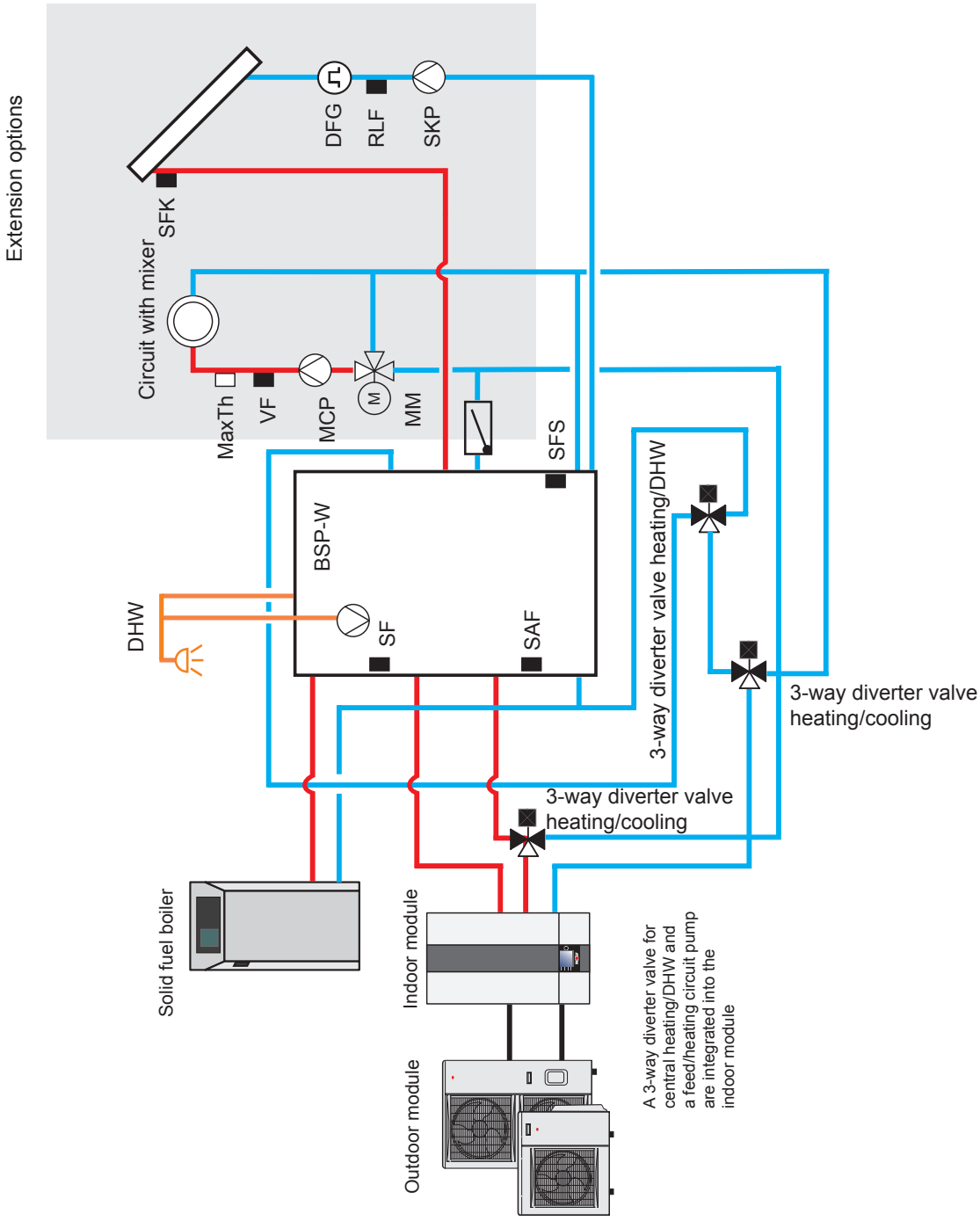


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.7 System configuration 14

BWL-1S(B)

- **Split air/water heat pump**
- **BSP-W**
- **Solid fuel boiler**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**
- **Active cooling possible**

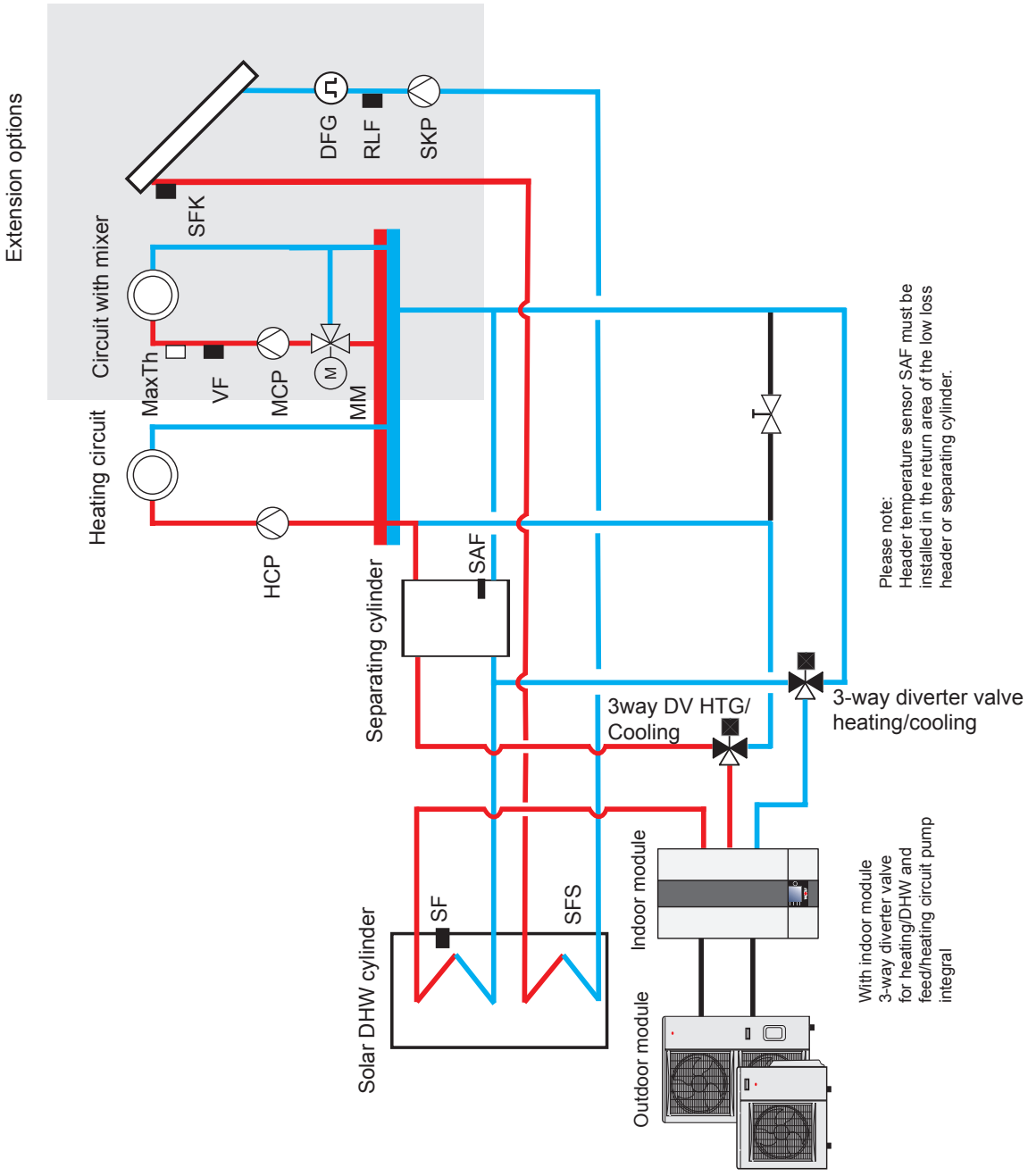


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.8 System configuration 15

BWL-1S(B)

- **Split air/water heat pump**
- **Separating cylinder**
- **Solar DHW cylinder**
- **Heating circuit**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**
- **Active cooling possible**

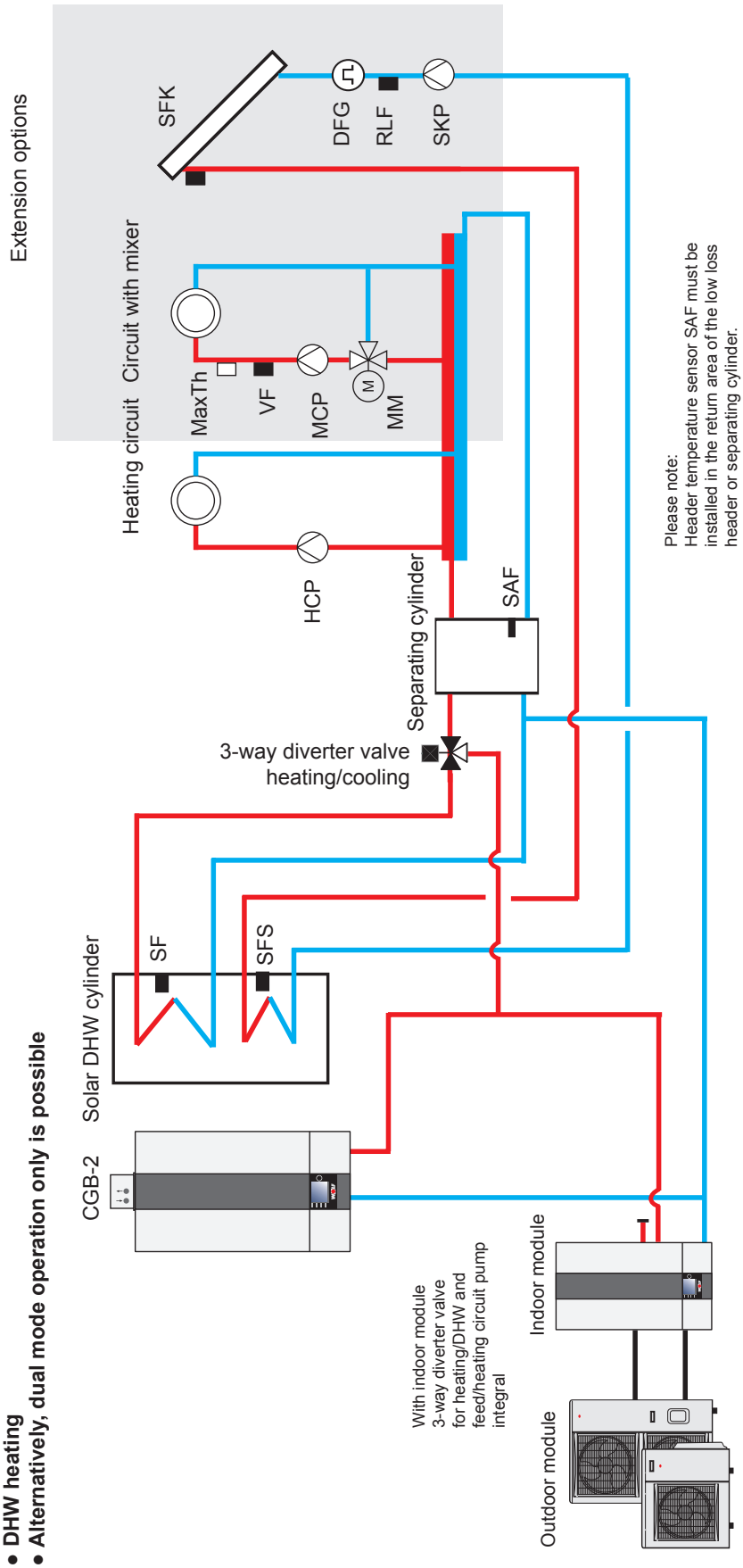


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.9 System configuration 33

BWL-1S(B)

- **Split air/water heat pump**
- **Separating cylinder**
- Solar DHW cylinder
- **CGB-2 (activation via output A1)**
- **Heating circuit**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**
- **Alternatively, dual mode operation only is possible**

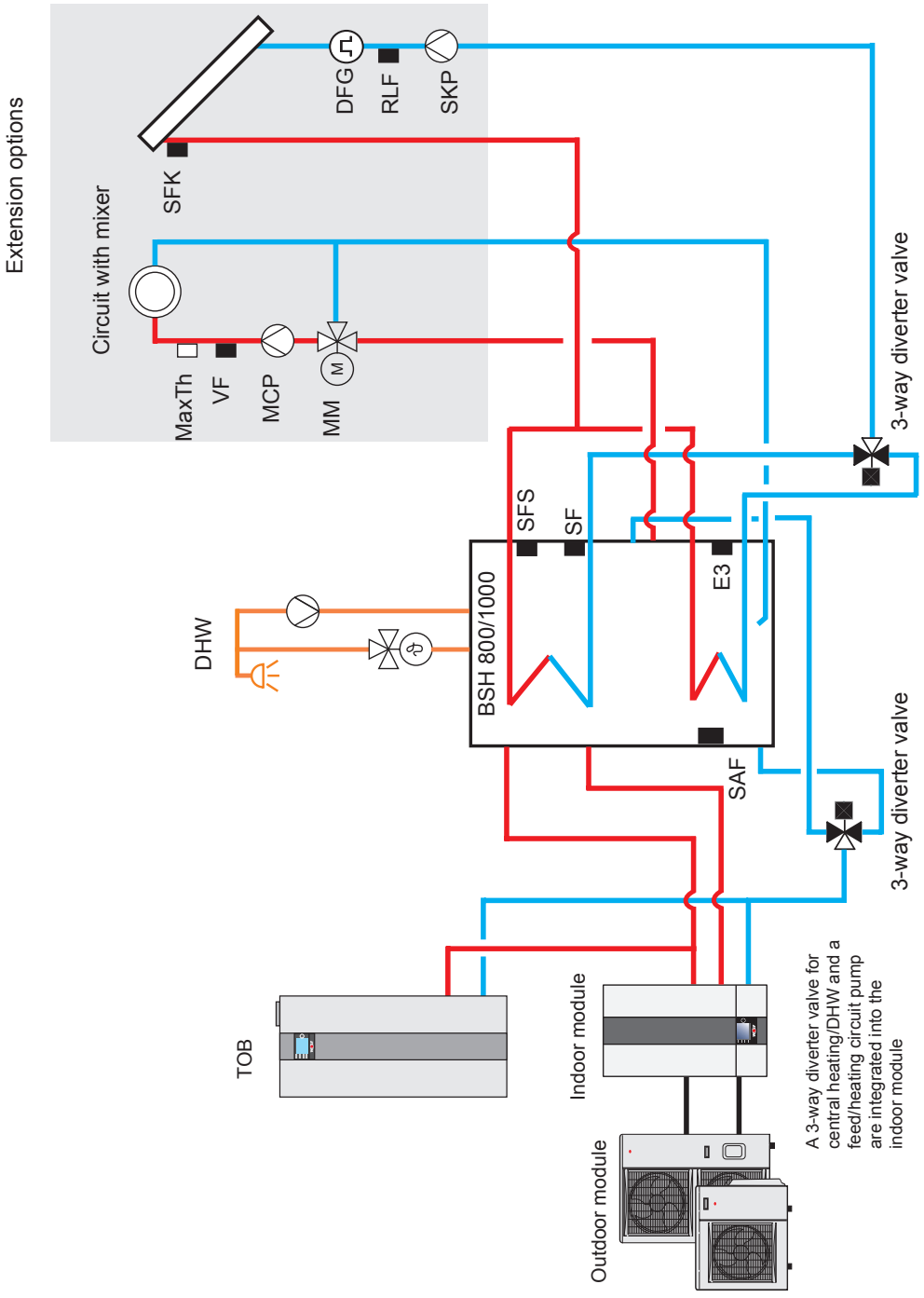


Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.10 System configuration 34

BWL-1S(B)

