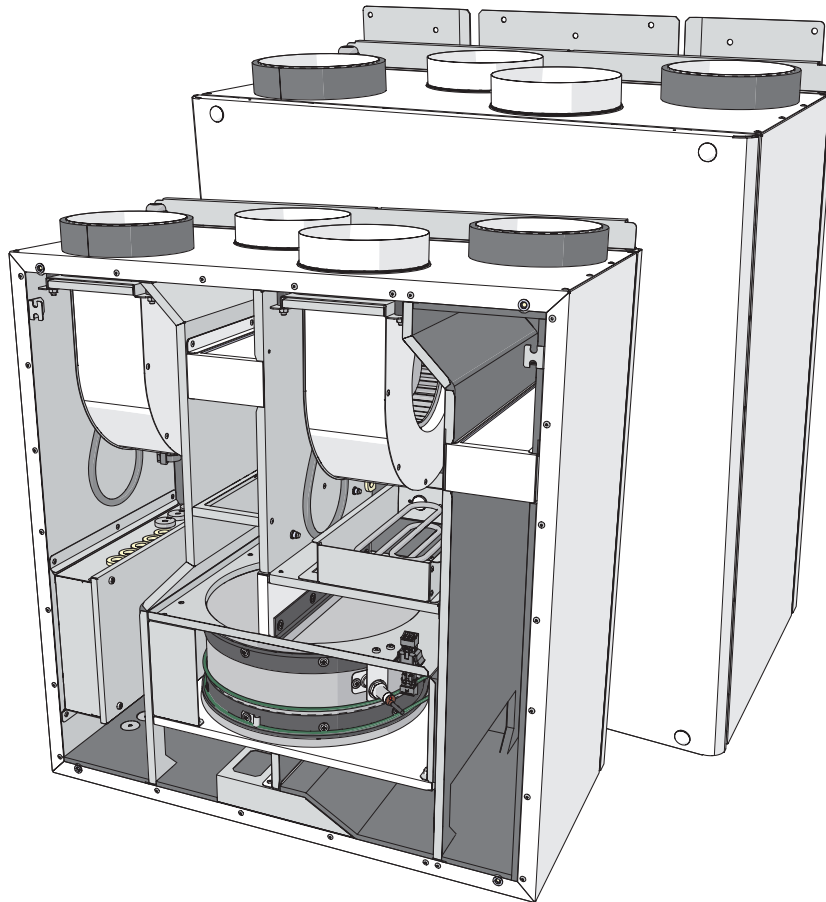


AHU WITH HEAT RECOVERY

**Smarty 2R VE
Smarty 2R VE plus**



User and service technical manual

Contents			
Symbols	3	<i>Event Log (History)</i>	26
Marking	3	<i>System Versions and Running Time</i>	26
Transportation and storage	3	The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)	27
Unpacking	4	The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)	28
Standard package of components	4	The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)	29
Description	4	The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)	30
Safety precautions	4	The principal connection scheme of internal and external components (cable harness I Smarty 2RVER-MCB.0-3k)	31
Components	5	The principal connection scheme of internal and external components (cable harness I Smarty 2RVER-MCB.0-3k)	32
Operating conditions	6	The principal connection scheme of internal and external components (cable harness I RSD-SMARTY2-S1-R-3k)	33
Maintenance	6	The principal connection scheme of internal and external components (cable harness I S1-0,2m-2k)	34
<i>Cover opening</i>	6	The principal connection scheme of internal and external components (fan R3G 140 AW 05-12 Smarty)	35
<i>Filters maintenance</i>	6	The principal connection scheme of internal and external components (heater SRR-0,6-1f EC-0k)	36
<i>Fans maintenance</i>	7	Controller MCB V1.0	37
<i>Heater maintenance</i>	8	<i>CO₂ sensor or connection of humidity sensor RH</i>	40
<i>Rotor maintenance</i>	9	<i>Room CO₂ transmitter installation recommendation</i>	41
Air flow	9	<i>CO₂ concentration according to Pettenkofer limit</i>	41
Dimensions	10	<i>Fire protection input (NC)</i>	42
Mounting	10	<i>External switches</i>	42
<i>Mounting on the wall</i>	11	<i>Connection of Remote Control Panel or ModBus</i>	43
<i>Connection of the kitchen hood</i>	11	"MCB tool" Program description	43
<i>Shield installation</i>	12	System protection	46
<i>Connection of the unit to electric network</i>	12	<i>Electrical connection of the units</i>	46
Technical data	13	<i>System protection</i>	46
Air flow Diagrams	14	<i>Recommendations prior to switching on the unit (prior to hand-over to the user)</i>	46
Mounting diagram	15	<i>Possible faults and troubleshooting</i>	46
Accessories	16	<i>Sensors and their technical information</i>	46
Spare Parts	17	<i>Inspection of the ventilation system</i>	46
Device control	18	Warranty	47
<i>Device control</i>	18	Unit's maintenance table	48
<i>Meaning of the symbols used in the instructions and on the device</i>	18		
<i>Descriptions of the functions</i>	18		
<i>Descriptions of Unit Functions</i>	19		
<i>System modes</i>	19		
<i>System Control</i>	19		
<i>System status</i>	20		
<i>Setting Date and Time</i>	20		
<i>Supply Air Temperature Control and Compensation</i>	21		
<i>Fan Control</i>	21		
<i>"BOOST" Function</i>	21		
<i>Planing</i>	22		
<i>Winter/Summer Mode</i>	22		
<i>Protection against Dryness</i>	22		
<i>Night Cooling Function</i>	22		
<i>CO₂ Reduction Function</i>	22		
<i>Filter Protections</i>	22		
<i>Mode from an External System Contactor</i>	22		
<i>Fan Speeds from an External System Contactor</i>	23		
<i>Heat Exchanger Control</i>	23		
System Monitoring	24		
<i>Stand-By Mode Blocking</i>	24		
<i>Air Flow Adjustment</i>	24		
<i>Manual Control of Components</i>	24		
<i>Changing Passwords</i>	24		
<i>Restoring Factory Defaults</i>	24		
<i>Indications of Functions, Alarms and Warnings</i>	24		
<i>Display and Cancellation of Alarms and Warnings</i>	25		

Symbols



Warning – pay attention



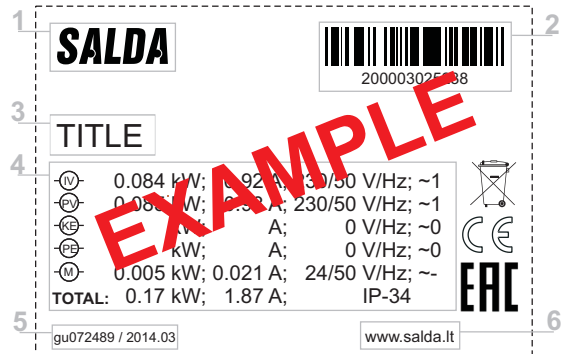
Additional information

Marking

Stick the auxiliary label on the unit (on an easily accessible place) or on the dashed place of a technical manual in order to keep the important information about the unit.

- 1 – Logo
- 2 – Internal usage code
- 3 – Brand name
- 4 – Technical data
- 5 – Units number
- 6 – Web address

STICK HERE

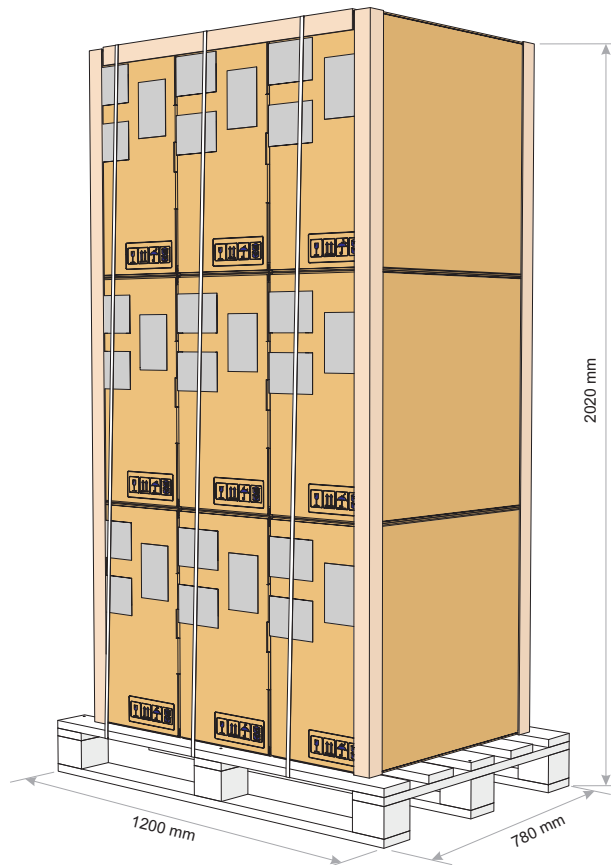


Transportation and storage

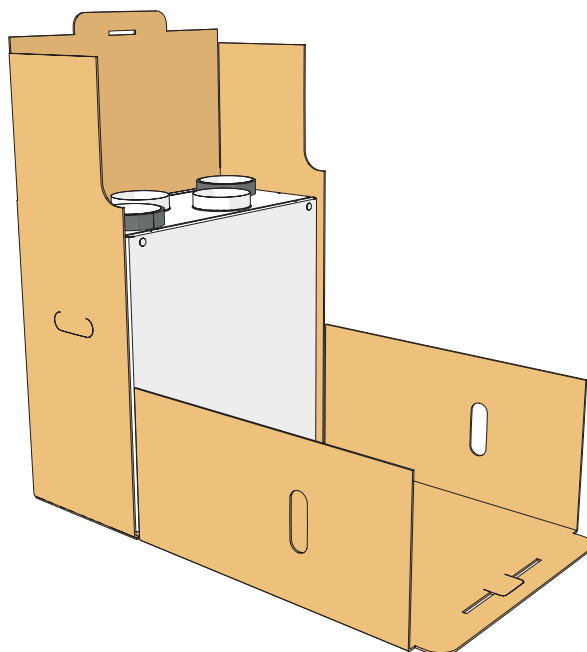
- All units are packed in the factory to withstand regular conditions of transportation.
- Upon unpacking, check the unit for any damages caused during transportation. It is forbidden to install damaged units!!!
- **The package is only for protection purpose!**

While unloading and storing the units, use suitable lifting equipment to avoid damages and injuries. Do not lift units by holding on power supply cables, connection boxes, air extract or exhaust flanges. Avoid hits and shock overloads. Before installation units must be stored in a dry room with the relative air humidity not exceeding 70% (at +20 °C) and with the average ambient temperature ranging between +5 °C and +30 °C. The place of storage must be protected against dirt and water.

- The units must be transported to the storage or installation site using forklifts.
- The storage is not recommended for a period longer than one year. In case of storage longer than one year, before the installation it is necessary to verify whether the bearings of fans and motor rotate easily (turn the impeller by hand) and if the electric circuit insulation is not damaged or the moisture is accumulated.



Unpacking



Standard package of components

Standard package (without optional accessories) includes:

1. Mounting brackets (mural and unit parts), Rubber seal for vibration damping.
2. Screws M5x25 DIN7985 CT for mounting brackets - 3 pcs.; 5. Spring washers DIN127 5 - 3 pcs.
3. Bushing caps - 8 pcs.
4. Antivibration stick - 2 pcs.
5. Key - 1 pcs.

Description

Smarty 2R VE and Smarty 2R VE plus is a residential air handling unit with a high efficiency (up to 75 %) rotor heat exchanger with integrated electrical heater. The unit provides ventilation in the home and takes the heat from the exhausted air. AHU complies with ErP 2018 requirements. The unit is operated by a separate remote control panel or through separate MB-Gateway by PC. Remote control panel and MB-Gateway are optional and not included in standard package.

Smarty 2R VE and Smarty 2R VE plus operates within the limits of the airflow diagrams and is suitable for indoor operation only. Required ambient temperatures must be from -20 °C to +40 °C. For the cold climate zones (air temperatures below -20 °C), optional pre-heater is required.



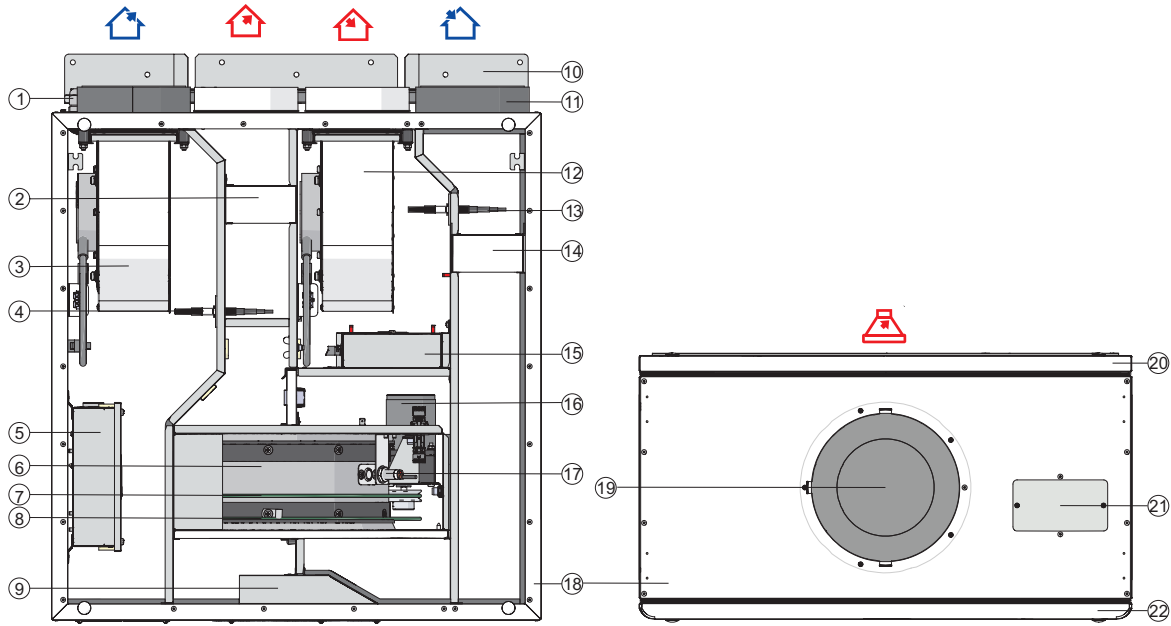
Unsuitable for operation in pools, saunas and other similar premises.

Safety precautions

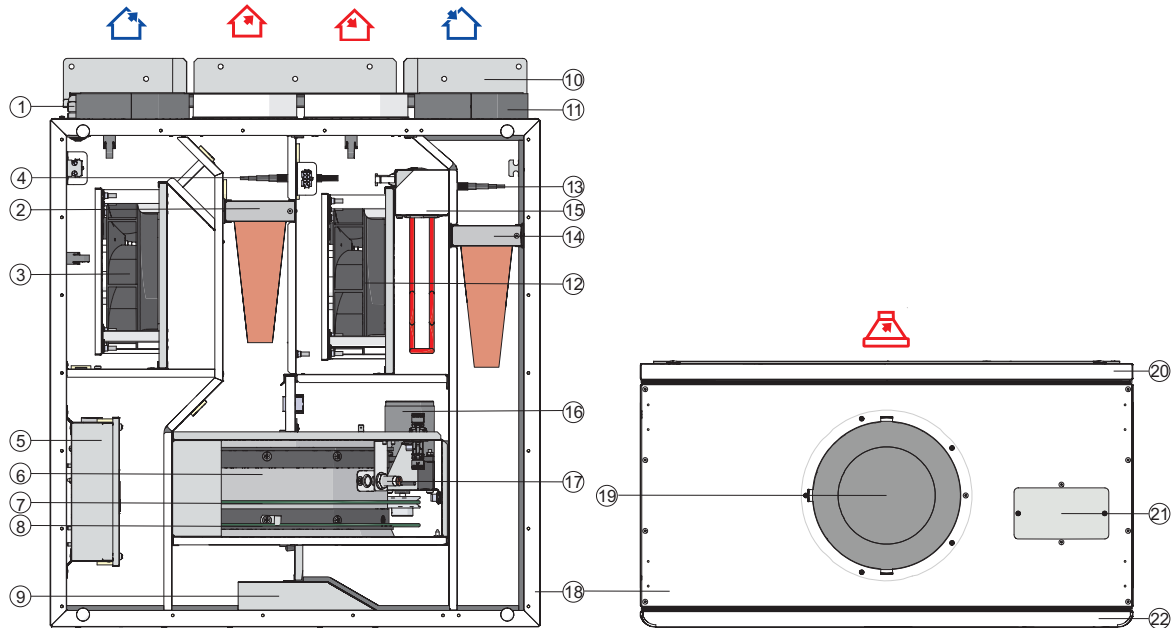
- Do not use the unit for purposes other than its' intended.
- Do not disassemble or modify the unit in any way which may lead to mechanical failure or injury.
- Use special clothing and be careful while performing maintenance and repair jobs – the unit's and its components' edges may be sharp and cutting.
- Do not wear loose clothing that could be entangled in to operating unit.
- If a outside object enters the unit, immediately disconnect power source. Before removing object, make sure that any mechanical motion has stopped, the heater has cooled down and the restart is not possible.
- Do not connect to any other power source than indicated on the model label.
- Do not place or operate unit on unsteady surfaces and mounting frames.
- Mount the unit firmly to ensure safe operating.
- Never use this unit in the environment containing any explosive or aggressive elements.
- Do not use the unit if external connections are broken or damaged. If there are any defects, stop operating the unit and replace the damaged parts immediately. That can be performed only by qualified electrician.
- Do not use water or another liquid to clean electrical parts or connections.
- If you notice condensat on electrical parts or connections, stop operating the unit.

Components

Smarty 2R VE



Smarty 2R VE plus



- 1. Power supply cable collar
- 2. Extract air filter
- 3. Exhaust air fan
- 4. Extract air temperature sensor
- 5. Control box
- 6. Rotor
- 7. Rotor belt
- 8. Spare rotor belt
- 9. Kitchen hood hole
- 10. Mounting brackets
- 11. Flange

- 12. Supply air fan
- 13. Outdoor air temperature sensor
- 14. Outdoor air filter
- 15. Electric heater
- 16. Rotor engine
- 17. Hall sensor
- 18. Galvanized steel casing
- 19. Kitchen hood flange cover
- 20. Back door
- 21. Cable connector cover
- 22. Front door



Operating conditions

- Unit is designed to operate only indoors.
- It is forbidden to use the unit in potentially explosive environment.
- Unit is designed to supply/extract only clean air (free of chemical compounds causing metal corrosion, of substances aggressive to zinc, plastic and rubber, and of particles of solid, adhesive and fibred materials).

Outdoor air	- temperature min./max.*	[°C]	-20 / +40
	- humidity	[%]	90

Extract air	- temperature min./max.*	[°C]	+15 / +40
	- max. humidity	[%]	60

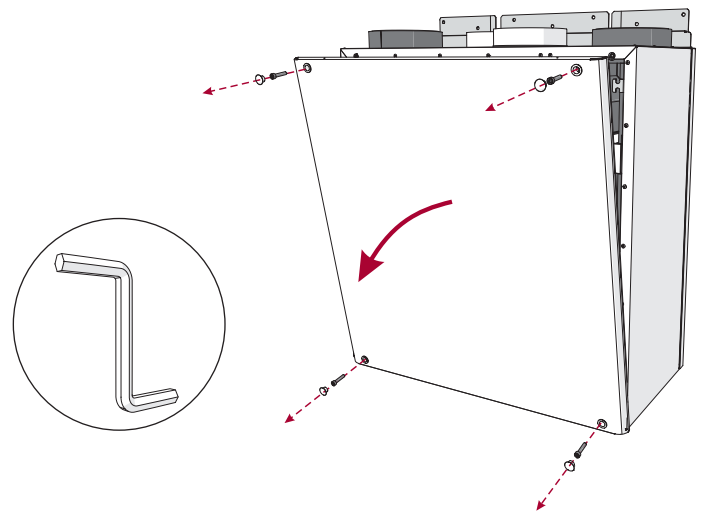
* Can be used at temperatures below -20 °C with pre-heater, the power of which is over 600W.

Maintenance



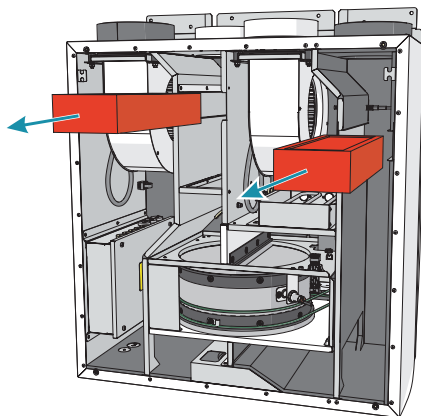
Unplug unit from mains before opening the door (disconnect the power plug from the outlet or if there is a two-pole automatic circuit breaker installed – disconnect it as well. It is necessary to ensure that it won't be turned on by third parties) and wait until the full stop of the fans (for about 2 min.).

