PAKOLE

Operation and Maintenance Documentation

ACR PRO – AIR CURTAINS

Type : (ACR Pro)

- ACR Pro 1500H
- ACR Pro 2000H
- ACR Pro 1500C
- ACR Pro 2000C
- ACR Pro 1500E
- ACR Pro 2000E

www.pakole.com

ACR_Pro_008_025_011_210617_V004_EN

EN

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1. GENERAL AND SAFETY PRINCIPLES

The **ACR Pro** air curtains are manufactured in compliance with the rules and standards concerning quality, ecology, utility and work comfort . Before starting the device be sure to read the Manual carefully.

The **ACR Pro** air curtains are delivered ready-to-use in a cardboard package that is to protect from any mechanical damages. The package consists of: the device, the Manual (Operation and Maintenance Documentation) and the Guarantee. If the optional automatic control ordered, it shall be delivered in a separate package. Make sure all the aforementioned elements are in the package immediately after the delivery. In the absence of any element, please fill in the suitable carrier document.

NOTICE!

- Do not use the curtain in rooms containing any flammable and/or combustible substances, biological substances or in environments with corrosive air components.
- Do not use the curtain in rooms with relative humidity above 80%
- Do not leave the curtain ON unattended for longer periods
- Do not use the curtain without proper grounding
- Do not turn on the curtain with protective cover on
- Before conducting any maintenance or cleaning work or during the break in operation for an extended period of time, make sure you unplug the power cable
- To connect the air curtain, use a supply cable with a fork that protects against unintended disconnecting from the power
- When the air curtain is connected directly to the cable, please make sure there is a splitter protecting against any undesired disconnecting
- Pay special attention while transporting the device not to damage the casing
- When the device is being operated, ensure the safety rules in accordance with the labour standards relating to the operation of any electrical devices
- Do not place any objects on the curtain or reduce the airflow in order to ensure the fire safety and if sparks or a damaged supply cable noticed, discontinue the operation immediately
- Electricity network, to which the curtain is connected, should be protected against overloading and short circuit

CAUTION!

- For reasons of serious danger to electric shock any exchanges of supply cable must be performed by a qualified specialist
- For reasons of serious danger to electric shock disconnect the power supply prior to conducting any repair or maintenance work
- Any leakage repairs of the heating medium in the device, of which pipes are under pressure, is strictly prohibited
- Cut-off/stop valve must be used to supply a heating medium
- It is prohibited to connect grounding-type plug to water pipe, gas tubes, lightning conductors, telephone or antenna network
- Wait for at least 3 hours before connecting the device to the supply power if the temperature while transporting is below zero

NOTICE !

Before mounting the device, read the manual carefully and adhere to the rules concerning the mounting procedures. Not applying to the rules may result in the inappropriate functioning of the device and the loss of the guarantee rights.
Pay special attention when working with electrical elements of the device.

2. PURPOSE OF THE DEVICE

The industrial air curtain is intended to be used in regions with a moderate and cold climate, in spaces where temperature ranges from -15 to +40°C and of relative humidity up to 80% (at the temperature of +25°C), in conditions free from external factors such as pollens, hydrometeor (horizontal precipitation) and chemical vapours.

In winters, air curtains protect against heat loss in rooms which is possible due to the airstream suitably directed that protects the entrance of cold air into a heated space. In summers, the curtains may be used as cooling devices preventing the entry of hot air from outside as well as air pollutants.

The **ACR Pro** industrial air curtains are designed to protect against heat losses in the gateways of buildings of medium and high capacity especially such as the followings:

- warehouse and production halls,
- Loading/unloading sections in supermarkets and large commercial premises,
- Car showrooms and service stations,
- exhibition surfaces

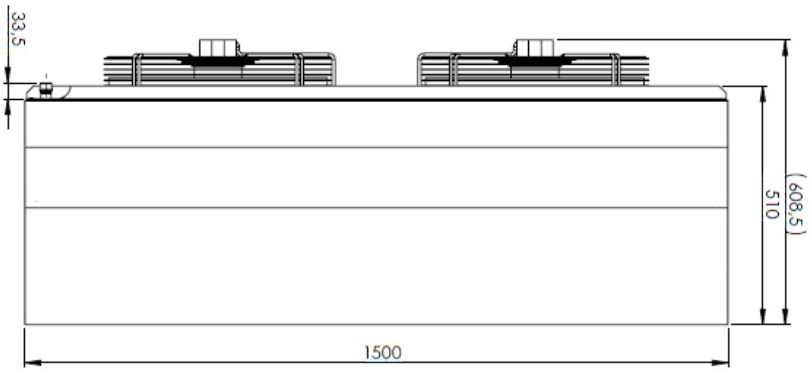
3. BASIC TECHNICAL PARAMETERS

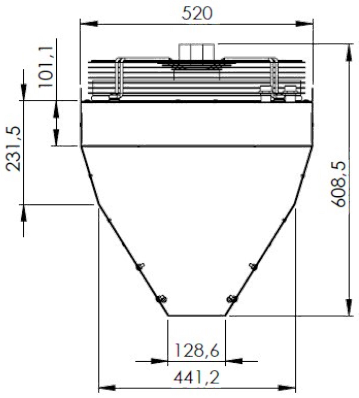
Parameters	unit	Curtain with water heater		Curtain with electric heater		Curtain without heater	
		ACR Pro 1500H	ACR Pro 2000H	ACR Pro 1500E	ACR Pro 2000E	ACR Pro 1500C	ACR Pro 2000C
Length of unit	**m**	1,5	2	1,5	2	1,5	2
Max. airflow range	**m**	7,5	7,5	7,5	7,5	7,5	7,5
Heat output*	**kW**	33	47	14	17,5	-	-
Max air output	**m^3/h**	6500	9000	6700	9100	6800	9200
Max working pressure	**MPa**	1,6	1,6	-	-	-	-
Diameter of connection nozzles	**-**	3/4”	3/4”	-	-	-	-
Motor power supply, consumption	**V/Hz/A**	230V/50Hz/2,2A	230V/50Hz/3,2A	230V/50Hz/2,2A	230V/50Hz/3,2A	230V/50Hz/2,2A	230V/50Hz/3,2A
Motor power	**kW**	0,5	0,75	0,5	0,75	0,5	0,75
Electric heater power supply, consumption	**V/Hz/A**	-	-	400V/50Hz/21A	400V/50Hz/27A	-	-
Weight filled with water / without water	**kg**	46/44	62/60	45	63	37	51
Noise level	**dB (A)**	59	61	59	61	59	61
Protection class IP		IP 54	IP 54	IP 21	IP 21	IP 54	IP 54

