

reventon
INDUSTRIAL SOLUTIONS

Technical datasheet

HEAT RECOVERY UNIT VERTIC SERIES




- 1. INTRODUCTION
 - 1.1 GENERAL INFORMATION
 - 1.2 STORAGE AND TRANSPORT
 - 1.3 PACKAGE CONTENT
 - 1.4 APPLICATION
- 2. DEVICE CHARACTERISTIC
 - 2.1 CONSTRUCTION AND PRINCIPLE OF OPERATION
 - 2.2 DIMENSIONS
 - 2.3 TECHNICAL DATA
 - 2.4 WORKING CHARACTERISTICS
- 3. ASSEMBLY
 - 3.1 GENERAL PRINCIPLES
 - 3.2 CONDENSATION DRAIN SYSTEM
- 4. INSTALLATION
 - 4.1 CONNECTION TO VENTILATION SYSTEM
 - 4.2 CONNECTION TO ELECTRICAL INSTALLATION
- 5. EXPLOITATION
 - 5.1 EXPLOITATION PRINCIPLES
- 6. CONTROLLING
 - 6.1 CONTROL PANEL
 - 6.2 ADVANCED CONTROL PANEL
 - 6.3 CONTROL PANEL VERTIC
- 7. CONTROLLER (PCB)
- 8. WARRANTY TERMS


1. INTRODUCTION

Thank you very much for purchasing the heat recovery unit VERTIC series. Please read and keep this manual for future reference of users and operators.

1.1 GENERAL INFORMATION

The owner and the user of heat recovery unit Reventon brand should read carefully this instruction and follow included guidelines. In case of any doubts, please reach out directly to the supplier i. e. company Reventon Group Sp. z o. o. [Ltd.]. The contact data are given at the section 8 (subsection XVII).

 The key recommendations from safety point of view are marked with the warning triangle (like the one on the left). It enables quick and easy localization of these recommendations and remind of them before interference with the unit.

 During installation, usage or maintenance of the unit, all local safety requirements must be respected.

The owner and each user of unit must be familiar with the Warranty Terms included in the section 8 of this instruction and follow its guidelines. In case of any doubts regarding warranty points, please reach out immediately to the company Reventon Group Sp. z o. o. [Ltd.] before taking any action.

The supplier reserves the rights to make changes in the technical documentation without previous notice.

1.2 STORAGE AND TRANSPORT

The unit should be stored and transported in its original packaging, in ambient temperature ranging from -20°C to 50°C and relative humidity ≤ 80%.

During collection of the unit, please check the device exactly to exclude any transport damages. If any is observed, the damage report in presence of the item supplier must be filled. Such report is the basement for transport complaint. The damage report must be provided by the carrier.

1.3 PACKAGE CONTENT

- standing heat recovery unit VERTIC
- mounting panel
- drain connector (for drain system)
- drain seal (for drain system)
- technical documentation including Warranty Card

1.4 APPLICATION

The heat recovery unit VERTIC provides mechanical ventilation with heat recovery of buildings like a house, a public building, a cafe, a warehouse etc. However the device cannot be used in contaminated environments with air containing flammable or explosive substances, chemicals, sticky substances, fibrous materials or soot and oil particles. The unit cannot be also used in places, where it would be exposed to too high humid (relative humidity higher than 80%) or direct contact with water or dust, exceeding the permissible contact due to the protection degree IP.

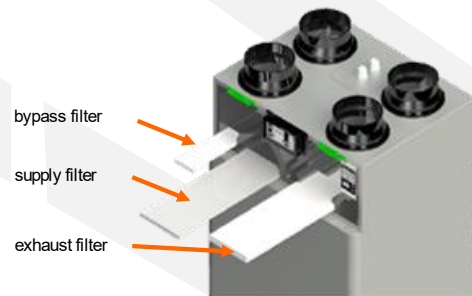
2. DEVICE CHARACTERISTIC

2.1 CONSTRUCTION AND PRINCIPLE OF OPERATION

Housing: the outer layer is made of powder coated steel, and the internal structure is made of expanded polypropylene (EPP). Thanks to this, the device has a good tightness and also high thermal and acoustic insulations. The front part is removable (separate inspection panel at the top and the lower part allowing access to the exchanger and the fans).

Counter-flow heat exchanger: made of polystyrene. This material is characterized by a high thermal conductivity, a very good tightness and stiffness as well as resistance to an oxidation and a mold. The use of polystyrene, in connection with the geometry of the exchanger (counterflow), allows for high efficient heat recovery from the exhaust air (temperature efficiency up to 95%).

