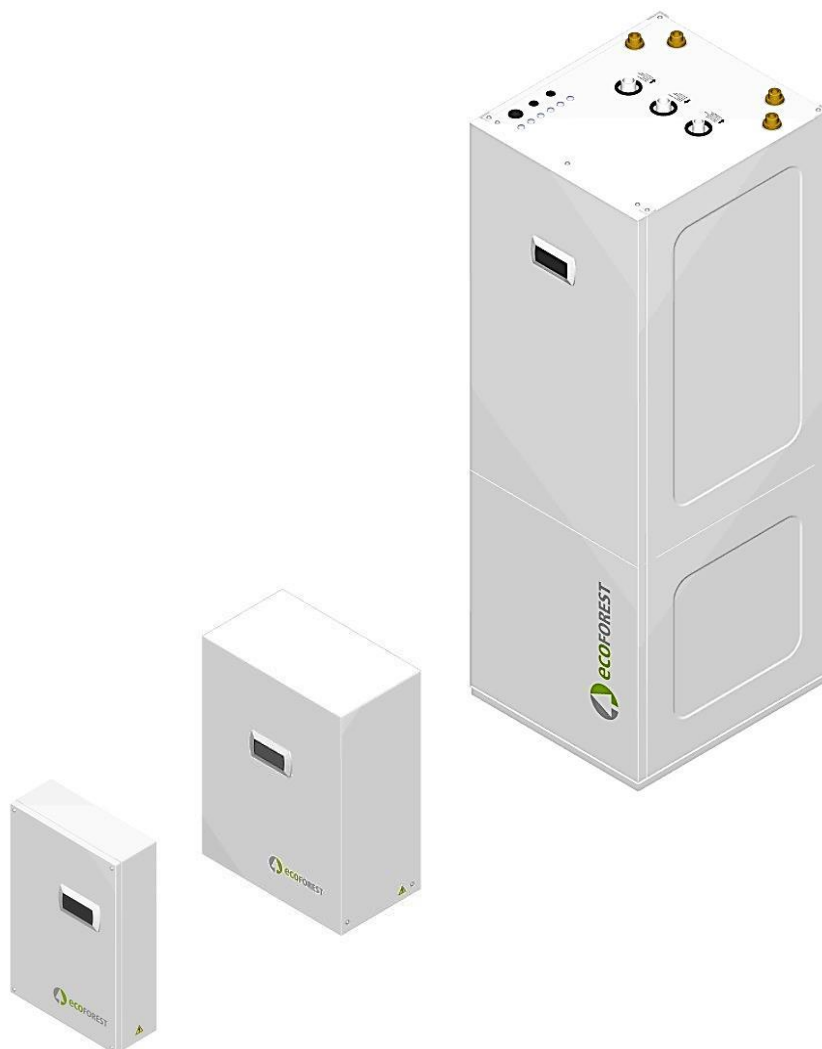




ecoAIR CM – Hidrokit - Hidrokit Compact (GEN2)

EN

TECHNICAL MANUAL Indoor Units

MODEL:

SERVICE CONTACT:

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1. General information



- This manual contains the necessary information to install the heat pump. Read this manual carefully before installing the equipment. Keep this manual handy for future reference.

This manual contains two different kinds of warnings that should be heeded.



NOTE

- Indicates a situation that may cause material damage or equipment malfunction. This may also be used to indicate practices that are recommended or not recommended for the equipment.



DANGER!

- **W**arning of imminent or potential danger which, if not avoided, may result in injury or even death. This may also be used to warn of unsafe practices.

Indoor units are designed to control heat pumps / ecoAIR outdoor unit, to serve heating or cooling systems, to produce domestic hot water (DHW), to heat pools or for other similar uses. The manufacturer is not responsible for any material damage and/or personal injury resulting from improper use or incorrect installation of the equipment.

The units must be installed by an authorised technician following local regulations and according to the instructions described in this manual.

1.1. Safety considerations

The detailed instructions in this section cover important safety aspects and must therefore be strictly complied with.



DANGER!

- **A**ll the installation and maintenance work described in this manual must be performed by an authorised engineer.
- **D**o not allow children to play with the units.
- **C**hildren should not clean or maintain the heat pump without adult supervision.
- **I**mproper installation or use of the equipment could cause electrocution, short circuits, leakage of working fluids, fire or other personal injuries and/or material damage.
- **I**f you are unsure of the procedures for installation, maintenance or use of the equipment, contact your local dealer or technical support for advice.
- **I**f you detect a malfunction in the unit, contact your local dealer or technical support to answer any questions.
- **W**hen carrying out installation, maintenance, or commissioning of the heat pump, always use appropriate personal protective equipment.
- **K**eeep the plastic bags included in the packaging out of the reach of children, as improper use could result in injury caused by asphyxia.

Hydraulic installation

Installation and subsequent interventions on hydraulic circuits must only be performed by authorised personnel in accordance with applicable local regulations and the instructions provided in this manual.



DANGER!

- Do not touch any of the pipes or any other components of the internal hydraulic circuits during or immediately after heat pump operation as this can result in burns caused by cold or heat. If these components need to be touched, allow sufficient time for the temperatures to stabilise and wear protective gloves to avoid injury.

Water quality

Be aware of how the DHW circuits and tank of the heat pump react to corrosion. If you are not sure about the quality of the water available for filling the system, analyse it. In the following tables you can check the water quality level requirements for the production circuit.

Water components	Concentration in mg/l	Water components	Concentration in mg/l
Alkalinity	$\text{HCO}_3^- < 70$	Free carbon dioxide	$\text{CO}_2 < 5$
Sulphur	$\text{SO}_4^{2-} < 70$	Nitrate	$\text{NO}_3^- < 100$
Alkalinity / Sulphur	$\text{HCO}_3^- / \text{SO}_4^{2-} > 1$	Iron	$\text{Fe} < 0.2$
Ammonium	$\text{NH}_4 < 2$	Aluminium	$\text{Al} < 0.2$
Free chlorine	$\text{Cl}_2 < 1$	Manganese	$\text{Mn} < 0.1$
Hydrogen sulphur	$\text{H}_2\text{S} < 0.05$	Chloride	$\text{Cl}^- < 300$

Table 1.1. Concentration limits of water elements for production and brine circuits.

Water properties	Limit values
pH	$7.5 < \text{pH} < 9$
Hardness	$4 < \text{°dH} < 8.5$
Electrical conductivity	$10 < \mu\text{S}/\text{cm} < 500$

Table 1.2. Water property limits for production and brine circuits.

The water used in the DHW tanks of Hidrokit Compact indoor units, must be drinking water with a chloride concentration of less than 250mg/l.



DANGER!

- Risk of damage due to unsuitable water.
- Deposits caused by the use of unsuitable water can damage the pipes, the heat exchangers and the DHW tank of the heat pump.
- The use of sea water is not permitted.
- The quality of the drinking water must comply with the applicable regional regulations and the instructions in this manual.

Electrical system

Any intervention on the electrical system must only be performed by an authorised electrician in accordance with applicable local regulations and the instructions provided in this manual.



DANGER!

- The units have more than one electricity source.

- **T**he heat pump must be supplied with an external switch that can cut off all the circuits. Ecoforest recommends that you install one automatic external switch for each power supply (indoor unit control, internal ancillary module, outdoor unit control and outdoor unit inverter).
- **B**efore performing any operation on the electrical panel, disconnect the power supply.
- **D**uring installation and maintenance of the unit, never leave the electrical panel unattended while it is exposed.
- **D**o not touch any component of the electrical panel with wet hands as this could cause an electric shock.

1.2. Type description

With the ecoAIR CM, Hidrokit and Hidrokit Compact indoor units, the control over the installations resides in the indoor unit. These units allow for the control of complex installations and, depending on the unit, the inclusion of installation components. The integrated components are specified below, according to the type of indoor unit:

	ecoAIR CM Lite	ecoAIR CM	HidroKit	HidroKit EH	HidroKit S	HidroKit EH-S	HK Compact EH	HK Compact EH-S
Control display	✓	✓	✓	✓	✓	✓	✓	✓
Services Electronic control		✓	✓	✓	✓	✓	✓	✓
Outlet and return temperature sensors			✓	✓	✓	✓	✓	✓
3-way DHW valve			✓	✓	✓	✓	✓	✓
Filtering and filling kit			✓	✓	✓	✓	✓	✓
Drain valves			✓	✓	✓	✓	✓	✓
Heater cartridge				✓		✓	✓	✓
Heat antifreeze agent / water exchanger					✓	✓		✓
Circulator pump with speed control					✓	✓		✓
DHW storage tank, 165l							✓	✓
DHW temperature sensor							✓	✓
12l expansion vessel							✓	✓
8l expansion vessel								✓
Safety valve 3 bar							✓	✓

Table 1.3. Components integrated into each indoor unit model.

If the installation is installed using an indoor unit, the outdoor unit is an integral part of the system, functioning as a slave to the indoor units. Furthermore, the ecoAIR CM indoor unit, in addition to managing the installation itself, can control up to six ecoAIR outdoor units in block.

In the case of the ecoAIR CM Lite, it is a control display on the outdoor unit, without installation management capacity. In this particular case, the outdoor unit will be in charge of controlling the installation. For more information on installation and control with an ecoAIR CM Lite, consult the manual corresponding to your outdoor unit. The ecoAIR CM Lite unit is compatible with outdoor units from GEN2.2.

This manual will cover the assembly, installation, control and properties of the ecoAIR CM, Hidrokit and Hidrokit Compact indoor units.

1.3. Maintenance



DANGER!

- **A**ll maintenance work must be performed by an authorized technician. Improper handling of the equipment as a whole can result in personal injury and/or damage to materials.
- **C**leaning and user maintenance shall not be made by children without supervision.
- **B**efore performing any operation on the unit, disconnect the power supply.
- **D**uring installation and maintenance of the equipment never leave the electrical panel unattended while it is exposed.
- **D**o not touch any component of the electrical panel with wet hands as this could cause an electric shock.
- **D**o not touch the antifreeze fluid. This can cause rashes and even burns.
- **D**o not swallow the antifreeze fluid. In the event of accidental ingestion, go to the nearest hospital immediately.
- **D**o not let the antifreeze fluid come into contact with the eyes. In the event of accidental contact, wash the eyes with plenty of water and go to the nearest hospital.
- **I**f there is a leak in the brine circuit, the circuit should only be filled with the appropriate antifreeze mixture; otherwise, the heat pump may malfunction or even break down.
- **D**o not spill water or other liquids directly on the heat pump to clean it, as this could cause an electric shock or fire.
- **T**he filling and refilling water must comply with local regulations and the indications shown in the heat pump installation manual.

Ecoforest heat pumps do not require specific maintenance after they are started up. The controller monitors a large number of parameters and will produce a warning if any problem arises. It is simply necessary to ensure that the installation is checked regularly by an authorized installer to make sure that the heat pump is running properly.

It is recommended that periodic inspections of the equipment and installation be carried out, including the following actions:

- Check that the unit does not emit unusual noises or vibrate unexpectedly during operation.
- Check and clean hydraulic circuit filters, if necessary. Replace if broken or damaged.
- Check that there are no leaks of antifreeze or water. Also check the seals.
- Check the pressure of the circuits. In the event of a drop in pressure, before filling the circuit and, if necessary, adjust the preload pressure of the expansion tank included in the Hidrokit Compact according to the needs of the installation.

1.4. Disposal



- This device should not be treated as household waste.
- At the end of its useful life, dispose of the device properly in accordance with local regulations and in an environmentally friendly way.

2. Installation of the ecoAIR CM indoor unit

2.1. Transport and handling

Transport the ecoAIR CM indoor unit in such a way that it is not exposed to bad weather conditions.

2.2. Dimensions and connections

The general dimensions of the ecoAIR CM indoor unit are set out below.

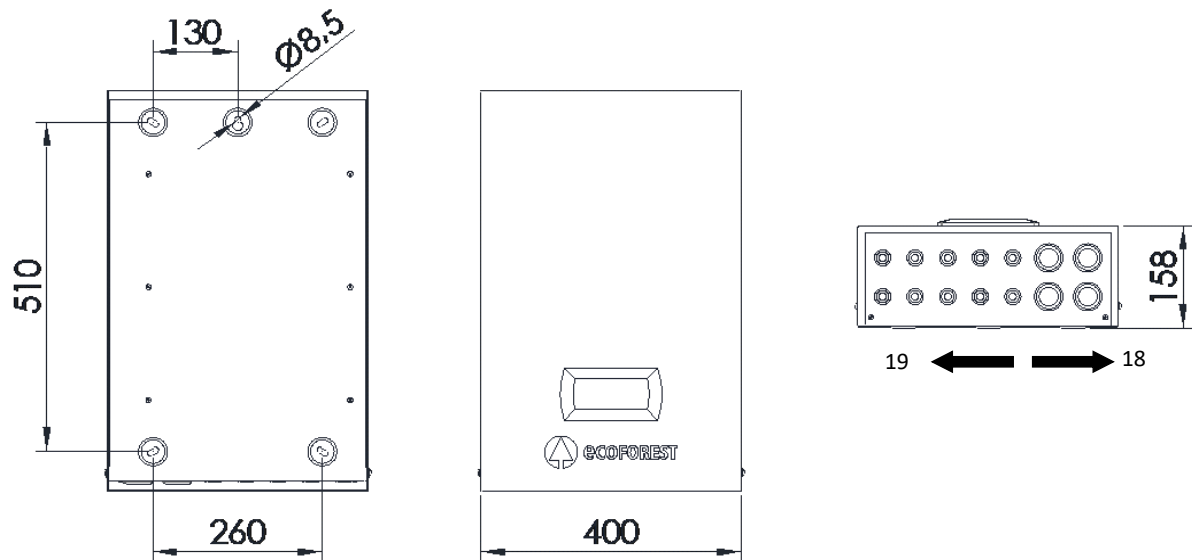


Figure 2.1. Overall dimensions of the ecoAIR CM indoor unit (Dimensions in mm).

2.3. Unpacking

When unpacking the ecoAIR CM indoor unit carefully remove the box and check that the unit has not been damaged during its transportation.

2.4. Assembly and disassembly of the covers

A 4 mm Allen wrench is needed to assemble and disassemble the covers. Remove the front cover by loosening the two side screws and pulling it.

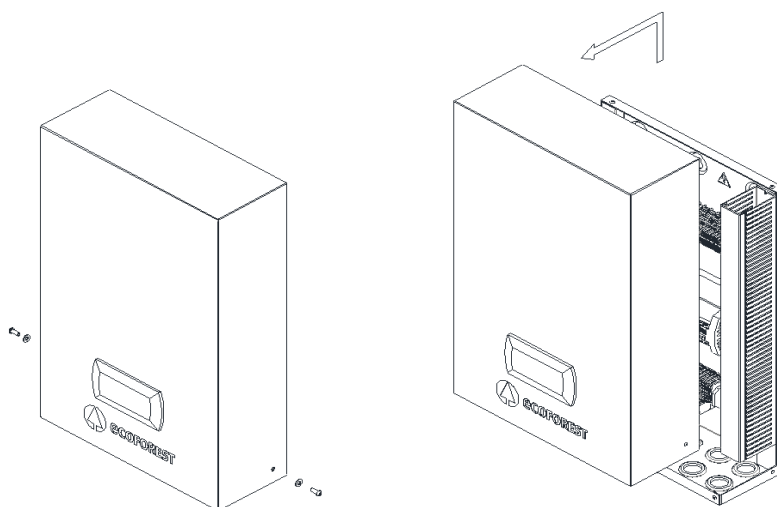


Figure 2.2. Removing the front cover of the ecoAIR CM indoor unit.



NOTE

- When removing the cover, take care to remove the control panel cable without damaging it.

EN

2.5. Location and assembly

Choose a dry place where there is no risk of frost. The ecoAIR CM indoor unit must be installed on a stable wall that can bear the total weight of the unit. Use a spirit level to ensure that it is completely horizontal.

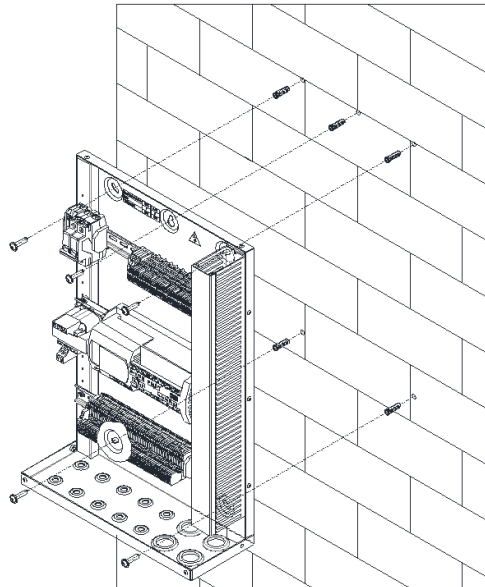


Figure 2.3. Positioning of the ecoAIR CM indoor unit.

2.6. Service areas

The minimum recommended distances to be left around the ecoAIR CM indoor unit to facilitate installation, start-up and maintenance work are indicated below.

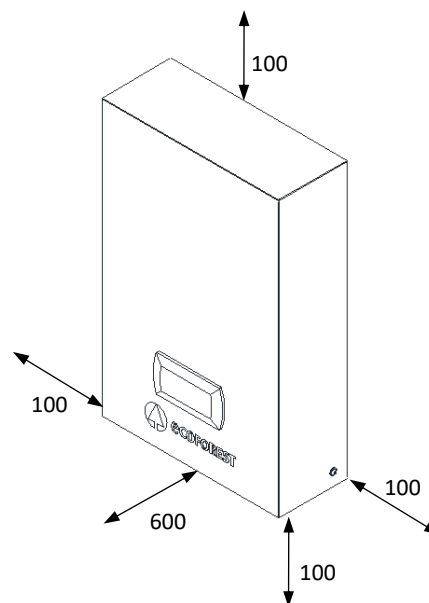


Figure 2.4. Areas of recommended minimum service around the ecoAIR CM indoor unit (dimensions in mm).

3. Installation of the Hidrokit indoor unit

3.1. Transport and handling

Transport the indoor unit in such a way that it is not exposed to bad weather conditions.



NOTE

- Due to the heavy weight of the Hidrokit indoor unit it should be handled by at least two workers using a forklift for heavy loads.

3.2. Dimensions and connections

The overall dimensions and the hydraulic connections of Hidrokit indoor units are set out below.

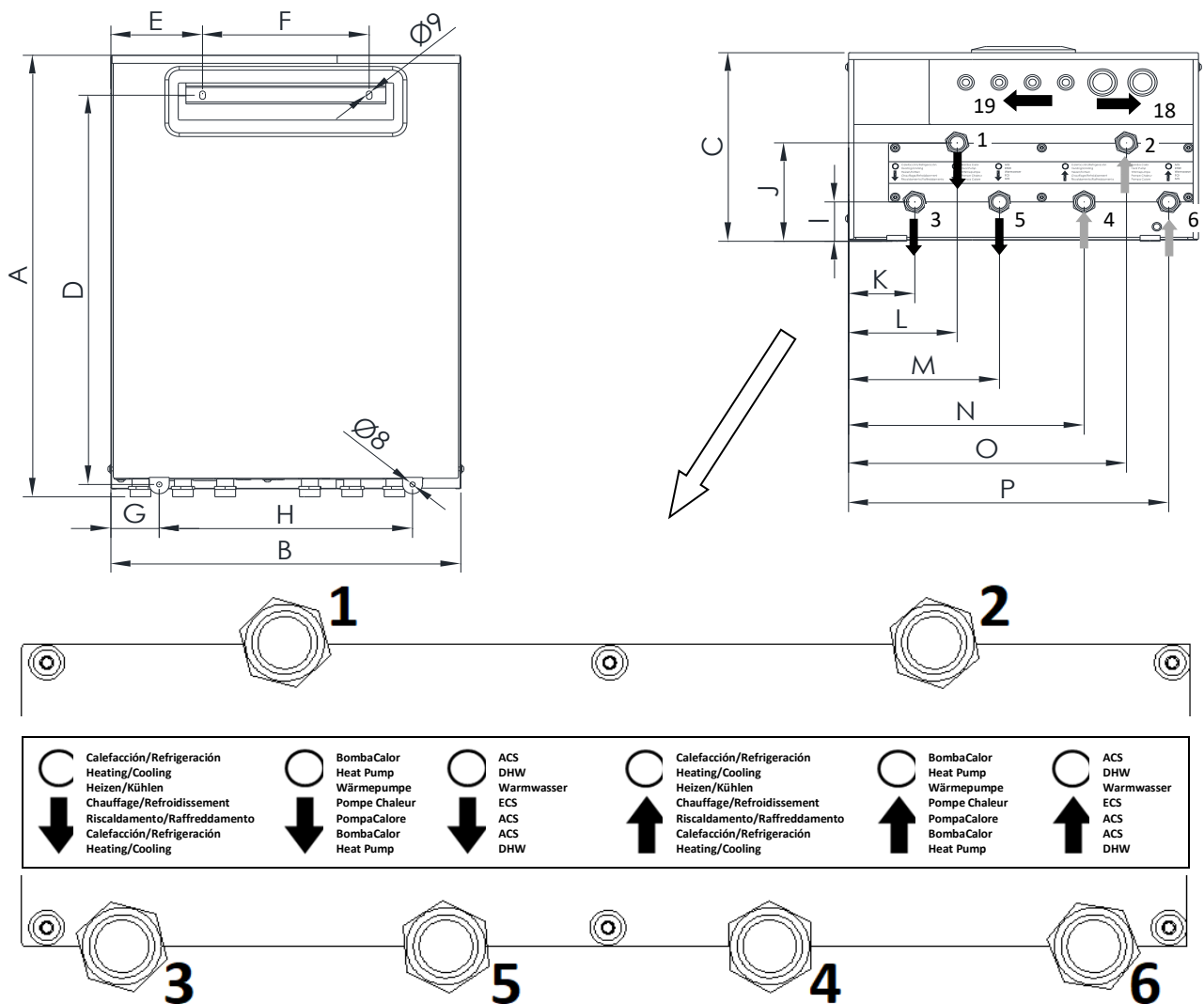


Figure 3.1. Overall dimensions and hydraulic connections of Hidrokit indoor units (Dimensions in mm).

Models	Dimensions (mm)															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Hidrokit Hidrokit 7	713	525	305	629	137	250	72	380	64	159	100	163	227	354	417	481
Hidrokit 20	718	580	335	629	165	250	90	400	68	183	106	169	236	360	423	486

Table 3.1. Overall dimensions of Hidrokits indoor units.

Nº	Description	Hidrokit, Hidrokit 7	Hidrokit 20
1	Supply to outdoor unit	G1" Male	G1-1/4" Male
2	Return from outdoor unit	G1" Male	G1-1/4" Male
3	Heating / cooling inlet	G1" Male	G1-1/4" Male
4	Heating / cooling return	G1" Male	G1-1/4" Male
5	Supply to DHW exchanger	G1" Male	G1-1/4" Male
6	DHW exchanger return	G1" Male	G1-1/4" Male
18	Power cables inlet		
19	Control cables inlet		

Table 3.2. Key to hydraulic connections of the Hidrokit indoor unit.

3.3. Unpacking

When unpacking the Hidrokit indoor unit, carefully remove the box and check that the unit has not been damaged during its transportation. Remove the anchor screws from the pallet.