- **Split air/water heat pump**
- **BSH-800/1000**
- **TOB (activation via output A1)**
- **Circuit with mixer extension with MM**
- **Solar circuit extension with SM1/SM2**
- **DHW heating**
- **Alternatively, dual mode operation only is possible**



Important information:
In this schematic diagram, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.11 System configuration 51

External demand / control by building management system (BMS)

U = 0…10 V at input E2/SAF:

0 V ≤ **U** < 1.2 V → heat pump OFF

1.2 V ≤ **U** ≤ 4.0 V → 0-100 % compressor cooling mode (1...12 % → 12 %)
(13...100 % →13...100 %)

4.2 V ≤ **U** ≤ 7.0 V → 0-100 % compressor heating mode (1...12 % → 12 %)
(13...100 % →13...100 %)

7.2 V ≤ **U** ≤ 10.0 V→ 100 % compressor heating mode
+ 0-100 % elec. heater, heating mode (1...20 % → 20 %)
(21...80 % → 21...80 %)
(81...100 % → 100 %)

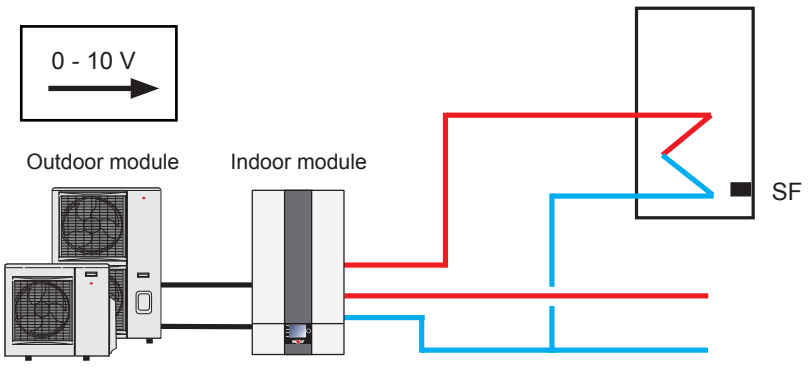
Notes:
- Application limits: Compressor T_FL/T_RTN = 55 °C, elec. heater T_FL = 75 °C
- Enable electric heater for heating mode (WP090 = ON)
- Configure output A1 to defrost (WP003 = Defrost)
  → In defrost mode, output A1 is switched in order to display defrost mode to the BMS.
- Ensure max. compressor starts per hour by BMS
- Ensure max. flow temperature by BMS
- Connect dew point monitor or jumper to input E1
- Ensure dew point monitoring by BMS if required

DHW heating mode for system configuration 51

In this system configuration, the appliance can carry out DHW heat-up automatically on demand. DHW heat-up mode has priority over BMS mode.
DHW heat-up mode can be suppressed in system configuration 51 by removing the SF cylinder sensor, carrying out a parameter reset and resetting the system configuration.
In this case, disconnect integral 3-way diverter valve for HTG/DHW.

BWL-1S(B)

- **Split air/water heat pump**
- **0 - 10 V activation (at input E2 / SAF)**
- **Active cooling possible**



A 3-way diverter valve for central heating/DHW and a feed/heating circuit pump are integrated into the indoor module

Important information:
In these schematic diagrams, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the hydraulic system solutions technical guide.

29.2.12 System configuration 52

External demand / control by building management system (BMS)

External floating contact at input E2/SAF:

Open	→	heat pump OFF
Closed	→	compressor ON

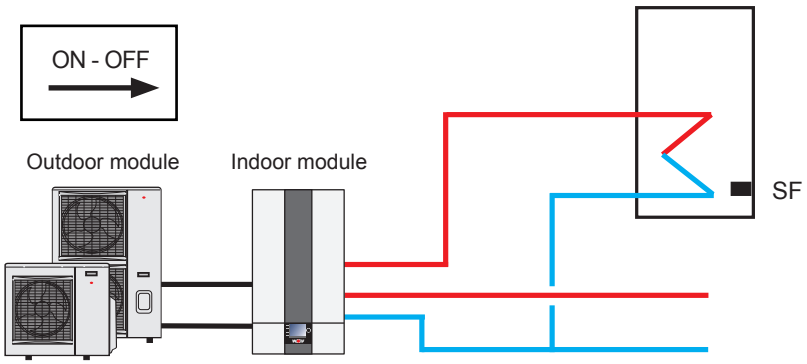
Notes:
- Application limits: Compressor T_FL/T_RTN = 55 °C, elec. heater T_FL = 75 °C
- The electric heater is not activated (except for frost protection and defrosting)
- Configure output A1 to defrost (WP003 = Defrost)
  → In defrost mode, output A1 is switched in order to display defrost mode to the BMS.
- Ensure max. compressor starts per hour by BMS
- Ensure max. flow temperature by BMS

DHW heating mode for system configuration 52

In this system configuration, the appliance can carry out DHW heat-up automatically on demand. DHW heat-up mode has priority over BMS mode.
DHW heat-up mode can be suppressed in system configuration 52 by removing the SF cylinder sensor, carrying out a parameter reset and resetting the system configuration.
In this case, disconnect integral 3-way diverter valve for HTG/DHW.

BWL-1S(B)

- **Split air/water heat pump**
- **ON/OFF activation (at input E2 / SAF)**



A 3-way diverter valve for central heating/DHW and a feed/heating circuit pump are integrated into the indoor module

Important information:
In these schematic diagrams, shut-off valves, air vent valves and safety equipment are not fully represented.
These should be provided for each system individually, in line with the applicable standards and regulations.
Hydraulic and electrical data can be found in the "Hydraulic System Solutions" technical guide.

30 Additional functions

30.1 Active cooling

The split air/water heat pump can, in addition to heating/DHW mode, also work in active cooling mode.
During active cooling, the cooling capacity of the heat pump is transferred to the heating system.

The following conditions must exist for active cooling:

1) System structure in accordance with hydraulic diagram with active cooling option
2) System configuration with active cooling option (WP001 = 01, 05, 14, 15, 51)
3) E1 input function (WP002) = DPM/MaxTh
4) Dew point monitor (DPM) or jumper connected to input E1
5) Dew point monitor (DPM) operational and not triggered
6) Enable active cooling (WP058) = ON
7) Active cooling standard setting = ON
8) No heating or DHW requirement present
9) Operating mode set for heating circuits to be cooled = automatic mode
10) Time within switching times set for active cooling (act. time program cooling)
11) Conditions for active cooling according to cooling curve setting
12) Outside temperature > outside temperature setting for enabling cooling (WP053)
13) Return temperature > set return temperature
14) Room temperature > day temperature for cooling
    (where BM-2 installed in room to be cooled as remote control and room influence activated)
15) U = 1.2 V ... 4.0 V at input E2/SAF by BMS (system configuration 51 only)

Notes on the BM-2 programming unit:

- Room influence is only active if the BM-2 programming unit is installed as a remote control.
- When room influence is on, the standard setting "Day temperature" (for heating mode) is available and, for systems with active cooling, the standard setting "Day temperature, cooling" (for cooling mode).
  The "Cooling curve" submenu is displayed only when the "Active cooling" standard setting is enabled in the contractor level.
- Temperature selection from -4 to +4 (parallel offset) and economy factor 0...10 (reduction in economy mode); no effect in active cooling mode.

30.2 Power-OFF

The power supply utility (PSU) can temporarily block compressor or compressor and electric heater operation using an external switching command (floating contact on terminal X1 – 9/10).
When the contact is open, the power-OFF function is active, i.e. regular operation of the compressor or compressor and electric heater is inhibited via the control unit of the BWL-1S(B). The power-OFF function is inactive when the contact is closed.
System frost protection (via compressor, electric heater and external additional heat generator), as well as the function of heating/mixer circuit pumps, remain operational when power-OFF is enabled.
The active power-OFF status message is shown on the status or operating mode displays and in the "Displays"/"Heating appliance" submenu on the AM display module and BM-2 programming unit.

Notes:

- For systems that can be temporarily blocked/shut down by the power supply utility (power-OFF), a corresponding switching signal (floating contact) of the energy supply utility must be connected to terminal X1-9/10 in order to signal the power-OFF period to the control unit of the BWL-1S(B).
- If the power-OFF function is not used, insert a jumper at terminal X1-9/10.
- The electrical connection of the power-OFF function must be made in accordance with the stipulations of the local power supply utility.

Terminals X1 – 9/10:	Function:
Open	Power-OFF active
Bridged	Heat pump standard mode

Contractor parameters	Meaning	Setting:
WP025	Smart Grid	OFF (= factory setting)
WP092	Power-OFF for elec. heater	OFF, ON

30.3 PV increase

The PV increase function enables an adjustment in heat pump operation, e.g. when connected to a photovoltaic (PV) system to optimise on-site consumption of PV energy.

An external switching command (floating contact on terminal X1 – 11/12) can increase the set temperature for heating and/or DHW, or enable the active cooling function.

The heat pump can be operated using a compressor, electric heater, or both a compressor and electric heater. When configuring on-site technical devices (e.g. PV inverter), take the maximum possible power consumption of the heat pump into account (see specification).

The PV increase status message is shown on the status pages of the BM-2 programming unit and in the "Displays"/"Heating appliance" submenu on the AM display module and BM-2 programming unit.

PV increase for heating is possible only in system configurations with header return temperature sensor SAF (T_headerRTN) and where the outside temperature is below the set winter/summer changeover.

For active cooling with PV increase, active cooling must be enabled in the AM/BM-2 standard settings, as well as in contractor parameters WP058 and WP033. In addition, the outside temperature must be above the set winter/summer changeover and the enable temperature for active cooling (WP053).

PV increase is not possible whilst power-OFF is active.
If the power-OFF function is not used, insert a jumper at terminal X1 – 9/10.

If standby mode is set on the BM-2 programming unit, PV increase is unavailable.

Terminal X1 – 11/12	Function:	PV status:
Open	Heat pump standard mode	Standard mode
Bridged	PV increase active (= activation on heating/cooling demand even outside set switching times and on shutdown during automatic mode (ECO-ABS); during heating or DHW operation with increase of set temperatures according to settings of WP026 and WP027)	Start command

Contractor parameters	Meaning	Setting:
WP025	Smart Grid	OFF (= factory setting)
WP026	Set heating temperature increase	0 ... 20 °C
WP027	Set DHW temperature increase	0 ... 40 °C
WP028	Heat generator activation	OFF, HP, HP+elec.htg, elec. heater
WP032	Heating with SG/PV	ON, OFF
WP033	Cooling with SG/PV	ON, OFF

30.4 Smart Grid (SG)

The Smart Grid (SG) function allows the power supply utility (PSU) to optimally adjust grid utilisation through intelligent control of consumers.

Using external switching commands (floating contacts SG_0 and SG_1 on terminals X1 – 9/10 and X1 – 11/12), the compressor and/or electric heater operation can be blocked, or requested with/without an increase in the set heating/DHW temperatures, or the active cooling function enabled.

The heat pump can be operated using a compressor, electric heater, or both a compressor and electric heater.

The SG function status message is shown on the status pages of the BM-2 programming unit and in the "Displays"/"Heating appliance" submenu on the AM display module and BM-2 programming unit.

The SG function for heating is only possible in system configurations with header return temperature sensor SAF (T_headerRTN) and where the outside temperature is below the set winter/summer changeover.

For active cooling by the SG function, active cooling must be enabled in the AM/BM-2 standard settings, as well as in contractor parameters WP058 and WP033. In addition, the outside temperature must be above the set winter/summer changeover and the enable temperature for active cooling (WP053).

If standby mode is set on the BM2 programming unit, the SG function is not available.

Terminal X1 9/10 (=SG_0):	Terminal X1 11/12 (=SG_1):	Function:	SG status:
Open	Open	Heat pump standard mode	Standard mode
Open	Bridged	Start recommendation (= activation on heating/cooling demand even outside set switching times and on shutdown during automatic mode (ECO-ABS))	Start recommendation
Bridged	Open	Heat pump shutdown (see power-OFF)	Power-OFF
Bridged	Bridged	Start command (= activation on heating/cooling demand even outside set switching times and on shutdown during automatic mode (ECO-ABS); during heating or DHW operation with increase of set temperatures according to settings of WP026 and WP027)	Start command

Contractor parameters	Meaning	Setting:
WP025	Smart Grid	ON
WP026	Set heating temperature increase	0 ... 20 °C
WP027	Set DHW temperature increase	0 ... 40 °C
WP028	Heat generator activation	OFF, HP, HP+elec.htg, elec. heater
WP032	Heating with SG/PV	ON, OFF
WP033	Cooling with SG/PV	ON, OFF

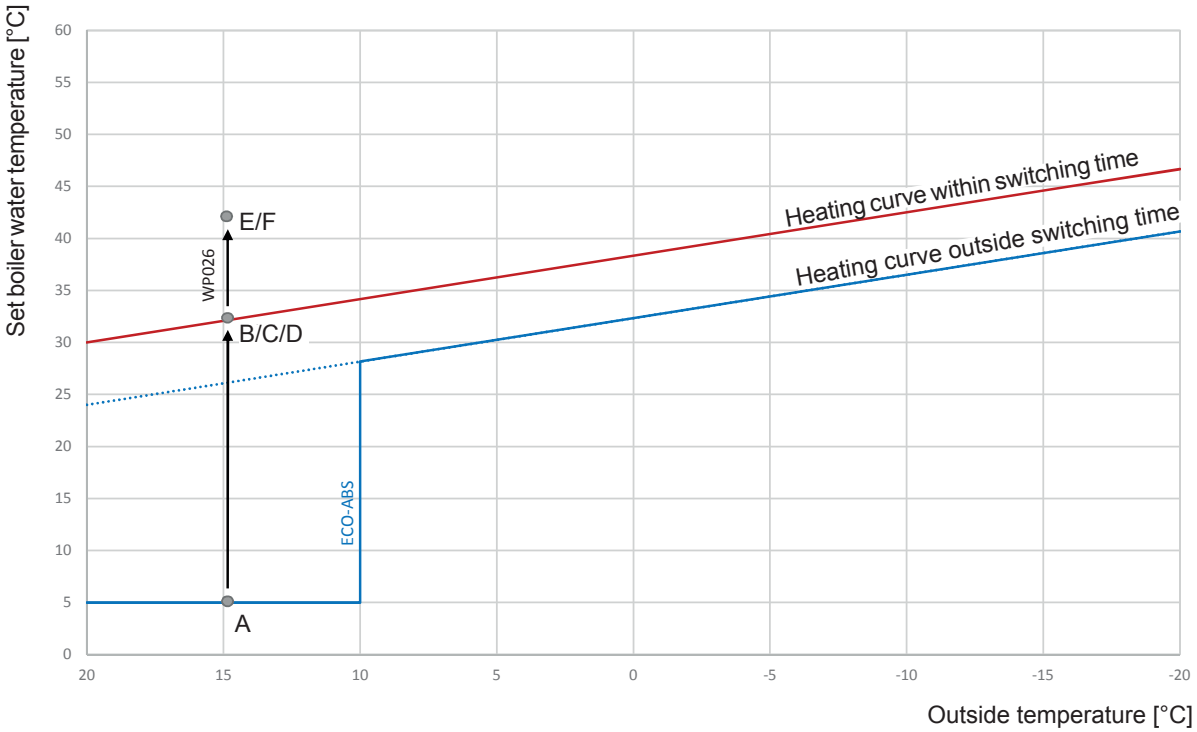
30.5 Calculating set temperatures when raising the temperature via PV or Smart Grid.

