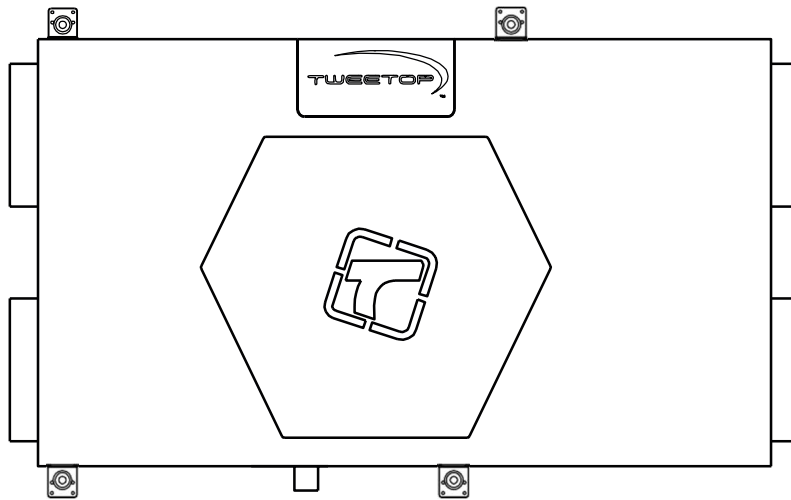




Operating instructions for a series of compact air handling units with cross-flow heat exchanger



EcoVent Recu

ver. 1.3

Table of contents

- 1. General information**4
- 2. Security**5
- 3. Technical data and application**.....5
- 4. Technical specifications**6
 - 4.1 Dimensions6
 - 4.2 Efficiency, electrical power, automation, filters8
 - 4.3 EcoVent Recu energy labels9
- 5. Operating principle** 10
- 6. Panel design** 11
- 7. Delivery and transport** 11
 - 7.1 Scope of supply 11
 - 7.2 Packaging and storage 11
 - 7.3 Transport of the appliance 12
- 8. Installation of the device** 13
 - 8.1 Site requirements 13
 - 8.2 Positioning in the workplace 13
 - 8.3 Connection of the air system 17
 - 8.4 Heater 19
 - 8.5 Electrical connection 19
 - 8.6 Condensate drain 20
- 9. Automation** 21
 - 9.1 Technology diagram 21
 - 9.2 Control principle 21
 - 9.3 Controller - description and connection 22
 - 9.4 Pre-heater 24
 - 9.5 Secondary heater 25
 - 9.6 Fans 26
 - 9.7 By-pass actuator 27
 - 9.8 Temperature sensors 27
 - 9.9 Power and indicator lights 27
 - 9.10 Description of the functions of the EcoVent Recu air handling unit 28
 - 9.11 Configuration parameters 28
 - 9.12 Regulator 30
 - 9.13 Assembly of the controller 30
 - 9.15 Initial start-up of the controller 32

10. Controller functions	33
10.1 Description of the controller control panel	33
10.2 Panel capacity	33
10.3 Panel operation	33
mode	34
10.4 Heating function	35
10.5 Cooling function	35
10.6 Indicator light	36
10.7 Calendar module	
- connection	
10.8 External internet module -	37
description and connection	
10.9 External internet module -	39
device registration	
11. Initial start-up	47
12. Operation of the appliance	47
12.1 Switching the device on and off	47
12.2 Summer operation	48
12.3 Winter operation	48
13. Basic maintenance	48
13.1 General information	48
13.2 Exchanger control	49
13.3 Filters.....	49
13.4 Condensate drainage system	51
13.7 Checking the automation for	52
memory errors	
13.6 Other activities.....	52
13.7 Typical appliance malfunctions and their	52
remedy before calling for service	
14. Health and safety at work	54
14.1 General information	54
14.2 Basic health and safety	54
conditions	
14.3 Health and safety conditions during maintenance operations	54
14.4 Information on residual risk	55
15. Warranty and service -	55
information	
16. Disposal and scrapping	55

1. General information

EcoVent Recu is an energy-efficient air handling unit used for air exchange with simultaneous heat recovery. The unit controls the circulation process inside the building and allows its intensity to be adjusted to the needs of the users, ensuring an uninterrupted supply of fresh air to the building, while removing stale air and moisture from the premises.

The Technical and Operating Manual of the **EcoVent Recu** series of compact air-handling units with cross-flow heat exchanger produced by Twe- etop Sp. z o.o. is a collection of information to help you become familiar with the construction and proper operation of the unit. Before installing, commissioning and operating the unit, it is essential to read this manual and strictly follow the guidelines and recommendations contained herein.

Attention:

- **Failure to comply with the guidelines and recommendations in this manual relieves the manufacturer of its warranty obligations.**
- **The unit is designed exclusively for ventilation of rooms during normal operation of the building. Use of the unit for other purposes is not permitted.**
- **It is forbidden to use the units to remove technological contaminants that are formed during renovation and other work where dust or aggressive or explosive chemical compounds are released.**
- **The recuperator may not be used in rooms with a risk of explosion of flammable gases and vapours containing organic solvents or other aggressive substances.**
- **The units are designed for operation in the so-called normal environment, under the conditions specified in the chapter on unit installation.**

2. Security

In order to use the recuperator safely, please read carefully and adhere to all warning signs on the unit as well as the prohibitions and orders described in these operating instructions, in particular:

- Before carrying out any work on the appliance, read the contents of this manual.
- To ensure the correct operation of the unit, the unit must be assembled and started up in accordance with all the instructions in this manual. All work, including electrical connections, must be carried out by a qualified installer, in accordance with the rules of the trade and the requirements of the relevant standards.
- Caution must be exercised due to the fact that the appliance is powered by life-threatening voltage.
- Caution should be exercised due to the fact that hot surfaces may be present when the power supply is connected.
- Installation and initial start-up must not be carried out by persons without installation experience.
- It is forbidden to carry out any service or maintenance work while the power is on
- It is forbidden to remove all designed guards and interlocks while the device is in operation
- All recommendations of this manual are to be followed.

3. Technical data and application

The compact recuperator with cross-flow heat exchanger is designed for ventilation systems with heat recovery in all types of rooms located in:

- single-family buildings,
- service buildings, including restaurants,
- other residential and office buildings.

An important and only limitation on the possibility of use is the capacity of the device.

Requirements for the rooms to be used for installation of the appliance can be found in section 8.1.

Attention :

It is forbidden to use the unit as a building moisture dehumidifier. When dehumidifying unoccupied rooms/buildings, the central is not covered by the manufacturer's warranty.

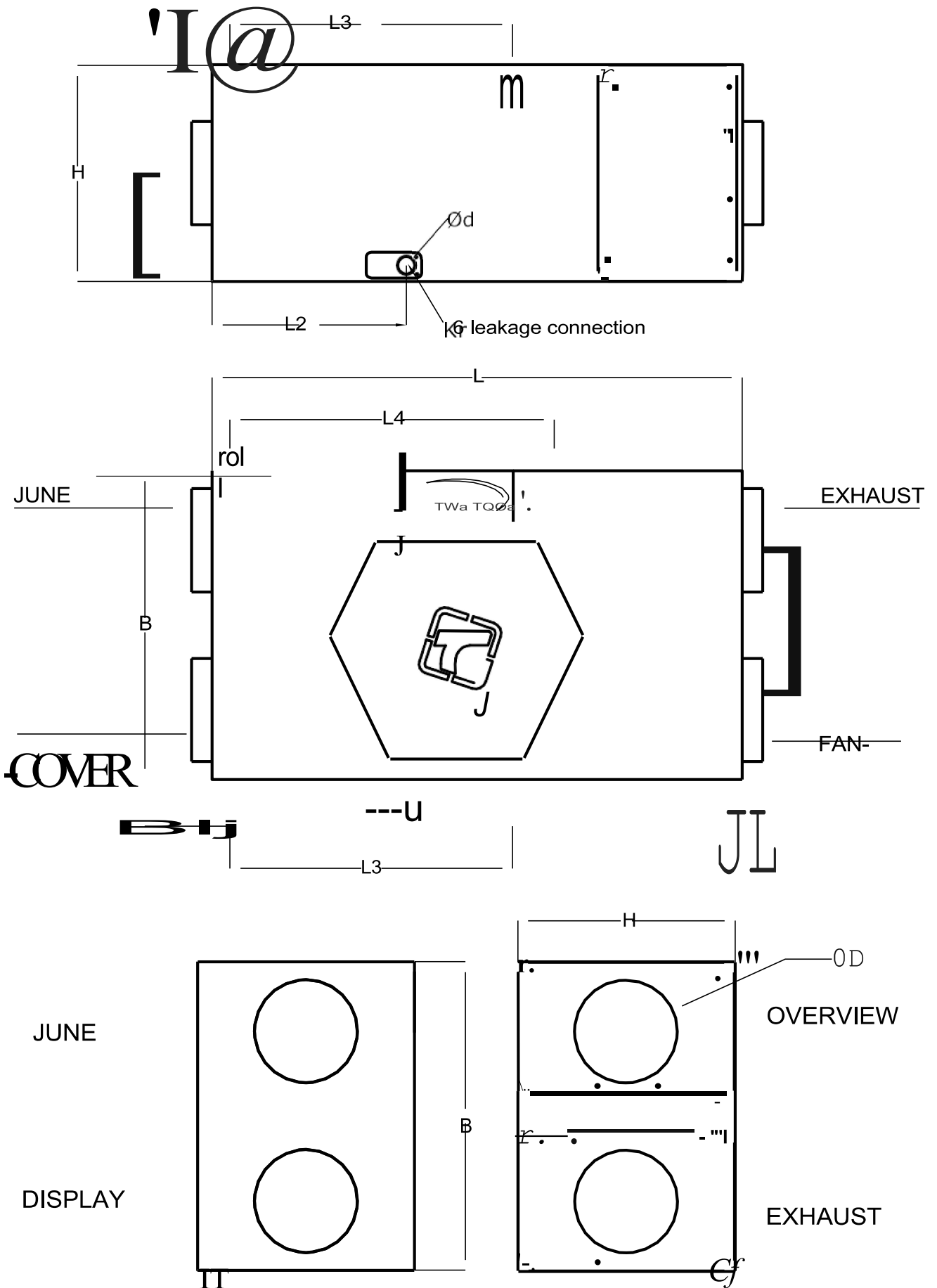
The recuperators of the EcoVent Recu series, operate using outside air. The energy source for the fans and automation system, as well as optional equipment, is electricity. The unit consists of the following components:

- housing, made of sheet metal, galvanised on both sides and powder-coated,
- M5 and G4 class filters with reduced flow resistance through the filter fabric,
- counter-flow heat exchanger,
- fans - direct-drive radial-axis, electrically commutated (EC),
- temperature sensors,
- control panel with thermostat - 1 pc,
- pre-heater for duct installation,
- automatic by-pass,
- condensate drain spigot d32mm.

4. Parameters technical

4.1 Dimensions

Dimensions of exchanges													
B	B1	H	H1	H2	L	L1	L2	L3	L4	L5	D	d	mass
[mm].													[kg]
EcoVent Recu 350													
620	45	342	171	330	1030	40	377	550	630	35	160	35	28
EcoVent Recu 450													
620	45	442	221	330	1030	40	377	550	630	35	200	35	30
EcoVent Recu 600													
620	45	642	320	330	1030	40	377	550	630	35	200	35	39,5



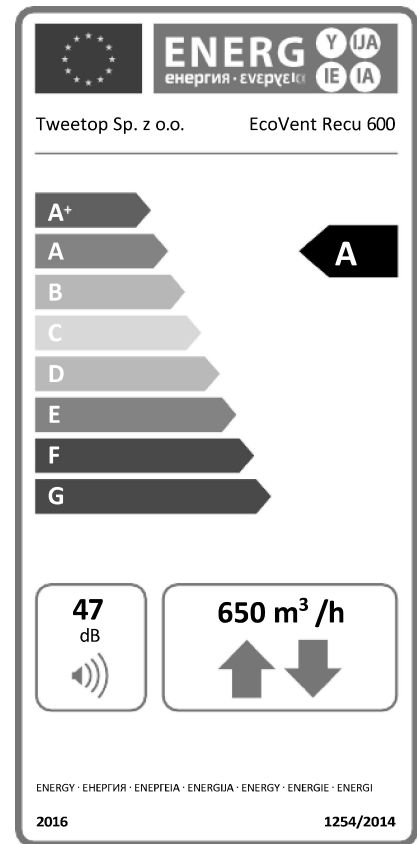
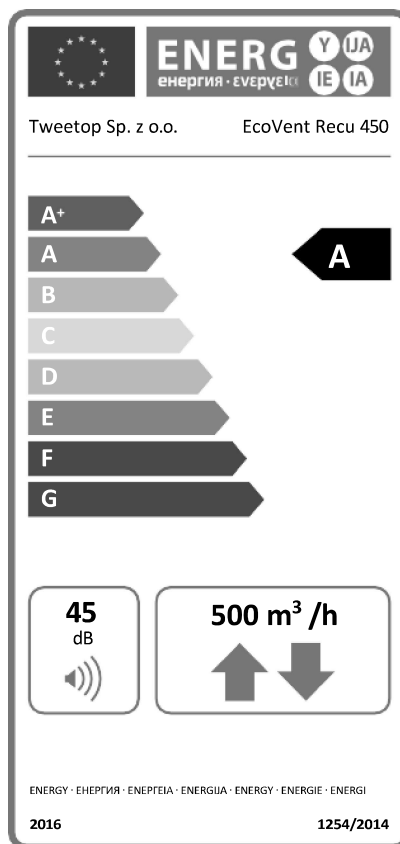
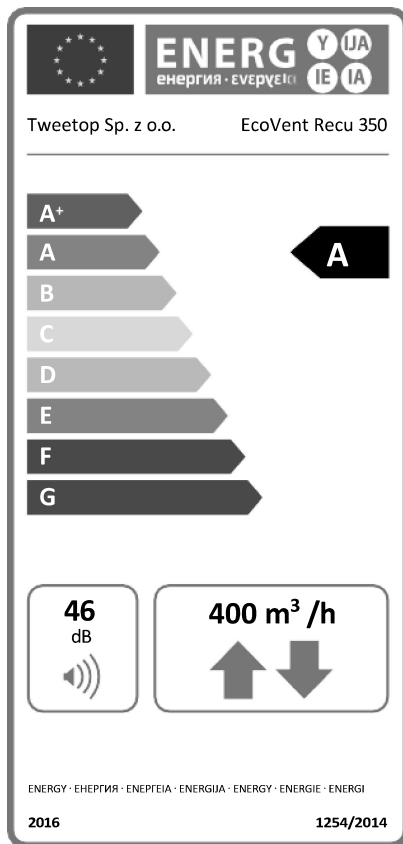
4.2 Efficiency, electrical power, automation, filters

Model	EcoVent Recu 350	EcoVent Recu 450	EcoVent Recu 600
Max specific energy consumption (WEU): cool / temperate / warm climate	69,51 / 34,07 / 11,15 kWh/(m ² /year)	71,94 / 36,09 / 12,93 kWh/(m ² /year)	75,30 / 39,12 / 15,81 kWh/(m ² /year)
JZE class	A		
Declared type of ventilation system	SWM, DSW (supply and extract air)		
Drive type	stepless fan speed control system		
Type of heat recovery	diaphragm (counterflow)		
Thermal efficiency of heat recovery (η_t)*	76,6% / 81,6%	78,2% / 83,1%	79,4% / 84,2%
Maximum flow rate	400 m ³ /h	500 m ³ /h	650 m ³ /h
Ventilator drive power consumption (at max. flow rate)	179 W	180 W	203 W
Sound power level (LWA)**	46 dB	45 dB	47 dB
Reference flow rate	0.078 m ³ /s	0.097 m ³ /s	0.013 m ³ /s
Differential pressure reference value	50 Pa	50 Pa	50 Pa
Specific power consumption (JPM)	0.36 W/(m ³ /h)	0.29 W/(m ³ /h)	0.17 W/(m ³ /h)
Control type factor and control type	central control as required		
Max annual electricity consumption (RZE)	908 kWh/year per 100 m ²	844 kWh/year per 100 m ²	735 kWh/year per 100 m ²
Max annual heating savings (ROO)	83.47 kWh	84.32 kWh	84.95 kWh

Attention:

For maximum soundproofing of the air system, we recommend the installation of flexible duct connections, duct silencers in the air system and plenum boxes at the diffusers - details on noise are described later in this manual.

