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Installation and operation manual

Hydraulic module AMB 900

- Read the manual before using the device!
- Pay attention to all information regarding safety!
- Keep the installation and operating manual!

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1 Explanations to the installation and operation manual

Installation and operation manual is an important part of the scope of delivery. That is why we recommend:

- ▶ Read the installation and operating manual before installing the device.
- ▶ Keep the installation and operating manual for the entire life of the device.
- ▶ Hand over the installation and operating manual to any subsequent owner or user of the device.

The manufacturer accepts no liability or warranty for any damage or consequential damage resulting from failure to observe the instructions in this manual or the applicable regulations, provisions, and standards at the place of product use.

1.1 Safety messages and hazard categories

WARNING **Type and source of the hazard are shown here.**

- ▶ Precautions to take in order to avoid the hazard are shown here.

There are three different levels of warnings:

Warning	Meaning
DANGER	Immediately imminent danger! Failure to observe the information will result in death or severe injuries.
WARNING	Possibly imminent danger! Failure to observe the information may result in death or severe injuries.
CAUTION	Dangerous situation! Failure to observe the information may result in minor or moderate injuries or property damage.

2 Safety

DANGER

Mains voltage (230 V AC / 400 V AC) can cause severe burns or death.

- Do not expose the actuator, electrical module and wires to water.
- Do not touch any live parts. Never connect or disconnect wires without turning off the power.
- Work on electrical circuits should be carried out by a person with the appropriate qualifications and with the appropriate authorizations.
- The permanent electrical installation must be fitted with appropriate safety equipment (overcurrent circuit breaker and residual current circuit breaker).
- Before starting any installation or maintenance work, disconnect the hydraulic module and the heat pump from the electrical power supply and protect it from being turned back on.
- Improper installation may cause a fire hazard.

WARNING

Risk of scalding.

- During assembly and maintenance work, there is a risk of scalding from hot water. Before starting work, make sure that the system has cooled down.
- Do not touch the pipes, which can become very hot and cause scalding.
- The electrical components and cables can get very hot under load (> 50°C). Before starting work, switch off the power supply and make sure that the installation has cooled down.

2.1 Intended use of the device

The hydraulic module AMB 900 is intended for use only in a closed heating system in accordance with EN 12828. The AMB 900 is used to connect a monobloc heat pump to a heating system. The module also allows the connection of the domestic electrical system and the heat pump control board with the components of the module and the heating system. Thanks to the built-in electric heater, AMB can work as an auxiliary and peak source for the heat pump.

Thanks to the internal distribution board, it allows the control of an electric heater, circulation pumps (max. 5) and a switching zone valve (AZV).

Thanks to the relays in the PCB, the specific devices can be controlled in a way that is safe for the heat pump control board.

Any other use is not intended and may lead to hazards.

Before using the product, ensure that it is suitable for the intended application. Take into account at least the following aspects:

- All applicable regulations, standards, and safety instructions at the place of use.
- All conditions and specifications stated for the product.
- The conditions related to the intended use.

Additionally, perform a risk assessment for the specific application in which the product will be used, following a recognized procedure, and implement all necessary safety measures based on the results.

Also consider the potential consequences of installing or integrating the product into a system or plant.

2.2 Quality control

Construction of AMB 900 complies with the current state of the technical standards regarding safety. Each device is checked for safety before shipment.

▶ The product should only be used if it is in a qualified technical condition. Read the manual for assembly and use as well as observe the relevant safety regulations.

2.3 Personnel qualification

Installation, commissioning, maintenance and decommissioning of this product must be carried out only by a qualified professional with adequate technical training, knowledge and experience to recognize and avoid hazards that may be caused by electricity. To avoid malfunctions and accidents, make sure that all persons using the device are familiar with its operation and Chapter 2 of this manual.

Based on their technical training, knowledge and experience, qualified personnel must be able to understand the contents of this manual and all documents pertaining to the product, and recognize possible hazards that may result from the use of the product.

Qualified personnel must be aware of all applicable regulations, standards and safety rules that must be observed during operation.

2.4 Personal protective equipment

Always use the required personal protective equipment. When working with the device, you should also take into account that there may be other hazards at the installation and use that are not directly caused by the product.

2.5 Modifications to the product

Changes and modifications carried out by unauthorized persons may cause hazards and are prohibited for safety reasons.

2.6 Usage of spare parts and accessories

Usage of unsuitable spare parts and accessories may cause damage to the product.

- ▶ Use only genuine spare parts and accessories of the manufacturer.

3 Product description

The hydraulic module AMB 900 is designed to connect an external monobloc heat pump unit with a buffer tank / heating system and a DHW tank. The internal electrical module allows for the power supply and control of individual devices included in the module and the heating system.

The most important components of the module are: an AZV 3-way switching valve, an immersion heater with a maximum power of 9.0 kW, consisting of three modules with a power of 3.0 kW each, and an ADS 181 magnetic dirt separator. The hydraulic components are connected by brass and steel components. All components are enclosed in a compact steel housing. The entire unit has been electrically and leak-tested.

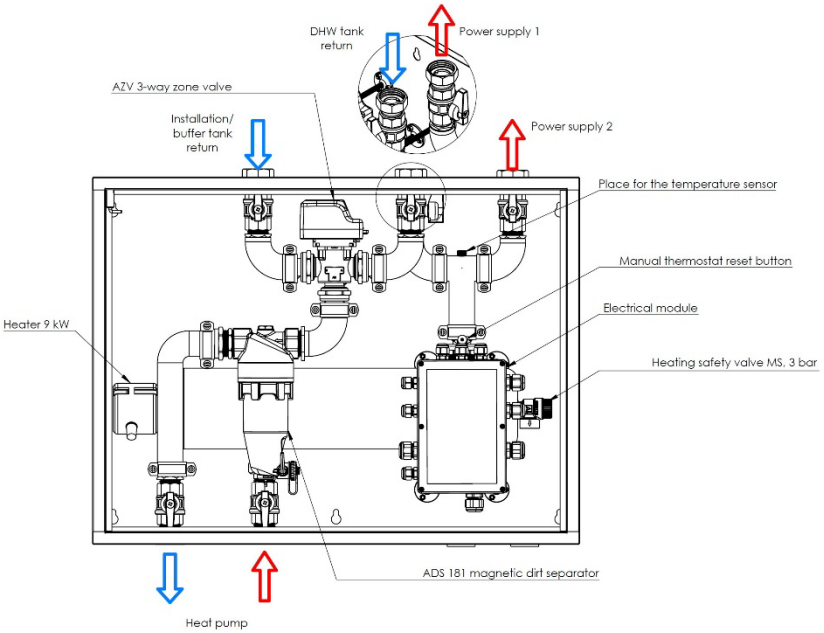


Figure 1. Construction of the AMB hydraulic module 900

3.1 Dimensions

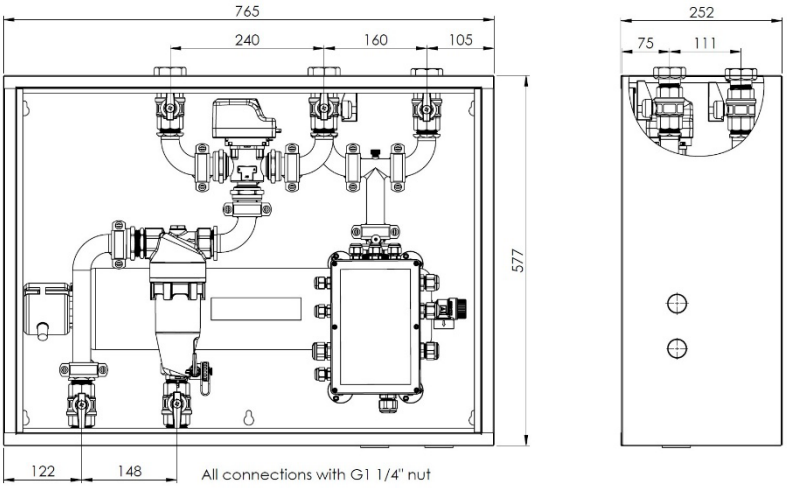


Figure 2. Dimensions of the hydraulic module AMB 900 and its connections [mm]

Keep a minimum of 1 metre of space before the module to allow for the free opening of its housing.

Select the remaining distances to the partitions according to the electrical and plumbing routing.

3.2 Construction and function

The hydraulic module AMB 900 is designed for connecting a heating system/buffer tank and a DHW tank with a monobloc heat pump. It also allows for a simple connection of the domestic electrical system and the heat pump control board with a heater, switching valve and circulation pump or pumps.

