

# USER'S MANUAL

MPA 800 W  
MPA 1200 W  
MPA 1800 W  
MPA 2500 W  
MPA 3200 W  
MPA 3500 W  
MPA 5000 W

PA 01 E  
PA 02 E  
PA 03 E

PA 01 W  
PA 02 W  
PA 03 W  
PA 04 W

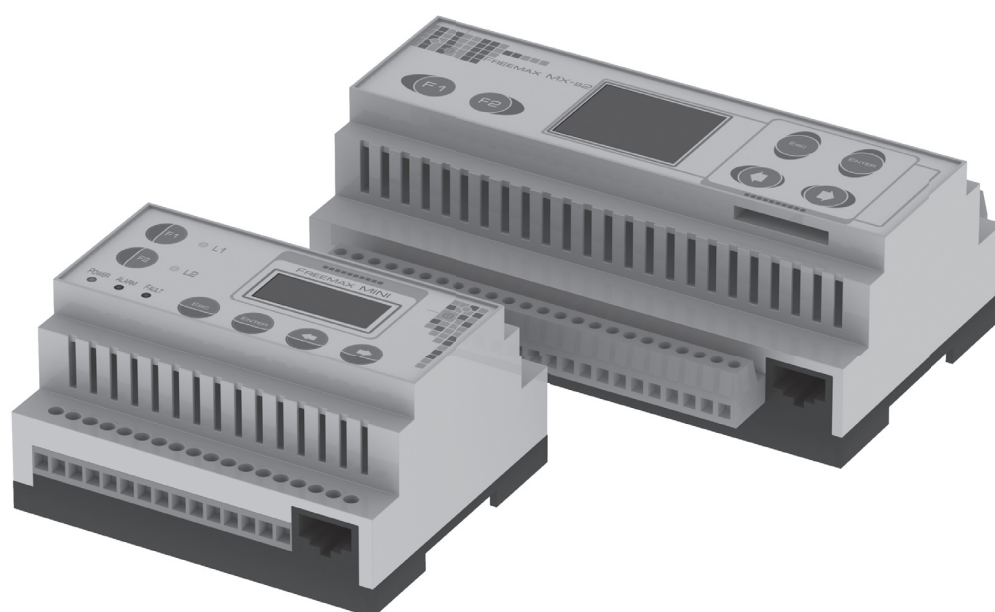
VUT 800 WH  
VUT 1000 WH  
VUT 1500 WH  
VUT 2000 WH

VUT 300 WH EC  
VUT 400 WH EC  
VUT 600 WH EC

VUT 350 PE EC  
VUT 600 PE EC  
VUT 1000 PE EC  
VUT 2000 PE EC  
VUT 3000 PE EC

VUT 600 PW EC  
VUT 1000 PW EC  
VUT 2000 PW EC  
VUT 3000 PW EC

VUT R 900 WH EC  
VUT R 900 EH EC  
VUT R 1500 EH EC



**Control system for air supply and air  
handling units based on  
Freemax controllers  
and AC208A2 sensor control panels**


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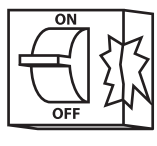
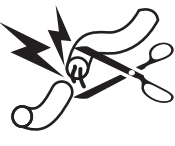
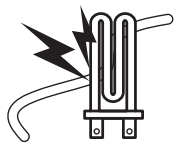

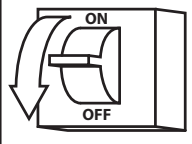

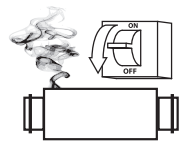
## SAFETY REQUIREMENTS

- Read the user's manual carefully prior to the operation and installation of the control unit.
- Installation and operation of the control unit shall be performed in accordance with the present user's manual as well as the provisions of all the applicable local and national construction, electrical and technical codes and standards.
- The warnings contained in the present user's manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the safety regulations may result in an injury or control unit damage.
- Read the manual carefully and keep it as long as you use the control unit.
- While transferring the unit control the user's manual must be turned over to the receiving operator.

Symbol legend used in the manual:

	<b>ATTENTION!</b>
	<b>RESTRICTED!</b>

### SAFETY PRECAUTIONS

	The unit must be disconnected from power supply prior to every installation or repair operation.		Ground the control unit!
	The unit must not be operated outside the temperature range stated in the user's manual or in aggressive or explosive environments.		Do not use damaged equipment or conductors to connect the unit to power mains.
	Do not change the power cord length at your own discretion. Do not bend the power cord. Avoid damaging the power cord.		Do not position any heating devices or other equipment in close proximity to the unit power cord.
	Do not touch the unit speed controller or the control panel with wet hands. Do not carry out the unit maintenance with wet hands.		The unit must be disconnected from the power supply prior to maintenance operations.
	Keep the power cord intact while operating the control unit. Do not put any foreign objects on top of the power cord.		In case of unusual sounds, smoke disconnect the unit from power supply and contact the service centre.

## CONNECTION TO POWER MAINS



DISCONNECT THE UNIT FROM POWER SUPPLY PRIOR TO ANY OPERATIONS WITH THE UNIT. THE POWER MAINS CONNECTION SHALL ONLY BE PERFORMED BY A QUALIFIED ELECTRICIAN WHO IS AUTHORIZED FOR UNASSISTED OPERATIONS WITH ELECTRIC UNITS OF POWER VOLTAGE UP TO 1000 V AFTER CAREFUL STUDY OF THE USER'S MANUAL.

THE RATED ELECTRICAL PARAMETERS OF THE UNIT ARE GIVEN ON THE MANUFACTURER'S LABEL. ANY TAMPERING WITH THE INTERNAL CONNECTIONS IS PROHIBITED AND WILL VOID THE WARRANTY.

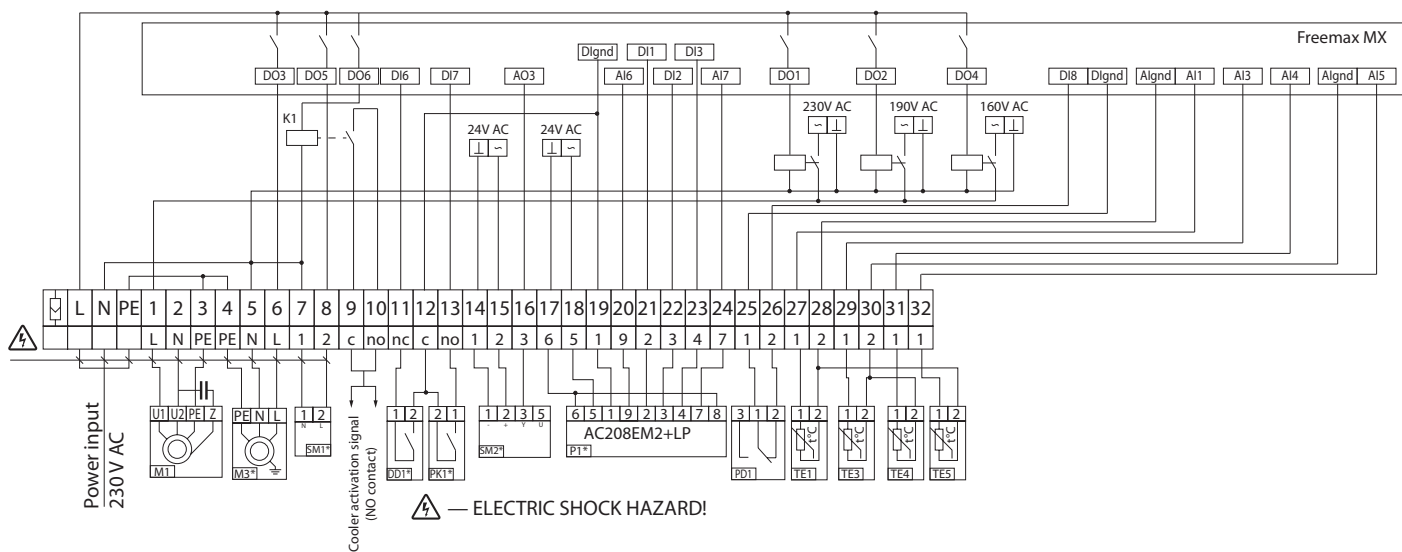
The units are designed for connection to AC 230 V/50 Hz single- or 400 V / 50 Hz three-phase power mains depending on the unit type. The cable cross section must be in compliance with the unit power consumption, wire type, maximum heating temperature, insulation type, cable length and installation type.

Use cables with copper wires only!

The unit is connected to power supply on the terminal block according to the wiring diagram and terminal marking. Connect the control and power cables in compliance with the terminal marking and polarity.

Connection to power mains must be performed via an automatic circuit breaker with magnetic trip, integrated into fixed house cabling with the tripping current exceeding the unit current consumption.

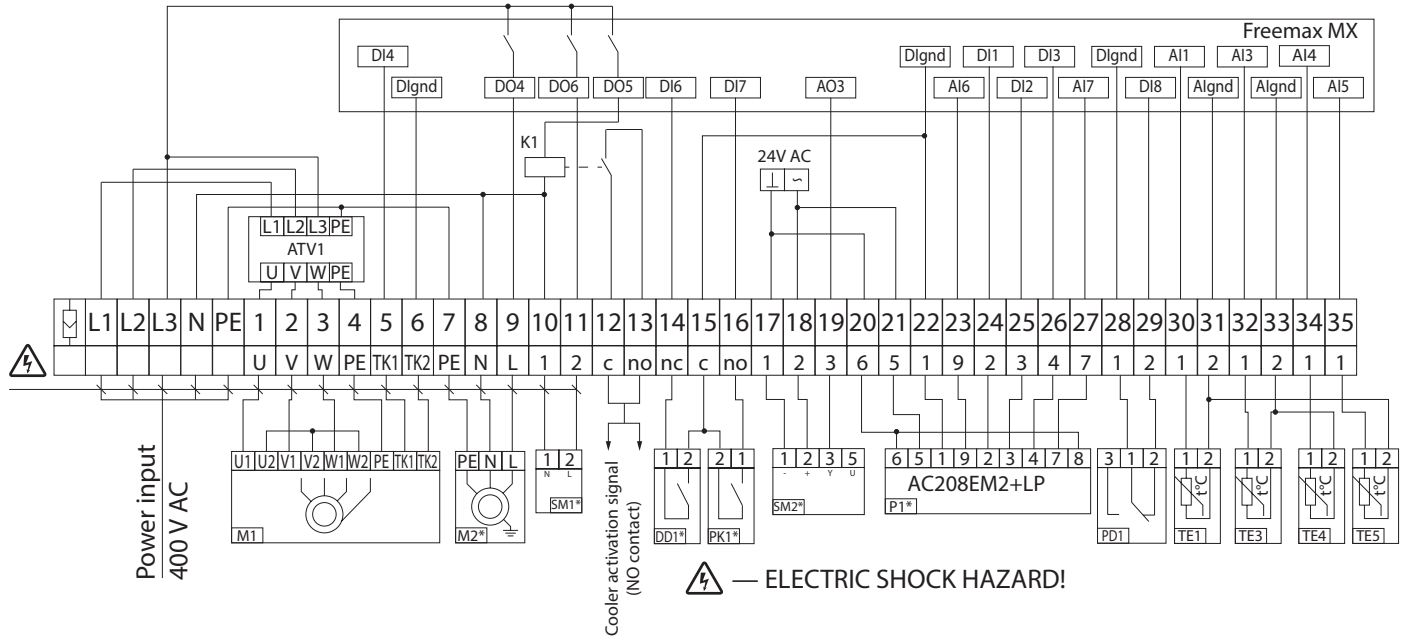
### EXTERNAL WIRING DIAGRAM FOR THE MPA 800 W, MPA 1200 W, MPA 1800 W AND MPA 2500 W UNITS



Designation	Name	Type	Cable
M1	Supply fan	max 0.8 kW	
M2*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
PD1	Pressure differential switch on the supply filter	NC	
TE1	Outdoor temperature sensor	PT 1000 ST-01	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature sensor	PT 1000 STa-02	

- The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 11 and 12 must be jumped.
- The maximum connecting cable length from the P1 remote control panel is 10 m.
- \*— not included into delivery set, available as a specially ordered accessory.
- \*\* maximum connecting cable length is 20 m.

