Installation

SolvisMia 8/10/14

Air/water heating pump with SolvisBen or SolvisMax solar heating systems

- Installation
- Start-up
- Maintenance

Wärme. Leben. Zukunft.

1 Information About These Instructions

This planning document contains basic instructions for the proper installation and operation of the system and system components.
We will give you tips on how to ensure that the system operates in an economical and environmentally friendly manner.
We recommend that you participate in a Solvis training course to ensure safe and proper installation.
As we are interested in improving our technical documentation, we appreciate feedback of any kind.

SOLVIS GmbH
Grotrian-Steinweg-Straße 12, D-38112 Braunschweig
Phone: +49 (0) 531 28904-0, Fax.: +49 (0) 531 28904-100
E-mail: info@solvis.de, Internet: www.solvis.com

A list of our international representatives is provided at www.solvis.com.
Please understand that the telephone numbers are reserved for use by our installers.
Interested system operators should contact their installer.

Symbols used

DANGER
Immediate danger, with serious health consequences and even death.

WARNING
Danger, with potentially serious health consequences.

CAUTION
Possible risk of moderate or light injury.

CAUTION
Risk of damage to unit or system.

Useful information, notes and work tips.

Change of document, referring to another document.

Energy-saving tip with suggestions on how to save energy. This reduces costs and helps protect the environment.

Contents

2 Notes

2.1 Safety notes and specifications

Observe the safety notes

This is primarily for your own safety.

- Make sure that you are familiar with the safety notes before beginning work.
- Observe and adhere to the applicable safety regulations and accident prevention regulations.

DANGER

Combustible refrigerant

Possibility of serious consequences for health due to the risk of fire and explosion.

- Follow the safety regulations on site!

DANGER

What to do if there is a risk of fire

- Immediately switch off the heating emergency switch.
- Shut off the fuel supply.
- Have a suitable fire extinguisher ready.

CAUTION

Observe instructions

Solvis is not liable for any damage resulting from non-observance of these instructions.

- Read the instructions carefully before operating or installing the system.
- Contact our Technical Sales department if you have any questions.

CAUTION

Do not make any unauthorised modifications

Otherwise, there is no guarantee that the system will function correctly.

- You must not make any changes to the components of the unit.
- Only use original spare parts.

Work to be performed by qualified technicians

- Only trained specialist companies may install or maintain the system.
- Only qualified electricians may work on electrical equipment.

Observe the following specifications

- DIN EN 12828 Heating systems in buildings
- DIN EN 1717 Protection of drinking water (d. w.)
- DIN 1988-100 Codes of practice for d. w. installat. (TRWI)
- DIN EN 806 Specifications for installations inside buildings conveying water for human consumption
- VDI 2035 Part 1, Prevention of damage in water heating installations - Scale formation
- VDI 2035 Part 2, Prevention of damage in water heating installations - Water corrosion
- Directives of the German Institute for Structural Engineering
- German Building Regulations (LBO)
- VDE 0100/IEC 60364 Erection of low voltage systems
- Low Voltage Directive 2006/95/EC.
- DIN EN 378 Refrigerating systems and heat pumps – Safety and environmental requirements
- IEC 60335 Part 2-40 (Particular requirements for electrical heat pumps)
- Chemicals Climate Protection Ordinance (ChemKlimaschutzV)

2.2 Output data according to EN 14511

The output data provided in the text, diagrams and technical data sheet was determined according to the measurement conditions of the EN 14511 standard. The output data for air-water inverter heating pumps at source temperatures > –7°C are partial load values, which deviates from this standard. The relevant percentage weighting in the partial load range can be found in EN 14825 and the EHPA seal of approval regulations.

The measurement conditions above generally do not fully correspond to the existing conditions of the system operator:

Deviations may be considerable depending on the measurement method chosen and the measurement conditions defined in the first paragraph of this section.

Other factors influencing the measured values are the measuring equipment, system configuration, system age and volume flows.

A confirmation of the specified output data is only possible if the measurement performed for this purpose is performed according to the measurement conditions defined in the first paragraph of this section.

3 Scope of Delivery

The SolvisMia heating pump is available in the three output variants 8, 10 and 14. All the variants have practically identical external dimensions (see p. 18, fig. 15). The specification for the output class is always based on point A2/W35.

Fig. 1: SolvisMia 8/10/14

The scope of delivery differs based on whether a package or a retrofit (available from around October 2022 onwards) was ordered from the price list. The additional scope of delivery for the heating pump is specified in the respective installation instructions. Additional accessories are added to create an entire system.

All accessories are listed in the ➔ *Solvis price list*.

Heating pump

- SolvisMia heating pump
- Technical documents for the SolvisMia (TU-MIA)
- My Solvis system folder (ORD-MN-ALG)
- 2 x straight connector 28, plastic (VB-28-KU).

Technical documents for the SolvisMia

- SolvisMia installation instructions (MAL-MIA)
- SolvisMia quick guide for electrical installation (MAL-MIA-KA).
- Installer operating instructions (BAL-SBSX-3-I)

My Solvia system documentation (ORD-MN-ALG)

- Operating instructions for SolvisBen / SolvisMax 7 / SolvisMia / SolvisLea with SolvisControl 3 for customers (BAL-SBSX-3-K)
- Heating pump (PTK-ALH-WP) inspection and system booklet
- System log for filling heating water for Solvis systems (BRO-AO-ALH)
- SolvisMia (PTK-MIA-I) start-up report
- Heating pump maintenance report (PTK-WP-W)
- SolvisBen / SolvisMax 7 start-up report (PTK-HEFT-I)
- SolvisBen / SolvisMax 7 maintenance book (PTK-HEFT-W)
- Product data sheets for storage tanks, burners, heating pumps, controls and solar stations.

4 Installation Conditions and Transport

4.1 Transporting to the installation site

Pay attention to the centre of gravity of the unit during transport:

- The centre of gravity is located near the compressor
- Use suitable transportation equipment (for example, a stair climbing truck)
- Protect the unit from strong impacts during transport.
- If the unit has to be tilted during transport, this must be done only briefly via one of the long sides. The compressor (see ➔ *fig. 2***1**) should always be on top.

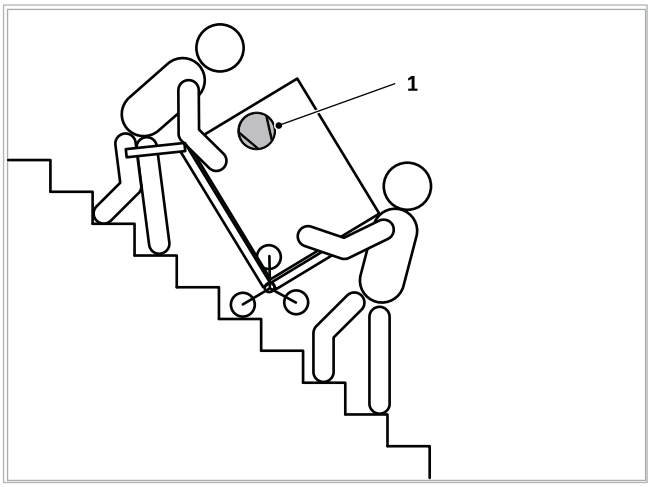


Fig. 2: Carrying the unit on stairs with the stair climbing truck

- The longer the unit is tilted, the more the refrigerant oil is distributed in the system.
- Wait approximately 30 minutes before operating the unit after tilting.

4.2 Noise insulation

When installing the unit, make sure that the unit is louder on the air intake and air discharge side than on the two closed sides.

Noise reduction measures

Please observe the following instructions when selecting the installation site.

For more information about the sound power level, see ➔ *"Technical Data" section, page 18*.

- Do not install the heating pump next to living rooms or bedrooms.
- Pipe lead-throughs in walls and ceilings must be insulated against structure-borne noise.
- Do not connect heating pumps using rigid pipes. If necessary, use flexible hoses for decoupling.
- Avoid installation on surrounding, sound-reflecting floor surfaces. Use floor insulation panels if necessary.
- Avoid blowing air directly towards neighbours or against walls; acoustic reflection may occur on walls.
- Reduce the noise level via acoustic measures such as lawn and planter areas, solid walls, fences, palisades, and so on.
- Avoid positioning between two closed walls and in corners and angles since these can mirror the source of noise.
- Use silent mode, especially at night.

More information about noise can be found in the ➔ *Planning document (PUL-MIA)*.

4.3 General installation

Store and install the units only in rooms with a surface area larger than 4 m². If this rule is not followed, the room may be filled with a combustible mixture in the event of a leakage.

Ensure that the installation location is suitable for operating the unit safely.

Maintain the following conditions

- The heating pump must be positioned horizontally.
- You must ensure that the unit is accessible for maintenance purposes.
- Keep the pipe length between the heating pump and the building as short as possible to minimise heat and pressure losses.
- Install hydraulic connection pipes thermally insulated in a protective conduit at a frost-resistant depth.
- Use flexible hoses for the hydraulic connection.
- Do not install the unit in, above or directly next to a shaft.
- If the heating pump is not installed near a wall and the main direction of the wind is on the supply side, a wind guard may need to be installed in front of the heating pump.
- Check if a building notice or building permit is necessary.
- Ensure that the antifreeze for the carrier pipes to the heating pump complies with applicable regulations.
- During winter, the unit must not be covered with snow or stand in water during heavy rainfall.
- The lower edge of the heating pump housing must be at least 10 cm above the max. snow depth.
- Take measures to reduce noise level.
- Structural changes and any subsequent enclosure of the heating pump are not permitted.
- Do not install the heating pump in structures that are closed on three sides. See ➔ *fig. 3*
- If the unit is installed in an open area, the air intake on the intake side must be protected. In this case, install a protective wall against the wind.

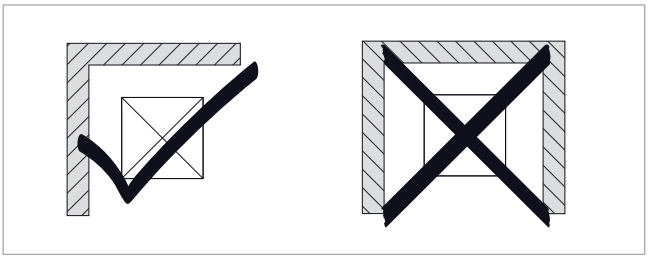


Fig. 3: Installation conditions near walls

The following also applies for installation on a flat roof:

- Due to the higher position of the unit when installed on flat roofs and the sound-reflecting roof surfaces, the operating noise produced may be louder than an installation close to the ground. Furthermore, the additional sound reflections from building surfaces must be taken into account in the calculation based on the planning document or using a sound calculator. Ensure sufficient distance from neighbouring buildings. Provide measures for noise reduction where necessary.
- Check that the height of the heating pump does not exceed the permissible building height according to the building development plan.
- Roofs must be sufficiently strong for the installation (e.g. reinforced concrete slabs). Roofs with a low weight per unit area (e.g. roofs made of wooden rafters or trapezoidal sheet metal) are not suitable.
- Access for service and maintenance must be available throughout the entire year. Sufficient maintenance areas must be provided. Suitable safety equipment (e.g. roof anchors) must be installed.
- There may be significant wind loads in the case of flat roof-mounted installation. The support structure must be designed by a planner in accordance with DIN 1991-1-4.
- The increased roof load and wind load must be taken into account during the structural analysis and while mounting the external unit.
- Installation on the roof is permitted only when a condensate drain is connected; otherwise, ice may form if the condensate is discharged freely. This could prevent the condensate from draining further and/or increase the roof loads.
- In addition, electrical heat tracing must be used for the condensate drain.

WARNING

Note for flat-roof installations

Risk of increased noise emissions and/or severe consequences to health in the event of incorrect structural analysis

- An assessment by a planner is required for the structural engineering (roof/wind load) and noise concepts.

Heat supply line

A prefabricated and insulated pipe system can be used for the connection between the heating pump and heating system. The heat supply line is connected to the flow and return of the heating pump via connector pieces (please order accessories separately).

The carrier line available from Solvis requires a bending radius of at least 250 mm (external diameter of the cable 68 mm) or 300 mm (external diameter of the cable 140 mm). If possible, it should only be routed in a frost-free area in the base and should only be used for short distances.

4.4 Installing SolvisMia

Clearances

Minimum spacing to walls must be maintained to minimise noise pollution and for maintenance purposes (see ➔ *Fig. 4*).

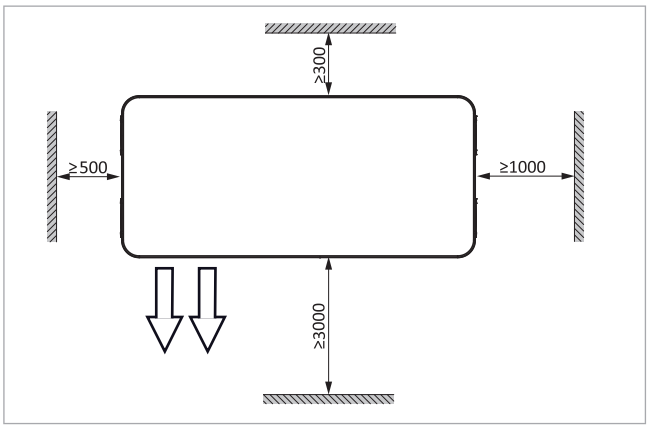


Fig. 4: Clearance to wall, SolvisMia

Base

The base on which the heating pump is installed should be horizontal, level, firm and durable. The frame of the heating pump should rest evenly. An uneven base can have an adverse effect on the noise behaviour of the heating pump. The heating pump must be accessible from all sides.

