



# HEAT RECOVERY AIR HANDLING UNIT



**KOMFORT EC LW**



**OPERATION MANUAL**



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**BLAUBERG Ventilatoren GmbH** Company is happy to offer your attention a suspended heat recovery air handling unit **KOMFORT EC LW**.

## INTRODUCTION

The present operation manual contains a technical description, technical data sheets, operation and mounting guidelines, safety precautions and warnings for safe and correct operation of the unit.

Read carefully and understand the operation manual, especially the safety requirements, before the unit mounting and start up.

Keep the operation manual available as long as you use the unit.

## GENERAL

The heat recovery air handling unit KOMFORT EC LW is designed for efficient and energy saving ventilation of domestic and public premises.

The unit is not a ready to use product but a component part of central air conditioning and ventilation network.

The unit is designed for indoor application with the ambient temperature ranging from +1 °C up to +40 °C and relative humidity up to 80 %.

Hazardous parts access and water ingress protection rating:

- unit motors - IP 44;
- assembled unit connected to air ducts - IP 22.

The unit design is regularly improved, so some models can slightly differ from those ones described in this operation manual.

## SAFETY REGULATIONS

All operations related to the unit electrical connections, servicing and repair works are allowed only after the unit is disconnected from power supply.

The unit is rated as a Class I electrical appliance.

All mounting and servicing operations are allowed by duly qualified personnel.

Please follow the safety regulations and working instructions (DIN EN 50 110, IEC 364).

Make sure the impeller and the casing are not damaged before connecting the unit to power mains. The casing internals must be free of any foreign objects which can damage the impeller blades or the motor.

The unit maintenance and repair is allowed only after power cut-off and full stop of the rotating parts.

Misuse of the unit or any unauthorized modifications are not allowed.

The unit is designed for connection to power supply in compliance with the «Technical data» section.

The unit is rated for continuous operation.

Take steps to prevent ingress of smoke, carbon monoxide and other combustion products into the room through open chimney flues or other fire-protection devices. Sufficient air supply must be provided for proper combustion and exhaust of gases through the chimney of fuel burning equipment to prevent back drafting. The maximum permitted pressure difference per living units is 4 Pa.

The transported air must not contain any dust or other solid impurities, sticky substances or fibrous materials.

The unit is not rated for operation in a flammable or explosive medium.

Fulfil the operation manual requirements to ensure a trouble-free and long service life of the unit.

## TRANSPORTATION AND STORAGE REGULATIONS

Transportation of the unit is allowed by any vehicle provided the unit is transported in the original package and is protected against weather and mechanical damages.

Use hoist machinery for handling and transportation to prevent possible mechanical damages of the unit. Fulfil the requirements for transportation of the specified cargo type during cargo-handling operations.

Store the unit in a dry and cool place in the original packing.

The storage environment must not be subjected to any aggressive and/or chemical evaporations, admixtures, foreign objects that may provoke corrosion and damage connection tightness.

Corrosion in an environment with minimized risk of mechanical damages, temperature and humidity fluctuations.

Do not expose the unit to the temperatures below +10 °C and above +40 °C.

Connection of the unit to power supply is allowed after the unit has been kept indoors for minimum two hours.

## MANUFACTURER'S WARRANTY

The unit complies with the requirements according to the EU norms and directives, to the relevant EU-Low Voltage Equipment Directives, EU-Directives on Electromagnetic Compatibility.

We hereby declare that the unit complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility, which relate to electrical appliances used in set voltage classes.

The manufacturer hereby warrants normal operation of the unit over the period of two years from the retail purchase date provided observance of the installation and operation regulations.

In case of a failure due to a manufacturing fault during the warranty period the consumer has the right to exchange the unit.

The replacement is offered by the Seller.

In case of no confirmation of the purchase date, the warranty period shall be calculated from the manufacturing date.

The MANUFACTURER is not responsible for any damage resulting from any misuse of or gross mechanical interference with the unit.

The MANUFACTURER is not responsible for the damages resulted due to the use of third party equipment or to third party equipment.



### WARNING

*The unit is not allowed for use by children and persons with reduced physical, mental or sensory capacities, without proper practical experience or expertise, unless they are controlled or instructed on the product operation by the person(s) responsible for their safety.*

*Supervise the children and do not let them play with the product.*



### WARNING

*Do not dispose in domestic waste.*

*The unit contains in part materials that can be recycled and in part substances that should not end up as domestic waste.*

*Dispose of the unit once it has reached the end of its working life according to the regulations valid in your country.*

**DESIGN**

The casing is made of double-skinned aluzinc panels, internally filled with 25 mm mineral wool layer for heat- and sound-insulation. The casing has mounting brackets with anti-vibration rubber mounts for easy installation. The spigots are located at the sides of the unit and are equipped with rubber seals for airtight connection to the air ducts. The hinged side panels ensure easy access to the internals for service works including cleaning, filter replacement, etc.

The unit is equipped with high-efficient external rotor EC-motors and centrifugal impellers with forward curved blades.

The unit is equipped with a high-efficient counter-flow polystyrene heat exchanger with a large surface area. The air flows are fully separated within the heat exchanger. Odours and contaminants contained in the extract air are not transferred to the supply air flow. Heat recovery is based on the utilization of the thermal energy of extract air for heating up supply air. The process of heat transfer proceeds in the heat exchanger where extract air transfers most of its heat to the intake air flow. This reduces thermal energy losses in cold seasons. In summer heat recovery acts reverse. Cooled extract air transfers part of cold to the warm intake air. This contributes to better performance of the air conditioner in ventilated premises. The electronic frost protection system based on bypass and heater is used to prevent the heat exchanger

freezing in cold seasons. The bypass damper is opened automatically according to temperature sensor readings. Cold intake air passes by the heat exchanger and is warmed up to set temperature in the heater. Synchronously extract air that passes by the heat exchanger is used for its defrosting. After the freezing danger is over the bypass damper is closed and the intake air passes through the heat exchanger again. The heat exchanger reverts to the regular operation mode.

The drain pan under the heat exchanger block is used for condensate collection and drainage.

The unit is equipped with a 2-row water (glycol) heater for operation at low outside temperatures. The integrated water heater is activated to warm up supply air flow if set indoor air temperature may not be reached by means of heat recovery only. Smooth water heater control ensures automatic control of supply air temperature. The air temperature sensor downstream of the heater and the return heat medium temperature sensor are used for freezing protection of the water heater.

The unit incorporates an integrated control system with a wall-mounted control panel with a sensor display. The standard delivery set includes a 10 m cable for connection of the unit to the control panel.

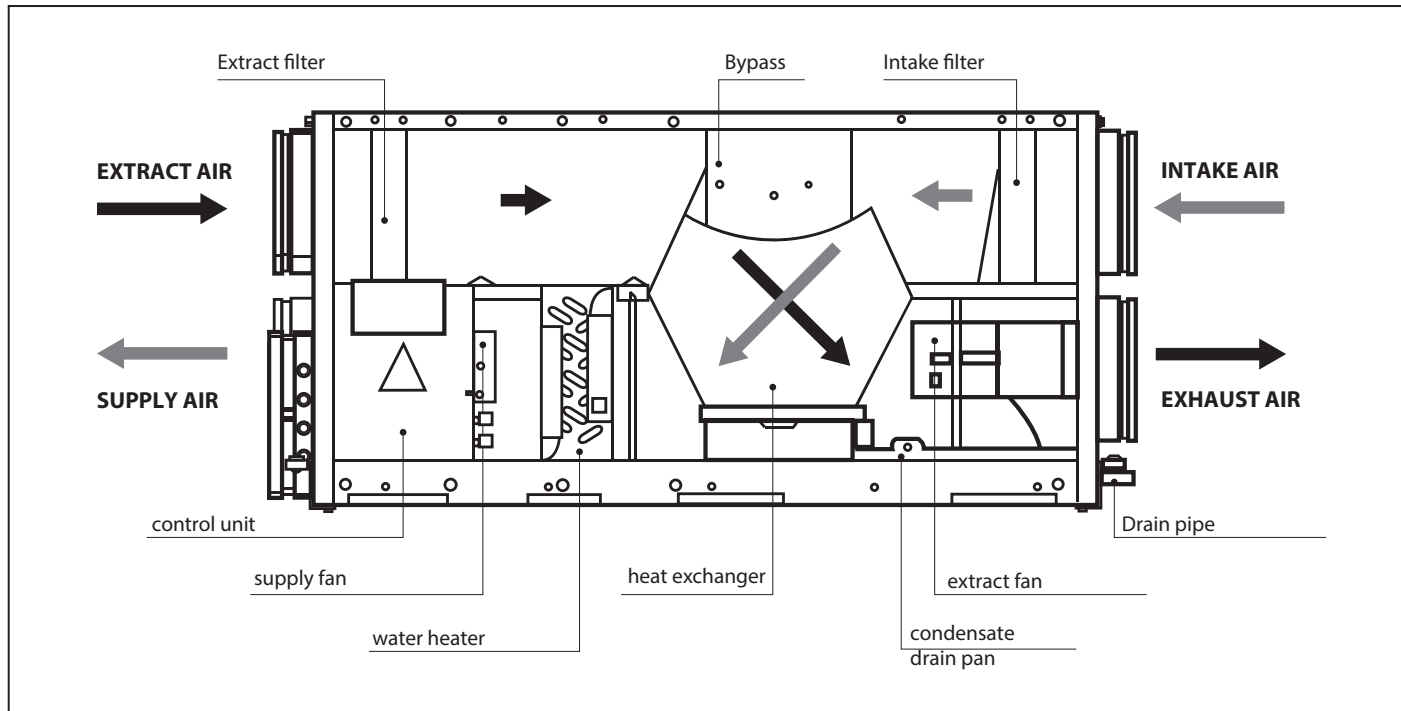


Fig. 1. Unit design and operating logic

**OPERATING LOGIC**

Cold fresh air from outside flows through the heat exchanger and is moved to the room with the supply fan.

Warm extract air is extracted from the room with the exhaust fan and is moved through the heat exchanger, where it transfers its heat energy to the intake air. After that it is exhausted outside.

Heat energy of warm and humid extract air is transferred to the cold fresh air. The air flows are fully separated while flowing through the heat exchanger.

Heat recovery minimizes heat losses and saves energy.

In summer the heat exchanger performs reverse and transfers cold from the cooled extract air to the warm fresh air. This contributes to better performance of the air conditioner in ventilated premises.

**DELIVERY SET**

- ✓ Air handling unit - 1 item;
- ✓ Operation manual - 1 item
- ✓ Wall-mounted control panel - 1 item;
- ✓ Packing box - 1 item



**ATTENTION**

Makesuretheunithasnovisibletransportdamages while accepting the goods. Check the ordered and the delivered goods for compliance.

