



SMARTY XV

EN MOUNTING AND INSTALLATION INSTRUCTION



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2. SYMBOLS AND MARKING



Figure 2.1. Technical label

1 - Logo; 2 - Product code (SKU); 3 - Product name; 4 - Technical data; 5 - Production place; 6 - Lot number and production date; 7 - Serial number.

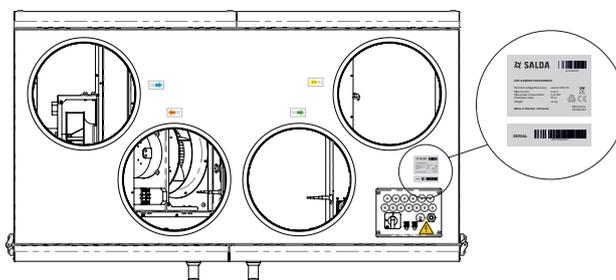


Figure 2.2. Technical label place



Figure 2.3. Indication for duct connection.

ODA - outdoor air; SUP - supply air; ETA - extract air; EHA - exhaust air.

3. SAFETY INSTRUCTIONS AND PRECAUTIONS

Read this instruction very carefully before installing and using this equipment. Installation, connection and maintenance should be carried out by a qualified technician and in accordance with the local rules and legal acts. The company shall take no responsibility for the injuries suffered by the people or for the damaged property, if the safety requirements are not followed or the device is modified without the permission of the manufacturer.



Warning – pay attention



Additional information

Main safety rules

Danger

- Before performing any electricity or maintenance tasks make sure, that the device is disconnected from the mains, that all moving parts of the device have stopped.
- Make sure that the fans can not be entered through air ducts or branch openings.
- If you notice liquids on electric parts or connections that bear voltage, stop the operation of the appliance.
- Do not plug the device into the mains, that differs from the one indicated on the label or on the housing.
- Voltage of the mains should comply with the electrotechnical parameters indicated on the label.
- The device should be earthed in accordance with the rules of installation of electric appliances. It is forbidden to turn on and use un-earthed device. Follow the requirements of the device's labels that indicate *Danger*.

Warnings

- Connection of electricity and maintenance of the device should be performed only by a qualified personnel, in accordance with the manufacturer's instructions and valid safety requirements.
- In order to reduce the risk during installation and maintenance, suitable protective clothes should be worn.
- Beware of sharp angles while performing installation and maintenance tasks.
- Do not touch heating elements until they haven't cooled down.
- Some devices are heavy, thus one should be very careful while transporting and installing. Use suitable lifting equipment.
- While connecting electricity to the mains a circuit breaker of suitable size is necessary.



Warning!

- If the device is installed in a cold environment, make sure that all connections and tubes are properly isolated. Intake and discharge air ducts should be isolated in all cases.
- Openings of the ducts should be covered during transportation and installation.
- Make sure not to damage the heater when connecting the piping of the water heater. For tightening up, use a wrench/spanner.



Before starting the equipment

- make sure, that there are no strange objects inside;
- manually check whether fans are not stuck or blocked;
- if rotary heat exchanger is installed in the device, make sure that it is not stuck or blocked;
- check the grounding;
- make sure that all components and accessories are connected in accordance with the project or provided instructions.



Danger: Fumes

Salda Antifrost system uses dis-balancing of the air flow and it may cause negative pressure in premises. Great care should be taken when using at the same time in premises as another heating appliance what depend on the air in premises. Such appliances include gas, oil, wood or coal-fired boilers and heaters, fireplaces, continuous flow or other water heaters, gas hobs, cookers or ovens which draw air in from the room and duct exhaust gases out through a chimney or extraction ducting. The heating appliance can be starved of oxygen, impairing combustion. In exceptional cases harmful gases could be drawn out of the chimney or extraction ducting back into the room. In this case we strictly recommend to turn off *Salda Antifrost* and use an external preheater for heat exchanger anti-frost protection (see *Salda Antifrost* function on the Remote controller manual).



4. DIMENSIONS AND WEIGHT

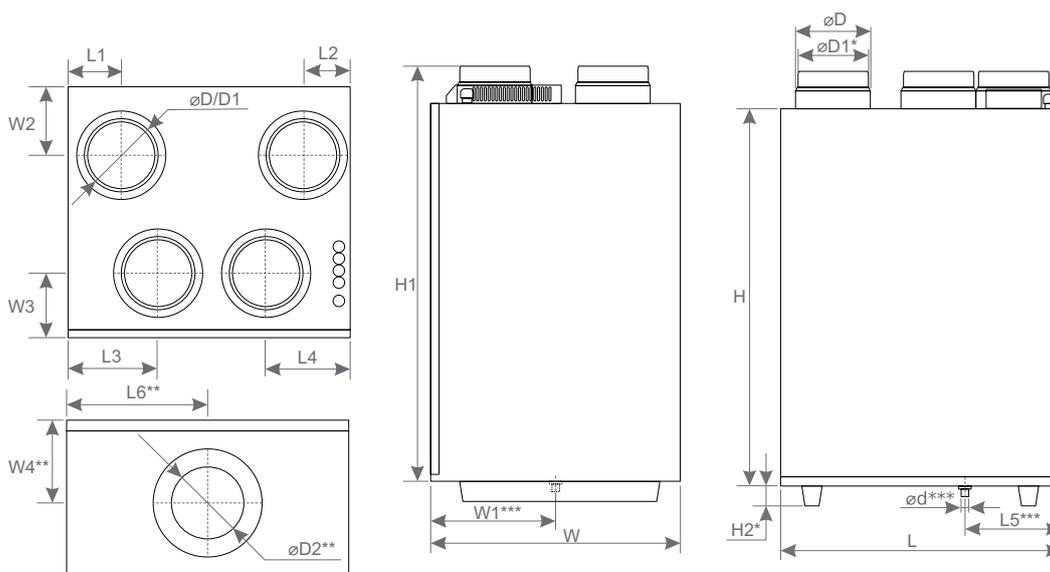


Figure 3.3 - Smarty XV dimensions

[mm]	SMARTY 2 XV	SMARTY 3 XV	SMARTY 4 XV
L	595	599	599
L1	83	110	110
L2	82	113	113
L3	195	110	110
L4	242	265	265
L5	209	193	193
L6**	-	-	-
H	697	810	810
H1	732	901	901
H2*	-	-	-
W	316	538	538
W1***	156	284	284
W2	79	170	170

W3	82	116	116
W4**	-	-	-
øD	125	160	160
øD1*	115	150	150
øD2**	-	-	-
ød***	16	G3/8	G3/8

* - depends on unit and its accessories.

SMARTY

WEIGHT	2 XV 1.1	2 XV 1.2	3 XV 1.1	3 XV 1.2	4 XV 1.1	4 XV 1.2
[kg]	25	25	39	39	39	39

5. ELECTRICAL DATA

SMARTY			2 VX 1.1	2 XV 1.2	3 XV 1.1	3 XV 1.2	4 XV 1.1	4 XV 1.2
Exhaust air fan	phase/voltage	[50 Hz/VAC]	~1/230	~1/230	~1/230	~1/230	~1/230	~1/230
	power/current	[kW/A]	0,035/0,35	0,035/0,35	0,083/0,75	0,083/0,75	0,21/0,92	0,21/0,92
	speed	[min ⁻¹]	4060	4060	3200	3200	4400	4400
	control input	[VDC]	0-10	0-10	0-10	0-10	0-10	0-10
	protection class		IP54	IP54	IP54	IP54	IP54	IP54
Supply air fan	phase/voltage	[50 Hz/VAC]	~1/230	~1/230	~1/230	~1/230	~1/230	~1/230
	power/current	[kW/A]	0,035/0,35	0,035/0,35	0,083/0,75	0,083/0,75	0,21/0,92	0,21/0,92
	speed	[min ⁻¹]	4060	4060	3200	3200	4400	4400
	control input	[VDC]	0-10	0-10	0-10	0-10	0-10	0-10
	protection class		IP54	IP54	IP54	IP54	IP54	IP54
Total power consumption	power/current	[kW/A]	0,67/3,35	0,07/0,75	1,37/6,75	0,17/1,55	1,62/7,09	0,42/1,89
Automatic control integrated			+	+	+	+	+	+
Thermal efficiency			92 %*	92 %*	88 %*	88 %*	90 %*	90 %*
Insulation of walls		[mm]	30	30	30	30	30	30
Pre-heater	power/current	[kW/A]	0,6/2,6	-	1,2/5,2	-	1,2/5,2	-

According to EN 13141-7 standard.

Smarty 2X V	LWA all, dB(A)	LWA, dB(A)						
		125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Supply	60,3	51,8	56,0	61,1	55,2	50,4	46,1	31,9
Exhaust	47,4	36,4	50,2	47,4	38,2	26,7	19,8	22,9
Surrounding	47,7	46,4	52,0	45,6	38,4	28,9	24,3	22,9
Measured at flow/pressure		[m ³ /h / Pa]	116/50					

Smarty 3X V	LWA all, dB(A)	LWA, dB(A)						
		125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Supply	62,8	54,3	64,9	61,1	56,5	51,3	42,8	35,3
Exhaust	47,7	42,0	54,6	45,0	36,0	28,8	19,6	22,4
Surrounding	49,0	47,2	54,8	46,1	39,5	34,2	24,9	22,6
Measured at flow/pressure		[m ³ /h / Pa]	267/50					

Smarty 4X V	LWA visas, dB(A)	LWA, dB(A)							
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	5 kHz
Supply	62	47	53	58	56	54	51	46	41
Exhaust	54	44	45	50	47	45	43	38	35
Surrounding	51	30	35	48	46	40	35	27	24
Measured at flow/pressure		[m ³ /h / Pa]	406/50						

6. CONSTRUCTION

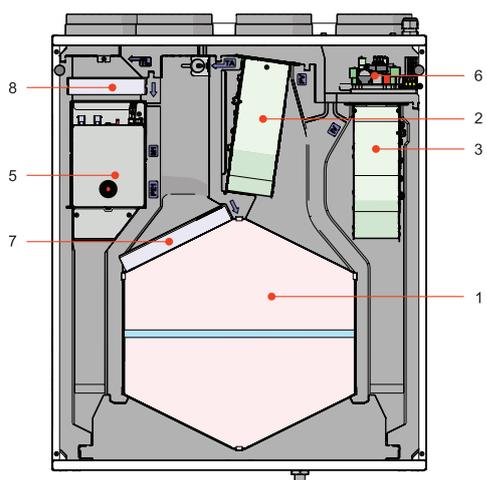


Figure 5.6 - Smarty 2 XV

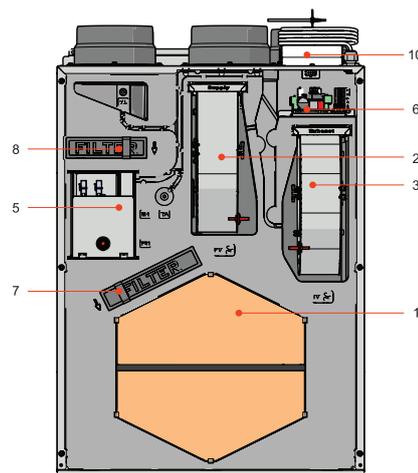


Figure 5.7 - Smarty 3-4 XV

1 - Plate/rotor heat exchanger; 2 - Supply fan; 3 - Exhaust fan; 5 - Electrical/water heater/pre-heater; 6 - Control board; 7 - Extract air filters (panel/pocket); 8 - Supply air filter (panel/pocket); 9 - Rotor engine.

7. OPERATING CONDITIONS

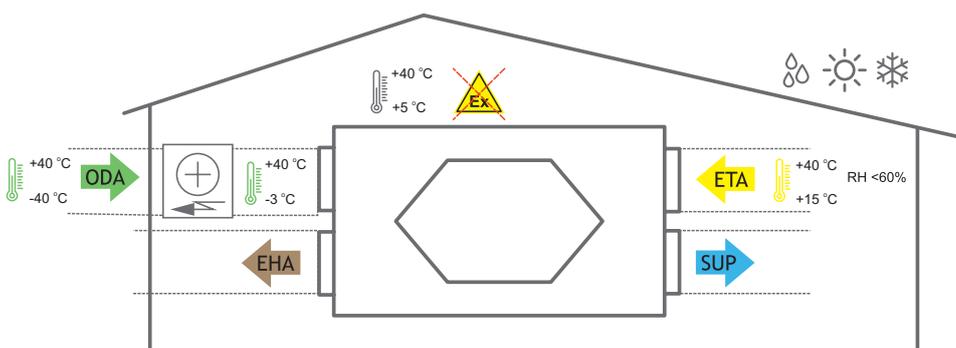


Figure 6.2 - with external pre-heater operating conditions

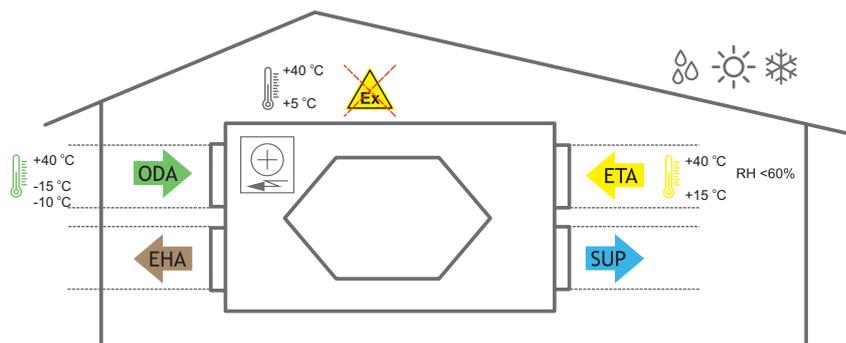
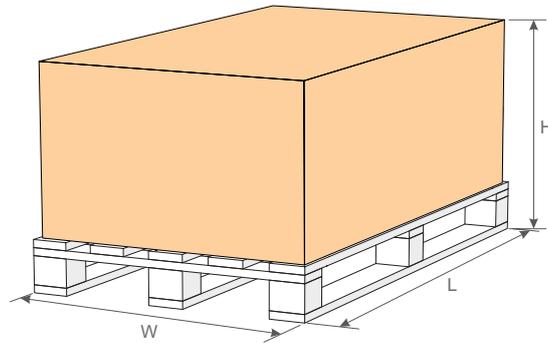


Figure 6.3 - with integrated pre-heater operating conditions (Smarty 2-3 XV pre-heater - 15 °C; Smarty 4 XV pre-heater - 10 °C)

8. PACKAGE

- 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.



	H	W	L	QUANTITY ON THE PALLET
SMARTY	[mm]	[mm]	[mm]	[units]
2 XV	480	700	800	1
3 XV	1060	600	800	1
4 XV	1060	600	800	1

9. TRANSPORTATION

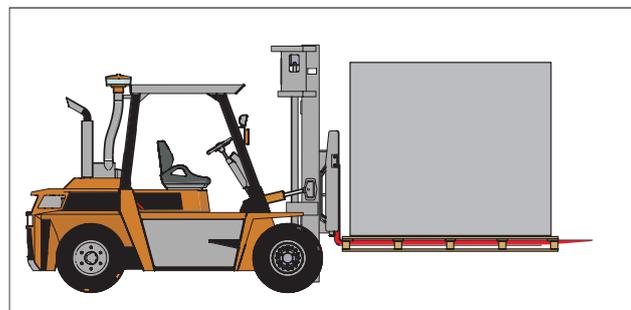
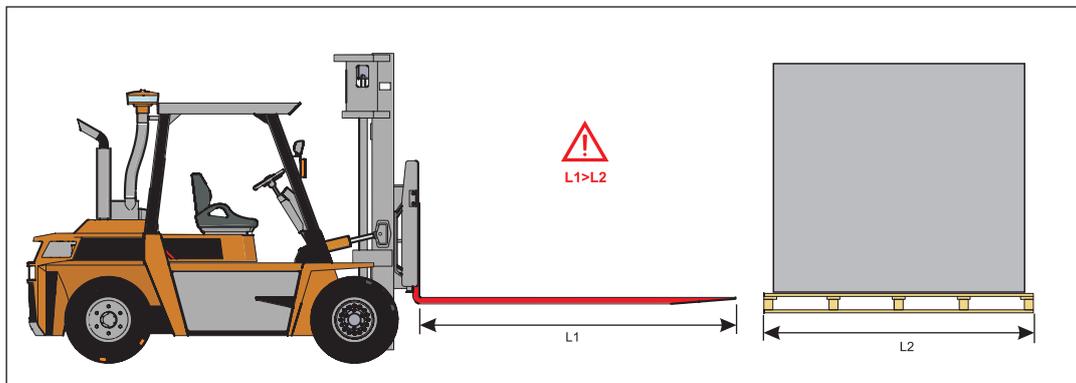


Figure. 9.1.

Lifting with forklift.



