USER'S MANUAL

VUT V mini EC
VUT H mini EC

HEAT RECOVERY AIR HANDLING UNIT

CONTENTS

INTRODUCTION

This user's manual includes technical description, operation, installation and mounting guidelines, technical data for the heat recovery air handling unit VENTS VUT…mini EC, hereinafter the unit.

USE

The heat recovery unit is designed to save heat energy by means of heat energy utilization and is one of the energy saving components used in buildings and premises.

The unit is a component unit and is not designed for independent operation.

The unit enables continuous air exchange by means of mechanical ventilation in private residences, offices, hotels, cafes, conference rooms as well as recovery of the waste heat energy contained in the extract air to warm up the clean supply air.

The unit is rated for continuous operation always connected to power mains.

THE UNIT IS NOT INTENDED TO BE USED BY CHILDREN, PHYSICALLY OR MENTALLY DISABLED PERSONS, PERSONS WITH SENSORY DISORDER, PERSONS WITH NO APPROPRIATE QUALIFICATION.
ANY OPERATIONS WITH THE UNIT MUST BE PERFORMED ONLY BY PROPERLY QUALIFIED PERSONNEL AFTER THE APPROPRIATE SAFETY BRIEFING.
THE UNIT INSTALLATION SITES MUST PREVENT ACCESS BY UNATTENDED CHILDREN.

DELIVERY SET

- Unit - 1 item;
- Sped controller R-1/010 - 1 item;
- User's manual - 1 item;
- Packing box - 1 item.

DESIGNATION KEY

VUT XXX X mini EC

Motor type
EC - electronically commutated motor

Spigot orientation
V - vertical;
H - horizontal.

Air capacity [m³/h]
200; 300

Unit type
VUT - heat recovery ventilation

TECHNICAL PARAMETERS

The unit is designed for indoor application with the ambient temperature ranging from +10 °C up to +40 °C and relative humidity up to 80%.

The unit is classified as a class I electric appliance.

Hazardous parts access and water ingress protection standard:

- Unit motors - IP 44;
- Unit assembly connected to air ducts - IP 22.

Main overall and connecting dimensions, outer view and technical parameters are shown in fig. 1 and tables 1,2.

The unit design is regularly improved, so some models may slightly differ from those ones described in this manual.

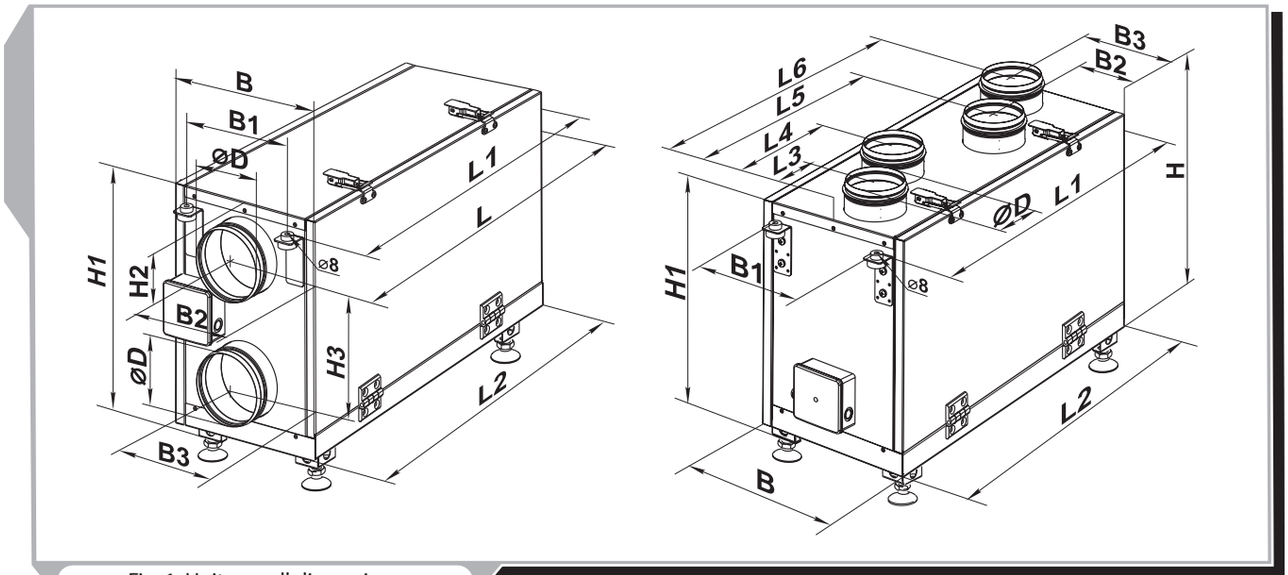

Fig. 1. Unit overall dimensions

Table. 1. Unit overall dimensions

Model	Dimensions [mm]										
	ØD	B	B1	B2	B3	H1	H2	H3	L	L1	L2
VUT 200 H mini EC	99	278	200	121	192	431	84	191	699	640	600
VUT 300 H mini EC	124	278	200	139	139	431	89	296	699	640	600

