



kensol



HEAT PUMP INSTALLATION GUIDELINES KENSOL MONOBLOCK

KTM 6 KW, KTM 10 KW, KTM 14 KW, KTM 17 KW

Table of Contents

1. HEAT PUMP INSTALLATION REQUIREMENTS.....	3
2. INSTALLATION OF THE OUTDOOR UNIT	3
3. HYDRAULIC GUIDELINES	4
4. PEAK HEAT SOURCE.....	6
5. PC HYDRAULIC SIDE PROTECTION	7
6. ELECTRICAL GUIDELINES.....	8
7. ECONET WEB MODULE.....	9

1. Heat pump installation requirements

EACH KENSOL HEAT PUMP INSTALLED IN ORDER TO OBTAIN A 5-YEAR GUARANTY MUST:

- Be picked up by the APS (Authorized Service Point)
- Pass annual inspections
- Be permanently connected to the ECONET online platform

REQUIREMENTS DURING ACCEPTANCE BY APS:

- Installation of outdoor unit and controller/internal unit
- Ensuring the required minimum water flow rate through the outdoor unit by maintaining the recommended diameters of the hydraulic lines and selecting a circulating pump GZ of the appropriate size performance
- Use of anti-freeze protection
- Maintaining a minimum CH volume of water (min. 15L/1kW of heat pump nominal power)
- Maintaining a minimum heat transfer surface area with CH/DHW coil (enameled coil 0.2m²/1kW, stainless steel coil min. 0.15m²/1kW nominal power)
- Provision of heating water with appropriate parameters
- Use of peak heat source for CH and DHW controlled via KT-Multi controller
- Use of a mesh filter and a magnetic separator or a device with both functions
- Use of diaphragm pressure expansion vessels adapted to the installation
- Use of a safety valve (3bar) as a PC safety device
- Use of electrical protection in accordance with the recommendations and manufacturer's requirements
- Use of electrical cables with the appropriate diameter
- Connection of the controller to the Internet via the included ECONET module

2. Installation of the outdoor unit

POSITION IN RELATION TO OBSTACLES

The outdoor unit must be installed observing the appropriate installation distances. These distances provide unobstructed air access to the evaporator and the necessary service access. The minimal distance from the ground or a full plinth provides protection for the PC from snow, and also allows for trouble-free drainage of condensation.

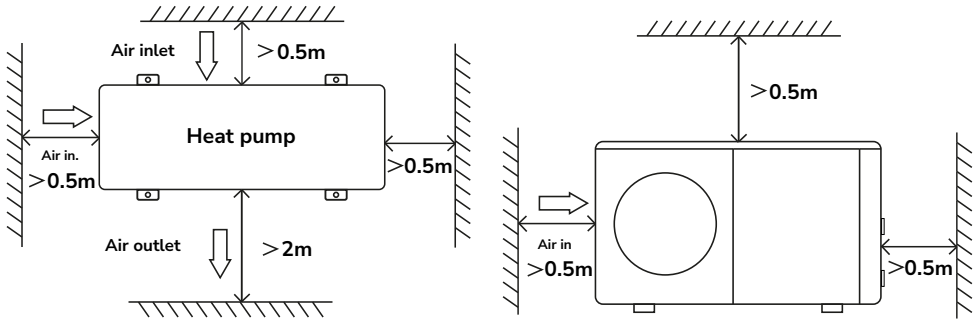


Figure 1

STABLE INSTALLATION

The heat pump must be mounted on a stable structure/concrete plinth using the included rubber pads, or another type of vibration isolator must be used. In addition, the unit should be perfectly leveled.



LOCATION IN RELATION TO THE DIRECTIONS OF THE WORLD

KENSOL heat pumps are recommended to be installed in non-sunny locations (north direction). If the outside temperature is distorted because of too much sunlight, it is recommended to install an additional outdoor temperature sensor (accessory) and lead it to the north side.

Due to the transmission of vibrations, it is not recommended to mount an outdoor unit close to the windows of the living quarters.