With start recommendation:
Set heating temperature = set boiler water temperature
Set DHW temperature (max. 64 °C) = set DHW temperature
Set cooling temperature = MAX (WP054; (outside temperature – WP055) OR (set boiler water temperature according to cooling curve))

With start command:
Set heating temperature = set boiler water temperature + WP026
Set DHW temperature (max. 64 °C) = set DHW temperature + WP027
Set cooling temperature = MAX (WP054; (outside temperature – WP055) OR (set boiler water temperature according to cooling curve))

Set DHW temperature: AM display module/BM-2 programming unit set DHW temperature
Set boiler water temperature: AM display module/BM-2 programming unit set heating flow temperature

Ex.*	Switching time	PV status	SG status	Set boiler water temperature from PV/ SG
A	Outside	Standard mode	Standard mode	5 °C
B	Within	Standard mode	Standard mode	32 °C
C	Outside	-	Start recommendation	5 °C --> 32 °C
D	Within	-	Start recommendation	32 °C
E	Outside	Start command	Start command	5 °C --> 32 °C + WP026 = 42 °C
F	Within	Start command	Start command	32 °C + WP026 = 42 °C
* Outside temperature = 15 °C, WP026 = 10 °C				



31 Sound level

Noise levels must be taken into consideration when siting the system.
In accordance with TA-Lärm [or local regulations], the following emission limits must be observed:

Area	Noise emission limits [dB(A)]	
	Day 06:00 - 22:00	Night 22:00 - 06:00
Spa complexes, hospitals and care homes, where indicated as such by means of signs on the premises or road.	45	35
Emission location surrounded exclusively by residential buildings **(purely residential areas)**	50	35
Emission location surrounded primarily by residential buildings **(generally residential areas)**	55	40
Emission location neither primarily surrounded by commercial facilities nor by residential buildings **(core areas, mixed areas)**	60	45
Emission location surrounded primarily by commercial facilities **(commercial areas)**	65	50
Emission location surrounded exclusively by commercial facilities and perhaps the occasional residential building for the owners and managers of the facilities and for supervisors and on-call staff **(industrial areas)**	70	70

Measuring location outside but close to the residence concerned (0.5 m in front of the open window that is most affected)

31.1 The following must be observed when installing the system

Avoid siting the heat pump directly outside or below windows of noise-sensitive rooms, e.g. bedrooms.

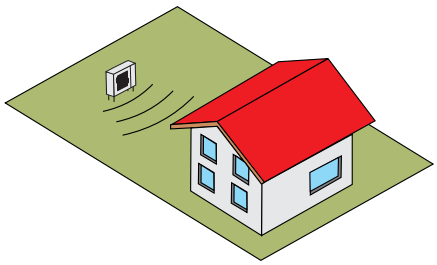
Installation in recesses or between 2 walls is not recommended, as this will increase the noise level due to sound reflection.

The sound power level of heat pumps is calculated in accordance with EN 12102. It enables comparisons to be made independently of surroundings, direction and distance.

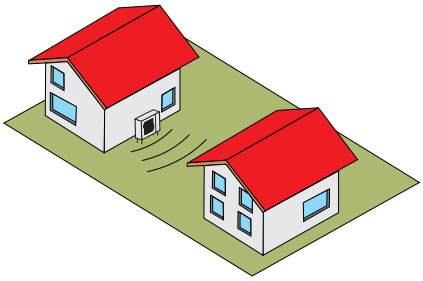
31.2 Sound reflection (directivity Q)

With the number of adjacent vertical surfaces (for example walls), the sound pressure level increases exponentially to the free positioning (Q = directivity).

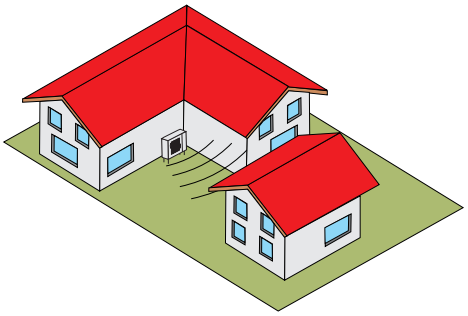
Q = 2: Freestanding outdoor heat pump installation



Q = 4: Heat pump or air intake/discharge (indoor installation) on a house wall



Q = 8: Heat pump or air intake/discharge (indoor installation) on a house wall with recessed corner in exterior wall



31.3 Sound pressure level L_{PA} calculation based on sound power level, distance and directivity

	Sound power level L_{WA} dB(A)				
Appliance type	Max.	"Max. night 75 %"	"Max. night 65 %"	"Max. night 55 %"	"Max. night 45 %"
BWL-1S(B)-05/230 V	60	57	57	56	56
BWL-1S(B)-07/230 V	63	59	57	56	56
BWL-1S(B)-10/400 V	64	59	58	57	57
BWL-1S(B)-14/400 V	65	60	59	58	57
BWL-1SB-10/230 V	65	60	59	58	58
BWL-1SB-14/230 V	64	61	60	59	58
BWL-1S(B)-16/400 V	66	61	60	59	57

Night mode can reduce the maximum noise emissions.
It should be noted that this also decreases the maximum performance.

Directivity Q	Distance from sound source								
	1 m	2 m	4 m	5 m	6 m	8 m	10 m	12 m	15 m
	Differential ΔL in relation to sound power level L_{WA} measured in dB(A) at the outdoor module								
Q = 2 (outdoor installation)	8	14	20	22	23.5	26	28	29.5	31.5
Q = 4 (installation up to 3 m from a wall)	5	11	17	19	20.5	23	25	26.5	28.5
Q = 8 (installation in a corner, up to 3 m from the walls)	2	8	14	16	17.5	20	22	23.5	25.5

Formula:

$$L_{PA} = L_{WA} - \Delta L$$

Example:

BWL-1S-07/230 V; Q = 4 installation on a house wall; distance 8 m
Max. sound pressure level = 63 dB(A) - 23 dB(A) = 40 dB(A)
Max. sound pressure level, night 55 % = 56 dB(A) - 23 dB(A) = 33 dB(A)

32 Configuring the dual mode point

32.1 Configuration example

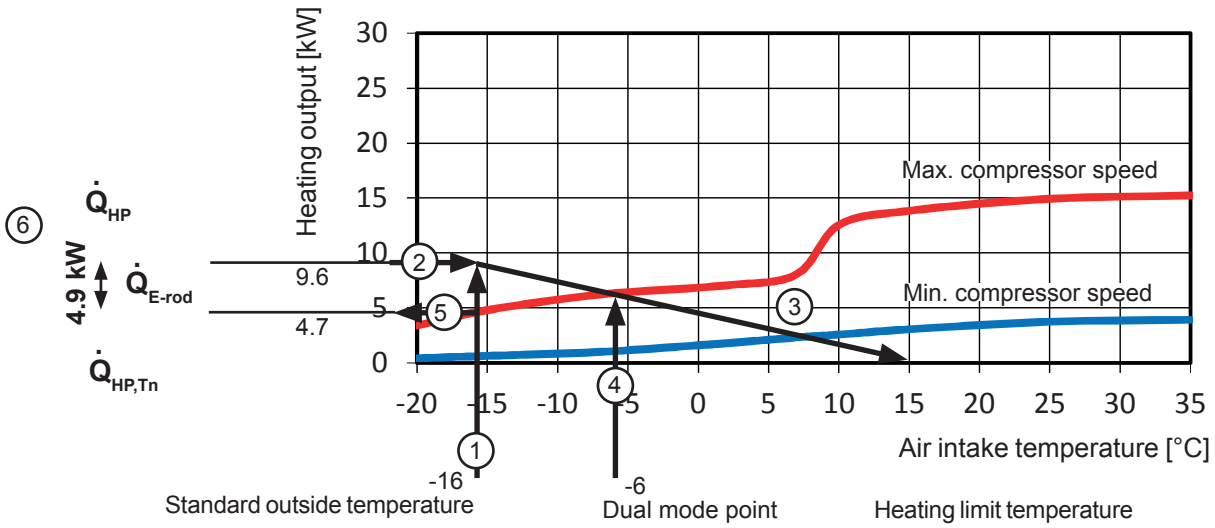
Central heating demand (building heat load) to DIN 4701 or EN 12831 of 7.7 kW. A DHW demand for 4 people (0.25 kW/person) and a standard outside temperature of -16 °C are assumed.
The power supply utility specifies a blocking time of 2 x 2 hours. The blocking time factor Z is 1.1.
Using these figures, the required heat pump output is calculated as follows:

$\dot{Q}_{HP} = (\dot{Q}_G + \dot{Q}_{DHW}) \times Z$ = (7.7 kW + 1.0 kW) x 1.1 = 9.6 kW

$\dot{Q}_{E\text{-}rod} = \dot{Q}_{HP} - \dot{Q}_{HP,Tn}$ = 9.6 kW - 4.7 kW = 4.9 kW

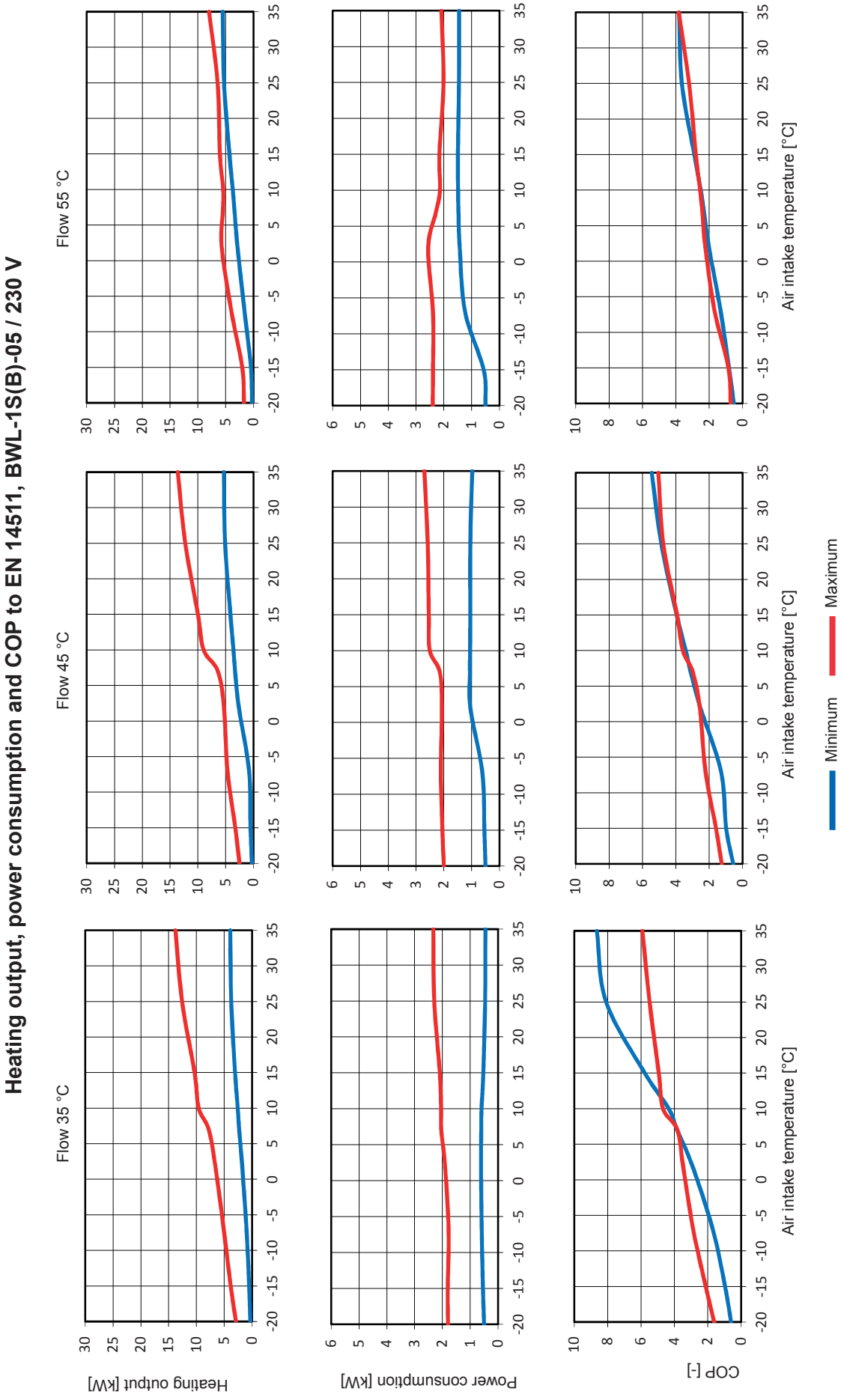
$\dot{Q}_{HP}$	:	Required peak output of the heat pump system
$\dot{Q}_G$	:	Building heat load (building heat demand, heating energy demand)
$\dot{Q}_{DHW}$	:	Output demand for DHW heating
$\dot{Q}_{E\text{-}rod}$	:	Immersion heater output
$\dot{Q}_{HP,Tn}$	:	Heating output of heat pump for standard design point
Z	:	Blocking time factor