4.3 Tweetop-Recu energy labels



5. Operating principle

The exchange of air in the rooms with Tweetop Recu air handling units involves the removal of used air and supplying fresh air.

The used air is transported through a duct system to the air handling unit, where it is filtered (to protect the heat exchanger from excessive soiling) and further discharged outside the building through an exhaust duct.

Fresh air, on the other hand, is drawn into the unit via an intake manifold and inlet duct, where, after passing through filters, it is directed to a heat exchanger (recuperator), where it is heated by the heat collected from the exhaust air and pumped into the ventilated rooms, halls or offices.

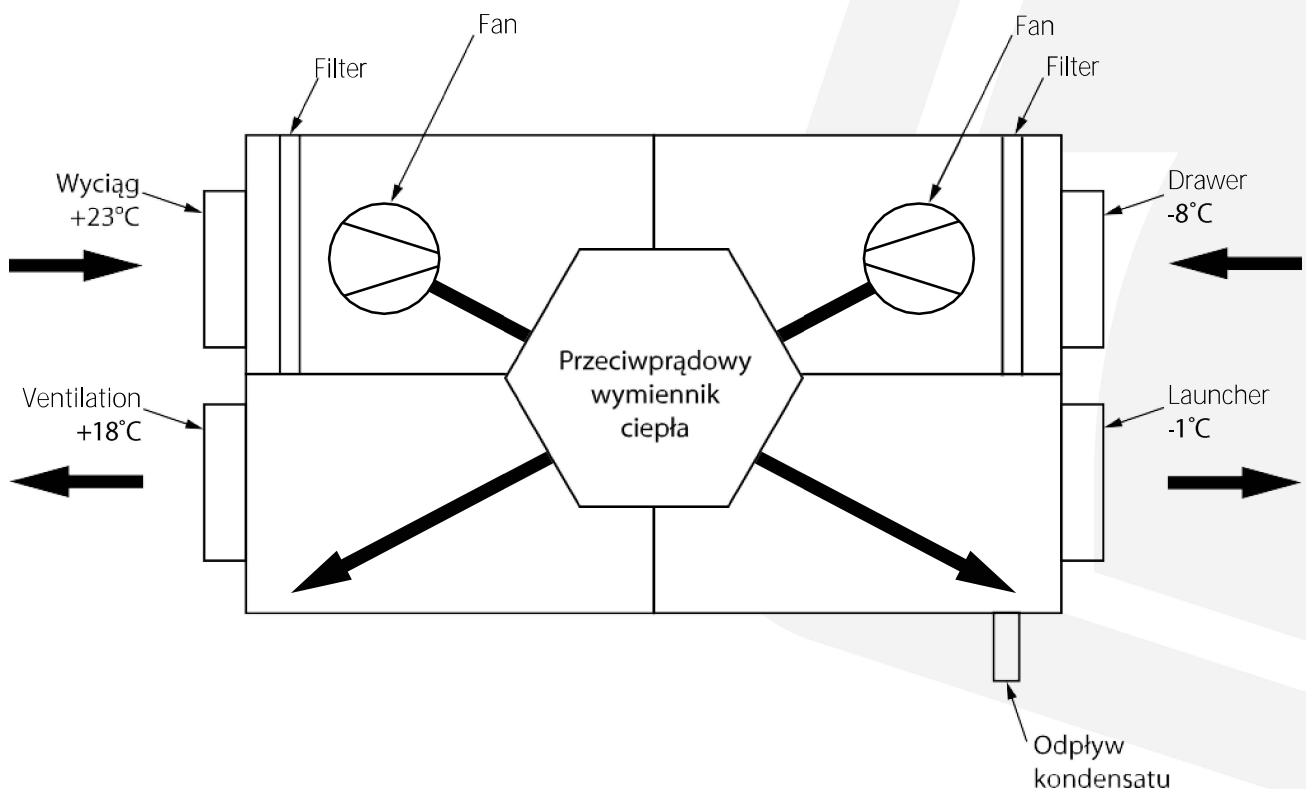


Fig. Principle of operation of heat recovery in a counterflow heat exchanger

6. Panel design

- a) the casing is made of galvanised and powder-coated sheet metal, which is specially shaped on CNC machines and fixed with galvanised rivets to form a rigid, rigid body.
monocoque construction,
- b) fans - direct-drive radial-axis, electrically commutated (EC),
- c) pre-heater - fitted in the unit for recuperators manufactured after 06 2022
- d) cross-flow counter-flow exchanger,
- e) by-pass system, guaranteeing efficient summer operation,
- f) air filters - disposable, replaceable class G4, M5,
- g) automation system.

Attention:

The units in the new version produced from June 2022 have a built-in pre-heater.

7. Equipment delivery and transport

7.1 Scope of supply:

- EcoVent Recu air handling unit - 1 pc,
- power supply cable for the unit (230V with IEC contact connector, length 1.8m),
- control panel with thermostat - 1kpl,
- temperature sensors,
- pre-heater for installation in the duct, for units manufactured after 06.2022 pre-heater installed in the unit,
- EcoVent Recu suspension brackets - 4 kpl,
- technical and operating documentation (user's manual) with warranty card.

7.2 Packaging and storage

- The manufacturer shall provide suitable packaging for the unit for transport, adapted to the risks involved (the unit is delivered on a pallet)

- Storage should take place in dry and roofed rooms at a positive temperature with adequate protection against damp and corrosion.
- In case of prolonged storage, it is advisable to leave the appliance in protective film and place it above the floor surface (at least on a pallet provided). The unit is sensitive to impacts and drops even from a low height.
- The unit is not protected against the chemical effects associated with the panel material.

7.3 Transport of the appliance

The method of transport and the number of people involved in the movement must be appropriate to the size of the unit. Heavier appliances should be moved using lifting equipment such as forklifts or pallet trucks.

In addition:

- It is forbidden to transport the appliance by personnel who do not have the required qualifications and who are not familiar with the safety requirements contained in the following operating instructions. Such actions may cause material damage.
- When moving the appliance, pay attention to all protruding outlet and inlet parts. It is forbidden to use them (hold, catch) to transport or unload the appliance. This can lead to damage to the spigots, which will prevent the system from being connected correctly.
- The unit should be transported in an upright position.
- Careless handling during transport and/or handling can cause serious injury or accidents.

NOTES:

- **Check the contents of the packaging immediately after delivery. If any defects are found, contact the carrier or supplier of the appliance.**
- **If the air handling unit is transported or stored improperly, the manufacturer is not liable for any damage caused thereby. Damage caused during this time is not subject to warranty and will be dealt with individually by the manufacturer.**

8. Installation of the device

Installation should be carried out by a person trained by the manufacturer to install the unit and select a suitable location.

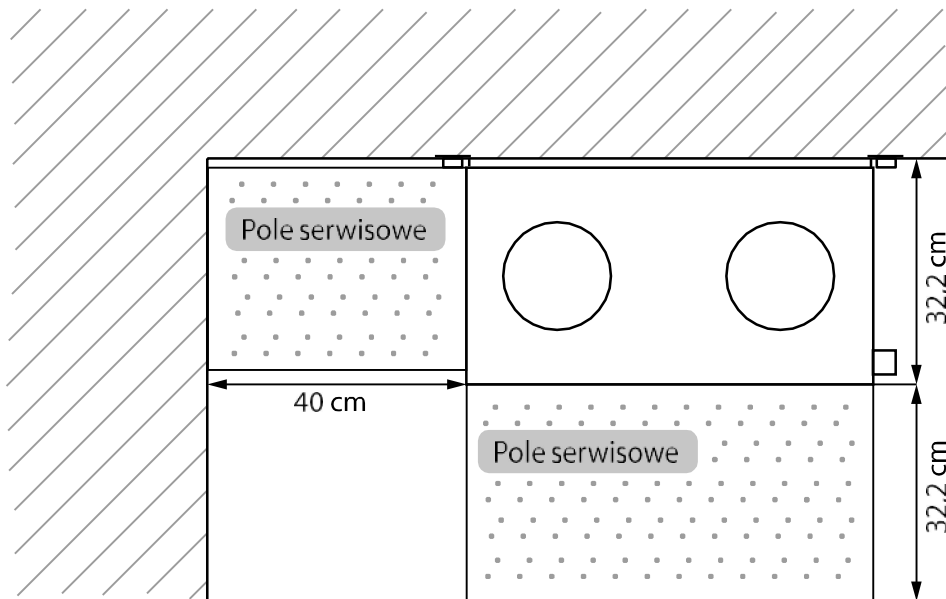
8.1 Workplace requirements

- It is recommended that the unit is installed in dedicated utility rooms.
- The unit should be placed in a dry and roofed room with a positive temperature between 5°C and 30°C and guaranteeing a relative humidity of up to 55% in winter.
- The EcoVent Recu unit should not be operated in potentially explosive atmospheres, with high dust and humidity or in the presence of aggressive fumes (acidic, alkaline, organic or inorganic with actual or potential corrosive effect). The manufacturer must be consulted before the equipment is operated under hazardous conditions.

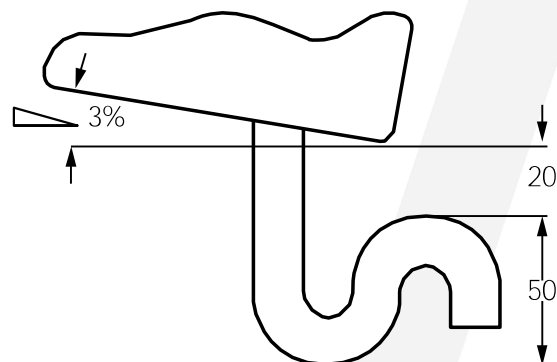
8.2 Positioning in the workplace

Before setting up the control unit at the work site, a suitable installation site must be prepared, in particular:

- a) Electrical connections, ventilation ducts, condensate drainage and optional access to the water supply must be provided.
- b) Adequate service space must be provided (unobstructed access to the inspection pit and possibility to remove the heat exchanger or fans from the unit, change filters, remove ducts). **EcoVent Recu** air handling units are equipped with inspection openings on both sides and must be installed to provide (at least on one side) an adequate service area equal in width to the unit width and 40 centimetres from the automatic side, so that service and operation works will not cause any problems.

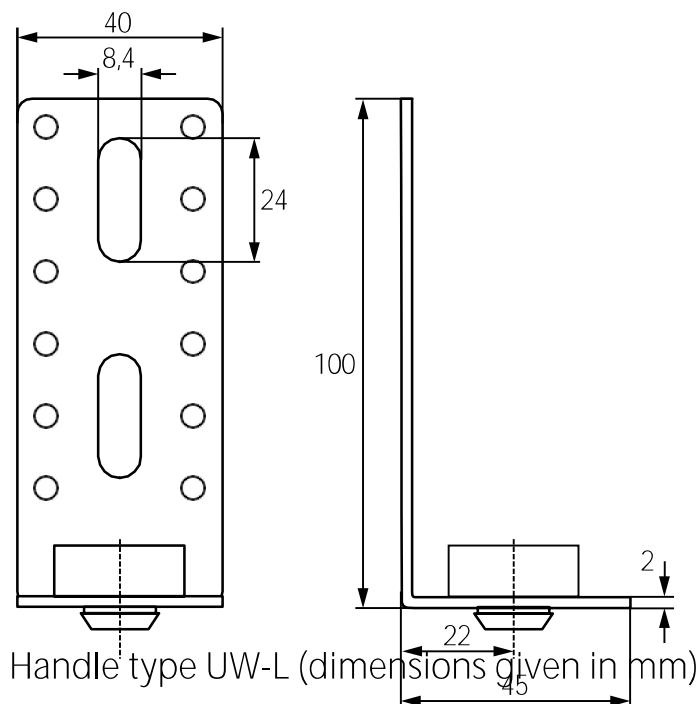


- c) The distance from the floor must be sufficient for the installation of the siphon - 50-70mm high.