Cover opening

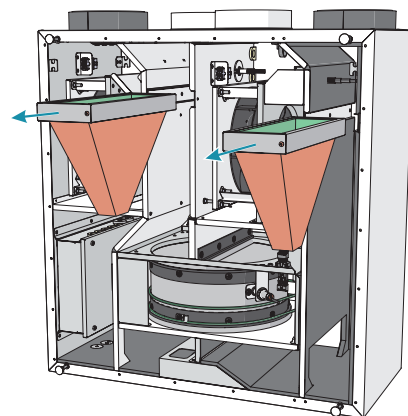


Filters maintenance

Smarty 2R VE



Smarty 2R VE plus



Dirt increases air resistance in the filter, therefore less air is supplied into the premises.

Taking off the filters:

- Open cover.
- Remove the filter.
- Use filters of M5 panel filter for Smarty 2R VE / pocket filter for Smarty 2R VE plus.



Changing filters, filters reload timer control. Description of remote control panel functions is provided in the remote control panel technical documentation or on the website www.salda.it.
Allowed to operate the unit without filters!

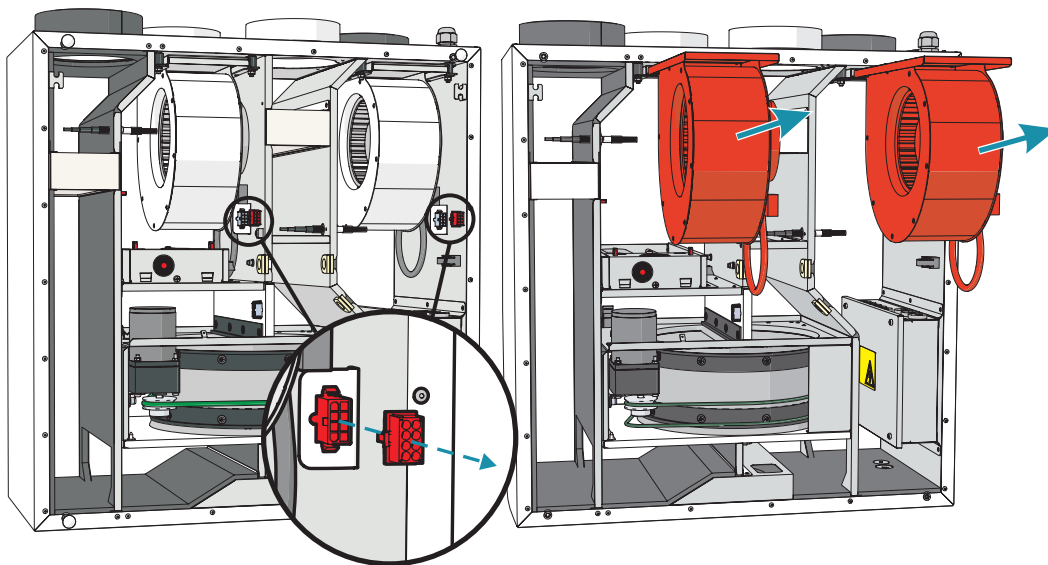


It is recommended to change the filters every 3-4 months, or in accordance to filter timer.

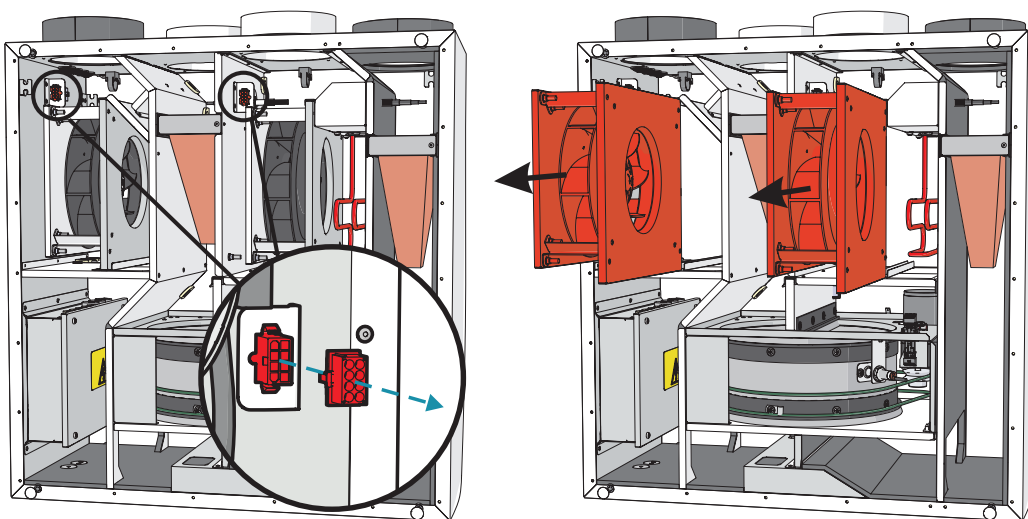
Fans maintenance

- Maintenance should be performed only by experienced and trained staff.
- The fan should be inspected and cleaned at least once a year.
- Be sure the fan is disconnected from power source before performing any maintenance or repair.
- Proceed to maintenance and repair after any rotation in the fan is stopped.
- Observe staff safety regulations during maintenance and repair.
- The motor is of heavy duty ball bearing construction. The motor is completely sealed and requires no lubrication for the life of the motor.
- Detach fan from the unit.
- Impeller should be specially checked for built-up material or dirt which may cause an imbalance. Excessive imbalance can lead to accelerated wear on motor bearings and noise, vibration.
- Clean impeller and inner housing with mild detergent, water and damp, soft cloth.
- Do not use high pressure cleaner, abrasives, sharp instruments or caustic solvents that may scratch or damage housing and impeller.
- Do not plunge the motor into any fluid while cleaning impeller.
- Make sure, that impeller's balance weights are not moved.
- Make sure the impeller is not hindered.
- Mount the fan back into the unit. Connect the fan to power supply source.
- If after maintenance the fan does not start or stop itself, contact the producer. Malfunction of the fan can be identified according to the pressure in the system (when pressure switches are connected). When there is a fault in fans' motor, any separate notice is shown on the control panel.

Smarty 2R VE



Smarty 2R VE plus

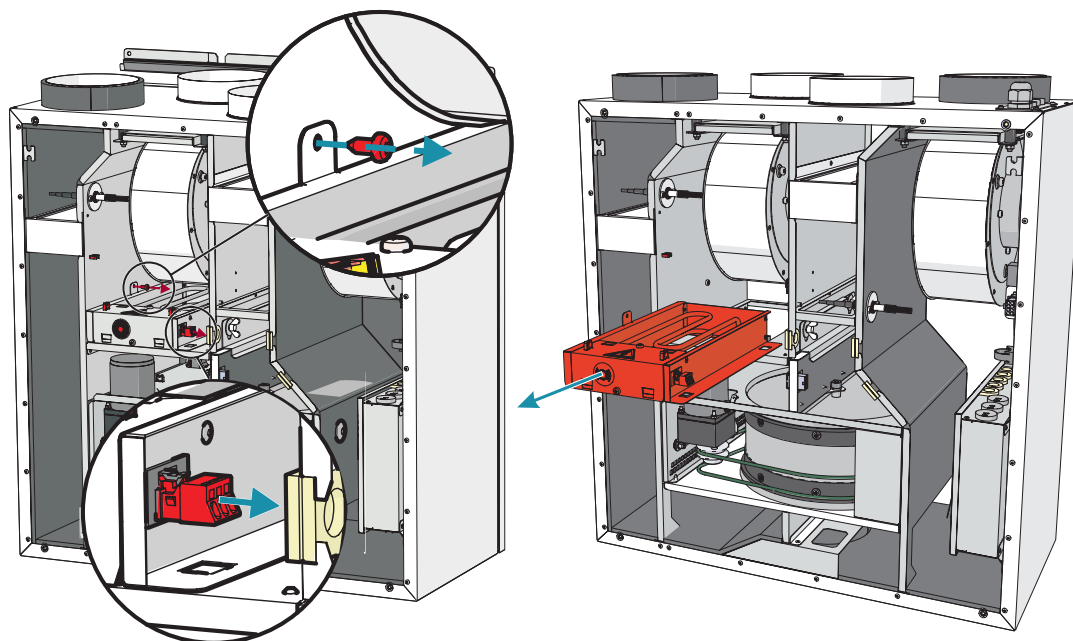


Be sure the unit is disconnected from power source before performing any maintenance or repair.

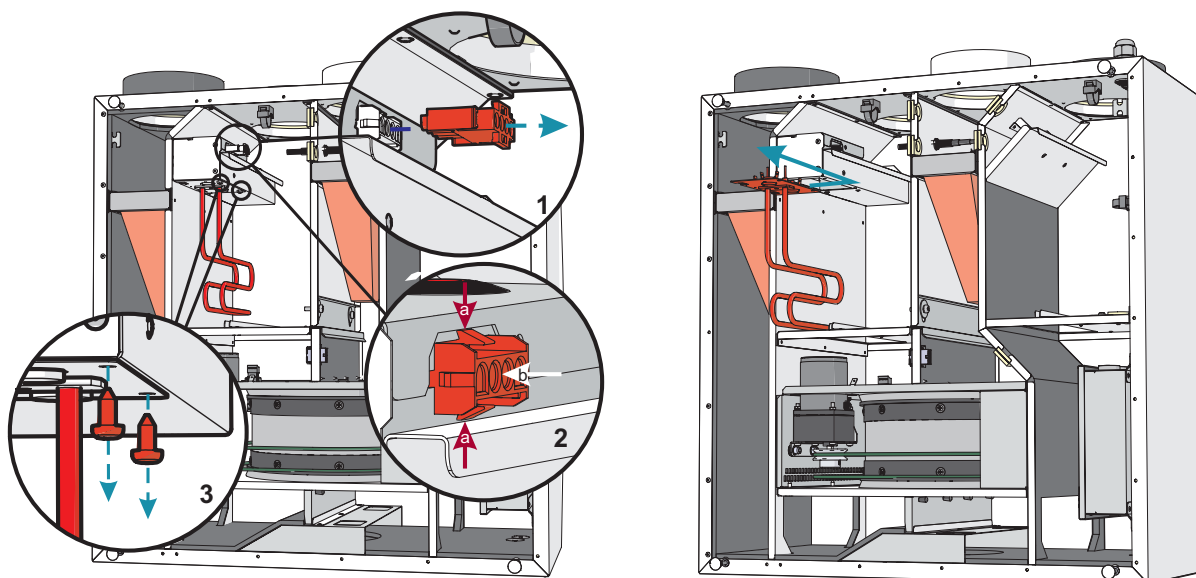
Heater maintenance

- Electrical heater does not need to be serviced additionally. It is compulsory to change filters as described above.
- Heaters have 2 thermal protections: automatically self-resetting, which activates at +50°C and the manually restored, which activates at +100°C.
- After the activation of the manually restored protection, the unit must be disconnected from the power supply. Wait until the heating elements cool down and the fans stop rotating. After identifying and removing the reason of failure, to start the unit, press the "reset" button. The failure can be identified only by a qualified professional.
- If necessary, the electric heater can be removed. Disconnect the electrical connector from the heater and remove the heater.

Smarty 2R VE



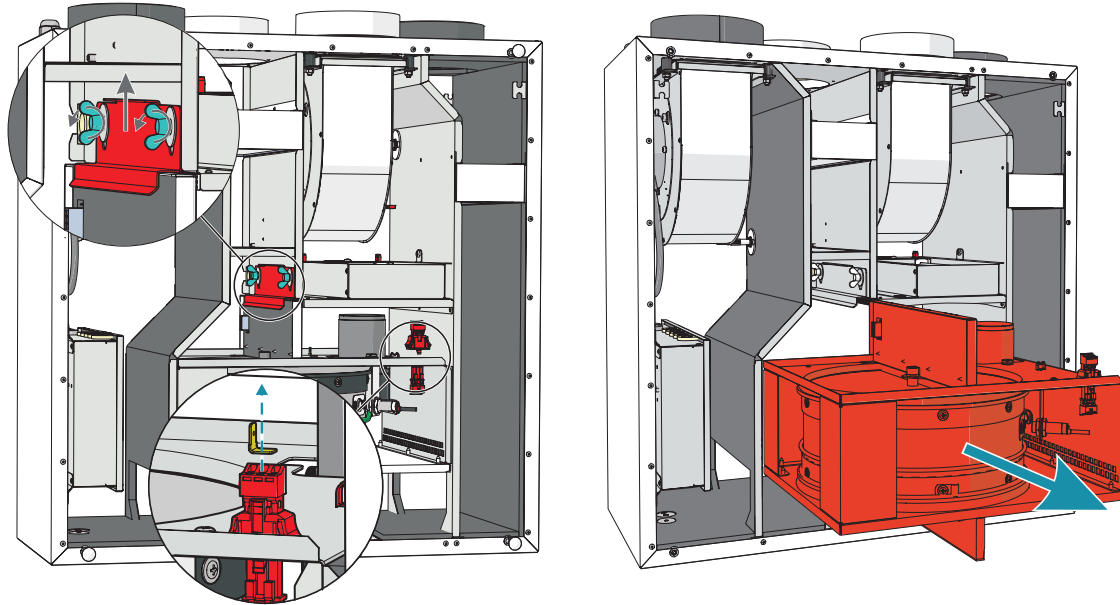
Smarty 2R VE plus



Rotor maintenance

- Rotor heat exchanger must be serviced once a year.
- Ensure that the gaps of the heat exchanger are clean, the brushes are not worn, the belt drive is not worn and the clamping nodes of the rotor heat exchanger are tight.
- Rotor heat exchanger can be easily removed from the unit. The power cord of the motor of the heat exchanger is disconnected. The clamp of rotor heat exchanger section is released and raised and the heat exchanger is removed.
- The heat exchanger is cleaned using the solution of warm water and non-corrosive toward aluminum alkaline agent or the air stream. It is not recommended to apply direct stream of liquid as it can harm the device.
- While cleaning, protect the motor of heat exchanger from entry of moisture and fluids.
- After reinstalling the heat exchanger, fasten the heat exchanger section with the clamp. Connect the heat exchanger motor.

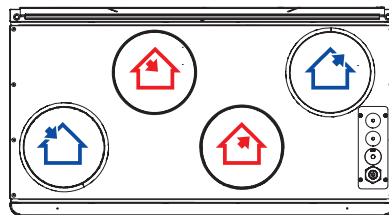
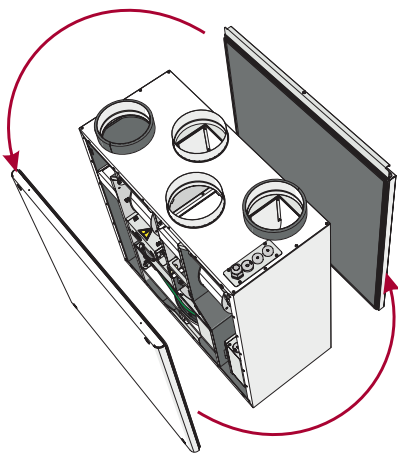
Smarty 2R VE / Smarty 2R VE plus



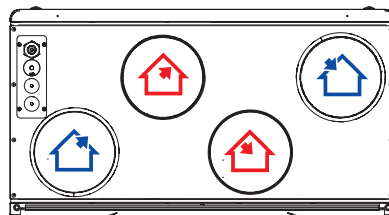
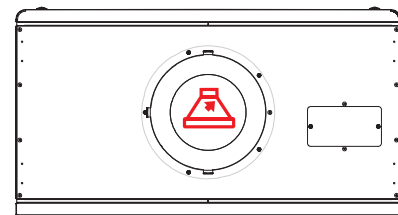
CAUTION: the heat exchanger can not be used when the filters are removed!

Air flow

- The maintenance side can be changed for the ventilation unit, i.e. it can be mounted with the left ambient air inlet or the right ambient air inlet. That can be implemented by switching over the back door and the front door. The default version of the ventilation unit is right.



Smarty 2R VEL / Smarty 2R VEL plus

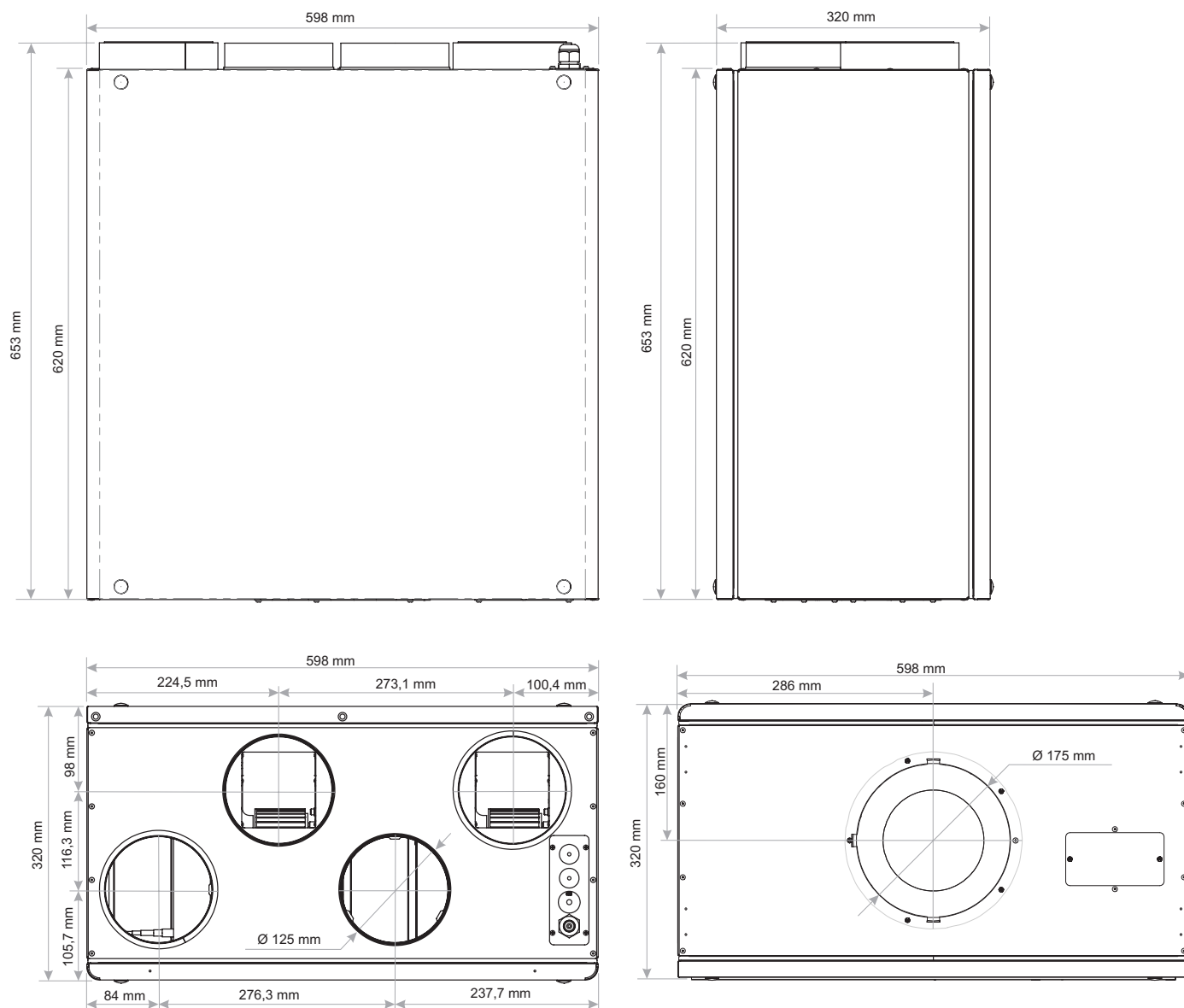


Smarty 2R VER / Smarty 2R VER plus

- Outdoor air
- Supply air
- Exhaust air
- Extract air
- Kitchen hood

Dimensions

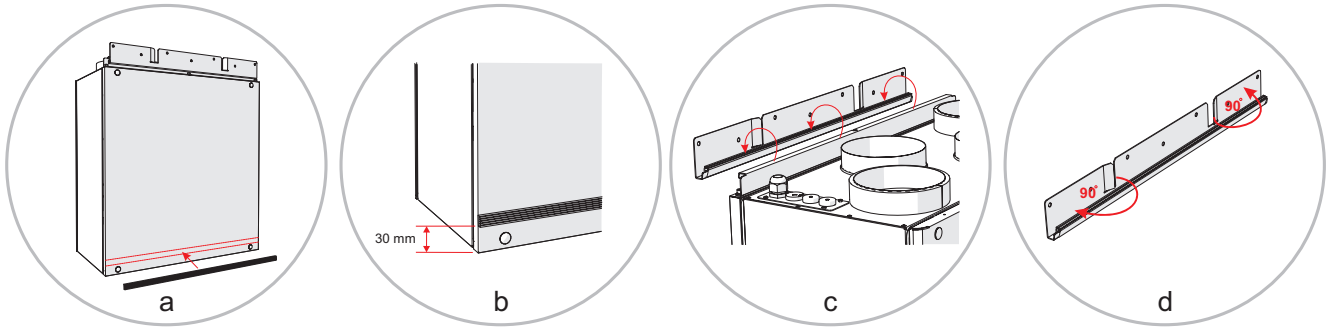
Smarty 2R VE / Smarty 2R VE plus



Mounting

- Installation should only be performed by qualified and trained staff.
- When connecting air ducts, consider the notices indicated on the casing of the unit.
- Before connecting to the air duct system, the connection openings of ventilation unit should be closed.
- Do not connect the bends close to connection flanges of the unit. The minimum distance of the straight air duct between the unit and the first branch of the air duct in the supply air duct must be $1xD$, in air exhaust duct $3xD$, where D is diameter of the air duct.
- It is recommended to use the accessories-holders. This will reduce vibration transmitted by the unit to the air duct system and environment.
- Enough space must be left for opening of the maintenance door and filter covers.
- If the installed ventilation unit is adherent to the wall, it may transmit noise vibrations to the premises. Though the level of noise caused by the fans is admissible, it is recommended to mount the unit at the distance of 400 mm from the nearest wall. If it is not possible, the mounting of the unit is recommended on the wall of the room where the level of noise is not important.
- Ducts are connected to the unit in such way that they could be easily disassembled and the heater could be removed from the unit when performing service or repair works.

