



reventon
INDUSTRIAL SOLUTIONS

Technical documentation

REKUPERATOR SERIA VERTIC & VERTIC ENTHALPY



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1. INTRODUCTION

Thank you for purchasing a VERTIC series heat recovery unit. Please read this manual carefully and retain it for the reference of all users and operators of the unit.

1.1 GENERAL INFORMATION

The purchaser and user of the Reventon device should read this manual carefully and follow the guidelines contained therein. If you have any questions regarding the content of this manual, please contact the device importer directly, i.e. Reventon Group Sp. z o. o. Contact details are provided on the last page and on the product label.



Recommendations that are crucial for safety reasons are marked with a warning triangle (symbol as on the left).



This will allow you to quickly locate these recommendations and recall them before any intervention in the device. For the same reason, periodic inspection and maintenance requirements for the device are indicated by a wrench symbol (like the one on the left).



All local safety requirements must be taken into account when installing, using or inspecting the heat recovery unit.

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1.2 STORAGE AND TRANSPORT

Store and transport the recuperator in its original packaging, in an environment with a temperature ranging from -20°C to 50°C and relative humidity $\bar{y}$ 80%.

When receiving the device from the transport company, please inspect it for any damage incurred during transport. If such damage is observed, a damage report should be completed in the presence of the delivery person, which will allow for filing a complaint. The damage report should be provided by the delivery company.

1.3 PACKAGE CONTENTS

- VERTIC recuperator
- mounting panel
- extension and plug (condensate drainage)
- user manual

1.4 APPLICATION

The VERTIC ventilation unit provides mechanical ventilation with heat recovery for buildings such as residential houses, public buildings, cafes, warehouses, etc. However, the recuperator cannot be used to pump air containing flammable or explosive substances, chemicals, sticky substances, fibrous materials or soot and oil particles.

The device should also not be installed in places where it would be exposed to excessive humidity (relative humidity above 80%) or the action of dust and water exceeding the resistance of the heat recovery unit to these factors (see IP protection class).

2. DEVICE CHARACTERIZATION

2.1 STRUCTURE AND OPERATION PRINCIPLE

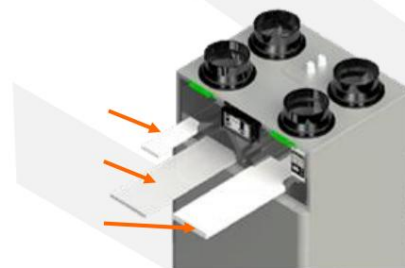
Housing: the outer shell is made of powder-coated steel, and the interior is made of expanded polypropylene (EPP). This ensures good tightness and thermal and acoustic insulation. The front part is removable (separately, the inspection panel at the top and the bottom part allowing access to the heat exchanger and fans).

Counterflow heat exchanger: The device features a heat exchanger made of polystyrene (VERTIC) or an enthalpy, polyethylene-graphene (VERTIC ENTHALPY). Both materials are characterized by high thermal conductivity, very good airtightness and stiffness, and resistance to oxidation and mold.

In the case of the VERTICENTHALPY version, the exchanger also recovers humidity.

Filters: The unit is equipped with three G4 pre-filters. Their function is to pre-clean the air before it is introduced into the rooms (supply filter and bypass filter) and to protect the heat exchanger from contamination (supply and exhaust filter).

