

# **COMPACT AIR HANDLING UNIT WITH HEAT RECOVERY**

**KTM125**

**EN**

**OPERATION MANUAL**

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**Kair** is happy to offer your attention a new compact air handling unit with heat recovery KTM125.

## INTRODUCTION

The present operation manual contains a technical description, technical data sheets, operation and mounting guidelines, safety precautions and warnings for safe and correct operation of the unit.

Read carefully and understand the operation manual, especially the safety requirements, before the unit mounting and start up.

Keep the operation manual available as long as you use the unit.

## GENERAL

The air handling unit with heat recovery KTM125 is designed for efficient and energy saving ventilation of domestic and public premises.

The unit is not a ready to use product but a component part of central air conditioning and ventilation network.

The unit is designed for suspended mounting.

The unit is available for round Ø 125 mm air ducts depending on the model.

The unit is rated for indoor application at ambient temperature from +1 °C up to +40 °C and relative humidity not exceeding 80 % with the transported air temperature from -25 °C up to +50 °C.

Hazardous parts access and water ingress protection rating:

- unit motors – IP44;
- assembled unit connected to air ducts – IP22.

The unit design is regularly improved, so some models can slightly differ from those ones described in this service instruction.

## SAFETY RULES

The unit complies with the requirements according to the EU norms and directives, to the relevant EU-Low Voltage Equipment Directives, EU-Directives on Electromagnetic Compatibility.

All operations related to the unit electrical connections, servicing and repair works are allowed only after the unit disconnection from power mains.

The unit is rated as a Class I electrical appliance.

All mounting and servicing operations are allowed by duly qualified personnel.

Please follow the safety regulations and working instructions (DIN EN 50 110, IEC 364).

Make sure the impeller and the casing are not damaged before connecting the unit to power mains. The casing internals must be free of any foreign objects which can damage the impeller blades.

The unit maintenance and repair is allowed only after power cut-off and full stop of the rotating parts.

Misuse of the unit or any unauthorized modification are not allowed.

The unit is designed for connection to ac single-phase power mains, see «Technical Data».

The unit is rated for permanent operation.

Take steps to prevent ingress of smoke, carbon monoxide and other combustion products into the room through open chimney flues or other

fire-protection devices. Sufficient air supply must be provided for proper combustion and exhaust of gases through the chimney of fuel burning equipment to prevent back drafting. The maximum permitted pressure difference per living units is 4 Pa.

The transported air must not contain any dust or other solid impurities, sticky substances or fibrous materials.

The unit is not rated for operation in a flammable or explosive medium.

Fulfil the operation manual requirements to ensure a trouble-free and long service life of the unit.

## TRANSPORTATION AND STORAGE RULES

Transportation of the unit is allowed by any vehicle provided the unit is transported in the original package and is protected against weather and mechanical damages.

Use hoist machinery for handling and transportation to prevent possible mechanical damages of the unit. Fulfil the requirements for transportation of the specified cargo type during cargo-handling operations.

Store the unit in a dry and cool place in the original packing.

The storage environment must not be subjected to any aggressive and/or chemical evaporations, admixtures, foreign objects that may provoke corrosion and damage connection tightness.

Store the unit in an environment with minimized risk of mechanical damages, temperature and humidity fluctuations.

Do not expose the unit to the temperatures below +5 °C and above +40 °C.

Connection of the unit to power mains is allowed after the unit has been kept indoor for minimum two hours.

## MANUFACTURER'S WARRANTY

The unit complies with the requirements according to the EU norms and directives, to the relevant EU-Low Voltage Equipment Directives, EU-Directives on Electromagnetic Compatibility.

We hereby declare that the unit complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility. This certificate is issued following test carried out on samples of the product referred to above. Assessment of compliance of the product with the requirements relating to electromagnetic compatibility was based on the following standards.

The manufacturer hereby warrants normal operation of the unit KTM125 over the period of two years from the retail sale date provided observance of the installation and operation regulations.

In case of failure due to manufacturing fault during the warranty period the consumer has the right to exchange it.

The replacement is offered by the Seller.

If case of no confirmation of the sale date, the warranty period shall be calculated from the manufacturing date.

The manufacturer shall not be liable for any damage resulting from any misuse of or gross mechanical interference with the unit.

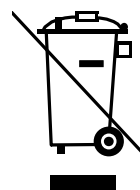
The manufacturer is not responsible for the damages resulted due to the use of third party equipment or to third party equipment.



### WARNING

*The unit is not allowed for use by children and persons with reduced physical, mental or sensory capacities, without proper practical experience or expertise, unless they are controlled or instructed on the product operation by the person(s) responsible for their safety.*

*Supervise the children and do not let them play with the product.*



### WARNING

*Do not dispose in domestic waste.*

*The unit contains in part material that can be recycled and in part substances that should not end up as domestic waste.*

*Dispose of the unit once it has reached the end of its working life according to the regulations valid in your country.*

**DESIGN**

The compact double-skinned unit casing is made of zinc aluminium and has 15 mm thermal and sound insulation of mineral wool.