Mounting on the wall



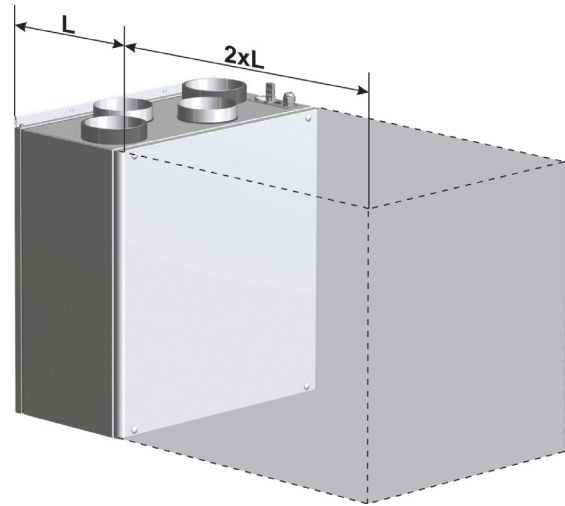
Mounting on the wall:

a) To reduce the vibration stick the insulating tape on the unit's casing side which touches the wall before mounting the unit on the wall.

b) The unit has to be mounted on the mounting brackets.

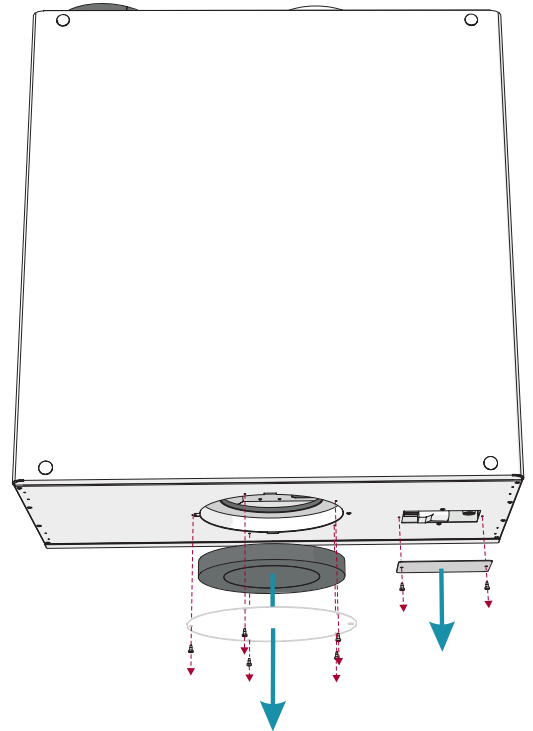
c) AHU mounting drawing.

d) After the unit is mounted two wall bracket tabs has to be folded to 90° angle by pliers to avoid the accident fall of the unit.



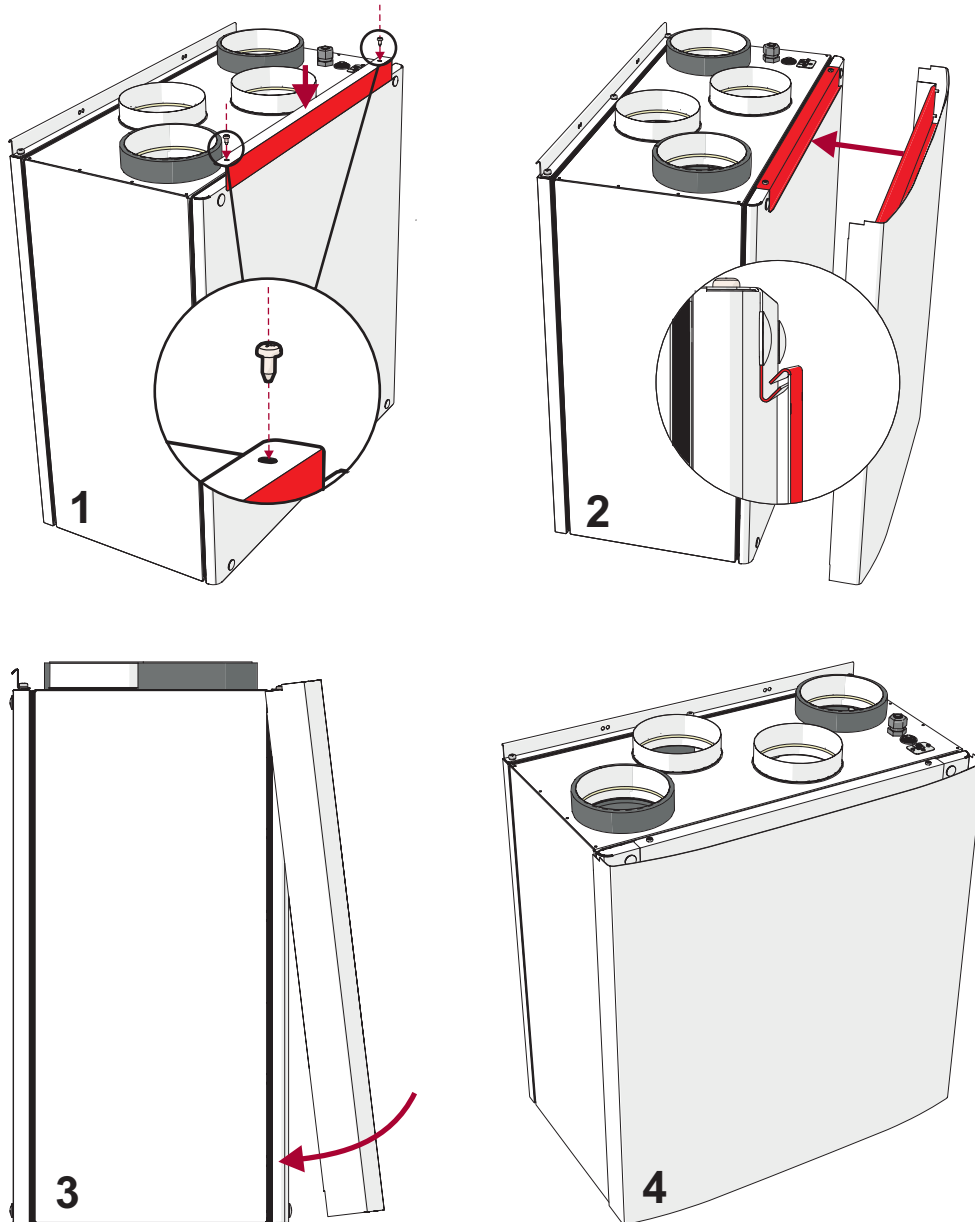
Connection of the kitchen hood

- Installation works must be performed only by trained and qualified personnel.
- If you have any questions regarding the safe installation and use of the product, please contact the manufacturer or the representative.
- Before installing the unit, unscrew the lid a covering the opening for connection of the kitchen hood and remove the middle part of the insulating ring.
- Cut the connecting opening as indicated on the insulation material.
- Carefully remove the lid, which covers the electric connection for the connection of the electrical part of the kitchen hood to the ventilation unit.
- Mount the hood to the ventilation unit. Fasten with self-tapping screws to the designated connection points.
- It is necessary to ensure the tight and reliable connection of the air ducts of the kitchen hood to the ventilation unit and the electrical contact of the control circuit.
- The subsequent installation of the device is performed according the description in chapter "Mechanic installation".
- Properties, assembly, control, use and maintenance of the kitchen hood are described in its installation manual.



Use cooker hood supplied by our company only. Equipment is not tested with other cooker hoods and company holds no responsibility for malfunction or failures of the equipment in this case.

Shield installation



Connection of the unit to electric network

- Supply voltage to the unit must be connected by a qualified specialist following the manufacturer's instructions and effective safety instructions.
- The unit's power network voltage must correspond to electrotechnical parameters of the unit indicated in the technical decal.
- The unit's voltage, power and other technical parameters are provided in the unit's technical decal (on the unit casing). The unit must be connected to the voltage plug socket of the grounded power network in compliance with the effective requirements.
- The unit must be earthed according to the rules on installing electrical equipment.
- It is prohibited to use extension wires (cables) and power network plug socket distribution devices.
- Prior to carrying out any ventilation unit installation and connection activities (until its hand-over to the customer), the unit must be disconnected from the power network.
- After installation of the ventilation unit, the power network plug socket must be accessible at any time and disconnection from the power network is performed through the two-pole circuit breaker (by disconnecting phase pole and neutral).
- The unit must be thoroughly checked against damages (execution, control, measurement nodes) during transportation before it is connected to the power network.
- The power cable can be replaced only by a qualified specialist upon the evaluation of the rated power and current.



The manufacturer does not assume any liability for personal injuries and property damage due to non-conformance with the provided instructions.

Technical data			
	Smarty	2R VER / 2R VEL	2R VER plus / 2R VEL plus
Heat exchange			
- phase/voltage	[f/VAC/Hz]	~1/230/50	~1/230/50
- power/current	[kW/A]	0,006/0,1	0,006/0,02
-thermal efficiency up to		75%	75%
Heater			
- power/current	[kW/A]	0,6/2,61	0,6/2,61
Exhaust air fan			
- phase/voltage	[f/VAC/Hz]	~1/230/50	~1/230/50
- power/current	[kW/A]	0,07/0,6	0,084/0,75
- speed	[min ⁻¹]	1380	3200
- protection class		IP44	IP54
- control input	[VDC]	0-10	0-10
Supply air fan			
- phase/voltage	[f/VAC/Hz]	~1/230/50	~1/230/50
- power/current	[kW/A]	0,07/0,6	0,084/0,75
- speed	[min ⁻¹]	1380	3200
- protection class		IP44	IP54
- control input	[VDC]	0-10	0-10
Total			
- power/current	[kW/A]	0,75/3,91	0,77/4,13
Automatic control integrated		+	+
Insulation of walls	[mm]	20	20
Weight	[kg]	36	36
Exhaust air filter			
class class		M5	M5
width	[mm]	270	270
height	[mm]	86	85
depth	[mm]	46	173
model		MPL	FMK
Supply air filter			
class		M5	M5
width	[mm]	270	270
height	[mm]	86	85
depth	[mm]	46	173
model		MPL	FMK

Smarty 2R VE	LWA total, dB(A)	LWA, dB(A)						
		125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Supply	65	50	59	61	59	55	51	40
Exhaust	60	45	58	53	45	37	28	21
Surrounding	46	37	40	42	38	29	19	16
Measured at	flow/pressure	[m ³ /h / Pa] 214/100						

Smarty 2R VE plus	LWA total, dB(A)	LWA, dB(A)						
		125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Supply	56	39	40	49	52	54	46	39
Exhaust	51	38	39	47	45	43	40	32
Surrounding	38	30	28	30	33	31	29	25
Measured at	flow/pressure	[m ³ /h / Pa] 113/60						

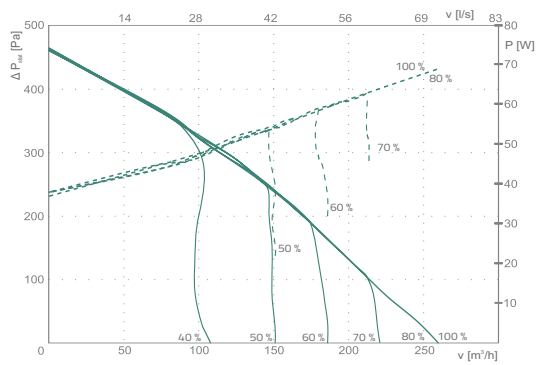
NOTE. Subject to technical modification

Air flow Diagrams

— Performance
 - - Power consumption

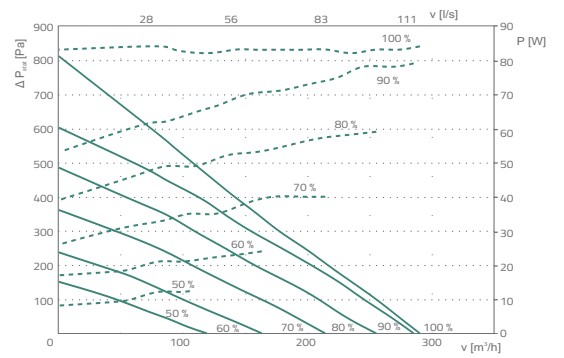
Smarty 2R VE

Supply air

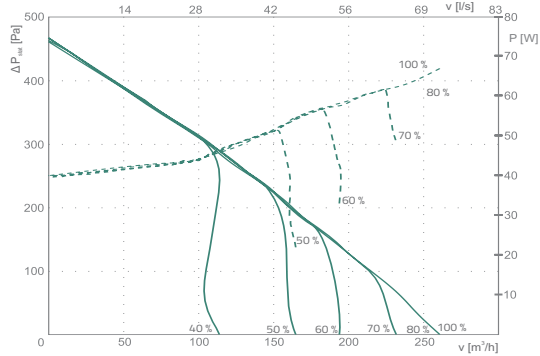


Smarty 2R VE plus

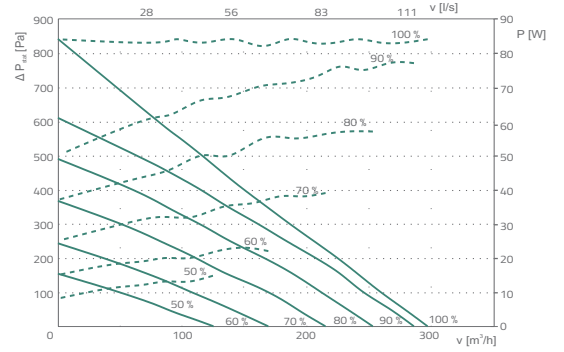
Supply air



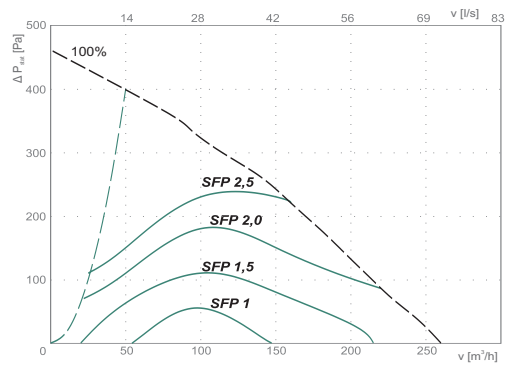
Exhaust air



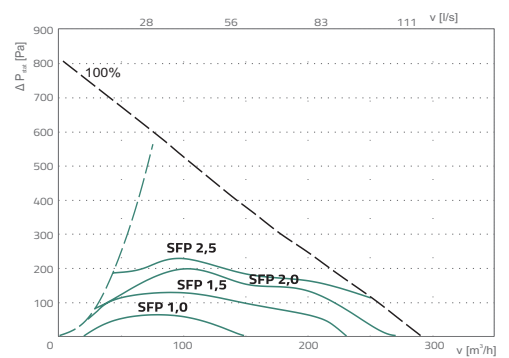
Exhaust air



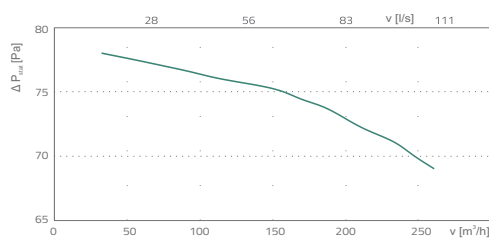
Specific fan power (SFP)



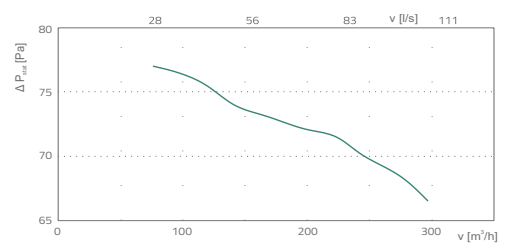
Specific fan power (SFP)



Temperature efficiency

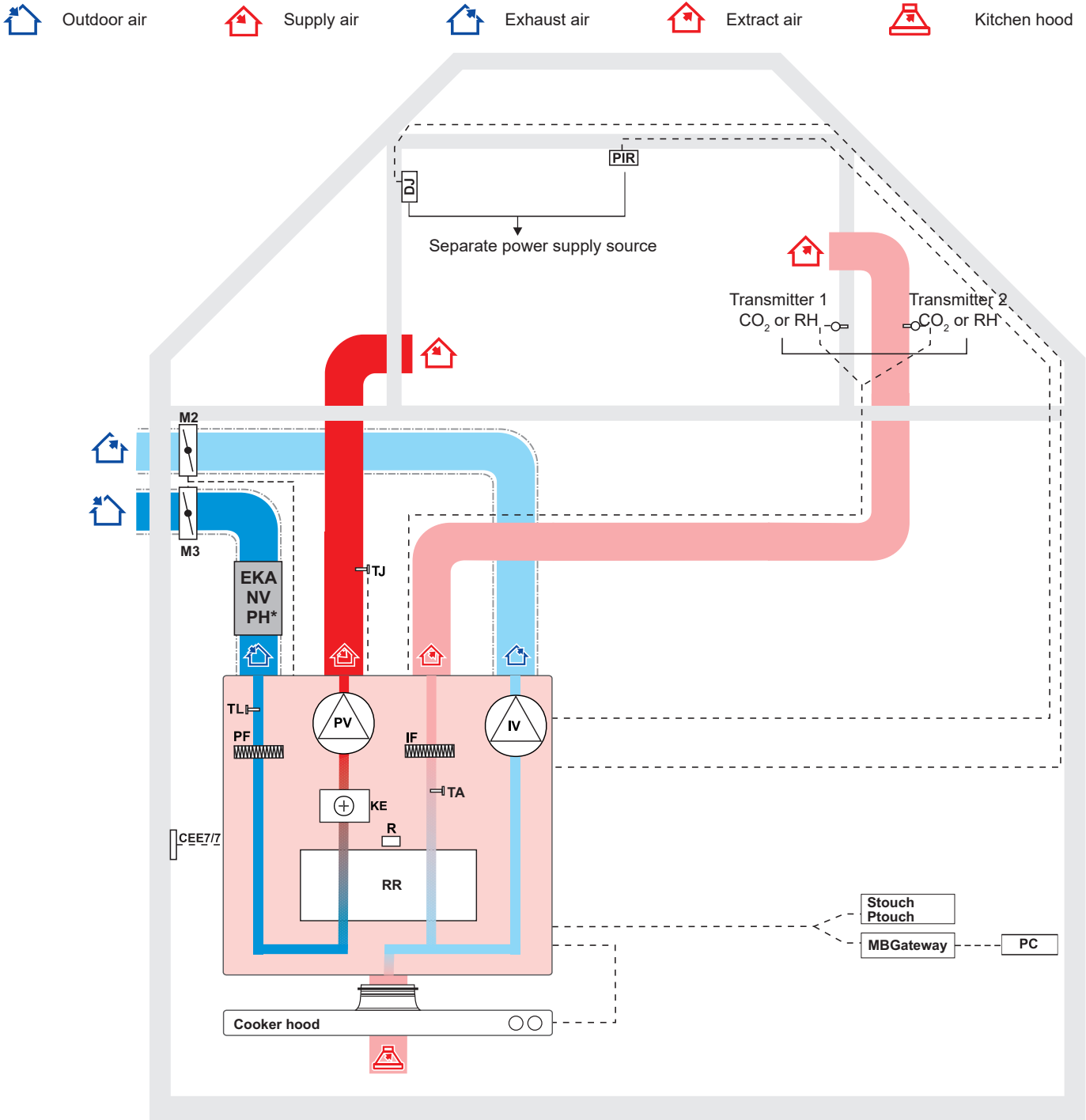


Temperature efficiency



Temperature efficiency (balanced mass flow):
 Extract air = - 20 °C / 90 % RH

Mounting diagram



----- it's recommended to insulate by 50 mm mineral wool

IV	Extract air fan	PIR	Motion detector
PV	Supply air fan	DJ	Smoke detector
RR	Rotor heat exchanger	TJ	Supply air temperature sensor
PF	Filter for supply air (M5)	CEE7/7	Power cable with plug
IF	Filter for extract air (M5)	PC	Personal computer
R	Rotor engine	MBGateway	Net module
TL	Outdoor air temperature sensor	Stouch	Control panel
TA	Extract air temperature sensor	Ptouch	Control panel
EKA NV PH*	Outdoor air electric preheater (* Lower than -20 °C use preheater)	Cooker hood	Kitchen hood
M2	Exhaust air damper actuator	M3	Outdoor air damper actuator