Recommended base: cast base, kerbstones or stone slabs. A recess (free space) must be provided in the base for the water and electrical installation pipes to be routed to the heating pump from below.

If the heating pump is not installed at ground level, a condensate drain-line heater must be installed.

Bolting to the base

The heating pump must be screwed to the base to secure it.

Attach the two supplied brackets on both sides so that they can be hooked into the slotted holes on the unit. Attach the unit to the base using the brackets and suitable dowels and screws. Do **not** use the screws that were used to secure the unit to the transport pallet.

Strip foundation

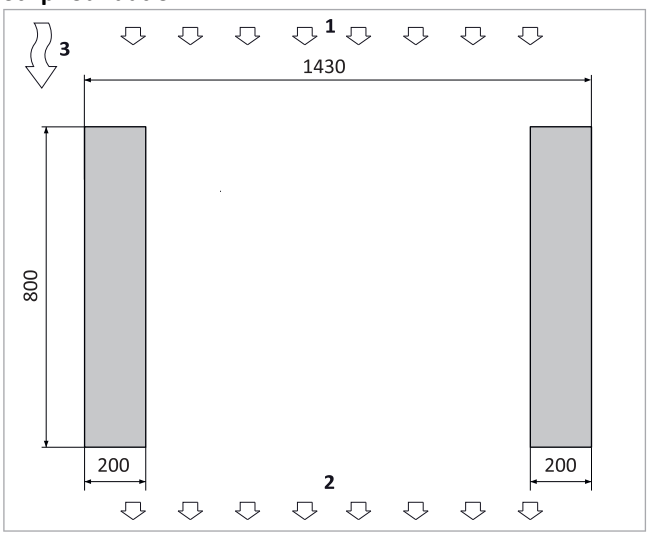


Fig. 5: Strip foundation for SolvisMia (view from above)

1 *Air intake side* 2 *Air discharge side* 3 *Prevailing wind direction*

The strip foundation must be provided with a condensate drainage pipe. The space between the two foundation strips must be filled with gravel or crushed rock up to the upper edge of the strip foundation. To secure the unit against tipping over or moving, the heating pump must be bolted to the foundation using the retaining brackets. Alternatively, the condensate can be discharged directly (into a rainwater pipe, for example). A siphon is recommended.

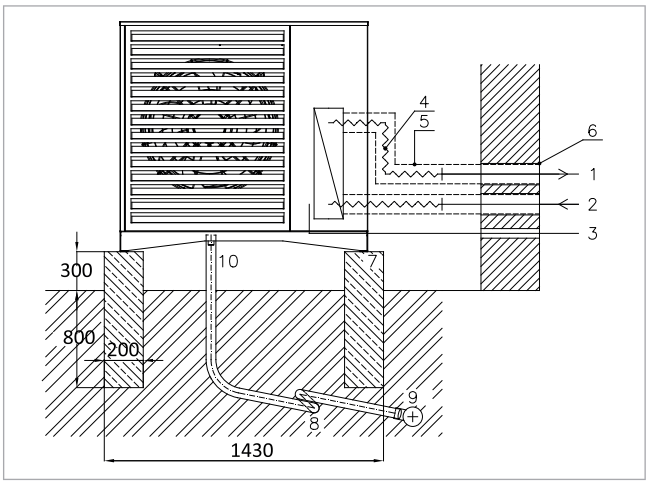


Fig. 6: SolvisMia mounted on strip foundation

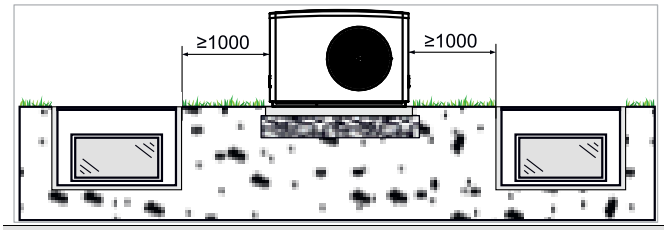
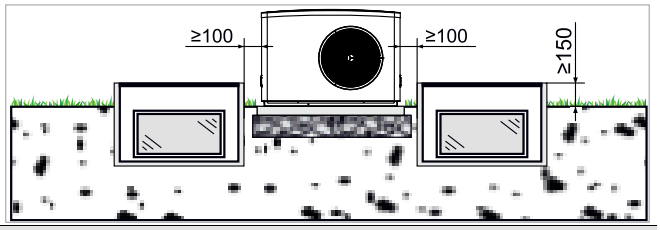
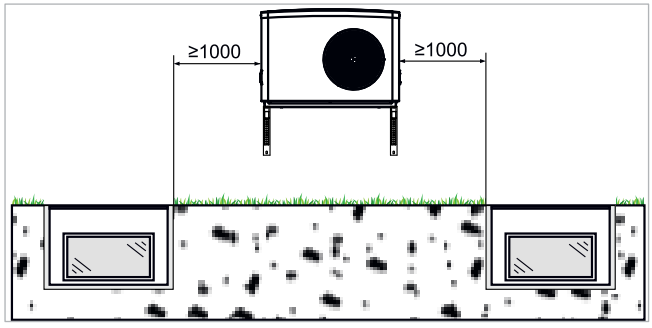
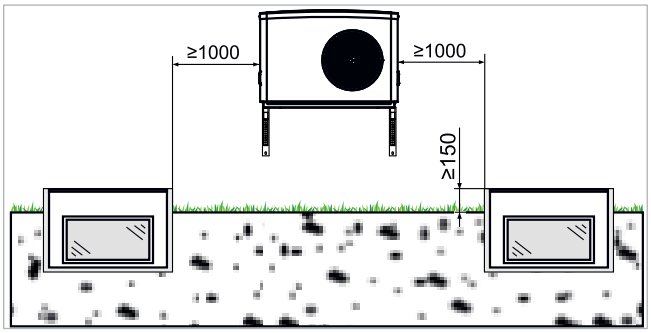
1	*Heat pump flow*	6	*House infeed*
2	*Heat pump return flow*	7	*Foundation (curb)*
3	*Electrical lines*	8	*Siphon (required for wastewater connection)*
4	*Flexible piping*	9	*Wastewater/rain drain pipe*
5	*Insulation, UV-stable*	10	*Pipe with condensate heating (10 W/m)*

This sketch serves as guidance only and does not claim to be complete. It does not replace detailed and specific planning.

- To ensure the installation type is performed correctly, follow all the applicable standards, guidelines and technical rules at all times.

Safety clearances to light shafts

To ensure that the safety concept for the unit is complied with, the following minimum distances from light shafts apply:

Installation on foundation, light shaft at ground level	**Installation on foundation, light shaft above ground level**
	
Installation on console, light shaft at ground level	**Installation on console, light shaft above ground level**
	

Note: The clearances shown apply to both the SolvisMia and the SolvisLea shown in the illustrations.

5 Installation

5.1 Flow and return connection

CAUTION

Foreign bodies, e. g. rust, sand or sealing material, can impair the operational safety of the heating pump.

- Thoroughly flush the pipe system before connecting the heating pump to supply lines.
- To protect against contamination, install a sludge separator on the return flow of the heating pump.

CAUTION

Observe the quality of the fill water

There may be damage due to limescale formation/corrosion in the heating system.

- The fill water for the heating system must meet the requirements of VDI 2035, parts 1 and 2.

CAUTION

When installing the system:

Failure to observe the following could lead to faults or even damage to the system.

- Ensure leak tightness when connecting the heating pump.
- Ensure that the heating flow and return flow are properly connected.
- Perform thermal insulation according to applicable regulations.
- Observe the internal pressure difference when designing the heating circuit. See ➔ *"Technical Data" section, page 18*.

5.2 Screws

CAUTION

Observe the tightening torque

The stainless steel screws used on the housing may be prone to cold welding if they are tightened to high torques or are not lubricated.

- Only tighten screws with a slow-turning cordless screwdriver or by hand.
- Only apply low torques
- Apply lubricating paste (e.g. graphite paste) to the screws.

5.3 Plug connection

CAUTION

Potential damage to the plug connection

- Tighten the screw cap of the plug connections by hand.
- Do not use tools.

Prevent removal of plug connections.

To ensure that the plug connections are held securely, tubes with a surface hardness > 225 HV (e.g. stainless steel) must have a slot.

1. Use a pipe cutter to cut a slot approx. 0.1 mm deep at a defined distance from the end of the pipe.

- Pipe diameter 22 mm: 17 +-0.5 mm
- Pipe diameter 28 mm: 27.5 +-0.5 mm

Functional principal of plug connections

The plug connections are equipped with a retaining element with stainless steel teeth and an O-ring for sealing. In addition, the plug connections have a "turn and lock" function.

By simply turning the screw cap by hand, the pipe is fixed in the connector and the O-ring is pressed onto the pipe for sealing.

Making a plug connection

CAUTION

Pipe ends must be free of burrs.

Otherwise, injuries or damage to the plug connections are possible.

- Only use a pipe cutter to shorten the pipes.

The connector must be in the unlocked position before insertion. In this position there is a narrow gap between the screw cap and the base body.

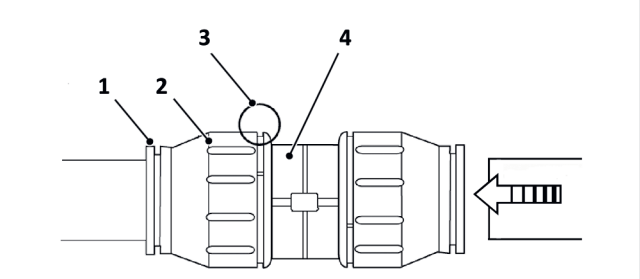


Fig. 7: Plug connection unlocked

1 *Retaining element*
2 *Screw cap*
3 *Gap between screw cap and base body*
4 *Base body*

Making a plug connection

1. Guide the pipe past the O-ring into the plug connection until the specified insertion depth is reached.
2. Tighten the screw cap hand-tight to the stop on the base body.

This will secure the plug connection.

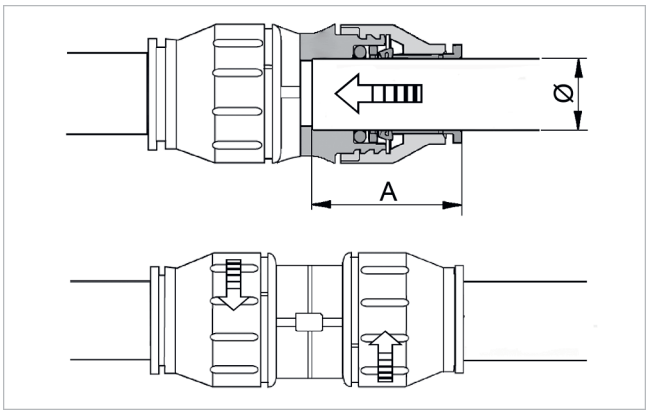


Fig. 8: Insert and lock the pipe.

A *Insertion depth 44 mm (only for pipe Ø 28 mm); 33 mm for pipe Ø 22 mm*
Ø *Pipe diameter*

Releasing plug connections

Releasing the plug connection

If it is necessary to release the plug connections at a later point in time, proceed as follows:

1. Loosen the screw cap anti-clockwise until there is a narrow gap of approx. 2 mm.
2. Press back the retaining element with your fingers and hold it firmly.
3. Pull out the inserted pipe.

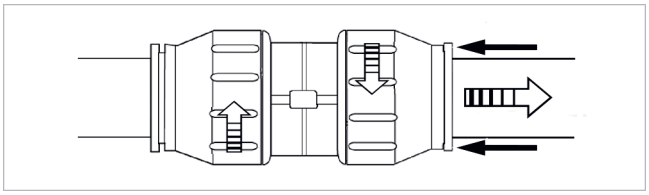


Fig. 9: Releasing the plug connection

5.4 Hydraulic connection SolvisMia and SolvisBen / SolvisMax

Continue installation, see ➔ *the installation instructions for the storage tank (MAL-MAX-7, MAL-BEN or MAL-BEN-LI-SL-WP) and the system diagram (ALS-MAX-7 or ALS-BEN).*

In order to simplify bleeding of the heating pump, BFD valves, shut-off valves and a safety group must be installed in accordance with the system diagram of the installation instructions mentioned above. Air can be safely removed from the pipe lines through the BFD valves with the aid of a flushing station. Likewise, an air separator can be used to permanently remove air.

5.5 Installing the SolvisMia

Installing the unit

1. Set the unit on the prepared base.

Connecting the supply lines of the heating pump

The flow and return are connected to the supply lines coming from the storage tank. We recommend that you use the protective cover set AD-MIA that is available as an accessory in combination with the hydraulic connections (ASS-ETL-WP-OH) .