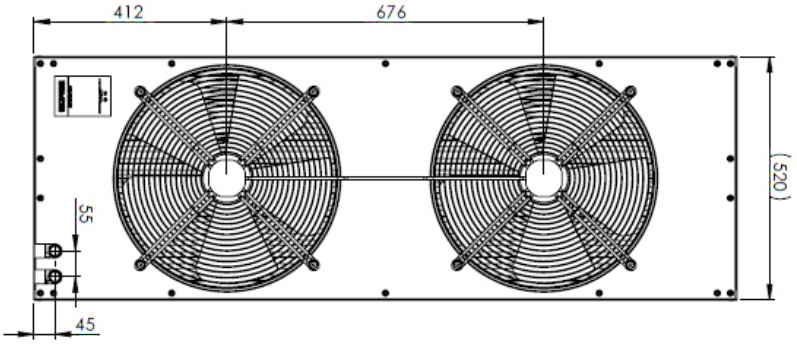
* for water parameters 90/70°C, inlet air temperature 0°C

4. DIMENSIONS

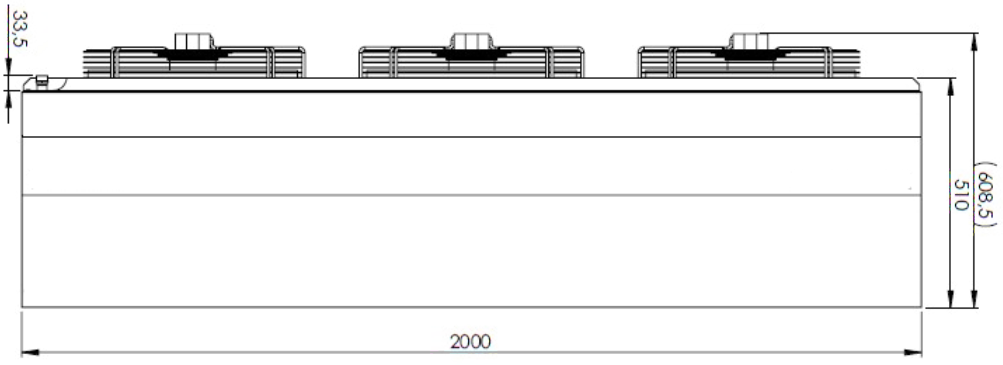
ACR PRO 1500H, ACR PRO 1500E, ACR PRO 1500C

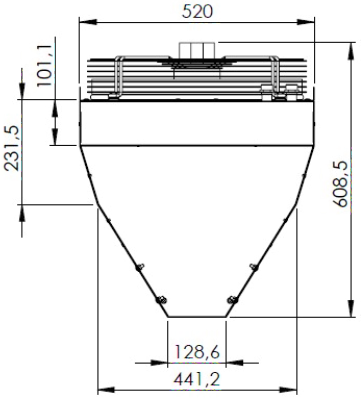


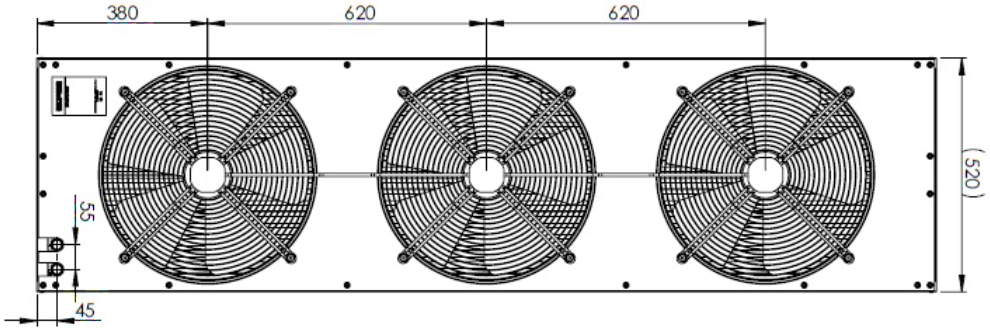




ACR PRO 2000H, ACR PRO 2000E, ACR PRO 2000C







5. HEAT OUTPUT RANGES

AIR CURTAINS WITH WATER HEATER ACR PRO 1500H AND 2000H

ACR Pro 1500H																				
inlet/outlet water temperature	60/40					70/50					80/60					90/70				
inlet air temperature	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
Airflow: 6500 m³/h																				
heat output [kW]	18,3	16,2	13,7	11,3	8,6	23,5	21,3	19,1	17,0	14,8	28,0	25,8	23,7	21,5	19,3	32,5	30,4	28,2	26,0	23,8
outlet air temperature [°C]	8,2	12,3	16,2	20,1	23,8	10,6	14,6	18,6	22,6	26,6	12,6	16,6	20,6	24,7	28,7	14,6	18,7	22,7	26,7	30,7
water flow [m³/h]	0,8	0,7	0,6	0,5	0,4	1,0	0,9	0,8	0,8	0,6	1,2	1,2	1,0	0,9	0,9	1,4	1,3	1,3	1,2	1,0
pressure drop [kPa]	2,3	1,8	1,3	0,9	0,9	3,6	3,0	2,4	2,0	1,5	4,9	4,2	3,6	3,0	2,5	6,4	5,7	4,9	4,2	3,6

ACR Pro 2000H																				
inlet/outlet water temperature	60/40					70/50					80/60					90/70				
inlet air temperature	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20	0	5	10	15	20
Airflow: 9000 m³/h																				
heat output [kW]	26,4	23,4	20,4	17,4	14,1	33,3	30,3	27,3	24,3	21,2	39,5	36,5	33,5	30,5	27,5	45,7	42,7	39,7	36,7	33,7
outlet air temperature [°C]	8,6	12,6	16,6	20,6	24,6	10,8	14,8	18,9	22,9	26,9	12,8	16,9	20,9	24,9	28,9	14,8	18,9	22,9	26,9	30,9
water flow [m³/h]	1,2	1,0	0,9	0,8	0,6	1,4	1,3	1,2	1,0	0,9	1,7	1,6	1,5	1,3	1,2	2,0	1,9	1,8	1,6	1,5
pressure drop [kPa]	5,4	4,3	3,3	2,5	1,7	8,1	6,8	5,6	4,5	3,5	11,0	9,5	8,1	6,8	5,6	14,0	13,0	11,0	9,5	8,1

AIR CURTAINS WITH ELECTRIC HEATER ACR PRO 1500E AND 2000E

ACR Pro industrial air curtians are equipped with modern and safe solution based on PTC electric heaters.
PTC are thermistors which means that along with the temperature increase the resistance of the heating element increases as well. Thanks to that feature there is no the risk of overheating which lead to safer devices with more efficient performances. An additional benefit is the lack of current on the heaters surface as well as larger energy exchange surface.

- No current on coil surface
- Lower temperature on coil surface in comparison to old type of electric heaters (for ex. electric wires), long life solution
- Large space of PTC coil, enhanced energy exchange between coil and air.
- Fully automated regulation of heat capacity depending on air flow
- No risk of system overheat, thanks to „self cooling" option (coil automatically decreases the temperature and heat capacity when air flow goes down)
- Very low energy consumption

6. ASSEMBLY

Before mounting the unit, take into consideration the followings:

- accessibility/easy access for any servicing and maintenance works
- access to water and electrical installation
- possibility to mount the curtain directly at the gate entrance

It is advisable to mount the device to the wall or the ceiling above the doorway on supporting mount pins or supporting constructions (shapes and dimensions of the supporting construction may be individually designed in compliance with durability and strength requirements).

