OPERATION AND MAINTENANCE MANUAL

for Recuperators

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1. General Safety Principles

RECOMMENDATIONS IN THE MANUAL
Failure to follow the recommendations in the manual may result in property damage and personal injury. The manufacturer is not liable for any damage resulting directly or indirectly from failure to comply with this manual.

STORING THE MANUAL
Keep this manual and the documentation pertaining to the recuperator in a location easily accessible to operators and service personnel.

REQUIREMENTS CONTAINED IN SUPPLEMENTARY INSTRUCTIONS
Depending on configuration, additional instructions for the following components may be provided with the unit. It is essential that you familiarise yourself with the safety requirements specified in these documents:

- Operation and Maintenance Manuals for OnyX accessories

PERSONNEL AUTHORISATIONS
Installation, start-up, and operation of the unit must be carried out by personnel having appropriate qualifications required by the current regulations.

ELECTRICAL CONNECTIONS
Please make sure that the mains supply voltage matches the data specified on the nameplate of the unit. The maximum permissible deviations are:

- Power supply voltage: +/- 6%
- Frequency: +/- 2%

CAUTION!
Before carrying out any electrical connections or any service work, make sure that that supply voltage is disconnected and the circuit-breaker is in the disconnected position.

Parameters of the power supply line and its necessary protective equipment must be selected and dimensioned by personnel with appropriate qualifications, regarding designing electrical installations, in accordance with applicable laws.

TRANSPORT
The unit must be transported to the place of installation, in accordance with the applicable safety regulations. Persons operating the means of transport (a forklift truck, a crane, etc.), must have appropriate authorisation. When transporting the unit, wear personal protective equipment (protective gloves, helmets, and safety goggles). Never stay under suspended loads.

OPERATION AND MAINTENANCE ACTIVITIES
Maintenance inspections must be carried out regularly, at the intervals specified in the “Operation” section. The goal is to detect defective or loose parts in advance, thus avoiding any malfunctions. Failure to rectify the detected fault increases the risk of failure, damage, or injury.

CAUTION! HOT PARTS
The unit contains parts with potentially high surface temperatures (e.g. heat exchangers, heaters, or motor housing). Direct contact with them may cause burns or other injuries. Exercise particular care, use protective clothing, and do not attempt to perform any maintenance actions, until temperature falls below 40°C.

CAUTION! SHARP EDGES
The unit features sharp edges (e.g. lamellas in heat exchangers). Contact with them may result in injuries. Use protective clothing and be particularly careful, when carryingout maintenance work.

CAUTION! MOVEABLE PARTS
The unit contains moveable parts (e.g. fan rotors). Contact with them may result in injuries or serious injuries. Maintenance work may only be carried out, when such parts have come to a complete standstill.

DETECTING DEFECTS

If mechanical damage is found in a delivered item, please draw up a damage report with the carrier. The report is to be drawn up on the day of delivery and it is the basis for acceptance of claims for transport damage. In the event of a fault or malfunction, switch off the unit and call an authorized service centre.

REPAIRS

Any and all repairs should be carried out by an authorized service centre and using original spare parts.

MODIFICATIONS

Unauthorized modifications to the device (mechanical or electrical) are not permitted and void the warranty. The manufacturer is not responsible for any such actions.

USING THE MACHINE AS INTENDED

The device must be used as intended, and within the operating parameters for which it has been designed. In the event of improper use, the manufacturer shall not be held liable for any consequences resulting from such misuse.

PACKAGING

Parts of the packaging (plastic foil, polyester foam, nails, etc.) are potentially dangerous and should be kept out of the reach of children, and after use disposed of, in accordance with the applicable regulations.

2. Declaration of the Manufacturer.

The Manufacturer declares that the equipment supplied meets the safety requirements of the following directives and associated standards:

- 2004/108/EC
- 2006/42/EC
- 2006/95/EC
- 2009/125/EC

Sub-assemblies delivered by suppliers have the appropriate declarations of conformity and/or the CE marking in accordance with the following directives:

- 97/23/EC

In order to satisfy the essential requirements of the EMC Directive 2004/108/EC, the appliance must be installed using professional engineering methods ensuring electromagnetic compatibility, taking into account information on the use of components for its intended purpose and meeting the requirements of the EMC Directive.

This declaration applies only if the unit has been installed, in accordance with the Operation and Maintenance Manual, and no changes have been made.

2.1 Residual hazards.

In the process of designing and manufacturing of the devices, solutions were applied that minimise the possibility of hazards to persons and property. However, this does not eliminate all possible risks. The following are some examples of events beyond the manufacturer's control, which may pose a potential risk to the health of persons and to the safety of property:

HAZARDS RESULTING FROM INCORRECT INSTALLATION AND ASSEMBLY

- accumulation and leakage of condensate (damage to property, causing a short circuit),
- leakage of water from the circuit (damage to property, causing a short circuit),
- falling of the appliance installed on an unsuitable substructure (danger to health and life, damage to property),
- installation in a place accessible to unauthorized persons (danger to health and life).

HAZARDS RESULTING FROM INCORRECT TRANSPORTING

- falling or overturning of the appliance in transport (danger to health and life, damage to property).

HAZARDS RESULTING FROM INCORRECT ELECTRICAL INSTALLATION

- short circuit, fire, formation of toxic fumes (danger to health and life, damage to property).

OPERATION WITHOUT PROTECTIVE PANELS AND GUARDS IN PLACE

- contact with moving or hot parts (danger to health and life).

3. General information.

This Operation and Maintenance Manual contains information regarding installing, commissioning, and maintaining of OnyX recuperators manufactured by FRAPOL. Read the instructions and recommendations, before carrying out any operation on the device. Damage to the unit, resulting from failing to follow the instructions, in particular by improper storage or transport, incorrect connecting, and ignoring operational activities, are not subject to warranty repairs.

> **CAUTION!**
>
> Warranty does not cover materials and consumables, in particular the following: air filters and fan bearings.

3.1 Identification and documentation of the recuperator.

The recuperator has a rating plate, which identifies the most important technical parameters of the device. A sample rating plate:

This Maintenance and Operational Manual is provided to the customer together with an invoice, warranty, and declaration of conformity, and any additional instructions that may be applicable.
Should you need to contact a service centre, please specify the type and serial number of the unit (look for the sticker located near the rating plate).

3.2 Intended use and scope of application.

The OnyX recuperators are used to prepare air in ventilation and air-conditioning systems, in residential buildings, commercial buildings, public utility buildings, and industrial facilities.
The units can be used for air treatment with the maximum dust concentration of 0.5mg/m3.
The permissible temperature range of the air supplied to the recuperator is as follows:

- From -20°C to +40°C.

The maximum moisture content of the air supplied to the recuperator shall not exceed 19g/kg p.s. (at the temperature of +30°C and relative humidity of 70%).

> **CAUTION!**
>
> Recuperators must not be installed in explosive atmospheres.

3.3 Structure of the recuperator and scope of delivery.

The OnyX Pride recuperators are equipped with the following components:

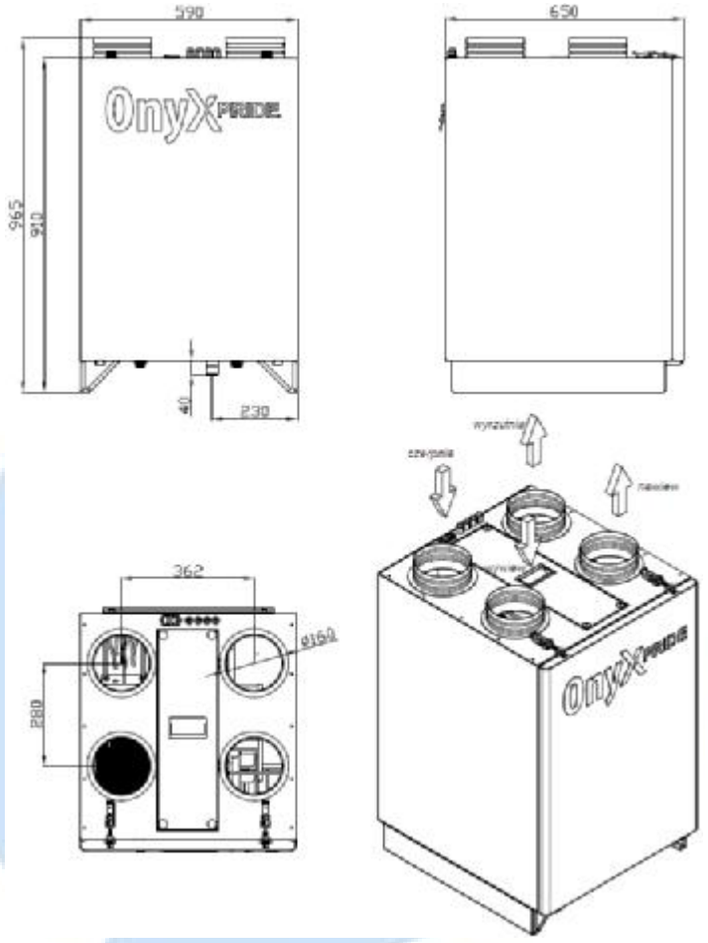
- A counter-current heat recovery system (1) with an automatic bypass system (2)
- Fresh air (3) and recovery room air (4) filters
- Supply (5) and extract air (6) fans
- An automation system (7) with a main switch and a power supply socket
- Adjustable attachment fittings for inspection flaps (8)
- An electric pre-heater of the anti-freeze system (9)
- Connection fittings for circular cross-section ventilation ducts

Scope of delivery:

- A recuperator with an integrated control system
- A control panel
- A power supply cord
- An electric heater of the anti-freeze system (if not installed inside the unit)
- An odour trap for condensate drainage systems
- O&M Manual

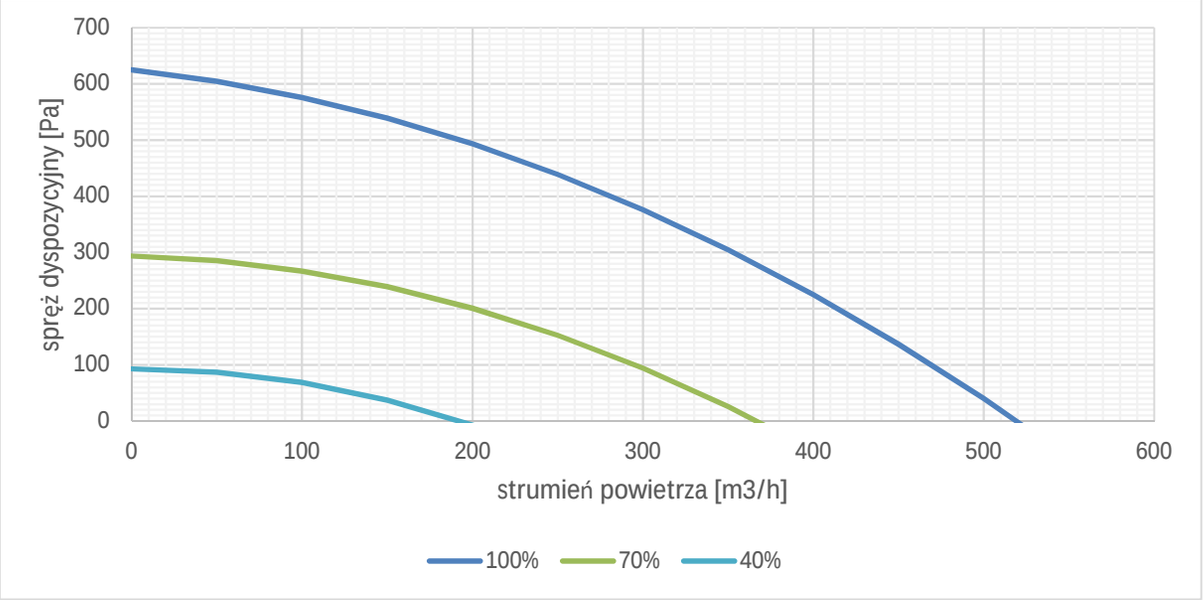
3.4 External dimensions.

3.4.1 OnyX Pride 400



3.5 Capacity range

3.5.1 OnyX Pride 400



Strumień powietrza [m3/h]	Air flow [m3/h]
Opory instalacji [Pa]	Installation resistances [Pa]

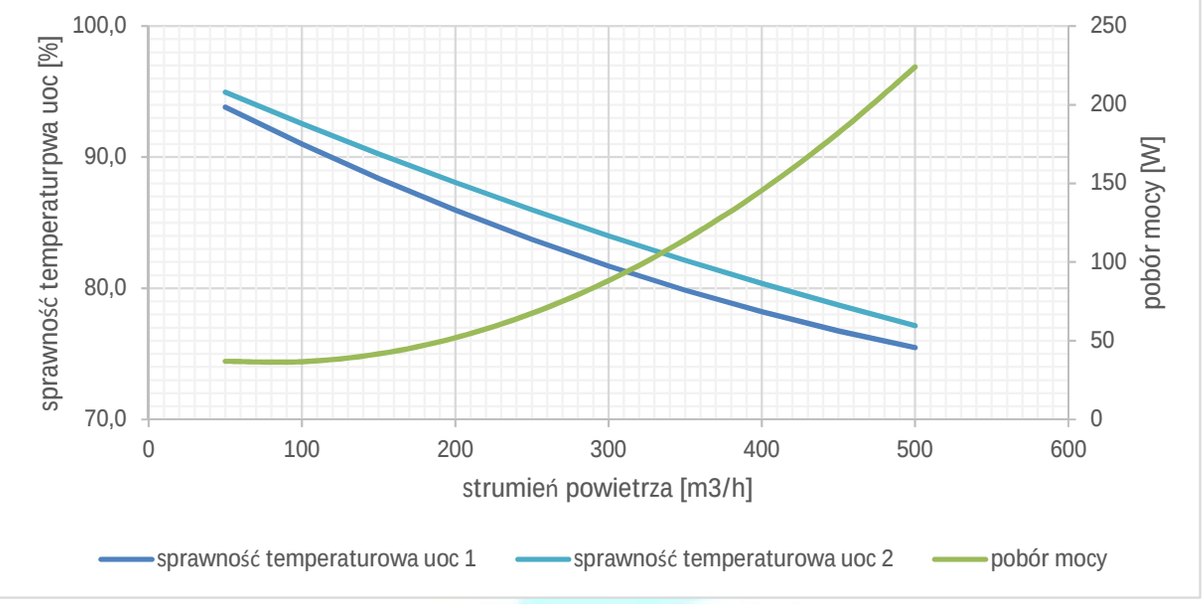
3.6 Efficiency of the heat recovery system and electric power consumption

The temperature efficiency of heat recovery in the OnyX series recuperators was determined on the basis of laboratory tests under the following operating conditions:
- temperature efficiency uoc 1
Fresh air parameters 7°C, 50%
Exhaust air parameters 20°C, 40%
- temperature efficiency uoc 2
Fresh air parameters 0°C, 50%
Exhaust air parameters 20°C, 40%
Normal operation mode (anti-freeze system inactive), with balanced, regulated ventilation system (fresh air volume = exhaust air volume) and clean air filters. The electrical power consumption is determined for the external static pressure of 100 Pa.