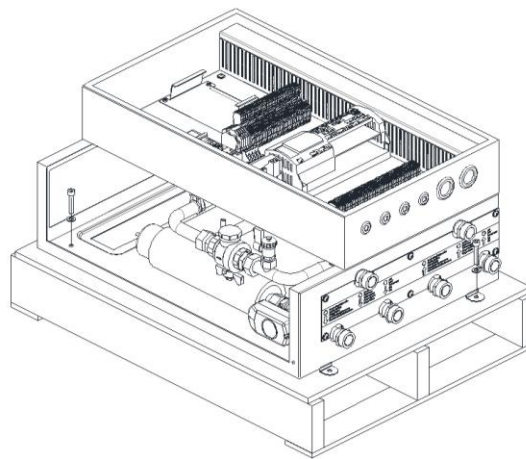


Figure 3.2. Disassembly of the screws that attach the Hidrokit indoor unit to the pallet.

3.4. Assembly and disassembly of the covers

A 4 mm Allen wrench is needed to assemble and disassemble the covers. Disassemble the cover of the Hidrokit indoor unit. Loosen the screws located on the sides and pull upwards.

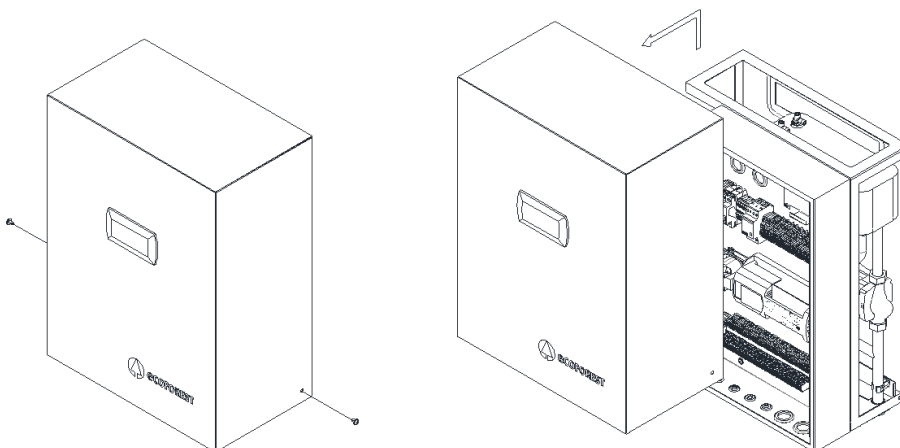


Figure 3.3. Disassembly of the cover of Hidrokit indoor units.

3.5. Location and assembly

Choose a dry place where there is no risk of frost. The Hidrokit should be installed on a stable wall that can support the total weight of the unit and the operating fluids in its interior. Use a spirit level to ensure that it is completely horizontal.

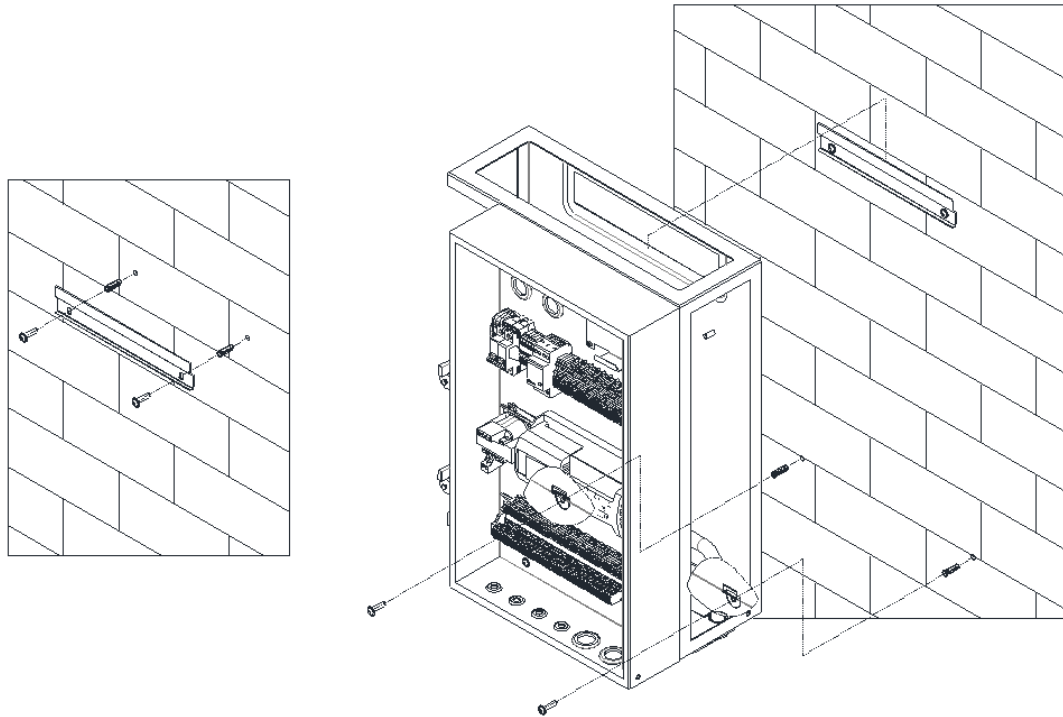


Figure 3.4. Positioning of Hidrokit indoor units.

3.6. Service areas

The minimum recommended distances to be left around the Hidrokit indoor unit to facilitate installation, start-up and maintenance work are indicated below.

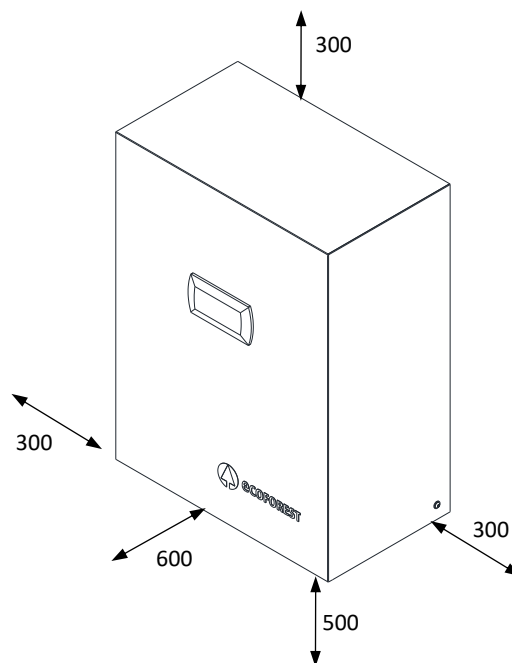


Figure 3.5. Areas of recommended minimum service around the Hidrokit indoor unit (dimensions in mm).

4. Installation of the Hidrokit Compact indoor unit

4.1. Transport and handling

Transport the indoor unit in such a way that it is not exposed to bad weather conditions.



- Due to the heavy weight of the Hidrokit indoor unit it should be handled by at least two workers using a forklift for heavy loads.

4.2. Dimensions and connections

The overall dimensions and the hydraulic connections of Hidrokit Compact indoor units are set out below.

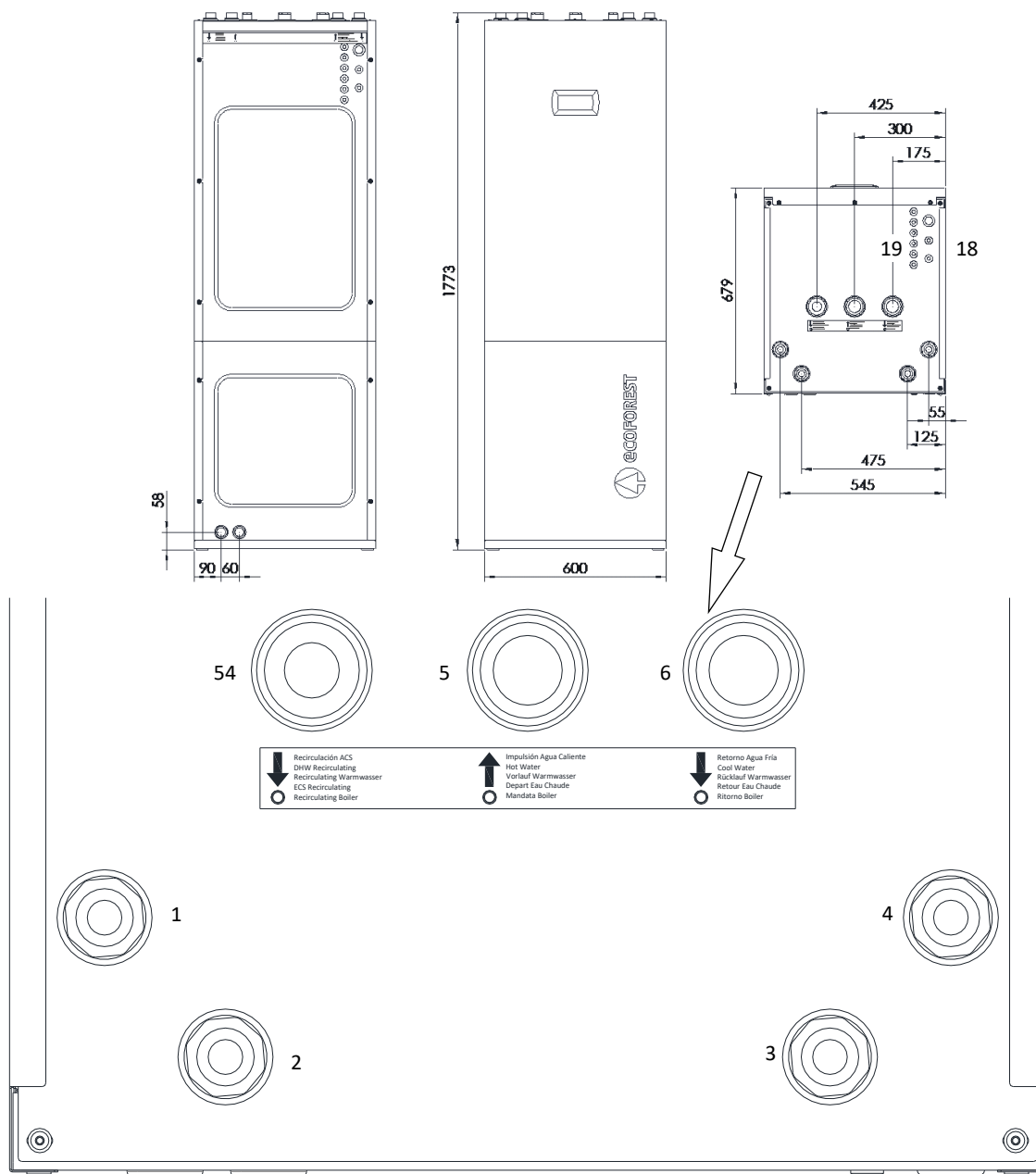


Figure 4.1. Overall dimensions and hydraulic connections of Hidrokit Compact indoor units (Dimensions in mm).

No	Description		No	Description	
1	Supply to outdoor unit	G1" Male	6	Tap water inlet	G1" Female
2	Return from outdoor unit	G1" Male	18	Power cables inlet	
3	Heating / cooling inlet	G1" Male	19	Control cables inlet	
4	Heating / cooling return	G1" Male	54	DHW Recirculation	G3/4" Female
5	DHW outlet	G1" Female			

Table 4.1. Key to hydraulic connections of the Hidrokit Compact indoor unit.

4.3. Unpacking

When unpacking the Hidrokit Compact indoor unit, carefully remove the box and check that the unit has not been damaged during its transportation. Remove the anchor screws from the pallet.

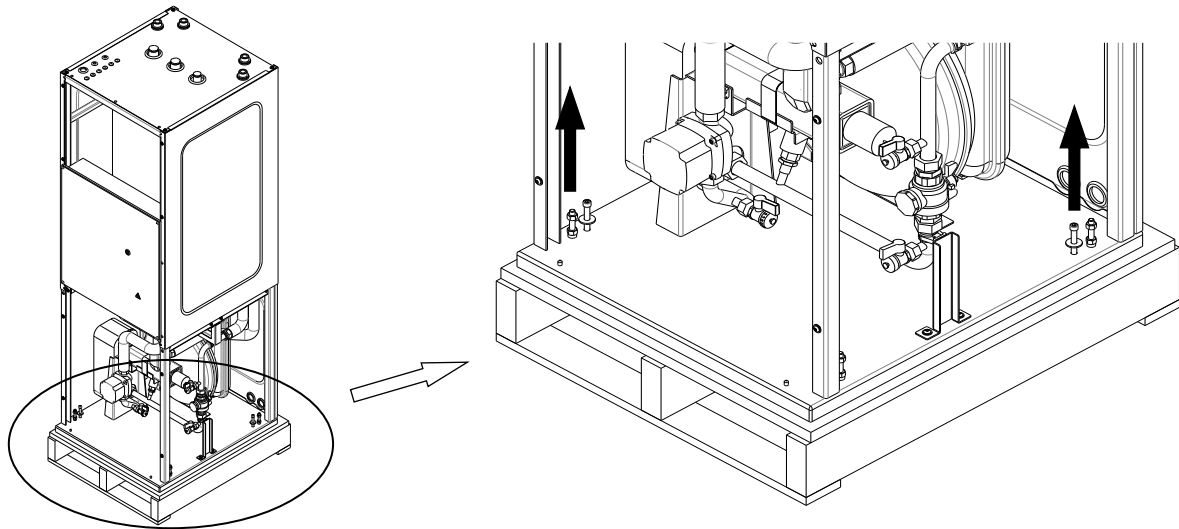


Figure 4.2. Disassembly of the screws that attach the Hidrokit Compact indoor unit to the pallet.

4.4. Assembly and disassembly of the covers

A 4 mm Allen wrench is needed to assemble and disassemble the covers.

1. Disassemble the top front cover. Remove the screws located at the upper part and pull the cover upwards.
2. Disassemble the bottom front cover. Remove the screws located at the upper part and pull upwards.
3. Disassemble the side covers. Loosen the screws located at the front and rear and remove the cover.

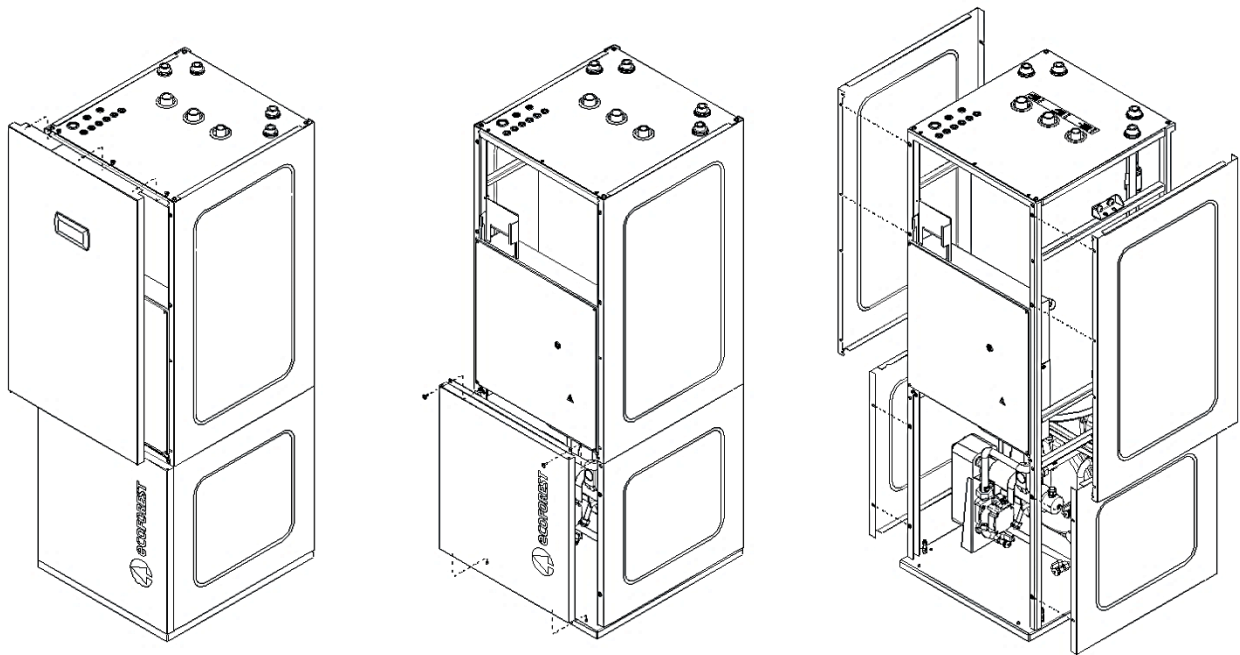


Figure 4.3. Disassembly of the cover of Hidrokit Compact indoor units.

4.5. Location and assembly

Choose a dry place where there is no risk of frost. The Hidrokit Compact indoor unit should be installed on a stable wall that can support the total weight of the module and the operating fluids in its interior. Use the adjustable legs to compensate for possible irregularities on the supporting surface. Use a spirit level to ensure that it is completely horizontal.

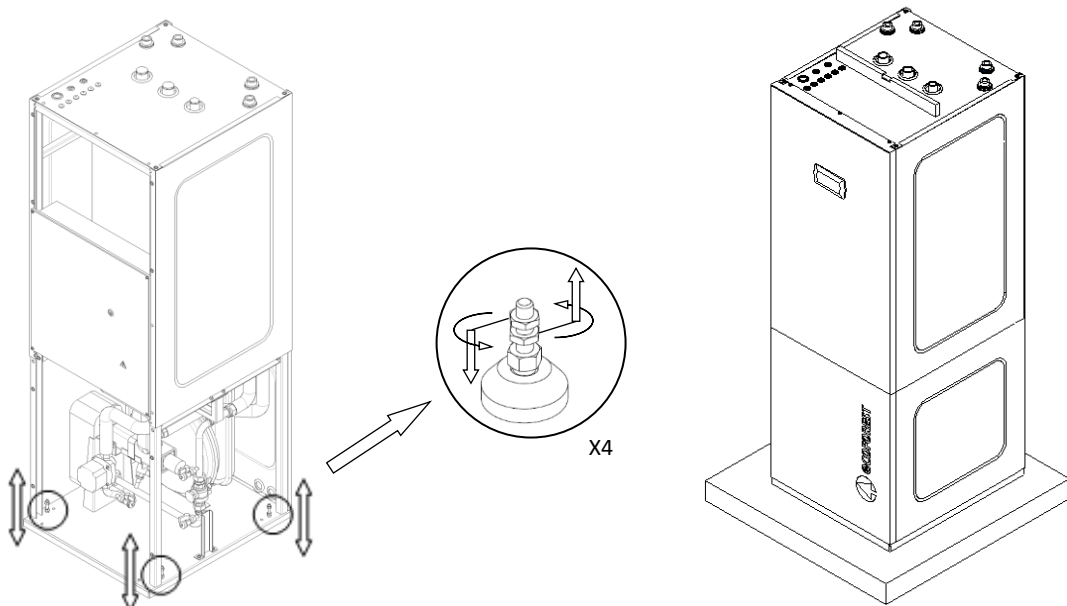


Figure 4.4. Positioning and levelling Hidrokit Compact indoor units.

4.6. Service areas

The minimum recommended distances to be left around the Hidrokit Compact indoor unit to facilitate installation, start-up and maintenance work are indicated below.

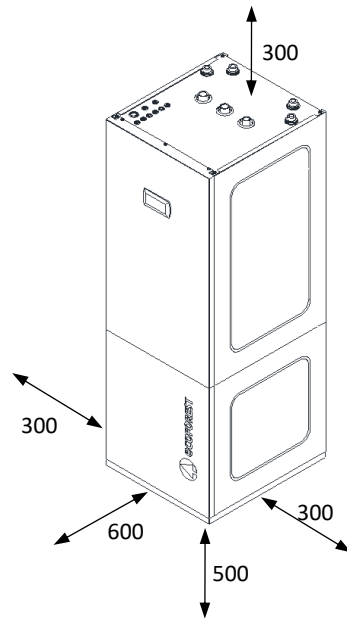


Figure 4.5. Areas of recommended minimum service around the Hidrokit Compact indoor unit (dimensions in mm).

5. Hydraulic installation



NOTE

- The installation diagrams included from here on should be considered simply as a guide.
- The design of the hydraulic installation must be performed by qualified personnel and in accordance with applicable local regulations.
- The design of the hydraulic installation must guarantee the minimum required flow rate through the heat pump, otherwise, it could lead to equipment malfunction or even breakage.
- To ensure that the installation works properly, it is essential that the hydraulic wiring is made with a compatible outdoor unit.
- The steps for the correct hydraulic wiring between the internal and the outdoor unit are described in the “Hydraulic installation” section of the outdoor unit manual.

5.1. General instructions

The following recommendations should be taken into consideration for proper hydraulic installation.

- Avoid excessive strain between the pipes and the connections and the modules to avoid leakage and/or the transmission of vibrations. Flexible hoses are recommended when wiring the outdoor unit.
- Install cut-off valves at all the hydraulic connections to facilitate future maintenance tasks.
- Install traps at all the installation points where air pockets can form.
- Place heat insulation on all circuit pipes to prevent unnecessary heat loss and possible condensation.



DANGER!

- During installation work on the hydraulic circuits, take special care to prevent liquid from spilling on the internal electrical heat pump components of the modules, which could cause personal injury due to electrocution and/or poor equipment operation.
- Do not install components that might cover the inlet or outlet of the safety valves; this could lead to a risk of some of its components breaking and cause injuries and/or material damage.

5.2. Heating / Cooling circuit

Indoor units Hidrokit and Hidrokit Compact, can be hydraulically connected to various types of heating / cooling systems, both directly and by using separator buffer tanks. On the other hand, indoor units ecoAIR CM, Hidrokit e Hidrokit Compact enable control over several devices that are external to the heating / cooling system directly from the module’s electrical panel.

Heating / cooling system

ecoAIR heat pumps are designed to be used with heating systems with nominal outlet temperatures of up to 70°C, such as underfloor heating systems, radiators or convectors. They are not recommended for use in heating systems that require higher temperatures.

ecoAIR heat pumps can be used with cooling systems with nominal outlet temperatures of up to 7°C, such as convectors and underfloor cooling systems.

Special care should be taken in the design and control in installations with underfloor cooling, to prevent problems of condensation on floors.

Direct installation

In simple heating / cooling installations, the indoor units Hidrokit and Hidrokit Compact, can be installed directly to the distribution system in systems with underfloor heating, radiators, or convectors.

This configuration makes it possible to simplify the hydraulic installation, reduce costs and space, while at the same time optimising the energy efficiency of the module. However, the design of the hydraulic installation must always guarantee the minimum required

flow rate through the heat pump. To accomplish this, the necessary elements must be planned to protect the heat pump in the event of a low flow situation in the emission system. The installation can be planned in such a way that at least one of the emission circuits remains open continuously. If all the outlet circuits can be closed, it is recommended that a differential pressure valve be installed between the heat pump supply and return pipe. Other solutions can also be considered, such as the installation of a hydraulic separator between the heat pump and the emission system, provided that the required minimum flow rate is guaranteed (see the technical manual of the outdoor unit).