The mounting angles on the unit casing ensure easy installation. The hinged side panel of the casing ensures easy access to the internals for service and maintenance operations.

The spigots for connection to the air ducts are located at the side of the unit and are equipped with rubber seals for airtight connection to the air ducts.

External rotor motor and centrifugal impeller with forward curved blades are used for air supply and exhaust.

The motors are equipped with integrated overheating protection with

automatic restart and ball bearings for longer service life. The unit is equipped with two backdraft dampers, one located in the supply and the other one in the exhaust air duct.

3-step speed control is performed with the CDP-3/5 external speed switch.

The plate cross-flow aluminium heat exchanger is used for heat recovery in the unit. The drain pan under the heat exchanger block is used for condensate collection and drainage.

The heat exchanger is equipped with a freeze protection system.

Two built-in panel filters with filtering class G4 provide efficient supply and extract air filtration.

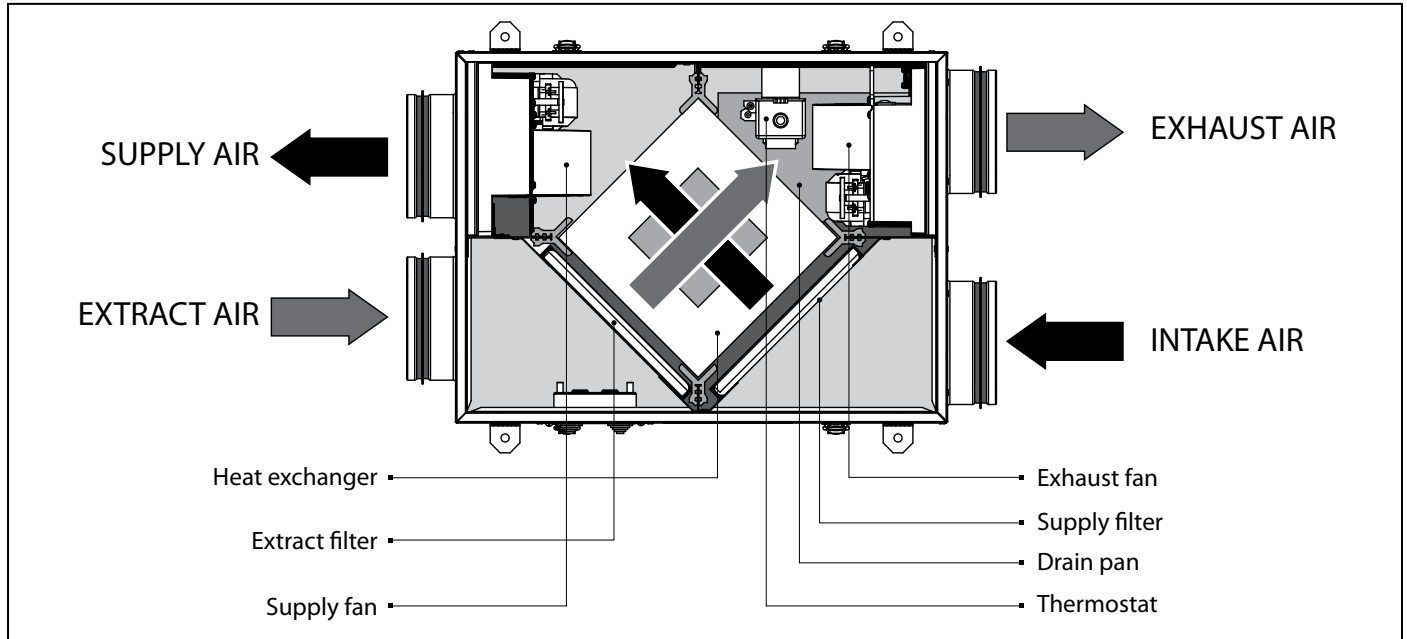


Fig. 1. Unit design and operating logic.

**OPERATING LOGIC**

Clean cold air from outside flows through the air duct to the heat exchanger, where from it is moved to the room with the supply fan.

Warm stale air is extracted from the room with the exhaust fan and is moved through the air ducts to the heat exchanger, where it transfers its heat energy to the intake air. After that it is exhausted outside.

Heat energy of warm and humid extract air is transferred to the cold intake air. The air flows are fully separated within the heat exchanger.

Heat recovery minimizes heat losses caused by traditional window ventilation and saves energy.

In summer the heat exchanger performs reverse and transfers cold air from the cooled extract air for warming up intake air. This contributes to better performance of the air conditioner in ventilated premises.