CAUTION!

The manufacturer is not responsible for reduced efficiency of heat recovery, resulting from improper operation and imbalance of the ventilation system.

3.6.1 OnyX Pride 400



Strumień powietrza [m3/h]	Air flow [m3/h]
Sprawność temperaturowa	Temperature efficiency

3.7 Technical Data

3.7.1 OnyX Pride 400

Air output (100Pa)	m^3/h	470
Power consumption in fans	W	198
Pre-heater power	W	1000
Rated supply voltage		230V AC/50Hz
Type of fuse	-	nadprądowy, wył. instalacyjny C10
Dimensions (width x height x length)	mm	590 x 965 x 650
Dimensions of ventilation connections (diameter)	mm	160
Weight	kg	64
Class of filters used	-	G4
Machine dimensions (W x H)	mm	400 x 180
Protection class	-	IP 40

Insulation class of the unit	-	I
Environmental conditions in the technical room		
Range of operating temperatures	°C	5-45
Permissible humidity	%	25-90 (no condensation)

(*) - power consumption at maximum load on the fans;

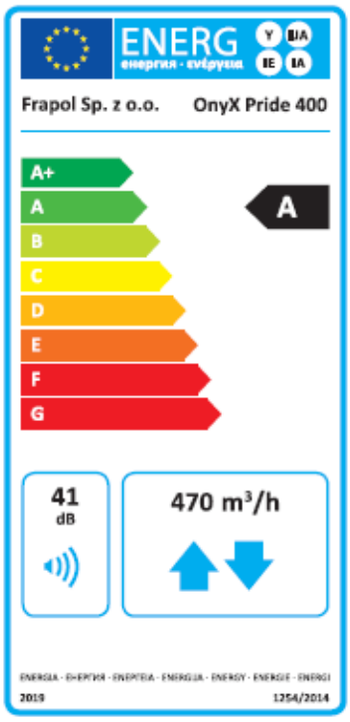
Acoustic characteristics									
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Σ
	dB								dB(A)
Air intake	64	58	57	58	55	55	52	41	61
Air supply	73	71	68	68	68	67	65	61	73
Exhaust	64	58	57	58	55	55	52	41	61
Exhaust vent	73	71	68	68	68	67	65	61	73
Enclosure	62	57	49	40	39	46	40	34	53
Operating point: 470m3/h 100Pa, all components of the recuperator clean and dry									

Acoustic characteristics									
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	Σ
	dB								dB(A)
Air intake	57	51	48	49	46	46	41	28	52
Air supply	66	64	59	59	59	58	54	48	64
Exhaust	57	51	48	49	46	46	41	28	52
Exhaust vent	66	64	59	59	59	58	54	48	64
Enclosure	55	50	40	31	30	37	29	21	41
Operating point: 329m3/h 50Pa, all components of the recuperator clean and dry									

3.8 Product data sheets and energy-related labels.

3.8.1 OnyX Pride 400

Product data sheet (technical data, in accordance with Regulation of the European Commission No. 1254/14)				
Name or trade mark of the Supplier	-	Frapol Sp. z o.o.		
Model identifier	-	OnyX Pride 400		
IZE (cold zone, moderate, warm)	kWh/(m2/year)	-74	-37,6	-14
Declared type	-	Two-way		
Type of drive installed	-	Stepless adjustment system		
Type of heat recovery system	-	Diaphragmatic		
Thermal efficiency of heat recovery	%	81		
Maximum flow rate	m3/h	470		
Power consumption by the fan drive system	W	198		
Sound power level	dB(A)	41		
Reference value for flow rate	m3/s	0,09		
Reference value for differential pressure	Pa	50		
JPM	W/(m3/h)	0,25		
Control type factor and type of control	-	0.85 - central control		
Declared maximum internal and external air leakage rates	%	Internal – 3		
		External - 3		
Degree of mixing	-	-		
Location and description of the visual warning mechanism for filter changing	-	Alarms displayed on the control panel screen		
Website address for downloading pre-assembly/dismantling instructions	-	www.frapol.com.pl		
RZE (cold zone, moderate, warm)	kWh/year	8,1	2,8	2,3
ROO (cold zone, moderate, warm)	kWh	85,6	43,8	19,8



4. Transport and storage.

The device should be stored in its original packaging, in a dry place, not exposed to weather conditions, in which the temperature remains between -25°C and +50°C.
The recuperator can be transported by means of a forklift or a crane, in its normal operating position, paying special attention to protecting the side surfaces and protruding elements against damage. Make sure that the inspection flaps are closed, before lifting the unit.

5. Installation.

5.1 Place of assembly.

The OnyX recuperator must be installed in a utility room, a boiler room, a garage, or in a room specifically adapted for this purpose. For safety reasons and due to the nature of the device, the recuperatormust not be operated at an ambient temperature below 5°C. The building in which the device is to be installed must be seasoned, and all plasters, paints, and floors must not be damp. Do not install the device indoors, where there is a high level of dustiness (gypsum finish residues or residues after scraping floors).

Before installing the appliance, a visual inspection of the general condition of the appliance must be carried out, checking also the conformity of all the components with the list of sub-assemblies.

The recuperator must be mounted on a suitable platform, a wall or a ceiling, or on a metal structure that ensures the correct load-carrying capacity, space and uniform support for the recuperator. Since it is required to provide drainage of condensate, the device should be set up in such a way that a water trap can be fitted. Provide a free space on the operating side of such width that allows opening all inspection flaps and carrying out normal operations. Hydraulic systems, electrical systems, etc., must be located in such a way that they do not hinder access to the recuperator.

> ⚠ CAUTION!
> Before installing the device, it is necessary to select appropriate fastening elements, taking into account current provisions of the building law. Carry out appropriate calculations, taking into account parameters of the substrate on which the control panel is to be mounted.

5.2 Assembly sequence.

- Remove packaging,
- place the recuperator on the structure, in accordance with the guidelines specified in item 5.1.

- Align the unit vertically and horizontally.
- Connect ventilation ducts to the unit.
- Carry out a condensate drainage system
- Install necessary accessories in the ductwork (e.g. a silencer, a re-heater, a radiator, etc.)
- Depending on the configuration, install additional measuring and control elements for the automation system
- Install a control panel
- Connect power supply to the unit

CAUTION!

After connecting ventilation ducts to the recuperator, the device should operate continuously. If it is planned to shut the unit down for a period of time longer than two hours, prevent any gravitational flow of air in the ventilation ducts, using shut-off dampers or automatic shut-off flaps. Otherwise, there is a risk of damage to the unit, resulting from flooding the unit with condensate accumulated in the ventilation ducts.

CAUTION!

Ventilation ducts must have their own suspensions and their weight cannot be supported on nozzles of the unit.

5.3 Connecting ventilation ducts

CAUTION!

Insulated ventilation ducts should be connected to the recuperator in dimensions corresponding to the dimensions of connection pipes. Insulation thickness should be taken into account, according to the current legal situation. It is recommended to use the insulation thickness values, in accordance with the guidelines of the Polish Ventilation Association.

Connections nozzles are marked with the following pictograms.

AIR INTAKE
Fresh air nozzle (air intake)

AIR SUPPLY
Nozzle for the air supplied to rooms

EXHAUST VENT
Exhaust air nozzle (exhaust vent)

EXHAUST
Nozzle for the air extracted from rooms

5.4 Air filters.

The recuperator is supplied with a set of filters. Before the first start-up, make sure that the filters are installed correctly.

CAUTION!

It is not allowed to start the unit without filter cartridges in place.

5.5 Fan.

The recuperator is equipped with factory-installed internal wiring and a main switch. All operations related to the operation of the fan motor must be carried out with the supply voltage disconnected. The motor must be connected by a qualified electrician, in accordance with the applicable OHS regulations.

5.6 Installing the controller.

5.6.1 Safety

CAUTION!

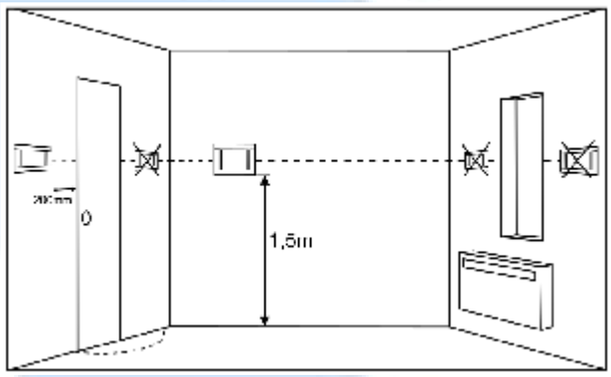
Safety requirements are discussed in the subsequent individual sections of this manual. In addition, the following requirements shall in particular be complied with.

- Before commencing assembly, repairs, or maintenance work, as well as during any connecting work, it is required to disconnect the mains supply and make sure that electrical terminals and wiring are not live.
- If the controller is switched off using the keyboard, dangerous voltage may occur at the terminals of the controller. The controller does not replace a breaker switch for other cooperating modules.
- The controller must not be used for purposes other than those for which it was intended.
- The controller should be installed by a qualified person, duly authorised, in accordance with the technical documentation and the applicable regulations. Incorrect wiring may cause damage to the unit.
- When installing the controller board, ensure a minimum air gap of 4mm and a surface distance of 6mm from the conductive live parts, and from the housing.
- The controller must not be used in an environment, in which condensation of vapour takes place, and must not be exposed to water. Provide protection against the ingress of dust and water.
- The controller is designed as a module to be installed in equipment with IEC Protection Class I. The controller board requires a protective PE connection for functional reasons, but due to the installation components to be connected and the presence of a conductive housing, a PE connection is also required for safety reasons.
- The protection class of a not installed controller board is IP00. The controller must be installed in such a way, as to prevent access to hazardous parts and to ensure that the air in the enclosure is exchanged.
- Values of the programmable parameters should be selected, according to the type of installation, taking into account all operating conditions. Selecting incorrect parameters can lead to a failure in operation. Any modification of the programmed parameters should only be carried out by an authorised person, who is familiar with the operating instructions.
- Software dedicated to the unit does not provide a high level of protection against malfunctions of the unit, and such protection should be ensured by using external safeguards, independent of the controller.
- Use additional protective elements that protect the unit against the consequences of the controller failure or errors in its software.
- The controller carries out the following procedures: switching off the heater in case of its overheating, protecting water heaters against freezing, switching off the fans when alarm conditions occur; however, the installed components must have their own protections independent of the controller.
- The device must be used as intended, and within the operating parameters for which it has been designed. In the event of improper use, the manufacturer shall not be held liable for any consequences resulting from such misuse.
- Do not exceed the permissible operating temperature of the controller: 40°C.

- The electrical system of which the controller is part should be protected with a fuse matching the occurring loads.
- Under no circumstances should the design of the controller be modified. It is forbidden to use the device, if it is faulty or has been repaired by an unauthorized service centre.
- Cables of the 230V supply network shall be routed in such a manner that they are not in contact with cables running from low-voltage components.
- Cables shall not come into contact with surfaces, which exceed their nominal operating temperature.

5.6.2 Installation instructions

- The control panel should be installed by a trained installer.
- The control panel is designed for wall mounting, indoors.
- The panel should be mounted at a height that ensures convenient operation, which is usually 1.5m above the floor.
- To connect the control panel, use the original YTKSYekw 2x2x0.8 cable with one-sided earthed shielding. A standard cable is 15m long, while all other length sizes are available on request. Communication is ensured over distances of up to 100m from the device, without any additional surge protections and signal amplification.
- The cable may be recessed in the wall or run along its surface.
- Do not run and avoid any crossing of the cable with power supply cables in the building. The cable must not be routed in the vicinity of any equipment that emits strong electromagnetic fields.
- Do not use it in an environment, in which vapour condensation is present, and do not expose it to water.
- To reduce any interferences during temperature measurement carried out by the unit, avoid areas with strong sunlight, poor air circulation, close to heating appliances, or directly by doors and windows.



CAUTION!

The panel and the controller can only be installed by the manufacturer of air handling units, or an installer familiar with this manual.
The assembly should be carried out, according to the binding regulations, standards, and guidelines specified in the controller documentation.

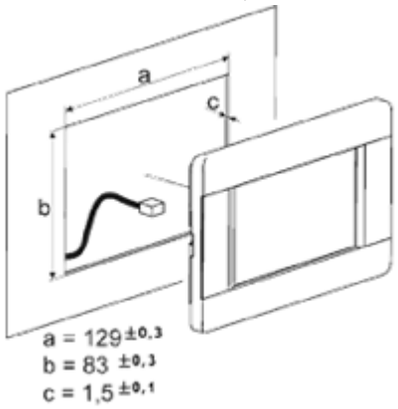
CAUTION!

Only the original shielded cable ensures correct operation of the unit. Cable extensions and any tampering with electrical connections are not permitted and may void the warranty.

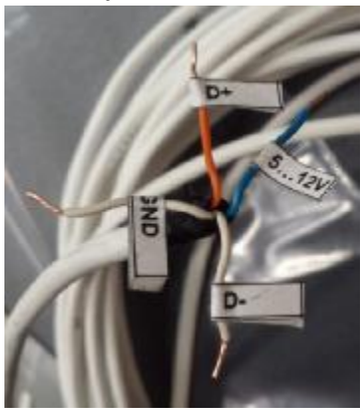
5.6.3 Assembly

The control panel and room panels should be installed, according to the following guidelines.