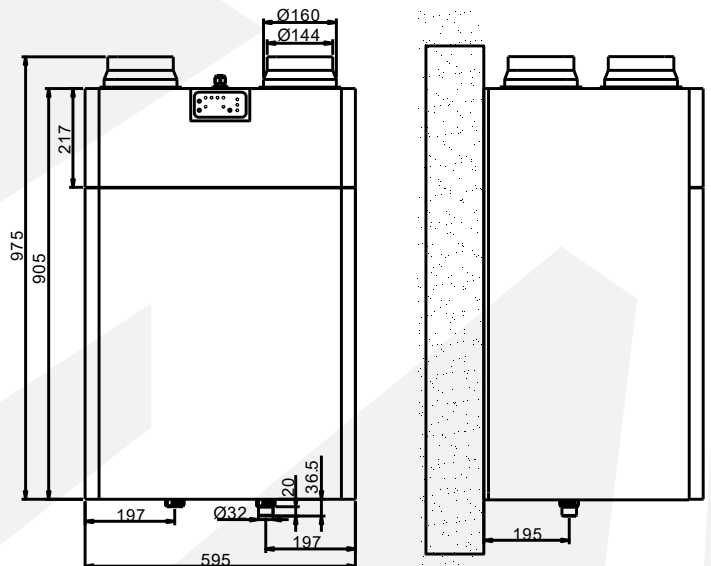
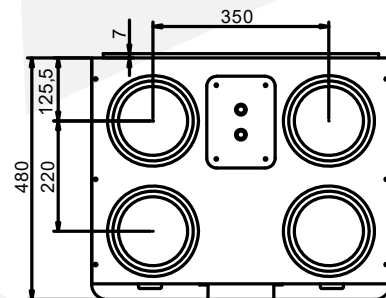
Filters: The device is equipped with the three G4 prefilters. Their function is to preclean the air before it is introduced into rooms (the supply filter and the bypass filter) and to protect the heat exchanger against dirt (the supply and exhaust filters). The location of the filters for the default connectors arrangement (according to the section 4.1) is shown in the graphic below. The F7 supply air filter is available as an option (product code VERTIC-F7-250-350-2051 or VERTIC-F7-500-2052).



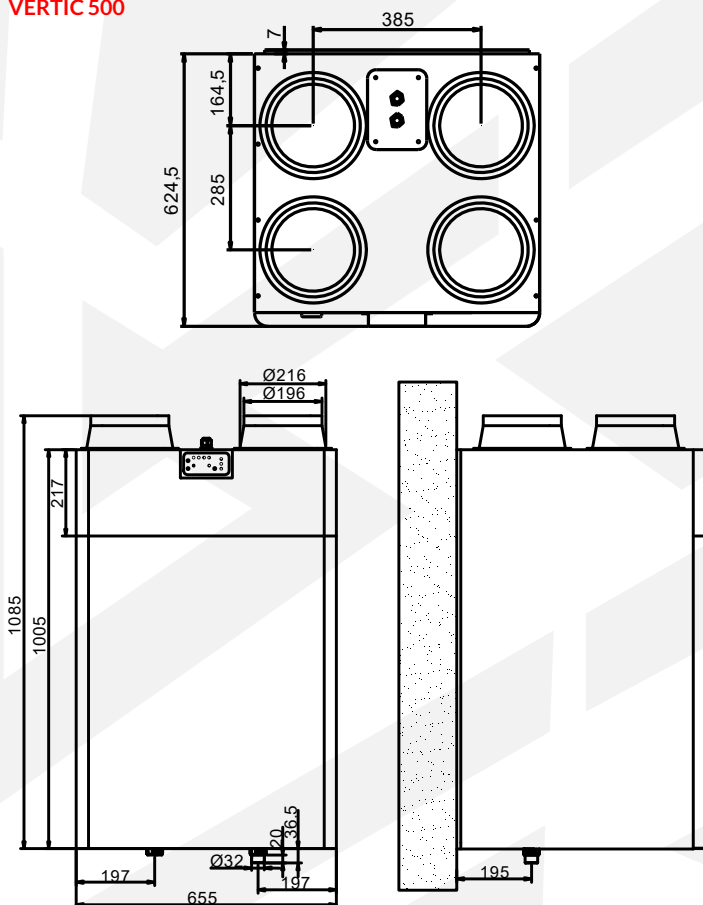
Supply and exhaust fans: the energy-saving EC fans, with five predefined speeds, ensuring air flow through the heat exchanger and further through ventilation ducts. Thanks to advanced electronics, the fans' rotation speed is adjusted for an actual resistance, in a way ensuring the constant air flow (within the pressure drop range from 0 - 200 Pa). This is visible in the performance curves in point 2.4 (slight drops in efficiency with increasing pressure).