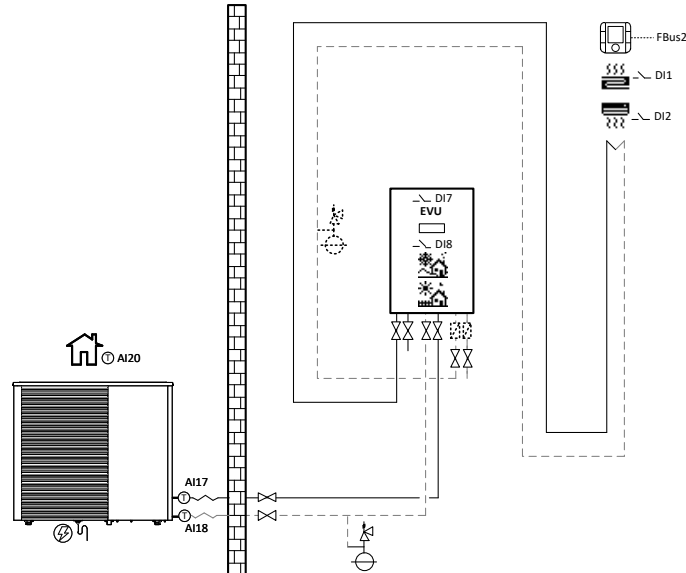


Figure 5.1. Single-zone direct connection diagram to the heating/cooling system, with Hidrokit

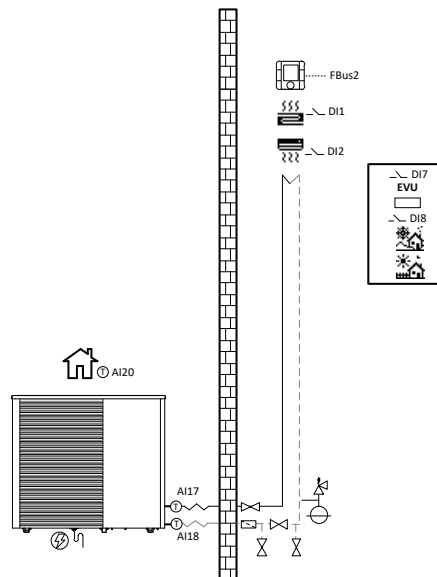


Figure 5.2. Single-zone direct connection diagram to the heating/cooling system, with ecoAIR CM.

For direct single-zone connection, the use of ecoAIR CM Lite is recommended, managing the service from the outdoor unit, whenever it allows it (consult the corresponding outdoor unit manual). In installations with more than one zone, it is necessary to use the ecoAIR CM, Hidrokit or Hidrokit compact indoor units.

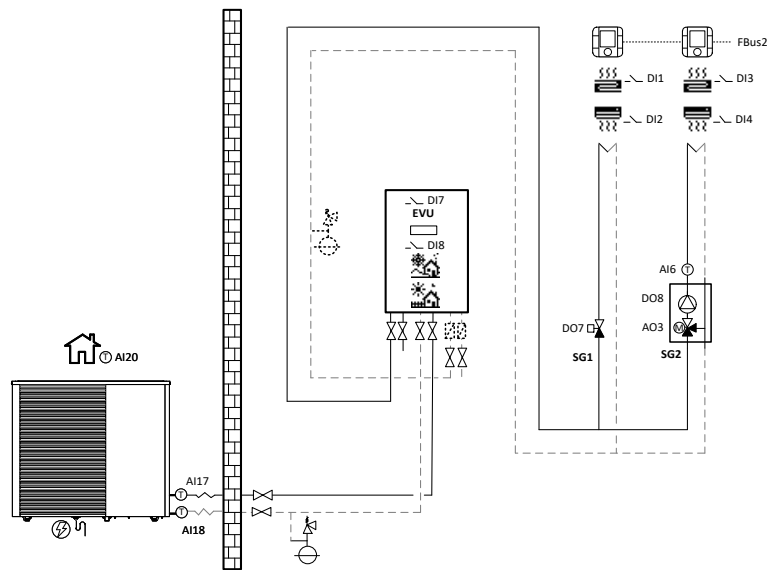


Figure 5.3. Dual zone connection diagram directly to the heating / cooling system with Hidrokit.

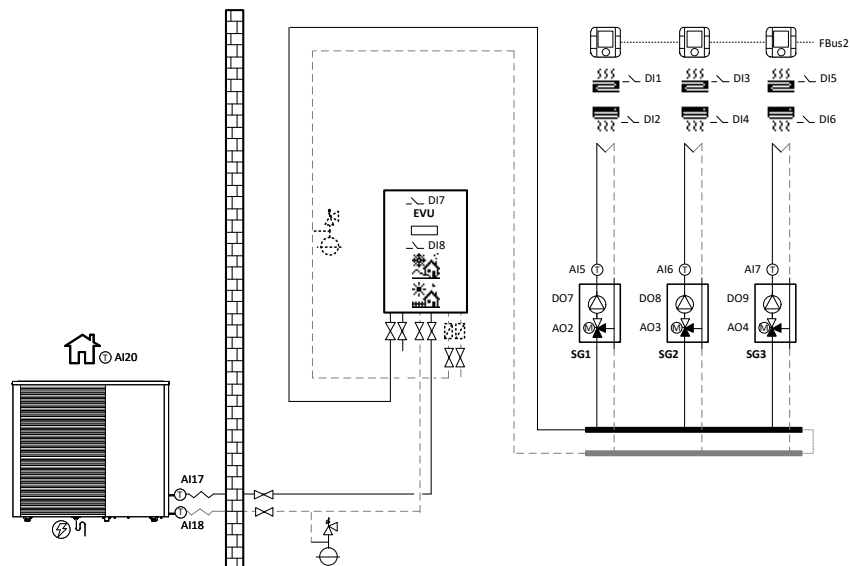


Figure 5.4. Connection diagram directly to the heating / cooling system with Hidrokit.

Installation using buffer storage tank

If required by the application, the Hidrokit and Hidrokit Compact can also be connected to the heating / cooling system using a separator buffer tank. The indoor units ecoAIR CM, Hidrokit and Hidrokit Compact, have the management of two temperature probes that allow controlling a buffer tank for heating and a buffer tank for cooling. With these units, in installations where there is only one buffer storage tank for heating and cooling, both sensors must be installed in the storage tank. Install the temperature sensors at the points where heating / cooling production begins. Heating / cooling production is stopped by the return temperature probe installed inside the unit.

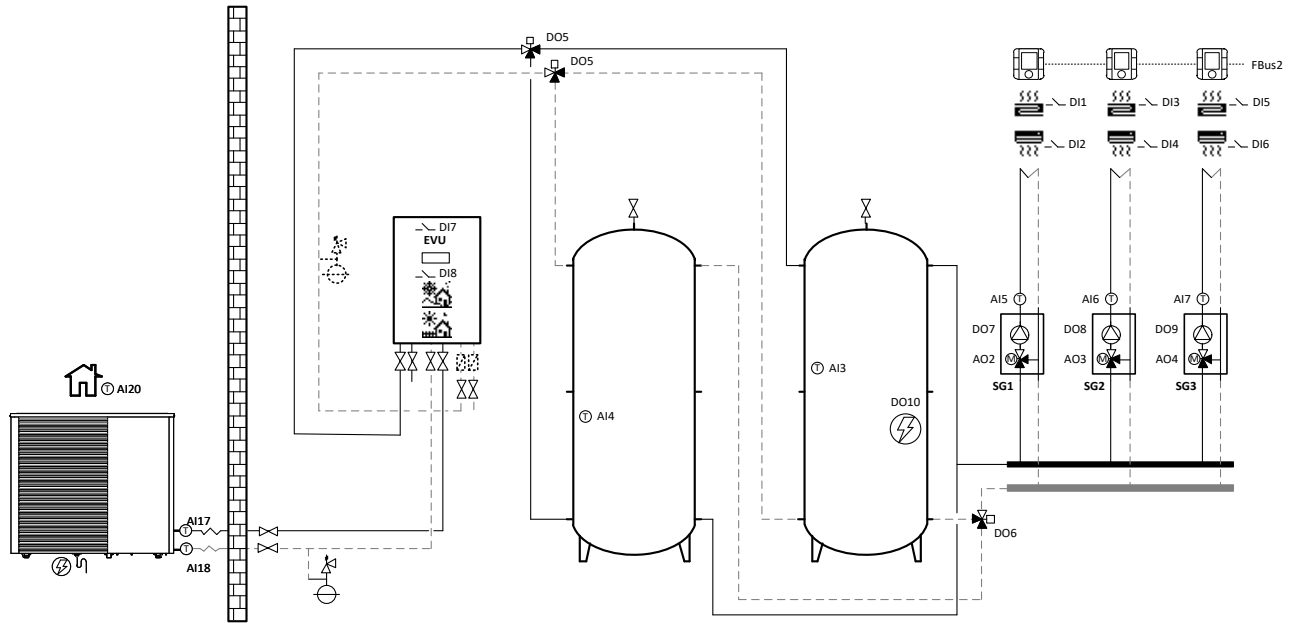


Figure 5.5. Connection diagram using two buffer storage tanks.

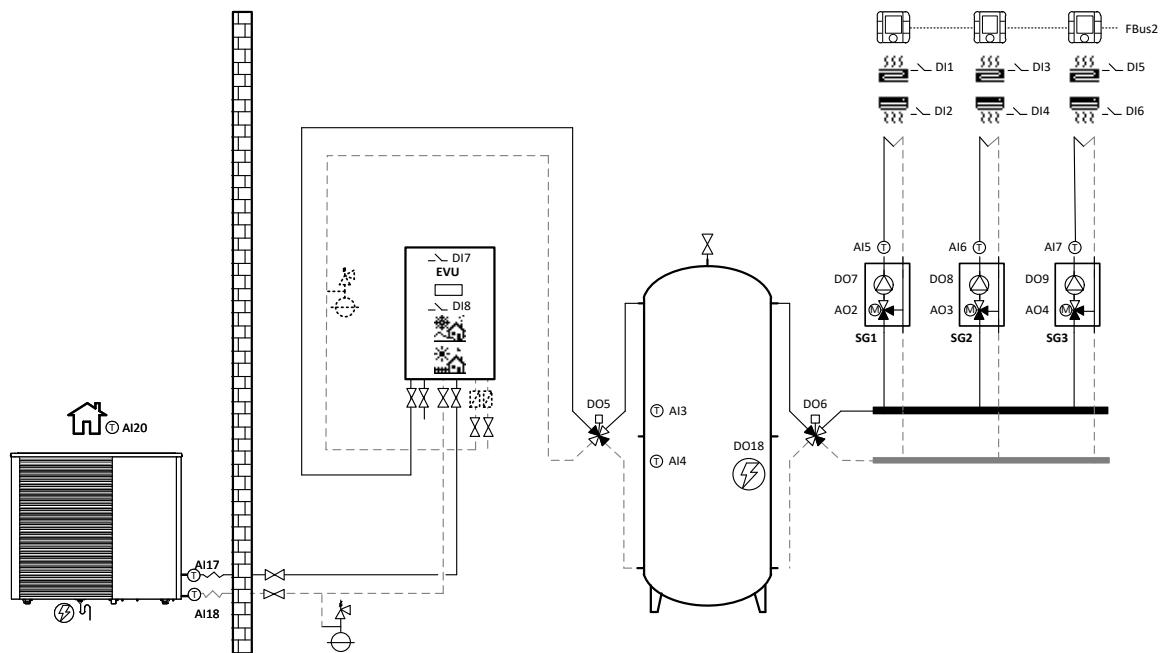


Figure 5.6. Connection diagram using a single buffer storage, with Hidrokit.

For simple installations with a single single-zone heating/cooling buffer tank and single-zone, the use of ecoAIR CM Lite is recommended, managing the service from the outdoor unit whenever it allows it. In this case, the installation of two temperature sensors will not be necessary (for more information, consult the corresponding outdoor unit manual).

Pump groups

The indoor units, ecoAIR CM, Hidrokit and Hidrokit Compact, allow to manage three pump groups with or without mixing (shunt groups or direct pump groups). When configuring the control, you must choose whether each pump groups is with or without mixture.

To control the pump groups, you must connect thermostat type input signals. The output signals should be 230Vac. To control pump groups with a mixture, it's also needed a temperature sensor and a 3-way mixing valve controlled with a 0-10Vac signal.

Auxiliary equipment

The auxiliary modules of the production circuit can be used for the heating service. In addition, if the indoor unit that you have chosen does not have a heater cartridge, it is possible to control a heater installed on the heating buffer tank. For more information, see point 5.6.

5.3. DHW circuit

EcoAIR heat pumps are designed to produce DHW with a heat exchanger and an accumulation tank. In many cases, the heat exchange system is inside the accumulation system itself, but this will depend on how each installation is designed.

EcoAIR CM and Hidrokit indoor units

EcoAIR CM and Hidrokit indoor units are designed to be used with external storage systems with a midway heat exchanger that can be either internal or external.

Hidrokit Compact indoor units

Hidrokit Compact indoor units are provided with an integrated inter storage tank with a capacity of 165 litres, so it does not require the installation of an external DHW storage tank.

DHW Recirculation

This is used to control activation of the DHW recirculation pump, depending on the temperature recorded in the recirculation line and the established time schedule.

The storage tanks included in Hidrokit Compact models are provided with a separate inlet for DHW recirculation. If an external storage tank without a separate inlet for DHW recirculation is used, it is recommended to connect recirculation to the cold-water inlet pipe.

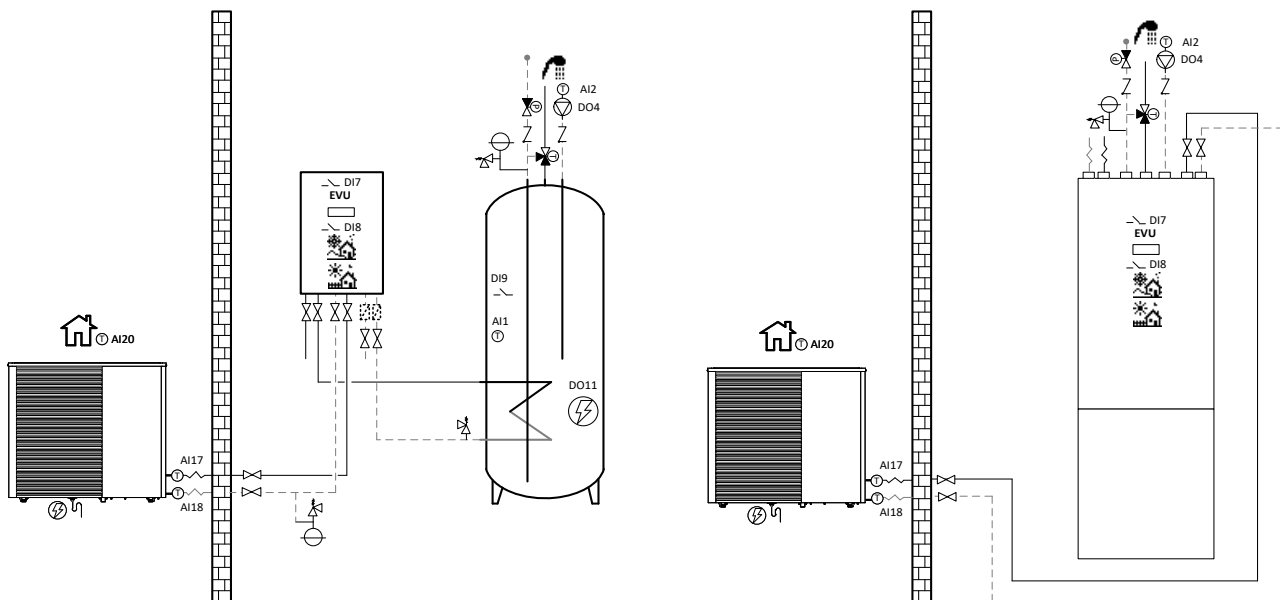


Figure 5.7. Connection diagram of a DHW circuit with Hidrokit and Hidrokit Compact.

For simple DHW installations, where recirculation management or integrated accumulator is not required, the use of ecoAIR CM Lite is recommended, managing the service from the outdoor unit whenever it allows it (consult the outdoor unit manual).

Installation instructions

Follow the instructions below to wire the DHW circuit.

- Install a check valve at the tap water inlet to prevent the possible return of hot water from the mains.
- The DHW tank is permanently connected to the tap water supply.
- If necessary, install a safety group (expansion vessel + safety valve) at the tap water inlet to prevent possible overpressure in the DHW storage tank. In Hidrokit compact models, the maximum tank pressure is 8 bar (800 kPa).
- If there is a risk of scalding, a thermostatic mixing valve should be installed at the DHW outlet.
- If the maximum system pressure can exceed 5 bar, it is recommended to install a pressure reducing valve in the mains inlet to prevent overpressure in the storage tank.
- If there is an auxiliary system integrated in the DHW storage tank, install a safety valve in the production circuit inlet to protect it from any overpressures.

Auxiliary equipment

The auxiliary modules of the production circuit can be used for the DHW service. It is also possible to control a heater installed in the DHW tank. For more information, see point 5.6.

5.4. Pool circuit

The indoor units ecoAIR CM, Hidrokit and Hidrokit Compact, allow the control of the heating of a pool using a temperature sensor and an intermediate heat exchanger. Pool production can be enabled / disabled with an external digital input.

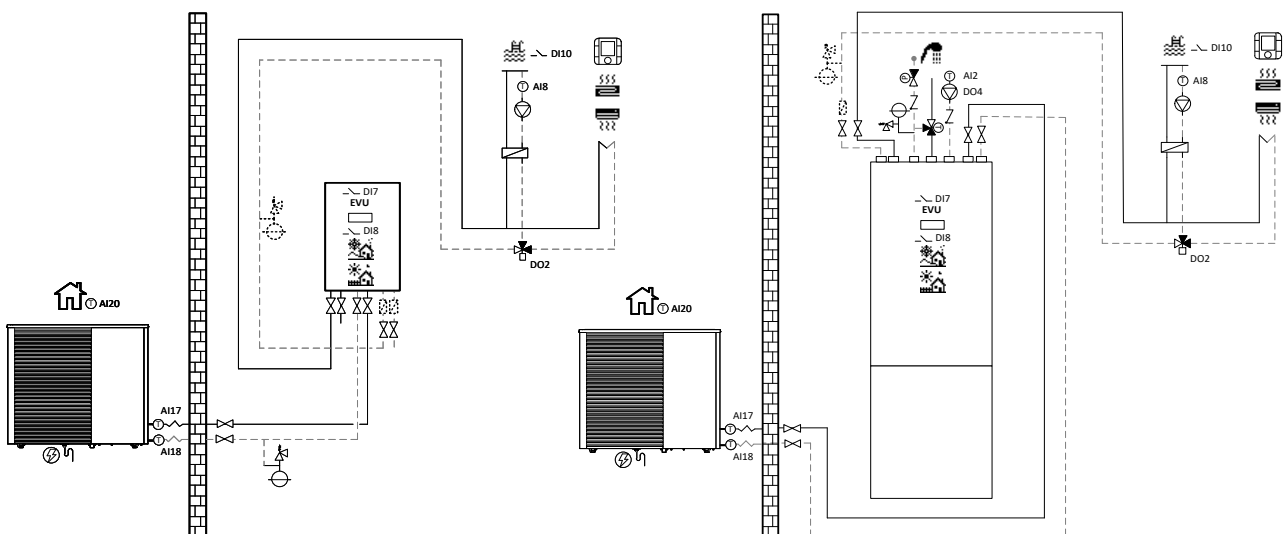


Figure 5.8. Pool production connection diagrams with Hidrokit and Hidrokit Compact.

Auxiliary equipment

The auxiliary modules of the production circuit can be used for the pool service. For more information, see point 5.6.

5.5. HTR system

Outdoor units with integrated HTR system can only be combined with ecoAIR CM and ecoAIR CM Lite indoor units. For more information on installation with ecoAIR CM Lite (stand-alone outdoor unit), refer to the manual of the corresponding outdoor unit. The outdoor units with integrated HTR system, with ecoAIR CM indoor unit, allow high temperature heat recovery for DHW, and pool services, simultaneously with the main heating and cooling service.

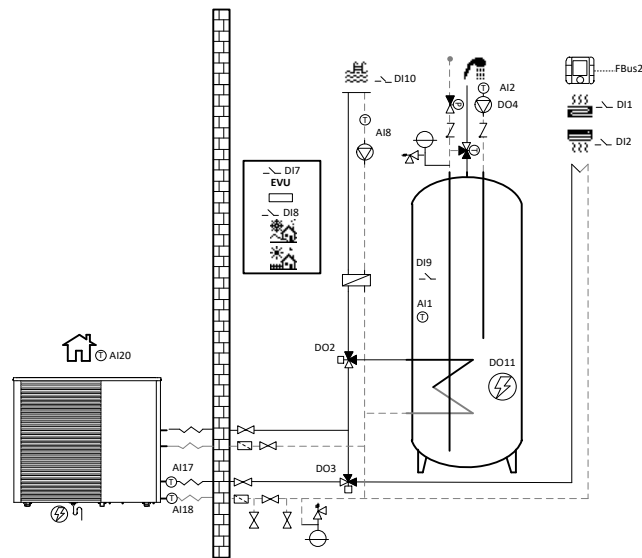


Figure 5.9. Connection diagram of the outdoor unit with HTR system, with ecoAIR CM indoor unit.

Components integrated

The outdoor unit integrated the following components of the production circuit:

- Variable speed and high efficiency pumps (energy class A).
- Automatic drains.
- Non-return valve in the HTR system.

Installation instructions

To make the hydraulic connection between the outdoor unit and the installation, take the following instructions into account.

- Install a pressure regulating system in each circuit as specified by local regulations. This system will commonly be an expansion vessel and a safety valve.
- Install a particle filter in the return pipe with a mesh size no larger than 1 mm. It is recommended to install shut-off valves just before and after each filter to facilitate cleaning or replacement.
- Install the necessary components to carry out filling in the return pipe.
- The circuit pressure should have a value between 0.7 and 6 bar gauge (70 and 600 kPa). The outdoor unit withstands a maximum pressure of 6 bar. Check the pressure allowed by all the elements of the installation.
- Optionally, with the ecoAIR CM indoor unit, you can install indoor supply and return temperature sensors.

5.6. Auxiliary equipment



DANGER!

- If you want to connect a heat generator to the circuit that can achieve high temperatures, such as a heater or a boiler, make sure they are not in direct contact with an antifreeze agent as this may overheat and generate toxic gases.



NOTE

- The hydraulic installation must ensure that while the boiler is operating, the temperature through the heat pump never exceeds 80°C, since this could cause serious damage to the refrigerant circuit.

Auxiliary heater in outlet

Hidrokit HK-EH, Hidrokit HK-EH-S, Hidrokit Compact HK-EH and Hidrokit Compact HK-EH-S indoor units have a heater cartridge in the production circuit. The heater cartridge may be used to produce heating, DHW and pool services. It can also be configured for each service in emergency or support mode or both. In addition, in the case of DHW, it can also be used for legionella protection treatments.

Auxiliary module in the heating buffer storage tank

All the indoor unit models, except those that include resistance, allow the control of auxiliary heater integrated in the heating buffer storage tank. It can be used for normal heat production or as emergency equipment.

Auxiliary module in the DHW storage tank

All the indoor unit models, allow the control of a support system integrated in the DHW storage tank. This can be used as support to reach higher temperatures during normal production, to carry out legionella protection programs or as emergency equipment.