Pay special attention to proper leveling of the device. If the device is not placed in a horizontal or vertical position, it may result in damaging the fan and consequently malfunctioning of the device. The air inlet and outlet must not be blocked by any objects. While installing the unit, remember to provide easy access to the control panel. A few curtains of the same type may be installed in case of a bigger doorway. They must be assembled side-by-side to make an uninterrupted stream of air. The curtain is mounted horizontally or vertically for permanent (on the left/right side of the doorway). The **ACR Pro** air curtain is advised to be wider (in case of horizontal mounting) or higher (in case of vertical mounting) than the gate way. If you decide on ACTIVE PROTECTION system, which is the assembly of curtains with water exchanger and without one, you have to mount air curtains with water exchangers on the bottom.

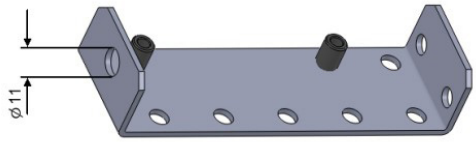
When connecting the curtain, make sure that maintenance work is possible to be conducted. On both connection nozzles manual shut-off valves should be installed in case of the necessity of disconnecting the unit. The hot water medium supply must be connected in accordance with the marking on the casing (inlet/outlet). When pipes being screwed to the heat exchanger make sure you secure the inlet connection of the heater to protect it against the torque (that may cause leakage in the heat exchanger).

The connections of heating medium with the threaded nozzles DIN 3/4” should be based on the project carried out by an authorized designer. In case of connecting the curtain to the heating network with no mixing module, a water filter must be installed.

NOTICE !
Pay special attention to proper leveling of the device. If the device is not placed horizontally or vertically, it may result in damaging the fan and consequently the malfunction of the device.
To sustain proper functioning of the device, keep safe distances as given in Figure below.

CONNECTING ACR PRO CURTAINS

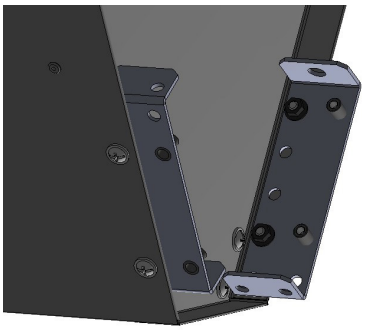
The **ACR Pro** multi-purpose connector is designed to connect curtains and to mount curtains to the ceiling (in case of horizontal mounting) or to the wall (in case of vertical mounting). The **ACR Pro** multi-purpose connector is not included in the content of the delivery and is available optionally. The connector should be installed in accordance with the figures below. The required number of the **ACR Pro** multi-purpose connectors may be calculated from the formula below



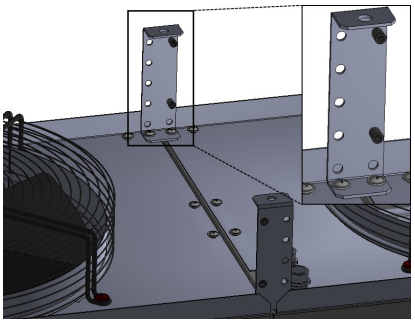
Horizontal assembly (N – number of curtains)
N x 4 = number of ACR Pro multi-purpose connectors

Vertical assembly (N - number of curtains)
(N x 4) – 2 = number of ACR Pro multi-purpose connectors

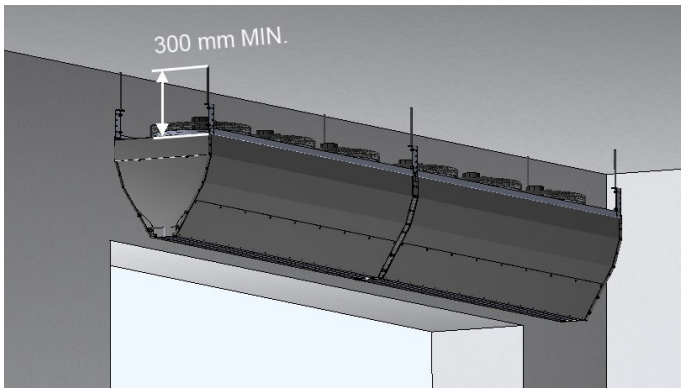
Installation of connector inside the curtain



Installation of connector at the back of the curtains



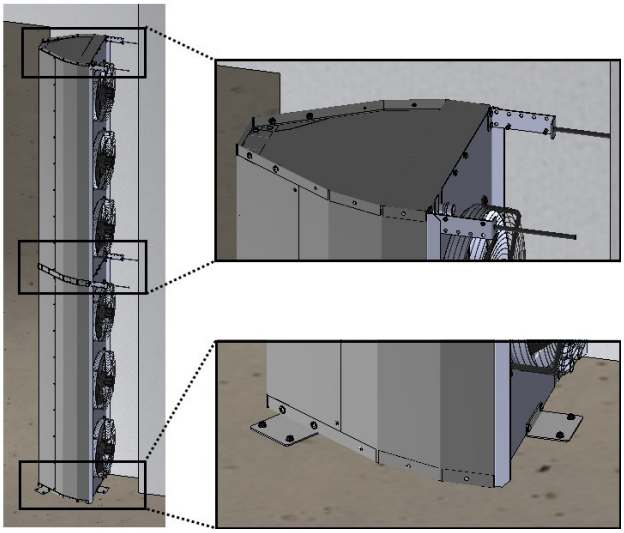
HORIZONTAL ASSEMBLY:



To mount the curtain horizontally in a proper way, keep the distance of min. 300mm from the rear side of the device.

To mount the **ACR Pro** curtain to the ceiling, use the **ACR Pro** multi-purpose connector. Mounting pins of diameter 11 may be attached to the connector (not included in the delivery).

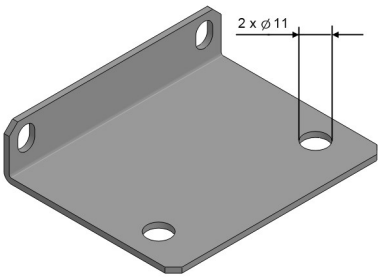
VERTICAL ASSEMBLY:



To mount the curtain vertically make sure the air outlet of the curtain is as close as possible to the doorway and air gap is at the height of the upper edge of the entry. Please, make sure to keep the distance of about 300 mm between the outlet casing and the wall.

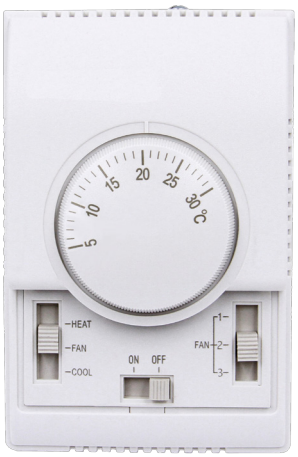
To mount two **ACR Pro** curtains one above the other, it is necessary to use the **ACR Pro** multi-purpose connector to install the curtain to the wall.