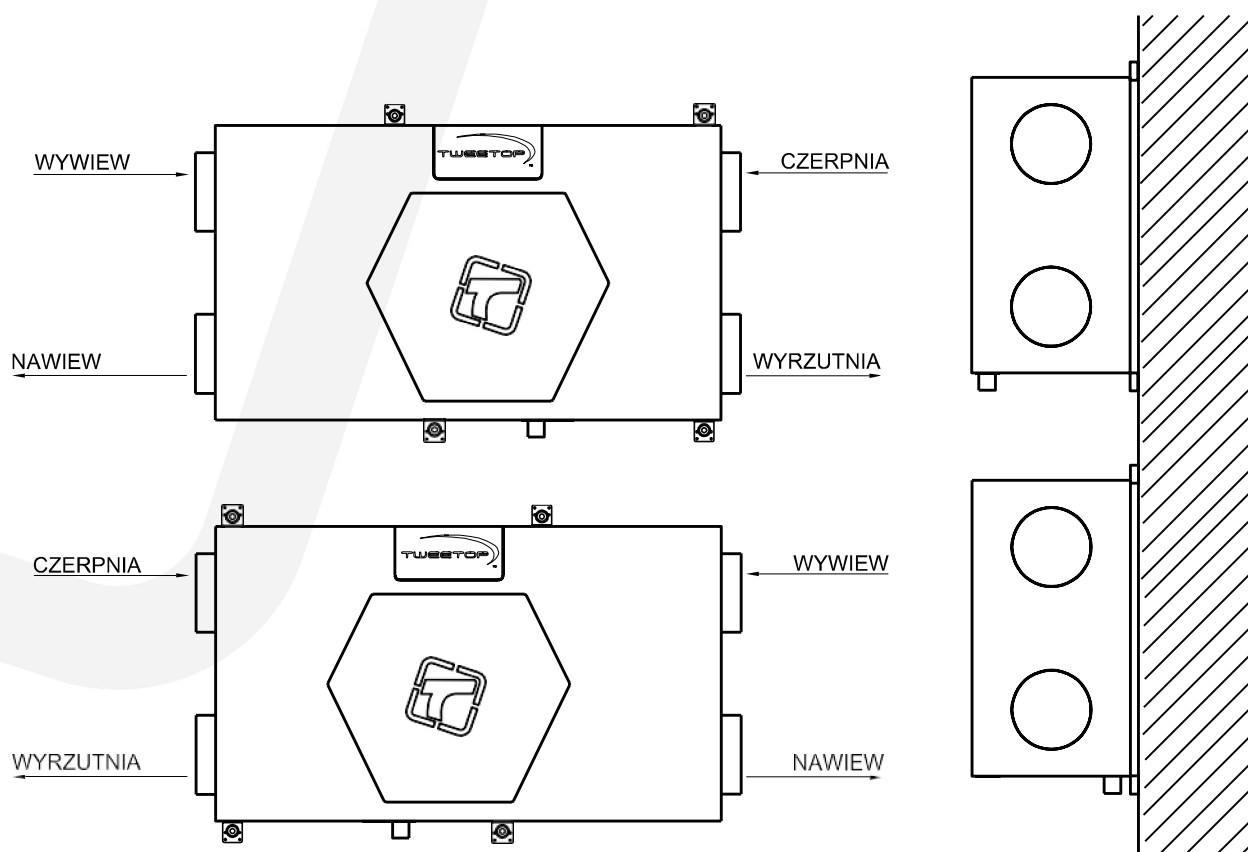
- d) The substrate should:
- provide a smooth and firm surface,
 - be resistant to moisture (water intake), or a drip tray may be used,
 - have adequate strength, taking into account the weight, surface area and distribution of the weight of the device over the various support points.
- e) The unit should be placed on a level, stable surface. When installing the unit on the floor, make sure that the correct distance from the floor is maintained for the installation of the siphon (see point c).
- f) It should be possible to dismantle and pull out the entire unit.
- g) The unit must be installed in such a position as to ensure that the condensate drains freely by gravity from the discharge stub - there must be a drop towards the outlet, approximately 3 ÷ 5 %.

The **EcoVent Recu** AHUs are equipped with four UW-L type brackets, which can be used to fix the unit to the ceiling, wall or on the floor. The brackets are protected against corrosion and have special rubber inserts to dampen mechanical vibrations.

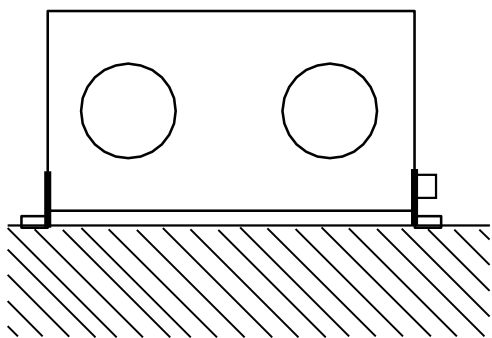
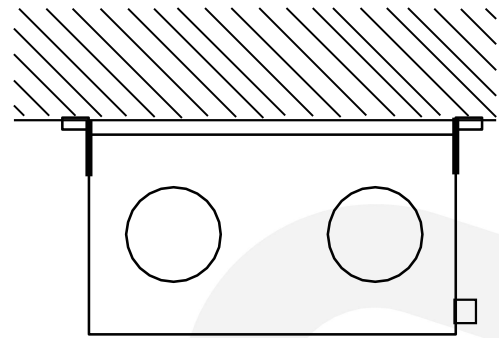


The following installation (positioning) methods are possible:

- Suspension in an upright position (on the side) - by upright position he means the layout of the air handling unit when the side with the condensate drain is perpendicular to the ground).

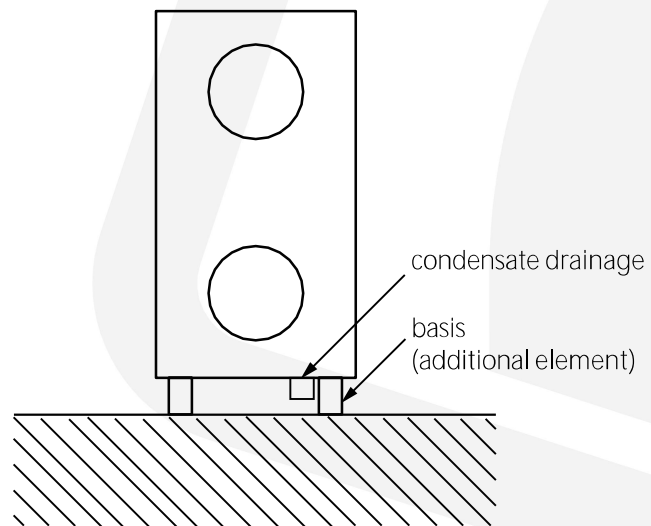


- Horizontal suspension - the horizontal position is understood to be the arrangement of the unit when the side with the condensate drain is parallel to the floor).



- Horizontal position on the floor. This type of positioning is possible when the UW-L type handles are moved into the specially provided threaded holes and the anti-vibration inserts are turned to form "feet".

- Vertical positioning on the floor. This type of installation is possible if we use additional elements, e.g. from the Erico or Walraven range, on which we place the unit, in a way that enables its stable operation and trouble-free draining of the condensate. When installing the recuperator in low spaces, e.g. attics, we should also remember about service access from the top of the unit to the automatics.



In addition, the easily removable panels with spigots (replaceable caps), allow them to be installed at a 90° angle, saving space if a bend needs to be installed right behind the unit.

**NOTES:**

- When installing the unit, the provisions of section 9.5 "Condensate drainage" must be observed.
- Inadequate ventilation in the room in which the appliance is installed can cause condensation to form on the housing of the appliance.
- The EcoVent Recu air handling unit is not intended for the dehumidification of houses and undrained (non-drained) rooms. In such cases, separate dehumidification units must be used.
- In the initial phase of operation in a newly-built or refurbished facility - frequent inspection and replacement of both fresh air and exhaust air filters is recommended.

8.3 Connection of the air system

The air handling unit is equipped with nipple stubs $\Phi 160$ or 200 depending on the model and output stubs $\Phi 160 / 200$.

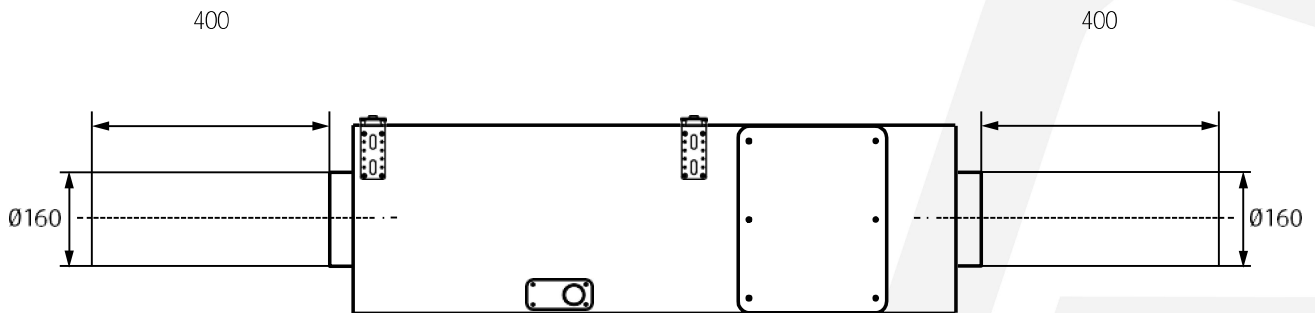
The ducts must be securely fixed to the spigots of the **EcoVent Recu air handling unit** to prevent accidental slipping or vibration damage. The duct sections at the spigots of the air handling unit should be suspended to reduce the stress on the spigots.

The manufacturer recommends connecting the unit with flexible ventilation ducts that have acoustic perforations. If rigid ducts are used, the system must be fitted with acoustic silencers. It is recommended that these are selected by a qualified engineer. In the case of flexible connections, the use of a stainless steel worm clamp is recommended. It is allowed to use another type of connection if it guarantees a tight connection of the installation with the air handling unit. If the unit is connected to a system made of rigid ducts (e.g. spiro type), the connection must also be tight (e.g.: rubber seal).

These conditions also apply to all ancillary equipment fitted to the installation (e.g. dampers, heaters and duct filters).

To minimise the drop in efficiency resulting from turbulent flow, na- lies:

- Provide a minimum of 400 mm of straight run at each spigot to stabilise the air flow (applies to all types of connections - flexible and rigid!).



- Make low-pressure installations from insulated ducts of a suitable diameter adapted to the required air flow.

Pipeline connections are to be made in accordance with the markings on the enclosure.

If a secondary heater, electric or water, is installed, install it according to the guidelines in the following section. The secondary heater must be installed at a distance of min. The secondary heater must be installed at a distance of at least 3 times the duct diameter, behind the air handling unit in the supply air.

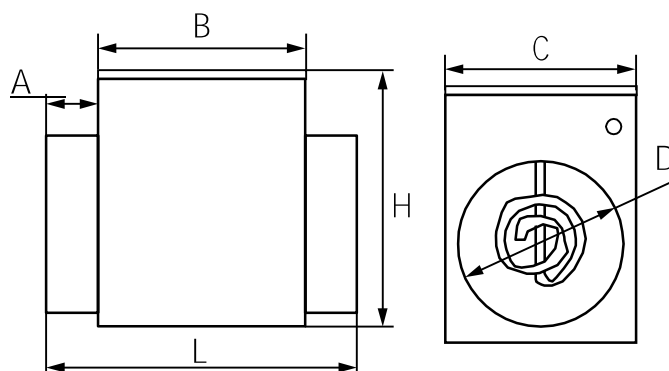
NOTES:

- It is forbidden to connect an electric heater without thermal protection,
- In the case of an electric heater, during operation the air velocity through the heating elements must not be less than 1.5 m/s, which must be taken into account when adjusting the system and when first commissioning the centrals,
- Use non-combustible, heat-resistant connectors and ducts when installing electric duct heaters.

8.4 Heater

The heater consists of the following elements:

- housing
 - electric heater
 - connection block
 - two thermal protections
- Diagram of connection heater can be found in section 9.4 (electrical). See section 8.3 for further information.



Heater model	Heater output	Dimensions [mm]					
		A	B	C	D	H	L
d160	1.0 kW / 0.6 kW primary/secondary	60	220	200	165	260	340
d200	1.0-1.2 kW / 0.6 kW primary/secondary	60	240	240	205	298	360



NOTES:

In the new version of the unit manufactured from June 2022, the pre-heater is built into the interior of the unit before the supply air ventilator. The heater output is 1kW in all units. The pre-heater is plugged in, operating steplessly from 0 to 1000 W.

Fig. Location of the heater

8.5 Connecting the electrical system

NOTE:

- **ALL CONNECTIONS MUST BE MADE WITH DISCONNECTED POWER SUPPLY TO THE CONTROL PANEL!**
- **THE CONNECTION MUST BE MADE BY AN EXPERIENCED FITTER IN ACCORDANCE WITH CURRENT REGULATIONS, INCLUDING STANDARDS.**

The electrical installation feeding the appliance must be carried out in compliance with the applicable building regulations and standards. The electrical connection may only be made by a person with appropriate electrical qualifications. The unit

must be connected to the mains via the power supply cable supplied with the unit, which must



be plugged into the ICE socket on the casing of the device.

If additional components are connected to the unit, such as heaters, regulators, etc., follow and refer to the DTRs provided with the additional components.

Once all components are connected, change the position on the ICE switch from 0 to I.

Fig. Switch

8.6 Condensate drain

The heat exchange between the heat exchanger fins results in condensation of water vapour. The condensate is removed from the unit via a stainless steel drain stub with an external diameter of d32mm, which is mounted on the side of the unit.

A ball siphon is recommended for the condensate drain. The installation of another type of siphon is permissible, provided that it is flooded at least twice during the ex- pansion period.