2.2 DIMENSIONS

VERTIC 250 i 350



VERTIC 500



2.3 TECHNICAL DATA

MODEL		VERTIC 250	VERTIC 350	VERTIC 500
Product code		VERTIC-250-2047	VERTIC-350-2048	VERTIC-500-2049
Nominal airflow [m³/h]*	V stage**	250	350	500
	IV stage	175	245	350
	III stage	145	180	270
	II stage	100	130	185
	I stage	80	100	105
Thermal efficiency [%]		≤ 95%	≤ 94%	≤ 94%
Energy efficiency class [-]**		A	A	A
Voltage [V] / Frequency [Hz]		230 / 50	230 / 50	230 / 50
Nominal motor current [A]	V stage	1.5	2.4	3.2
Nominal motor power [W]	V stage	170	320	480
IP protection rating of motor [-]		X2	X2	X2
Net weight [kg]		40	40	50
Noise [dB(A)]****		35	37	39

* the airflows are the predefined airflows for stages I - IV averaged over a pressure range of 0 - 200 Pa - see characteristics in the section 2.4; these predefined values can be changed as described in the section 6.2 (see „Adjusting the airflows for stages I - IV“)

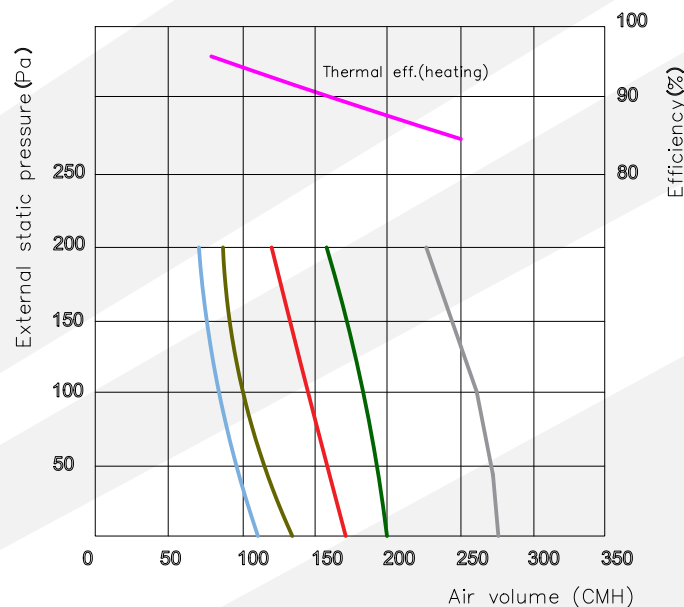
** V stage is so called boost speed which is design for temporary increasing of the airflow, e. g. for enhanced ventilation of rooms - see description of the boost speed in the section 6.1

*** according to EU no. 1254/2014

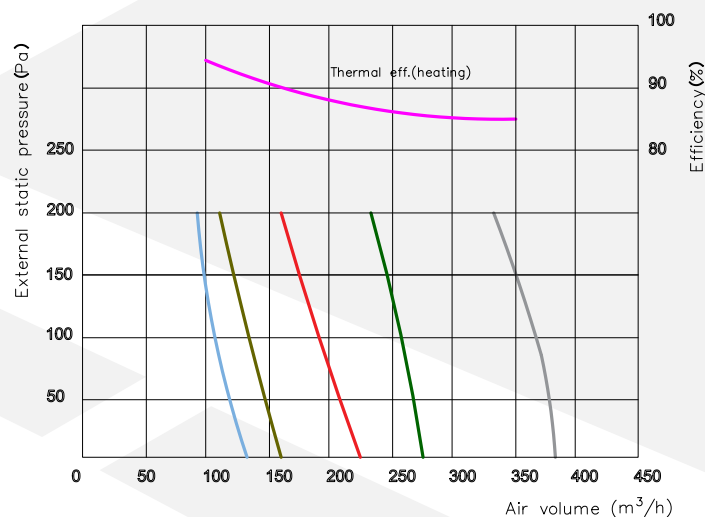
**** the measurement at the distance of 1,5 m from the device, for the unit working at IV stage and pressure 50 Pa

2.4 WORKING CHARACTERISTICS

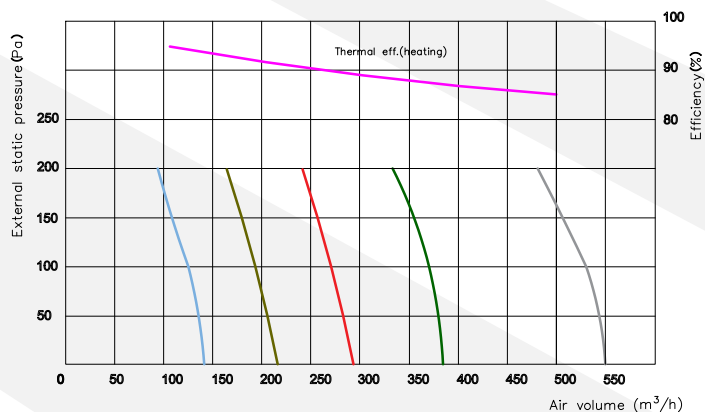
VERTIC 250



VERTIC 350



VERTIC 500



3 ASSEMBLY

3.1 GENERAL PRINCIPLES

! The heat recovery unit should be assembled by a person experienced in mounting of such devices and - if local law requires it - with appropriate qualifications.

! It is the responsibility of the assembler to make the mounting according to the guidelines from this instruction and in accordance with the local regulations in force.

