VUT mini EC

Operating manual
30637114-016.14 RE

2009

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INTRODUCTION

This operating manual combines technical specification, instruction manual and data sheet, and contains information on installation.
VUT...mini EC ventilation plant with heat recovery of VENTS series (further in the text “VUT...mini EC plant”).

PURPOSE

Ventilation plants with heat recovery - VUT 200 H mini EC, VUT 200 V mini EC, VUT 300 H mini EC, VUT 300 V mini EC - of maximum capacity of 200 m^3/h and 300 m^3/h are designed to secure constant air exchange in mechanically ventilated household and public rooms (private houses, offices, hotels, cafes, conference halls and other premises) and heat recovery of the exhaust air for heating up the supplied clean outdoor air.

VUT...mini EC plants are manufactured in accordance with TU U V.2.5-29.2-30637114-016: 2008.

A typical VUT...mini EC plant is a unit for saving of heat energy by way of heat recovery and is one of the energy-saving technology elements for the premises.

VUT... mini EC plant is a component part and is not subject to be used independently. The transported air shall not contain any combustible or explosive mixtures, vapors of chemicals, coarse dust, soot, fat and media where harmful substances may be formed (poisons, dust and pathogenic bacteria), sticky substances, fibrous materials.

WARNING

This plant is not intended to be used by children, persons with lowered sensory or mental abilities, and also by the persons without appropriate training.
Properly instructed specialists are admitted to work with the plant.
The plant shall be mounted in places preventing any independent access by children.

DELIVERY SET

Delivery set includes:

- VUT …mini EC plant - 1 piece;
- operating manual - 1 piece;
- packing box - 1 piece.

SPECIFICATIONS

VUT …mini EC plants are applied in closed areas with ambient temperature from +1°C to +40°C and relative humidity up to 80%.
By type of protection against electric shock the VUT …mini EC plant refers to devices of Class I.
Degree of protection against access to dangerous components and against penetration of water:
- of motors mounted in the plant is IP 44 (protection against objects bigger or equal to 1.0 mm; splash-proof);
- of the VUT …mini EC plant mounted in the pipeline is IP 22 (protection against objects bigger than 12.5 mm; protected from vertically falling drops of water when the cover is deflected for 15^0).
Nomenclature of VUT …mini EC plants, their basic and mounting dimensions, external view and technical data are shown in figures 1 and 2 and in tables 1 and 2.
Design of VUT …mini ES plants is constantly improved that's why some models may differ insignificantly from those described in this operating manual.

NOMENCLATURE OF THE PLANT

VUT XXX X mini EC

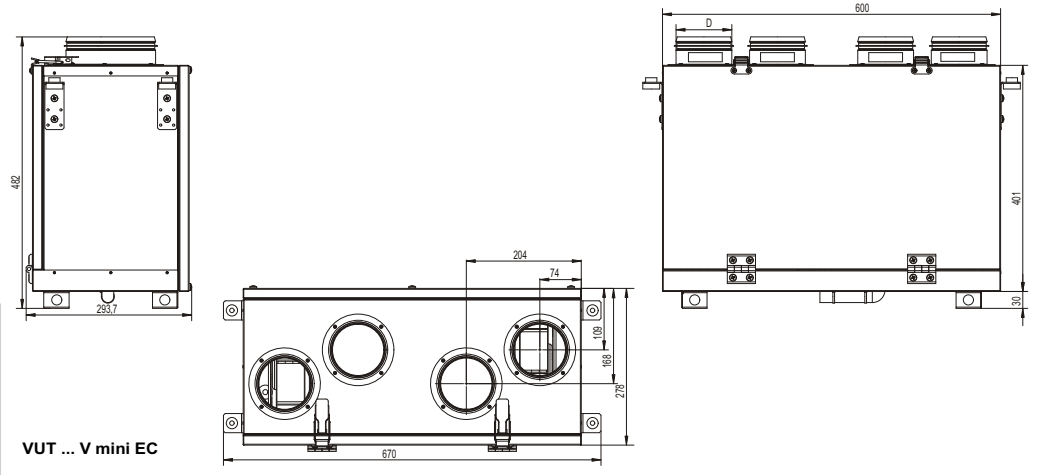
Type of motor:
EC - electronic commutated motor

Position of branch pipes:
H - horizontal
V - vertical

Capacity range, m^3/h:
200, 300

Type of the ventilation plant:
VUT - ventilation with heat recovery

Example:
Ventilation plant with heat recovery of 300 m^3/h capacity, with horizontal position of branch pipes and electronic commutated motor:
VENTS VUT 300 H EC.