The freeze protection thermostat which prevents the heat exchanger icing is installed in the exhaust air duct. In case of a freezing danger the thermostat turns the supply fan off to let the heat exchanger get warmed with warm extract air flow. Turn the thermostat control knob to set a thermostat set point.

The factory temperature setting is +3 °C.

**DELIVERY SET**

- ✓ Air handling unit – 1 item;
- ✓ Operation manual – 1 item;
- ✓ Speed switch – 1 item;
- ✓ Packing – 1 item.



**WARNING**

Make sure the unit has no visible transport damages while accepting the goods. Check the ordered and the delivered goods for compliance.

**TECHNICAL DATA**

Table 1. Technical data of the unit

Parameters	KTM125		
	low	med.	high
Speed	low	med.	high
Unit voltage [V / 50 Hz]	1~ 230		
Unit power [W]	30	38	56
Unit current [A]	0.18	0.23	0.34
Max. air capacity [m <sup>3</sup> /h]	57	78	106
Rotation speed [min <sup>-1</sup> ]	1300	1950	2500
Sound pressure level at 3 m distance [dBA]	24	32	41
Transported air temperature [°C]	-25 up to +50		
Casing material	Zinc aluminium		
Insulation	15 mm, PE foam film		
Filter: extract / supply	G4		
Replaceable filter*	FP-Ultra D105-A		
Connected air duct diameter [mm]	Ø 125		
Weight [kg]	13		
Heat recovery efficiency [%]	65 up to 76		
Heat exchanger type	cross-flow		
Heat exchanger material	plastic		

\* extra replaceable filters are special accessories and available on separate order.

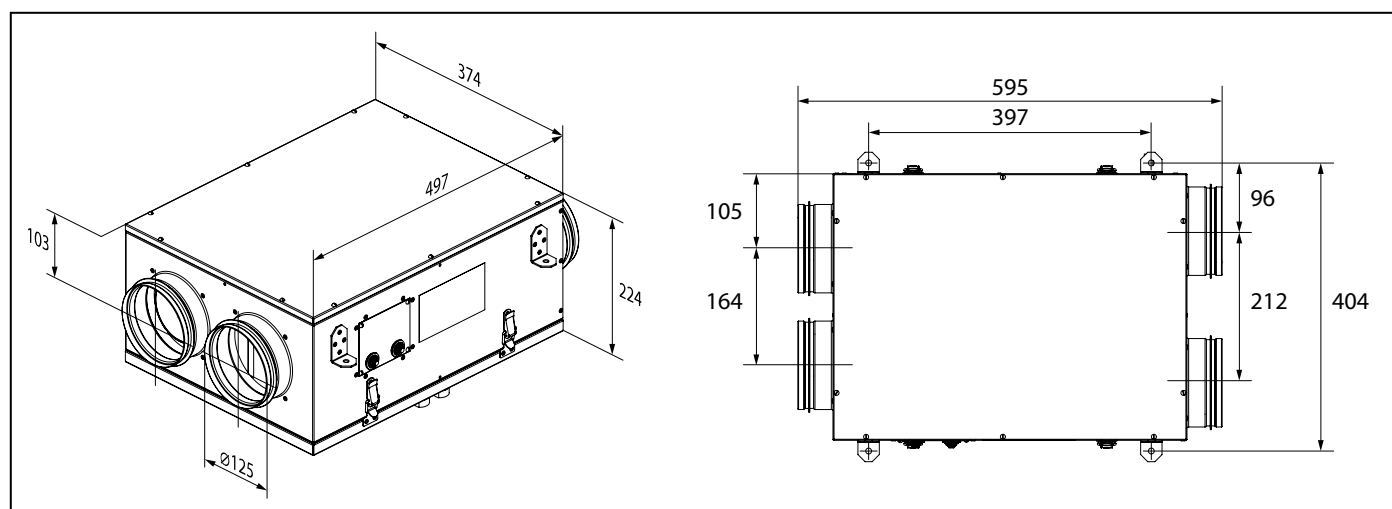


Fig. 2. KTM125 overall dimensions

**MOUNTING**

Due to the compact casing size the unit is designed for horizontal mounting behind false ceiling and connection to Ø 125 mm air ducts.

The unit is suitable for mounting in engineering and service premises as well as living and lounge areas.

The installation place must have connection to the sewage drain system.

While planning the ductwork layout avoid too long air duct sections, numerous bends and reducers because it may reduce air flow.

The mounted air ducts must not be deformed.

Provide airtight connection of the air ducts to the unit spigots and fittings.

While mounting consider the need to ensure sufficient service access to the unit.

The minimum distance between the unit and a surface on servicing side is shown in fig. 3.

The unit is suspended to the mounting surface using a threaded rod fixed inside of the threaded dowel.