Model	Dimensions [mm]												
	ØD	B	B1	B2	B3	H	H1	L1	L2	L3	L4	L5	L6
VUT 200 V mini EC	99	278	200	109	169	481	431	640	600	73,5	204	396	526,5
VUT 300 V mini EC	124	278	200	100	178	481	431	640	600	74	210	390	526

Table 2. Technical characteristics

	VUT 200 H mini EC	VUT 200 V mini EC	VUT 300 H mini EC	VUT 300 V mini EC
Supply voltage, 50 Hz [V]	1~ 230		1~ 230	
Max. fan power [W]	2 items x 105		2 items x 105	
Fan current [A]	2 items x 0,9		2 items x 0,9	
Total unit power [W]	210		210	
Total unit current [A]	1,80		1,80	
Max. air capacity [m^3/h]	240		345	
RPM [min^{-1}]	3550		3570	
Noise level 3 m, [dB(A)]	24-45		28-47	
Transported air temperature [°C]	from -25 up to +60		from -25 up to +60	
Casing material	Zinc aluminium		Zinc aluminium	
Insulation	20 mm mineral wool		20 mm mineral wool	
Filter: extract/supply	panel G4 type		panel G4 type	
Replaceable filter*	SF VUT mini G4		SF VUT mini G4	
Summer block*	VL VUT mini		VL VUT mini	
Connected air duct diameter [mm]	Ø100		Ø125	
Weight [kg]	30		30	
Heat recovery efficiency	up to 85%		up to 85%	
Heat exchanger type	Cross flow		Cross flow	
Heat exchanger material	aluminium		aluminium	
*extra replaceable filter sets and summer blocks are the specially ordered items and are available upon separate order				

SAFETY REQUIREMENTS

Installation and operation of the unit shall be performed in accordance with the present user's manual as well as the provisions of all the applicable local and national construction, electrical and technical codes and standards.

The unit is classified as a class I electric appliance.

The unit must be grounded!

Before connecting the unit to power mains make sure that the unit is free of any visible damages or any other foreign objects inside the casing that can damage the impeller blades.

Mounting and connection of the unit to power mains only by duly qualified electricians with valid electric work permit!

The unit is not rated for operation in an environment that contains toxic or aggressive substances as acids, alkalis, organic solvents, soot, paint as well as sputtered particles of explosive or aggressive substances. The unit is not rated for use in areas where atmospheric conditions are determined by sea climate or hot springs.

DISCONNECT THE UNIT FROM POWER SUPPLY PRIOR TO MOUNTING, MAINTENANCE, CONNECTION AND REPAIR WORKS!

DO NOT!

- **DO NOT OPERATE THE UNIT BEYOND THE SPECIFIED TEMPERATURE RANGE OR IN AN AGGRESSIVE AND EXPLOSIVE MEDIUM!**
- **DO NOT CONNECT CLOTHES DRYERS OR SIMILAR EQUIPMENT TO THE VENTILATION SYSTEM!**
- **DO NOT OPERATE THE UNIT IN THE AIR AND DUST MIXTURE MEDIUM!**

DESIGN AND OPERATING LOGIC

The unit has the following operating logic, fig. 2:

Warm stale extract air from the room flows through the air ducts to the unit, where it is filtered, then air flows through the heat exchanger and is exhausted outside by the extract fan through the air ducts.

Clean cold air from outside is moved by the supply fan to the unit, where from it is directed to the supply filter. Then filtered air flows through the heat exchanger and moves to the room through the air ducts.

Heat energy of warm extract air is transferred to clean intake fresh air from outside and warms it up. Heat recovery minimizes thermal energy losses, energy demand and operating costs for air heating accordingly.

The air handling unit construction includes specially designed and sealed service panels for repair and preventing operations. The terminal block on the side panel incorporates a terminal block. Power and ground cables are connected to the terminal block through the sealed electric lead-ins.

