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INDUSTRIAL SOLUTIONS

Technical datasheet

HEAT RECOVERY UNIT VERTIC & VERTIC ENTHALPY SERIES

ErP 2018 COMPLIANT

ENG

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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 importer i. e. company Reventon Group Sp. z o. o. [Ltd.]. The contact data are given at the last page and at the product label.

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. For the same reason, the requirements for periodic inspection and maintenance of the device, are marked with the wrench symbol (like the one on the left).

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

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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 product deliverer must be filled. Such report is the basement for the warranty claim. The damage report must be provided by the product deliverer.

1.3 PACKAGE CONTENT

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

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 that 80%) or direct contact with water or dust, exceeding the permissible contact due to the protection degree IP.

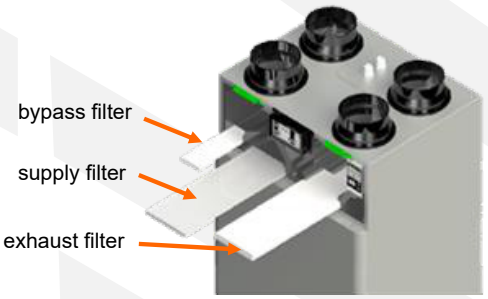
2. DEVICE CHARACTERISTIC

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 exchanger: the unit contains heat exchanger made of polystyrene (VERTIC) or enthalpy one made of polyethylene and graphene (VERTIC ENTHALPY). This both materials are characterized by high thermal conductivity, very good tightness and stiffness as well as resistance to oxidation and mold. In case of VERTIC ENTHALPY series, the exchanger recovers moisture too.

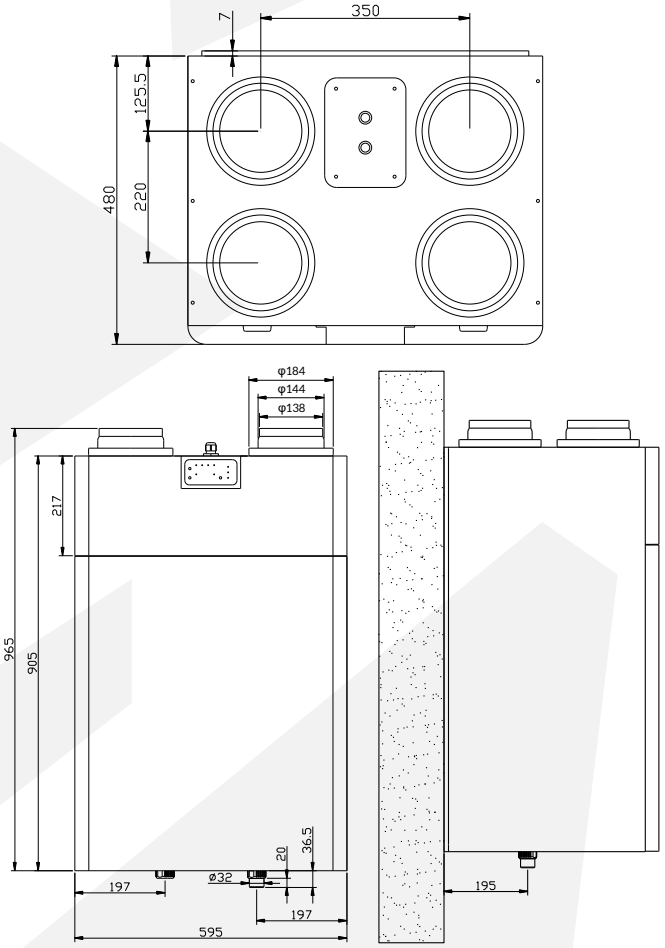
Filters: The device is equipped with the three G4 prefilters. Their function is to preclean the air before it is introduced into rooms (the supply filter and the bypass filter) and to protect the heat exchanger against dirt (the supply and exhaust filters). The location of the filters for the default 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).