The outdoor unit must be located so that it is not exposed to flooding from the roof and sliding snow.

DRAINAGE OF THE CONDENSATE

Provide drainage of condensate from the outdoor unit in a controlled location.

3. Hydraulic guidelines

FLOW AND DIAMETER OF HYDRAULIC LINES

For optimum operation and performance of Kensol heat pumps, it is necessary to ensure a minimum flow through the exchanger in the outdoor unit according to the table below.

Heat pump	KTM 6kW	KTM 10kW	KTM 14kW	KTM 17kW
Minimum flow [liter/minute].	23,3	36,6	51,6	66,6

The flow rate depends on the pressure drops in the system and the capabilities of the circulating pump GZ. The pump should be selected to provide the minimum flow through the heat pump taking into account pressure drops in the system.

To ensure minimum flow rates, hydraulic connections must be observing appropriate diameters. Depending on the material, a distinction is made between lines with different wall thicknesses, in which there may be constrictions on the connectors therefore special attention should be paid to the inner diameter.

Recommended pipe diameters for installations not exceeding 10mb distance (PC-buffer):

Heat pump	KTM 6kW	KTM 10kW	KTM 14kW	KTM 17kW
PP	32mm	32mm	40mm	50mm
Clamping steel	28mm	28mm	35mm	42mm
PeX	32mm	32mm	40mm	63mm

NOTE!

Please avoid the use of unnecessary elbows, couplings and constrictions. If there are a large number of connectors, increase the diameter of the wires. Pipelines and connectors should be thermally insulated. It is recommended to connect the outdoor unit with flexible installation elements or use of compensators.

VOLUME OF WATER IN THE SYSTEM/HEAT BUFFER

A minimum volume of water should be ensured in the installation. For Kensol heat pumps, assume the relationship of 15L of volume of water per 1kW of PC nominal power.

A buffer is not required, but it is recommended to install a heat buffer in the system in parallel connection due to a number of advantages. You can hook up a PC to the installation directly, however, a minimum volume of water in the system and minimum flows must be ensured regardless of the external control of the circuits on the system.

Product model	KTM 6kW	KTM 10kW	KTM 14kW	KTM 17kW
Minimum volume of water in the system [liter]	90	150	210	255
Minimum buffer capacity [liter]	50	100	150	200
Recommended buffer capacity [liter]	100	150	200	300

WARNING - In the case of a heating system based on radiator installation and the occurrence of other heat sources it is necessary in the installation of a heat pump put a buffer tank.

PARAMETERS OF HEATING WATER IN THE CIRCUIT

To ensure long and trouble-free operation of the heat pump, the water in the system should have the right parameters:

- Temperature: $\geq 60^{\circ}\text{C}$
- pH: 7-9 pH
- Alkalinity: $60\text{mg/l} < \text{HCO}_3 < 300\text{mg/l}$
- Conductivity: $< 500\mu\text{S/cm}$
- Hardness: 3.5-8.4 odH

HEAT EXCHANGER / DHW HEATER

- PC Kensol can also be used for DHW. In such a case, it is necessary to ensure that the heat is adequately received through a heat exchanger suitable for contact with DHW:
- Plate heat exchanger - should be selected so that the temperature drop is around 2°C , and Δt between supply and return did not exceed 5°C
- Coil built in DHW heater - assume the following conversion rate:
 - a. Enamelled coil - recommended area $0.25\text{m}^2/\text{kW}$ nominal power, minimum area $0.2\text{m}^2/\text{kW}$ nominal power
 - b. Stainless steel coil - minimum area $0.15\text{m}^2/\text{kW}$ nominal power

ANTI-FREEZE PROTECTION

PC Kensol is a monobloc pump, so it is necessary to protect the hydraulic system and the exchanger in the outdoor unit from freezing in the event of a power outage or failure.

Acceptable anti-freeze solutions:

- Propylene glycol solution up to 30%
- Solution of other antifreeze agents with corrosion inhibitors (e.g. Fenox Antifreeze protector ALPHI-11, Sentinel X500)
- Anti-freeze valves
- UPS-based backup systems with manufacturer's guarantee for operation in emergency situations.