32.2 Diagram for calculating the dual mode point and the output of the electric immersion heater

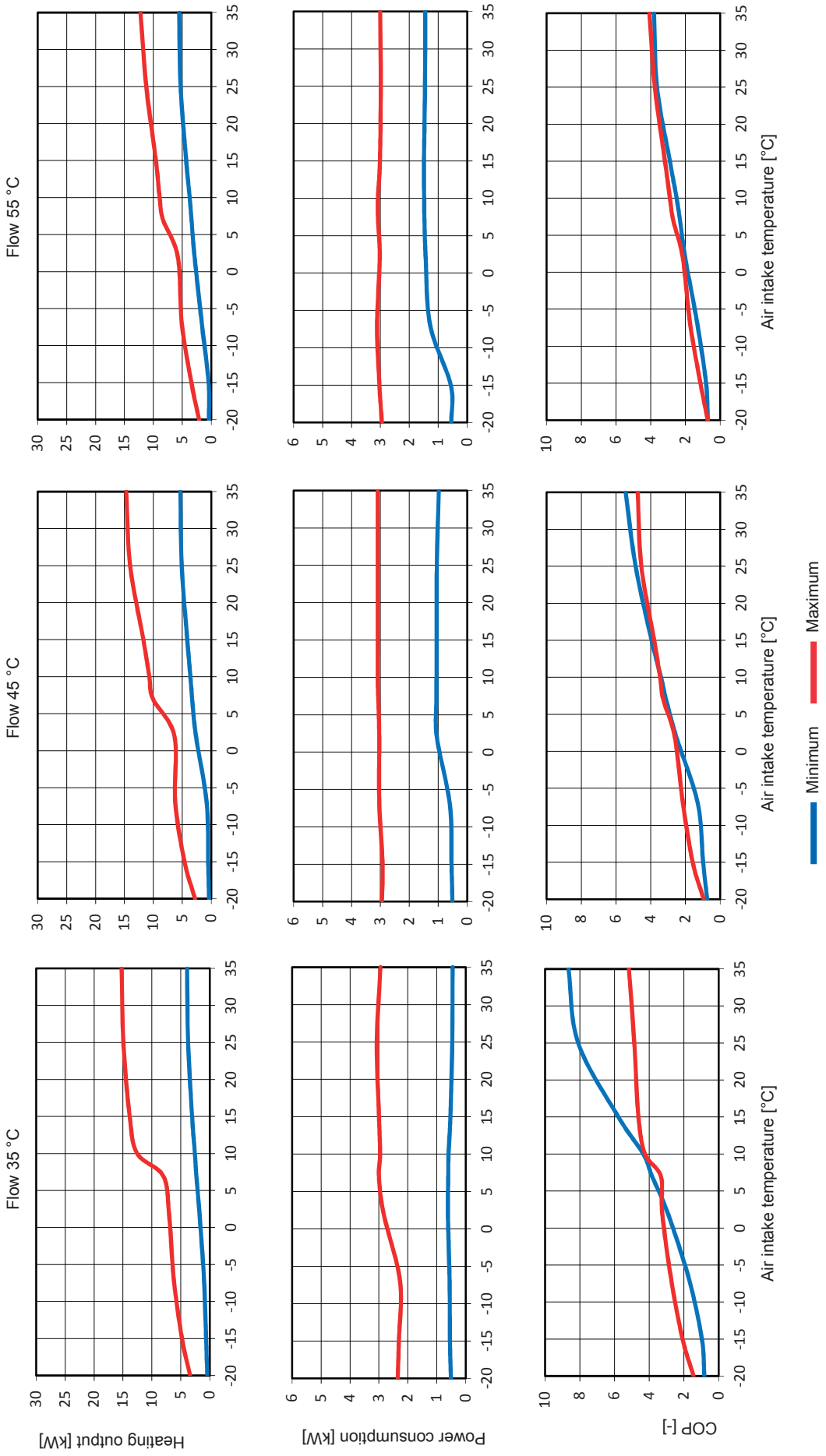


①	Standard outside temperature
②	Required peak output of the heat pump system $\dot{Q}_{HP}$
③	Heat demand of the building up to the heating limit pressure
④	Dual mode point (= point where the heat demand of the building intersects with the max. compressor speed)
⑤	Proportion of heat pump heating output at standard outside temperature
⑥	Proportion of electric immersion heater heating output at standard outside temperature

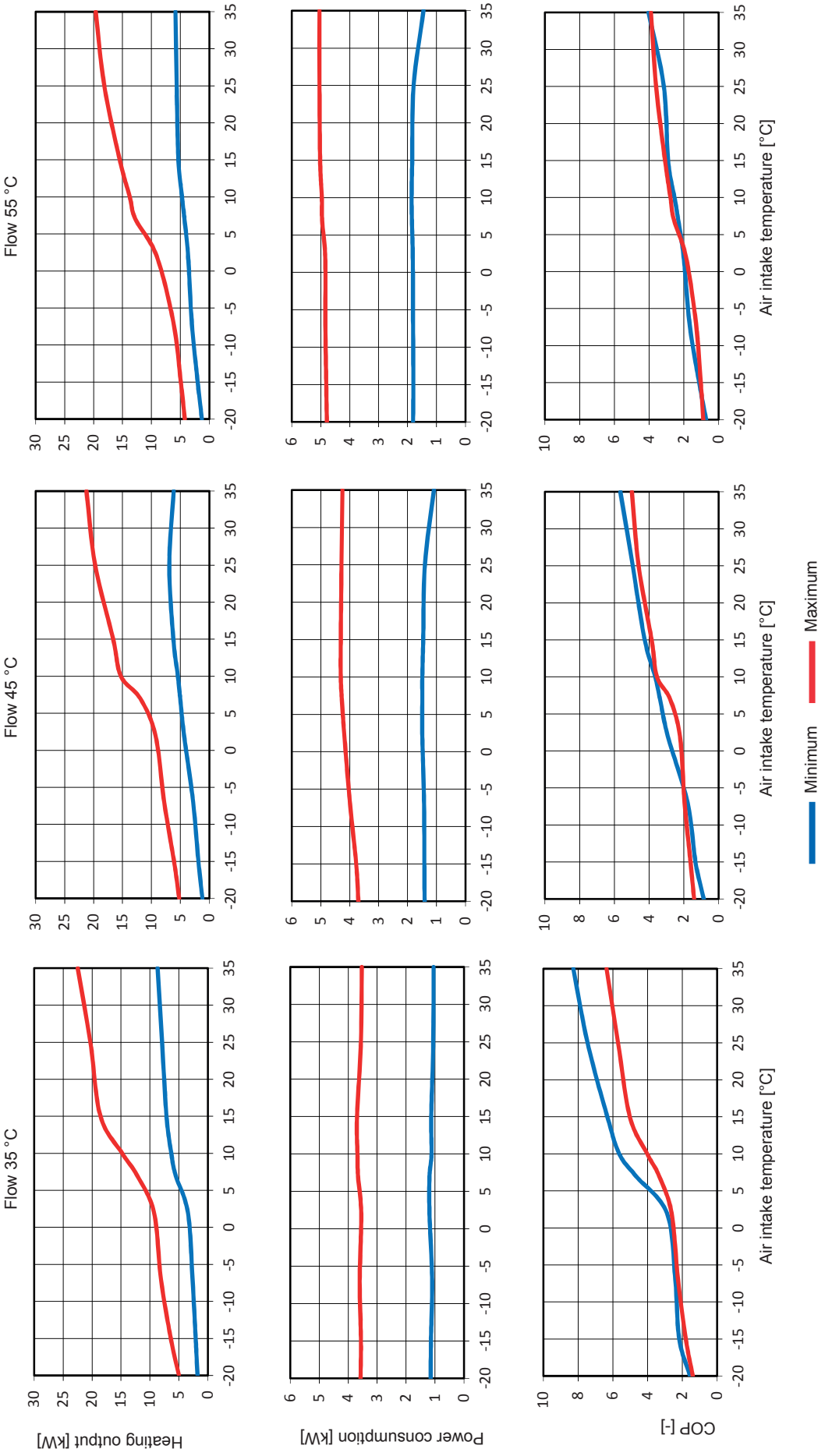
33 Heating output, power consumption, COP