1. Press the hydraulic connections into the plug connection and secure them.
2. Alternatively: Release the push fitting and install the press fitting (28 mm to 1", for example). Releasable connections must always be provided.

The connections on the heating pump are now prepared.

3. If necessary, mount a 1" connector piece to the supply lines.
4. Route the supply lines to the unit from below or from the side.
5. Connect the supply lines with flow and return flow to each other. Ensure leak tightness.
6. Insulate the lines, including the plug connections.

Ensuring condensate drainage

If the unit is placed on a base, the condensate drips freely into the condensate drainage pipe. Otherwise, proceed as follows:

1. Ensure that the condensate line is not bent.
2. Protect the condensate hose from frost by providing adequate thermal insulation. Provide trace heating where necessary.
3. After installing the condensate hose, check whether the condensate can drain off properly.

Bleeding the unit

The hydraulic system of the loading circuit should preferably be bled using the Solvis flushing station (FUES-SBS). In the pipe line system, areas in which air may accumulate must be provided with bleeders.

1. Bleed gases from the pipe line system by opening the bleeders.

5.6 Electrical connection

5.6.1 General information

DANGER

Hazard due to electric shock

This can result in injury or even cardiac arrest.

- Disconnect the system from the mains before carrying out work on it and ensure that it cannot be turned on again.
- When working on or near the inverter, wait 5 minutes after switching it off until the capacitors have discharged.

CAUTION

Country-specific regulations

Regulations can differ depending on the country and the region.

- These are to be observed and adhered to in order to ensure safe and faultless operation.
- If certain laws and regulations do not apply in a particular country, they are to be replaced by the country's own specific laws and regulations.

WARNING

In the event of incorrect mains connection

Contact voltages can be extremely hazardous.

- All mains connection work must be performed by authorised technicians.
- Work must be performed in compliance with relevant regulations, especially DIN VDE 0100/IEC 60364 (Erection of low voltage installations), accident prevention regulations and the guidelines of the responsible power supply company.
- Before connection, the current type and the mains voltage must be compared with the specifications on the unit nameplate.
- The minimum cross section of all connection pipes must be designed in accordance with the power consumption of the unit.
- Only operate the unit while observing the prescribed safety measures and information in these instructions.
- Incorporate the unit into the local equipotential bonding while observing the minimum cross section.
- Ensure that the phase is correct during multiphase mains connection.
- FI circuit breakers for the heating pump must be AC/DC-sensitive (type B); type A FI circuit breakers might not trip correctly in some cases.

CAUTION

Prevent the system from being influenced by electromagnetic fields.

Risk of heating system malfunction or failure.

- Prevent electrostatic discharges.
- Keep strong electrical fields such as those created by mobile phones away from the heating system. These fields can cause sensitive electronic components to malfunction.

CAUTION

Criteria for line installation

Malfunction or failure of heating system possible.

- Check that all cable and plug connections are connected correctly.
- The bus and sensor lines must be routed separately from lines over 50 V to prevent the controller from being influenced by electromagnetic fields.
- Do not install control devices directly adjacent to control cabinets or electrical devices.
- The electrical lines must not come into contact with hot parts.
- If possible, run all lines in a cable channel and, if necessary, secure with strain relief devices.

CAUTION

Criteria for line length

Risk of heating system fault or failure.

- The total cable resistance for the sensor cables must not exceed 2.5 ohms. For cables with a cross section of 0.25 mm², this corresponds to a length of up to 5 m.
- For cross sections of 0.5 or 0.75 mm², the maximum cable length is 15 or 50 m.
- Sensor cables for temperature sensors should not be unnecessarily long. For very long cables, sensor correction can be performed to minimise the systematic variance errors.
- The sensor cable for volume flow encoders should not be longer than 10 m.

CAUTION

Observe ambient conditions

Malfunction or failure of system possible.

- Avoid ambient temperatures outside of the permitted range of 5°C to +50°C.
- Avoid dew condensation and an annual mean relative humidity higher than 75% (briefly 95%).

5.6.2 SolvisMia connection

Making the connection area accessible

1. Unscrew the screws on the sides of the cover (**1**) and remove the cover.
2. Screw the cable guide elbows onto the housing opening (**2**) and guide the cables through.

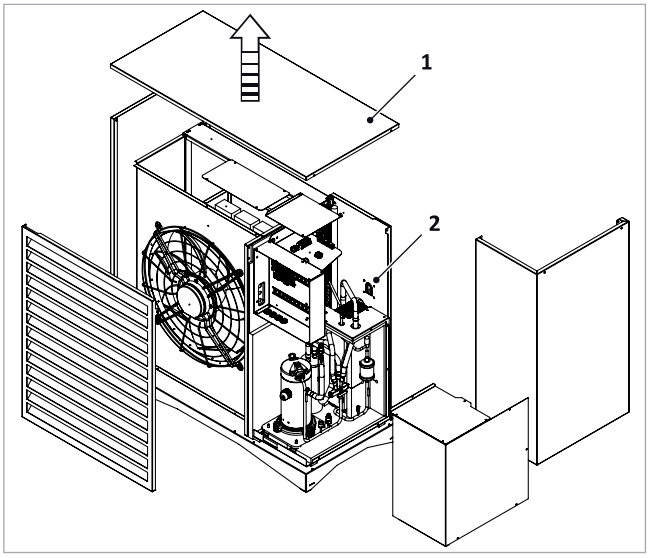


Fig. 10: Remove the cover and screw on the cable guide elbow

3. Route the electrical lines through the strain relief device (**1**) into the connection area.

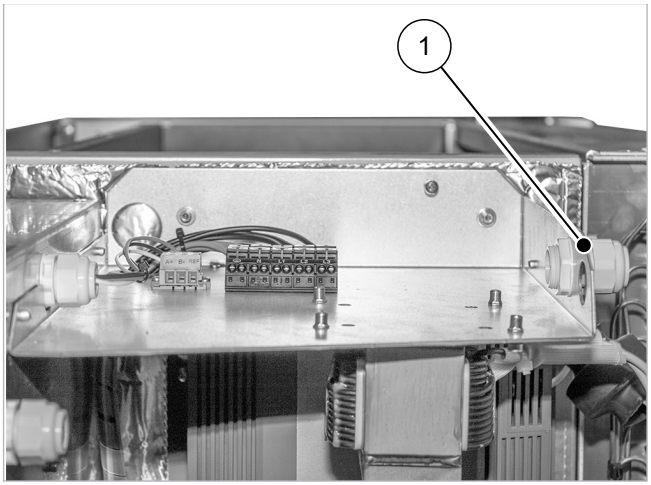


Fig. 11: Guiding the cables through

1 Strain relief device

Connecting the SolvisMia

1. Route the electrical connection pipes and signal cables either as underground cables or through separate conduits from the building to the heating pump.
2. Connect electrical cables according to the following figure.

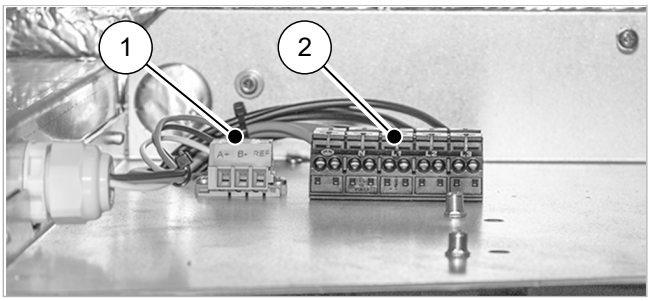


Fig. 12: SolvisMia connection area

1 Low voltage safety (BUS)
- BUS A, BUS B and earth BUS (REF)

2 Compressor (inverter)
- L1, L2, L3, N and PE

3. Check the function of the strain relief device.

Always connect the emergency/auxiliary heating (in monoenergetic systems, this is installed on the storage tank) to ensure the trouble-free operation of the heating pump (antifreeze). For more information about switching off the auxiliary heating via the controller, see ➔ *operating instructions (BAL-SBSX-3-K)*.

Mounting and wiring the connection box

1. Connect the BUS line to the connection box at the storage tank:
   - Brown = GND (REF)
   - White = A
   - Green = B

The BUS line must be shielded on one side. The shielding is already connected to the storage tank.

When PLAS-WP-WM is installed:
- The Modbus connection box is located inside the PLAS-WP-WM housing.

→ See the assembly instructions for the relevant buffer charging station (MAL-PLAS-HP-WM)

Trace heating

The trace heating must be connected to a separate power supply on the subdistributor.

6 Start-Up

6.1 Prerequisites

CAUTION

Note the following before switching on:

- Disconnect the power supply for the heating pump and heating element on the fuse box before switching on the SolvisControl. This prevents damage to the compressor and heating element.
- Start up the heating pump aggregate 2 hours after installation and connection at the earliestto allow the refrigerant to settle.

Checking the start-up conditions

1. Check the correct voltage connection on the terminal box (fuses for the heating pump aggregate and, if necessary, electric emergency/auxiliary heating OFF).
2. Manually bleed the unit during and after filling.

For further information on bleeding, see the ➔ *installation instructions (MAL-MAX-7, MAL-BEN or MAL-BEN-LI-SL-WP)*.

3. Check whether the heating system has been filled with the correct pressure.
4. Check that the buffer charging station is correctly connected.
5. Check the safety temperature limiter of the emergency/auxiliary heating.

6.2 Start-up Heating pump aggregate

Switching on the heating system

1. The heating pump is started up according to the start-up report PTK-MIA-I.

The current sensor values are indicated on the SolvisControl in the "**System status**" window.

The systems folder includes a start-up report that must be filled out completely when starting up the system and kept together with the system.

7 Maintenance

7.1 General maintenance

Care instructions

In between annual maintenance work, we recommend that you check the general condition of the system on a regular basis. This helps to conserve the value of the system and ensure continuity of supply.

Dampen and wipe off visible surfaces with water and a neutral conventional household cleaner. Regular cleaning prevents dirt from setting and becoming difficult to remove.

You should clean the operator interface now and then with a damp cloth (do not use any cleaning agents).

For a description of maintenance, see the ➔ *"Maintenance" section in the installation instructions (MAL-MAX-7, MAL-BEN or MAL-BEN-LI-SL).*

7.2 Heating pump maintenance

DANGER

Hazard due to electrical shock

This can result in injury or even cardiac arrest.

- Disconnect the unit before starting any maintenance and cleaning work from all poles of the power supply.
- After the unit has been disconnected from the power supply , voltage may still be present on the unit for a period of 2 minutes since the capacitors on the inverter still need to discharge.

CAUTION

Risk of injury due to rotation of the fan

- Disconnect the unit from the power supply before removing the casing on the fan side.

CAUTION

Note the following before servicing the heating pump:

- Maintenance of the heating pump aggregate requires that the air intake has no faults.
- Relevant accident prevention and safety regulations must be observed.
- Maintenance work or measurements on the cold circuit of the heating pump aggregate may only be carried out by authorised refrigeration specialists.
- Operate the heating pump aggregate with R454B refrigerant only.
- Some work is only possible when the heating pump aggregate is running.

The cooling circuits of the SolvisMia heating pumps do not require maintenance.

The EU Regulation Concerning Fluorinated Greenhouse Gases requires an annual leakage check for a cooling circuit that is hermetically sealed and a CO_2 equivalent of ten tonnes or more. This is not required for the models of the SolvisMia heating pump.

However, some inspection and cleaning work on the heating pump aggregate is required annually.

Checking the heating pump

Regularly perform the following inspection and cleaning work:

1. Remove the rear heating pump grid by lifting it.
2. Clear the ventilation grid and evaporator fins of leaves and other impurities.
3. Check the function of the condensate drain and remove any dirt. To do so, pour water on the fins on the rear side (using a watering can, for example). Check that the water drains from the machine.
4. Bent evaporator fins can be straightened again with a special tool (contents of the heating pump tightness service box).
5. Flush the plate heat exchanger of the heating pump via the charging circuit.
6. Deposits must be cleaned from the cooling fins on the inverter heat exchanger using a brush or compressed air. The cooling fins are located under the housing cover above the fan.

CAUTION

Do not use a high-pressure cleaner!

To avoid damage, the unit must not be cleaned with a high-pressure cleaner.

For more information on remedying problems, see ➔ *"Troubleshooting" section, page. 15*

Switching on the heating pump aggregate

The heating pump can be switched on via the SolvisControl for maintenance purposes.

See the ➔ *"Switching on the heat generator for maintenance" section in the operating instructions (BAL-SBSX-3-I).*

Performing maintenance

1. Perform maintenance and complete the maintenance report accordingly.

See ➔ *Heating pump (PTK-ALH-WP) inspection and system booklet and maintenance report (PTK-WP-W).*

8 Troubleshooting

DANGER

Hazard due to electrical shock

This can result in injury or even cardiac arrest.

- Disconnect the unit before starting any maintenance and cleaning work from all poles of the power supply.
- After the unit has been disconnected from the power supply , voltage may still be present on the unit for a period of 2 minutes since the capacitors on the inverter still need to discharge.

CAUTION

Risk of injury due to rotation of the fan

- Disconnect the unit from the power supply before removing the casing on the fan side.