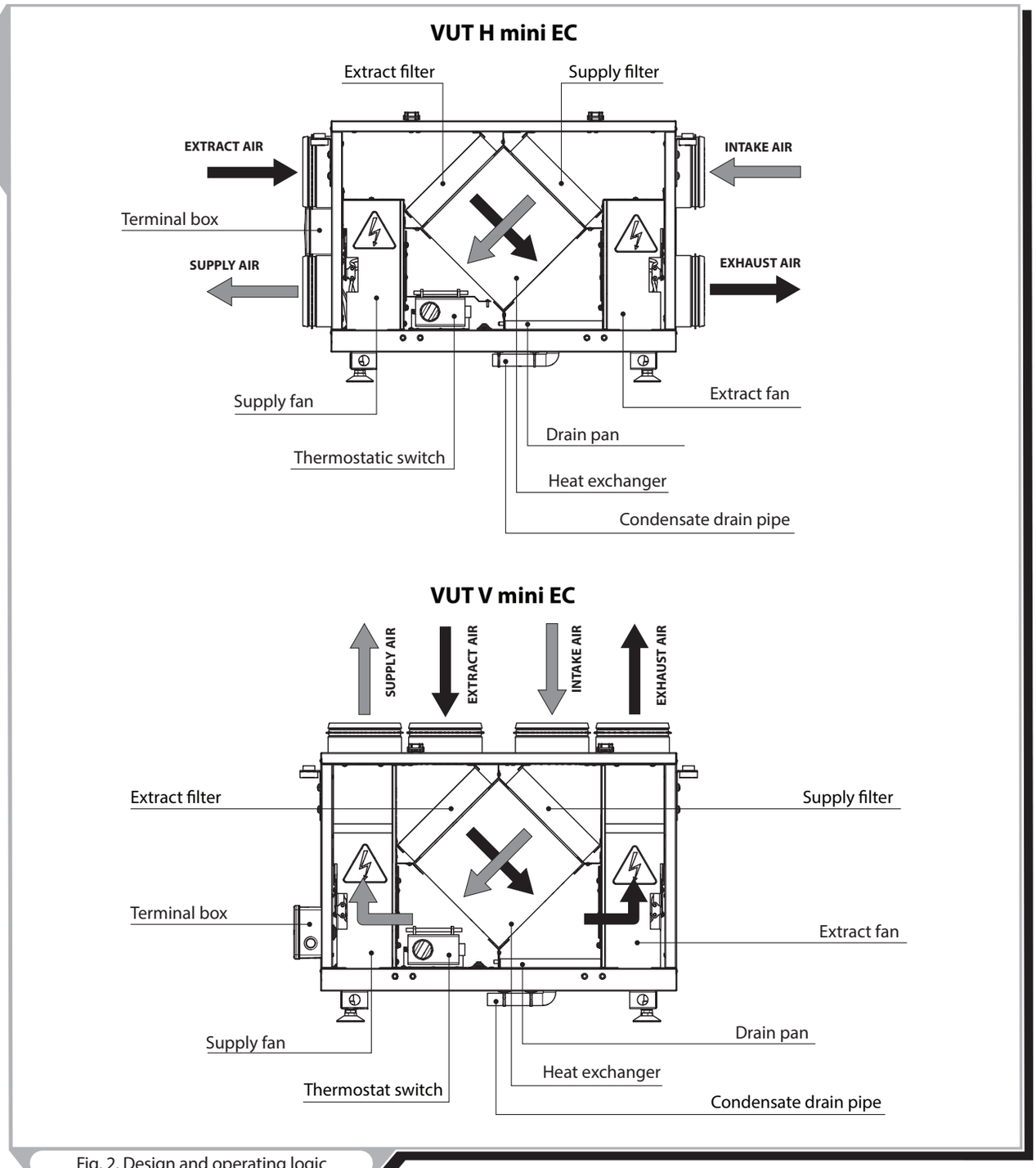

Fig. 2. Design and operating logic

The unit is designed for suspended mounting by means of the threaded rod fixed in the threaded dowel pin. The unit is also suitable for rigid fixation on a horizontal plane, fig. 3.

While mounting the unit provide the minimum required access to the unit for maintenance and repair. The required minimum distances from the unit to the wall is shown in fig. 3-5.