Auxiliary boiler in the production circuit

All the indoor unit models, allow the control of start-up / stop of an auxiliary boiler and regulate final temperature downstream from the boiler by a 0-10 Vdc modulating 3-way valve. The unit may use the boiler to produce the heating, DHW and pool services. It can also be configured for each service in emergency or support mode or both. In addition, in the case of DHW, it can also be used for legionella protection treatments.

With the indoor units, ecoAIR CM, Hidrokit and Hidrokit Compact, the connection terminals of the SG3 pump group are used to manage the auxiliary boilers, so this one cannot be used.

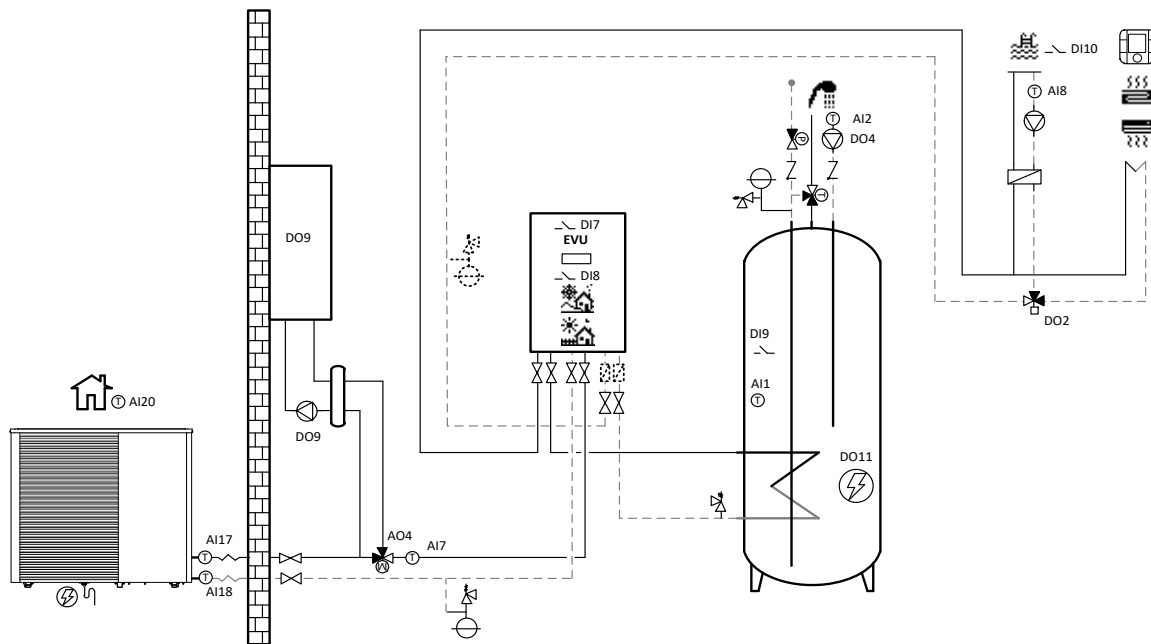


Figure 5.10. Boiler connection diagram with Hidrokit.

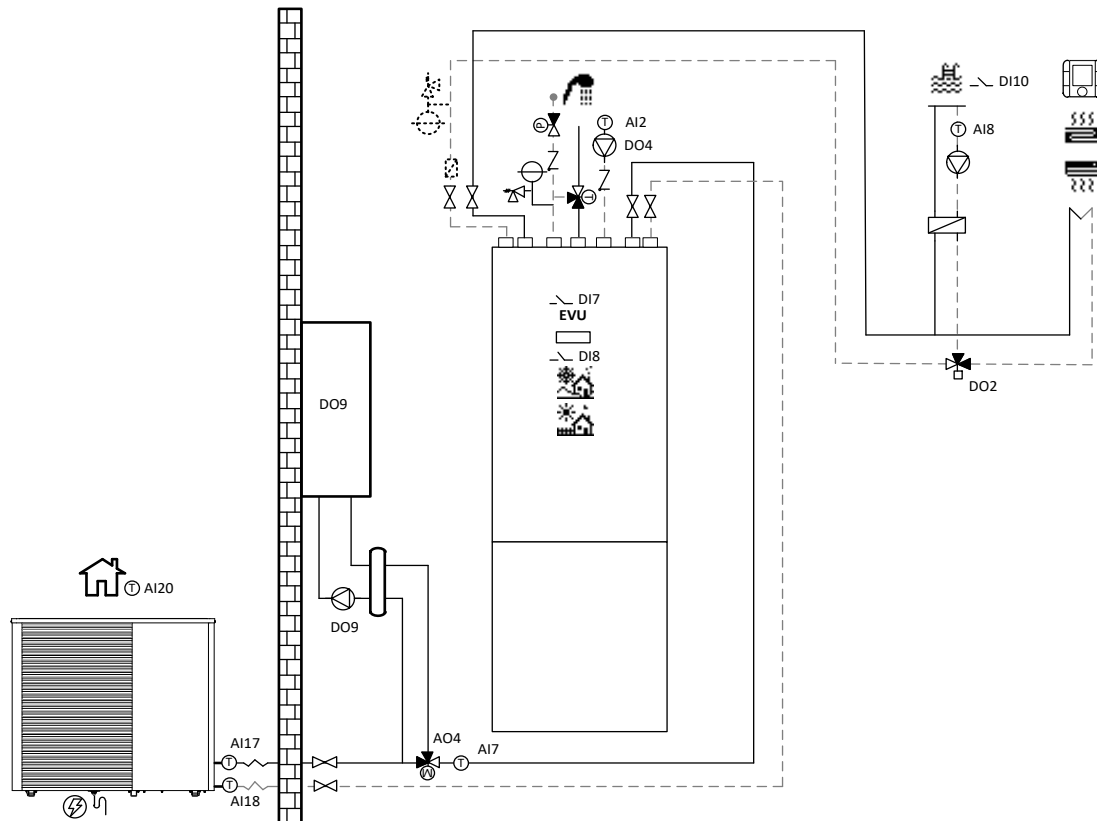


Figure 5.11. Boiler connection diagram with Hidrokit Compact.

If the hydraulic system allows it, the auxiliary boiler can be installed downstream of the indoor unit.

In the system with HTR, the boiler will have to be installed in the main production.

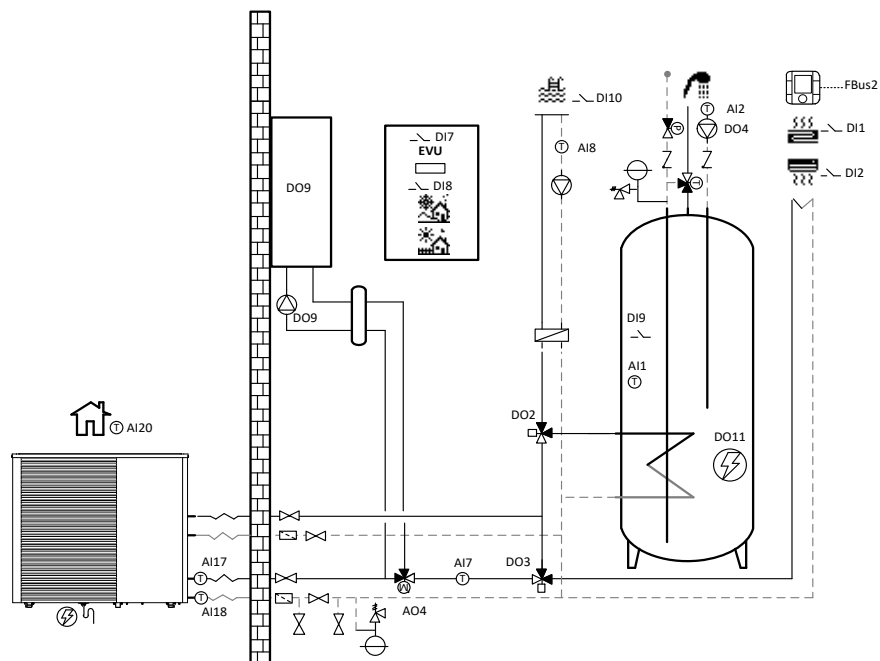
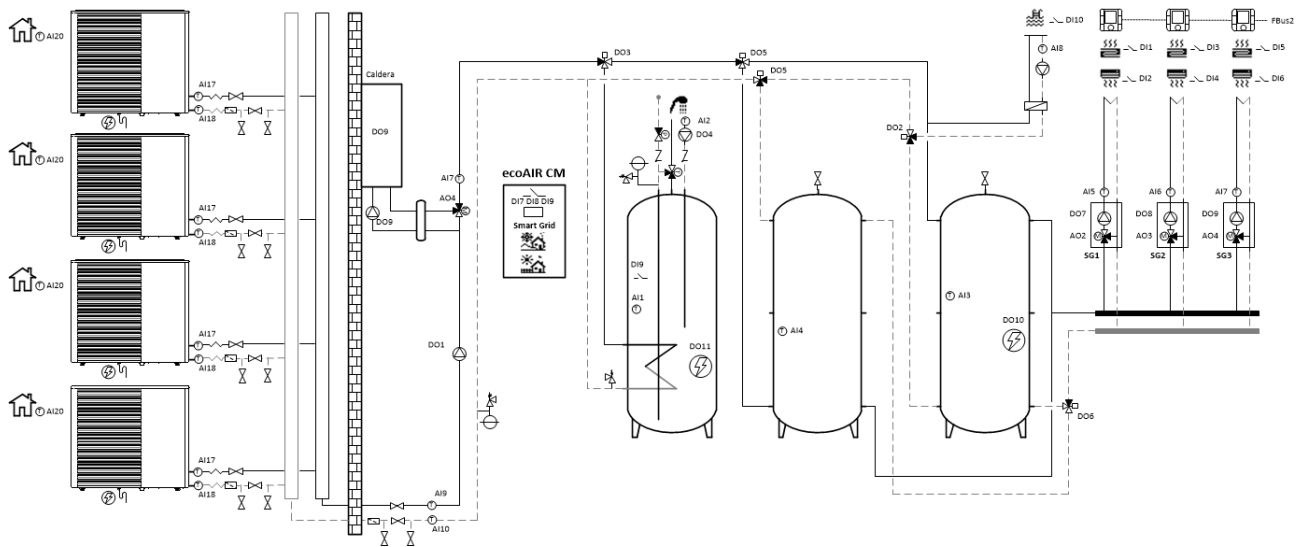


Figure 5.12. Boiler connection diagram with HTR outdoor unit and ecoAIR CM indoor unit.

Ecoforest outdoor units, when combination with ecoAIR CM indoor units, can operate in a coordinated manner on a system communication network, or Modbus network, to provide the required services jointly. These networks always have one device acting as the network master, ecoAIR CM indoor unit, while the outdoor unit act as slaves.

- It is important to correctly balance the hydraulic system of the installation to avoid the risk of freezing or equipment breakage.
- Contact your distributor or technical office.



6. Filling and discharge the circuits



- During installation work on the hydraulic circuits, take special care to prevent liquid from spilling on the internal electrical heat pump components, which could cause personal injury due to electrocution and/or poor equipment operation.



- If the outside temperatures were to fall below 0°C at any time, it is recommended that you fill the outdoor unit with an antifreeze mixture. The freezing temperature of this mixture must be less than the minimum temperature that may be reached in the area.
- Fill the circuits so that they are completely purged. Failure to do so may cause the module and indeed the entire installation to malfunction.
- In the units with an integrated expansion vessel, check that the volume of the expansion vessel is capable of absorbing any overpressures from the circuit. If this volume is not enough, install a supplementary external expansion vessel. Before filling the circuit, check and, if necessary, adjust the preload pressure of the expansion tank according to the requirements of the installation.
- To fill the circuits with ecoAIR CM Lite and ecoAIR CM, check the manuals of the outdoor units.

The Hidrokit and Hidrokit Compact indoor units have internal valves to facilitate filling and emptying the different circuits.

6.1. Filling with the Hidrokit HK and Hidrokit HK-EH indoor units

To fill the circuits through the Hidrokit HK and Hidrokit HK-EH indoor units, follow these steps.

- Open all the valves of the production circuits.
- Connect the supply of filling liquid to valve 14. Open it and fill the circuit until the target pressure is reached. Make sure that the pressure does not exceed 3 bar (pressure gauge) under any circumstance.
- Remove the air from the circuit using the traps installed for that purpose.
- Check the circuit pressure and repeat the filling process if necessary.

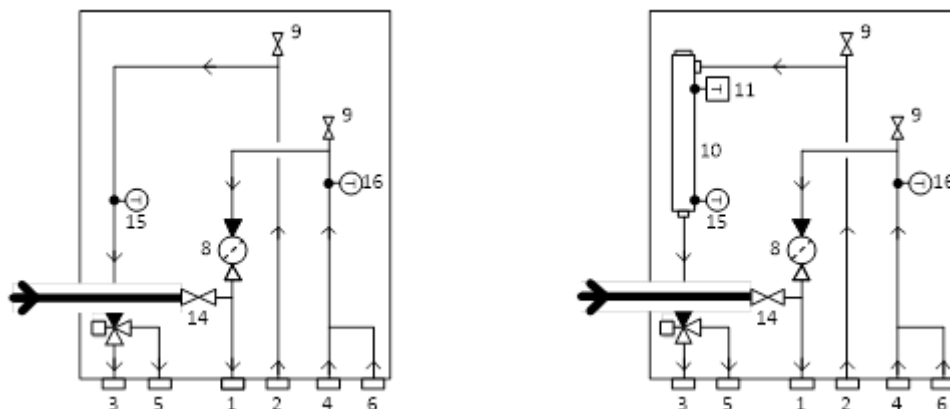


Figure 6.1. Filling the circuits with the Hidrokit HK and Hidrokit HK-EH indoor units.

6.2. Filling circuits with the Hidrokit HK-S and Hidrokit HK-EH-S indoor units

To fill circuits with the Hidrokit HK-EH-S indoor unit, follow these steps:

Primary circuit

- Connect the supply of filling liquid to valve 14A.

2. Connect a transparent hose to valve 14B. If you want to recover the liquid, connect the other end of the host to the tank than contains the filling liquid.
3. Close valve-filter 8 and open valves 14A and 14B.
4. Begin the filling process and maintain the circulation until no air can be detected in the inlet (transparent hose).
5. Open valve-filter 8 making sure to maintain the circulation without any interruption to eliminate the air held between valves 14A and 14 B.
6. Close valve 14B and pressurise the circuit until target pressure is reached. Pay special attention to ensuring the pressure never exceeds the safety valve trigger pressure.
7. Close valve 14A.

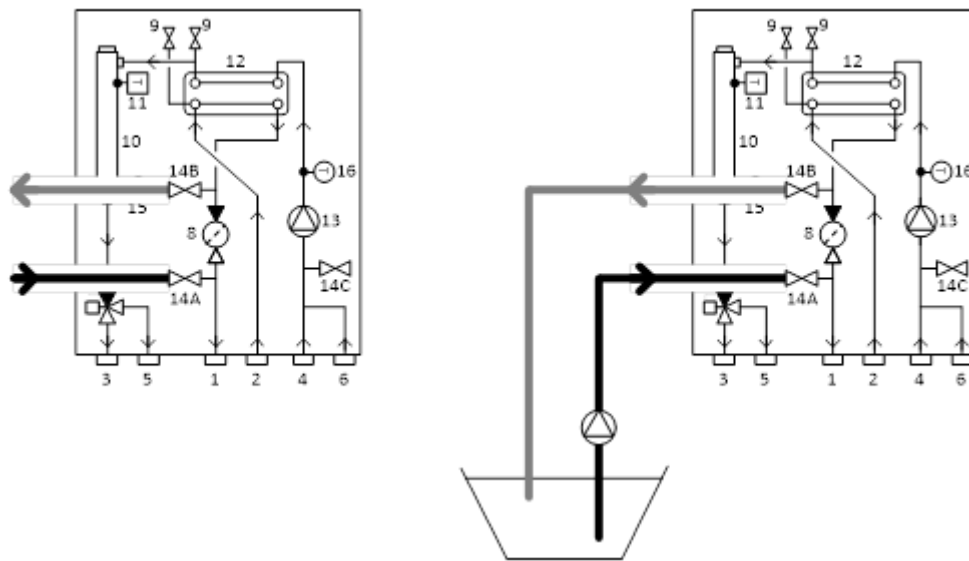


Figure 6.2. Filling the primary circuit with the Hidrokit HK-EH-S indoor unit (same procedure for Hidrokit HKS).

Secondary circuit

1. Open all the valves of the production circuits.
2. Connect the filling liquid to valve 14C, open the valve and load the circuit until the target pressure is reached. Make sure that the pressure does not exceed 3 bar (pressure gauge) under any circumstance.
3. Remove the air from the circuit using the traps installed for that purpose.
4. Check the circuit pressure and repeat the filling process if necessary.

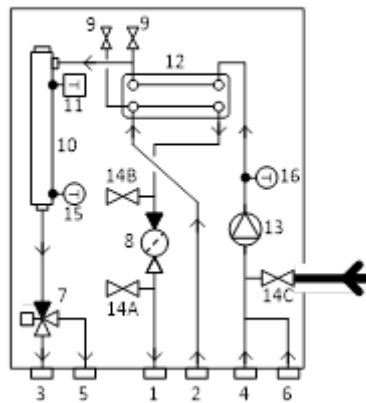


Figure 6.3. Filling the secondary circuit with the Hidrokit HK-EH-S indoor unit (same procedure for Hidrokit HKS).

6.3. Filling with the Hidrokit HK-EH indoor unit

To fill circuits through the Hidrokit Compact HK-EH indoor unit, follow these steps.

1. Open all the valves of the production circuits.
2. Connect the supply of filling liquid to valve 14. Open it and fill the circuit until the target pressure is reached. Make sure that the pressure does not exceed 3 bar (pressure gauge) under any circumstance.
3. Remove the air from the circuit using the traps installed for that purpose.
4. Check the circuit pressure and repeat the filling process if necessary.

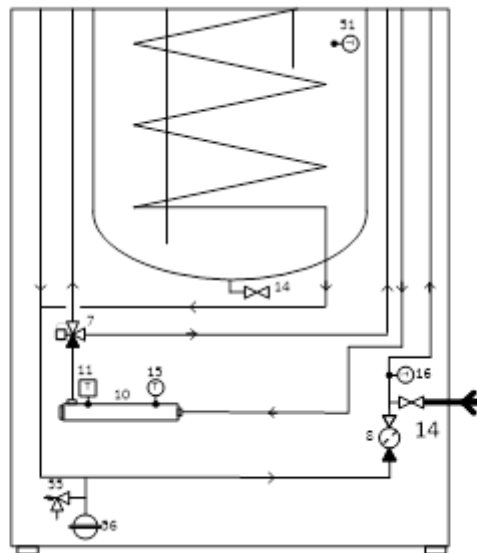


Figure 6.4. Filling circuits with the Hidrokit Compact HK-EH indoor unit.

6.4. Filling with the Hidrokit Compact HK-EH-S indoor unit

To fill circuits with the Hidrokit Compact HK-EH-S indoor unit, follow these steps:

Primary circuit

1. Connect the supply of filling liquid to valve 14A.

2. Connect a transparent hose to valve 14B. If you want to recover the liquid, connect the other end of the host to the tank than contains the filling liquid.
3. Close valve-filter 8 and open valves 14A and 14B.
4. Begin the filling process and maintain the circulation until no air can be detected in the inlet (transparent hose).
5. Open valve-filter 8 making sure to maintain the circulation without any interruption to eliminate the air held between valves 14A and 14 B.
6. Close valve 14B and pressurise the circuit until target pressure is reached. Pay special attention to ensuring the pressure never exceeds the safety valve trigger pressure.
7. Close valve 14A.

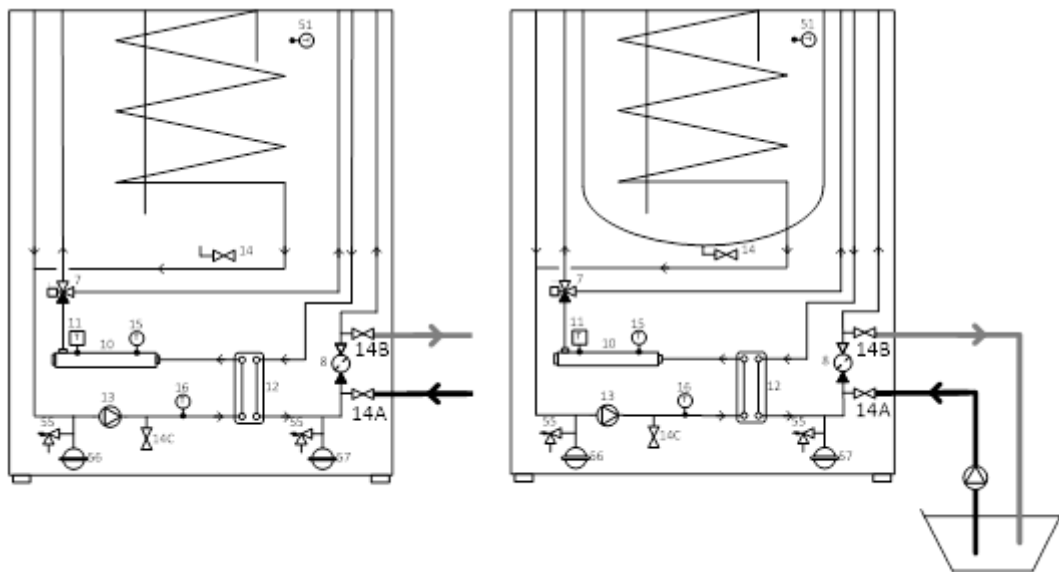


Figure 6.5. Filling the primary circuit with the Hidrokit Compact HK-EH-S indoor unit.

Secondary circuit

1. Open all the valves of the production circuits.
2. Connect the filling liquid to valve 14C, open the valve and load the circuit until the target pressure is reached. Make sure that the pressure does not exceed 3 bar (pressure gauge) under any circumstance.
3. Remove the air from the circuit using the traps installed for that purpose.
4. Check the circuit pressure and repeat the filling process if necessary.

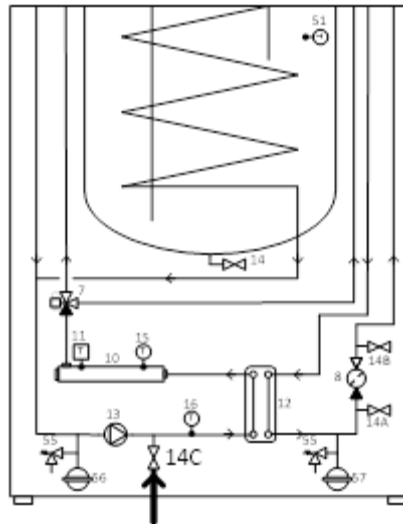


Figure 6.6. Filling the secondary circuit with the Hidrokit Compact HK-EH-S indoor unit.

6.5. Discharging the circuits

Hidrokit indoor units have internal drain valves to facilitate a complete discharge of the different circuits.

7. Electrical system



DANGER!