Reset button

If the heating pump was blocked due to a malfunction, it must be reset. This reset is triggered via the SolvisControl. See the operating instructions (BAL-SBSX-3-I).

Malfunctions on the heating pump aggregate

System/malfunction message	Possible cause	Note/remedy
No communication	Modbus connection is interrupted, the heating pump fuse is deactivated or there is a phase loss (L1)	Check the Modbus connection, check the heating pump fuse and check the sliding switch position on the SEC
High pressure sensor: maximum high pressure exceeded	Load pump volume flow is too low	Check whether the load pump is switched on (A2) and the PWM output (O-4) is set to "**Auto**"; check the temperature setpoints
Sensor error: e.g. temperature sensor	Connection between SEC and sensor is defective	Check the line for the relevant sensor; replace the sensor if necessary
Inverter error: Phase loss at the input	Phase loss	Check the fuse, check the voltage on the connection to the building, via the utility supply company if necessary, and check the wiring to the inverter in the heating pump
Compressor unit configuration error	Incorrect compressor unit or no compressor unit specified in the SEC	Go to "**Factory service**" => "**Heat generator**" to set the correct type
No reaction from heating pump after switching on, but values visible in system status	Blocking time of the energy supplier active	Check under "**Others**" => "**System diagram**" and wait until the blocking time has elapsed if necessary.
Loud hissing at the expansion valve	Lack of refrigerant in cold circuit	Please contact Solvis customer service.
	No supercooling of the refrigerant	
	Defective expansion valve	
Iced pressure compensation or iced expansion valve	Lack of refrigerant in cold circuit	
	Air supply impaired	Check the grid and/or evaporator fins and clean if necessary.
Frequent and long defrosting	Wind cools down the evaporator too much during the defrosting phase	Protect the intake side of the heating pump from strong wind via a protective wall when installed in the open.

8.1 Setting the switches

CAUTION

Ensure that there is no voltage.

An improper setting may result in damage to the electronics.

- Change the sliding switch only if the heating pump is disconnected from the power supply.

Checking the sliding switch

The sliding switch is located on the SEC.

1. Ensure that the sliding switch is set correctly.

Fig. 13: sliding switch

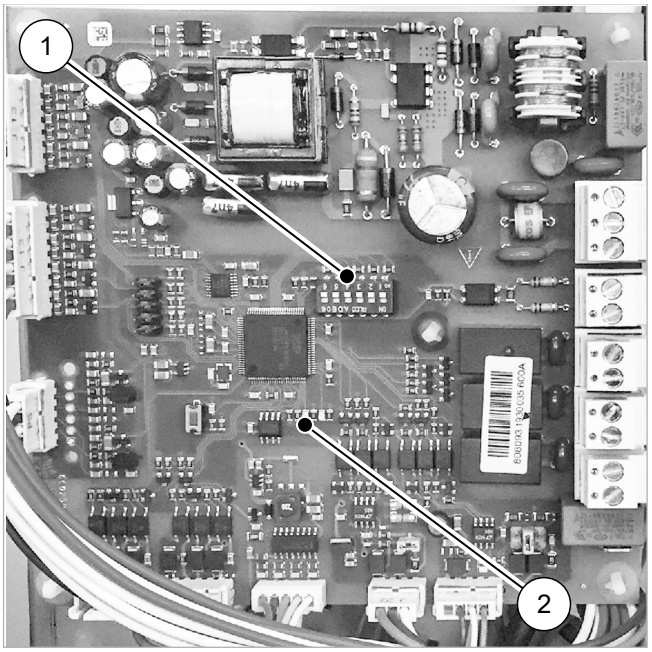


Fig. 14: SolvisMia SEC

1 sliding switch
2 LED strip

Enable access to SEC

1. Loosen the 4 screws and remove the cover.
2. Unscrew the 2 screws on the side part (on the right).
3. Raise the side part slightly and remove it.

8.2 LED strip signals

LED strip (IWS) signals

LED	Display	Meaning	Remedy
Orange LED	Flashes (twice per second)	Communication with the inverter is established	No action necessary
	Remains off	Communication with the inverter is interrupted	Refer to the error message on the SolvisControl display. For information about troubleshooting, see the → *chapter "Troubleshooting" in the BAL-SBSX-3-I operating instructions.*
Yellow LED	Flashes (twice per second)	Communication with the SC-3 is established	No action necessary
	Remains off	Communication with the SC-3 is interrupted	Refer to the error message on the SolvisControl display. For information about troubleshooting, see the → *chapter "Troubleshooting" in the BAL-SBSX-3-I operating instructions.*

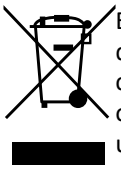
9 Decommissioning

Disposal of materials

Properly and professionally dispose of this unit according to locally applicable regulation and laws.

Information about ElektroG

As per the regulations of the Electrical and Electronic Equipment Act (ElektroG), we are obliged to take back electrical and electronic equipment supplied by us and to reuse or dispose of it. We must also provide the following information:



Electrical and electronic equipment must not be disposed of with household waste! This is indicated by a waste bin symbol that is crossed out on a black bar. If the device can no longer be used, every end user is obliged to dispose of old devices separately from domestic waste, e.g. at a collection point in his or her local municipality/district. This ensures that the old equipment is recycled professionally and that negative effects on the environment are avoided.

In order to fulfil our disposal and reuse obligations, we belong to a comprehensive disposal system. Our registration number with the National Register for Waste Electric Equipment (“Stiftung Elektro-Altgeräte-Register”) is: WEEE reg. no.: DE 63776771.

10 Technical Data

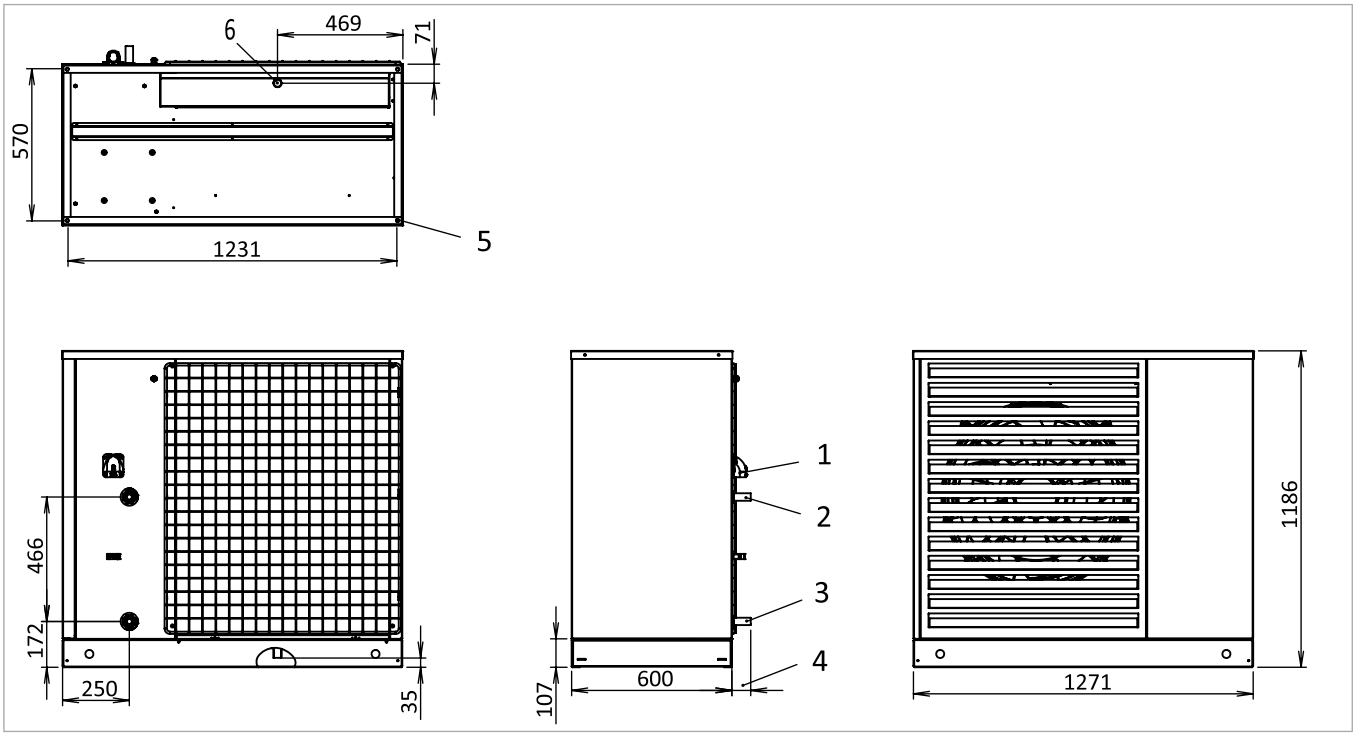


Fig. 15: SolvisMia dimensions

1	*Lead-in for electrical lines*	4	*SolvisMia 8, 10 = 47 mm, SolvisMia 14 = 70 mm*
2	*Flow line to the storage tank (Ø28 mm)*	5	*Screw connection (M8)*
3	*Return flow line from the storage tank (Ø28 mm)*	6	*Condensate drain (1")*

SolvisMia general technical data

Name	Unit	SolvisMia 8	SolvisMia 10	SolvisMia 14
Height x width x depth (without cover and grid)	[mm]	1184 x 1271 x 600		
Design				
Condenser material	[-]	1.4401/Cu		
Antifreeze protection	[yes/no]	Yes		
Emergency heating power consumption (SolvisBen WP-HPT-VSG / SolvisMax with charging module WP-VSG)	[kW]	6.2 (fitted on buffer)		
Flow/return flow connection	[mm]	28		
Condensate drain diameter		1" male thread		
Operating limits				
Heat source, min.	[°C]	-23		
Heat source, max.	[°C]	37		
Heating return, min.	[°C]	20		
Max. heating flow (at -7 °C outdoor temperature)	[°C]	65		
Electrical data				
Max. power consumption (without emergency heating)	[kW]	3.13	4.95	6.1
Degree of protection	[-]	IP43		
Frequency	[Hz]	50		
Max. operating current	[A]	13.82	7.26	9.34
Startup current	[A]	< 2.42	< 1.28	< 1.87
Compressor protection	[-]	1x B16 A	3x B16 A	3x B20 A
Emergency heating protection	[-]	2x B16 A		
Controller protection	[-]	Via compressor protection		
Compressor phases	[-]	1/N/PE	3/N/PE	
Emergency heating phases*	[-]	2L/2N/PE		
Controller phases	[-]	Via compressor phases		
Emergency heating rated voltage	[V]	230		

	Unit	SolvisMia 8	SolvisMia 10	SolvisMia 14
Aggregate weight	[kg]	205		
Refrigerant /GWP	[-]	R454 B / 466		
Refrigerant fill quantity/CO_2 equivalent	[kg]/[t]	1.3 / 0.51	1.4 / 0.61	1.8 / 0.84
Volume flow, heat source side	[m³/h]	3250	4500	5000
Max. volume flow, heat reduction-side	[m³/h]	1.95	2.34	3.37
Permitted operating overpressure, heating circuit	[bar]	3		
Internal pressure difference	[hPa]	55	60	70
Maximum installation height	[m]	2000		

** GWP = Global Warming Potential (GWP_{100}), CO_2 equivalent in 100 years in [kg CO_2 per 1 kg R454B].*

Noise level specifications*

	Unit	SolvisMia 8	SolvisMia 10	SolvisMia 14
Sound power level (EN 12102)	[dB(A)]	52	53	54
Sound pressure level, 5 m clearance, open area	[dB(A)]	27	28	29
Sound power level, outdoor installation (max.)	[dB(A)]	64	64	64

** Note: These values are laboratory values.*

Room heating energy efficiency η_s of the heating pumps based on time of year

	Unit	SolvisMia 8	SolvisMia 10	SolvisMia 14
For average climatic conditions				
Low-temperature applications	[%]	174	168	172
Medium-temperature applications	[%]	130	127	129

Performance data at the operating point

Outdoor temperature/flow temperature	SolvisMia 8		
	Heat output	Power consumption	Coefficient of performance (COP)
	[kW]	[kW]	[-]
Minimum/maximum performance at operating point			
A7/W35	2.44 / 7.90		
A2/W35	2.09 / 6.20		
A-7/W35	2.18 / 5.90		
Performance at the operating point according to EN 14511			
A7/W35	5.60	1.14	4.90
A7/W55	5.50	1.72	3.20
A2/W35	4.00	1.11	3.60
A-7/W35	5.40	2.16	2.50
A-7/W55	5.30	2.41	2.20
A-15/W35	4.20	1.91	2.20
A10/W35	6.77	1.18	5.72

Outdoor temperature/flow temperature	SolvisMia 10			SolvisMia 14		
	Heat output [kW]	Power consumption [kW]	Coefficient of performance (COP) [-]	Heat output [kW]	Power consumption [kW]	Coefficient of performance [-]
Minimum/maximum performance at operating point						
A7/W35	3.34 / 13.20			5.20 / 16.90		
A2/W35	2.88 / 10.10			4.50 / 13.40		
A-7/W35	3.01 / 8.80			4.59 / 12.70		
Performance at the operating point according to EN 14511						
A7/W35	7.98	1.69	4.72	12.00	2.45	4.90
A7/W55	7.81	2.60	3.00	11.80	3.69	3.20
A2/W35	5.65	1.57	3.60	8.60	2.39	3.60
A-7/W35	7.63	3.07	2.49	11.50	4.60	2.50
A-7/W55	8.10	3.86	2.10	11.40	5.18	2.20
A-15/W35	6.70	3.05	2.20	9.60	4.36	2.20
A10/W35	8.67	1.74	4.99	14.35	2.40	5.99