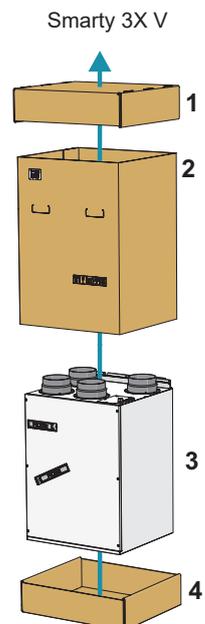
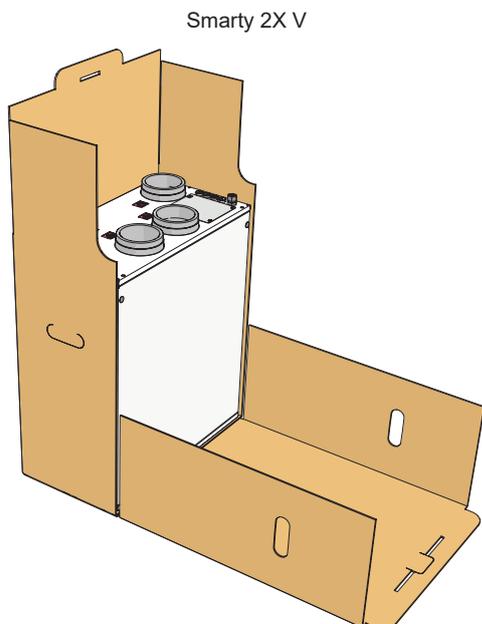
Only a product placed on a pallet may be lifted in order to prevent damage to the casing.

10. UNPACKING



Accessories may be packed together with the product. Prior to transporting the unit, first unpack the accessories.

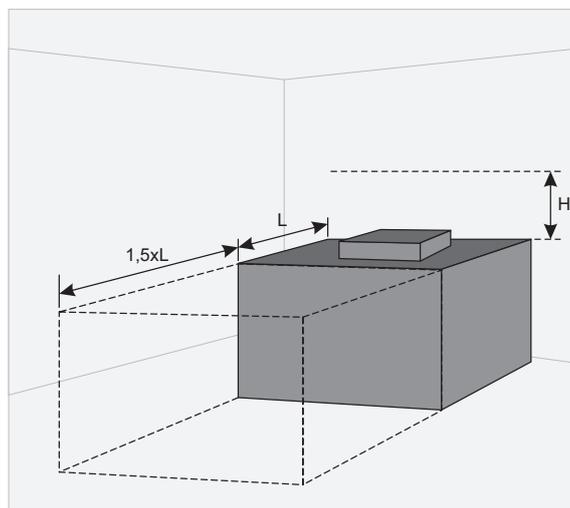
- Remove the film from the unit.
- Remove the bracing packaging tape which keeps the protective profiles.
- Remove the protective profiles.
- After unpacking the unit, examine it to make sure that it has not been damaged during transportation. The installation of damaged units is prohibited!
- Verify that all ordered equipment are delivered before starting the installation. Any deviation from the ordered equipment must be reported to the supplier of products.



11. STANDART PACKAGE OF COMPONENTS

SMARTY	2 XV	3 XV	4 XV
Key M4 Z-type	1		
Outlet pipe G3/8	1	1	1
Fix - PV gasket 6x20 (white)	550 mm	1180 mm	1180 mm
Sealing rubber 15x8x7 427021	60 mm	-	-
Bracket 2	-	1	1
Bracket 3	1	-	-

12. PLACE REQUIREMENTS



Min. distance to open the door - 1,5xL; Min. distance to open control box door - H > 400 mm.

13.MOUNTING

-  The protective film is intended to protect the unit during transportation. It is recommended to remove the film because otherwise oxidation signs may occur.
-  Before every heating season the condensate tube shall be filled with water as indicated during the first startup!

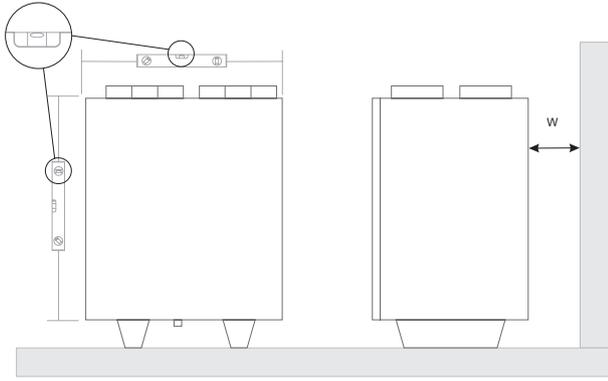


Figure 12.4 - mounting positions (W=400 mm)

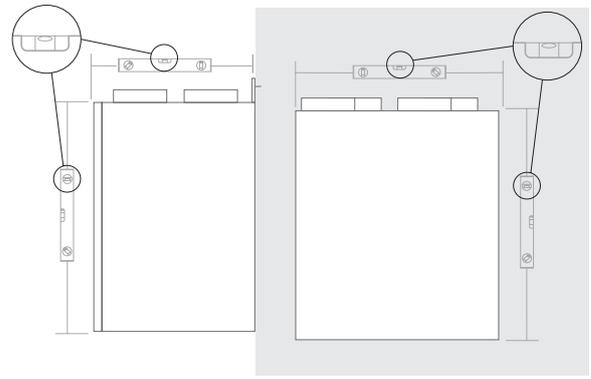
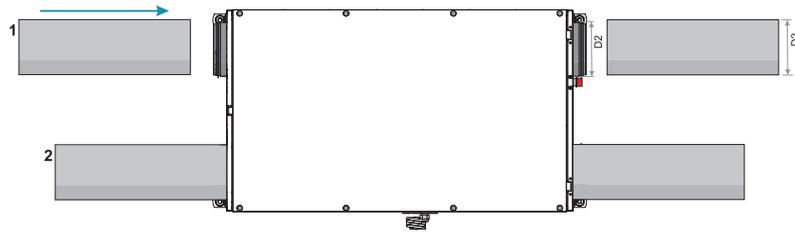


Figure 12.5 - mounting positions

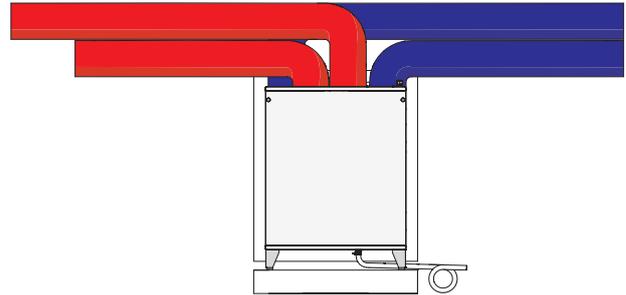
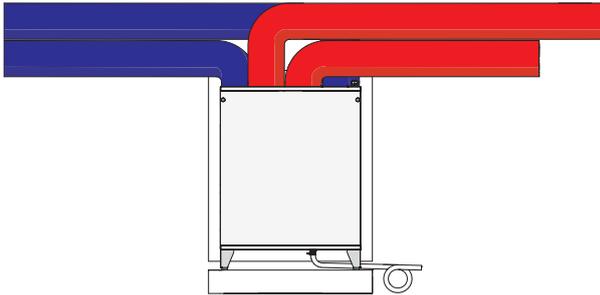
14.CONNECTION OF THE AIR DUCT



D2 dimensions depend on unit.

Right side connection

Left side connection



14.1. FLOOR MOUNTING

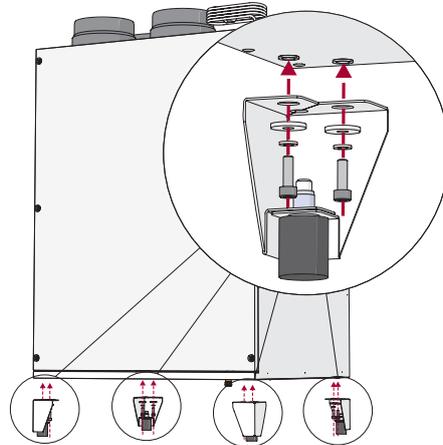


Figure 14.1.1. - floor mounting (optional accessory required)

14.2.

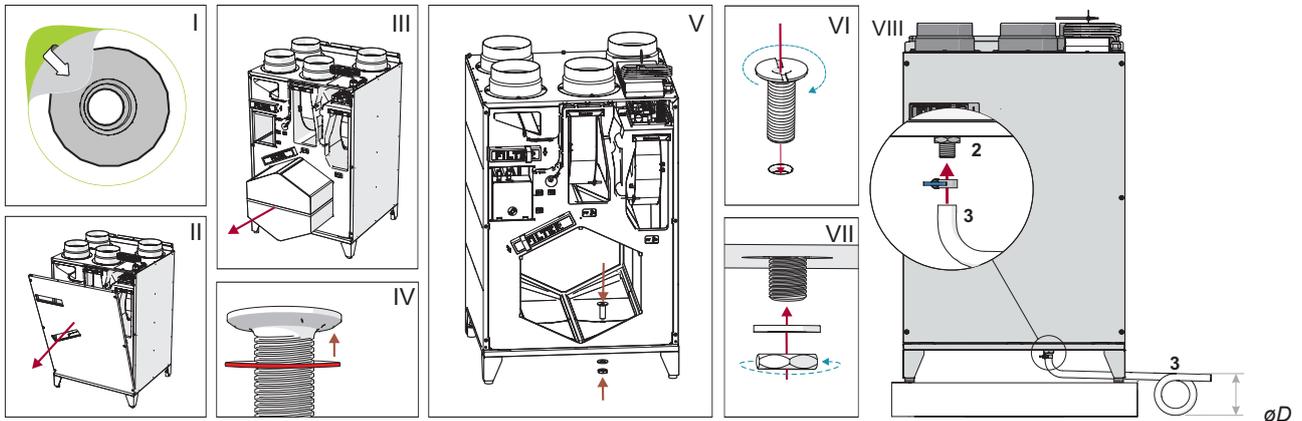


Figure 12.2.3 - drainage installation (øD=150 mm)

It's required to connect condensate drainage system after hanging or placing of air handling unit. Insert condensate draining into AHU. Condensate draining must be lubricated with a sealant (I-VII) and connected to a condensate removal system.

Remove the sticker on the bottom of the unit, which covers a drainage hole. Then open the unit cover (II) and take out the heat exchanger. Put condensate outlet pipe to EPP casing through intended hole (V), use silicon gasket (IV). Place from the bottom side gasket and screw a brass nut on (VII). Screw the nut by holding the pipe with a hand in order prevent spinning (it's possible to hold with a screwdriver or 1 Euro coin by putting it in the notch on the pipe). Screw the nut with a wrench (No. 27) until a top part presses in the EPP casing (level with a surface or slightly enters into it). **Attention: Screwing force may not exceed 2 Nm.**

Pipe (3) (metal pipe should be connected with G3/8 elbow, plastic pipe – with G3/8 elbow or rubber hose – with strap if the unit is placed on the legs, in other cases condensate hose can be connected in any direction) should be connected by following order: AHU (1), pipe (2), and drainage system. Pipes (3) should be bended not less than 3° degrees (1 meter of pipe must be bended 60 mm downwards)! Before turning on AHU (1) the draining system should be filled up with at least 0.5 l of water (pipe loop (3) must be always filled with water), also check if water reaches sewerage system! In other case premise can be flooded during AHU operation!

Draining system must be installed in the premise where the temperature is not lower than 1°C. If temperature falls below 0°C the draining system should be isolated with thermal isolation. The pipe loop 2) not necessarily must be mounted below the AHU (1), but below the AHU (1) level.

Note. If the collector is situated upstream, install a system with a condensate pump (offered as an accessory).



Before every heating season the condensate tube shall be filled with water as indicated during the first start-up! Before every heating season the condensate tube shall be filled with water as indicated during the first start-up!

14.3. MOUNTING ON WALL

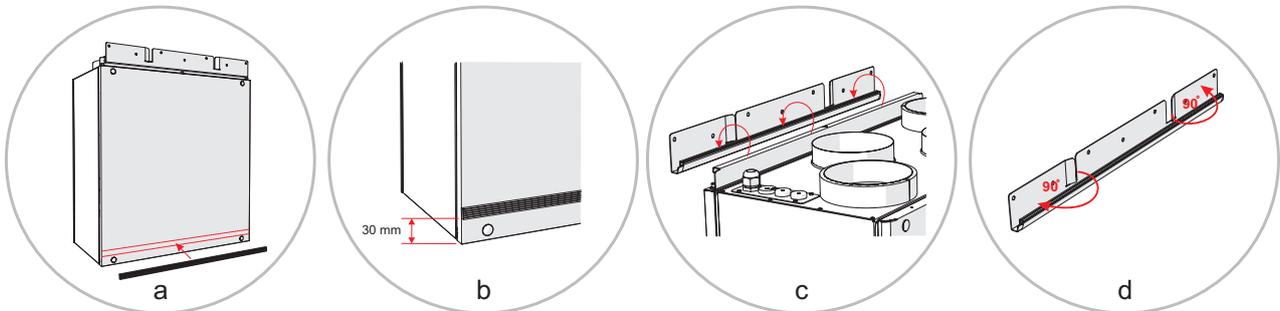


Figure 12.3.1 - mounting on the wall

15.CONNECTION DIAGRAM

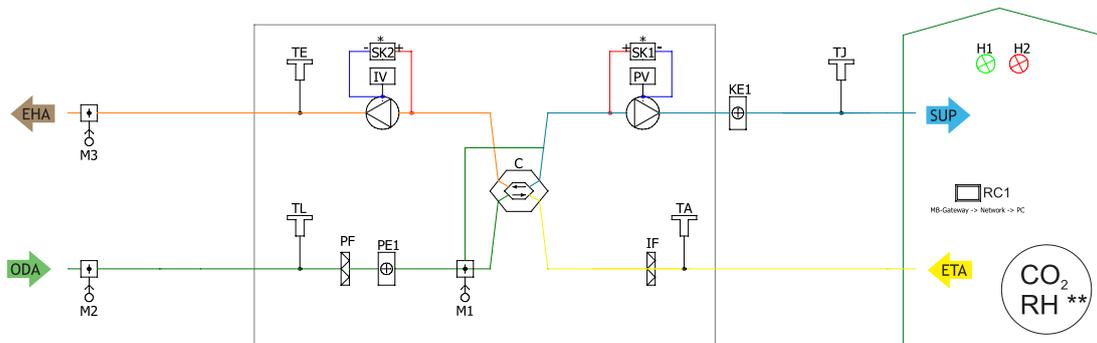


Figure 15.3 - Smarty XV 1.1 (* Not available in "2 XV 1.1" models)

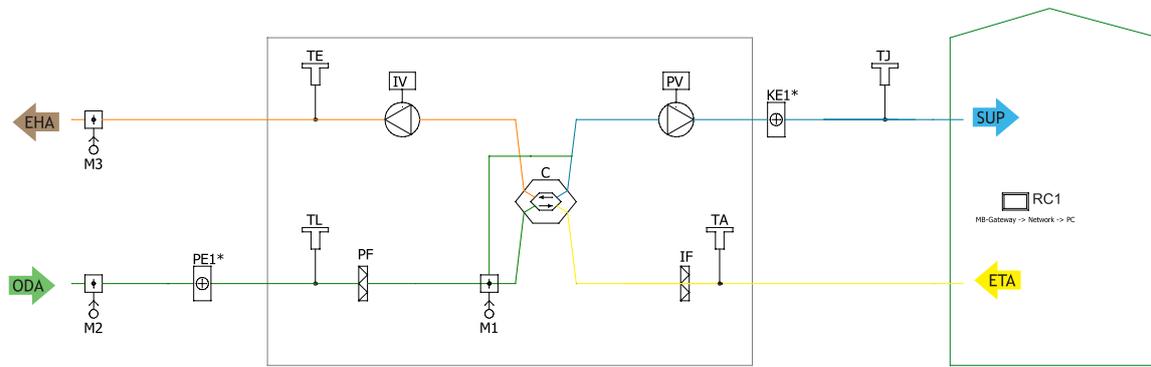


Figure 15.4 - Smarty XV 1.2 (* Only heater or preheater can be connected at a time)



Figure. 15.1.

Indication for duct connection.



Figure. 15.2.

Ventilated premises

ODA - outdoor air; SUP - supply air; ETA - extract air; EHA - exhaust air.

LIST OF COMPONENTS

C	Plate heat exchanger	A1	Fire alarm damper actuator I
PV	Supply air fan	A2	Fire alarm damper actuator II
IF	Extract air filter	TJ	Supply air temperature sensor
PF	Supply air filter	TL	Outdoor air temperature sensor
IV	Exhaust fan	TE	Exhaust air temperature sensor
KE1	Electric heater	DTJ	Extract air temperature and RH sensor
PE1	Electric pre-heater	T2	Cooler changeover thermostat
KV2	Water pre-heater	TV2	Water preheater temperature sensor
KV3	Water cooler	TV3	Water cooler temperature sensor
DX	DX cooler	U3	PV pressure transmitter
M1	By-pass damper	U4	IV pressure transmitter
M2	Outdoor air damper actuator	CO₂	CO ₂ sensor*
M3	Exhaust air damper actuator	RH	RH sensor*
M5	Water cooler valve motor	PC	Computer
M12	Water pre-heater valve actuator	RC1	Stouch or SA-Control remote control panel
M14	Water cooler circulation pump	RC2	Stouch, Flex or SA-Control remote control panel
M15	DX cooler valve actuator	MB-Gateway	Network module
M16	Water pre-heater circulation pump	NET	Network
R	Rotor heat exchanger		

POSSIBLE PCB INPUTS/OUTPUTS

FA	Fire alarm	H1	Working indication output
FPP	Fireplace protection	H2	Alarm indication output
System mode switch (START/STOP)		Fans speed switch (BOOST)	

* Component/possibility to connect it depends on model. For more information please, check the manual

16.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 nonconformance with the provided instructions.

17. START-UP RECOMMENDATIONS

17.1. RECOMMENDATIONS BEFORE THE START OF THE UNIT (BEFORE THE FINAL 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 electrical devices are connected to power supply and fit for service,
- all necessary automation elements are installed and connected to power supply and terminal blocks,
- cable connection to 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 are proper.