After mounting of the device, the assembler is obliged to fill out the Warranty Card (positions 1 and 2). It is also treated as a guarantee, that the assembly was made in accordance with the requirements. The Warranty Card is included in this manual under the Warranty Terms.

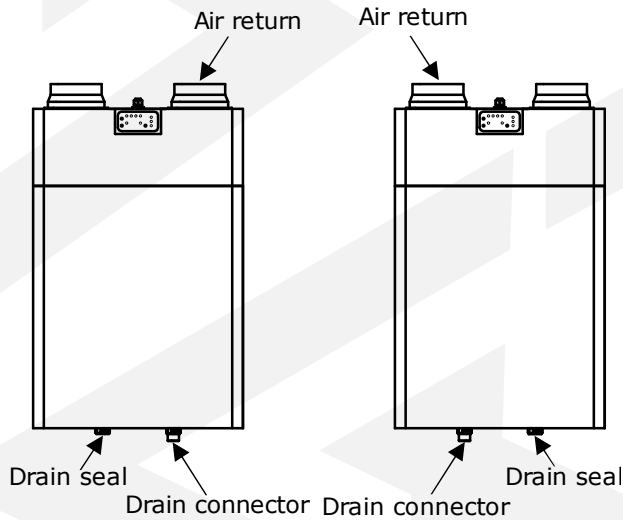
! The heat recovery unit must be attached to a vertical partition with the appropriate load capacity (see the net weight of the unit in the section 2.3) with the mounting panel (included in the set). The air outlets/inlets must be upwards and there should be also a gap from the bottom for connection of the condensation drain system.

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

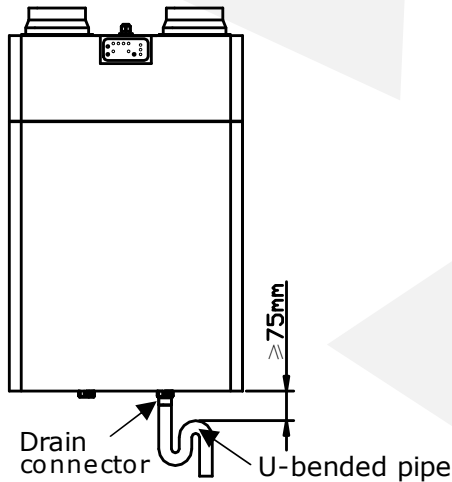
3.2 CONDENSATION DRAIN SYSTEM

The heat recover unit requires an installation to discharge to a sewage system the condensate formed during the operation of the device. For this purpose, one of the two holes at the bottom of the unit should be used, depending on the selected arrangement of the inlets and the outlets.

As shown on the picture below, the drain connector should be connected to the one of these two holes. Then the drain connector should be connected to a sewage system. The second hole is not needed anymore - it must be plugged with the provided drain seal.



After the drain connector, keeping the distance shown below, a U-shaped backwater bended pipe must be connected. This bended pipe should be piped to a sewage system. Before start up of the unit, the U-shaped bended pipe must be filled with water.



! The condensation drain system must be done according to the guidelines from this section and in accordance with the local regulations in force.

4. INSTALLATION

! Before connecting the unit to an electrical installation, it must be assembled permanently to a suitable partition (according to the recommendations contained in the section 3).

! The connection of the heat recovery unit to the ventilation and electrical installations as well as all repairs and disassembly works, must be performed by qualified persons i.e. having the appropriate qualifications for these works. It is the responsibility of the installer to make the installation according to the guidelines from this instruction and in accordance with the local regulations in force.

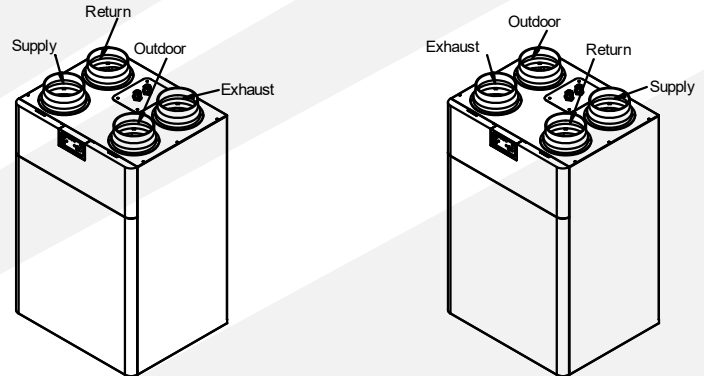
After connecting to the ventilation or electric installations, the installer is obliged to make an entry in the Warranty Card, confirmed by a stamp and signature (positions 3 and 4). It is also treated as a guarantee, that the installation was made in accordance with the requirements of this point 4. The Warranty Card is included in this manual under the Warranty Terms in point 8.

4.1 CONNECTION TO VENTILATION SYSTEM

! The ventilation system must be carried out in accordance with the state of the art and the local regulations in force.