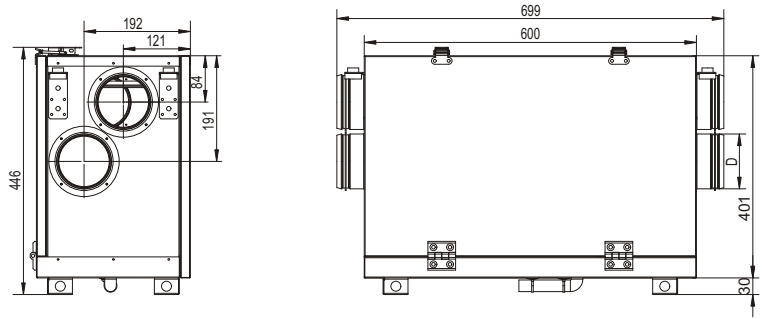


VUT ... V mini EC

Fig. 1

Type	Diameter of branch pipes, mm	Distance between plates of the heat exchanger, mm	Loss of pressure on the heat exchanger, Pa	Efficiency of heat recovery, %	Insulator thickness, mm	Weight, kg
VUT 200 H mini EC VUT 200 V mini EC	100	2,2	20-50	60-80	20	30
VUT 300 H mini EC VUT 300 V mini EC	125	2,2	30-80	55-75	20	30

table 1



VUT ... H mini EC

Fig. 2

Тип	Capacity, m^3/h	Pressure, Pa	Supply voltage, V	Max. capacity of the ventilators, W	Input current, A	Rotation frequency, rpm	Noise level, dBa, 3m	Ambient temperature, C (max.)
VUT 200 H mini EC VUT 200 V mini EC	200	450	230 50 Hz	2x71	0,62	2950	25-45	40
VUT 300 H mini EC VUT 300 V mini EC	300	450	230 50 Hz	2x80	0,7	3300	25-45	40

table 2

SAFETY REQUIREMENTS

When installing and operating the VUT...mini EC plants the requirements of this operating manual, “Rules of Electrical Unit Arrangement”, “Rules of Consumer Electrical Unit Operation”, current building norms and regulations, as well as “Fire Protection Regulations of Ukraine” must be observed.
By type of protection against electric shock VUT...mini EC plants refer to devices of Insulation class 1.
VUT...mini EC plants should be necessarily earthed.
Class of protection against access to dangerous components and against penetration of water is IP 22.
Before connecting a VUT...mini EC plant to the power supply network please make sure that it does not have any visible damages or foreign objects inside the plant that may damage the impeller.
Connection of VUT...mini EC plant shall be performed by a qualified electrician admitted to perform such works.

Mounting, maintenance, connecting and repair of a VUT …mini EC plant shall be performed only after the plant is disconnected from the power supply network.

Don't use VUT …mini EC plants for operation with explosive dust air mixture.

Operation of VUT …mini EC plants beyond the temperature range specified in this operating manual, as well as in the rooms with aggressive impurities in the air and in explosive environment.

Connection of a dryer and other similar equipment to the ventilation network.

DESIGN AND FUNCTION

The basic model of a VUT …mini EC plant consists of:
- two radial ventilators (supply 1 and exhaust 2) with backward-curved impeller blades and electric motors with external rotor and built-in thermal protection that do not require any maintenance;
- cross-flow plate-type heat exchanger (3). The plate-type heat exchanger may be replaced with a block for the summer period when heat recovery is not required.
- two filters: supply air filter (4) (efficiency of EU5 or EU7) and exhaust air filter (5) (efficiency of EU3 or EU4).
- condensate drip tray (6);
- relay-thermostat (7).