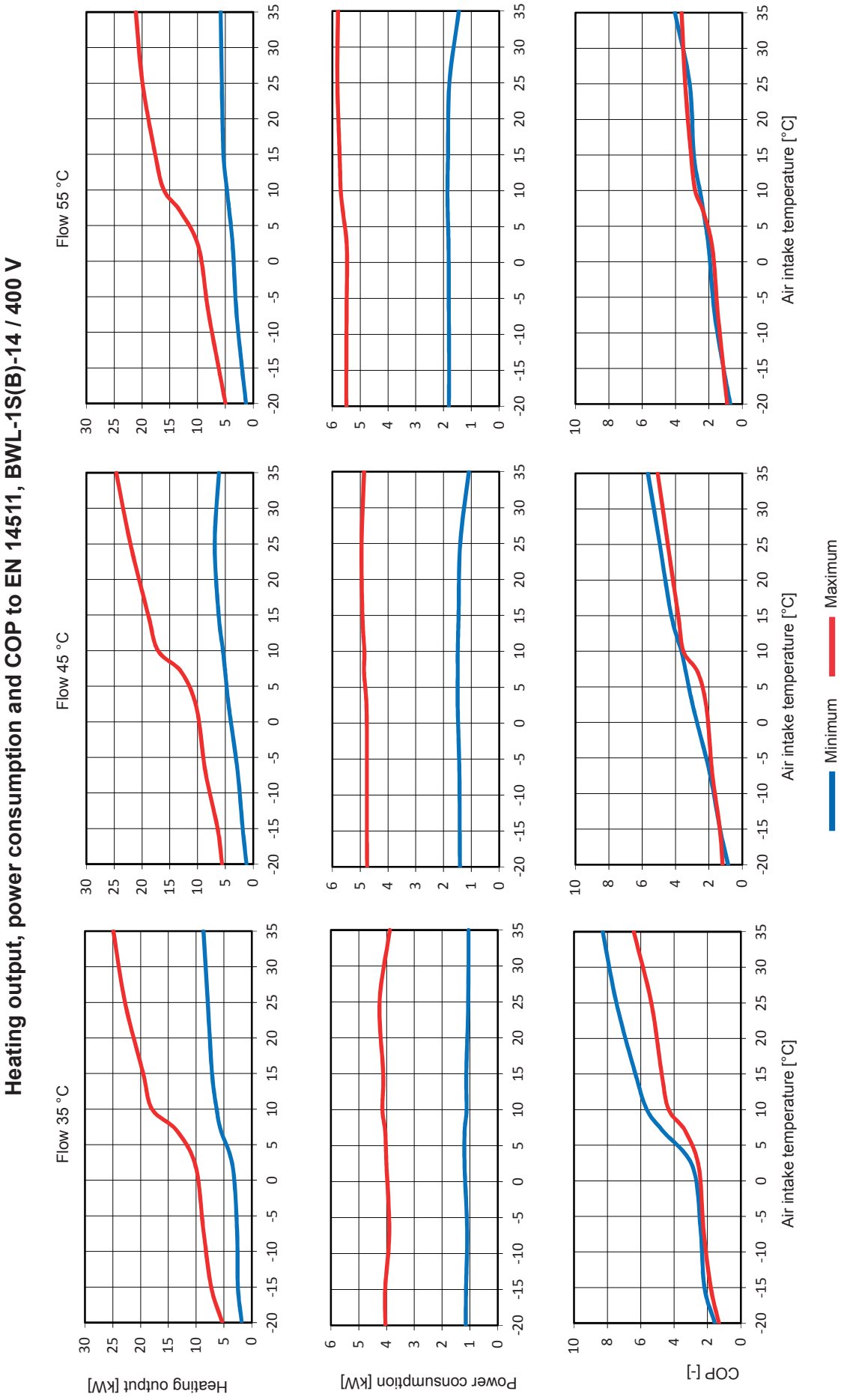


Heating output, power consumption and COP to EN 14511, BWL-1S(B)-07 / 230 V

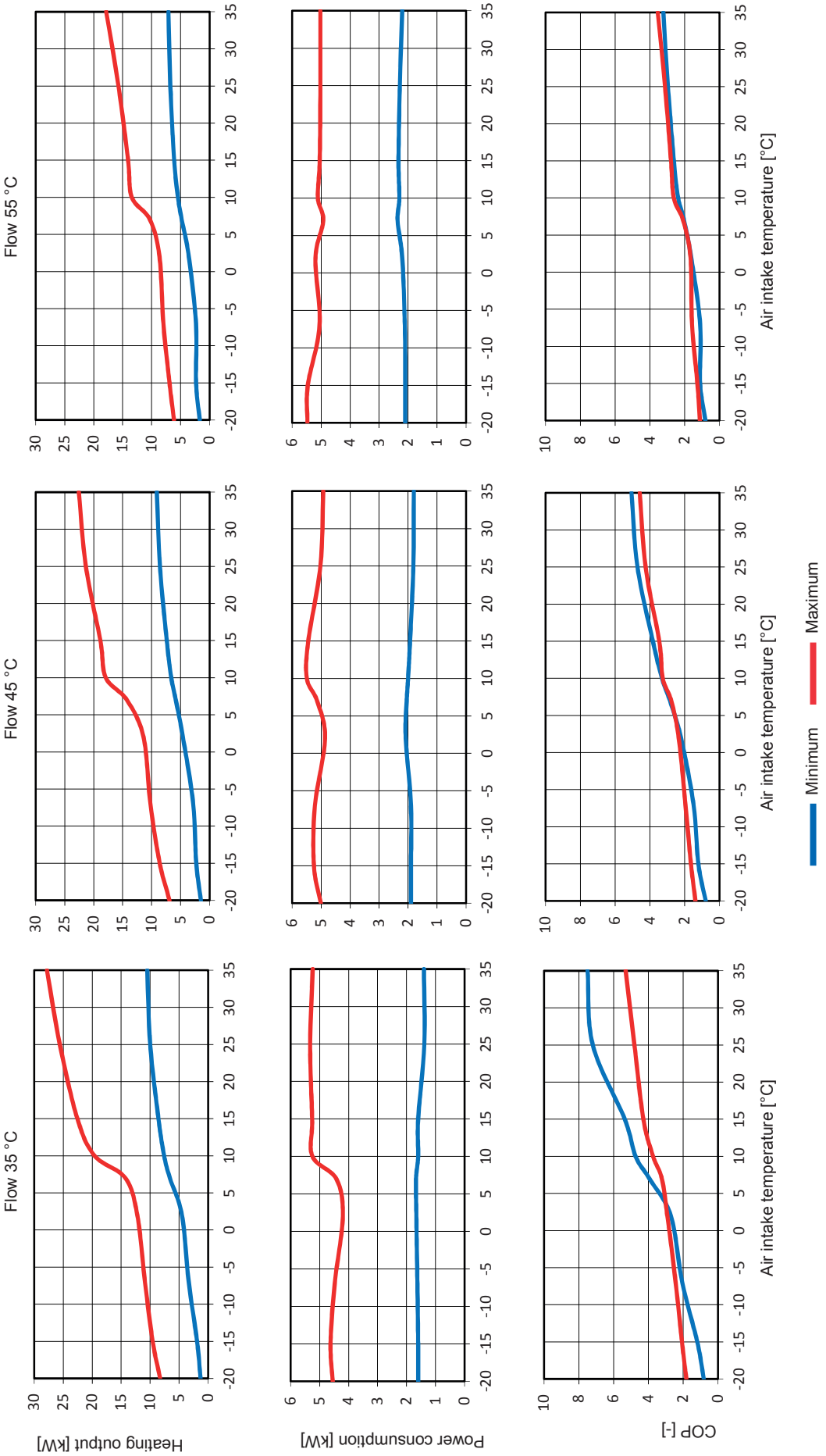


Heating output, power consumption and COP to EN 14511, BWL-1S(B)-10 / 400 V

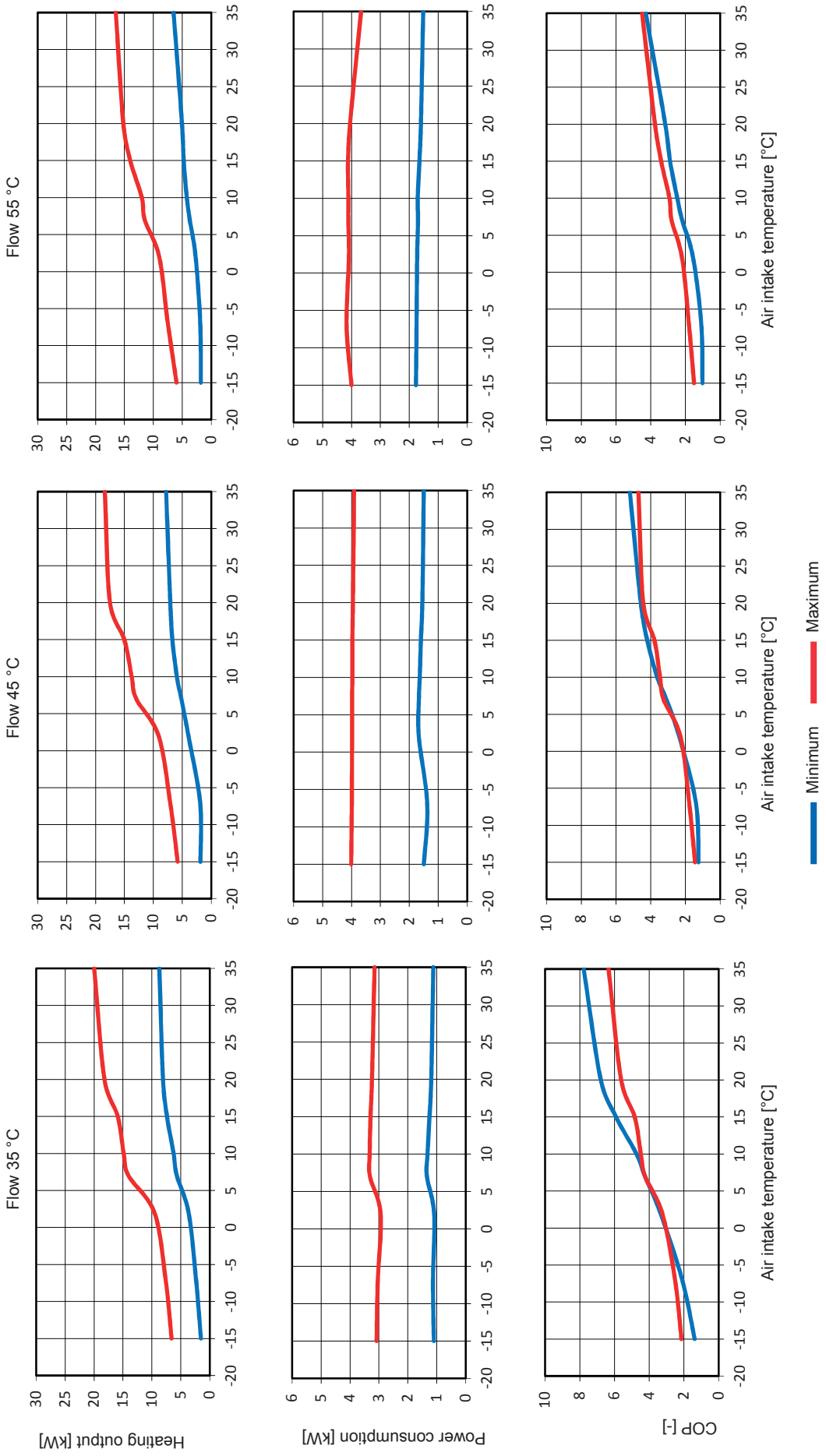



Heating output and power consumption and COP to EN 14511, BWL-1S(B)-14 / 400 V
Flow 35 °C
Flow 45 °C
Flow 55 °C
Heating output [kW]
Power consumption [kW]
COP [-]
Air intake temperature [°C]
Minimum
Maximum

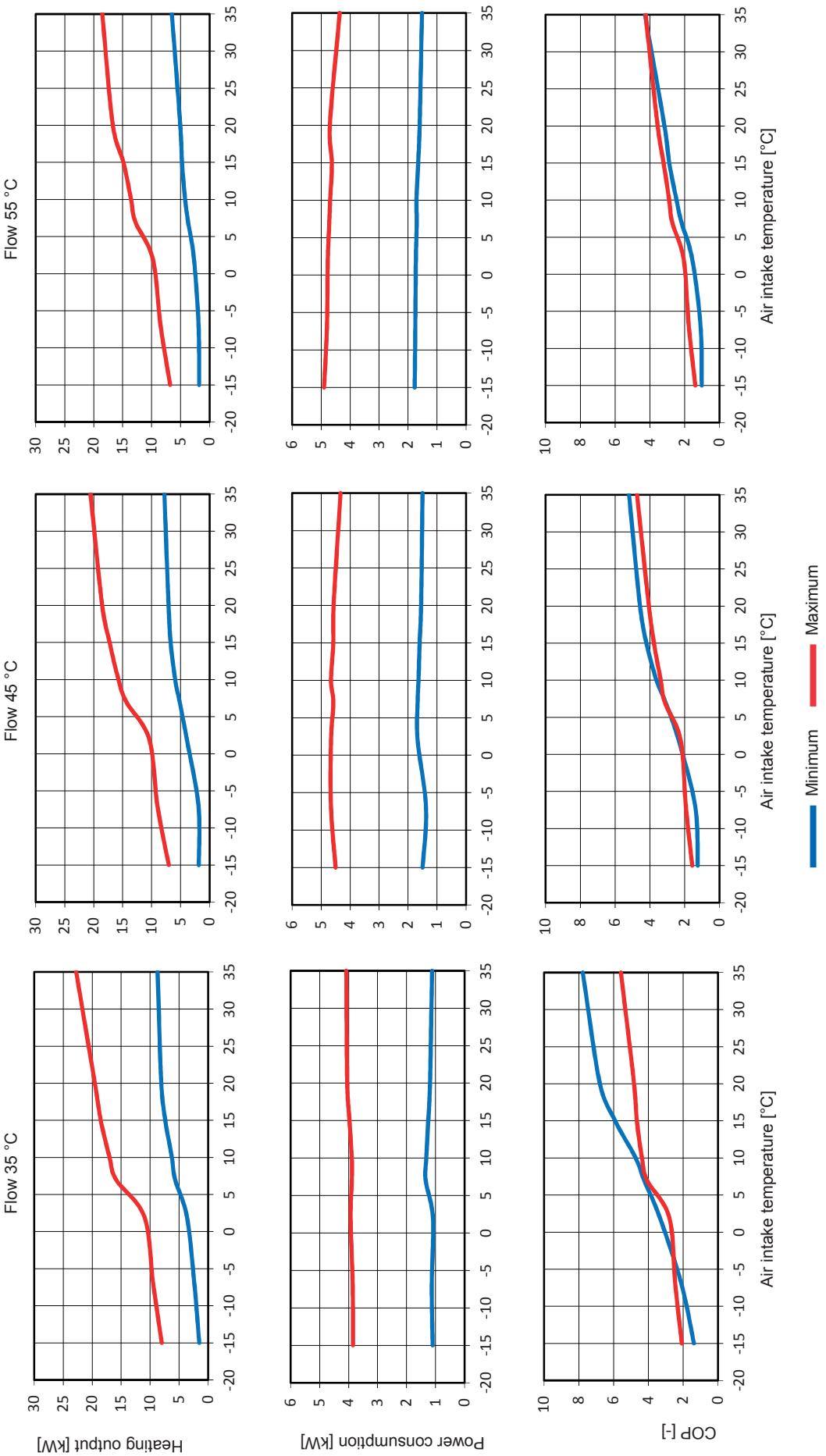
Heating output, power consumption and COP to EN 14511, BWL-1S(B)-16 / 400 V



Heating output, power consumption and COP to EN 14511, BWL-1S(B)-10 / 230 V

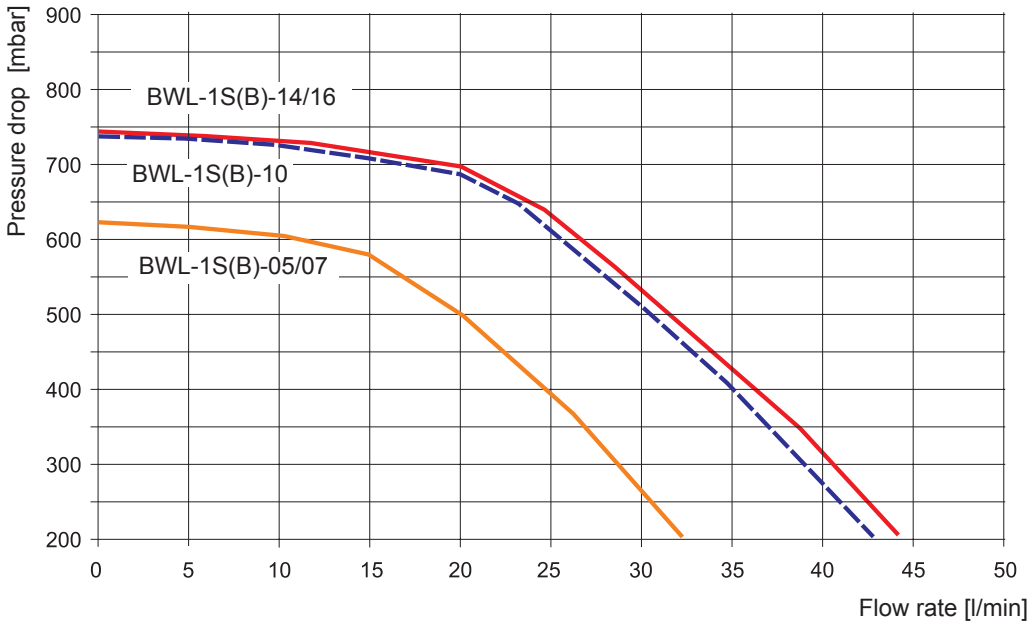


Heating output, power consumption and COP to EN 14511, BWL-1S(B)-14 / 230 V



34 Heating circuit residual head

34.1 Heating circuit residual head



34.2 Residual head / nominal water flow rate

		BWL-1S(B)-05 230 V	BWL-1S(B)-07 230 V	BWL-1S(B)-10 400 V	BWL-1S(B)-14 400 V	BWL-1S(B)-16 400 V
Nominal water flow rate	l/min	15.2	19.7	28.8	34.1	40.2
Residual head	mbar	580	490	550	460	310

		BWL-1S(B)-10 / 230 V	BWL-1S(B)-14 / 230 V
Nominal water flow rate	l/min	31.8	40.4
Residual head	mbar	530	340

35 Specification

TYPE		BWL-1S(B) - 05/230 V	BWL-1S(B) - 07/230 V
Width x height x depth of outdoor unit (incl. feet and front doors)	mm	964 x 862 x 363	
Width x height x depth of indoor unit (incl. feet and front doors)	mm	440 x 790 x 340	
Weight of outdoor/indoor unit	kg	66 / 33	
Refrigerant circuit			
Refrigerant type / GWP	-	R410A / 2088	
Charge weight / CO_2 equiv.	kg / t	2.15 / 4.49	
Max. length of refrigerant line	m	25	
Quantity of refrigerant to be added, line length > 12 m - 25 m	g/m	60	
Refrigerant oil / charge weight	- -/ ml	FVC68D FV68S / 650	
Compressor type		Rotating piston	
Maximum operating pressure	bar	43	
Heating output / COP to EN 14511			
A2/W35 rated output	kW / -	3.4 / 3.7	5.0 / 3.5
A7/W35 rated output	kW / -	5.2 / 4.9	7.3 / 4.8
A-7/W35 max. output	kW / -	5.1 / 2.9	6.2 / 2.7
Output range at A2/W35	kW	1.9 - 6.6	1.9 - 8.8
Cooling capacity / EER to EN 14511			
A35/W7 rated output	kW / -	4.5 / 2.5	7.6 / 2.7
A35/W18 rated output	kW / -	6.1 / 3.5	9.0 / 3.8
Compressor output range at A35/W18	kW	1.6 - 6.9	2.9 - 9.6
Sound, outdoor unit			
Sound power level (based on EN 12102/EN ISO 9614-2) for A7/W55 at rated heating output	dB(A)	59	61
Max. sound power level	dB(A)	61	63
Max. sound power level in reduced night mode	dB(A)	56	56
Application limits			
Operating limit temperatures, heating mode	°C	+20 to +55	
Operating limit temperatures, cooling mode	°C	+7 to +20	
Max. heating water temp. with electric heater	°C	75	
Min./max. operating limit temps, air in heating mode	°C	-20 / +35	
Min./max. operating limit temps, air in cooling mode	°C	+10 / +45	
Heating water			
Minimum flow rate	l/min	15	15
Nominal water flow rate	l/min	16	19.7
Maximum water flow rate	l/min	24.7	24.7
Heat pump pressure drop at nominal	mbar	54	78
Residual head at nominal water flow rate	mbar	540	490
Maximum operating pressure	bar	3	
Heat source			
Air flow rate at nominal operating point	m^3/h	2600	
Connections			
HTG flow/return//DHW flow connection	mm	28x1	
Connection, refrigerant lines	UNF	5/8 + 7/8	
Dimensions, refrigerant lines	mm	10x1 + 16x1	
Dimensions, condensate line, outdoor unit	mm	16	
Electrics, outdoor unit			
Power supply / fuse protection, outdoor unit		1~NPE, 230 V AC, 50 Hz / 20 A(C)	
Max. fan power consumption	W	57	
Standby power consumption	W	9	
Output / current / cosφ at A7/W35	kW/A/-	1.3 / 5.8 / 0.97	1.52 / 6.8 / 0.97
Max power consumption / compressor current / cosφ within application limits	kW/A/-	3.6 / 16 / 0.92	
Compressor starting current	A	10	
Compressor starting current with blocked rotor	A	25	
Starting current (charging of DC capacitors)	A	35	
IP rating, outdoor unit		IP 24	
Maximum no. of compressor starts per hour	1/h	6	
Pulse number p		2	
Compressor frequency range	Hz	20 - 70	20 - 90
Electrics, indoor unit			
Power supply / fuse protection, heating element [1)]		Either 3~NPE, 400 V AC, 50 Hz / 16 A(B) or 1~NPE, 230 V AC, 50 Hz / 32 A(B)	
Power supply / fuse protection, control voltage		1~NPE, 230 V AC, 50 Hz / 16 A(B)	
Power consumption, electric heater [1)]	kW	2 / 4 / 6 or 3 / 6 / 9	
Power consumption, pump	W	3 - 45	
Standby power consumption	W	5	
Maximum power consumption, 6 kW electric heater [1)]	A	8.7 (400 V AC) / 26.1 (230 V AC)	
Maximum power consumption, 9 kW electric heater [1)]	A	13 (400 V AC)	
IP rating, indoor unit		IP 20	

