Библиотека СОК

komfovent

KOMBI

INSTALLATION MANUAL

en



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1. INTRODUCTION

This Installation Manual is intended for professionals, qualified to install the KOMBI hybrid heating and ventilation unit. Qualified professionals are people with sufficient professional experience and knowledge of heating and ventilation systems and installation thereof, knowledge of electrical safety and plumbing requirements and having ability to perform works without endangering themselves or others.

1.1. Safety Requirements

To avoid misunderstandings, read this Instruction Manual carefully before installation of the unit.

Units may be installed only by qualified professionals in accordance with the manufacturer's instructions and applicable legal acts and safety requirements. KOMBI unit is an electrical-mechanical device that contains electrical and moving parts; therefore, ignoring the instructions of this manual will void the manufacturer's warranty and could result in direct damage to property or health.

- **Before starting any tasks, make sure that the unit is unplugged from the mains.**
- **Use caution when performing works near internal or external heaters as their surfaces may be hot.**
- **Do not connect the unit to the mains unless all the external assemblies are fully installed.**
- **Do not connect the unit to the mains in case of any visible damage incurred during transportation.**
- **Remove all foreign objects and tools from the unit.**
- **Do not operate the unit in areas with potentially explosive atmospheres.**
- **Use appropriate safety equipment (gloves, goggles) when performing installation or repair works.**
- **Heat pump system is filled with refrigerant (F-gas), therefore any mechanical/electrical works on a heat pump must be performed only by qualified refrigeration systems' specialists or "Komfovent" representative.**
- **Temperature of evaporating refrigerant is very low and causes severe frostbite in contact with skin, therefore use appropriate safety equipment (gloves, goggles).**
- **Maximum pressure in cold water supply system – 6 atm. If water pressure in the system is higher, a pressure relief valve must be installed.**

1.2. Structure

KOMBI – is a hybrid heating and ventilation unit for domestic hot water production, temperature control with underfloor heating systems and quality ventilation. KOMBI unit is composed of 3 parts: ventilation unit, heat pump and hot water system. All systems can operate independently or in combination based on user's settings.

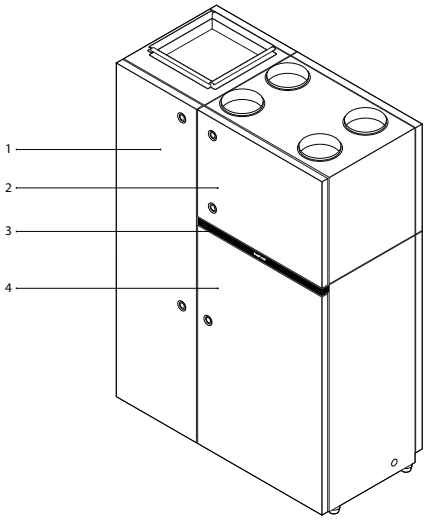


Fig. 1. KOMBI unit
1 – heat pump, 2 – ventilation unit, 3 – indication bar, 4 – domestic hot water tank

KOMBI units are available in various modifications which are indicated as follows:

KOMBI	-	A7	-	W	-	E4,5	-	R	-	C9	/	CP
1		2		3		4		5		6		7

1. Name of the unit's range.
2. Nominal heating capacity:
   A9 – 9 kW;
   A7 – 7 kW.
3. Hot water tank type:
   W – standard tank;
4. Integrated electrical water heater capacity:
   E6 – 6 kW;
   E4.5 – 4,5 kW;
5. Inspection side:
   R – right;
   L – left.
6. Type of control automatics.
7. Additional functions:
   CP – unit with a hot water circulation function.

Each unit can have either left or right inspection side[1]. Inspection side indicates on which side of the unit the hot water tank and ventilation unit are located.

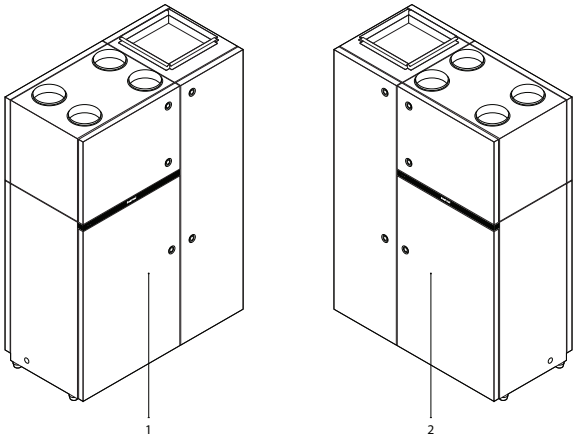


Fig. 2. Inspection Sides
1 – left, 2 – right

The inspection side determines how the air ducts and water pipes will be routed, therefore it must be considered when choosing the installation location.

[1] Depends on the order.

1.2.1. Heat pump

Heat pump takes thermal energy form the outside air and transfers it to water circulating in the heating system or domestic hot water production system. Heat pump assembly consists of a piping system containing refrigerant, compressor, heat exchangers, fan and separate control electronics.

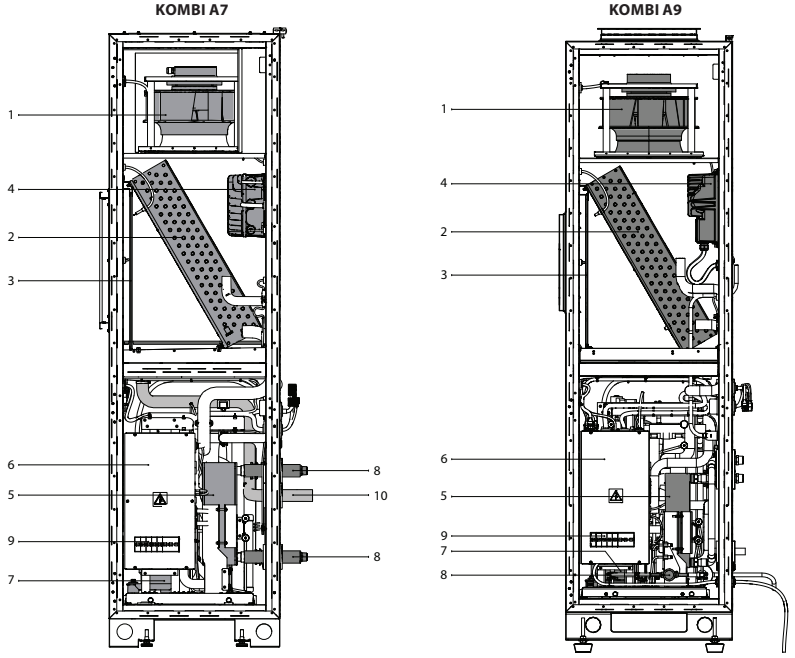


Fig. 3. Heat pump
1 – heat pump fan, 2 – heat exchanger (evaporator), 3 – air filter, 4 – compressor's frequency converter,
5 – heat exchanger (refrigerant - water), 6 – control automatics, 7 – compressor, 8 – flexible connecting pipes, 9 – automatic circuit breakers,
10 – condensate drainage connection

1.2.2. Air handling unit

An air handling unit is a device designed to ensure good ventilation in the premises. An air handling unit removes indoor air containing carbon dioxide, various allergens or dust and replaces it with filtered fresh outdoor air. Rotary heat exchanger installed in the unit extracts thermal energy from indoor air and transfers most of it to the supply air. If the capacity of the heat exchanger is not sufficient to reach the temperature set by the user, hot or cold water from the heat pump is additionally used.

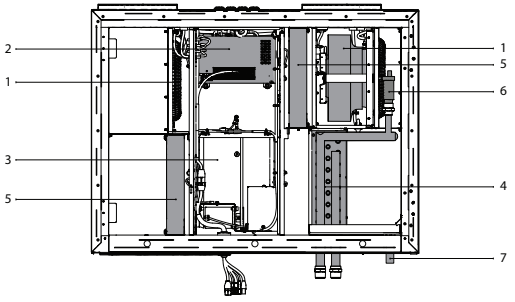


Fig. 4. Air handling unit
1 – fans, 2 – control automatics, 3 – rotary heat exchanger, 4 – water heater / cooler, 5 – air filters, 6 – automatic air release valve, 7 – condensate drainage connection

1.2.3. Hot water preparation system

Hot water preparation system consists of a domestic hot water tank and water distribution pipeline. Hot water section also includes water distribution devices (valves, actuators, pumps) that ensure proper circulation of heating / cooling water and domestic hot water.

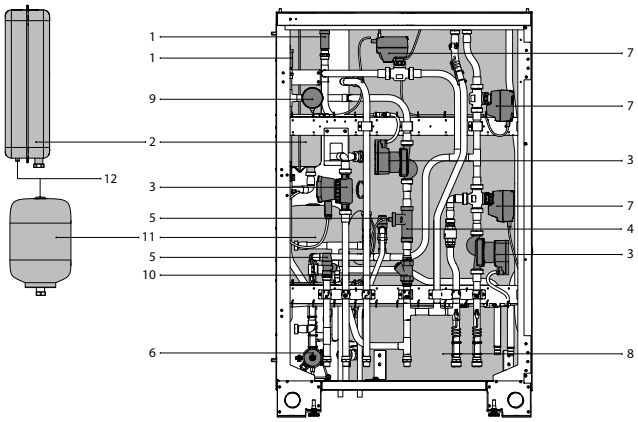


Fig. 5. Hot water system section
1 – automatic air release valves 2 – expansion vessel for underfloor system, 3 – water pumps, 4 – water flow sensor,
5 – safety valves, 6 – electric heater, 7 – water valves with actuators, 8 – domestic hot water tank,
9 – water pressure manometer, 10 – coarse water filter, 11 – expansion vessel for hot water system, 12 – schrader valves for pressure adjustment

2. TRANSPORTATION AND STORAGE

KOMBI package consists of 2 parts: a heat pump section and a hot water section together with AHU. KOMBI unit must be transported and stored in its original packaging. During transportation, packages must be properly secured and additionally protected against possible mechanical damage, rain or snow. Unloading or lifting operations must be performed by an employee qualified to operate a forklift truck or crane and familiar with the principles of cargo lifting and safety requirements.

Upon delivery, take time to inspect the packaging for any damage. If you notice any mechanical or other damage (e.g., wet cardboard packaging), notify the carrier immediately. If there is extensive damage, do not accept the delivery. Also, make sure to inform the seller or UAB KOMFOVENT representative of any damage that occurred during transportation within 3 working days[1].

Devices must be stored in clean and dry premises in their original packaging. If the unit is installed but not yet in use, all air duct and pipeline connection openings must be tightly closed and the unit must be additionally protected against environmental influences (dust, rain, cold, etc.).

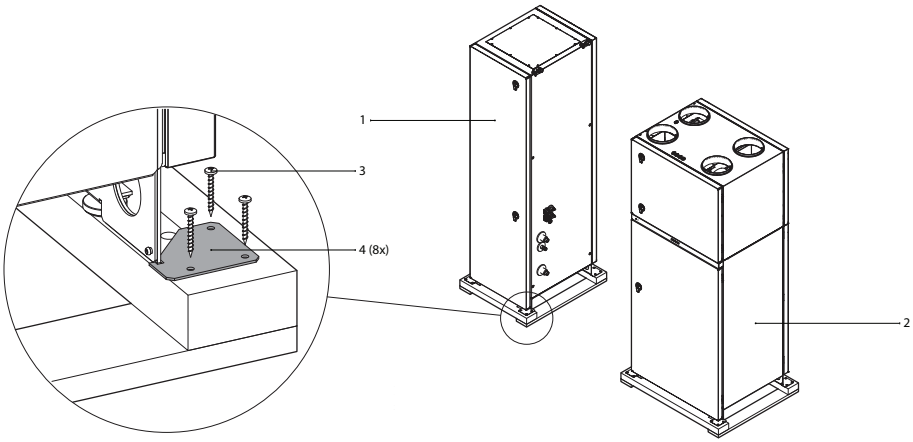


Fig. 6. Packaging examples
1 – heat pump section (~180 kg), 2 – hot water section together with AHU (~250 kg), 3 – Fastening screws at the bottom of the pallet (8 pcs.)