The hydraulic module fulfils the following functions.

- Switching the flow between two zones:
  - central heating system or buffer tank,
  - DHW tank.
- Additional heating of the specific circuit depending on demand, after receiving a proper signal from the heat pump.
- Separation of dirt.
- Protection against overpressure.

3.2.1 Construction and principle of operation of the electrical part

The electrical part of the hydraulic module consists of a PCB board, an ABS housing with IP68 protection rating and a set of cable glands.

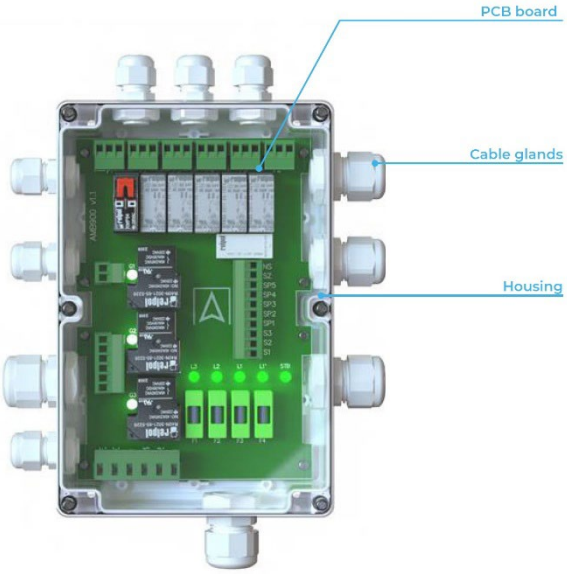


Figure 3. Construction of the electrical part

PCB board

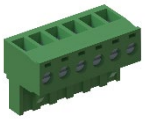
A complete PCB consists of non-detachable components permanently attached to the board, such as capacitors, diodes and sockets, and detachable components used, among other things, to connect electrical/control cables (Table 1 and Figure 4). Attempting to remove non-separable components may result in damage to the device. Separable components should only be disconnected from the PCB after the power supply has been switched off.

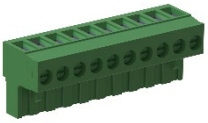
Terminal blocks are used to connect the earth, neutral and phase wires from the domestic electrical network and signal wires for controlling individual devices from the heat pump control board.

An electromagnetic relay is a disconnecting component whose function is to close the contact supplying a specific segment and test its correct connection/operation. For more information, see Chapter 6, “Installation and activation”.

The fuse set is designed to protect the system or electrical installation from damage due to overload or short circuit. For more information, refer to Chapter 7, „Maintenance”. The complete electrical diagram can be found in Chapter 12 „Electrical diagram”.

Table 1. List of PCB board detachable components

Nr	Description	Illustration
1	Female detachable terminal block, 2-pin, 5 mm	
2	Female detachable terminal block, 3-pin, 5 mm	
3	Female detachable terminal block, 6-pin, 5 mm	
4	Female detachable terminal block, 6-pin, 7.62 mm	

Nr	Description	Illustration
5	Female detachable terminal block, 10-pin, 5 mm	
6	Relay: electromagnetic; SPDT; Coils: 230VA; 8A/250VAC	
7	Relay: electromagnetic; DPDT; 230VAC; 8A	
8	Fast-acting fuse; 15A; 250VAC; cylindrical, glass	
9	Fast-acting fuse; 6.3A; 250VAC; cylindrical, glass	
10	Fuse cover 5x20mm	

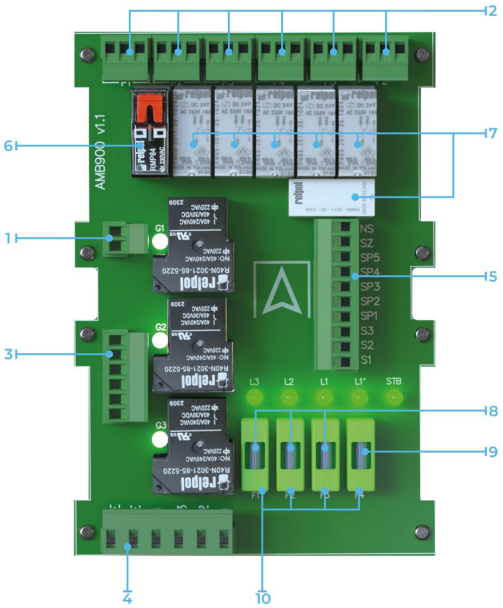
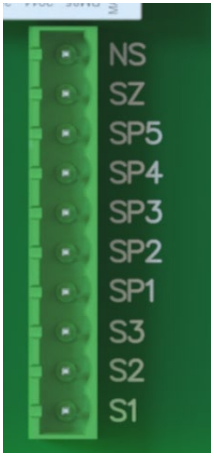
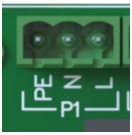
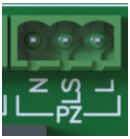
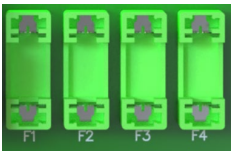
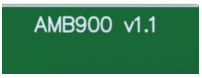


Figure 4. List of PCB board detachable components

Table 2. PCB board description key

Nr	Description	Illustration
1	Power socket: • PE: Grounding wire, • PE: Optional grounding wire, • N: Neutral wire, • L3: Phase wire number 3, • L2: Phase wire number 2, • L1: Phase wire number 1..	
2	Heater power socket: • G1: Phase wire number 1, • G2: Phase wire number 2, • G3: Phase wire number 3, • N: Neutral wire, • PE: Grounding wire, • PE: Optional grounding wire.	

Nr	Description	Illustration
3	Heat pump control socket: • NS: Neutral control wire, • SZ: AZV control wire, • SP5: Control wire for circulation pump number 5, • SP4: Control wire for circulation pump number 4, • SP3: Control wire for circulation pump number 3, • SP2: Control wire for circulation pump number 2, • SP1: Control wire for circulation pump number 1, • S3: Control wire for third stage of heater, • S2: Control wire for second stage of heater, • S1: Control wire for first stage of heater.	
4	Circulation pump control socket • PE: Grounding wire, • N: Neutral wire, • L1: Phase wire number 1.	
5	AZV valve control socket • N: Neutral wire, • LS: Signal phase wire, • L: Fixed phase wire.	
6	Information green LEDs • L3: Fuse status check with current power supply L3, • L2: Fuse status check with current power supply L2, • L1: Fuse status check with current power supply L1, • L1': Control circuit fuse check, • STB: Thermostat function check.	
7	Information red LEDs • G1: First stage of heater operation, • G2: Second stage of heater operation, • G3: Third stage of heater operation.	

Nr	Description	Illustration
8	Fuse sockets • F1: Fuse number 1 15A, • F2: Fuse number 2 15A, • F3: Fuse number 3 15A, • F4: Fuse number 4 6.3A.	
9	STB: Thermostat socket.	
10	AMB 900 v1.1: PCB version designation.	

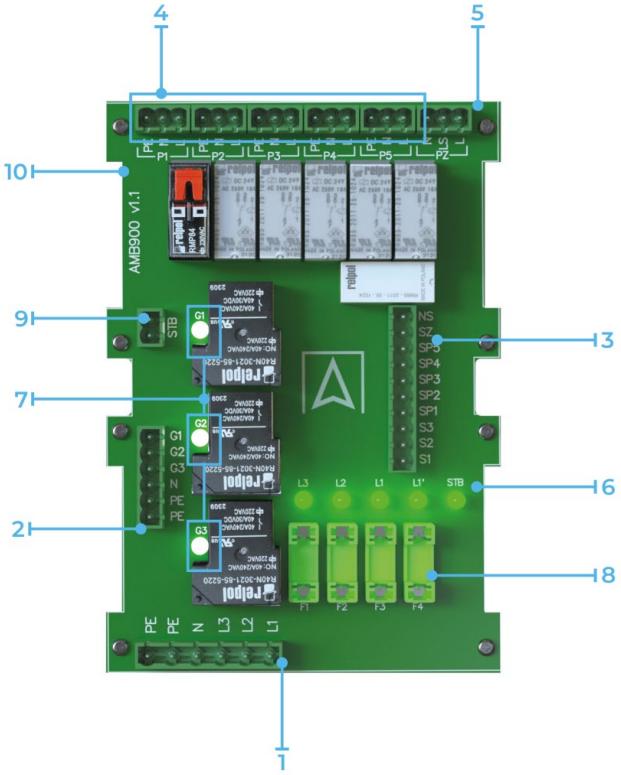


Figure 5. Descriptions on the PCB board

PCB board housing

The electrical housing consists of two parts. The bottom part is made of ABS and has a PCB board and cable glands attached to it, while the upper part is made of transparent PC. The PCB housing is connected with six M3x20 screws.

