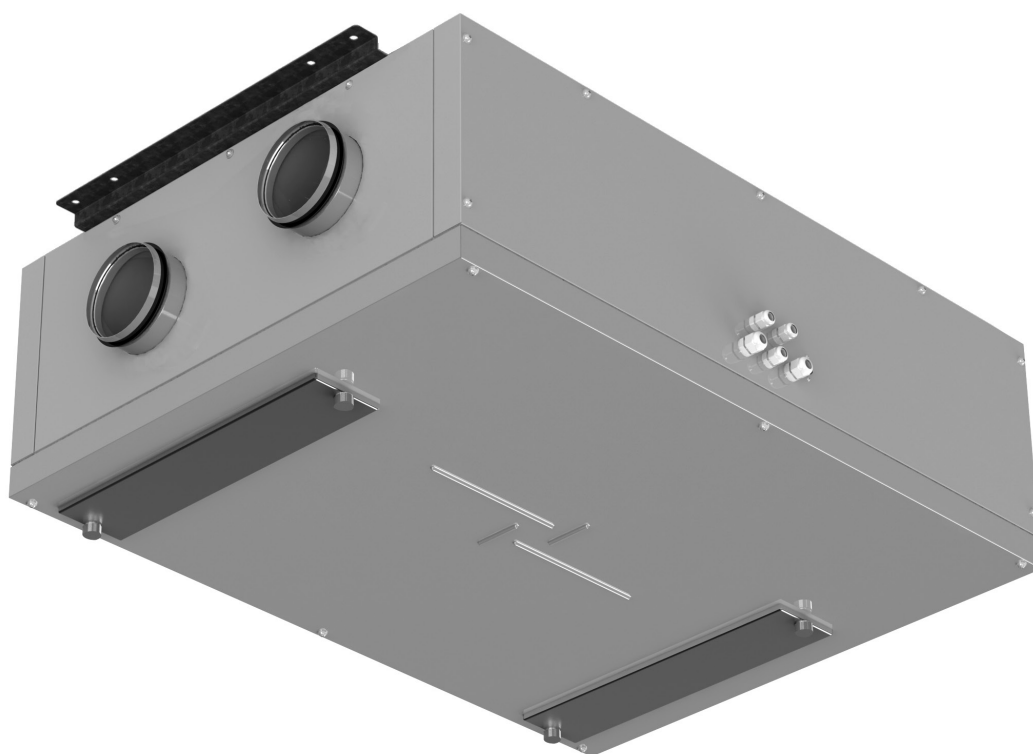


USER'S MANUAL

VUT 160 PB EC A11

VUT 350 PB EC A11



Heat recovery air handling unit

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SAFETY REQUIREMENTS

- Read the user's manual carefully prior to installing and operating the VUT PB EC A11 heat recovery air handling unit.
- Fulfil the user's manual requirements as well as the provisions of all the applicable local and national construction, electrical and technical norms and standards.
- The warnings contained in the user's manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the rules and safety precautions noted in this user's manual may result in an injury or unit damage.
- After a careful reading of the manual, keep it for the entire service life of the unit.
- While transferring the unit control the user's manual must be turned over to the receiving operator.

Symbol legend used in the manual:



WARNING!



DO NOT!

UNIT MOUNTING AND OPERATION SAFETY PRECAUTIONS



- Disconnect the unit from power mains prior to any installation operations.



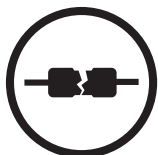
- Unpack the unit with care.



- Do not lay the power cable of the unit in close proximity to heating equipment.



- While installing the unit follow the safety regulations specific to the use of electric tools.



- Do not use damaged equipment or cables when connecting the unit to power mains.



- Do not operate the unit outside the temperature range stated in the user's manual.
- Do not operate the unit in aggressive or explosive environments.



- Do not touch the unit controls with wet hands.
- Do not carry out the installation and maintenance operations with wet hands.

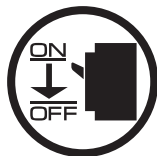


- Do not wash the unit with water.
- Protect the electric parts of the unit against ingress of water.





- Do not allow children to operate the unit.



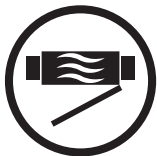
- Disconnect the unit from power mains prior to any technical maintenance.



- Do not store any explosive or highly flammable substances in close proximity to the unit.



- When the unit generates unusual sounds, odour or emits smoke disconnect it from power supply and contact the Seller.