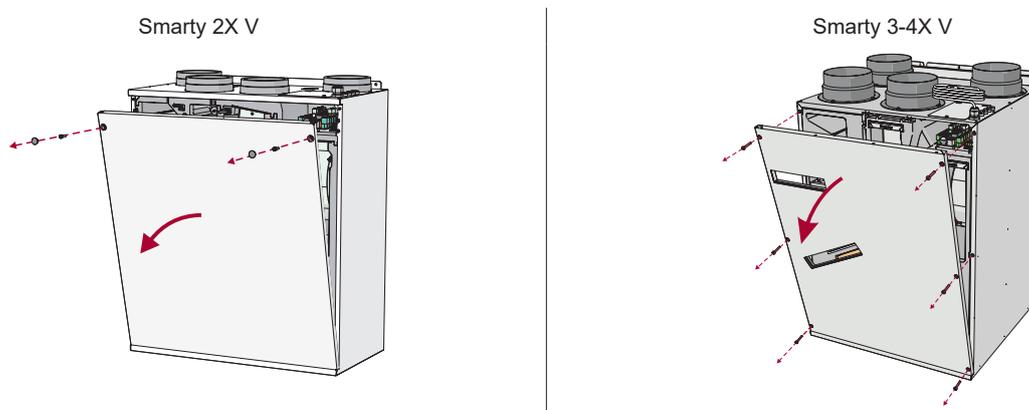
17.2. POSSIBLE FAULTS AND TROUBLESHOOTING

FAILURE	CAUSE	EXPLANATION / CORRECTIVE ACTIONS
Unit is not operating	No supply voltage	Check whether the device is connected to the power network
	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 pre-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 contact 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 or their switch is broken, or its pressure is set improperly.	Shorten filter timer time till the message of clogged filters or replace the pressure switch of the filters, or set their proper pressure.

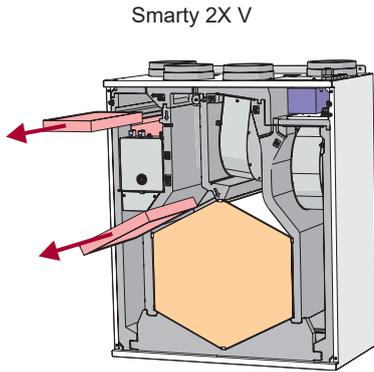
18. MAINTENANCE

⚠ 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.).

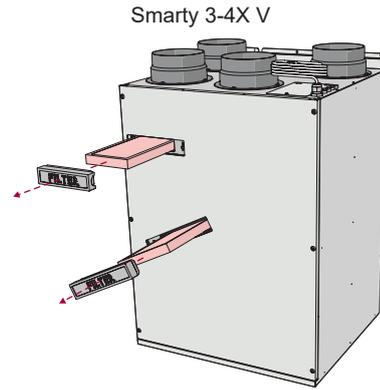
18.1. COVER OPENING



18.2. FILTERS MAINTENANCE



Removing Smarty 2X V filters: key loosened and removable product doors, removable filters. Uses G4 / (F7 - optional) filters.



Removing Smarty 3-4X V filters: opening filter cover (pulling the strap), retractable filter. Uses G4 / (F7 - optional) filters.



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 advisable to change the filters every 3 - for 4 months, or according to their testimony timer remote control.

18.3. 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.
- 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. Supplied air fan from X15, X2, X4. Extract air fan from X16, X2, X4.
- 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 vibration.
- Clean impeller and inside 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.

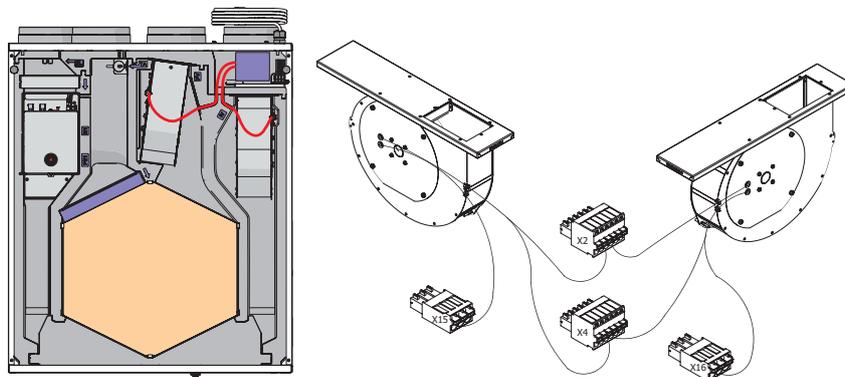


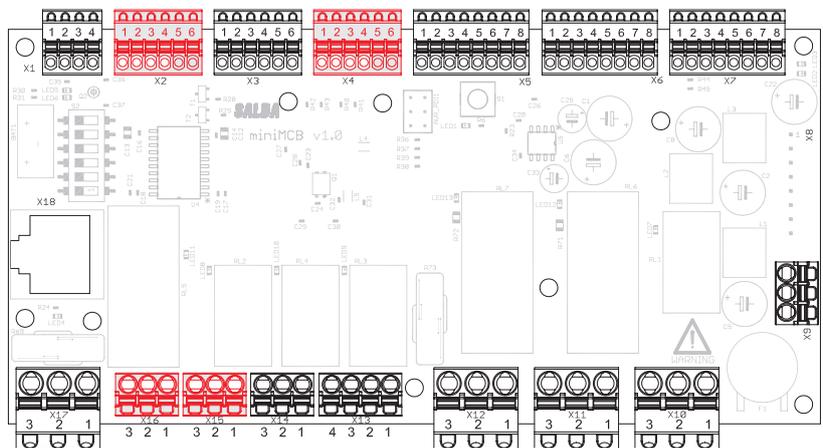
Be sure the unit is disconnected from power source before performing any maintenance or repair.

- Remove the fan connectors from the control board. Supplied air fan from X15, X2, X4. Extract air fan from X16, X2, X4.

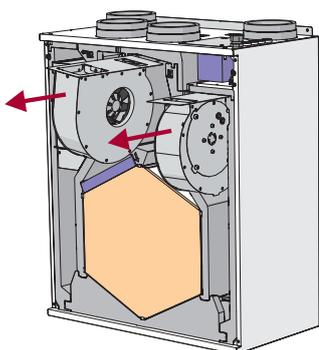
Note:

- X2, X4 are common for both fans.
- Reassembly shall be executed in the reverse order.

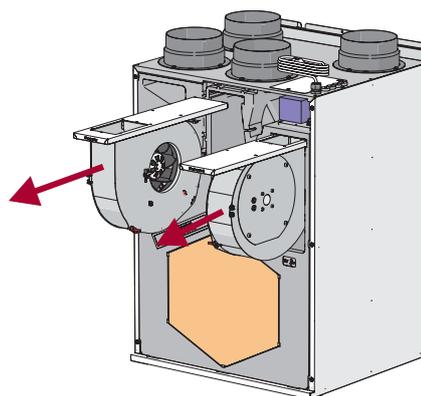




Smarty 2X V



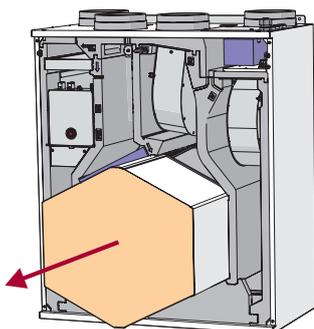
Smarty 3-4X V



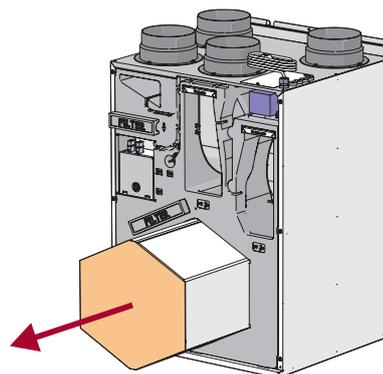
18.4. HEAT EXCHANGER MAINTENANCE

- Proceed to maintenance and repair after any rotation in the fan stopped.
- Clean the heat exchanger once a year.
- Firstly take out heat exchanger cassette carefully. Submerge it into a bath and wash with warm soapy water (do not use soda). Then rinse it with weak hot water stream (too strong stream can fold the plates). Place back the heat exchanger only when it is completely dry.

Smarty 2X V

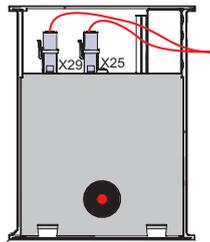


Smarty 3-4X V

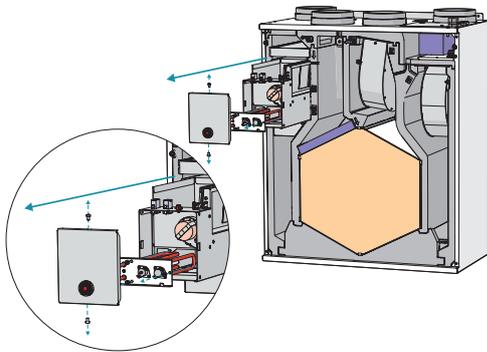


18.5. BYPASS DAMPERS AND PRE-HEATER MAINTENANCE

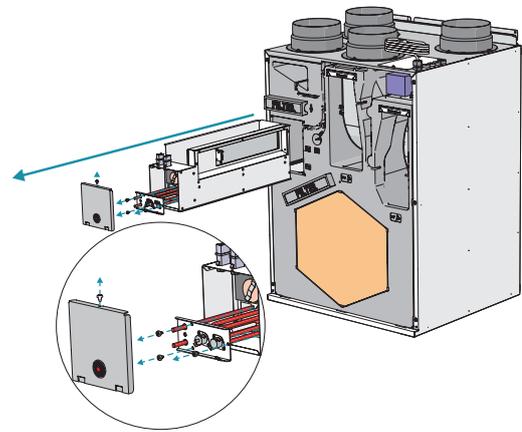
Bypass damper and pre-heater are mounted on one block. The pre-heater shall be disconnected by removing X29 connector. The bypass damper shall be disconnected by removing X25 .



Smarty 2X V

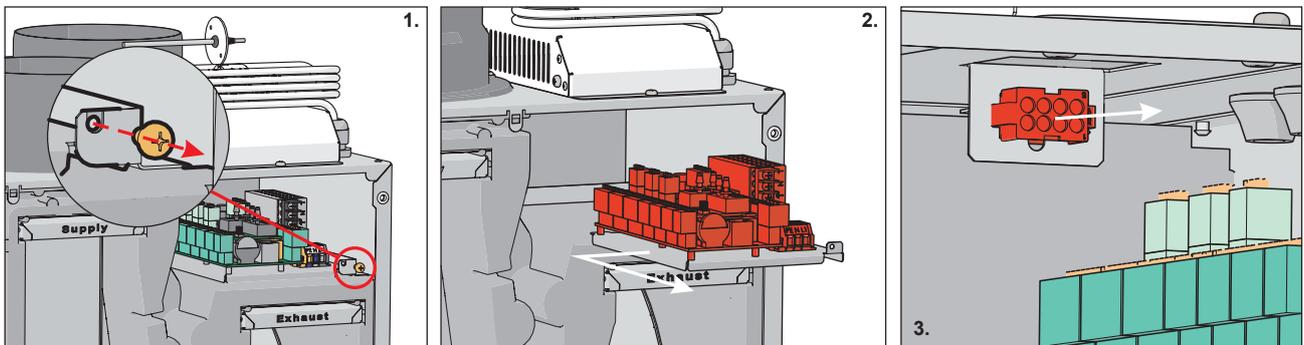


Smarty 3-4X V



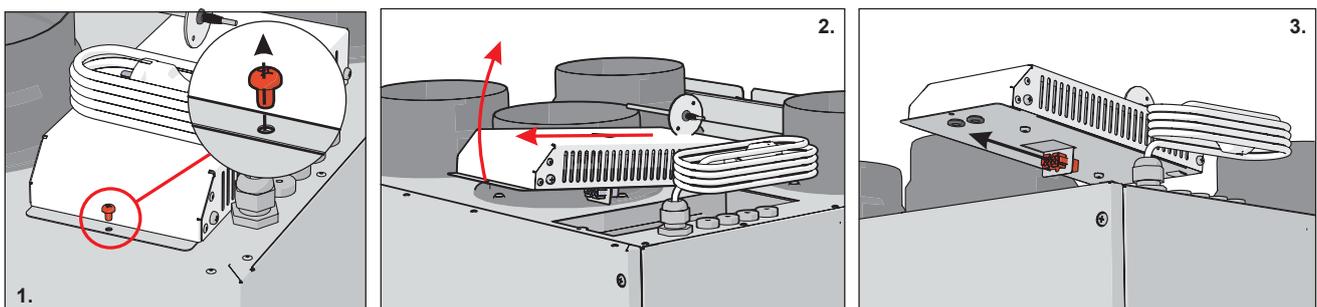
18.6. CONTROL BOARD MAINTENANCE

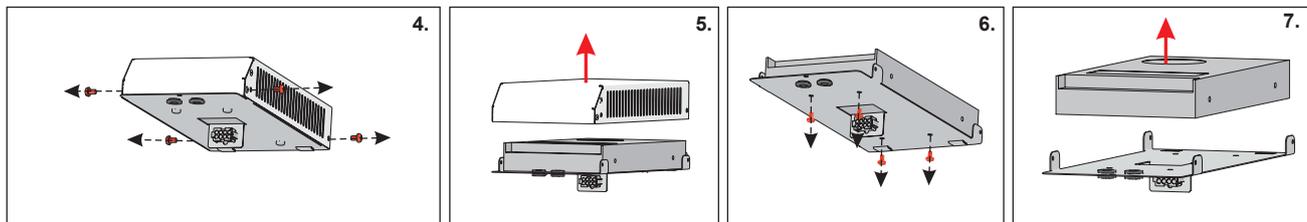
- Unscrew the front bolt securing the control board holder to the unit casing.
- Withdraw the automation through the front part.
- Disconnect the connectors from the control board.
- The connectors are marked according to connection location. Thus during automation reassembly please observe the marking of the connection location of connectors and controller. If the marking on the controller terminals is not visible follow the PCB information provided in this passport (see miniMCB description: Fig. 2 and Fig. 3):



18.7. SWITCHING POWER SUPPLY MAINTENANCE

- Unscrew screw at the front side;
- After loosening power supply, lift it up in order to disconnect connector below. (2-3).
- Power supply is under the protection cover. Please remove the cover in order to change it (4-5). Then release power supply from the base (6-7).
- Perform assembly in the reverse order.
- Connectors are marked according connection place, therefore, please, pay attention to the marking.





19. 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.

MB-Gateway + WIFI + SALDA AIR app	Stouch	FLEX MCB	SA-Control	MB-Gateway	BMS
+	+	+	+	+	Modbus RTU

19.1. DESCRIPTION OF THE UNITS 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:

Selected control panel. Full functionality and configuration possibility can be assured only by MB-Gateway web interface SA-Control, SALDA AIR app.

Connected external devices: external heaters, dampers, sensors and etc. (see the description of the acquired air handling system).

Internal components of the device: type of heat exchanger (plate or rotor), integrated dampers, sensors and etc. (see components of the chosen device).

Control board type.



Air Handling Unit uses MCB board.



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

19.2. SYSTEM MODES

Stand-by;
 Building protection;
 Economy;
 Comfort.



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



The Building protection mode is designed to protect premises against moisture accumulation. The system operates at speed 1. Based on manufacturer's parameters (by default) this mode controls the temperature (the desirable one is indicated), but, if necessary, it can be switched off, i.e. to activate the energy saving mode. Also, if necessary, full recirculation function is activated. (ADJUSTER › USER SETTINGS › BUILDING PROTECTION MODE TEMPERATURE or USER › MENU › SETTINGS › BUILDING PROTECTION).

After activating the energy saving mode, temperature is maintained only by the heat exchanger. It will seek to maintain the current temperature in the room; however, if the supply air temperature falls below the minimal supply air temperature level, heaters will be activated and they will maintain a temperature one degree above the minimum. Also, if the supply air temperature rises above the maximal supply air temperature level, coolers will be activated and they will maintain a temperature one degree below the maximum.



Economy mode is designed to save energy when people are absent from the premises. The system operates at speed 2. Based on manufacturer's parameters this mode controls the temperature maintaining (the desirable one is indicated), but, if necessary, it can be switched off, i.e. to activate the energy saving mode. Also full recirculation function is activated. (ADJUSTER › USER SETTINGS › ECONOMY MODE TEMPERATURE or USER › MENU › SETTINGS › ECONOMY MODE).



Comfort mode is running when people are present in the premises. The system operates at speed 3. In this mode the temperature is always maintained – it is set in the main window (ADJUSTER › VENTILATION CONTROL or USER › SET POINT).

19.3. SYSTEM CONTROL

System modes are changed by the following functions (indicated in a sequential order):

- Weekly Schedule;
- Switching on is activated from an external contactor;
- Manual mode selection;

Holiday Schedule;
Stand-by mode blocking.

Based on the Weekly Schedule the system decides in what mode it will be operating; however, the user may change it manually. The system informs when the next mode change is scheduled. After power loss the mode is selected based on the Weekly Schedule; however, if it is not set, the mode that was set before the power loss will be activated.

The user may change modes even when the switching on is activated from an external contactor. The only case when it is not possible – active period of Holiday Schedule of which the system informs and which must be changed to avoid blocking.