- Before performing any operation on the electrical panel, disconnect the power supply.
- Remember that the indoor unit may have more than one electrical power supply.
- Ecoforest recommends installing an automatic external switch for each electrical power supply (electronic control and internal auxiliary module).
- Any intervention on the electrical system must only be performed by an authorised electrician in accordance with applicable local regulations and the instructions provided in this manual.
- The cables used to connect the module must comply with applicable national regulations.
- Install cables entering the module in such a way that they have no tension, cannot become corroded, are not affected by vibration and do not touch sharp edges.
- Install power cables so that the ground cable is at least 50mm longer than the rest of the cables, to ensure that it is the last cable to be disconnected in case of accidental disconnection.

7.1. General instructions

The locations of the main electrical panel components of the indoor units are shown below.

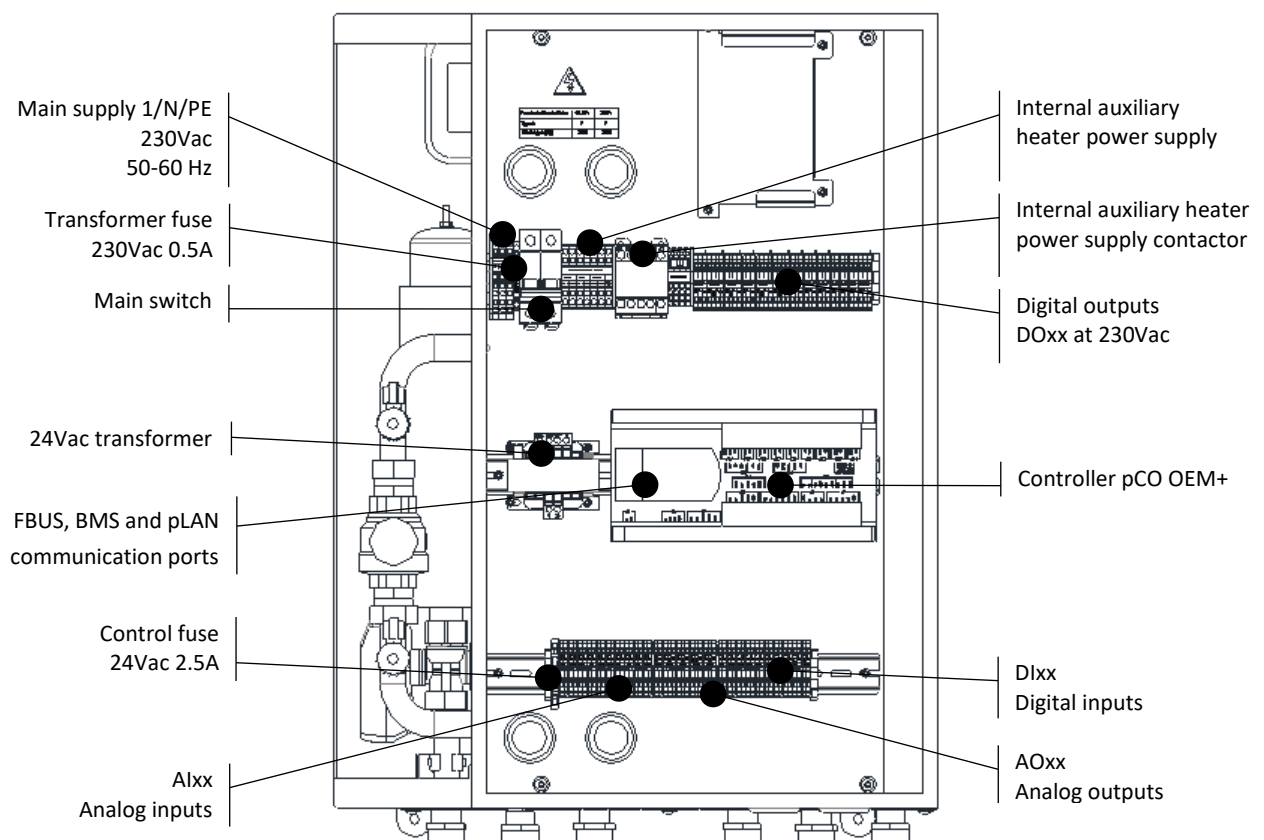


Figure 7.1. Locating electrical panel components.

EcoAIR CM, Hidrokit and Hidrokit Compact control several devices from the installation, some of which are included with the indoor units and others which must be installed. The components included in the indoor unit, are connected to the electrical panel in the factory. Depending on the installation that the indoor unit is going to be connected to, in addition to the power supply, it may be necessary to connect various temperature sensors (analogue inputs AIxx), control signals from thermostats or other external equipment (digital inputs DIxx) on/off switching of pumps and/or valves (digital outputs DOxx) or regulation of pumps and/or valves (analogue outputs AOxx).

The following figure shows an example of an installation and indicated the possible connection of the components: external to the unit.

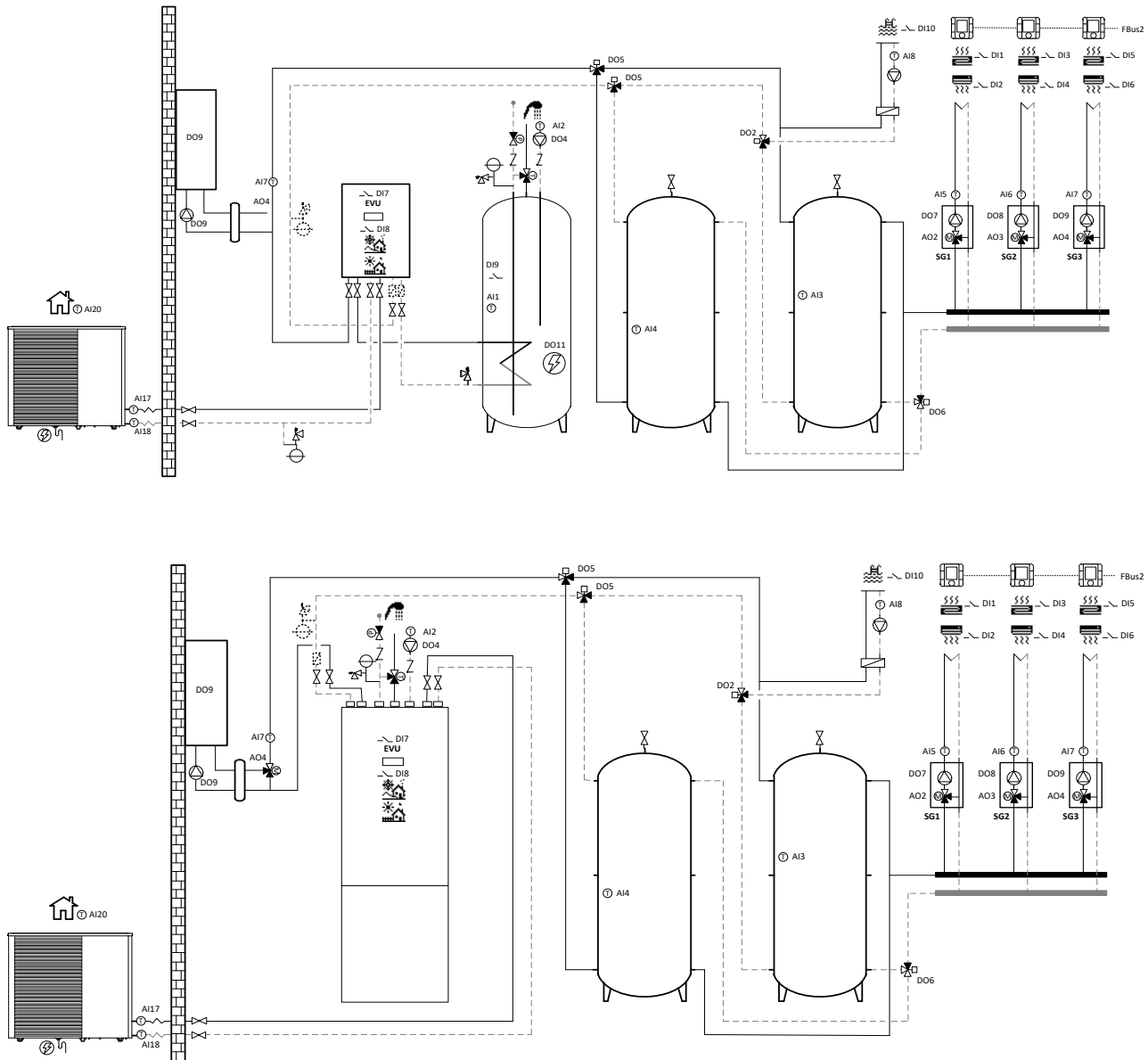


Figure 7.2. General electrical control diagram of the indoor unit.

Analog inputs (AIxx)

These terminals are used to connect external temperature sensors. Only passive NTC temperature sensors can be connected, so cable connection polarity is not important.

If necessary, use extension cables with a maximum length of 50 m and a minimum diameter of 0.75 mm². For greater lengths (up to 120 m) it is recommended to use cable with a section of 1.5 mm².

i
NOTE

- Use original temperature sensors only; other types of components could cause the module to malfunction and/or a heat pump component to break.

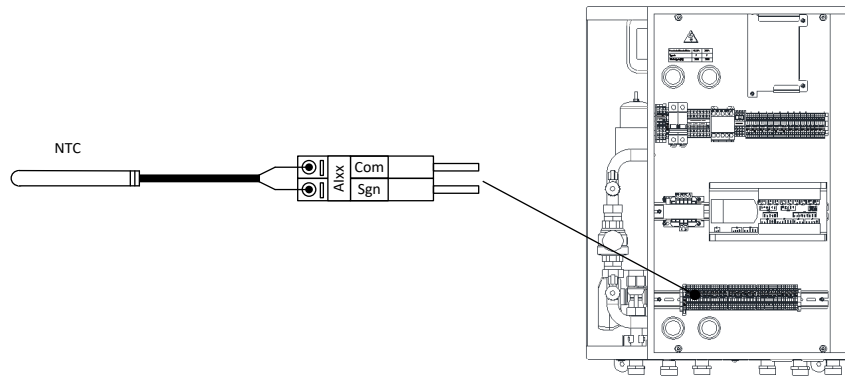


Figure 7.3. Example of temperature sensor connections.

Digital control inputs (Dlxx)

Digital signals from thermostats or other external devices can be connected to these terminals to control indoor unit production functions.

i
NOTE

- Pay special attention to the working voltage of each digital input; improper handling could cause the module to malfunction and/or a heat pump component to break. Some digital inputs require voltage-free signals, while others require 24Vac signals. 24Vac signals are sent from their own terminal block strip.
- Do not mix voltage-free and 24Vac signals.

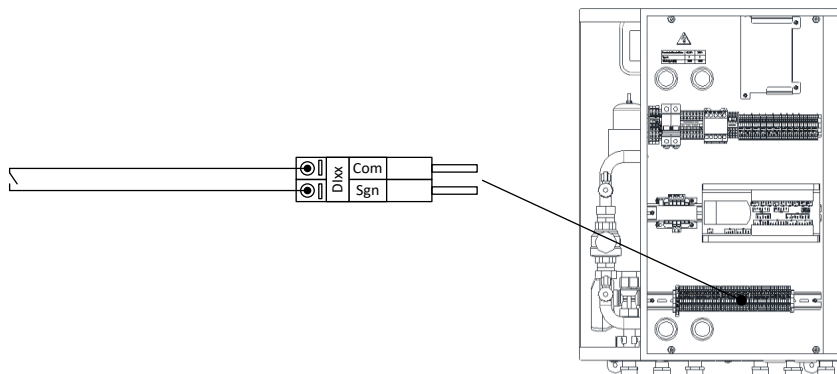


Figure 7.4. Example of voltage-free digital input connections.

i
NOTE

- Outdoor units can be connected directly to 24Vac from the indoor unit. In total, the connected modules must not exceed 36VA or 1.5A. Failure to comply with these ranges could cause the module to malfunction and/or a heat pump component to break.

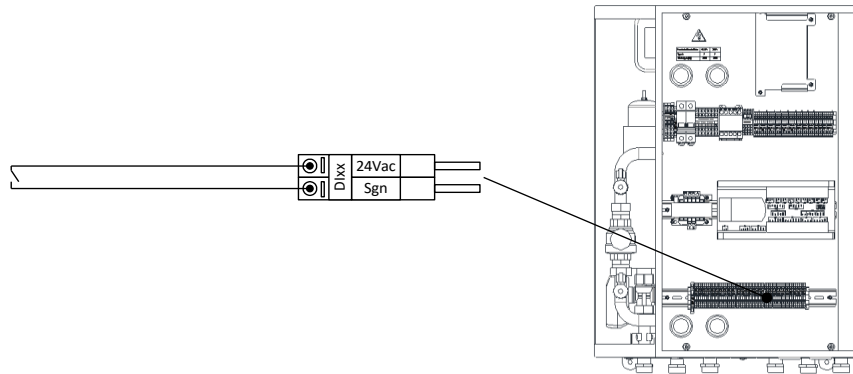


Figure 7.5. Example of digital input connection with 24 Vac voltage.

Analog outputs (AOxx)

These terminals provide two types of analog regulation signals:

- PWM signals, to control the speed of the production circulator pump.
- 0-10Vdc signals, for the modulating control of outlet modules with a mixture, auxiliary external boilers, etc. On the other hand, these connectors have a 24Vac power supply terminal to supply the modulating valve motor.

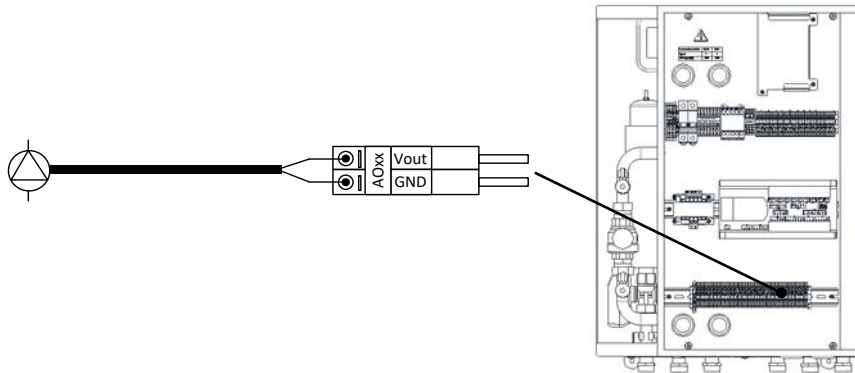


Figure 7.6. Example of the connection of PWM modulating regulation signals.

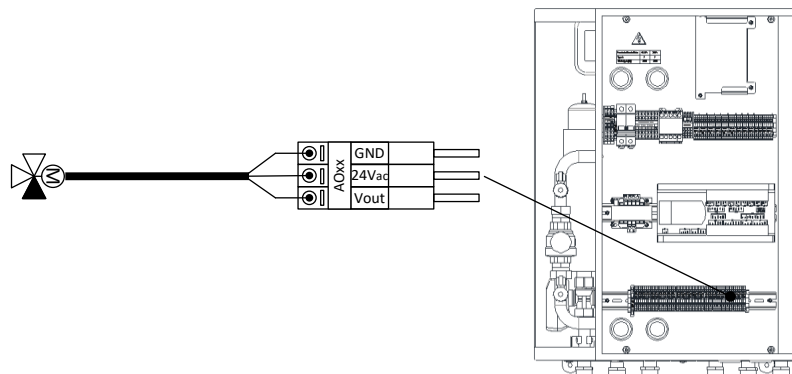


Figure 7.7. Example of 0-10Vdc modulating regulation signal connections.

Digital outputs (DOxx)

These terminals provide 230Vac activation signals for various external components, such as outlet modules, open / close 3-way valves, external auxiliary equipment, etc. The connectors used for valve control allow connection of any type of 2-point control valve, as long as it has a single-phase 230Vac power supply.



- Pay special attention to the maximum consumption allowed by each connector. Use an intermediate relay for the connection, if necessary.

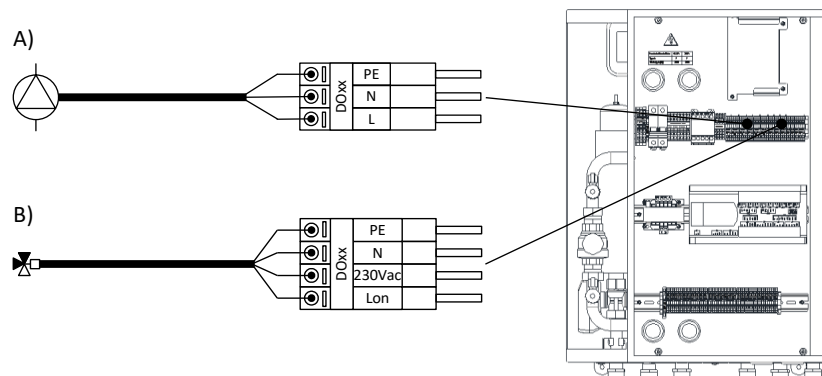


Figure 7.8. Example of digital outputs to relay for A) circulator pumps and B) open / close 3-way valves.

ModBus RS485 communication ports

Communication buses with other devices can be established through the FBus1, FBus2, BMS, BMS2 and pLAN ports. More information can be found in the following chapters.

7.2. Power supply

The indoor unit only requires a supply of electricity. To this electricity supply we connect the power supply of the control, the power supply of the circulators and/or the internal and external valves and also the regulation signals, and the digital and analog inputs. The following table shows the characteristics of the necessary electrical connection:

Type of power supply	Type of protection/ Cut-off current	Recommended cable section
1/N/PE 230 V / 50-60 Hz	Magnetic, thermal and differential / 16A	2.5 mm ²

Table 7.1. Characteristics of the electrical power supply of the indoor unit.

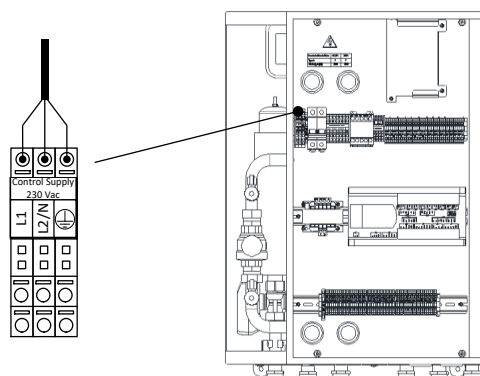


Figure 7.9. Connection diagram of the power supply of the indoor unit.

7.3. Internal auxiliary equipment power supply

Hidrokit HK-EH, Hidrokit HK-EH-S, Hidrokit Compact-EH and Hidrokit Compact EH-S indoor units have an internal auxiliary heater. Depending on the indoor unit model, it can have three elements of 2kW each up to a maximum of 6kW with all elements connected, three elements of 1.3kW each up to a maximum of 4kW with all elements connected or a single element of 2kW.

The heater requires an independent power supply for each element. Depending on the thermal power you wish to obtain, connect the number of elements you need. In the following table you can find the electrical characteristics of an element of the heater:

Models	Type of power supply	Type of protection	Power per element	Total Power
Hidrokits EH 20 and EH-S 20	1/N/PE 230 V / 50-60 Hz	Magnetic, thermal and differential	2 kW	6 kW
Hidrokits EH and EH-S Hidrokits Compact EH and EH-S	1/N/PE 230 V / 50-60 Hz	Magnetic, thermal and differential	1.3 kW	4 kW
Hidrokits EH 7 and EH-S 7	1/N/PE 230 V / 50-60 Hz	Magnetic, thermal and differential	2 kW	2 kW

Table 7.2. Characteristics of an element of the electric heater.

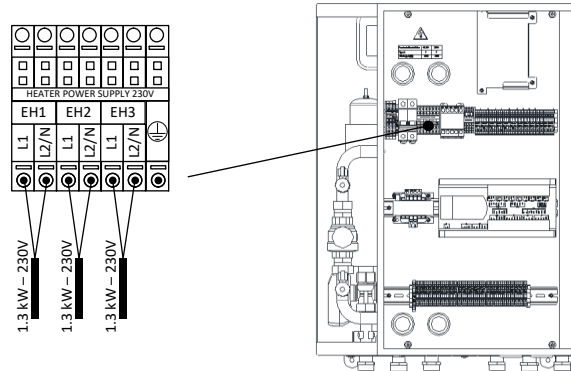


Figure 7.10. Example of a single-phase connection with 1.3kW, 2.6 kW or 4 kW.


NOTE

- If you have a three-phase 3/N/PE 400 V / 50-60 Hz electricity supply, you can connect the heater with a star-type connection. In this way you will obtain 4 kW or 6 kW of thermal power, depending on the model.
- Do not connect the electrical heater in delta; this could cause the module to malfunction and/or a heat pump component to break.

7.4. Production control

In installations in which hydraulic separation is required, you may control a second production circulator pump. For such control, you must install outlet and inlet temperature sensors. In the case of the Hidrokit and Hidrokit Compact indoor unit, these sensors are built in. In the case of the Hidrokit HK-EH-S and Hidrokit Compact EH-S, the circulator pump is also included.

Description	Signal	Type	Connector
Interior circuit production pump	Digital output	Activation 230Vac / 1A maximum	DO1
	Analog output	PWM regulation	AO1
Interior circuit outlet production temperature	Analog input	NTC 10K 25 °C sensor	AI9
Interior circuit inlet production temperature	Analog input	NTC 10K 25 °C sensor	AI10

Table 7.3. Connection terminals for the components of the production circuit.

In installations without a heat exchanger, you may install interior outlet and inlet temperature sensors so that they can provide information.

7.5. Equipment of the heating / cooling circuit

Production and consumption of heating / cooling

This makes it possible to control the manoeuvre of equipment for the production and consumption of heating and cooling, such as bypass valves or pumps.

Description	Signal	Type	Connector
Active cooling production	Digital output	Activation 230Vac / 2A maximum	DO5
Heating / cooling consumption	Digital output	Activation 230Vac / 2A maximum	DO6

Table 7.4. Connection terminals of heating and cooling production and consumption equipment.

Buffer tanks

These can be used to control storage, heating and cooling temperatures using temperature probes.

Description	Signal	Type	Connector
"Buffer T1" Heating and/or cooling buffer storage tank	Analog input	NTC 10K 25 °C sensor	AI3
"Buffer T2" Cooling buffer storage tank	Analog input	NTC 10K 25 °C sensor	AI4

Table 7.5. Connection terminals for the temperature of buffer tanks.

Auxiliary equipment

It is possible to control an auxiliary system installed in the production circuit and to use it to produce heat. It is also possible to control an electrical heater installed in the heating buffer tank. For more information, see point 7.8.

Pump groups with G1 – G3 mixture

The indoor unit can control three outlet pump groups which can be with or without a mixture (G1, G2 and G3). pump groups activation can be controlled according to heating or cooling demand. In addition, if pump groups with mixture are configured, you can measure the pump groups outlet temperature and generate a regulation signal for the 3-way modulating valve.

Description	Signal	Type	Connector
G1 module with mixture	Analog input	NTC 10K 25 °C sensor	AI5
	Analog output	Valve regulation 0 – 10Vdc	AO2
	Digital output	Activation 230Vac / 2A maximum	DO7
G2 module with mixture	Analog input	NTC 10K 25 °C sensor	AI6
	Analog output	Valve regulation 0 – 10Vdc	AO3
	Digital output	Activation 230Vac / 2A maximum	DO8
G3 module with mixture	Analog input	NTC 10K 25 °C sensor	AI7
	Analog output	Valve regulation 0 – 10Vdc	AO4
	Digital output	Activation 230Vac / 2A maximum	DO9

Table 7.6. Connection terminals for outlet pump groups.