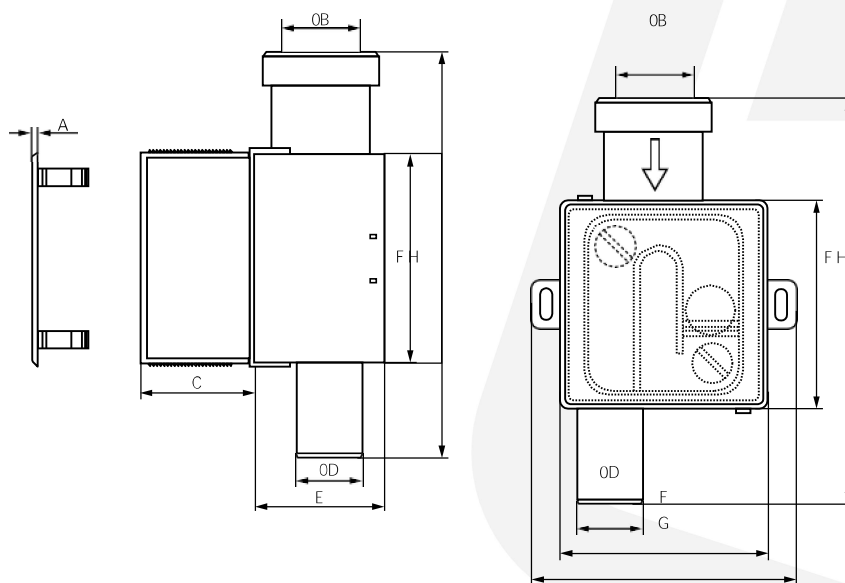


Fig. Ball trap

Size	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
ISN32	27,5	20-32	0-50	DN32	60	100	128	197

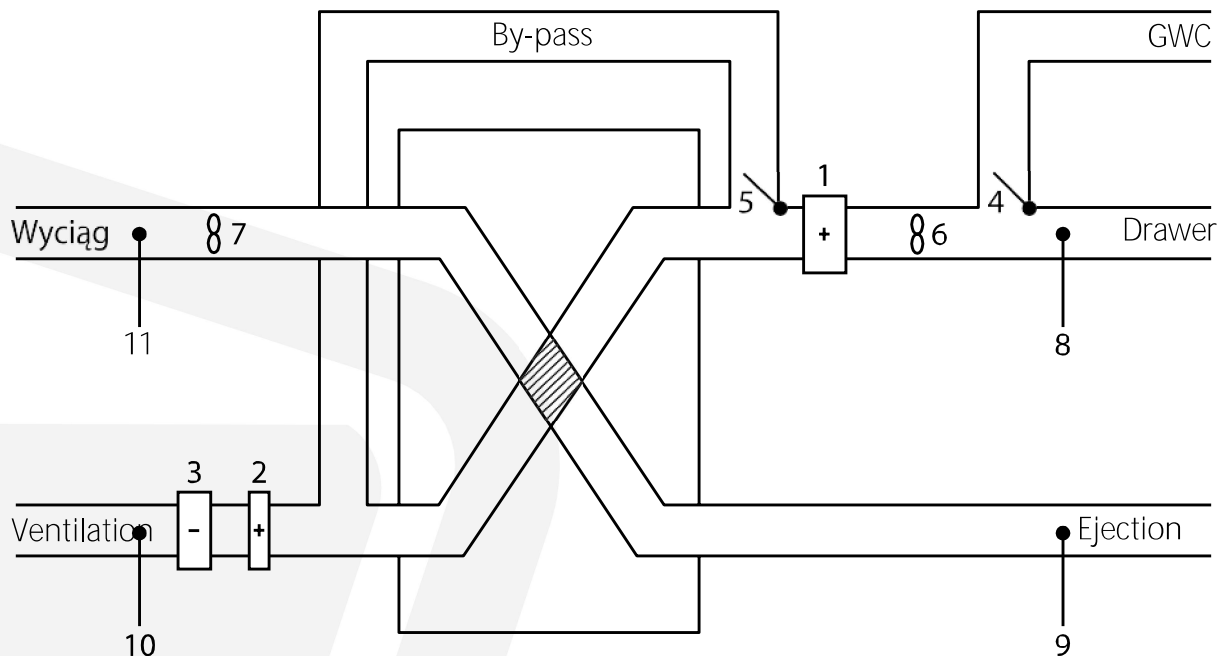
Proper drainage of condensate requires constant flooding of the trap.

The condensate drainage system should only be discharged to the sewerage system (sanitary or rainwater) via a trap and should be laid with a minimum gradient of 3%.

If the cables are laid in an unheated space, they must be protected with heat-insulating lagging and optionally with a heating cable.

9. Automation

9.1 Technology diagram



1. Electric pre-heater ON/OFF or PWM
2. Electric secondary heater ON/OFF or PWM
3. ON/OFF cooler
4. By-pass damper for GWC - beyond delivery Tweetop
5. By-pass flap
6. Supply fan
7. Exhaust fan
8. Outdoor temperature sensor
9. Launcher sensor
10. Supply air sensor
11. Exhaust sensor

9.2 Control principle

When switched on, the supply and exhaust fans are activated. The fans are controlled steplessly, each with a separate independent signal, with the possibility of setting different outputs using the service panel (see separate automation manual for details).

The anti-freeze protection of the counter-flow heat exchanger is implemented through an appropriate operating algorithm based on the efficiency of the unit.

The automation system is prepared to handle such elements as:

- electric pre-heater,
- secondary heater,
- radiator - ON/OFF signal only,
- by-pass,
- air quality sensor.

9.3 Controller - description and connection

The control unit is equipped with advanced dedicated control automation. The unit is controlled by a modern microcontroller which monitors and controls all the functions of the unit. The following pages show the wiring diagrams of the devices connected to the main controller board.

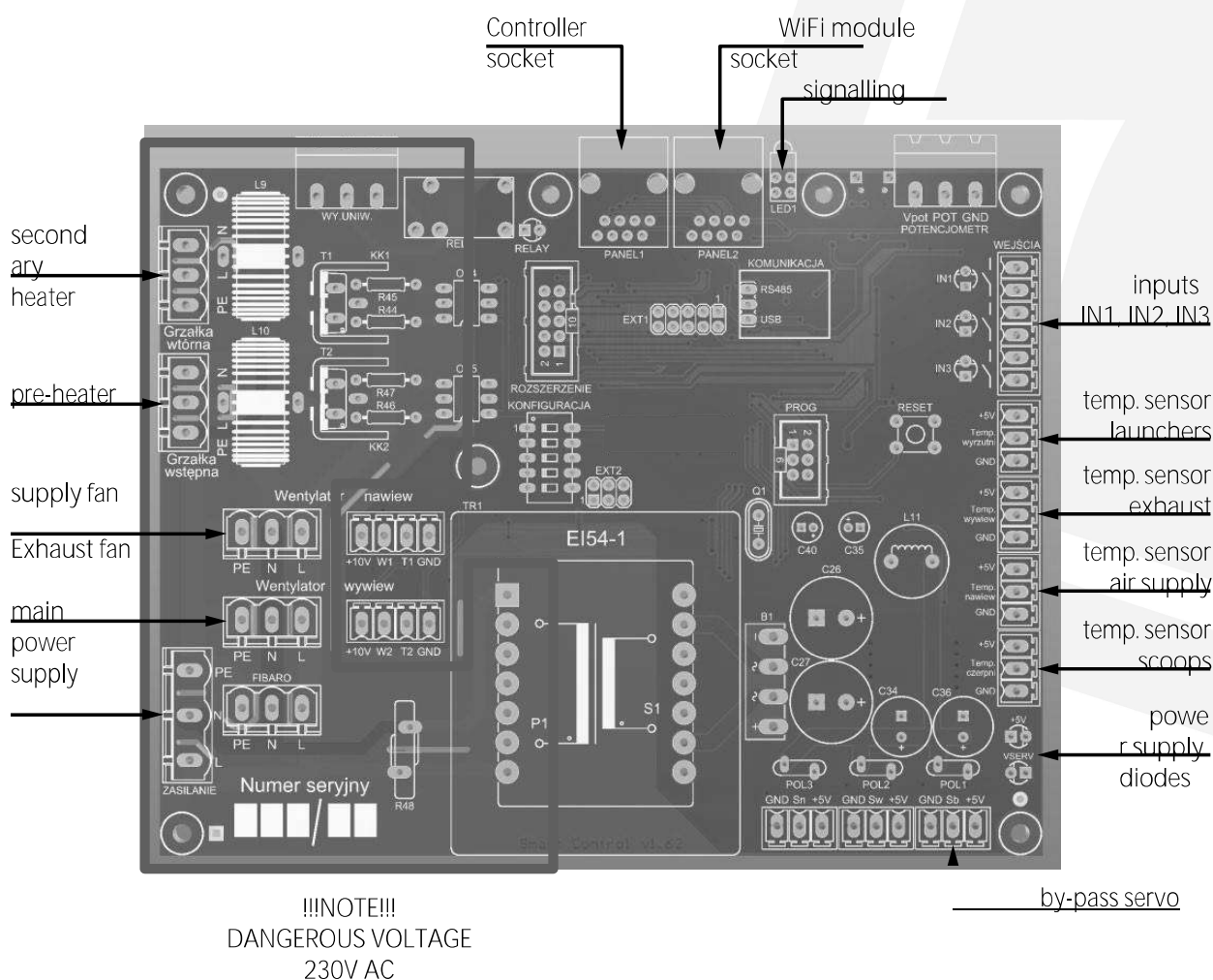


Fig. Controller diagram.

Connect the power cable to the controller according to the markings provided, as shown below. Make sure that the phase sequence is definitely observed. The unit is pre-wired at the factory.

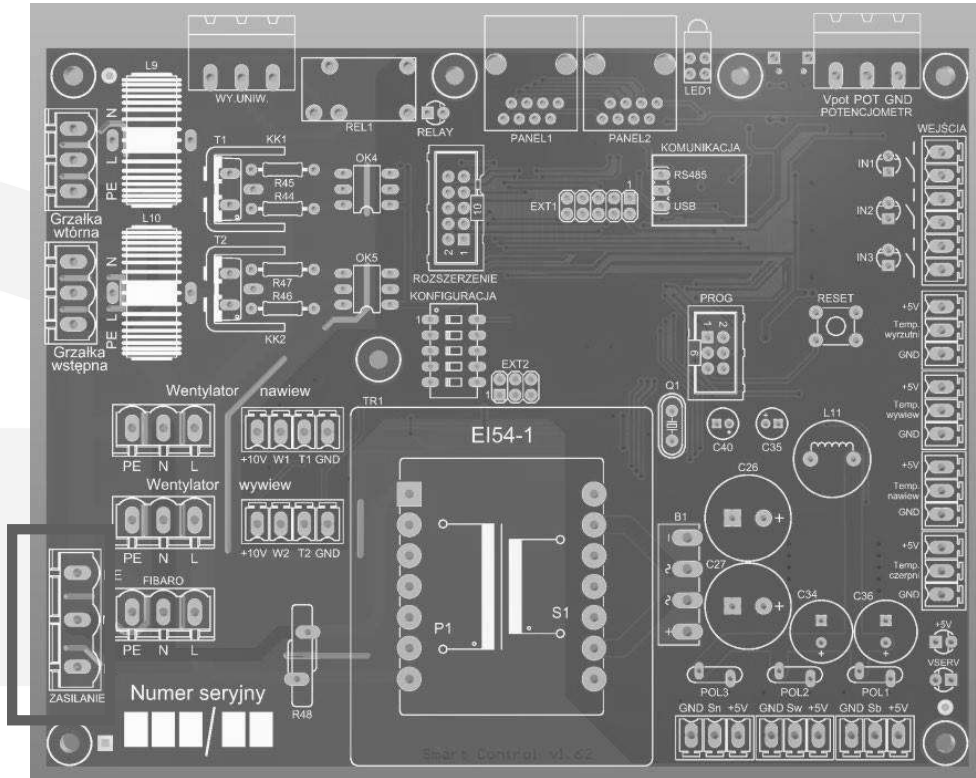


Fig. Connection diagram for the power cable to the controller.

9.4 Pre-heater (accessory - available as a complete unit)

The heater responsible for the defrost mode. It is activated only to defrost the heat exchanger.

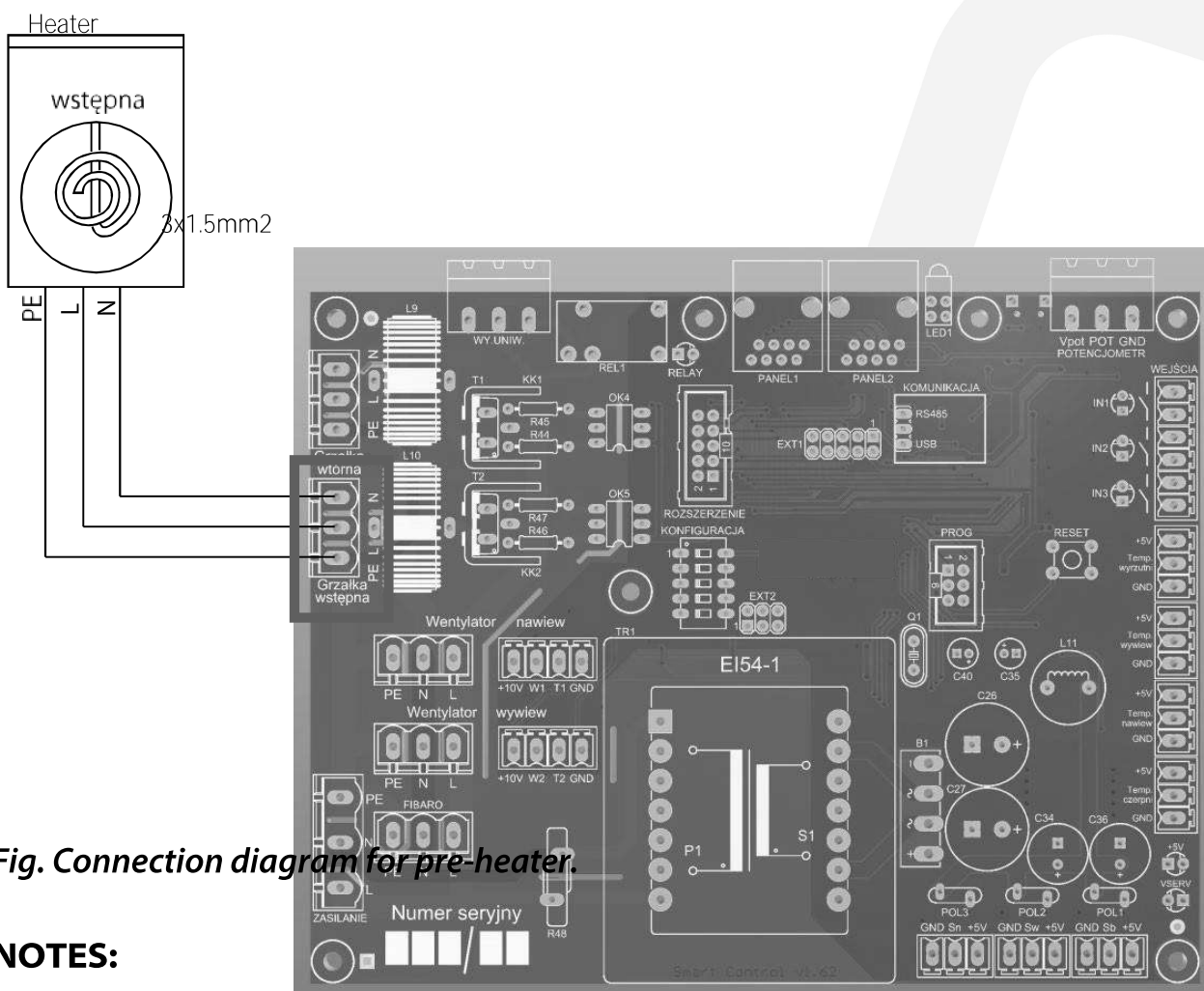


Fig. Connection diagram for pre-heater.

NOTES:

In the new version of the unit manufactured from June 2022, the pre-heater is built into the interior of the unit in front of the supply air ventilator. The heater output is 1kW in all units. The pre-heater is plugged in and operates steplessly from 0 to 1000W.