Stand-by mode can be blocked by 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 mode shall be activated.

The function order is provided below.

Start >

- › Reading of input data;
- › Weekly Schedule;
- › Mode external switch;
- › User entered data;
- › Holiday Schedule;
- › Stand-by mode schedule;
- › Stand-by mode blocking;
- › Protection against Dryness;
- › Boost ventilation;
- › Air handling unit operating algorithm;
- › Protection;
- › Blocking of air handling unit operating algorithm;
- › Manual Control of Components;
- › Data entering into outputs and user environment.

End <

19.4. SYSTEM STATES

This field informs a user about the existing system state. It is displayed in the main window ADJUSTER › VENTILATION CONTROL or the main window of the user environment. The table below shows possible system states.

SYSTEM STATE	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 details refer to alarms section)
Preparing	System is preparing for operation (pre-heating of water heaters, etc.)
Opening dampers	Dampers are opened
BOOST function activated	BOOST function is active
Cooling heaters	Electric heaters are cooled down prior to shutdown of fans
Closing dampers	Dampers are closed
Critical alarm	Critical failure, system is shut down (for details refer to alarms section)
Fire alarm	Fire protection from an external contactor is activated
Heat exchanger frost protection activated	Heat exchanger frost protection is activated
Change filters	Warning about clogged filters (pressure switches are activated or filter timer is activated)
Room RH 3 days average is lower than 30%. Limiting speed.	Reduced airflow because of too low exhaust air moisture
DX cooler defrosting	Dissolving the DX cooler / heater
Fire damper testing	Checking fire dampers

19.5. SETTING DATE AND TIME

For smooth execution of schedules, event log and winter/summer function, it is necessary to set proper date and time in section ADJUSTER › USER SETTINGS › DATE AND TIME SET and click a button DATE AND TIME SET. It can also be indicated in user environment USER › MENU › SETTINGS › DATE AND TIME. Fast synchronization with the computer time is possible in user and adjuster environment.

19.6. SUPPLY AIR TEMPERATURE CONTROL AND COMPENSATION

Temperature for supply air or premises temperature may be indicated. In the service environment section SERVICE › MAIN › SUPPLY AIR TEMPERATURE CONTROL you can control it based on supply or exhaust air temperature. If control by premises temperature is selected, then it is calculated what kind of air is to

be supplied so that the proper room temperature is maintained. It is limited by allowable limits of supply air temperature. The air handling unit is not designed to heat premises, therefore it is not necessary to use full capacity for low temperature differences – the compensation in percentage is provided for this purpose. This parameter indicates a percentage of the temperature difference (between the set temperature and premises temperature) to be compensated for by this function. E.g. set point is 20 °C, temperature in the premises 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. When the received value is added to the set temperature we get the required supply air temperature – 2+20=22 °C. This temperature is not limited as it is within the supply air temperature protection limits. In this case the system maintains the supply air temperature at 22 °C. The closer the premises temperature is to the set temperature (20 °C), the faster the supply air temperature reaches 20 °C. It may be too hot in the premises, therefore this function both heats and cools. Preferred (compensated) temperature is displayed in the window MONITORING (REQUIRED SUPPLY). If the displayed temperature is 0 °C, it means that temperature maintaining of supply air is switched off.

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

- Fans (operate slower, if it is too hot);
- Recirculation valve (if the ambient air temperature is favourable);
- Water cooler;
- DX cooler;
- Recirculation damper and CO₂ (in case of favorable outdoor temperature);
- Bypass damper or rotor (in case of favorable outdoor temperature);
- Recirculation damper and CO₂ (in case of favorable outdoor temperature);
- DX heater;
- Water heater;
- Water cooler/heater;
- Electrical heater;
- Fans (operate slower, if it is too cold).

Firstly the system tries to maintain the supply air temperature by means of a heat exchanger. In case of a plate heat exchanger, the bypass damper is controlled, and in case of a rotary heat exchanger, the rotor rotating speed or interval is changed. The heat exchanger can both heat and cool – it depends on outdoor and room air temperatures. It is controlled by a PID controller whose coefficients are indicated in the adjuster environment section ADJUSTER › PID CONTROLLERS ADJUSTING › HEAT EXCHANGER CONTROL BY SUPPLY AIR TEMPERATURE.

When the heat exchanger operates at full capacity and preferred temperature is not reached, the recirculation damper, then the heater or cooler etc. is activated (if necessary). Only the components configured for temperature maintaining are activated. It takes 10 s for the system to switch between the elements.

19.7. FAN CONTROL

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

- Building protection;
- Economy;
- Comfort;
- Maximum power.

Fan speed can be controlled by:

- Percentage - speed in percentage is indicated in the adjuster environment window ADJUSTER › AIR FLOWS ADJUSTING: 0 % corresponds to 0, and 100 % – 10 V control signal voltage;
- Pressure - the maximum system pressure is indicated, which based on speed settings in the adjuster environment ADJUSTER › AIR FLOWS ADJUSTING means 100 % air-flow;
- Air-flow (m³/h) - K factors of supply and exhaust air and the maximum system air-flow (m³/h) are displayed, which based on speed settings in the adjuster environment ADJUSTER › AIR FLOWS ADJUSTING means 100 %.

Fans based on air-flow and pressure are controlled by PID controller and its coefficients are indicated in the adjuster environment section ADJUSTER › PID CONTROLLERS ADJUSTING › FANS SPEED CONTROL BY AIR FLOW OR PRESSURE. Each fan is controlled individually.

In the service environment window SERVICE › MAIN › FANS SPEED CONTROL you can limit the minimum and maximum fan control signal voltage. Based on manufacturer set parameters, the minimum 2V voltage is indicated, which means that 0V voltage signal is sent when fans are off, and 2V voltage signal is immediately switched on when rotation is required.

It is possible to specify the nominal flows of supply and exhaust air. Then, the maximal air flow is calculated automatically.

19.8. “BOOST“ FUNCTION

Boost ventilation function is used for fast ventilation of premises. It activates the maximum air-flow (speed 4). Boost ventilation has to be temporary, i.e. it must be a final condition (e.g. CO₂ limit, time). The reason for this limitation – protection against dryness. High air flow reduces humidity, and dry air is harmful for health.

The function is activated by pressing ON and deactivated by pressing OFF button in the BOOST section, or by means of an external contactor (FANS SPEED SWITCH), which is configured in the service environment (SERVICE › MAIN › FANS SPEED SWITCH) section.

The function is inactive when Stand-by mode is on. Time limit is indicated (ADJUSTER › USER SETTINGS › BOOST TIMER or USER › MENU › SETTINGS › BOOST TIMER). Once the function is activated, the time is set by the timer and the time is counted till its deactivation. It may be adjusted in real-time, i.e. when the function is on, in ADJUSTER › VENTILATION CONTROL or in the user environment main window.

19.9. WEEKLY SCHEDULE

A weekly schedule consists of 10 weekly events. They can be added, deleted, activated and deactivated. One event indicates time, mode/BOOST function, days of the week. Also it is possible to indicate the change of settable mode temperature.

The system changes modes according to the Weekly Schedule only at the indicated times, therefore a user can always change the existing mode manually. This schedule notifies of the upcoming mode change by indicating the time remaining till the next event.

The schedule is edited in user environment USER › MENU › SCHEDULE.

19.10. HOLIDAY SCHEDULE

This schedule is used when the unit has to operate in uniform mode during holidays. The user interface shows when the schedule period is active as nobody can change the mode activated by this function (except for protection). 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 dates must be changed. Up to five holiday periods can be set. The schedule is edited in the user environment USER › MENU › HOLIDAY.

19.11. WINTER/SUMMER MODE

The winter/summer function is set during the cold periods, because some parts of the system have to be protected against cold outdoor air. During winter it is recommended to leave the unit switched on, therefore it is possible to set blocking of switch-off. Water heaters must always be switched on during the entire winter.

The winter mode may be indicated

Manually;

By date;

Based on 3-day mean outdoor temperature, to be calculated only when the fresh air (outdoor) pre-heater is off.

19.12. DRYNESS PROTECTION

This function is designed to protect 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 set limit (30%), fans start operating in speed 2 in comfort mode. A user is notified of the activated protection and limited air flow.

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

The function is switched on/off in the section ADJUSTER › USER SETTINGS › DRYNESS PROTECTION or in the window USER › MENU › SETTINGS › OTHER.

19.13. NIGHT COOLING FUNCTION

This function is designed to save energy in the morning, when a fresh night air is used to cool down the building. The function is active only in summer. If it is switched on but not active yet, activation conditions are checked:

System time from function start to the end (hours/minutes);

Time is exactly every hour from the start;

If STAND-BY mode is set, the unit operates in BUILDING PROTECTION mode for 5 minutes so that the actual temperature data is available. The temperature is checked after purging. If it is not suitable, the unit returns to STAND-BY mode;

Outdoor temperature is higher than the set outdoor temperature;

Exhaust air temperature is higher than the set temperature;

Exhaust air temperature is higher than the outdoor temperature by at least 2 °C;

Summer.

If all conditions are met the unit starts operating in COMFORT mode (without temperature maintaining). The main window shows that the Night cooling function is active. When it is active continuously, the deactivation conditions are checked:

Time does not correspond to the start/end interval;

Exhaust air temperature drops below the set temperature;

Outdoor temperature drops below the set temperature;

Mode other than COMFORT was switched or the unit has been shut down.

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

The function is configured in the section ADJUSTER › USER SETTINGS › NIGHT COOLING FUNCTION or in the window USER › MENU › SETTINGS › NIGHT COOLINGS.

19.14. CO₂ REDUCTION FUNCTION

This function is designed to maintain a proper quality of room air. To activate it the exhaust air CO₂ sensor must be connected and properly configured in the service environment window SERVICE › SENSORS. When completed, the exhaust air CO₂ value is displayed in the section MONITORING.

In the service environment window SERVICE › MAIN › CO₂ REDUCTION FUNCTION you can switch on/off the function, indicate preferred CO₂ level and allowable limit; when it is exceeded (CO₂ set + allowable excess) CO₂ is reduced, information is displayed and air-flow is increased. When CO₂ reaches the set point, reduction is switched off.

CO₂ protection is inactive in the stand-by and building protection modes.

19.15. FILTER PROTECTIONS

Filter Timer Settings

The filter timer limit is set in the service environment window SERVICE › MAIN › AIR FILTERS PROTECTIONS. The maximum setting is 1 year.

System Mode Communication with External Contactor

This function activates the preferred system switching on by means of external contactor; it indicates what signal will be sent to input. Possible types of signals:

Not used;

Upon pressing a button the selected system mode is activated. After receipt of the first impulse the function is activated, and after second impulse

– deactivated;

On/off; selected system mode is activated. The mode is active while the contactor is on;

PIR sensor. When the sensor is activated, the selected system mode is activated. If the signal is not received for 30 minutes, the mode is activated.

Function is set in the service environment section SERVICE › MAIN › SYSTEM MODE SWITCH.

19.16.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.

19.17.HEAT EXCHANGER CONTROL

Cold - Heat Recuperation

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

Using plate heat exchanger - bypass damper. When it is closed, the heat exchanger is operating at full capacity. Its power is reduced by opening the damper.

Rotary heat exchanger power is controlled by changing its rotating speed or interval. When the rotor rotates at full speed, the heat exchanger is used at full capacity. The power is reduced by slowing down the rotating speed or increasing the interval.

The heat exchanger can both heat and cool – it depends on air temperature. If it is colder outside than in the premises, the heat exchanger pre-heats the outdoor air by using the room heat. If it is colder in the premises than outside, the heat exchanger cools down the outdoor air temperature by room air. Its power is reduced to the minimum when the target supply air temperature is the same as outdoor one. The higher the difference between the preferred and supply air temperatures, the higher heat exchanger power is used. When it is operating at maximum capacity, it is allowed to activate other heating/cooling components.

For this function suitable heat exchanger type is indicated in the window SERVICE › HEAT EXCHANGER and PID controller coefficients – in the window ADJUSTER › PID CONTROLLERS ADJUSTING.

PID controller output limits are set for rotor or bypass damper, at which their operation starts.

If rotor is controlled by 0..10 V signal, at low voltages it does not rotate, the motor heats up, thus the minimum 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 the bypass damper opens only a few percent, noise can occur, thus minimum opening is limited, which also applies when coming to the full opening. If the plate heat exchanger with a 3-way bypass damper is used, the opening time of the bypass damper is indicated in the window SERVICE › HEAT EXCHANGER.

If a plate heat exchanger with segment valves is controlled by an external controller is used, then the type of the bypass damper “REMOTE CONTROLLER” is shown in the window “SERVICE › HEAT EXCHANGER”.

If a plate heat exchanger with segment valves connected to a controller is used, then the type of the bypass damper is shown in the window “SERVICE › HEAT EXCHANGER” as either “2 SEGMENTS” or “3 SEGMENTS”. In the case of heat recovery control, segments are closed in sequence, i.e. if heat recovery is not required, then all the segments are closed and the bypass damper is opened.

When the fans are switched on during the heating season, the heat exchanger runs for 10 minutes at full power, until the system stabilizes.

19.18.SYSTEM MONITORING

The service and adjuster environment have the window MONITORING where you can monitor operation of the entire system, i.e. see controller input and output, CO₂ values, versions of connected modules, date and time, speed of fans, temperatures, pressure, etc. The amount of information depends on the system configuration. This tool is designed for preventive maintenance of the system.

19.19.STAND-BY MODE BLOCKING

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

Always allow shutdown;

Block shutdown;

Block shutdown in winter;

Block shutdown in summer.

It must be indicated for how long the shutdown is permissible within 12 hours. If it is blocked and the system is shut down, the system counts and informs the user on the remaining time. This function is configured in the service environment (SERVICE › MAIN › SYSTEM BLOCKING). If the time has expired and Stand-by mode is blocked, the user is informed by the function indication.

19.20. AIR FLOW ADJUSTMENT

Air-flows are adjusted in the adjuster environment window ADJUSTER › AIR FLOWS ADJUSTING. There are 4 of them in the system and they are dedicated to specific modes:

- Building protection;
- Economy;
- Comfort;
- Maximum power (BOOST function).

Air-flows are arranged in an ascending order, i.e. upon setting lower air-flow in COMFORT mode then in ECONOMY mode, the air-flow of the latter is reduced automatically. With respect to the system configuration, air-flows are indicated in percentage, pressure or amounts of air. 100 % value of air-flow is indicated in service environment window SERVICE › FANS › FAN SPEED CONTROL.

19.21. MANUAL CONTROL OF COMPONENTS

This function manually activates/deactivates the components controlled by digital and analogue outputs. The latter ones are controlled in percentage, and digital ones – by ON/OFF. Based on manufacturer’s parameters (by default) the status of all components is AUTO, which means that control is based on air handling unit operating algorithm. Components are displayed by the system configuration. Settings must be saved so they remain active after power loss.

The lowest power consumption is when the Stand-by mode is on, and position of components – AUTO.

Prior to using the manual control function, it is recommended to activate the force shutdown function, which blocks the air handling unit operating algorithm.

This can be useful, if you need to check if everything is properly connected. Moreover, in the event of failure, certain components 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 the service environment window SERVICE › SENSORS displays an external (REMOTE) type of a temperature sensor, its temperature may be indicated manually. The values may be indicated via the Modbus interface.

19.22. CHANGING PASSWORDS

In the service environment section SERVICE › MAIN › PASSWORD › PASSWORD CHANGING MODE › ON you can change login passwords. For this it is necessary to activate the change and after entering a preferred password (4 digits), click a button SET. To review and change the parameters without a password, just set 0.

19.23. RESTORING FACTORY DEFAULTS

If set parameters result in incorrect operation of the system, you can always restore the factory defaults in the service environment window SERVICE › MAIN › FACTORY SETTINGS.

19.24. INDICATIONS OF FUNCTIONS, ALARMS AND WARNINGS

User about active functions, warnings or alarms is notified in the window ADJUSTER › ALARMS or USER › ALERT. Functions are displayed in the main window ADJUSTER › VENTILATION CONTROL or in the user environment window. The table below provides indications and their descriptions.

FUNCTIONS		DESCRIPTION
	Working indication output	Working indication output is activated
	Alarm indication output	Failure indication output is activated
	System mode switch	Switching on from an external contactor is activated
	Custom fans speed switch	Selected fans speed from an external contactor is activated
	Winter	Winter mode is active
	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 depending 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	Blocking of air handling unit operating algorithm; 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

19.25.DISPLAY AND CONCELLATION OF ALARMS AND WARNINGS

The system notifies the user about the system failures by warnings that are canceled automatically and by alarms that have to be canceled manually. The latter are recommended to be canceled by a specialist prior to finding out the causes of the alarm. Information on alarms and warnings is also displayed

in the main window ADJUSTER › VENTILATION CONTROL. If at least one alarm is active, the system is shut down and external failure indication is activated. Alarms and warnings can be reviewed and canceled in the window ADJUSTER › ALARMS or USER › ALERT. All possible alarms and warnings are provided in the table below.