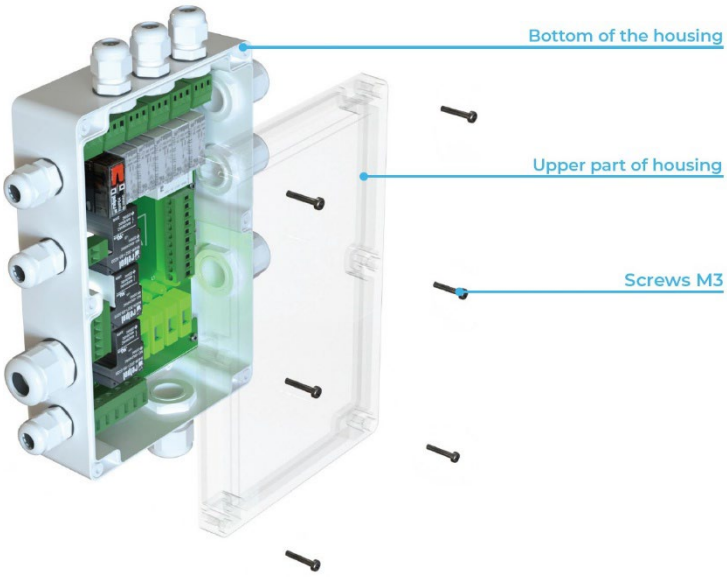


Figure 6. Electrical housing construction

Cable glands

The electrical part uses a set of 11 cable glands in sizes PG9, PG13 and PG16. Each of them corresponds to one power/control cable for the PC board. It is not recommended to add additional cables to the glands through which the cable already passes at the factory. This will maintain the tightness of the structure. It is recommended to pull only one cable through the remaining glands, as described in Chapter 6 “Installation and activation” of the manual. Each unused gland has a special insert that will maintain the tightness of the construction.

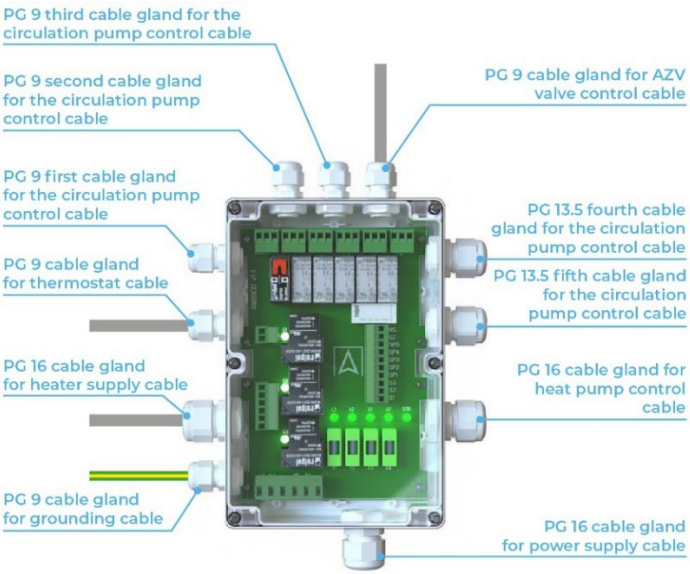


Figure 7. Cable gland designations

3.2.2 Construction and operating principle of an electric heater

The flow-through electric heater consists of three modules, each with a power rating of 3.0 kW. The maximum power of the heater is 9.0 kW. Depending on the heat demand, the heat pump can start one or more modules to achieve the required temperature of the heating medium. The heater is connected to a thermal protection device with manual reset – when the medium temperature exceeds 80°C, the power supply to all heater modules is switched off by opening the thermostat contact. To switch the heater back on, press the manual reset button located above the PCB housing (Fig. 8).

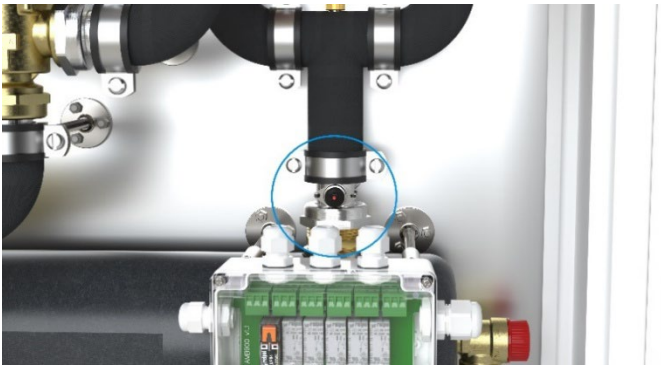


Figure 8. Manual reset button

3.2.3 Construction and operating principle of the AZV switching valve

The AZV 3-way switching valve is used to switch the flow between the system/buffer tank and the DHW tank after receiving a control signal from the heat pump. The valve body is made of CW617N brass.

The actuator is controlled by a 2-point 230 V AC signal. When voltage is applied only to the L wire, the flow is from connection AB to connection B. When voltage is applied to the L and L1 wires (signal from the heat pump), the valve actuator switches the flow so that it is from AB to A. When the voltage is removed from the L1 wire, the valve closing element returns to its initial position.

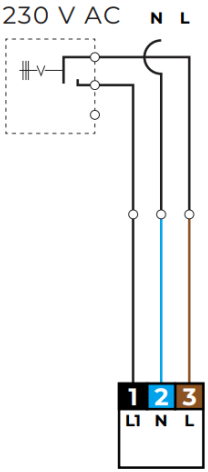


Figure 9. Electrical diagram of the AZV valve actuator

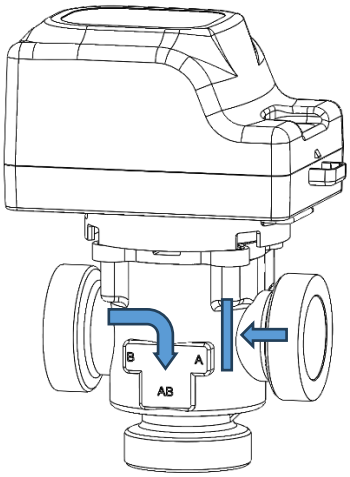


Figure 10. Flow diagram in the AZV valve without voltage supply

In the event of a power failure, the valve closing element remains in the last position it was in before the failure. To remove the actuator from the valve for maintenance or for manual operation of the closing element, remove the metal locking clip and lift the actuator. The valve can then be operated freely using the red adjustment ring (Fig. 11). The current position of the AZV valve can be checked in the actuator window (Fig. 12), where green indicates open flow and red indicates closed flow.

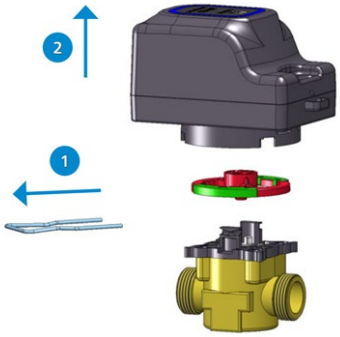


Figure 11. Procedure for removing the actuator from the valve

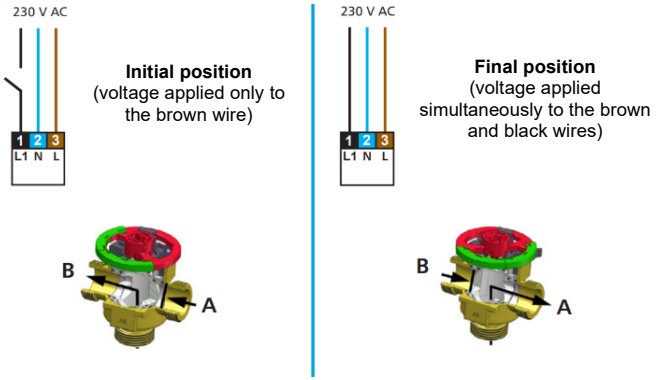


Figure 12. Position of the three-way valve

The most important technical parameters of the AZV switching valve are presented in the table below.

Table 3. Technical data for AZV switching valve

Parameter/part	Value/description
Valve	
Connections	G1¼”
Flow coefficient Kvs	11 m^3/h
Size	DN25
Medium temperatures	-15÷90°C
Medium pressure	max 10 bar
Material	CW617N brass
Actuator	
Supply voltage	230 V AC, 50 Hz
Switching time	15 s
Rated power	7 VA, 0 VA in rest position
Protection degree of the housing	IP54
Housing protection class	II (in accordance with EN60730-1)
Ambient temperature range	0÷75°C at S3 25%

Detailed information on the construction, operation and technical data of the switching valve can be found in the installation and operating manual included in the scope of delivery of the module.