The unit mounting position must provide condensate drainage and access to the terminal box for electric connection and access to the service panel for maintenance and filter replacement.

While mounting install a ventilation grille, an outer hood, a disk valve or any other protecting device at outlet from the air duct with a mesh width not exceeding 12.5 mm.



**WARNING**

**Safety precautions:**

*The unit must be mounted to a rigid and stable structure.*

*The unit must be suspended using anchor bolts. Before starting mounting check that the mounting structure has sufficient loading capacity for the unit weight, otherwise reinforce it with beams, etc.*

*If the fixing rods are too short it may result in resonating with ceiling. To prevent resonance problem use fixing rods with a sufficient length.*

*If the spiral air duct connection point is supposed to be the source of noise generation replace the spiral air duct with a flexible one. The flexible connectors are also recommended for noise absorption.*

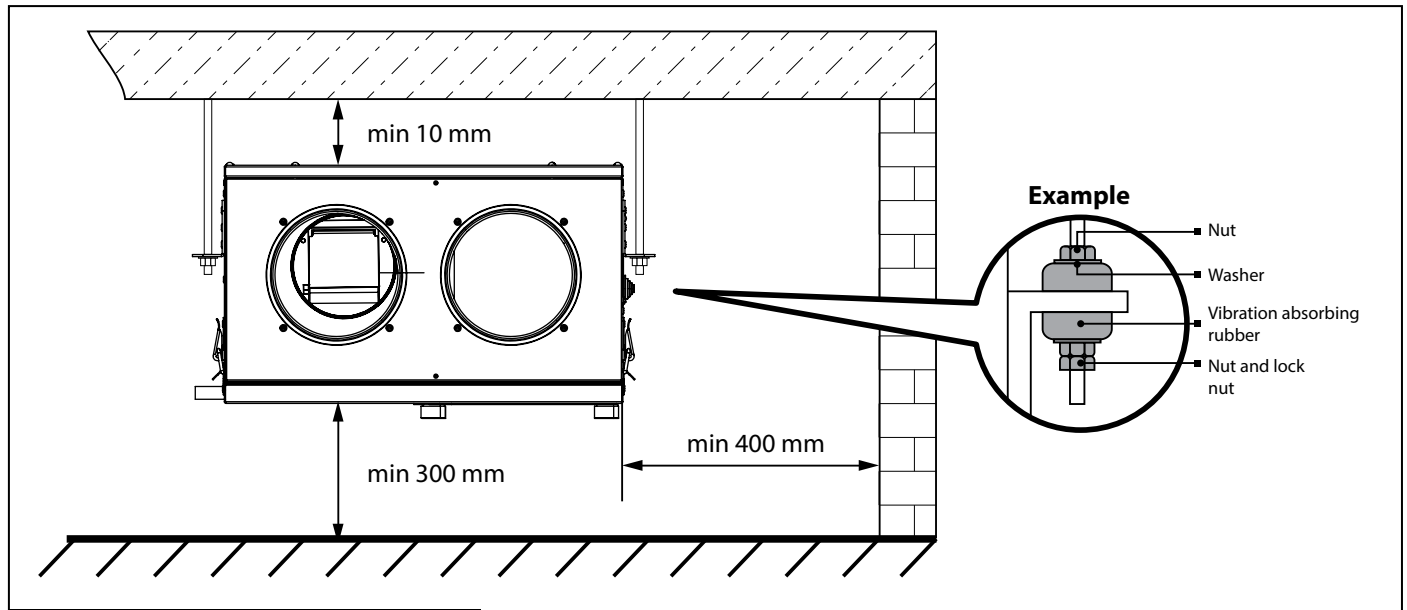


Fig. 3. KTM125 unit mounting

## CONDENSATE DRAIN

The drain pan is equipped with a drain pipe for condensate removal outside the unit.

Connect the drain pipe, the U-trap (not included into the delivery set) and a sewage system with metal, plastic or rubber drain hoses.

While laying the hoses provide the slope downward min. 3 %.

Fill the system with water prior to connecting it to power supply. The U-trap must always be filled with water.

Before starting the unit fill the drain system with water and keep the U-trap always filled with water. Provide free drainage for the condensed water, otherwise it is accumulated inside the unit which may result in the equipment damage and condensate outflow to the room.