- Drill holes (spacing of 90x43mm) in the wall and install screws, or cut a rectangular mounting hole.



- Electrically connect the controller and the panel.

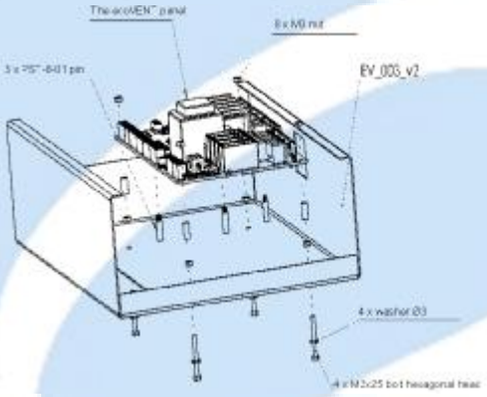


The controller module must be installed in such a way that:

- a degree of protection appropriate to the environmental conditions in which the module will be used is ensured.

> **CAUTION!**
> Keep a safe distance of ≥ 1cm between terminals of the module and the conductive components of the enclosure

- Protect connection cables against tearing out, loosening, or stressing.



Sample installation, when the module is built in.

5.6.4 Electrical connection

The controller is powered with 230V~/50Hz voltage - it is connected to the following terminals: L. N, and PE.
The installation should:

- use a three-wire cable with a protective conductor,
- and be carried out in accordance with applicable laws.

> **CAUTION!**
> If the controller is switched off using the keyboard, dangerous voltage may occur at the terminals of the controller.
> Before starting any installation work, it is essential to disconnect power supply and make sure that no dangerous voltage is present on the cables.

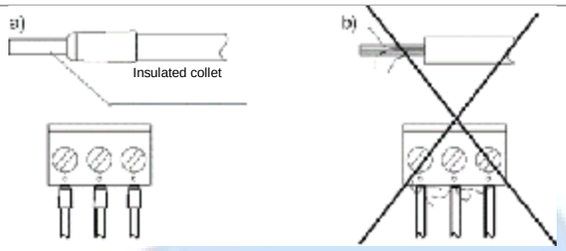
> **CAUTION!**
> Connecting the mains voltage to the digital input terminals and to the analogue and transmission outputs will damage the controller and pose a risk of electric shock.

> **CAUTION!**
> Connect the protective conductor of the power supply cable to the PE input of the module, the terminal ⏚ on the housing, and to the protective conductors of the connected devices.

> **CAUTION!**
> All peripheral devices must be connected by the installer, in accordance with the applicable regulations. Follow the safety precautions for electric shock.

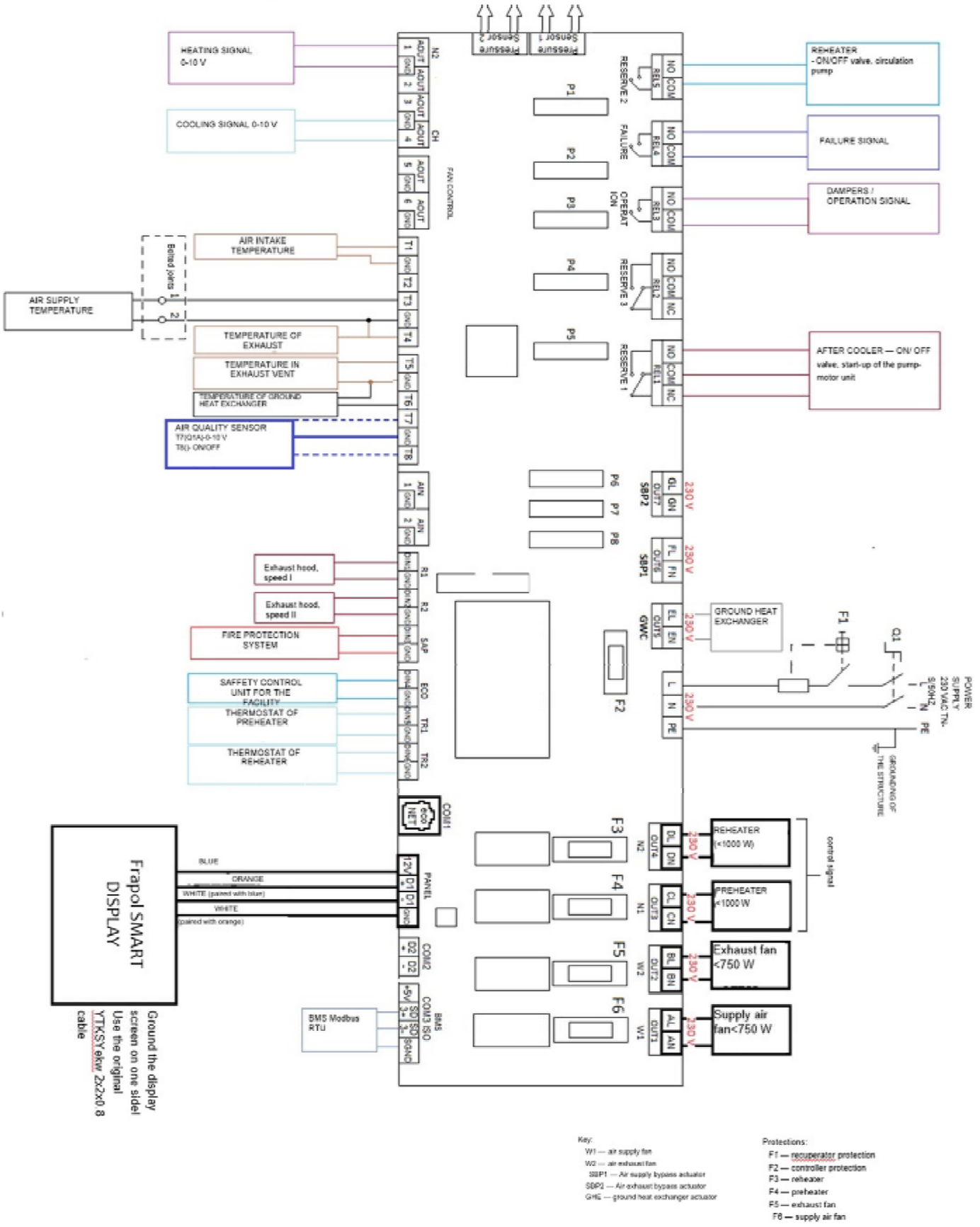
CAUTION!

The connector is equipped with screw-in splice connectors adapted for accepting cables with a sleeve tip, plugged in sockets.
Cable ends, especially those transferring mains voltage, must be protected against delamination, for example by insulated collets. Use the cable diameters and tightening torques for screw terminals specified in the technical data.



Protection of cable ends: a) correct, b) incorrect.

5.6.5 Electrical diagram of the controller board



5.6.6 List of controller inputs and outputs

Digital inputs:

- R1 - the first threshold of air flow requirement, forced from an external sensor (potential-free NO contact) / supply air filter pressure control
- R2 - the second threshold of air flow requirement, forced from an external sensor (potential-free NO contact) / exhaust filter pressure control
- SAP - signal input from the FIRE control unit (potential-free NC contact)
- ECO - signal input from the alarm control unit (potential-free NO contact)
- TR1 - pre-heater thermostat (NC)
- TR2 - re-heater thermostat (NC)
- Q1D - air quality measurement (NO) (alternatively with 0-10V).

Analogue inputs:

- Q1A - air quality measurement (0-10V signal) - the input functions interchangeably with the digital input Q1

Temperature inputs (NTC 10K sensors):

- T1 – air intake temperature
- T3 – air supply temperature
- T4 – air exhaust temperature
- T5 – exhaust vent temperature
- T6 – GHE temperature

Digital outputs:

- W1 - supply air fan (750W)
- W2 - exhaust air fan (750W)
- N1 – pre-heater (1000W)
- N2 – re-heater (1000W)
- GWC - ground heat exchanger actuator
- SBP1 - heat exchanger bypass actuator, supply air duct
- SBP2 - heat exchanger bypass actuator, exhaust air duct
- OPERATION - potential-free contact (NO)
- FAILURE - potential-free contact (NO)
- RESERVE 1, 2 - potential-free contact (NO)

Analogue outputs:

- N2 - pre-heater, three-way valve (0-10V)
- CH - water cooler, three-way valve (0-10V)
- SBP1 - heat exchanger bypass actuator, supply air duct (0-10V)
- SM1 - mixing chamber actuator (0-10V)
- W1 - supply air fan control (0-10V, PWM)
- W2 - exhaust air fan control (0-10V, PWM)

CAUTION!

The device does not provide absolute protection of the systems working with the controller and the environment in which it operates. The components working with the controller should be connected electrically, in a manner ensuring safe activation of protection mechanisms, regardless of the algorithms implemented by the controller, using, among other, the following:

- hard-wired control of the heater valve actuators, depending on the activation of the anti-freeze thermostat
- spring-return actuators for external dampers or control valves,
- hard-wired disconnection of fans or the entire device, after receiving a signal from the SAP control unit.
- Backup power supply systems, particularly dedicated to the device working with water heaters.
- In the event of a power failure, the control unit for the circulating pump or the control valve without a return spring may not be able to protect the water heat exchanger from freezing.

5.6.7 Connecting and checking temperaturesensors

CAUTION!

The sensors necessary to activate the controller and ensure its correct operation are the supply air temperature sensor and the air intake temperature sensor, the latter of which also measures the outside temperature (weather sensor).

Use only sensors of the NTC 10K type.
Sensor cables may be additionally extended, using cables with a cross-section of ≥ 0.5mm², total length of cables ≤ 15m.

CAUTION!

The sensors must be installed correctly and firmly, and protected against loosening on ventilation ducts, according to the guidelines of the unit's manufacturer.

The sensors must not be flooded with water or oils. Sensor cables should be separated from power supply lines and heat sources (incorrect temperature indication). The minimum distance between such cables ≥ 40cm.

The sensors must be connected to the controller, according to the wiring diagram.

To check the sensors, measure their resistance at a given temperature. The table below shows the nominal resistance values provided by the manufacturer.

NTC 10K	
Ambient temperature [°C]	Nominal [Ω]
0	33620
10	20174
20	12535
30	8037
40	5301
50	3588
60	2486
70	1759
80	1270
90	933
100	697
110	529
120	407

5.6.8 Connecting the room panel

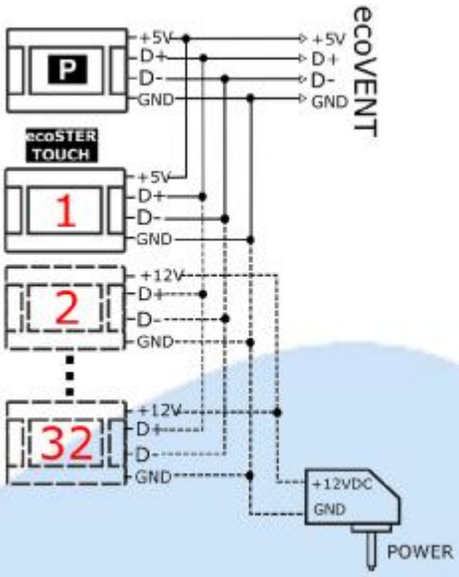
The ecoSTER TOUCH room panels can be connected to the controller module socket. The panels function as:

- a room thermostat,
- a control panel for the controller,
- alarm signalisation.

CAUTION!

Only 1 room panel (control panel + room panel) can be connected directly to the +5V power supply terminal of the ecoVENT module socket. All other panels (2-32, 31 pcs.) must by supplied from an external power source of +12VDC, min. current = number of panels x 0.15A.

Max. cable length ≤ 30m. The length can be increased, if using conductors with the cross-section > 0.5mm².

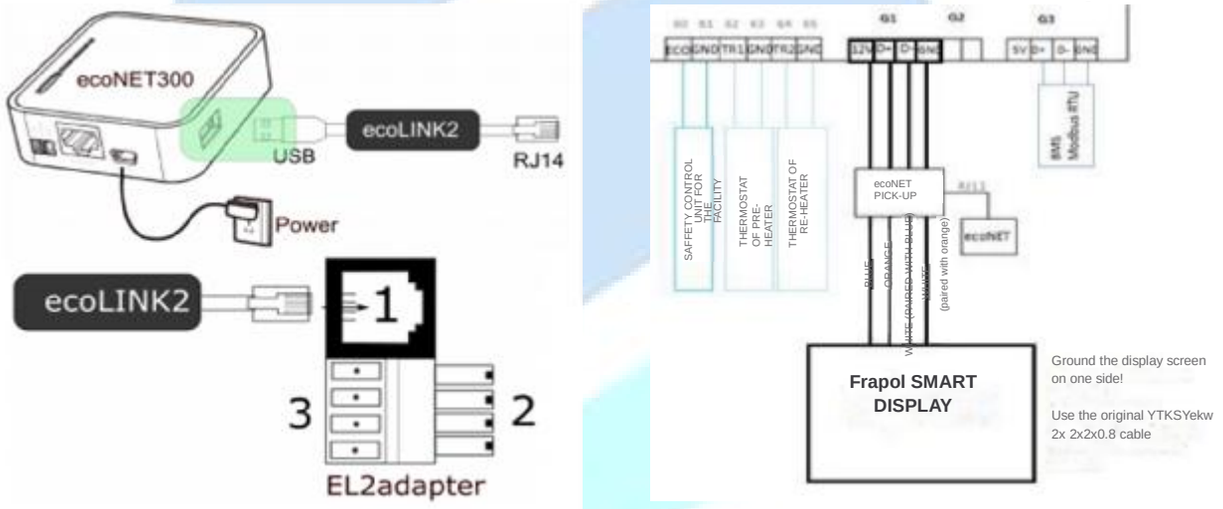


The ecoSTER TOUCH room panel can work in the *Hotel Mode*, which blocks the possibility of editing/viewing other room panels and access to the controller menu from the selected panel. This way, the user can make only the basic settings of the controller.