**EXTERNAL WIRING DIAGRAM FOR THE MPA 3200 W, MPA 3500 AND MPA 5000 W UNITS**

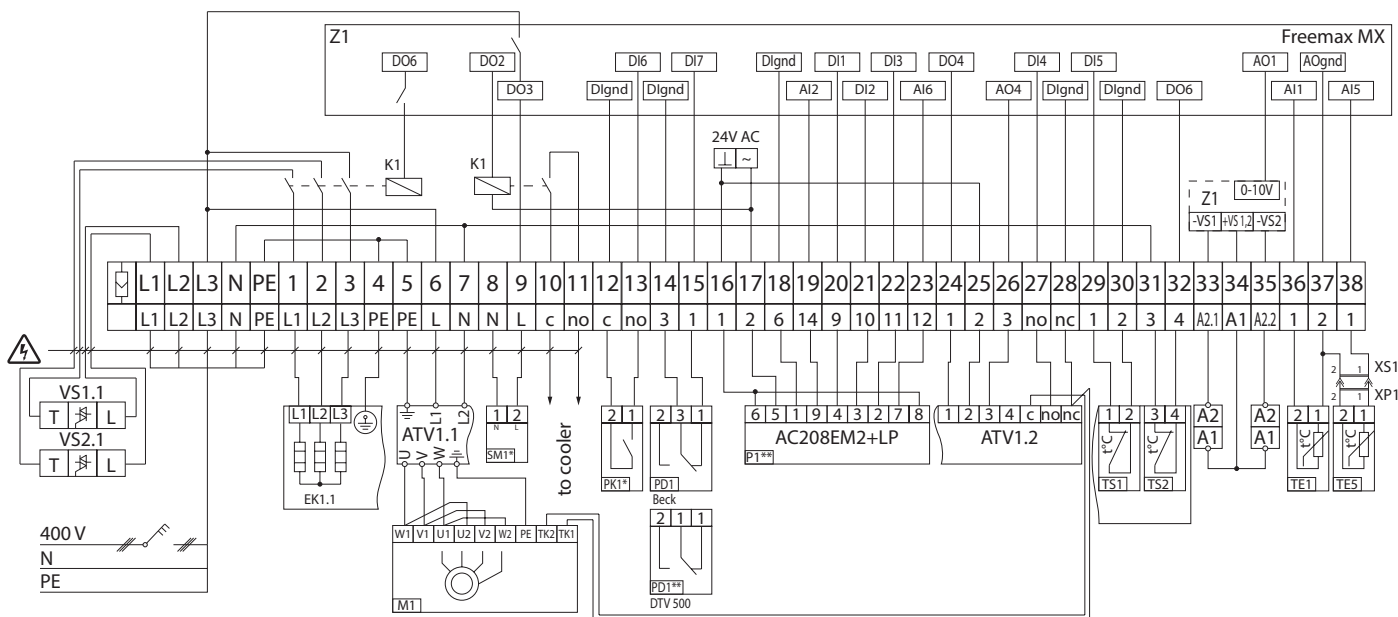


**⚡ — ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
ATV1	Frequency inverter	Sinus M	
M1	Supply fan		
M2*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
PD1	Pressure differential switch on the supply filter	NC	
TE1	Outdoor temperature sensor	PT 1000 ST-01	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature sensor	PT 1000 STa-02	

1. The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 14 and 15 must be jumped.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \*— not included into delivery set, available as a specially ordered accessory.
4. \*\* maximum connecting cable length is 20 m.

**EXTERNAL WIRING DIAGRAM FOR THE PA 01 E, PA 02 E AND PA 03 E UNITS**

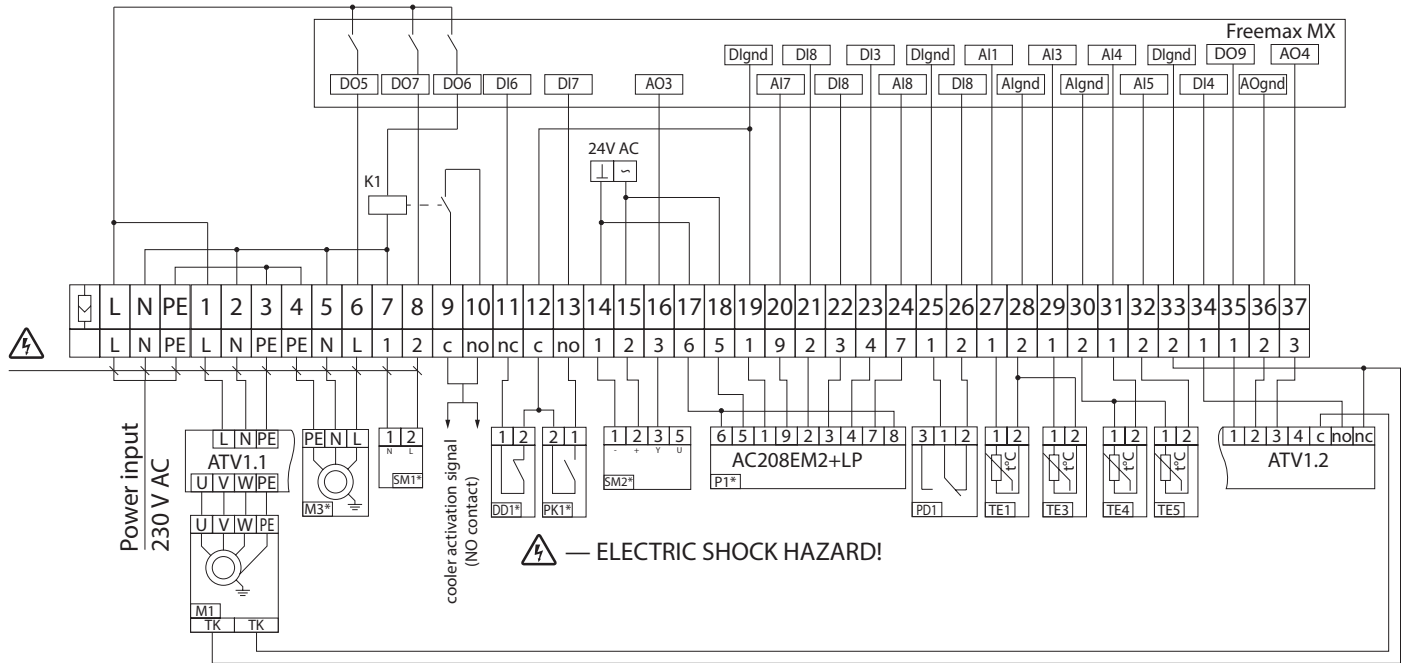


**⚠ — ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
VS1, VS2	Semiconductor relay	Depends on the heater type	
EK1	Heater	Depends on the unit type	
ATV1	Frequency inverter	Depends on the motor type	
PD1**	Pressure differential switch on the supply filter	Beck (DTV 500)	
M1	Supply fan	Depends on the unit type	
P1**	Remote mounted control panel	AC208EM2+LP	
PK1*	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF 230 Belimo	3 x 0,75 mm <sup>2</sup>
TE1	Outdoor temperature sensor	ST-01	
TE5	Supply air temperature	Sta-02.250	
	Cooler activation signal	NO	2 x 1,0 mm <sup>2</sup>

1. The TE5 temperature sensor must be fixed in a straight air duct segment with stable air flow free of turbulence.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \*— not included into delivery set, available as a specially ordered accessory.

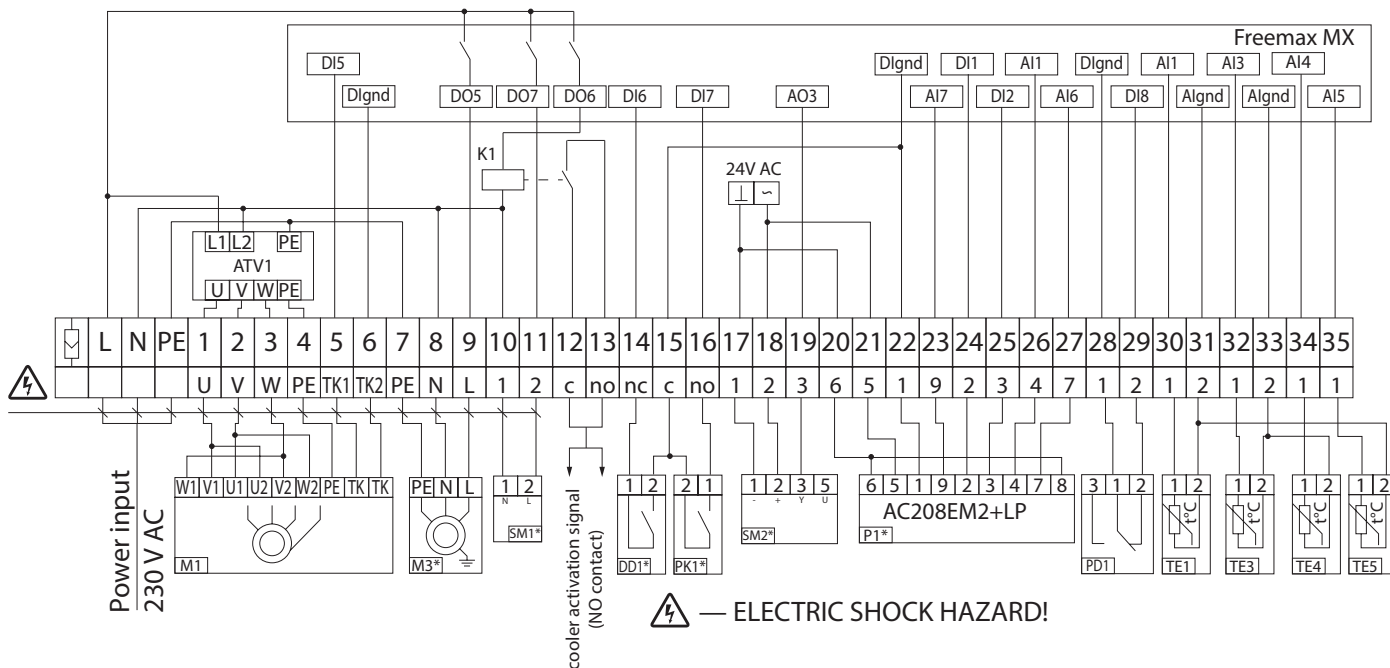
**EXTERNAL WIRING DIAGRAM FOR THE PA 01 W, PA 02 W AND PA 03 W UNITS**



Designation	Name	Type	Cable
ATV1	Frequency inverter	Depends on the motor type	
M1	Supply fan		
M2*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
PD1	Pressure differential switch on the supply filter	NC	
TE1	Outdoor temperature sensor	PT 1000 ST-01	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature sensor	PT 1000 STa-02	

1. The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 11 and 12 must be jumped.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \*— not included into delivery set, available as a specially ordered accessory.
4. \*\* maximum connecting cable length is 20 m.

EXTERNAL WIRING DIAGRAM FOR THE PA 04 W UNIT



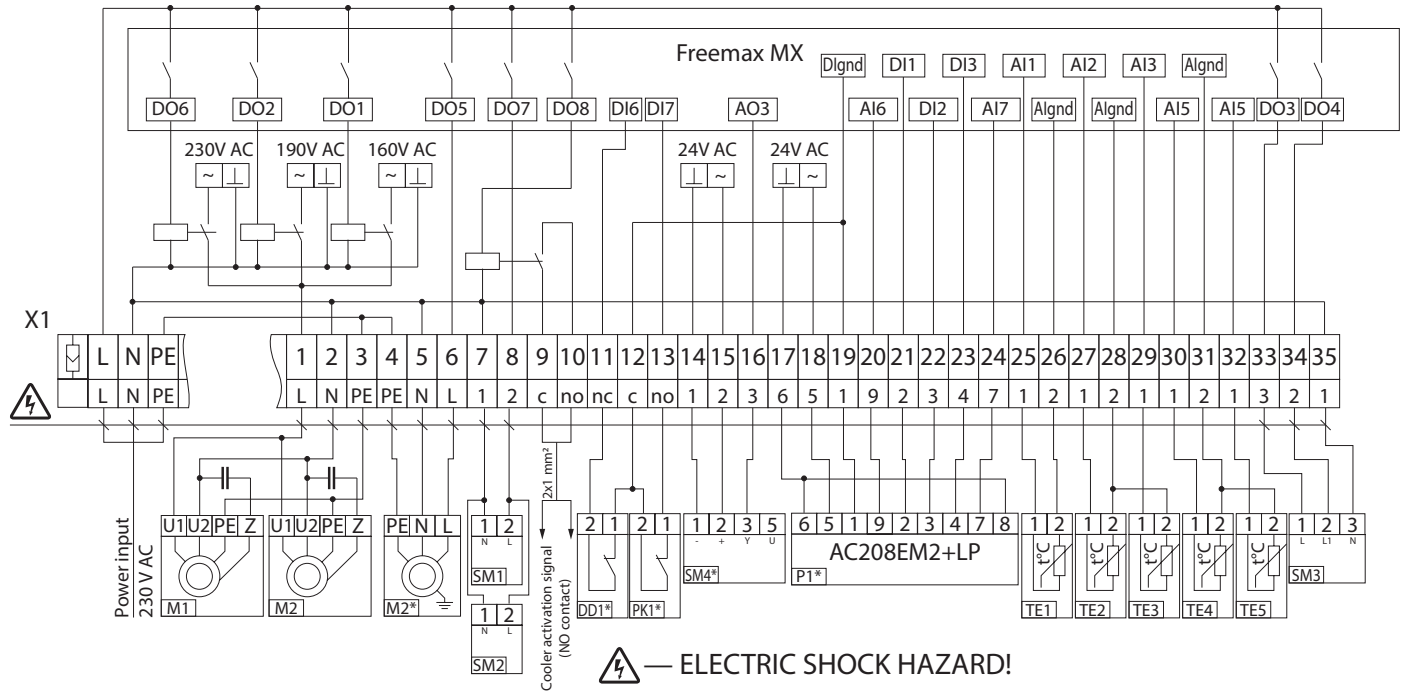
⚡ — ELECTRIC SHOCK HAZARD!

Designation	Name	Type	Cable
ATV1	Frequency inverter	Sinus M	
M1	Supply fan		
M2*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
PD1	Pressure differential switch on the supply filter	NC	
TE1	Outdoor temperature sensor	PT 1000 ST-01	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature sensor	PT 1000 STa-02	

1. The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 14 and 15 must be jumped.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \*— not included into delivery set, available as a specially ordered accessory.
4. \*\* maximum connecting cable length is 20 m.