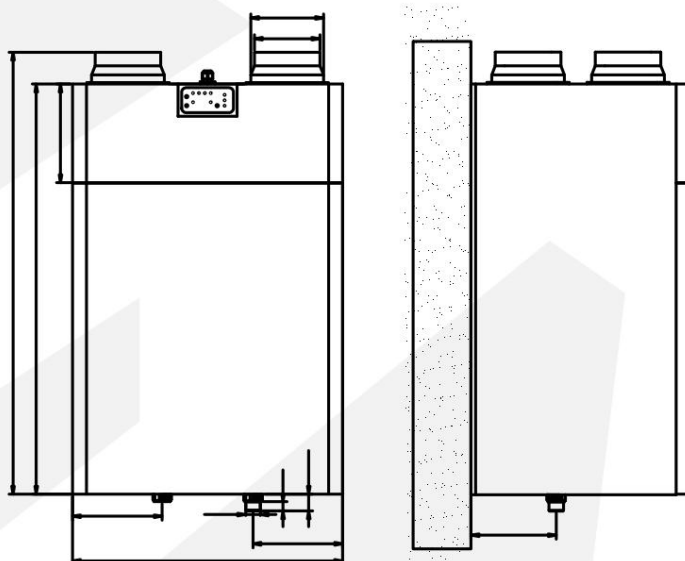
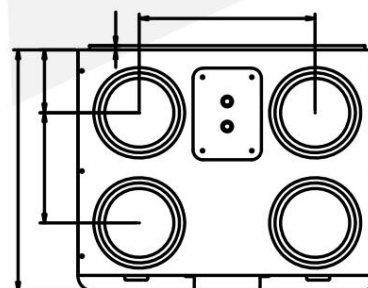
The filter locations for the default connection layout (as per section 4.1) are shown in the graphic below. An optional F7 supply filter is available (product code VERTIC-F7-250-350-2051 or VERTIC-F7-500-2052).



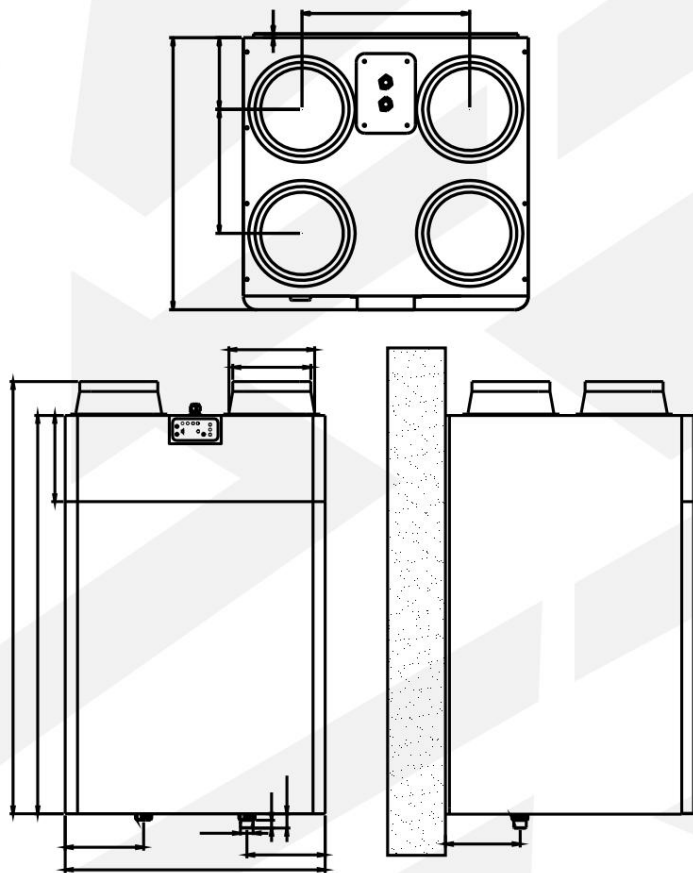
Supply and exhaust fans: Energy-efficient EC fans with five pre-set speeds ensure airflow through the heat exchanger and then through the ventilation ducts. Advanced electronics continuously adjust the fan speed to ensure the most consistent airflow possible (within a resistance range of 0-200 Pa). This is evident in the performance characteristics in section 2.4 (slight performance drops with increasing compression).

2.2 DEVICE DIMENSIONS

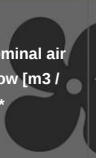
VERTIC 250 i 350 / VERTIC250 i 350 ENTHALPY



VERTIC500 / VERTIC500 ENTHALPY



2.3 TECHNICAL DATA

MODEL	VERTIC 250 / VERTIC 250 ENTHALPY	VERTIC 350 / VERTIC 350 ENTHALPY	VERTIC 500 / VERTIC 500 ENTHALPY
Product code	VERTIC-250-2047/ VERTIC-250E-2321	VERTIC-350-2048/ VERTIC-350E-2322	VERTIC-500-2049/ VERTIC-500E-2323
 5th gear** 4th run 3rd gear 2nd gear And the run	250	350	500
	175	245	350
	145	180	270
	100	130	185
	80	100	105
Temperature efficiency [%]	90% / 83%	87% / 77%	88% / 78%
Enthalpic efficiency [%]	- / 78%	- / 72%	- / 73%
Energy efficiency class [-]**	A	A	A
Voltage [V] / Frequency [Hz]	230 / 50	230 / 50	230 / 50
Rated current [A] In run	1,0	1,9	2,9
Rated motor power [W] 5th gear	137	272	412
IP protection class of the motor [-]	X2	X2	X2
Net Wt. [kg]	40	40	50
Volume [dB(A)]****	35	37	39