- **KOMBI unit and sections thereof are heavy, therefore care must be taken during lifting, carrying or moving operations. Use personal protection equipment, do not stand under a suspended unit or a section thereof.**
- **When lifting or handling the unit or a section thereof, note that their centre of gravity may differ from the geometric centre of the load.**
- **Do not transport or store the unit sections in a horizontal position. In order to bring the sections to tight rooms, they can be tipped horizontally for a short time. Immediately after that, they must be returned to a vertical position.**

[1] UAB KOMFOVENT does not take any responsibility for any losses caused by the carrier during transportation and unloading.

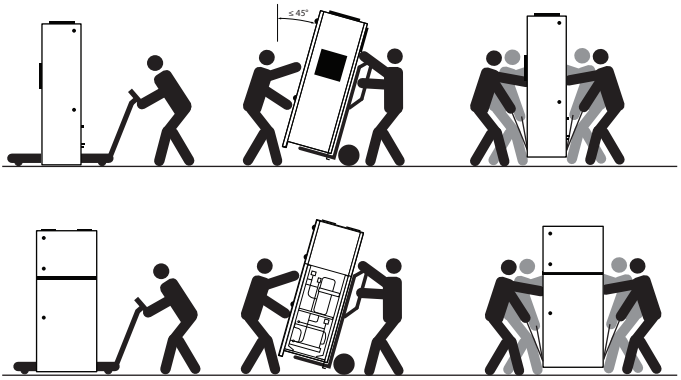


Fig. 7. Examples of section transportation

If it is necessary to reduce the weight of a section (for example, to bring it down to the basement), you can remove the AHU from the hot water section. For this purpose, you must remove the side panel of the hot water section, unscrew water pipes and condensate drainage, disconnect cables and remove four screws in the corners of the section.

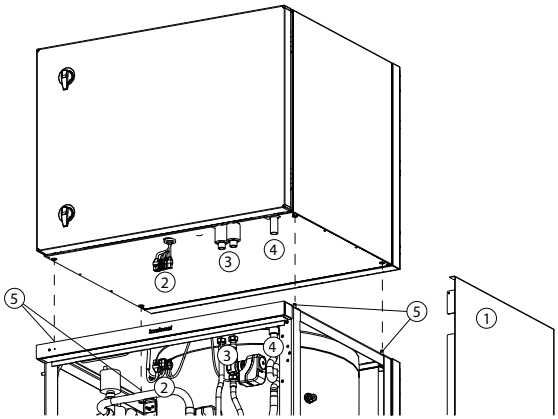
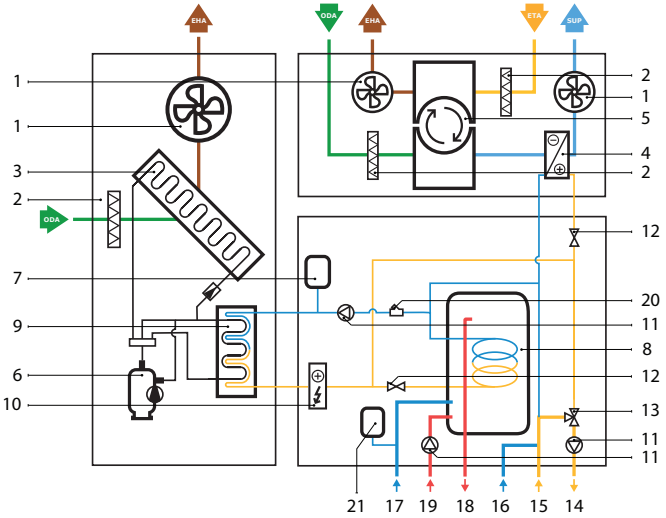


Fig. 8. Removal of the AHU
1 – remove side panel, 2 – disconnect cables, 3 – disconnect water pipes, 4 – remove condensate drainage,
5 – remove screws in the corners of the AHU

Units must be stored in a clean and dry room, at 0–40 °C temperature. When choosing a storage location, ensure that the unit is not accidentally damaged, that other heavy objects are not placed on it, and that no dust or moisture enters the unit.

3. MECHANICAL INSTALLATION

KOMBI A7



KOMBI A9

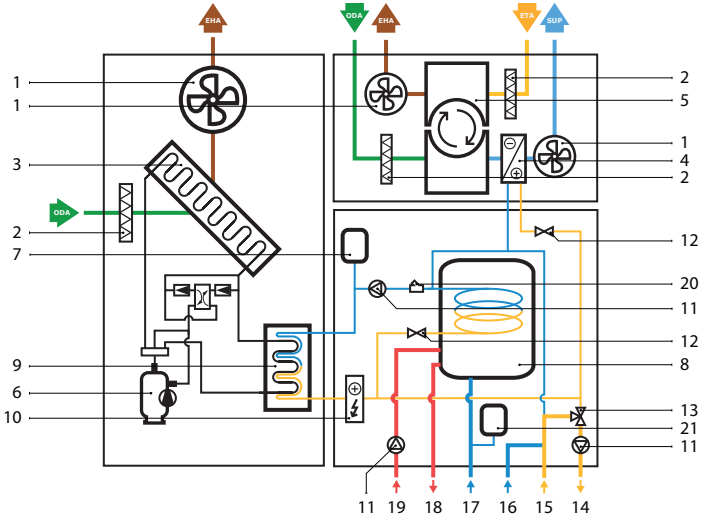


Fig. 9. KOMBI principal diagram
1 – fans, 2 – air filters, 3 – heat pump heat exchanger, 4 – water air heater, 5 – rotary heat exchanger, 6 – compressor, 7 – expansion vessel for the heating system (12 l), 8 – domestic hot water tank, 9 – heat exchanger (refrigerant – water), 10 – electric heater, 11 – circulation pumps, 12 – water shut-off valves, 13 – flow regulating valve, 14 – water supplied to the heating system, 15 – water returning from the heating system, 16 – heating system inlet, 17 – cold water inlet, 18 – domestic hot water, 19 – hot water recirculation inlet (optional function), 20 – coarse water filter, 21 – expansion vessel for hot water system (8 l), ODA – outdoor air, SUP – supply air, ETA – extract air, EHA – exhaust air

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3.1. Requirements for Mounting Location and Installation Base

KOMBI units are intended for installation in domestic or technical premises with proper ventilation, at 0–40 °C temperature, 20–80% relative humidity (non-condensing). Air handling units are designed for ambient temperatures from -30 °C to +40 °C.

Unit must be mounted on a relatively large and sturdy base, based on the weight of the unit and in accordance with the building regulations. Base must be made of reinforced concrete or metal structures. If the unit is not fitted with adjustable height feet, it must be installed on a flat base. In this case, vibration dampening gaskets must be fitted between the unit and installation base. Installed unit must be horizontally levelled. KOMBI unit makes noise during operation, therefore it is not recommended to install the unit near living rooms or in premises without sound insulation (e.g., rooms with non-insulated plasterboard partitions).

- **KOMBI units are not suitable for outdoor installation.**
- **Do not operate the unit in areas with potentially explosive atmospheres.**
- **The minimum volume of the installation room must be at least 10 m³ due to potential health hazard in the event of refrigerant leak.**
- **Make sure that children do not get inside the unit or play with it without adult supervision.**
- **When the AHU is installed in a room with high humidity level, condensate may form on the walls of the unit at low outdoor temperatures.**
- **The installation room should have waterproof floor and a floor drain. This way the room will be protected during an emergency (e.g., water leakage) and preventive maintenance and repair works (e.g., when draining water from the hot water tank or heating system).**

When selecting an installation or mounting location, you must foresee sufficient and security compliant access space for repair and maintenance operations. The unit must be installed in a way to allow partial or full disassembling, if needed (e.g., in case of heavy repairs).

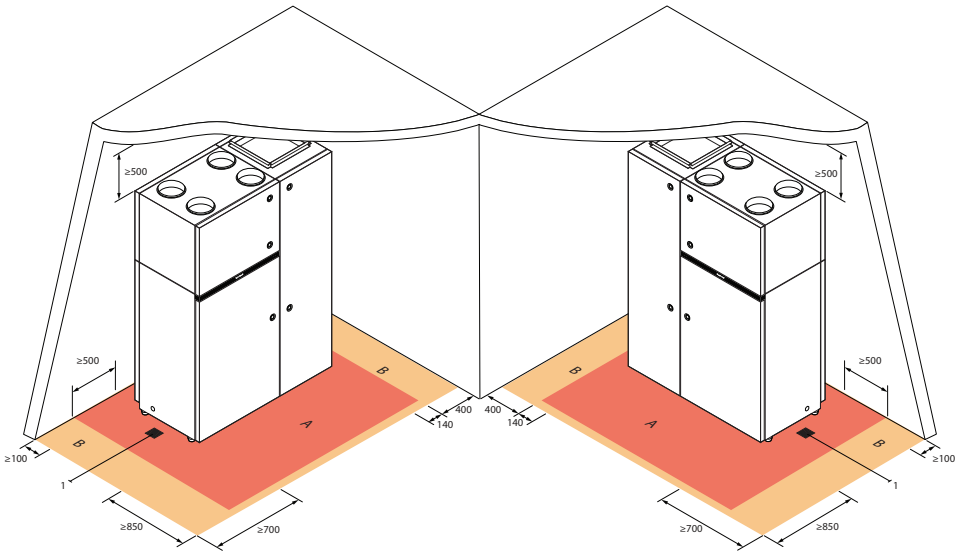


Fig. 10. Device inspection area
A – min. inspection area, B – recommended inspection area, 1 – water floor drain

Minimum service area A defines an area, which must be free of any stand-alone or immovable devices, equipment, partitions, structure or furniture. This area is sufficient for performing service and filter replacement works. For repair and replacement of components (e.g., cleaning of hot water tank), access area equal to the width of the device B shall be ensured in front of the unit and next to it.

3.2. List of received parts

Prior to installation, check whether you received the complete kit of parts. If any part from the list is missing, contact the seller.

- Heat pump section - 1 pc.
- Hot water section – 1 pc.
- Air handling unit – 1 pc.
- Blind for the heat pump air duct, 400x400 mm – 1 pc.
- Filters for the air handling unit, 585 x 258 x 46 – 2 pcs.
- Filter for a heat pump 585x505 – 1 pc.
- Box for assembled parts – 1 pc.
  - Control panel – 1 pc.
  - Feet – 8 pcs.
  - Bolts for connecting sections (M8 x 20) – 4 pcs.
  - Bolts for nuts for external fasteners (M6 x 20) – 2 pcs.
  - Installation Manual – 1 pc.
  - User Manual – 1 pc.
  - Door handles – 5 pcs.

3.3. Recommended accessories

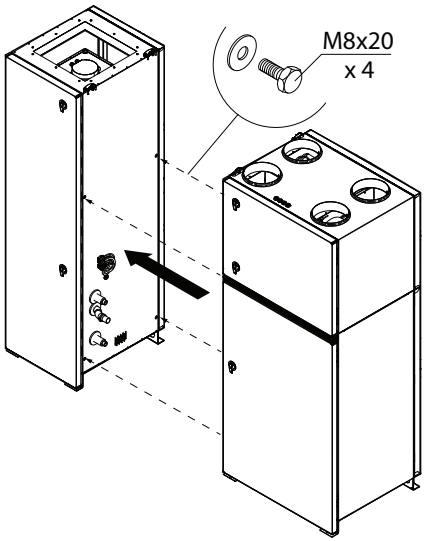
To ensure proper operation of the unit, we recommend using the following optional accessories:

- Motorized air dampers for the AHU, d 200 mm – 2 pcs.
- Noise damping / connection boxes – 2 pcs.
- Flexible duct connections, 400x400 mm – 2 pcs.
- Circular noise suppressors, d 200 mm – 2 pcs.
- Condensate drain hose.
- Funnel for condensate.
- Buffer tank ≥ 30 l.
- Magnetic water filter.

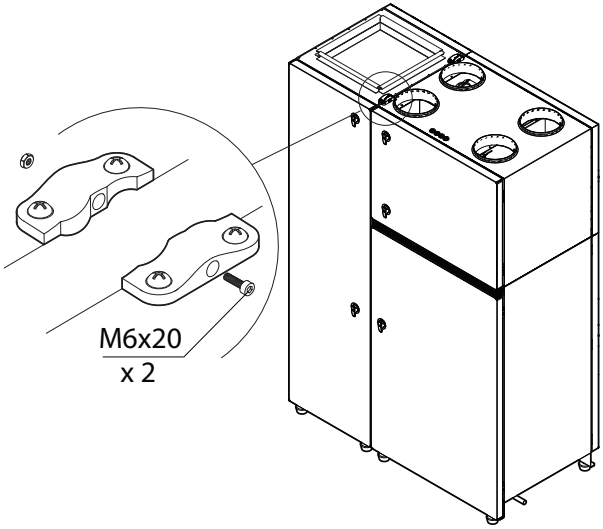
The installer shall choose accessories to be used according to ventilation and hydraulic system project of the building.