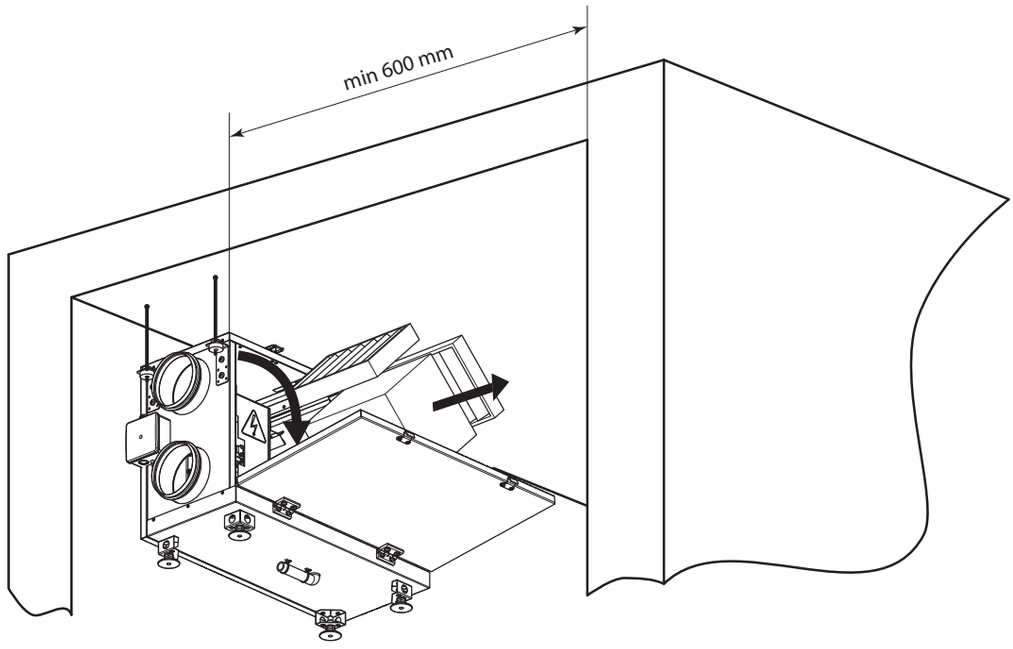

Fig. 3. Minimum distance for service access

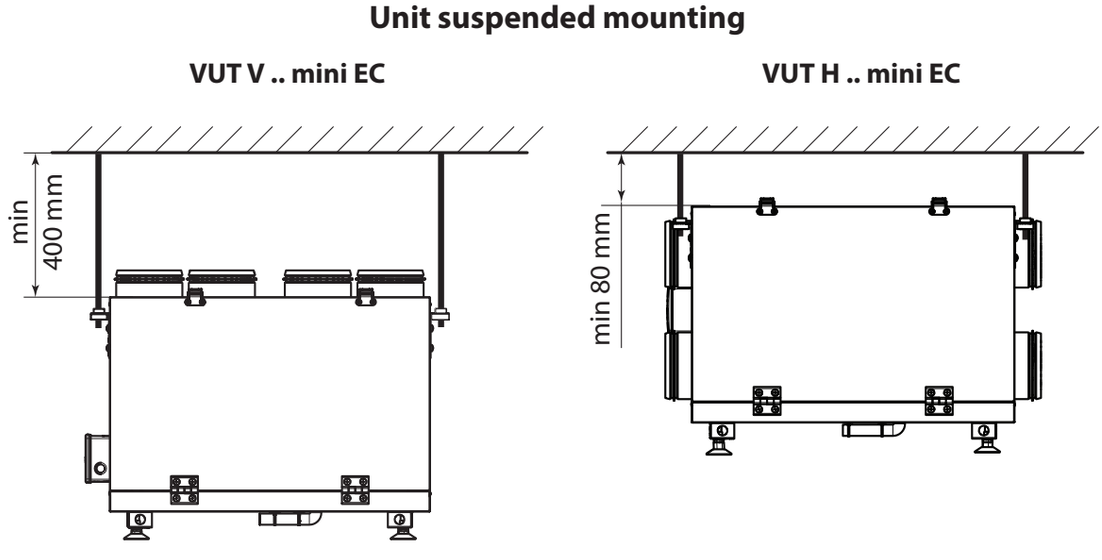

Fig. 4. Unit suspended mounting

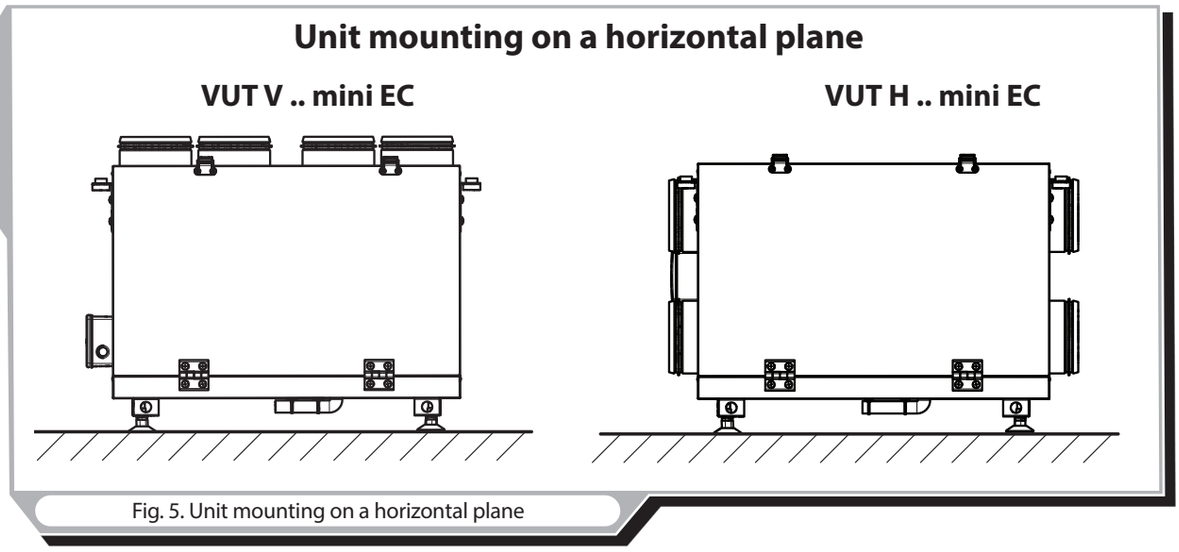

Fig. 5. Unit mounting on a horizontal plane

Safety precautions:

The unit is designed for mounting on a rigid and stable structure. Prior to mounting check the technical specifications and the unit weight.

The unit is mounted with anchor bolts. Make sure that a mounting construction has sufficient load capacity matching the unit weight. Otherwise reinforce an installation place by beams, etc. Then insert the threaded rods fixed inside the threaded expansion anchors in the ceiling. If the threaded bolts used for the unit mounting are too short the unit can generate abnormal noise and resonate with the ceiling.

While mounting the unit ensure enough access for the unit servicing and provide an inspection hole for servicing of the filters, heat exchangers and the fans. Each unit must be serviced by the individual hole. For more details, refer to the outline drawing, fig. 1.