* The given flows are predefined flows for runs I - IV, averaged for pressure in the range of 0 - 200 Pa - see characteristics in point 2.4; predefined speeds can be changed as described in section 6.2 (see "Adjusting air flows for gears I - IV")

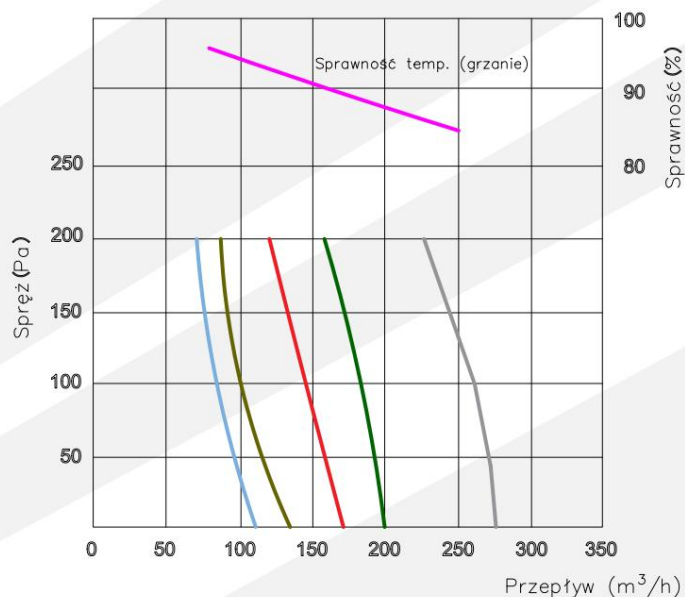
** The fifth gear is the so-called boost used to ventilate rooms, switched on temporarily - see the description of the boost speed in section 6.1

*** according to EU No. 1254/2014

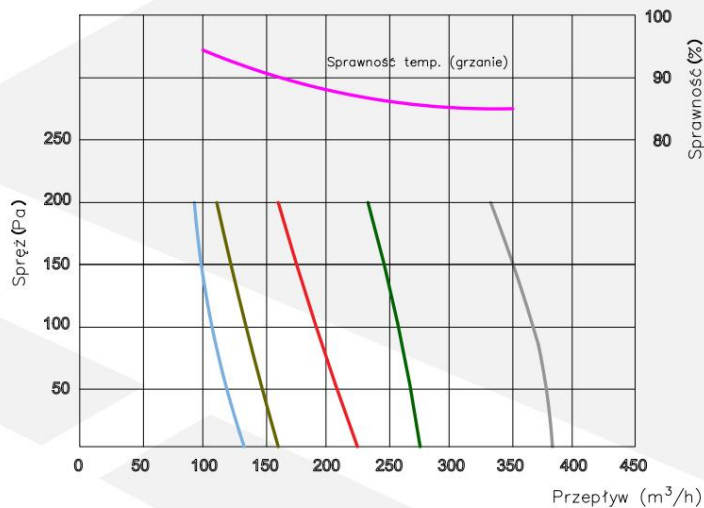
**** measurement at a distance of 1.5 m for a device operating at 4th speed and 50 Pa pressure