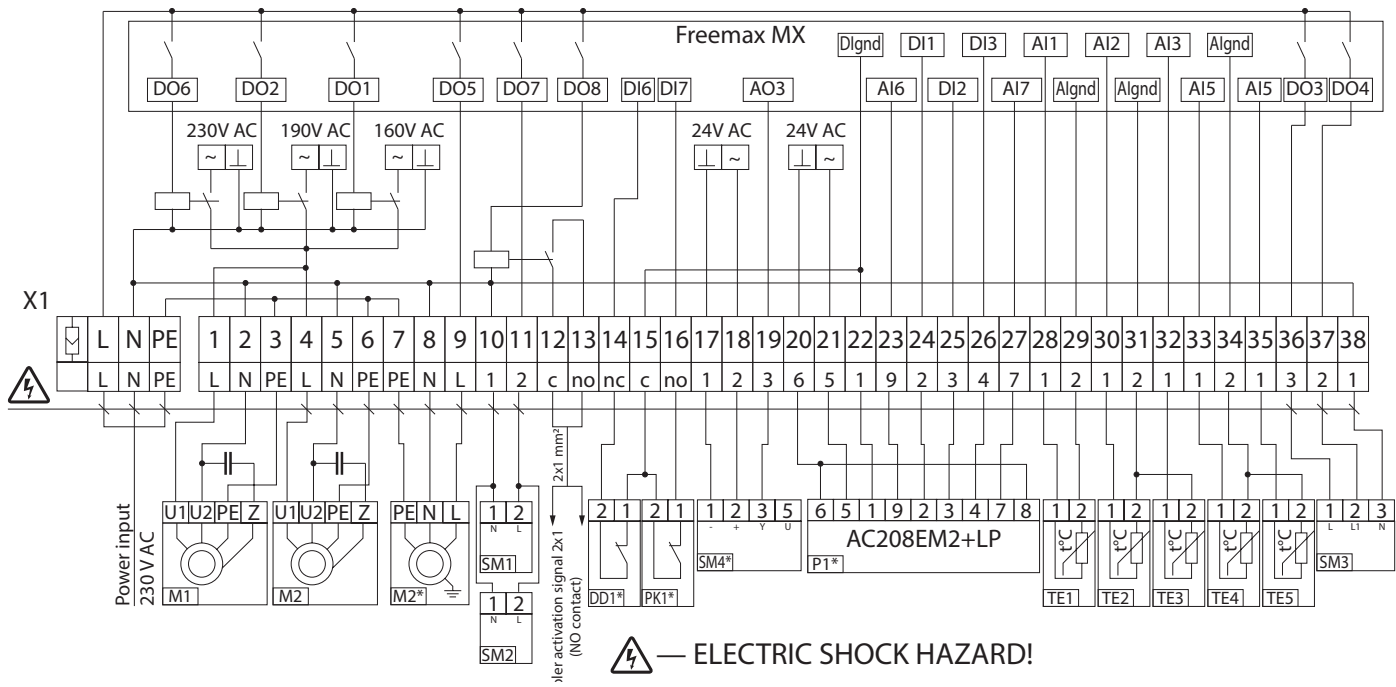
**EXTERNAL WIRING DIAGRAM FOR THE VUT 800 WH AND VUT 1000 WH UNITS**



Designation	Name	Type	Cable
M1	Supply fan	max 0.4 kW	
M2	Extract fan	max 0.4 kW	
M3*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 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>
SM3	Heat exchanger damper actuator	LM 24 SR	3 x 0,75 mm <sup>2</sup>
SM4*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST-01	2 x 0,75 mm <sup>2</sup>
TE2	Air temperature downstream of the heat exchanger	PT 1000 STa-02	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature	PT 1000 STa-02	

1. The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 11 and 12 must be jumped.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \*— not included into delivery set, available as a specially ordered accessory.
4. \*\* maximum connecting cable length is 20 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT 1500 WH AND VUT 2000 WH UNITS**

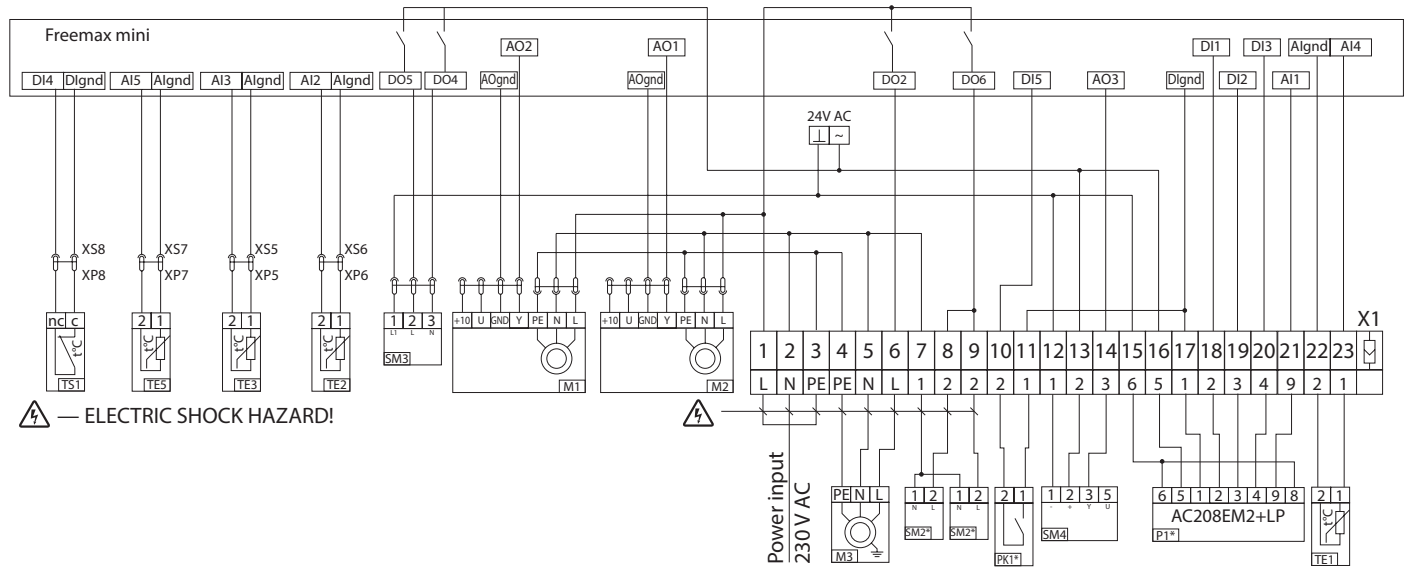


**ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
M1	Supply fan	max 0.8 kW	
M2	Extract fan	max 0.8 kW	
M3*	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
DD1*	Dry run protection relay	NC	2 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>
SM3	Heat exchanger damper actuator	LM 24 SR	3 x 0,75 mm <sup>2</sup>
SM4*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 STa-01	2 x 0,75 mm <sup>2</sup>
TE2	Air temperature downstream of the heat exchanger	PT 1000 STa-02	
TE3	Return heat medium temperature sensor	PT 1000 STw-02	
TE4	Freeze protection sensor of the water heater	PT 1000 STw-02	
TE5	Supply air temperature sensor	PT 1000 STa-02	

1. The system is operable in case of no DD1 fluid pressure switch in the water heater. In this case the contacts 14 and 15 must be jumped.
2. The maximum connecting cable length from the P1 remote control panel is 10 m.
3. \* — not included into delivery set, available as a specially ordered accessory.
4. \*\* maximum connecting cable length is 20 m.

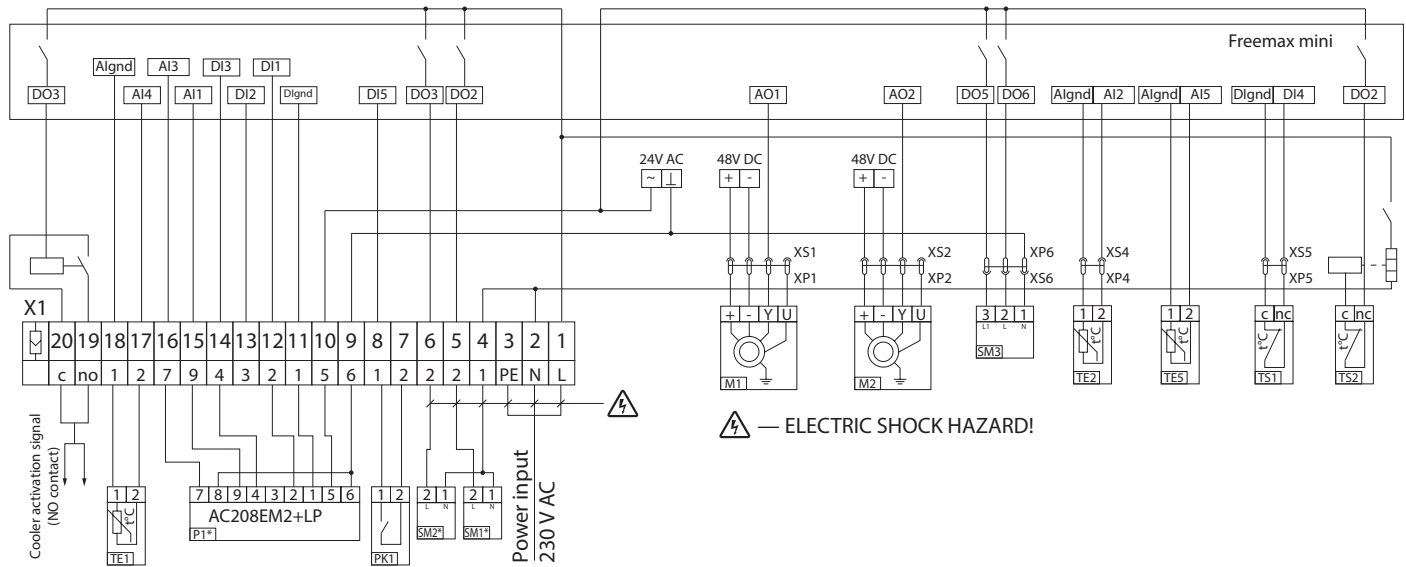
**EXTERNAL WIRING DIAGRAM FOR THE VUT 300 WH EC, VUT 400 WH EC AND VUT 600 WH EC UNITS**



Designation	Name	Type	Cable
M3	Circulating pump	max 0,3 kW	3 x 0,75 mm <sup>2</sup>
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM4	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.  
 1. \*\* maximum connecting cable length is 20 m.  
 2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

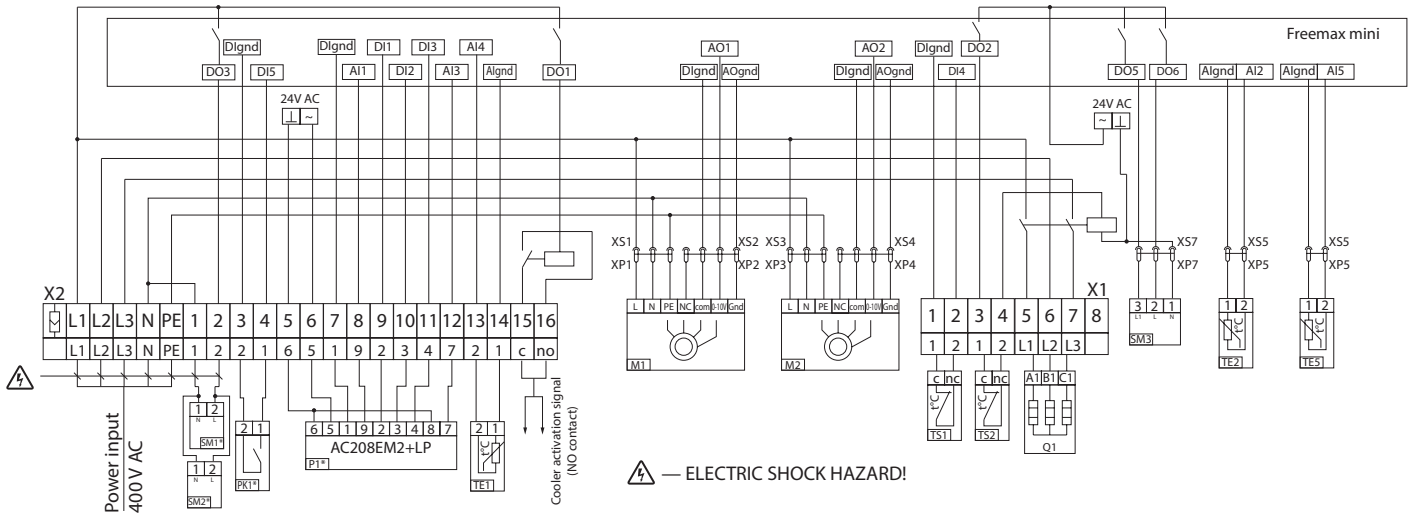
**EXTERNAL WIRING DIAGRAM FOR THE VUT 350 PE EC, VUT 600 PE EC AND VUT 1000 PE EC UNITS**



Designation	Name	Type	Cable
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
PK1	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
P1	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>
KK5	DX cooler		2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.  
 1. \*\* maximum connecting cable length is 20 m.  
 2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT 2000 PE EC UNIT**



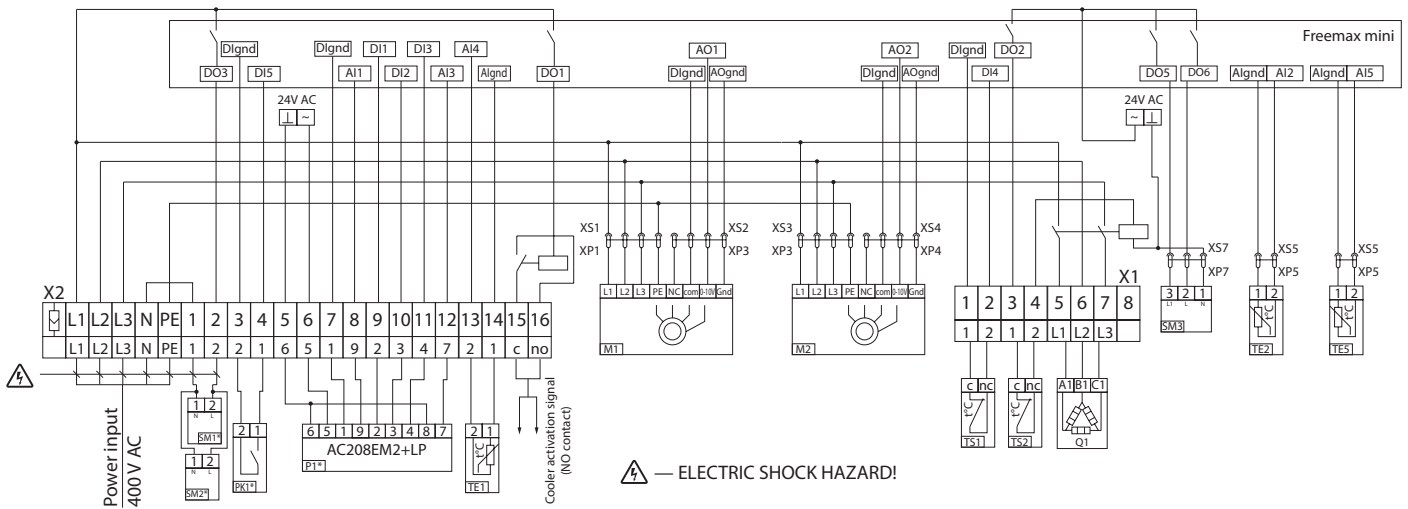
Designation	Name	Type	Cable
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
PK1	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
P1	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>
KK5	DX cooler		2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.