To mount **ACR Pro** curtain to the floor, use vertical holder/support, which is used to attach the curtain to the EURO pallet (for the period of transport). The support is included in the delivery. The curtain must be attached to the floor from each side and its rear side as shown in Figure.



7. CONTROLLER INSTALLATION

ACR COMFORT CONTROLLER



ACR Comfort is a controller that allows to regulate air speed and desired temperature in the room. ACR Comfort should be located beyond the air stream generated by the air curtain. The ACR Comfort allows to regulate 1 pc of ACR PRO unit.

Description of the ACR Comfort settings:

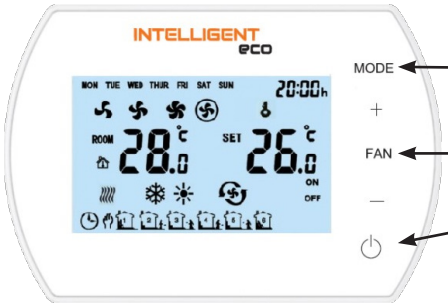
ON/OFF – turning ON/OFF a unit
I-II-III – switch for fan speed regulation
HEAT – thermostat sends a signal to the valve and actuator fan and fan turns off when temperature in the room is reached, valve/actuator closes water supply.
FAN/COOL – functions not active

ACR INTELLIGENT CONTROLLER

Panel Intelligent controls actuators/valves and regulates fan's speed. The controller is able to connect with BMS by MODBUS RTU protocol.

Functions:

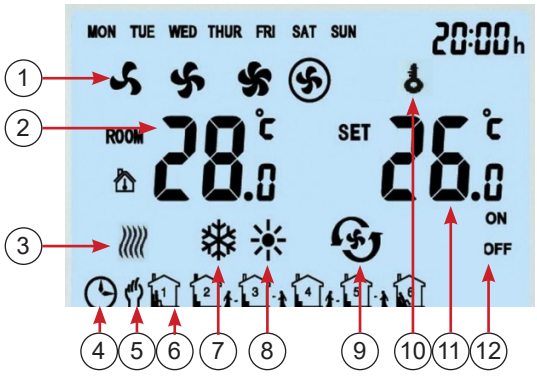
- • Weekly thermostat (5/1/1 days)
- • Automatic or manual 3-step fan speed adjustment.
- AUTO mode is not available for GUARD PRO
- • Control room temperature (by opening/closing the vale,
- or by adjusting air volume automatically).
- • Antifreeze mode- protection against dropping room
- temperature below critical level 5 ~ 15 °C.
- • Possibility to connect external NTC temperature sensor.
- • BMS communication by MODBUS protocol.



MODE: Press shortly to select manual or automatic mode.
Press and hold for 3 sec. and select cooling, heating or ventilation mode.

FAN: Press shortly and select fan speed: Low, Med, High or Auto.

ON/OFF INTELLIGENT Panel

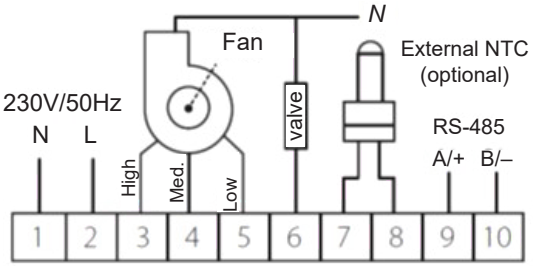


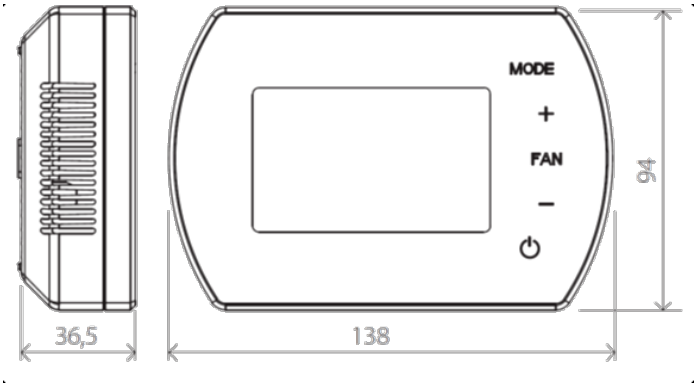
1. Fan Speed: LOW, MED, HI and AUTO
2. ROOM TEMP. or NTC EXTERNAL SENSOR TEMP. (measured temperature)
3. Anti-freeze indication
4. Automatic programmable mode
5. Manual mode
6. 6 Time Zones for each day
7. Cooling Mode
8. Heating Mode
9. Ventilation Mode
10. Buttons Lock
11. SET TEMP. (desired room temperature)
12. ON/OFF status of time zones

Technical parameters:

Power supply: 230V AC / 50Hz
Temperature setting range: 5 °C – 40 °C
Temperature working range: -10 °C – 60 °C
IP class: IP 20
Temperature sensor: Internal / external NTC (optional)

Electrical connections:





SETTINGS MENU

When Panel Intelligent is switched off, press and hold MODE for 5 seconds.
To change option use MODE button.
To change value use +/- buttons.

Setting menu	Option	Value
1	Temperature calibration	-9 °C ~ +9 °C
2	Fan status	**C1**: Thermostatic mode **C2**: Continuous mode
3	Temperature sensor	**0**: Internal Sensor **1**: External Sensor NTC (optional)
4	Antifreeze	**0**: Off **1**: On
5	Antifreeze range	+5 °C ~ +15 °C
6	BMS speed	**0**: 2400 **1**: 9600 **2**: 19200
7	Modbus ID	1~247 (01~F7)

BUTTON LOCK

To LOCK buttons, press and hold + and then – and hold both of them for 5 seconds.
To UNLOCK buttons, press and hold + and then – and hold both of them for 5 seconds.

PRESS MODE:

Change on manual mode or automatic mode .

HOLD MODE FOR 5 SECONDS:

Change to cool mode , heating mode or ventilation mode .

PRESS FAN:

Change of the fan speed to low , medium , high or automatic .

HOLD FAN FOR 5 SECONDS:

Manual calendar programming Monday – Friday, Saturday, Sunday / 6 settings per day.