- Do not open the unit during operation.



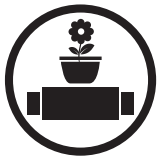
- Do not direct the air flow produced by the unit towards open flame or ignition sources.



- Do not block the air duct when the unit is switched on.



- In case of continuous operation of the unit periodically check the security of mounting.



- Do not sit on the unit and avoid placing foreign objects on it.



- Use the unit only for its intended purpose.



THE PRODUCT MUST BE COLLECTED SEPARATELY AT THE END OF SERVICE LIFE.

DO NOT DISPOSE OF AS UNSORTED MUNICIPAL WASTE.

■ INTRODUCTION

This user's manual consisting of the technical details, operating instructions and technical specification covers the installation and mounting of the VUT ... PB EC A11 heat recovery air handling, hereinafter referred to as «the unit».

■ PURPOSE

Due to the ability to save heating energy by means of energy recovery the unit is an important element of energy-efficient premises. The unit is a component part and is not designed for independent operation.

The unit is designed to ensure continuous mechanical air exchange in houses, offices, hotels, cafes, conference halls and other utility and public spaces as well as to recover the heat energy contained in the air extracted from the premises to warm up the filtered stream of supply air.

Transported air must not contain any flammable or explosive mixtures, evaporation of chemicals, coarse dust, soot and oil particles or environments favourable for the formation of hazardous substances (toxic substances, dust, pathogenic germs), sticky substances and fibrous materials.



THE UNIT MAY NOT BE OPERATED BY CHILDREN OR PERSONS WITH REDUCED PHYSICAL, MENTAL OR SENSORY CAPACITIES, OR LACKING THE APPROPRIATE TRAINING.

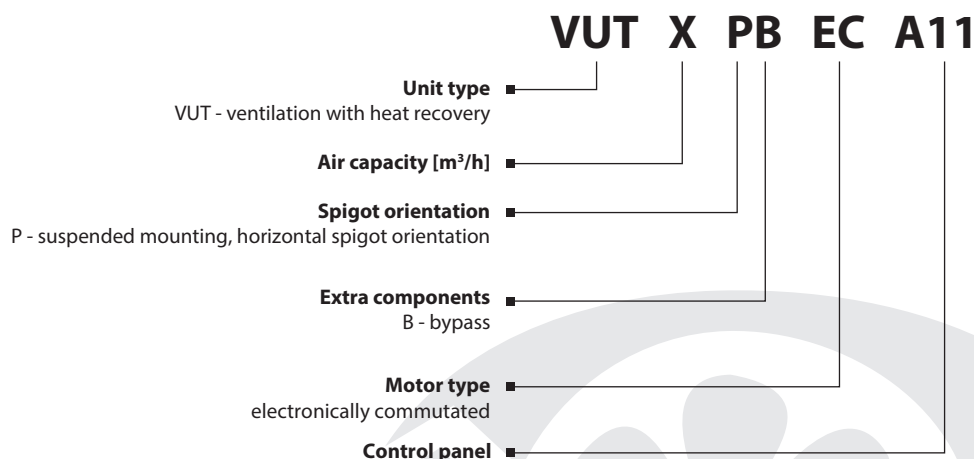
THE UNIT MUST BE INSTALLED AND CONNECTED ONLY BY PROPERLY QUALIFIED PERSONNEL AFTER THE APPROPRIATE BRIEFING.

THE CHOICE OF UNIT INSTALLATION LOCATION MUST PREVENT UNAUTHORIZED ACCESS BY UNATTENDED CHILDREN.

■ DELIVERY SET

■ Unit	1 item
■ User's manual	1 item
■ Control panel user's manual	1 item
■ Control panel	1 item
■ Packing box	1 item