1. \*\* maximum connecting cable length is 20 m.

2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT 3000 PE EC UNIT**



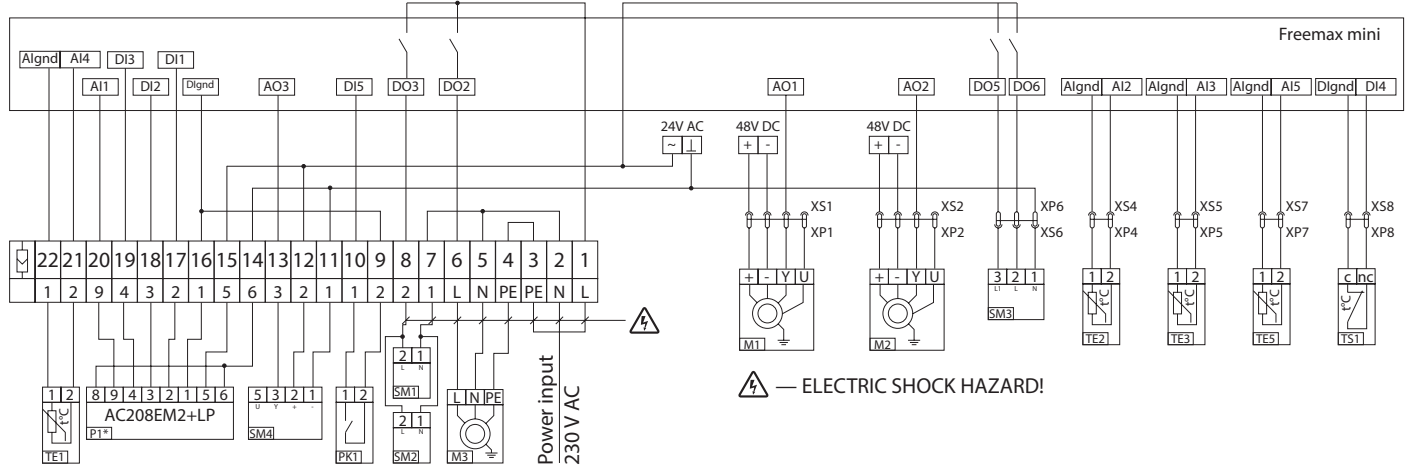
Designation	Name	Type	Cable
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
PK1	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
P1	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>
KK5	DX cooler		2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.

1. \*\* maximum connecting cable length is 20 m.

2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT 600 PW EC AND VUT 1000 PW EC UNITS**

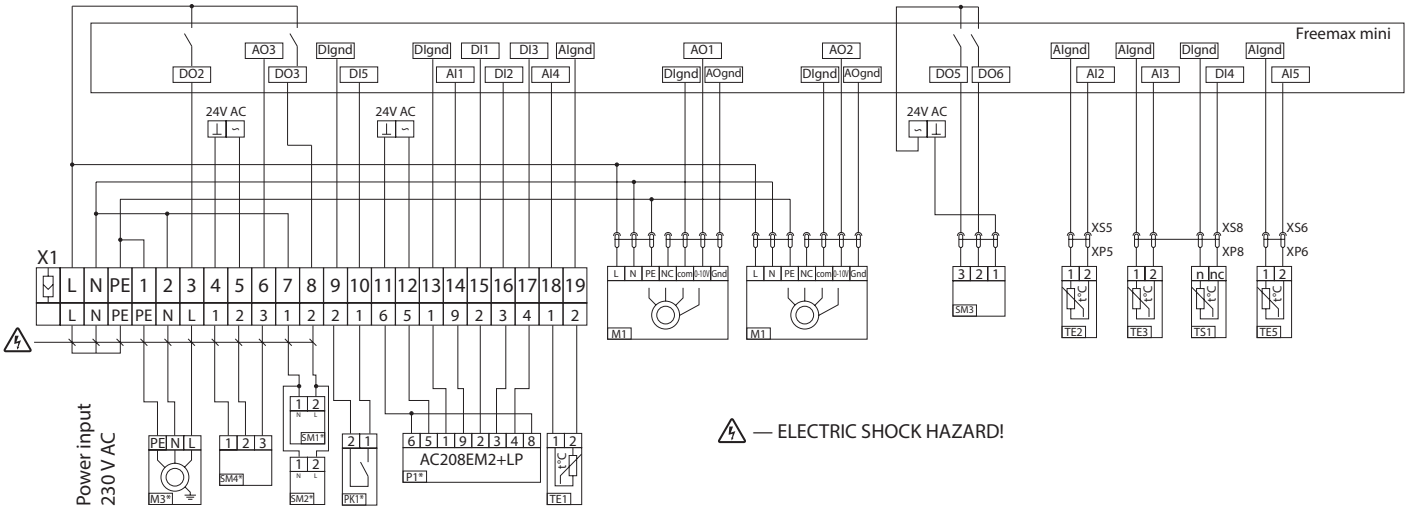


**⚠ — ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
M3	Circulating pump	max 0,3 kW	3 x 0,75 mm <sup>2</sup>
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM4	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.  
 1. \*\* maximum connecting cable length is 20 m.  
 2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT 2000 PW EC UNIT**

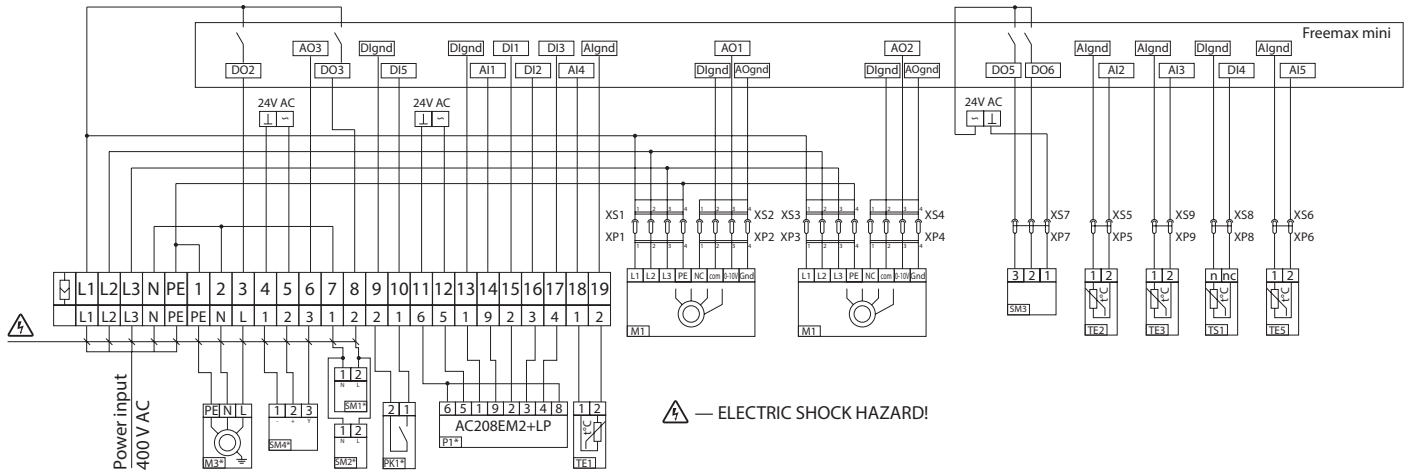


**⚠ — ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
M3	Circulating pump	max 0,3 kW	3 x 0,75 mm <sup>2</sup>
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM4	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.  
 1. \*\* maximum connecting cable length is 20 m.  
 2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

EXTERNAL WIRING DIAGRAM FOR THE VUT 3000 PW EC UNIT



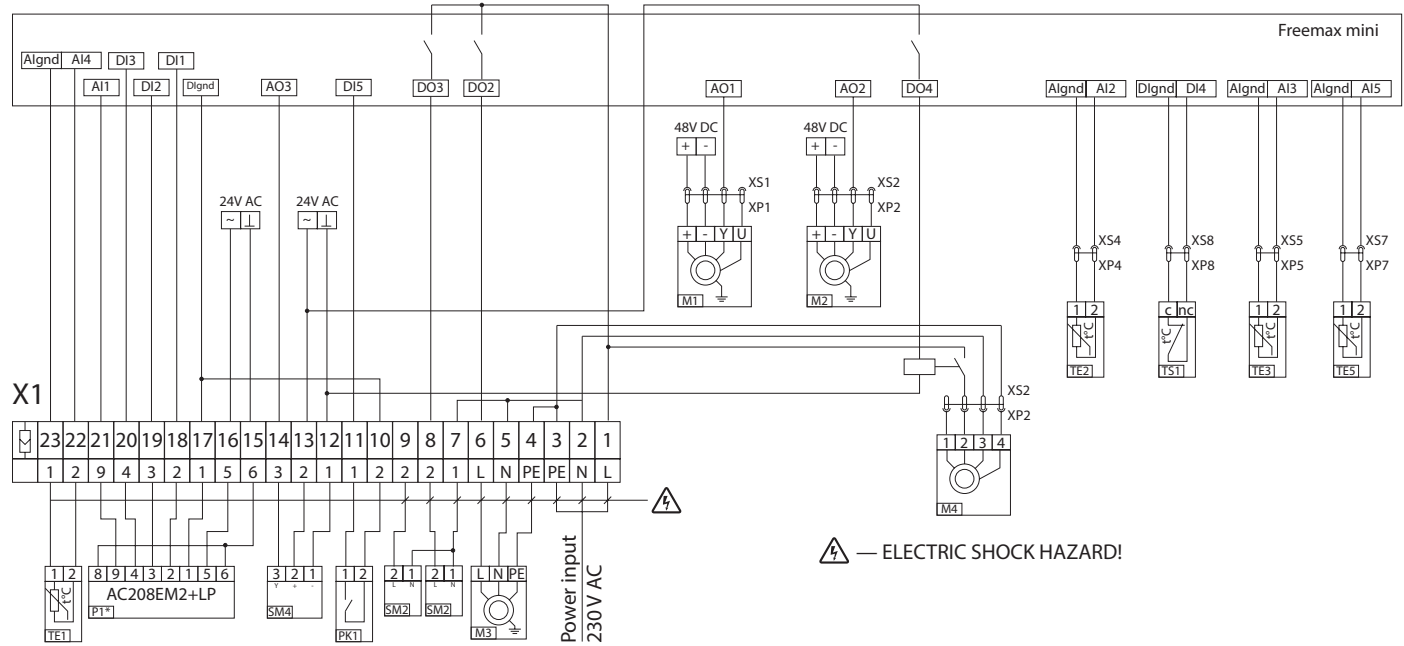
⚠ — ELECTRIC SHOCK HAZARD!

Designation	Name	Type	Cable
M3	Circulating pump	max 0,3 kW	3 x 0,75 mm <sup>2</sup>
SM1	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM4	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST 01	2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.

- 1. \*\* maximum connecting cable length is 20 m.
- 2. \*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

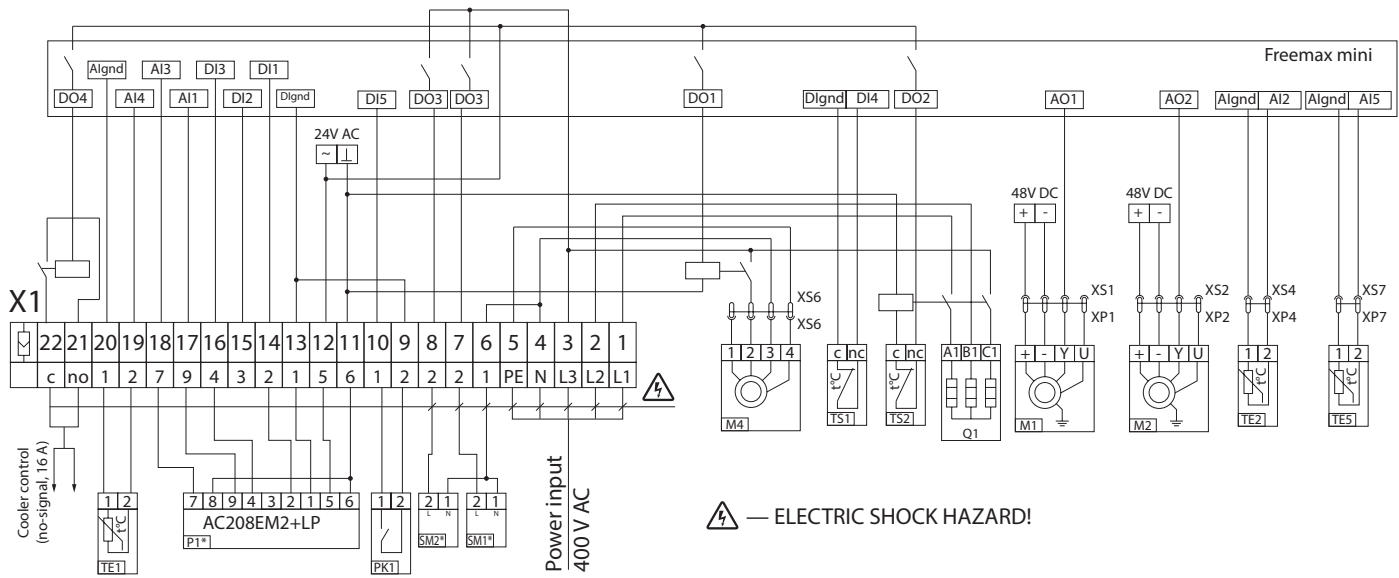
**EXTERNAL WIRING DIAGRAM FOR THE VUT R 900 WH EC UNIT**



Designation	Name	Type	Cable
M3	Circulating pump	max 0.3 kW	3 x 0,75 mm <sup>2</sup>
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM4*	Heat medium regulating 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	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST-01	2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.  
 1.\*\* maximum connecting cable length is 20 m.  
 2.\*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

**EXTERNAL WIRING DIAGRAM FOR THE VUT R 900 EH EC AND VUT R 1500 EH EC UNITS**



**⚠ — ELECTRIC SHOCK HAZARD!**

Designation	Name	Type	Cable
SM1*	Supply air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
SM2*	Exhaust air damper actuator	LF230	2 x 0,75 mm <sup>2</sup>
PK1*	Contact from fire alarm panel	NO	2 x 0,75 mm <sup>2</sup>
P1	Remote mounted control panel	AC208EM2+LP	
TE1	Outdoor temperature sensor	PT 1000 ST-01	2 x 0,75 mm <sup>2</sup>
KKБ	DX cooler		2 x 0,75 mm <sup>2</sup>

The unit delivery set includes P1 and TE1 only.