Accessories



NEW filter 
www.newfilter.lt

Panel filter
MPL (M5/M5)
GKOFIL0015
(Smarty 2R VE)



NEW filter 
www.newfilter.lt

Panel filter
MPL (F7/F7)
GKOFIL0016
(Smarty 2R VE)



NEW filter 
www.newfilter.lt

Pocket filters
FMK (M5/M5)
GFIRIRS3002
(Smarty 2R VE plus)



Electrict pre-heater
EKA NV 125-0,6-1f PH
PSIEKANVPH1250.6_1
(Smarty 2R VE)



Electrict pre-heater
EKA NV 125-0,9-1f PH
PSIEKANVPH1250.9_1
(Smarty 2R VE plus)



Humidity sensor
S-RFF-U-D-F2
ZAKKT0050



CO₂ sensor
S-RCO2-F2
ZAKKT0048



CO₂ sensor
S-KCO2
ZAKKT0049



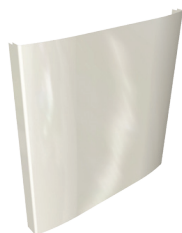
Cooker hood for stainless steel
Cooker hood
ZPGKT0042



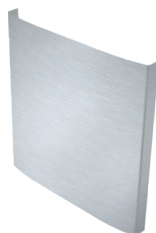
Cooker hood for white
Cooker hood
ZPGKT0041



Front cover mounting bracket
Mounting bracket
GNGKRON17



Front cover white
Front cover
GNGGAUBT022



Front cover stainless steel
Front cover
GNGGAUBTSS1



Silencer
Silencer, 350 mm
GSORIRS168_152



Silencer
Silencer, 750 mm
GSORIRS168_324



Remote control
Stouch
PRGPU51



Remote control
Ptouch
PRGPU081



Net module
MB Gateway
PRGPU082



Humidity sensor
S-KFF-U
ZAKKT0051



Actuator for damper
CM24-F-L
ZAKP0029



Damper
SKG-A 125
GSKSKG028

Spare Parts



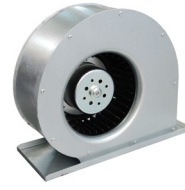
Rotor box belt
Rotor belt
GNG00062



Smarty 2R VE door
Door
GNG00061



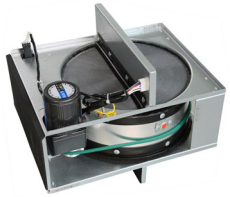
Rotor box motor
Rotor motor
ZVAR0133



Fan supply/exhaust
Fan
GPUVRA009
(Smarty 2R VE)



Fan supply/exhaust
Fan
GVESMARTY001
(Smarty 2R VE plus)



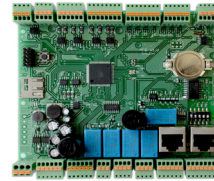
Rotor box
Rotor box
GPURSD085_330



Temperature sensor 3 m
TJ
PJUT0063



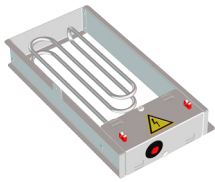
Temperature sensor 1,5 m
TL/TA
PJUT0062



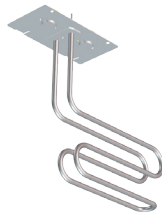
Controller
MCB V1.0
ZED00985



Hall sensor
Hall H1A-D12P24-1
PJUT0006



Electrical heater
SRR 0,6-1f EC-1k
ZESSRR028
(Smarty 2R VE)



Electrical heater
SRR V-0,6-1f
ZESSRR032
(Smarty 2R VE plus)

Device control

Device control

Ventilation unit can be controlled using a remote control, web interface via MB-Gateway and building management system. More information about the possibilities of controlling is provided in the table below.

Ptouch	Stouch	MB-Gateway	BMS
+	+	+	Modbus RTU

Meaning of the symbols used in the instructions and on the device



Outdoor air



Supply air



Exhaust air



Extract air



Kitchen hood

Descriptions of the functions

Functions	MCB	
	SMARTY 2R VE	SMARTY 2R VE plus
	E	E
Date and time settings	•	•
System modes for easy and-user friendly control (<i>Stand-by, Building protection, Economy, Comfort</i>)	•	•
BOOST function (Fans operate at highest speed)	•	•
Comfortable air temperature function	•	•
Cold/heat recovery	•	•
Heating season (from a selected date, 3-day temperature average or manually)	•	•
Dryness protection	○	○
Weekly/holiday schedule	•	•
User and service control levels	•	•
Manual air flow balancing	•	•
CO ₂ level indication and reduction function	○	○
Night cooling function	•	•
Relative humidity (RH) level indication and reduction function	○ P	○ P
Software and configuration update possibility	•	•
Supply air temperature control according to the extract air sensor	•	•
Monitoring function (all sensors and I/O) Mode switch (start/stop)	•	•
Manual components control	•	•
Switching the speed of the fans	•	•
Functional units		
Fans		
Soft start and stop	•	•
Protection by RPM	•	•
Speed synchronous/asynchronous 0-10V control	•	•
Electrical heater		
On/off control	•	•
Overheat protection (additional protection software)	•	•
Filter pollution monitoring		
By filter timer	•	•
Rotor		
On/off control	•	•
Motor belt levers protection	•	•
Rotation speed indication	•	•
Service timer	•	•

Air temperature sensors		
temperature sensor failure protection (with emergency mode)	•	•
Supply air temperature sensor	•	•
Outdoor air temperature sensor	•	•
Extract air temperature sensor	•	•
Dampers		
open/close	○	○
Emergency signals and inputs/outputs		
Fire protection input	•	•
Configurable digital inputs	•	•
Remote controllers		
Stouch	○	○
Ptouch	○	○
MB Gateway	○	○

- standard feature
- for the feature to function an accessory is needed
- it is not possible to use the feature

P - Function will be available in IIQ 2016

Descriptions of Unit Functions

All functions indicated in this section are installed in the software of the control board. However, operation and control of the device depends on the following:

1. Selected control panel. Full functionality and configuration possibility can be assured only by MB-Gateway web interface or Ptouch control panel.
2. Connected external devices: external heaters, dampers, sensors and etc. (see the description of the acquired air handling system).
3. Internal components of the device: type of heat exchanger (plate or rotor), integrated dampers, sensors and etc. (see components of the chosen device).
4. Control board type. Different boards provide an opportunity to connect different components. (See scheme of the device board).



Air Handling Unit uses MCB board.



The unit can be configured only with Ptouch remote control panel or MB-Gateway web application.
The following control board functions can be fully controlled only with Ptouch remote control panel or MB-Gateway web application. In case of Stouch remote control panel use the description of remote control panel functions for MCB control board.

System modes

System modes:

- Stand-by
- Building protection
- Economy
- Comfort

In stand-by mode the system is shut down for a permissible shutdown period (based on the stand-by mode blocking function settings).

The building protection mode is designed to protect a building against moisture accumulation. In this mode the system operates at speed 1. By default, in this mode temperature maintenance is controlled (preferred temperature is indicated). However, if necessary, temperature maintenance can be switched off.

Economy mode is designed to save energy when people are not in the room. In this mode the system operates at speed 2. By default, in this mode temperature maintenance is controlled (preferred temperature is indicated). However, if necessary, temperature maintenance can be switched off.

Comfort mode is used when people are present in the room. In this mode the system operates at speed 3. In this mode the temperature is always maintained.

System Control

System mode can be changed automatically by the functions (in a sequential order as indicated):

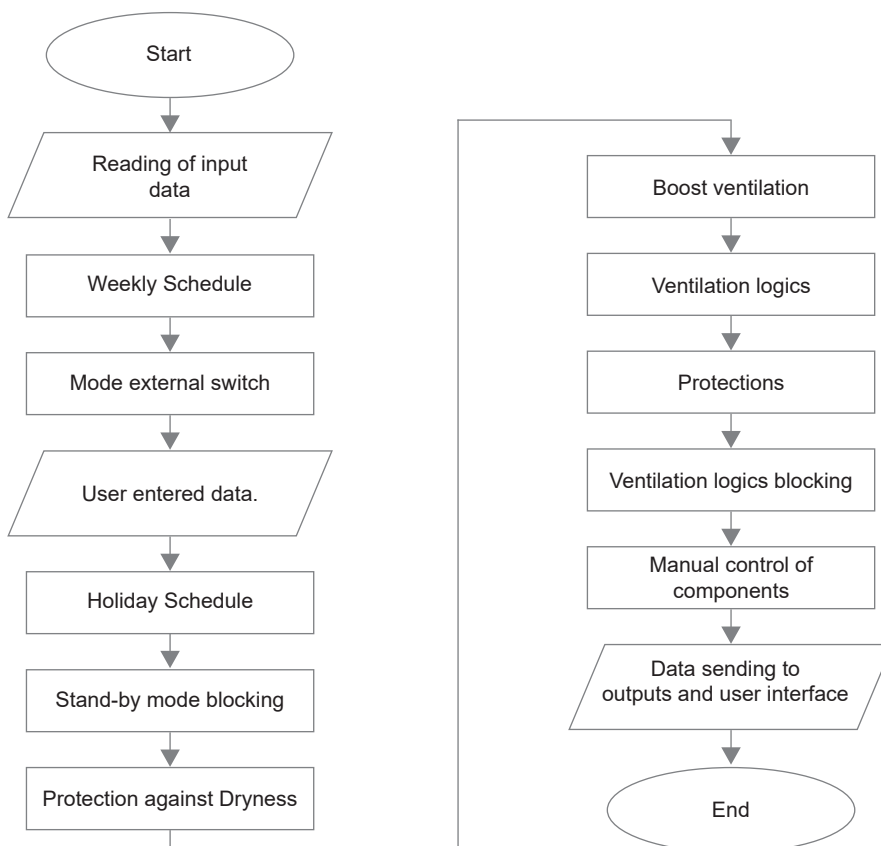
- 1 - Weekly Schedule
- 2 - Mode is activated from an external contactor
- 3 - User's manual mode selection
- 4 - Holiday Schedule
- 5 - Stand-by mode blocking

Based on the weekly schedule the system decides which mode it will be operating in; however, the user may change the existing mode manually. The system will inform when the next mode change is scheduled. After power loss the mode is selected based on the weekly schedule; however, if the schedule is not set, the mode used before the power loss will be activated.

The user may change modes only when the mode is activated from an external contactor. The only case when the user cannot change the mode is when the period of a holiday schedule is active. The system informs that the holiday schedule mode is active. To prevent blocking, the period of the holiday schedule must be changed.

Stand-by mode can be blocked based on selected parameters. If at least one of the above functions changes its mode into stand-by mode, it must be checked whether this mode is not currently blocked. If it is blocked, the previous selected mode is on.

The function order is provided below.



System status

The field of a system status is designed to notify a user of the existing system status. The table below provides possible system statuses.

System status	Description
Stand-by mode	System operates in stand-by mode
Building protection mode	System operates in building protection mode
Economy mode	System operates in economy mode
Comfort mode	System operates in comfort mode
Emergency run	System operates in emergency mode. For more information see alarms
Preparing	System is preparing for operation (pre-heating water heaters, etc.)
Opening dampers	Dampers are opened
BOOST function activated	“BOOST” function is active
Cooling heaters	Electric heaters are cooled down prior to stopping fans
Closing dampers	Dampers are closed
Critical alarm	Critical failure, system is shut down. For more information see alarms
Fire alarm	Fire protection from an external contactor is activated
Heat exchanger frost protection activated	Heat exchanger frost protection is activated
Change filters	Warning on clogged filters. Pressure relays are activated or filter timer is activated
Room RH 3 days average is lower than 30%. Limiting 3 speed.	Protection against dryness is activated. Room 3-day humidity average is lower than 30%. Air flow is reduced

Setting Date and Time

Proper date and time must be set to have proper functioning of schedules, event log and winter/summer function. Fast synchronization with the computer time is possible in user and adjuster environments.

Supply Air Temperature Control and Compensation

Temperature may be indicated for supply air or room temperature. The temperature can be maintained based on supply or extract air temperature. If control by room temperature is selected, the function calculates the temperature to be supplied to maintain proper room temperature. Temperature is limited based on supply air temperature permissible limits.

The ventilation unit is not designed to heat premises; therefore it is not necessary to use full capacity for low temperature differences as the compensation in percentage is provided for in this function. This parameter indicates a percentage part of the temperature difference (between the set point and room temperature) to be compensated by this function. E.g. set point is 20°C, room temperature is 16°C, compensation is 50%, difference between the indicated and existing temperatures is 20-16=4°C. Since 50% is compensated, then 4*50%=2°C, and when the received value is added to the set point we get the required supply air temperature 2+20=22°C. As this temperature is within the supply air temperature protection limits, it is not limited. In this case the system will maintain the supply air temperature at 22°C. The closer room temperature is to the set point (20°C), the closer required supply air temperature is to 20°C.

It can be also too hot in the room, therefore this function is compensating in both directions (both heats and cools). The required (compensated) temperature is displayed in the window "Monitoring" ("Required supply t."). If it is displayed that the required temperature is equal to 0°C it means that the supply air temperature maintenance is switched off.

The supply air temperature is maintained by the following components (in a sequential order as indicated):

- Fans (if too hot the speed is decreased)
- Cooler
- Recirculation damper (in case of favourable outdoor air temperature)
- Bypass damper (in case of favourable outdoor air temperature)
- Heater
- Fans (if too cold the speed is decreased)

The system first of all tries to maintain the supply air temperature by means of a heat exchanger. If plate heat exchanger is used, the bypass damper is used. The heat exchanger can both cool and heat with respect to outdoor and room air temperatures. The heat exchanger is controlled based on PID controller assigned to it. When the heat exchanger operates at full capacity and required temperature is not reached, the recirculation damper, then the heater or cooler is activated (if necessary) etc. Only the components configured for temperature maintenance are activated. From one component to another one the system switches over in 60 seconds.

Fan Control

The preferred air flow can be indicated in percentage or 4 fixed speeds where each of them is dedicated to a relevant system mode:

1. Building protection
2. Economy
3. Comfort
4. "BOOST" function

Fan speed can be controlled based on:

- Percentage value. Speed percentage is indicated. 0% corresponds to 0V control signal voltage, 100% corresponds to 10V control signal voltage.
- Pressure. The maximum system pressure is indicated which means 100% air flow.
- Air flow (m³/h). Supply and extract air factor K and maximum system air flow (m³/h) is indicated which means 100% air flow.

The fans are controlled by PID controller based on air flow and pressure. Every fan is controlled individually.

It is possible to limit the minimum and maximum fan control signal voltage. By default, minimum 2V voltage is indicated which means that 0V voltage signal is sent when fans are off, and 2V voltage signal is immediately sent when rotation is required.

Fan Protection based on Rotating Speed

If fans have "tacho" outputs, the fan failure can be identified based on their rotating speed. If the system sends the signal for fans to rotate and they fail to rotate, then protection is activated, system operation is shut down and alarm is displayed.

Slowing Down Air Flows based on Temperature

If supply air temperature is more important than air flow, the function of air flow slowing down based on temperature may be switched on. If full heating/cooling capacity is used to reach the desired temperature and it is not reached, the air flow is slowed down to have sufficient power to maintain the desired temperature.

Continuous Temperature Maintenance by Slowing Fans Down

This function is designed to save energy when air flow is changed. It is active when fans are controlled based on percentage, since PID controllers do it automatically if it is controlled based on air flows or pressure. Fast change of air flows imbalances the temperature maintenance function and consumes energy until it is balanced again. If a user sets a higher air flow, this function starts gradually increasing the air flow and gradually slows down the conversion speed when it approaches the set value. In this way the temperature maintenance function suffers less stress and consumes less energy. If the user reduces the air flow, the system switches off coolers and heaters to prevent from the heat/cold wave and gradually changes the air flow. After the air flow has been reduced, heaters and coolers continue operating as required.

"BOOST" Function

Boost ventilation function is used for fast ventilation of the rooms. This function activates the maximum air flow (speed 4). Boost ventilation must be temporary, i.e. it must be a final condition (e.g. CO₂ limit, time). The reason for this limitation is protection against dryness. The function is activated manually and from the external system contactor.

The function is inactive in stand-by mode. Time limit shall be set to this function. Once the function is activated, the indicated time is set for the function timer and time is counted till the function deactivation. This time may be adjusted in real-time, i.e. when the function is on.

Planing

Weekly Schedule

A weekly schedule consists of 10 weekly events. They can be added, deleted, activated and deactivated. One event indicates time, mode and days of the week.

The system changes modes based on the weekly schedule only when the indicated time comes; therefore a user can always change the existing mode manually. This schedule notifies the user of the upcoming mode change by indicating the time remaining till the next event.

Holiday Schedule

A holiday schedule is used when the unit has to operate in an indicated mode during holidays. The user interface shows when the schedule period is active as the mode activated by this function (except for protections) can be changed by no-one. In order to control the system in a normal manner, the holiday schedule period must be deactivated, i.e. zero values must be indicated or period dates must be changed. Up to five holiday periods can be indicated.

Winter/Summer Mode

The winter/summer function is used to set upcoming cold periods, because some part of the system need to be protected against cold outdoor air. During the winter period it is recommended to leave the unit on, therefore it is possible to set that the system switch-off is blocked during the winter period. Water heaters must be always on during the entire winter period.

The winter mode may be indicated:

- Manually
- By date
- Based on 3-day mean outdoor air temperature. The mean is calculated only when the fresh air (outdoor) pre-heater is off.

Protection against Dryness

This function is designed to protected premises against dryness. If the function is active, it calculates the 3-day mean humidity of extract air from the premises. If the mean drops below 30%, fans start operating at speed 2 in comfort mode. A user is notified of the activated protection and limited air flow.

If the humidity mean exceeds 30% or the function is switched off manually, fans start operating at speed 3 in comfort mode.

Night Cooling Function

This function is designed to save energy which is used to cool a building in the morning by cool night air.

If the function is on but not active, activation conditions are checked:

- 1 - System time is between function start and function end (hours/minutes).
- 2 - Time is every hour since the start.
- 3 - If "Stand-by" mode is set, the unit operates in "Building protection" for 5 minutes so that the actual temperature data is available. Temperatures are checked after purging. If wrong temperatures are received the unit returns to "Stand-by" mode.
- 4 - Outdoor temperature is higher than the set outdoor temperature.
- 5 - Extract air temperature is higher than the set temperature.
- 6 - Extract air temperature is higher than the outdoor temperature by at least 2 °C.
- 7 - Summer time.

If all conditions are fulfilled the unit starts operating in "Comfort" mode (without temperature maintenance). The main window shows that the night cooling function is active.

Where the function is active, the deactivation conditions are regularly checked:

- 1 - Time does not correspond to the start/end interval.
- 2 - Extract air temperature drops below the set point.
- 3 - Outdoor air temperature drops below the set point.
- 4 - Mode other than "Comfort" was switched or the unit has been shut down

If at least one condition is correct, the unit switches off the night cooling function and it switches to the mode that was on prior to activating the function.

CO₂ Reduction Function

This function is designed to maintain a proper quality of room air.

Where CO₂ exceeds the permissible limit, CO₂ reduction is activated and air flow is increased. When CO₂ reaches the set point, this function is switched off.

Filter Protections

Filter Timer Settings

Filter timer limit is set to the function. The maximum setting can be 1 year.

Mode from an External System Contactor

This function is designed to activate the preferred system mode by means of an external contactor. The function indicates a type of a signal to be sent to the input.

Possible types of signals:

- *Not used*
- Button click. Selected system mode is activated. Function is activated when it receives an impulse. It is deactivated when it receives the impulse again.
- *On/off*. Selected system mode is activated. Mode is active when contactor is on.
- PIR sensor. When the sensor is activated, the selected system mode is activated. If the signal is not received within 30 minutes, the mode is deactivated.

Fan Speeds from an External System Contactor

This function is designed to activate/deactivate the boost ventilation function or preferred combination of fan speeds by means of an external contactor. The function indicates a type of a signal to be sent to the input and components controlled by it. Possible combinations of signal types and functions:

- *Not used.*
 - *On/off.* Selected fan speed combination is activated. Function is on when contactor is on.
 - *Button click.* Selected fan speed combination is activated. Function is activated when it receives an impulse. It is deactivated when it receives the impulse again.
 - *On/off.* Boost ventilation function is controlled. Function is on when contactor is on. If the boost ventilation function is not terminated by means of this function within the boost ventilation time limit, force shutdown is used after the time expires.
 - *Button click.* Boost ventilation function is controlled. Function is activated when it receives an impulse. It is deactivated when it receives the impulse again.
 - If the boost ventilation function is not terminated by means of this function within the boost ventilation time limit, force shutdown is used after the time expires.
- It is also indicated whether boost ventilation will be activated or combination of fan speeds is preferred, i.e. it is possible to indicate preferred supply and extract air fan speeds individually.

Heat Exchanger Control

Cold - Heat Recuperation

Cold-heat recovery function is designed to control a heat exchanger. Its power is controlled:

1. Together with a plate heat exchanger a bypass damper is used. When it is closed, the heat exchanger is used at its full capacity. Its power is reduced by opening the damper.
2. Using a rotary heat exchanger power is controlled by changing its rotating speed or interval. When the rotor rotates at its full speed, the heat exchanger is used at its full capacity. Power is reduced by reducing rotating speed or increasing an interval.