3.2.4 Construction and operating principle of the ADS 181 dirt separator

The ADS 181 magnetic dirt separator is designed to separate metallic and non-metallic dirt from the medium. The purified medium then flows to the heat source.

Figure 13. Stages of medium filtration in the ADS 181 separator

Detailed information on the construction, operation and technical data of the separator can be found in the installation and operating manual included in the scope of delivery of the module.

3.2.5 Construction and operating principle of the MS safety valve

The MS safety valve protects the module heater against pressure peaks caused by an increase in the medium temperature. If the pressure in the system reaches 3 bar, the valve releases some of the medium from the system to reduce the pressure.

The safety valve is used to protect the module itself! Another valve must be installed outside the module to protect the heat source and the heating system.

Detailed information on the construction, operation and technical data of the valve can be found in the installation and operating manual included in the scope of delivery of the module.

WARNING **Risk of scalding**

- ▶ Hot liquid may leak from the safety valve discharge pipe under pressure. This is normal valve operation.
- ▶ Never block the safety valve outlet.
- ▶ Read the safety valve manual.

3.3 Scope of delivery

The AMB 900 module delivery includes:

- hydraulic module,
- set of dummies for the hydraulic module housing,
- set of flat gaskets for connecting the module,
- template for wall mounting,
- outlet pipe for the safety valve,
- module installation and operating manual,
- service kit for ADS 181 dirt separator,
- operating manual for ADS 181 dirt separator,
- operating manual for AZV switching valve,
- operating manual for MS safety valve.

3.4 Technical data

Table 4. Technical data for the AMB 900 module

Parameter/part	Value/description
General specifications	
Dimensions (HxWxD)	765 x 578 x 252 mm
Weight	27,6 kg
Operating pressure	max 3 bar (0,3 MPa)
Operating temperature	5÷90ºC
Heat pump connections	G1¼" nut
Zone-specific connections	G1¼" nut
Glycol concentration	max 50%
Kvs	6,5 m^3/h
Flow	max 3,1 m^3/h
Recommended heat pump output	max 16,0 kW
Electrical parameters	
Electricity supply	AC 230 V ~/ AC 400 V 3N ~, 50 Hz
Heater output	max 9,0 kW for 400 V AC max 3,0 kW for 230 V AC
Recommended power cable	5x 2,5 mm^2 for 400 V AC 3x 2,5 mm^2 for 230 V AC
Recommended control cable for the heat pump (depending on the system requirements)	min 5x 1,0 mm^2 max 10x 1,0 mm^2

3.5 Approvals, approvals, conformity

AFRISO hereby declares that the product complies with:

- LVD Directive: 2014/35/EU,
- EMC Directive: 2014/30/EU,
- RoHS Directive: 2011/65/EU,
- PED Directive: 2014/68/EU.

4 Example application diagrams

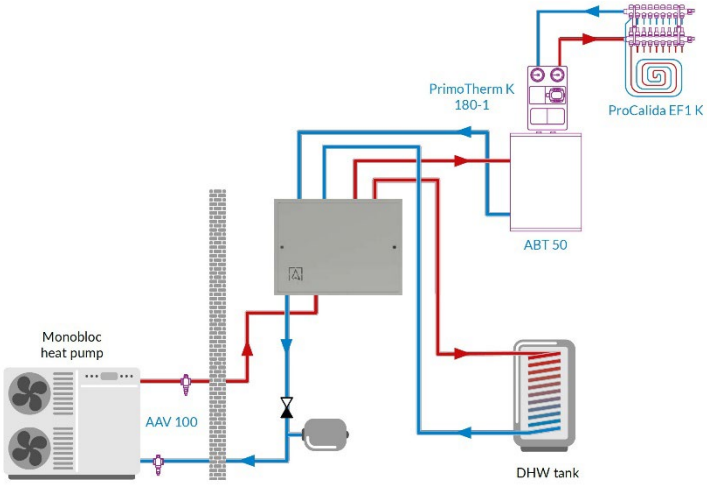


Figure 14. AMB 900 hydraulic module used in a system with a monobloc heat pump and a single surface heating circuit

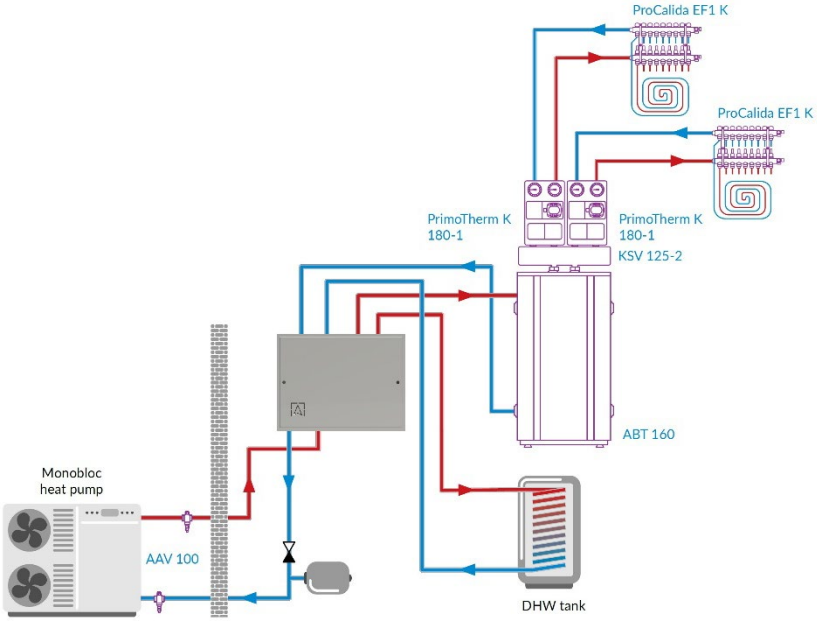


Figure 15. AMB 900 hydraulic module used in a system with a monobloc heat pump and two surface heating circuits

5 Transport and storage

WARNING **Possibility of damage to the device during improper transport and storage.**

- ▶ Do not throw the device.
- ▶ Protect against moisture, dirt and dust.
- ▶ Store the device in a dry and clean room.
- ▶ Protect against moisture, dirt and dust.

6 Mounting and activation

The installation site of the AMB 900 module must provide protection against weather conditions. The AMB 900 must not be installed outside buildings. The module can be installed in any room protected against temperatures below 5°C. It is designed to be hung on a wall in a horizontal position.

The module construction allows the housing to be dismantled and the rear part to be freely mounted on the wall.

First, check whether the wall on which the module is to be mounted is sufficiently strong. Select the proper mounting plugs for the specific wall type (not included in the scope of delivery).

WARNING **Possibility of damage to existing installations**

- ▶ When drilling into walls, take special care not to damage electrical cables or other existing wiring.

6.1 Wall mounting

On a selected, straight wall, mark the locations for the dowels so that they coincide with the holes in the rear of the AMB 900 housing (Fig. 16). The kit includes a template for drilling the holes in the wall (Fig. 17).

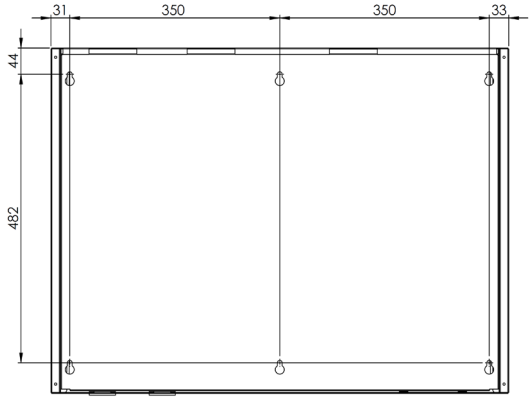


Figure 16. Mounting hole spacing [mm]

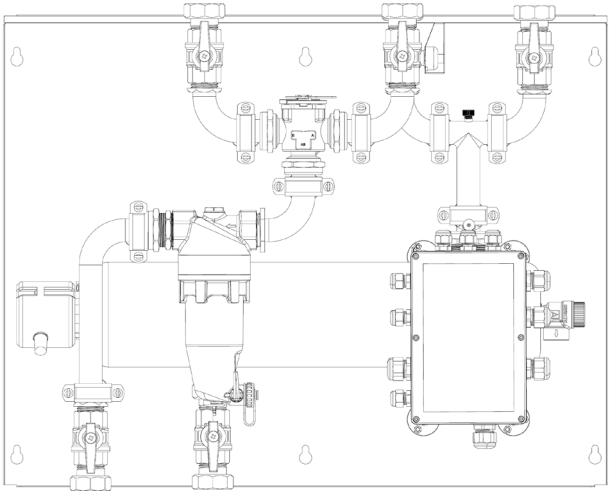


Figure 17. Mounting template

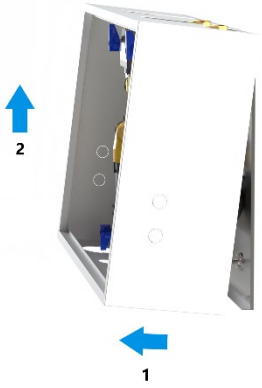
Next, hang the module on the wall. Wall mounting can be performed with or without the housing. The procedure for removing the housing is described below:

1. Unscrew the wing nut and then pull out the two ends of the grounding wires with ring terminals. There will be a corrosion pad underneath them. Put them in a safe place.