Install M8 anchor bolts. Install an anchor bolt M8 into the fixation for the ceiling suspension mount and fix it with nuts and washers.

Make sure of no foreign objects (e.g., foil or paper) inside the unit casing before installation.

If the fastening bolts used for the unit mounting are too short, the unit may generate abnormal noise and resonate with the ceiling.

If the unit connection place to the spiral seam duct is supposed to be the source of abnormal noise, install a flexible air duct instead of the flexible one. Normally this measure is enough to troubleshoot the resonance.

Optionally the flexible connectors may also be used to prevent resonating.

Access to the unit must be prevented by installing a protecting grille or any other device with the mesh width up to 12.5 mm.

CONDENSATE DRAINAGE

The unit must be connected to sewage system, fig.6. Connect the pipe, U-trap (not included in delivery package) and sewage collection system with metal, plastic or rubber connecting pipes. The pipe slope downwards must be at least 3°. Fill up the system with water before connecting the unit to the power mains! The U-trap must be filled with water at all times during the unit operation. Make sure that the water flows freely into the sewage collection system or otherwise condensed water may build up in the unit during the heat exchanger operation.

The condensate drainage system is designed for normal operation in premises with air temperatures above 0 °C.

If the expected air temperatures are below 0 °C the condensate drainage system must be equipped with heat insulation and pre-heating facilities.

DO NOT CONNECT SEVERAL DRAIN PIPES FROM SEVERAL AIR HANDLING UNITS TO ONE U-TRAP!

DIRECT CONDENSATE OUTSIDE WITHOUT CONNECTION TO DRAIN SYSTEM IS NOT ALLOWED!

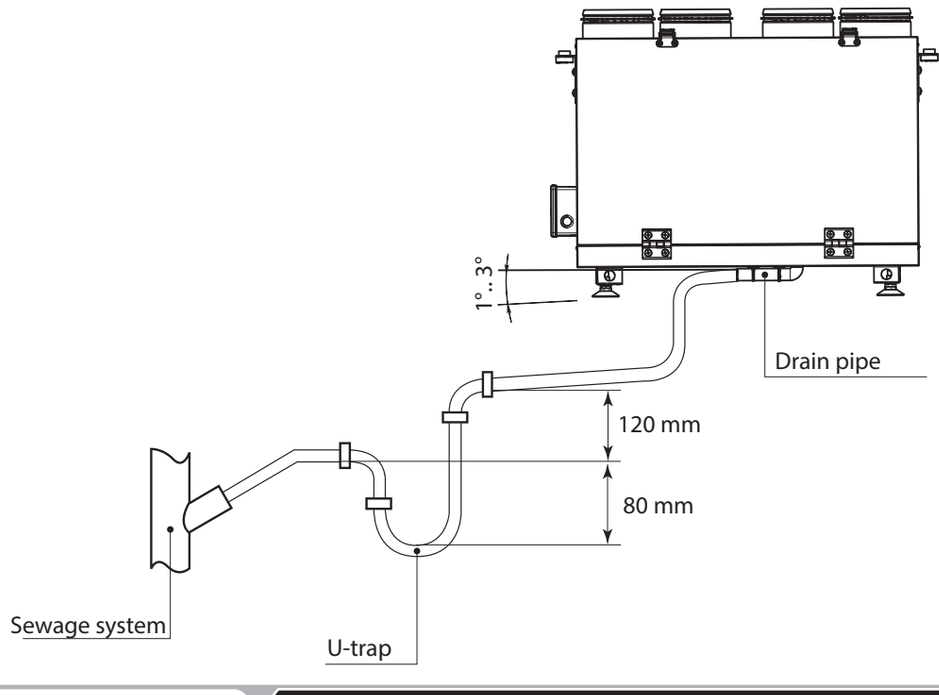

Fig. 6. Condensate drainage

CONNECTION TO POWER MAINS

THE POWER MAINS CONNECTION SHALL ONLY BE PERFORMED BY QUALIFIED PERSONS AFTER CAREFUL STUDY OF THE USER'S MANUAL.
THE UNIT IS INTENDED FOR AC MAINS SUPPLYING THE VOLTAGE COMPLIANT WITH THE TECHNICAL SPECIFICATION CHART.
CHECK THE CABLE FOR CHOKING.
DO NOT SWITCH ON THE UNIT IF THE CABLE IS DAMAGED. NEVER UNPLUG THE UNIT FROM THE SOCKET WITH WET HAND OR BY HOLDING THE ELECTRIC CABLE.
DISCONNECT THE UNIT FROM POWER SUPPLY PRIOR TO ANY OPERATIONS WITH THE UNIT!
THE RATED ELECTRICAL PARAMETERS OF THE UNIT ARE GIVEN ON THE MANUFACTURER'S LABEL. ANY TAMPERING WITH THE INTERNAL CONNECTIONS IS PROHIBITED AND WILL VOID THE WARRANTY.

The unit is rated for connection to single-phase ac 230 V / 50 Hz power mains. The connection must be made using durable, insulated and heat-resistant conductors (cables and wires) with min. cross section 0.75 mm^2.

The given conductor sections are for reference only. The conductor section selection shall account for the wire type, maximum permissible wire heating, insulation, length and installation method.