OWN SOLUTIONS ARE UNACCEPTABLE AS THE ONLY OPTION TO SECURE THE HEAT PUMP AGAINST FREEZING.

4. Peak heat source

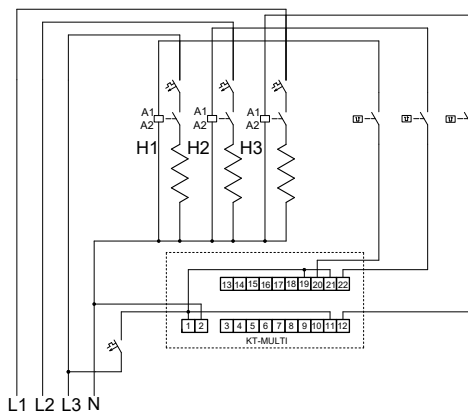
Since heat pumps operate in bivalent mode, each installation must be equipped with an automatic peak heat source. Such a source must meet the following requirements:

- It must be actuated via a potential-free contact from the PC (this contact is connected to the peak source contacts in the KT-Multi)
- It must work for all heating circuits and DHW depending on demand

Therefore, in the case of a CH+CWU system, the most popular solution is a flow-through heater which must be installed before the CH/CWU switching valve on the PC side.

NOTE: THE PEAK HEAT SOURCE IN THE FORM OF A FLOW HEATER SHOULD BE CONNECTED USING EXTERNAL CONTACTORS. CONNECT THE HEATER TO THE „WORKING” CONTACTS AND CONNECT THE „CONTROL” CONTACTS TO THE KT-MULTI CONTROLLER. IN ADDITION, THE HEATER SHOULD BE PROTECTED BY A THERMOSTAT. IT IS RECOMMENDED TO USE 3-STAGE HEATERS TO TAKE ADVANTAGE OF THE CAPABILITIES OF THE CONTROLLER AND REDUCE OPERATING COSTS.

WIRING OF A FLOW-THROUGH ELECTRIC HEATER



Exemplary wiring diagram of the heater through a contactor (control of 230V AC contactor coil)

5. PC hydraulic side protection

Heat exchange between the refrigeration system and the water system takes place in the condenser. To ensure long trouble-free operation, a number of requirements must be met in an installation with a PC.

PROTECTION AGAINST SOLID CONTAMINANTS

In order to protect the PC from contamination, it is absolutely necessary to install a magnetic separator and a mesh filter on the return. These protections can be used as 2 separate devices or use magnetic separators with built-in mesh filters

PRESSURE PROTECTION OF THE INSTALLATION

Water changes its volume with a change in temperature. In order to avoid damage caused by excessive system pressure or large pressure fluctuations, it is necessary to:

- Install a safety valve (max. 3 bar) to protect the PC from excessive pressure. In addition, there must be no possibility of hydraulic separation between PC and safety valve (e.g., installation of shut-off valves)
- Install an expansion vessel to protect against high pressure fluctuations. Expansion vessels should be selected according to the volume of water and temperature. In addition, set the pre-pressure in the vessel according to the target pressure in the system.

		Supply temperature 60 °C				
Type	The system's volume of water in liters					
	<120	130-270	280-450	460-670	680-960	
Minimum capacity of the expansion vessel	<11.8	12.2-17.8	18.2-24.9	25.3-34.5	35-49.5	
Type of vessel	12	18	25	35	50	
Required inside diameter of the expansion pipe	20 mm					
		Supply temperature 40 °C				
Type	The system's volume of water in liters					
	<260	270-590	600-830	840-1160	1170-1660	
Minimum capacity of the expansion vessel	<11.8	12-17.8	18-24.9	25.2-34.8	35.1-49.8	
Type of vessel	12	18	25	35	50	
Required inside diameter of the expansion pipe	20 mm					