INDICATION	ALARMS LIST	INDICATION	ALARMS LIST
U.01	Warning! Rotor broken belt alarm	R.31	Alarm! Controller cabinet temperature sensor failure. System stopped
R.02	Alarm! Fireplace protection activated	U.32	Fire damper test OK
U.03	Warning! Dryness protection activated	U.33	Warning! Fire damper test failed
U.04	Warning! Plate heat exchanger frost protection activated	R.34	Alarm! Heater manual protection. System stopped!
R.05	Alarm! Plate heat exchanger frost protection system stopped	U.35	Warning! Heater automatic protection
U.06	Warning! Plate heat exchanger frost protection (pressure relay)	R.36	Alarm! Pre-heater manual protection. System stopped!
R.07	Alarm! Hydronic heater frost protection. System stopped	U.37	Warning! Pre-heater automatic protection
U.08	Warning! Too low supply temperature	R.38	Alarm! Supply fan failure
U.09	Warning! Too high supply temperature	R.39	Alarm! Extract fan failure
R.10	Alarm! Too low supply temperature. System stopped	U.40	Warning! DX cooler failure
R.11	Alarm! Too high supply temperature. System stopped	R.41	Alarm! Fire
U.12	Warning! Change supply air filter (pressure relay)	R.42	Alarm! Supply fan pressure protection. System stopped
U.13	Warning! Change extract air filter (pressure relay)	R.43	Alarm! Extract fan pressure protection. System stopped.
U.14	Warning! Change supply and extract filters (time-out)	R.44	Alarm! Internal system error.
R.15	Alarm! Power supply failure. Please, check F1 fuse	R.45	Alarm! Heater manual protection. Boosting.
U.16	Warning! Supply air temperature sensor failure. Emergency run	R.46	Alarm! Pre-heater manual protection. Boosting.
U.17	Warning! Extract air temperature sensor failure. Emergency run	R.47	Alarm! Internal communication error
U.18	Warning! Exhaust air temperature sensor failure. Emergency run	U.48	Warning! DX cooler defrosting
U.19	Warning! Outdoor air temperature sensor failure. Emergency run	U.49	Warning! Too high 3 days extract humidity. Increasing air flow.
U.20	Warning! Hydronic heater water temperature sensor failure. Emergency run	U.50	Warning! Too high extract humidity. Boosting.
U.21	Warning! Hydronic pre-heater water temperature sensor failure. Emergency run	R.51	Alarm! Rotor broken belt alarm. System stopped.
U.22	Warning! Hydronic cooler water temperature sensor failure. Emergency run	U.52	Warning! Gas heater failure

U.23	Warning! Controller cabinet temperature sensor failure. Emergency run	U.53	Warning! Gas pre-heater failure
R.24	Alarm! Supply air temperature sensor failure. System stopped	U.54	Warning! Too high condensation level
R.25	Alarm! Extract air temperature sensor failure. System stopped	U.55	Warning! Supply fan failure. Emergency run
R.26	Alarm! Exhaust air temperature sensor failure. System stopped	U.56	Warning! Extract fan failure. Emergency run
R.27	Alarm! Outdoor air temperature sensor failure. System stopped	U.57	Warning! Too low supply air flow for DX cooler
R.28	Alarm! Hydronic heater water temperature sensor failure. System stopped	R.58	Alarm! Bypass damper failure. System stopped.
R.29	Alarm! Hydronic pre-heater water temperature sensor failure. System stopped	R.59	Alarm! Hydronic heater/pre-heater circ. pump failure. System stopped.
R.30	Alarm! Hydronic cooler water temperature sensor failure. System stopped	U.60	Warning! Hydronic heater/pre-heater circ. pump failure.

19.26.EVENT LOG (HISTORY)

The system records 50 recent events (failures, alarms, fire damper testing results, etc.). The log stores the description of events and time. The event log may be reviewed in the window ADJUSTER > HISTORY or USER > MENU > HISTORY.

19.27.SYSTEM VERSIONS AND RUNNING TIME

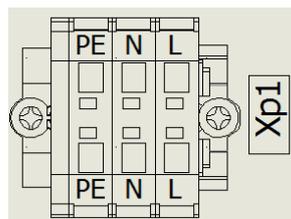
In the section ADJUSTER > USER SETTINGS > ABOUT you may see software and configuration versions that are saved in the production line namely to every unit. Next to them the running time since the unit has been manufactured is also displayed. It is calculated when the fans are rotating.

20.WIRING DIAGRAM

Electrical equipment connection to the control board terminals. Control board connectors shall be of the following cross sectional area.

Control board	0,5 mm ²	1,5 mm ²	2,5 mm ²
MiniMCB	X1, X2, X3, X4, X5, X6, X7	X9, X13, X14, X15, X16	X10, X11, X12, X17
MiniEX1	X19, X20, X21, X23	-	-
Power supply	-	-	Xp1

Automation E zone, connector Xp1 general power connection to the unit ~1/230 VAC.



21.CONNECTION OF ACCESSORIES

Accessories can be configured only by “Ptouch” and “MBGateway”.

21.1. CONTROLLER MINIMCB EX1 V1.0V

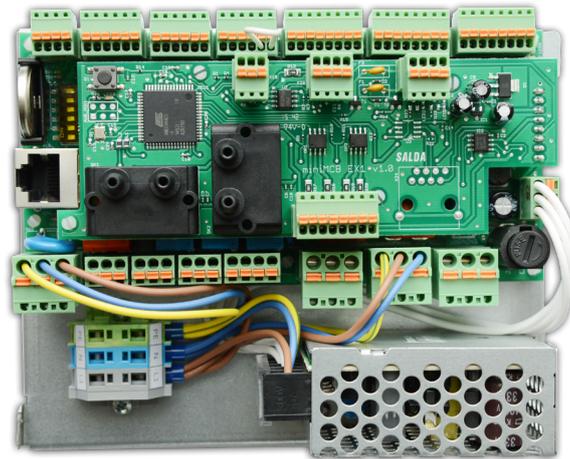


Figure 21.1.1. Unit automation

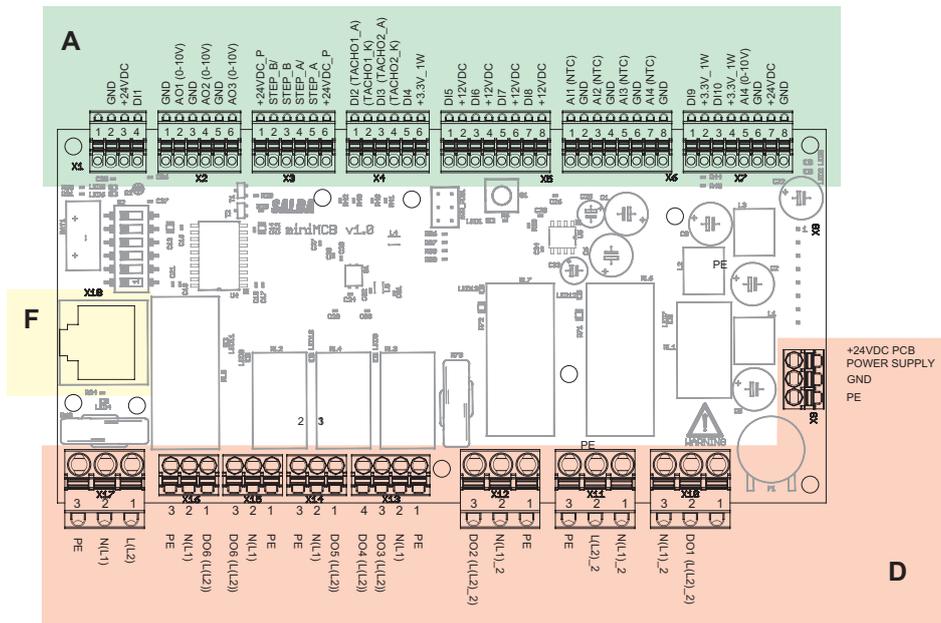


Figure 21.1.2. miniMCB controller zones

A			
Connector	Contact No.	Contact name	Functional block name
miniMCB			
X1	1	PE	Not used
	2	GND	
	3	24VDC	
	4	DI1 (HOLO)	
X2	1	GND	Supply air fan control (output 0-10VDC)
	2	AO1 (0-10V)	
	3	GND	Extract air fan control (output 0-10VDC)
	4	AO2 (0-10V)	
	5	GND	Electric/Water preheater control (output 0-10VDC)
	6	AO3 (0-10V)	

X3	1	24VDC_P	Bypass step motor control
	2	STEP_B/	
	3	STEP_B	
	4	STEP_A/	
	5	STEP_A	
	6	24VDC_P	
X4	1	DI2 (TACHO1_A)	Supply fan speed RPM
	2	(TACHO1_K)	
	3	DI3 (TACHO2_A)	Extract fan speed RPM
	4	(TACHO2_K)	
	5	DI4	Fire protection input (NC)
	6	3.3V_1W	
X5	1	DI5	Electric Preheater automatic protection (NC)
	2	12VDC	
	3	DI6	Electric Preheater manual protection (NC)
	4	12VDC	
	5	DI7	Bypass closed (NC)
	6	12VDC	
	7	DI8	Not used
	8	12VDC	
X6	1	AI1 (NTC)	Supply air temperature sensor
	2	GND	
	3	AI2 (NTC)	Fresh air temperature sensor
	4	GND	
	5	AI3 (NTC)	Extract air temperature sensor
	6	GND	
	7	AI4 (NTC)	Exhaust air temperature sensor (optional)
	8	GND	
X7	1	DI9	System mode switch
	2	3.3V_1W	
	3	DI10	Fan speed switch
	4	3.3V_1W	
	5	AI4 (0-10V)	A2-Extract air CO ₂ or RH (input 0-10VDC)
	6	GND	
	7	24VDC	24VDC Power supply for Air quality transmitter I
	8	GND	
D			
Connector	Contactor No.	Contactor name	Functional block name
miniMCB			
X9	1	24VDC POWER	24VDC power supply input
	2	GND	
	3	PE	
X10	1	PE	Electric/Water Heater power line/circulation pump (max.0,6kW)
	2	DO1 (L(L2)_2)	
	3	N(L1)_2	

X11	1	N(L1)_2	230VAC Power supply for X10 and X12
	2	L(L2)_2	
	3	PE	
X12	1	PE	Preheater power line (max. 2kW)
	2	N(L1)_2	
	3	DO2 (L(L2)_2)	
X13	1	PE	Supply/extract air damper control output DO3 (Open) DO4 (Close) 0,5A
	2	N(L1)	
	3	DO3 (L(L2))	
	4	DO4 (L(L2))	
X14	1	DO5 (L(L2))	Not used
	2	N(L1)	
	3	PE	
X15	1	PE	Supply fans power line - PV
	2	N(L1)	
	3	DO6 (L(L2))	
X16	1	DO6 (L(L2))	Extract fans power line - IV
	2	N(L1)	
	3	PE	
X17	1	L(L2)	230VAC Power supply for X13, X14, X15, X16
	2	N(L1)	
	3	PE	
F			
Connector	Contactor No.	Contactor name	Functional block name
miniMCB			
X18	1	RS422_Z	RS422/485 communication port
	2	RS422_Y	
	3	-	
	4	RS422/485_A	
	5	RS422/485_B	
	6	RS_GND	
	7	24VDC	
	8	GND	

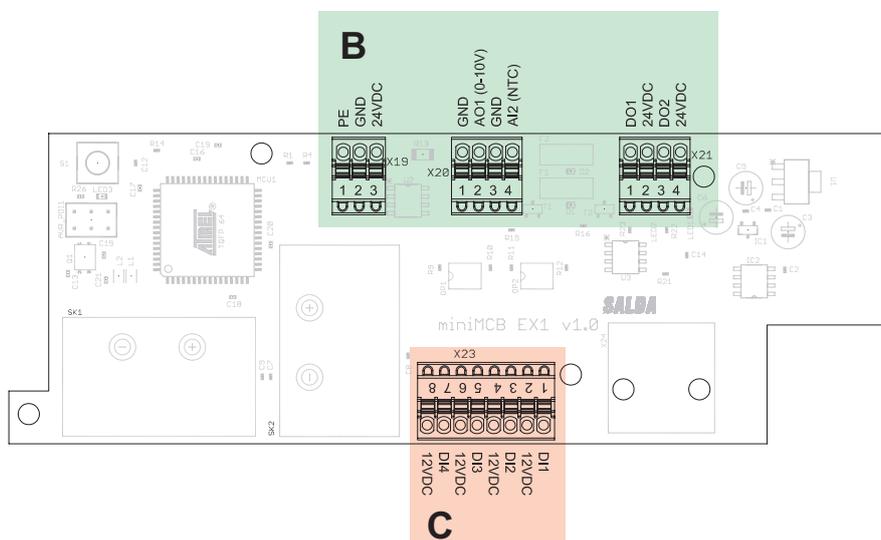


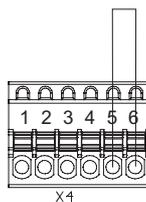
Figure 21.1.3. EX1 controller zones

B			
Connector	Contactor No.	Contactor name	Functional block name
miniEX1			
X19	1	AI1 (0-10V)	A1-Supply air CO ₂ or RH (input 0-10VDC)
	2	GND	
	3	24VDC	
X20	1	GND	Electric/Water heater control (output 0-10VDC)
	2	AO1 (0-10V)	
	3	GND	Hydraulic heater water temperature sensor
	4	AI2 (NTC)	
X21	1	DO1	Working indication output (START). 24VDC; 1,2W max.
	2	24VDC	
	3	DO2	Alarm indication output (STOP). 24VDC; 1,2W max.
	4	24VDC	
C			
Connector	Contactor No.	Contactor name	Functional block name
miniEX1			
X23	1	DI1	Electric heater manual protection (NC)
	2	12VDC	
	3	DI2	Electric heater automatic protection (NC)
	4	12VDC	
	5	DI3	Filter relay/Fire place I, DI (NC)
	6	12VDC	
	7	DI4	Filter relay/Fire place II, DI (NC)
	8	12VDC	

21.2. FIRE PROTECTION SIGNAL INPUT (FIRE PROTECTION INPUT (NC))

Fire protection signal input must be normally closed, until the fire protection system is not connected a jumper is installed in the factory.

Automation controller A zone X4.



21.3. OUTDOOR AIR PRE-HEATER

In product versions 1.1 pre-heater is integrated inside the product. In product versions 1.2 pre-heater is integrated on the outdoor air channel. Pre-heater is controlled by 0-10V signal.

Installation diagram.

Installation based on air direction Air Damper M2 -> Pre-Heater PE -> Recuperator.

Wiring diagram.

Automation controller A (X2) and D (X12) zones (page 34).

Wiring diagram

Automation controller A (X2) and D (X12) zones.

21.4. SUPPLY AIR CO₂ OR RH (INPUT 0-10VDC)

Supply air CO₂ or RH (input 0-10VDC) connection. This connection is possible for unit version 1.1 miniMCB basic with EX1 controller.

Installation diagram.

Transmitter shall be installed inside supply air duct.

Wiring diagram.

Automation controller B zone X19.



21.5. EXTRACT AIR CO₂ OR RH (INPUT 0-10VDC)

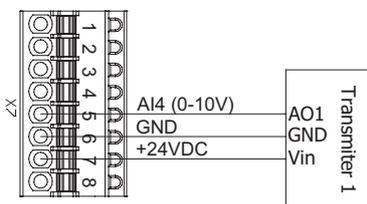
Extract air CO₂ or RH (input 0-10VDC) connection.

Installation diagram.

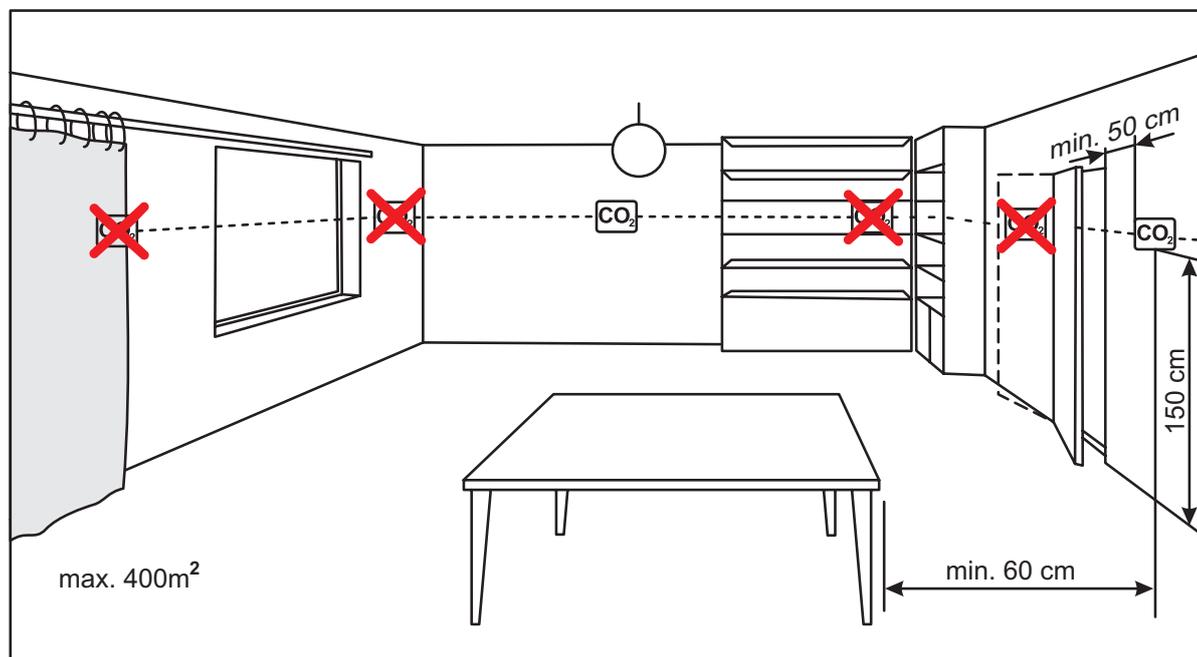
Transmitter shall be installed inside extract air duct or room.