VUT … H mini EC OPERATION SCHEME

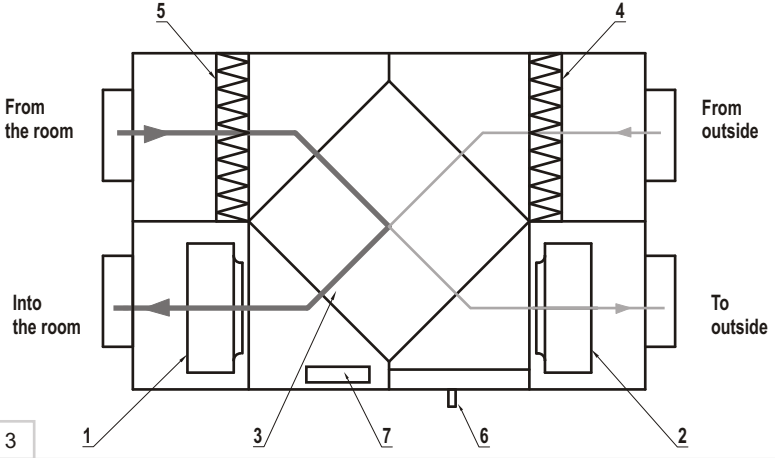


Fig. 3

VUT … V mini EC OPERATION SCHEME

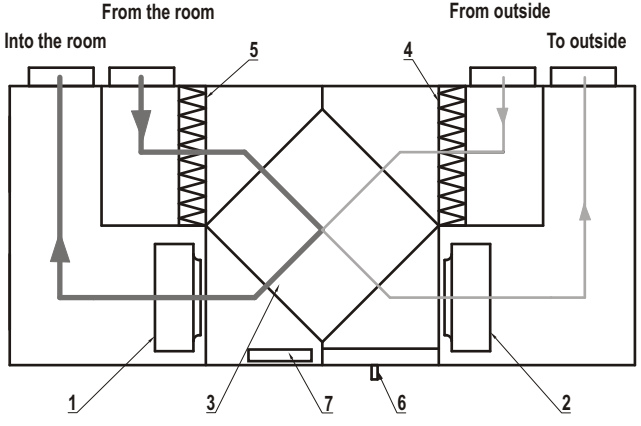
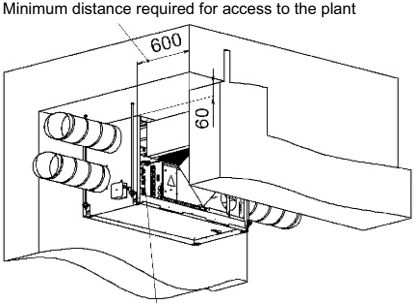


Fig. 4

1. **Supply air ventilator;**
2. **Exhaust ventilator;**
3. **Cross-flow plate-type heat exchanger;**
4. **Supply air filter;**
5. **Exhaust air filter;**
6. **Condensate drip tray;**
7. **Thermostat relay.**

INSTALLATION AND PREPARATION FOR OPERATION

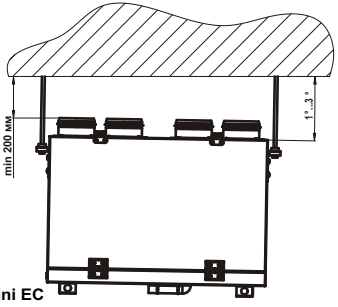
VUT...mini EC plants should be mounted so that to enable an easy access to them for maintenance and repair.
The plant can be either suspended to the ceiling on a threaded rod fixed in a thread expansion bolt (fig. 5, 6, 7) or can be rigidly fixed horizontally (fig. 8, 9).