9.6 Fans

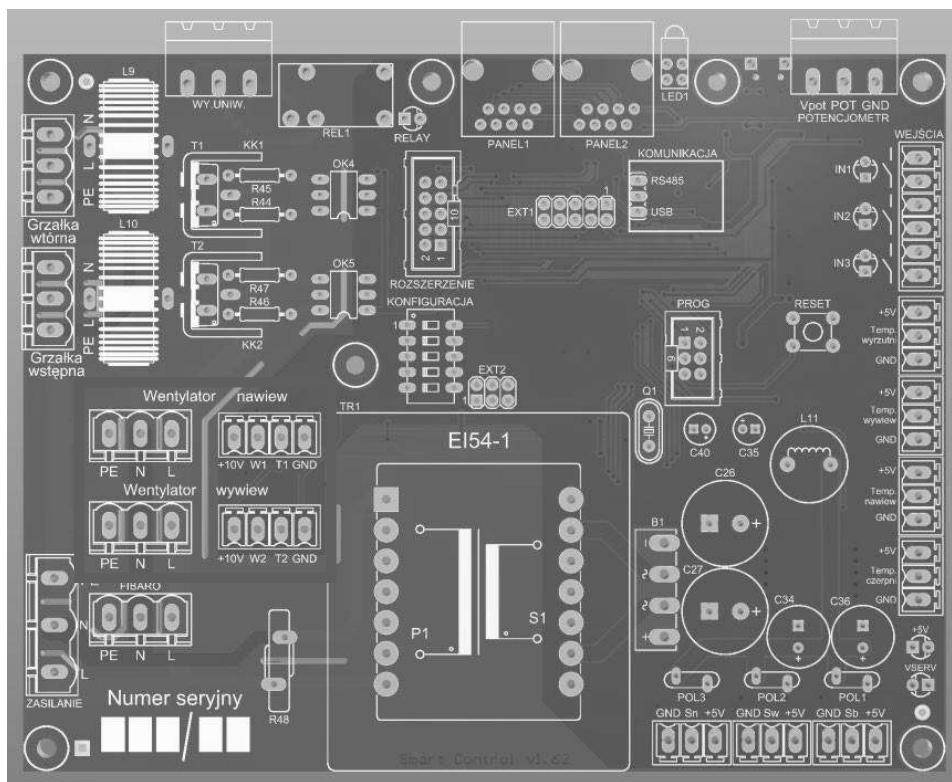


Fig. Connection diagram of fans to the controller.

Table: Connection of fans to the controller

	Signal	Colour	Function
Power supply	L	brown/black	Power supply 230V AC 50-60Hz
	N	blue	Neutral
	PE	green/yellow	Protective
Control	0-10V	yellow	0-10V control input
	Tacho	white	Speed feedback signal
	10V	red	Voltage output, do not short circuit!!!!
	GND	Blue	Control system weight

9.7 By-pass actuator

The air handling unit is equipped with an internal damper that co-operates with the By-pass activation system (automatic actuator).

9.8 Temperature sensors

The air handling unit has built-in temperature and humidity sensors to monitor the operation of the air handling unit and the temperature in the air ducts. Each sensor is connected to a different spigot in order to accurately monitor the internal temperature and operating parameters of the air handling unit.

Additional humidity sensors can be connected at the express request of the user.








9.9 Power supply and indicator lights

LEDs are placed at two locations on the controller board to informate the operating status of the unit.

Table: Power and indicator lights

	Description	Colour	Function
Power supply diodes	+5V	green	Processor supply voltage
	Vserw	green	Servo voltages
Indicator lights		green	Status LED Flashing indicates correct operation
		red	Error LED Continuous lighting indicates an error in the operation of the device

9.10 Description of functions of the EcoVent Recu air handling unit

State name	Description	Status of outputs
 Ventilation	Instantaneous ventilation of the entire building (duration approx. 15 minutes)	Activated by shorting input IN1
 Boost mode	Mode of temporary increase of the air handling unit's capacity up to 100%	Activated by shorting input IN1
 Windy	Mode using only the exhaust fan to ventilate the building	Activated by shorting the IN2 input
 Open windows	This mode is activated when the windows in the building are open. This makes use of the natural coolness in summer.	Activated by shorting the IN2 input
 Holidays	Mode of limiting energy consumption to 30% during users' absence	Activated by shorting input IN3
 Dream	Air handling unit capacity reduction mode for comfortable resting	Activated by shorting input IN3
 Calendar	Mode for individual scheduling of the air handling unit	Set by the wifi module, which is an accessory to the devices

9.11 Parameters configuration

The table below provides information on the configuration parameters that affect the key functions of the control panel. The parameter values have been adjusted to suit the user's needs. Any changes should only be made by authorised service technicians. Changing them yourself may result in failure or damage to the unit.

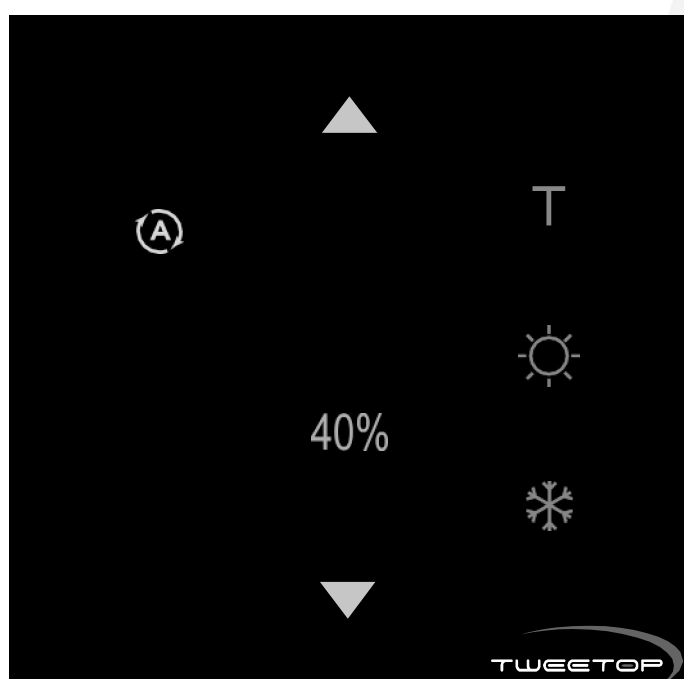
Table: Configuration parameters.

Name of parameter	Description	Default value
MAX_TEMP_ERR	Maximum temperature inside the panel above which the panel enters error mode	60°C
By-pass_MIN	The lower limit of air temperature at the air intake, above which the controller enters the mode By-pass	18°C
By-pass_MAX	Upper limit of the air temperature at the air intake above which the controller exits the mode By-pass	24°C
STATE DEFROSTING	Temperature at the outlet below which the centra- la enters defrost mode	0°C
AIS+* SYSTEM	Temperature at the outlet below which the centra- la enters defrost mode	-3°C
AIS++* SYSTEM	Parameters below which the unit will enter defrost mode	Dew point curve
HEATING	Supply air temperature below which the centre- la enters reheating mode	20°C
SERVO_PREDICTION	Function to be activated at the explicit request of the user	Other
SER_CHEESE_CLOSED	Parameter responsible for the speed of throttle movements. Parameter set by the manufacturer	other
SER_CHEESE_OPEN	Parameter responsible for the range of operation of the air intake switch. Parameter set by the manufacturer	other
SER_SHORT-TE	Parameter responsible for the range of operation of the air intake switch. Parameter set by the manufacturer	other
SER_OPEN	Parameter responsible for the range of operation of the air cleaner on the ejector. Parameter set by the manufacturer	other
SER_BYPA_CLOSED	Parameter responsible for the range of operation of the air cleaner on the ejector. Parameter set by the manufacturer	other
SER_BYPA_OPEN	Parameter responsible for the operating range of the throttle on the By-pass. Parameter set by the manufacturer	other
DEFROST TIME	Parameter responsible for the operating range of the throttle on the By-pass. Parameter set by the manufacturer	5 min
TIME_INTERVAL_DURATION	Time for which the heaters will be switched on when the timer defrost mode is activated	30 min

* not available on EcoVent Recu units

9.12 Regulator

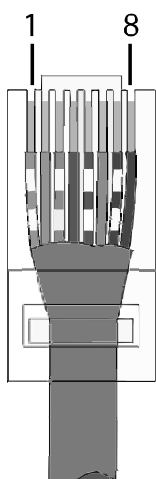
The Tweetop Smart controller is a state-of-the-art device that allows you to adapt the operation of the air handling unit to your individual needs. Tweetop Smart consists of an elegant glass panel and an innovative module with a microcontroller which makes it possible to adjust the capacity of the air handling unit, to set it into one of 5 operating modes and to activate and set the supply air heating/cooling function. The controller is designed for wall mounting indoors. It is recommended to locate the panel in an easily accessible place and at least 2 m away from the heat source.



Note: The panel should not be in a location that allows access by children.

9.13 Mounting controller

a) Connection cable



The connection between the **Tweetop Smart** controller and the air handling unit control unit is to be carried out using a connecting cable: Category 6 shielded twisted-pair UTP, both sides wired with RJ45 modular plugs of the same type (according to EIA/TIA 568B).

Attention:

- **the maximum cable length should not exceed 20 m,**
- **indoor use only.**

b) Connection of the regulator to the controller

In order to ensure communication between the controller and the regulator, they must be connected together using the above-mentioned connection cable. Care must be taken to ensure that the cable is plugged into the correct socket in accordance with the operating instructions and that the pins are connected in the correct order.

- connection to the controller

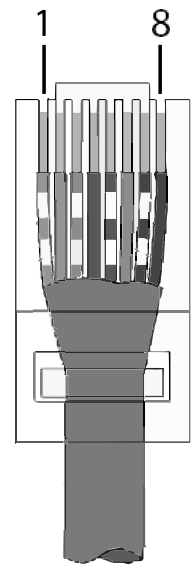
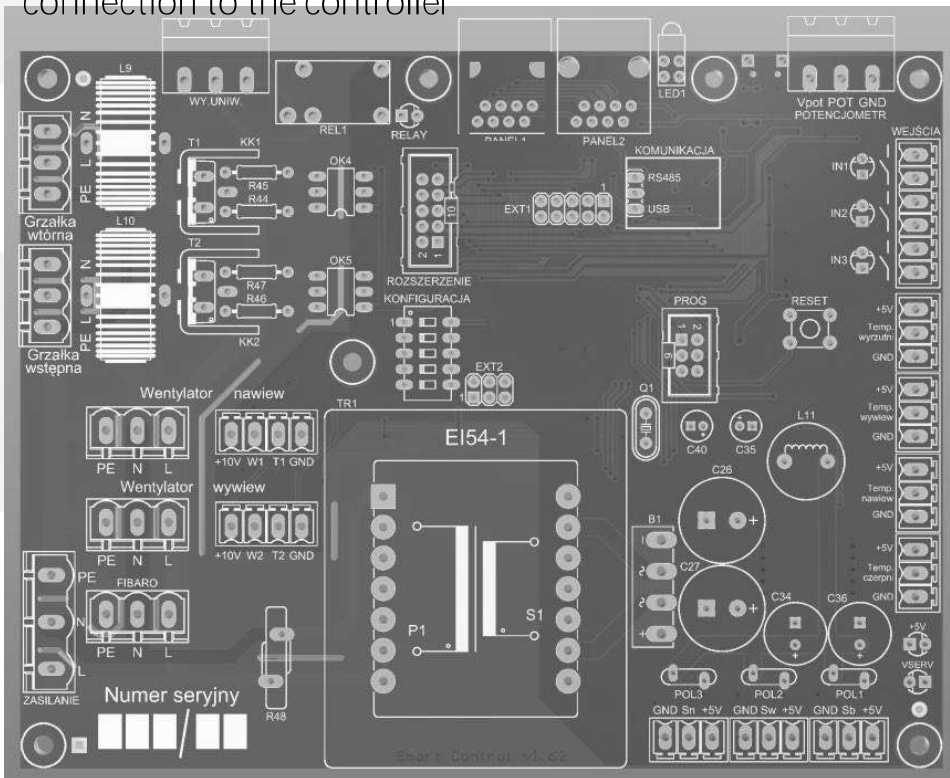
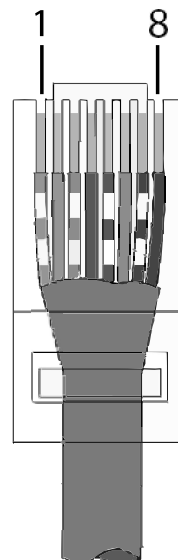


Fig. Controller sub-assembly diagram

- connection to the controller



NOTES:

In the new version of the unit manufactured from June 2022 onwards, the connection of the regulator and internet control is made outside the unit - as shown in the picture below:



With the change in connection, the supply air sensor has been placed on the casing of the air handling unit, this sensor must be installed in the supply air duct to the room and, if a secondary heater is used, it must be placed behind the heater.

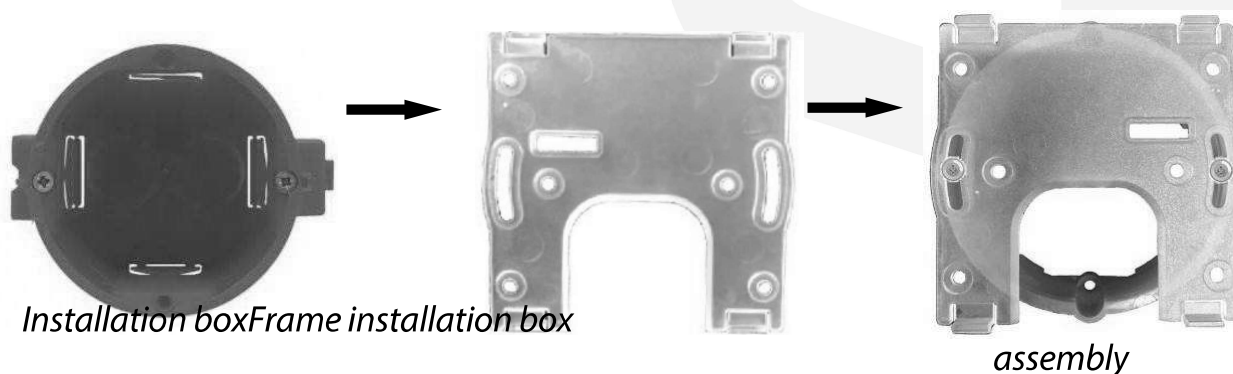
c) Mounting the regulator

The controller is mounted to a flush-mounted installation box with a diameter of 60 mm using a mounting frame, which is supplied with the controller:

- Fix the frame to the installation box with 2 screws,
- connect the connecting cable to the regulator socket,
- place the regulator on the mounting frame and press down.