3.4. Connection of Sections

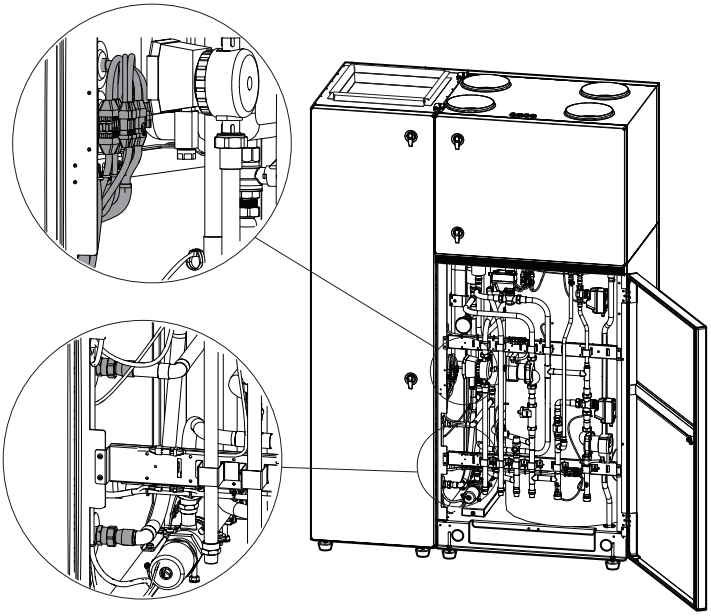
Place a hot water section with AHU next to it. Adjust the section so that it stands vertically and at the same level as the heat pump. Fasten both sections together using four bolts (from the water tank side).



Tighten two external fasteners at the top.

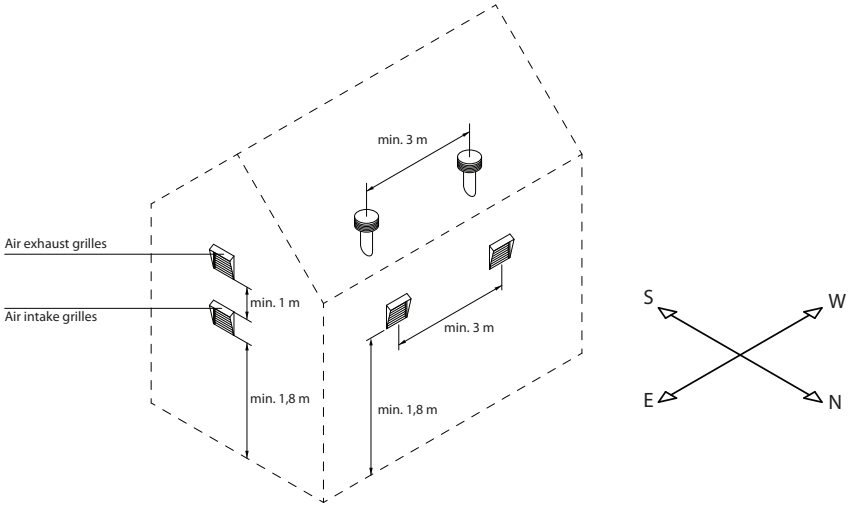


Connect wire connectors that are marked with stickers (see section "Installation of Electrical Components"). Make sure that connected wires are marked the same on both sides. Tighten connection pipes to the water tank pipeline.



4. MECHANICAL INSTALLATION: AIR DUCTS

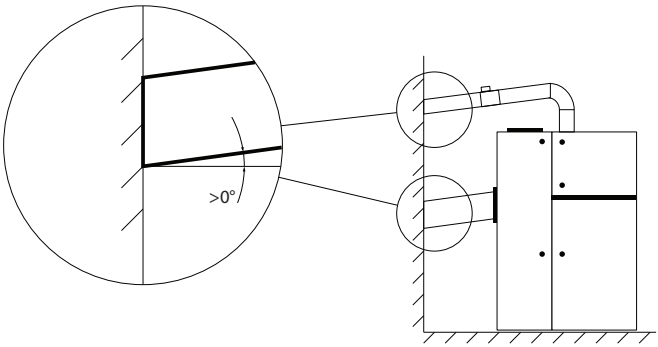
Air duct system must be properly designed to ensure low air flow rates and small pressure differences. This will ensure more accurate volumes of ventilated air, lower energy consumption, lower noise level and longer lifetime of the unit. External grilles must be installed as far apart as possible, preferably on different sides of the building, so that the exhausted air does not flow back into the air intake grille. Air intake grille shall be installed where the outdoor air is the cleanest. Do not point install them facing the street, parking lot or outdoor fireplace. We also recommend installing the air intake grille on the north or east side of the building. In this case, the heat of the sun in summer would not have a significant effect on the temperature of the supply air.



We recommend insulating air ducts that are installed in unheated premises (attic, basement) to prevent heat loss. Also, we recommend insulating supply air ducts when the unit is used for cooling.

- **Air duct system components must have separate brackets and to be mounted in a way that their weight is not shifted to the casing of the unit.**
- **Air ducts connecting the air handling unit to the exterior of the building must be insulated (insulation thickness 50–100 mm) to prevent condensation on cold surfaces.**

Air ducts connecting the AHU to the outside of the building should have a minimum slope to prevent rain water or snow from entering the unit.



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4.1. Installation of ventilation air duct system

Air is supplied to the AHU through ø 200 mm air ducts. Ducts are fastened to the AHU connection points with self-tapping screws.

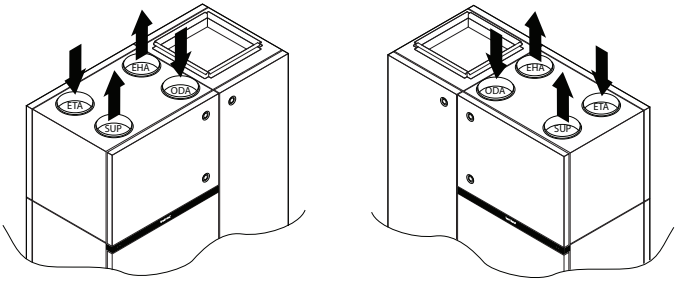


Fig. 11. AHU air duct connections

A sticker on the unit shows the positions of different air flow connections.

- **Air intake and exhaust ducts must be fitted with air closing dampers (if the unit is used in cold climate zones, where the outdoor temperature may drop below 0°C, the electric damper actuators must be equipped with a return spring) to protect the AHU from exposure to climatic conditions when the unit is switched off, or in the event of a power outage.**
- **In order to minimise the AHU generated noise and noise moving through the ducts into ventilated areas, sound suppressors must be connected to the AHU.**

4.2. Installation of the heat pump air ducts

For proper operation of a heat pump a relatively high air flow through its heat exchanger is required. Therefore, 400x400 mm ducts are connected to the heat pump section, which should be as short as possible. Air duct coming out of the heat pump can be led to the back side of the unit or upwards, depending on the installation location. Remaining branch of the air duct must be sealed with a supplied blind.

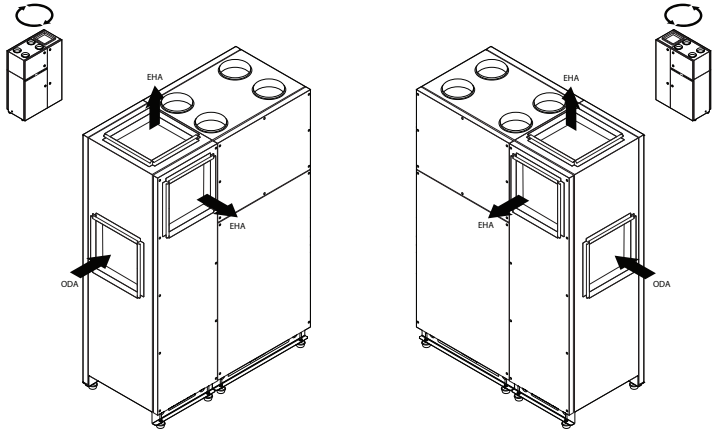


Fig. 12. Heat pump air duct connections

Use noise suppressors or special connection boxes[1] that can be installed inside the walls to reduce noise generated by the heat pump fans and compressor. Connection box is equipped with a noise suppressor. What is more, these can be connected both to the heat pump's and AHU'S air ducts going outside. Also, the length of the box is adjustable so it can fit walls of various thickness.

[1] Sold separately.

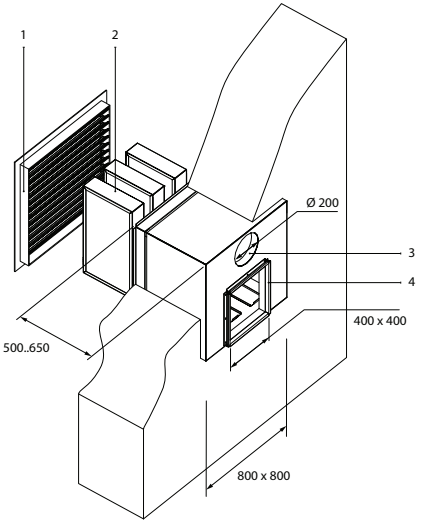


Fig. 13. Structure of a connection box[1]
1 – external grille, 2 – noise absorbing partitions, 3 – connection for the AHU air duct,
4 – connection for the heat pump air duct

Outside, the openings of air ducts and connection boxes are covered with grilles or decorative hoods to protect against rain and wind. Just like in case of the AHU, external grilles of the heat pump should be installed on different sides of the building or as far away from each other as possible.

[1] Sold separately.

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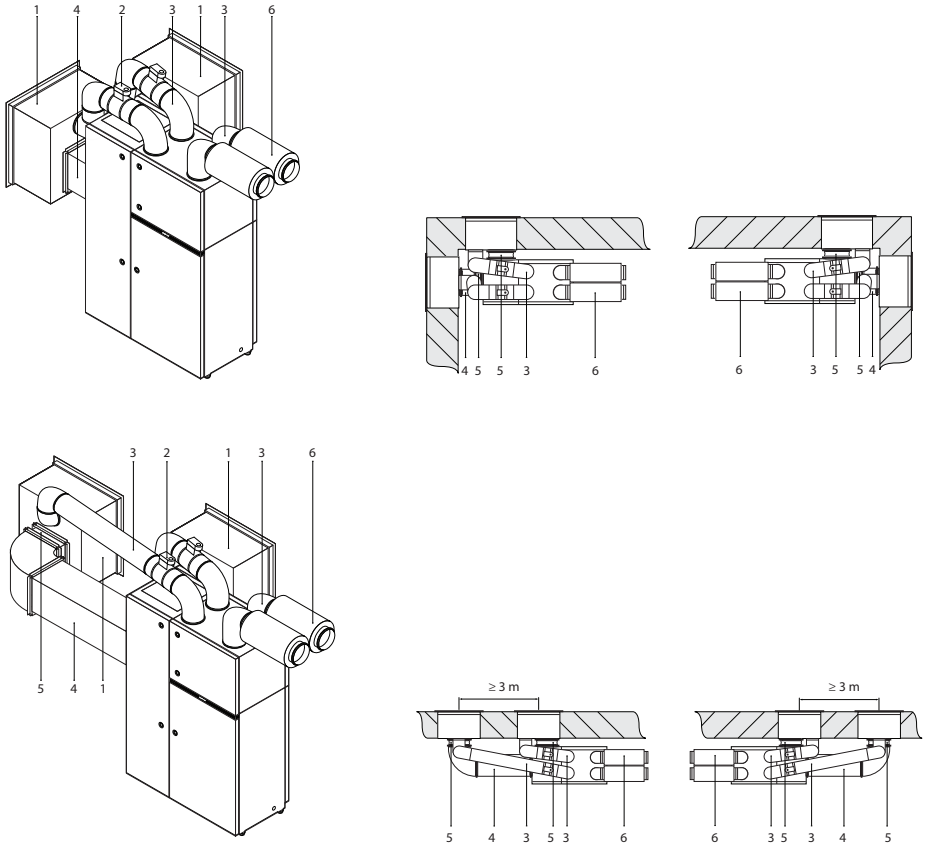


Fig. 14. Examples of the KOMBI unit installation together with connection boxes
1 – connection boxes, 2 – air closing dampers, 3 – ducts for ventilation unit, 4 – heat pump ducts, 5 – flexible connections, 6 – noise attenuators for the ventilation system

Which exact components should be used depends on the specific technical design of the building's ventilation and heating systems.