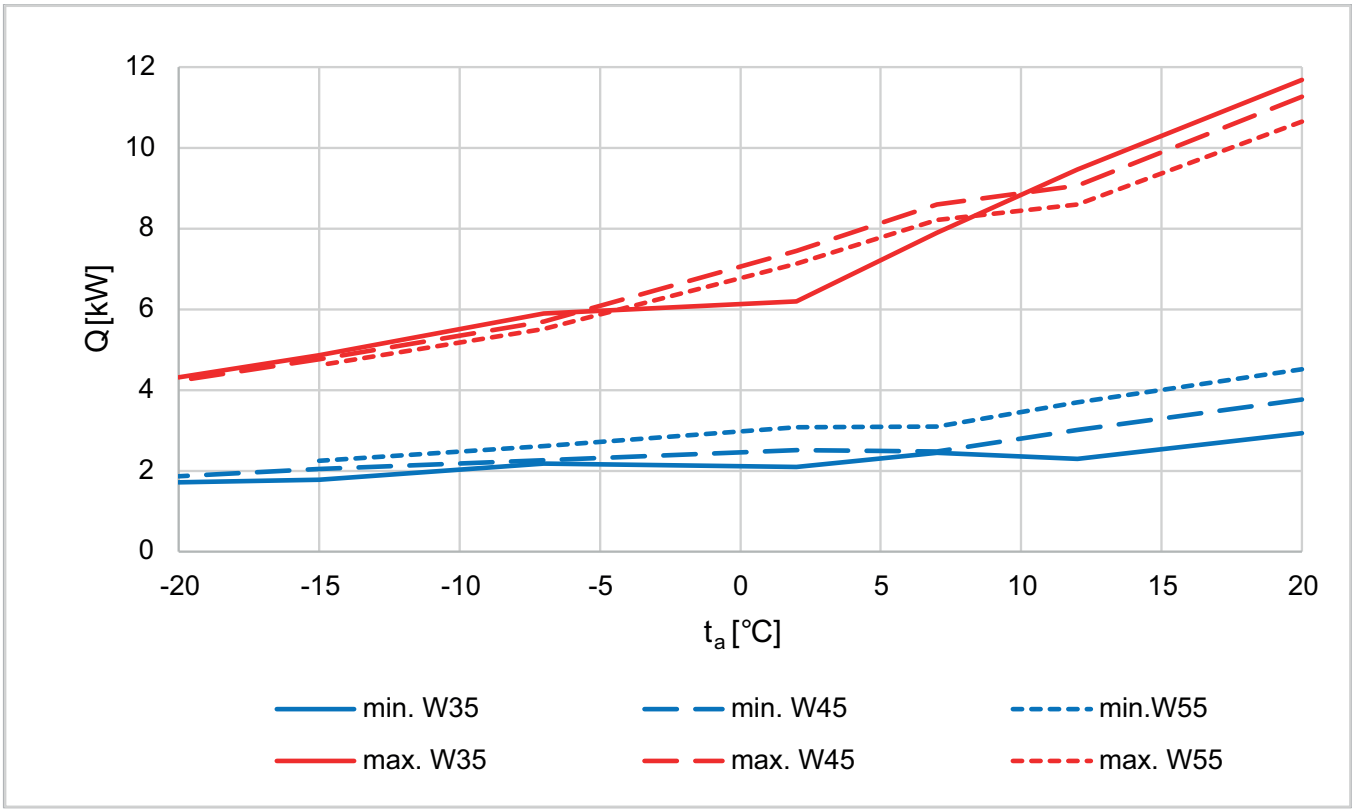


Fig. 16: Performance data diagram for SolvisMia 8

Q *Heating output [kW]* t_O *Outdoor temperature [°C]*

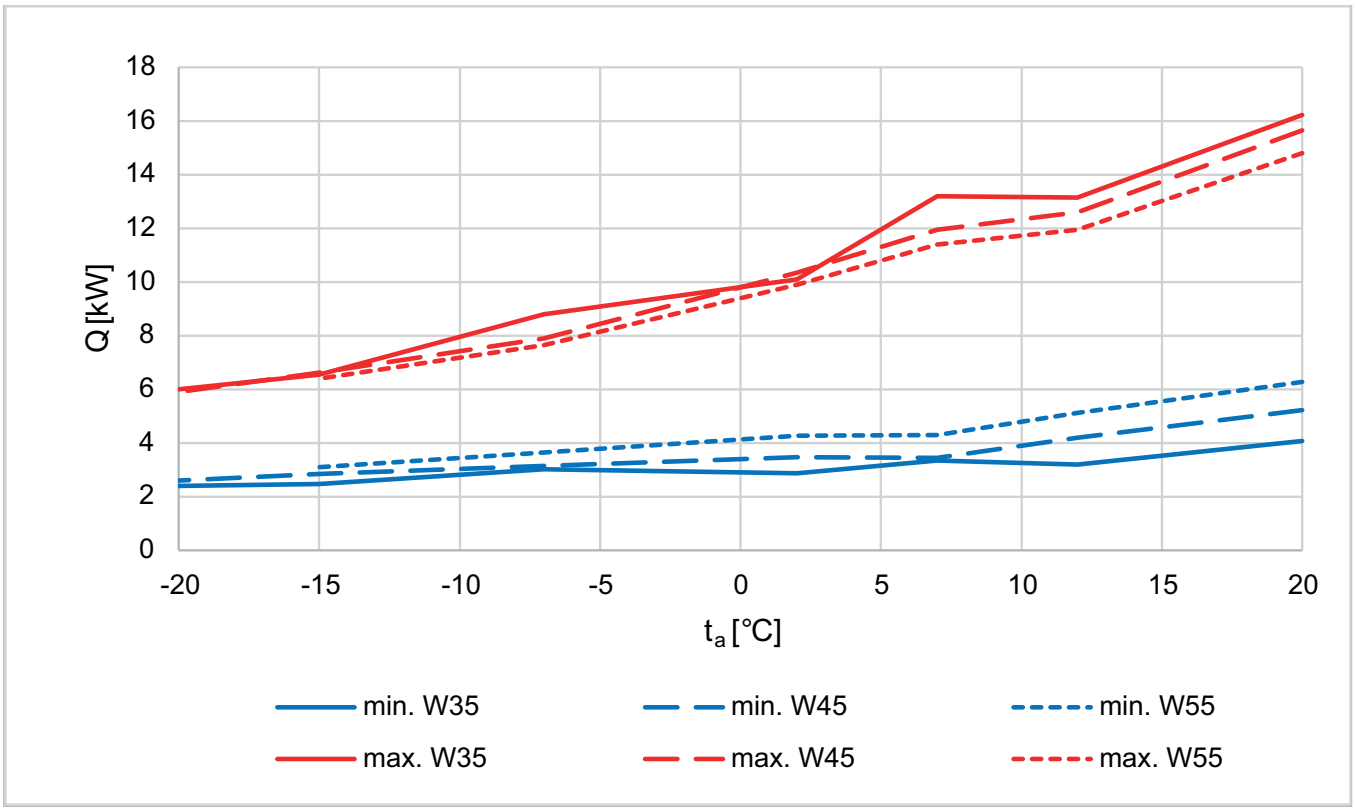


Fig. 17: Performance data diagram for SolvisMia 10

Q *Heating output [kW]* t_O *Outdoor temperature [°C]*

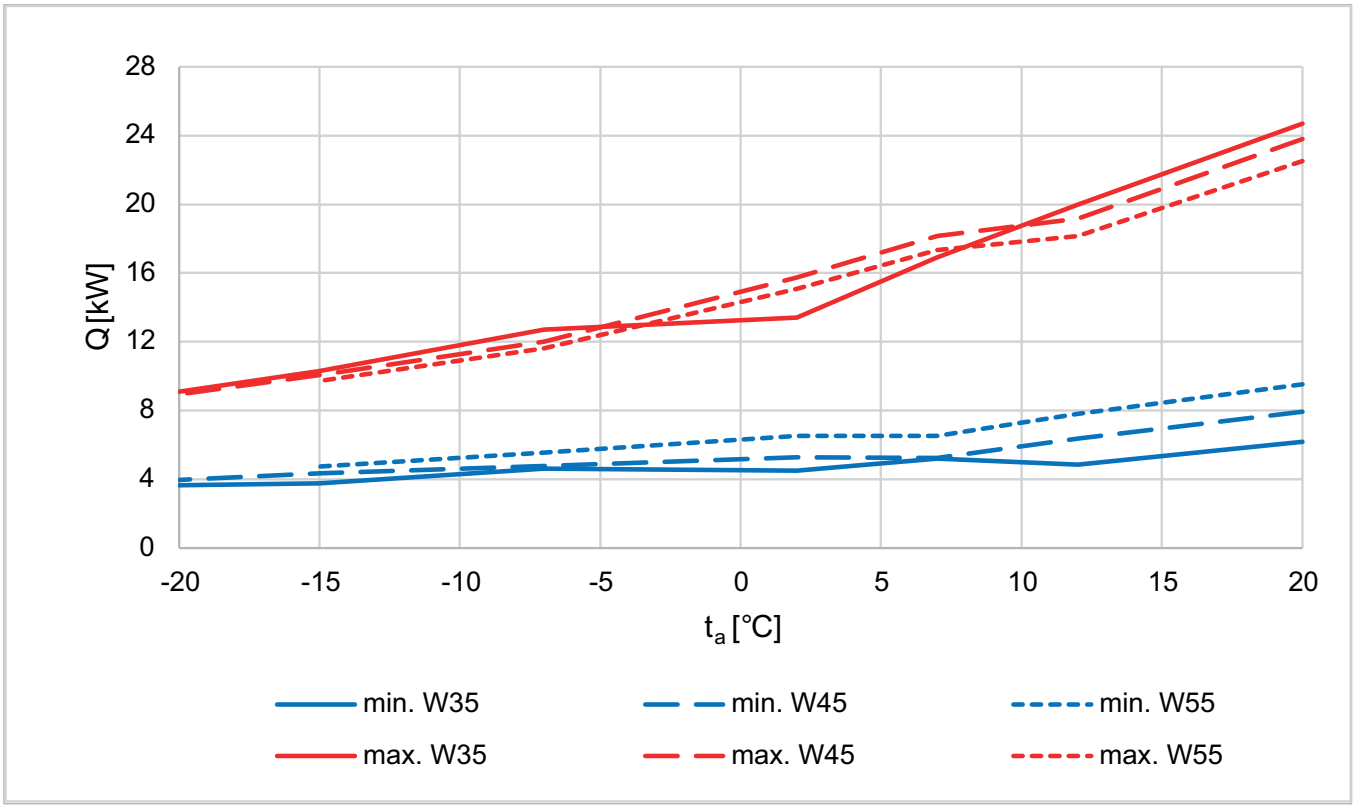


Fig. 18: Performance data diagram for SolvisMia 14

Q *Heating output [kW]* t_O *Outdoor temperature [°C]*

11 Appendix

11.1 System diagram

See ➔ *connection diagrams and system diagrams documents (ALS-BEN and ALS-MAX-7).*

11.2 Data sheets/certificates

Data sheets, e.g. on the refrigerant and compressor oil, can be provided by our application consultancy if required (see ➔ *page 2* for telephone numbers).