Ventilation ducts should be routed in a way that matches one of the two available arrangements of the inlets and the outlets – see picture below. The system of the air inlets/outlets can be changed using the advanced control panel (see 'Changing the arrangement of the inlets and the outlets' in the section 6.2). By default, the arrangement on the left of the picture below is selected.

ATTENTION! It should be remembered that if the arrangement of the air inlets/outlets is changed, the supply filter becomes the exhaust one and vice versa.



4.2 CONNECTION TO ELECTRICAL INSTALLATION

! The electrical installation must be carried out in accordance with the state of the art and the local regulations in force.

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

As the power cable, it is recommended to use a three-core cable with a 1.5 mm² cross-section with earthing.

The PCB is located in the electrical box built in the top of the device - to get the access to the board, four screws must be uncrewed. Power supply should be carried out through the threaded connector located in the cover of the box.

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

! Before the start up, it is required to check the electrical installation in terms of damaged insulation, incorrect connection in the terminals, risk of potential short circuits etc.

5. EXPLOITATION

5.1 EXPLOITATION PRINCIPLES

! The user is obliged to be familiar with this instruction before exploitation of the device.

! Before any interference in the device, the electricity supply to the unit must be absolutely cut off.

! Access to the device by parties like unauthorised people, children and animals is forbidden and should be prevented or at least hindered.

! Operation of open device is forbidden – before turning on the unit, it is important to ensure that the inspection panel and the access part to the exchanger and fans are closed.

! The device cannot work with covered or restricted air inlets or outlets.

! The unit is designed for handling of air at temperature ranging from -20°C to 40°C and with relative humidity ≤ 80%.

! If the outside air temperature can drop temporarily below -10°C, a primary duct heater should be used to heat the outside air to a temperature > -10°C before it goes to the heat recovery unit.

! In case of any malfunctions in the operation of the energy recovery unit, immediately cut off the device from the electrical system and contact directly with the supplier or the distributor.

! If the device is not used for a longer time disconnect the unit from the electrical installation.

! The heat recovery unit should not work without or with dirty filters.

If the degree of filtration provided by the G4 supply filter is insufficient, it should be replaced with the F7 fine filter (product code VERTIC-F7-250-350-2051 or VERTIC-F7-500-2052).

! The device should be serviced periodically, according to the given frequencies, as follows:

- blow out the G4 filters with the compressed air, each time the filter alarm is displayed - after installing cleaned/new filters, remove the filter alarm (see 'Filter alarm reset' in the section 6.1)
- wash the heat exchanger in warm water with detergent at least once every two year
- clean the remaining elements from residue with a soft cloth at least once every two year

! Additionally, it is recommended to inspect ventilation ducts and the condensation drain system for potential risk of clogging, leaks, etc. at least once a year.

! The F7 filter should be replaced with a new one each time when the filter alarm displays and it is heavily soiled. The G4 filter should be replaced with a new one at least every two years.

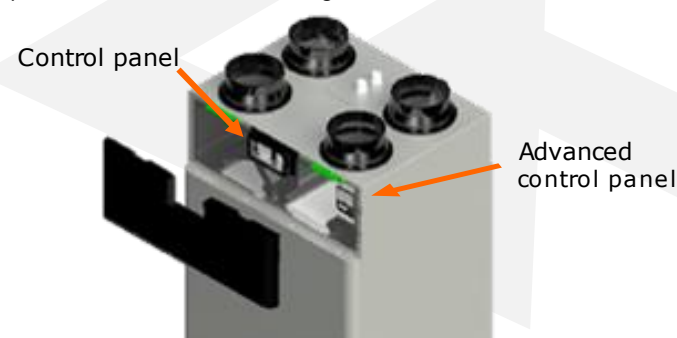
! The unit must be maintained by a user who is familiar with this instruction or by an external entity if due to the way of assembly or local regulations additional authorisations like e.g. working at heights are required. Before starting any maintenance work, the energy recovery unit must be disconnected from the power supply.

! The frequency of the service should depend on the actual dirtiness - if the device is operating in an environment with a high concentration of dust, periodic cleaning should be performed much more often.

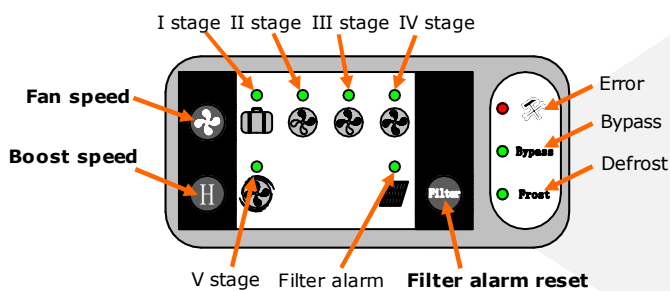
After exploitation time, please utilise the unit according to the local regulations.

6. CONTROLLING

Two control panels are used to control the unit. The first is at the front of the device, the second, so-called the advanced control panel, is located inside the device, behind the inspection panel. The functionality of these panels is described in the following sections.