Depending on the outdoor temperature, the heat exchanger can be used to heat or to cool. If the temperature outside is lower than the temperature in the room, the heat exchanger pre-heats outdoor air by using the heat of the room. If the temperature in the room is lower than the temperature outside, the heat exchanger cools down outdoor air by using air of the room. The power of a heat exchanger is reduced to the minimum when the required supply air temperature is the same as the temperature outdoors. The higher the difference between required and supplied air temperatures, the higher power usage of the heat exchanger. Other heating/cooling components can be activated only when the heat exchanger operates at its maximum capacity.

The type of a heat exchanger suitable for this function is indicated in SERVICE › HEAT EXCHANGER, while coefficients of PID controller are indicated in ADJUSTER › PID CONTROLLERS ADJUSTING window.

PID controller output rate is determined for rotor or bypass damper, at which they start operating.

- If rotor is controlled by 0.10 V signal, it won't rotate at a low voltage and the engine heats, thus minimal control signal output is limited. If On/Off rotary heat exchanger is used, PID percentage for activating the rotor is indicated in the window SERVICE › HEAT EXCHANGER.
- If bypass damper opens just some percent, noise may occur, so minimal opening of the damper is limited and this limit is also applied when the damper is almost opened. Where the plate heat exchanger with a three-position bypass damper is used, the time it takes for a bypass damper to open is indicated in the window SERVICE › HEAT EXCHANGER.

Heat Exchanger Anti-Frost Protection

This protection is designed to protect the heat exchanger against accumulation of ice, which can damage the structure of the heat exchanger. It is configured in the service environment window SERVICE › HEAT EXCHANGER.

Activation / deactivation of the protection is performed taking into account:

- the indicated outdoor air temperature;
- the indicated extract air temperature;
- the indicated extract air and calculated freezing point temperature difference (the latter is calculated according to the outside temperature, room temperature and humidity);
- the pressure relay.

Possible means of protection (performed in a sequential order as indicated):

- reduction of the supplied air flow (-30 %);
- recirculation of the outdoors and exhaust air;
- heating of the outdoors air by pre-heater;
- opening of the bypass damper or slowing down the rotor;
- stopping of the device (taking into account the temperature of the supplied air);
- stopping of the device, if safety zone is not reached for a determined time (two cycles);
- stopping of the device taking into account the critical outdoors air temperature (stopped after 30 seconds).

Conditions and means of protection can be activated by choice. The time of moving from one mean to the other is also indicated. If at least one activation condition is met, the protection is activated and a message is displayed. The process is started from the measures using the least amount of energy, i.e. (if allowed) the flow of the supplied air is reduced. If this does not help during the indicated time, the next measure is applied. The sequence of moving from one protection measure to another shall be followed. For a protection with a pre-heater, a position of the outdoors air sensor regarding the pre-heater, is indicated (before/after). If the sensor is indicated before the pre-heater, the device is not stopped if the required outdoors temperature is not reached with the pre-heater.

Recirculation of the outdoors and exhaust air is economical and effective protection, but it provides extracted air into the flow of the supplied air. Pre-heater of the outdoors air may be used in all its capacity or just to maintain the determined temperature. If the second variant is selected, then the activated protection at first turns on the pre-heater to operate at full capacity for a determined time period, and then it helps to maintain the indicated deactivation temperature.

If a plate heat exchanger with a bypass damper is used, a heater of the supplied air must be installed. By opening the damper the flow of the cold air passing the heat exchanger is reduced but the supplied air, which has to be warmed by the heater, is cooled down. This protection slowly opens the bypass damper, until activation conditions are met. When they are met, damper is stopped for 5 min. and then it is closed slowly. Slow closing also happens, when the temperature of the supplied air drops below the allowed limit.

System Monitoring

This function is used to monitor controller input and output values, versions of connected modules, system date and time, fan speeds, temperatures, CO₂ value, pressure, etc. The amount of information depends on the system configuration. This tool is designed for preventive maintenance of the system.

Stand-By Mode Blocking

This function is designed to protect the system against the impermissible unit shutdown. It is recommended to limit the unit shutdown up to 1 hour within 12 hours during the winter period. Possible function modes:

- Always allow shutdown
- Block shutdown
- Block shutdown during winter period
- Block shutdown during summer period

It must be indicated for the function for how long the switch-off is permissible within 12 hours. If the switch-off is blocked and the system is shut down, the system counts the time and informs the user on the remaining time.

Air Flow Adjustment

4 air flows are used in the system and they are dedicated to specific modes:

1. Building protection
2. Economy
3. Comfort
4. "BOOST" function

The flows are displayed in ascending order, i.e. when "Comfort" mode is set to lower air flow than that of "Economy" one, the "Economy" mode air flow will be reduced automatically. With respect to the system configuration, air flows are indicated in percentage or pressure or amounts of air. 100% value of air flow is indicated in service environment.

Manual Control of Components

The function of manual control of components is designed to activate/deactivate the components manually. Components are controlled by digital and analogue outputs. Analogue outputs are controlled in percentage, and digital output are controlled by "on/off". By default, all components are attributed "Auto" status which means that a component is controlled based on ventilation logic. Components are displayed by the system configuration. Settings must be saved so that they remain the same after power loss.

The minimum unit consumption in stand-by mode is ensured only when all the manual control components are set to "Auto" position.

Prior to using the manual control function, it is recommended to activate the force shutdown function which blocks the ventilation logic functions.

This function may be useful, if you need to check whether everything is properly connected. Moreover, in the event of failure, certain component can be activated so that the unit operates irrespective of sensors and protections. Of course, this method should be applied in exceptional cases until the failure is rectified.

If an external ("Remote") type of a temperature sensor is displayed, the sensor temperature may be indicated manually, and the values may be indicated via the Modbus interface.

Changing Passwords

Login passwords can be changed in the service environment. To change passwords of service and adjuster environments the password must be activated.

The password consists of 4 digits. If password is not necessary for parameter review and change, set the password (number "0").

Restoring Factory Defaults

This function allows to restore the factory defaults.

Indications of Functions, Alarms and Warnings

Function indications are designed to inform a user on active functions and on the presence of at least one warning or alarm. The table below provides indications and their descriptions.

Functions indications	Description
Working indication output	Working indication output is activated
Alarm indication output	Failure indication output is activated
System mode switch	Mode is activated from an external contactor
Custom fans speed switch	Selected fan speed from an external contactor is activated
Winter	Active winter mode
Stand-by mode blocking activated	Stand-by mode blocking is activated
Slowing down fans	Fans are slowed down
Slowing down fans by temperature	Fans are slowed down based on supply air temperature
Night cooling function activated	Night cooling function is activated
Hydronic pump exercise activated	Preventive maintenance of circulation pumps is activated
Service stop function	Ventilation logic operation is blocked. Service activities are carried out
Holidays	Holiday schedule interval is active. System mode can be changed only upon changing the holiday schedule interval.
Reducing CO ₂ level	CO ₂ reduction function is activated
Full recirculation	Full recirculation function is activated

Display and Cancellation of Alarms and Warnings

The system notifies the user of system failures by alarms and warnings. Warnings are cancelled automatically, whereas alarms must be cancelled manually. It is recommended that alarms are cancelled by a specialist prior to finding out the causes of the alarm. If at least one alarm is active, the system is shut down and external failure indication is activated. All possible alarms and warnings are provided in the table below.

ALARMS

NO	NAME
A1	FIREPLACE PROTECTION ACTIVATED
A2	PLATE HEAT EXCHANGER FROST PROTECTION. SYSTEM STOPPED
A3	PLATE HEAT EXCHANGER FROST PROTECTION (PRESSURE RELAY). SYSTEM STOPPED
A4	HYDRAULIC HEATER FROST PROTECTION. SYSTEM STOPPED
A5	TOO LOW SUPPLY TEMPERATURE. SYSTEM STOPPED
A6	TOO HIGH SUPPLY TEMPERATURE. SYSTEM STOPPED
A7	CHANGE SUPPLY FILTER (PRESSURE RELAY). SYSTEM STOPPED
A8	CHANGE EXTRACT FILTER (PRESSURE RELAY). SYSTEM STOPPED
A9	CHANGE SUPPLY AND EXTRACT FILTERS. SYSTEM STOPPED
A10	SUPPLY AIR TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A11	EXTRACT AIR TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A12	EXHAUST AIR TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A13	OUTSIDE AIR TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A14	HYDRAULIC HEATER WATER TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A15	HYDRAULIC PREHEATER WATER TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A16	HYDRAULIC COOLER WATER TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A17	CONTROLLER CABINET TEMPERATURE SENSOR FAILURE. SYSTEM STOPPED
A18	HEATER MANUAL PROTECTION. SYSTEM STOPPED
A19	PREHEATER MANUAL PROTECTION. SYSTEM STOPPED
A20	SUPPLY FAN PROTECTION
A21	EXTRACT FAN PROTECTION
A22	DX COOLER PROTECTION
A23	FIRE ALARM
A24	SUPPLY AIR PRESSURE PROTECTION. SYSTEM STOPPED
A25	EXTRACT AIR PRESSURE PROTECTION. SYSTEM STOPPED
A26	BAD CONFIGURATION
A27	HEATER MANUAL PROTECTION: FAN BOOST ENABLED
A28	PREHEATER MANUAL PROTECTION: FAN BOOST ENABLED
A29	INTERNAL COMMUNICATION ERROR

WARNING

NO	NAME
W1	BROKEN ROTOR BELT (Applicable when a rotor heat exchanger is built in the unit)
W2	DRYNESS PROTECTION ACTIVATED
W3	PLATE HEAT EXCHANGER FROST PROTECTION ACTIVATED
W4	TOO LOW SUPPLY TEMPERATURE
W5	TOO HIGH SUPPLY TEMPERATURE
W6	CHANGE SUPPLY AND EXTRACT FILTERS
W7	SUPPLY AIR TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W8	EXTRACT AIR TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W9	EXHAUST AIR TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W10	OUTSIDE AIR TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W11	HYDRAULIC HEATER WATER TEMPERATURE SENSOR FAILURE. EMERGENCY RUN

W12	HYDRAULIC PREHEATER WATER TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W13	HYDRAULIC COOLER WATER TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W14	CONTROLLER CABINET TEMPERATURE SENSOR FAILURE. EMERGENCY RUN
W15	FIRE DAMPER TEST PASSED
W16	FIRE DAMPER TEST FAILED
W17	HEATER AUTOMATIC PROTECTION
W18	PREHEATER AUTOMATIC PROTECTION

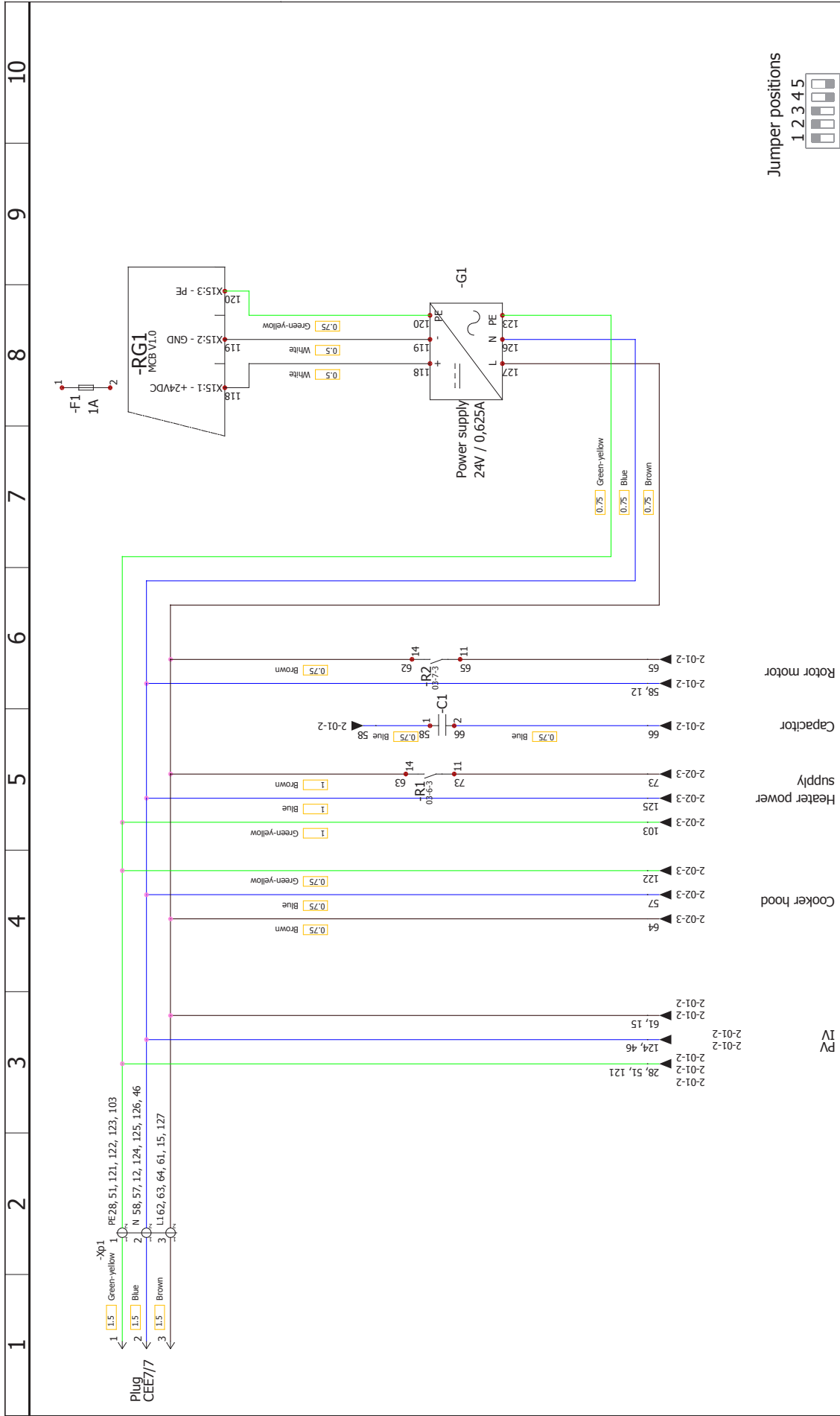
Event Log (History)

The system records 50 recent events (failures, alarms, fire damper testing results, etc.). The log stores the event description and time.

System Versions and Running Time

Every unit has a configuration version specific to this unit, which is saved in the production line. Besides the system configuration and software versions the running time is also displayed since the unit manufacture date. Running time is calculated when fans are rotating.

The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)

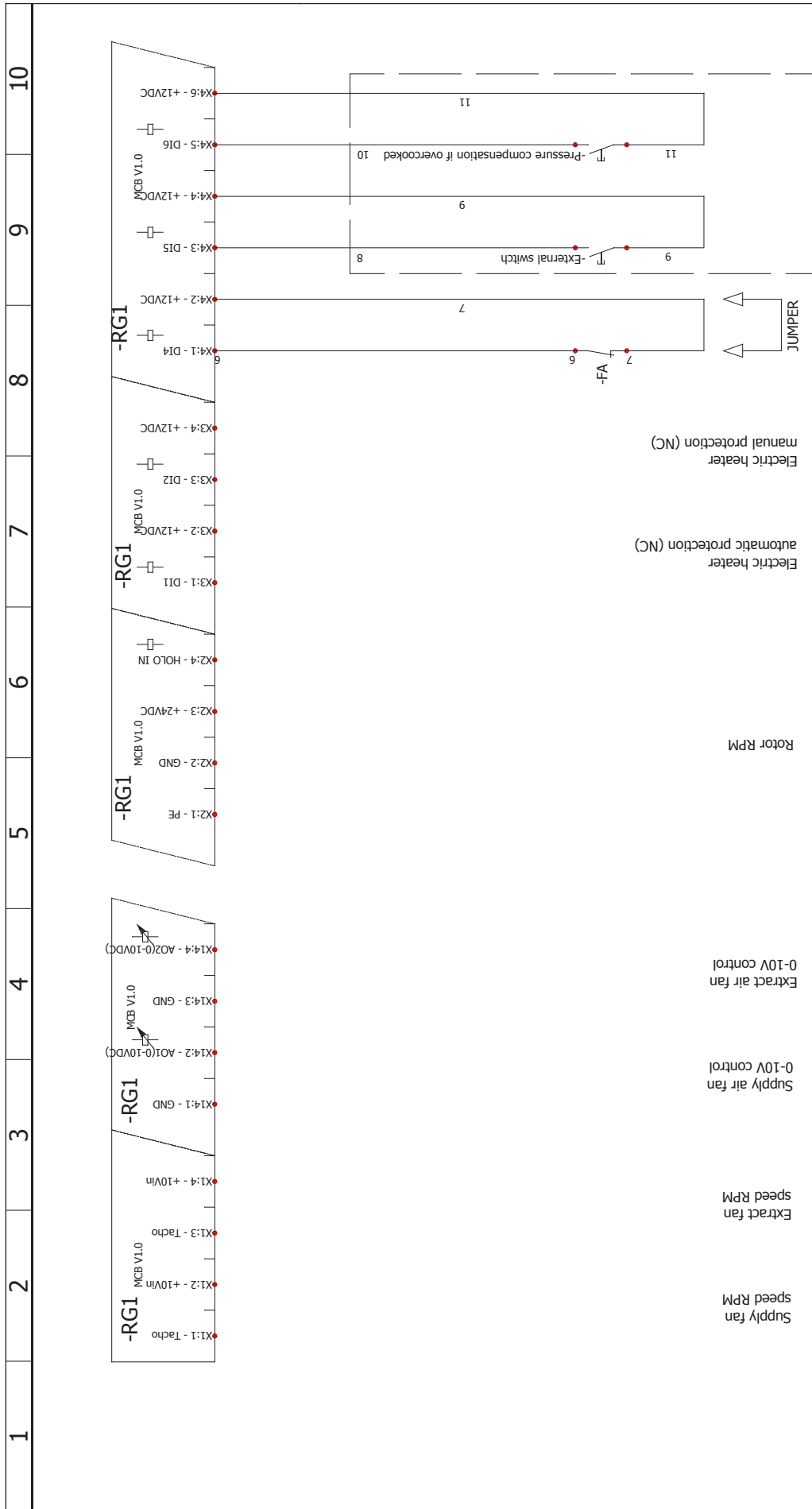


Jumper positions
1 2 3 4 5

Aut. Smarty 2RVER-MCB.0-3k	219.0161.0.1.1-PS-3k		DUTIES / NAME		DATE	Book #
	Automatic connections principal scheme		EI O. Drasutis	2016-06-07	1	
			EI K. Vasiliauskas	2016-06-07	Drawing #	
			T. T. Gaillunas	2016-06-07	01	

UAB "SALDA"

The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)

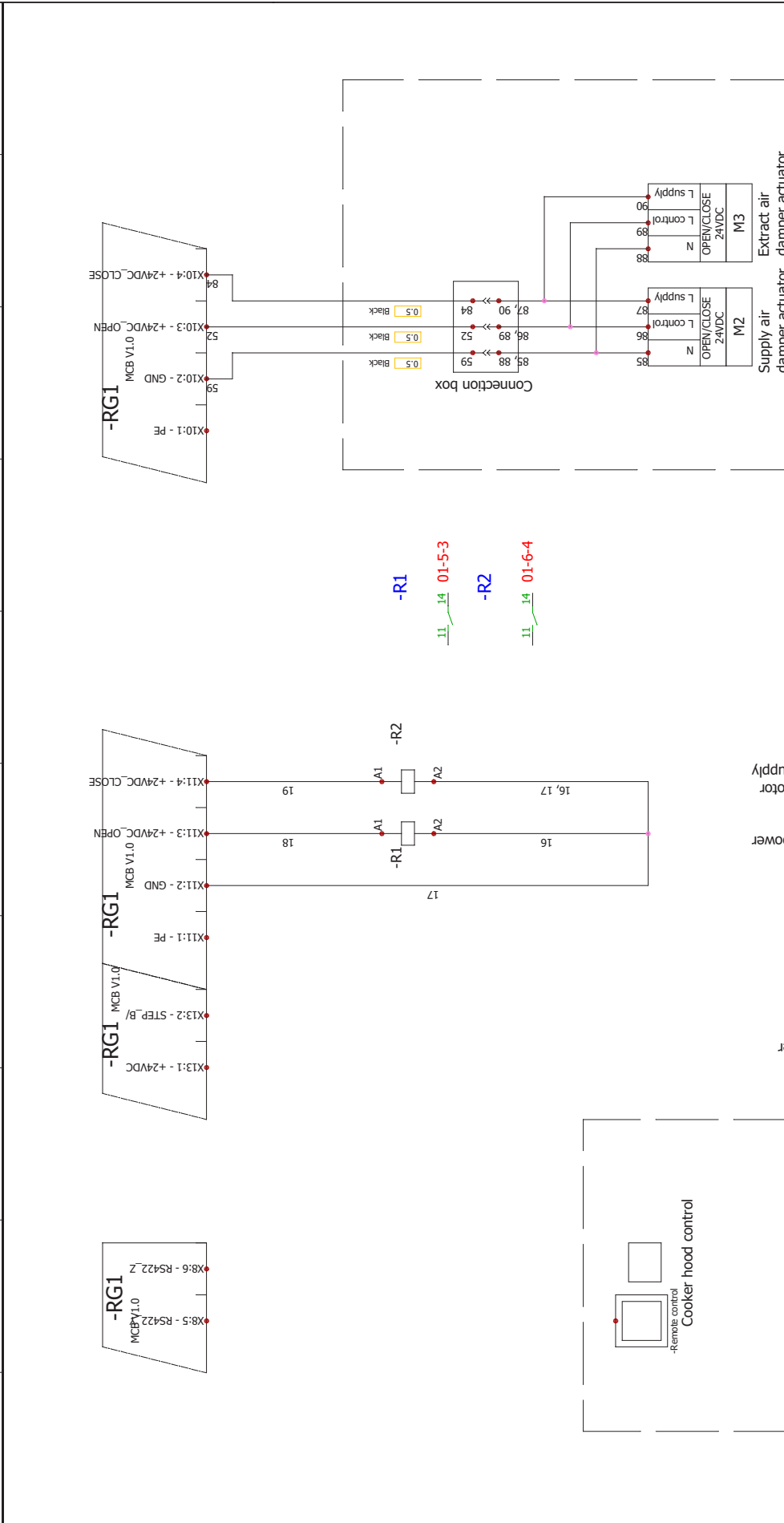


Punktyrne linija pažymėtus komponentus ir kabelius pajungia SALDA arba vartotojas.
Components and cables marked with the dash line connected by SALDA or customer.