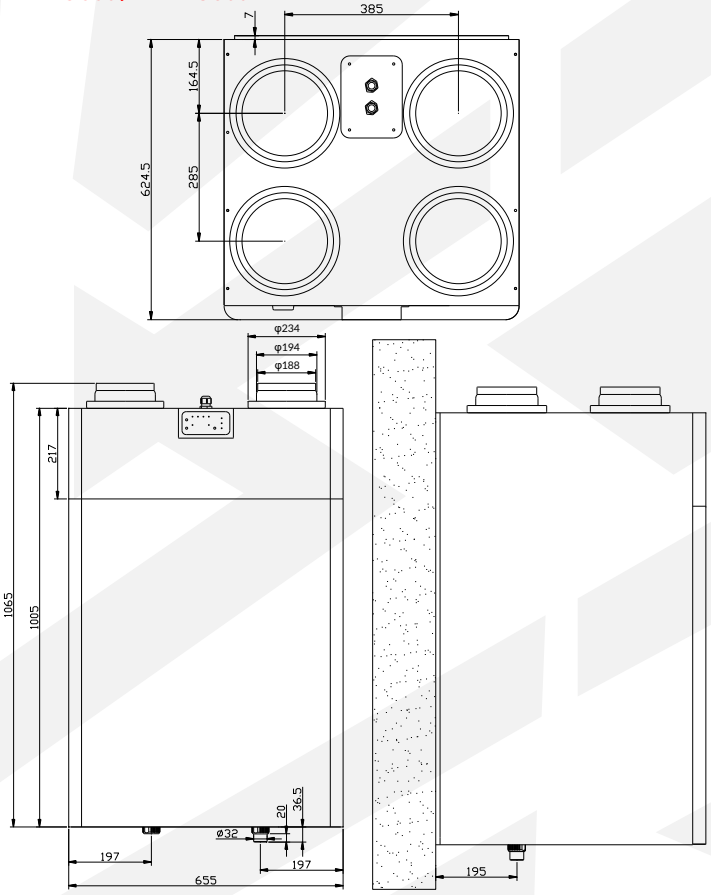
Supply and exhaust fans: the energy-saving EC fans, with five predefined speeds, ensuring air flow through the heat exchanger and further through ventilation ducts. Thanks to advanced electronics, the fans' rotation speed is adjusted for an actual resistance, in a way ensuring the constant air flow (within 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 and 350 / VERTIC 250 and 350 ENTHALPY



VERTIC 500 / VERTIC 500 ENTHALPY



Product data sheets compliant with Commission Delegated Regulation (EU) No 1254/2014 are
available at the link below or by scanning the QR code.