11.3 Wiring diagram

11.3.1 Heating pump system

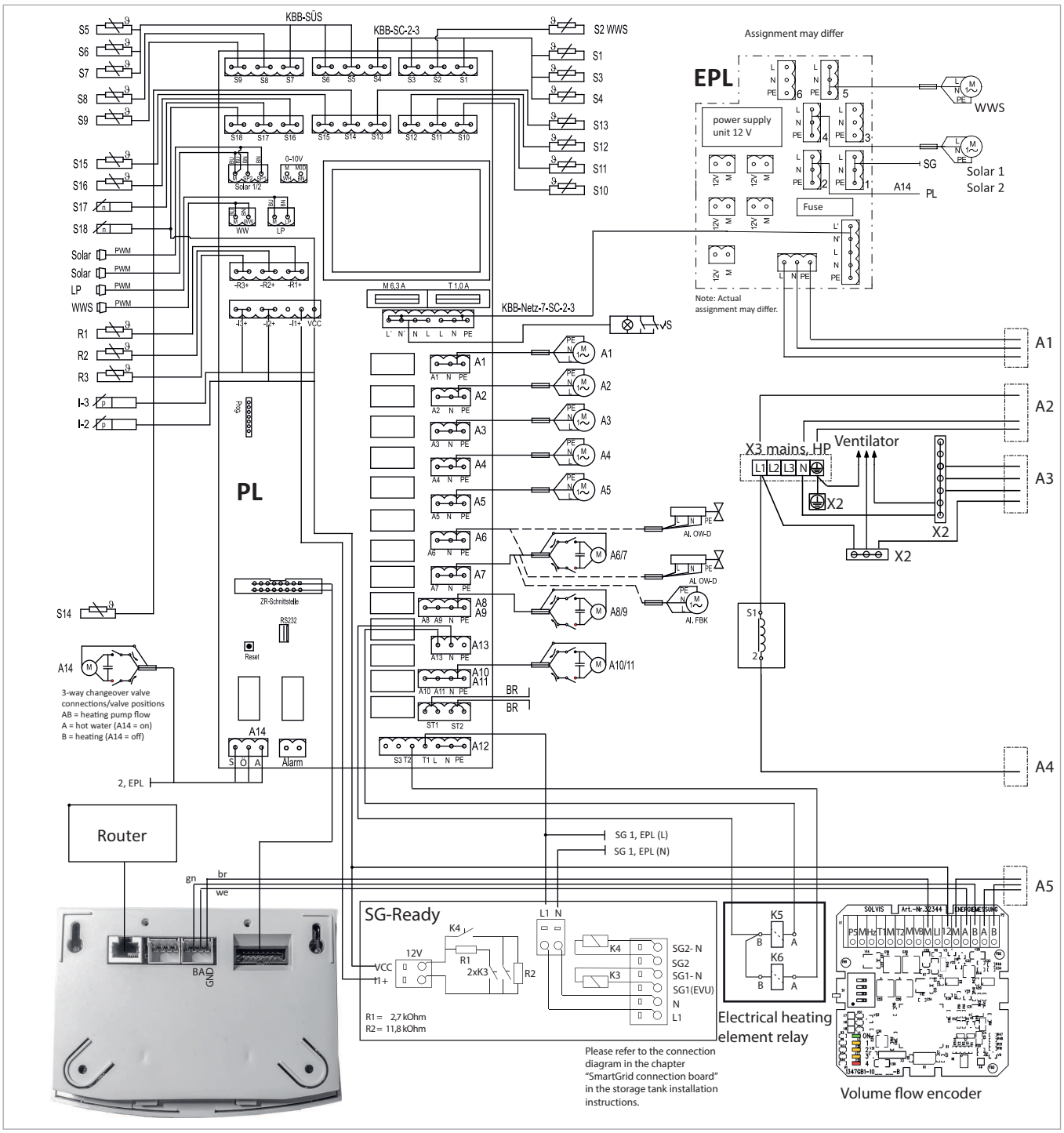


Fig. 19: SolvisMia 8 wiring diagram – part 1

X3	*Heating pump mains and bus connection*	M1	*Axial fan*
Y1	*4-way valve*	AL	*Alternative*
E2	*Oil sump heater*	PE	*Protective earth*
EEV	*Electronic expansion valve*	WWS	*Hot water station*
SEC	*Integrated heating pump controller*	Solar	*Solar pump*
SG	*SmartGrid board*	KBB	*Cable harness*
L	*Phase*	BR	*Jumper*
L'	*Release phase from power supply company*	PL	*SolvisControl 3 mains circuit board*
N	*Neutral conductor*	EPL	*Expansion board*
LP	*Load pump*	SC-3	*SolvisControl 3*
M2	*Heating pump compressor*	X2	*Terminal strip X2*

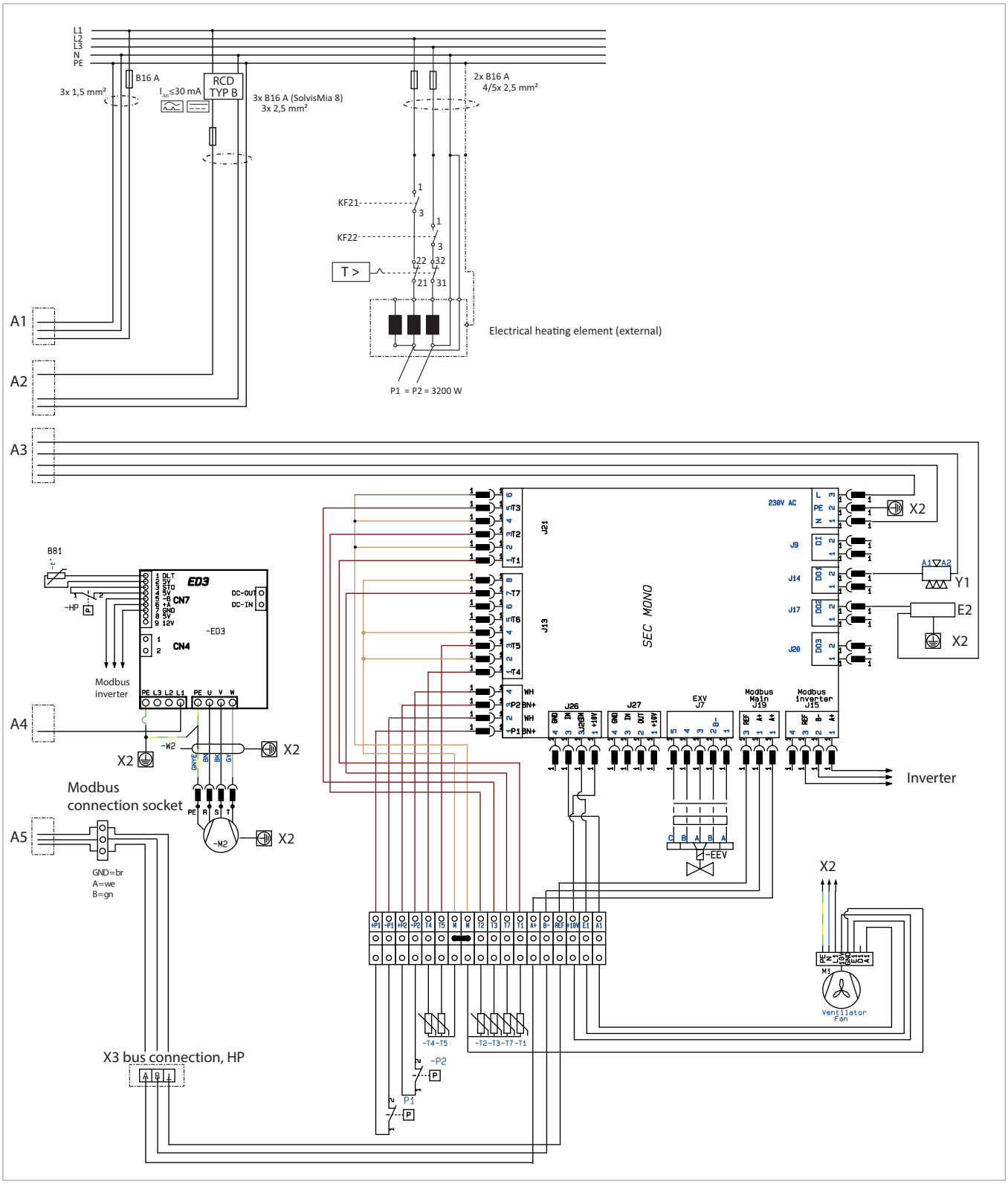


Fig. 20: SolvisMia 8 wiring diagram – part 2

The diagram shown represents an overview of the system based on the information available to us. It does not replace detailed and specific planning. Please note: to ensure the system functions correctly, the installation, operating and maintenance instructions must be followed. When connecting a third-party boiler, do not rely solely on the information provided by Solvis – always consult the manufacturer of the boiler. The shut-off and safety valves shown provide a rough guide only. Observe all the relevant standards, guidelines and technical rules at all times. This is the only way to ensure that installations are carried out correctly.	

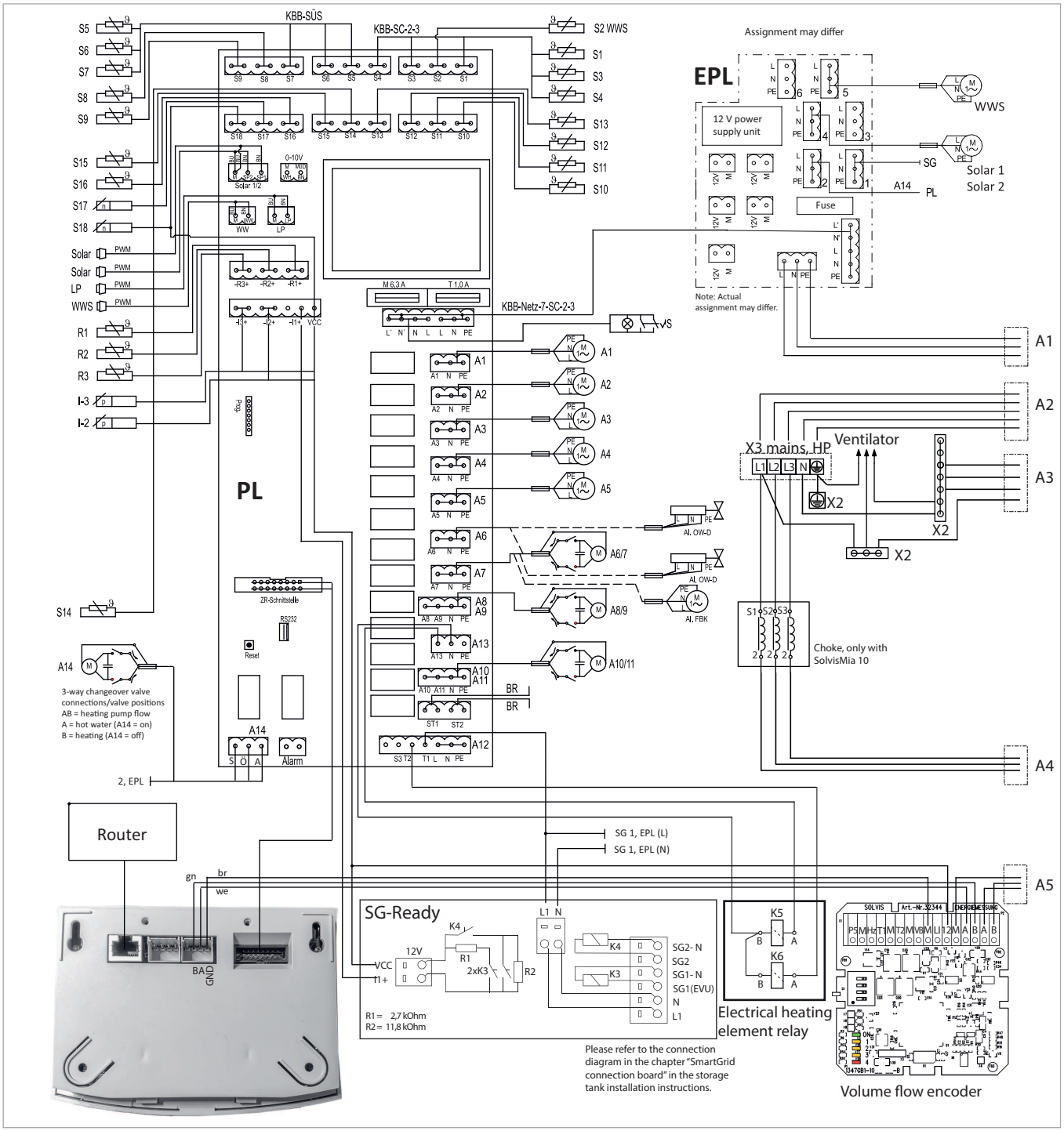


Fig. 21: SolvisMia 10/14 wiring diagram – part 1

X3	*Heating pump mains and bus connection*	M1	*Axial fan*
Y1	*4-way valve*	AL	*Alternative*
E2	*Oil sump heater*	PE	*Protective earth*
EEV	*Electronic expansion valve*	WWS	*Hot water station*
SEC	*Integrated heating pump controller*	Solar	*Solar pump*
SG	*SmartGrid board*	KBB	*Cable harness*
L	*Phase*	BR	*Jumper*
L'	*Release phase from power supply company*	PL	*SolvisControl 3 mains circuit board*
N	*Neutral conductor*	EPL	*Expansion board*
LP	*Load pump*	SC-3	*SolvisControl 3*
M2	*Heating pump compressor*	X2	*Terminal strip X2*