Aut. Smarty 2RVER-MCB.0-3k	219.0161.0.1.2-PS-3k		DUTIES / NAME	SIGNATURE	DATE	Book #
	Automatic connections principal scheme		ET O. Drasutis	2016-06-07	1	
			CHECKED BY	2016-06-07	Drawing #	
			APPROVED BY	2016-06-07	02	
UAB "SALDA"						

The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)

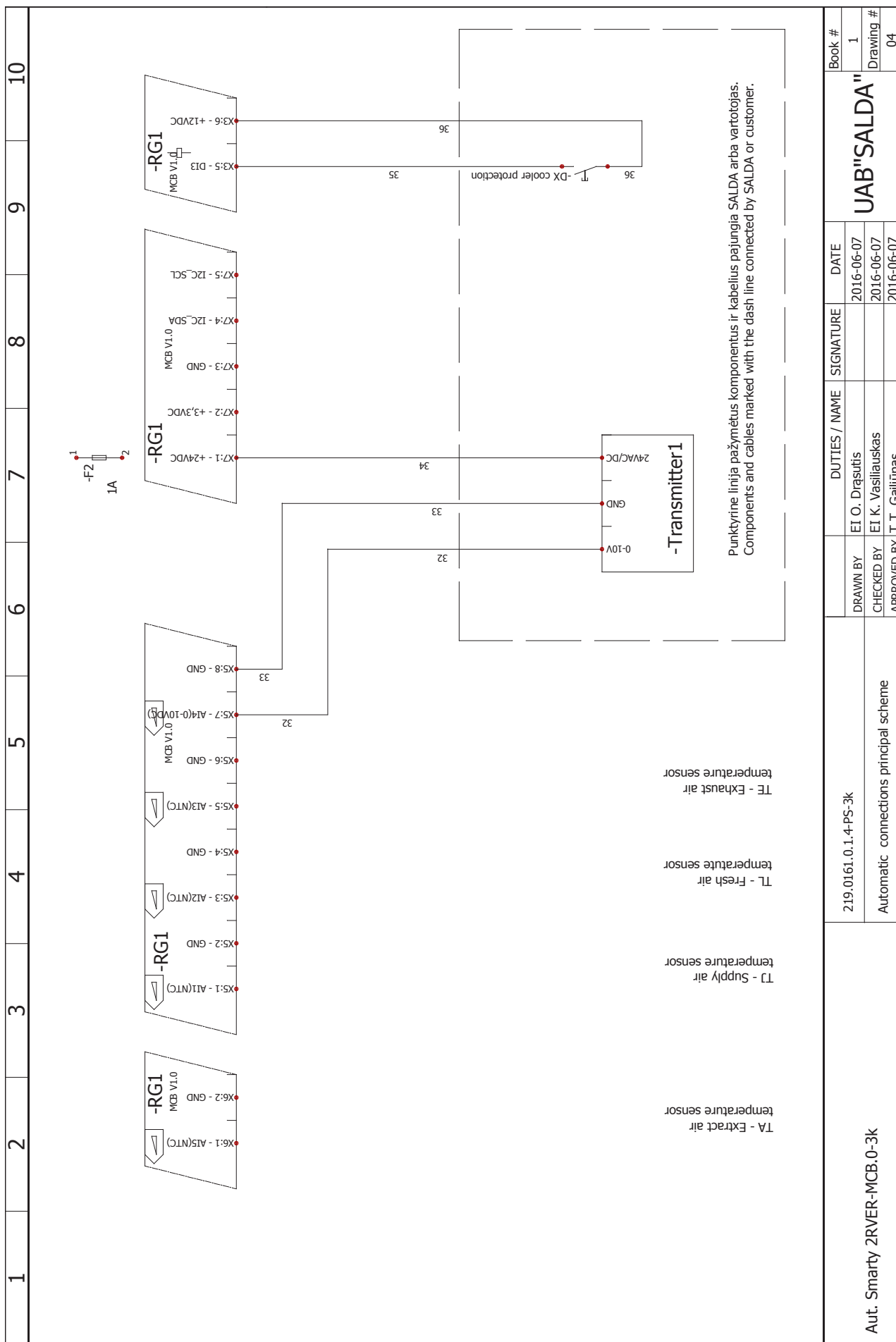
1 2 3 4 5 6 7 8 9 10



Punktyrine linija pažymėtus komponentus ir kabelius pajungia SALDA arba vartotojas.
Components and cables marked with the dash line connected by SALDA or customer.

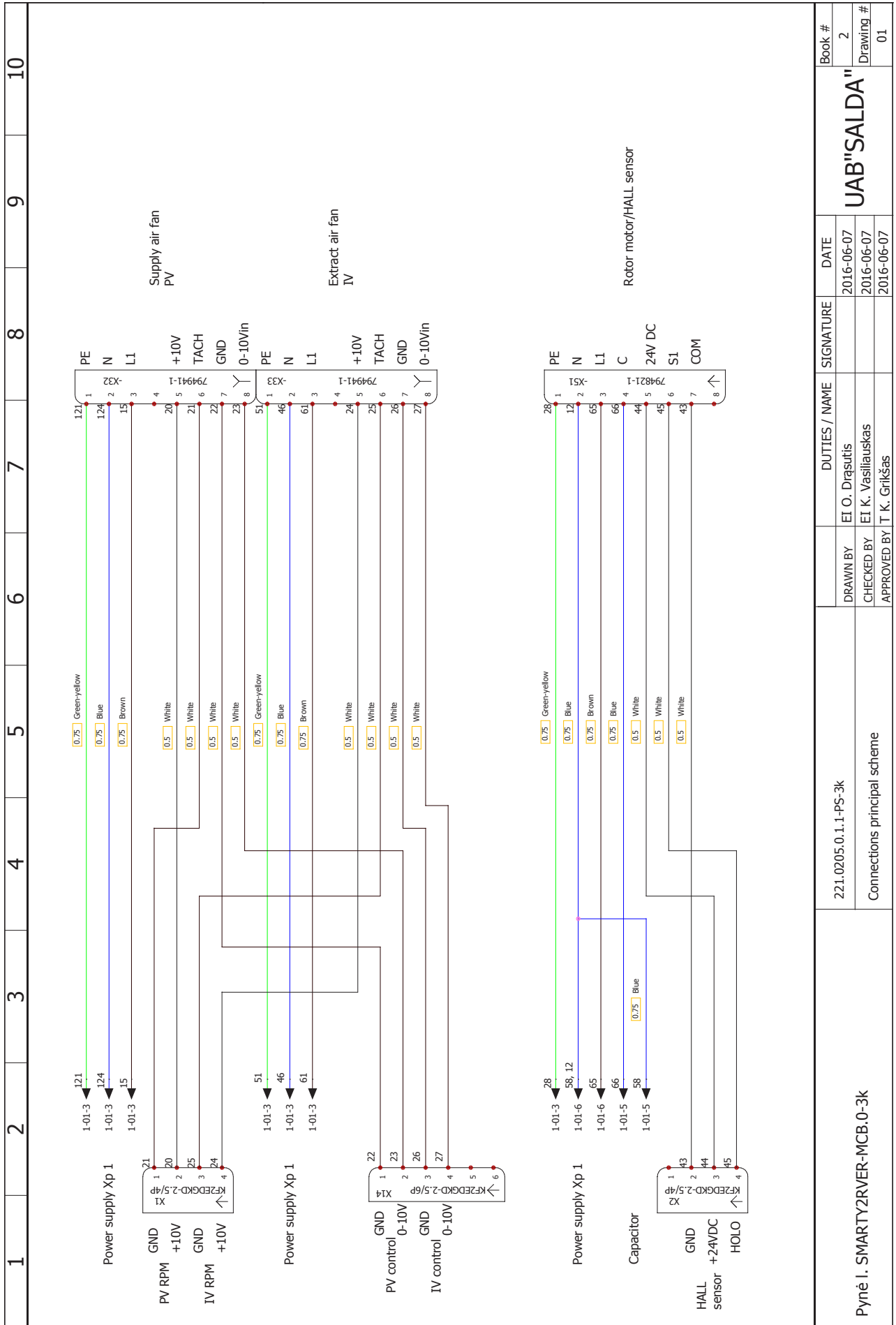
Aut. Smarty 2RVER-MCB.0-3k	219.0161.0.1.3-PS-3k	Automatic connections principal scheme	DRAWN BY EI O. Drašutis	DATE 2016-08-09	SIGNATURE	UAB "SALDA"	
						DUTIES / NAME	DATE
			CHECKED BY EI K. Vasiliauskas	2016-08-09		Book # 1	Drawing # 03
			APPROVED BY T. T. Gailiūnas	2016-08-09			

The principal connection scheme of internal and external components (control Smarty 2RVER-MCB.0-3k)



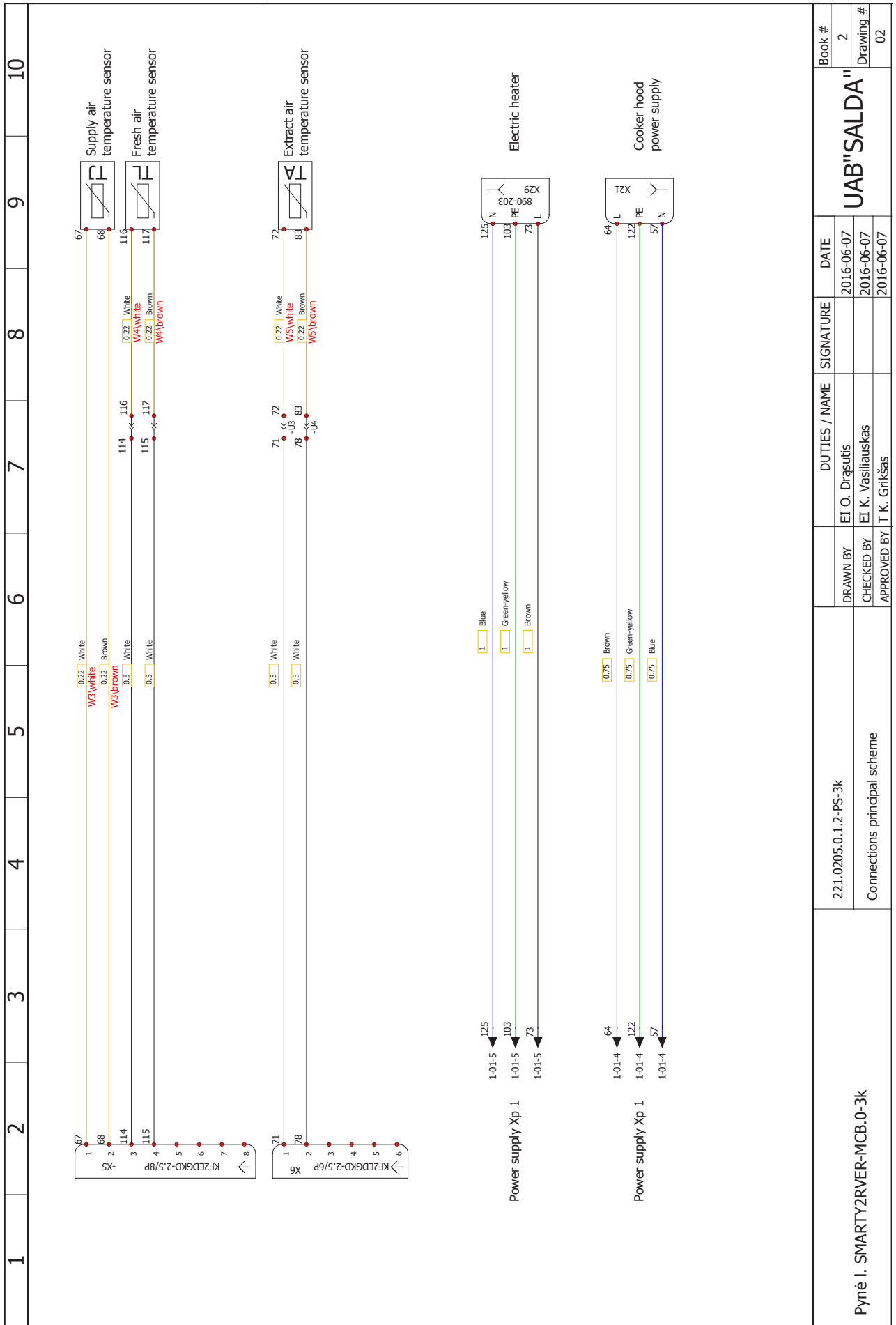
Aut. Smarty 2RVER-MCB.0-3k	219.0161.0.1.4-PS-3k	DUTIES / NAME	SIGNATURE	DATE	Book #
	Automatic connections principal scheme	DRAWN BY EI O. Drasutis		2016-06-07	1
		CHECKED BY EI K. Vasilauskas		2016-06-07	Drawing #
		APPROVED BY T. T. Gailiūnas		2016-06-07	04
UAB "SALDA"					

The principal connection scheme of internal and external components (cable harness I Smarty 2RVER-MCB.0-3k)

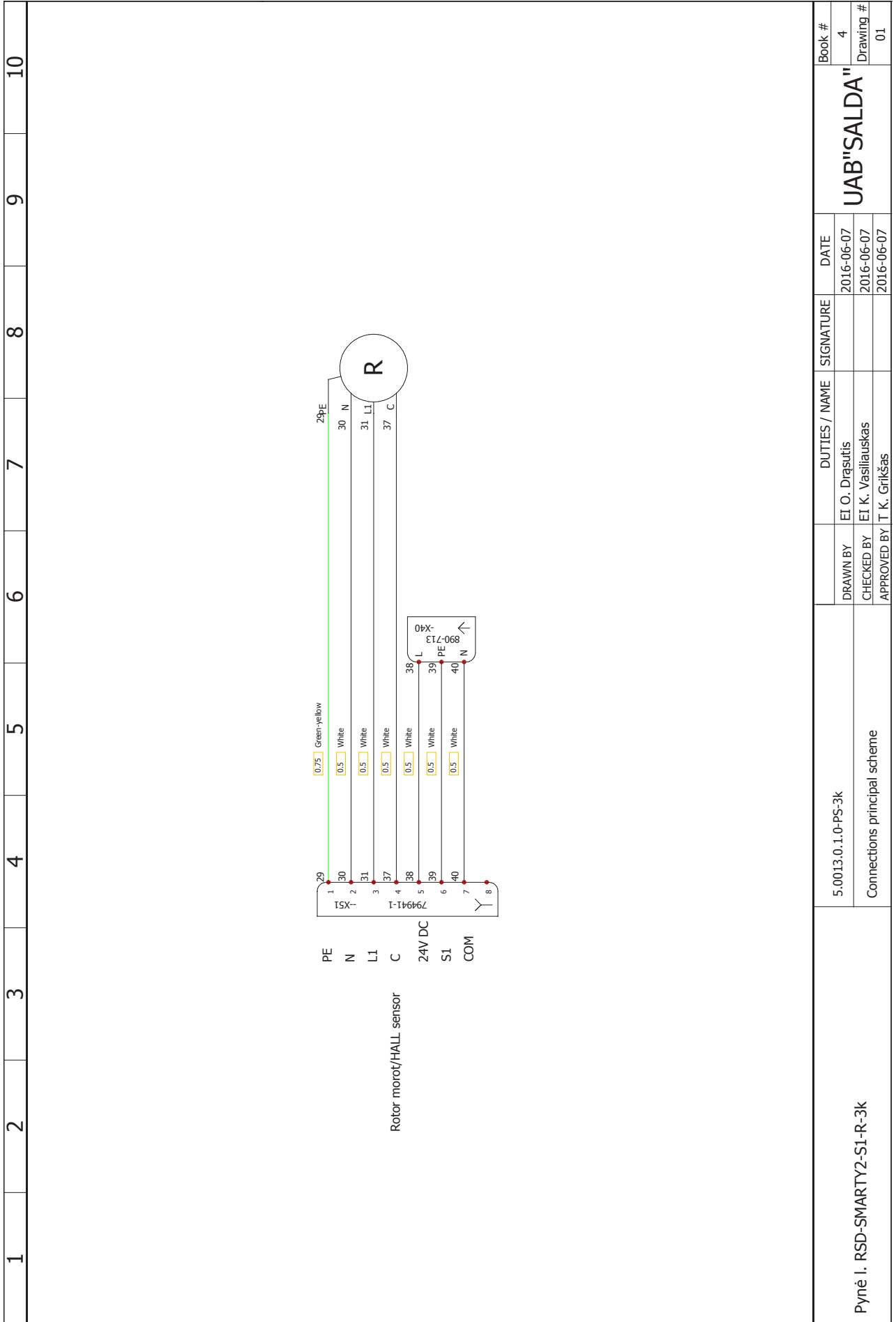


Pyné I. SMARTY2RVER-MCB.0-3k		221.0205.0.1.1-PS-3k		Connections principal scheme		DUTIES / NAME		DATE		Book #	
						EI O. Drašutis		2016-06-07		2	
						EI K. Vasiliauskas		2016-06-07		Drawing #	
						APPROVED BY T. K. Griškės		2016-06-07		01	
UAB "SALDA"											

The principal connection scheme of internal and external components (cable harness I Smarty 2RVER-MCB.0-3k)



The principal connection scheme of internal and external components (cable harness I RSD-SMARTY2-S1-R-3k)

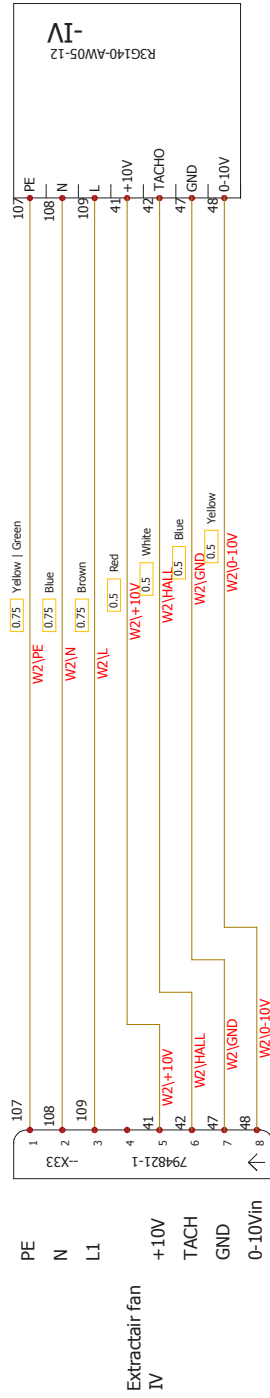
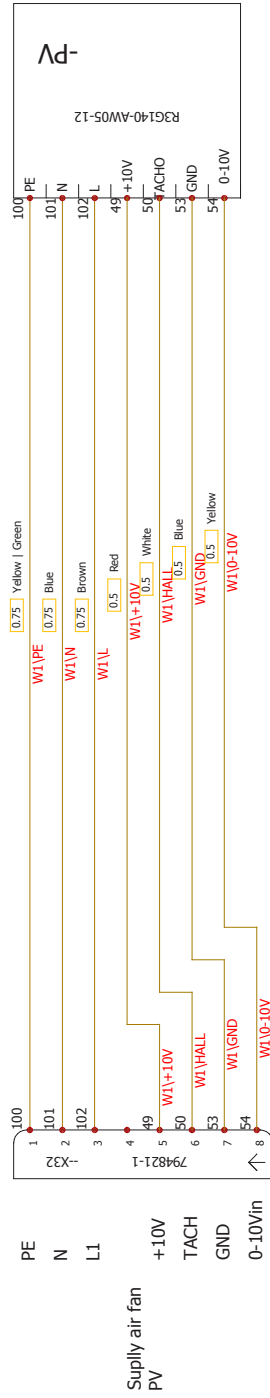


The principal connection scheme of internal and external components (cable harness I S1-0,2m-2k)