https://reventongroup.eu/pdf/kp/vertic.pdf

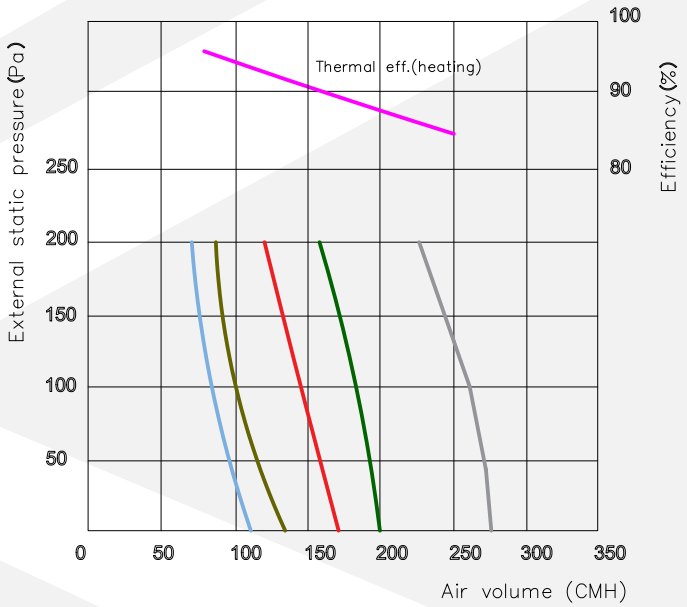
2.3 TECHNICAL DATA

MODEL Product code		VERTIC 250 / VERTIC 250 ENTHALPY VERTIC-250-2047/ VERTIC-250E-2321	VERTIC 350 / VERTIC 350 ENTHALPY VERTIC-350-2048/ VERTIC-350E-2322	VERTIC 500 / VERTIC 500 ENTHALPY VERTIC-500-2049/ VERTIC-500E-2323
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
Maximum heat recovery efficiency [%]		90% / 83%	87% / 77%	88% / 78%
Maximum moisture recovery efficiency [%]		- / 78%	- / 72%	- / 73%
Energy efficiency class [-]***		A	A	A
Voltage [V] / Frequency [Hz]		230 / 50	230 / 50	230 / 50
Nominal motor current [A]	V stage	1.0	1.9	2.9
Nominal motor power [W]	V stage	137	256	412
IP protection rating [-]		X2	X2	X2
Net weight [kg]		38.1	38.1	49.1
Sound power level [dB(A)] ***		49	51	53

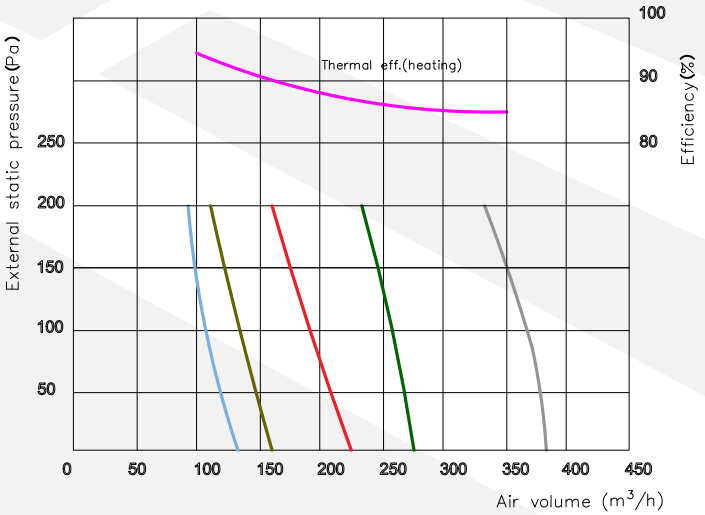
* the airflows are the predefined airflows for stages I - IV averaged over a pressure range of 0 - 200 Pa - see characteristics in the section 2.4; these predefined values can be changed as described in the section 6.2 (see ‚Adjusting the airflows for stages I – IV')
** V stage is so called boost speed 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

2.4 WORKING CHARACTERISTICS

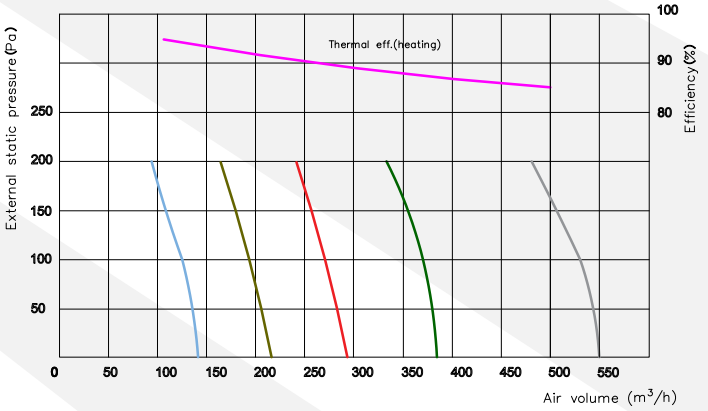
VERTIC 250 / VERTIC 250 ENTHALPY



VERTIC 350 / VERTIC 350 ENTHALPY



VERTIC 500 / VERTIC 500 ENTHALPY



3 ASSEMBLY

3.1 GENERAL PRINCIPLES

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

Due to the relatively large weight and the dimensions of the unit, the assembly should be performed by at least two people and at least one of them must meet the requirements in the paragraph above.

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.

The unit must be leveled in a way enabling a water drain which could occurs during operation (see section 3.2).