Attention:

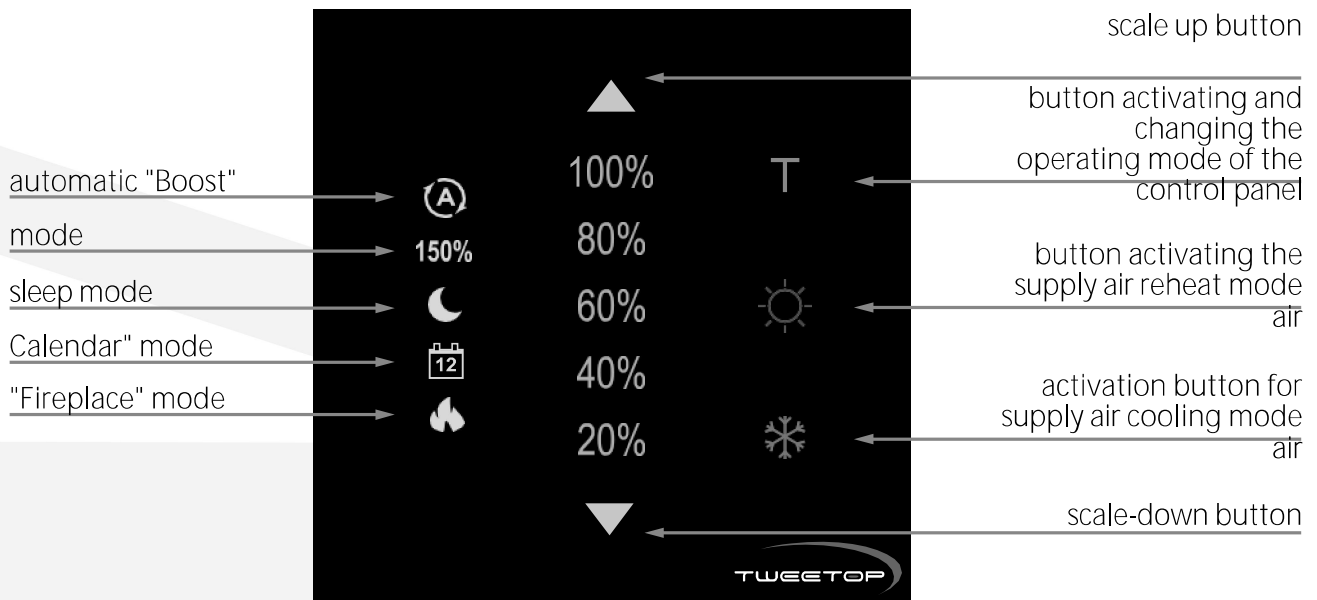
- **The flush-mounted installation box is not included in the scope of supply!**
- **The mounting frame connects to the regulator housing using a snap-in system.**

**9.14 Initial start-up of the controller**

Once connected, the controller seeks communication with the controller for 60 seconds. After one minute has elapsed, the desired capacity must be set or the selected mode of the air handling unit must be switched on.

10. Controller functions

10.1 Description of the controller control panel



10.2 Panel capacity

To change the output of the air handling unit,



change the value on the main scale of the controller with short presses of the button/. If no

value is highlighted, it means that the air handling unit is off. The range of values on the scale is from 0% (air handling unit off) to 100% (maximum unit capacity), changing in 20% increments.





10.3 Panel operation mode

The button activates the five selected operating modes of the recuperator. The first press of the button activates the first mode, each subsequent press changes the mode in accordance with their order. Each mode is marked with an icon on the left side of the controller. Mode activation is indicated by highlighting its icon. Clicking the T button, after activating the last mode, deactivates the modes.

automatic mode

A mode in which the control unit, through a system of sensors, compares the current temperature conditions and humidity level in the room and, based on their analysis, switches to the appropriate operating mode.

Attention: it is necessary to equip the air handling unit with a humidity sensor in order for the mode to work properly!

 150% boost* mode
A mode in which the air handling unit increases its capacity to 100%, allowing the room to be ventilated immediately. The mode lasts 15 minutes.
 sleep mode
Mode, reducing the capacity of the air handling unit (up to 30%) to ensure a comfortable rest. The mode lasts for 8 hours.
 calendar
A mode that allows an individual schedule to be set for the operation of the ventilation unit. Note: Before activating the calendar function, it is necessary to select the performance level of the air handling unit to which the unit will automatically return after exiting the schedule (at the end of a given event).
 fireplace mode
A mode that makes it easy to light the fireplace and prevents ash from entering the room. The mode also works perfectly with the hood by keeping the air in the room balanced.

*Boost mode is available on models with a capacity of up to 400 m³/h. In other units, the mode results in an immediate increase in capacity to 100%. The mode lasts 15 minutes.

If the mode icons are not illuminated, the unit is in manual control mode. This means that any change in the performance of the unit, will only occur when the user changes the setting. In manual mode, the operation of the air handling unit in the CTW system is still active. The system includes automatic by-pass, freecooling and cold recovery, which are activated by the controller, based on an analysis of the current temperature conditions inside and outside the building.

Note: If, during any operating mode, the user manually changes the capacity of the air handling unit, the controller automatically switches to manual control mode and the previous operating mode is deactivated.

10.4 Heating function

Activation of the mode is indicated by the illumination of the pictogram. To set the air temperature values, hold down the button for 3s. When the button starts flashing, the desired temperature can be set on the scale. Once the temperature is set on the scale, press the button again to confirm. When the icon stops flashing - the setting has been confirmed.

Value on the scale:	Corresponding temperature value:
20%	18°C
40%	20°C
60%	22°C
80%	24°C
100%	26°C

10.5 Cooling function

Activation of the mode is indicated by highlighting the pictogram. To set the temperature values, hold the button down for 3s. When the key starts flashing, the desired temperature can be set on the scale. After setting the temperature on the scale, press the button again to confirm. When the icon stops flashing - the setting has been confirmed.

Value on the scale:	Corresponding temperature value:
20%	14°C
40%	16°C
60%	18°C
80%	20°C
100%	22°C

This function is only available for units equipped with air coolers with additional automatics. In standard EcoVent Recu air-handling units, activation of the above function will open the heat exchanger by-pass - in the forced mode.

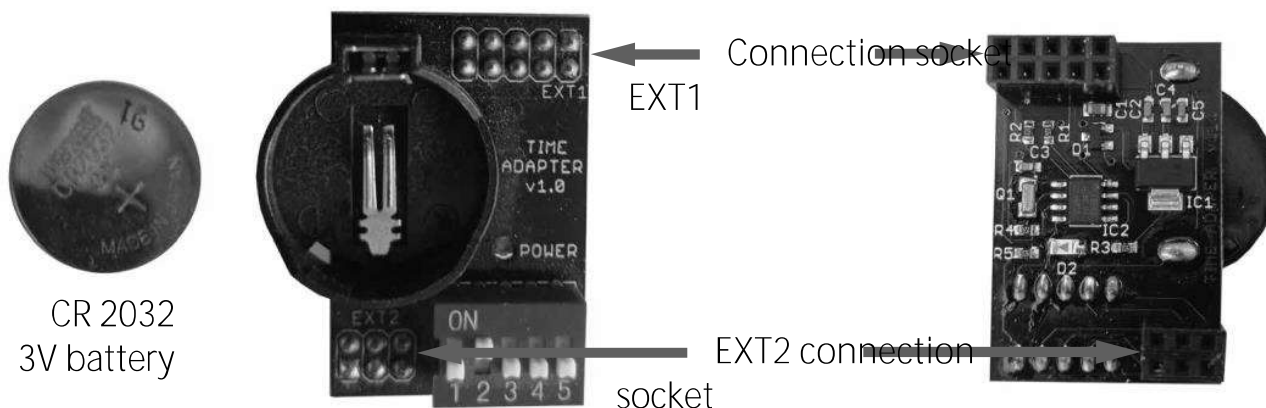
Note: the first time the heating or cooling function is activated, the controller immediately switches the capacity scale to the temperature setting scale. At this point, you can set the desired temperature on the scale. Once the temperature is set on the scale, press the button again to confirm. When the icon stops flashing - the setting has been confirmed.

10.6 Indicator light

The indicator light only comes on in two situations:

- a. error / panel fault - diode flashes red. The diode goes off automatically when the fault is cleared.
- b. filter replacement - the LED lights up orange. After replacing the filters, reset the message yourself. Reset is done by holding the / (more and less) buttons on the capacity scale simultaneously for 5 s.

The calendar module is supplied complete with a battery (type: CR 2032 3V) , which must be inserted into the module before it is installed in the control panel - the module is shown on both sides in the photos below:



10.8 External internet module - description and connection

The external module allows the control unit to be remotely controlled via any electronic device (laptop, computer, tablet) connected to the Internet.

Monitoring of the parameters and status of the control panel takes place by viewing the Nefele portal (<https://steruj.online/>) on any device with a browser connected to the Internet.

The Safe IT wifi module also allows the configuration parameters of the connected controller to be set. The kit includes:

- wifi module
- Nefele website (<https://steruj.online/>)
- application for mobile devices
- connection block

Types of devices on which the web portal can be displayed:

- smartphone
- tablet
- laptop
- desktop

NOTES:

In the new version of the appliance manufactured from June 2022 onwards, the connection of the Internet module is made on the outside of the appliance - photo illustrating this type of connection on page 32.

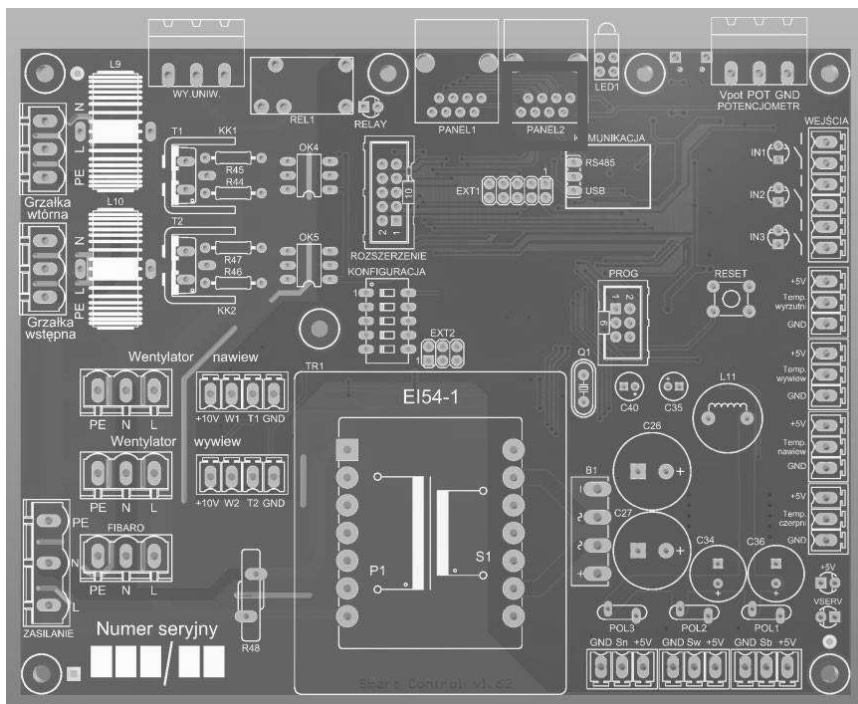
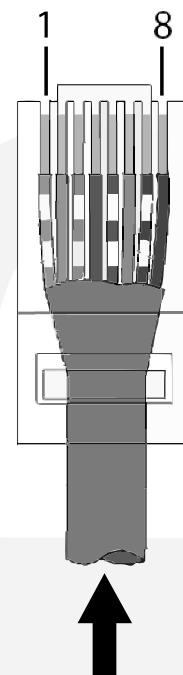
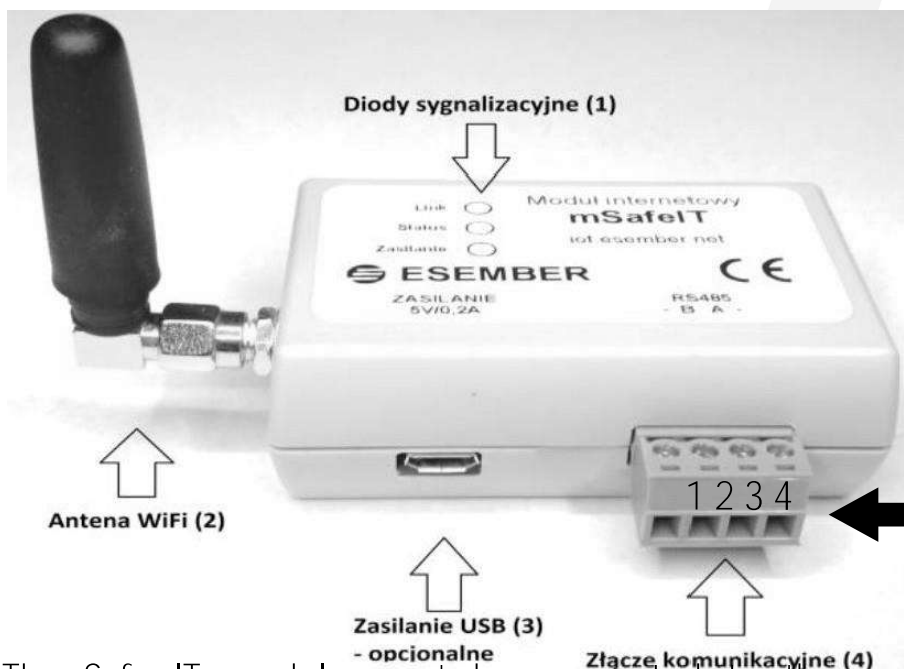


Fig. Wifi module connection diagram.



- 1 - 6V power supply
- 2 - GND
- 4 - RS485 communication A
- 5 - RS485 communication B



- 1 - orange (GND)
- 2 - white-blue (RS485 communication B)
- 3 - blue (RS485 communication A)
- 4 - white-orange (6V supply)

The Safe IT module must be connected to the monitored device via the communication interface (4).

For some applications, an additional power supply via a micro-USB connection is required, but in such cases the user manual of the manufacturer of the monitoring device clearly defines this need.

Description:

(1) Indicator lights to visualise the status of the device.

Description of the diode	Function	Possible states
Link	communication with the monitored device	correct - flashing
		incorrect - no light
Status	connection to the Nefele portal	configuration - diode changes brightness slowly
		correct - LED on
		invalid - LED not illuminated
Power supply	LED indicating correct power supply	

(2) WiFi antenna used to establish wireless communication with the router. The antenna is connected to the rest of the module with a connector which, in the event of range problems, enables the antenna to be replaced with a version with higher amplification. The module is supplied from the factory with an antenna with a 2dBi gain.

(3) A power/service connector used to supply power to the module via typical, general-purpose mains power supplies/chargers with an operating voltage of 5V and a current greater than 200mA. The presence of this connector depends on the type of device being monitored. The device can also be powered by connector (4).

(4) Connector of the monitored device used to connect the device whose status will be monitored. To the connector we connect the power supply (5..12V 0.2A), and two RS485 interface signals.

10.9 External internet module - device registration

a. User registration for the Nefele portal.

In order to use Safe IT, user registration on the Nefele portal is required.

The registration form can be found at <https://steruj.online/#!/regi-ster>.