1	2	3	4	5	6	7	8	9	10
Pynė I. S1-0,2m-2k	5.0014.0.1.0-PS-2k								
	Connections principal scheme								
	DRAWN BY		DUTIES / NAME		SIGNATURE		DATE		Book #
CHECKED BY		EI O. Drąsutis				2016-06-06		5	
APPROVED BY		EI D. Aleksandravičius				2016-06-06		Drawing #	
		K. Griškās				2016-06-06		01	
UAB "SALDA"									

The principal connection scheme of internal and external components (fan R3G 140 AW 05-12 Smarty)

1 2 3 4 5 6 7 8 9 10

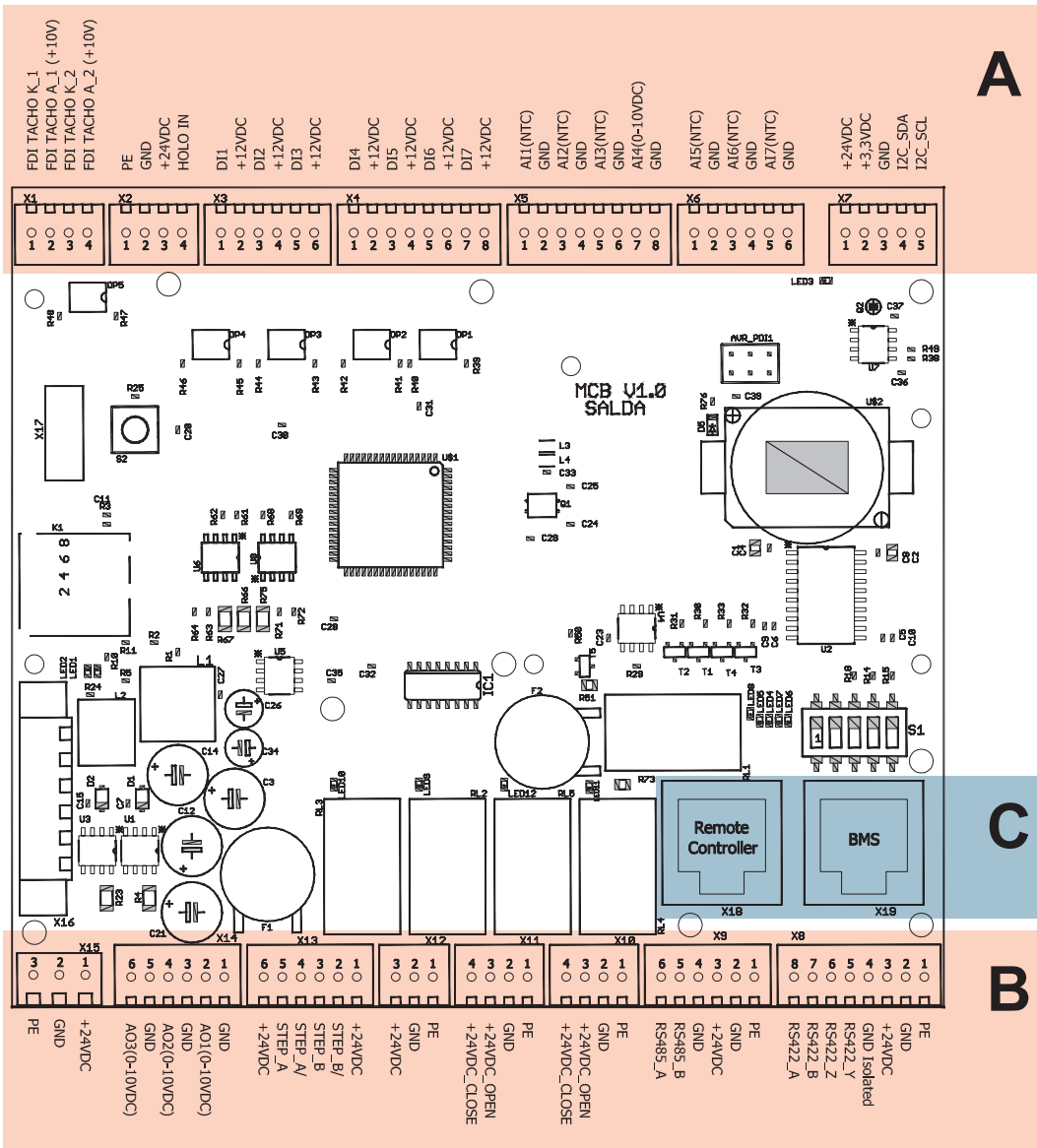
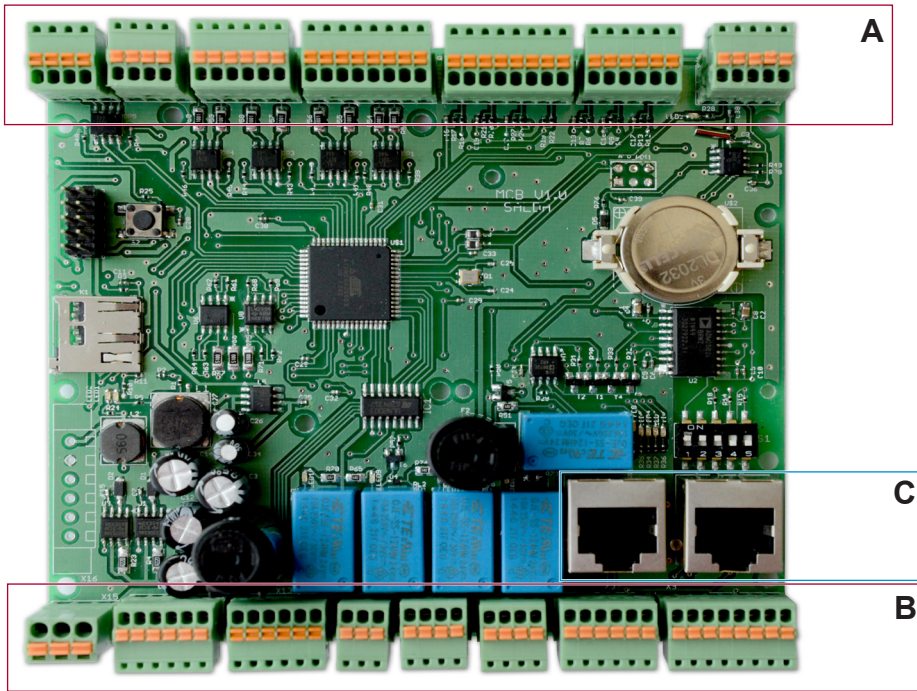


Vent: mazgas R3G 140 AW 05-12 Smarty	224.0084.0.1.0-PS-1k			UAB "SALDA"			Book #
	connections principal scheme						6
							Drawing #
				DRAWN BY	DUTIES / NAME	SIGNATURE	DATE
				ET O. Drąsutis	ET O. Drąsutis		2016-06-06
				CHECKED BY	ET D. Aleksandravičius		2016-06-06
				APPROVED BY			2016-06-06
							01

The principal connection scheme of internal and external components (heater SRR-0,6-1f EC-0k)

1	2	3	4	5	6	7	8	9	10		
<p style="text-align: center;"> EK - heating element ATI - automating overhear protection RT1 - manual overhear protection </p>											
Šildyt. SRR-0,6-1f EC-0k	1.680.200.5.0-PS-1k				DUTIES / NAME		SIGNATURE		DATE		
	Principle scheme				DRAWN BY EI O. Drasutis		CHECKED BY EI D. Aleksandravičius		APPROVED BY		
				Book #		7		Drawing #		01	
				UAB "SALDA"							

Controller MCB V1.0



A			
Connector	Contact No.	Contact name	Functional block name
MCB			
X1	1	MCB FDI TACHO K_1(GND)	Supply fan speed RPM
	2	MCB FDI TACHO A_1(+10V)	
	3	MCB FDI TACHO K_2(GND)	Extract fan speed RPM
	4	MCB FDI TACHO A_2(+10V)	
X2	1	PE	Rotor speed RPM
	2	GND	
	3	+24VDC	
	4	MCB HOLO	
X3	1	MCB DI1	Not used
	2	+12VDC	
	3	MCB DI2	
	4	+12VDC	
	5	MCB DI3	
	6	+12VDC	
X4	1	MCB DI4	Fire protection input (NC)
	2	+12VDC	External switch
	3	MCB DI5	
	4	+12VDC	
	5	MCB DI6	Pressure compensation if overcooked
	6	+12VDC	Not used
	7	MCB DI7	
	8	+12VDC	
X5	1	MCB AI1 (NTC)	Supply air temperature sensor
	2	GND	Outdoor air temperature sensor
	3	MCB AI2 (NTC)	
	4	GND	
	5	MCB AI3 (NTC)	Not used
	6	GND	Air quality transmitter I input 0-10V
	7	MCB AI4 (0-10V)	
	8	GND	
X6	1	MCB AI5 (NTC)	Extract air temperature sensor
	2	GND	Not used
	3	MCB AI6 (NTC)	
	4	GND	
	5	MCB AI7 (NTC)	
	6	GND	
X7	1	+24VDC	
	2	+3,3VDC	
	3	GND	
	4	I2C_SDA	
	5	I2C_SCL	

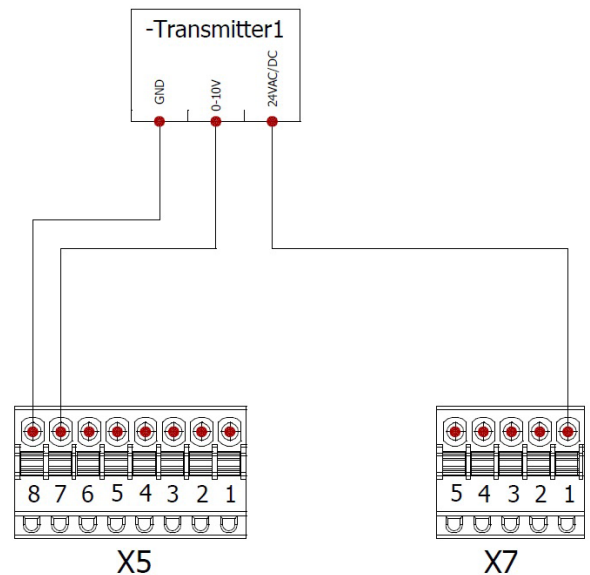
B			
Connector	Contact No.	Contact name	Functional block name
MCB			
X8	1	PE	Not used
	2	GND	
	3	+24VDC	
	4	GND isolated	
	5	RS422_Y	
	6	RS422_Z	
	7	RS422_B	
	8	RS422_A	
X9	1	PE	Not used
	2	GND	
	3	+24VDC	
	4	GND	
	5	RS485_B	
	6	RS485_A	
X10	1	MCB PE	Outside air damper
	2	MCB GND	
	3	MCB RECIRC_+24VDC_OPEN	
	4	MCB RECIRC_+24VDC_CLOSE	
X11	1	MCB PE	Not used
	2	MCB GND	Not used
	3	MCB BYPASS_+24VDC_OPEN	El. heater relay
	4	MCB BYPASS_+24VDC_CLOSE	Rotor motor relay
X12	1	PE	Not used
	2	GND	
	3	+24VDC	
X13	1	+24VDC	Not used
	2	STEP_B/	
	3	STEP_B	
	4	STEP_A/	
	5	STEP_A	
	6	+24VDC	
X14	1	GND	Supply air fan control (output 0-10VDC)
	2	MCB AO1(0-10VDC)	Supply air fan control (output 0-10VDC)
	3	GND	Extract air fan control (output 0-10VDC)
	4	MCB AO2(0-10VDC)	Extract air fan control (output 0-10VDC)
	5	GND	Not used
	6	MCB AO3(0-10VDC)	Not used
X15	1	+24VDC	MCB Power supply 24VDC
	2	GND	
	3	PE	
C			
Connector	Contact No.	Contact name	Functional block name
MCB			
X18			Remote control connection (RS485)
X19			BMS connection (galvanically isolated RS485 or RS422, configurable via SL1)

CO₂ sensor or connection of humidity sensor RH**Settings:****CO₂ converter (S-KCO2 or S-RCO2-F2)**

1. Set that next to 0.10 V input an extracted air CO₂ converter is connected 'Service-> Sensors-> 0-10 VDC sensors-> Air quality sensor 1' (choose 'Extract CO₂')
2. Indicate:
 - „Air quality sensor MIN“: 0
 - „Air quality sensor MAX“: 2000
3. CO₂ reduction function is activated 'Service-> Main-> CO₂ reduction function' (controlled recirculation damper and fans)
4. To see the CO₂ level: 'Adjuster-> Monitoring-> Extract air CO₂'

Humidity RH converter (S-KFF-U) or room RH converter (S-RFF-U-D-F2)

1. Set that next to 0.10 V input an extracted air RH converter is connected 'Service-> Sensors-> 0-10 VDC sensors-> Air quality sensor 2' (choose 'Extract RH')
2. Indicate:
 - „Air quality sensor MIN“: 0 (0*0.1=0.0 %)
 - „Air quality sensor MAX“: 1000 (1000*0.1=90.0 %)
3. You can see the level of extracted air RH in: 'Adjuster-> Monitoring-> Extract air RH'

Electric installation:

RH sensor of the extracted air is used to calculate the freezing point

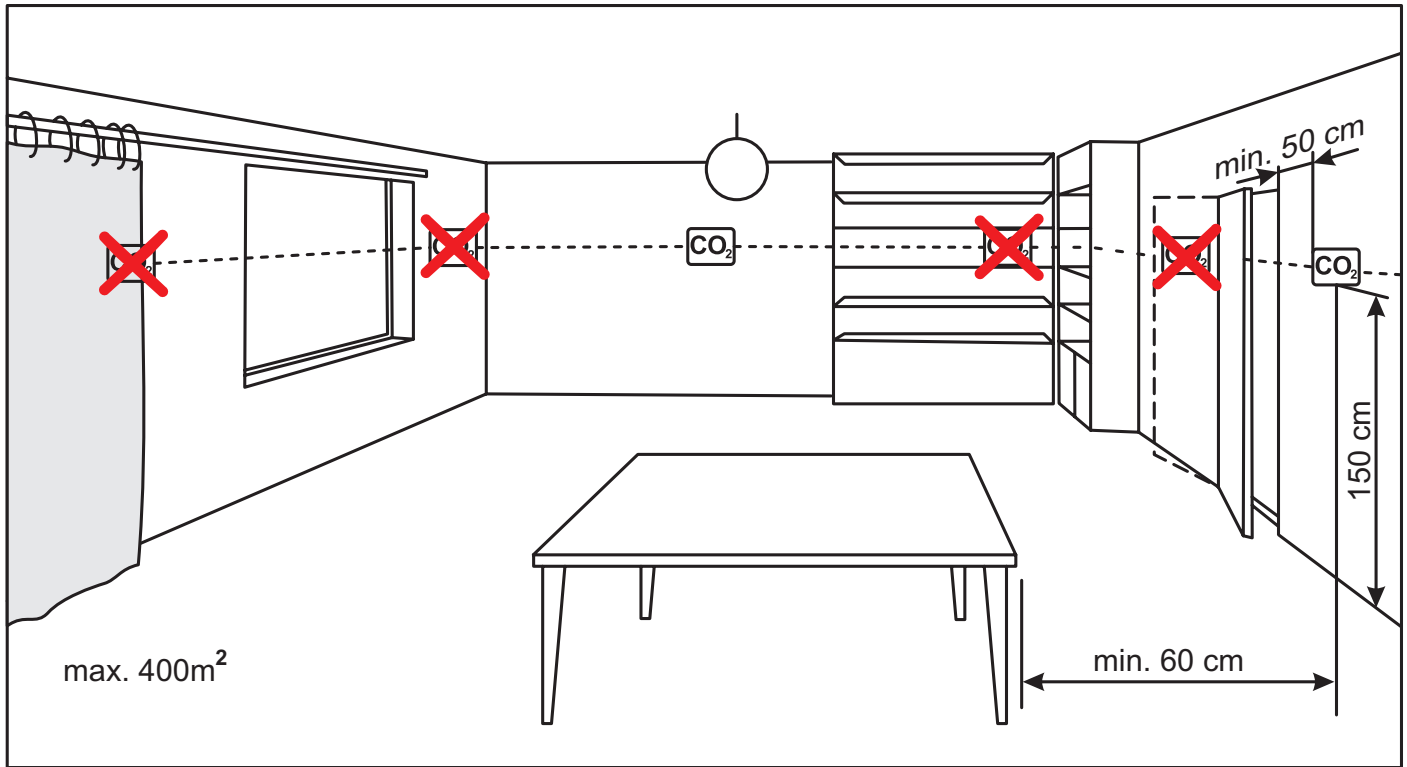
In order to reduce the CO₂ concentration in the premise (-s), it is necessary to connect CO₂ converter (canal or installed in the premises).

Purpose of the connectors contacts:

MCB:

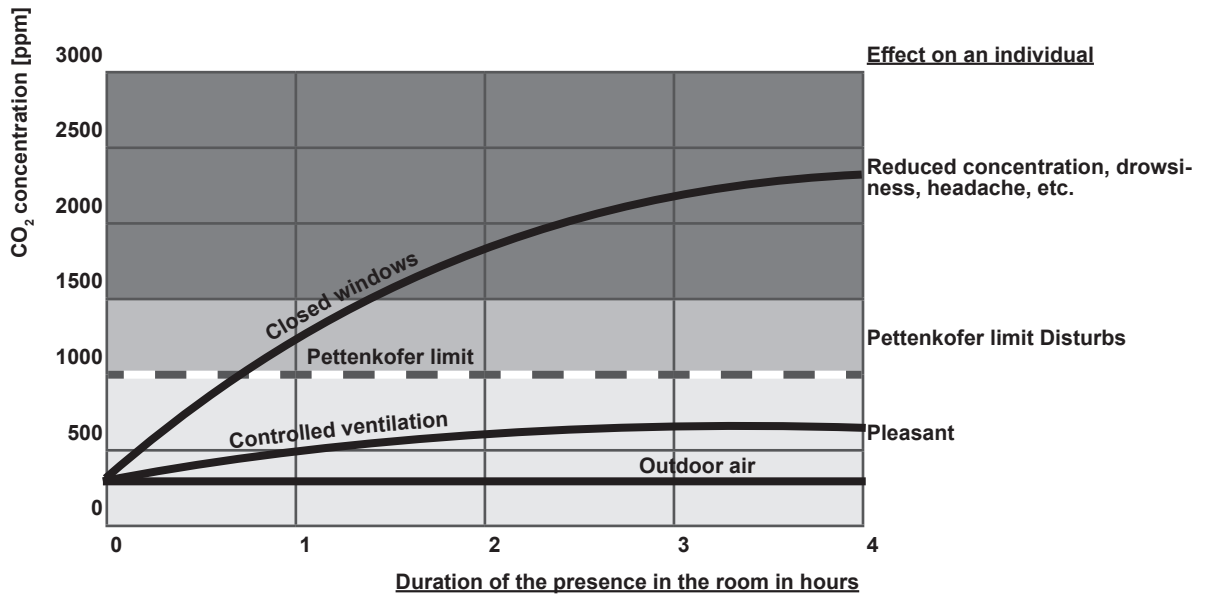
- X7:1 – power supply of the converter +24 V DC
- X5:7 – analogue input 0–10 V DC
- X5:8 – general GND

Room CO₂ transmitter installation recommendation



Where the channel CO₂ transmitter is used: it must be installed in the extract air duct. Tool for drilling holes are required for its installation.

CO₂ concentration according to Pettenkofer limit

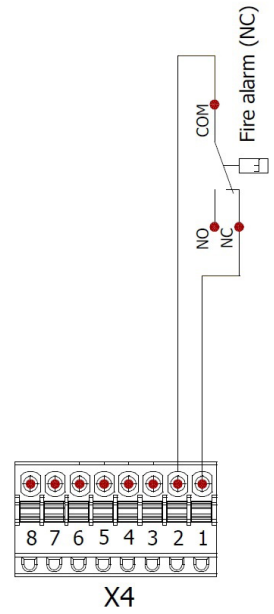


Fire protection input (NC)

Fire protection signal input has to be normally closed, until the fire protection system is not connected. In factory the short-circuiter is applied. KEFA KF2EDGKD-2.5/8P X4 connector 1 and 2 contacts.

Fire protection signal:

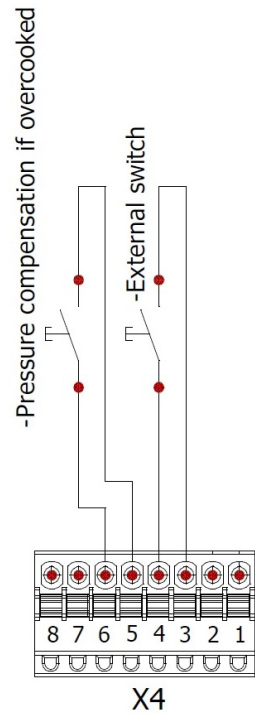
MCB:
X4: 1, 2



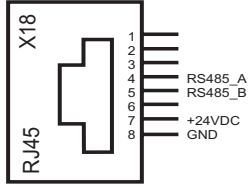
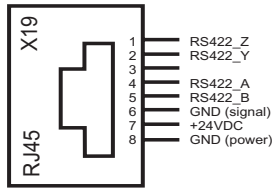
External switches

Functions are activated using external switches.