Wiring diagram.

Automation controller A zone X7.

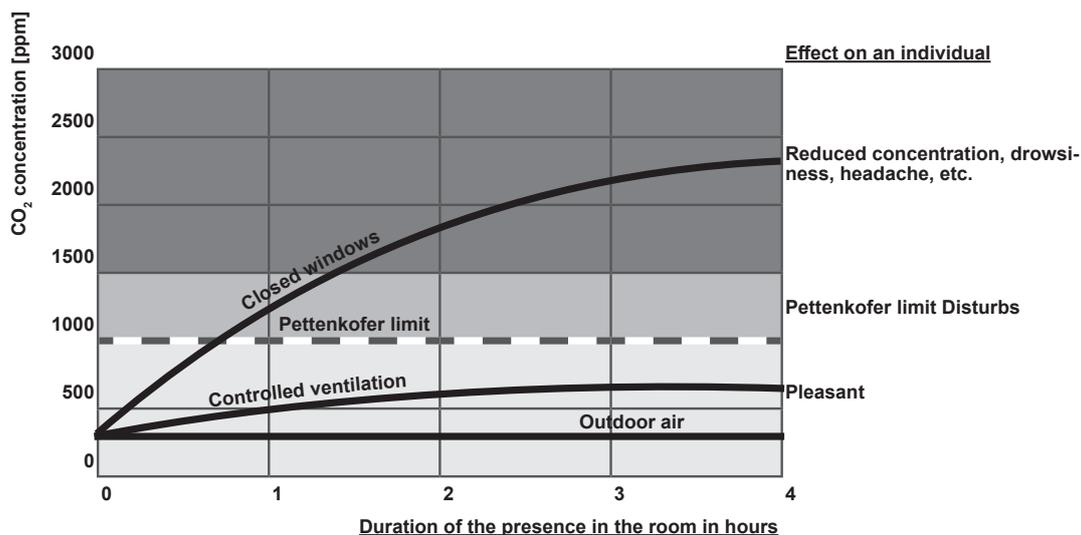


21.6. ROOM CO₂ TRANSMITTER INSTALLATION RECOMMENDATION



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.

21.7. CO₂ CONCENTRATION ACCORDING TO PETTENKOEFER LIMIT



21.8. SMARTY X V 1.1 VERSION - HEATER CONTROL

Product Smarty X V 1.1 version can be equipped with either electric or water heater.

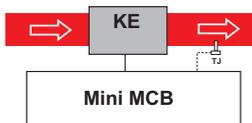
The electric heater can be controlled by:

- On/Off – control of electric heater up to 0.6kW/230V or the circulation pump.
- 0-10V – control of electric or water heater.

- Electric heater control by On/Off.

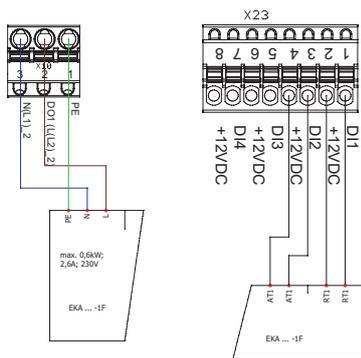
Installation diagram.

Electric heater shall be installed inside air duct. Arrangement based on air direction Electric Heater -> Supply Air Sensor (TJ).

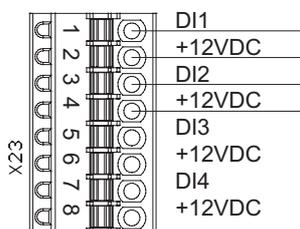


Wiring diagram.

On/Off heater connection. Automation controller D zone X10 and C zone X23. This control method is suitable only to electric heaters up to 0.6 kW/230 V. In order to control more powerful heater above 0.6 kW by On/Off method, intermediate relay shall be used where power circuit shall be connected to a separate power supply.



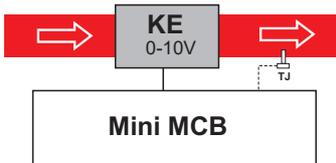
- Automatic and manual protection shall be connected to EX1 controller X23 connector if the electric heater is equipped with these connection terminals.
- Otherwise jumpers are installed on X23 connector protection inputs.



- Electric heater control 0-10V.

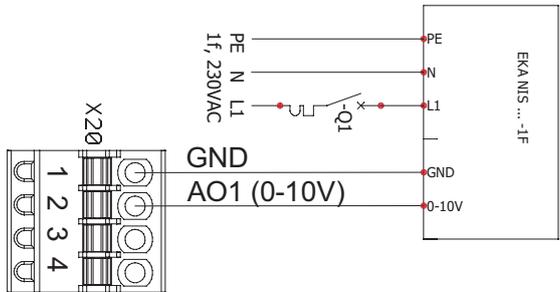
Installation diagram.

Electric heater shall be installed inside air duct. Arrangement based on air direction Electric Heater -> Supply Air Sensor (TJ).

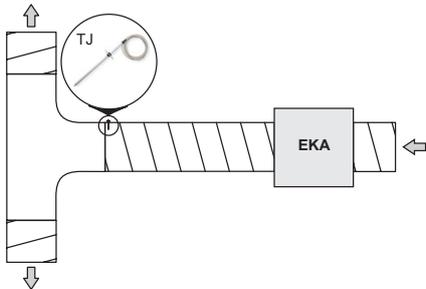


Wiring diagram.

0-10V heater connection. Automation controller B zone, X20 connector.



When using the supply air heater, the supply air sensor (SS) shall be installed downstream the heater (or cooler) as the sensor cable allows or until the first branching, bend of the air transportation system.

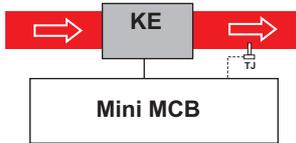


21.9. SMARTY X V 1.2 VERSION - HEATER CONTROL

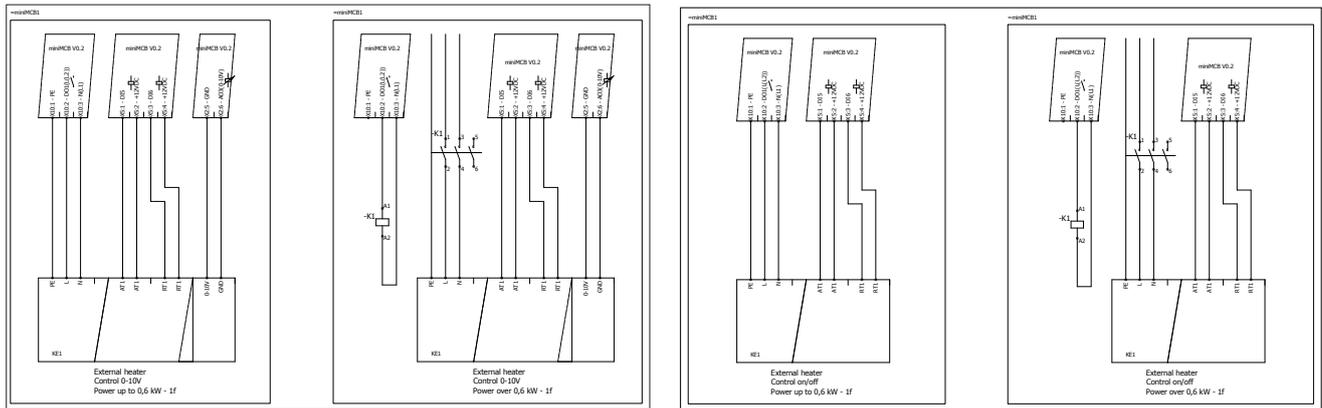
Smarty X V 1.2 version of the product can be connected which an electrical heater, which can be controlled by
 - On/Off signal EKA;
 - 0-10V signal EKA NIS.

Installation diagram

The electrical heater shall be installed in the air duct. The arrangement procedure in the direction of air: electrical heater -> TJ supply air sensor.



Connection diagrams SP55 and SP56:



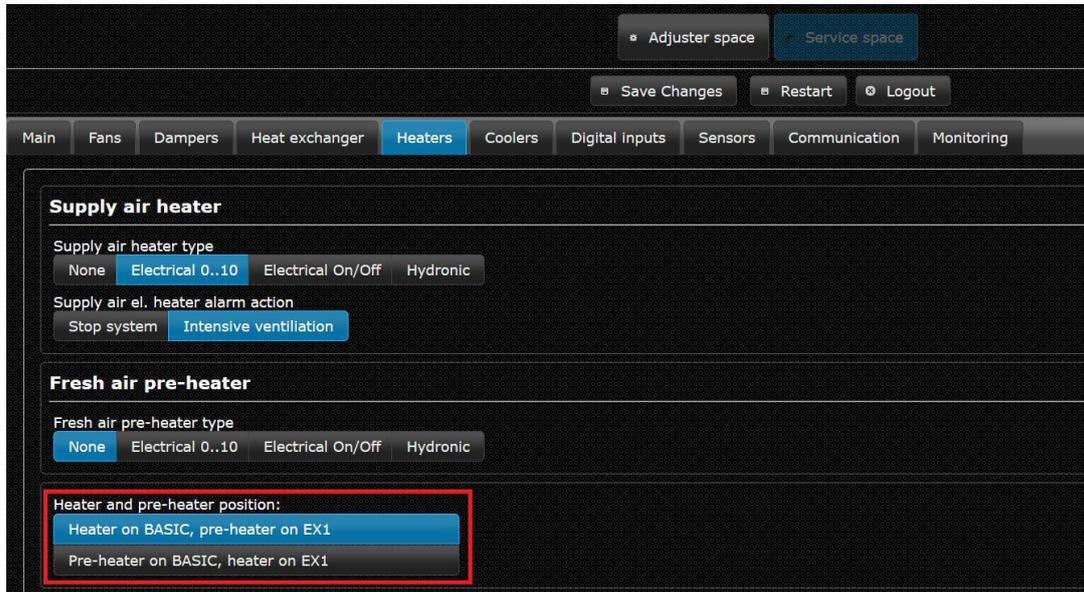
Since a pre-heater is to be connected according to the factory settings, settings should be changed in the environment of the MB-Gateway WEB

application service or on the FLEX MCB control panel¹.

Settings in the environment of the MB-Gateway WEB application service

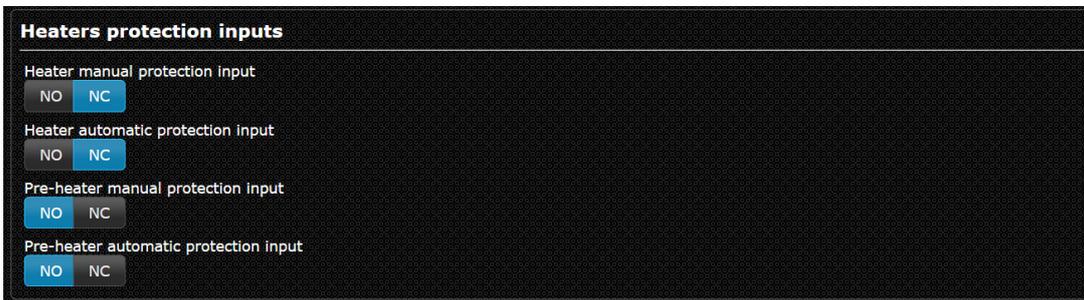
Change the settings as follows:

- Service password 4444;
- Service -> Heaters -> Heater and pre-heater position;
- Select either the heater or pre-heater to be switched on MiniMCB basic.

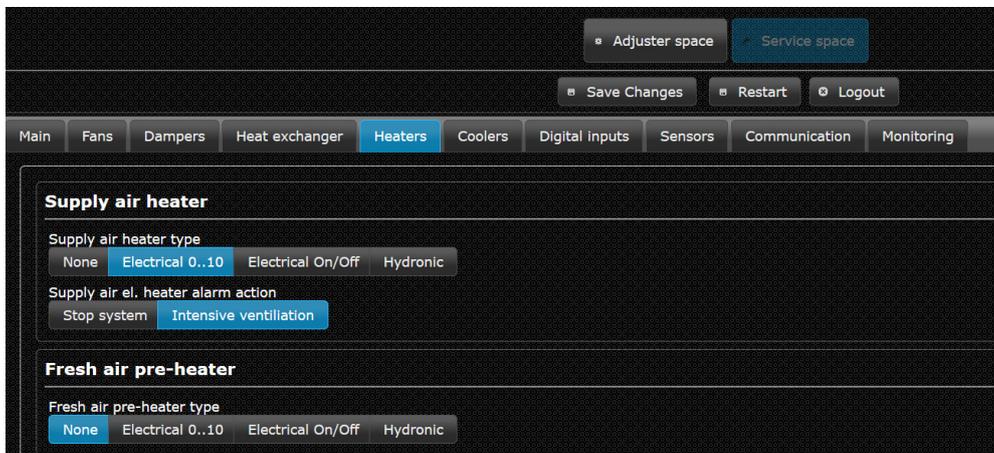


¹With the Stouch control panel, it is impossible to change the settings

- Service -> Digital inputs -> Heaters protection inputs
Set the manual and automated protection statuses of the heater or pre-heater – according to the standards, it should be NC.



- Service -> Heaters -> Supply air heater or Fresh air pre-heater
Set whether it is a heater or pre-heater as well as the type of the heater or pre-heater and actions to be performed in case of the activation of a danger signal.



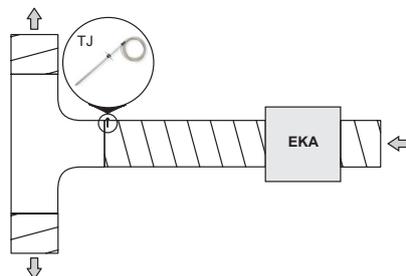
Settings with the FLEX MCB control panel

1. Go to Menu/Service/Heaters. Enter the password (the initial password – 4444);
2. Select Control Position in the settings “Heater on basic” or “Pre-heater on basic”.
3. Go to Menu/Service/Heaters/Heater Set type “E010” 0-10 control, EONOFF On/Off control, NONE – heater switch-off, and also specify the system’s response to danger.

4. Go to Menu/Service/Heaters/Preheater. Set type "E010" 0-10 control, EONOFF On/Off control, NONE – heater, pre-heater switch-off. Set the system's response to danger.
5. Go to Menu/Service/Digital inputs/Heater protection. Set the manual and automated protection statuses – according to the standards, it should be NC.
6. Go to Menu/Service/Digital inputs/Preheater protection. Set the manual and automated protection statuses – as a standard, it should be NC.



When using the supply air heater, the supply air sensor (SS) shall be installed downstream the heater (or cooler) as the sensor cable allows or until the first branching, bend of the air transportation system.



21.10.CONNECTION OF SUPPLY AND EXTRACT AIR DAMPERS

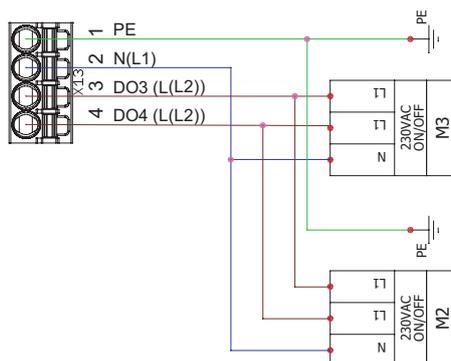
Product Smarty XV all versions can be equipped with fresh air damper and extract air drives. They are controlled by 3-point.

Installation diagram.

See "Principle mounting diagram"

Wiring diagram.

Automation controller D zone. Upon activation of output X13:3 the dampers shall open, Upon activation of output X13:4 the dampers shall close.



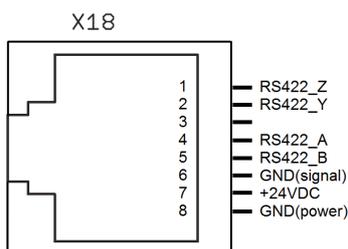
21.11.CONNECTION OF REMOTE CONTROL PANEL OR MODBUS

Wiring diagram.

Automation controller F zone, X18 connector.

Switch positions for X18 connector configuration

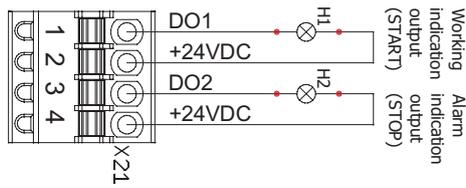
Switch	Position	Purpose
S2	1	A+Y (RS422->RS485)
	2	B+Z (RS422->RS485)
	3	120R line termination resistor
	4	1kR line pull-up resistor
	5	1kR line pull-down resistor
	6	Galvanic isolation disable (turn ON when connecting Remote Controller - RS_GND will be shorted to GND, OFF - when connecting to BMS)



21.12. OPERATION AND ALARM INDICATION (SMARTY 4X V 1.1)

Wiring diagram.

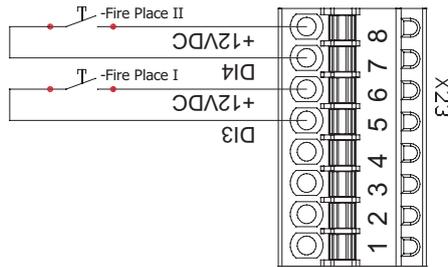
Automation controller B zone, X21 connector.