**TECHNICAL DATA**

Table 1. Technical data

Parameters	KOMFORT EC LW300-2	KOMFORT EC L1W300-2	KOMFORT EC LW400-2	KOMFORT EC LW550-2
Unit voltage [V /50-60 Hz]	1~ 230			
Number of water heater rows	2			
Power [kW]	0,14		0,35	
Current [A]	1,2		2,6	
Maximum air capacity [m³/h]	300		400	550
R.p.m.	1380		1340	2150
Sound pressure level at 3 m distance [dB(A)]	24-45		28-47	
Transported air temperature [°C]	from -25 up to +60			
Casing material	aluzinc			
Insulation	25 mm mineral wool			
Extract filter	cassette G4			
Intake filter	cassette F7			
Connected air duct diameter [mm]	150	160	315	
Weight [kg]	40			
Heat recovery efficiency [%]	up to 90			
Heat exchanger type	counter-flow			
Heat exchanger material	polystyrene			

Table 2. Accessories

Model	Replaceable G4 cassette filter	Replaceable F7 cassette filter
KOMFORT EC LW300-2	FP-EC LW300-550 G4	FP-EC LW300-550 F7
KOMFORT EC L1W300-2		
KOMFORT EC LW400-2		
KOMFORT EC LW550-2		

Table 3. Overall dimensions

Model	Dimensions [mm]										
	D	B	B1	B2	B3	H	H2	H3	L	L1	L2
KOMFORT EC LW300-2	149	500	403	161	249	555	127	231	1092	1137	1198
KOMFORT EC L1W300-2	159	500	403	161	249	555	127	231	1092	1137	1198
KOMFORT EC LW400-2	199	500	403	161	249	555	127	231	1092	1137	1198
KOMFORT EC LW550-2	199	500	403	161	249	555	127	231	1092	1137	1198

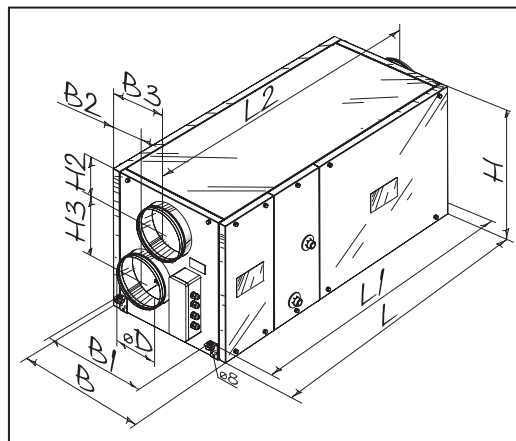


Fig. 2.

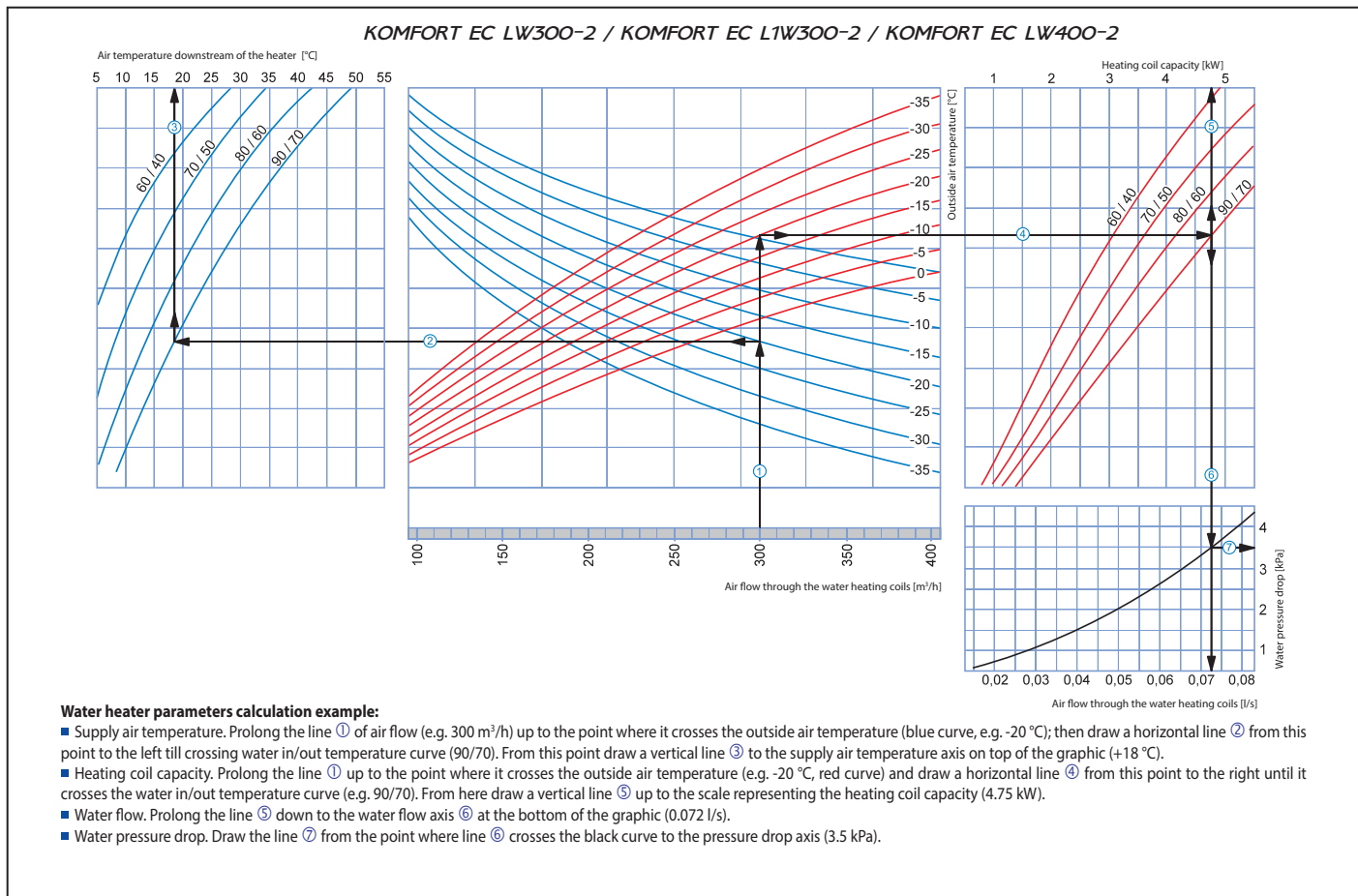


Fig. 3. Calculation of water heater parameters for KOMFORT EC LW300-2 / KOMFORT EC L1W300-2 / KOMFORT EC LW400-2

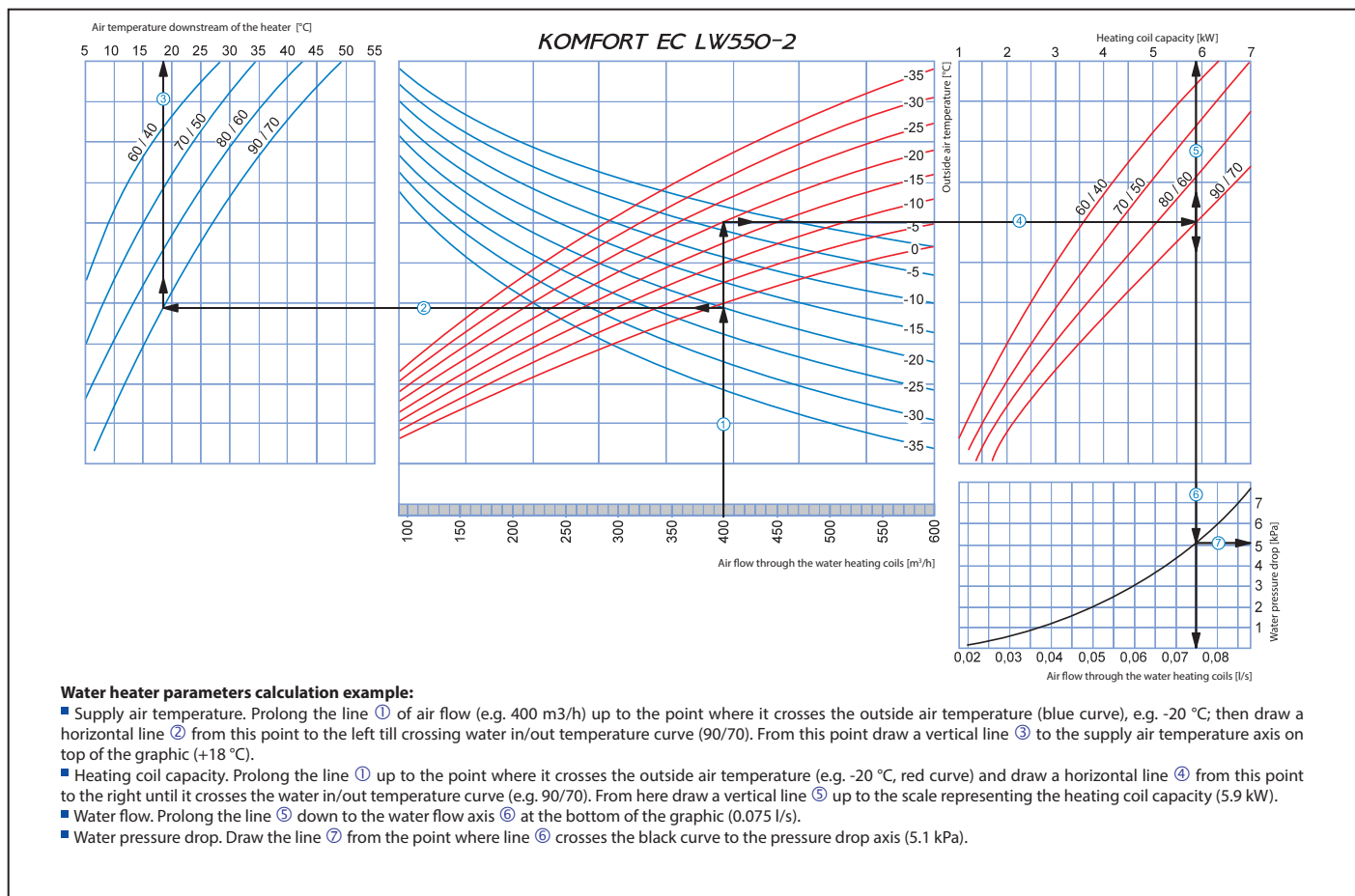


Fig. 4. Calculation of water heater parameters for KOMFORT EC LW550-2

## MOUNTING

**WARNING****Safety precautions:**

The unit must be mounted to a rigid and stable structure.  
The unit must be suspended using anchor bolts. Make sure that the base structure is capable of sustaining the unit weight.  
The unit mounting is allowed only after power cut-off and full stop of the rotating parts.

**Restrictions:**

- Do not operate the unit beyond the determined temperatures, in aggressive and in explosive medias.
- Do not connect the clothes dryer or other similar equipment to the ventilation system.
- Do not use the unit for air/dust mixture handling.

The unit mounting position must provide condensate drainage and access to the terminal box for electric connection and access to the service panel for maintenance and filter replacement (Fig. 5).