2.4 WORK CHARACTERISTICS

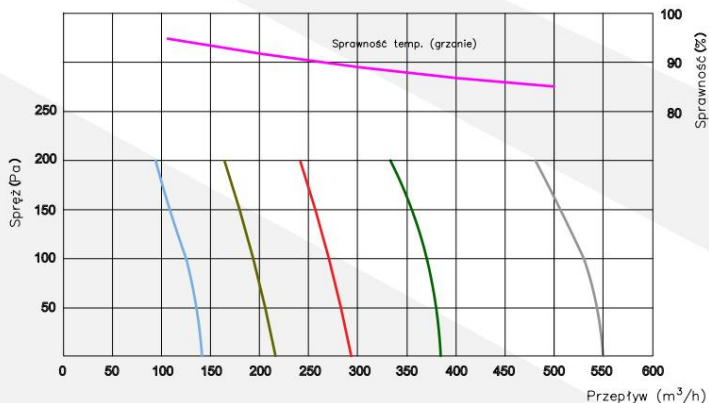
VERTIC 250 / VERTIC250 ENTHALPY



VERTIC 350 / VERTIC350 ENTHALPY



VERTIC 500 / VERTIC500 ENTHALPY



3 ASSEMBLY

3.1 GENERAL RULES



The assembly and disassembly of the device should be performed by persons experienced in installing this type of devices or - if local regulations require it - with appropriate qualifications.



Due to the relatively large weight and dimensions of the fan, the assembly should be performed by at least two people, of which at least one must meet the requirements set out in the previous paragraph.



The persons installing the device are responsible for carry out the assembly in accordance with the recommendations contained in this manual and with the legal provisions in force in a given region.



The heat recovery unit must be leveled to allow for drainage. condensate (see section 3.2).

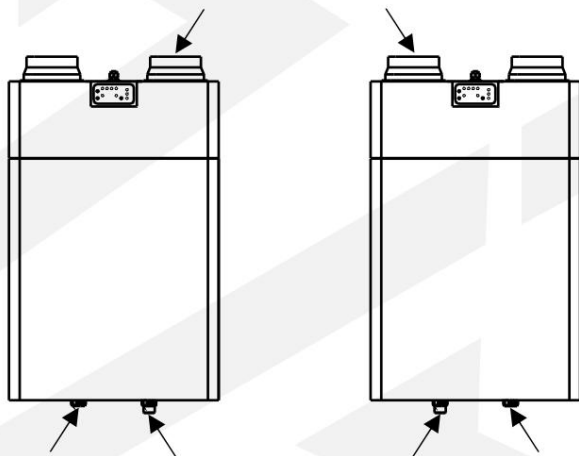
! The heat recovery unit must be mounted to a vertical partition with adequate load-bearing capacity (see unit weight in section 2.3) using the included mounting panel. The inlet/outlet connections must face upwards, and space for the condensate drainage system (from the bottom of the unit) must also be considered.

The distance between the front of the appliance (i.e. the side with the control panel and inspection door) and the nearest obstacle should be at least 600 mm to allow for maintenance of the appliance.

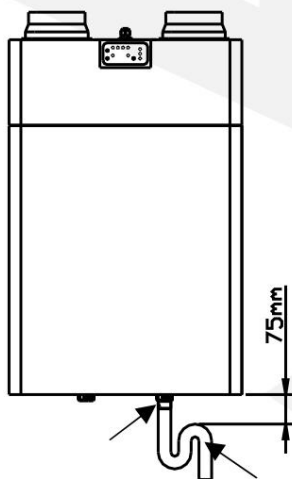
3.2 CONDENSATE DRAINAGE INSTALLATION

The heat recovery unit requires a system to drain condensate generated during operation into the sewer system. This can be accomplished by using one of the two openings located at the bottom of the unit, depending on the selected inlet and outlet configuration.

As shown in the graphic below, screw an extension into one of the holes and connect it to the sewer system. The second hole will not be needed – it should be plugged with the included cap.



A siphon should be installed behind the extension, maintaining the distance shown below, and only then connected to the existing sewage system. Before starting the recuperator, the siphon must be filled with water.



! The condensate drainage system must be installed in accordance with the recommendations contained in this section and the regulations applicable in the given region.

4. INSTALLATION

! Before connecting the heat recovery unit to the ventilation and electrical installation, it must be permanently mounted to the appropriate building partition (according to the recommendations in point 3).