NOTE

- Pump groups can be connected directly to 24Vac from the module. Remember that in total, the connected modules must not exceed 36VA or 1.5A. Failure to comply with these ranges could cause the module to malfunction and/or a heat pump component to break.

Inside environment control

The heating and cooling functions can be controlled by digital signals from relay thermostats, by interior terminals with bus communication, by a combination of both or even not using any interior control terminal.

Relay thermostats:

Each outdoor unit, from G1 to G3, has two digital signals to activate heating or cooling demands from the interior thermostats or other external control devices.

Description	Signal	Type	Connector
Mixture G1 module heating request	Digital input	Voltage-free (0V)	DI1
Mixture G1 module cooling request	Digital input	Voltage-free (0V)	DI2
Mixture G2 module heating request	Digital input	Voltage-free (0V)	DI3
Mixture G2 module cooling request	Digital input	Voltage-free (0V)	DI4
Mixture G3 module heating request	Digital input	Voltage-free (0V)	DI5
Mixture G3 module cooling request	Digital input	Voltage-free (0V)	DI6

Table 7.7. Connection terminals for digital inputs that control pump groups G1 – G3.

A single thermostat or several thermostats connected in parallel can be used for each pump groups, as shown below.

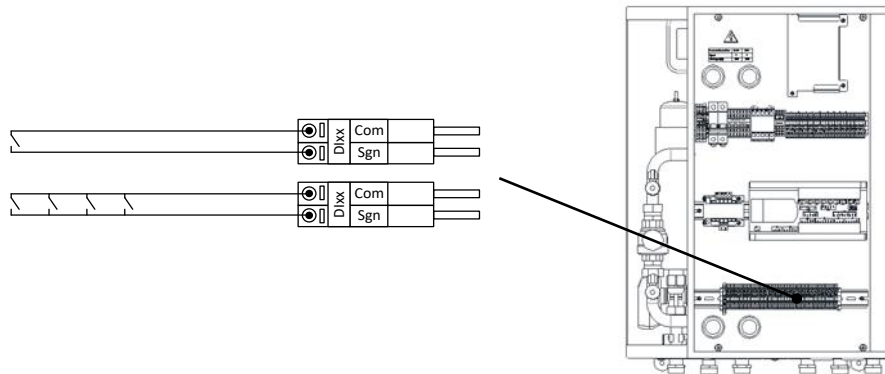


Figure 7.11. Example of the connection of a thermostat and several thermostats in parallel.

Bus indoor terminals

In addition to digital input control (indoor thermostats) indoor terminals with data bus communication can also be used. These terminals allow the environmental conditions of the area associated with each of the available supply groups to be acquired via a serial cable using the Modbus protocol. Only one terminal can be connected per pump group.

Before installing the terminals, carefully read the assembly instructions in the manual supplied with the terminal itself and in the Control Manual.

Description	Signal	Connector
Bus communication terminal	ModBus RS485	FBus2

Table 7.8. Data bus connection terminals.

Follow the recommendations below to connect the terminals to the indoor unit.

- Use a three-pole, shielded AWG 20-22 cable for the connection. If the terminal does not have GND, connect it only to the controller.
- Connect the terminals in series for installations with more than one terminal in the network. The maximum length of the circuit assembly should not exceed 500 metres. For connection networks with more than two terminals it is necessary to install a 120 Ohm heater between A(+) and B(-) in the first and last terminal to prevent possible communication problems.
- If possible, it is recommended to ground the bus cable display.
- Configure the terminal address according to the controller configuration by following the steps indicated in the terminal manual and the Control Manual.

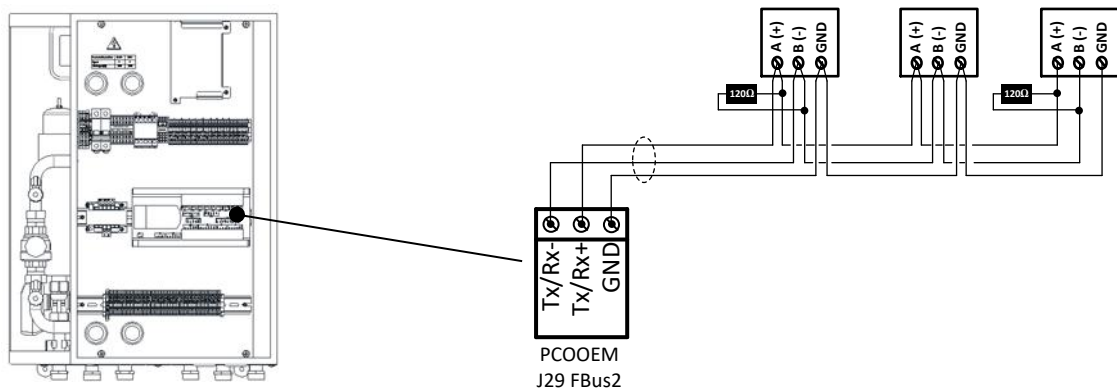


Figure 7.12. Example of connection of terminal bus connection.

Installation without interior terminals

The indoor units can also be used in installations that do not have any type of interior terminal to generate request signals. In these cases, a continuous request can be imposed at the digital input of the module to activate by selecting the appropriate control logic in the controller. As a result, the indoor unit will run the start / stop cycles according to the temperature control of the circuit and the outside cut-off temperatures of each service.

7.6. DHW circuit equipment

DHW production/HTR

This makes it possible to control the manoeuvre of a three-way valve or a pump. It also allows you to use a temperature probe to control the DHW storage temperature.

Description	Signal	Type	Connector
DHW production	Digital output	Activation 230Vac / 2A maximum	DO3
DHW storage temperature/HTR1	Analog input	NTC 10K 25 °C sensor	AI1
HTR2 control temperature	Analog input	NTC 10K 25 °C sensor	AI4

Table 7.9. Connection terminal elements for DHW production and storage.

Auxiliary equipment

It is possible to control an auxiliary system installed in the production circuit and to use it to produce DHW. It is also possible to control an electric heater installed in the DHW tank. For more information, please see point 7.8.

Remote control

There is a digital input to enable/disable the DHW production function. For more information, see point 7.9.

DHW Recirculation

This allows you to control a DHW recirculation pump with a schedule and a temperature probe in the inlet.

Description	Signal	Type	Connector
DHW Recirculation	Digital output	Activation 230Vac / 2A maximum	DO4
DHW recirculation inlet temperature	Analog input	NTC 10K 25 °C sensor	AI2

Table 7.10. Connection terminal elements for DHW recirculation.

7.7. Pool circuit equipment

Pool production

This allows you to control the heating of a pool using an intermediate heat exchanger. Read the value of the temperature of the pool using a temperature probe and control the manoeuvre of a three-way valve or a pump.

Description	Signal	Type	Connector
Pool production	Digital output	Activation 230Vac / 2A maximum	DO2
Pool inlet temperature	Analog input	NTC 10K 25 °C sensor	AI8

Table 7.11. Connection terminal elements for pool production.

Auxiliary equipment

It is possible to control an auxiliary system installed in the production circuit and to use it to produce the pool service. For more information, see point 7.8.

Remote control

There is a digital input to enable/disable the pool production function. For more information, see point 7.9.

7.8. Auxiliary equipment

This is used to control the activation of the auxiliary modules integrated in the DHW storage tanks and the heating buffer tanks via outputs to digital ones. They are also used to control activation of all / nothing external auxiliary boiler. If modulating boilers are installed, it is also used to control the temperature downstream from the boiler, so the heat pump and the boiler can function simultaneously.

The connection terminals of the SG3 outlet module are used to manage the auxiliary boilers, so this one cannot be used.

Description	Signal	Type	Connector
Auxiliary heating buffer storage tank equipment	Digital output	Activation 230Vac / 2A maximum	DO10
DHW inter-storage tank auxiliary equipment	Digital output	Activation 230Vac / 2A maximum	DO11
Auxiliary boiler	Analog input	NTC 10K 25 °C sensor	AI7
	Analog output	Valve regulation 0 – 10Vdc	AO4
	Digital output	Activation 230Vac / 2A maximum	DO9

Table 7.12. Auxiliary equipment connection terminals.

7.9. Remote services production control

The indoor unit is equipped with digital inputs for remote control of production services.

Description	Signal	Type	Connector
Control SMART GRID (EVU/SG/FNN)	Digital input	24Vac signal	Configurable (DI7/DI8/DI9)
WINTER / SUMMER program selection	Digital input	24Vac signal	Configurable (DI7/DI8/DI9)
Enable / disable DHW production	Digital input	24Vac signal	Configurable (DI7/DI8/DI9)
Enable / disable DHW pool production	Digital input	24Vac signal	DI10

Table 7.13. Connection terminals for digital inputs that control service production.

SMART GRID control

This allows you to configure energy production with both the compressor and auxiliary equipment, based on external signals that may be sent by the electricity company itself, in order to try to keep the distribution network balanced at all times.

The different signals are EVU, SG, and FNN, which are mutually exclusive. For more information on configuring the different signals, refer to the control manual.

Remote WINTER / SUMMER program selection

Used for remote selection of the heat pump operation program.

DHW production

Enables / disables the DHW production function. If the function is enabled, DHW production is governed by the DHW configuration in the module controller.

Pool production

Allows the pool production service to be enabled/disabled. If the signal is enabled, pool production is governed by the pool configuration in the module controller.

7.10. Alarm signal

If the heat pump cannot start up the compressor because of an active alarm, the indoor unit will generate an alarm signal.

Description	Signal	Type	Connector
Alarm signal	Relay digital output	Activation 230Vac / 2A maximum	DO12

Table 7.14. Connection terminals for aerothermal or hybrid brine systems.

7.11. Energy meter

The heat pump allows MODBUS communication with energy meters supplied by Ecoforest. Before installing the energy meter, carefully read its assembly instructions.

Description	Signal	Connector
Energy meter BUS communication	ModBus RS485	J29 - FBus2

Table 7.15. Data bus connection terminals for the energy meter.

Follow the recommendations below to connect the energy meter to the heat pump.

- Use a three-pole, shielded AWG 20-22 cable for the connection.
- Connect the terminals in series for installations with more than one terminal in the network. The maximum length of the circuit assembly should not exceed 500 metres. For connection networks with more than two terminals, it is necessary to install a 120 Ohm heater between A(+) and B(-) in the first and last terminal to prevent possible communication problems.
- If possible, it is recommended to ground the bus cable display.
- To install the device supplied by Ecoforest, follow the steps in the manufacturer's installation manual included with the equipment. It is necessary to configure a 100 address on the measurement device for proper communication with your heat pump (See control applications manual).

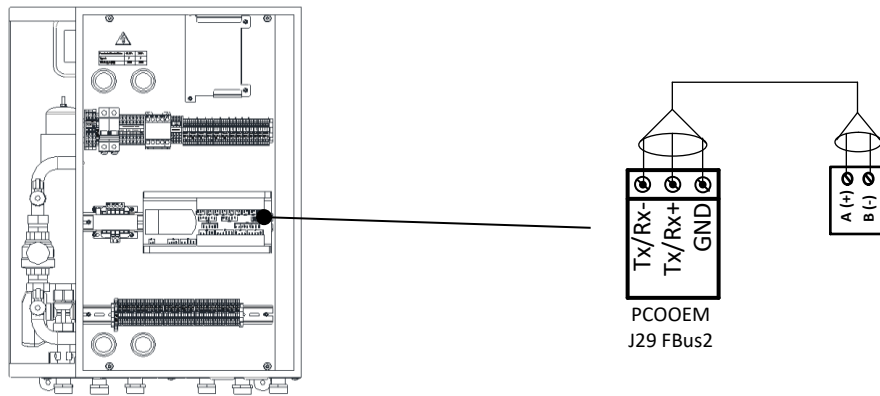


Figure 7.13. Example of connection FBUS2 of energy meter.

7.12. Communications bus with other devices

You can connect other devices to the indoor unit via a communication bus. In this way, a large amount of data can be read and certain variables can be written, such as, switching on/off the heat pump, activating the demand for DHW, swimming pool or heating or cooling services for each configured outlet module and varying the set points for DHW, swimming pool and each group for both heating and cooling. The port for this purpose is BMS2, located in the indoor unit controller.

Description	Signal	Connector
MODBUS read and write	ModBus RS485	J11 - BMS2

Table 7.16. Read and write data bus connection terminals.

Follow the recommendations below for connecting the converters.

- Use a three-pole, shielded AWG 20-22 cable for the connection.
- For installations with more than one heat pump, connect the terminals in series. The maximum length of the circuit assembly should not exceed 500 metres.
- Configure the BMS2 terminal address on the controller following the steps laid out in the technical service manual.

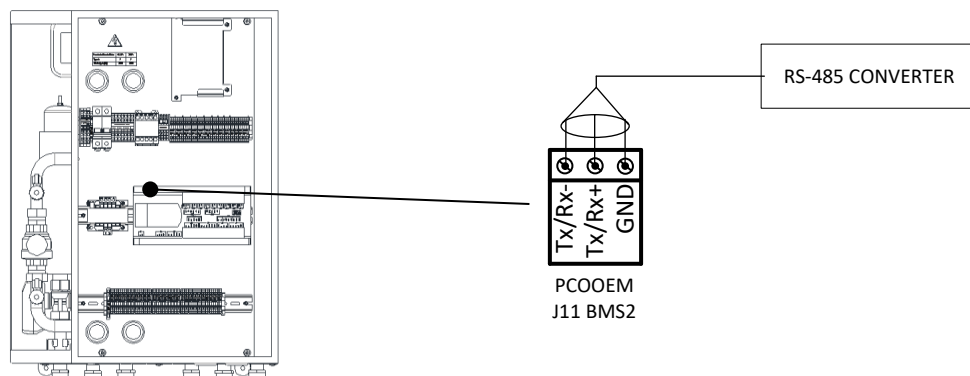


Figure 7.14. Example shown: an RS-485 converter connection for read write data on the heat pump.

It is also possible to establish communication with other Ecoforest – Carel controllers. The port dedicated to this type of communication is the pLAN of the indoor unit.



NOTE

- To ensure that the unit works properly, communication with a compatible outdoor unit is essential.

- To establish bus communication between the indoor and outdoor unit, see the chapter “*Bus communication between the external and the indoor unit*” in the manual of your outdoor unit.

7.13. Block units communications network

To build the network needed to connect Ecoforest equipment to each other, you must connect the BMS2 terminals of each outdoor unit controller to the Fbus terminal of the ecoAIR CM indoor unit controller using Modbus communication cables. The bus network consists of a master unit (MASTER), an ecoAIR CM indoor unit, and one or more slave units (SLAVE 1-n), ecoAIR outdoor units.

For the bus network to work properly, follow these recommendations:

- Use a three-pole, shielded AWG 20-22 cable for the connection. Using other types of cable may cause communication interference.
- Make sure to connect the wiring to the corresponding terminal on each controller (Tx/Rx-, Tx/Rx+, GND).
- Connect the cable shield to ground to avoid interference.
- Avoid installing the pLAN network cable parallel to power cables.

For more information, see the Control Manual.

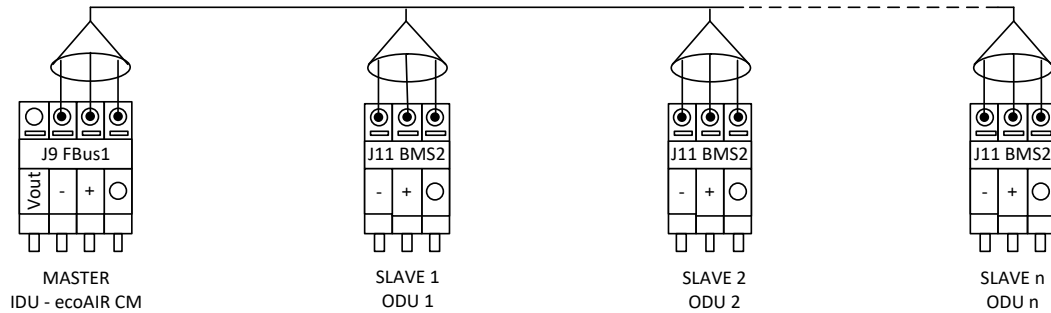


Figure 7.15. Construction of the bus network, for block units.

8. Start-up

Check the following items before starting up the heat pump. Not doing so could result in poor heat pump operation and/or serious heat pump damage.

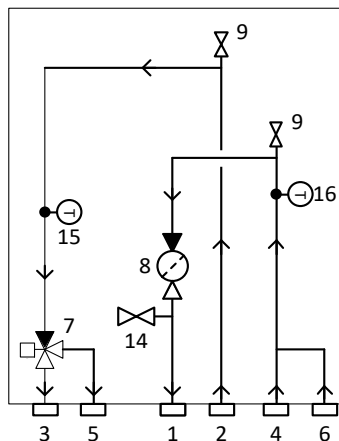
- All the hydraulic circuits of the installation have been properly filled and bled.
- The cut-off valves of the hydraulic circuits are open.
- An external switch has been installed to cut off all the power supply circuits of the heat pump.
- The heat pump power supply has the proper voltage and allows sufficient consumption to start up the compressor.
- The inside room temperature of the home is at least 18°C. Otherwise, the temperature has to be increased by auxiliary equipment.

9. Technical specifications

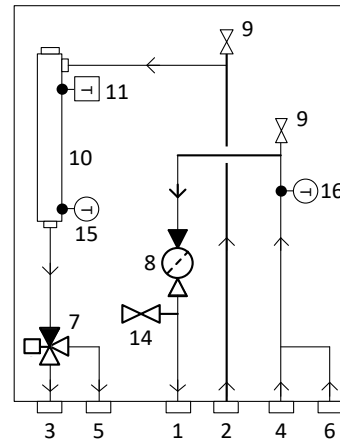
9.1. Location of components, Hidrokit indoor units

No	Description	No	Description
1	Return to outdoor unit	11	Safety thermostat
2	Outlet from outdoor unit	12	Exchanger separator glycol water / water
3	Heating / cooling inlet	13	Production circulator pump (indoor unit)
4	Heating / cooling return	14	Filling / drain valve (indoor unit)
5	DHW inter-accumulator inlet	15	Production outlet temp. probe (indoor unit)
6	DHW inter-storage tank inlet	16	Production return temp. probe (indoor unit)
7	DHW valve	17	Electrical panel (indoor unit)
8	Filter valve	18	Power cable inlet (indoor unit)
9	Manual trap	19	Control cable inlet (indoor unit)
10	Outlet resistor		