[1)] Available as an accessory for the BWL-1SB

TYPE		BWL-1S(B) - 10/400 V	BWL-1S(B) - 14/400 V	BWL-1S(B) - 16/400 V
Width x height x depth of outdoor unit (incl. feet and front doors)	mm	964 x 1261 x 363		
Width x height x depth of indoor unit (incl. feet and front doors)	mm	440 x 790 x 340		
Weight of outdoor/indoor unit	kg	110 / 35	110 / 37	110 / 37
Refrigerant circuit				
Refrigerant type / GWP	-	R410A / 2088		
Charge weight / CO_2 equiv.	kg / t	2.95 / 6.16	2.95 / 6.16	3.5 / 7.31
Max. length of refrigerant line	m	25		
Quantity of refrigerant to be added, line length > 12 m - 25 m	g/m	60		
Refrigerant oil / charge weight	- / ml	POE / 1100		
Compressor type		Twin rotating piston		
Maximum operating pressure	bar	43		
Heating output / COP to EN 14511				
A2/W35 rated output	kW / -	7.6 / 3.8	8.8 / 3.8	10.8 / 3.3
A7/W35 rated output	kW / -	10.2 / 4.8	12.1 / 4.8	17.5 / 4.0
A-7/W35 max. output	kW / -	8.1 / 2.7	8.7 / 2.7	10.9 / 2.4
Output range at A2/W35	kW	2.9 - 10.6	3.1 - 12.4	3.5 - 12.2
Cooling capacity / EER to EN 14511				
A35/W7 rated output	kW / -	8.8 / 2.7	10.7 / 2.5	11.7 / 2.1
A35/W18 rated output	kW / -	8.7 / 4.1	12.0 / 3.4	13.0 / 2.5
Compressor output range at A35/W18	kW	3.1 - 11.0	3.2 - 13.2	4.5 - 14.3
Sound, outdoor unit				
Sound power level (based on EN 12102/EN ISO 9614-2) for A7/W55 at rated heating output	dB(A)	61	63	64
Max. sound power level	dB(A)	64	65	66
Max. sound power level in reduced night mode	dB(A)	57	57	57
Application limits				
Operating limit temperatures, heating mode	°C	+20 to +55		
Operating limit temperatures, cooling mode	°C	+7 to +20		
Max. heating water temp. with electric heater	°C	75		
Min./max. operating limit temps, air in heating mode	°C	-20 / +35		
Min./max. operating limit temps, air in cooling mode	°C	+10 / +45		
Heating water				
Minimum flow rate	l/min	21	25	25
Nominal water flow rate	l/min	28.8	34.1	40.2
Maximum water flow rate	l/min	36	42.7	49.4
Heat pump pressure drop, nominal	mbar	121	141	194
Residual head at nominal water flow rate	mbar	550	460	310
Maximum operating pressure	bar	3		
Heat source				
Air flow rate at nominal operating point	m³/h	3500	4200	4200
Connections				
HTG flow/return//DHW flow connection	mm	28x1		
Connection, refrigerant lines	UNF	5/8 + 7/8		
Dimensions, refrigerant lines	mm	10x1 + 16x1		
Dimensions, condensate line, outdoor unit	mm	16		
Electrics, outdoor unit				
Power supply / fuse protection, outdoor unit		3~NPE, 400 V AC, 50 Hz / 20 A(C)		
Max. fan power consumption	W	70	102	102
Standby power consumption	W	21		
Output / current / cosφ at A7/W35	kW/A/-	2.12 / 3.1 / 0.98	2.52 / 3.7 / 0.98	3.21 / 4.7 / 0.98
Max power consumption / compressor current / cosφ within application limits	kW/A/-	5 / 8 / 0.92	6.3 / 10 / 0.92	6.3 / 10 / 0.92
Compressor starting current	A	10		
Compressor starting current with blocked rotor	A	16		
Starting current (charging of DC capacitors)	A	30		
IP rating, outdoor unit		IP 24		
Maximum no. of compressor starts per hour	1/h	6		
Pulse number p		6		
Compressor frequency range	Hz	20 - 65	20 - 75	20 - 85
Electrics, indoor unit				
Power supply / fuse protection, heating element [1)]		Either 3~NPE, 400 V AC, 50 Hz / 16 A(B) or 1~NPE, 230 V AC, 50 Hz / 32 A(B)		
Power supply / fuse protection, control voltage		1~NPE, 230 V AC, 50 Hz / 16 A(B)		
Power consumption, electric heater [1)]	kW	2 / 4 / 6 or 3 / 6 / 9		
Power consumption, pump	W	3 - 75		
Standby power consumption	W	5		
Maximum power consumption, 6 kW electric heater [1)]	A	8.7 (400 V AC) / 26.1 (230 V AC)		
Maximum power consumption, 9 kW electric heater [1)]	A	13 (400 V AC)		
IP rating, indoor unit		IP 20		

[1)] Available as an accessory for the BWL-1SB (9 kW heating element only as an accessory)

TYPE		BWL-1S(B) - 10/230 V	BWL-1S(B) - 14/230 V
Width x height x depth of outdoor unit (incl. feet and front doors)	mm	964 x 1261 x 363	
Width x height x depth of indoor unit (incl. feet and front doors)	mm	440 x 790 x 340	
Weight of outdoor/indoor unit	kg	110 / 33	110 / 35
Refrigerant circuit			
Refrigerant type / GWP	- /	R410A / 2088	
Charge weight / CO_2 equiv.	kg / t	2.95 / 6.16	
Max. length of refrigerant line	m	25	
Quantity of refrigerant to be added, line length > 12 m - 25 m	g/m	60	
Refrigerant oil / charge weight	- / ml	FV50S / 1700	
Compressor type		Scroll	
Maximum operating pressure	bar	43	
Heating output / COP to EN 14511			
A2/W35 rated output	kW / -	7.7 / 3.5	9.6 / 3.3
A7/W35 rated output	kW / -	11.1 / 4.7	14.1 / 4.3
A-7/W35 max. output	kW / -	7.7 / 2.5	9.5 / 2.5
Output range at A2/W35	kW	3.6 - 9.5	3.6 - 10.9
Cooling capacity / EER to EN 14511			
A35/W7 rated output	kW / -	6.6 / 2.7	8.2 / 2.5
A35/W18 rated output	kW / -	8.5 / 3.4	10.1 / 2.9
Compressor output range at A35/W18	kW	4.9 - 11.2	4.9 - 12.9
Sound, outdoor unit			
Sound power level (based on EN 12102/EN ISO 9614-2) for A7/W55 at rated heating output	dB(A)	63	
Max. sound power level	dB(A)	65	64
Max. sound power level in reduced night mode	dB(A)	58	
Application limits			
Operating limit temperatures, heating mode	°C	+20 to +55	
Operating limit temperatures, cooling mode	°C	+7 to +20	
Maximum heating water temperature with electric heater	°C	75	
Min./max. operating limit temps, air in heating mode	°C	-15 / +35	
Min./max. operating limit temps, air in cooling mode	°C	+10 / +45	
Heating water			
Minimum flow rate	l/min	21	25
Nominal water flow rate	l/min	31.8	40.4
Maximum water flow rate	l/min	39.8	50.6
Heat pump pressure drop at nominal	mbar	126	175
Residual head at nominal water flow rate	mbar	530	340
Maximum operating pressure	bar	3	
Heat source			
Air flow rate at nominal operating point	m^3/h	3800	
Connections			
HTG flow/return//DHW flow connection	mm	28x1	
Connection, refrigerant lines	UNF	5/8 + 7/8	
Dimensions, refrigerant lines	mm	10x1 + 16x1	
Dimensions, condensate line, outdoor unit	mm	16	
Electrics, outdoor unit			
Power supply / fuse protection, outdoor unit		1~NPE, 230 V AC, 50 Hz / 25 A(C)	1~NPE, 230 V AC, 50 Hz / 32 A(C)
Max. fan power consumption	W	102	
Standby power consumption	W	21	
Output / current / cosφ at A7/W35	kW/A/-	2.28 / 10.1 / 0.98	3.27 / 14.5 / 0.98
Max power consumption / compressor current / cosφ within application limits	kW/A/-	5.4 / 24 / 0.92	6.4 / 28 / 0.92
Compressor starting current	A	10	
Compressor starting current with blocked rotor	A	25	32
Starting current (charging of DC capacitors)	A	30	
IP rating, outdoor unit		IP 24	
Maximum no. of compressor starts per hour	1/h	6	
Pulse number p		2	
Compressor frequency range	Hz	20 - 70	
Electrics, indoor unit			
Power supply / fuse protection, heating element [1)]		Either 3~NPE, 400 V AC, 50 Hz / 16 A(B) or 1~NPE, 230 V AC, 50 Hz / 32 A(B)	
Power supply / fuse protection, control voltage		1~NPE, 230 V AC, 50 Hz / 16 A(B)	
Power consumption, electric heater [1)]	kW	2 / 4 / 6 or 3 / 6 / 9	
Power consumption, pump	W	3 - 75	
Standby power consumption	W	5	
Maximum power consumption, electric heater (6 kW) [1)]	A	8.7 (400 V AC) / 26.1 (230 V AC)	
Maximum power consumption, electric heater (9 kW) [1)]	A	13 (400 V AC)	
IP rating, indoor unit		IP 20	

[1)] Available as an accessory for the BWL-1SB (9 kW heating element only as an accessory)

36 Commissioning

To ensure correct operation, we recommend that the system is commissioned by our customer service department.

A commissioning report with checklist is supplied with every appliance and should be worked through before commissioning.

The key criteria are:

- Has the appliance been positioned and installed in line with the installation and operating instructions?
- Have all electrical and hydraulic connections been completed in full and have you checked that the fan in the outdoor unit can run freely?
- Are all slides and shut-off valves in the heating water circuit open?
- Have all circuits been flushed and thoroughly vented?
- Is condensate drainage guaranteed?
- Do the power feeds to the compressor, electric heater and control system have omnipolar fuse protection?
- Before commissioning, it is essential to carry out a function test on the circulation pump.

37 System log book

37.1 Responsibilities of the operator

As part of the Kyoto Protocol, the European Union is committed to reducing the emissions of fluorinated greenhouse gases. To this end, EC Regulation No. 517/2014 of 16/04/2014 has been adopted. The overriding goal of this F-gas Regulation is to reduce emissions of fluorinated greenhouse gases over the entire life cycle of these gases.

In accordance with EC Regulation No. 517/2014, the owner/operator has the following obligations:

37.1.1 Annual tightness test

In accordance with Article 4, systems which contain more than 3 kg of refrigerant and which are not hermetically sealed or, as of 2017, systems with a CO2 equivalent mass of 5 t or more, must undergo an annual tightness test. For systems containing less than 3 kg of refrigerant, but with a CO2 equivalent mass of more than 5 t, a transitional period applies until 31/12/2016. From 01/01/2017, these systems will then be required to undergo an annual tightness test.
WOLF split heat pumps use F-gas R410A, an HFC mixture with a global warming potential (GWP100) of 2088. This means that 1 kg of R410A equates to 2.088 t of CO2.
Which WOLF split heat pumps require a tightness test is detailed in the following table.

	BWL-1S(B)-05/07	BWL-1S(B)-10	BWL-1S(B)-14	BWL-1S(B)-16
Refrigerant charge weight in delivered condition	2.15 kg (4.49 t CO2 equiv)	2.95 kg (6.16 t CO2 equiv)	2.95 kg (6.16 t CO2 equiv)	3.50 kg (7.31 t CO2 equiv)
Refrigerant per m of pipe	60 g R410A/m pipe length corresponds to 125 kg CO_2 equiv. per metre of pipe length			
Tightness test	No (below 5 t CO2 equiv)	Yes (over 5 t CO2 equiv)	Yes (over 5 t CO2 equiv)	Yes (over 5 t CO2 equiv)
	Yes if pipe length has been extended by more than 4 m (total length greater than 16 m).	-	-	-

Conversion to charge weight CO2 equivalent mass:
Refrigerant charge weight x GWP100 = charge weight as CO2 equivalent mass
Example: 2.15 kg R410A * 2088 kg CO2 = 4489 kg CO2 = 4.49 t CO2

The tightness test may only be carried out by certified contractors/refrigeration engineers in accordance with EC 842/2006, 303/2008 and 517/2014.

37.1.2 Compulsory documentation

All work carried out on a heat pump, e.g. maintenance, repair and tightness tests, must be documented and the record of results must be retained for five years.
This obligation applies to the operator and the company carrying out the work.

The following data must be entered:

- Details of all repair and maintenance work
- Type of refrigerant filled into the system (new, re-used or recycled) and the quantity of refrigerant removed from the system
- If an analysis of a re-used refrigerant is available, the results must also be documented in the system report.
- The origin of the re-used refrigerant
- Modifications and replacements of system components
- Results of all regular routine tests
- Prolonged shutdowns

37.1.3 Dismantling of heat pump and disposal of refrigerant

The heat pump must only be dismantled and the refrigerant contained in it must only be disposed of by certified contractors/refrigeration engineers in accordance with EC 842/2006, 303/2008 and 517/2014.

37.1.4 Disposal and recycling

- Always dispose of materials according to environmental, recycling and waste management standards.
- Old appliances, wearing parts, defective components and environmentally hazardous liquids and oils must be disposed of or recycled according to applicable waste disposal regulations without harming the environment.
  They must not be disposed of as household waste.
- Dispose of packaging made of cardboard, recyclable plastics and synthetic filler materials in an environmentally responsible manner through appropriate recycling systems or at a recycling centre.
- Please observe the applicable national and local regulations.

37.2 The following system data must be documented

- System data
- Type and properties of the fill water
- Tightness tests, specific refrigerant loss / leakage rate
- Repair and maintenance reports
- Refrigerant charge weights

System data:

_____
Name of system operator

_____
Postal address

_____
Installation location

_____
Tel. no. of system operator

WOLF heat pump type: _____

Outdoor unit serial number _____

Year of construction _____

Commissioning _____

Refrigerant/charge weight _____

The above data can be found on the type plate of the appliance.

Type and properties of the fill water:

☐ Tap water with hardness:_____ °dH

☐ Heating water to VDI 2035 treated with: _____

_____

☐ Conductivity of the fill water_____ µS/cm

_____ _____
Place, date Company stamp, signature

The following maintenance work and regulatory tightness tests (to para 5, section 3 of the ChemKlimaschutzV (chemicals climate protection ordinance) in conjunction with EC Regulation No. 303/2008 - Category I) have been carried out on the heat pump's refrigerant circuit:

Date	- Results of maintenance - Quantity of refrigerant removed/added (in kg) - Tightness test conducted	Name of specialist company / certified engineer	Signature of expert

38 Maintenance / cleaning

Although heat pumps are considered low-maintenance heating systems, regular periodic maintenance work offers advantages.