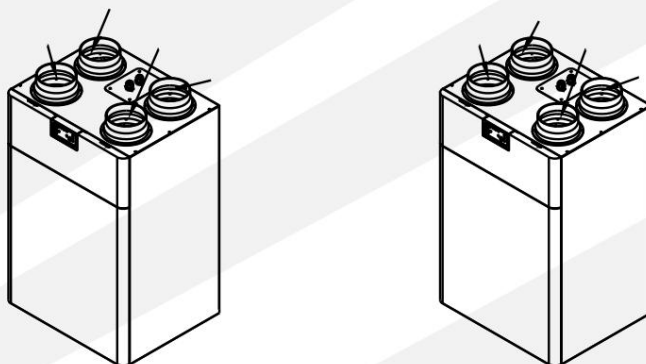
! All installation, repair, and removal work must be performed by qualified personnel, i.e., those with appropriate authorizations for such work. The installer is responsible for completing the installation in accordance with the recommendations contained in this manual and with applicable local regulations.

4.1 CONNECTING TO THE VENTILATION SYSTEM

! The ventilation system must be installed in accordance with good practice and the regulations in force in a given region.

Individual ventilation ducts should be routed to fit one of the two available inlet and outlet spigot configurations – see the graphic below. The spigot configuration can be changed using the advanced control panel (see "Changing the inlet and outlet spigot configuration" in section 6.2). By default, the configuration on the left side of the graphic below is selected.

NOTE! Please remember that if you change the connector arrangement, the supply filter becomes the exhaust filter and vice versa.



4.2 CONNECTING TO THE ELECTRICAL INSTALLATION

! Electrical installation must be carried out in accordance with good practice and regulations applicable in a given region.

! The electrical power supply from the mains with appropriate power supply parameters (see table in section 2.3) should be connected to the L, N and PE terminals of the PCB (see section 7).

It is recommended to use a three-core cable with a cross-section of 1.5 mm² as the power cable.

The PCB is located in a box built into the top of the device. To access it, unscrew four screws. Electrical power is supplied through a threaded connector located in the box cover.

! The electrical installation should include all safety elements required by law and an ON/OFF switch, enabling safe disconnection of power from the heater.

! Before the first start-up, it is essential to check the electrical installation for damaged insulation, incorrect connections in the terminal block, risk of potential short circuits, etc.

5. OPERATION

5.1 OPERATING RECOMMENDATIONS

! The user is obliged to read this manual before using the device.

! Before any intervention in the device, it is absolutely necessary to cut off the power supply.

! The device is not intended for use by children or adults with limited physical, sensory, or intellectual abilities. It should be kept out of the reach of children and animals.

! It is forbidden to operate the device with it open - before turning on the recuperator, make sure that the inspection panel and the access part are closed the exchanger and fans are closed.

! The device must not be operated with the air inlet or outlet covered or restricted.

! The recuperator is designed to pump air at a temperature of -20°C to 40°C and relative humidity of φ 80%.

! If the outside air temperature may periodically drop below -10°C, a duct pre-heater should be used to heat the outside air to a temperature of < -10°C before it enters the recuperator.

! In the event of any irregularities (e.g., tripping of a circuit breaker, unusual noise, etc.), immediately disconnect the device from the power supply and contact the installer, importer, or distributor. Do not reconnect the device without diagnosing and correcting the cause of the irregularity.

! If the recuperator is not to be used for a long time, it is recommended to completely disconnect it from the power supply.

! The recuperator should not operate without or with dirty filters.

If the airflow filtration provided by the G4 filter is insufficient, replace it with an F7 fine filter (product code VERTIC-F7-250-350-2051 or VERTIC-F7-500-2052).

Periodic inspection and maintenance of the device according to the guidelines presented below should be carried out at the specified frequency and each time before starting the device after a period of inactivity of two weeks or longer.

Before starting any maintenance work on the fan, it must be disconnected from the power supply.

As part of periodic inspection and maintenance of the device, the following should be carried out:

- blow out the G4 filters with compressed air each time the filter alarm is displayed - after installing the cleaned/new filters, the filter alarm must be removed (see "Resetting the filter alarm" in section 6.1)
- the F7 filter should be replaced with a new one each time it reminds you of the filter alarm and it is very dirty; the G4 filter should be replaced with a new one at least once a year
- assess the condition of the electrical installation for damage at least once in the year and remove/repair any damage
- check the patency of air inlets and outlets (connectors), ventilation ducts and condensate drainage system for clogging, leaks, etc. at least once a year and eliminate any problems
- wash the heat exchanger in lukewarm water with detergent at least once over
- clean the remaining elements from deposits with a soft cloth at least twice a year
- at least once a year, connect the device to the mains and assess the correct operation of the fan at all permissible operating levels; additional noise, metallic reverberation, friction, vibrations, etc. indicate incorrect operation - immediately disconnect the device from the power supply and contact the installer, importer or distributor

Inspection and maintenance of the fan should be carried out by a user familiar with this manual or by an external entity if, due to the method of installation or local regulations, additional permissions are required, e.g. for electrical work or work at heights.