BMS FUNCTIONS:

- Setting/Reading to work parameters
- Work/Stop conditions
- Weekly program
- Temperature
- Fan speed
- Heating, ventilation, cool
- Antifreeze mode

Nr.	Setting	Parameters
1	Working Mode	RS485 Semi-duplex; PC or main controller is master; thermostat is slave
2	Interface	A (+), B (-), 2 wires
3	Baud Rate	2400, 9600, 19200
4	Byte	9 bits in total: 8 data bit + 1 stop bit
5	Modbus	RTU Mode
6	Transmission	RTU (Remote Terminal Unit) format (please refer to Modbus instruction)
7	Thermostat address	1–247: (0 is broadcast address and stand for all thermostat without response)

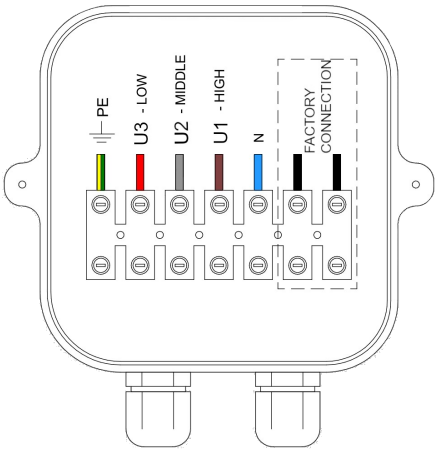
8. ELECTRICAL CONNECTION DIAGRAMS

To connect the curtain use a 3-core copper cable of minimal diameter 3x1,5mm² for two curtains (up to 6 fans) or 3x2,5mm² for 3 curtains (up to 9 fans). The electrical installation and connection to power supply must be done in compliance with the existing regulations and standards for building industry.
The electric network, to which the device is to be connected, should protect the device against overloading and short circuit. It is necessary to use protective grounding. Any electrical installation works and the connection to supply power must be conducted in accordance with the applicable building regulations and standards. The connection of the unit to the power supply must be conducted by a qualified specialist who is familiar with the Manual. Fan's motor is equipped with internal thermal protection against overheating. Power cable and a main switch are not included in the set.
Also the DOORSTOP door contact switch can be installed; it turns off the ACR Pro curtain when the door is being closed and the moment the door is being opened the ACR Pro curtain starts operating accordingly to the parameters set in the control panel of the device.

The Multi 6 control box allows to connect and control up to 6x ACR Pro 2000 and 6x servomotors. The control of the unit motors is via COMFORT or INTELLIGENT controller, there is a possibility to connect DOORSTOP switch to it. The thermostat has a primary function when connected to the unit with the DOORSTOP. In order to connect more than 6 air curtains there is a possibility of connecting up to 10 Multi 6 controls in serial. To do so in to remove the DS-N jumper in the first Multi 6 box and install DS-N jumper in all the other boxes.

Fan wiring description:

PE (yellow/green): earth protection
U3 (red): low speed
U2 (grey): middle speed
U1 (brown): high speed
N (blue): Null



AFTER A YEAR OF OPERATION CHECK THE ELECTRICAL CONNECTIONS AND IF NEEDED TIGHTEN THE WIRE CONNECTIONS TO ELIMINATE POTENTIAL SPARKLING.

MAKE THE ELECTRICAL CONNECTION OF THE CONTROLLER IN PHASE CORRECTLY, MAKE SURE TO CONNECT THE PHASE TO ONE OF POINT "U" AND NULL TO POINT "N".

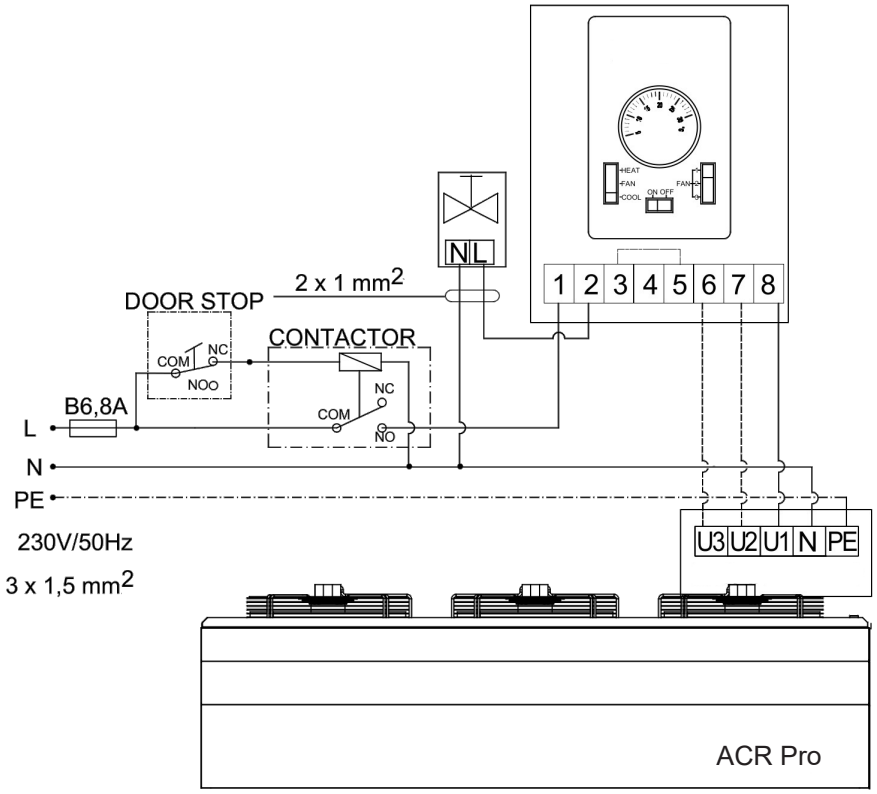
Any and all repair and maintenance works must be conducted with the power off and the heat input disconnected.
Only suitably qualified staff well acquainted with the safety regulations concerning handling with an electrical device must be employed when the device is being installed, started and operated!

ELECTRICAL CONNECTION FOR ACR PRO E (PTC ELECTRIC HEAT EXCHANGER)

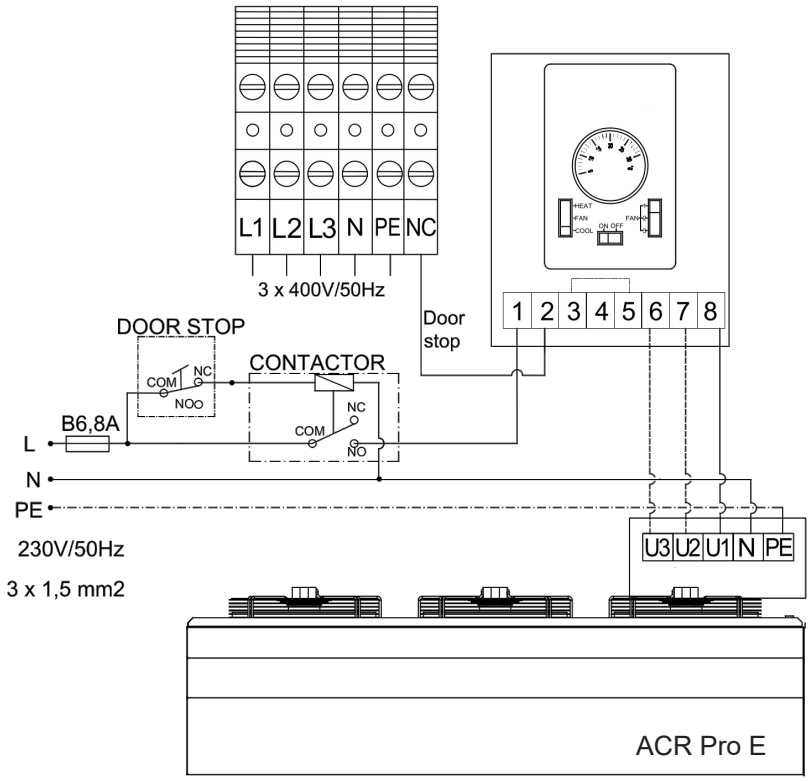
- **Before making the electrical connection, make sure that the mains voltage and mains frequency correspond to the values indicated on the rating plate of the appliance.**
- **Do not start the appliance without connecting the earth-ground!**