2. The front panel is fitted with a detachable hinge system. It can be detached by pulling the hinge component.

3. Unclip the two knee-shaped latches located at the bottom of the housing, symmetrically positioned relative to the centre.

4. Lift the lower part of the housing slightly, then slide it forward, moving the housing away from back panel.



5. The back panel with the hydraulic part attached must be screwed to the wall. The template included in the package can be used for this purpose. The hydraulic connection can be made before or after mounting the housing.

6. Install the housing on the back panel by following steps 1-4 in reverse order. **Before finishing the mounting, make sure that all grounding wires are in the proper outlet above the corrosion pad!**

6.2 Hydraulic connections

Before connecting the module to the heating system, flush the system thoroughly, paying particular attention to removing any solder residue, pipe cutting, threading, etc. For additional protection against corrosion and dirt, we recommend using a corrosion inhibitor in the system.

In order to protect the heat pump against damage caused by ice, which may form during a power failure in winter, follow the heat pump manufacturer's recommendations first. If the manufacturer does not specify a recommended method for protecting the pump against frost, AAV AFRISO anti-freeze valves or anti-freeze fluid should be used.

The module should be connected to the system using flat gaskets included in the scope of delivery. When connecting the buffer tank/system and the DHW tank, pay attention to the markings of the specific return connection. The flow is controlled by a switching valve on the return.

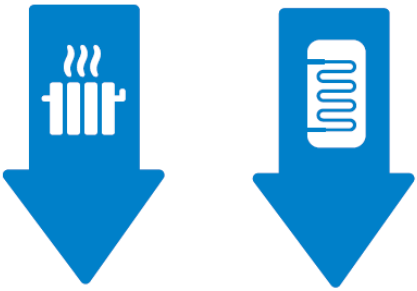


Figure 18. Designations of return connections from circuits

Heat consumers or a buffer tank should be connected directly to the connection marked with . A DHW tank coil should be connected to the connection marked with . The order of power supply connections is irrelevant.

The medium temperature sensor from the heat pump control system should be placed in the proper location on the supply pipe by unscrewing the brass nut, inserting the sensor and tightening the nut (Fig. 19). The diameter of the heat pump sensor sleeve must not exceed 7 mm. The depth of the sensor location is 30 mm.

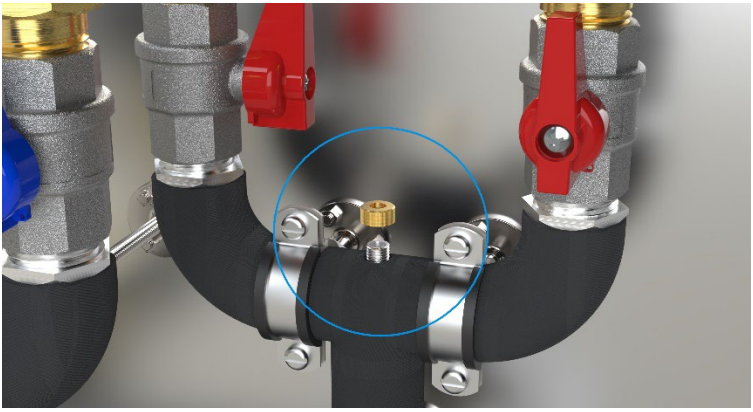


Figure 19. Temperature sensor insertion point

The outlet from the safety valve must be connected to the sewer drain. To do this, screw in the discharge pipe included in the set and discharge it through the opening provided for this purpose (Fig. 20). When routing the discharge pipe to the sewer, follow the instructions in the MS safety valve installation and operating manual, which is included in the scope of delivery of the module.

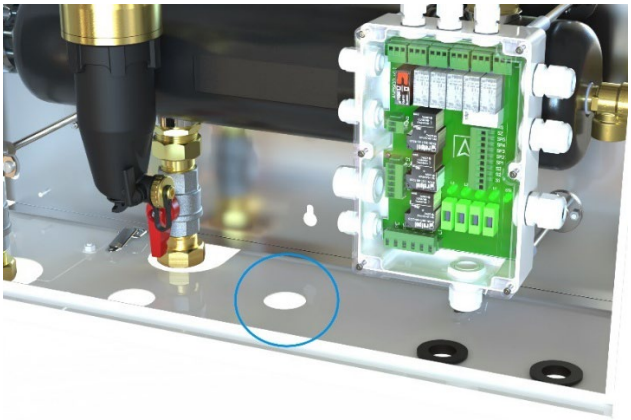


Figure 20. Safety valve discharge opening

6.3 Changing the opening side of the housing

It is possible to change the opening side of the AMB module enclosure door from left to right. To do this, disconnect the grounding wires, switch the door from left to right by reversing the hinge and screw, and reconnect the grounding in a mirror image. The procedure for changing sides is described below:

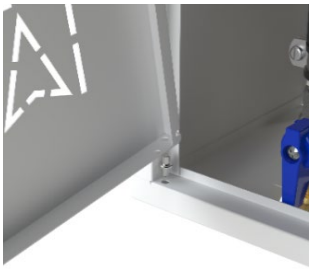
1. Unscrew the wing nut and then pull out the two grounding wires with ring terminals. There will be a corrosion-resistant washer underneath. Transfer to the protrusion located symmetrically on the right side, remembering the assembly order: corrosion-resistant washer and wire with a ring terminal coming from the electrical part. Put the nut in a safe place.

2. Unscrew the nut on the grounding cable in the door, then move it to the symmetrically located outlet on the opposite side, remembering the assembly order: self-locking washer, cable with ring terminal and nut.

3. The front panel is fitted with a detachable hinge system. It can be detached by pulling the hinge component.

4. Slide the hinge out of the hole and place it symmetrically on the other side of the door.

5. Pull out the door and remove the hinge element.



6. Untighten the screw on the other side of the housing. A locking nut is screwed into the screw under the metal plate. Insert the hinge component into the hole. Thread the screw into the hole on the opposite side (point 5). Slide in the door with the hinge attached and **connect the grounding cables.**

6.4 Electrical connections

DANGER

The mains voltage (230 V AC / 400 V AC) can cause serious injury or death.

- Do not allow the actuator, electrical module and cables to come into contact with water.
- Do not touch any live components. Never connect or disconnect connection cables under load.
- Work on electrical circuits should be carried out by a person with the proper qualifications and authorisation.
- Before starting any mounting or maintenance work, disconnect the hydraulic module and heat pump from the power supply and secure them against being switched on again.
- Incorrect mounting may cause a fire hazard.

Before connecting the electrical module, verify that the electrical installation is equipped with protective devices (circuit breaker and residual current device). If the installation does not have these components, they must be retrofitted. When connecting the electrical module to the domestic power supply, observe the health and safety regulations and other relevant accident prevention regulations. Also observe all national regulations applicable in this case.

When mounting the module and during future maintenance work, make sure that the connections are tightened to the proper torque to prevent the cables from loosening. This could damage the electrical equipment and result in electric shock. The complete electrical diagram is provided in Chapter 12, “Electrical diagram”.

WARNING

No residual current device in the AMB module

- In order to protect against electric shock, a residual current device that is not part of the AMB module's electrical switchgear must be installed in the domestic electrical installation.

The AMB 900 hydraulic module is connected to a power supply of 230 V AC or 3x 230 V AC. To use the full power of the heater (9.0 kW), the domestic installation must be 3-phase. If the installation is 1-phase, the flow heater has a maximum power of 3.0 kW.

The wires for connecting the electric heater module should be routed through proper rubber grommets mounted in the bottom wall of the cabinet (or knocked out in the designated places on the sides of the enclosure, **remembering to move the rubber grommet to this place**) and cable glands in the PCB board housing.