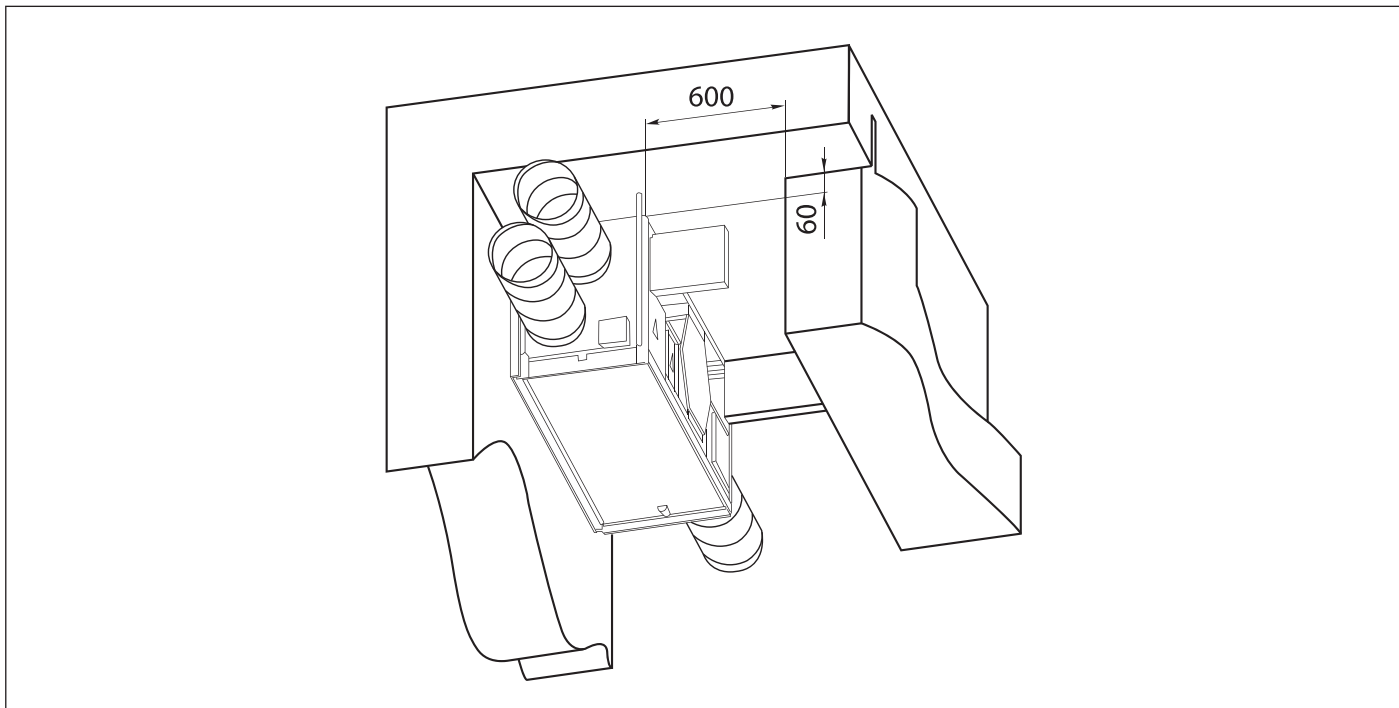


Fig. 5. Minimum service access to the unit

The unit can be installed on the floor, suspended to the ceiling or fixed to the wall by means of mounting brackets (Fig. 6).

The unit is suspended using threaded rods and threaded dowels.

The unit must be mounted to an even surface to avoid the unit casing distortion and operation disturbances. The installation place must have connection to the drain system. While planning the ductwork layout avoid too long air duct sections, numerous bends and reducers because it may reduce air flow. The mounted air ducts must not be deformed. Provide airtight connection of the air ducts to the unit spigots and fittings.

Install straight air ducts on both sides of the unit to minimize aerodynamic resistance caused by air flow turbulence, the minimum air duct section length is equal to 1 time air duct diameter on the inlet side and 3 time air duct diameters on the outlet side.

In case of insufficient length or no air ducts cover the unit spigots with a protecting grille or any other protecting device with maximum mesh width 12.5 mm to prevent ingress of foreign objects inside the unit and to prevent contact with fans of the unit.

Prior to starting mounting make sure the mounting surface has sufficient load capacity matching the unit weight. Otherwise reinforce the installation place with beams. Use threaded rods of sufficient length to avoid possible resonance with a mounting surface. If the connection point of the spiral air duct to the unit is supposed to be a source of noise generation, replace a spiral seam air duct with a flexible air duct. The flexible anti-vibration connectors (specially ordered accessories) may also be useful.

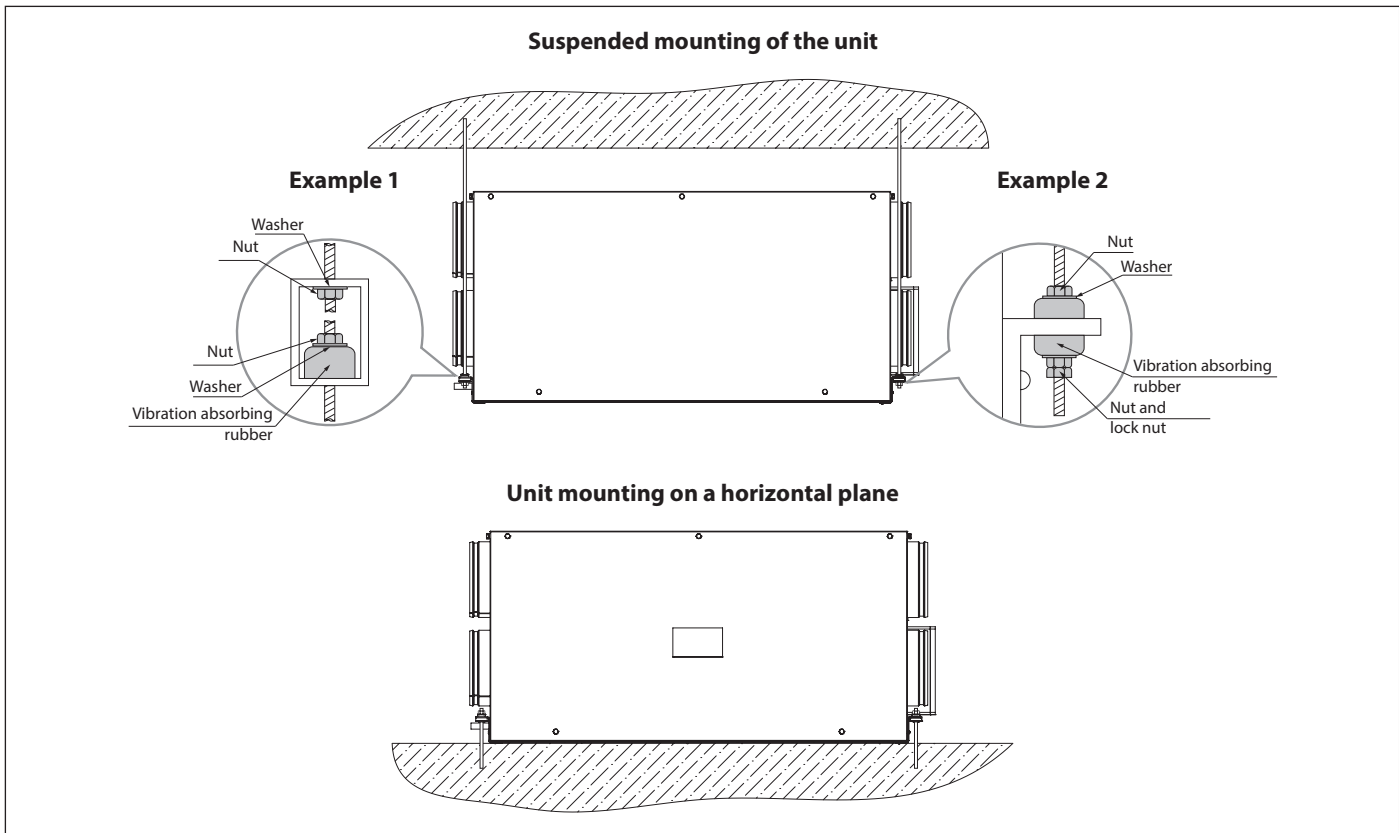


Fig. 6. Mounting

In order to achieve maximum power the water heater should be counter-flow connected (Fig. 7). All calculation diagrams (ref. Fig. 3-4) are valid for the counter-flow connection of the water heater. In case of the direct-flow basis

connection the water heater has lower power but higher frost-resistant properties.

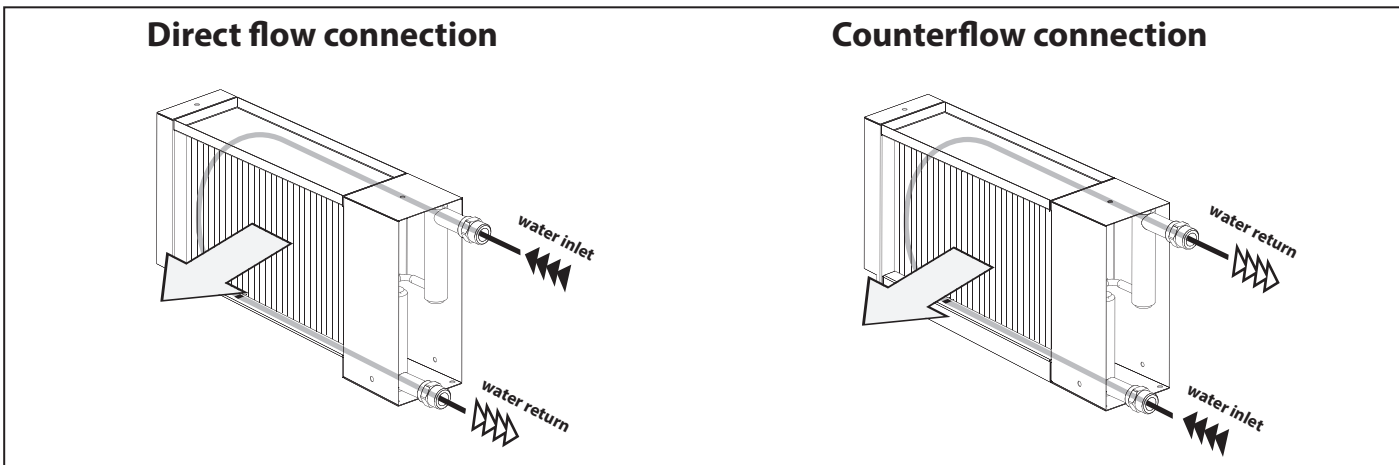


Fig. 7. Water heater connection



Connection diagram for the water heater mixing unit (to be ordered separately) is shown in Fig. 8.