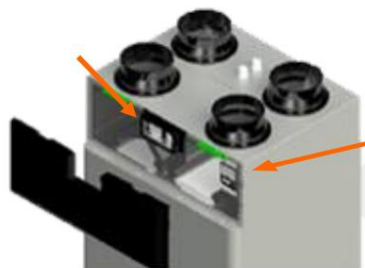
The frequency of maintenance should depend on actual conditions - if the device operates in an environment with high dust concentration, periodic maintenance should be carried out more frequently.

After the period of use, ensure that the device is disposed of in accordance with applicable standards and local regulations.

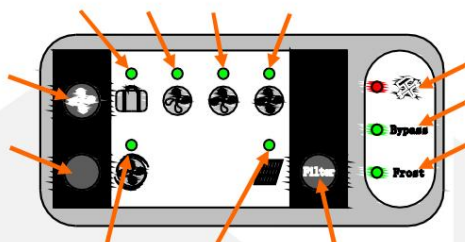
6. CONTROL

The recuperator is controlled by two control panels. The first is located on the front of the unit, while the second, the so-called advanced control panel, is located inside the recuperator, behind the inspection panel.

The following subsections describe the functionality of these panels.



6.1 CONTROL PANEL



A - BUTTONS

The panel has three buttons (bold in the figure above): **Fan Speed** – This

button allows you to change the speed of the supply and exhaust fans (simultaneously). Four speeds are available with predefined flow rates, as shown in the table in section 2.3. The currently selected speed is indicated by a green LED above the icon.

The flows assigned to individual gears can be changed using the advanced control panel – see section 6.2.

Boost speed – pressing the button will cause the device to operate at boost speed (described as V gear in the table in point 2.3), by default for 30 minutes.

After this time, the device will return to operation according to the previous setting. Active boost speed is indicated by a green diode on the V-gear icon.

Filter Alarm Reset – This button clears the filter alarm, which should be done after installing clean/new filters. The filter alarm is indicated by a green LED above the filter alarm icon (see the figure at the beginning of this section) and appears by default after 60 days of operation since the last filter alarm reset. This value can be changed using the VERTIC intelligent touchscreen control panel (product code VERTIC-IP-2050), but it is not recommended, especially when using the F7 fine air supply filter.

B – OTHER LEDS

The remaining three indicator LEDs indicate:

Error – A flashing red LED indicates a problem with the fans or sensors. In this case, contact the importer or distributor directly.

Bypass - the green bypass LED illuminates to indicate that it is active.

By default, the automatic bypass opens when the outside temperature measured by the recuperator sensor is between 17 and 21°C.

Defrost Mode - A green defrost mode LED indicates that it is active. The device enters this mode if the outside air or exhaust air temperature drops below -5°C or 5°C, respectively. For outside air, this condition must persist for at least two hours (a time equal to the defrost interval), while for exhaust air, defrosting is not activated immediately. In this mode, the supply fan is off and the heat exchanger is heated using exhaust air from the room (the exhaust fan operates at speed IV). By default, the defrost cycle lasts 10 minutes and is activated by the exhaust air sensor every half hour or by the outside air sensor every two hours.

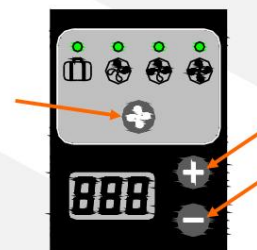
C – SENSORS

In addition to temperature sensors, the VERTIC recuperator has a built-in humidity sensor. When this sensor detects that the maximum permitted relative humidity level (default 75%) has been exceeded, the recuperator begins operating at speed IV until the humidity level falls below this permitted level.

The recuperator also supports a CO2 sensor (product code VERTIC-CO2-2053). This sensor should be connected to the PCB as shown in point 7. When this sensor detects that the maximum permissible CO2 concentration level has been exceeded (default 1000 PPM), the recuperator will operate at speed IV until the CO2 concentration drops below this permissible level.