1.\*\* maximum connecting cable length is 20 m.

2.\*\* — The maximum connecting cable length from the P1 remote control panel is 10 m.

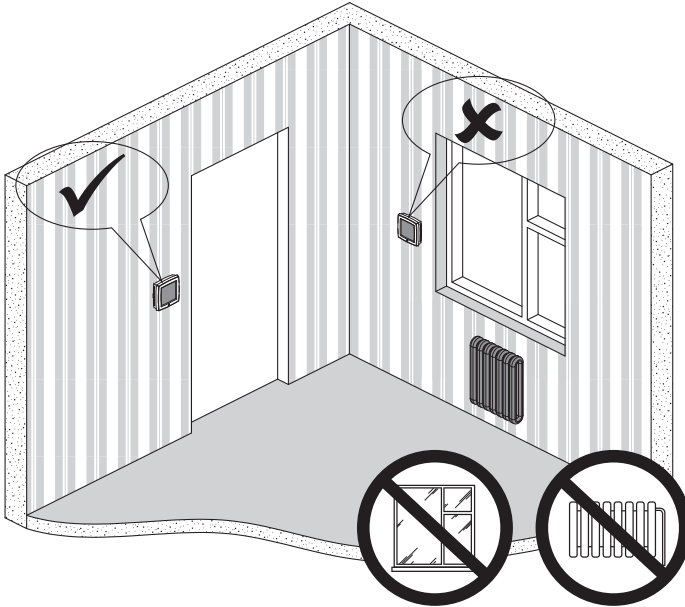


## CONTROL PANEL MOUNTING

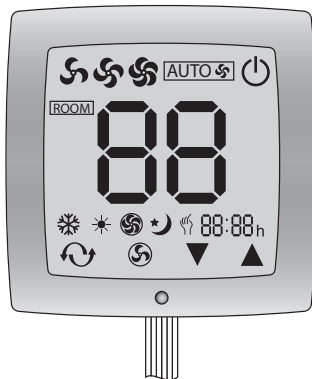


THE CONTROL PANEL MUST BE INSTALLED IN A PREMISE WHICH IS VENTILATED BY THE UNIT TO ENSURE ITS CORRECT OPERATION.

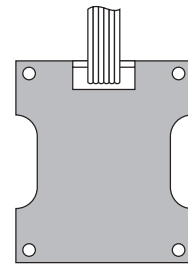
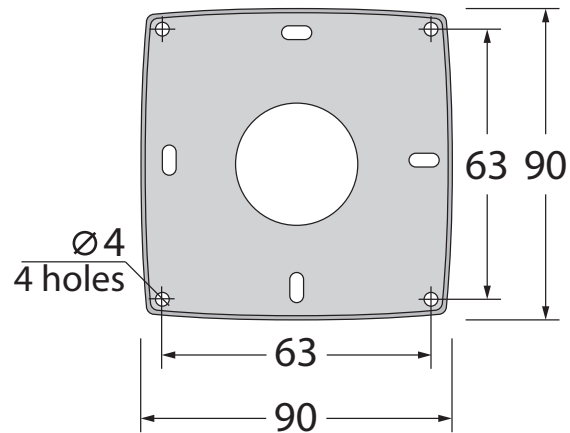
The installation place of the control panel must have stable temperatures and be not exposed to temperature fluctuations from heater batteries, vertical air convection, etc.



## CONTROL PANEL OVERALL AND CONNECTING DIMENSIONS



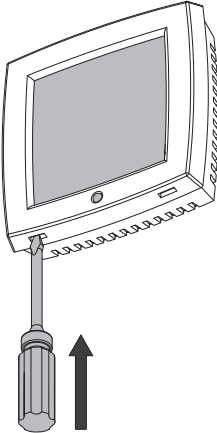
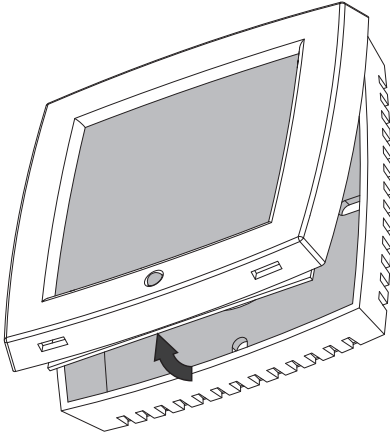
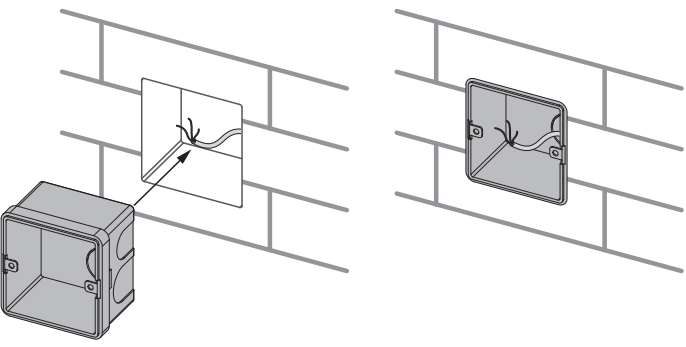
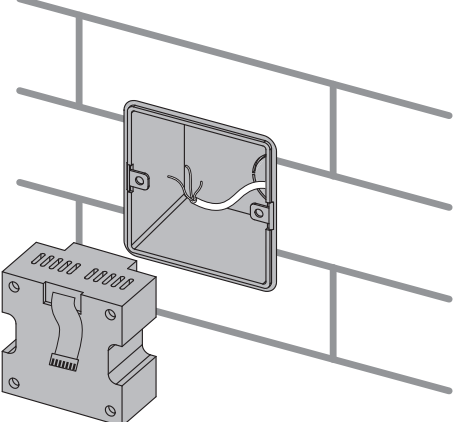
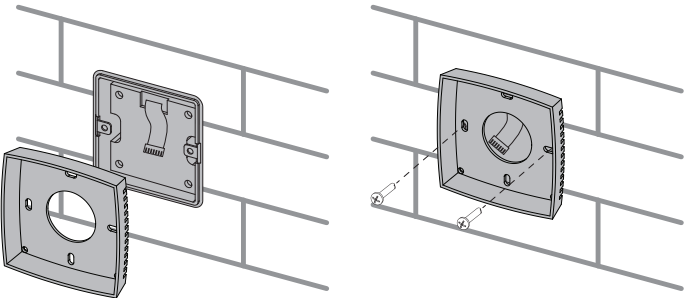
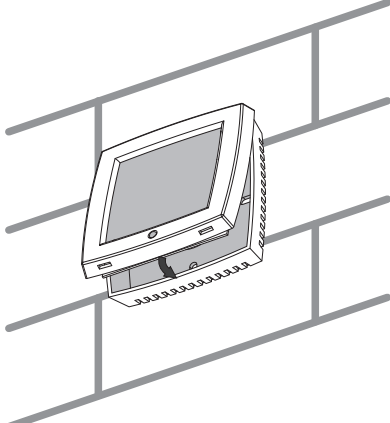
90x90x18 mm



61x61x39 mm

**MOUNTING****ATTENTION!**

Make sure the control panel is not damaged. Do not use a damaged control panel! Do not install the control panel on an uneven surface. Mounting of the control panel must be carried out by a professional electrician in compliance with the mounting drawings and guidelines.

	
<p>1. Install a small screwdriver with 3.5 slot width in one of the rectangular control panel openings for 4 mm.</p>	<p>2. Press the screwdriver to open the control panel.</p>
	
<p>3. Route the required cables and wires and install the junction box in the wall.</p>	<p>4. Connect and place the executive element inside of the mounting box.</p>
	
<p>5. Fix the control panel back side to the wall with screws.</p>	<p>6. Connect the executive element to the front part of the control panel and install the front panel.</p>

## UNIT CONTROL

The unit is operated with the AC208A2+LP sensor control panel. The touch-sensitive AC208A2+LP control panel has speed switching, temperature control and other functions to operate the ventilation unit. The control panel has a touch screen.





### CONTROL PANEL TECHNICAL DATA

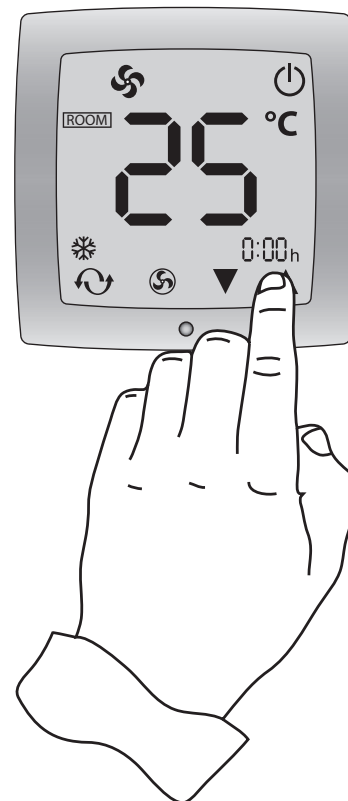
Voltage	24 V, 50-60 Hz
Max. load current	1A
Input power	<1,5 W
Accuracy	±1 °C
Range of set values	from +7 °C up to +50 °C temperature range is limited by the controller from +15 °C up to +35 °C
Countdown error	<1%
Output power	<200 W
Ingress Protection	IP30



### CONTROL


The ventilation units are operated by the sensor buttons located on the control panel display. The control panel generates sounds when the buttons are pressed.

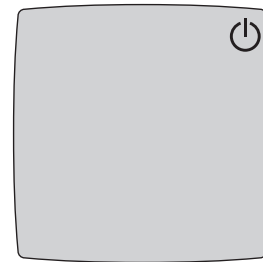
Button symbol	Designation
	Power on/off
	Operation mode control
	Speed setting: auto, high, medium, low
	Temperature and operation mode setting buttons




## MENU AND ADJUSTMENT

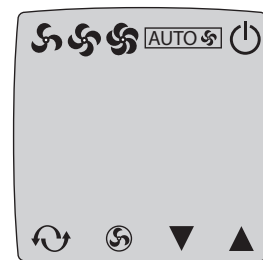
### 1. Turning Unit On/Off.

The unit is turned on and off with the button  on the control panel display.





### 1. Fan Speed Adjustment.


Press the button  to switch the ventilation unit speed. Fan speed: Auto-High-Medium-Low. In automatic mode the control panel sets the fan speed depending on the actual and set indoor temperature difference.




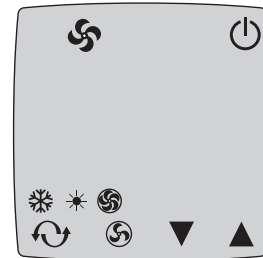
### 2. Operation Mode Adjustment.

Press the button  to select the ventilation unit operation modes. The mode selection is as follows: Heating-Cooling-Ventilation.

**Heating mode**  – heater is activated and supply air is heated up to set temperature.

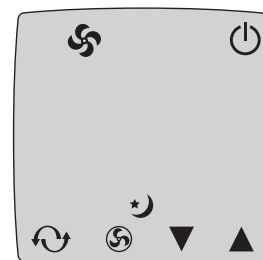
**Cooling mode**  – cooler is activated and supply air is cooled down to set temperature.

**Ventilation mode**  – heater and cooler are not activated. The unit operates exclusively in the ventilation mode.










### 3. Sleep Mode Adjustment.




The Sleep mode is disabled for air supply and air handling units.



### 4. Operation Mode Selection and Temperature Setting.

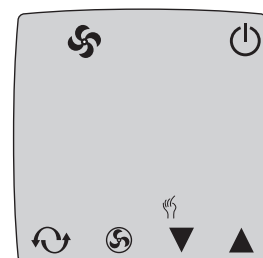
Keep the button  on the control panel display pressed for 3 seconds and then select the icon  using the icon  to enter the **manual operation mode**. When the icon  starts blinking press the button  to confirm or  cancel. No icon  on the control panel display means that the week-scheduled operation of the week timer is activated.