5. MECHANICAL INSTALLATION: HYDRAULIC SYSTEM

Hydraulic system must be designed to meet the needs of the building and the user. Make sure to use materials and components that are compatible with water used in the system, pressure and temperature thereof as well as with other materials used in the unit.

Piping of the KOMBI unit is made of copper, therefore, the use of zinc coated materials is prohibited.

Drainage valves should be installed at all lowest points of the system to allow complete drainage of water from the system. Install air release valves at the highest points of the system. Valves shall be installed in easily accessible locations for convenient maintenance. In the hot water preparation section of the KOMBI unit, two safety pressure valves are installed. They can open when the water pressure in the system exceeds critical limits. Drain pipes are connected to the valves and lead to the bottom of the unit, so it is recommended installing a water trap under this section to collect the water coming out of the valves in the event of an emergency.

All hydraulic system connection works must be performed by a qualified specialist.

5.1. Heating system examples

To ensure proper operation of the KOMBI unit, the pressure of the heating system must not exceed 3 bar, maximum water temperature must not exceed 70 °C and water flow rate must correspond to the characteristics of the circulation pump installed in the unit:

Unit model	Optimum water flow rate in the heating system	The unit will stop when the water flow drops
KOMBI - A9 - ...	1,54 m^3/h	≤ 0,34 m^3/h
KOMBI – A7 - ...	1,2 m^3/h	≤ 0,34 m^3/h

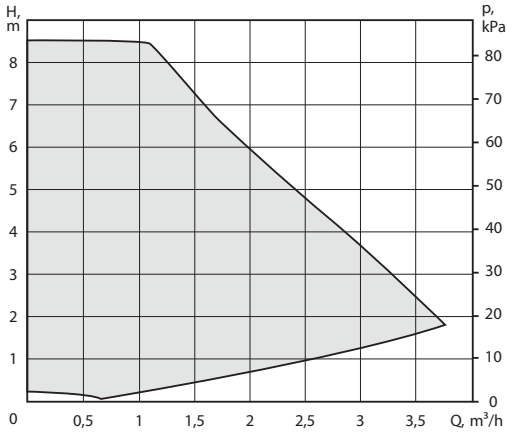


Fig. 15. Characteristics of the circulation pump of the heating system

Below are typical diagrams of heating systems with recommended components. We recommend installing a buffer tank (No 5) and an overflow valve (No 6), which will ensure operation of the unit when the system manifolds are completely closed. Buffer tank volume must be at least 20 l. KOMBI unit is fitted with a 12 l expansion vessel for the heating system; however, if the system volume exceeds 250 l, additional expansion vessel is recommended (No 2). If steel components (e.g., radiators or pipes) will be used in the heating system, a magnetic filter (No 4) and special inhibitors are recommended to protect the system from rust.

The integrated expansion vessel is pre-charged with a pressure of 1.5 bar. If a higher water pressure is planned to be used in the heating system, adjust the pressure in the expansion vessel accordingly. The pressure in the expansion vessel can only be adjusted before the system is filled with water.

The exact components to be used depend on the design of building's heating system.

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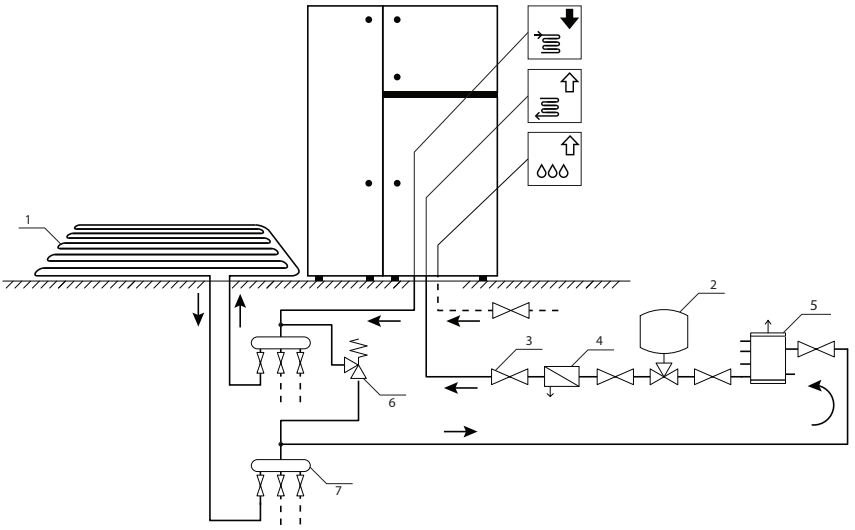


Fig. 16. Underfloor heating
1 – underfloor piping, 2 – expansion vessel[1], 3 – shut-off valves, 4 – magnetic filter, 5 – buffer tank, 6 – overflow valve, 7 – manifolds

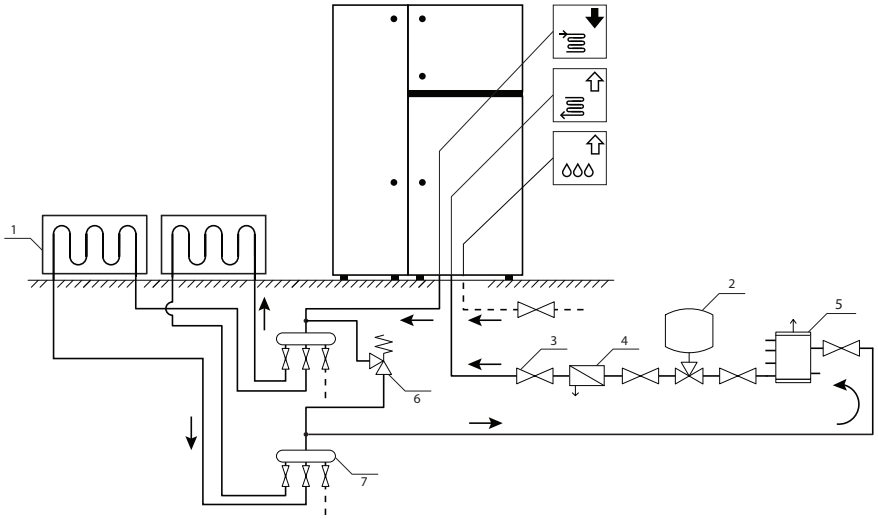


Fig. 17. Heating system with radiators
1 – radiators, 2 – expansion vessel[2], 3 – shut-off valves, 4 – magnetic filter, 5 – buffer tank, 6 – overflow valve, 7 – manifolds

[1] Recommended if the system volume is greater than 250 l.
[2] Recommended if the system volume is greater than 250 l.

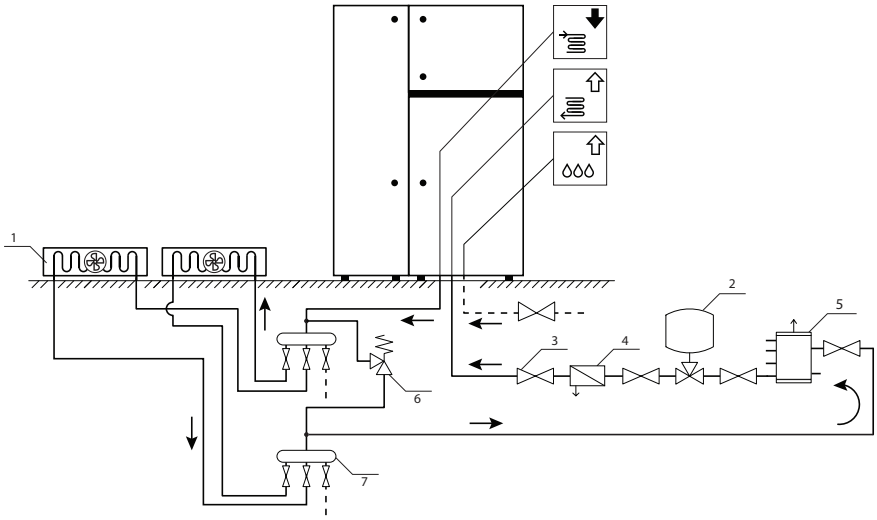


Fig. 18. Heating system with fan coils
1 – fan coils, 2 – expansion vessel[1], 3 – shut-off valves, 4 – magnetic filter, 5 – buffer tank, 6 – overflow valve, 7 – manifolds

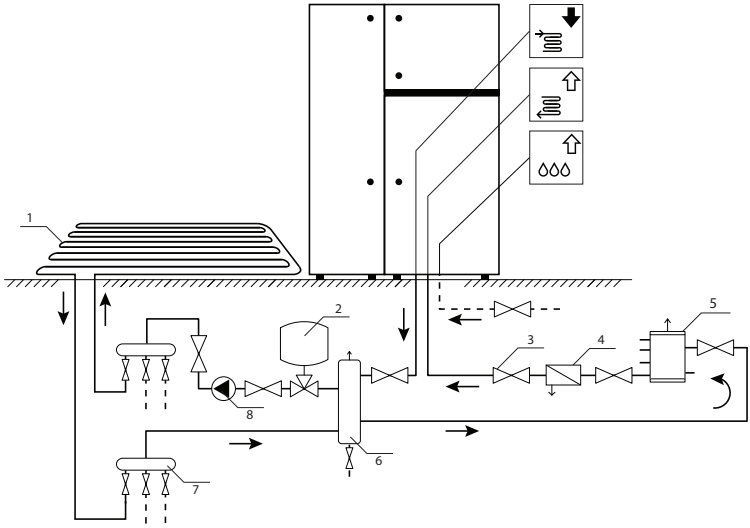


Fig. 19. Heating system with a hydraulic separation vessel
1 – piping / radiators / fan coils, 2 – expansion vessel[2], 3 – shut-off valves, 4 – magnetic filter, 5 – buffer tank,
6 – hydraulic separation vessel, 7 – manifolds, 8 – Circulation pump

[1] Recommended if the system volume is greater than 250 l.
[2] Recommended if the system volume is greater than 250 l.

5.2. Examples of a hot water system

Below are typical diagrams of the domestic hot water system. An 8 l expansion vessel for the hot water system is integrated inside the KOMBI unit, suitable for a standard water inlet pressure of ~ 4 bar. If the inlet pressure is higher, it is recommended to install an additional expansion vessel (No. 1) in the piping system.

The integrated expansion vessel is pre-charged with a pressure of 2.5 bar. If a higher water pressure is planned to be used in the domestic hot water system, adjust the pressure in the expansion vessel accordingly. The pressure in the expansion vessel can only be adjusted before the system is filled with water.

- **If the building's water inlet pressure exceeds 6 bar, it must be reduced using a pressure regulating valve (No 5), otherwise the safety valves may trip frequently or water leaks may occur in the piping connections of the unit.**
- **The exact components to be used depend on the design of building's heating system.**

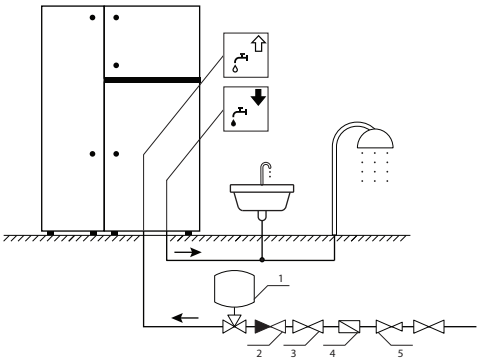


Fig. 20. Short diagram of a hot water system without recirculation
1 – expansion vessel[1], 2 – one way valve, 3 – shut-off valves, 4 – mechanical cleaning filter, 5 – pressure regulating valve

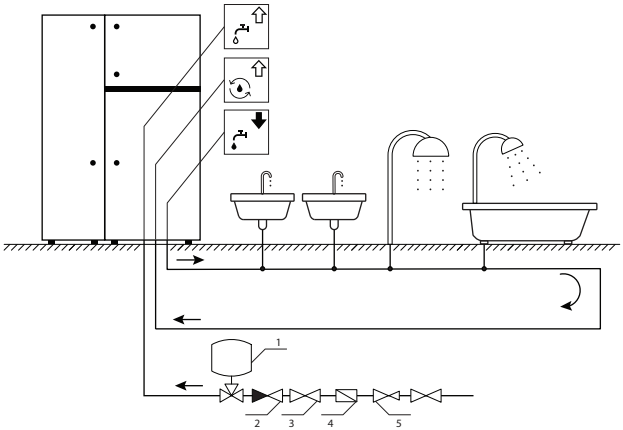


Fig. 21. Hot water system with recirculation[2]
1 – expansion vessel[3], 2 – one way valve, 3 – shut-off valves, 4 – mechanical cleaning filter, 5 – pressure regulating valve

[1] Recommended when the water inlet pressure is higher than 4 bar.
[2] Hot water recirculation is an optional function.
[3] Recommended when the water inlet pressure is higher than 4 bar.