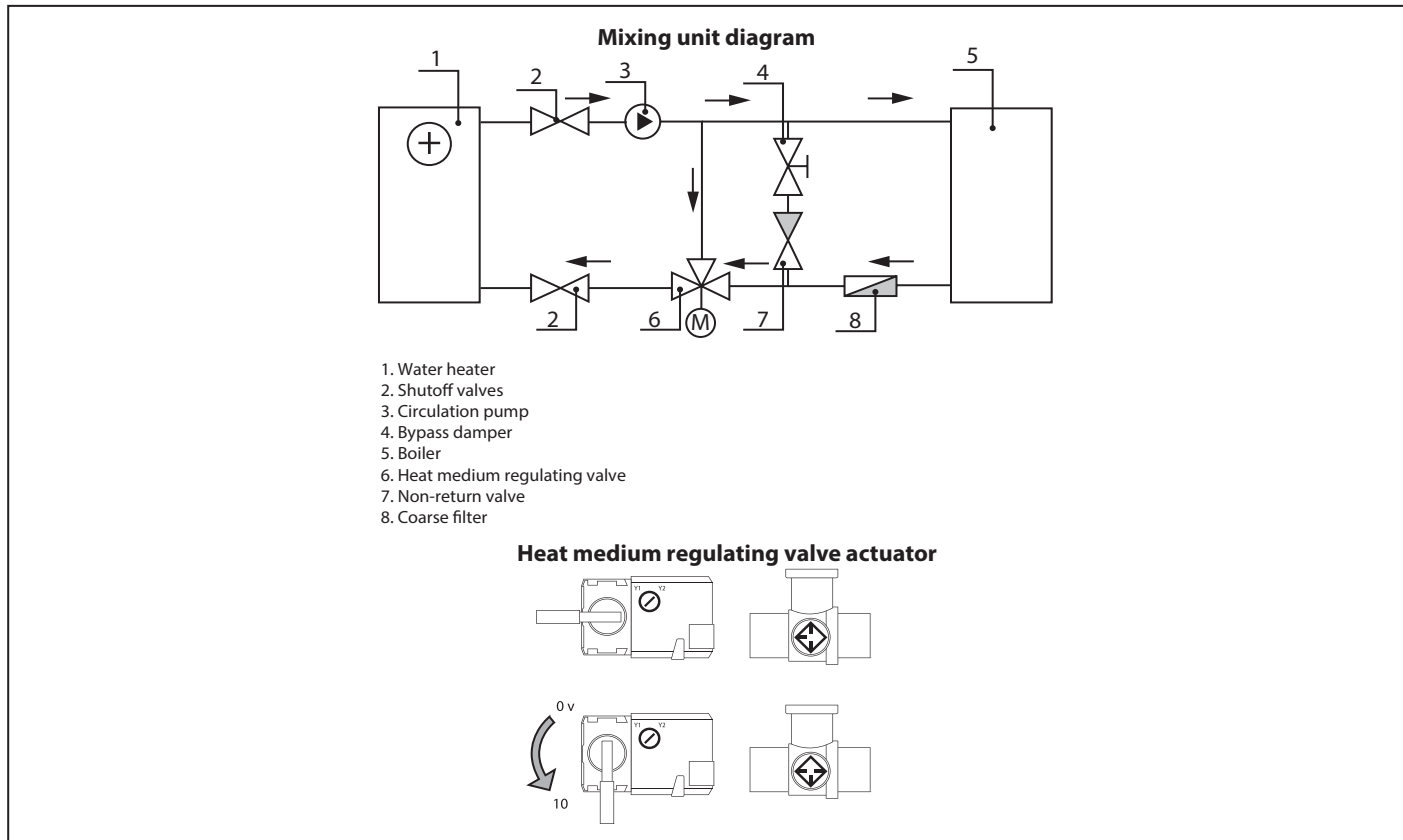


Fig. 8. Mixing unit diagram

**CONDENSATE DRAINAGE**

The drain pan is equipped with a drain pipe for condensate removal outside the unit.

Connect the drain pipe, the U-trap (not included in the delivery set) and a sewage system with metal, plastic or rubber drain hoses (Fig. 9). While laying the hoses provide the slope downwards min. 3%. Fill the system with water prior to connecting it to power supply! During operation the U-trap must always be filled with water. Provide free drainage for the condensed water,

otherwise it is accumulated inside the unit which may cause the equipment damage and condensate outflow to the room.

**The condensate drainage system is designed for normal operation in premises with air temperatures above 0 °C!**

**If the expected ambient air temperatures are below 0 °C the condensate drainage system must be equipped with heat insulation and pre-heating facilities.**

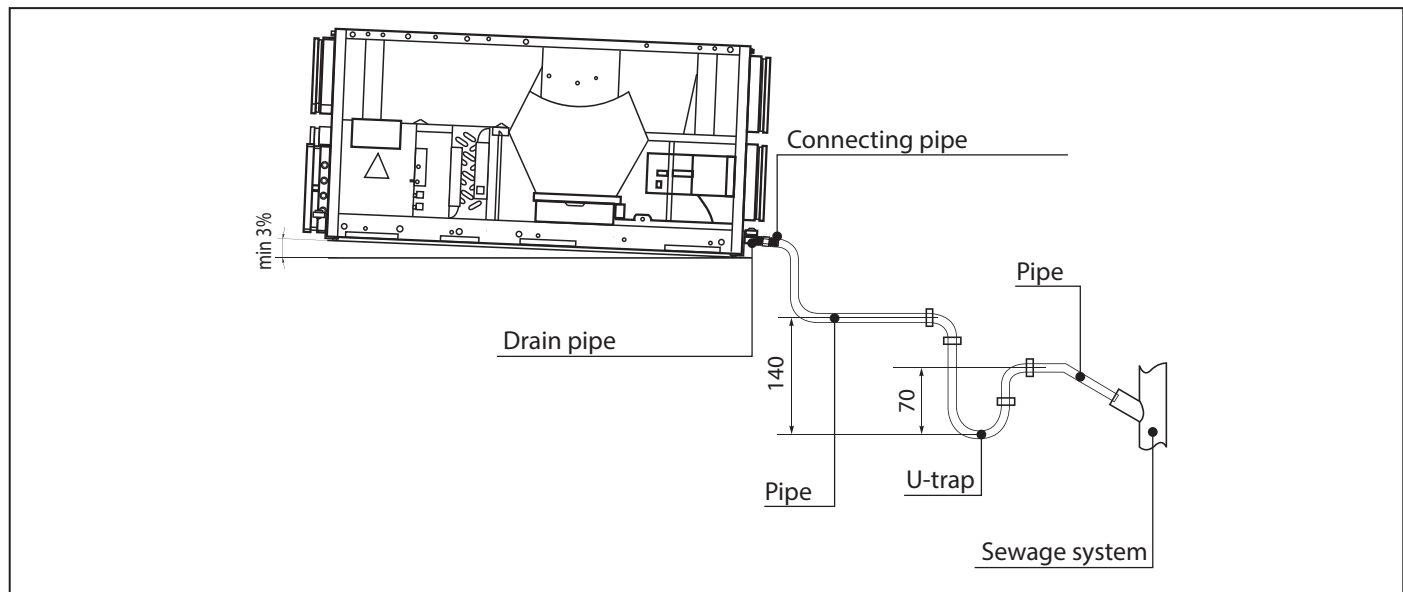


Fig. 9. Condensate drainage



**ATTENTION!**

*In case of several units mounting connect each unit to an individual U-trap.  
Direct condensate drainage with no connection to the drain system is not allowed.*

CONNECTION TO POWER MAINS



**WARNING**

Read the service instruction prior to any electric installations. Connection of the unit to power mains is allowed by a qualified electrician only. The rated electrical parameters are stated on the rating plate. Any tampering with the internal connections is prohibited and will void the warranty.

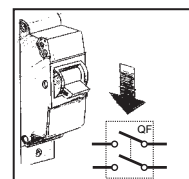
Connect the unit only to power mains with valid electric standards. Follow the respective electric standards, safety rules (DIN VDE 0100), TAB der EVUs.

The house cabling system must be equipped with a magnetic trip automatic switch at the external input. The contact gap on all poles must be at least 3 mm (VDE 0700 T1 7.12.2 / EN 60335-1). The automatic switch trip current must be not below the rated current consumption (ref. to Table 1).

Enable quick access to an automatic switch installation place.

Cut power supply to the unit off by turning the automatic electric switch QF to OFF position prior to any operations.

Take steps to prevent activation of the automatic switch before finishing all the operations.



The units are rated for connection to 230 V / 50-60 Hz one-phase alternating current power mains via insulated, durable and thermal-resistant cords (cables, wires) with respective cross section not less than 2.5 mm<sup>2</sup>.

The wiring diagram is shown in Fig. 10 and in Table 4. The functional diagram is shown in Fig. 11.

The unit must be grounded in compliance with the valid electrical standards of the user country!

Connect all the control and supply cables in compliance with the terminal marking and polarity!

The rating plate with a terminal designation is placed inside of the terminal box.

The terminal clamp marking corresponds to the marking on the wiring diagram.

Route the conductors to the terminal box through the electric lead-in on the unit panel to preserve the electrical protection class.

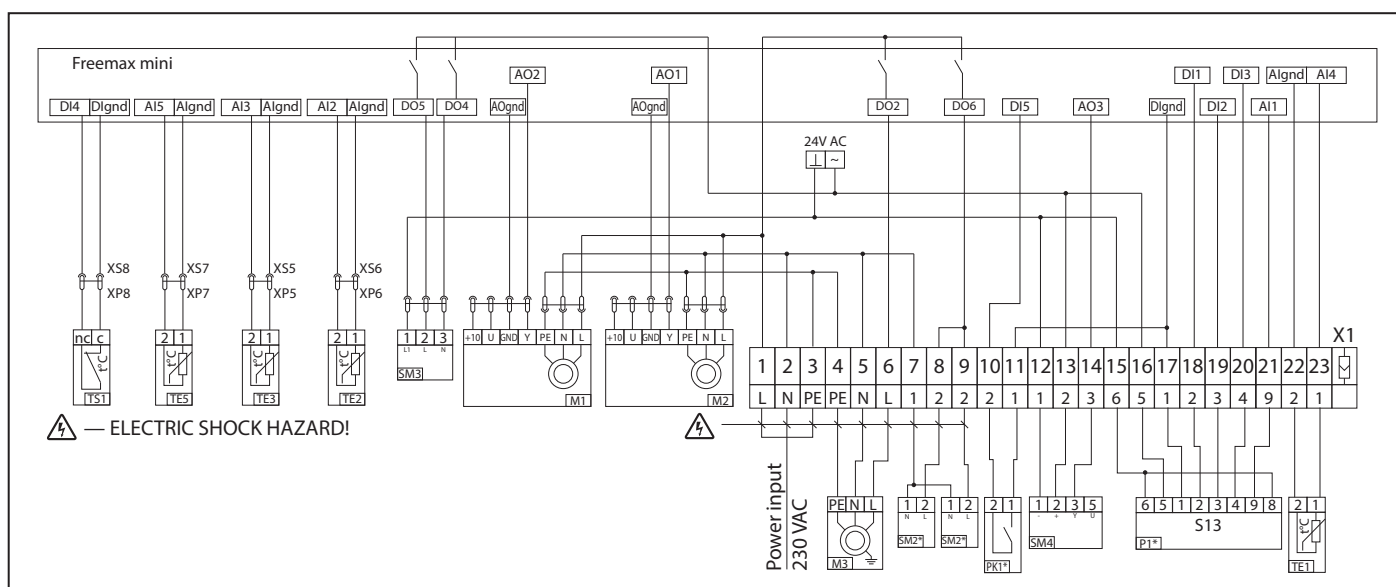


Fig. 10. Wiring diagram

Table 4. Wiring diagram symbol

Designation	Name	Model	Wire***
M3*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF 230	2 x 0,75 mm <sup>2</sup>
SM2*	Exhaust air damper actuator	LF 230	2 x 0,75 mm <sup>2</sup>
SM4*	Heat medium valve actuator	LR 24 SR	3 x 0,75 mm <sup>2</sup>
PK1*	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
P1	Control panel **	S13	10 x 0,22 mm <sup>2</sup>
TE1	Outdoor air temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>

\* - The devices are not supplied with the unit, are available on the separate order.

\*\* - Cable length from control panel (P1) - 10 meters.

\*\*\* - Maximum connecting cable length is 20 m!