6.1 CONTROL PANEL



A - BUTTONS

The panel has three buttons (bold in the figure above), i.e.:

Fan speed - the button allows to change the stage of the supply and exhaust fans (simultaneously). There are four stages with predefined airflows according to the table in the section 2.3. The currently selected stage is signalled by the shining green LEDs above the individual icons. The airflows assigned to individual stages can be changed using the advanced control panel - see section 6.2.

Boost speed - pressing the button causes that the device starts to work at the boost speed (described as V stage in the table in point 2.3), by default for 30 minutes. After this time, the device resumes operation at the previous chosen stage. The active boost speed is indicated by the green LED above the V stage icon.

Filter alarm reset - the button allows you to delete the filter alarm. This should be done after installing cleaned or new filters. The filter alarm is signalled 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 device operation since the last filter alarm reset. This value can be changed with the intelligent control panel VERTIC (product code VERTIC-IP-2050),

however in case of usage the F7 fine filter as supply filter it is not recommended.

B - OTHER LEDS

The other three signalling LEDs mean:

Error - shining red error LED indicates a problem with the fans or sensors. In this case, please contact directly with the supplier or the distributor.

Bypass - shining green bypass LED indicates that the bypass is active. By default, the automatic bypass opens when the outside temperature measured by the unit's sensor is within the range of 17 - 21°C.

Defrost - shining green defrost mode LED indicates that the defrost mode is active. In this mode, the supply fan is turned off and the heat exchanger is heated by the exhaust air from the room (the exhaust fan works at the boost speed). The defrost cycle last 10 minutes by default and will be activated every half hour if the outdoor air temperature is $\leq -5^{\circ}\text{C}$.

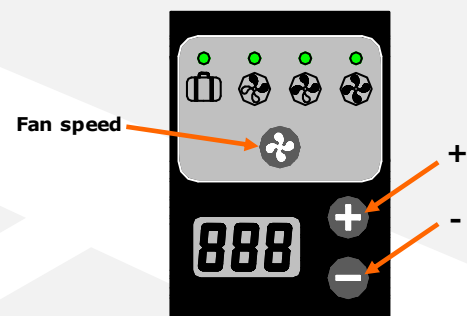
C - SENSORS

In addition to temperature sensors, the heat recovery unit VERTIC has the inbuilt humidity sensor. When this sensor detects that the maximum permitted level of relative humidity has been exceeded (75% by default), the unit starts to work at the boost speed until the humidity level drops below this permitted level.

The unit also supports the CO₂ sensor (product code VERTIC-CO2-2053). It should be connected to PCB in accordance with the section 7. When this sensor detects that the maximum permitted level of CO₂ concentration has been exceeded (1000 PPM by default), the unit starts to work at the boost speed until the level of CO₂ concentration drops below this permitted level.

The default values mentioned in the above paragraphs (number of days, temperatures, duration time, etc.) can be changed using the intelligent control panel VERTIC (product code VERTIC-IP-2050) - details in the user manual of this panel.

6.2 ADVANCED CONTROL PANEL



The panel has three buttons (bold in the figure above), which allow for the following:

Adjusting the airflows for stages I - IV - select the stage for the adjustment with the 'Fan speed' button. The chosen stage is indicated by the number of shining LEDs. Then use '+' and '-' buttons to change the predefined airflow for this stage - each time '+' or '-' is pressed, the airflow is increased or decreased by 5 m³/h respectively. The maximum values for the fourth stage are 250 m³/h for the VERTIC 250 model, 350 m³/h for the VERTIC 350 model and 500 m³/h for the VERTIC 500 model. Overwriting the settings for the chosen stage should be done by pressing the 'Fan speed' button again or it happens automatically after 15 seconds of inactivity.

Setting the supply/exhaust air ratio - press and hold the 'Fan speed' button for 6 seconds to enter to the editing mode of 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 streams provided by the unit are equal to each other. The change of this value in the range from -50 to 50 is possible with the use of the '+' and '-' buttons. The more positive the value, the greater the supply/exhaust air ratio (i. e. greater supply stream in comparison to the exhaust stream). The more negative the value, the greater the excess of exhaust air over the supply air.

Changing the arrangement of the inlets and the outlets - press and hold the '+' button for 6 seconds to switch to the editing mode of this parameter. This is indicated by the "PLP" code on the display next to the '+' and '-' buttons. When the value shown on the display is 1, the system of inlets/outlets is default (see section 4.2). Changing the value to 2, using the 'Fan speed' button, changes the arrangement to the alternate one.

Restore factory settings - pressing the '+' and '-' buttons simultaneously causes restore the factory settings of values such as airflows for stages I - IV, supply/exhaust air ratio etc.

Setting the RS485 address - press and hold the '-' button for 6 seconds to go to the RS485 address settings. Then, using the '+' and '-' buttons, set the address according to the individual guidelines of the superior BMS system.

6.3 CONTROL PANEL VERTIC

The intelligent control panel VERTIC (product code VERTIC-IP-2050) increases the functionality of the device, including e. g. controlling the operation of an ON/OFF external duct heater.