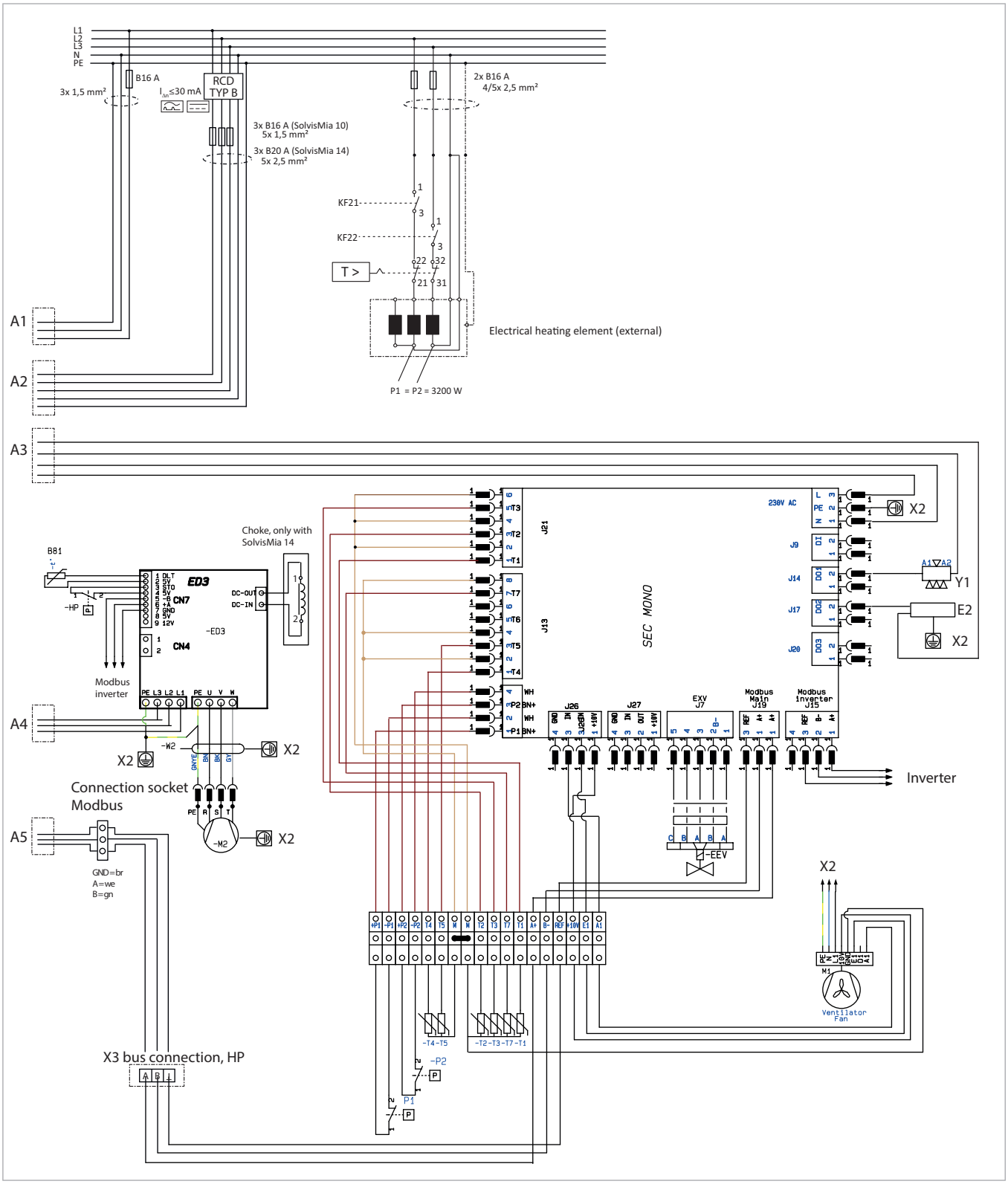


Fig. 22: SolvisMia 10/14 wiring diagram – part 2

The diagram shown represents an overview of the system based on the information available to us. It does not replace detailed and specific planning. Please note: to ensure the system functions correctly, the installation, operating and maintenance instructions must be followed. When connecting a third-party boiler, do not rely solely on the information provided by Solvis – always consult the manufacturer of the boiler. The shut-off and safety valves shown provide a rough guide only. Observe all the relevant standards, guidelines and technical rules at all times. This is the only way to ensure that installations are carried out correctly.	

11.3.2 Hybrid system

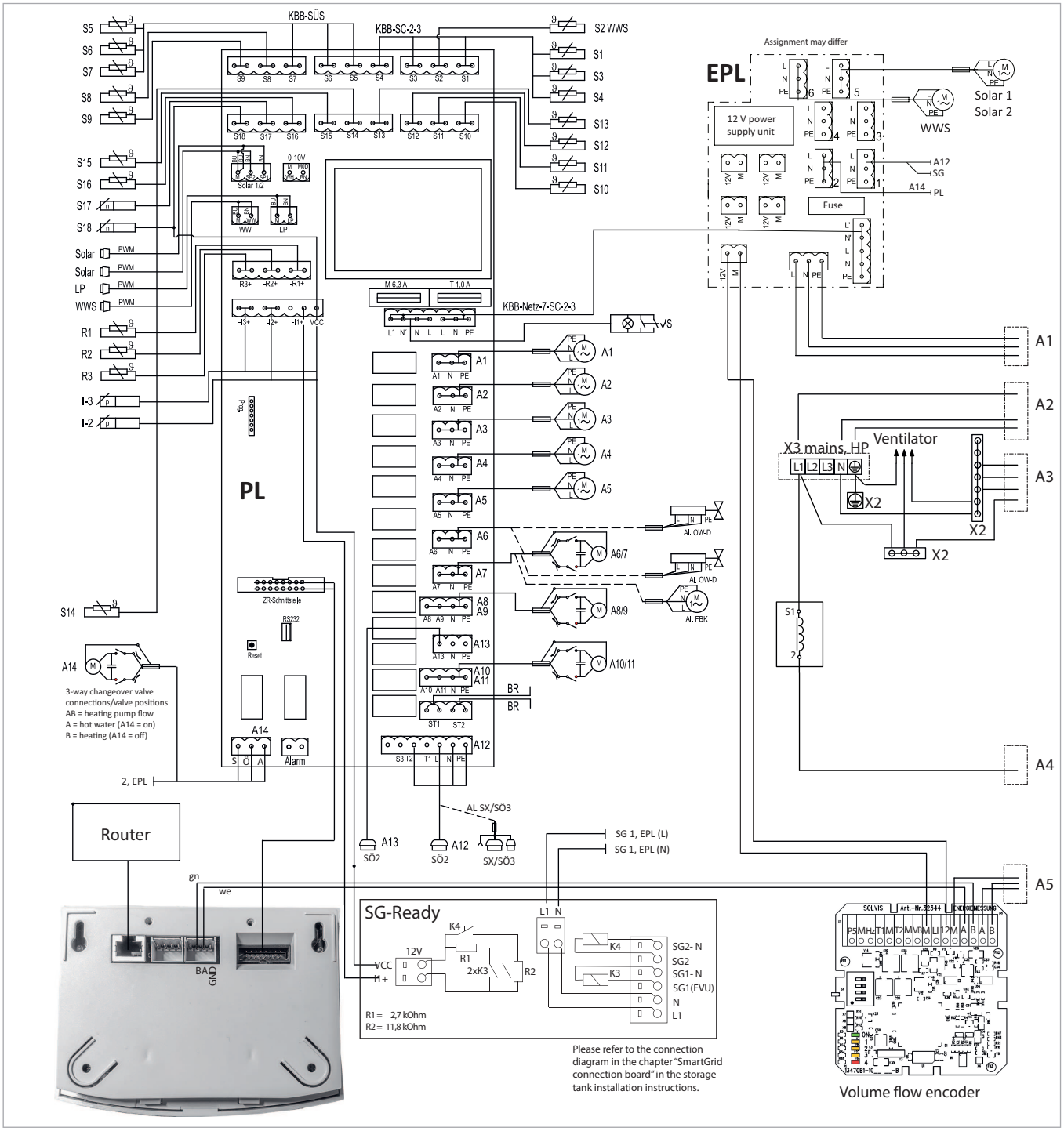


Fig. 23: SolvisMia 8 hybrid system wiring diagram – part 1

X3	
Y1	*4-way valve*
E2	*Oil sump heater*
EEV	*Electronic expansion valve*
SEC	*Integrated heating pump controller*
SG	*SmartGrid board*
L	*Phase*
L'	*Release phase from power supply company*
N	*Neutral conductor*
LP	*Load pump*
M2	*Heating pump compressor*
M1	*Axial fan*
UV	*Switching valve*
AL	*Alternative*
PL	*SolvisControl 3 mains circuit board*
PE	*Protective earth*
WWS	*Hot water station*
Solar	*Solar pump*
KBB	*Cable harness*
BR	*Jumper*
DHC	*Electrical auxiliary heater*
RSE	*Ripple control receiver*
PWM	*Pulse width modulation (speed control)*
HW-V	*Hot water valve*
WP	*Heating pump*
SC-3	*SolvisControl 3*
SX	*Gas burner SX-LN-3*
BW2	*SÖ-BW-2 oil burner*
EPL	*Expansion board*

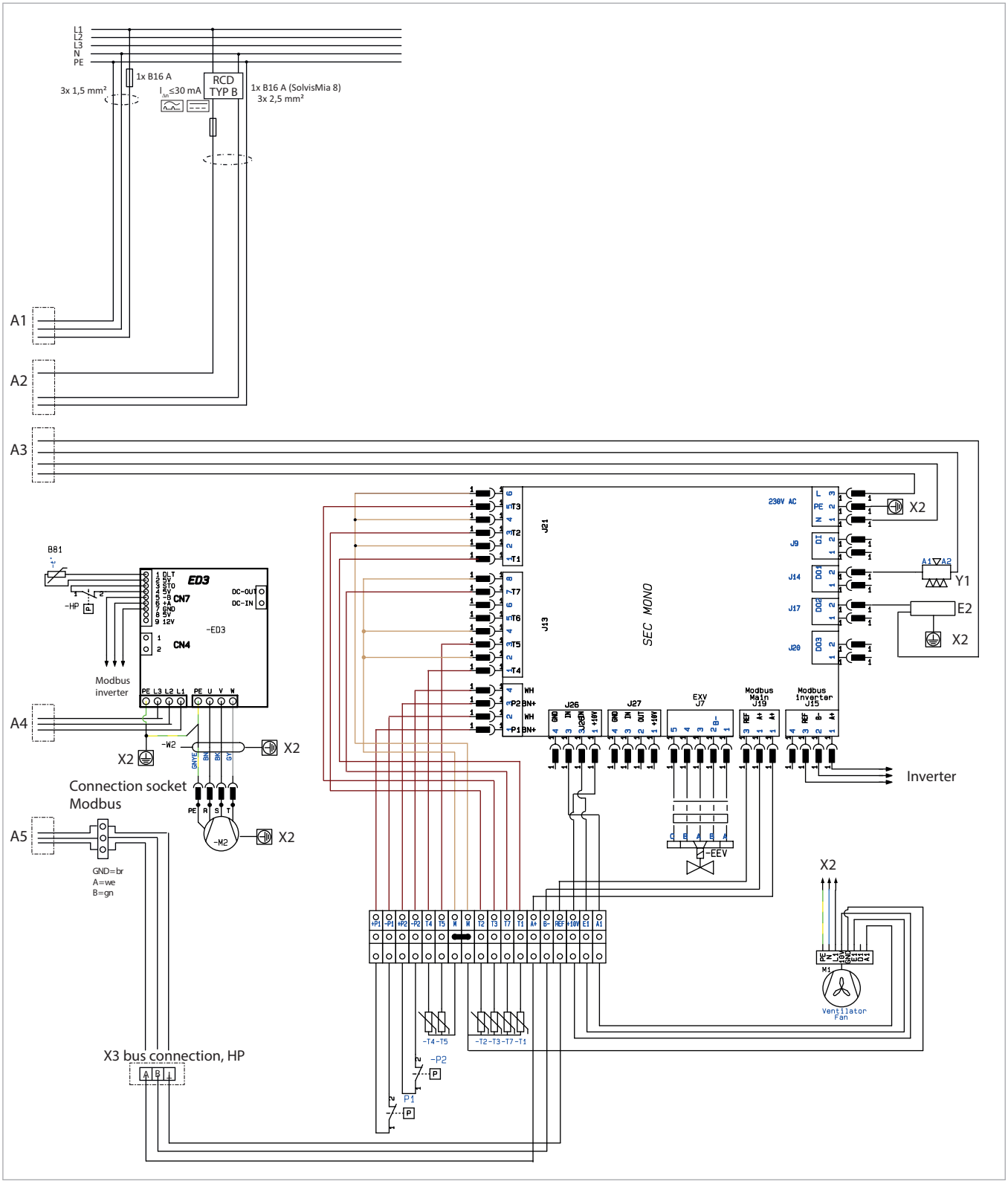


Fig. 24: SolvisMia 8 hybrid system wiring diagram – part 2

The diagram shown represents an overview of the system based on the information available to us. It does not replace detailed and specific planning. Please note: to ensure the system functions correctly, the installation, operating and maintenance instructions must be followed. When connecting a third-party boiler, do not rely solely on the information provided by Solvis – always consult the manufacturer of the boiler. The shut-off and safety valves shown provide a rough guide only. Observe all the relevant standards, guidelines and technical rules at all times. This is the only way to ensure that installations are carried out correctly.	