21.13. FIRE PLACE CONNECTION (SMARTY X V 1.1)

Wiring diagram.

Automation controller C zone, X23 connector.



LED indication

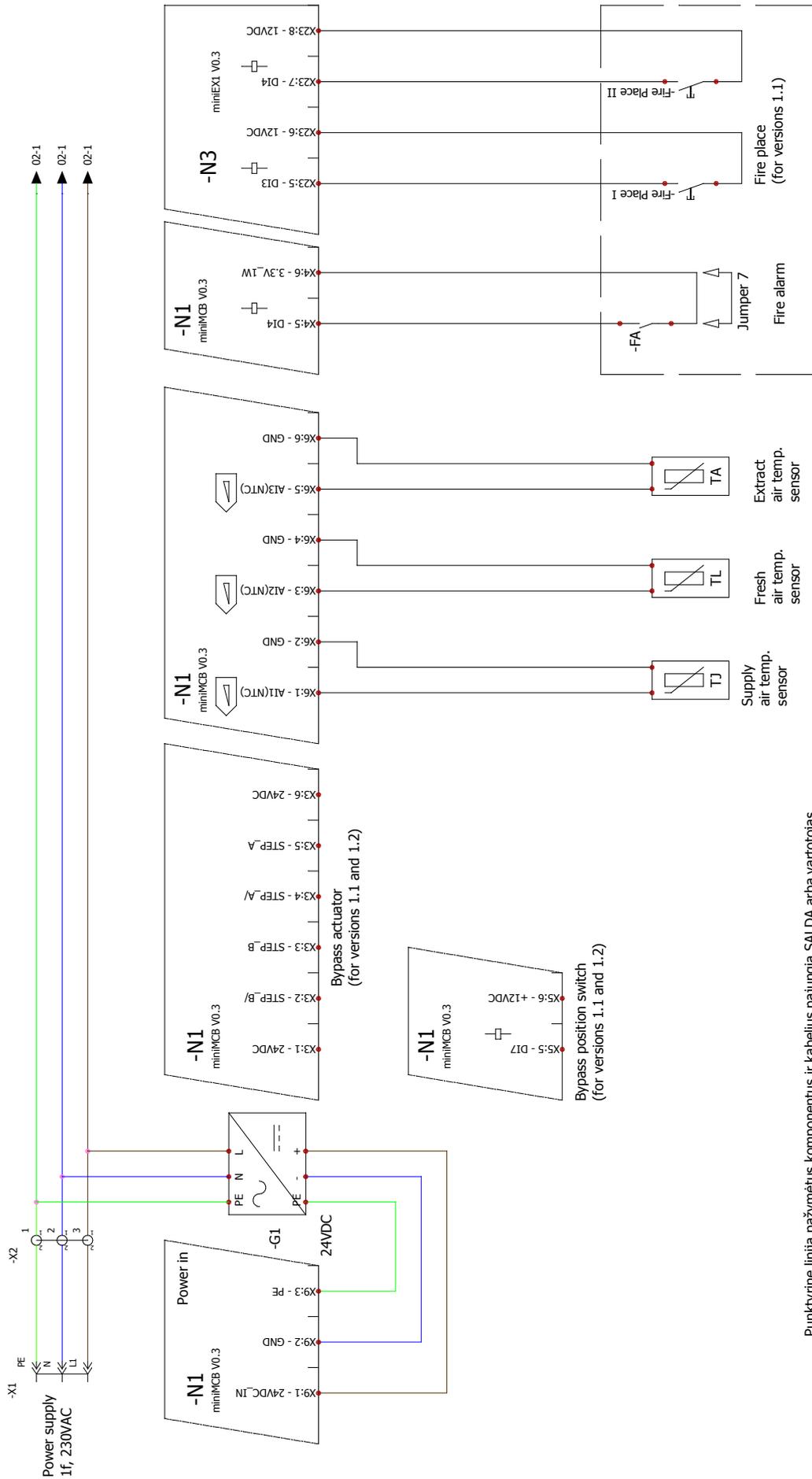
miniMCB

- LED1 3.3V miniMCB power indication (1W mode)
- LED2 12V miniMCB power indication
- LED3 3.3V miniMCB power indication (ON mode)
- LED4 MiniMCB status LED
- LED5 Communication line Transmit indication
- LED6 Communication line Receive indication
- LED7 24V peripheral POWER ON indication

miniEX1

- LED1 EX1 status LED

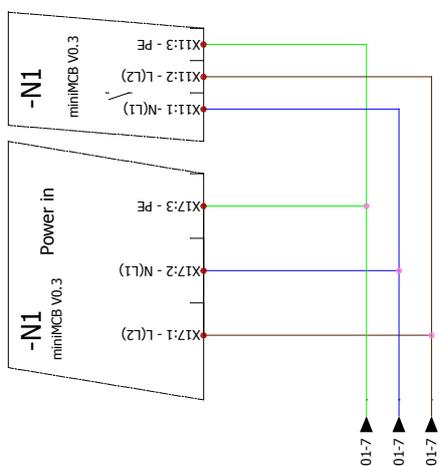
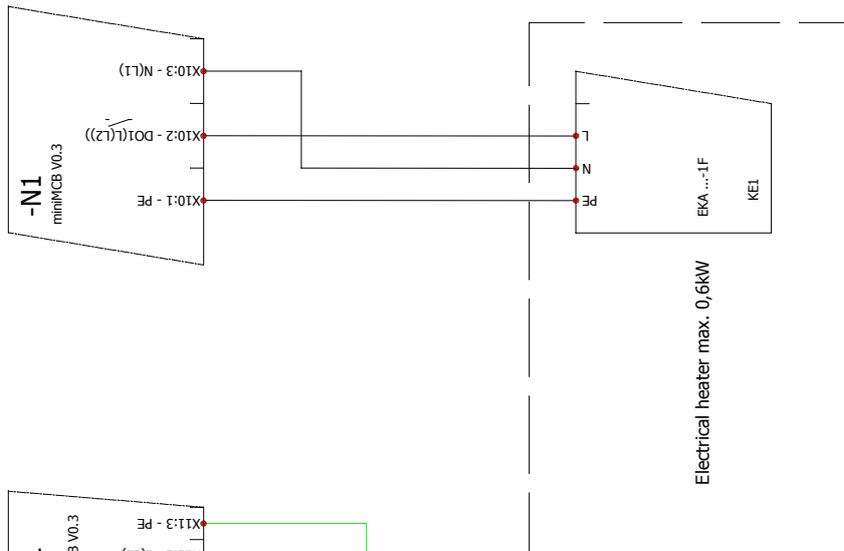
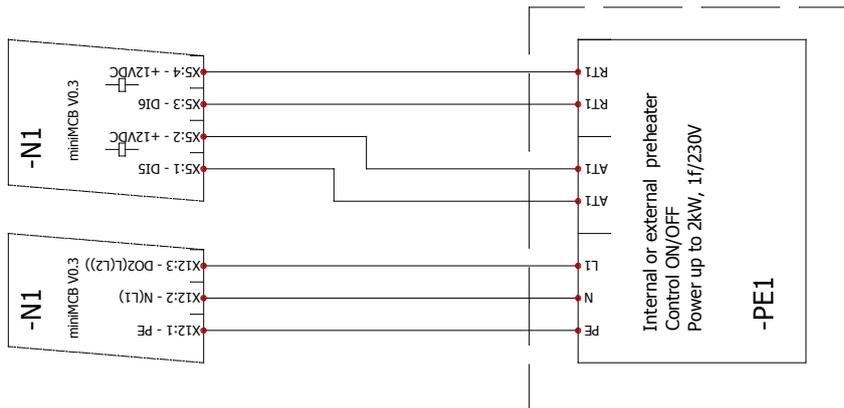
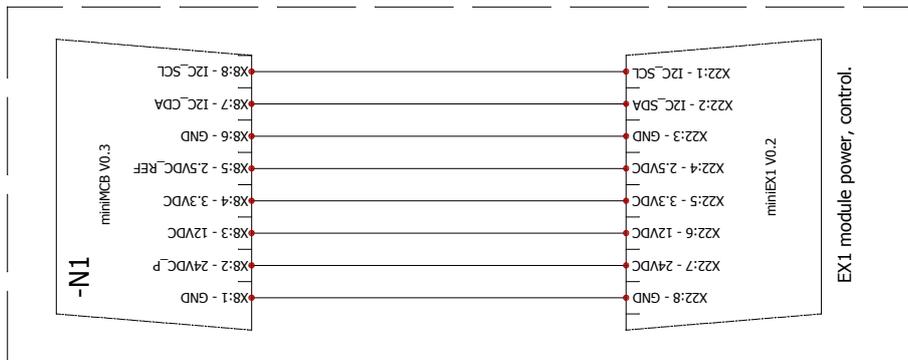
22.ĮRENGINIO VIDINIŲ IR IŠORINIŲ MAZGŲ JUNGIMO ORIENTACINĖ SCHEMA



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

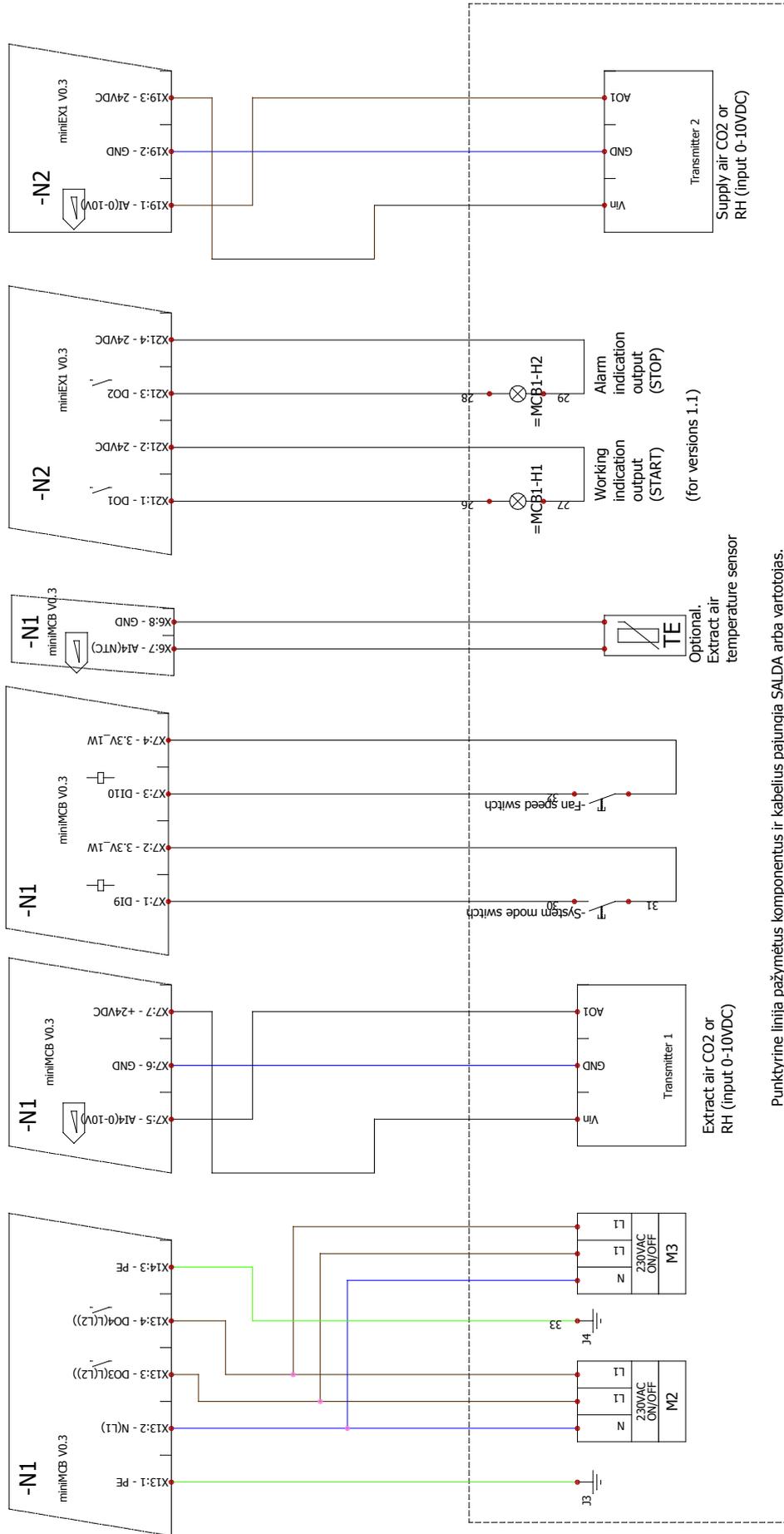
2019.1017.0.1.1-PS

Electrical preheater
 DI5 - automatic protection
 DI6 - manual protection



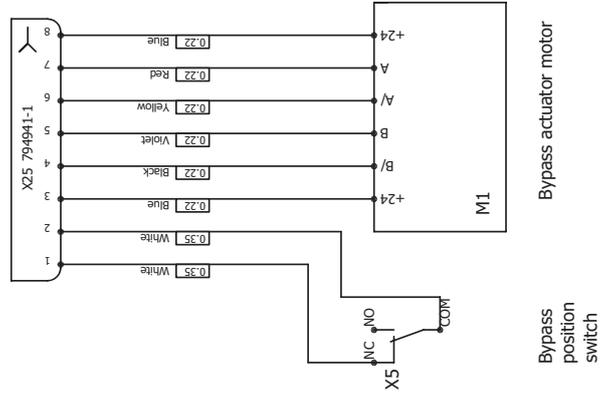
2019.1017.0.1.2-PS

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

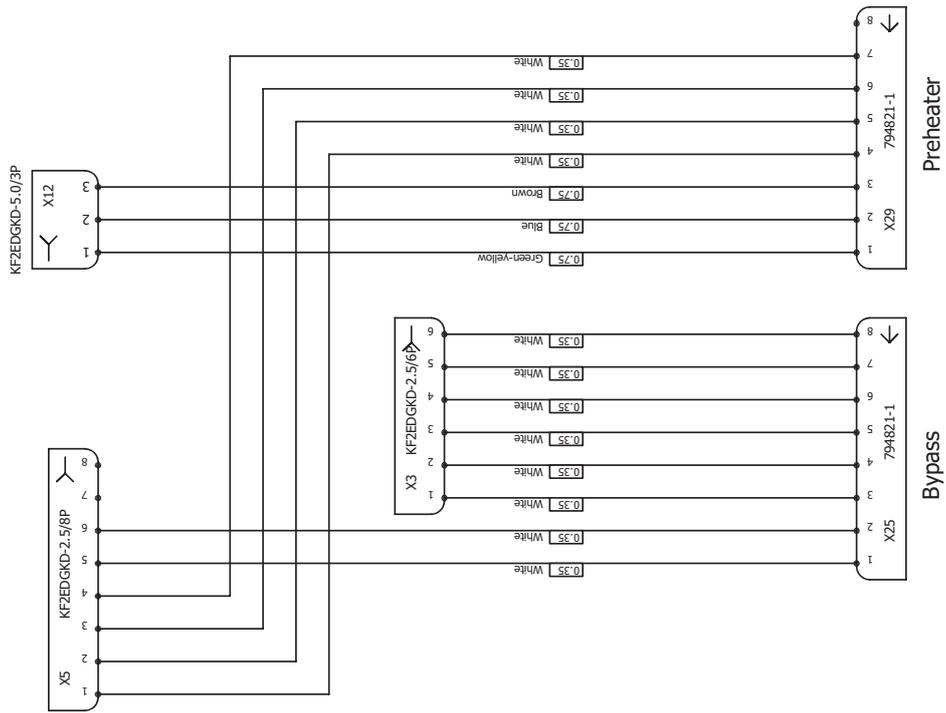


2019.1017.0.1.3-PS

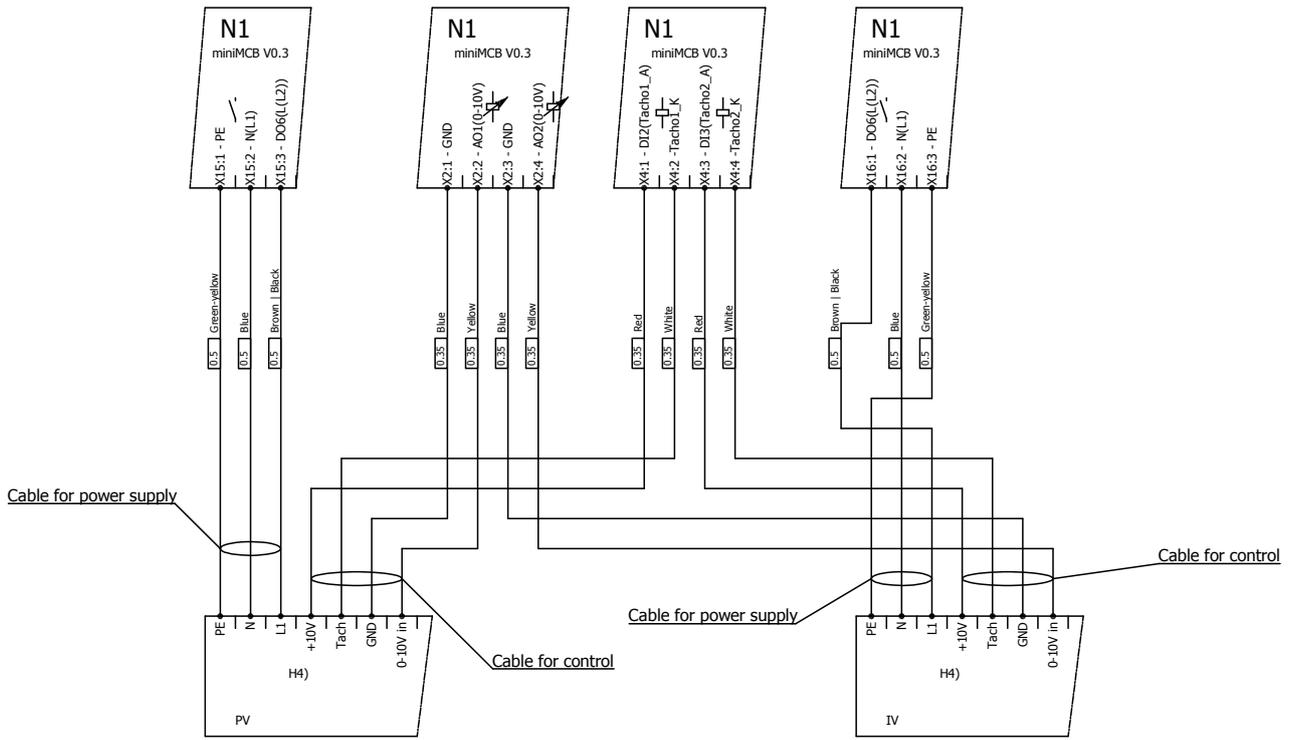
Punktyrine linija pažymėtus komponentus ir kabelius pajungia SALDA arba vartotojas.
Components and cables marked with the dash line connected by SALDA or customer.