5.3. Connecting pipeline to the unit

Pipes for the heating and hot water system are routed under the unit and connected at the bottom of the water tank section. Pipes of the unit are marked with stickers and arrows indicating the water flow direction:

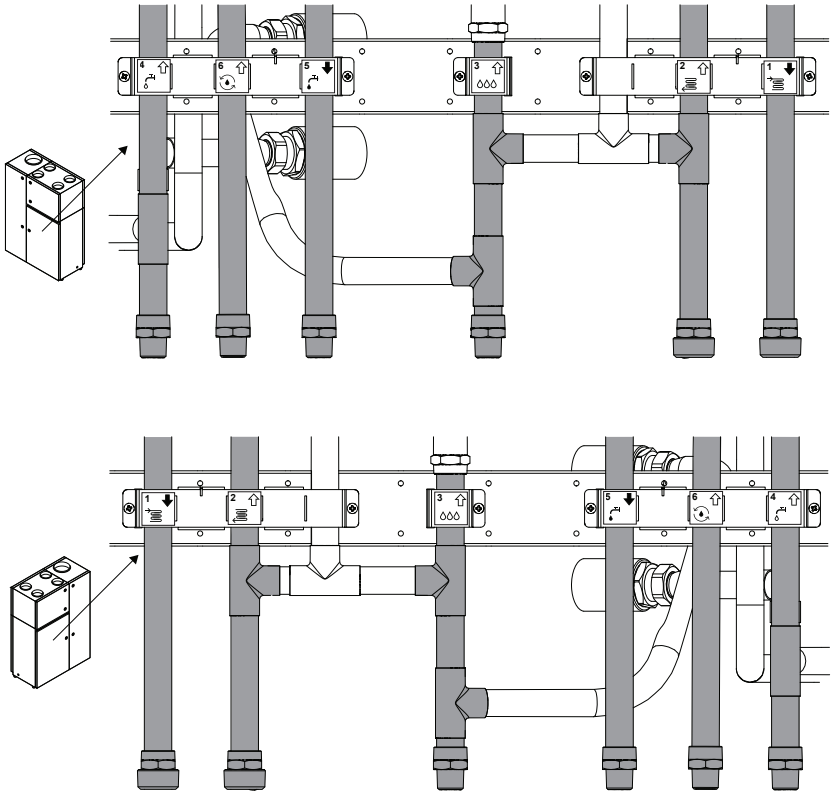


Fig. 22. Water pipeline connections
1 – water supplied to the heating system (1“), 2 – water returning from the heating system (1“),
3 – heating system inlet (1/2“), 4 – domestic cold water inlet (1/2“), 5 – domestic hot water supplied to the system (1/2“), 6 – recirculated hot water (1/2“)[1]

- **For KOMBI unit connections to the heating and hot water systems use the same diameter pipes as the connections of the unit.**
- **When connecting the pipes, hold the connections from both sides using two keys. Otherwise, the piping of the unit may be damaged.**

[1] Hot water recirculation is an optional function.

5.3.1. Filling of the hydraulic system

- **To avoid damage to the heating system and heat pump, use water that meets the current European Water Quality Directive 98/83/EC and applicable local requirements. Avoid borehole, spring or well water that contains salts, iron or other impurities. Such water must be cleaned with appropriate filters before entering the system.**
- **We recommend using water inhibitors in the heating system to protect against corrosion, lime scale and bacteria.**

Open all automatic air release valves before filling the heating system. The unit is fitted with 4 air release valves: 3 of them are near the water tank and one in the AHU. To open the valves, turn the black air release valve cap two full turns counter-clockwise.

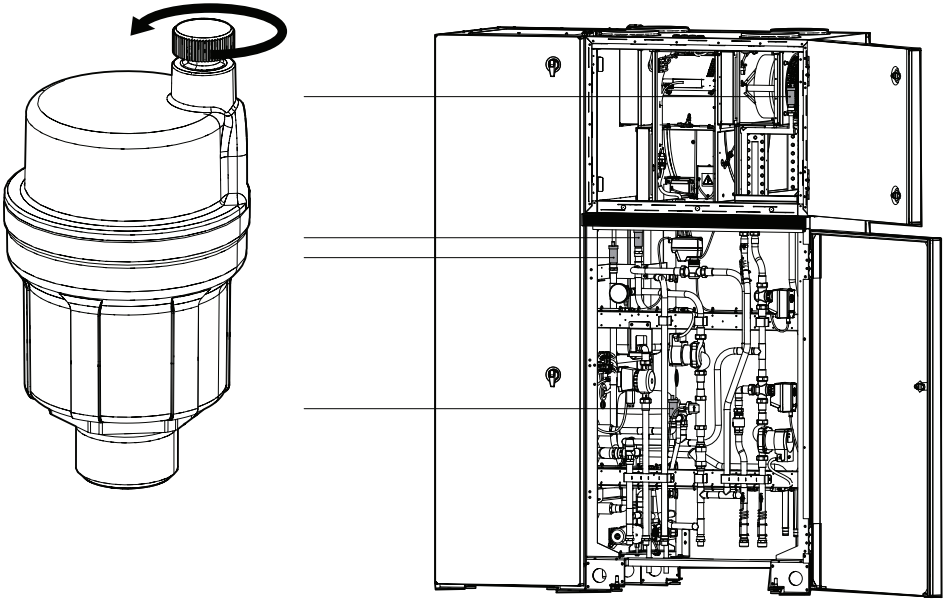


Fig. 23. Location of automatic air release valves

Fill the heating system through the dedicated pipe No 3 (see fig. 22) to a pressure of 1.5 bar. Some air will escape from the system through the air release valves during filling. However, all of the air will escape in just a few hours of operation, so the system may need to be filled up later. You can monitor the system water pressure with an integrated manometer.

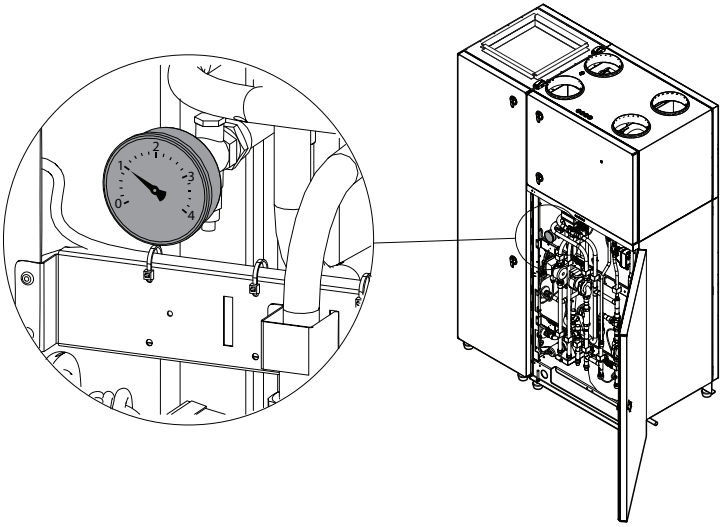


Fig. 24. Heating system water pressure manometer

The hot water tank is filled through the dedicated pipe No. 4. (See fig. 22). To fill the tank faster, open one or more hot water taps in your home.

When filling hydraulic systems, check the KOMBI pipe connections to see if they have not loosened during transportation. In case of water leakage, stop filling up of the system and fasten the loose connections.

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5.4. Condensate drainage

During operation of KOMBI unit condensation is formed. The unit is fitted with two condensate collection trays: one under the heat pump heat exchanger and one under the AHU water heater. Connect condensate drainage hoses to both condensate collection trays and lead them outside the unit.

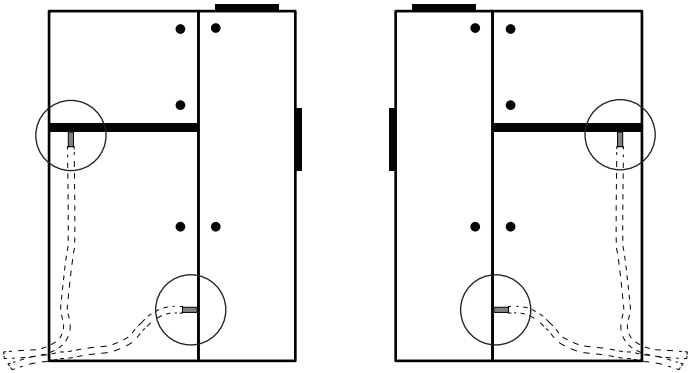


Fig. 25. Drainage connection points

Due to negative air pressure in the unit, water may not drain out of the condensate collection tray by itself. To ensure water removal, connect siphons to the drainage hoses or make a loop from the hoses. Condensate from the unit's drainage system must be collected in a separate funnel or flow into the drain grate (water trap) without direct contact. Do not connect the drainage system directly to the sewage pipe and do not submerge it in water. Condensate collection location must be easily accessible for cleaning and disinfection.

Do not connect both drainage hoses together (for example, with a 3-way valve).

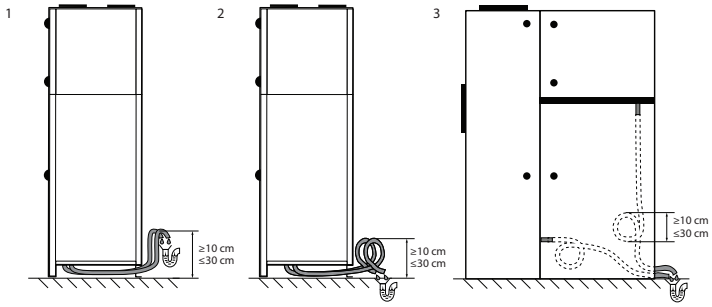


Fig. 26. Examples of proper condensate removal
1 – condensate is collected in a funnel raised above the floor,
2 – hose loops made outside of the unit, condensate is discharged into the water trap,
3 – hose loops made inside the unit, condensate is discharged into the floor drain

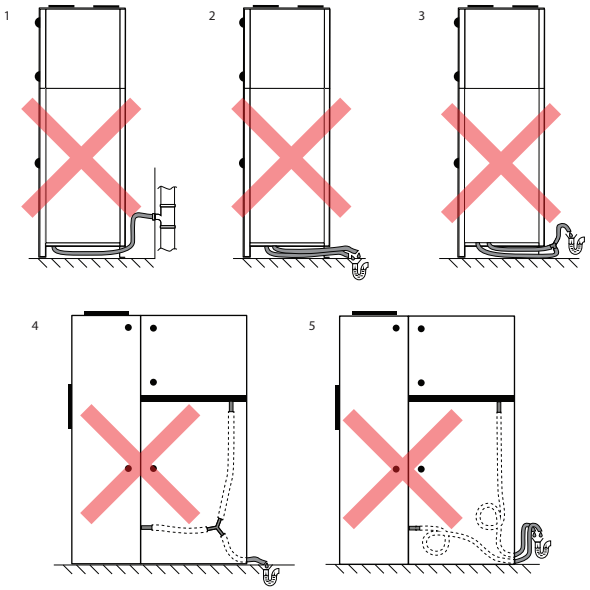


Fig. 27. Examples of improper condensate removal
1 – drainage is connected directly to the sewage pipe, 2 – no loops, hoses not raised above the ground, siphons not used,
3 – both hoses connected using a 3-way connector outside the unit,
4 – both hoses connected using a 3-way connector inside the unit,
5 – the hoses are raised from the floor, even though loops are made inside the unit

After connecting the condensate drain, pour several litres of water into the condensate collection trays in the AHU and under the heat pump heat exchanger. In this way, you will fill the drainage siphons or hose loops with water and check whether the condensate drains properly from the unit.