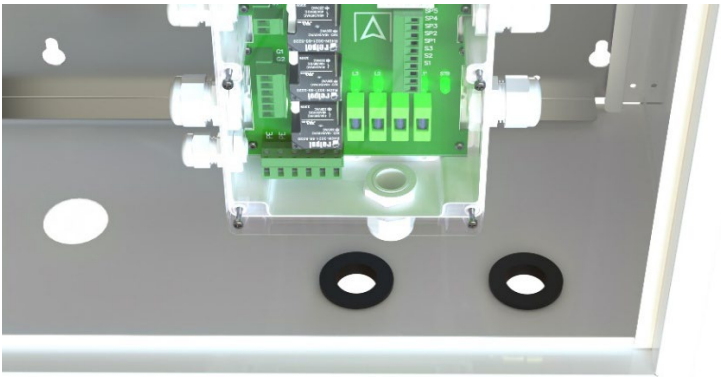


Figure 21. Place for routing power supply cables

Figure 22. Place for punching holes for power supply cables

Recommended cable cross-section:

The power supply to the AMB 900 hydraulic module must be connected using a five-core cable with a cross-section of 2.5 mm². Using a larger cross-section may cause difficulties with connecting the cable to the socket. A 5G2.5mm² cable is recommended for powering the PCB board. During preparation of the cable for connection, it is recommended to remove the insulation to a length of 10 mm. This will allow for convenient connection to the slot.

The connection between the heat pump and the AMB 900 hydraulic module must be made using a multi-core cable, with the number of cores matching the specific requirements of the installation.

For control purposes, we recommend a YKSY 10×1 mm² cable, which enables full use of all AMB 900 hydraulic module functions and fits through a PG16 cable gland. If not all circulation pumps are to be used, a cable with a reduced number of cores may be selected accordingly. A maximum of five P3 slots are available for connecting circulation pump control. The minimum number of wires required to start the module with a single-stage heater is four.

The most common configuration - with a three-stage heater and two circulation pumps - requires a cable with seven wires.

When preparing the cable for connection, it is recommended to strip the insulation to a length of 9 mm, allowing for easy insertion into the slots.

Table 5. Technical data of the AMB 900 module

Type of cable	Number of wires	Recommended cable cross-section	Recommended cable
Power supply	5	2,5 mm^2	5G2,5mm^2
Control	4-10	0,75 -1,5 mm^2	YKSY10x1mm^2
Circulation pump	3	1-1,5 mm^2 *	OWY3x1mm^2

** Assuming a standard circulation pump with a power rating of up to 100 W*

Installing the wire in the slot

Remove the terminal strip from the board, insert the proper cable into the slot and tighten the corresponding screw (Fig. 23). A correctly installed wire should not come out of the slot when pulled. Insert the prepared strip with the crimped wires into the appropriate place on the PCB board.

The cable should be installed in the slot after disconnecting the power supply from the PCB board.

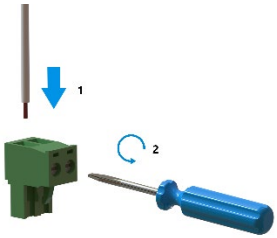


Figure 23. Wire installation in the terminal strip

Power supply

The power supply must be connected to a 6-pin female detachable terminal block (7.62 mm) marked with the number 1 in Table 2: *PCB board description key*. A 5-core cable containing 3 phases of 230 V AC, a neutral wire and an grounding wire must be connected to the power supply socket. Connect the brown wire to the first phase slot marked L1. Connect the black wire to the second phase marked L2, and connect the grey wire to the third phase marked L3. Connect the blue neutral wire to the slot marked N. Connect the yellow-green grounding wire to one of the two slots marked PE.

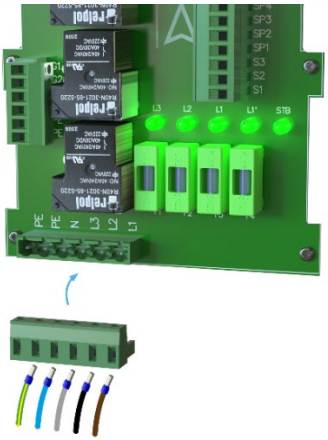


Figure 24. Power supply cable installation on the PCB board

Heat pump control

The control cable must be connected to the 10-pin female detachable terminal block (5 mm) marked with the number 3 in Table 2: *PCB board description key*. Connect a cable with 5 to 10 wires to the control socket, depending on the number of circulation pumps to be controlled. 5 wires will allow for the necessary control connection. The colours of the wires connected to the slots on the heat pump PCB board must match the same colours in the proper slots on the AMB 900 PCB board. The heater control wires must be plugged into the slots marked S1, S2 and S3, respectively. The wire numbers match the heater stages. The wire for controlling the three-way switching valve must be plugged into the slot marked SZ. The neutral wire must be plugged into the NS slot. Optional circulation pump control must be plugged into slots SP1, SP2, SP3, SP4 or SP5.

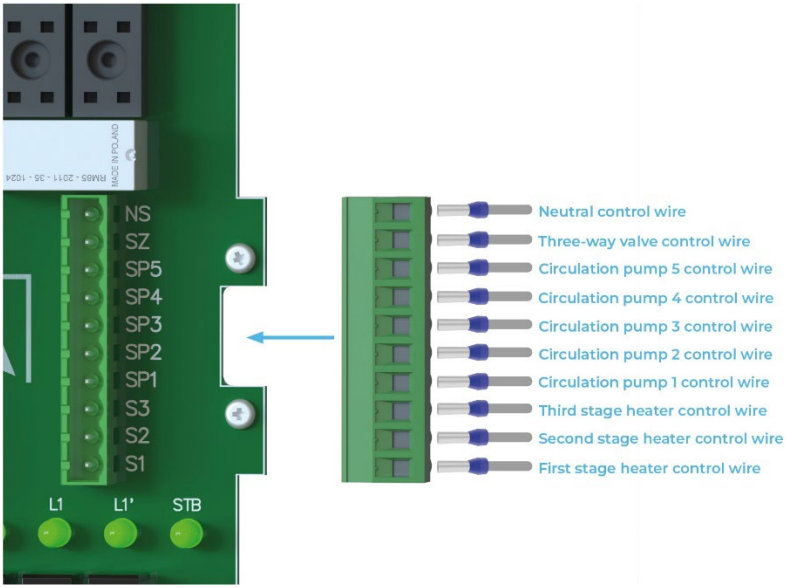


Figure 25. Control cable installation on the PCB board

Circulation pump connection

The circuit pump cable should be connected to the 3-pin female detachable terminal strip (5 mm) marked with the number 4 in Table 2. *PCB board description key*. The phase wire should be plugged into the slot marked L. The blue neutral wire should be connected to the slot marked N. The yellow-green grounding wire should be connected to the slot marked PE (Fig. 26).

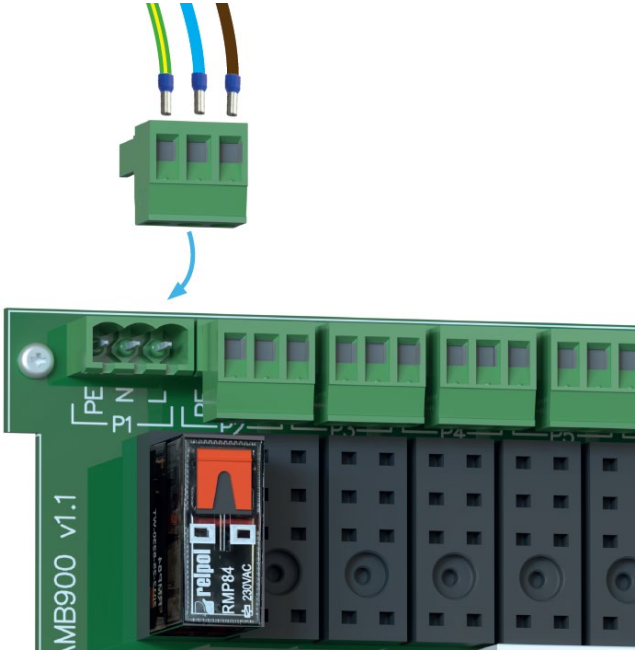


Figure 26. Circulation pump cable installation

Circulation pump connection test

After connecting the circulation pump, it is possible to manually test the operation of the device. To perform the test, connect the electromagnetic relay to the proper socket (it is factory connected to the first socket) and lift the lever. Lifting the lever will short-circuit the contact, transmit the signal and activate the pump. To disable the manual test, lower the lever. To check other sockets, remove the relay from the socket and place it in another socket according to the pin layout (Fig. 28).