■ DESIGNATION KEY



■ TECHNICAL DATA

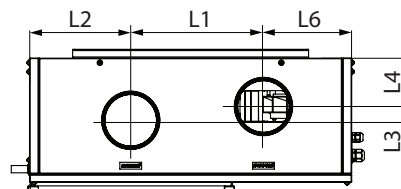
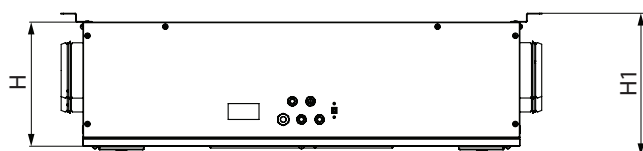
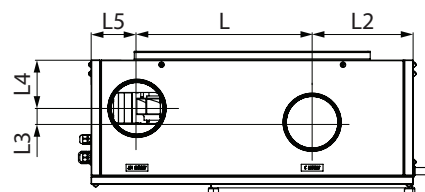
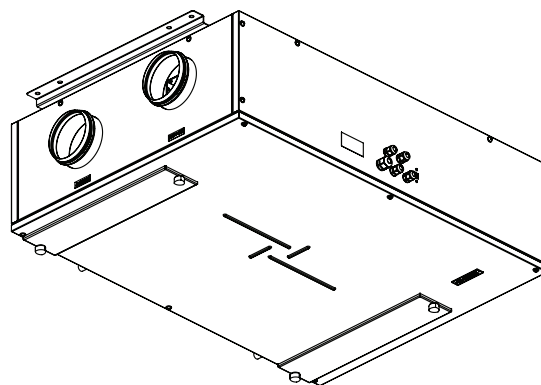
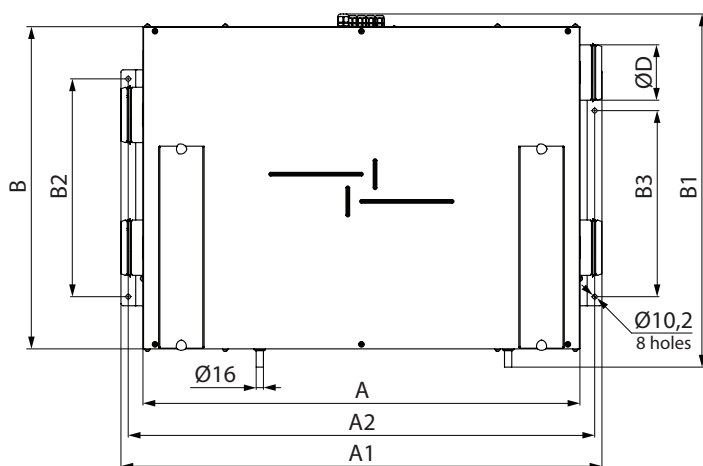
The unit is designed for indoor application with the ambient temperature ranging from +1 °C up to + 40 °C and relative humidity up to 80 %.

Hazardous parts access and water ingress protection rating:

- IP44 for the unit motors
- IP22 for the assembled unit connected to the air ducts

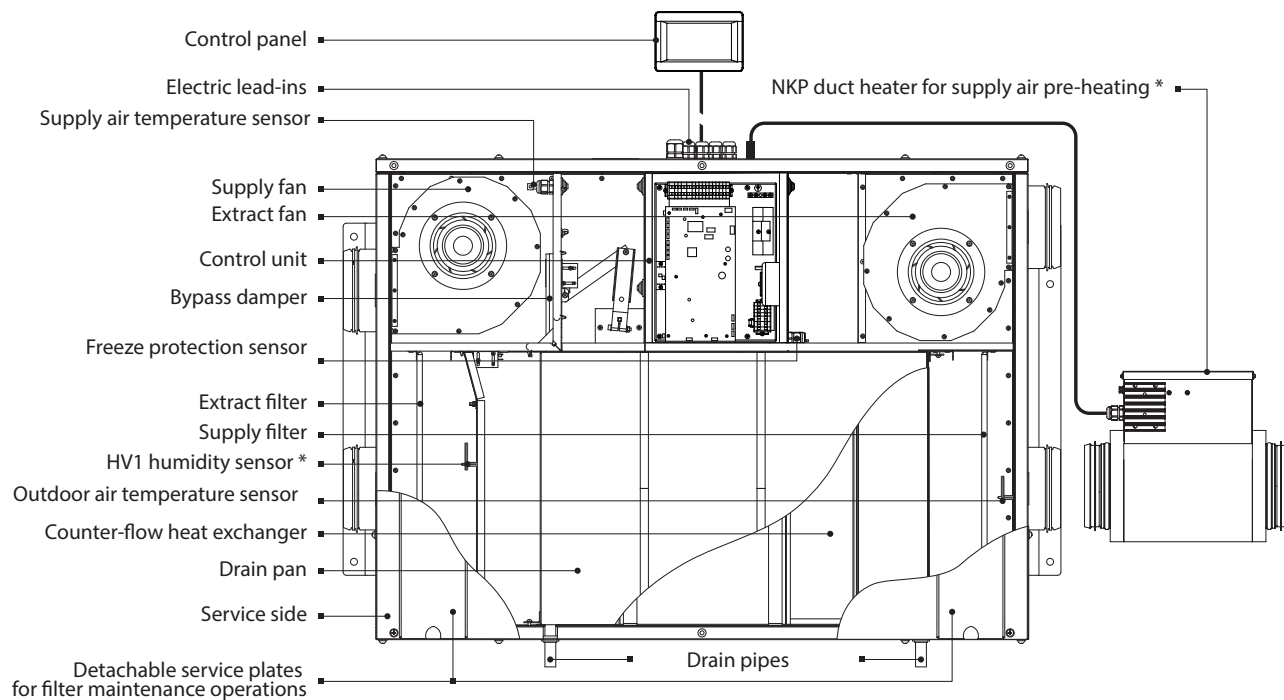
The unit design is constantly being improved, so some models can slightly differ from those ones described in this manual.