6. INSTALLATION OF ELECTRICAL COMPONENTS

Only qualified professionals may perform electrical installation works in accordance with the manufacturer's instructions and applicable legal acts and safety requirements. Before installing any electrical components:

- **Make sure the unit is unplugged from the mains.**
- **If the unit has been standing in an unheated room for a long time, make sure there is no condensation inside and check if contacts and electronic parts of the connectors are not damaged by moisture.**
- **Inspect the power cable ant other wiring for damage in insulation.**
- **Locate the electrical diagram of the unit.**

6.1. Requirements for power input

- **The unit is intended for 400 V AC, 50 Hz supply voltage.**
- **Power supply cable must be at least 5 × 4.0 mm² (Cu).**
- **Connect the unit only to a proper power outlet with protective earthing. Earthing must be installed according to the EN61557, BS 7671 requirements.**
- **We recommend connecting the unit to the power source through a 32 A circuit breaker with 30 mA current leakage protection (type B or B+).**
- **Control cables should be installed at least 20 cm away from power cables to reduce the possibility of electrical interference.**
- **All external electrical elements must be connected strictly according to the wiring diagram of the unit.**
- **Do not disconnect the connectors by pulling wires or cables.**

Power supply cable must be passed through the gasket at the bottom of heat pump section and connected to N and PE terminals as well as automatic switch in QF6 pump section. To access the connection points, remove the cover of the automation box.

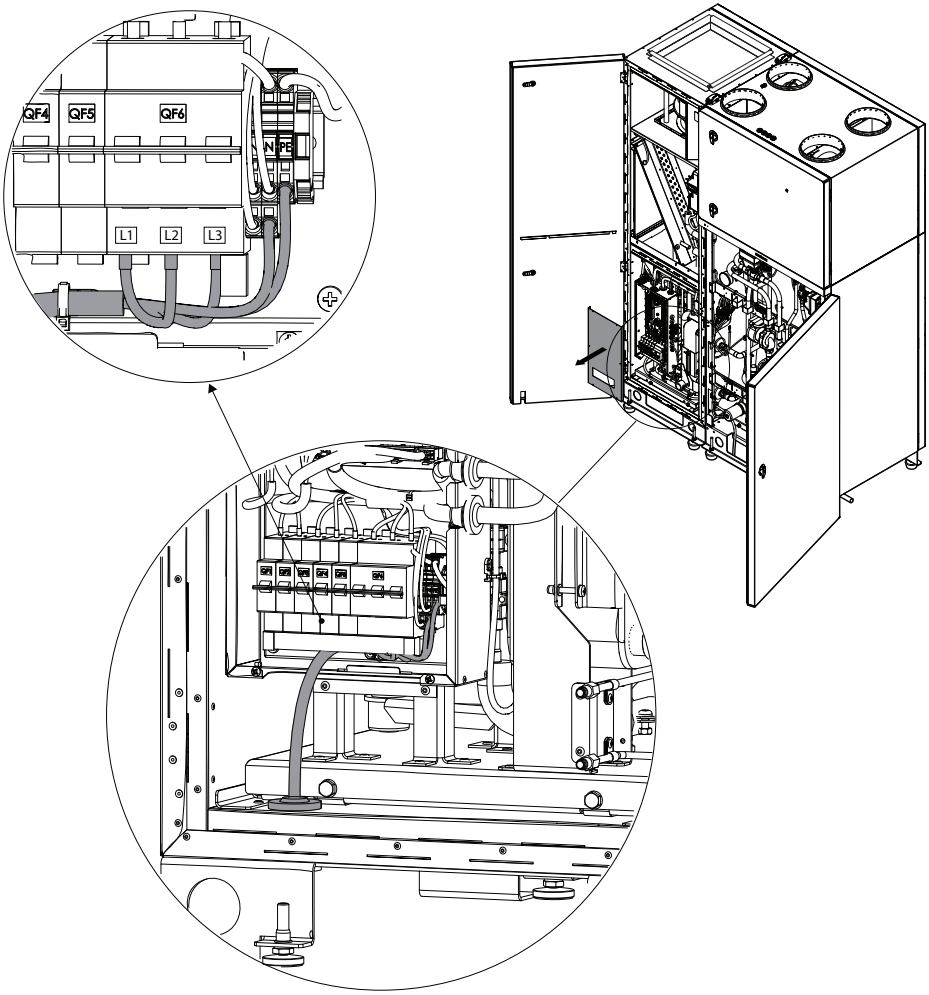


Fig. 28. Connecting the power supply cable

6.2. Connection of Electrical Components

All external components of the unit must be connected to the main board inside the AHU.

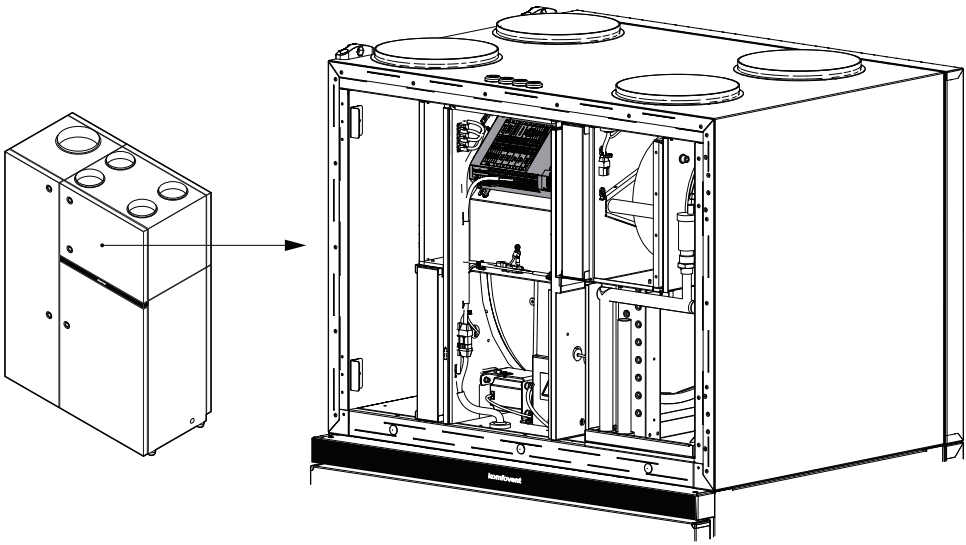


Fig. 29. Location of the main board

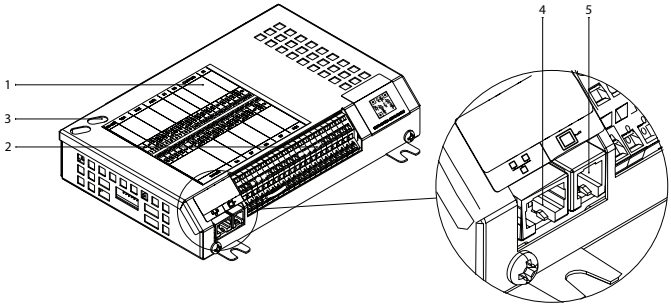


Fig. 30. Main board of C9 control panel
1 – terminal sticker, 2 – terminals for external components, 3 –fan pressure sensors, 4 – LAN or Internet connection, 5 – control panel connection

Terminals of the external elements of the controller board are numbered and are used only to connect external components. These may remain empty if no additional features are required.

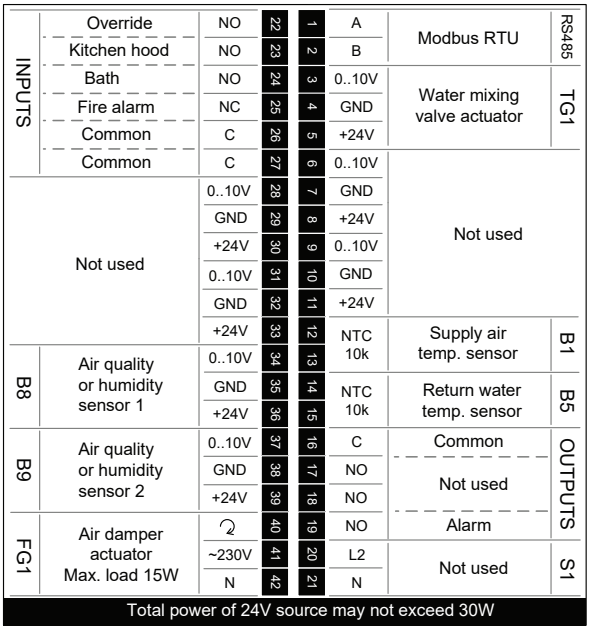


Fig. 31. Connection terminals for external components on the main board of control panel

- **Total power of all external devices with 24 V supply voltage shall not exceed 30 W.**
- **Cables of all external components should be routed to the device through dedicated rubber gaskets. Do not make an "X" cut in the gasket or cut a hole that is too large, as this will compromise tightness of the seal.**
- **Condensation formed inside the unit could then flow through the surface of the wires to the controller board and cause damage. Therefore, leave the connected cables of the external components slightly longer inside the unit and form a cable loop.**

RS485 (1 – 2) – possible connections:

- Control panel (see fig. 33).
- Data cable connection for controlling the unit from a building management program via Modbus RTU protocol.

TG1 (3 – 5) – air heater/cooler valve actuator for the air handling unit is already connected here; it regulates water temperature in the water coil.

B1 (12 – 13) – supply air temperature sensor of the AHU is already connected here.

B5 (14 – 15) – return water temperature sensor of the AHU heater / cooler is already connected here.

FAULT SIGNAL (16, 19) – contacts 16 and 19 are closed if KOMBI unit has critical alarms or malfunctions.

INPUTS (22 – 27) – to switch KITCHEN, BATH, OVERRIDE operation modes (see "User Manual), corresponding terminals must be connected together with one of the GND terminals (26 or 27). These modes will run as long as terminals are connected. To activate these modes, a switch, motion sensor, thermostat or kitchen hood with normally open contacts (NO) can be connected to the terminals. Each function can have an individual switch.

Fire alarm requires a normally closed contact (NC), therefore, a jumper is connected between terminals 25 and 26, instead of which, building fire system can be connected. Once the contact is disconnected, the unit is stopped and a fire alarm message is issued.

B8/B9 (34 – 39) – air quality or humidity sensors required for the air quality function are connected here. Once the sensors are connected, specify the type and connection location in the settings (see "User Manual").

FG1 (40 – 42) – terminals used to connect air damper actuators. These terminals may also be used for connecting 230 V power supply actuators with or without a spring return.

6.3. Connection of Cables and Wires Between Sections

Once the KOMBI unit sections are fastened together, you shall connect connecting cables and wires of the sections. Cable connectors have labels with connector number; only connect connectors with the same number.

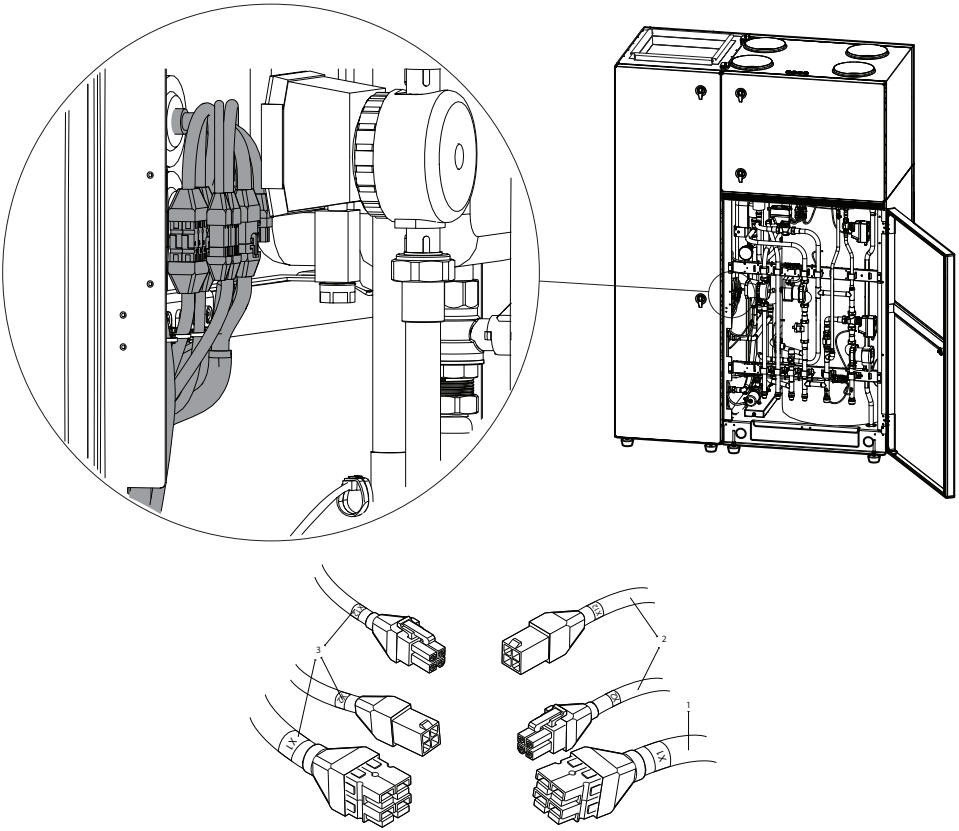


Fig. 32. Cable connections between sections
1 – power supply cables, 2 – communication cables between electronic boards 3 – labels with connection numbers

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6.4. Control Panel Installation

The control panel must be installed in a room with:

- Ambient temperature – 0.. 40 °C;
- Relative humidity – 20.. 80 %;
- Guaranteed protection against accidental water drops.