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

As the communication cable, it is recommended to use a shielded cable with a 0.5 mm² cross-section.

The communication cable should be led through the empty threaded connector located in the cover of the box (in the other connector the power cable should be already led).

! Before starting the connecting of the intelligent control panel VERTIC, the electricity supply to the unit must be absolutely cut off.

CONTROLLING OF A DUCT HEATER VIA THE CONTROL PANEL VERTIC

! A heater should be connected to the dedicated terminals L and N located on PCB (see section 7). , according to the scheme in the section 7. However, if the heater's heating capacity exceeds 2 kW, the heater must be supplied from an another source, and the L contact should be used as a signal for the relay controlling the operation of this heater.

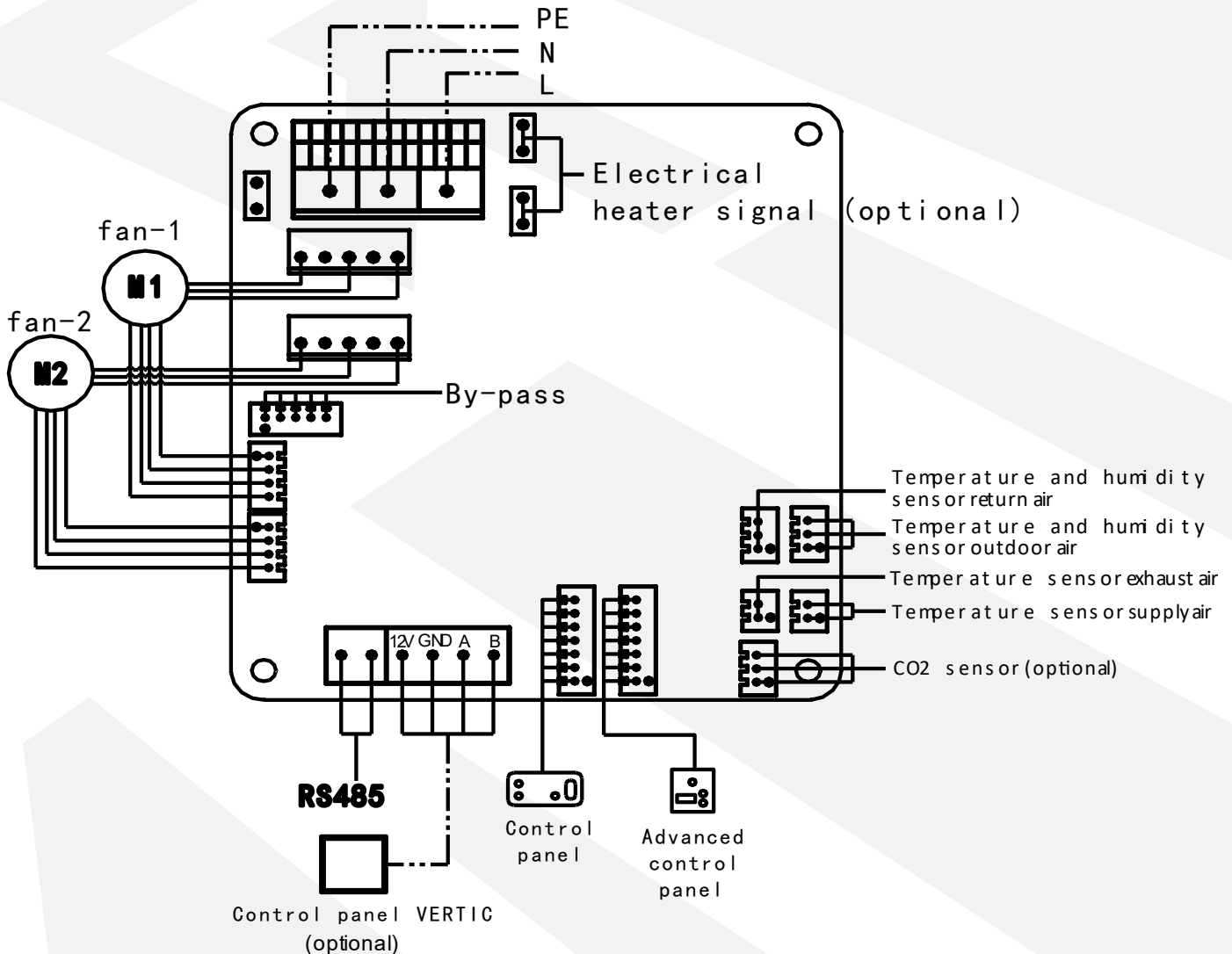
The heater will be activated when the set temperature for the supply (value marked with the thermometer icon on the panel VERTIC) is 5°C higher than the actual supply air temperature (value SA on the panel VERTIC).

! Depending on the place of installation, an ON/OFF heater can be both a preheater and a secondary heater. In the first case, depending on the actual conditions, it is necessary to control the set temperature for the supply, in a way, that the heater raises the outside air temperature OA above -10°C.