5.6.9 Connecting the Internet module

Connecting to the controller

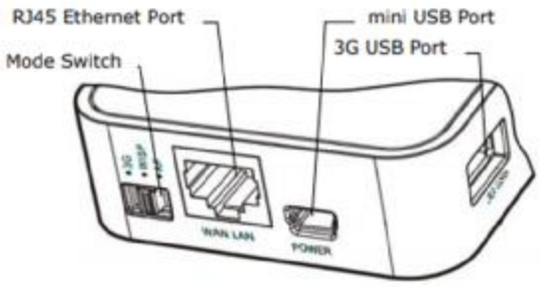
The Internet module must be connected to the controller module via the ecoLINK2 interface and the EL2-adapter.

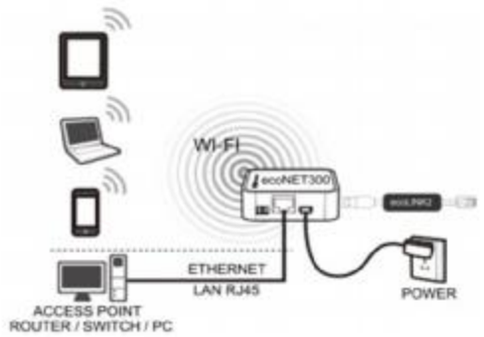


Connect the pick-up socket (1) with the ecoLINK2 interface; connect the terminals (3) to the Frapol Smart display, then plug the pick-up plugs (2) in socket G1 of the controller.

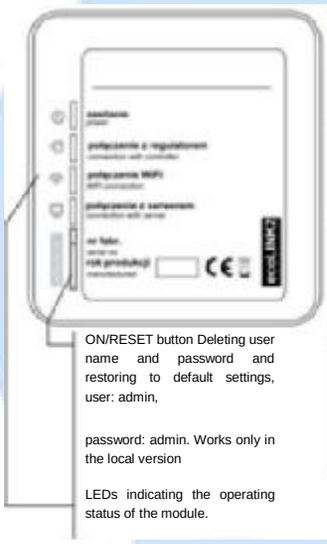
Connecting to the Internet

The EcoNET300 requires a permanent connection to an Internet LAN or wireless Wi-Fi network at the location where the controller is installed.





Plug the power plug into the mini USB port socket, and connect the 3G USB port to the ecoLINK2 interface. Use the Ethernet cable to connect the RJ45 Ethernet port, for example, to an ADSL router, a switch, or a modem. You do not need to use this socket , if there is access to wireless Wi-Fi.
After connecting power supply, the ecoNET300 Internet module will take approximately one minute to load the operating system. Only after the system has been loaded, the module starts operating and signals its status with LED controls.



LED	LED status	Operational status of ecoNET300
Power supply	Lights up	Power on
	No light	Power supply switched off
Connection to the controller	Lights up	Connection to the boiler controller has been established.
	No light	There is no connection to the boiler controller.
Connection to Wi-Fi	Lights up	Connection to a programmed wireless network has been established.
	No light	There is no connection to a wireless network.
Connection to the server	Lights up	Connection to the external ecoNET24.com server has been established.
	No light	There is no connection to the ecoNET24.com external server

After the module has successfully connected to the controller, additional options will appear in the main menu of the controller:

- Menu → Information → ecoNET WiFi
- Menu → Information → ecoNET Ethernet
- Menu → General settings → WiFi

When connecting both to LAN and WiFi networks, EcoNET300 requires that the Access Point (network access point), e.g. a router, has a DHCP server switched on, as manual IP address assignment is not supported for the module. Connecting to a WiFi network requires the following settings: network name (SSID), type of protection, access password.

Connecting to a wired LAN network
Menu → Information → ecoNET Ethernet
Here, you can find the IP number, mask, Gateway, check the connection status to the econet24 server. It is required to save the displayed IP number (sample IP: 10.1.2.237). This number, in the form of: http://10.1.2.237, must be entered in the address bar of your web browser, from the LAN network level. When entered, it will open a web page to operate the controller menu.
In the case of a wireless connection (Wi-Fi), it is necessary to enter the parameters of this network in the menu of the controller.
Menu → General settings → Wi-Fi

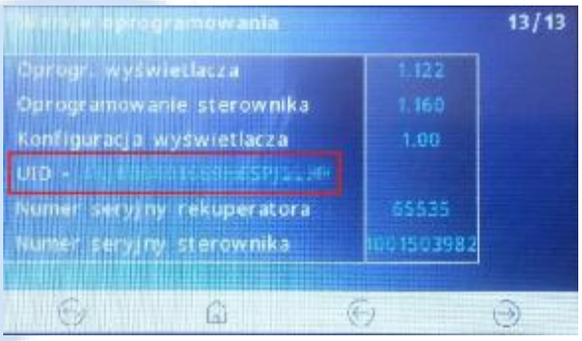
- SSID - enter the name of a local wireless network
- Protection type - select and confirm the type of encryption for a given Wi-Fi network (the most common type of encryption is WPA2)
- Password - enter the password to access the Wi-Fi network

Use Menu → Information → ecoNET WiFi to read the IP number, mask, gateway, and the connection status to the ecoNET server.
Logging into your ecoNET account

To log into your account, go to the following page www.econet24.com.

> **CAUTION!**
> The controller should be powered on and properly connected to the ecoNET300 Internet module.

> **CAUTION!**
> The module should be connected to an Internet network and logged in to an external server (the "connection to server" indicator light is on).



To create a new account, enter the UID code of the recuperator (Menu →Information). After entering the UID code and connecting to the module, a window for creating a new account is displayed. Please fill in the form with your user data, and enter your login password. Mandatory fields to be filled in: Email Password Password (repeat) UID identifier of the controller

- Controller identifier - it is required to enter the UID number of the controller
- Controller label - enter any name for your controller
- Advanced user (Edition of service parameters) - select this box, in order to be able to change service parameters of the controller from the website level (After selecting this box, it is necessary to enter the password to access service settings of the controller).
- Service access - allows accessing and editing parameters of the controller by a service centre and the device manufacturer.
- Alarm notifications (Allow alarm notifications to be sent bye-mail) - in the event of an alarm condition, the controller will send an alarm message with the alarm content to the specified email account.
- Controller installation address (same as user address) - check this box, if the controller installation address is the same as your residential address.

> **CAUTION!**
> You will be able to create an ecoNET account after you have read the user terms and conditions, in the form of regulations, and ticked the following option: I agree to be bound by these Terms and Conditions.

5.6.10 Other controller functions

Power failure

CAUTION!

In the case of power failure, once power supply is restored, the controller returns to the operating status it had before power failure. A power outage may not protect the components connected to the controller from damage, e.g. when water heat exchangers are powered and controlled directly from the controller.

5.6.11 Changing parts or components

Changing fuses

CAUTION!

Changing overcurrent protections built into the device should be performed in consultation with the manufacturer.

Use 230V mains fuses, time-delayed, porcelain, 5x20mm. Fuses in the output circuits of fans and heaters should be selected, depending on the loads present in the network. By default, fuse F1 (power supply input of the controller and ground heat exchanger outputs, SBP1, SBP2) is 6.3A. Fuses of a lower voltage rating are permitted, if the total load present in these circuits is lower.

The table below shows the approximate rating values for a fuse, depending on the load.

Load [W]	Fuse rating [A]
300	1.00
380	1.25
480	1.60
580	2.00
730	2.50
920	3.15
1000	4.00

Changing the control panel

CAUTION!

When changing the control panel, make sure that its program is compatible with the program in the controller module.

5.6.12 Record of modifications

CAUTION!

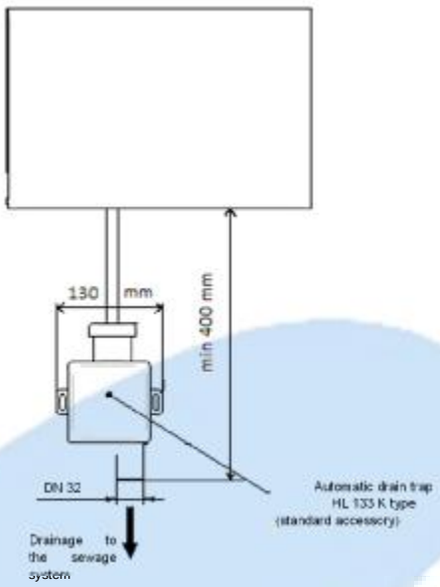
The manufacturer reserves the right to introduce improvements and modifications to the products.

5.7 Drainage of condensate.

During assembly, pay attention to the position of the drain nozzle that evacuates condensate from the drip tray. The position of the device shall ensure free access to the drain nozzle, and enable connecting a drain trap and a drain pipe, at the correct angle. As a standard, the recuperator is equipped with an automatic drain trap, which does not require periodic pouring of water.

CAUTION!

Failure to properly trap the condensate drained from the device will result in the sucking in of air from the sewage system, and will prevent proper draining of the condensate from the recuperator. This can lead to the overfilling of the drip tray and damage to the unit.



5.8 Electric heater.

The heater has double overheating protection, which means that power supply can be cut off, if there is a danger of overheating. One of the protections can be deleted manually. During assembly, pay attention to the direction of air flow through the heater, as it must comply with the marking on its housing. Failure to do so may result in overheating of the heater, as the temperature limiter will not activate. Connect electrical wires via rubber chokes to the terminal strip of the heater, according to the wiring diagram supplied with the heater. Special attention must be paid to the correct connection of the protective conductor. The heater must be connected by a qualified electrician, in accordance with the technical documentation and the applicable regulations. The electric installation of the heater must be carried out in such a way that it can be disconnected from the mains supply, by means of contacts installed at least 3mm apart at each pole, via a circuit breaker or a contactor. The connection of the electric heater to the mains must be confirmed by a report drawn up after measuring the insulation of the supply cable and the electric shock protection. After switching off the heater, the automation system must force the air supply fan to operate for a period of time that ensures the cooling of the heaters (for 3-5 minutes).

6. Pre-start testing and starting-up.

6.1 Testing.

General status:

- Are the individual components of the recuperator properly and tightly assembled?
- Is the interior of the recuperator free from foreign objects?
- Are the flexible flanges for connecting ventilation ducts stretched too tightly, squeezed, or damaged?

Air filters:

- Are the filter cartridges fitted correctly and securely fastened in the guide rails?
- Does the filter class and type match the recuperator documentation provided?
- Is the filter cloth not torn?

Fan:

- Is the interior and the surrounding of the fan free from foreign objects?
- Does the rotor rotate freely after it has been activated manually?

Fan motor:

- Does the supply voltage correspond to the rated motor voltage?

Water trap:

- Is the water trap installed and connected to the sewage system?

Counter-flow heat exchanger

- Does the actuator close and open a bypass damper, according to the force signal sent from the control system, and not the other way round?

6.2 Start-up.

The unit may only be put into operation, when it is connected to a ready-to-use and fully armed air duct system (all grilles, heaters, and air duct filters, etc., are fitted), in which all dampers, fire flaps, etc., are open. All inspection flaps must be closed, when the recuperator operates. After the initial start-up, the recuperator should operate for about half an hour. During the test run, make sure that the unit operates smoothly, paying particular attention to the following:

- excessive vibration or noise caused by the fan,
- rotational speed losses, or overheating of the motor.

Should any of the above symptoms appear, immediately switch off the device and eliminate the cause of malfunction.
At the end of the test run, the device shall be inspected in general, as prescribed in paragraph 6.1.

7. Operation.

Since the mechanical ventilation system is in constant operation almost all year round, its individual components should be periodically inspected and cleaned. From time to time, clean the following:

- Recuperator
- Control panel
- Supply and extract air diffusers located in the rooms
- Fresh air intake and exhaust air discharge grilles
- Ventilation ducts included in the recuperation system

CAUTION!

Before carrying out any service work, make sure that supply voltage is disconnected and the circuit-breaker is in the disconnected position.

7.1 Filters.

Periodic inspection/changing of the air filters must be carried out at least every 3 months. It is recommended to change the filters at least every 3 months, regardless of their level of soiling, in order to maintain high quality of the fresh air supplied to the rooms, and reduce energy consumption of the fans (a soiled filter causes an additional flow resistance).

In order to reduce the operating costs related to the OnyX Dream 400 recuperator, change only filter cloth.

	Filtration class	Filter dimensions [mm]
OnyX Pride 400	G4	400x180

To check / change filters, do the following:

- Press the  button on the controller to shut the unit down.
- Remove the plug from the outlet, causing the power circuit to be clearly interrupted.
- Remove/open the inspection flap in the recuperator.
- Remove the filters and check their level of soiling (if necessary, change them for new ones).
- Re-install the filters.
- Close the inspection flap and start the unit.
- The following diagrams illustrate the method of replacing filter cartridges.

CAUTION!

In the regions characterised by high dust levels in the air, it is recommended to check the condition of the filter cloth more frequently.

CAUTION!

When inspecting, make sure that none of the filter elements has been torn (e.g. from excessive soiling).

CAUTION!

Regular changing of filters is essential to maintain the correct performance parameters and energy efficiency of your system.

CAUTION!

Recuperators with the nominal capacity of <1000m3/h are equipped with a filter change warning system controlled by a timer. In recuperators with the nominal capacity of >1000m3/h, a warning signal is activated, when the final value of pressure drop in the filter is exceeded.

7.2 Heat recovery system.

The condition of the heat exchanger should be checked once every six months. If necessary, clean the heat exchanger with compressed air or a vacuum cleaner. In addition, check the following: the level of soiling in the condensate tank; whether the water trap is unobstructed and filled with water; and whether that the bypass damper rotates freely.

7.3 Electric heater.

The level of soiling in the heater should be checked on a quarterly basis. This operation may only be carried out, when power supply to the unit has been disconnected. If necessary, clean the heater with compressed air (directing its flow in the opposite direction to the normal direction of air flow and parallel to the lamellas), or using a vacuum cleaner with a soft suction cup. The heater is an electric device subject to periodical inspection, in accordance with applicable regulations.