Control panel can be mounted in a concealed mounting box or directly on the wall (screws are supplied with the panel). You can also use magnets (on the back surface) to attach the panel to metal surfaces (i.e. on the door of the unit). Control panel shall be installed in a place with good circulation of ventilated air. Do not install the control panel in a closet, behind a door, in a corner of a room or in direct sunlight. This is especially important when the room temperature maintenance or the air quality function is used, the operation of which is ensured by the temperature and humidity sensors in the control panel.

Control panel is supplied with a 10 m cable. If this cable is too short, you can replace it with a 4 × 0.22 mm cable, up to 150 m long.

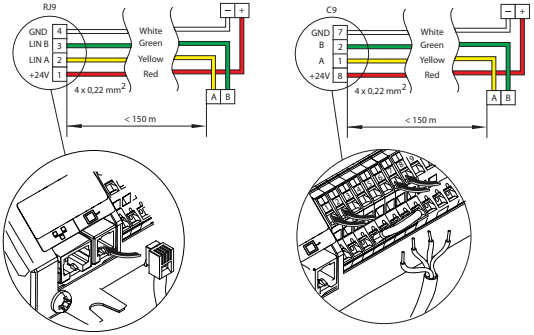


Fig. 33. Control panel wiring diagram

Control panel cable shall be installed further away from other power supply cables or high voltage electrical equipment (electrical enclosure, electrical water heating boiler, air conditioning unit, etc.). The cable can be pulled through openings in the back or bottom part of the control panel (follow the installation instructions provided with the control panel). Wire to the board of the C9 control panel must be connected to a dedicated slot (RJ9 connector) or to a terminal for external components.

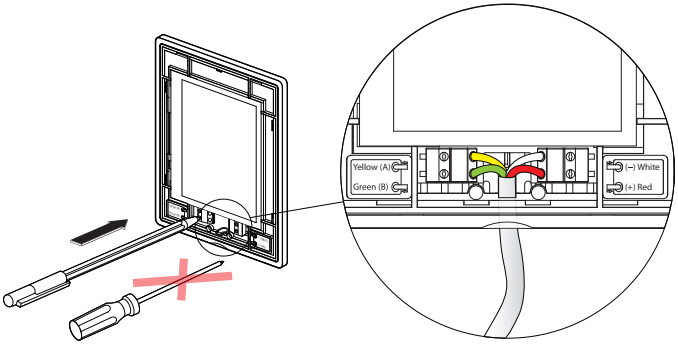


Fig. 34. Control panel cable wiring

- **Do not use any other type or size screws but those that are supplied for control panel mounting. Wrong screws may damage electronics board.**
- **Do not use sharp tools for pinning contacts in the control panel (e.g., screwdriver). Please use a pencil or a ballpoint.**

7. COMMISSIONING AND INSPECTION OF THE UNIT

Before switching on the device, check for foreign objects, debris or tools inside the unit. Make sure that air filters are installed and condensate drainage is connected. Make sure that the ductwork is free from obstructions such as fully closed diffusers or adjustment valves or blocked external air intake grilles. Check whether the ball valves and collector actuators in the heating system are open, whether domestic water is supplied to the unit for hot water preparation.

- **You may start your KOMBI unit only when it is fully installed, ducts, pipes and external electrical elements are connected, water systems are filled up and vented.**
- **Do not operate the unit connected to a temporary power supply as unstable power supply can damage electronic components.**

The easiest way to turn on or off the KOMBI unit – press the button on the indicator bar of the unit. Hold the button for 5 seconds to turn on or turn off the unit.

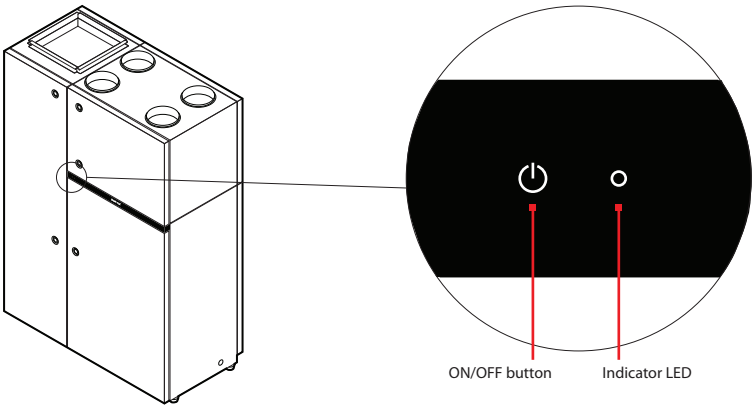
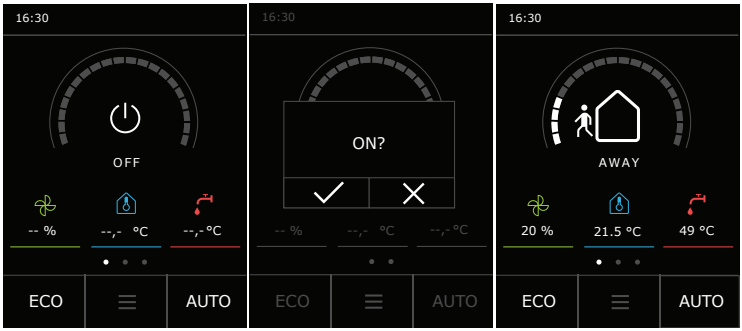


Fig. 35. Indicator bar

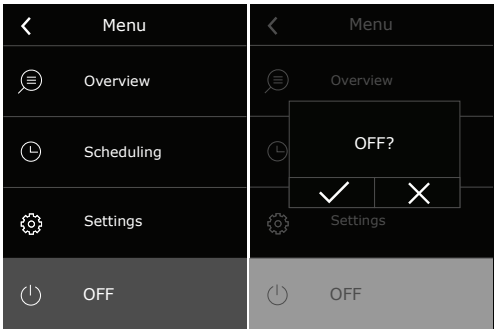
LED next to the button indicates the unit's status:
- Solid red – unit is turned off.
- Solid white – unit is in operation;
- Blinking red – unit is stopped or error messages are displayed.

To turn on KOMBI unit with a control panel:
1. Press the ON/OFF button in the centre of the home screen.
2. Confirm the message that appears.
3. A symbol will appear in the centre of the home screen indicating an operating mode which will start soon.



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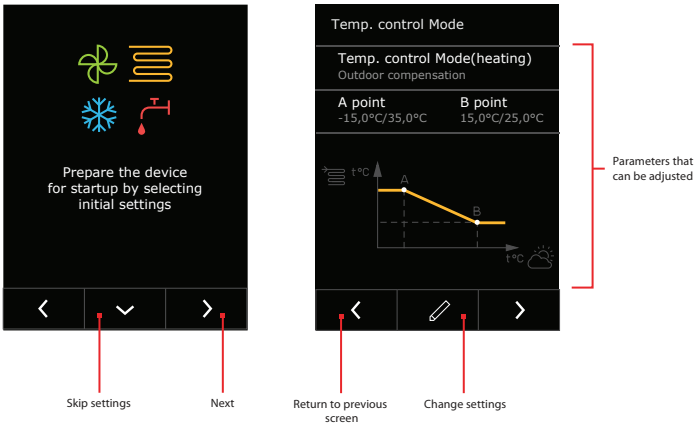
To turn off the device with a control panel:
1. Press "Menu" button at the bottom of the home screen.
2. Press the ON/OFF button at the bottom of the menu window.
3. Confirm the message that appears.
4. Press a return icon at the top of the window to return to the main screen.



For more information about control and settings see "KOMBI User Manual".

7.1. Setup wizard

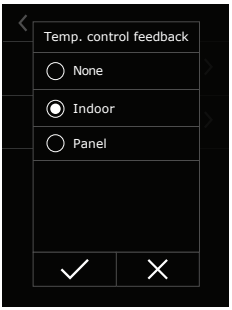
The first time you plug the unit into the power supply, you will see an automatic startup guide on the control panel, which will guide you through the basic device settings step by step:



More information about the settings and functions that can be changed in the startup wizard can also be found in the "Kombi User Manual".

Temperature feedback

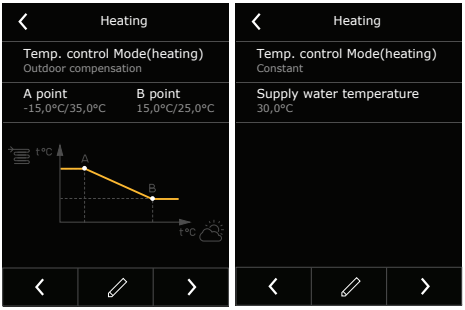
- **None** – indoor temperature is not measured.
- **Indoor** – room temperature is measured in the ventilation device (if the ventilation is used) at the extraction side.
- **Panel** – a sensor integrated in the AHU control panel measure room temperature.



Temp. control mode (heating)

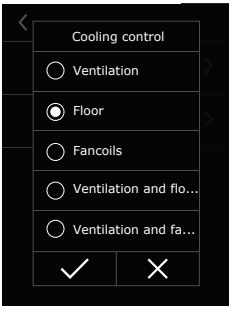
Here, the temperature of water supplied to the underfloor heating system or ventilation unit is selected. Prepared water will be used for heating the premises. Choose the temperature correctly, so that the rooms are not too cold.

- **Outdoor temperature compensation** – water temperature is adjusted according to weather conditions using the user-set curve. Two points of the curve (A and B) are set – outdoor and prepared water temperature. For example, when the outside temperature drops, the temperature of water supplied to the underfloor heating system will automatically increase.
- **Constant** – constant temperature of the prepared water is maintained.



Cooling

The unit can use ventilation unit, underfloor system or separately purchased fan coils for cooling the premises. When only AHU is used, the supply air temperature is automatically maintained according to the settings of the active mode. If cooling with underfloor system or fan coils is selected, you will be able to additionally specify the minimum water temperature during cooling. Choose the minimum water temperature so that the floor is not too cold to walk and condensation is prevented.



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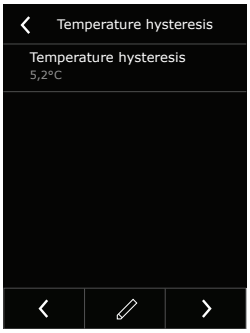
Ventilation settings

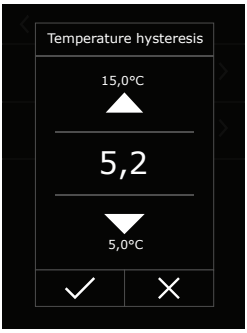
Here you can select the flow measurement units and set the maximum air volume to which all ventilation functions and modes will be limited.



Temperature hysteresis

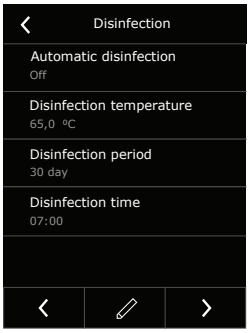
Select the temperature range that will be used for heating domestic hot water. Hysteresis determines how many degrees the temperature of the domestic hot water should drop compared to the desired temperature before the heat pump starts heating the water again. Low temperature hysteresis will keep the water hot for longer during frequent washes. High hysteresis will allow the water in the tank to cool down more, but this will help to save energy.





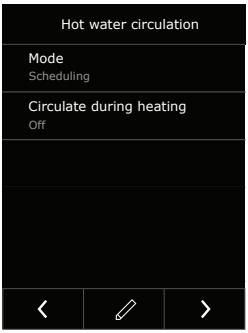
Disinfection

Here you can set parameters for domestic hot water system disinfection: temperature, duration, time and intervals.