- **Power supply for PTC heaters are 3x400V/50Hz!**
- **For ACR Pro 1500E use wire min. 5x6mm², fuse B25**
- **For ACR Pro 2000E use wire min. 5x6mm², fuse C32**

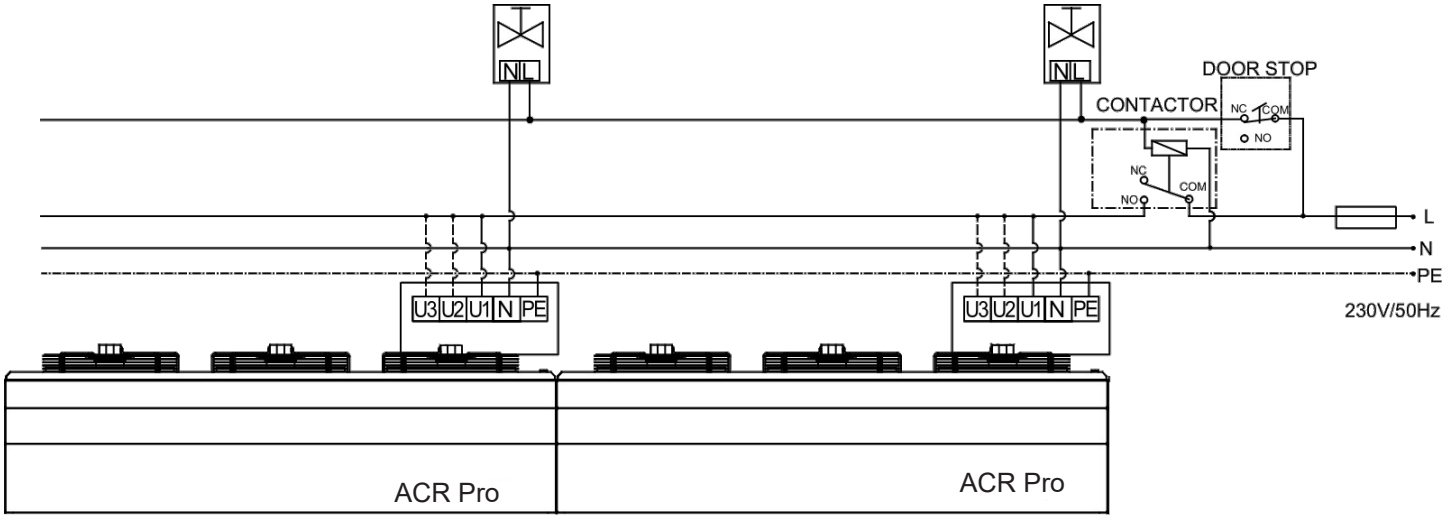
8.1 CONNECTION SCHEME FOR 1 UNIT ACR PRO H OR C TYPE WITH COMFORT CONTROLLER



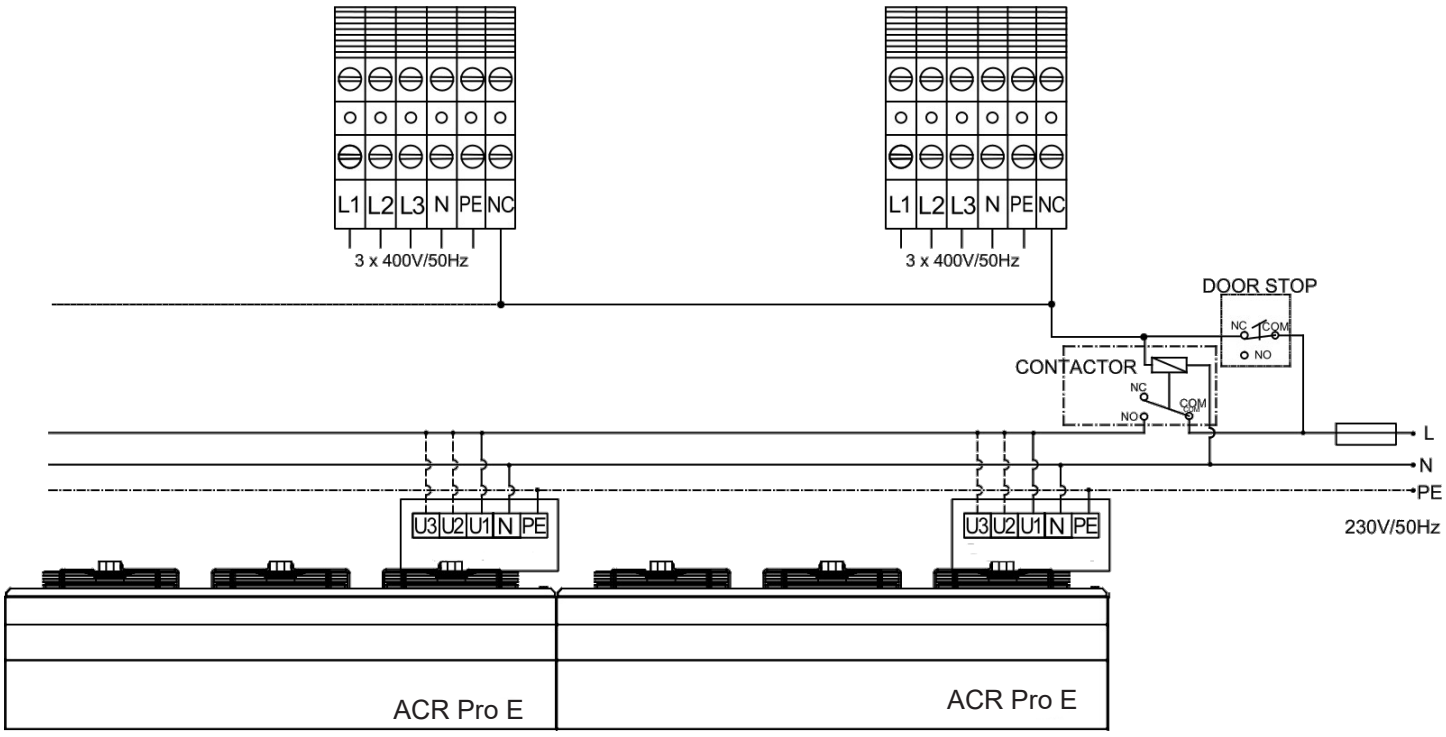
8.2 CONNECTION SCHEME FOR 1 UNIT ACR PRO E TYPE WITH COMFORT CONTROLLER