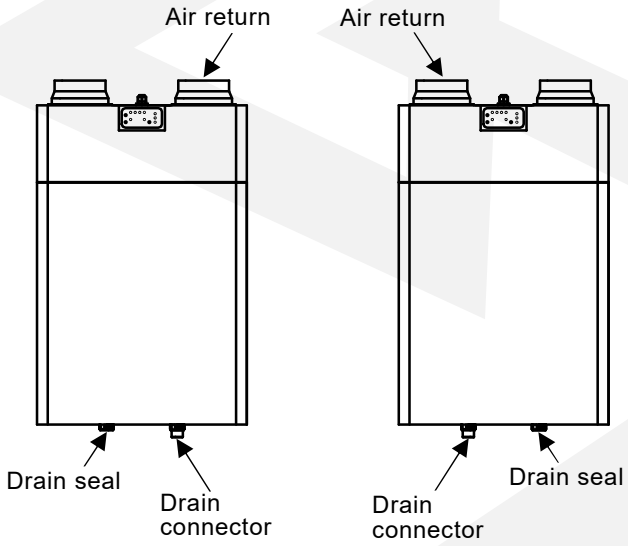
The heat recovery unit must be attached to a vertical partition with the appropriate load capacity (see the net weight of the unit in the section 2.3) with the mounting panel (included in the set). The air outlets/inlets must be upwards and there should be also a gap from the bottom for connection of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

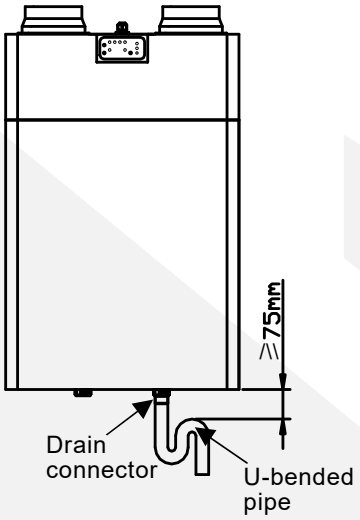
3.2 CONDENSATION DRAIN SYSTEM

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.

For VERTIC Enthalpy units, a condensate drainage system is not required, and the drain openings must be sealed.

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).

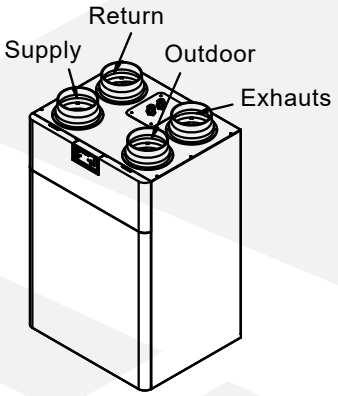
The connection of the heat recovery unit to the ventilation and electrical installations as well as all repairs and deinstallations, must be performed by qualified persons i. e. having the appropriate qualifications for these works. It is the responsibility of the installer to make the installation according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

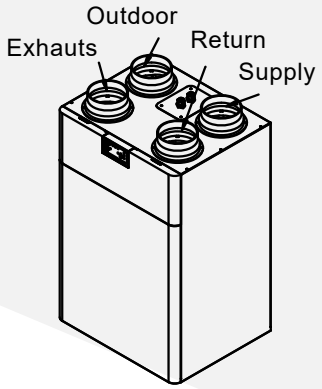
4.1 CONNECTION TO VENTILATION SYSTEM

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 arrangement 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 mm^2 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.

All works concerning electrical installation (disassembly, repair etc.) should be made by the qualified staff, who possess the qualifications due to the domestic and local norms, regarding electrical installations.

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.

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 (like blow a fuse, unusual noise etc.), immediately cut off the device from the electrical system and contact directly with the installer, the importer or the distributor. It is forbidden to turn on the unit before diagnosing and removing the reason of this malfunction.

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 cannot be operated by children and adults with reduced mobility, sensual and intellectual disability. It should be kept out of reach of children and animals.

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.

Periodical inspection and maintenance of the device according to the guidelines below, should be carried out with the given frequencies and always after two-weeks or a longer period of inactivity.

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

At the periodic inspection and maintenance, the following should be successively done:

- blow out G4 filters with the compressed air, each time when the filter alarm is displayed - after installing cleaned/new filters, remove the filter alarm (see ‚Filter alarm reset' in the section 6.1)
- F7 filter should be replaced with a new one each time when the filter alarm displays, and it is heavily soiled; G4 filter should be replaced with a new one at least every two years
- check the condition of the wiring for its damage at least once per year, and remove/repair any damage
- verify patency of unit's inlets and outlets, vent ducts and the condensation drain system at least once per year -> if there are any restriction or contamination, remove them
- 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
- at least once per year, connect the device to the power supply and assess if the fans work correctly at each stage; additional murmur, metallic reverberation, grinding noise, vibration etc. says about a malfunction - in such case, immediately cut off the device from the electrical system and contact directly with the installer, the importer or the distributor

Inspection and maintenance of the roof fan should be carried out 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 with electricity or at heights are required.