ATTENTION! The circulation pump function test should only be performed on a fully filled system (see Chapter 6.5).

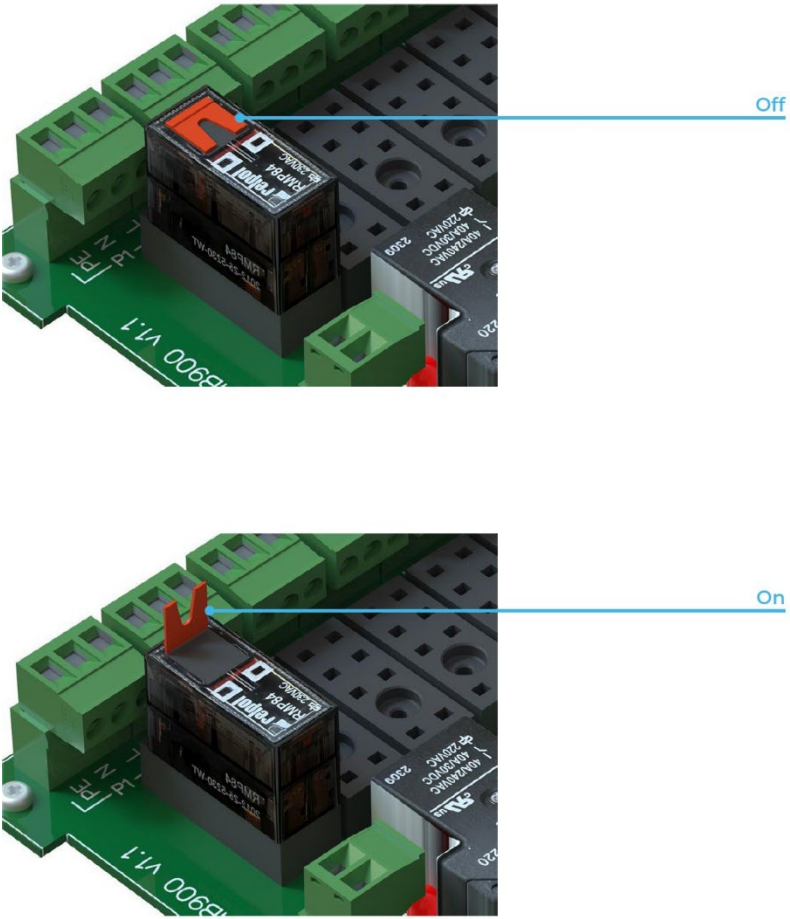


Figure 27. Circulation pump connection test

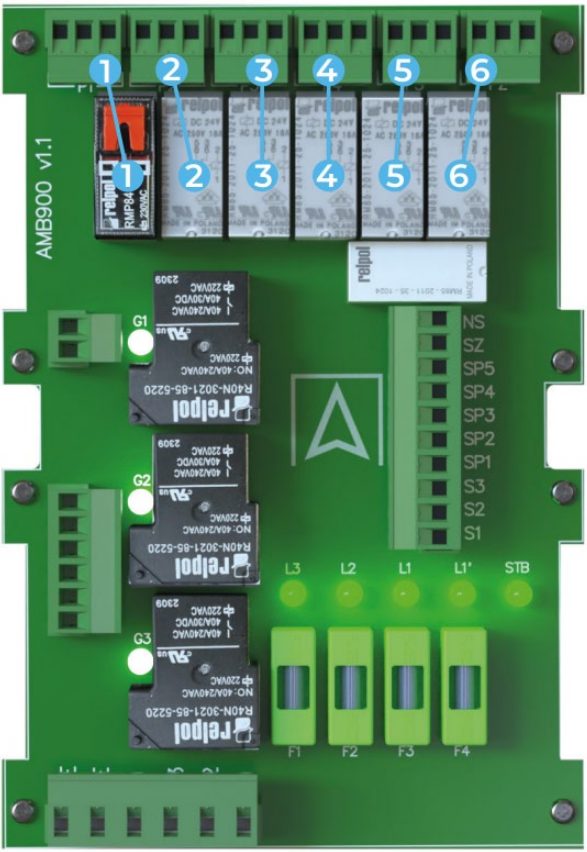


Figure 28. Relay sockets corresponding to specific circulation pumps

6.5 Filling and venting

Fill the module with heating water in accordance with VDI 2035. The module is suitable for a water/glycol mixture of up to 50%. The filling process must be carried out slowly and carefully to prevent damage to system components. Ensure proper venting throughout the filling process. **The electric heater must not be operated without water!**

CAUTION **Risk of scalding and electric shock**

- Hot water may cause scalding during installation and maintenance work. Always ensure that the system has cooled down before starting any work.
- Do not touch pipes - they may be extremely hot and can cause serious scalding.
- Do not touch any live components. Never connect or disconnect cables under electrical load.
- Prevent the actuator, electrical switchgear components, and cables from coming into contact with water.
- Electrical switchgear components and cables may become very hot under load (above 50°C). Before performing any work, disconnect the power supply and allow the system to cool down.

7 Maintenance

Periodically, at least once a year, check the tightness of the connections between the system and the module and visually inspect the module for mechanical damage and corrosion.

The MS safety valve must be checked for correct operation at least once every 6 months. The procedure is described in the valve operating manual, which is included in the scope of delivery of the AMB module.

The dirt separated by the ADS 181 separator must be drained at regular intervals. In addition, the separator must be thoroughly cleaned at least once a year. The procedure for periodic and thorough cleaning is described in the separator operating manual.

At least once a year, check the condition of the electrical installation in the electrical module. Check the tightness of all electrical connections. Tighten any loose connections and check the cable glands for stability and tightness. Check the cables, cable connections and equipment for signs of overheating, e.g. discolouration or deformation. It is recommended to perform electrical measurements.

7.1 Replacement of the fast-acting fuse

If the fuse blows, replace it as soon as possible. To replace the fuse, remove the plastic cover from the slot and slide the fuse out. Place the new fuse in the plastic cover and insert it into the slot.

Table 6. Selection of fuses for proper slots

Code	Name
F1, F2, F3	Fast-acting fuse; fast; 15A; 250VAC; cylindrical, glass. LITTELFUSE 0217015.HXP
F4	Fast-acting fuse; fast; 6.3A; 250VAC; cylindrical, glass. LITTELFUSE 021806.3HXP

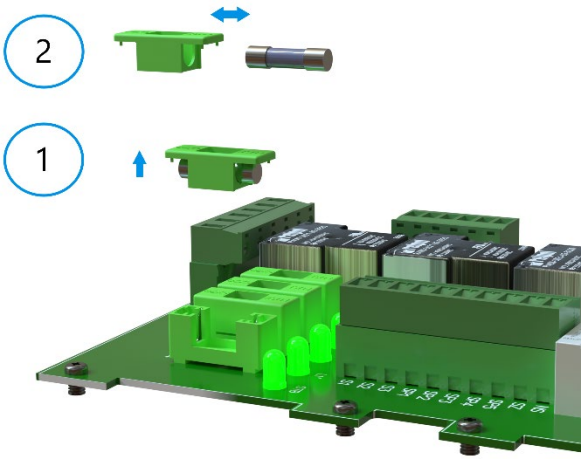


Figure 29. Replacement of the fast-acting fuse

8 Troubleshooting

Problems that cannot be solved using the measures described in this chapter may only be resolved by the manufacturer or specialised personnel.