Technical data	VUT 160 PB EC A11	VUT 350 PB EC A11
Unit voltage [V /50–60 Hz]	1~ 230	
Maximum unit power [W]	50	170
Maximum unit current [A]	0,4	1,3
Maximum air capacity [m ³ /h]	190	410
RPM	3770	3200
Sound pressure level at 3 m distance [dB(A)]	26	34
Maximum transported air temperature [°C]	from -25 to +60	
Casing material	aluzinc steel	
Insulation	40 mm mineral wool	
Extract filter	G4	
Supply filter	F7	
Connected air duct diameter [mm]	Ø125	Ø160
Weight [kg]	48	70
Heat recovery efficiency	from 82 to 94 %	from 80 to 91 %
Heat exchanger type	counter-flow	
Heat exchanger material	aluminium	



Model	Dimensions [mm]																
	ØD	A	A1	A2	B	B1	B2	B3	H	H1	L	L1	L2	L3	L4	L5	L6
VUT 160 PB EC A11	125	1004	1104	1072	754	822	480	410	320	361	386	293	245	31	128	123	216
VUT 350 PB EC A11	160	1135	1234	1202	1044	1112	680	610	320	363	555	417	345	40	119	144	282

UNIT DESIGN AND OPERATING LOGIC



*Additional equipment for the unit is purchased separately as an accessory:

- **HV1 humidity sensor.** The humidity sensor is purchased separately as an accessory. The unit with the installed humidity sensor maintains a set indoor humidity point: as the extract air humidity rises above the set point, the system automatically switches to the maximum speed. As the humidity drops down below the set point the unit returns to the previous mode. Installation and connection of the humidity sensor (see page 9) is carried out on site by the service technician.
- **NKP duct heater for supply air pre-heating.** The heater maintains the duct air temperature at a point that prevents the heat exchanger freezing. A control system regulates heater operation. Mounting and connection of the heater, see page 9.