8. Control system.

8.1 Scope of delivery

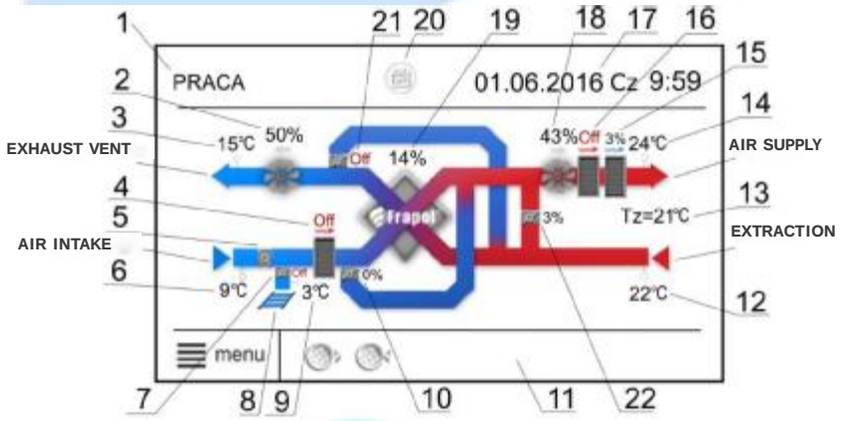
- built-in power supply and control system, including the Frapol SMART microprocessor controller and a set of instruments to control the components built into the recuperator;
- colour touch-operated control panel with a 15m cable;
- a power outlet with a main switch,
- power supply connection cable terminated with a plug (1x230VAC),
- pressure switches monitoring the soiling of air filters (for OnyX Sky 1500),
- a power supply and control system for the electric heater (in the case of a built-in heater).

8.1.1 Temperature sensors

Each OnyX recuperator is supplied with a set of temperature sensors built into the device:

- Air supply temperature
- Fresh air temperature sensor
- Extract air temperature sensor
- Exhaust air temperature sensor

8.2 Main screen



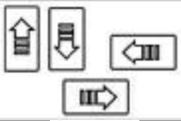
Key:			
1	Adjustment mode: OPERATION OPERATION - heating, OPERATION - cooling, Cleaning the heat exchanger, Thawing, Standstill	12	Temperature of extracted air [°C]
2	Exhaust fan air flow [%]	13	Pre-set temperature [°C]
3	Temperature of extracted air [°C]	14	Temperature of supplied air [°C]
4	Operation of an electric or water pre-heater [on/off]	15	Freon or water cooler operation [%]
5	Position of actuator for the air intake damper [on/off]	16	Re-heater operation [%]
6	Temperature of air intake (outside temperature) [°C]	17	Date, time, and day of the week
7	Position of actuator for the ground heat exchanger damper [on/off]	18	Air flow for supply air fan [%]
8	Ground Heat Exchanger (GHE)	19	Thermal efficiency of heat recovery system
9	Temperature of ground heat exchanger [°C]	20	Additional information field
10	Bypass actuator position - supply side	21	Bypass actuator position - exhaust side
11	Information field	22	Position of the recirculation actuator
[R1][R2]	Threshold of air flow requirement	[TR1] [TR2]	Heater thermostat
[SAP]	Signalling input from the FIRE control unit	[Q1]	Air quality measurement

[ECO]	Signal input from the alarm control unit		
Pictograms			
	Extract air fan operation		Information about filter changes
	Supply air fan operation		Operation of the electric pre-heater
	Bypass		Operation of the electric re-heater
	Radiator operation		Operation of the water pre-heater
	Operation with ground heat exchanger		Operation of the water re-heater
	External temperature (weather)		Ground floor
	Downtime schedule		Ventilating
	Shutdown schedule		Exit
	Overpressure		User modes I, II, III, IV

8.3 Operation

The device features a touch-screen display.

Selection of menu items and editing of parameters is effected by pressing the selected symbol on the screen:

	Return to the previous menu or failure to accept parameter settings
	Fast return to the main screen from each menu level
	Information about the selected parameter
	Access to the service menu
menu	Access to the main menu
[-] , [+]	Decrease or increase the value of the selected parameter
	Move parameter list down, up, previous, next
OK	Entering the selected menu item or confirming the setting for the selected parameter

	Switch the controller on/off

8.3.1 User menu

 Temperature setpoint - continuous mode

 Temperature setpoint settings

Lead control sensor
- Supply air sensor
- Exhaust air sensor

Reduction schedule activation
- Schedule of temperature reductions:

- Working days Saturday Sunday

 Working modes

Recuperator working mode
- Standstill
- Continuous operation
- Mode 1 Mode 2 Mode 3 Mode 4

Additional operating status
- Off
- Exit
- Party
- Ventilating

Overpressure function activation

 Setting operating statuses

Setting working mode
- Work duration
- Supply air fan speed
- Exhaust air fan speed
- Pre-set temperature

Setting ventilation mode
- Ventilation duration
- Fan speed

Setting overpressure mode
- Fan speed difference

Duration of exit mode

User mode 1/2/3/4
- User mode 1,2,3,4

- Pre-set temperature
- Supply air fan speed
- Exhaust air fan speed

Continuous mode settings
- Supply air fan speed
- Exhaust air fan speed

 Schedules

Operational schedule
- Work schedule

- Working days Saturday Sunday

 Cleaning the heat exchanger

Manual activation of cleaning

Activation interval - days

Start time for cleaning

 Alarm control panel - ECO

Operation of the alarm control panel

Reaction of recuperator
- Recuperator off
- Variable speed

Ventilation function
- Inactive
- Active

Input logical status
- Normally open
- Normally closed

Ventilation duration

Cyclic ventilation duration

 Heatrecovery

Cross-flow heat exchanger control
- No recovery
- Full recovery
- Auto Free-Cooling
- Auto without Free-Cooling

Ground Heat Exchanger
- Ground Heat Exchanger control:

- Close

- Open

- Auto
- Summer opening temp.
- Winter opening temp.
- Control settings:

- Maximum opening time of the GHE

- Adjustment time for the GHE

- Manual activation of adjustment

 Generalsettings

Language

Date

Clock

Brightness

Keystroke sound
Alarm sound
Screen saver settings
- Screen saver On/Off
- Screen saver time
- Backlit screen saver

Software update
Name of ecoSTER TOUCH
Parental control
Setting the address

EcoNET Settings
SSID
Type of WiFi protection
Password


Alarms


Maintenance Settings


Information


Switch the controller on/off

8.4 Controller working modes

- *OPERATION* - the controller controls the ventilation operation taking into account the parameters set by the user and strives to achieve the desired temperature in the room.
- *OPERATION - Heating* - the controller first selects the available heat source which can supply the warmest air transferred to the heat exchanger, when temperatures of the external air are low, in order to maintain the pre-set room temperature.
- *OPERATION - Cooling* - the controller first selects the available heat source which can supply the coolest air transferred to the heat exchanger, when temperatures of the external air are high, in order to maintain the pre-set room temperature.
- *Cleaning of the heat exchanger* - first of all, the controller performs the function of cleaning the exchanger.
- *Thawing* - the controller carries out the process of defrosting the exchanger – it is a master algorithm, and the user has no influence on the operation parameters of the air handling unit.
- *STANDSTILL* - the controller stops ventilation.

8.5 Resetting the air filter counter

To reset the air filter counter, go to:
Menu → Heat Recovery
- Resetting the filter operation counter - confirm by ticking *YES*

8.6 Temperature setpoint settings

Set the pre-set temperature of the recuperator (the temperature to be reached by the ventilation system) in:
Menu → Temperature set-point in continuous mode
Additional settings related to the temperature set-point which will be maintained by the recuperator during the adjustment period can be found in:
Menu → Temperature set-point settings
- *Lead control sensor* - sets the sensor according to which the temperature set-point will be adjusted in the recuperator. You can choose between a supply air sensor or an extract air sensor.
- *Schedule activation* - *YES* to switch it on or *NO* to switch it off

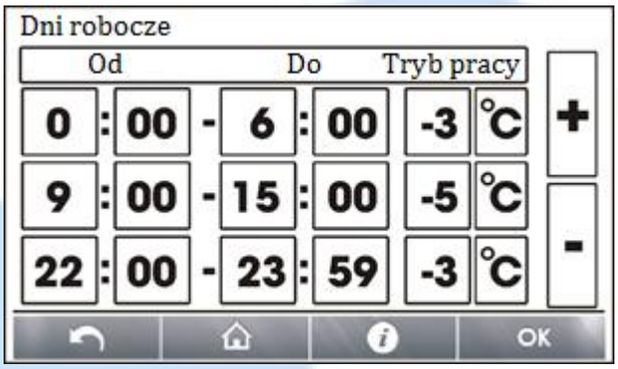
8.7 Schedule of temperature reductions.

It is possible to set time intervals for reducing temperature pre-sets in the controller.
The time periods allow you to set the desired value of temperature reduction during a certain period of time, e.g. at night, or when the user leaves the heated room. This way, the temperature set-point can be lowered automatically, without affecting thermal comfort, while at the same time reducing energy consumption.

To active time intervals, set the *Reduction schedule activation to Yes in the* Temperature set-point settings menu, which will call up an additional parameter - *Temperature reduction schedule*.
Select *Work Days*, *Saturday* or *Sunday*. Then, it will be possible to define the beginning and the end of a given period (From, To), and the value by which the temperature set-point will be lowered. Three time intervals are available per day.
See below an example of a night-time temperature set-point reduction from 10:00 p.m. till 06:00 a.m., and a daytime reduction from 09:00 a.m. to 3:00 p.m.

CAUTION!

The time intervals for a given day should be defined starting from 00:00.



The time zone editing window with sample settings for a selected day.
As illustrated in the example, the controller will set the desired temperature set-point reduction to 3°C, from 00:00 to 06:00 a.m. Then, from 06:00 a.m. to 09:00 a.m., the controller will leave the set temperature at the set-point level (no reductions). The controller will set the desired temperature set-point reduction to 5°C, from 09:00 a.m. to 3:00 p.m. Then, from 3:00 p.m. to 10:00 p.m., the controller will leave the set temperature at the set-point level (no reductions). From 10:00 p.m. to 11:59 p.m., the controller will reduce the pre-set temperature by 3°C.

CAUTION!

The programmed schedule is based on the internal memory and it will not be erased, after a power failure.

CAUTION!

A time interval is ignored, when the value of reduction is set to "0", even if a number of hours has been defined.

8.8 Working modes

To set the main operating mode and additional operating modes for the controller, according to which the control will be performed, go to:
Menu → Working modes

- *Recuperator working mode* - setting a working mode for the recuperator. Setting the mode to *Standstill* will stop the unit, leaving only protective functions active. This mode can be used, for example, to prevent unpleasant odours penetrating from the outside. If the *Continuous* operation mode is set, the recuperator remains switched on and will operate, according to the settings. The unit can also work in additional modes: *Mode 1* , *Mode 2*, *Mode 3*, *and Mode 4*, for which the user can define individual temperature settings and control parameters for the fans.
- *Additional operating mode* - activation of an additional, temporary mode of operation for the recuperator: *Exit*, *Party* or *Ventilation*. Selecting *OFF* will disable the effect of the additional operating mode on the ventilation system.
- *Overpressure function activation (fireplace, hood)* - allows the overpressure function to be *activated* or *deactivated*. When the function is activated, the extractor fan control will depend on the speed of the supply fan and the set speed difference between the fans. The recommended operation mode of the ventilation system working in combination with a fireplace with a closed combustion chamber and a kitchen hood, if it is necessary to reduce the value of the extract air fan in relation to the value of the supply air fan.

Additional operating modes
The settings related to additional operating modes of the controller, in which the status of the air handling unit control is changed for a specified period of time, can be found in:

Menu → Settings for additional operating modes

The additional operating modes enable setting an operation mode for the unit, which will best suit preferences of the user.

- *Settings the party mode* - this mode is useful, e.g. if more people are present in the room. The controller increases the air exchange rate, by setting the fan speed, according to the *supply air fan speed* and *the extract air fan speed*. Set the duration of this operating mode in *Party mode duration*. After this time expires, the controller returns to the previous operating mode.
- *Ventilation mode settings* - this mode is used, when ventilating rooms. The controller increases the air exchange intensity, by setting the extract fan speed to *Fan speed*. To set the working mode in which only the exhaust fan will operate, go to *Ventilation duration*. After this time expires, the controller returns to the previous operating mode.
- *Overpressure mode settings (fireplace/hood)* - settings related to the overpressure mode, in which where you can set the difference between fan speeds in the constant control mode. The *Fan speed difference* parameter sets the speed difference between the two fans in the overpressure mode. The exhaust fan speed will be permanently adjusted by the speed difference defined by the *Fan speed difference* parameter (in relation to the supply air fan speed).
- *Duration of the exit mode* - it is a period of time during which operation of the unit is stopped. It is used, e.g. when the user leaves the room for a longer period of time. After this time expires, the controller returns to the previous operating mode.
- *User mode 1/2/3/4* - these are settings related to user modes 1, 2, 3, 4, in which the user sets individual temperature settings for the *Temperature set-point* and control parameters for the supply and exhaust fans in the *Supply air fan speed* and *Extract air fan speed*.
- *Continuous mode settings* - setting of the *Supply air fan* speed and *Extract air fan speed* in the control mode with constant air flow in the fans.

8.9 Schedules

Enabling or disabling the recuperator, depending on schedule settings. The available *Work schedule* controls interruptions in the recuperator operation.

The work scheduler settings are analogous to the reduction scheduler settings, although the recuperator is switched off (*OFF*) for the defined periods on a given day, and remains switched on outside those periods of time.

8.10 Cleaning the heat exchanger

The purpose of cleaning the heat exchanger is to protect it against the accumulation of mineral and biological deposits inside it, which reduces its heat recovery efficiency. The settings related to the heat exchanger cleaning mechanism can be found in:

Menu → Cleaning the exchanger

- *Manual activation of cleaning* - manual activation of cleaning, without waiting for the cleaning criteria to be satisfied.
- *Activation interval - days* - setting the number of days after which the unit operation. The heat exchanger should be cleaned periodically.
- *Start time of cleaning* - This is the time at which cleaning is started on the scheduled cleaning day.