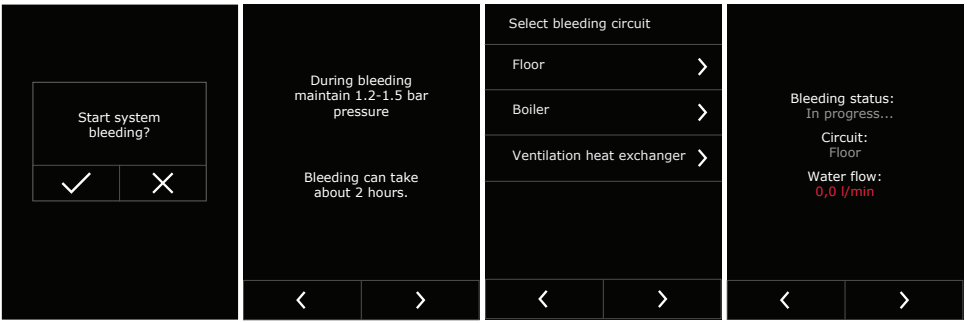


Hot water circulation [1]

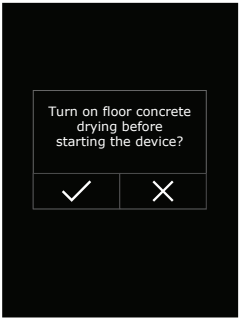
In case of large domestic hot water systems (e.g., several bathrooms and sinks), we recommend using the hot water circulation system, so you will not have to wait for hot water to arrive. In this menu you will be able to specify the control of a circulating hot water pump. It can be on at all times or run on a weekly schedule created by the user. You can also turn on water circulation during heating. In this case, the circulation pump will always turn on when the hot water in the tank is heated.



At the end of the setup wizard, you can start air bleeding of the water systems. Before bleeding, open the automatic air vent valves inside the unit (see "Filling of the hydraulic system"). During air bleeding, monitor the system pressure and wait until the water flow becomes stable.



After air bleeding the water systems, you can also turn on the floor warm up function before starting the unit. During this function, the floor temperature will be raised very slowly (by 5 °C per day) until it reaches the set temperature.

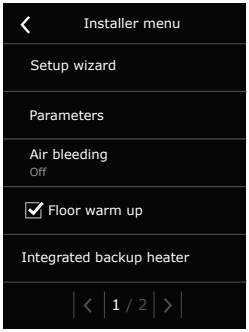


[1] Depending on the order.

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7.2. Installer menu

To reach the installer menu, press and hold the "Settings" button for 5 seconds, and enter the PIN code ***0100*** when requested.



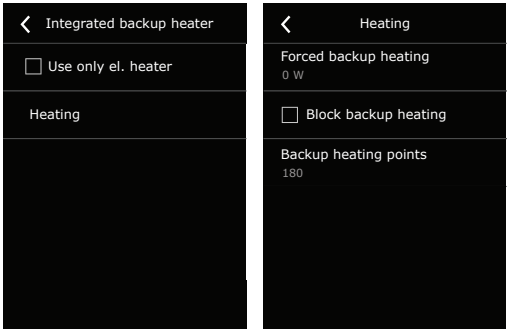
In the installer menu you will find additional settings or functions that are not accessible to the user. Here you can restart the Setup wizard, view the parameters of all sensors, perform air bleeding of water systems or enable the slow floor warm up function (see "Setup wizard").

The settings of the integrated backup heater allow you to limit or force the operation of the electric heater when preparing water for the heating system (floors or radiators):

Use only electric heater – only an electric heater will be used to prepare water, and the heat pump will operate in a blocker mode.

Forced backup heating – the heat pump and additional electric heater will always be used together for water preparation. This will allow the desired floor or radiator temperature to be reached faster. Power of the electric heater to be used for this function can be adjusted – selecting 0 W will disable the function.

Block backup heating – the water for the heating system will be heated only by the heat pump, and the electric heater will not be used, even if desired water temperature in the heating system can not be reached.



Manual defrost – emergency mode is designed to defrost the heat pump evaporator if this failed during automatic defrost

Maximum current – it is possible to limit the heat pump's electrical current, thereby also limiting compressors' power.

Use maximum current limitations only after consulting with authorized service representatives, otherwise you may damage the compressor.

7.3. Fast Check

The first time you start your device, make sure that:

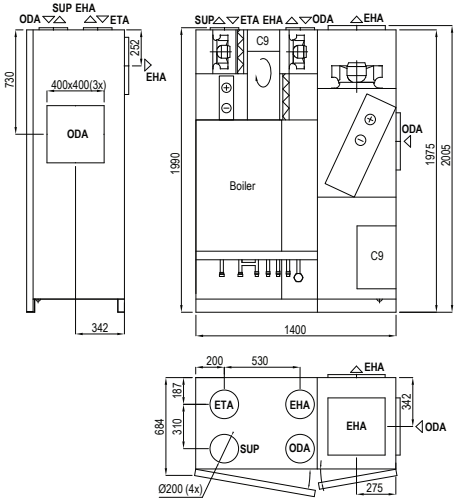
Task	Yes	No	Comments
Control panel is working, responds to touch, no error messages			
All air filters are installed			
Air valves fully open			
Changing the ventilation modes changes the fan speed			
The unit is airtight without gaps or air leakage			
Heating/cooling devices are working			
Connected external sensors are working			
The heating and hot water piping is watertight, there is no water leakage			
Circulation pumps are operating			
The condensate easily flows from the unit and the drainage piping is watertight			
Check for leaks in the heat pump refrigerant circuit			
Check if there is no moisture in the refrigerant system			
Hydraulic systems are vented			
There are no unusual noise or vibrations during operation			
Other comments:			

Installer	
Company	
Tel. No.	
Date	
Signature	

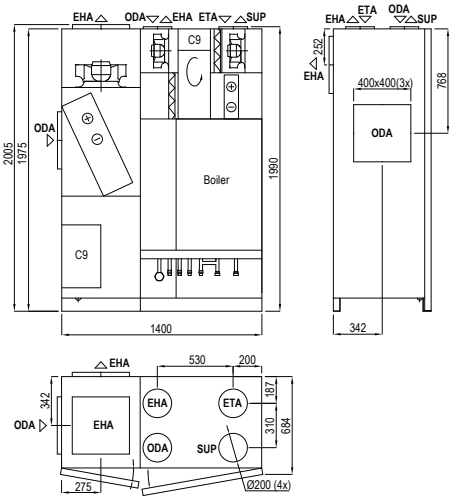
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8. TECHNICAL SPECIFICATIONS

Left inspection side L1



Right inspection side R1



ODA – outdoor intake
SUP – supply air
ETA – extract indoor
EHA – exhaust air

General data

	A7	A9
Voltage, V	3~400	3~400
Nominal current, A	21,2	27,7
Power cable, mm²	5×4	5×4
IP protection class	IP 40	IP 40
Heat pump section weight, kg	180	180
Boiler and AHU section weight, kg	238	238
Unit weight, kg	418	418
Heat pump section dimensions B×H×L, mm	550 × 2005 × 684	550×2005×684
Boiler and AHU section dimensions B×H×L, mm	850 × 2005 × 684	850×2005×684
Maintenance space, mm	900	≥900

Connections

	A7	A9
Water supplied to the heating system	1''	1''
Water returning from the heating system	1''	1''
Heating system refill	½''	½''
Domestic cold water inlet	½''	½''
Domestic hot water supplied to the system	½''	½''
Domestic hot water recirculation	½''	½''
Ducts, heat pump section, mm	2 (3) × 400 × 400	2 (3) × 400 × 400
Ducts, air handling unit, mm	4 × 200	4 × 200

Noise power level, L_{WA}

	A7	A9
Casing in heating mode (A7/W35), dB(A)	48	48
Casing in heating mode (A7/W45), dB(A)	49,5	49,5
Casing in heating mode (A7/W55), dB(A)	49	49
Casing max., dB(A)	53,6	53,6
Outdoor in heating mode (A7/W35), dB(A)	50,4	50,4
Outdoor in heating mode (A7/W45), dB(A)	50,5	50,5
Outdoor in heating mode (A7/W55), dB(A)	51,1	51,1
Outdoor max, dB(A)	58,1	58,1

Air handling unit data

	A7	A9
Maximal air flow, m^3/h	517	517
Maximal air flow, l/s	144	144
Reference flow rate, m^3/s	0,101	0,101
Reference pressure difference, Pa	50	50
SPI, W/(m^3/h)	0,31	0,31
Thermal efficiency of heat recovery, %	86	86
Air heater capacity at nominal airflow, W45, kW	3,4	3,4
Air cooler capacity at nominal airflow, W7, kW	3,3	3,3
Electric power input of the fan drive at maximum flow rate, W	137	137
Electric power input of the fan drive at reference flow rate, W	59	59
Noise power level, Supply intlet, L_{WA}, dB(A)	55	55
Noise power level, Supply outlet, L_{WA}, dB(A)	67	67
Noise power level, Exhaust inlet, L_{WA}, dB(A)	57	57
Noise power level, Exhaust outlet, L_{WA}, dB(A)	68	68
Air filters dimensions B×H×L, mm	585×258×46	585×258×46
Air filters class according to ISO 16890, Supply/Extract	ePM1 60 % / ePM10 50 %	ePM1 60 % / ePM10 50 %

Heat pump data

	A7	A9
Refrigerant type	R454C	R410A
Refrigerant charge, kg	1,7	4,5
Nominal heating capacity, kW	7	9
Nominal cooling capacity (floor+AHU), kW	7	7
Back-up electrical heater, kW	4,5	6
Number of integrated water pumps	2	2
Max. water pump power consumption, W	75	75
Integrated expansion vessel for heating system, l	12	12
Internal water valume for heating system, l	13,6	13,6
Heating circuit water flow min., m^3/h	0,34	0,34
Heating circuit water flow at nominal capacity, m^3/h	1,2	1,54
Operating water pressure min., bar	0,5	0,5
Operating water pressure max., bar	3	3
Operating outdoor temperature min. (heat pump only), °C	-25	-25
Operating outdoor temperature max. (heating), °C	17	17
Operating outdoor temperature min. (cooling), °C	15	15
Air filter dimensions B×H, mm	585×505	585×505
Filter class according to ISO 16890	*coarse* 65%	*coarse* 65%
Heat pump seasonal energy efficiency according to EN 14825		
Heating average climate (+2 °C), SCOP W 35 °C	4,91	4,86

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	A7	A9
Heating warm climate (+7 °C), SCOP W 35 °C	6,62	6,53
Heating cold climate (-7 °C), SCOP W 35 °C	4,23	4,03
Cooling (35 °C), SEER W 18 °C	5,34	5,11

Domestic hot water (DHW) data

	A7	A9
Hot water tank volume, l	186	186
Hot water tank material	Stainless steel	Stainless steel
Hot water tank corrosion protection	Magnesium anode	Magnesium anode
Integrated expansion vessel for DHW, l	8	8
Operating water pressure max., bar	10	10
Water heating time from 10°C to 45°C, min.	25	25
Tap profile according to DIN EN 16147	XL	XL
Number of water circulation pumps (optional)	1	1
Max. water pump power consumption, W	5	5
Tank disinfection water temperature max., °C	70	70

KOMBI-A7 heating/cooling performance data according to EN 14511

	Capacity, kW	Power consumption, kW	COP	EER
A2/W35	7	1,85	3,78	–
A7/W35	7	1,46	4,79	–
A2/W45	7	2,25	3,11	–
A7/W45	7	1,85	3,78	–
A2/W55	7	2,49	2,81	–
A7/W55	7	2,31	3,04	–
A35/W18	7	1,36	–	5,16
A35/W7*	3,3	1,23	–	2,68

* AHU only

KOMBI-A9 heating/cooling performance data according to EN 14511

	Capacity, kW	Power consumption, kW	COP	EER
A2/W35	9	2,14	4,21	–
A7/W35	9	2,01	4,47	–
A2/W45	9	2,80	3,21	–
A7/W45	9	2,47	3,65	–
A2/W55	9	3,17	2,84	–
A7/W55	9	2,90	3,1	–
A35/W18	7	1,38	–	5,07
A35/W7*	3,3	1,24	–	2,67

* AHU only

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