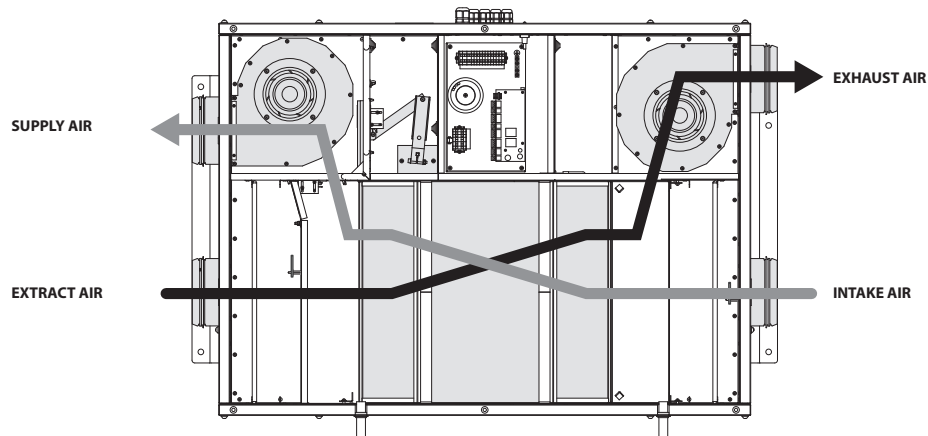


UNIT OPERATION MODES

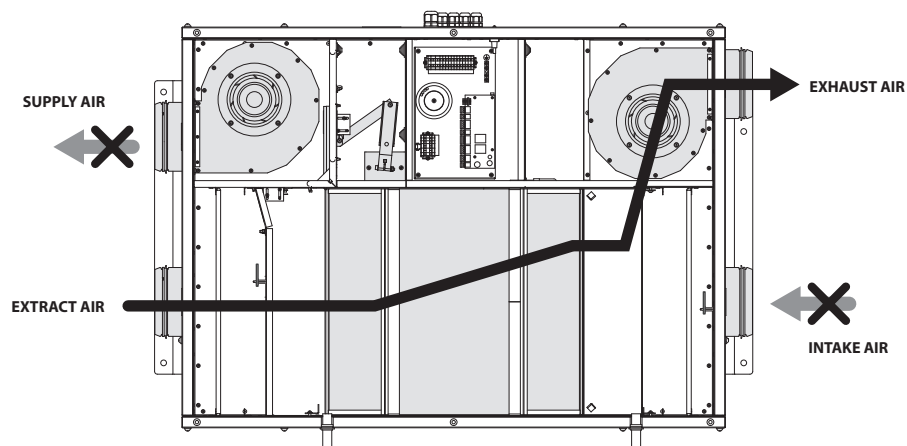
Heat recovery mode: warm extract air from the room flows into the unit and is cleaned in the extract filter. Then the air is moved through the heat exchanger and is exhausted outside with the extract fan.

Cold fresh air from outside flows into the unit, where it is cleaned in the supply filter. Then the air flows through the heat exchanger and is moved to the room with the supply fan.

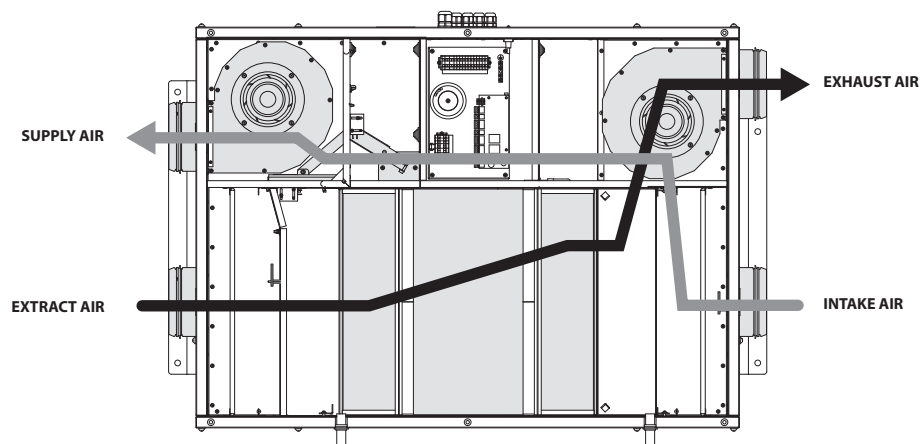
Supply air is heated in the heat exchanger by transferring the heat energy of warm and humid extract air to the cold fresh air. The air flows are fully separated while flowing through the heat exchanger. Heat recovery minimizes heat losses, which reduces the cost of space heating in the cold season.



Defrosting mode: Defrosting mode: to prevent the heat exchanger freezing in the cold season the unit has an automatic Defrosting mode according to the freeze protection temperature sensor readings in the exhaust air duct downstream of the heat exchanger. Only the extract fan operates in the Defrosting mode, the supply fan is switched off. Warm stale extract air from the room flows through the heat exchanger and warms it up. The unit switches to the Defrosting mode at the extract air temperature $+3^{\circ}\text{C}$. As the temperature rises the unit returns to the previous mode.



Summer Cooling mode: the bypass damper is opened, the intake air that is supplied to the premises bypasses the heat exchanger. The intake air temperature remains constant.