6. Electrical guidelines

ELECTRICAL PROTECTION

Product model	KTM 6kW	KTM 10kW	KTM 14kW	KTM 17kW	Controller KT-Multi
Power supply	230V/1F 50 Hz	380V/3F 50 Hz	380V/3F 50 Hz	380V/3F 50 Hz	230V/1F 50 Hz
Min. recommended cross section of power cable (mm ²)	3x4	5x2.5	5x4	5x4	5x2.5
Recommended protection	C20A	C16A	C20A	C20A	C6A

A peak heat source in the form of an electric heater cannot be plugged into the same overcurrent protection as an outdoor unit or controller. The overcurrent protection of the flow-through heater should be adapted to its power. All electrical cables should be protected from mechanical damage and moisture.

NOTE! Each heat pump, controller and heater must be protected with a residual current circuit breaker with a trip current $I_{\Delta n} \leq 30\text{mA}$

In case of using a GZ circulating pump with a motor power greater than 150 W, circulating pump should be connected with the KT-Multi controller using contactors.

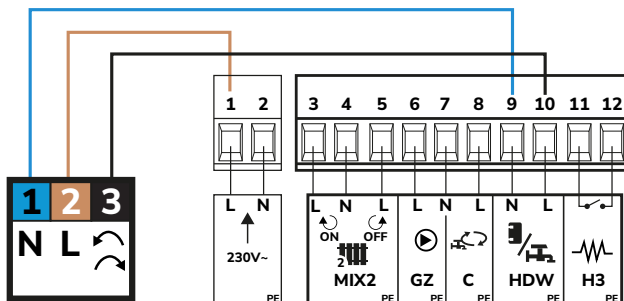
Communication between the PC and the KT-Multi controller is carried out using the MOD-BUS communication protocol. In order to communicate properly, the two devices must be connected by a cable attached to the KT-Multi with prepared plugs:

- KTM 6 kW (KT-Multi „B” -> PC „CN8”)
- KTM 10, 14, 17 kW (KT-Multi „B” -> PC Main board „CN2”)

CH/CWU DIVERTER VALVE

KT-Multi controller works only with switching valves with one control phase (230V AC)

Connection of the switching valve with fixed phase and control phase

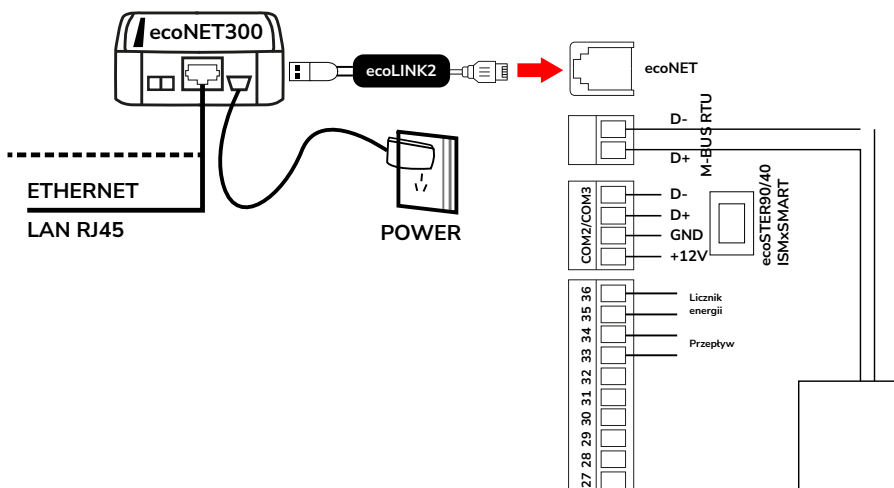


7. ECONET web module

Each Kensol PC is equipped with an Internet module that allows remote reading and changing of settings via the ECONET platform.

The Internet module should be connected to the power supply. Connect the ECOLINK device (USB-RJ14) to the KT-Multi controller (G2 input - ECONET). You can connect to the Internet through:

- WI-FI network
- RJ45 ethernet cable e.g. with router, switch





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