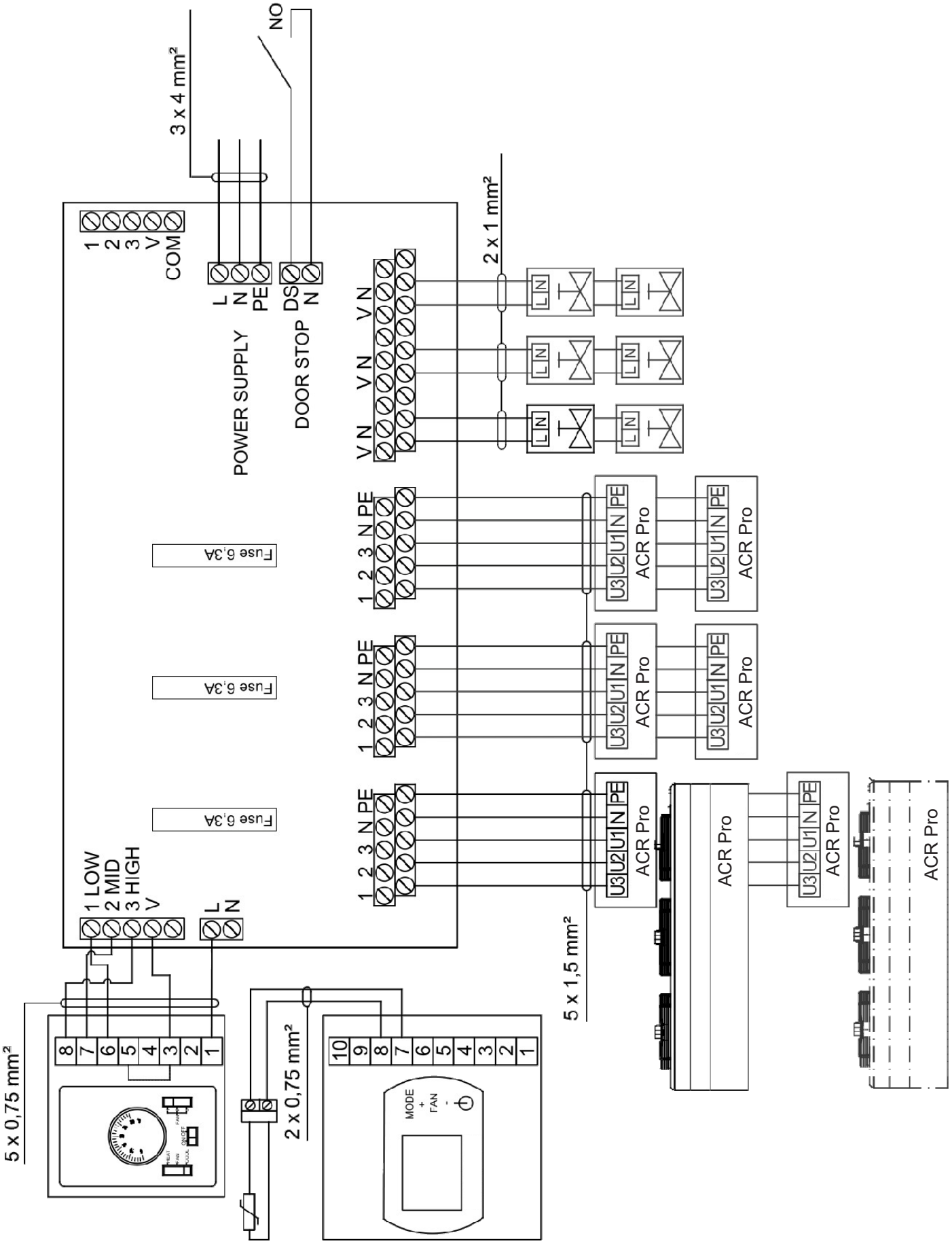
8.3 CONNECTION SCHEME FOR ACR PRO H OR C TYPE WITH CUSTOM CONTROLLER



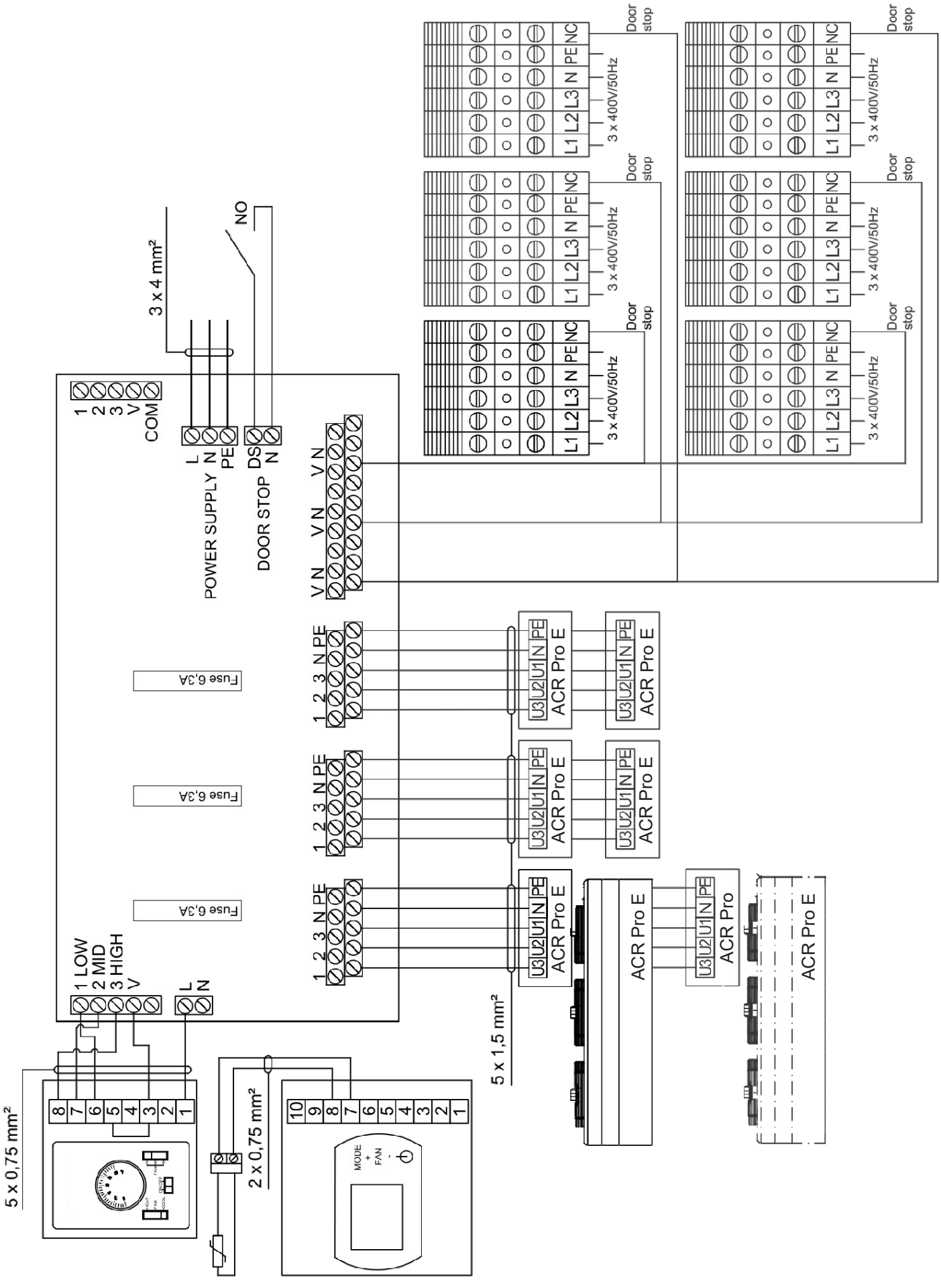
8.4 CONNECTION SCHEME FOR ACR PRO E TYPE WITH CUSTOM CONTROLLER