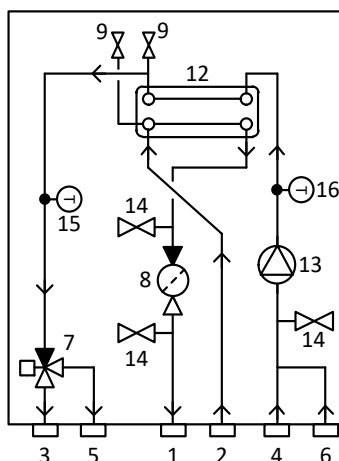
Hidrokit HK



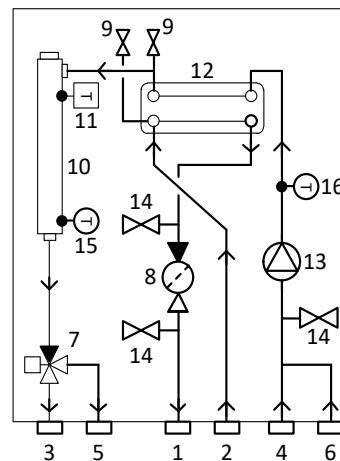
Hidrokit HK-EH



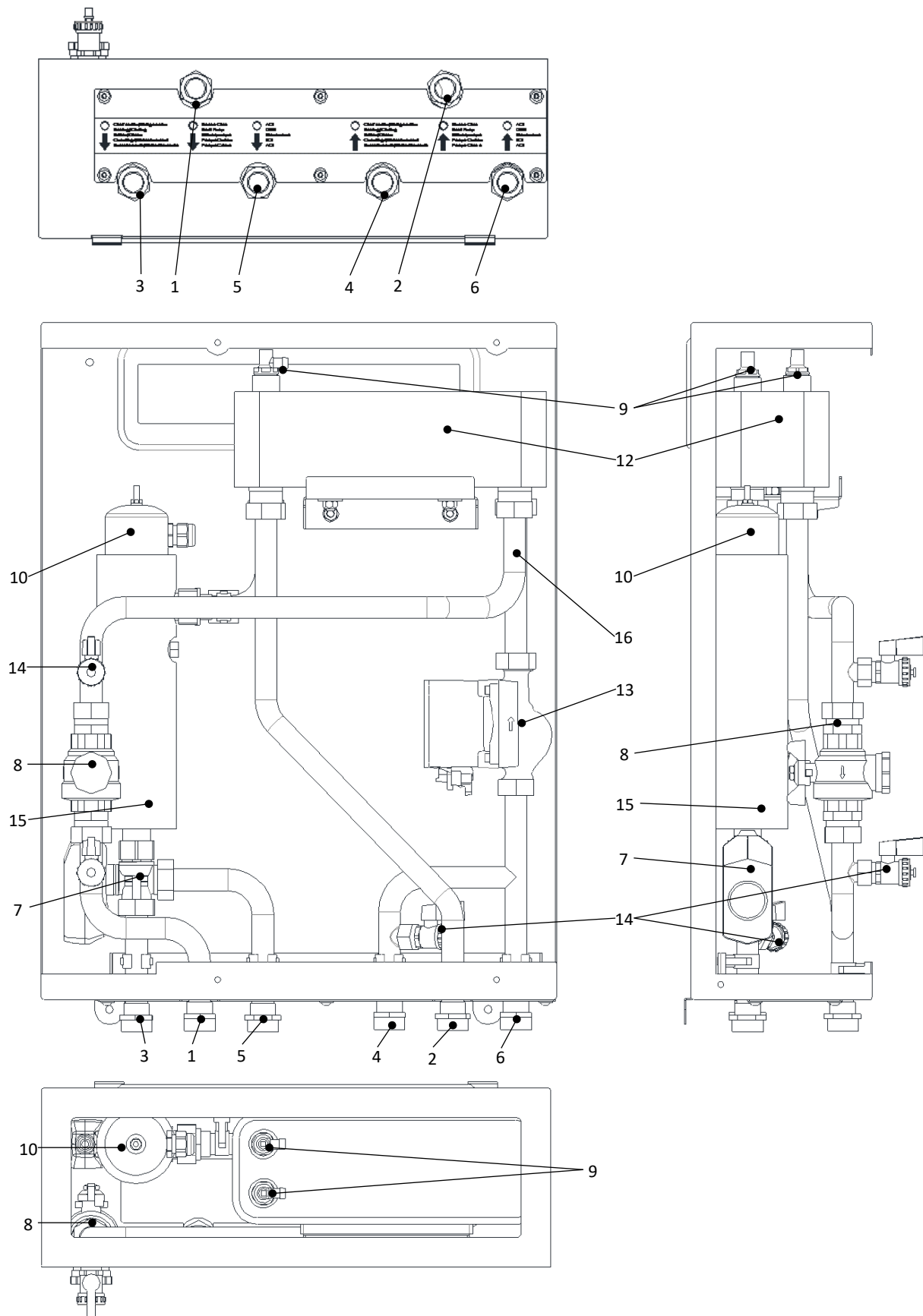
Hidrokit HK-S



Hidrokit HK-EH-S

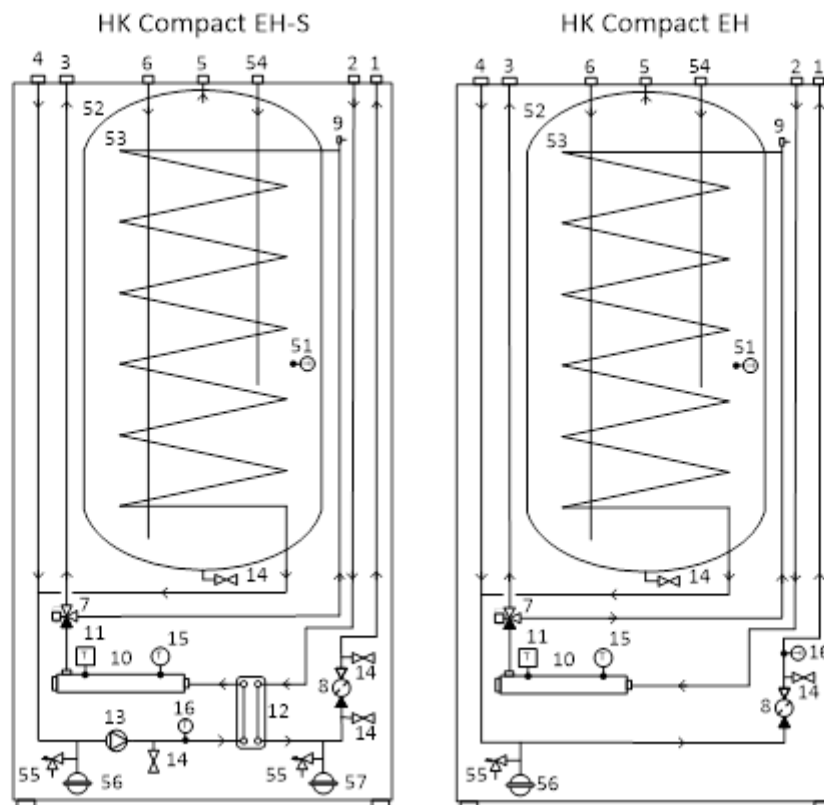


Hidrokit HK-EH-S

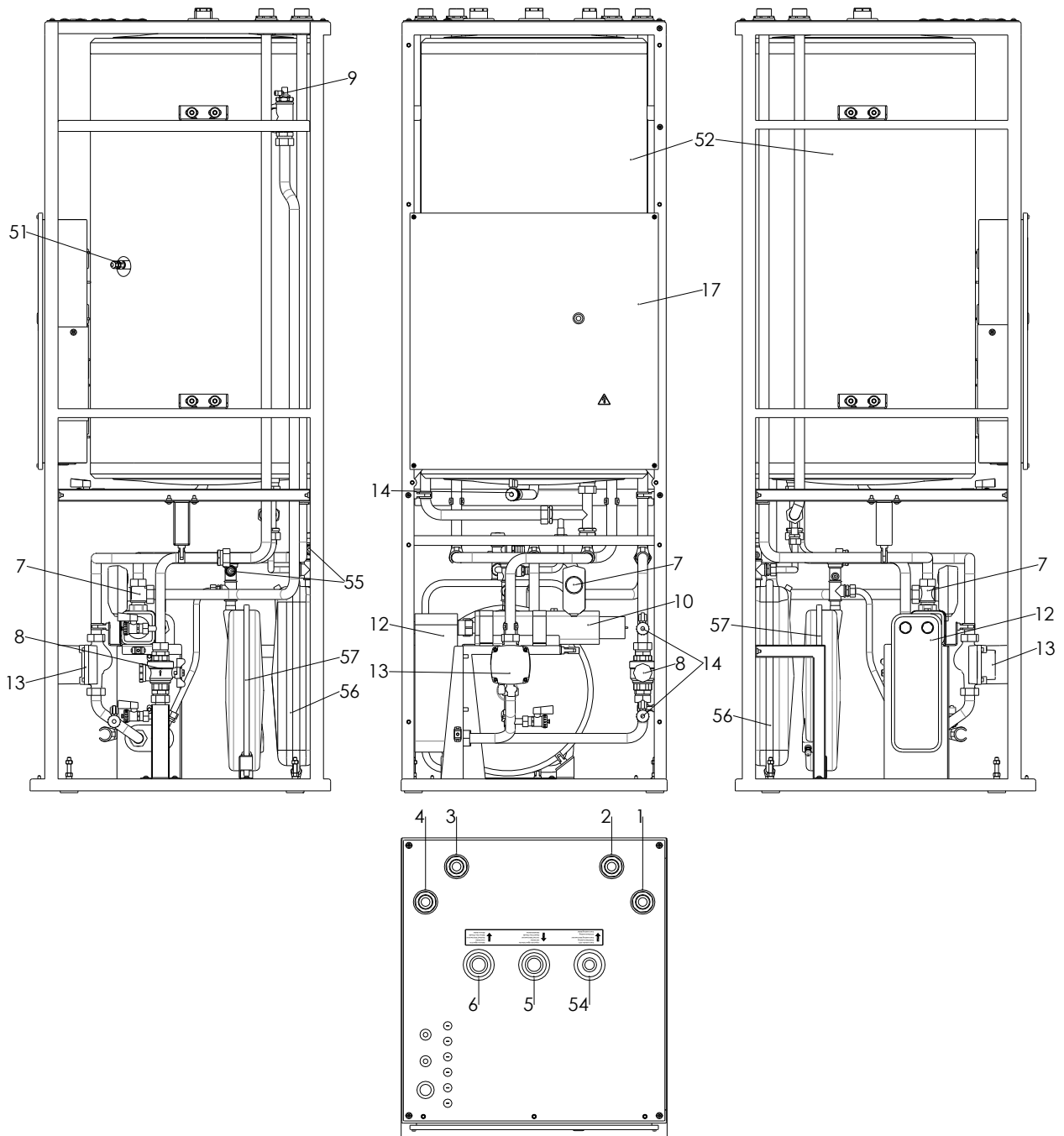


9.2. Location of components, Hidrokit Compact indoor units

No	Description	No	Description
1	Return to outdoor unit	14	Filling / drain valve (indoor unit)
2	Outlet from outdoor unit	15	Production outlet temp. probe (indoor unit)
3	Heating / cooling inlet	16	Production return temp. probe (indoor unit)
4	Heating / cooling return	17	Electrical panel (indoor unit)
5	DHW outlet	18	Power cable inlet (indoor unit)
6	Tap water inlet	19	Control cable inlet (indoor unit)
7	DHW valve	51	DHW storage tank temp. probe (Compact unit)
8	Filter valve	52	DHW storage tank
9	Manual trap	53	DHW coil
10	Outlet resistor	54	DHW Recirculation
11	Safety thermostat	55	Safety valve
12	Exchanger separator glycol water / water	56	12l expansion vessel
13	Production circulator pump (indoor unit)	57	8l expansion vessel

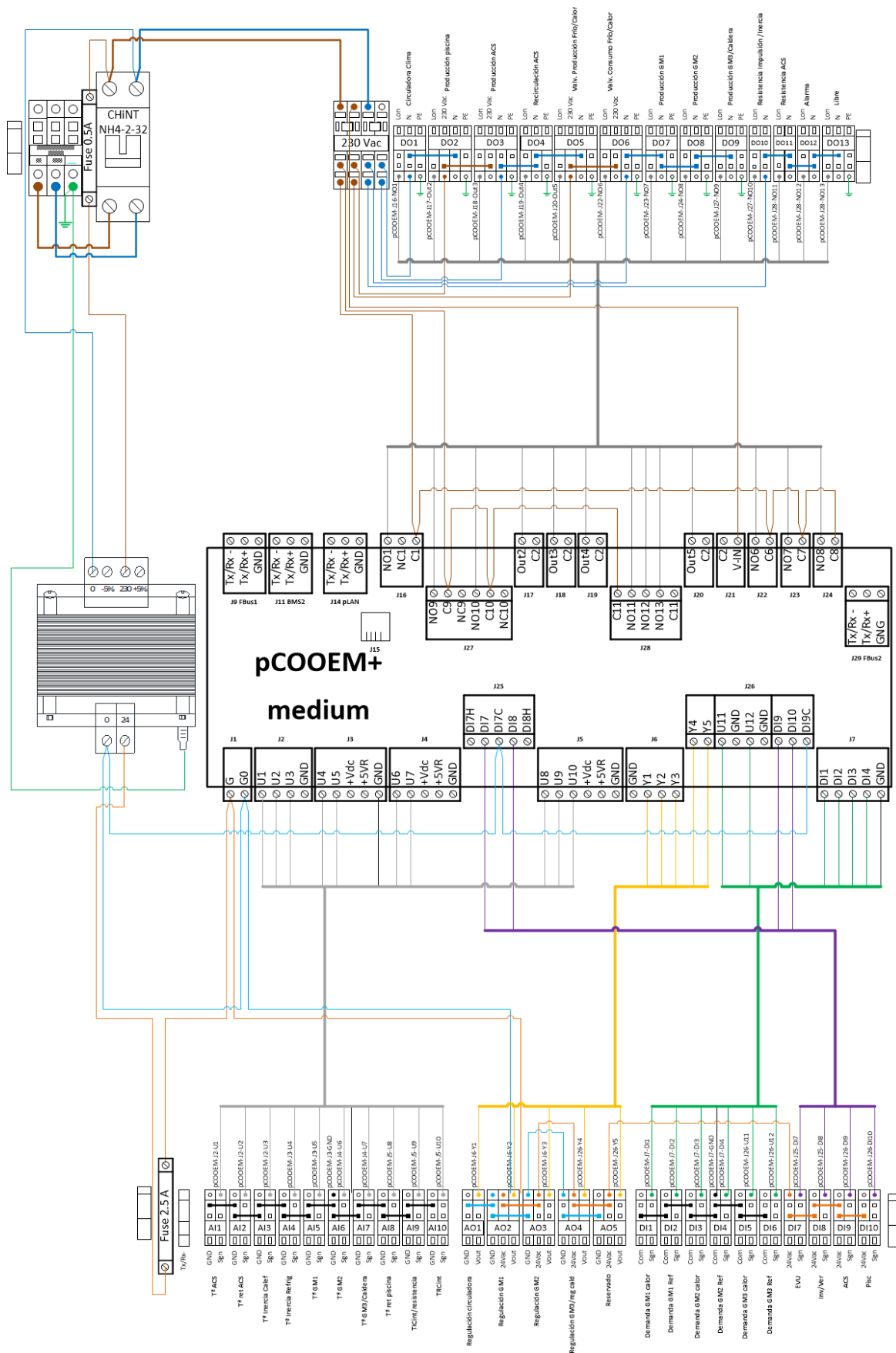


HK Compact -EH-S

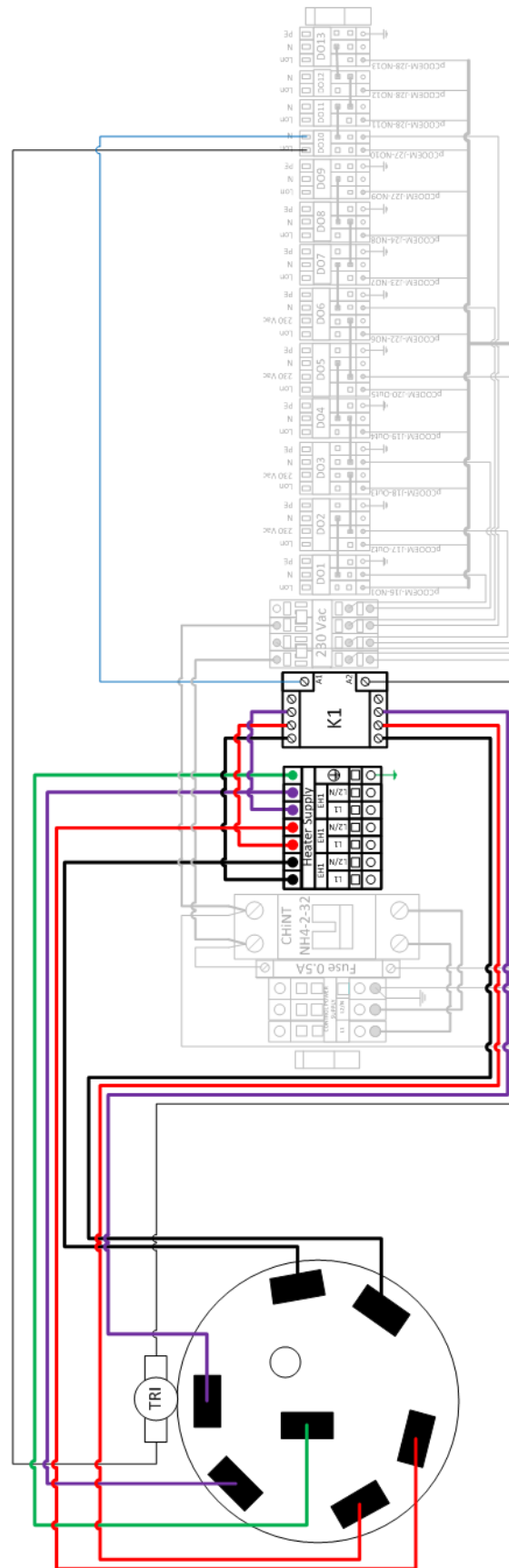


9.3. Electrical diagrams

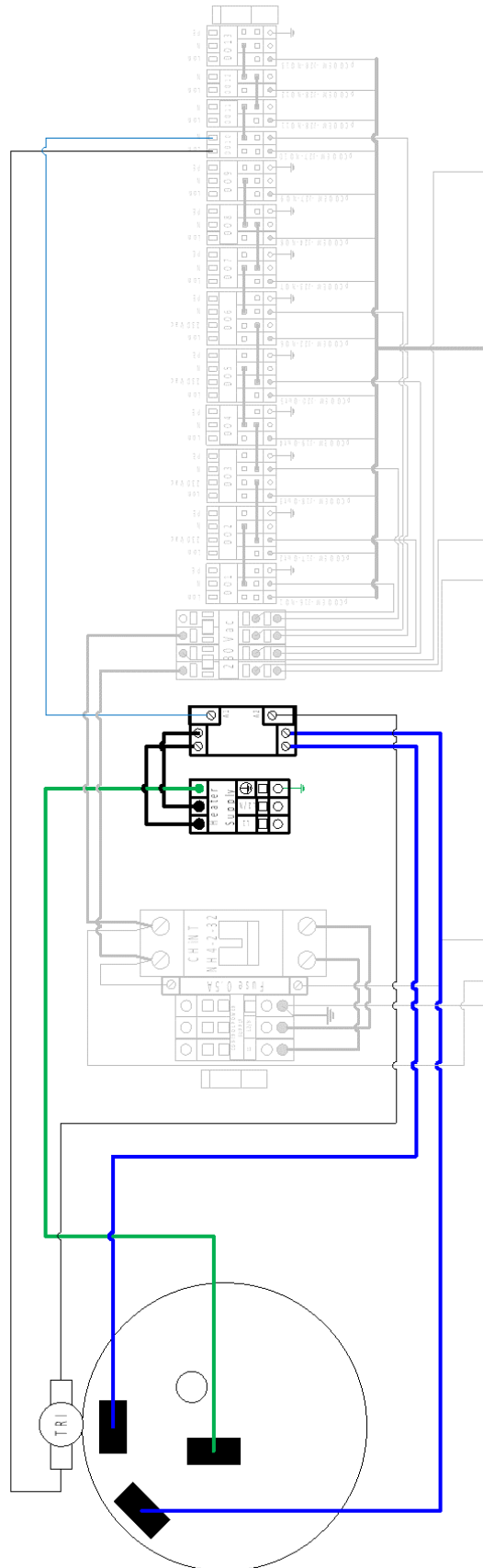
EcoAIR CM, Hidrokits and Hidrokits Compact



Wiring diagram - Internal resistor, Hidrokit HK-EH, Hidrokit HK-EH-S, Hidrokit HK-EH 20, Hidrokit HK-EH-S 20, Hidrokit Compact HK-EH and Hidrokit Compact HK-EH-S



Wiring diagram - Internal resistor, Hidrokit HK-EH 7 and Hidrokit HK-EH-S 7



9.4. Electrical connection tables

Electrical connection tables for the ecoAIR CM, Hidrokits and Hidrokits Compact indoor units. In the case of ecoAIR CM Lite, the connections are made in the outdoor unit, consult the connection tables, in the manual of the outdoor unit.

DIGITAL OUTPUTS			
CONNECTIONS		DESCRIPTION	
Connection terminal	Controller terminal	Type	Signal
Block I / DO1	pCOOEM+ / J16 / NO1	Activation 230Vac / 1A max.	Production circulator pump
Block I / DO2	pCOOEM+ / J17 / Out2	Activation 230Vac / 1A max.	Pool production
Block I / DO3	pCOOEM+ / J18 / Out3	Activation 230Vac / 2A max.	DHW production
Block I / DO4	pCOOEM+ / J19 / Out4	Activation 230Vac / 2A max.	DHW Recirculation
Block I / DO5	pCOOEM+ / J20 / Out5	Activation 230Vac / 2A max.	Cooling/Heating production
Block I / DO6	pCOOEM+ / J22 / NO6	Activation 230Vac / 2A max.	Cooling/Heating consumption
Block I / DO7	pCOOEM+ / J23 / NO7	Activation 230Vac / 2A max.	SG1 group production
Block I / DO8	pCOOEM+ / J24 / NO8	Activation 230Vac / 2A max.	SG2 group production
Block I / DO9	pCOOEM+ / J27 / NO9	Activation 230Vac / 2A max.	SG3/Boiler production group
Block I / DO10	pCOOEM+ / J27 / NO10	Activation 230Vac / 2A max.	Outlet/Buffer resistor
Block I / DO11	pCOOEM+ / J28 / NO11	Activation 230Vac / 2A max.	DHW resistor
Block I / DO12	pCOOEM+ / J28 / NO12	Activation 230Vac / 2A max.	Alarm
Block I / DO13	pCOOEM+ / J28 / NO13	Activation 230Vac / 2A max.	Free

COMMUNICATIONS			
CONNECTIONS		DESCRIPTION	
Connection terminal	Controller terminal	Type	Signal
Block II / FBus1	pCOOEM+ / J9 FBus1	RS485 ModBus RTU	Communication Outdoor unit - Inverter
Block II / BMS2	pCOOEM+ / J11 BMS2	RS485 ModBus RTU	Remote bus access
--	pCOOEM+ / BMS card	Communications card connector	
Block II / pLAN	pCOOEM+ / J14 pLAN	RS485 ModBus RTU	Controller network connector
--	pCOOEM+ / BMS card	Communications card connector	Remote bus access.
Block II / FBus2	pCOOEM+ / J29 FBus2	RS485 ModBus RTU	Interior thT and th-Tune terminals

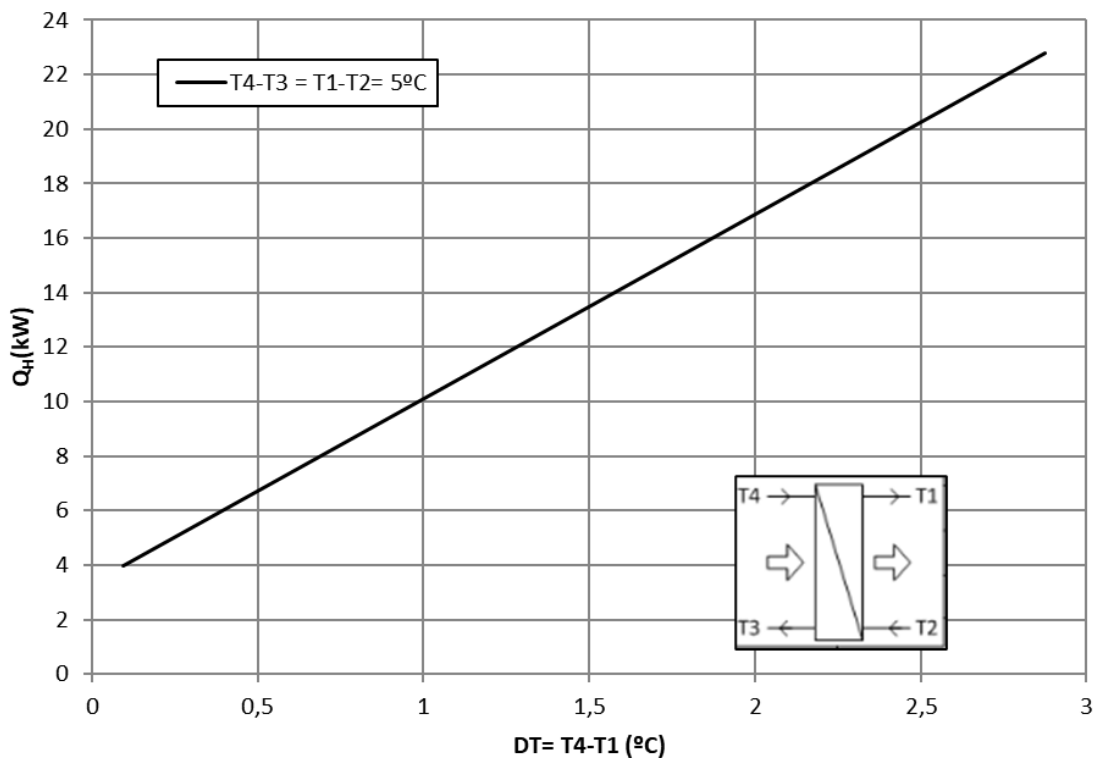
ANALOG INPUTS			
CONNECTIONS		DESCRIPTION	
Connection terminal	Controller terminal	Type	Signal
Block II / AI1	pCOOEM+ / J2 / U1	NTC 10K 25 °C	DHW storage temperature/HTR1
Block II / AI2	pCOOEM+ / J2 / U2	NTC 10K 25 °C	DHW recirculation temperature
Block II / AI3	pCOOEM+ / J2 / U3	NTC 10K 25 °C	"Buffer T1" Heating and/or cooling buffer storage tank
Block II / AI4	pCOOEM+ / J3 / U4	NTC 10K 25 °C	"Buffer T2" Cooling buffer storage tank / HTR2
Block II / AI5	pCOOEM+ / J3 / U5	NTC 10K 25 °C	Mixture group 1 temperature
Block II / AI6	pCOOEM+ / J4 / U6	NTC 10K 25 °C	Mixture group 2 temperature
Block II / AI7	pCOOEM+ / J4 / U7	NTC 10K 25 °C	G3/Boiler temperature
Block II / AI8	pCOOEM+ / J5 / U8	NTC 10K 25 °C	Pool inlet temperature
Block II / AI9	pCOOEM+ / J5 / U9	NTC 10K 25 °C	Outlet prod. temperature Interior/Heater.
Block II / AI10	pCOOEM+ / J5 / U10	NTC 10K 25 °C	Interior production inlet temperature