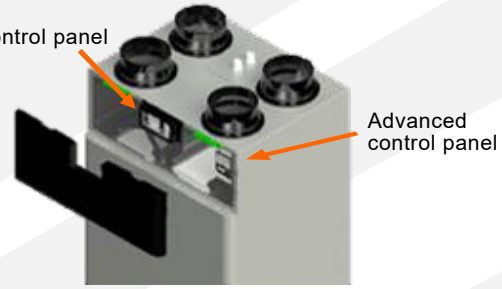
The frequency of the service should depend on the actual dirtiness - if the device is operating in an environment with a high concentration of dust, periodic cleaning should be performed much more often.

At the end of its service life, the device must be removed and disposed of in accordance with local regulations. Instructions for dismantling the unit, including a list of the required tools, are available via the QR code (on the left) or at the link below.

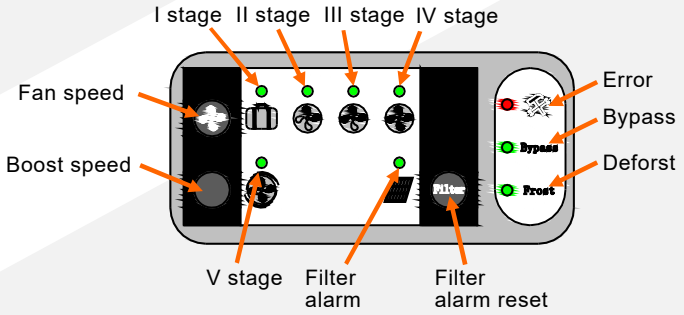
https://reventongroup.eu/pdf/lang/dismounting/vertic.pdf

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 signalised 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 signalised 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 importer 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. The defrost begins when the outdoor air temperature or the exhaust air temperature drop below -5°C or 5°C respectively. In case of the outdoor air, the temperature lower than -5°C must be for at least two hours (the time period equal defrosting time interval set with VERTIC panel), while in case of the exhaust air the defrost is activated immediately. 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 IV speed). The defrost cycle last 10 minutes by default and is activated by the exhaust air temperature sensor every half hour or by the outside air temperature sensor every two hours.

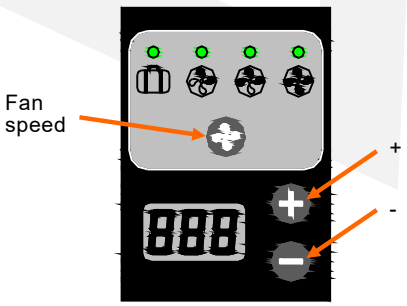
C –SENSORS

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 4th fan speed until the humidity level drops below this permitted level.

The unit also supports the CO_2 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 CO_2 concentration has been exceeded (1000 PPM by default), the unit starts to work at the 4th fan speed until the level of CO_2 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 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 m^3/h respectively. The maximum values, depending on the model, are equal 250 m^3/h, 350 m^3/h or 500 m^3/h. 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 'Fan speed', '+' 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 mm^2 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 of 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

Between the terminals of the electrical duct heater (see point 7) there is voltage 230 V when the heater is to be started. This signal should be used to control the operation of a relay through which the heater should be powered.