It is also possible to launch it from the login page (<https://steruj.online/>) by pressing **"Register"** and filling in the registration form.

b. SafeIT device registration

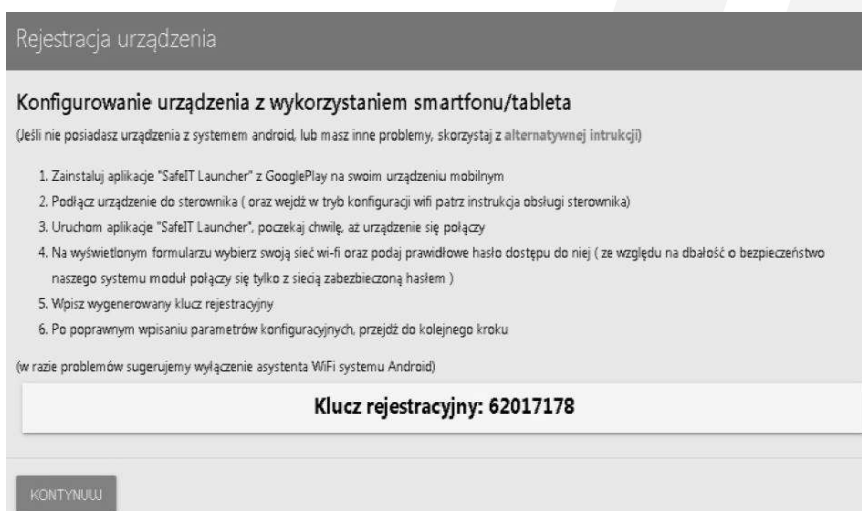
Once registered on the Nefele portal, log in and begin the process of

device registration. When logging in for the first time, the following device registration window will appear automatically.



Enter a name for the device to be registered that is convenient for the user of Safe IT (e.g. "DOM") and press the **"Start registration"** button.

In the next window, the registration key for the Safe IT device will be generated (e.g. 99590577). This should be copied or saved, as you will need it for the rest of the device registration.



In the next step, connect to the mSafeIT wifi network.

In configuration mode, the mSafeIT module creates its own WiFi network to which you must connect to complete the registration (the password to access this network is: **11223344**).

Once connected to the network, open a new window in your browser and enter the IP address of the Safe IT module: **192.168.4.1**



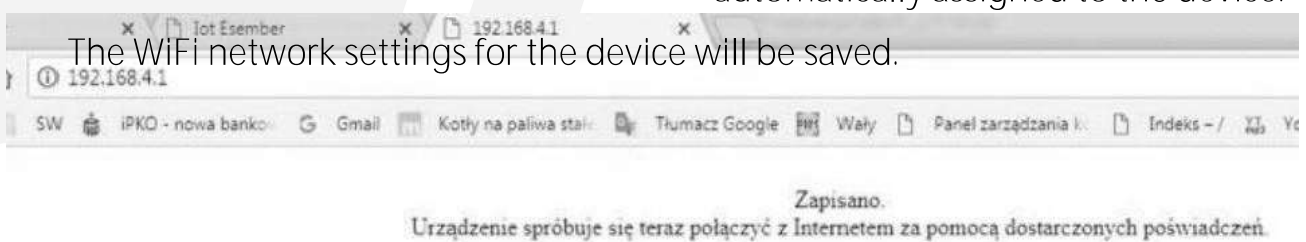
Once connected to the mSafeIT network, a window will open in which we need to enter the name of the WiFi network, the password of the WiFi network in question and the registration key of the Safe IT device.



After entering the settings of the WiFi network, save the changes using the "Save" button. After saving the changes, the module should automatically connect to the selected network, which will be signalled by the "Status" LED lighting up continuously.

If this does not happen, it is necessary to manually switch the computer configuration to the selected WiFi network. The registration key is automatically assigned to the device.

The WiFi network settings for the device will be saved.



You then need to switch back to the registration tab in your browser and confirm by clicking on Continue.

Once the device has been successfully registered on the mSafeIT module, all three LEDs should be lit, going from the top:

- Link - communication with monitored device - intermittent light
- Status - Connection to the Nefele portal - continuous light
- Power supply - continuous light

In some cases, a one-time reset of both the module and the monitored device is required to display all parameters of the monitored device.

c. Use of the NEFELE web portal.

After logging into the **Nefele** portal (<https://steruj.online/>) and registering the device, the user will go to the main panel, which displays the key controlled parameters of the device:



- The main elements of the portal - the menu bar at the top of the page includes:
 - "Main panel - described earlier on page
 - " Charts - containing historical data (up to one month back) of key parameters of the device
 - " Events - any events relating to the Safe IT system (e.g. loss of connection to the controller) are logged and displayed here.
 - " Configuration - more detailed device parameters
 - " Schedule (optional) - configuration of the schedule of the device operation as a function of time
- "Device list" - all registered devices are visible here, as well as a form for registering a new device
- " Messages - list of messages assigned to the account
- "Account settings" - a tab for editing account settings such as changing the password.

- Changing the WiFi network on the device.

If the configuration of the WiFi network in the router has changed, e.g. by changing the network name or password, and the Safe IT device is assigned the previous settings, the WiFi network registration must be carried out again on the module.

To do this, press the button on the underside of the module, which will put the module into configuration mode.

When the button is pressed, the module will return to configuration mode, allowing the WiFi network to be re-selected with a new password.

Then connect to the **mSafe IT** network

Open a new window in your browser and enter the IP address of the Safe IT module

192.168.4.1

After connecting to the mSafeIT network, a window opens in which you have to enter the new name of the WiFi network, the password of the WiFi network in question. The registration key is no longer entered as the device has it assigned when it was first set up.

After entering the Wifi network settings, save everything. The mSafeIT wifi network should automatically switch to the main WiFi network. If this does not happen, you must manually switch to the



selected WiFi network.

d. Application for mobile devices

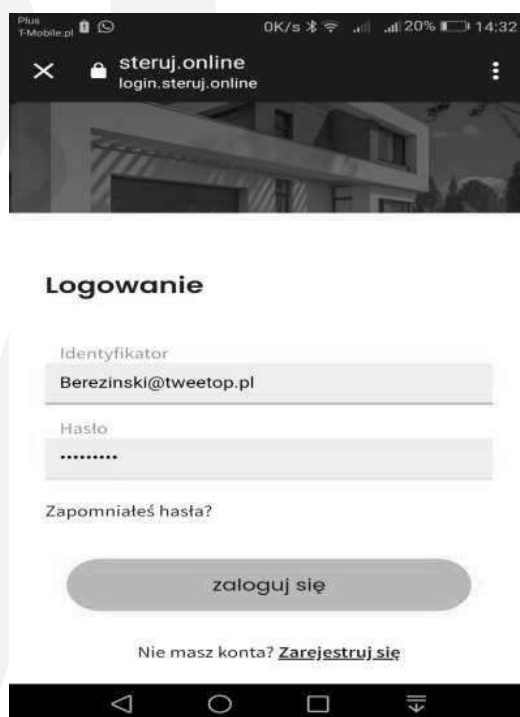
The web portal can also be managed using the Android mobile app, which can be downloaded from the Google Play shop at this link:

<https://play.google.com/store/apps/details?id=com.esember.esemberiot&hl=pl>

The application gives the user a full overview of the registered device and allows management of its operating parameters.

After installing the remote control and downloading the app, you will have access to almost all operating parameters of the recuperator as well as the wall controller and the possibility to control them remotely. The operation of the app is intuitive, which makes it very simple and user-friendly.

The first step is to log in to the application:

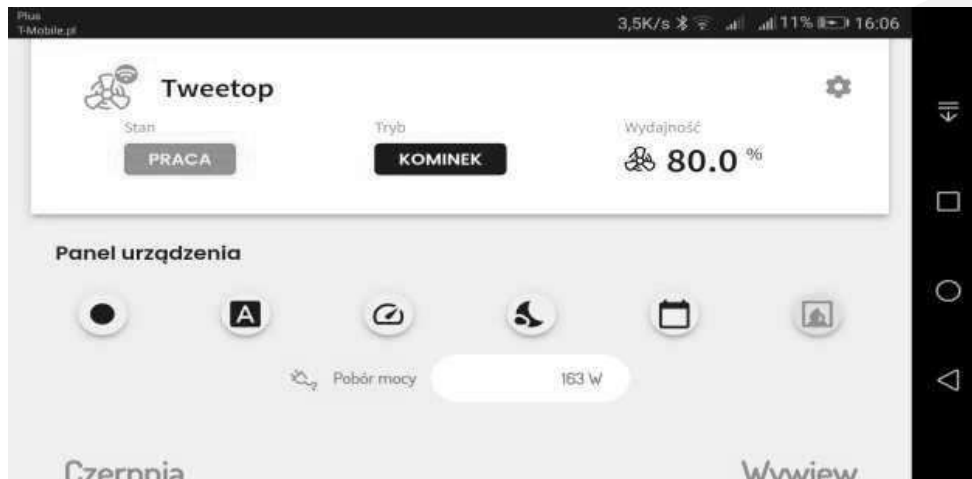


In the basic operating panel, in addition to the control icons, you will find information on:

- instantaneous current consumption in watts [W],
- temperature and humidity of the exhaust air,
- outside air temperature,
- supply air temperature,
- ejection air temperature (optional),
- the percentage expenditure settings on the individual fans,
- the contamination level of the filters,
- instantaneous heat and cold recovery (in preparation).

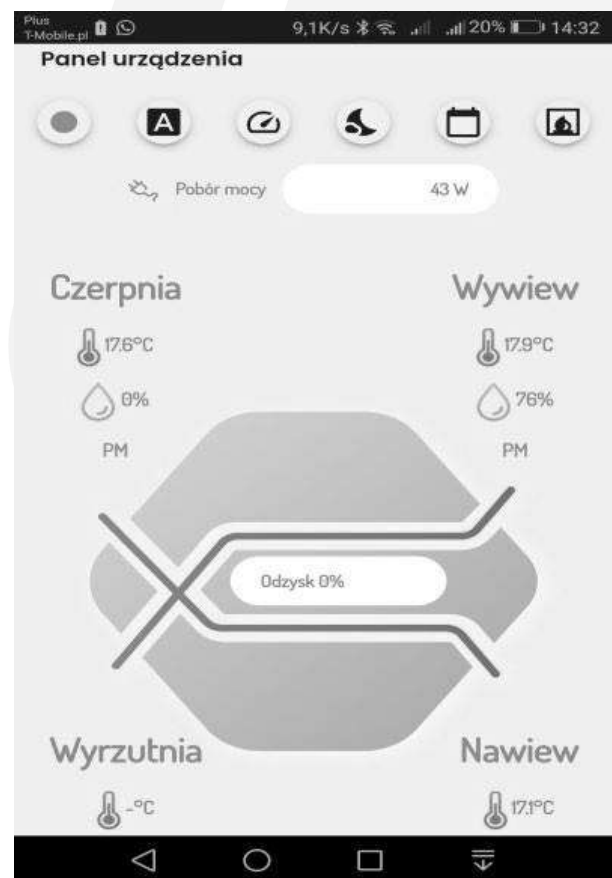
The fan icon with the sign of the WiFi network, visible in the top left corner above the caption **WORK**.

Other important fields are the operating mode, e.g. the 'fireplace icon', and the output indicated by the fan logo and the percentage output, in this case we have 80% visible.



Below is an abbreviated description of the functionality of the icons, in order from the left edge of the application screen:

- **Green icon** - manual operation non-active fan mode with visible green range signal.
- **Icon A** - Automatic operation (the unit tries to maintain the humidity between 40 - 60% of the room extract air).
- **Speedometer symbol** - ventilate mode - the unit enters max. flow rate for 15 min. 150% of the flow rate is displayed on the regulator.
- **Moon symbol** - Night mode reduces expenditure to 30% for eight hours.
- **Calendar symbol** - the device works according to the tasks set in the calendar.
- **Fireplace symbol** - the air handling unit operates at 80% supply and 20% exhaust (cycle lasts 20 min).



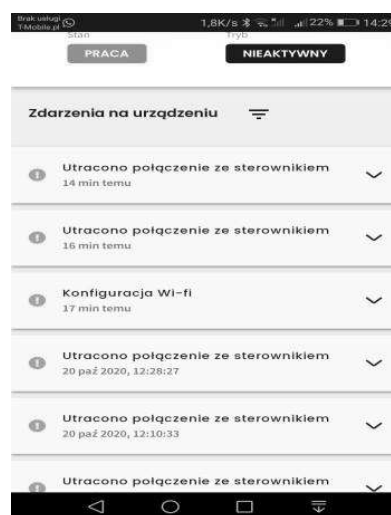
In the side tab of the 'Management' application, located on the left-hand side of the screen, we have access to functions such as:

1. PANEL, MAIN SCREEN - shown on previous page.

2. CHarts - allowing the monitoring of the device's operation, over a selected time interval:



3. EVENTS - overview of logins, WiFi settings, registration, device connections):



4. CONFIGURATION - allowing you to set :

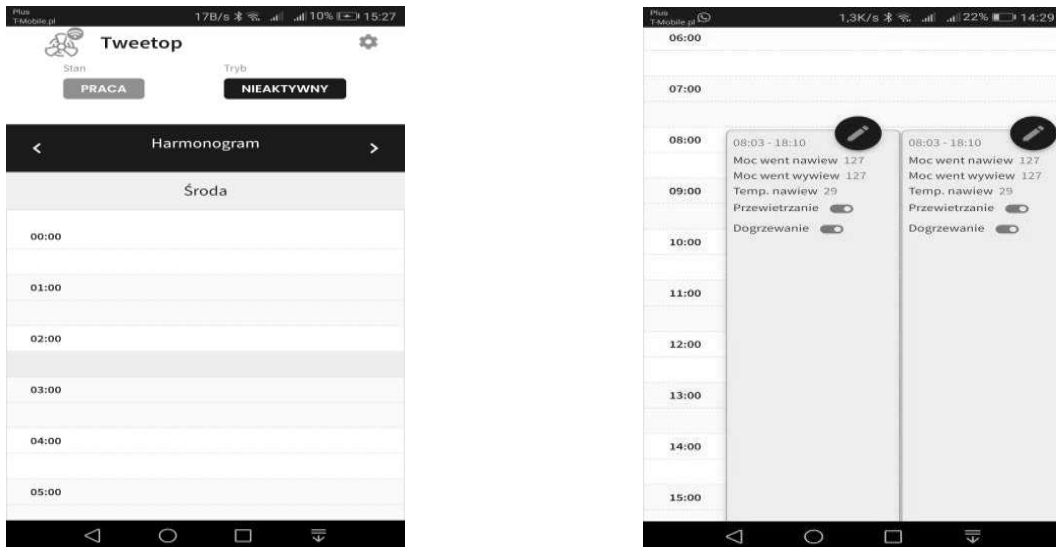
- temperatures ,
- by-pass,
- fan power,
- air humidity (in preparation),
- filter replacement time,
- switching-on time and reheating temperature setting,

- time switch-on and cooling temperature setting (in preparation),
- the current time, date and day ,
- error review.