8.11 Alarm control panel - ECO

Settings related to the processing of signals sent from the alarm control panel. After receiving a signal from the alarm control panel, the value of air flow through fans is reduced, in accordance to the settings in:

Menu → Alarm control panel - ECO

- *Control panel operation* - switching the alarm control panel on or off. When a signal is received from the alarm control panel and the function is active, the control panel changes its settings for the period of time necessary to receive the signal from the unit
- *Reaction of recuperator* - setting a reaction of the recuperator, after receiving a signal from the alarm control panel. You can turn the alarm control panel off using the *Recuperator off* parameter, or change its operational speed in *Speed change*.
- *Ventilation function* - switching on - Active, or switching off - *Inactive* of the ventilating function, if the active control mode with an alarm control panel is on.
- *Input Logical Status* - Set the logical status of a digital input to *Normally Open* or *Normally Closed*.
- *Ventilation duration* - the time in minutes during which ventilation will continue.

- *Cyclic ventilation time* - it is a time interval at which the ventilation cycle is to be repeated, after the unit has switched to control mode.

8.12 Heat recovery

This menu contains user settings related to bypass and ground heat exchanger (GHE).
Bypass dampers allow diverting external air and bypass the heat exchanger to disable the heat recovery function at high external temperatures, or when there is a risk of frosting.

- *Cross-flow heat exchanger control* - allows selecting a control mode for bypass dampers. The dampers can be permanently opened - *Full* recovery (in this case the permanent heat recovery function is deactivated. There is no risk of frosting of the heat exchanger), or permanently closed - No *recovery*; or they can be controlled by the *Auto* Free-Cooling algorithm (the air inside is cooled to the temperature set by the low temperature of outside air), or the normal operating algorithm - *Auto without Free-Cooling*.

The controller controls the ground heat exchanger (GHE) as part of the ventilation system. Ground temperature of approx. 8ºC is used to heat up the air in the winter, or to cool the air flowing through the GHE, in the summer.

> **CAUTION!**
> In order to operate the GHE, an external temperature sensor must be connected.

The *GHE* control parameter allows selecting an operating mode for the GHE:

- *Close* - the controller closes the damper on the GHE line and cuts off the air flow through the GHE.
- *Close* - the controller opens the damper on the GHE line and opens the air flow through the GHE.
- *Auto* - the controller closes the air intake damper and opens the GHE damper for the intake of air to the recuperator, through the GHE, when the outside temperature is above the *Winter opening temperature*, e.g. in autumn and winter periods. The controller closes the air intake damper and opens the GHE damper for the intake of air to the recuperator through the GHE, when the external temperature is below the *Summer opening temperature*, e.g. in the summer. The switching of the dampers depends on the operating status of the controller set by the user.

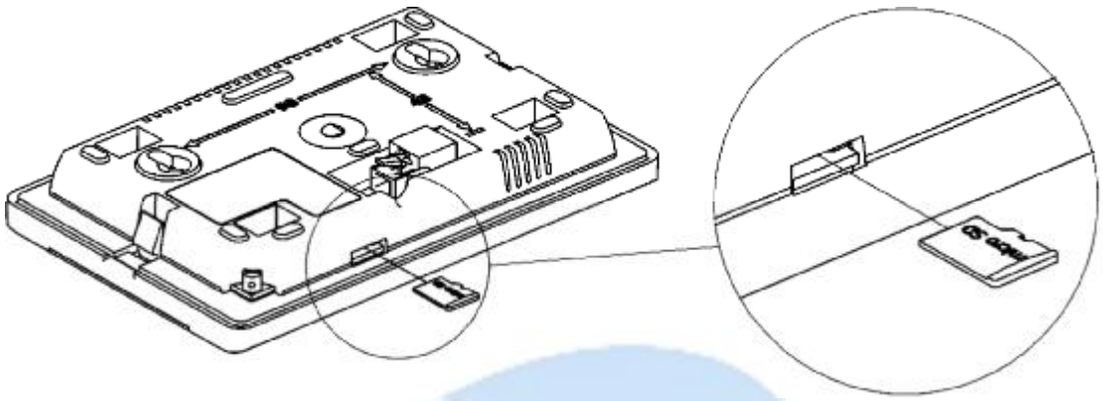
> **CAUTION!**
> The outside temperature is measured by a temperature sensor at the inlet to the air intake.

The additional adjustment settings for the GHE can be found in:
Menu → Heat recovery → GHE → Control settings

- *Maximum opening time of GHE* - the maximum time during which the GHE damper throttle can remain opened. After this time, the GHE regeneration procedure will be started.
- *Recovery time of the GHE* - regeneration time for the GHE. During regeneration, the GHE damper will remain closed.
- *Manual activation of regeneration* – manual activation of regeneration, without waiting for the temperature and time criteria to be met.

8.13 General Settings

- *Alarm sound*- activating or deactivating the acoustic signal for alarms.
- *Language* - selecting menu language.
- *Date* - setting the date. After entering the date, the day of the week will be set automatically.
- *Clock* - setting the time. Changing the time from the level of any ecoSTER TOUCH room panel will also change the time in the controller itself.
- *Brightness* - the intensity of display backlight.
- *Keystroke tone* - activating or deactivating the sound of pressing a key on the touch screen.
- *Software update* - updating software for the controller module and control panel, by means of a microSDHC memory card (only), which is installed in the socket in the panel housing, and in the corresponding programmable devices connected to the controller module.



To change the program, disconnect power supply to the controller. Insert the memory card into the indicated slot. The new software should be stored on the memory card in *.pfc format and in the form of two files: a file with a panel program and a file with a program for module A of the controller. Insert the new software directly into the memory card without nesting the data in a subdirectory. When the card is entered into the panel, the update screen starts. First of all, change the program in module A of the controller. After restarting the controller, go to Menu → General Settings → Software update and then select *Update panel.*

CAUTION!

Power supply must not be disconnected, during installation. Otherwise, the controller can be damaged.

CAUTION!

When software is updated, it will restore factory settings in the controller. Before starting the recuperator, it is necessary to reconfigure the settings for its components.

- *Setting the address* - it assigns an individual address to a room panel in a given bus, if more than one room panel is connected to the controller.

CAUTION!

To ensure that the system operates correctly, assign a different address for each of the separate room panels, choosing from the 100-132 pool.

- *Parental control* - if this function is active, the menu cannot be accessed. Touch the screen for approx. 3 seconds to unlock (you will see an animation showing the opening of a padlock).
- *Name of ecoSTER TOUCH* – enter the same name as the one given by the user to the ecoSTER TOUCH room panel. The assigned name should be identical for all the connected room panels.
- *ecoNET Settings* - configuration of the WiFi network connection, if the ecoNET300-V Internet module is connected to the controller. Connect the ecoNET300-V module to the controller, as described in section 5.6.9, enter SSID – network identifier, select the type of Wi-Fi protection, and enter password for the selected Wi-Fi network. Further configuration of the module must be carried out, according to the Operation and Maintenance Manual for ecoNET300-V.
- *Screen saver settings* - Setting the *Screen saver On/Off* parameter to YES makes the screen go dim or off, after a certain period of time. The period time to start the screen saver is set in *Time to activate screen saver*. To set the backlight value during the active screen saving mode, go to *Backlit screen saver*.

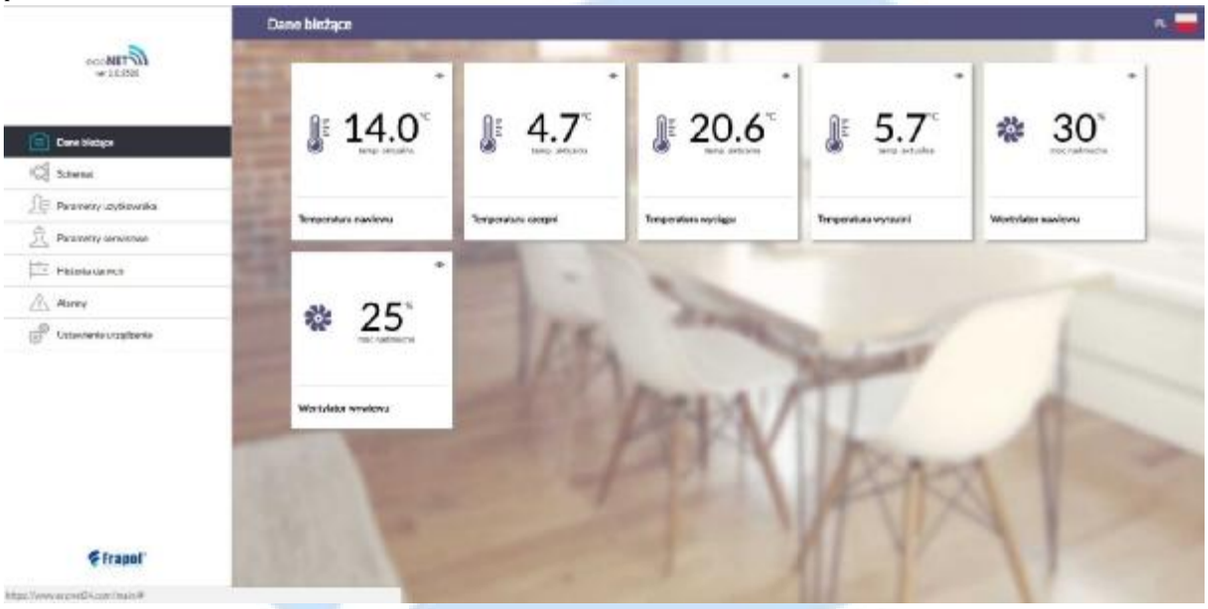
8.14 Working with the Internet module.

Ordering a control system equipped with an ecoNET module, which provides access to the services available in the ecoNet System – the Administrator of which is PLUM Sp. z o.o. in Ignatki, is tantamount to accepting the *Terms and Conditions of the www.econet24.com website and the EcoNET service* available at http://www.plum.pl/index.php/econet#pobierz, as well as by email, at every request of the User. At the same

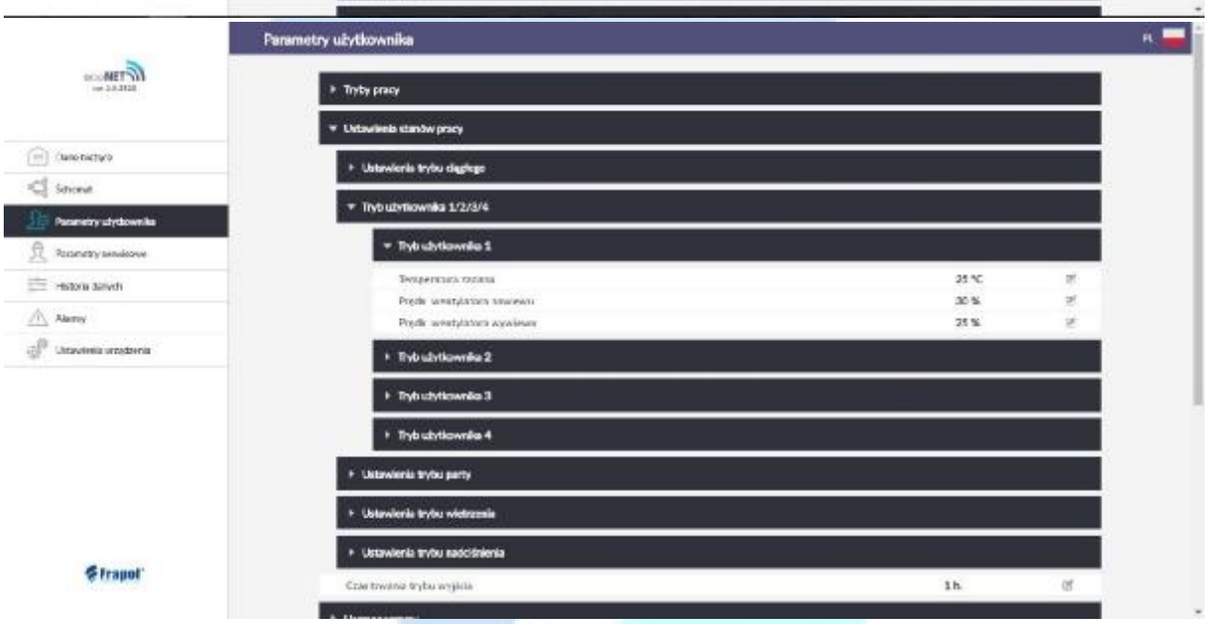
time, it also constitutes a consent to full remote access to the controller, in particular, monitoring its operation and editing service parameters of the controller, if it is required to perform technical service.

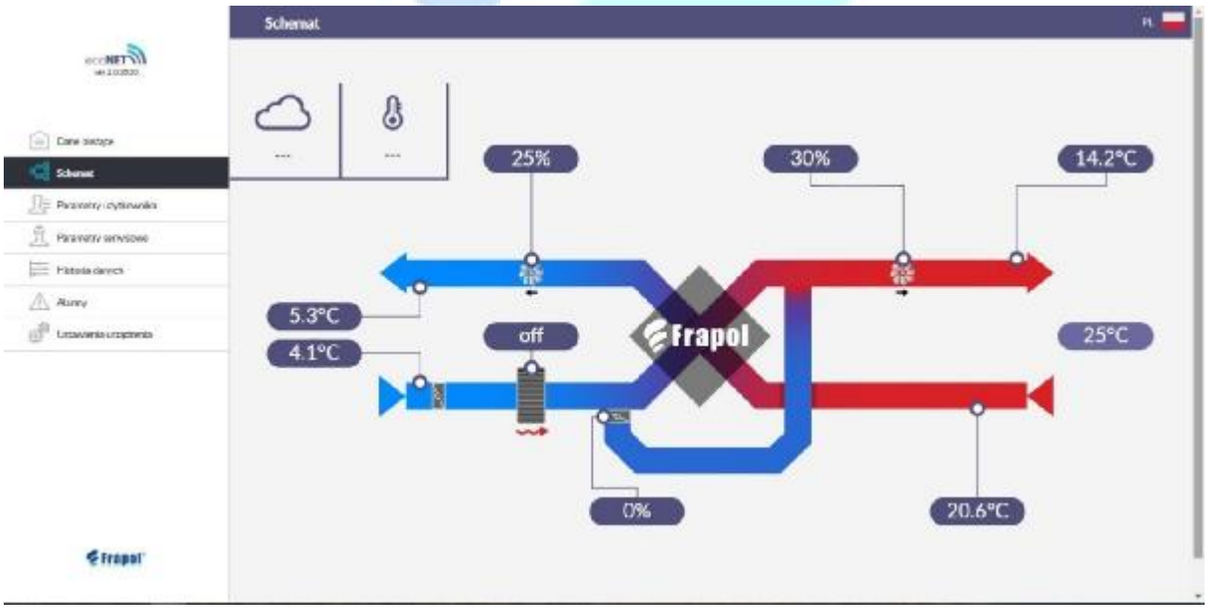
The ecoNET300-V Internet module enables remote managing of the controller operation via a Wi-Fi/LAN network, and the website owned by www.econet24.com. The user can use a PC, a tablet, or a phone with a web browser to remotely monitor the operation of the controller and modify its operating parameters. When using the Android system, you can additionally do this via a convenient mobile app ecoNET.apk.