**The condensate drain system is suitable for indoor frost-free application with the ambient temperature above 0 °C. In case of need provide heating for the drain system.**

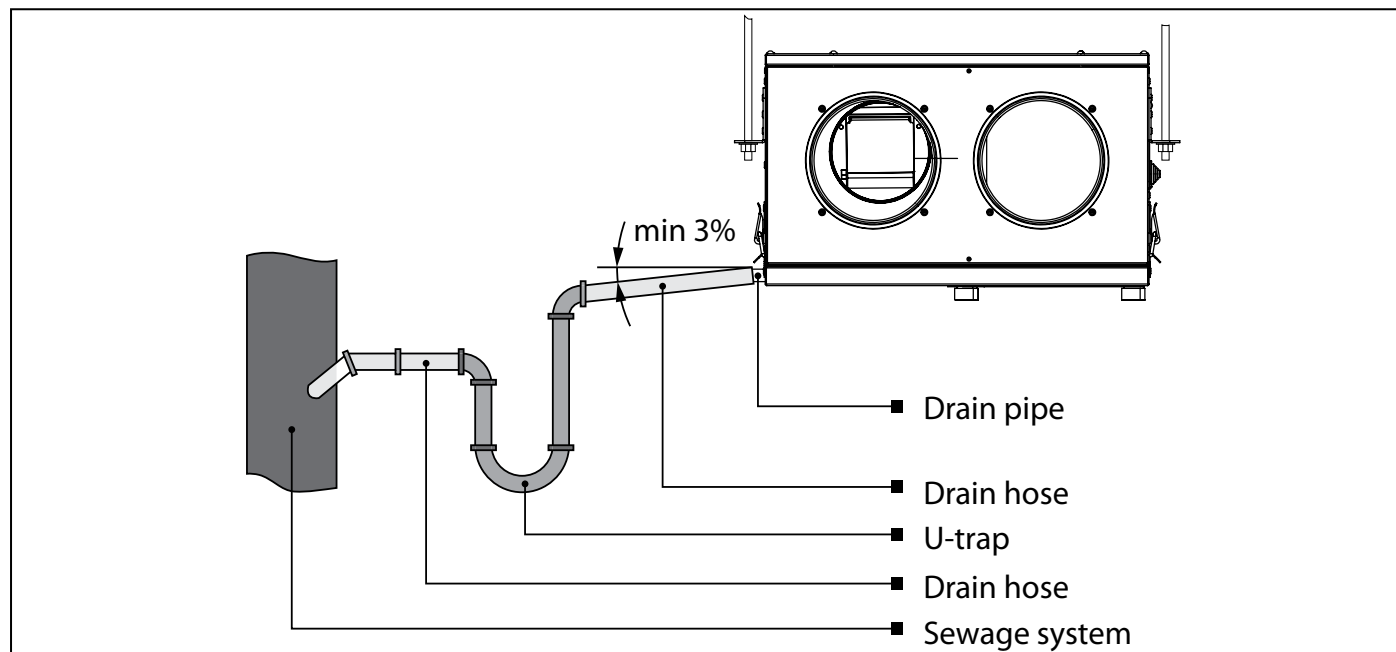


Fig. 4. Condensate drainage



### WARNING

In case of several unit mounting connect each unit to an individual U-trap. Direct condensate withdrawal with no connection to the drain system is not allowed.

## CONNECTION TO POWER MAINS



### WARNING

Read the operation manual prior to any electric installations. Connection of the unit to power mains is allowed by a qualified electrician only.

The rated electrical parameter are stated on the rating plate. No modifications of internal connections are allowed and will result in void warranty.

Connect the unit only to power mains with valid electric standards.

Follow the respective electric standards, safety rules (DIN VDE 0100), TAB der EVUs. The house cabling system must be equipped with an automatic switch at the external input. Connect the unit to power mains through the automatic switch. The contact gap on all poles at least 3 mm (VDE 0700 T1 7.12.2 / EN 60335-1).

The automatic switch trip current must be not below the rated current consumption, refer Table 1. Install the automatic switch to ensure prompt access.

The unit is rated for connection to single-phase alternating current power mains 230 V / 50 Hz.

The unit is connected to power supply via a pre-wired power cable with a plug. In case of need to connect a longer cable follow the wiring diagram below. The electric connections must be performed with insulated, durable and heat-resistant conductors (cables, wires) with a matching cross section, in any case not below 0.75 mm<sup>2</sup>.

The referred conductor cross section is for reference only. While selecting the conductors with respective cross section consider the wire type, the maximum permissible conductor heating temperature, its insulation, length and layout.

Use copper wires only! The unit must be grounded!

Connect the unit to power mains through the terminal block located in

the terminal box on the unit casing following the wiring diagram and the terminal designation, fig. 5.

Connect all the control and power conductors in compliance with the terminal marking and polarity. The rating plate with a terminal designation is placed inside of the terminal box. The terminal clamp marking corresponds to the marking on the wiring diagram.

Route the conductors to the terminal box through the electric lead-in on the unit panel to preserve the electrical protection class.

The fixed electrical wiring must be equipped with an automatic switch that is used for connection of the unit to power mains with a gap on all poles at least 3 mm. The automatic switch trip current must be not below the rated current consumption (min. 1 A).