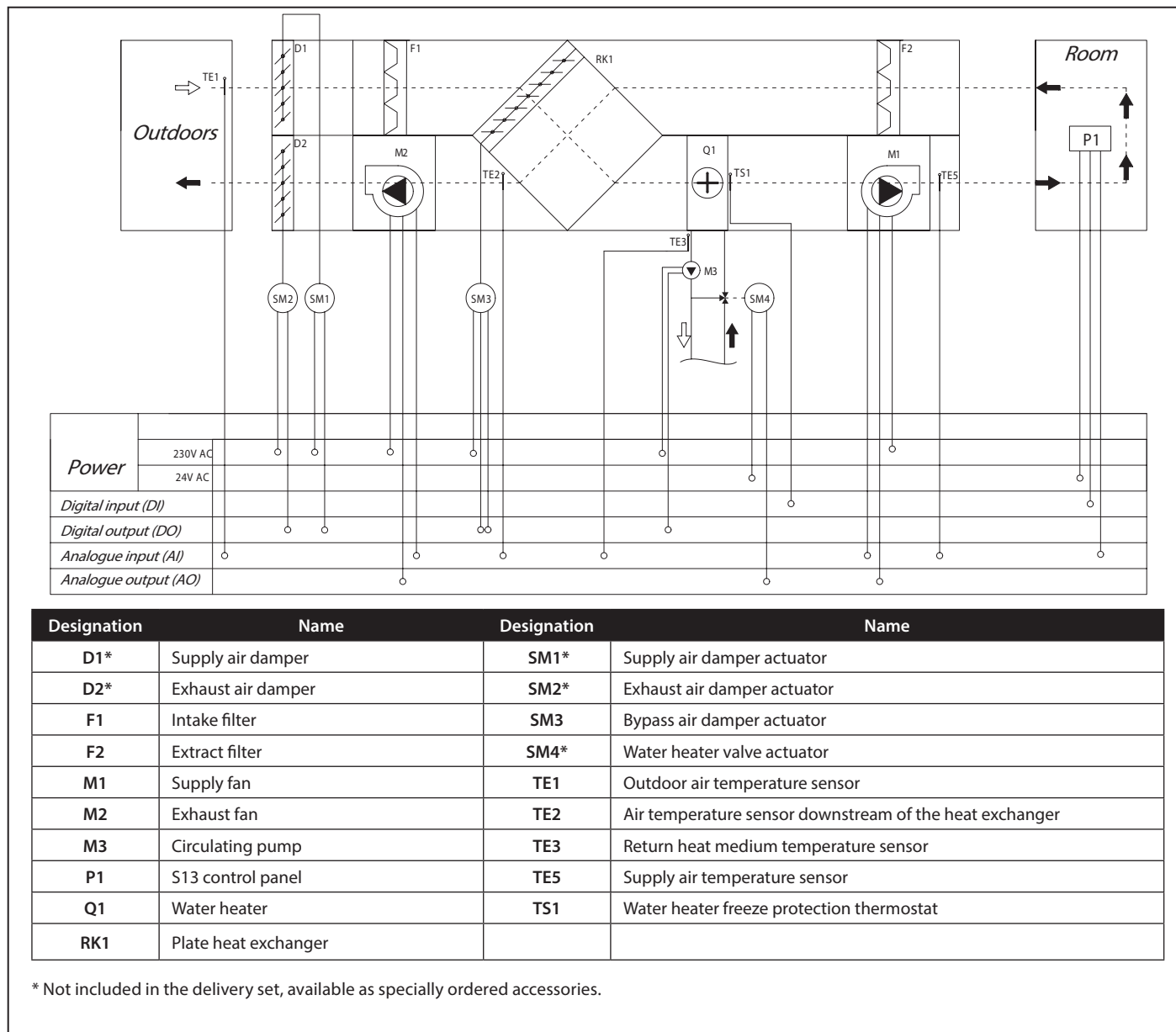


Fig. 11. Functional diagram

**CONTROL PANEL MOUNTING**

The unit incorporates an integrated control system with the S13 wall-mounted control panel with a sensor display (Fig. 12). The standard delivery

set includes a 10 m cable for connection of the unit and the control panel. The control panel technical data are shown in Table 5.

Table 5. Technical parameters of the control panel

Parameter	Value
Unit voltage	24 V/ 50-60 Hz
Maximum load current	1 A
Power	<1,5 W
Accuracy	±1 °C
Range of set values	from +7 °C up to +50 °C Temperature range is limited by the controller from +15 °C up to +35 °C
Countdown error	<1 %
Output power	<200 W
Ingress protection rating	IP30

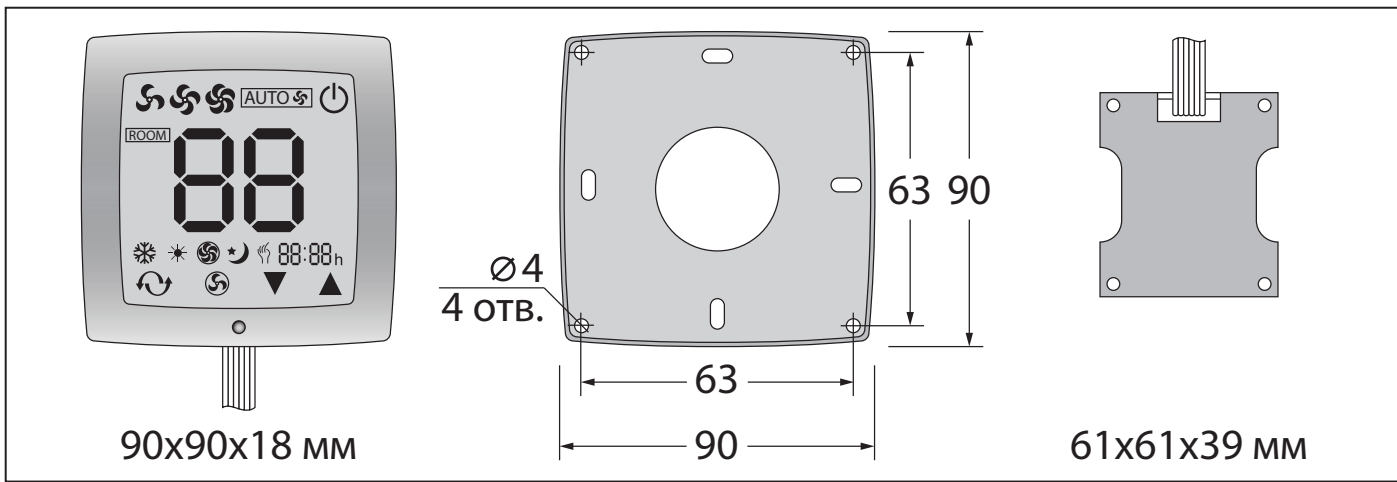


Fig. 12. Overall dimensions of the control panel



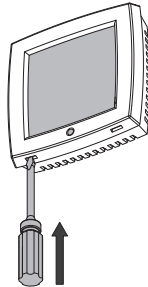
**WARNING**

For correct operation of the unit place the control panel in the premises, ventilated by this unit.  
Do not lay the cable in close proximity parallel to the control panel cable!  
Do not coil the control panel cable in loops while laying it.

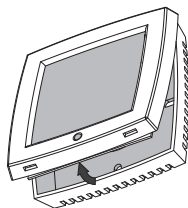
The room temperature sensor is integrated into the control panel, for that reason the control panel must be installed in a temperature balanced place, at least 1 m away from the heating equipment, doors and windows. Fix the control panel to the wall using the screws and connect it to the air handling unit using a supplied ten-wire connecting cable. The control panel is supplied assembled and pre-wired to the unit. In case of need to re-assemble the control panel follow the steps below.

Unit mounting sequence:

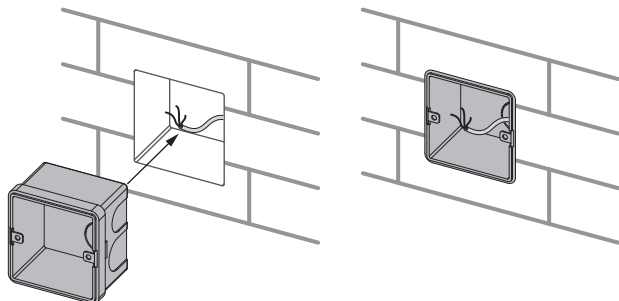
1. Install a small screwdriver with a 3.5 mm slot width in one of the rectangular control panel openings for 4 mm.



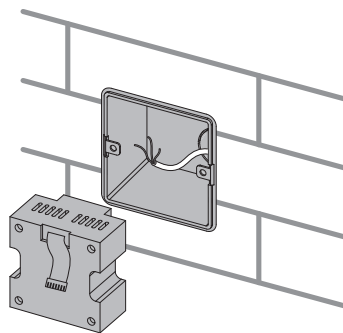
2. Press the screwdriver to open the control panel.



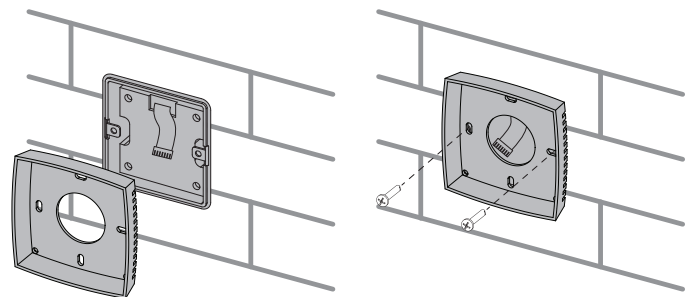
3. Route the required cables and wires and install a junction box (included in the delivery set) in the wall.



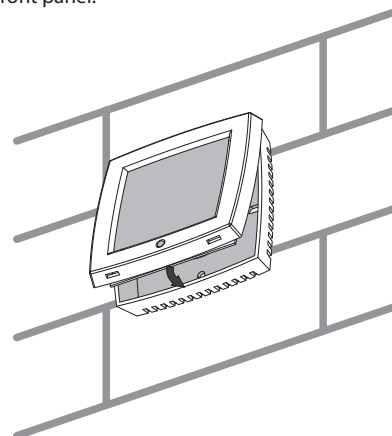
4. Connect and place the executive element inside of the mounting box.



5. Fix the back side of the control panel to the wall using screws.



6. Connect the executive element to the front part of the control panel and install the front panel.



**UNIT CONTROL**

The unit is controlled using the S13 wall-mounted control panel with a sensor display, Fig. 13.

Control panel functions:

- Unit activation and deactivation.
- Fan speed setting.
- Supply air temperature setting and maintaining.
- Room temperature display.
- Week-scheduled operation setting.



Fig. 13. S13 control panel

The ventilation units are operated at the touch of sensor buttons located on the sensor control panel display (ref. to Fig. 14). The control panel generates sounds when the buttons are pressed.

Table 6. Technical parameters of the control panel

Button symbol	Designation
	Power on/off
	Operation mode control.
	Speed selection: Auto, High, Medium, Low.
	Temperature and operation mode setting buttons.

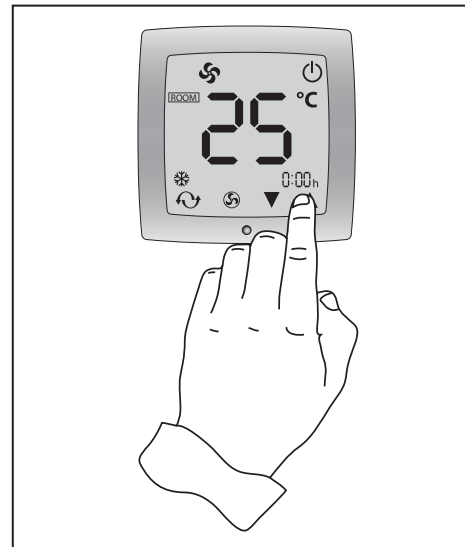


Fig. 14. Panel control

**Automatic restart after power resumption.**

All the current data are saved in the control panel memory in case of power failure. After power supply resumption the data on the control panel are recovered.

After resumption of power supply the unit returns to the previous operation mode.

The data saving function is also available for the Week timer operation mode.