Location of the electronic control block

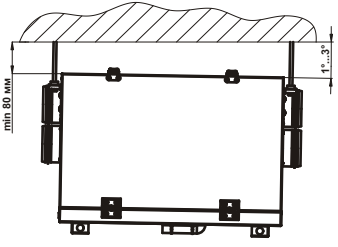
Fig. 5

MOUNTING TO THE CEILING



VUT ... V mini EC

Fig. 6



VUT ... H mini EC

Fig. 7

MOUNTING ON THE FLOOR VUT … V mini EC

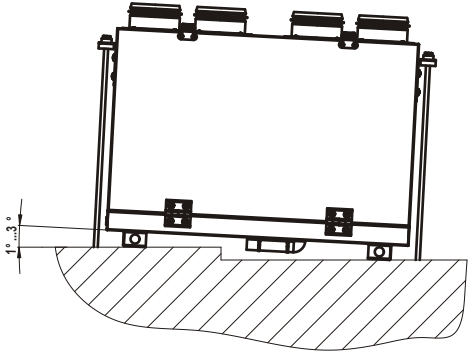


Fig. 8

MOUNTING ON THE FLOOR VUT … H mini EC

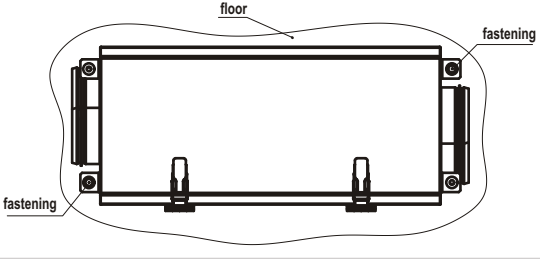


Fig. 9

To achieve best results from application of a VUT...mini EC plant, it is necessary to install it in such way that there is a direct section of the air duct not less than 1m long in front of and behind the plant.
If a VUT...mini EC plant is installed at the entry/exit of the air duct, it should be equipped with a grid (cell size of not more than 12.5 mm) or with another device preventing easy access to ventilators of the VUT...mini EC plant.

CONDENSATION DRAINAGE

VUT...mini EC plant is mounted with a slope of 2-3^0 towards the condensation drain pipe. Connect the heat exchanger, siphon and collecting system with pipes (metal, plastic or rubber). Pipes shall have a not less than 3^0 incline downwards
(1 meter of the pipe shall be inclined downwards by 55 mm).

WARNING

Before turning on the plant, fill in the system with water (the siphon should be always filled with water). Make sure that water passes to the collecting system, otherwise operation of VUT …mini EC may cause an overflow of water.
The condensate drain system may be used in rooms, where the temperature is above 0^{0}C! In case the temperature is below 0^{0}C, then the condensate drain system should be insulated or equipped with heating

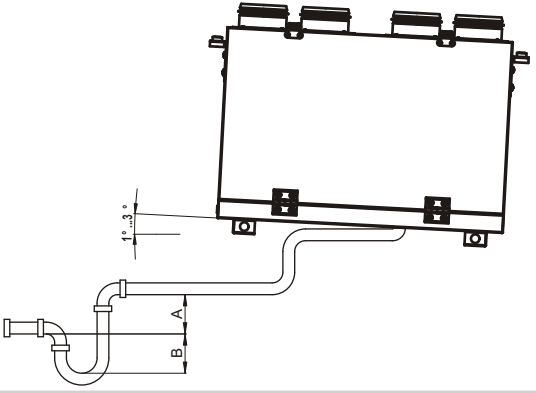


Fig. 10

Due to the reduced pressure inside the plant caused by the use of suction ventilators, it is important to correctly install the water damper (fig.10).
In this very case of 600 Pa maximum pressure, values A are about 120 mm and B are about 80 mm.

SCHEME OF CONNECTION TO THE POWER SUPPLY NETWORK

Before conducting any works in a VUT …mini EC plant it must be disconnected from the electric power source. Connecting of the plant to the network shall be performed by a qualified electrician. Rated values of electric parameters of the VUT …mini EC plant are specified on the label of the manufacturing factory. Any changes in internal connection scheme are prohibited and will result in a loss of warranty.

VUT …mini EC plant shall be supplied with single-phase alternating current of 220-240V / 50-60Hz. The plant should be connected with insulated, solid and thermostable conductors (cable, wires) of appropriate cross-section (not less than 0.75 mm^2).
Commutation of a VUT …mini EC plant shall be done in a terminal block in accordance with the electric wiring diagram and symbol marking of terminals shown in fig. 11.
Plan of terminal symbols is affixed inside the terminal box.
Marking of terminal clamps of the plant corresponds to their marking in the wiring diagram.
Connection of conductors to the terminal box fixed to the side wall of the plant is made through a pressure seal in the wall of the box in order to preserve the class of electric protection. Connecting of the plant to a single-phase supply network shall be done via an automatic switch with electromagnetic tripper (nominal current of not less than 2.5A) that is built in the stationary network.