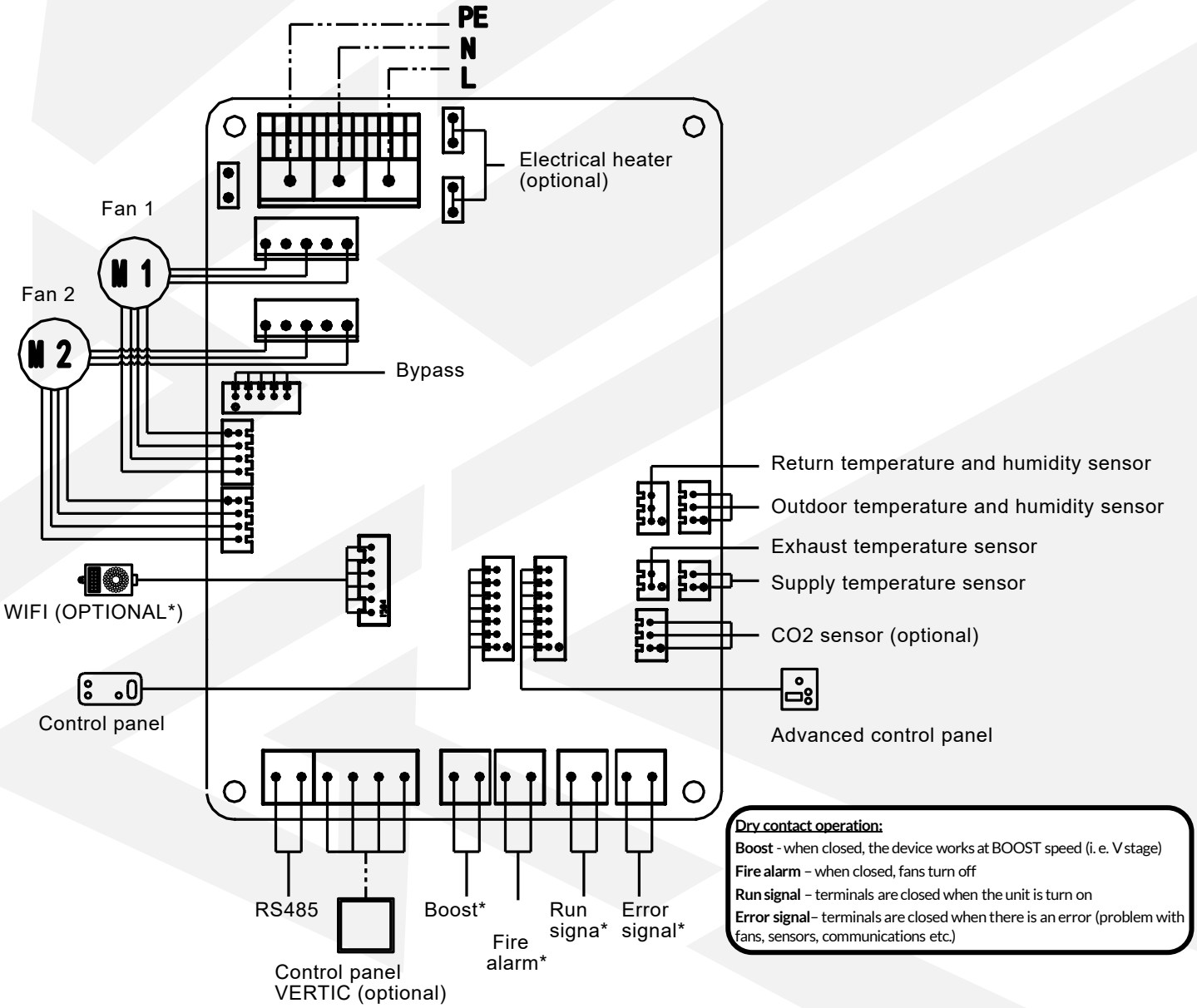
The heater will be activated when the set temperature for the supply (value marked with the thermometer icon on the panel VERTIC) is 5°C higher than the actual supply air temperature (value SA on the panel VERTIC). In case of such logic is unsatisfactory, a heater with its own controlling should be used.

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 the 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 / VERTIC 250 ENTHALPY	250	1
VERTIC 350 / VERTIC 350 ENTHALPY	350	1.5
VERTIC 500 / VERTIC 500 ENTHALPY	500	2

7 CONTROLLER (PCB)



Dry contact operation:

Boost - when closed, the device works at BOOST speed (i. e. V stage)

Fire alarm – when closed, fans turn off

Run signal – terminals are closed when the unit is turn on

Error signal– terminals are closed when there is an error (problem with fans, sensors, communications etc.)

*** WIFI function requires additional WIFI module VERTIC**



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