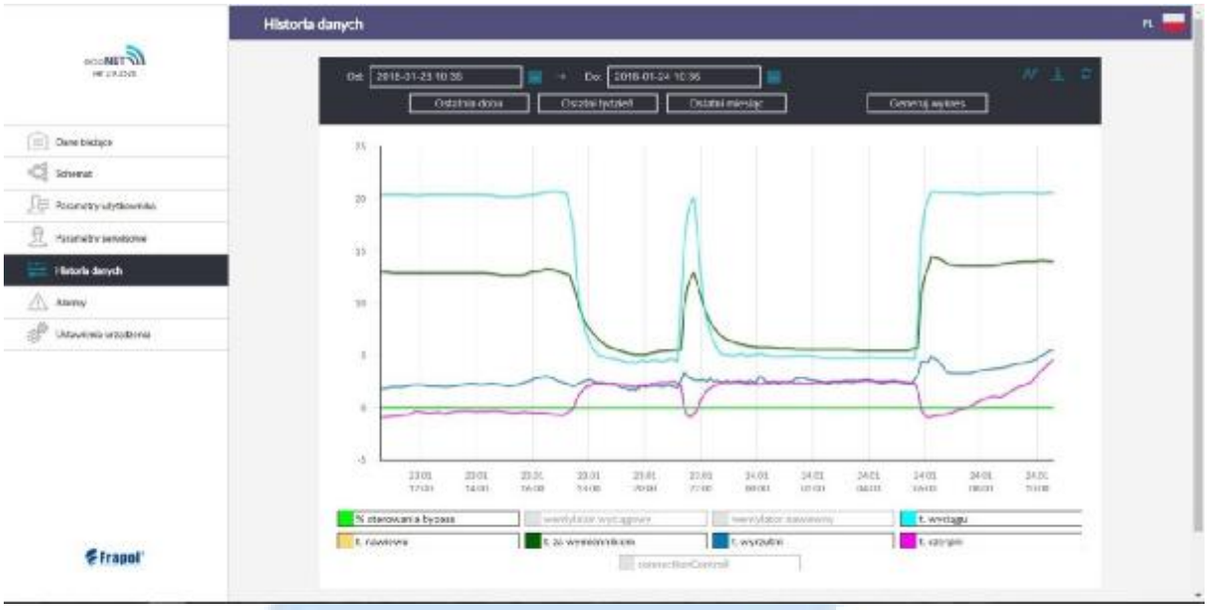
The method of connecting the ecoNET300-V module to the controller has been described in detail in the ecoNET300-V user manual.
Below is an overview of the website and mobile application with sample values corresponding to the operating parameters of the controller.




Parametry użytkownika
Informacje
Temperatury
Sterowanie wentylatorem
Dodatkowe stany pracy
Filtry przeciwzabrudzeniowe
Przepustnice bypass
Temperatura zadana
Komora mieszania/Chłodnica
Nagrzewnica pierwotna/wtórna
Wejścia cyfrowe 1
Wejścia cyfrowe 2
Czyszczenie wymiennika
Odzysk energii - prognoza dobowa
Czasy pracy


Parametry użytkownika
Tryby pracy
Ustawienia stanów pracy
Ustawienia trybu długiego
Tryb użytkownika 1/2/3/4
Tryb użytkownika 1
Tryb użytkownika 2
Tryb użytkownika 3
Tryb użytkownika 4
Ustawienia trybu party
Ustawienia trybu wietrzenia
Ustawienia trybu nadciśnienia


Schemat
25%
30%
14.2°C
5.3°C
4.1°C
off
Frapol
25°C
0%
20.6°C



Interface of the ecoNET.apk app with sample settings. The mobile ecoNET.apk app can be downloaded free of charge.

8.15 Alarms

Alarm	Possible cause	Effect of alarm	Display
Outdoor temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Supply air temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
The temperature sensor after the heat exchanger is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Exhaust vent temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Room air temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
GWC temperature sensor is defective.	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Air intake temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Exhaust air temperature sensor is defective	The sensor has been damaged, has been connected incorrectly or not configured	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded, then the alarm disappears
Frosting of the heat exchanger	Frosting of the heat exchanger - defrosting procedure has been started.	Signalling of alarm, defrosting procedure	Continuously from the moment the cause is recorded, then the alarm disappears
SAP alarm - the recuperator was stopped due to an external signal.	SAP alarm - the recuperator was stopped due to an external signal.	Signalling of alarm, SAP operation procedure	Continuously from the moment the cause is recorded, then the alarm disappears
No confirmation of supply or extract air fan operation.	The fan has been damaged, has been connected incorrectly or is not powered.	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded,
Soiled filter - service life of the filter has expired, call the service centre to have the filters changed.	Filter may be soiled - call the service centre to have the filters changed.	Signalling of alarm, no display for energy recovery	Until the installer has entered completion of a new inspection
Temperature of the air supplied to the room was too high.	Temperature of the air supplied to the room was too high.	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded,
Overheating of the electric secondary heater - triple activation of the thermostat.	Temperature in the secondary electric heater is too high - triple activation of the thermostat. Airflow too low, thermostat of the heater may require the alarm to be acknowledged.	Signalling of alarm, electrical heater cyclic alarm procedure	Continuously from the moment the cause is recorded,
General inspection by the technical service of the manufacturer is required	General inspection required - contact the technical service of the manufacturer.	Signalling of alarm, no display for energy recovery	Every 7 days, after the cause is recorded

Periodic inspection approaching.	Periodic inspection approaching - contact the technical service of the manufacturer.	Signalling of alarm,	Every 2 days, after the cause is recorded
Unauthorized start-up - device locked	Unauthorised attempt to configure the device	Signalling of alarm, stopping and blocking the recuperator	Continuously from the moment the cause is recorded,
Overheating of the electric pre-heater - triple activation of the thermostat.	Temperature in the electric pre-heater is high - triple activation of the thermostat. Airflow too low, thermostat of the heater may require the alarm to be acknowledged.	Signalling of alarm, electrical heater cyclic alarm procedure	Continuously from the moment the cause is recorded,
Possible overheating of the pre-heater.	A thermostat that prevents the unit from overheating has been triggered, which may require a reset.	Signalling of alarm, alarm procedure for the electric heater	Continuously from the moment the cause is recorded, then the alarm disappears
Possible overheating of the re-heater.	A thermostat that prevents the unit from overheating has been triggered, which may require a reset.	Signalling of alarm, alarm procedure for the electric heater	Continuously from the moment the cause is recorded, then the alarm disappears
The supply air temperature is too low.	Temperature of the air supplied to the room is too low.	Signalling of alarm, stopping the recuperator	Continuously from the moment the cause is recorded,
Low temperature in the water heater	Low temperature in the water heater - heating procedure is started	Signalling of alarm, heating procedure	Continuously from the moment the cause is recorded, then the alarm disappears

8.16 Assembly instructions and operational settings for the SMART controller

CAUTION!

The following diagram does not replace the design of the ventilation system. It is used for illustrative purposes only.

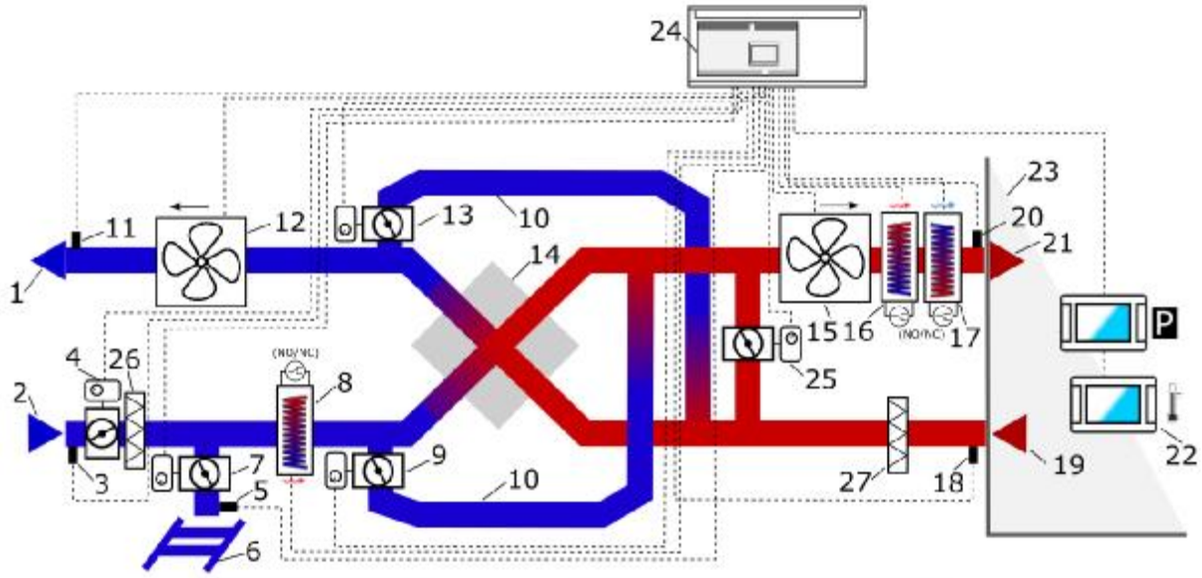


Diagram of the ventilation system with a cross-/counter-flow heat exchanger and a secondary freon or water cooler, as well as an electric pre-heater and re-heater: 1 - Exhaust vent, 2 - Air intake, 3 - Air intake temperature sensor, NTC type (external temperature), 4 - Air intake damper actuator, 5 - GHE temperature sensor, NTC type 6 – Ground Heat Exchanger, 7 - GHE damper actuator, 8 - Electric heater or a primary water heater with a thermostat (NO-NC), 9 - Bypass damper actuator, 10 – Bypass, 11 - Exhaust vent temperature sensor, NTC type 12 - W2 exhaust fan, 13 - Bypass damper actuator 2, 14 - Cross-/counter-flow heat exchanger, 15 - W1 air supply fan, 16 - Electric heater or a secondary water heater with a thermostat (NO-NC), 17 - Freon heater or a secondary water heater with a thermostat (NO-NC), 18 - Exhaust temperature sensor (from the room), NTC type 19 - Exhaust, 20 - Supply air temperature sensor, NTC type 21 - Supply air, 22 - ecoSTER TOUCH room panel with a room thermostat function, 23 - Living space, 24 - Built-in ecoVENT-F module, 25 - Damper actuator in the mixing chamber, P – Control panel, 26 – Air intake filter, 27 – Exhaust filter.

General principle of operation.

When the controller is switched on, the supply and extract air dampers are opened by the actuators (if connected to the OPERATION contact), and then the supply and extract air fans are started. Depending on the demand for cold or heat, the controller automatically opens or closes the bypass damper 1 and bypass damper 2, or starts the freon cooler, the water cooler, or the electric heater.

The heat exchanger is protected against frosting by a multi-stage procedure, taking into account the following:

- Switching on of a pre-heater (if any).
- A reduction of the air flow in the air supply fan and an increase of the air flow in the air exhaust fan - if the risk that the heat exchanger will freeze is real: the ratio can change up to 25% - the supply air, 80%- the exhaust air.
- Maintaining the temperature, if secondary heat exchangers are used - if not present, only by the heat recovery exchanger.
- Opening of the supply air bypass - final protection.

8.17Installer Menu

> **CAUTION!**
>
> This menu is available only after entering the installer's password.

In order to activate additional system components (reheater/after cooler, ground heat exchanger damper, kitchen hood input R1/R2, air quality sensor input), it is necessary to:

- Switch off the recuperator in the radial menu using the "switch off recuperator" button
- Access the service menu
- Enter the password for accessing the installer menu
- Configure the controller on the tabs
- Output configuration (heaters/coolers/GHE damper)
- Inputs configuration (measuring elements, inputs R1/R2)

Maximum air flow	[0-10,000]
Filter settings	
Reset filter operation counter	[Yes/No]
Manual control	[ON/OFF]
Supply air fan, Exhaust air fan, Electric pre-heater, Electric re-heater, Ground Heat Exchanger, Operation, Failure, Cooler	
Manual control setting	[0-100%]
Re-heater control	
SBP1 control	
SM1 control	
Radiator control	
Air supply fan control	
Exhaust air fan control	
Information	
Hardware configuration of recuperator outputs	
GHE support	[Yes/No]
Re-heater type	[None / Digital electric / Analogue electric / Digital water / Analogue water]
Pre-heater support	[Off / Electric / Water]
SM1 damper control	[Yes/No]
Radiator support	[Yes/No]
Bypass damper 2 support	[No/Yes]
SM1 settings:	[SM1 minimum control / SM1 maximum control]
Configuration of potential-free contacts	
Actuator power supply	[None / Heat recovery / Radiator / Heater]
Reserve 1	[None / Heat recovery / Radiator / Heater]
Reserve 2	[None / Heat recovery / Radiator / Heater]
Cooling demand threshold	
Heating demand threshold	
Hardware configuration of recuperator inputs	
Air quality sensor	[No/Yes]
Air quality sensor support	No / Analogue CO2 sensor / Analogue humidity sensor / Digital sensor]
Heater thermostats	
Pre-heater thermostat	[Normally Open/Normally Closed]
Re-heater thermostat	[Normally Open/Normally Closed]

R1/R2 input settings	
R1/R2 input working mode	[None / Hood / Filter pressure switches]
R1 input logical status	[Normally Open/Normally Closed]
R2 input logical status	[Normally Open/Normally Closed]
Hood mode settings	
Supply air fan, controlled with R1	[-100-100%]
Exhaust air fan, controlled with R1	[-100-100%]
Supply air fan, controlled with R2	[-100-100%]
Exhaust air fan, controlled with R2	[-100-100%]
Fan settings	
Air supply fan minimum control	[25-100%]
Air supply fan maximum control	[75-100%]
Exhaust air fan minimum control	[25-100%]
Exhaust air fan maximum control	[75-100%]
Air supply fan stop delay	[0..20min]
Minimum outside temperature	
Permitted from min. outside temp.	[No/Yes]
Min. outside temperature	[-20..20ºC]
Hysteresis of min. outside temp.	[0..10 ºC]
Inspection settings	
Inspection function support	[On/Off]
Resetting work day counter	[No/Yes]
Number of days to inspection	[30..160]
Modbus settings	
Modbus address	[0..200]
Baud rate	[9600/19200/115200]
Number of stop bits	[1 stop bit /2 stop bits]
Parity	[None/Even/Odd]
Modbus activation	[No/Yes]
Parameter edition	[No/Yes]
Recuperator control	[No/Yes]
Modification lock	[No/Yes]
Default settings	
Panel default settings	
ecoVENT default settings	
Touch panel calibration	

8.18 Description of Installer Menu

Maximum energy expenditure in the recuperator

Setting the maximum energy expenditure for the recuperator in use.