Cut power supply to the unit off by turning the automatic electric switch QF to OFF position prior to any operations.

Take steps to prevent activation of the automatic switch.

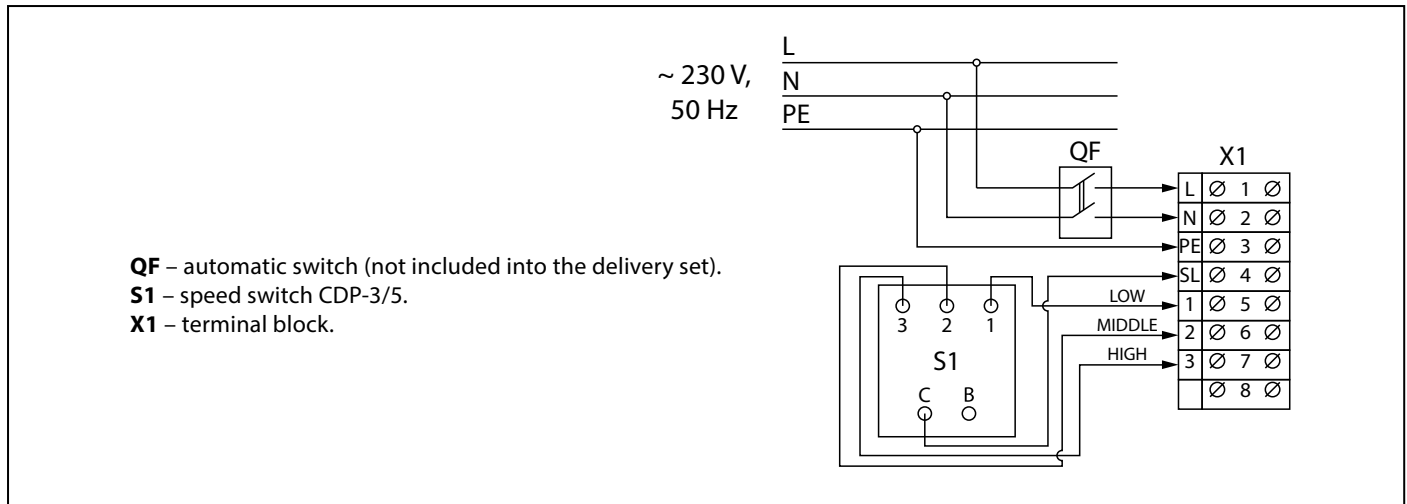
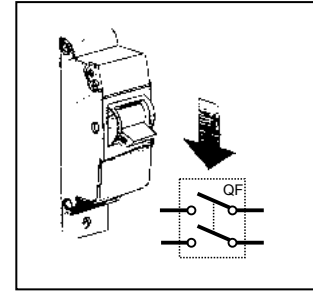


Fig. 5. Wiring diagram

**UNIT CONTROL**

The unit air flow has 3-step control performed with the CDP-3/5 speed switch.

Install the speed switch in any convenient place for the unit control.

Set the speed switch control knob to a required position to activate a required unit speed, fig. 6.