Table 7. Unit control and operating parameter setting

Function	Indication
<p><b>1 Turning the unit on/off</b></p> <p>Press  button on the display to switch the unit ON/OFF.</p>	
<p><b>2 Fan speed setting</b></p> <p>Select the unit speed by pressing .</p> <p>Fan speed: Auto - High - Medium - Low.</p> <p>In Auto mode the panel sets the fan(s) speed automatically, depending on the actual and set temperature difference in the room.</p>	

Table 7. Unit control and operating parameter setting (continued)





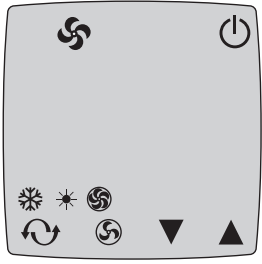










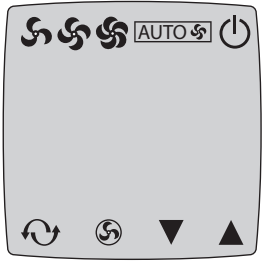







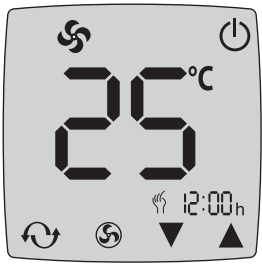



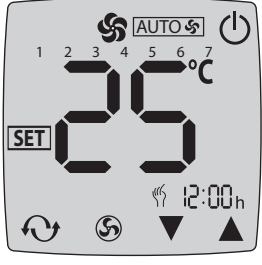






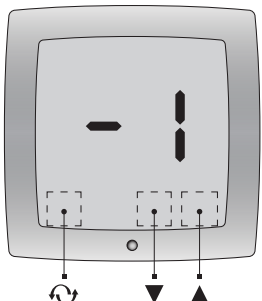
Function	Indication
<p><b>3 3. Unit operation mode setting</b></p> <p>Operation mode switching by pressing  button. Switching sequence: Heat - Cool - Fan.</p> <p><b>Heating mode</b>  – activation of the ventilation unit heater and supply air heating to a set temperature.</p> <p><b>Cooling mode</b>  – activation of the ventilation unit cooler and supply air cooling to a set temperature.</p> <p><b>Ventilation mode</b>  – the cooler and heater are not active. The unit operates in the ventilation mode only.</p>	
<p><b>4 Week timer setting</b></p> <p>Press and hold  on the display for 3 seconds to switch to Manual control mode. Then select  icon by pressing  button. When  icon starts blinking press  to confirm or  to escape. Absence of  icon on the display means that unit operates in Week timer mode.</p> <p><b>Manual control:</b> To set temperature setpoint enter the Stand-by mode that is confirmed by the  icon and select the temperature value using the   buttons on the control panel display.</p> <p><b>Week-scheduled operation mode:</b> In case of the timer activation the following functions are not available:</p> <ul style="list-style-type: none"> <li>• temperature setting;</li> <li>• unit activation/deactivation setting (ref. to <b>Week timer setting</b>).</li> </ul>	
<p><b>5 Selection of temperature control and setting mode</b></p> <p>Setting the <b>week timer</b> is as follows:</p> <p><b>5.1. Time setting.</b></p> <ul style="list-style-type: none"> <li>• Press and hold  button on the display for 3 seconds to open the <b>Settings mode</b>. Then select <b>Minutes</b> option using  button and press   to make appropriate adjustment.</li> <li>• Select <b>Hours</b> option using  button and press   to make appropriate adjustment.</li> </ul>	
<p><b>5.2. Week day setting.</b></p> <p>Press the  button to set a day of the week in the Settings mode and make appropriate adjustment using  :</p> <ul style="list-style-type: none"> <li>• Mn-Fr - 1-5</li> <li>• St - 6</li> <li>• Sn - 7</li> </ul>	
<p><b>5.3. Time period setting.</b></p> <p>Press –  to select a time period parameter. Press –   to set parameters. Time period setting is made according to Table 8.</p>	
<p><b>6 Temperature sensor calibration</b></p> <p>Press and hold  on the display for 3 seconds to switch to Debugging mode, control panel being switched off. In Off mode all buttons are located as in On mode, but they are not highlighted. To change settings in the appropriate mode press the buttons in the following order:</p> <p>1 - Temperature calibration (from -9°C up to +9°C).   – Setpoint temperature compensation upwards.   – Setpoint temperature compensation downwards.</p>	

Table 8. Time period setting

Purpose	Icon	Monday-Friday		Saturday		Sunday	
		Time	Temperature	Time	Temperature	Time	Temperature
Time period 1 ON		6:00	20 °C	9:00	25 °C	9:00	25 °C
Time period 1 OFF		10:00		12:00		12:00	
Time period 2 ON		17:00	25 °C	18:00	25 °C	18:00	20 °C
Time period 2 OFF		20:00		22:00		22:00	

During the time span between the indicated time periods the unit is in Standby mode, the fans are off.

**CONTROL PANEL TROUBLESHOOTING**

Table 9. Control panel troubleshooting

Fault	Troubleshooting
The control panel does not operate when power is supplied.	<ul style="list-style-type: none"> <li>• Check the correct contact connection.</li> <li>• Make sure the On/Off button on the control panel display operates normally.</li> <li>• Check the stub line from the executive element to the control panel for integrity.</li> </ul>
LCD screen failure.	<ul style="list-style-type: none"> <li>• The back cover is horizontally overpressed during mounting. Release one or two fixing screws.</li> </ul>
The display glows but displays no information.	<ul style="list-style-type: none"> <li>• Contact the Seller.</li> </ul>
Incorrect temperature display.	<ul style="list-style-type: none"> <li>• Perform calibration of the control panel temperature sensor.</li> </ul>

**AUTOMATIC CONTROL SYSTEM**

The electronic automatic control and operation unit is integrated into the air handling unit. Digital controller is the main element of automatic control system (ref. to Fig. 15).

**General functions of automatic control system (ACS):**

1. Turning the unit on/off.
2. Keeping supply air temperature at set point.
3. Control of the bypass damper actuator.
4. Fan operation and control.

5. Control of the air damper actuator.
6. Control of the air damper actuator.
7. System shutdown by the command from fire fighting system.
8. Heater control. Heater freezing and overheating control.
9. Control of the DX-cooler by the thermostat in the control panel (applicable only for the units with a cooler connection possibility).
10. Fan activation after power failure. The function is activated and set in the controller menu.

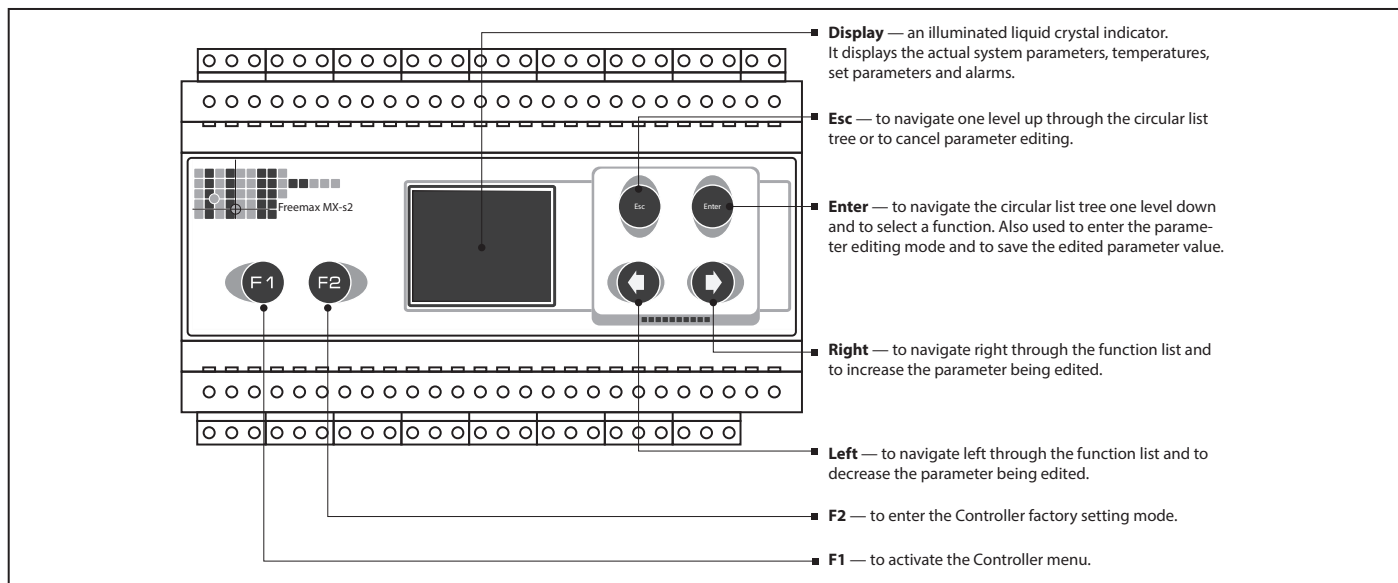


Fig. 15. Digital controller

**To call the necessary function:**

Use the and buttons to select the function as necessary and press Enter. To return to the general function list press the Esc button until reaching the general function list.

**To modify the parameter values:**

Select a required parameter using and buttons, then press Enter. The setting may be decreased or increased using and and respectively. A set parameter value blinks. To save the new value press Enter. To cancel parameter editing and exit the menu press the Esc button. The editable parameters are enclosed in brackets «><».

Table 10. Controller parameters

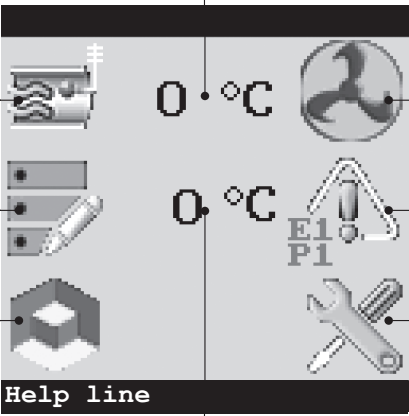
Function	Indication
<p><b>1 Controller menu</b></p>  <p><b>Current temperatures</b> ■ Menu of temperature sensor current readings.</p> <p><b>Temperature setup</b> ■ Temperature setting menu.</p> <p><b>System status</b> ■ Online system status menu.</p> <p><b>Help line</b></p>	<p>■ <b>Set supply air temperature</b> Set supply air temperature display.</p> <p>■ <b>Fan(s) status</b> Displaying online fan(s) status.</p> <p>■ <b>Alarms</b> Alarm status and error code.</p> <p>■ <b>Settings</b> Engineering setting menu.</p> <p>■ <b>Supply air temperature.</b> Online supply air temperature display.</p>
<p><b>2 Current temperatures</b></p> <p><b>TE1:</b> outdoor air temperature. <b>TE2:</b> exhaust air temperature downstream of the heat exchanger. <b>TE3:</b> return heat medium temperature. <b>TE4:</b> air temperature downstream of the water heater. <b>TE5:</b> supply air temperature.</p>	<pre> Online temp-res ----- Outside temperature (TE1)    5.0 °C Temperature aft.exhc.(TE2)     5.0 °C Temperature of return heat exch. (TE3)   50.0 °C Heater temperature (TE4)  50.0 °C Intake temperature (TE5)   5.0 °C                     </pre>
<p><b>3 System status</b></p> <p><b>Heater:</b> heat medium regulating valve opening ratio. <b>Heat Exch.:</b> heat exchanger activation ratio. <b>Pump:</b> circulating pump operating status.</p> <ul style="list-style-type: none"> <li>• <b>Off:</b> circulating pump is not activated.</li> <li>• <b>On:</b> circulating pump is activated.</li> </ul> <p><b>Cooler:</b> cooler operating status.</p> <ul style="list-style-type: none"> <li>• <b>Off:</b> cooler is not activated.</li> <li>• <b>On:</b> cooler is activated.</li> </ul> <p><b>Winter/Summer:</b> system operation mode. The automatic control system operates either in <b>Winter</b> or <b>Summer</b> mode. The operation mode selection is determined by outdoor temperature readings. If the outside air temperature exceeds 0 °C the system operates in Summer mode and if the outside air temperature is below 0 °C the system changes into Winter mode. In <b>Summer</b> mode the ACS additionally performs the following functions:</p> <ul style="list-style-type: none"> <li>• Supply air temperature maintaining at set point (set from the control panel) during the fan operation by means of controlling the heat medium regulating valve.</li> <li>• Closing of the heat medium regulating valve, the supply and extract air dampers after the fan switching off.</li> </ul>	<pre> SYSTEM STATUS ----- Heater           0 Heat exch.      100 Pump             Off Cooler           Off Winter/Summer    Summer                     </pre>