8.5 CONNECTION SCHEME FOR 6 UNIT ACR PRO H OR C TYPE WITH MULTI 6 AND COMFORT



8.6 CONNECTION SCHEME FOR 6 UNIT ACR PRO E TYPE WITH MULTI 6 AND COMFORT



9. WATER CONNECTION

Water connections are located at the back of the unit on the right side. Connections should allow access for service and maintenance therefore on both nozzles the shut-off valves should be installed. The order of connecting inlet/outlet pipes does not affect the operation of the exchanger.

10 OPERATION AND MAINTENANCE

The engine and fan used in the **ACR Pro** air curtains are maintenance-free devices but regular check-ups are advised, especially motor and bearing (fan's rotor should rotate freely, free from any axial and radial throws/run-outs and undesired knocks/rattles.

The heat exchanger requires systematic cleaning all dirts /impurities off. Before the start of the heating period, the heat exchanger is advised to be cleaned with compressed air directed to the air outlets; there is no need for dismantling the device. Pay special attention when cleaning the exchanger's fin due to high possibility of damaging them. If the fin is bent, use a special tool. If the device has not been used for a longer period of time, unplug it before the next use.

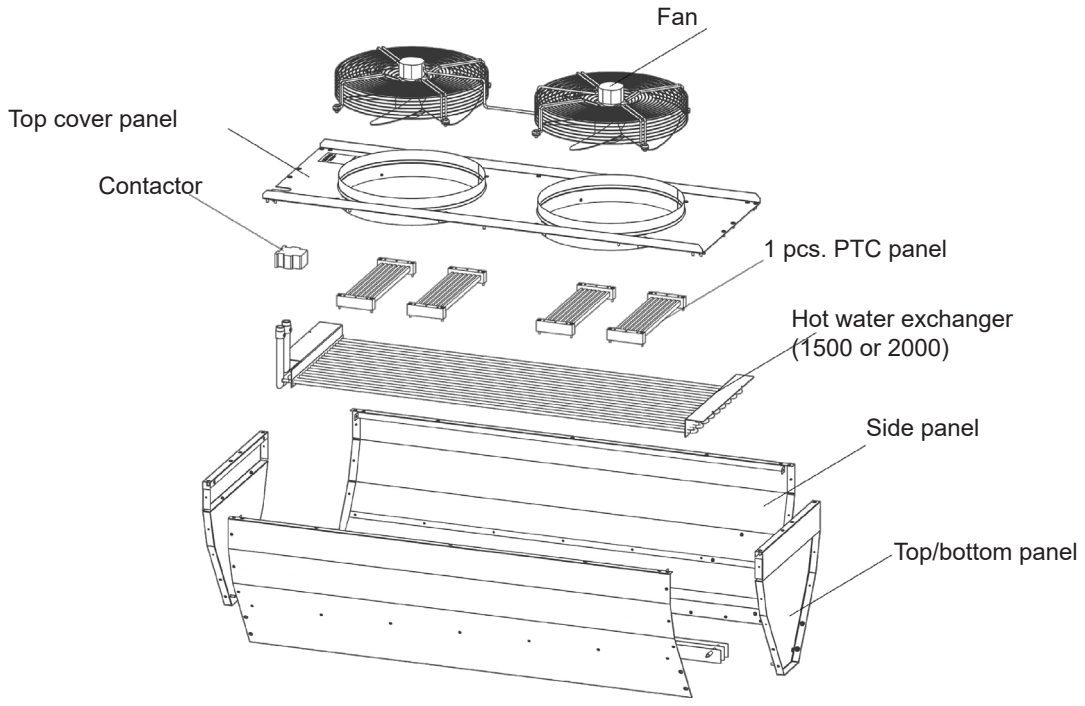
The heat exchanger is not equipped with any anti-freeze protection device. The heat exchanger may be damaged if the room temperature goes below 0°C.

If the device is to operate in a room where the temperature goes below 0°C, anti-freeze liquid must be added to the water circulation/system. Anti-freeze liquid must be appropriate for the material the exchanger is made of (copper), as well as other elements of the hydraulic system/circulation. The liquid must be diluted with water accordingly to the manufacturer's recommendation.

NOTICE !

- **Any and all repair and maintenance works must be conducted with the power off and the heat input disconnected.**
- **Only suitably qualified staff well acquainted with the safety regulations concerning handling with an electrical device must be employed when the device is being installed, started and operated**
- **In the event of coolant leak, when the water system is under pressure, any repairs of the leakage are strictly prohibited.**
- **Any repairs of the device must be conducted only if the device is disconnected from the power supply.**
- **If the device being operated gives metallic clatter, vibration or the level of noise is increasing, check if the mounting of the fan has not become loose – in case of any problems contact the installer of the device or the authorized Service immediately.**

11 SPARE PARTS



GUARANTEE AND SERVICES

PRESERVE THIS WARRANTY

Type: _____

Serial no.: _____

Date of purchasing:: _____

LIMITED GUARANTEE *

The manufacturer guarantee the costumer that the product and its parts are free from material and production failures. During normal use the warranty is 2 years. This warranty concerns the first retail customer.

The guarantee concerns the costs of laboratory investigations and the parts, which are needed for proper operation. The delivery and unforeseeable costs belong also to the mending costs and do not contain compensation costs.

Guarantee mending can only be realized by authorized retailer or service centre.
The guarantee does not concerns the following failures, which are caused by: improper using,damaging,neglect,accident,lack of maintenance,normal attrition, transformation,modification and operation influenceable factor,contaminated fuel, installation of non-suitable part and mending which is done by not authorized retailer or service station.

The regular maintenance is the owner's responsibility.
The manufacturer does not assume the responsibility in case of accidentally happened or directly caused mistake respectively improper using.

***We reserve the right to change of this specification without extra notification. The guarantee can be applied in accordance with above defined.**
Additional guarantee is not accepted.

Guarantee servicing

If your appliance needs guarantee service in that case it can be requested at nearest authorized service station giving in the appliance for repairs.

Mending services

Take the appliance to the nearest authorized service station. If the device is not under guarantee the service cost will be invoiced to the costumer at defined price. The service centres are independent from one another and may have different owners. We reserve the right to change of this specification without extra notification. If you would like to contact us the type and serial number of device always be at hand.

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