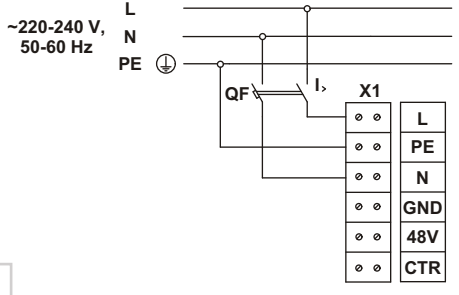


Fig. 11

where:
QF - external automatic switch,
X1 - terminal box for connection of wires of the electric network.

PRINCIPLE OF OPERATION AND SYSTEM CONTROL

Principle of operation of a VUT …mini EC plant is as follows:

Dusty warm air from the room comes through the air ducts into the VUT …mini EC plant, where it is filtered, then it goes though the heat exchanger and is blown to the outside with the help of the exhaust ventilator. Fresh cold air from the outside comes through the air ducts into the VUT …mini EC plant, where it is filtered, and then it goes through the heat exchanger and is blown into the room with the help of the supply air ventilator.
The heat exchanger serves for exchange of heat energy of the dusty warm air going out of the room and the fresh cold air coming in from the outside. This reduces the loss of heat energy and results in saving of costs for heating the rooms during the cold period of year. Air consumption in the VUT …mini EC plant is controlled with a stepless P-1/010 regulator (further in the text “regulator”).
Control ranges from zero to maximum position depending on the needs.
External view of the regulator is shown in fig.12.

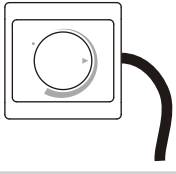


Fig. 12

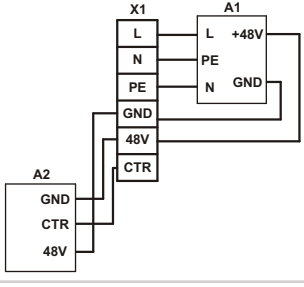


Fig. 13

The regulator is installed in an easy for control place. Initially it is connected by the manufacturing factory to the terminal box installed on the side wall of the plant in accordance with the diagram (fig.13). Power supply unit A1 provides the supply of 48V direct voltage, and is delivered together with the plant and connected by the manufacturing factory (fig.13).

To protect of the heat exchanger from freezing in the cold period of the year (supply air ventilator for heating up the heat exchanger with warm air flow from the room is switched off), a thermostat relay is built inside the case (fig. 3, 4). The thermostat relay is controlled manually by turning the regulating handle to the required minimum value of the thermostat sensor response. Values of response are selected individually depending on the area of operation of the VUT …mini EC plant.
Recommended setup value for the thermostat sensor is +3°C (default setting).

MAINTENANCE

Maintenance of the VUT ...mini EC plant shall be performed 3-4 times per year.
In addition to common cleaning, it is necessary to fulfill the following works:

1. Service to filters.
Dirty filters increase resistance of air in them and, therefore, less air is supplied into the room. Filters need to be cleaned as they become dirty. They may be cleaned with a vacuum cleaner or replaced. After the filter has been cleaned for three times, it should be replaced with a new one (1-2 times per year). To purchase a new filter, please contact your local vendor.

2. Check-up of the heat exchanger (once per year).
Even if you follow instructions of the above paragraph 1, the dust will accumulate on the heat exchanger block. In order to keep high degree of heat exchange the heat exchanger must be periodically removed and cleaned. Wash it with warm soap water or dish-washing detergents.

3. Inspection of ventilators (annually).
Even if the recommended service like cleaning and replacement of filters is done, the ventilators may accumulate dust. This may decrease their efficiency. The ventilators shall be cleaned with rags or soft brush without water or abrasive washing materials, as well as sharp objects and aggressive solvents that may damage the impellers.

4. Check-up of condensation drainage (once per year).
The condensation drainage (drain line) can be soiled with particles from the exhaust air. Check the drain line by pouring water into it for good passage to the condensate drip-tray at the bottom of the VUT ...mini EC plant. Clean the hydraulic seal and drain line if necessary.