The values mentioned in the above paragraphs (temperatures, durations, etc.) can be changed using the VERTIC intelligent touch panel (product code VERTIC-IP-2050), the MODBUS system or – in the case of the Wi-Fi version – the Smart Life application – details in the individual instructions.

6.2 ADVANCED CONTROL PANEL



The panel has three buttons (bold in the image above) that allow you to:

Adjusting airflow for speeds I-IV – use the "Fan Speed" button to select the speed you want to change. The selected speed is indicated by a green LED. You can then use the "+" and "-" buttons to change the predefined flow for that speed – each press of "+" or "-" increases or decreases the flow by 5 m³/h, respectively. The maximum values are, depending on the model, 250 m³/h, 350 m³/h, or 500 m³/h. The settings must be overwritten by pressing the "Fan Speed" button again, or this occurs automatically after 15 seconds.

Setting the supply/exhaust air ratio – pressing and holding the "Fan Speed" button for 6 seconds will enter edit mode for this parameter. This is indicated by the "LPL" code on the display next to the "+" and "-" buttons. When the value shown on the display is 0 (default value), the supply and exhaust airflows delivered by the heat recovery unit are equal. Changing this value within the range of -50 to 50 is possible using the "+" and "-" buttons. The more positive the value, the greater the excess of supply air over the exhaust air. The more negative the value, the greater the excess of exhaust air over the supply air.

Changing the inlet and outlet port configuration - pressing and holding the "+" button for 6 seconds will enter edit mode for this parameter. This is indicated by the "PLP" code on the display next to "+" and "-".

When the value shown on the display is 1, the nozzle arrangement is default (see section 4.2). Changing the value to 2 using the "Fan speed" button will change the arrangement to the alternative one.

Restoring factory settings - pressing the "Fan speed", "+" and "-" buttons simultaneously will restore the factory settings of values such as air flows for speeds I - IV, supply/exhaust air ratio, etc.

Setting the RS485 address - pressing and holding the "-" button for 6 seconds will take you to the RS485 address settings. Then, using the "+" and "-" buttons, set the address according to the individual guidelines of the master BMS system.

6.3 VERTIC CONTROL PANEL

The optional intelligent VERTIC touchscreen control panel (product code VERTIC-IP-2050) increases the functionality of the device, including enabling, for example, operation of an external electric duct heater ON/OFF.

 The panel should be connected to the A, B, GND and 12V terminals located on the PCB, according to the diagram in point 7.

It is recommended to use a shielded cable with a cross-section of at least 0.5 mm² as a communication cable.

The communication cable should be routed through the empty threaded connector located in the box cover (the unit's power supply should be routed through one connector).

 Before connecting the VERTIC control panel, it is essential to disconnect the unit's electrical power supply.

7. CONTROLLER (PCB)

CONTROL OF DUCT HEATER USING LUVERTIC PANEL

 A voltage of 230 V appears between the contacts of the duct heater (see point 7) when the heater is to be started. This signal should be used to control the operation of the relay through which the heater should be powered.