#### Manual operation:

To set the selected temperature point enter the standby mode confirmed by the icon  and set the temperature using the buttons   on the control panel display.

**Week scheduled operation:** In case of the activated week timer the following functions are disabled:








- temperature setting
- activation/deactivation time setting for the ventilation unit. For details, refer to Week Timer Adjustment.

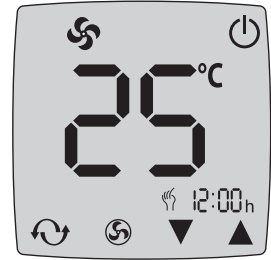


**5. Week Timer Adjustment.**




Adjustment sequence for the week timer:

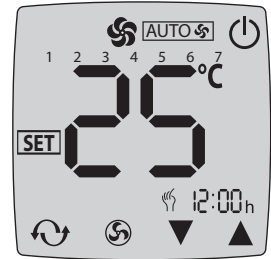
**1. Time setting.**

- Keep the button  on the control panel display pressed for 3 seconds to enter the configuration mode. Then select the "Minutes" parameter using the buttons  on the control panel display and set the minutes using the buttons  .
- Select the "Hour" parameter using the buttons  and set the hour parameter using the buttons   on the control panel display.





**2. Weekday setting.**

- In the configuration mode, select the weekday adjustment with the button  and set the parameters as follows using the buttons  :  
 Mon-Fri: 1-5;  
 Sat: 6;  
 Sun: 7.







**3. Time zone adjustment.**

Press the button  to select the time zone parameter.

The parameters are set with the button  .

The time zones are adjusted as follows:


Adjustment1	Icon	Mon-Fri		Sat		Sunday	
		Time	Temperature	Time	Temperature	Time	Temperature
First time zone activation		6:00	20 °C	9:00	25 °C	9:00	25 °C
First time zone deactivation		10:00		12:00			
Second time zone activation		17:00	25 °C	18:00	25 °C	18:00	20 °C
Second time zone deactivation		20:00		22:00			

During the time span between the indicated time zones the unit is in standby mode, the fans are off.

**AUTOMATIC RESTART AFTER RESUMPTION OF POWER SUPPLY**

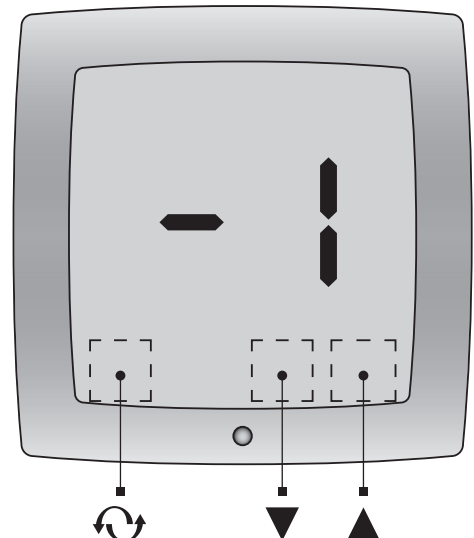
All the current data are saved in the control panel memory in case of power failure. After resumption of power supply the unit reverts to the previous operation mode. The data saving function is also available for the **Week Scheduled Operation Model**.

**TEMPERATURE SENSOR CALIBRATION**

Turn the control panel off and keep the button  on the display pressed for 3 seconds to enter the debugging mode. In the off condition all the buttons are located in the same positions but are not highlighted. To change the settings in the respective mode press the buttons as follows:

**1 - Temperature calibration (from -9 °C up to +9 °C).**

- ▲ — Temperature compensation upwards.
- ▼ — Temperature compensation downwards.



**CONTROL PANEL TROUBLESHOOTING AND REMEDY**

Fault	Remedy
Power supply is on, the control panel does not operate.	<ul style="list-style-type: none"> <li>• Check the correct contact connection.</li> <li>• Make sure the button On/Off on the control panel display is operable.</li> <li>• Check the stub line from the executive element to the control panel for integrity.</li> </ul>
LCD faulty operation	<ul style="list-style-type: none"> <li>• The back cover is horizontally pressed during the mounting. Release one or two fixing screws.</li> </ul>
The display glows but displays no information.	<ul style="list-style-type: none"> <li>• Contact service centre.</li> </ul>
Incorrect temperature display.	<ul style="list-style-type: none"> <li>• Perform calibration of the control panel temperature sensor.</li> </ul>

**CONTROL SYSTEM OPERATION DESCRIPTION**

The electronic automatic control and operation unit is integrated into the ventilation unit.

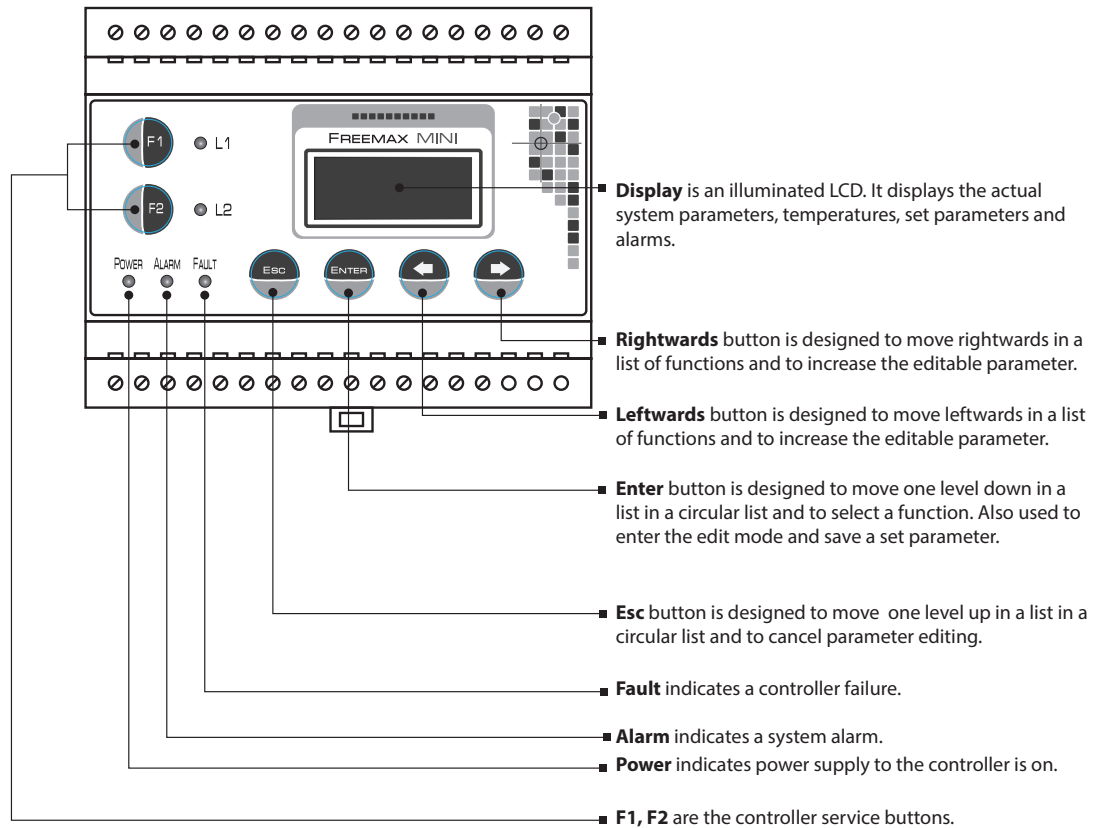
AUTOMATIC CONTROL SYSTEM FUNCTIONS	
1.	1. Turning Unit On/Off.
2.	2. Keeping supply air temperature at set point.
3.	3. Bypass damper actuating.
4.	4. Heat exchanger freezing protection.
5.	5. Fan operation and control.
6.	6. Actuating air dampers.
7.	7. System shutdown on signal from the fire alarm panel.
8.	8. Heater control. Heater freezing and overheating control.
9.	9. Control of the compressor and condensing unit of the DX cooler by the thermostat in the control panel (applicable only for the units with cooler connection possibility).
10.	10. Fan activation after power failure. The function is activated and set in the controller menu.

**CONTROLLER FUNCTIONS**

Digital controller is the basic component of the automatic control system. Matching of the controller and the ventilation unit is given in the table below.

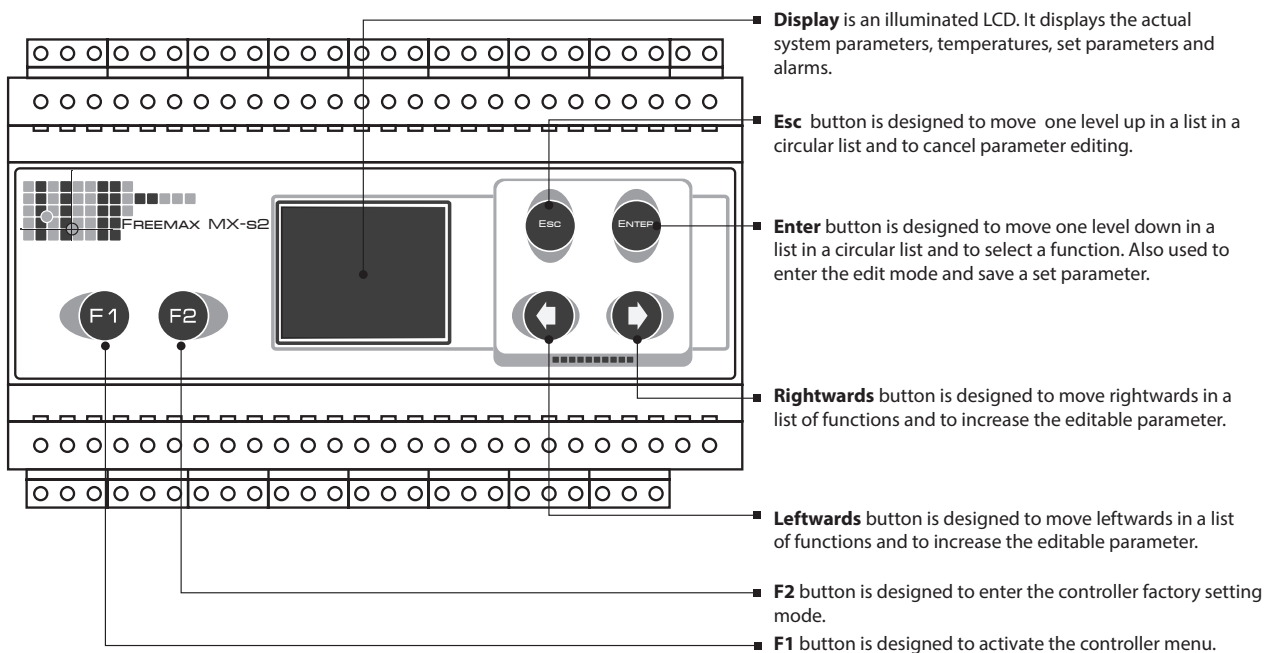
Controller	
Freemax Mini	Freemax MX
VUT 600 PW EC	VUT 800 WH
VUT 1000 PW EC	VUT 1000 WH
VUT 2000 PW EC	VUT 1500 WH
VUT 3000 PW EC	VUT 2000 WH
VUT 350 PE EC	PA 01 W
VUT 600 PE EC	PA 02 W
VUT 1000 PE EC	PA 03 W
VUT 2000 PE EC	PA 04 W
VUT 3000 PE EC	PA 01 E
VUT 300 WH EC	PA 02 E
VUT 400 WH EC	PA 03 E
VUT 600 WH EC	MPA 800 W
VUT R 900 WH EC	MPA 1200 W
VUT R 900 EH EC	MPA 1800 W
VUT R 1500 EH EC	MPA 2500 W
	MPA 3200 W
	MPA 3500 W
	MPA 5000 W

### FREEMAX MINI DIGITAL CONTROLLER





L1 and L2 indicators are disabled.





### FREEMAX MX DIGITAL CONTROLLER



#### Selecting the required function:





Select a required function using the buttons  and , then press Enter. Press Esc to return back to the list of functions. To get to the general function list press Esc until you get there.

#### Parameter editing:

Select a required parameter using the buttons  and , then press the Enter button. The setting may be decreased or increased using the buttons  or  respectively. The value of the set parameter is blinking. Press the Enter button to save a new value. Press the Esc button to exit menu and cancel parameter editing. The editable parameters are enclosed in the brackets "><".

FREEMAX-MINI CONTROLLER PARAMETERS		
Menu tree	Factory setting	Setting functions and parameters, actions
Current parameters		Current parameters – current system parameters.
Alarms		<b>Alarms</b> – system alarm codes: <b>1</b> – alarm; <b>0</b> – no alarm.
E1 0		<b>E1</b> : breakout or short circuit of the outdoor temperature sensor. The fans are stopped.
E2 0		<b>E2</b> : breakout or short circuit of the exhaust temperature sensor. The fans are stopped.
E3 0		<b>E3</b> : breakout or short circuit of the return heat medium temperature sensor. The fans are stopped.
E4 0		<b>E4</b> : breakout or short circuit of the temperature sensor for the water heater freezing protection. The fans are stopped.
E5 0		<b>E5</b> : breakout or short circuit of the supply air temperature sensor. The fans are stopped.
F1 0		<b>F1</b> : heat exchanger freezing. The exhaust temperature downstream of the heat exchanger measured by the TE2 temperature sensor is below the R-02 set point within the R-03 time period when the fans are operating. The bypass damper is fully opened. The supply and extract fans keep operating.
O1 0		<b>O1</b> : emergency system shutdown on signal from the fire alarm panel. The fans are stopped.
P1 0		<b>P1</b> : supply fan failure. The fans are stopped.
P2 0		<b>P2</b> : extract fan failure. The fans are stopped.
U1 0		<b>U1</b> : heater freezing danger. The alarm is generated if the air temperature downstream of the water heater falls down below +3 °C.
U2 0		<b>U2</b> : low return heat medium temperature. This 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 are stopped, the regulating heat medium valve is 100% opened and the circulating pump is started. The fans may not be stopped in case of any of the freezing dangers. The system restart is possible only after removal of the U1 alarm, i.e. after rising of the air temperature downstream of the heater above set point, TE4 parameter, and U2 alarm, i.e. after rising of the return heat medium temperature TE3 parameter.
U3 0		<b>U3</b> : return heat medium temperature at the end of the water heater preheating cycle does not exceed +40 °C (factory setting). The fans may not be started.
U4 0		<b>U4</b> : pump failure. No signal from the fluid pressure switch in the water heater after the signal to activate the circulating pump. The circulating pump is deactivated and the fan operation status does not change.
U5 1		<b>U5</b> : electric heater overheating. The air temperature downstream of the heater is above +50 °C. The electric heater is deactivated, the fans are stopped after air supply to the heating elements.
U6 0		<b>U6</b> : low supply air temperature. The supply air temperature measured by the TE5 temperature sensor remains below the E-03 parameter within the E-02 time period after the unit activation. Malfunction of the electric heater. The electric heater is deactivated, the fans are stopped.
System status		<b>Online system status display menu.</b>
Cooler Off		Online cooler operating status.