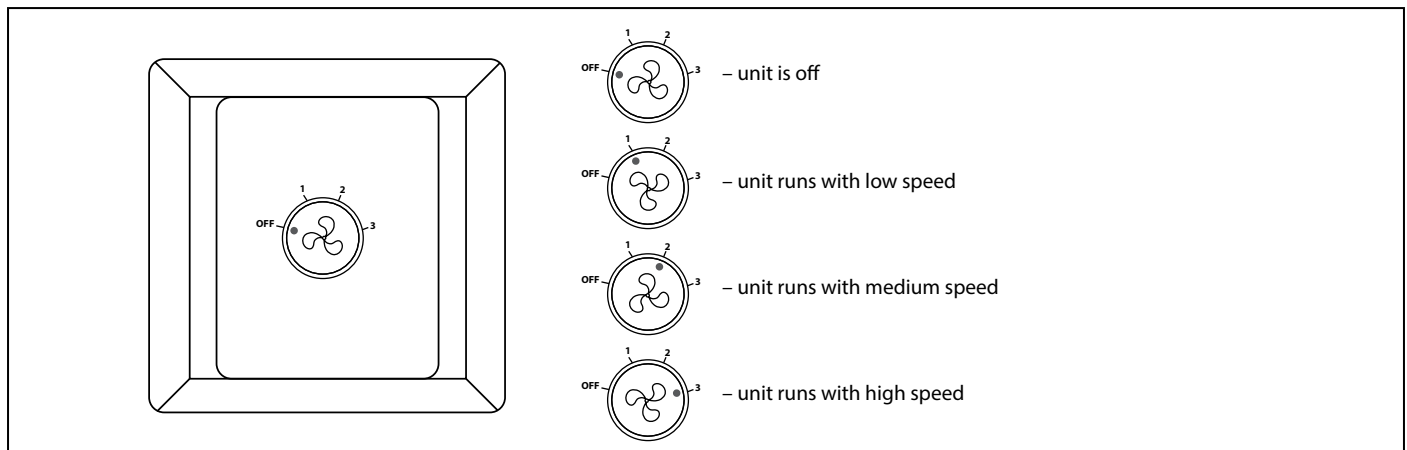


Fig. 6. CDP-3/5 speed switch



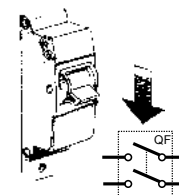
**TECHNICAL MAINTENANCE**



**WARNING!**

*Cut power supply to the unit off by turning the automatic electric switch QF to OFF position prior to any maintenance operations.*

*Take steps to prevent re-activation of the automatic switch.*



Regular technical supervision and maintenance of the unit are required to ensure the product long service life and non-stop operation.

**Warning! Consider the unit sharp edges! Fulfil maintenance operations in work gloves!**

Disconnect the unit from power mains prior to any maintenance operations.

Fulfil the unit maintenance 3–4 times per year.

Remove the filter covers.

The unit technical maintenance includes regular cleaning and other works:

**1. Filter maintenance (3–4 times per year)**

Dirty filters increase air resistance and decrease supply air. Clean the filter with a vacuum cleaner or flush it with water. After two consecutive cleanings the filter must be replaced. Install dry filters only! Contact a local distributor for the filters stated above in the section «Technical data».

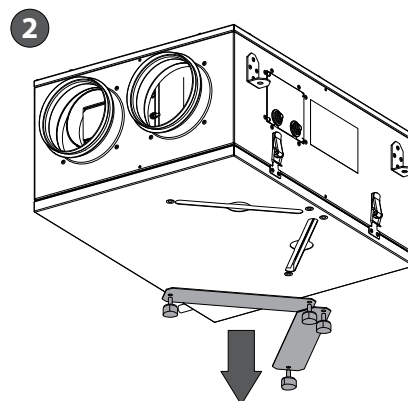
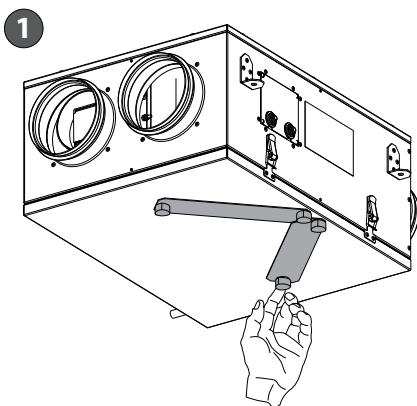
**Dirty filters are not considered as a warranty case! Replace immediately humid and mouldy filters!**

Filter removing as follows:

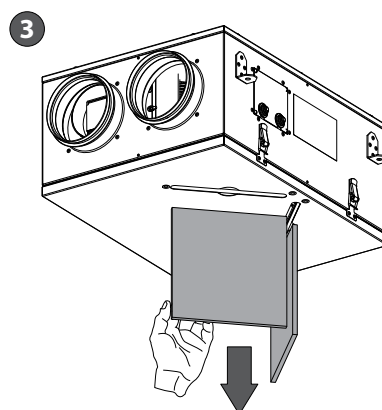
Make sure the unit is disconnected from power mains.



Remove the four triangular screws.



Pull the filters downward to remove.



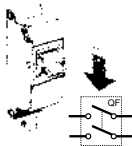
**2. Heat exchanger maintenance (once per year).**

The heat exchanger must be regularly cleaned to maintain high heat exchanger efficiency even in case of the regular filter cleaning.

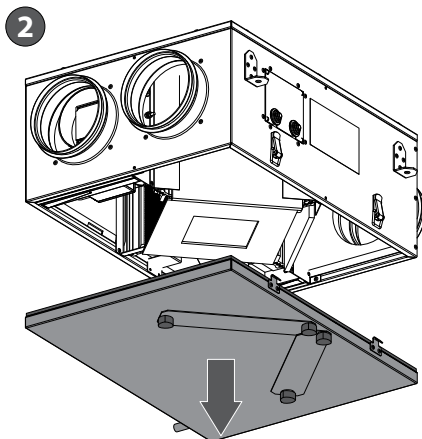
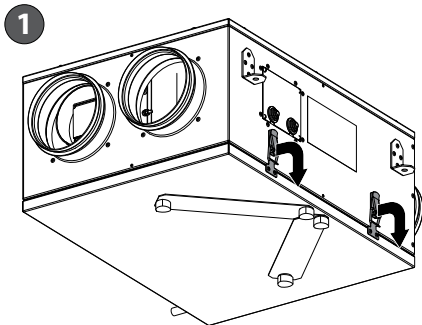
Clean it with warm detergent solution. Remove the heat exchanger from the unit and flush it with warm detergent solution. Install the dry heat exchanger back to the unit.