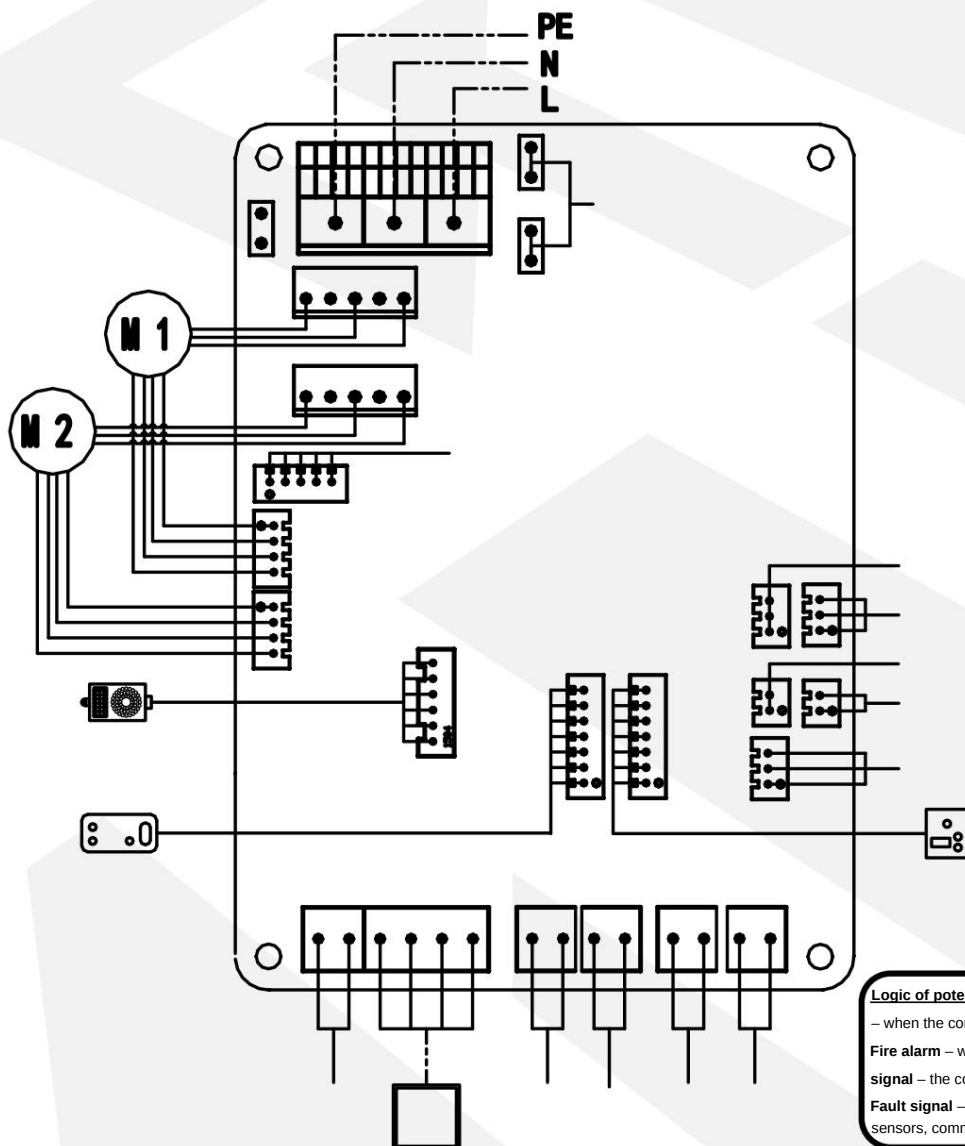
The heater will turn on when the set supply air temperature (the value indicated by the thermometer icon on the controller) is 5°C or more higher than the actual supply air temperature (the SA value on the controller). If this operating logic is unsatisfactory, a duct heater with independent control should be used.

 Depending on the installation location, the ON/OFF heater used can function as either a preheater or a postheater. In the former case, depending on actual conditions, the supply air temperature setting should be controlled so that the heater raises the outside air temperature (OA) above -10°C.

The power of the ON/OFF heater should be selected depending on the required increase in air temperature and flow - e.g. when the outside temperature can drop to -20°C, the pre-heater should be able to increase the temperature of the air entering the recuperator by at least 11°C (so that it is higher than -10°C - according to point 5.1).

Below is an example table with the required heating power for pre-heaters of individual VERTIC models, for assumed maximum flows and a minimum external temperature of -21°C.

MODEL	FLOW AIR, m ³ /h	HEATING POWER HEATER, kW
VERTIC 250 / VERTIC 250 ENTHALPY	250	1
VERTIC 350 / VERTIC 350 ENTHALPY	350	1,5
VERTIC 500 / VERTIC 500 ENTHALPY	500	2



Logic of potential-free contacts operation: Boost

— when the contacts are closed, the device operates at BOOST speed (i.e. Vspeed

Fire alarm — when the contacts are closed, the fans turn off **Operation**

signal — the contacts are closed when the device is working

Fault signal — the contacts are closed when an error occurs (problem with fans, sensors, communication, etc.)

NOTES

The background of the page is white, featuring a series of horizontal dotted lines. Overlaid on these lines are several light gray geometric shapes, including triangles and parallelograms, some of which are tilted at an angle. These shapes are scattered across the page, creating a modern, abstract design.



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