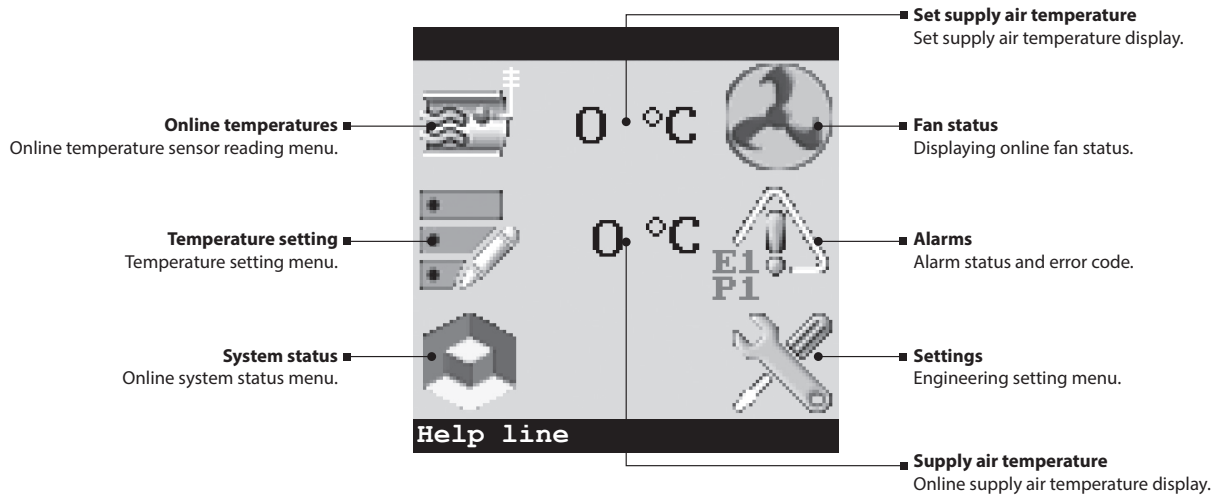
Menu tree	Factory setting	Setting functions and parameters, actions
HeatSetP 12.0		Online supply air temperature setting in heating mode.
CoolSetP 35		Online supply air temperature setting in cooling mode.
Cooler % 0		Cooler activation [%]
Heater % 0		Heat medium regulating valve positioning [%]
Recup. % 0		Heat exchanger damper positioning [%]
Pump off		Online pump operating status: On – the pump is on; Off – the pump is off.
SuppFan% 0		Online supply fan capacity (% of the rated capacity).
OutFan% 0		Online extract fan capacity (% of the rated capacity).
Preheat Off		Online preheating operating status: <b>On:</b> preheating is activated; <b>Off:</b> preheating is deactivated.
Blowing Off		Online air blowing operating status: <b>On:</b> air blowing is activated; <b>Off:</b> air blowing is deactivated.
Confi- guration		<b>Display menu and online configuration settings.</b>
CoolMode > 20 <		Temperature of seasonal change from heating into cooling mode and vice versa [°C].
MotoHour		<b>Motor hours</b>
MotoHour 0		Online motor hour statistics.
Online Temp-res		<b>Online temperatures – online temperature sensor readings.</b>
TE1 0.0		<b>TE1:</b> outdoor air temperature.
TE2 0.0		<b>TE2:</b> exhaust air temperature downstream of the heat exchanger.
TE3 0		<b>TE3:</b> return heat medium temperature.
TE5 0.0		<b>TE5:</b> supply air temperature.
Settings		<b>Settings:</b> this menu contains basic controller settings. Editing the setting menu must be performed by professionals only. The setting menu is password protection against unauthorized modification of the controller settings.
Password > **** <	2222	<b>Password</b> is the password required to enter the Configuration Menu. 2222 by default. The password consists of 4 digits and is displayed as ****. Enter the first password digit by pressing the buttons  and  and press the Enter button. Enter the second number with the buttons  and  , then press the Enter button and so on. Press the Esc button to get back to the previous digit. If the password is correct after entering it you get access to the Configuration Menu.
Engineering menu		<b>Engineering menu:</b> this menu consists the controller engineering setting.
Adjust- heater		<b>Water heater configuration menu.</b>

Menu tree	Factory setting	Setting functions and parameters, actions
> Q-01 20 <	20	<b>Q-01:</b> set point for return heat medium temperature maintenance in the winter mode, the fans are off [°C]. Return heat medium temperature is maintained at set point in the winter mode, when the fans are off, by means of actuating the heat medium regulating valve.
> Q-02 180 <	180	<b>Q-02:</b> water heater preheating cycle duration [sec]. During the preheating cycle the heat medium regulating valve is opened and the pump is activated.
> Q-03 40 <	40	<b>Q-03:</b> return heat medium temperature at the end of the preheating cycle [°C]. If the return heat medium temperature is below Q-03 the fans may not be started and the alarm signal U3 is generated.
> Q-04 5 <	5	<b>Q-04:</b> minimum return heat medium temperature to indicate the water heater freezing danger [°C]. If the return heat medium temperature drops down below Q-04 point, the water heater freezing protection is activated, refer U2 alarm.
> Q-05 0 <	0	<b>Q-05:</b> outdoor air temperature. If the outdoor temperature drops down below Q-05 point, the control system changes into the winter mode.
> Q-07 180 <	180	<b>Q-07:</b> time period to reset the water coils freezing danger alarms [s]. In case of any of the water heater freezing dangers and in case of enabling alarm resetting the alarm is automatically reset upon the expiry of the Q-07 time period after the alarm cause removing. The fans are restarted if they were running before the alarm.
> Q-08 2.00 <	2,0	<b>Q-08:</b> proportional control factor of proportional-integral control law. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.
> Q-09 60 <	60	<b>Q-09:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.
> Q-10 0.5 <	0,5	<b>Q-10:</b> dead zone [°C]. Setting parameters for the supply air temperature control by means of the heat medium regulating valve. If the discrepancy is below Q-10, it shall be disregarded.
> Q-11 2.00 <	2,0	<b>Q-11:</b> proportional control factor of proportional-integral control law. Setting parameters for return heat medium temperature control by means of the heat medium regulating valve.
> Q-12 60 <	60	<b>Q-12:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the return heat medium temperature control by means of the heat medium regulating valve.
> Q-13 0.5 <	0,5	<b>Q-13:</b> dead zone [°C]. Setting parameters for the return heat medium temperature control by means of the regulating heat medium valve. If the discrepancy is below Q-13, it shall be disregarded.
> Q-14 Enable <	Enable	<b>Q-14:</b> enabling/disabling water preheating before the fan start-up in winter mode.
Adjust-cooler		<b>Cooler configuration menu.</b>
> C-01 2.00 <	2,0	Setting proportional control factor of proportional-integral control law for supply air temperature control.
> C-02 60 <	60	Setting integral action time of proportional-integral control law for supply air temperature control.
> C-03 0.5 <	0,5	Setting dead zone of proportional-integral control law for supply air temperature control.
> C-04 60 <	60	Minimum time period between cooler turning on/off [sec].
> C-05 20 <	20	Minimum cooler activation temperature [°C]

Menu tree	Factory setting	Setting functions and parameters, actions
Adjust- Recuper.		<b>Configuration menu for heat exchanger protection</b>
R-01 0	0	<b>R-01:</b> minimum permissible exhaust air temperature downstream of the heat exchanger that does not require activation of the exhaust air temperature control function [°C]. If the exhaust air temperature falls down below this parameter the exhaust air temperature control function by means of the bypass damper is activated to maintain exhaust air temperature at set point and prevent freezing of the heat exchanger. Once the exhaust air temperature exceeds the set point the bypass damper is fully closed and the unit reverts to the previous operation mode.
R-02 -5	-5	<b>R-02:</b> permissible low exhaust air temperature downstream of the heat exchanger. If the actual exhaust air temperature is below this parameter the heat exchanger freezing protection function is activated and the bypass damper is fully opened. If during the unit operation the exhaust air temperature remains below this parameter within the R-03 time period the control system generates the F1 alarm signal.
R-03 600	600	<b>R-03:</b> time period to monitor the exhaust air temperature point [sec].
R-04 1.00	1,00	<b>R-04:</b> setting proportional control factor of proportional-integral control law for exhaust air temperature control by means of the heat exchanger bypass damper.
R-05 25	25	<b>R-05:</b> setting integral action time of proportional-integral control law for extract air temperature control by means of the heat exchanger bypass damper [s].
R-06 0.5	0,5	<b>R-06:</b> setting dead zone parameters for the extract air temperature control by means of the bypass damper [°C]. If the discrepancy is below the set point, it shall be disregarded.
R-07 1.00	1,0	<b>R-07:</b> setting proportional control factor of proportional-integral control law for supply air temperature control by means of the bypass damper.
R-08 25	25	<b>R-08:</b> setting integral action time of proportional-integral control law for supply air temperature control by means of the bypass damper [sec].
R-09 0.5	0,5	<b>R-09:</b> setting dead zone parameter for supply air temperature control by means of the bypass damper [°C]. If the discrepancy is below the set point, it shall be disregarded.
Adjust- heater		<b>Electric heater configuration menu.</b>
E-01 3	3	<b>E-01:</b> time required for heat withdrawal from the electric heating element after the unit deactivation [min].
E-02 600	600	<b>E-02:</b> low supply air temperature monitoring time [sec]. If the actual supply air temperature downstream of the electric heater remains below the E-03 parameter within this time period the fans are stopped and the control system generates the U6 alarm signal.
E-03 5	5	<b>E-03:</b> minimum permissible supply air temperature [°C]. If the actual supply air temperature downstream of the electric heater remains below this parameter within the E-02 time period, the fans are stopped and the control system generates the U6 alarm signal.
E-04 6	6	<b>E-04:</b> electric heater power control [sec].
E-05 1	1	<b>E-05:</b> minimum activation/deactivation heater time [sec].
E-08 2.0	2,0	<b>E-08:</b> setting proportional control factor of proportional-integral control law for supply air temperature control by means of the electric heater.
E-09 60	60	<b>E-09:</b> setting integrating factor of proportional-integral control law for supply air temperature control by means of the electric heater [sec].
E-10 0.5	0,5	<b>E-10:</b> setting dead zone parameter for supply air temperature control by means of the electric heater [°C]. If the discrepancy is below the set point, it shall be disregarded.
Extra settings		<b>Extra controller configuration menu</b>
Clock- Calendar		Date and time setting and display menu.
13/11/23 11:11:18		Date and time setting and display.

Menu tree	Factory setting	Setting functions and parameters, actions
Time correction	0	<b>Time adjustment</b> - set clock correction factor. If the controller clock is too slow or too fast set the time mismatch factor pro month. The factor must be set in seconds. Set the minus value if the clock is controller clock is too fast or the plus value if the controller clock is too slow.
Password change		<b>Password reset menu to enter the configuration menu.</b>
Password > ***0 <		Password reset
Light > off <	Off	LCD light operation mode. Two modes are available: <b>Off:</b> the LCD light goes off in some time period if no buttons were activated; <b>Cont.:</b> the LCD light is continuously on.
Adjust-vent		<b>Fan configuration menu.</b>
V-01 > 30 <	30	<b>V-01:</b> fan failure analysis time [sec].
V-02 > 40 <	40	<b>V-02:</b> setting supply fan first speed [%]
V-03 > 70 <	70	<b>V-03:</b> setting supply fan second speed [%]
V-04 > 100 <	100	<b>V-04:</b> setting supply fan third speed [%]
V-05 > 40 <	40	<b>V-05:</b> setting extract fan first speed [%]
V-06 > 70 <	70	<b>V-06:</b> setting extract fan second speed [%]
V-07 > 100 <	100	<b>V-07:</b> setting extract fan third speed [%]
v-08 > Disabl <	Enabl	<b>V-08:</b> parameter to enable fan restart after power failure. Two available settings: <b>Enabl:</b> fan restart after power failure is enabled. <b>Disabl:</b> fan restart after power failure is disabled.
Adjust-pump		<b>Circulating pump configuration menu.</b>
H-01 > 20 <	20	<b>H-01:</b> minimum operation time of the circulating pump.
H-02 > Enable <	Enabl	<b>H-02:</b> parameter to enable circulating pump operation in summer mode. Two available options: <b>Enabl</b> – pump start in summer mode is disabled. <b>Disabl</b> – pump start in summer mode during is enabled in case of the heat medium regulating valve activation.