Use only copper core wires.

The unit must be properly earthed.

Connect the unit to power mains on the terminal block located in the terminal box in compliance with the wiring diagram and terminal marking, fig. 7. Connect all the control and power cables in compliance with the terminal marking!

The terminal marking is shown inside of the terminal box. The unit terminal clamps are marked according to the marking on the wiring diagram.

Route the wires to the terminal box through the cable gland on the unit side panel to preserve the electrical protection class.

Connect the unit to power mains through the external automatic circuit breaker with magnetic trip integrated into the fixed wiring system with the rated current not below the rated current consumption (above 2.5 A).

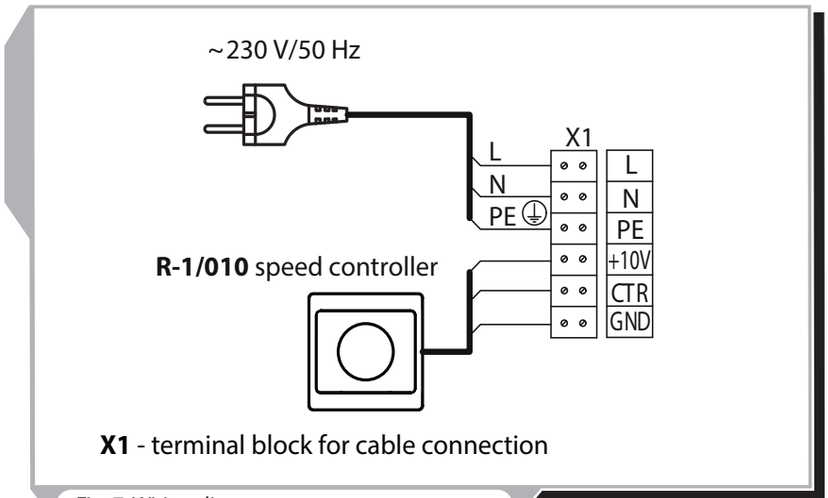

Fig. 7. Wiring diagram

UNIT CONTROL

Smooth speed control is performed with the R-1/010 speed controller, hereinafter the speed controller, fig. 8.

The speed is controlled from minimum to maximum value by rotating the control dial.

Install the speed controller in an easy operated place. The speed controller is pre-wired to the terminal block located in the terminal block on the unit side panel in compliance with fig. 8.

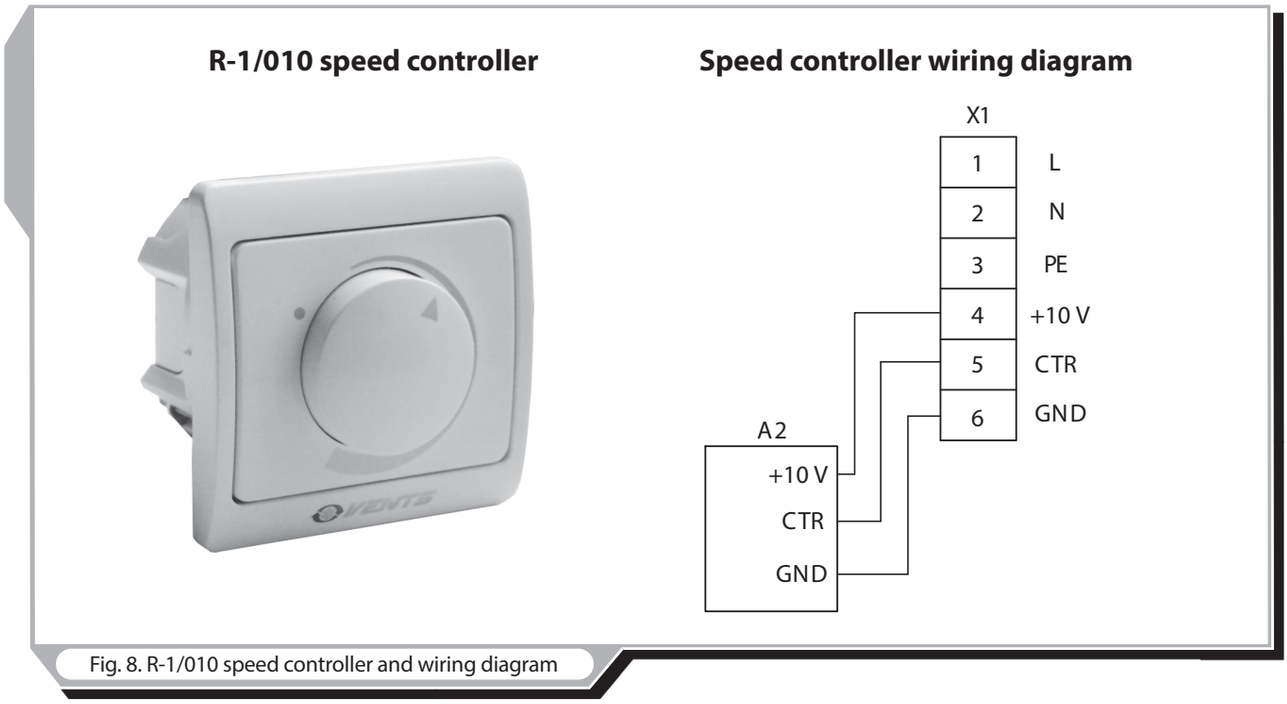

Fig. 8. R-1/010 speed controller and wiring diagram

The freeze protection thermostat is installed in the exhaust air duct downstream of the heat exchanger. In case of a freeze danger the thermostat switches the supply fan off and the heat exchanger is warmed up with warm extract air flow, fig. 2. Rotate the thermostat control dial to set the operation temperature of the thermostat sensor. The thermostat set point is selected individually depending on the unit operating specifics.