Table 10. Controller parameters (continued)

Function	Indication																		
<p>In <b>Winter</b> mode the ACS additionally performs the following functions:</p> <ul style="list-style-type: none"> <li>• Maintaining supply air temperature at set point (set from the control panel) during the fan operation by means of controlling the heat medium regulating valve.</li> <li>• Water heater warming-up before the fans start-up within n minutes (set from controller menu) by means of 100 % opening of the heat medium regulating valve. The warming-up function is activated in the controller menu.</li> <li>• Maintaining of the return heat medium temperature at set minimum value.</li> </ul> <p>Activation of the freeze protection of the heater in any mode by means of TS1 thermostat located in the air duct downstream of the water heater. In case of a freezing danger fans are turned off, supply and exhaust air dampers are opened, the heat medium regulating valve is 100 % opened and the circulating pump is started.</p> <p>In addition, restart of the automatic fans after supply failure may be activated in controller menu.</p>	<table border="1"> <thead> <tr> <th colspan="2">SYSTEM STATUS</th> </tr> </thead> <tbody> <tr> <td>Heater</td> <td>0</td> </tr> <tr> <td>Heat exch.</td> <td>100</td> </tr> <tr> <td>Pump</td> <td>Off</td> </tr> <tr> <td>Cooler</td> <td>Off</td> </tr> <tr> <td>Winter/Summer</td> <td>Summer</td> </tr> </tbody> </table>	SYSTEM STATUS		Heater	0	Heat exch.	100	Pump	Off	Cooler	Off	Winter/Summer	Summer						
SYSTEM STATUS																			
Heater	0																		
Heat exch.	100																		
Pump	Off																		
Cooler	Off																		
Winter/Summer	Summer																		
<p><b>4 Temperature setting</b></p>																			
<p><b>T.ret.w.heat.:</b> return heat medium temperature at the end of the warming-up [°C]. If the return heat medium temperature at the end of the warming-up is below T.ret.w.heat., the fans start is disabled and the alarm signal is generated (ref. to Alarm list, <b>U3</b>).</p> <p><b>T.ret.w.min.:</b> minimum return heat medium temperature to determine water heater freezing danger [°C]. If the return heat medium temperature falls down below the minimum temperature point in <b>Winter</b> mode, the water heater freezing protection function is activated (ref. to Alarm list, <b>U2</b>).</p> <p><b>T.seas.ch:</b> upper limit of the outdoor air temperature. After reaching this limit the system changes into the Summer mode.</p> <p><b>T.ret.w.spoin:</b> minimum return heat medium temperature to maintain temperature mode when the fans are turned off.</p> <p>The return heat medium temperature is automatically maintained at the set point in Winter mode when the fans are turned off by means of controlling the heat medium regulating valve.</p> <p><b>T.w.heat. min.:</b> lower limit of the air temperature downstream of the water heater to determine a water heater freezing danger [°C]. If the air temperature falls down below <b>T.w.heat. min.</b> the water heater freezing protection function is activated (ref. Alarm list, <b>U1</b>).</p> <p><b>T.h.exch.ch.:</b> exhaust air temperature downstream of the heat exchanger point that activates the function of the exhaust air temperature maintenance by means of controlling the bypass damper. If the exhaust air temperature falls down below <b>T.h.exch.ch.</b> in Summer mode, the function of maintaining the exhaust air temperature is activated by means of regulating the heat exchanger bypass damper to prevent a heat exchanger freezing. Once the air temperature downstream of the heat exchanger rises above T.h.exch.ch., the control system runs out of the exhaust air temperature maintenance and the bypass damper is fully closed.</p> <p><b>T.h.exch.min.:</b> boundary low exhaust air temperature downstream of the heat exchanger. If the exhaust air temperature remains below this point within the <b>F1</b> Fault delay time period, the <b>F1</b> alarm is generated.</p> <p><b>T.cool.min.:</b> boundary high outdoor air temperature. If the actual outdoor air temperature rises above this point the unit changes into the Cooling mode.</p>	<table border="1"> <thead> <tr> <th colspan="2">Temp. setpoints</th> </tr> </thead> <tbody> <tr> <td>T.ret.w.heat.:</td> <td>40 °C</td> </tr> <tr> <td>T.ret.w.min.:</td> <td>5 °C</td> </tr> <tr> <td>T.seas.ch.</td> <td>0 °C</td> </tr> <tr> <td>T.ret.w.spoin:</td> <td>20 °C</td> </tr> <tr> <td>T.w.heat. min.:</td> <td>3 °C</td> </tr> <tr> <td>T.h.exch.ch.:</td> <td>0 °C</td> </tr> <tr> <td>T.h.exch.min.:</td> <td>-5 °C</td> </tr> <tr> <td>T.cool.min.:</td> <td>20 °C</td> </tr> </tbody> </table>	Temp. setpoints		T.ret.w.heat.:	40 °C	T.ret.w.min.:	5 °C	T.seas.ch.	0 °C	T.ret.w.spoin:	20 °C	T.w.heat. min.:	3 °C	T.h.exch.ch.:	0 °C	T.h.exch.min.:	-5 °C	T.cool.min.:	20 °C
Temp. setpoints																			
T.ret.w.heat.:	40 °C																		
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T.seas.ch.	0 °C																		
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T.w.heat. min.:	3 °C																		
T.h.exch.ch.:	0 °C																		
T.h.exch.min.:	-5 °C																		
T.cool.min.:	20 °C																		

Table 10. Controller parameters (continued)






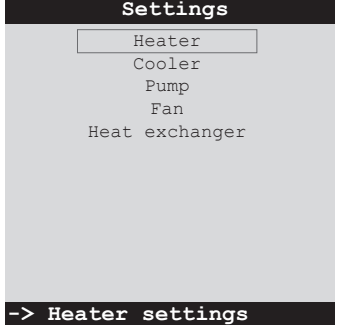
Function	Indication
<p><b>5 Alarms</b></p> <p><b>E1:</b> outdoor air temperature sensor breakout or short circuit. The fans stop.</p> <p><b>E2:</b> exhaust air temperature sensor breakout or short circuit. The fans stop.</p> <p><b>E3:</b> return heat medium temperature sensor breakout or short circuit. The fans stop.</p> <p><b>E4:</b> breakout or short circuit of the temperature sensor for the water heater freezing protection. The fans stop.</p> <p><b>E5:</b> breakout or short circuit of the supply air temperature sensor. The fans stop.</p> <p><b>F1:</b> heat exchanger freezing. The exhaust air temperature downstream of the heat exchanger measured by the <b>TE2</b> temperature sensor is below the 0 °C set point within the 10 min time period when the fans are turned on. The bypass damper is completely opened. The fans continue operating.</p> <p><b>O1:</b> emergency system shutdown on signal from the fire alarm panel. The fans stop.</p> <p><b>O2:</b> filter clogging. The fans stop.</p> <p><b>P1:</b> supply fan failure. The fans stop.</p> <p><b>P2:</b> exhaust fan failure. The fans stop.</p> <p><b>U1:</b> heater freezing danger. The alarm is generated if the air temperature downstream of the water heater falls down below +3 °C.</p> <p><b>U2:</b> low return heat medium temperature. The alarm is generated if the return heat medium temperature falls down below the set critical point. In case of any of the above freezing dangers the fans stop, the heat medium regulating valve is completely opened and the circulating pump is starts. The fans may not be started in case of any of these freezing dangers. The system restart is possible only after removal of the water freezing danger, i.e. after removal of the <b>U2</b> alarm, i.e. after rising of the return heat medium temperature <b>TE3</b> or after removal of the <b>U1</b> alarm, after rising of the air temperature downstream of the heater above set point to prevent the water heater freezing.</p> <p><b>U3:</b> appears if return heat medium temperature at the end of the water heater warming-up cycle in Winter mode before the fans start does not exceed +40 °C (factory setting). The fan start is disabled in case of this alarm.</p> <p><b>U4:</b> pump failure. No signal from the fluid pressure switch in the water heater after the signal to activate the circulating pump. This alarm causes the hydronic coil heater pump shutdown. The fan operation status does not change. In case of the alarm the fans keep operating if they were turned on before the pump failure.</p>	
<p><b>6 Settings</b></p> <p><b>Password:</b> password is part of Configuration Menu. 2222 by default.</p> <ul style="list-style-type: none"> <li>The password consists of 4 digits and is displayed as ****.</li> <li>Then use the  and  buttons to enter the first password digit and press Enter. Enter the second number with the buttons  and , then press Enter etc.</li> <li>Press Esc to get back to the previous digit.</li> <li>Upon entering the 4th digit of the correct password the display shows the <b>Settings menu</b> automatically.</li> </ul>	
<p><b>Settings menu.</b> This menu contains basic controller settings. Editing the Settings menu must be performed by professionals only, otherwise it may cause controller failure or breakdown.</p>	

Table 10. Controller parameters (continued)

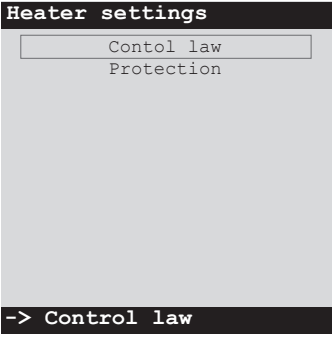
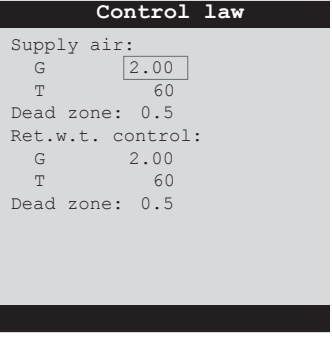
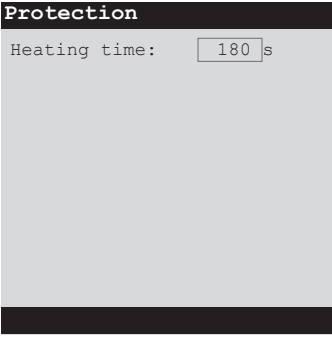
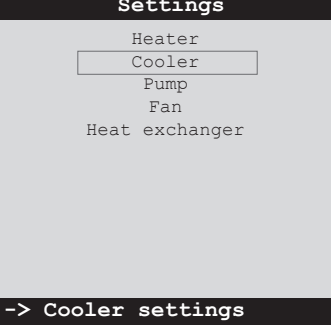
Function	Indication
<p><b>6.1 Heater settings</b></p>	
<p><b>Heater:</b> heater settings menu</p>	
<p><b>Heater control law</b></p> <ul style="list-style-type: none"> <li><u>Supply air control law</u>  <b>G:</b> proportional control factor of proportional-integral control law. Parameters setting for supply air temperature control by means of the regulating heat medium valve.  <b>T:</b> integrating factor of proportional-integral control law [sec]. Parameters setting for supply air temperature control by means of the regulating heat medium valve.  <b>Dead zone:</b> dead zone [°C]. Parameters setting for supply air temperature control by means of the regulating heat medium valve. If the discrepancy is below the set point, it is taken to be 0.</li> <li><u>Ret.w.t. control</u>  <b>G:</b> proportional control factor of proportional-integral control law. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve.  <b>T:</b> integrating factor of proportional-integral control law [sec]. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve.  <b>Dead zone:</b> dead zone [°C]. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve. If the discrepancy is below the set point, it is taken to be 0.</li> </ul>	
<p><b>Protection settings</b></p> <ul style="list-style-type: none"> <li><u>Heating time:</u> Heating time: time required for the water coil preheating [sec].                      During the warming-up time the heat medium regulating valve is fully opened, the pump is started and the Preheating/Alarm light indicator blinks.</li> </ul>	
<p><b>6.2 Cooler settings</b></p>	
<p><b>Cooler</b> — Cooler configuration menu</p>	