To remove the heat exchanger:

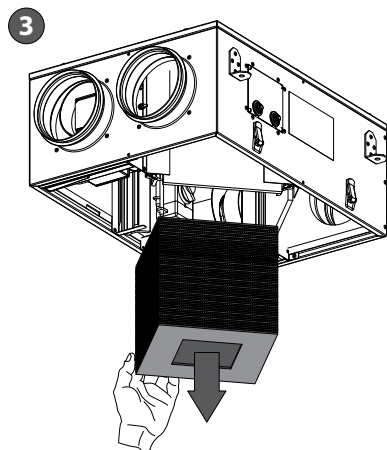
- Make sure the unit is disconnected from power mains.



- Remove the drain pipe.
- Lift the four latches and open the service panel.



- Turn the retaining support to loosen and remove the heat exchanger. Clean the heat exchanger with warm detergent solution. Re-install the clean and dry heat exchanger back to the unit.



**3. Fan maintenance (once per year).**

The regular filter cleaning may not completely prevent the dust ingress into the unit, which results in the unit capacity decrease.

Clean the fan with a soft cloth or a brush. Cleaning with water, abrasive detergents, sharp object or chemicals is not allowed.

**4. Condensate drain system maintenance (once per year).**

Extract air particles may accumulate in the condensate drain system and cause its clogging. Pour a drain pan under the unit with water to check free water flow. Clean a U-trap and the drain system if required.

**5. Supply air flow control (twice per year).**

Check the supply grille and remove foreign objects to maintain free air intake.

**6. Air ducts maintenance (once in 5 years).**

The regular unit maintenance in compliance with the above rules may not completely prevent dust ingress into the air ducts which may result in air flow decrease. The air duct maintenance consist in periodical cleaning or replacement.

**7. Exhaust grilles and intake diffuser maintenance (as required).**

Remove the exhaust grille and the intake diffuser and flush those with warm detergent solution.

Check the ductworks thread connections periodically.

## TROUBLESHOOTING AND FAULT HANDLING

Table 2. Fault list and fault handling

Fault	Possible reason	Fault handling
<b>The fan does not start when the unit is on</b>	No power supply or wrong connection to power mains.	Connect the unit to power mains. Troubleshoot the connection error.
	Jammed motor, soiled impeller blades.	Remove the motor jam, clean the impeller blades.
<b>Automatic switch tripping</b>	Short circuit in power grid.	Turn the unit off and contact your seller for troubleshooting.
<b>Low air flow</b>	Too low set speed.	Set higher speed.
	The filters and the fans are soiled, the heat exchanger is soiled.	Clean or replace the filters, fans and heat exchanger.
	The air dampers, the supply diffusers or the exhaust grilles are closed or soiled.	Remove and clean the air dampers, the supply diffusers, the exhaust grilles to ensure free air flow.
	The speed switch is defective.	Turn the unit off and contact your seller for troubleshooting.
<b>Low supply air temperature</b>	The extract filter is soiled.	Clean or replace the extract filter.
	The heat exchanger is iced.	Check the heat exchanger condition. Shutdown the unit if required and turn it on after the freezing danger is no longer imminent.
<b>Noise, vibration</b>	The impeller is soiled.	Clean the impeller.
	The screw connection is loose.	Tighten the screws.
	No flexible anti-vibration connectors.	Install the flexible anti-vibration connectors.
<b>Condensate leakage</b>	The drain system is clogged, damaged or wrong installed.	Clean the condensate drain system. Check the drain hose slope. Make sure the U-trap is filled with water and the drain system is frost-protected.

**ACCEPTANCE CERTIFICATE**

The air handling unit with heat recovery

KTM125	
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is recognizes as serviceable.

The unit complies with the requirements according to the EU norms and directives, to the relevant EU-Low Voltage Equipment Directives, EU-Directives on Electromagnetic Compatibility.

We hereby declare that the following product complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

This certificate is issued following test carried out on samples of the product referred to above.

Approval mark                      Manufacturing date \_\_\_\_\_

**CONNECTION CERTIFICATE**

The air handling unit with heat recovery

KTM125	
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is connected to power mains in compliance with the operation manual requirements by the professional:

Company: \_\_\_\_\_

Name: \_\_\_\_\_

Date \_\_\_\_\_ Signature \_\_\_\_\_

**WARRANTY CARD**

KTM125	
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**SELLER**

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**SALES DATE**

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**REPRESENTATIVE IN EU**

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Blauberg Ventilatoren GmbH  
Aidenbachstr. 52  
D-81379 Munich, Germany

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NOTES

Lined area for taking notes, consisting of multiple horizontal lines.