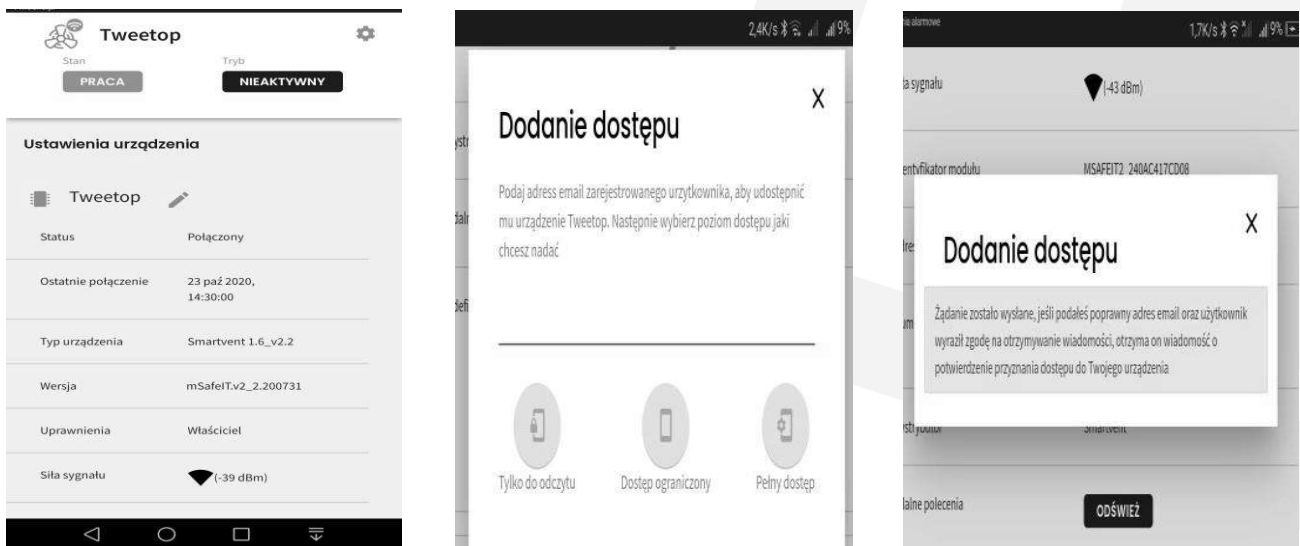
In addition, there is information about the current version of the software:



5. CALENDAR - allows you to programme the operating time of the appliance. In order for the calendar to function correctly, the correct date must be set in the "CONFIGURATION" panel:



6. SETTINGS - here you can obtain information on the operating status of the device, WiFi signal strength, software version. From this level, it is also possible to grant access to a third party to the device, e.g. a service technician:



11. Initial start-up

After the unit has been assembled and all electrical, installation and automation connections have been made:

- Check the levelling of the air handling unit in the direction of the condensate drain.
- Check the patency of the condensate drainage system.
- Check that the electrical connections are correct.
- Check the condition of control cables, sensors, connections, couplings, etc.
- Secure the ventilation ducts against accidental slipping out of the connectors in accordance with art.
- Check air system connections for leaks.
- Check the condition of the ventilation ducts, connections and installation (if any) of connectors, dampers, duct heaters, dampers, etc.
- Check the correct connection of other auxiliary units working with EcoVent Recu.
- Carry out a function check of the pre-heater (optional).
- Carry out a function check of the by-pass damper (optional).

If all connections are found to be correct, the unit can be started up, in the following sequence:

- switch on the appliance as described in chapter AUTOMATICS,
- adjust and set the appropriate air volume on the fans (all gears),
- optionally set appropriate temperatures.

NOTES:

- **the appliance is started up from the control panel - for details, see the Automation chapter,**
- **When the instrument is started up for the first time, the start-up protocol must be completed.**

12. Operation of the appliance

12.1 Switching the device on and off

The unit is operated from the control panel. For description see chapter AUTO- MATH.

12.2 Summer operation

During the summer season, the ventilation should operate at minimum output, only at night time can the output be increased by bringing in cooler air from outside.

Switching off heat recovery by switching on the By-pass or replacing the heat exchangers with a summer cassette will eliminate the unnecessary heating of cool outside air with warm exhaust air.

If an actuator-controlled by-pass damper is used, it must be set to automatic temperature operation. The air handling unit controller analyses the exhaust and fresh air temperatures and controls the heat recovery itself, selecting the optimum setting for efficient room cooling.

12.3 Winter operation

During the heating season, ventilation requires special attention, as its absence or malfunction during this period carries the most risks.

The unit should be operated in continuous mode: automatic or manual; it is recommended to switch off the air handling unit when there are no people in the house, but after the house has been ventilated. In winter, the air flow should be adjusted depending on the number of people and the intensity of household chores, bearing in mind that excessive ventilation of rooms dries the air, decreasing the comfort of living and increasing the power consumption.

13. Basic maintenance

13.1 Information general

Regular inspection of the air handling unit's operation will ensure many years of trouble-free operation of the unit and prevent its failure in the future. Therefore, it is necessary to carry out regular inspections, at least once a year (preferably before the heating season), observing the following recommendations.

NOTES:

- **All maintenance, repair or preventive maintenance must always be carried out when the unit is stopped and switched off.**
- **Servicing of the unit is carried out when the filters are changed.**
- **Servicing should only be carried out by a suitably qualified person.**

13.2 Control exchanger

Sequence of activities:

- Switch off the control unit and remove the plug from the socket.
- Remove the heat exchanger by pulling it out in accordance with pictures 1, 2 and 3. The heat exchanger can only be removed from the unit by pulling on the plastic strip.
- Visually check the cleanliness of the ducts Fig. 4. In case of fouling, the exchanger should be vacuum-cleaned and removed beforehand. After vacuuming, the exchanger should be re-installed in the unit. If the exchanger is still dirty, it is necessary to rinse it with clean water. Pour off excess water and let the exchanger dry completely. After drying, insert the exchanger in the right place.
- **Do not use a high-pressure water jet, as this can damage the exchanger plates.**
- In case of light fouling, blow off dust and dirt from the exchanger fins (if fouling is visible) by removing the exchanger as shown in Fig. 1 and 2. After checking cleanliness in accordance with Fig. 4, the exchanger must be reinstalled in the unit.

13.3 Filters

The air handling unit is equipped with two filters, one M5 class on the intake and the other G4 class on the exhaust. Both filters must be replaced on a regular basis. The cartridge filters should be replaced when they become dirty, at a frequency depending on the degree of air contamination. We recommend replacing them every 2500 operating hours of the air handling unit, i.e. approximately every 3-4 months. A new set of filters should be ordered from the manufacturer.

To replace dirty filters, open the inspection flaps and then pull out the filters. When re-installing the filters, pay particular attention to the class of filter being inserted: M5 on the inlet, G4 on the exhaust.

Maintenance sequence:

- Switch off the control unit and unplug the power cord from the socket.
- After the fans have stopped, remove the front inspection cover (fig. 1 and 2).
- Remove the filters one by one from the filter chamber (Fig. 5) and insert new filters.
- Used filter cartridges G4 and M5 must be discarded, they may not be cleaned, regenerated or reused in the air handling unit.
- Reinstall the exchanger.
- Fit inspection cover, check condition of gaskets before fitting inspection cover. Replace with new ones if damaged.
- Connect the control panel and switch on the appropriate operating mode.

NOTES:

Excessively dirty filters cause a decrease in airflow, which can lead to emergency shutdown of the electric heater and result in a reduction in the energy efficiency of the system.

photo 1

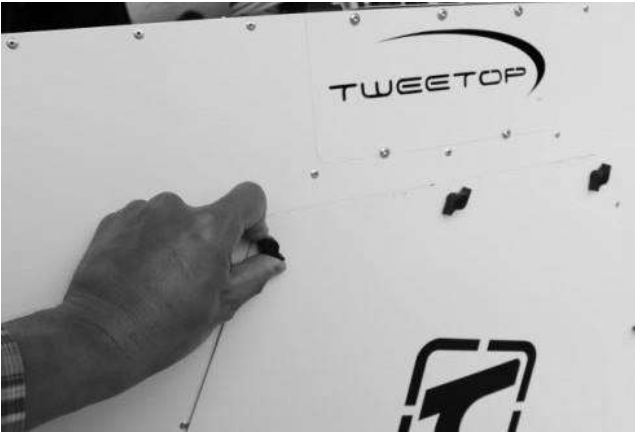


photo 2

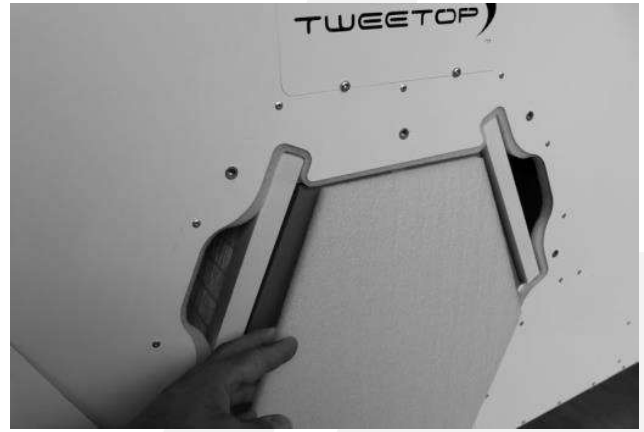


photo 3



photo 4



picture 5



13.4 Drainage system condensate

Check the patency of the condensate drain because solid particles and other impurities (building foil, polystyrene) carried in with the air can cause deposits or clogging of the drain connection.

Sequence of activities:

- Switch off the control unit and remove the plug from the socket.
- Remove the front inspection cover once the fans have stopped.
- Remove the heat exchanger.
- Check the inclination of the air handling unit towards the condensate drain.
- Check the drain patency by pouring approx. 1l of water into the drain tray in the air handling unit's chamber to assess the efficiency of the water flow towards the discharge stub. If the water does not flow from the tray or the drain stub pipe is not sufficiently unobstructed, a service technician must be called immediately and the unit must not be operated. The manufacturer allows you to remove the blockage yourself (the user should call a plumber).
- Clean the condensation tray with water and detergent.
- Flood the ball trap.
- Reinstall filters and exchanger.
- Fit inspection cover, check condition of gaskets before fitting inspection cover. Replace with new ones if damaged.
- Connect the control panel and switch on the appropriate operating mode.

Inspection of the condensate drain system is recommended:

- For typical standing exchanges once a year (preferably before the heating season).
- For suspended units twice a year, also in the middle of the heating season.

The photos show the condensate outlet as viewed from the inside of the unit and from the outside:



13.5 Checking the automation for memory errors

With the unit switched on, check the information LEDs on the controller. The colour of the LEDs tells us the operating status of the unit as indicated below.

When checking the operation of the automation, the operation of the temperature sensors placed in the unit should also be checked. As well as checking the operation of the by-pass.

DESCRIPTION		COLOUR	FUNCTION
Power supply diode	+5V	green	Processor supply voltage
	Vserv	green	Servo voltage
Indicator lights		green	Status LED Flashing indicates correct operation
		red	Error LED Continuous lighting indicates an error in the operation of the device
		red	Error LED Continuous red flashing indicates a temperature sensor error or unplugging of one of the sensors

13.6 Other activities

- Visual inspection of the condition of the air intake and exhaust.
- Check the condition of the ~230V power cable and the condition of the control cables. The wires should not be damaged, nor should there be any loose connections at the connectors.
- Checking the condition of the ventilation ducts and their insulation, paying particular attention to the connections to the spigots of the air handling unit.

13.7 Typical appliance malfunctions and their remedy before calling for service

PROBLEM	POSSIBLE SOLUTION / COMMENT
The air handling unit gives too little air	<ul style="list-style-type: none"> • check the state of dirtiness of the filters and exchanger
At low temperatures, the supply fan runs intermittently	The unit is equipped with an antifreeze system, functioning by slowing down the speed of the supply fan, which during severe frost periodically slows down the fan speed for the time of defrosting the heat exchanger. The defrosting time depends on the outside temperature and the temperature and humidity of the exhaust air. This is normal operation of the unit.

At low temperatures, the supply fan is permanently switched off

If the air handling unit is equipped with an anti-freeze system, which functions by slowing down the speed of the supply fan, check:

- whether the temperature of the air extracted from the room as well as the temperature at which the recuperator operates is too low.
- that the ejection air temperature sensor is not defective.

Supply fan switched off permanently	<ul style="list-style-type: none"> defective or out of adjustment defrost sensor
The air handling unit does not extract air from the room	<ul style="list-style-type: none"> check the condition - patency of the launcher, check the condition of the exhaust filter,
The air handling unit does not supply air to the room	<ul style="list-style-type: none"> check the patency of the air intake, check the state of contamination of the fresh air filter
The control unit does not operate in any gear	<ul style="list-style-type: none"> no connection between the control panel and the mains socket or a damaged power cable, no voltage at the mains socket supplying the control panel, blown fuse.
Water collects in the air handling unit	<ul style="list-style-type: none"> obstructed water drainage from the air handling unit, Clogged condensate drain, Dirty drip tray causing drain clogging, very high humidity of the exhaust air causing dripping in places not intended for it, incorrectly levelled unit, air-operated siphon.
Water leaks from the air handling unit	<ul style="list-style-type: none"> Clogged condensate drain, incorrectly levelled unit, air-operated siphon.
Water condenses on the air handling unit and in the ducts.	<ul style="list-style-type: none"> high humidity and air temperature in the room where the unit is installed, insufficient insulation of ventilation ducts.
Water drips from the anemostats	<ul style="list-style-type: none"> insufficient insulation of ventilation ducts.
The control panel with processor control does not switch on, but displays a message: Emergency STOP	<p>The emergency STOP is caused by exceeding the temperature in a given measuring channel. The function is used as fire protection for the control panel and the installation. The cause of the emergency stop can be:</p> <ul style="list-style-type: none"> too high a temperature (above 55°C), unconnected or loose terminal contacts of the thermistor connection, defective cable or thermistor, Once the cause of the alarm has been eliminated, the manipulator should be provoked to check again whether the cause has been removed. A detailed description of this procedure and other alarm messages is available in the manual of the keypad.

NOTES:

- The control unit has a delay of approximately 2 minutes after switching on. After this time, the unit starts to operate according to the preset setting.**
- If after switching the air handling unit on, it starts operating with increased flow, the red diode flashes on the control panel and the air handling unit shuts down after a while (approx. 2 minutes), it means that one of the sensors is faulty or it has been "disconnected" from the control panel (main control panel). This operation is to cool down the air handling unit in case of using the pre-heater.**