Table 7. Troubleshooting

Problem	Cause	Repair
None of the LEDs on the PCB are on	No power supply	Check presence of power supply, status of protection in the switchgear supplying the AMB
		Check that the power supply cable is correctly installed and that the plug is properly inserted into the socket
The green LED L1, L2 or L3 are off despite the power supply being present	The PCB board power supply circuit protection has been activated	Check fuses F1, F2 and F3. If any of them are blown, this may indicate that the heater is faulty. After checking the condition of the heater and its power supply cable, replace the faulty fuse. If the heater is faulty, replace it with a new one
The green LEDs L1' and L1 are off	No L1 phase on PCB power supply	Check the power supply and the status of the fuse in the AMB module power distribution board
		Check that the power supply cable is correctly installed and that the plug is properly inserted into the slot

Problem	Cause	Repair
L1 green LED off	The F4 safety device on the PCB board control circuit has been activated	Check the F4 fuse. If it is blown, this may indicate damage to one of the components powered by this circuit – pump, AZV switching valve. After checking the condition of these components, their power supply cables and the condition of the plugs, replace the fuse with a new one. If any of the components (pump, valve) is damaged, replace it with a new one
Green STB LED are off	Break in the heater control safety circuit	Check the connection of the control cable in the NS slot
		Check the connection of the STB thermostat cable.
		The STB safety device has been activated – the temperature at the heater outlet has exceeded 80˚C. This may be caused by insufficient flow through the heaters. Check that the system valves are fully open or check the condition of the dirt filter, then press the RESET button on the STB thermostat
Despite the G1, G2 or G3 LED are on, the temperature at the power supply does not increase	The immersion heater is not functioning properly	Check that the heater power cable is correctly installed
		Check the connection of the control cable in slots S1, S2 and S3
		Check the condition of the heater - replace with a new one if damaged

Problem	Cause	Repair
The circulation pump is not working	Incorrect connection of the circulation pump cable, failure of the electro-magnetic relay or failure of the circulation pump	Check the connection of the control cable in the SP slot
		Check the operation of the pump using an electro-magnetic relay with manual activation. See Fig. 27. If the pump is working, replace the faulty electromagnetic relay
		Check the operation of another device in this slot. Possible failure of the circulation pump
Switching valve does not work	Incorrect connection of the switching valve cable, failure of the electromag-netic relay or switching valve	Check the connection of the control cable in the SZ slot
		Check the operation of the switching valve using a manually activated electromagnetic relay. See Fig. 27. If the valve operates, replace the defective electromagnetic relay
		Check the operation of another device in this socket. Possible failure of the switching valve

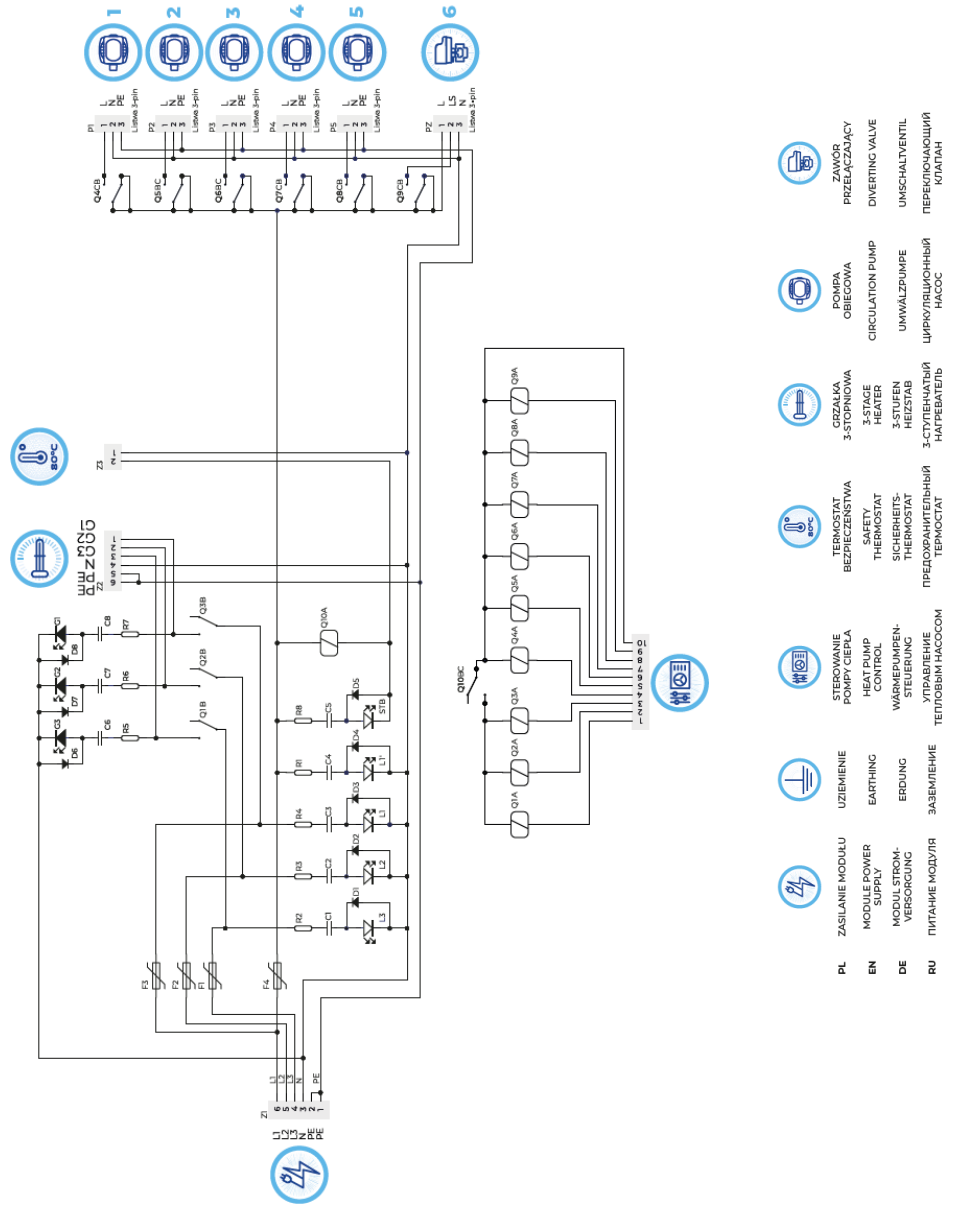
9 Decommissioning, disposal

1. Disconnect the power supply.
2. Dismount the device.
3. Dispose of the product according to local directives and guidelines. Electronic parts and batteries should not be disposed of with household waste. Return the product to the appropriate collecting point or to the manufacturer’s or distributor’s collecting point.

10 Warranty

Product guarantee in accordance with the general conditions of sale and delivery.

11 Electrical diagram



12 Declaration of conformity

AFRISO instalacje pod kontrolą	Deklaracja zgodności UE *EU Declaration of Conformity* *EU-Konformitätserklärung*	Formularz F 33

Nazwa i adres producenta: AFRISO Sp. z o.o., Szałsza ul. Kościelna 7, 42-677 Czekanów
Manufacturer / Hersteller

Produkt/y: Moduł hydrauliczny do pomp ciepła
Product / Erzeugnis

Typ: AMB 900
Type / Typenbezeichnung

Dane techniczne: AC 230 V / 400 V 3N, 50 Hz, Pmax 3 bar, Tmax 90°C,
Techn. details / Betriebsdaten

Wymieniony powyżej produkt, objęty deklaracją, jest zgodny z wskazanymi poniżej wymaganiami unijnego prawodawstwa harmonizacyjnego:
The above-mentioned product, meets the requirements of the following European Directives:
Das bezeichnete Erzeugnis stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:

- Dyrektywa niskonapięciowa (2014/35/UE)
  (Low Voltage Directive / Niederspannungsrichtlinie)
- Dyrektywa kompatybilności elektromagnetycznej (2014/30/UE)
  (Electromagnetic Compatibility Directive / Elektromagnetische Verträglichkeit)
- Dyrektywa RoHS (2011/65/UE)
  (RoHS Directive / RoHS-Richtlinie)
- Dyrektywa ciśnieniowa (2014/68/UE)
  (Pressure Equipment Directive / Druckgeräterichtlinie)

Zastosowane Normy techniczne:
Technical standards / Technische Richtlinien:

- PN-EN 60335-1:2012 + A1:2019-10 + A2:2019-11+ A11:2014-10 + A13:2017-11 A14:2020-05 + A15:2022-01,
- PN-EN 60335-2-35:2016-03 + A1:2020-05 + A2:2022-02,
- PN-EN IEC 55014-1:2021-08,
- PN-EN 55016-2-1:2014-09 + A1:2017-12,
- PN-EN 55016-2-3:2017-06 + A1:2020-01,
- PN-EN 61000-3-2:2019-04 + A1:2021-08,
- PN-EN 61000-3-3:2013-10 +A1:2019-10,
- PN-EN 61000-4-7:2007 + A1:2011,
- PN-EN 61000-4-30:2015-05.

Wystawiona przez: Krzysztof Mainka, Dyrektor Techniczny.
Signed / Unterzeichner

W dniu: 9 kwietnia 2025 r., Szałsza, Polska
Date / Datum

Podpis:
Signature / Unterschrift

AFRISO Spółka z o.o.
SZAŁSZA, ul. Kościelna 7
42-677 CZEKANÓW
NIP 631-19-79-176, Regon 273439075

Wydanie 1	Niniejsza deklaracja zgodności zostaje wydana na wyłączną odpowiedzialność AFRISO Sp. z o.o.	str. 1/1