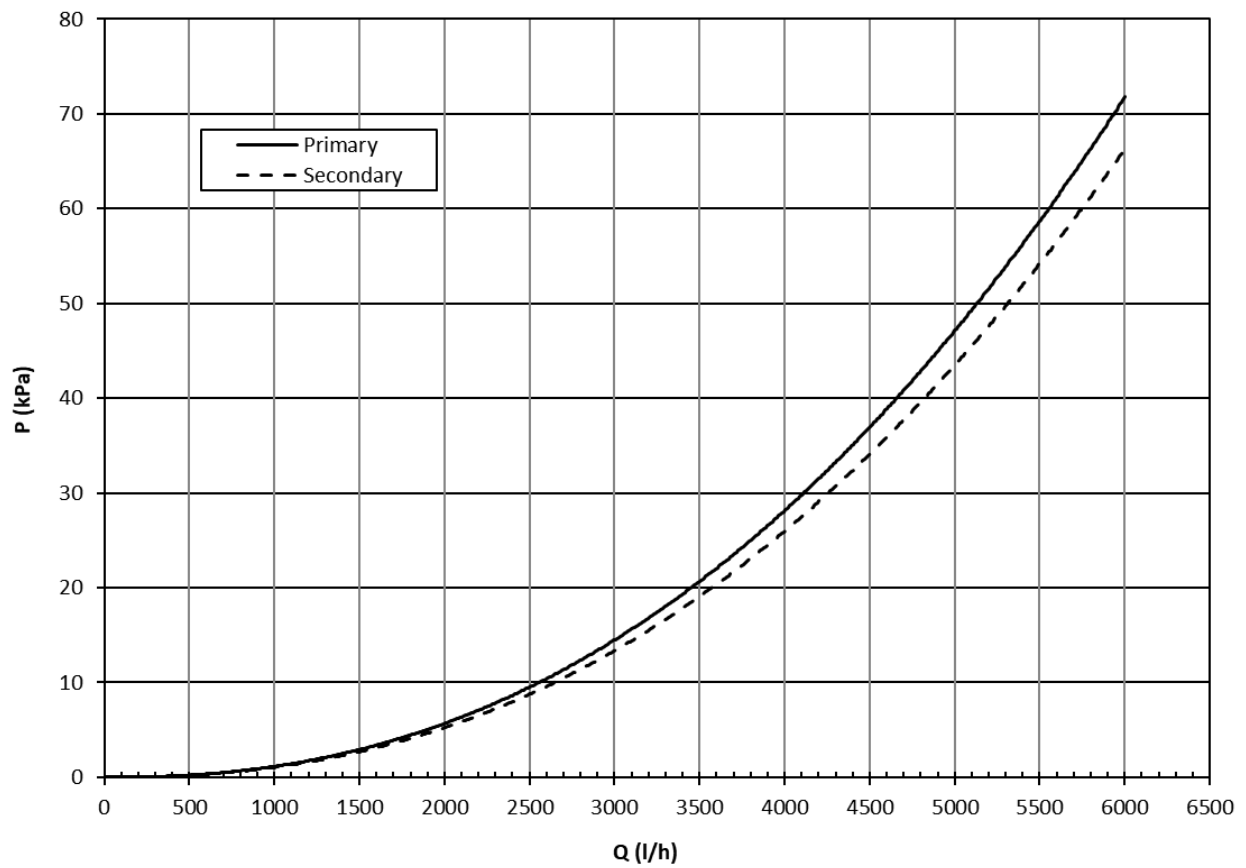
ANALOG OUTPUTS			
CONNECTIONS		DESCRIPTION	
Connection terminal	Controller terminal	Type	Signal
Block II / AO1	pCOOEM+ / J6 / Y1	PWM inverted	Interior production pump regulation
Block II / AO2	pCOOEM+ / J6 / Y2	0-10Vdc	Regulation of mixture group 1
Block II / AO3	pCOOEM+ / J6 / Y3	0-10Vdc	Regulation of mixture group 2
Block II / AO4	pCOOEM+ / J26 / Y4	0-10Vdc	G3/Boiler regulation
Block II / AO5	pCOOEM+ / J26 / Y5	0-10Vdc	Free

DIGITAL INPUTS			
CONNECTIONS		DESCRIPTION	
Connection terminal	Controller terminal	Type	Signal
Block II / DI1	pCOOEM+ / J7 / DI1	Voltage-free (0V)	G1 heating request
Block II / DI2	pCOOEM+ / J7 / DI2	Voltage-free (0V)	G1 cooling request
Block II / DI3	pCOOEM+ / J7 / DI3	Voltage-free (0V)	G2 heating request
Block II / DI4	pCOOEM+ / J7 / DI4	Voltage-free (0V)	G2 cooling request
Block II / DI5	pCOOEM+ / J26 / U11	Voltage-free (0V)	G3 heating request
Block II / DI6	pCOOEM+ / J26 / U12	Voltage-free (0V)	G3 cooling request
Block II / DI7	pCOOEM+ / J25 / DI7	24Vdc / 24Vac	Electrical consumption control SMART GRID or WINTER / SUMMER selection or DHW production
Block II / DI8	pCOOEM+ / J25 / DI8	24Vdc / 24Vac	
Block II / DI9	pCOOEM+ / J26 / DI9	24Vdc / 24Vac	
Block II / DI10	pCOOEM+ / J26 / DI10	24Vdc / 24Vac	Pool production

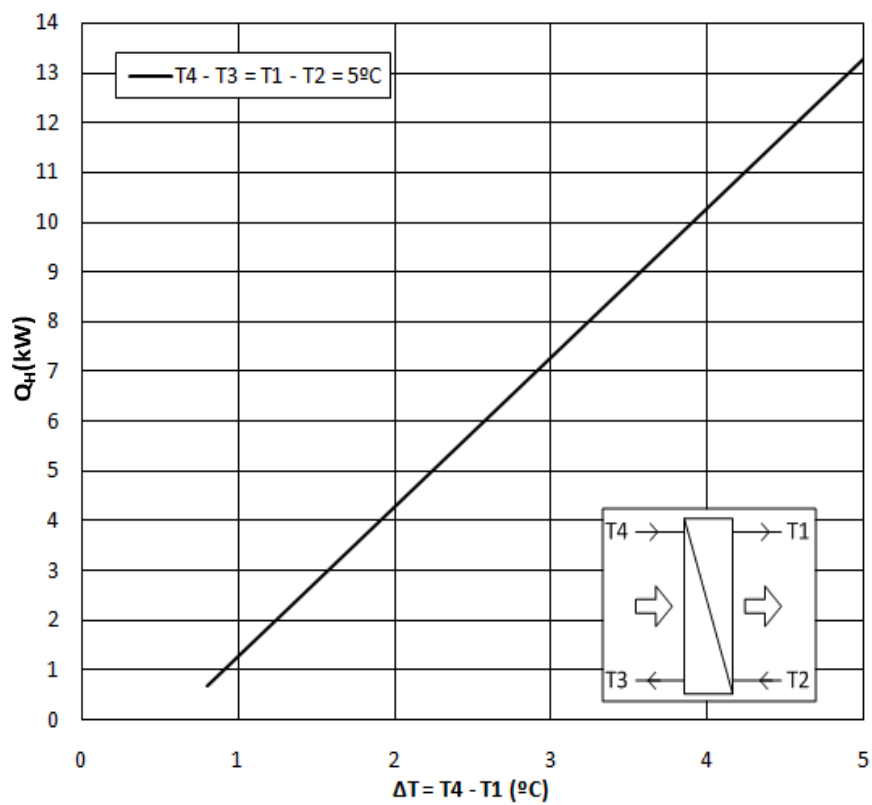
9.5. Exchanger Separator

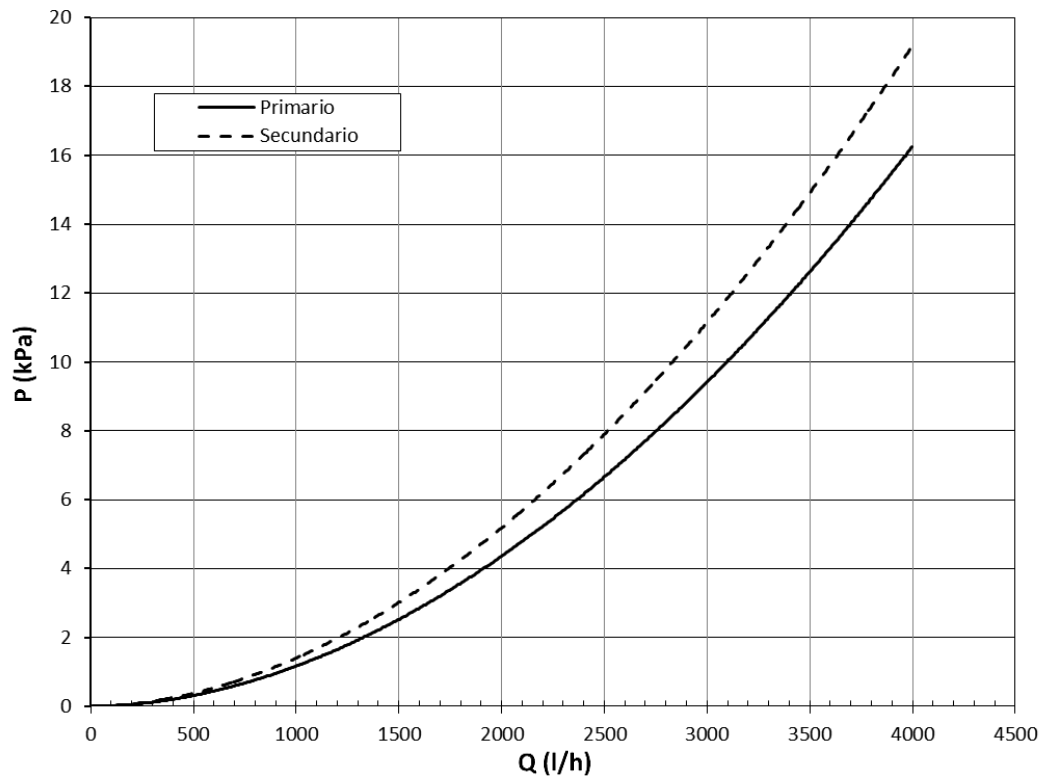
Hidrokit HK-EH-S 20 power exchange and pressure drop charts



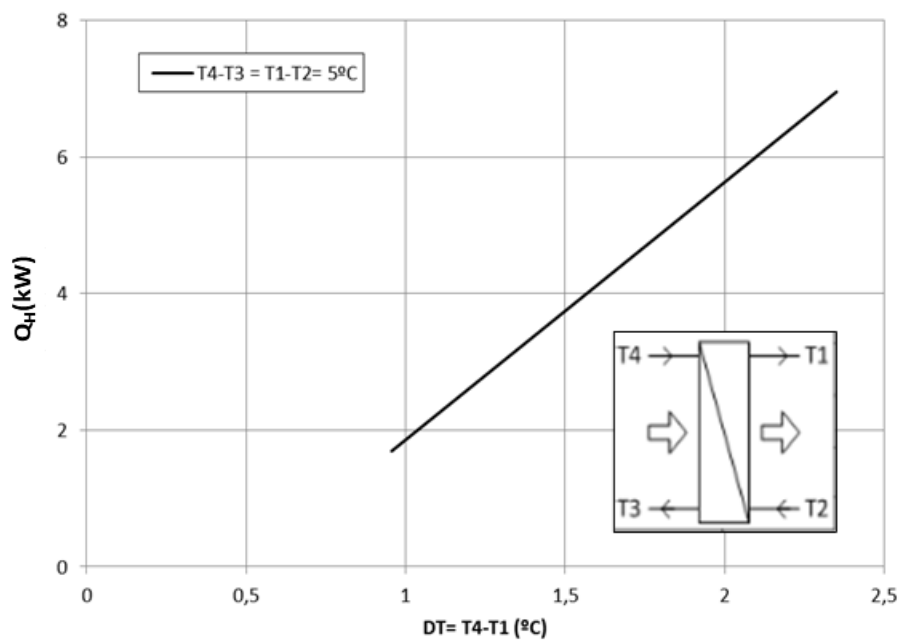


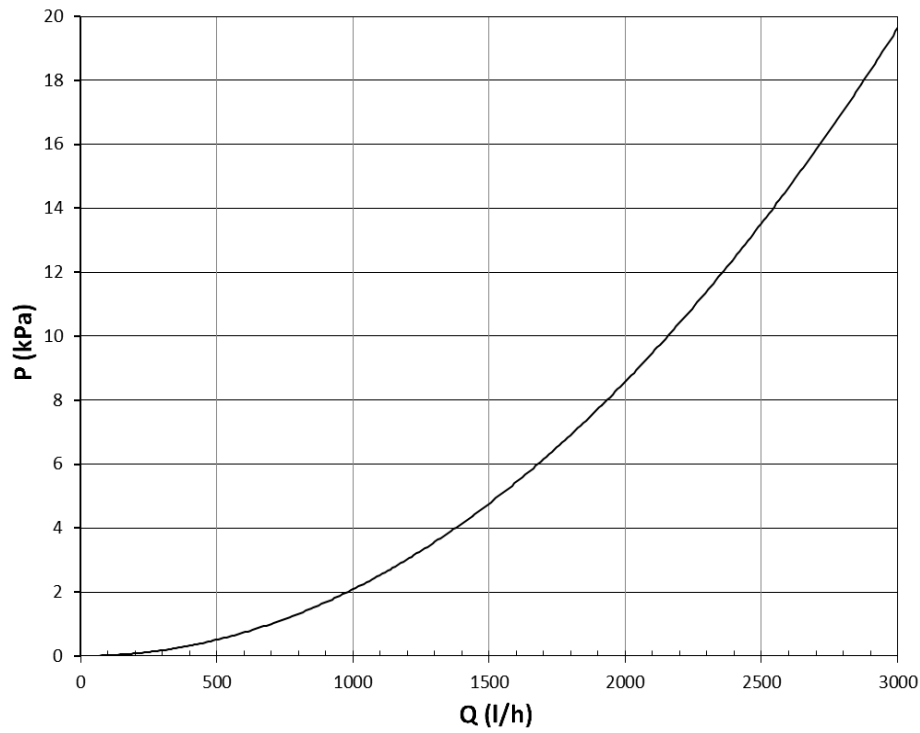
Hidrokit HK-EH-S and HK Compact EH-S power exchange and pressure drop charts





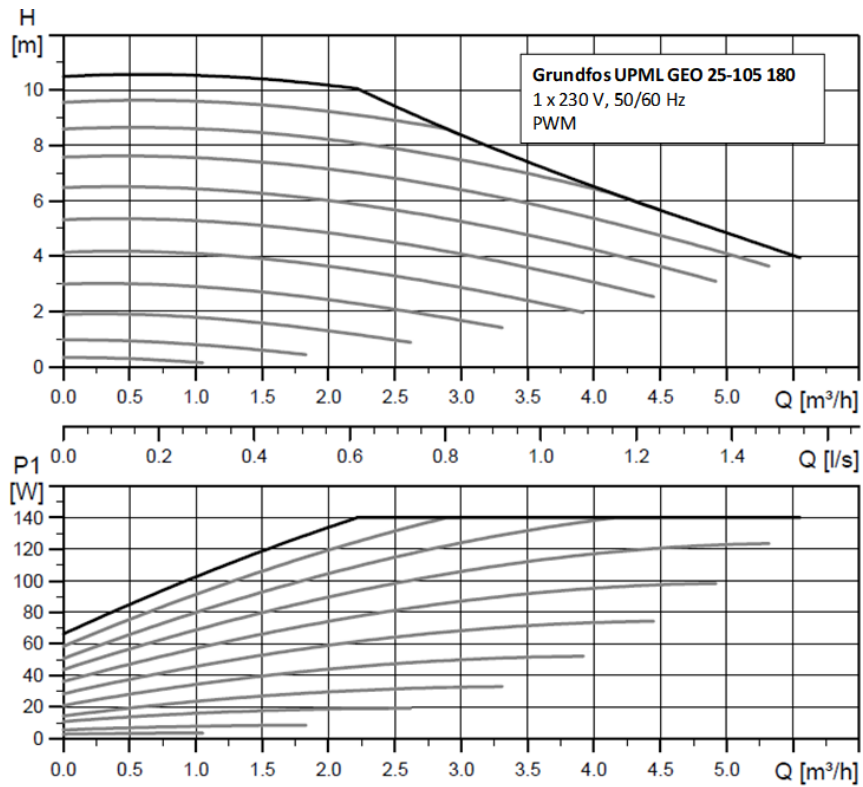
Hidrokit HK-EH-S 7 power exchange and pressure drop charts



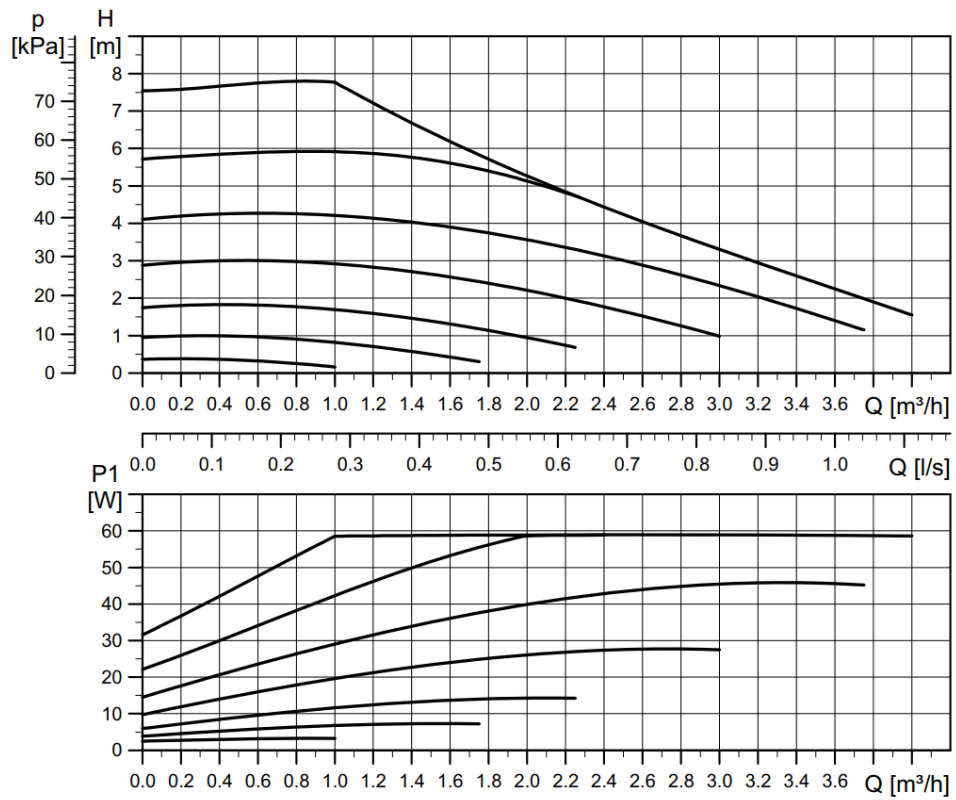


9.6. Production circulator

Hidrokit HK-EH-S 20



Hidrokit HK-EH-S, Hidrokit HK-EH-S 7 and HK Compact EH-S



10. Technical data table

INDOOR UNIT specification		uds	Control	Hidrokits- HK									HK Compact	
			ecoAIR CM	S 7	EH 7	EH-S 7	EH	S	EH	EH-S	EH 20	EH-S 20	EH	EH-S
Application	Place of installation	-	Indoors											
	Heating, DHW and pool	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Active cooling	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Heating derivation/Integrated DHW	-	--	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Integrated 165l storage tank	-	--	--	--	--	--	--	--	--	--	--	✓	✓
	Integrated electrical resistance	-	--	--	✓	✓	--	--	✓	✓	✓	✓	✓	✓
	Integrated hydraulic separation	-	--	✓	--	✓	--	✓	--	✓	--	✓	--	✓
Operating limit	Production circuit pressure	bar	--	0.5 - 3										
	Max. pressure DHW storage tank	bar	--										8	
	DHW storage tank temperature	°C	--										80	
Electrical control data	1/N/PE 230Vac / 50-60 Hz ¹	-	✓											
	Maximum recommended external protection	A	C10A											
	Primary transformer circuit fuse	A	0.5											
	Secondary transformer circuit fuse	A	2.5											
Electrical integrated resistance backup data	Connection option 1/N/PE 230Vac / 50-60 Hz ¹	-	--	--	✓	--	--	✓	--	✓	✓	✓	✓	✓
	Number of elements	-	--	--	1	--	--	1 / 2 / 3	--	1 / 2 / 3	1 / 2 / 3	1 / 2 / 3	1 / 2 / 3	1 / 2 / 3
	External protection recommended 1 / 2 / 3	A	--	--	C16A	--	--	C10A / C16A / C20A	--	C16A / C20A / C32A	C16A / C20A / C32A	C10A / C16A / C20A	C10A / C16A / C20A	C10A / C16A / C20A
	Max. consumption 1 / 2 / 3	kW	--	--	2	--	--	1.3 / 2.7 / 4.0	--	2 / 4 / 6	2 / 4 / 6	2 / 4 / 6	1.3 / 2.7 / 4.0	1.3 / 2.7 / 4.0
	Max. consumption 1 / 2 / 3	A	--	--	8.8	--	--	6.3 / 12.6 / 18.9	--	8.8 / 17.6 / 26.4	8.8 / 17.6 / 26.4	8.8 / 17.6 / 26.4	6.3 / 12.6 / 18.9	6.3 / 12.6 / 18.9
	Connection option 3/PE 400Vac / 50-60 Hz ¹	-	--	--	--	--	--	✓	--	✓	✓	✓	✓	✓
	External protection recommended	A	--	--	--	--	--	C10A	--	C16A	C16A	C16A	C10A	C10A
	Maximum consumption	kW	--	--	--	--	--	4.0	--	6	6	6	4.0	4.0
Size and weight	Height x width x depth	m m	600x 400x 158	713x525x305							718x580x335		1770x595x678	
	Empty weight (without assembly)	kg	15	40	41	43	37	44	40	47	40	47	130	145

1. The permitted voltage range for correct operation is $\pm 10\%$.

11. Symbols



DHW circuit



Pool



Heating system



Cooling system



NTC temperature sensor



Open/closed contact or thermostat signal



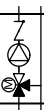
Data bus communication terminal



Circulator pump



Direct outlet module



Outlet module with mixture



Electrical heater



Drain defrost heater



Expansion vessel



3-way valve open/closed



3-way thermostatic valve



3-way modulating valve 0-10Vdc



Check valve



Cut-off valve



Safety valve



Differential pressure valve



Particulate filter



Heat exchanger



Outlet pipe



Return pipe



Flexible hose



Drain

ECOFOREST GEOTERMIA, S.L.

Parque Empresarial Porto do Molle, Rua das Pontes, 25

36350 Nigrán - Pontevedra (Spain)

Tel.: +34 986 262 184 / +34 986 417 700

Fax: +34 986 262 186

e-mail: Info@ecoforest.es

<http://www.ecoforest.es>



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biomasa - bomba de calor - solar

The manufacturer reserves the right to make modifications without prior notice.

Several of the features described in this version of the manual may require an update to the factory-installed software version.