5. Check for fresh air intake.
The grid of the supply air ventilator can be littered with tree leaves or other objects, and air intake will decrease. Examine the supply grid twice a year and clean, if necessary.

6. Check of the air duct system (every 5 years).
Even if the filters are replaced regularly, the dust may accumulate inside the air duct system. This will decrease the efficiency of the ventilation system. Air ducts shall be cleaned and replaced from time to time. Rigid metal ducts can be cleaned by pushing through the holes for diffusers or special service doors (if any) with a brush soaked in hot soap water.

TROUBLE-SHOOTING

In case of failures, please check the following before making a call to the service centre:

Failure	Possible cause	Remedy
Ventilator (ventilators) does not start.	No connection to the power supply network.	Make sure that the plant is correctly connected to the power supply network, or eliminate the connection error.
Incoming air is cold	Exhaust filter is littered.	Clean or replace the exhaust filter.
	Heat exchanger is ice-coated.	Check the heat exchanger for ice inside; if necessary, switch off the VUT …mini EC plant and wait till the ice is melted.
Low air consumption	Filters, ventilators or heat exchanger are dirty.	Clean or replace filters; clean ventilators and heat exchanger
	Ventilation system is soiled or damaged.	Check the opening of diffusers and shutters, check the exhaust hood and supply air grid, clean them, if necessary; make sure the air ducts are not soiled or damaged.
Noise, vibration	Ventilator impellers are soiled;	Clean the ventilator impellers.
	Screw connections are loose.	Remove the ventilator and check screw connections for tightness. Make sure that vibration dampers are installed.
Water leak	Drain line is soiled, damaged or installed incorrectly.	Clean the drain line, if necessary. Check for the incline of the drain system, check the hydraulic seal and if the drainage system is protected from freezing.

STORAGE AND TRANSPORTATION

VUT ...mini EC plants shall be stored in the factory packing in a ventilated room at temperature from +10°C to + 40°C and relative humidity of maximum 60% (at +20°C). Vapors and admixtures in the ambient air that may cause corrosion, damage the insulation or affect leakproofness of the connections are not allowed.
Use lifting devices for unloading and in the warehouse operations to avoid damaging of the equipment from falling or vibrations.

Transportation by any vehicle is allowed provided that the equipment is protected from mechanical damage and atmospheric precipitations.
Loading and unloading works shall be done with care to avoid shocks and knocks.

MANUFACTURER'S WARRANTY

The manufacturer guarantees stable work of the VUT ...mini EC plant within 2 years from the date of sale through the retail distribution network provided that transportation, storage, mounting and operation instructions have been observed.

In case of the note about the date of sale is absent, the warranty period will be counted from the date of manufacture.

In case of failures in the work of the VUT ... mini EC plant within the warranty period, the manufacturing company will accept claims from the customer only on condition that the customer provides technically grounded statement about the character of such failure.
In case of any unauthorized changes in the electrical circuit made by the customer, the warranty shall be considered invalid and free service shall be no more available.

RECLAMATIONS WILL NOT BE ACCEPTED WITHOUT SUBMITTING THIS OPERATING MANUAL AND COMPLETED CERTIFICATE OF COMMISSIONING.

WARNING

WARNING

The MANUFACTURER is not liable for damages resulting from misuse of the VUT ...mini EC plant or in case of gross mechanical interference.
Buyer of the VUT ...mini EC plant shall follow the instructions of the manual.

ACCEPTANCE CERTIFICATE

Ventilation plant with heat recovery VUT _____ mini EC

meets the requirements of technical conditions and is recognized suitable for operation.

Stamp of the acceptance inspector

Date of issue

Sold by

name of the vendor, stamp of the shop

Date of sale

CERTIFICATE OF COMMISSIONING

Ventilation plant with heat recovery VUT _____ mini EC is connected to the power supply network pursuant to the requirements of this Operating manual by:

Surname, name, patronymic _____

Date _____ Signature _____

Surname, name, patronymic _____

Date _____ Signature _____

Surname, name, patronymic _____

Date _____ Signature _____

WARRANTY COUPON

Questions of warranty and post-warranty service shall be addressed to:

_____

_____

_____

_____

_____

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