The recommended thermostat operating temperature is +3 °C (factory setting).

MAINTENANCE

The unit must undergo technical maintenance 3 to 4 times a year. Maintenance includes general cleaning of the unit and the following operations:

1. Filter maintenance (3-4 times per year).

Contaminated filters increase air resistance thus impairing supply air delivery into the premises. The filters should be cleaned as they get dirty, but at least 3-4 times a year. Clean the filter with a vacuum cleaner or replace the worn filter with a new one. For new filters contact your Seller.

2. Heat exchanger maintenance (once per year).

Even regular technical maintenance may not completely prevent dirt accumulation on the heat exchanger casing. Clean the heat exchanger on a regular basis to ensure high heat recovery efficiency. To clean the heat exchanger remove it from the unit and wash with warm neutral detergent solution. Re-install the dry heat exchanger into the unit.

Removing of the filters and the heat exchanger is as following:

- make sure the unit is disconnected from power mains;
- undo two clips that fix the front panel to open the unit, fig. 9.1. The hinged panel is opened, fig. 9.2.
- remove the filters, fig. 9.3.
- remove the heat exchanger, fig. 9.4.

3. Fan maintenance (once a year).

Even regular technical maintenance of the filters may not completely prevent dirt accumulation in the fans which reduces the fan capacity and impairs supply air delivery into the premises. Clean the fans with rugs or a soft brush. Do not use water, aggressive solvents or sharp objects as they may damage the impeller.

4. Condensate drain check (once a year).

The condensate drain (line) may get clogged by dirt and dust particles contained in the exhaust air. Check the drain line operation by filling the drain pan under the unit with water, clean the U-trap and the drain line, if necessary.

5. Fresh air supply duct check (twice a year).

The supply duct grille may get clogged with leaves and other objects reducing the unit performance and supply air delivery. Check the supply duct grill twice a year and clean it as required.

6. Duct system check (every 5 years).

Even regular fulfilling of all the prescribed above maintenance operations may not completely prevent dirt accumulation in the air ducts which reduces the unit capacity. The air duct maintenance includes their periodic cleaning or replacement.

7. Maintenance of the exhaust louve shutters and supply diffusers (as required).

Remove the disc valves and the louvre shutters and wash those with warm detergent solution. Do not change the positions of the disc valves and the louvre shutters.