- Operational reliability is maintained.
- A consistently high seasonal performance factor is achieved.
- Low fault rate.
- The service life of system components can be prolonged.
- Possible damage or faults are detected early.
- Heating convenience is assured in the long term.
- Legal requirements are met.

38.1 Overview of maintenance work

Cleaning	Completed
Clean the dirt filter in heating circuit	
Clean the heat pump casing and interior	
Clean fins on evaporator of air heat pump	
Clean the condensate pan	
Clean the condensate drain	

Function and visual checks	
Visual check of all refrigerant-carrying components for oil leaks and traces of oil	
Visual check for leaks of all water-carrying parts	
Check settings for heating control unit and switching times	
Check heating circuit pressure and function of heating circuit diaphragm expansion vessel (pre-charge pressure)	
Check of the safety valves	

Checks, display values	
Visual check of electrical connections / plug-in connections / cables for damage	
Check that threaded electrical connections are firmly attached	
Temperature sensors (appliance sensors)	
Read the fault memory	
Refrigerant circuit tightness test if more than 5 t CO2 equiv.	
Entry in the system log book	

38.2 Cleaning the evaporator on the BWL-1S(B)

Please note

In areas with high concentrations of dust or pollen, shorter cleaning intervals may be necessary alongside the mandatory annual inspection and cleaning, in order to ensure that the system operates efficiently. Adjust the cleaning interval to suit the local conditions.

The evaporator must be checked annually for dirt/contamination and cleaned if necessary. Wet cleaning with a commercially available garden hose is recommended. Contaminated fins may reduce the system's transfer performance and consequently its energy efficiency, and in the worst case scenario may result in system failure.
When cleaning, ideally use a wide nozzle with a spray angle of 15° - 20°. To prevent damage to the fins, direct the water spray at the evaporator surface from the front at an angle of 90°. When cleaning, the water pressure should not exceed 2 - 3 bar.

Please note

Never spray the fins from the side, as this may cause them to become deformed or bent. Maintain a distance of approx. 20 cm to 30 cm from the evaporator surface.

38.3 Cleaning the condensate pan / condensate drain

Before the heating season, remove any dirt (leaves, twigs, sludge, etc.) from the condensate drain.

Before opening the appliance, ensure that all power circuits are isolated from the power supply.

When cleaning, avoid using sharp or hard objects in order to prevent damage to the evaporator and condensate pan.
In extreme weather conditions (e.g. drifting snow), ice may occasionally form on the intake and discharge grilles. In this event, remove any ice and snow from the intake and discharge areas to ensure the minimum air flow rate.
Regularly check and clean the condensate pan to ensure correct drainage. Check and clean the condensate drain hose. For correct drainage, ensure that there is a continuous fall.

38.4 Cleaning the casing

The appliance can be cleaned with a damp cloth and commercially available detergents. Never use abrasive cleaners or detergents containing acid or chlorine on the appliance surfaces.

38.5 Cleaning the dirt trap / sludge separator

Install a dirt trap/sludge separator in the heating return. This ensures that neither particles nor dirt can get into the plate heat exchanger (condenser) of the heat pump. Condenser blockages and any resulting high pressure malfunctions are thereby prevented.

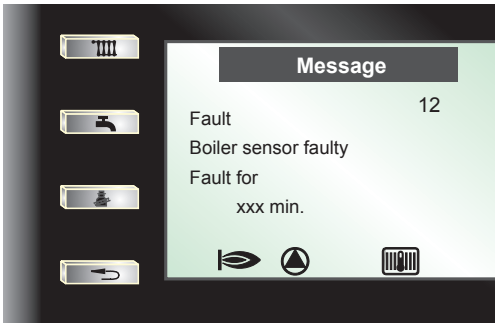
39 Troubleshooting

39.1 General information

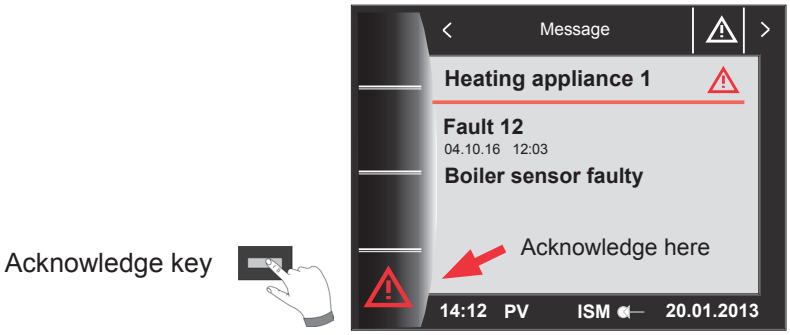
Never remove, bypass or otherwise disable any safety or monitoring equipment. Only operate the heat pump in perfect technical condition. Any faults or damage which impact or might impact upon safety must be remedied immediately by a qualified contractor. Replace faulty components and equipment only with original WOLF spare parts.
Faults are shown in plain text on the display of the control accessory – AM display module or BM-2 programming unit – and correspond to the messages listed in the following tables.
A fault symbol (triangle with exclamation mark) on the display indicates an active fault message. A padlock symbol indicates that the current fault message has caused a lockout of the heat pump. The display also shows how long the message has been active.

Faults must only be rectified by qualified personnel. If a fault message is acknowledged several times without the cause of the problem being repaired, this can lead to component or system damage.
The control unit automatically acknowledges faults such as faulty temperature sensors or other sensors if the part concerned has been replaced and plausible test values have been supplied.

39.2 Fault message on AM



39.3 Fault message on BM-2



39.4 Procedure in the case of faults

- Read fault message
- Determine cause of fault using the table below and remedy it
- Clear fault with "Fault reset" button or in the contractor menu under "Acknowledge fault".
- Check that the system is functioning correctly

39.5 Fault codes

Fault code	Short designation	Possible cause	Remedy
12	Boiler sensor faulty	Flow temperature (T_boiler) outside permissible range (0 … 95 °C)	Check flow temperature (T_boiler)
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor faulty	Check/replace sensor
14	DHW sensor faulty	DHW cylinder temperature outside permissible range (0 … 95 °C)	Check DHW cylinder temperature
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor is not correctly positioned at measuring point	Check position of sensor and if necessary insert sensor correctly
		Sensor faulty	Check/replace sensor
15	Outside sensor faulty	Outside temperature outside permissible range (-39 … 50 °C)	
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor faulty	Check/replace sensor
16	T_return	Return temperature outside permissible range (0 … 95 °C)	Check return temperature
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor faulty	Check/replace sensor
35	BCC missing	Appliance type connector missing	Insert suitable appliance type connector
37	BCC incompatible	Wrong appliance type connector	Insert suitable appliance type connector
52	Max.cylinder heating time	The maximum cylinder heat time is longer than permitted	Cylinder sensor (SF): check position and insert correctly if necessary
			Check parameter WP022 and adjust if necessary
			Descale the cylinder
78	Header sensor faulty	Header temperature outside permissible range (0 … 95 °C)	
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor is not correctly positioned at measuring point	Check position of sensor and if necessary insert sensor correctly
		Sensor faulty	Check/replace sensor
101	Electric heater	Electric heater not connected	Check lead and plug-in connection
			Acknowledge fault if WP090 = OFF
		High limit safety cut-out of the electric heater has tripped:	
		Before commissioning the heat pump	Perform reset of high limit safety cut-out on electric heater
		Scale build-up in electric heater	Have the notes in the installation instructions regarding hot water treatment been observed? Perform reset of high limit safety cut-out on electric heater; after max. 3 resets, replace electric heater.
		Air in the electric heater	Dry fire; replace the electric immersion heater
104	Fan	Fan communication interrupted (ODU)	Contact service engineer
107	HC pressure	Pressure in heating circuit outside permissible range (0.5 ... 3.0 bar)	Check pressure in heating circuit
		Lead to pressure sensor faulty	Check lead and plug-in connection
		Pressure sensor faulty	Replace pressure sensor
109	High pressure	High pressure fault (ODU) (cooling circuit/hot gas side)	Contact service engineer

Fault code	Short designation	Possible cause	Remedy
110	T_intake gas (AWO)	Refrigerant temperature outside permissible range Lead to sensor is faulty Sensor faulty	Check lead and plug-in connection Check refrigerant temperature Check/replace sensor (condenser temperature (IRT))
111	T_hot gas	Hot gas temperature outside the permissible range (ODU, CTT sensor)	Contact service engineer
112	T_supply air	Supply air temperature outside the permissible range (ODU, OAT sensor)	Contact service engineer
118	PCB interrupted	Bus connection interrupted between IDU and ODU	Check bus cable and plug-in connections
		No communication between HCM-3, AWO-/EWO board, ODU	Check AWO/EWO board and HCM-3
		No power supply to ODU	Check ODU power supply
119	Defrost energy	Defrost energy in heating circuit too low during defrosting	Check heating circuit flow rate and electric heater; if necessary briefly reduce the heating circuit volume
124	AWO pressure sensor	Pressure outside permissible range	Check refrigerant temperature (ICT)
		Lead to sensor is faulty	Check lead and plug-in connection
125	Boiler sensor AWO	Flow temperature (AWO T_boiler) outside permissible range	Check flow temperature (AWO T_boiler)
		Lead to sensor is faulty	Check lead and plug-in connection
		Sensor faulty	Check/replace sensor
126	Evaporator temperature sensor	Evaporator temperature outside the permissible range (ODU, OMT sensor)	Contact service engineer
127	Refrigerant inlet temperature sensor	Refrigerant inlet temperature outside the permissible range (ODU, OCT sensor)	Contact service engineer
128	ODU	Fault in ODU or one of its components	Contact service engineer
129	Compressor	Compressor fault (ODU)	Contact service engineer
132	System	System fault in IDU (AWO)	Fault message is only for additional information

40 Technical parameters to EU Regulation No. 813/2013

Type			BWL-1S(B)-05/230 V		BWL-1S(B)-07/230 V		BWL-1S(B)-10/400 V		BWL-1S(B)-14/400 V		BWL-1S(B)-16/400 V	
Air/water heat pump	(Yes/No)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Water/water heat pump	(Yes/No)		No	No	No	No	No	No	No	No	No	No
Brine/water heat pump	(Yes/No)		No	No	No	No	No	No	No	No	No	No
Low temperature heat pump	(Yes/No)		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
With booster heater	(Yes/No)		Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Combi boiler with heat pump	(Yes/No)		No	No	No	No	No	No	No	No	No	No
			Values for **medium temp. (55 °C)/low temp. (35 °C)** application with average climate conditions									
Information	**Symbol**	**Unit**	**55 °C**	**35 °C**	**55 °C**	**35 °C**	**55 °C**	**35 °C**	**55 °C**	**35 °C**	**55 °C**	**35 °C**
Rated heating output (*)	P_{rated}	kW	5	6	6	7	11	10	13	12	15	12
Specified output for partial load at 20 °C room air temperature and outdoor air temperature												
Tj = -7 °C	Pdh	kW	4.7	5.2	6.0	5.9	8.3	8.5	9.2	11.0	10.1	10.7
Tj = +2 °C	Pdh	kW	2.9	3.1	3.5	3.7	5.2	5.5	7.3	6.7	8.3	7.0
Tj = +7 °C	Pdh	kW	2.2	2.3	2.9	2.8	4.5	5.0	4.7	5.1	4.9	5.2
Tj = +12 °C	Pdh	kW	2.6	2.9	3.1	3.4	5.1	5.9	4.9	5.1	6.0	6.2
Tj = dual mode temperature	Pdh	kW	4.7	5.2	4.7	5.9	8.0	9.3	8.9	10.8	10.7	10.6
Tj = operating temperature limit	Pdh	kW	4.6	5.0	5.5	6.6	8.2	9.3	9.4	10.8	10.1	10.6
For air/water heat pump Tj = -15 °C (where TOL < -20 °C)	Pdh	kW	-	-	-	-	-	-	-	-	-	-
Dual mode temperature	T_{biv}	°C	-3	-7	-3	-7	-3	-8	-3	-8	-3	-7
Seasonal central heating efficiency	n_s	%	115	168	133	180	130	195	131	178	125	172
Specified coefficient of performance or primary energy ratio for partial load at 20 °C room temperature and outdoor air temperature												
Tj = -7 °C	COPd	-	2.04	2.91	2.11	2.96	2.05	2.97	2.03	2.86	1.9	2.59
Tj = +2 °C	COPd	-	2.81	4.06	3.41	4.33	3.22	5.00	3.25	4.04	3.14	4.27
Tj = +7 °C	COPd	-	3.60	5.77	4.12	5.95	4.30	6.21	4.77	6.68	4.73	5.91
Tj = +12 °C	COPd	-	5.59	8.06	5.31	7.21	5.30	7.36	5.20	8.58	6.18	7.77
Tj = dual mode temperature	COPd	-	2.04	2.91	2.60	2.96	2.51	3.08	2.51	2.86	2.27	2.59
Tj = operating temperature limit	COPd	-	1.88	2.71	1.85	2.66	1.86	2.81	1.86	2.86	1.79	2.41
For air/water heat pump Tj = -15 °C (where TOL < -20 °C)	COPd	-	-	-	-	-	-	-	-	-	-	-
For air/water heat pump: Operating temperature limit	TOL	°C	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
Heating water operating temperature limit	WTOL	°C	55	55	55	55	55	55	55	55	55	55
Power consumption in operating modes other than the operating condition: OFF state	P_{OFF}	kW	0.006	0.006	0.007	0.007	0.026	0.026	0.026	0.026	0.017	0.017
Power consumption in operating modes other than the operating condition: Thermostat OFF state	P_{TO}	kW	0.012	0.008	0.011	0.011	0.026	0.026	0.026	0.026	0.19	0.019
Power consumption in operating modes other than the operating condition: Standby mode	P_{SB}	kW	0.021	0.021	0.010	0.010	0.026	0.026	0.026	0.026	0.026	0.026
Power consumption in operating modes other than the operating condition: Crankcase heater mode	P_{CK}	kW	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Booster heater rated heating output	P_{sup}	kW	0.7 / 0	0.9 / 0	0.9 / 0.0	0.1 / 0.0	2.6 / 0.0	0.8 / 0.0	3.5 / 0.0	2.8 / 0.0	4.9 / 0	1.3 / 0
Energy supply type	-	-	electrical		electrical		electrical		electrical		electrical	
Output control	fixed/variable		variable		variable		variable		variable		variable	
Indoor sound power level	L_{WA}	dB	27	27	42	42	42	42	44	44	44	44
Outdoor sound power level	L_{WA}	dB	59	59	61	61	61	61	63	63	64	64
For air/water heat pump: Nominal air flow rate, outdoors	-	m3/h	2600	2600	2600	2600	3500	3500	4200	4200	4200	4200
For water/brine-water heat pump: Nominal water or brine flow rate	-	m3/h	-	-	-	-	-	-	-	-	-	-
Contact			WOLF GmbH, Industriestrasse 1, 84048 Mainburg, Germany									

(*) For heating appliances and combi boilers with heat pump, the rated heating output P_{rated} is equal to the design load in heating mode $P_{designh}$ and the rated heating output of a booster heater Psup is equal to the additional heating output sup(Tj).