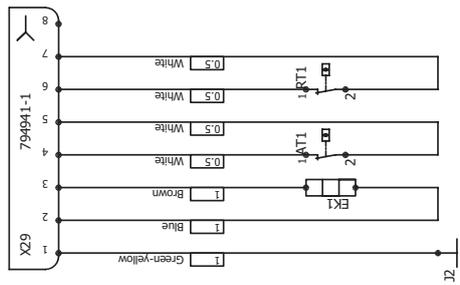
SMARTY ZP3XV-0k



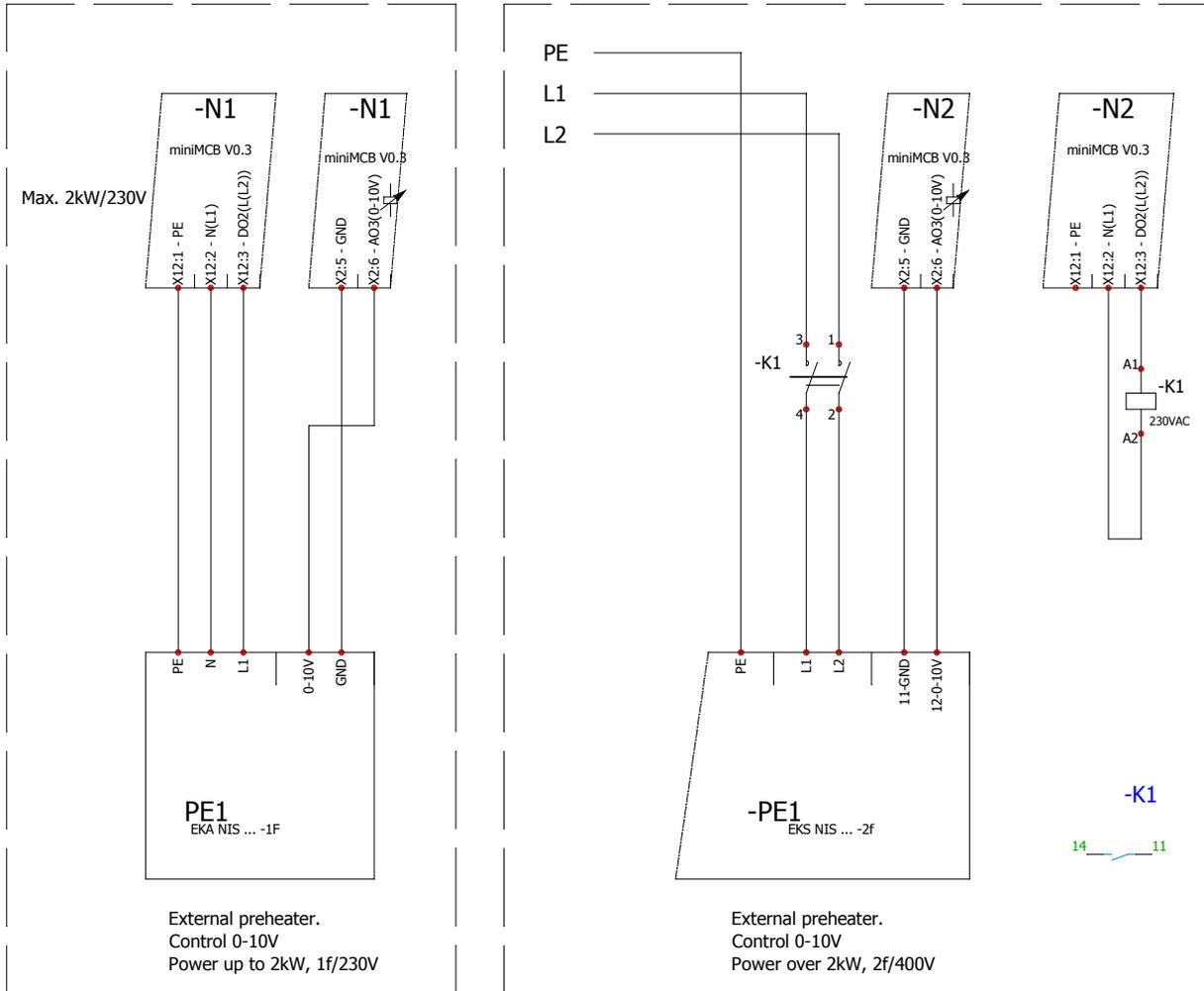
Smarty 3XV-PE-0k



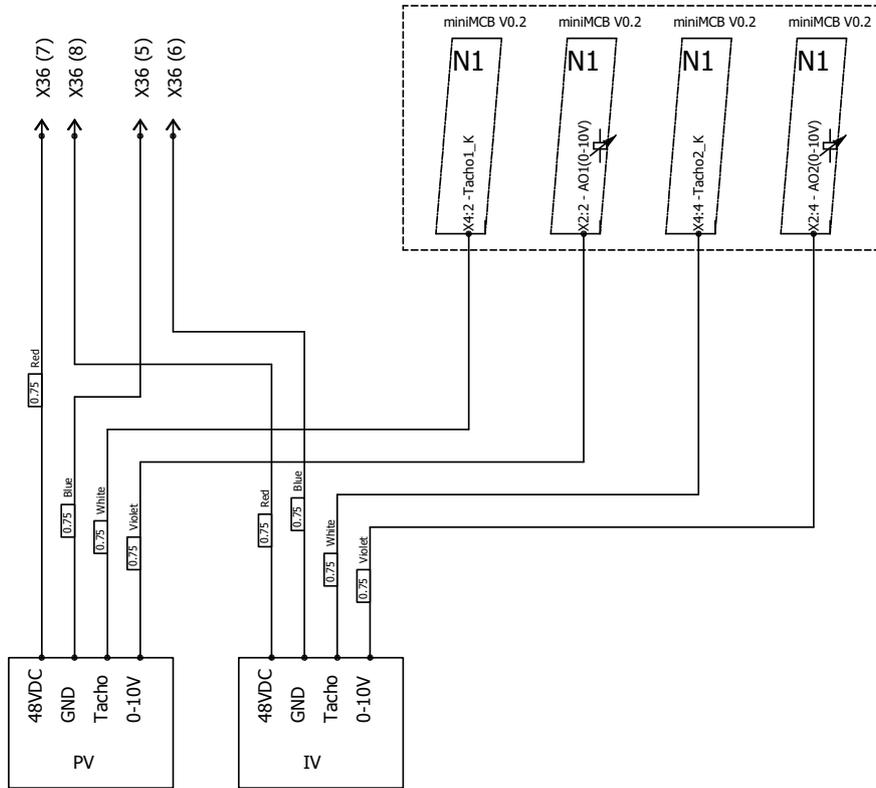
Fans (MiniMCB)



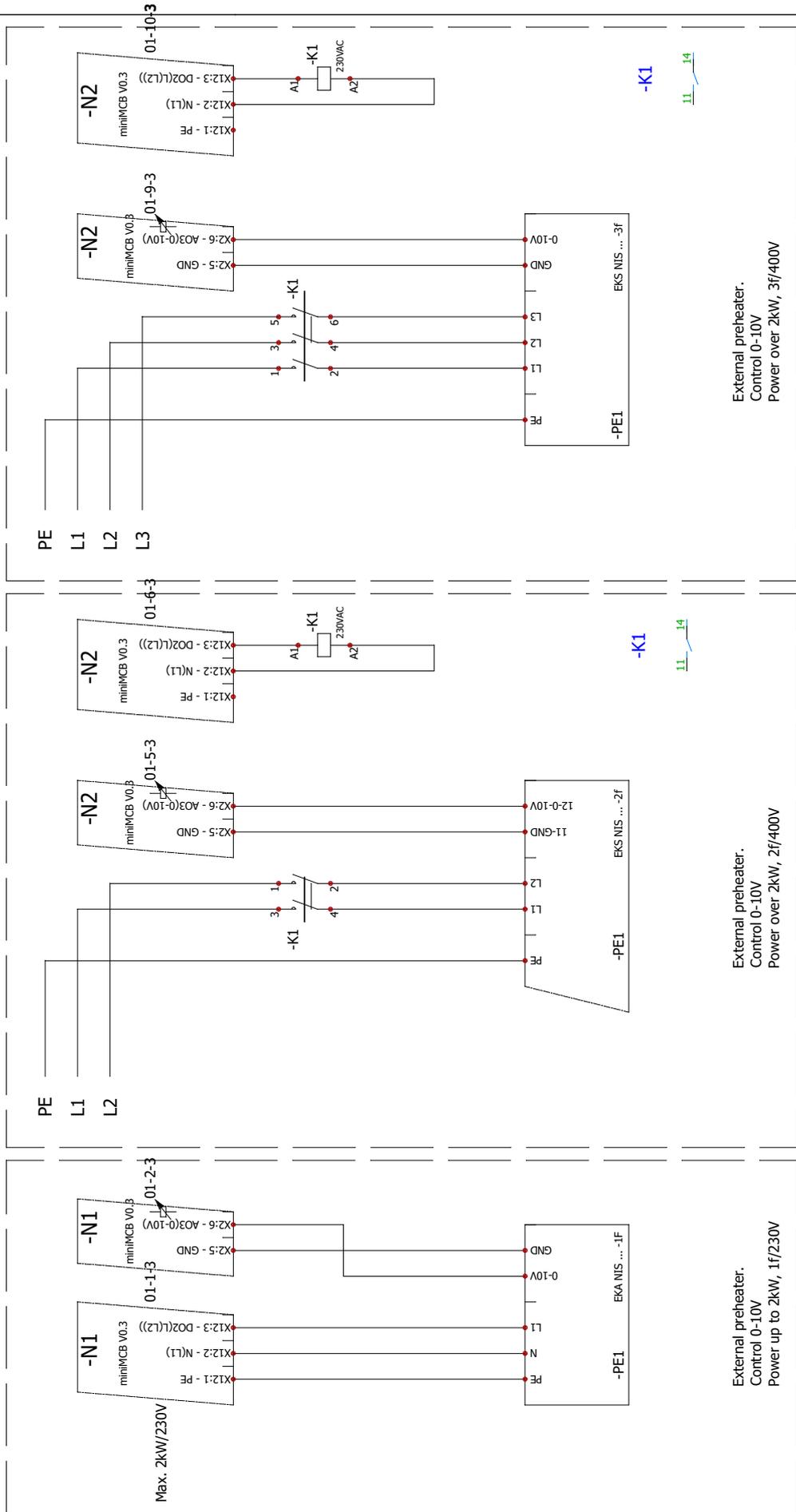
SP35



SP45



SP47



SP45

23.ECODESIGN DATA TABLE

SMARTY		2 XV 1.1	2 XV 1.2	3 XV 1.1	3 XV 1.2	4 XV 1.1	4 XV 1.2
Specific energy consumption (SEC) cold	[kWh/m ² a]	-75,7	-75,7	-74,8	-74,8	-68	-68
Specific energy consumption (SEC) average	[kWh/m ² a]	-37	-37	-37,1	-37,1	-31,7	-31,7
Specific energy consumption (SEC) warm	[kWh/m ² a]	-12,2	-12,2	-12,9	-12,9	-8,3	-8,3
Declared typology		bidirectional	bidirectional	bidirectionals	bidirectionals	bidirectionals	bidirectionals
Type of drive installed (fan)		Variable	Variable	Variable	Variable	Variable	Variable
Type of heat recovery system		recuperative	recuperative	recuperative	recuperative	recuperative	recuperative
Thermal efficiency of heat recovery	[%]	90,4	90,4	86,9	86,9	82	82
Maximum flow rate	[m ³ /s]	182	182	394	394	583	583
Electric power input of the fan drive at maximum flow rate	[W]	82	82	170	170	421	421
Sound power level (Lwa)	[dB(A)]	51	51	50	50	54	54
Reference flow	[m ³ /s]	0,035	0,035	0,077	0,077	0,113	0,113
Reference pressure difference	[Pa]	50	50	50	50	50	50
SPI	[W/(m ³ /h)]	0,31	0,31	0,26	0,26	0,4	0,4
Control factor and control typology		0,95	0,95	0,95	0,95	0,95	0,95
Declared maximum internal leakage rates	[%]	1,2	1,2	1,2	1,2	1,2	1,2
Declared maximum external leakage rates	[%]	1,2	1,2	1,2	1,2	1,2	1,2
Position and description of visual filter warning for RVU's		Timer	Timer	Timer	Timer	Timer	Timer
AEC average	[kWh]	391	391	344	344	501	501
AEC cold	[kWh]	928	928	881	881	1038	1038
AEC warm	[kWh]	346	346	299	299	456	456
AHS Average	[kWh/a]	4610	4610	4505	4505	4356	4356
AHS Cold	[kWh/a]	9018	9018	8812	8812	8521	8521
AHS Warm	[kWh/a]	2085	2085	2037	2037	1970	1970
ErP Compliance		2018	2018	2018	2018	2018	2018
Internet address for disassembly instructions							www.salda It

24.DECLARATION OF CONFIMITY

Manufacturer

SALDA, UAB
Ragainės g. 100
LT-78109 Šiauliai, Lithuania
Tel.: +370 41 540415
www.salda.lt

Hereby confirms that the following products - Air handling units:

SMARTY XV*

(where by “*” indicates possible unit installation type and modification)

Provided it was delivered and installed in the facility in accordance with the included installation instructions, comply with all applicable requirements in the following directives:

Machinery Directive 2006/42/EC
EMC Directive 2014/30/EU
Ecodesign Directive 2009/125/EC

The following harmonized standards are applied in applicable parts:

LST EN ISO 12100:2011 - Safety of machinery - General principles for design - Risk assessment and risk reduction.
 LST EN 60204-1:2006 - Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
 LST EN 60335-1:2012 - Household and similar electrical appliances. Safety. Part 1: General requirements.
 LST EN 60529:1999 - Degrees of protection provided by enclosures (IP code).
 LST EN 61000-6-2:2005 - Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments.
 LST EN 61000-6-3:2007 - Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments.

Should any alterations be made in the products, this declaration will no longer apply.

Notified body: VšĮ Technikos priežiūros tarnyba, Naugarduko g. 41, LT – 03227 Vilnius, Lithuania, identification number 1399.

Quality: Salda UAB activities are in line with the international quality management system standard **ISO 9001:2015**.

Date 2019-02-01



Giedrius Taujenis
 Director product development

25. 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.
 - 3.5. Company SALDA UAB is not responsible for potential loss of property or personal injury in cases where AHU is manufactured without a control system and the control system will be installed by the client or third parties. The manufacturer's warranty does not cover devices that will be damaged by installing the control system.
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.

25.1. LIMITED WARRANTY COUPON

Warranty term
24 months*

I received complete package and technical manual of the product ready for usage. I have read warranty terms and conditions and agree with them:

.....
 Customer's signature

*refer to WARRANTY CONDITIONS

Dear User, we appreciate your choice and do hereby guarantee that all ventilation equipment manufactured by our Company is inspected and thoroughly tested. An operational and high-quality product is sold to the direct buyer and shipped from the territory of the factory. It is provided with a 24-month warranty since invoice issue date. Your opinion is important to us, thus we always look forward to hearing your comments, feedback, or suggestions regarding technical and operational characteristics of the Products. In order to avoid any misunderstandings, please read the instructions for installation and operation of the product as well as other technical documents of the product carefully. The number of the Limited Warranty Coupon and serial number of the product specified on the silver identification sticker attached to the housing must match. The Limited Warranty Coupon shall be valid provided that the seller's stamps and records are clear. It is prohibited to change, delete, or rewrite the data specified on it in any manner – such a coupon shall be invalid. With this Limited Warranty Coupon the manufacturer confirms one's obligations to implement the imperative requirements established by effective laws on protection of consumer rights in the event of identification of any defects of the products. The manufacturer reserves the right to refuse provision of free warranty servicing in cases when the warranty conditions listed below are disregarded.