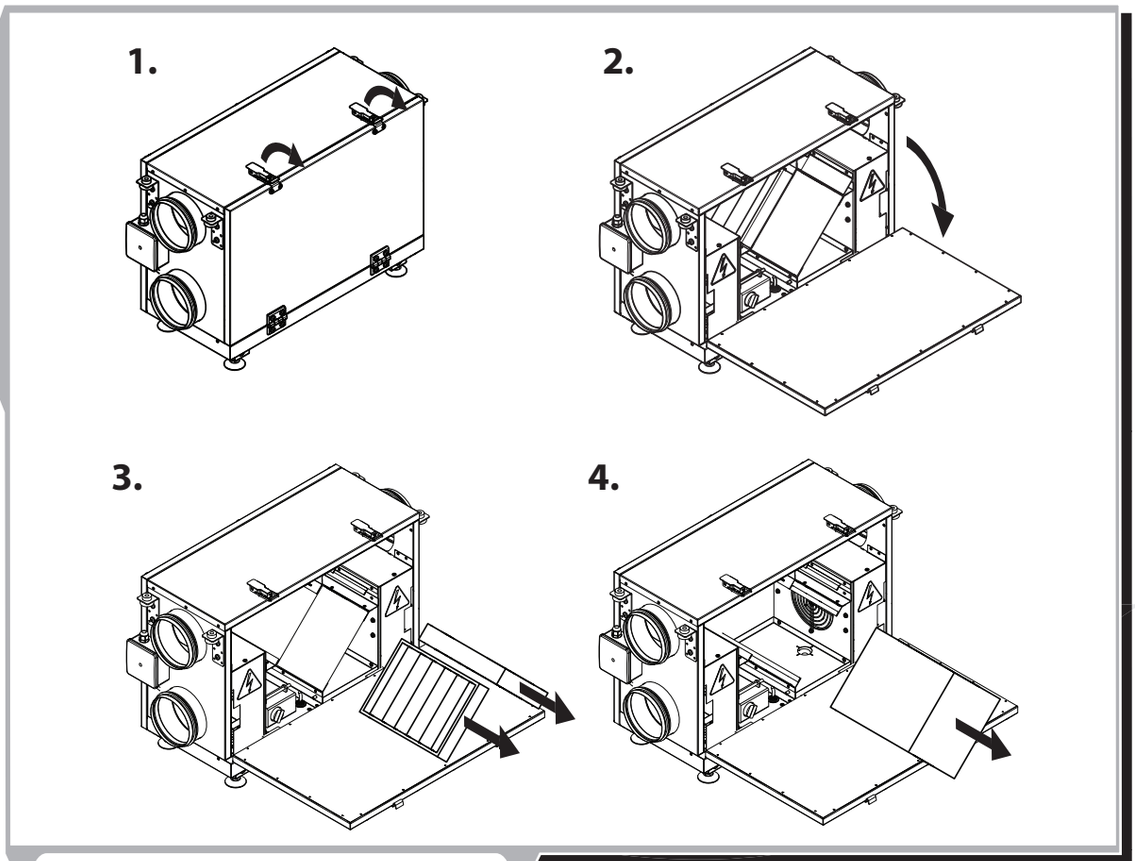

Fig. 9. Unit maintenance

TROUBLESHOOTING

Table 3

Possible faults and troubleshooting

Fault	Possible reasons	Fault handling
The fan does not start up during the unit start-up.	No power supply.	Make sure that the unit is properly connected to power mains and make any corrections, if necessary.
	Motor is jammed, the impeller are clogged.	Turn the unit off. Troubleshoot the motor jam and the impeller clogging. Clean the blades. Restart the unit.
Automatic switch tripping following the unit turning on.	Overcurrent resulted from short circuit in the electric circuit.	Turn the unit off. Contact the service centre.
Low air flow.	Low set fan speed.	Set higher speed.
	The filters, the fans or the heat exchanger are dirty.	Clean or replace the filter, clean the fans and the heat exchanger.
	The ventilation system components (air ducts, diffusers, louver shutters, grilles) are clogged or damaged.	Clean or replace the ventilation system components, such as air ducts, diffusers, louver shutters, grilles.
	The air dampers, diffusers or the louvre shutters are closed.	Make sure the air dampers, diffusers or the louvre shutters are fully opened.
High noise, vibration.	The impeller(s) are soiled.	Clean the impeller(s).
	The screw connection is too loose.	Tighten the fan or casing screw connection against stop.
	No anti-vibration dampers.	Install anti-vibration rubber mounts.
Water leakage.	The drain pipe is clogged, damaged or wrong mounted.	Clean the drain line, if necessary. Check the drain line slant, inspect the U-trap and make sure the drain line is equipped with frost protection.

STORAGE AND TRANSPORTATION RULES

Store the unit in the manufacturer's original packing box in a dry ventilated premise at the temperatures from +10 °C up to +40 °C.

Storage environment must not contain aggressive vapours and chemical mixtures provoking corrosion, insulation and sealing deformation.

Use hoist machinery for handling and storage operations to prevent the unit damage. Fulfil the handling requirements applicable for the applicable freight type.

Transportation with any vehicle type is allowed provided that the unit is protected against mechanical and weather damage. Avoid any mechanical shocks and strokes during handling operations.

MANUFACTURER'S WARRANTY

The manufacturer hereby warrants normal operation of the unit over the period of 24 months from the retail sale date provided the user's observance of the transportation, storage, installation and operation regulations.

In case of no confirmation of the sales date the warranty period is calculated from the manufacturing date.

In case of failures in the unit operation during the warranty period the manufacturer will accept reclamations and complaints from the owner of the device only after receiving technically sound act with detailed description of the failure.

Unit damage as a result of unauthorized tampering with the circuit diagram is not a warranty case.

For warranty and post-warranty services of the unit please contact the product manufacturer.

In case of warranty claim please submit the present user's manual with the seller's stamp, filled connection certificate and warranty card.

Warranty repair services and post-warranty services are fulfilled at the manufacturing facility.

WARRANTY CLAIMS ARE ACCEPTED WITH THIS USER'S MANUAL AND FILLED CONNECTION CERTIFICATE ONLY.

THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY MECHANICAL OR PHYSICAL DAMAGES RESULTING FROM

THE MANUAL REQUIREMENTS VIOLENCE, THE UNIT MISUSE OR GROSS MECHANICAL EFFECT.

FULFILL THE REQUIREMENTS SET IN THE USER'S MANUAL TO ENSURE PROPER FUNCTIONING OF THE UNIT.

ACCEPTANCE CERTIFICATE

The air handling unit with heat recovery VUT _____ mini EC

has been duly certified as serviceable.

The product 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. Assessment of compliance of the product with the requirements relating to electromagnetic compatibility was based on the above standards.

Acceptance Inspector's Stamp

Date of manufacture_____

Sold by

Name and stamp of trade company

_____

Date of sale_____

CONNECTION CERTIFICATE

This is to certify that the air handling unit VUT _____ mini EC has been connected to power mains pursuant to the requirements stated in the present user's manual by a qualified technician:

Company:_____

Name_____

Date _____Signature_____

_____

_____

WARRANTY CARD

NOTES