Filter settings

Settings related to anti-soiling filters.

- *Resetting filter operation counter* - this setting is used to erase the counter displaying the number of days the filter has been in operation, which will clear the alarms requiring changing the filter, and the counting of filter working days will start anew.

Manual control

The menu enables manual control of individual automation elements, by switching them on and off.

Manual control settings

Setting the speed of analogue outputs in manual control.

Information

It contains various information about the operation of the controller: values of the measured temperatures, statuses of outputs and inputs, software versions, etc.

Hardware configuration of recuperator outputs

The controller can be programmed to control individual recuperator outputs, which affects the control of devices connected to these outputs.

- *GHE operation* - switching the GHE control module on or off. If GHE is not available in the system, disable GHE support, by setting the parameter to *No*, so that the control algorithm is not affected by the absence of the module.
- *Type of re-heater* - activating or deactivating the type of the re-heater in use with the *None* set-point.
- *Re-heater support* - activation or deactivation of the -re-heater operation (electric or water heater).
- *SM1 damper support* - activation or deactivation of the SM1 damper support (located between the duct that connects the air supply and air exhaust).
- *Radiator support* - activate or deactivate radiator control. Freon or water cooler is supported.
- *Bypass damper 2 support* - activation or deactivation of bypass damper 2 operation during the process of air control and recovery.
- *SM1 settings* - service settings for the SM1 butterfly valve. Setting the minimum and maximum control values for the SM1 butterfly valve, below which the control algorithm will not work, using the *SM1* minimum control and *SM1 maximum control* parameters.
- *Configuration of potential-free contacts* - settings related to the assignment of functions to potential-free contacts.
- The actuators corresponding to the dampers in use will be controlled based on the ON-OFF principle, which corresponds to the damper position in the Open-Close position.

CAUTION!

It is recommended to use a damper with an actuator on the inlet side, which will cut off air flow, when the controller is switched off.

The method of connecting damper actuators to the controller terminals is shown in the wiring diagram.

Hardware configuration of recuperator inputs

Setting the configuration related to the recuperator inputs.

- *Air quality sensor* - activation or deactivation of an air quality sensor. The supported sensors include: *Analogue CO_2 sensor*, which allows you to control concentration of CO_2 in the rooms, *Analogue humidity sensor*, which allows you to control the level of humidity in the rooms, and a *Digital sensor*.

CAUTION!

The transfer of moisture from the exhaust air to the usually dry supply air is only possible with a rotary recuperator or an enthalpy heat exchanger.

The connection of the CO_2 and humidity sensors must be carried out, according to the wiring diagram.

- *Heater thermostats* - settings related to the thermostats in the pre- and re-heaters. Determine the rest state for the thermostat contact corresponding to the heater in use, and set the *Pre-heater thermostat* and *Re-heater thermostat* parameters to *Normally Open* or *Normally Closed*.
- *Settings for R1/R2 inputs* - settings related to the operation of the R1/R2 digital inputs.

The settings related to the operation of digital inputs to change the air flow demand for fans, in the constant control mode, are made in the *Hood mode settings* parameter group.

- *Hood mode support* - activation and deactivation of the control corresponding to changing the demand for air flow, based on the readings of signals from the R1 and R2 digital inputs.
- *Logical status of the R1, R2 inputs* - the *Normally Open* or *Normally Closed* logical states corresponding to detecting air flow demand in R1, R2.
- *Supply air fan controlled with R1, R2* and *Extract air controlled with R1, R2* - setting the percentage change of the supply air fan and the extract air fan speeds based on the R1 and R2 signals. Setting a value above "0" increases the air flow rate, while any value below "0" reduces the air flow through the fan.

Fan settings

This menu contains fan settings available to the installer, in which you can set the minimum and maximum fan control values and a delay in stopping the fans, after the electric heaters were activated.

- *Min* and *Max supply air fan control* - corresponding to the minimum and maximum control values that can be set in the installed supply air fan. The setting should be selected, depending on the fan power.
- *Min* and *Max extract air fan control* - corresponding to the minimum and maximum control values that can be set in the installed extract air fan. The setting should be selected, depending on the fan power.
- *Air supply fan stop delay* - delay in stopping the air supply fan, after the electric pre-heater stops working.
- *Minimum outside temperature* - the minimum outside temperature at which the recuperator is permitted to operate. The recuperator will not be able to operate below the threshold set in the *Permitted from min outside temperature* parameter. In addition, the *Min outside temperature* parameter makes it possible to set a value of temperature below which the recuperator will not be allowed to work, also taking into account the value of the difference from this temperature threshold set in the *Hysteresis of min outside temperature*.

CAUTION!

The outside temperature is measured by a temperature sensor at the inlet to the air intake.

Modbus Settings

Settings related to Modbus communication. Set your *Modbus* Address and the preferred *baud rate*, the *number of stop bits* and *Parity*.

- *Modbus Activation* - activation/deactivation of the Modbus protocol.
- *Editing of Parameters* - permission to edit parameters with the Modbus protocol.
- *Recuperator control* - permission to control the recuperator with the Modbus protocol.
- *Modification lock* - activation/deactivation of locking parameter modification. When this function is activated, only some of the controller parameters (such as ON/OFF or Modbus settings) can be changed, while other parameters will be locked for editing.

Cleaning the heat exchanger

- *Activation interval - days* - setting the number of days, after which cleaning of the exchanger should start.
- *Start time of cleaning* - start time of the cleaning procedure. It is the time at which cleaning is started on the scheduled cleaning day.

Inspection settings

Settings related to switching the general inspection and the recuperator interlock support on or off.

- *Maintenance function support* - enable or disable the notification about the necessity to perform periodic inspection.
- *Resetting work day counter* - resetting the number of working days of the device, in order to calculate the time left to inspection and to lock operation of the unit.
- *Number of days to inspection* - setting the number of days to notify about the necessity to perform periodic inspection - it is determined by the installer, in accordance with the manufacturer's recommendations.

Additional service settings

- *Calibrate touch panel* - Adjusts the touch response precision for the control panel.
- *Default Settings* - if the *Restore default settings for panel/ecoVENT* parameter is set to *YES*, all changes are cancelled and default (factory) settings restored.

8.19 Technical Data

Power supply/current consumption (controller only)	230V~, 50Hz/40mA
Max. rated current	6 (6)A
Ambient/storage temperature	0...+40°C/-25..+50°C
Relative humidity	5 - 85%, without vapour condensation
Temperature measuring range of the NTC 10K sensor	-20...+125°C
Network screw-in splice connectors	Cross-section 0.5...2.5mm², tightening torque 0.55Nm, 7mm isolation
Signal screw-in splice connectors	Cross-section 0.25...1.5mm², tightening torque 0.235Nm, 7mm isolation
Display	Colour Graphic, 480x272 with a touch panel
Standard	PN-EN 60730-2-9, PN-EN 60730-1
Software class	A (acc. to PN-EN 60730-1)
Protection rating	To be built into Class I instruments
Level of contamination	Level 2 (acc. to PN-EN 60730-1)
Inputs/outputs	
Analogue inputs	AI0-AI6
Digital inputs	DI0-DI4
Analogue outputs	AO0-AO5, whereas: - 2 outputs (0-10V) - 2 outputs (PWM) - 2 PWM outputs or (0-10V), programmable switching outputs
Communication outputs	3xRS485, of which one is separated
Outputs with a potential-free contact	- 3 (NO) normally open, - 2 (NO/NC), switchable
Power outputs	- 2 (NO), 1000W - 2 (NO), 750W
Potential signalling outputs	- 3 (NO), 230V~

8.20Operating conditions

Controller:

- Do not expose to direct weather conditions (rain, sunlight) and vibrations greater than those typically encountered during transport.
- Do not use it in an environment, in which vapour condensation is present, and do not expose it to water.
- The storage and transport temperatures must not exceed the range of -25°C to 50°C.
- It should be installed in a dry living space.

9. Disassembly and disposal of the device

DISASSEMBLY
The device must be disassembled by qualified personnel, in accordance with applicable safety regulations. Every effort should be made to recover any substances present in the unit, to avoid damage to property and contamination of the surrounding area.

DISPOSAL
The unit must be disposed of by a specialist agency. All materials used in the unit must be disposed of or recovered, in accordance with the regulations in force. The devices are made of the following materials:

- Plastic materials: PA6, EPDM, Polyethylene, Rubber.
- Metal materials: galvanized steel, stainless steel, aluminium, copper (recoverable and recyclable).
- In addition, the devices are equipped with fans with permanent magnet motors and electronic components.

At the end of their service life, these components must be dismantled with commonly available tools, such as a screwdriver, a cross-thread screwdriver, or a set of flat wrenches 6-22mm.
After dismantling, these components shall be placed in containers dedicated to WEEE (Waste
Electrical & Electronic Equipment), in accordance with Directive No. 2012/19/EU.
Other elements of the housing and the components of the unit should be sorted by the type of material (metal, plastic, other) and placed in containers intended for a corresponding type of waste.

10. Terms of warranty

This warranty is valid in the Republic of Poland. FRAPOL Sp. z o.o. provides warranty and post-warranty service of the device. The warranty covers free-of-charge repairs, within 24 (twenty-four) months from the date of purchase. The Guarantor undertakes to process each claim, within 14 (fourteen) days from the date it has been filed.

10.1 Validity of the Warranty Card

The warranty card is considered valid, if:

- it contains the installer's seal and the serial number of the device assigned by the manufacturer,
- it bears the vendor's stamp, the signature and date of sale of the device.

The validity of the warranty depends on the technically correct start-up of the unit (in accordance with the Operation and Maintenance Manual). All electrical connections should be made by an installer, who is familiar with the requirements of this OMM and has a licence from the Association of Polish Electrical Engineers - at least up to 1kV. The so-called EQUIPMENT HANDOVER REPORT is mandatory - it is attached to the Operation and Maintenance Manual. The report should be sent by email, within 30 days from the start-up date, to serwis@frapol.com.pl, or by post, to the company's address, with a note "technical maintenance". Failure to send the equipment handover report will void the warranty.
To be able to pursue warranty claims, it is required to submit a properly filled warranty card, supplemented with a filled-in Equipment Handover Report, and a proof of purchase (a receipt or an Invoice).

10.2 Exclusions

The Customer may lose the right to warranty claims, when a technical service centre of Frapol Sp. z o.o. establishes that defects occurred not by fault of the manufacturer, but resulted from:

- modifications to the design of the unit
- unauthorized repairs carried out by third parties
- the use of non-original wiring or its modification
- failing to comply with the user manual (incorrect installation and operation)
- exposure to environmental factors
- damage due to over-voltage or atmospheric discharges
- damage caused by negligent maintenance
- accidents or random events

11. Complaints

A complaint should be submitted as a complaint notification form, sent by email to the following address serwis@frapol.com.pl

A failure report sheet can be found on the following website:http://www.frapol.com.pl/Zgloszenie-Serwisowe. The sheet is available as a pdf document, in an editable format (.xls sheet).

The costs related to processing a warranty claim during the warranty term shall be borne by Frapol Sp. z o.o. If any discrepancies are found and a warranty claim is rejected, the costs of expertise and shipping of the goods shall be imposed on the complaining party.

Warranty Card

Air handling unit type: model:	
Serial No.:	
Date of sale:	
Proof of purchase No.:	

Stamp of the point of sale		Stamp and signature of the Installer	
Date:		Date:	

Date of submitting:		Date of repair:	
Description of defect:			
Materials and repair actions:			

Date of submitting:		Date of repair:	

Description of defect:
Materials and repair actions:

CAUTION: The Equipment Handover Report is an integral part of the Warranty Card.

Equipment Handover Report

Customer:	Name and address of the facility:	
Type and size of the unit:	Factory No. of the unit:	Delivery date:

Assembly and Commissioning

Activity	Name and address of the company carrying out the activity	Date and signature	Comments
Assembly and installation			
Electrical connections			
Hydraulic connections (e.g. connecting a drain trap)			
Start-up			
Measurements			

Results of measurements of the unit operation parameters

Air supply	Exhaust

Air flow			Air flow		
Designed [m³/h]	Measured [m³/h]	Difference [%]	Designed [m³/h]	Measured [m³/h]	Difference [%]

CAUTION: Returning a filled-in equipment handover report within 30 days from the date of commissioning constitutes the basis for granting the warranty. Please send the reports to:

- Email: serwis@frapol.com.pl
  or to:
- Address: Frapol Sp. z o.o. ul. Mierzeja Wiślana 8, 30-832 Kraków, with a note “technical maintenance”

FRAPOL Sp. z o.o.
ul. Mierzeja Wiślana 8, 30-832 Kraków
Tel. [+48] 12 653 27 66, [+48] 12 659 05 77
Fax [+48] 12 653 27 89
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