### FREEMAX-MX CONTROLLER PARAMETERS



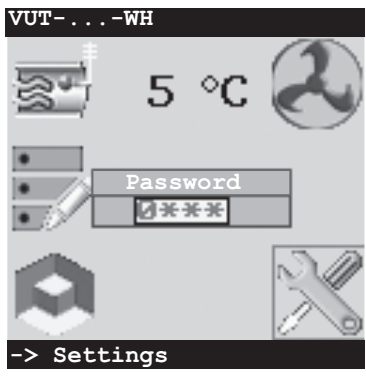




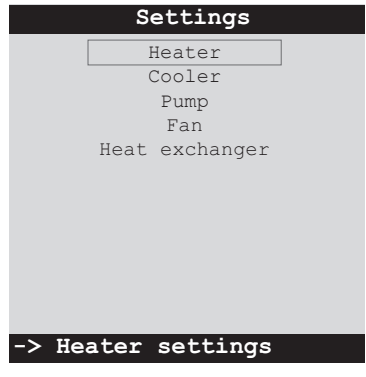
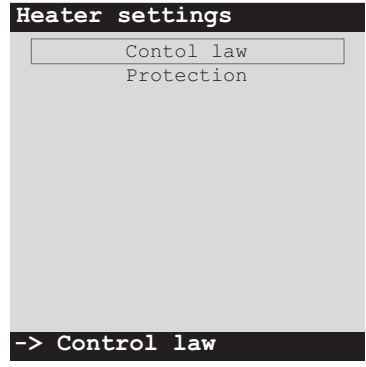
### ONLINE TEMPERATURES

Online temp-res	
Outside temperature (TE1) 5.0 °C	<b>TE1:</b> outdoor air temperature.
Temperature aft.exhc. (TE2) 5.0 °C	<b>TE2:</b> exhaust air temperature downstream of the heat exchanger.
Temperature of return heat exch. (TE3) 50.0 °C	<b>TE3:</b> return heat medium temperature.
Heater temperature (TE4) 50.0 °C	<b>TE4:</b> air temperature downstream of the water heater.
Intake temperature (TE5) 5.0 °C	<b>TE5:</b> supply air temperature.

### SYSTEM STATUS

	<b>Heater:</b> heat medium regulating valve opening ratio [%].
	<b>Heat Exchanger:</b> heat exchanger activation ratio [%].
	<b>Pump:</b> circulating pump operating status. <b>Off:</b> the circulating pump does not operate. <b>On:</b> the circulating pump operates.
	<b>Cooler:</b> cooler operating status. <b>Off:</b> the cooler does not operate. <b>On:</b> the cooler operates.
	<b>Winter/Summer:</b> the system operation mode. The automatic control system operates in winter or in summer mode. The operation mode selection is determined by outdoor temperature readings. If the outside air temperature exceeds 0 °C the system operates in the summer mode and if the outside air temperature is below 0 °C the system changes into the winter mode. <b>In the summer mode the automatic control system performs the following functions:</b> <ul style="list-style-type: none"> <li>supply air temperature maintaining at set point (set from the remote controller) during the fan operation by means of actuating the heat medium regulating valve.</li> <li>closing the heat medium regulating valve, the supply and the extract air damper during the fan shutdown.</li> </ul> <b>In the winter mode the automatic control system performs the following functions:</b> <ul style="list-style-type: none"> <li>supply air temperature maintaining at set point (set from the remote controller) during the fan operation by means of actuating the heat medium regulating valve.</li> <li>water heater preheating before the fan start-up within n minutes (Q-02 parameter, set from the controller menu) by means of full opening of the heat medium regulating valve. The preheating function is set from the controller menu, Q-14 parameter.</li> <li>return heat medium temperature maintaining at set minimum value, Q-01 parameter.</li> </ul>
	The water heater freezing protection function is active in any mode and is performed by the TS1 thermostat installed in the air duct downstream of the heat exchanger. In case of a freezing danger the fans are stopped, the supply and exhaust air dampers are opened and the heat medium regulating valve is fully opened to let 100% heat medium flow through the water coils. The circulating pump is activated. In addition to the above, the function of the automatic fan restart after power failure may be activated.
<b>SYSTEM STATUS</b>	
Heater 0	
Heat exch. 100	
Pump Off	
Cooler Off	
Winter/Summer Summer	

TEMPERATURE SETTING		
<b>Temp. setpoints</b> 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	50	<b>T.ret.w.heat.:</b> return heat medium temperature at the end of the preheating cycle [°C]. If the return heat medium temperature at the end of the preheating cycle is below the T.ret.w.heat. point, the fans may not be started and the alarm signal is generated. Refer to Alarm lists, U3).
	5	<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 the winter mode, the water heater freezing protection function is activated. Refer to Alarm list, U2).
	0	<b>T.seas.ch.:</b> threshold high outdoor temperature for the winter mode. If the actual outdoor air temperature exceeds the set point, the system changes into the summer mode.
	20	<b>T.ret.w.spoin.:</b> minimum return heat medium temperature to maintain safe temperature mode during the fan shutoff. The return heat medium temperature is automatically maintained at the set point in the winter mode during the fan shutoff by means of actuating the heat medium valve.
	3	<b>T.w.heat.min.:</b> minimum air temperature downstream of the water heater to determine the water heater freezing danger [°C]. If the air temperature falls down below the T.w.heat.min. point, the water heater freezing protection function is activated. Refer to the Alarm list, U1.
	0	<b>T.h.exch.ch.:</b> exhaust air temperature point that activates the function of the exhaust air temperature maintenance by means of actuating the bypass damper control. If the exhaust air temperature falls down below the T.h.exch.ch. point in the summer mode, the function of maintaining the exhaust air temperature is activated by means of regulating the heat exchanger bypass damper to prevent the heat exchanger freezing. Once the air temperature downstream of the heat exchanger rises above the T.h.exch.ch. point the control system runs out of the exhaust air temperature maintenance and the bypass damper is fully closed.
	-5	<b>T.h.exch.min.:</b> threshold low outdoor temperature. If the actual outdoor air temperature is below the T.h.exch.min. point, the bypass damper is fully closed. If the exhaust air temperature remains below this point within the F1 Fault delay time period, the F1 alarm is generated.
	20	<b>T.cool.min.:</b> permissible high air temperature. If the actual outdoor air temperature is above this point the unit changes into the cooling mode.
ALARMS		
<b>E1:</b> outdoor temperature sensor breakout or short circuit. The fans are stopped.		
<b>E2:</b> exhaust temperature sensor breakout or short circuit. The fans are stopped.		
<b>E3:</b> return heat medium temperature sensor breakout or short circuit. The fans are stopped.		
<b>E4:</b> breakout or short circuit of the temperature sensor for the water heater freezing protection. The fans are stopped.		
<b>E5:</b> breakout or short circuit of the supply air temperature sensor. The fans are stopped.		
<b>F1:</b> heat exchanger freezing. The exhaust temperature downstream of the heat exchanger measured by the TE2 temperature sensor is below the R-02 set point within the R-03 time period when the fans are operating. The bypass damper is fully opened. The supply and extract fans keep operating.		
<b>O1:</b> emergency system shutdown on signal from the fire alarm panel. The fans are stopped.		
<b>O2:</b> filter clogging. The fans are stopped.		
<b>P1:</b> supply fan failure. The fans are stopped.		
<b>P2:</b> extract fan failure. The fans are stopped.		
<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><b>U2:</b> low return heat medium temperature. This 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 regulating heat medium valve is 100% opened and the circulating pump is started. The fans may not be stopped 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 U2 alarm, i.e. after rising of the return heat medium temperature TE3 or after removal of the U1 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> return heat medium temperature at the end of the water heater preheating cycle in the winter mode before the fan start does not exceed +40 °C (factory setting). The fans may not be started.</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. The circulating pump is deactivated. The fan operation status does not change. In case of the alarm the fans keep running if they were on before the pump failure.</p>		
<p><b>U5:</b> electric heater overheating. The air temperature downstream of the heater is above +50 °C. The electric heater is deactivated, the fans are stopped after blowing of the heating elements.</p>		
<p><b>U6:</b> low supply air temperature. The supply air temperature measured by the TE5 temperature sensor remains below +10 °C within the time period U6 Fault delay after the unit activation. This alarm indicates malfunction of the electric heater. The electric heater is deactivated, the fans are stopped.</p>		
SETTINGS		
	2222	<p><b>Password</b> is the password required to enter the Configuration Menu. 2222 by default. The password consists of 4 digits and is displayed as ****. Enter the first password digit by pressing the buttons  and  and press the Enter button. Enter the second number with the buttons  and , then press the Enter button and so on. Press the Esc button to get back to the previous digit. If the password is correct after entering it you get access to the Configuration Menu.</p>
		<p><b>Configuration menu.</b> Settings: this menu contains basic controller settings. Editing the setting menu must be performed by professionals only, otherwise it may cause controller malfunction or breakdown.</p>
		<p><b>Heater:</b> heater configuration menu</p>

HEATER CONTROL LAW		
<p><b>Control law</b></p> <p>Supply air:</p> <p>G <input type="text" value="2.00"/></p> <p>T 60</p> <p>Dead zone: 0.5</p> <p>Ret.w.t. control:</p> <p>G 2.00</p> <p>T 60</p> <p>Dead zone: 0.5</p>	Supply air control law	
	2,0	<b>G:</b> proportional control factor of proportional-integral control law [sec]. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.
	60	<b>T:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.
	0,5	<b>Dead zone:</b> dead zone, °C. Setting parameters for the supply air temperature control by means of the regulating heat medium valve. If the discrepancy is below the set point, it shall be disregarded.
	Ret.w.t. control	
	2,0	<b>G:</b> proportional control factor of proportional-integral control law [sec]. Setting parameters for the return heat medium temperature control by means of the heat medium regulating valve.
	60	<b>T:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the return heat medium temperature control by means of the heat medium regulating valve.
0,5	<b>Dead zone:</b> dead zone, °C. Setting parameters for the return heat medium temperature control by means of the regulating heat medium valve. If the discrepancy is below the set point, it shall be disregarded.	
PROTECTION SETTINGS		
<p><b>Protection</b></p> <p>Heating time: <input type="text" value="180"/> s</p>	180	<b>Heating time:</b> time required for the water coil preheating [sec]. During the preheating time the heat medium regulating valve is fully opened, the pump is started and the Preheating/ Alarm light indicator glows.
		<b>Blowing time:</b> time required to supply air to the electric heating elements after the unit deactivation.
		<b>U6 Fault delay:</b> countdown time for monitoring of the supply air. If it is below +10 °C the U6 alarm is generated.
<p><b>Settings</b></p> <p>Heater</p> <p><input type="text" value="Cooler"/></p> <p>Pump</p> <p>Fan</p> <p>Heat exchanger</p> <p><b>-&gt; Cooler settings</b></p>	<b>Cooler configuration menu</b>	



<p><b>Cooler settings</b></p> <p>Cooler delay on: <input type="text" value="600"/> s</p>	600	<b>Cooler delay on</b> – minimum cooler activation time [sec].
<p><b>Settings</b></p> <p>Heater Cooler <input type="text" value="Pump"/> Fan Heat exchanger</p> <p><b>-&gt; Pump settings</b></p>		<b>Pump configuration menu.</b>
<p><b>Pump settings</b></p> <p>Min.work.time: <input type="text" value="20"/> s Summer mode: <input type="text" value="Enable"/></p>	20	<b>Min.work.time:</b> minimum circulating pump operating time [sec].
	1	<b>Summer mode:</b> parameter to enable /disable circulating pump operation before the fan start-up in summer mode. Two settings are available: <b>Disabl:</b> the pump activation in summer mode is disabled. <b>Enabl:</b> the pump activation in summer mode is enabled provided that the heat medium regulating valve is operating.
<p><b>Settings</b></p> <p>Heater Cooler Pump <input type="text" value="Fan"/> Heat exchanger</p> <p><b>-&gt; Fan</b></p>		<b>Fan configuration menu</b>

<p><b>Fan</b></p> <p>P1, P2 Fault delay: <input type="text" value="30"/> s</p>		<p><b>P1, P2 Fault delay:</b> set time period to analyse a fan fault [sec]. In case of no signal from the frequency inverter of a respective fan after a signal for activation of the fans, on expiration of this time period the supply or extract fan alarm signal is generated, refer to the Alarm list.</p>
<p><b>Settings</b></p> <p>Heater Cooler Pump Fan <input type="text" value="Heat exchanger"/></p> <p>-&gt; Heat exch.sett.</p>		<p><b>Heat exchanger configuration menu.</b></p>
<p><b>Heat exch.sett.</b></p> <p>F1 Fault delay: <input type="text" value="600"/></p> <p>Supply air control law: G 1.00 T 100 Dead zone: 0.5</p> <p>Exhaust air control law : G 1.00 T 100 Dead zone: 0.5</p>	600	<p><b>F1 Fault delay:</b> set time period to monitor exhaust air drop [sec]. If the actual exhaust air temperature is below the T.h.exch.ch. point within this time period, the F1 alarm signal is generated.</p>
	Supply air control law	
	1,0	<p><b>G:</b> proportional control factor of proportional-integral control law. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.</p>
	100	<p><b>T:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the supply air temperature control by means of the heat medium regulating valve.</p>
	0,5	<p><b>Dead zone:</b> dead zone [°C]. Setting parameters for supply air temperature control by means of the regulating heat medium valve. If the discrepancy is below ****, it shall be disregarded.</p>
	Exhaust air control law	
	1,0	<p><b>G:</b> proportional control factor of proportional-integral control law. Setting parameters for the return heat medium temperature control by means of the heat medium regulating valve.</p>
	100	<p><b>T:</b> integrating factor of proportional-integral control law [sec]. Setting parameters for the return heat medium temperature control by means of the heat medium regulating valve.</p>
	0,5	<p><b>Dead zone:</b> dead zone [°C]. Setting parameters for the return heat medium temperature control by means of the regulating heat medium valve. If the discrepancy is below this point, it shall be disregarded.</p>