Table 10. Controller parameters (continued)

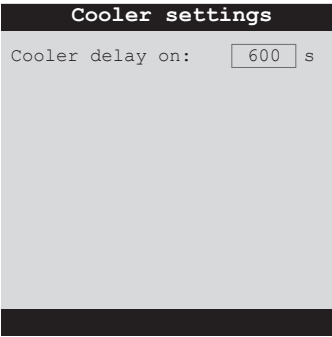
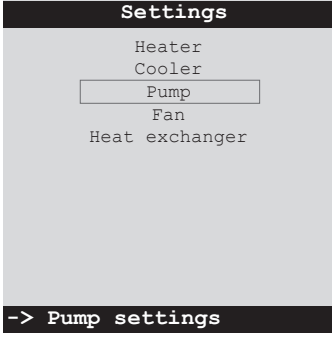
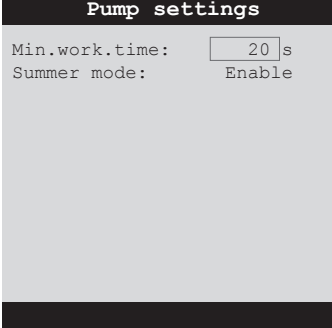
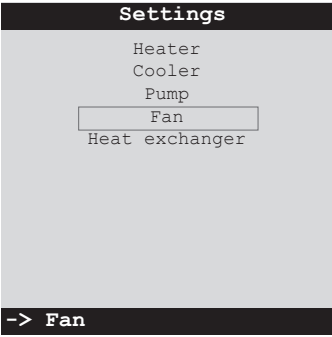
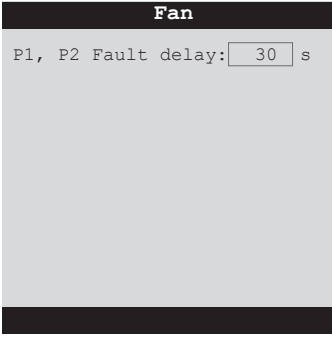
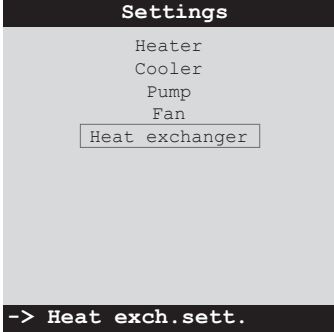
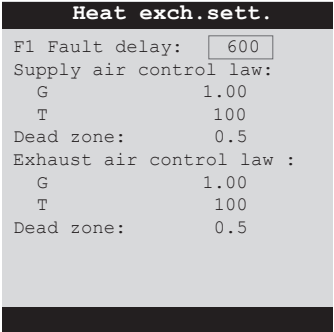
Function	Indication
<p><b>Cooler delay on</b> – minimum cooler activation time [sec].</p>	
<p><b>6.3 Pump settings</b></p>	
<p><b>Pump</b> – Pump configuration menu.</p>	
<p><b>Min.work.time:</b> minimum circulating pump operating time [sec].  <b>Summer mode:</b> parameter that enables /disables circulating pump operation of the water heater in <b>Summer mode</b>.                  Two settings are available:  <b>Disabl:</b> the pump activation in <b>Summer mode</b> is disabled.  <ul style="list-style-type: none"> <li><b>Enabl:</b> the pump activation in <b>Summer mode</b> is enabled provided that the heat medium regulating valve is operating.</li> </ul> </p>	
<p><b>6.4 Fan settings</b></p>	
<p><b>Fan</b> – Fans settings menu.</p>	
<p><b>P1, P2 Fault delay:</b> set time period to analyse fans fault [sec]. If during this period there is no signal from the frequency inverter of a respective fan after a signal for activation of the fans, the supply or exhaust fan alarm signal is generated (ref. to Alarm list).</p>	

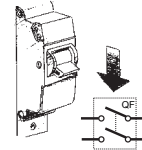
Table 10. Controller parameters (continued)

Function	Indication
<p><b>6.5</b> <b>6.5. Heat exchanger settings</b></p>	
<p><b>Heat exchanger</b> – Heat exchanger settings menu.</p>	
<p><b>F1 Fault delay:</b> set time period to monitor exhaust air drop downstream of the heat exchanger [sec]. If the actual exhaust air temperature is below <b>T.h.exch.ch.</b> within this time period, the F1 alarm signal is generated.</p> <p><b>Heat exchanger control law</b></p> <ul style="list-style-type: none"> <li><u>Supply air control law</u></li> </ul> <p><b>G:</b> proportional control factor of proportional-integral control law. Parameters setting for supply air temperature control by means of the regulating heat medium valve.</p> <p><b>T:</b> integrating factor of proportional-integral control law [sec]. Parameters setting for supply air temperature control by means of the regulating heat medium valve.</p> <p><b>Dead zone:</b> dead zone [°C].</p> <p>Parameters setting for supply air temperature control by means of the regulating heat medium valve. If the discrepancy is below this point, it is taken to be 0.</p> <ul style="list-style-type: none"> <li><u>Exhaust air control law</u></li> </ul> <p><b>G:</b> proportional control factor of proportional-integral control law [sec]. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve.</p> <p><b>T:</b> integrating factor of proportional-integral control law [sec]. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve.</p> <p><b>Dead zone:</b> dead zone [°C]. Parameters setting for the return heat medium temperature control by means of the regulating heat medium valve. If the discrepancy is below this point, it is taken to be 0.</p>	

**TECHNICAL MAINTENANCE**

**WARNING**

Cut power supply to the unit off by turning the automatic electric switch QF to OFF position prior to any maintenance operations.  
Take steps to prevent activation of the automatic switch before finishing all the operations.



Regular technical supervision and maintenance of the unit are required to ensure the product long service life and non-stop operation.

Disconnect the unit from power supply prior to any maintenance operations.

**WARNING! Consider the unit sharp edges! Fulfill maintenance operations in work gloves!**

**1. Filter maintenance (3-4 times per year).**

Dirty filters increase air resistance and decrease supply air volume. Clean the filters with a vacuum cleaner or flush those with water. After two consecutive cleanings the filters must be replaced. Install dry filters only! Contact the Seller to purchase the filters stated above in the «Technical data» section.

**Dirty filters are not considered as a warranty case!**

**Replace humid and mouldy filters immediately!**

**2. Heat exchanger maintenance (once a year).**

The heat exchanger must be regularly cleaned to maintain high heat recovery efficiency even in case of the regular filter cleaning. To clean the heat exchanger pull it out, flush the heat exchanger with warm detergent solution. After cleaning install the dry heat exchanger back to the unit.

**3. Fan maintenance (once a year).**

The regular filter cleaning may not completely prevent the dust ingress into the unit, which results in the unit capacity decrease. Clean the fan with a soft cloth or a brush. Cleaning with water, abrasive detergents, sharp object or chemicals is not allowed.

**4. Condensate drain system maintenance (once per year).**

The condensate drainage (drain line) may get clogged by dirt and dust particles contained in the exhaust air. Check the drain line operation by filling the drain pan under the unit with water, clean the U-trap and the drain line, if necessary.

**5. Technical maintenance of the supply grille (twice a year).**

Check the supply grille and remove foreign objects to maintain free air intake.

**6. Air ducts maintenance (once in 5 years).**

Even regular fulfilling of all the prescribed above maintenance operations may not completely prevent dirt accumulation in the air ducts which reduces the unit capacity. Duct maintenance means regular cleaning or replacement.

**7. Exhaust and intake diffusers maintenance (if required).**

Remove the exhaust and the intake diffusers and flush those with warm detergent solution. Check the ductworks connections periodically!

**TROUBLESHOOTING**

Table 11. Possible faults and troubleshooting

Fault	Possible reason	Troubleshooting
<b>The fan(s) does not start when the unit is on</b>	No power supply or connection error.	Connect the unit to power supply. Troubleshoot the connection error.
	Jammed motor, soiled impeller blades.	Remove the motor jam, clean the impeller blades.
	Alarm in the system.	Remove the system alarm. Restart the unit.
<b>Automatic switch tripping</b>	Short circuit in power grid.	Turn the unit off and contact the unit Seller for fault diagnostics.
<b>Low air flow</b>	Too low set speed.	Set higher speed.
	The filters and the fans are soiled, the heat exchanger is soiled.	Clean or replace the filters, fans and the heat exchanger.
	The air dampers, the supply diffusers or the exhaust grilles are closed or soiled.	Open and clean the air dampers, the supply diffusers, the exhaust grilles to ensure free air flow.
<b>Cold supply air</b>	The extract filter is soiled.	Clean or replace the extract filter.
	The heat exchanger is frozen.	Check the heat exchanger condition. Turn the unit off if required and restart it after the freezing danger is no longer imminent.
	Malfunction of the water heater.	Contact the Seller.
<b>Noise, vibration</b>	The impeller is soiled.	Clean the impeller.
	The screw connection is loose.	Tighten the fastening screws.
	No flexible anti-vibration connectors are installed.	Install the flexible anti-vibration connectors.
<b>Condensate leakage</b>	The drain system is clogged, damaged or wrong installed.	Clean the condensate drain system. Check the drain hose slope. Make sure the U-trap is filled with water and the drain system is frost-protected.

**ACCEPTANCE CERTIFICATE**

**The air handling unit with heat recovery**

KOMFORT EC LW300-2		KOMFORT EC LW400-2	
KOMFORT EC L1W300-2		KOMFORT EC LW550-2	

**is recognized as serviceable.**

The unit complies with the requirements according to the EU norms and directives, to the relevant EU-Low Voltage Equipment Directives, EU-Directives on Electromagnetic Compatibility. We hereby declare that the unit complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility, which relate to electrical appliances used in set voltage classes.

This certificate is issued following test carried out on samples of the product referred to above.

Quality Inspector's Stamp

Manufacture Date \_\_\_\_\_

**CONNECTION CERTIFICATE**

**Heat recovery air handling unit**

KOMFORT EC LW300-2		KOMFORT EC LW400-2	
KOMFORT EC L1W300-2		KOMFORT EC LW550-2	

is connected to power mains in compliance with the operation manual requirements by the professional:

Company: \_\_\_\_\_

Expert's Full Name \_\_\_\_\_

Date \_\_\_\_\_ Signature \_\_\_\_\_

**WARRANTY CARD**

KOMFORT EC LW300-2		KOMFORT EC LW400-2	
KOMFORT EC L1W300-2		KOMFORT EC LW550-2	

**SELLER**

**PURCHASE DATE**

**REPRESENTATIVE IN EU**

BLAUBERG Ventilatoren GmbH  
 Aidenbachstr. 52a,  
 D-81379 München,  
 Deutschland



[www.blaubeergventilatoren.de](http://www.blaubeergventilatoren.de)  
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