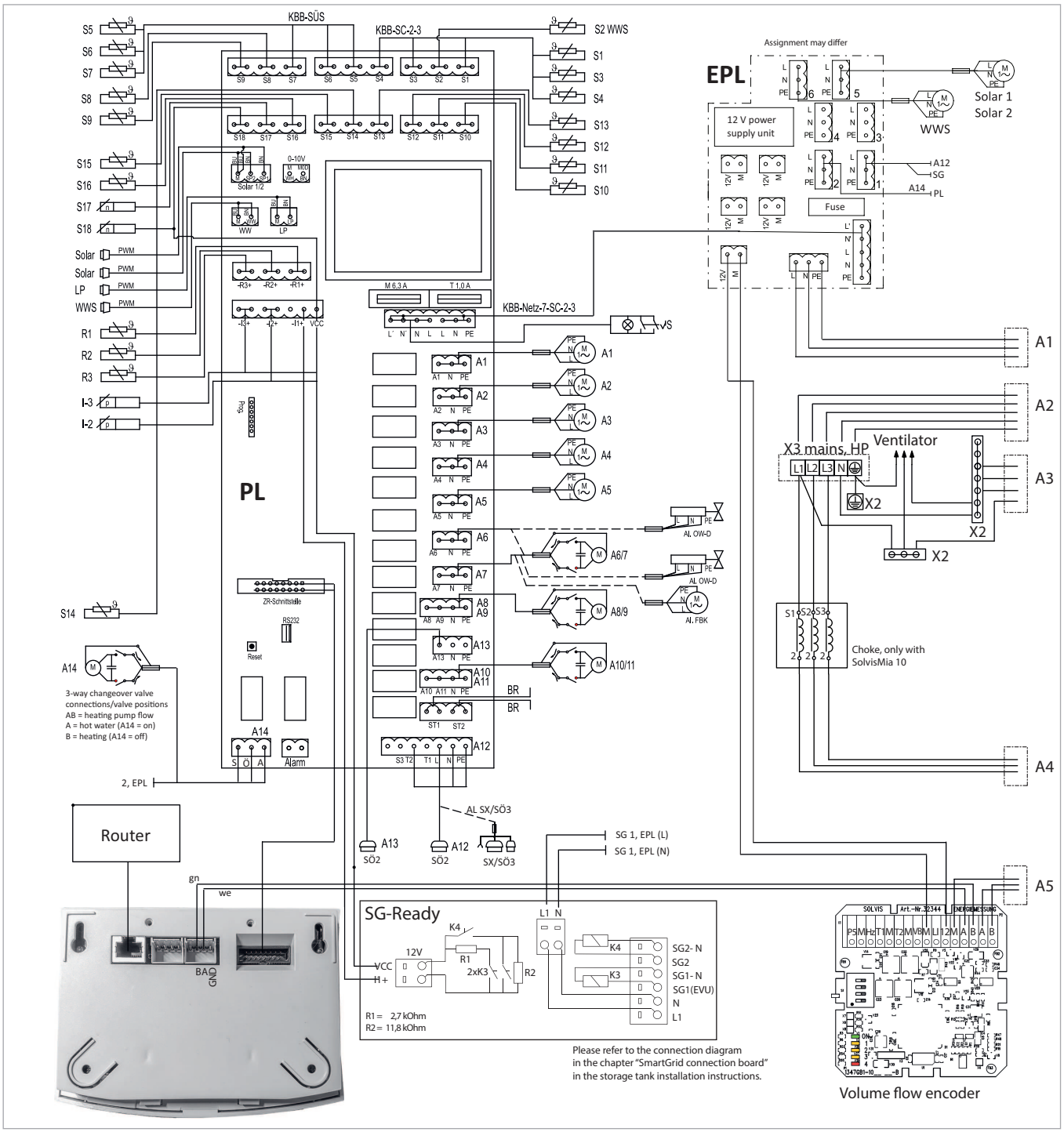


Fig. 25: SolvisMia 10/14 hybrid system wiring diagram – part 1

X3	
Y1	*4-way valve*
E2	*Oil sump heater*
EEV	*Electronic expansion valve*
SEC	*Integrated heating pump controller*
SG	*SmartGrid board*
L	*Phase*
L'	*Release phase from power supply company*
N	*Neutral conductor*
LP	*Load pump*
M2	*Heating pump compressor*
M1	*Axial fan*
UV	*Switching valve*
AL	*Alternative*
PL	*SolvisControl 3 mains circuit board*
PE	*Protective earth*
WWS	*Hot water station*
Solar	*Solar pump*
KBB	*Cable harness*
BR	*Jumper*
DHC	*Electrical auxiliary heater*
RSE	*Ripple control receiver*
PWM	*Pulse width modulation (speed control)*
HW-V	*Hot water valve*
WP	*Heating pump*
SC-3	*SolvisControl 3*
SX	*Gas burner SX-LN-3*
BW2	*SÖ-BW-2 oil burner*
EPL	*Expansion board*

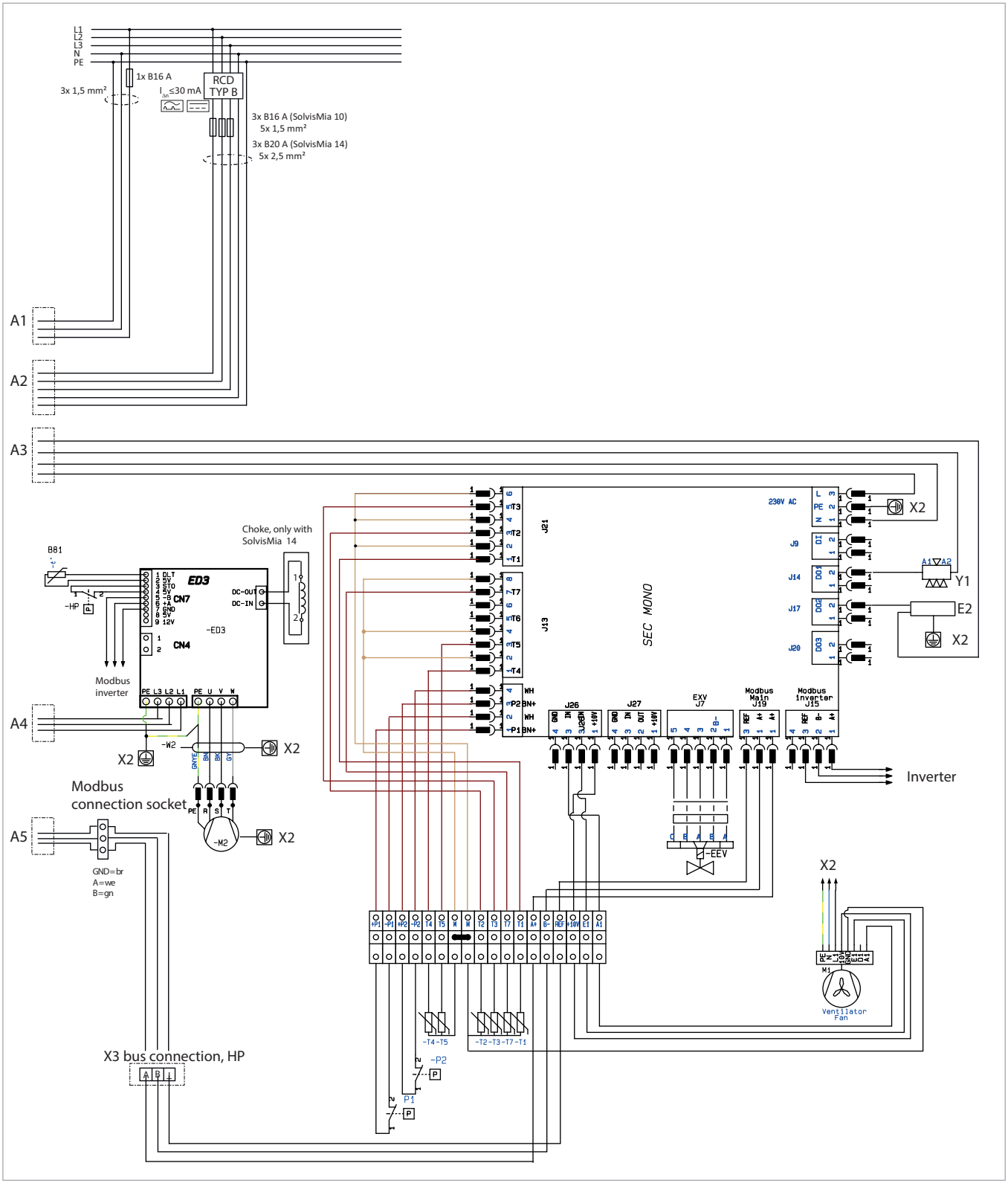


Fig. 26: SolvisMia 10/14 hybrid system wiring diagram – part 2

The diagram shown represents an overview of the system based on the information available to us. It does not replace detailed and specific planning. Please note: to ensure the system functions correctly, the installation, operating and maintenance instructions must be followed. When connecting a third-party boiler, do not rely solely on the information provided by Solvis – always consult the manufacturer of the boiler. The shut-off and safety valves shown provide a rough guide only. Observe all the relevant standards, guidelines and technical rules at all times. This is the only way to ensure that installations are carried out correctly.	

11.4 Accessories

All accessory parts must be selected individually and ordered separately.
Additional accessories and spare parts can be found in the Solvis price list.

Modbus cable, 15 m/30 m (KB-MOD-BUS-15 / 30)
Shielded and twisted cable for safe signal transmission from SC-3 to SolvisMia.

Pipe (RO-68-FLX-WP)
Thermally insulated, flexible single-pipe heat supply line for hydraulic connection of the air/water heating pump installed outside via the building system hydraulics. Version for direct installation in the ground available by the metre. A thicker insulation thickness is recommended if not installed in the ground.

Technical data:

- DN 32
- Minimum bending radius: 0.25 m
- Max. operating temperature: 95 °C
- External diameter: 68 mm

Rubber end cap (KP-68-WP)
To protect the insulation at the pipe ends and to seal components. Waterproof up to 0.3 bar. To fit the flexible pipe (RO-68-FLX-WP) with 68 mm external diameter.

Rubber end cap (KP-68-WP)
To protect the insulation at the pipe ends and to seal components. Waterproof up to 0.3 bar. To fit the flexible pipe (RO-68-FLX-WP) with 68 mm external diameter.

Pipe (RO-140-FLX-WP)
Thermally insulated, flexible single-pipe heat supply line for hydraulic connection of the air/water heating pump installed outside via the building system hydraulics. Version for direct installation in the ground available by the metre. For increased insulation requirements.

Technical data:

- DN 32
- Minimum bending radius: 0.30 m
- Max. operating temperature: 95 °C
- External diameter: 140 mm

Rubber end cap (KP-140-WP)
To protect the insulation at the pipe ends and to seal components. Waterproof up to 0.3 bar. To fit the flexible pipe (RO-140-FLX-WP) with 140 mm external diameter.

WP underground cable connection set (ASS-ETL-WP-OH)
For connecting the supply lines coming from the ground (RO-68-FLX-WP) with the SolvisMia / SolvisLea connections and the 28 mm pipes of the storage tank. Viega press system.

Wall duct, water-pressure tight (DF-DWD-68)
Wall duct for the heat supply line to seal against water pressure. To be inserted on the water side into the core drill hole or the lining pipe.

Technical data:

- For connection pipe, outer diameter 68 mm
- Core drill hole, 125 mm
- Water-pressure tight up to 0.5 bar

Wall duct, 2-way, water-pressure tight (DF-DWD-2-68)
Multi-way wall duct for two heat supply lines and two electric lines to seal against water pressure. To be inserted on the water side into the core drill hole (200 mm) or the lining pipe.

Technical data:

- For connection pipe, external diameter 2 x 68 mm and electric line 2 x 9 mm.
- Core drill hole, 200 mm
- Water-pressure tight up to 1.0 bar

Wall duct, water pressure-tight (DF-DWD-140/140-80)
Wall duct for the heat supply line to seal against water pressure. To be inserted on the water side into the core drill hole or the lining pipe.

Technical data:

- For connection pipe, outer diameter 140 mm
- Core drill hole, 200 mm
- Water-pressure tight up to 0.5 bar

Wall duct, not water-pressure tight (DF-NDW-68)
Wall duct for the heat supply line, for setting in concrete or masonry.

Technical data:

- For connection pipe, outer diameter 68 mm
- Core drill hole, 110 mm
- Length: 400 mm

Wall duct, not water-pressure tight (DF-NDW-140)
Wall duct for the heat supply line, for setting in concrete or masonry.

Technical data:

- For connection pipe, outer diameter 140 mm
- Core drill hole, 200 mm
- Length: 550 mm

SolvisMia protective cover set (AD-MIA)
Protective cover for SolvisMia including pipes, comprising:

- 1 x connection pipe cover
- 1 x copper pipe, 28 x 1.5 x 438 mm
- 2 x 28 mm plastic bracket

SolvisMia connection set (ASS-MIA)
For connecting the flexible pipes (RO-68-FLX-WP) with a rigid pipe (diameter 28 mm, for connecting the HP and connecting the storage tank). Viega press system.

Hose (SH-DR-WIG or SH-DR-GG)
Flexible connection hose for decoupling structure-borne noise when rigid pipes are otherwise used.

12 Index

Notes

Notes

Notes

Art.-Nr.: 33340 - MAL-MIA-EN - Dokument-Nr.: 33340-2b / Redaktioneller Stand: 08.23 - Technischer Stand: 06.23

SOLVIS GmbH
Grotrian-Steinweg-Straße 12
D-38112 Braunschweig

Phone: +49 (0) 531 28904-0
Fax.: +49 (0) 531 28904-100
E-mail: info@solvis.de

Internet: www.solvis.com