Technical parameters to EU Regulation No. 813/2013

Type			BWL-1SB-10/230 V		BWL-1SB-14/230 V	
Air/water heat pump	(Yes/No)		Yes	Yes	Yes	Yes
Water/water heat pump	(Yes/No)		No	No	No	No
Brine/water heat pump	(Yes/No)		No	No	No	No
Low temperature heat pump	(Yes/No)		No	Yes	No	Yes
With booster heater	(Yes/No)		Yes/No	Yes/No	Yes/No	Yes/No
Combi boiler with heat pump	(Yes/No)		No	No	No	No
			Values for **medium temperature (55 °C)/ low temperature (35 °C)** application with average climate conditions			
Information	**Symbol**	**Unit**	**55 °C**	**35 °C**	**55 °C**	**35 °C**
Rated heating output (*)	P_{rated}	kW	10	10	11	12
Specified output for partial load at 20 °C room air temperature and outdoor air temperature						
Tj = -7 °C	Pdh	kW	8.0	9.0	7.9	9.8
Tj = +2 °C	Pdh	kW	5.1	5.5	6.8	6.7
Tj = +7 °C	Pdh	kW	4.6	4.8	4.7	4.9
Tj = +12 °C	Pdh	kW	5.6	5.8	5.5	5.2
Tj = dual mode temperature	Pdh	kW	7.8	7.9	8.3	8.9
Tj = operating temperature limit	Pdh	kW	6.8	9.1	6.8	8.7
For air/water heat pump Tj = -15 °C (where TOL < -20 °C)	Pdh	kW	-	-	-	-
Dual mode temperature	T_{biv}	°C	-5	-5	-3	-4
Seasonal central heating efficiency	n_s	%	111	150	111	150
Specified coefficient of performance or primary energy ratio for partial load at 20 °C room temperature and outdoor air temperature						
Tj = -7 °C	COPd	-	1.64	2.52	1.61	2.23
Tj = +2 °C	COPd	-	2.89	3.63	3.01	3.93
Tj = +7 °C	COPd	-	4.10	5.34	4.29	5.51
Tj = +12 °C	COPd	-	5.23	7.32	4.95	5.27
Tj = dual mode temperature	COPd	-	1.85	2.84	2.01	2.82
Tj = operating temperature limit	COPd	-	1.38	2.10	1.38	2.04
For air/water heat pump Tj = -15 °C (where TOL < -20 °C)	COPd	-	-	-	-	-
For air/water heat pump: Operating temperature limit	TOL	°C	-10	-10	-10	-10
Heating water operating temperature limit	WTOL	°C	55	55	55	55
Power consumption in operating modes other than the operating condition: OFF state	P_{OFF}	kW	0.026	0.026	0.026	0.026
Power consumption in operating modes other than the operating condition: Thermostat OFF state	P_{TO}	kW	0.026	0.026	0.026	0.026
Power consumption in operating modes other than the operating condition: Standby mode	P_{SB}	kW	0.026	0.026	0.026	0.026
Power consumption in operating modes other than the operating condition: Crankcase heater mode	P_{CK}	kW	0.000	0.000	0.000	0.000
Booster heater rated heating output	P_{sup}	kW	2.84 / 0.0	0.7 / 0.0	4.61 / 0.0	2.9 / 0.0
Energy supply type	-	-	electrical		electrical	
Output control	fixed/variable		variable		variable	
Indoor sound power level	L_{WA}	dB	42	42	44	44
Outdoor sound power level	L_{WA}	dB	63	63	63	63
For air/water heat pump: Nominal air flow rate, outdoors	-	m3/h	3800	3800	3800	3800
For water/brine-water heat pump: Nominal water or brine flow rate	-	m3/h	-	-	-	-
Contact			WOLF GmbH, Industriestrasse 1, 84048 Mainburg, Germany			

Product fiche according to Regulation (EU) no. 811/2013

Product group: BWL-1S(B) (35°C)

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1S-05/230V	BWL-1S-07/230V	BWL-1S-10/400V	BWL-1S-14/400V
Seasonal space heating energy efficiency class			A++	A++	A++	A++
Rated heat output under average climate conditions	P_{rated}	kW	6	7	10	12
Seasonal space heating energy efficiency under average climate conditions	η_s	%	168	180	195	178
Annual energy consumption under average climate conditions	Q_{HE}		2,847	2,068	2,997	3,969
Sound power level, indoors	L_{WA}	dB	27	42	42	44
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	6	7	11	11
Rated heat output under warmer climate conditions	P_{rated}	kW	6	7	10	12
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	138	139	142	136
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	232	239	252	216
Annual energy consumption under colder climate conditions	Q_{HE}		3,981	4,287	6,120	6,848
Annual energy consumption under warmer climate conditions	Q_{HE}		1,345	1,687	2,119	2,956
Sound power level, outdoors	L_{WA}	dB	59	61	61	63

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Material number: 3021352 08/2017

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1S-16/400V	BWL-1SB-05/230V	BWL-1SB-07/230V	BWL-1SB-10/230V
Seasonal space heating energy efficiency class			A++	A++	A++	A++
Rated heat output under average climate conditions	P_{rated}	kW	12	6	7	10
Seasonal space heating energy efficiency under average climate conditions	η_s	%	172	168	180	150
Annual energy consumption under average climate conditions	Q_{HE}		5,686	2,847	2,068	3,583
Sound power level, indoors	L_{WA}	dB	44	27	42	42
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	12	6	7	
Rated heat output under warmer climate conditions	P_{rated}	kW	15	6	7	10
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	133	138	139	
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	235	232	239	171
Annual energy consumption under colder climate conditions	Q_{HE}		10,803	3,981	4,287	
Annual energy consumption under warmer climate conditions	Q_{HE}		1,896	1,345	1,687	3,061
Sound power level, outdoors	L_{WA}	dB	64	59	61	63

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1SB-10/400V	BWL-1SB-14/230V	BWL-1SB-14/400V	BWL-1SB-16/400V
Seasonal space heating energy efficiency class			A++	A++	A++	A++
Rated heat output under average climate conditions	P_{rated}	kW	10	12	12	12
Seasonal space heating energy efficiency under average climate conditions	η_s	%	195	150	178	172
Annual energy consumption under average climate conditions	Q_{HE}		2,997	4,206	3,969	5,686
Sound power level, indoors	L_{WA}	dB	42	44	44	44
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	11		11	12
Rated heat output under warmer climate conditions	P_{rated}	kW	10	12	12	15
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	142		136	133
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	252	195	216	235
Annual energy consumption under colder climate conditions	Q_{HE}		6,120		6,848	10,803
Annual energy consumption under warmer climate conditions	Q_{HE}		2,119	3,061	2,959	1,896
Sound power level, outdoors	L_{WA}	dB	61	63	63	64

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Material number: 3021352 08/2017

Product fiche according to Regulation (EU) no. 811/2013

Product group: BWL-1S(B) (55°C)

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1S-05/230V	BWL-1S-07/230V	BWL-1S-10/400V	BWL-1S-14/400V
Seasonal space heating energy efficiency class			A+	A++	A++	A++
Rated heat output under average climate conditions	P_{rated}	kW	5	6	11	13
Seasonal space heating energy efficiency under average climate conditions	η_s	%	115	133	130	131
Annual energy consumption under average climate conditions	Q_{HE}		3703	2690	4569	5437
Sound power level, indoors	L_{WA}	dB	27	42	42	44
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	4	7	12	11
Rated heat output under warmer climate conditions	P_{rated}	kW	6	7	9	11
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	81	105	105	112
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	151	143	174	158
Annual energy consumption under colder climate conditions	Q_{HE}		4446	5213	9125	7439
Annual energy consumption under warmer climate conditions	Q_{HE}		1906	2717	2862	3765
Sound power level, outdoors	L_{WA}	dB	59	61	61	63

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Material number: 3020915 08/2017

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1S-16/400V	BWL-1SB-05/230V	BWL-1SB-07/230V	BWL-1SB-10/230V
Seasonal space heating energy efficiency class			A++	A+	A++	A+
Rated heat output under average climate conditions	P_{rated}	kW	15	5	6	10
Seasonal space heating energy efficiency under average climate conditions	η_s	%	125	115	133	111
Annual energy consumption under average climate conditions	Q_{HE}		9210	3703	2690	4711
Sound power level, indoors	L_{WA}	dB	44	27	42	42
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	14	4	7	
Rated heat output under warmer climate conditions	P_{rated}	kW	10	6	7	10
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	104	81	105	
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	153	151	143	135
Annual energy consumption under colder climate conditions	Q_{HE}		9032	4446	5313	
Annual energy consumption under warmer climate conditions	Q_{HE}		3924	1906	2717	3904
Sound power level, outdoors	L_{WA}	dB	64	59	61	63

Supplier's name or trade mark			Wolf GmbH	Wolf GmbH	Wolf GmbH	Wolf GmbH
Name			BWL-1SB-10/400V	BWL-1SB-14/230V	BWL-1SB-14/400V	BWL-1SB-16/400V
Seasonal space heating energy efficiency class			A++	A+	A++	A++
Rated heat output under average climate conditions	P_{rated}	kW	11	11	13	15
Seasonal space heating energy efficiency under average climate conditions	η_s	%	130	111	131	125
Annual energy consumption under average climate conditions	Q_{HE}		4569	5619	5437	9210
Sound power level, indoors	L_{WA}	dB	42	44	44	44
Any specific precautions that shall be taken when the space heater is assembled, installed or maintained			See installation instruction	See installation instruction	See installation instruction	See installation instruction
Rated heat output under colder climate conditions	P_{rated}	kW	12		11	14
Rated heat output under warmer climate conditions	P_{rated}	kW	9	13	11	10
Seasonal space heating energy efficiency under colder climate conditions	η_s	%	105		112	104
Seasonal space heating energy efficiency under warmer climate conditions	η_s	%	174	135	158	153
Annual energy consumption under colder climate conditions	Q_{HE}		9125		7439	9032
Annual energy consumption under warmer climate conditions	Q_{HE}		2862	5083	3765	3924
Sound power level, outdoors	L_{WA}	dB	61	63	63	64

Wolf GmbH, Postfach 1380, D-84048 Mainburg, Tel. +49-8751/74-0, Fax +49-8751/741600, Internet: www.wolf-heiztechnik.de
Material number: 3020915 08/2017

42 Abbreviations / key

0-10 V/On-Off	- Input for external demand
3way DV HTG/Coolg	- 3-way diverter valve for heating/cooling
3way DV HTG/DHW	- 3-way diverter valve for heating/DHW
A1	- Programmable output 1
AF	- Outside temperature sensor
AM	- Display module
AWO	- AWO board (= communication board in indoor module)
BCC	- Appliance type connector (GTS)
BM-2	- Programming unit-2
BVG	- Bioline wood gasification boiler
BWL-1SB	- Bioline split air heat pump, without electric heater
BWL-1S	- Bioline split air heat pump, with electric heater
C1	- Bus connection for outdoor module BWL-1S-07/10/14
C2	- Bus connection for outdoor module BWL-1S-07/10/14
DFL HC	- Heating circuit flow rate
E1 / E2	- Programmable input 1 / input 2
eBUS	- eBUS system
el HTG	- Electric heater
PSU	- Input for blocking by power supply utility (power-OFF)
EWO	- EWO board (= communication board in indoor module)
GTS	- Appliance type connector (parameter plug)
BMS	- Building management system
GND	- Earth (ground)
HCM-3	- PCB in indoor module
HC 1	- Heating circuit 1
HCP	- Heating circuit pump
HS	- Heating season
HTG	- Heating
IDU	- Indoor module / indoor unit
SPF	- Seasonal performance factor
L_0	- 230 V mains supply for outdoor unit
N_0	- 230 V mains supply for outdoor unit
MaxTh	- Maximum thermostat
MC 1	- Mixer circuit 1
MCP	- Mixer circuit pump
MM	- Mixer motor or mixer module
ODU	- Outdoor module / outdoor unit
PV	- Photovoltaic system
PWM	- PWM switching of the ZHP
RTN	- Return
RLF	- Return temperature sensor
RT	- Room thermostat
SAF	- Header return temperature sensor
SF	- Cylinder temperature sensor
SFK	- Collector temperature sensor (solar thermal system)
SFS	- Cylinder temperature sensor (solar thermal system)
SG	- Smart Grid
SKP	- Solar circuit pump
SM1 / SM2	- Solar module 1/solar module 2
DPM	- Dew point monitor
VLF / VF	- Flow temperature sensor
FL	- Flow
VT	- Previous day
DHW	- Domestic hot water
ZHP	- Feed/heating circuit pump (appliance pump)
Zirk	- DHW circulation remote control or DHW circulation pump (Zirkomat)
Zirk100	- DHW circulation pump 100 % (continuous operation)
Zirk20	- DHW circulation pump 20 % (2 mins on, 8 mins off)
Zirk50	- DHW circulation pump 50 % (5 mins on, 5 mins off)
Z1	- 230 V output when ON/OFF switch is in the ON position
Add HG	- Additional heat generator

43 Notes

DECLARATION OF CONFORMITY

(to DIN EN ISO/DIN 17050-1)

Number:	3064298
Issuer:	**WOLF GmbH**
Address:	Industriestrasse 1, 84048 Mainburg, Germany
Product:	**Split air/water heat pump**

BWL-1S -05/230 V
BWL-1SB-05/230 V
BWL-1S -07/230 V
BWL-1SB-07/230 V
BWL-1S -10/400 V
BWL-1SB-10/400 V
BWL-1S -14/400 V
BWL-1SB-14/400 V
BWL-1SB-10/230 V
BWL-1SB-14/230 V
BWL-1S -16/400 V
BWL-1SB-16/400 V

The product described above conforms to the requirements specified in the following documents:

EN 349: 2009 (EN 349: 1993)
EN 378: 2012 (EN 378: 2008)
EN ISO 12100: 2011 (EN ISO 12100: 2010)
EN 12102: 2013 (EN 12102: 2013)
EN 14511: 2013 (EN 14511: 2013)
EN 14825: 2016 (EN 14825: 2016)
EN 60335-1: 2014 (EN 60335-1: 2012 / AC: 2014)
EN 60335-2-40: 2014 (EN 60335-2-40: 2003 + A11: 2004 + A12: 2005 + A1: 2006 + Corr. : 2006 + A2: 2009 + Corr. : 2010 + A13: 2012 + A13: 2012 / AC: 2013)
EN 55014-1: 2012 (EN 55014-1: 2006 + A1: 2009 + A2: 2011)

In accordance with the following Directives:

2014/68/EU Pressure Equipment Directive class I
2006/42/EU Machinery Directive
2014/35/EU Low Voltage Directive
2014/30/EU EMC Directive
2009/125/EG ErP Directive
2011/65/EU RoHS Directive
EU Regulation 517/2014
EU Regulation 811/2013
EU Regulation 813/2013

this product is identified as follows:

CE

Mainburg, 19/06/2017

Gerdewan Jacobs
Technical Director

Jörn Friedrichs
Manager R&D