The heating capacity of an ON/OFF heater should be selected depending on the required increase of air temperature and flow - e.g. when the external temperature may drop to -20°C, the preheater should be able to raise the temperature of the air going to the heat recovery unit by at least 11°C (this temperature must be greater than -10°C - according to the section 5.1). The example table below shows the required heating capacities for preheaters of particular VERTIC models, for the assumed maximum flows and minimum external temperature equal -21°C.

MODEL	AIRFLOW, m ³ /h	HEATING CAPACITY OF HEATER, kW
VERTIC 250	250	1
VERTIC 350	350	1,5
VERTIC 500	500	2

7 CONTROLLER (PCB)



8. WARRANTY TERMS

I. The supplier Reventon Group Sp. z o. o. [Ltd.] provides to the owner 24-month warranty protection period for the following devices:

- heat recovery unit VERTIC 250
- heat recovery unit VERTIC 350
- heat recovery unit VERTIC 500

II. The warranty protection is valid from the purchasing date (i.e. the issue date of invoice) but not longer than 30 months from leaving the supplier's warehouse.

III. The complaint should be sent by the complaint form on the website (<https://reventongroup.eu/en/complaints>). The scan or the photo of the fulfilled warranty card (the card is not required in case of accessories) and the purchase invoice must be attached to the form. The Warranty Card is not required in case of accessories.

IV. The supplier is committed to consider the claim within 14 working days since the date of reporting (i. e. the day of receipt of the correctly fulfilled warranty form).

V. In exceptional cases, the supplier reserves the right to extend the time for consideration of the request, especially if the defect is not permanent one and its determination requires a deeper analysis. The extension must be notified by the supplier before the end of the 14th working day.

VI. Under the guarantee protection, the supplier provides a repairment, replacement (the device or its component) or refund for the defective item within a specified time.

VII. In the case of replacement of a device component, the warranty protection of the whole unit is not prolonged.

VIII. The supplier does not cover the costs of disassembly and eventual reassembly of the complaint device.

IX. The supplier may decide to bring the defective device or its component to the Reventon's service. In such case the transport of the item is organised and paid by the producer. The responsibility of the device's owner is to prepare the item for the shipment - the device must be packed in a way which protects it against transport damages and the dimensions and weight of the package must not exceed 660 x 650 x 400 mm and 30 kg respectively. In the case of elements which cannot be packed in this way, the method of shipment must be agreed and approved by Reventon Group Sp. z o. o. [Ltd.]. In the case of sending a non-standard package without agreement of the supplier, the supplier reserves the right to charge the owner of device with all additional transport costs.

X. In the case of arrival of the authorized service of the supplier or an installer to fix the complaint item, the customer must ensure them seamless access to the device and all required media like electricity, water, lighting etc. free of charge.

XI. The warranty protection does not cover the parts of the device subject to the normal usage and the following cases:

- a) mechanical damage of the product
- b) defects and damages through:
 - improper storage or transport
 - improper or non-compliant use and maintenance (i. e. inconsistent with the manual)
 - using the device in the improper conditions (too high humidity, too high or too low temperature, impact of the surrounding, sun etc.)
 - unauthorized (i. e. by the user or other unauthorized persons) repairs, modifications or construction changes
 - connecting equipment inconsistent with the technical documentation
 - connecting additional equipment, which is not recommended by the supplier
 - improper power supply
- c) elements which wear and tear such as discolour of the housing

If there is any of the above, the claimant will be charged for transport and /or repairs.

XII. During collection of the device, the item must be checked exactly by the receiver to exclude transport damages. If any of them is observed, the damage report in presence of the supplier have to be filled - such report is the basement for transport complaint. The damage report must be provide by the carrier.

XIII. The supplier does not take the responsibility for potential losses and damages related to the downtime of the device during its failure and the complaint considering.

XIV. Any changes in the Warranty Terms, improper use of the product as well as traces of self repairing (beyond the Reventon's service) or alterations cause, the warranty become invalid.

XV. These supplier's Warranty Terms do not exclude or limit any rights arising from the pledge.

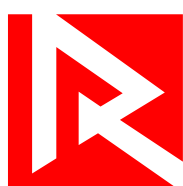
XVI. Not following to any of the warranty regulations makes the protection invalid.

XVII. All correspondence should be send to the following address: Reventon Group Sp. z o.o. [Ltd.], 556 Wyzwolenia Street, 43 340 Kozy, Poland or email address: serwis@reventongroup.eu.

Warranty Card

1 - Model and serial number* or product code	2 - Address and place of assembly
3 - Date of connection to: Heating/cooling installation (if applicable)	4 - Stamp and signature of installer:
Ventilation installation (if applicable)	
Electrical installation (if applicable)	

* serial number is required only for water heaters HC-3S, HC-EC and FARMER HCF series and recovery units INSPIRO, INSPIRO BASIC and VERTIC series



reventon
INDUSTRIAL SOLUTIONS

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