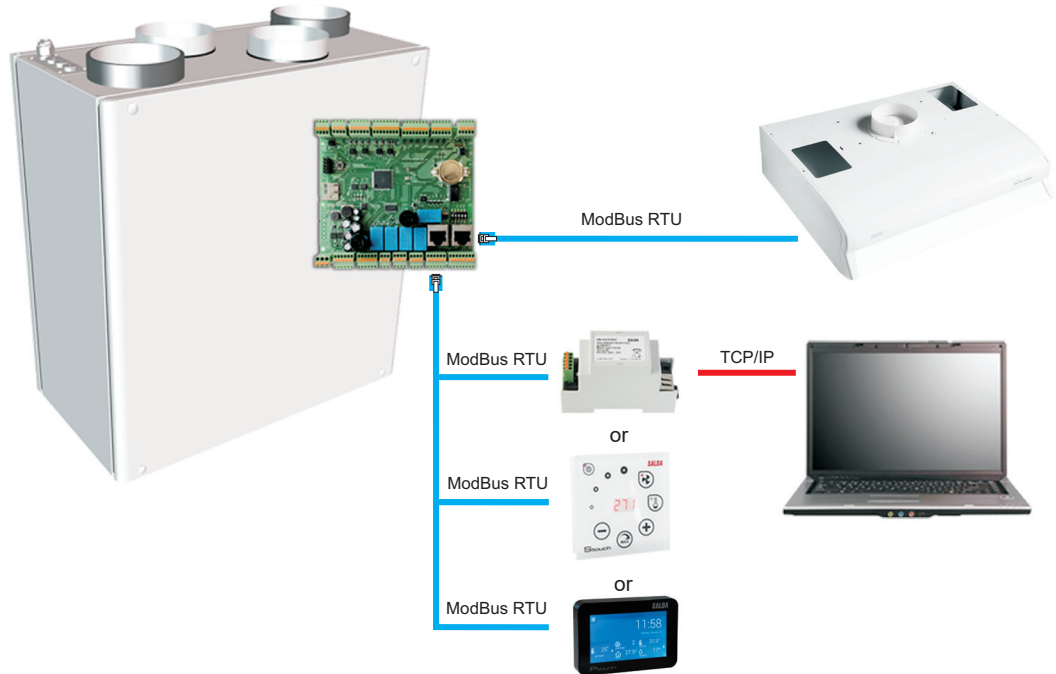
- Pressure compensation after steam extraction – KEFA KF2EDGKD-2.5/8P X4 connector 5 and 6 contacts;
- External switch – KEFA KF2EDGKD-2.5/8P X4 connector 3 and 4 contacts.



Connection of Remote Control Panel or ModBus



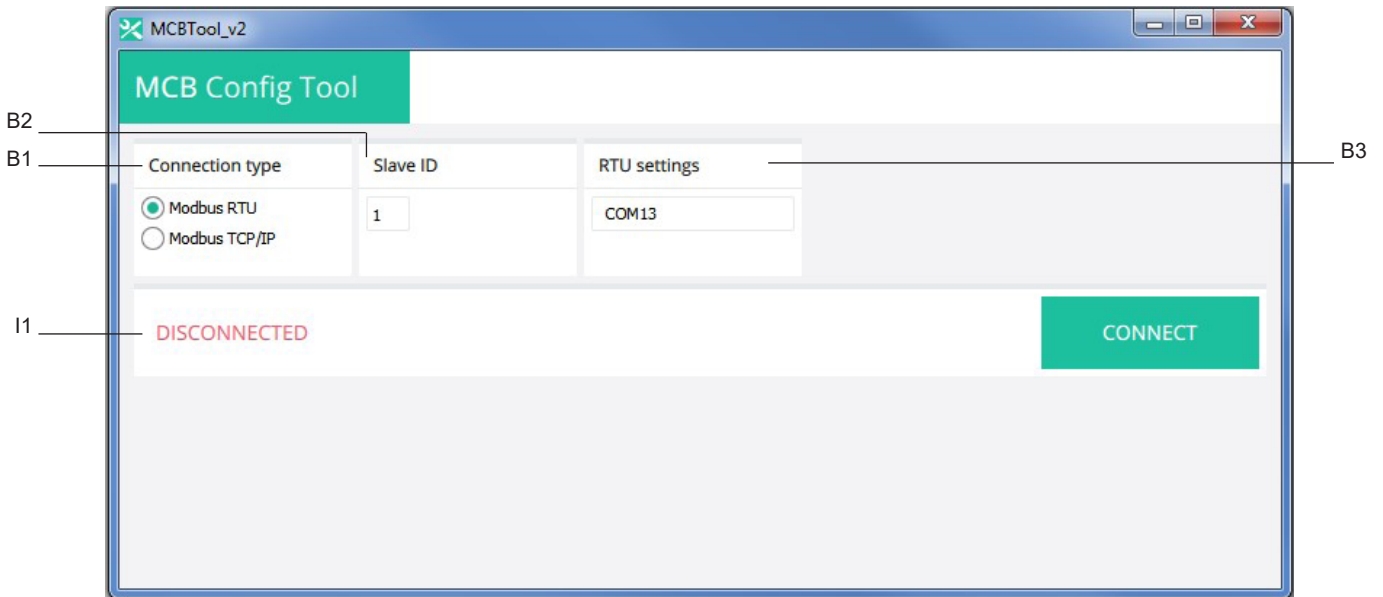
SL1 DIP switch	Purpose (ON position)
1	A+Y (RS422->RS485)
2	B+Z (RS422->RS485)
3	120R line termination resistor
4	1kR connection line pull-up resistor
5	1kR connection line pull-down resistor



“MCB tool” Program description

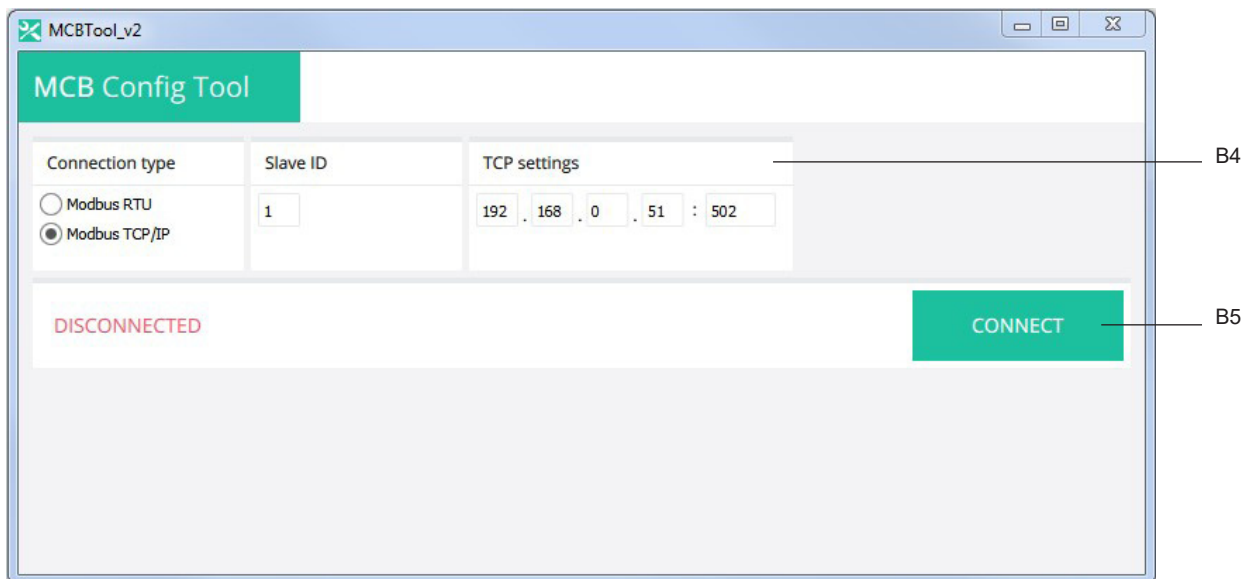
The app 'MCB tool' is for importing control board MCB settings from MCB to the media in a computer, and to export MCB settings from the media in a computer to MCB. Download the app from http://www.salda.it/en/products/category/download_page/.

1. Choose connection type
 - a. Modbus RTU (connect with RS485 converter)



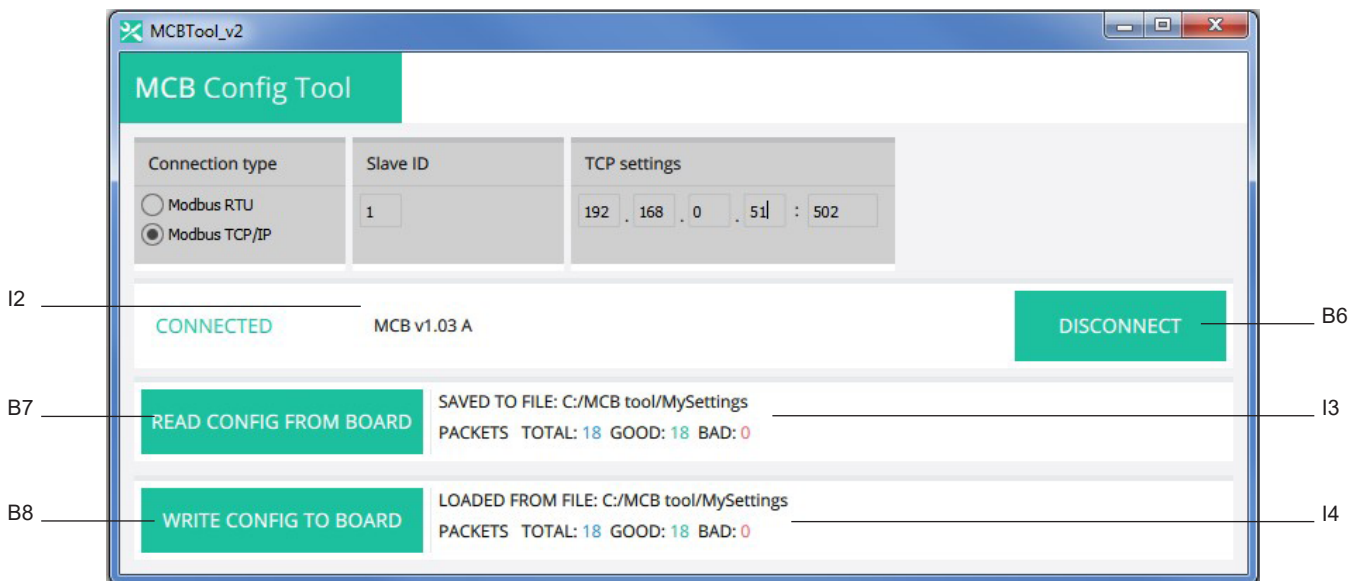
I1	Connection status
B1	Select connection type
B2	Set Modbus slave ID
B3	Select COM port of RS485 converter

b. Modbus TCP/IP (connect with TCP/IP Modbus gateway (MB-GATEWAY))



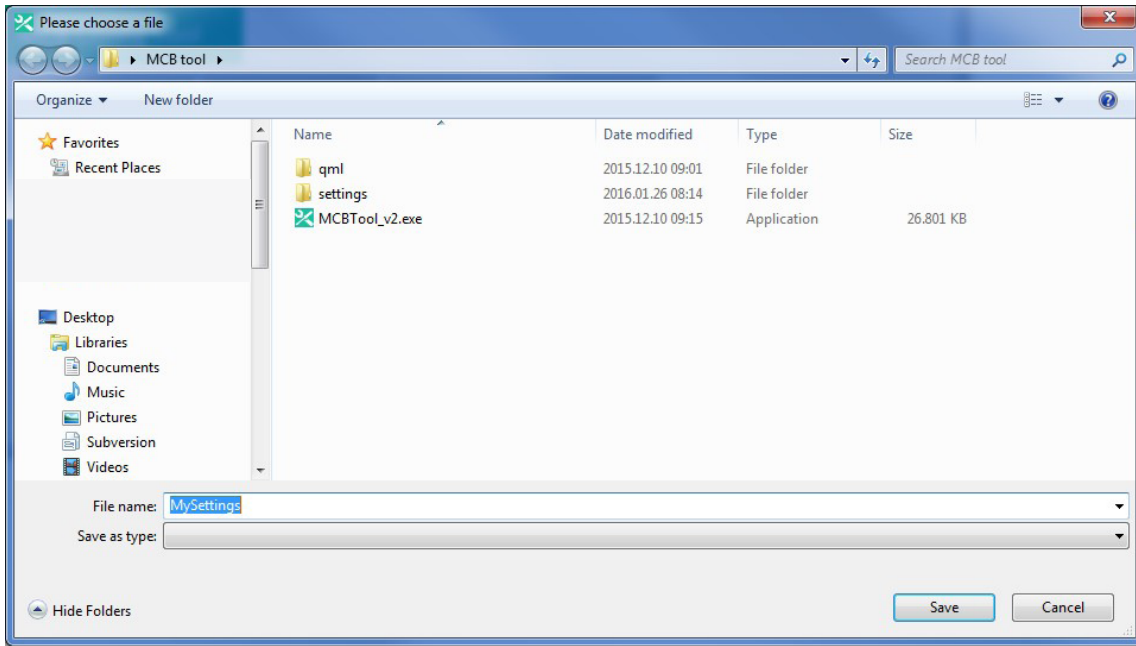
B4	Set IP of TCP/IP Modbus gateway (MB-GATEWAY)
B5	Press to connect

2. Connect to device (press “CONNECT” button)

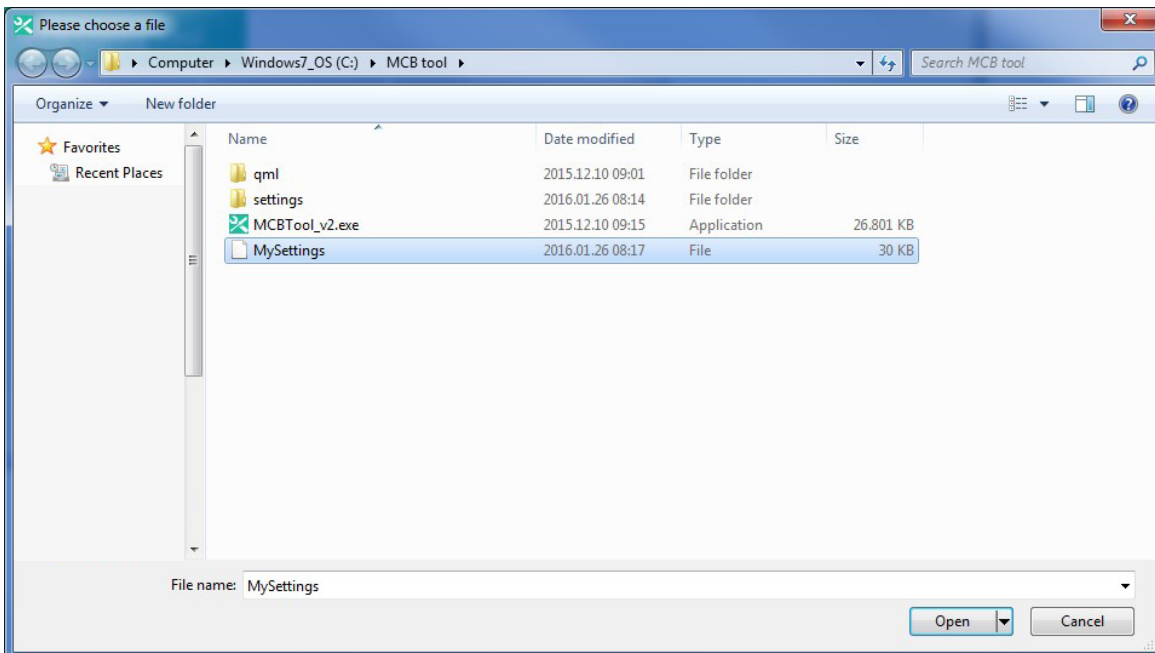


I2	Device software version
I3	Configuration read status
I4	Configuration write status
B6	Press to disconnect from device
B7	Press to read configuration from device
B8	Press to write configuration to device

3. Read configuration from device and save to your computer (press "READ CONFIG FROM BOARD" button and write configuration file name)



4. Write configuration to device from your computer (press "WRITE CONFIG TO BOARD" button and select configuration file)



System protection

Electrical connection of the units

- Electrical connection can only be implemented by the qualified electrician in accordance with the applicable international and national electrical safety requirements and requirements for installation of electrical devices.
- Use only power source which meets the requirements specified on the device label.
- Power supply cable should be selected based on the electrical specification of the device. If the device power supply line is far from the unit, the distance and voltage drop should be considered.
 - Device must be earthed.
 - Install the control panel at the designated place.
 - Install the supplied connection cable between the control panel and the HVAC unit. It is recommended to install the control panel separately from the power cables.

NOTE: If cable is used together with other power cables, shielded control panel cable with earthed shield should be used.
NOTE: The remote control panel can be connected and (or) disconnected only after disconnecting the power supply for the HVAC unit.
 • Select the desired fan rotation speed and the supply air temperature using the remote controller.

System protection

Control system of the unit has an integrated protection against short-circuit for these functional components. The controllers have the following protections:

MCB



To ensure safe maintenance of the unit, it is necessary to remove the plug from the power network.

Recommendations prior to switching on the unit (prior to hand-over to the user)

- Prior to start-up the system must be thoroughly cleaned. Check whether:
- operation systems and unit elements as well as automation and automation devices were not damaged during installation,
 - all consumers are connected to power supply and fit for service,
 - all necessary automation elements are installed and connected to power supply and MCB terminal blocks,
 - cable connection to MCB terminal blocks comply with the existing power connection diagrams,
 - all electrical equipment protection elements are properly connected (if they are additionally used),
 - cables and wires correspond to all applicable safety and functional requirements, diameters, etc.,
 - earthing and protection systems are properly installed,
 - condition of all seals and sealing surfaces is proper.

Possible faults and troubleshooting

Failure	Cause	Explanation / corrective actions
Unit is not operating	No supply voltages	Check whether the device is connected to the plug socket
	Two-pole protection device is off or a current leakage relay is active (if installed by the installer)	Switch on only if the unit condition has been evaluated by a qualified electrician. If the system failed, the failure MUST BE rectified prior to switching it on.
Air supply heater or heater is not operating or malfunctioning (if installed)	Too low air flow in air ducts activates automatic protection	Check if air filters are not clogged Check if fans are rotating
	Manual protection is activated	Possible heater or unit failure. MUST address the servicing staff for failure detection and its elimination.
Too low air flow at rated fan speed	Clogged supply and/or extract air filter(s)	Filter replacement needed
Filters are clogged and no message is shown on the remote control	Wrong time in filter timers	Shorten filter timer time till the message of clogged filters

Sensors and their technical information

The controller is used with NTC sensors.
 Default sensor NTC
 10 kΩ β (25/85) 3977
 Limits for temperature measurement -30 ...105 °C.
 Accuracy - ± 0,2 %
 Safety class – IP-54

Inspection of the ventilation system

For the ventilation unit to work properly, perform the inspection of the entire ventilation system once a year. Check if the air inlet grating and room air supply devices are clean. Check if the air duct system is not dirty. If necessary, clean or replace these devices.

Warranty

1. All equipment manufactured in our factory is checked in operating conditions and tested before delivery. Test protocol is supplied together with the unit. The equipment is shipped in good working order and condition to the direct client. The unit is warranted for the period of two years from the invoice date.
2. If equipment is found to have been damaged during transportation, a claim should be made against carrier, as we assume no responsibility for such damage.
3. This warranty does not apply:
 - 3.1. when transportation, storage, installation and maintenance instructions of the unit are violated;
 - 3.2. when the equipment is improperly maintained, mounted - inadequate maintenance;
 - 3.3. when the equipment without our knowledge and permission has been upgraded or unskilled repairs were made;
 - 3.4. when the unit was used not for its original purpose.
4. This warranty does not apply at these malfunction cases:
 - 4.1. mechanical damage;
 - 4.2. damage caused by entering outside objects, materials, liquids;
 - 4.3. damage caused by natural disaster, accident (voltage change in the electricity network, lightning, etc..).
5. The company assumes no liability for its products either directly or indirectly damage, if the damage is caused by failure to comply with installation and mounting regulations, deliberate or careless users or third-party behavior.

These conditions are readily discernable when the equipment is returned to our factory for inspection.

If the direct client determines that equipment is found to be faulty, or a breakdown occurred, he should inform the manufacturer within five working days and deliver the equipment to manufacturer. Delivery costs should be covered by customer.



Manufacturer reserves the right to change this technical passport any time without prior notice, if some typographic errors or inaccurate information is found, as well as after improving the apps and/or the devices. Such changes will be included in the new issues of the technical passport. All illustrations are just for information and thus may differ from the original device.

Unit's maintenance table

Product name	*1
gu/lu number	*1

	Interval	Date
Installation		
Fan cleaning	Once a year *2	
Heat exchanger cleaning	Once a year *2	
Filter replacement	Every 3-4 months *2	

*1
-Look at the product label.

*2
- At least.

NOTE. The purchaser is required to fill in the "Product maintenance table".