MOUNTING AND SET-UP

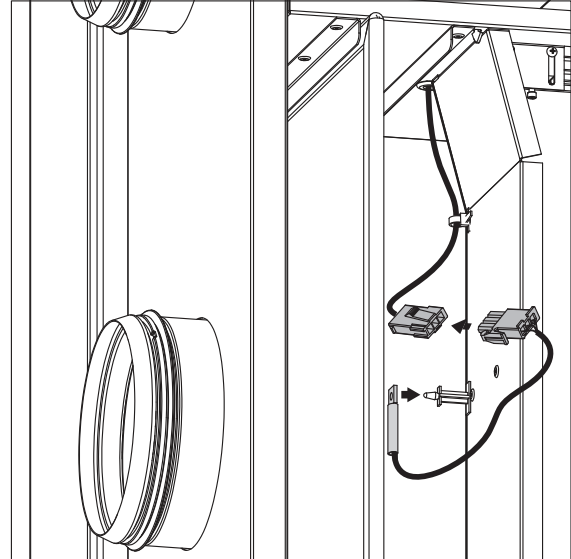
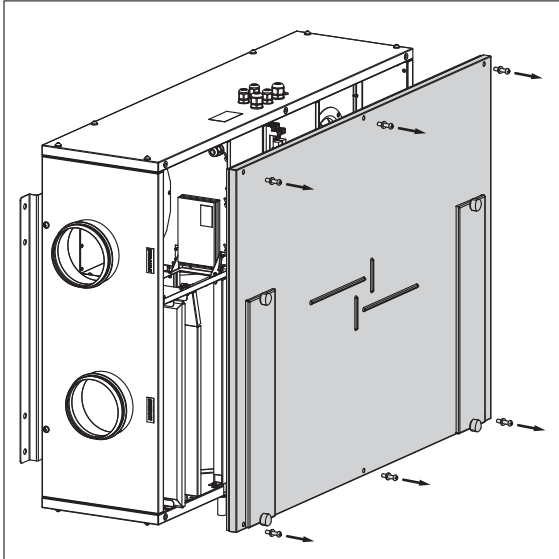


THE UNIT MUST BE MOUNTED BY A QUALIFIED EXPERT ONLY, PROPERLY TRAINED AND HAVING THE REQUIRED TOOLS AND MATERIALS.

HV1 HUMIDITY SENSOR MOUNTING AND CONNECTION

The HV1 humidity sensor is not included in the delivery set and can be ordered separately.

Remove the service panel from the service side and install the humidity sensor into the mount from the side of the extract air duct, then connect the humidity sensor contact socket to the respective contact socket coming from the control unit.



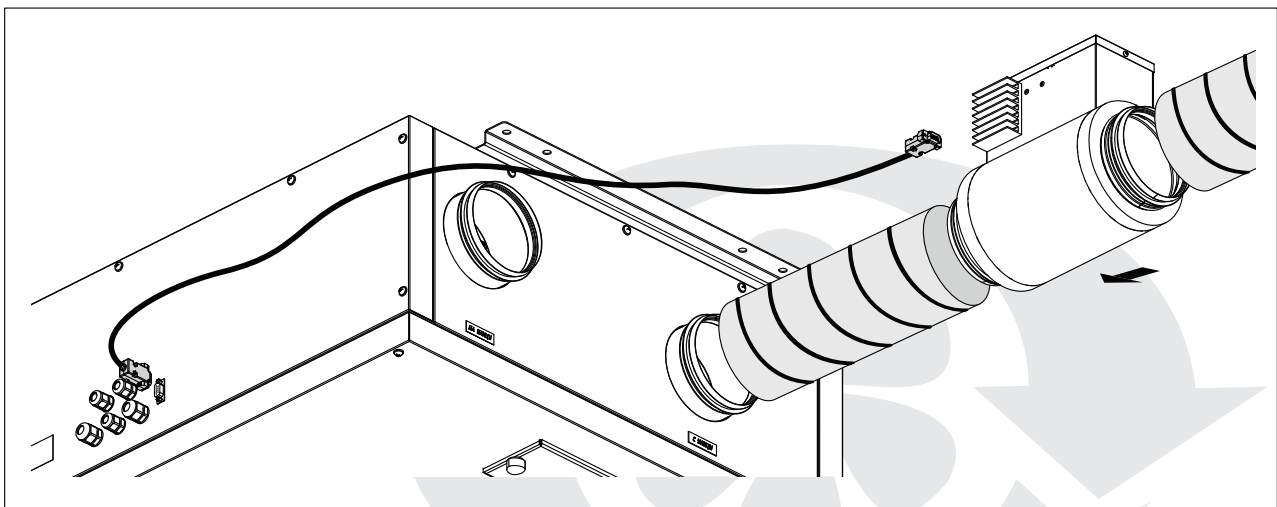
NKP HEATER MOUNTING

The NKP heater is not included in the delivery set and can be ordered separately.

The heater is rated for connection to single-phase AC 230 V/50 (60) Hz.

The heater is designed for mounting in the air duct connected with the supply spigot of the unit.

The electric heater and the air handling unit must be connected via the cable with the DB-9M connectors through the prewired DB-9F connectors.



■ UNIT MOUNTING

To attain the best performance of the unit and to minimise turbulence-induced air pressure losses connect the straight air duct section to the spigots on both sides of the unit while mounting.

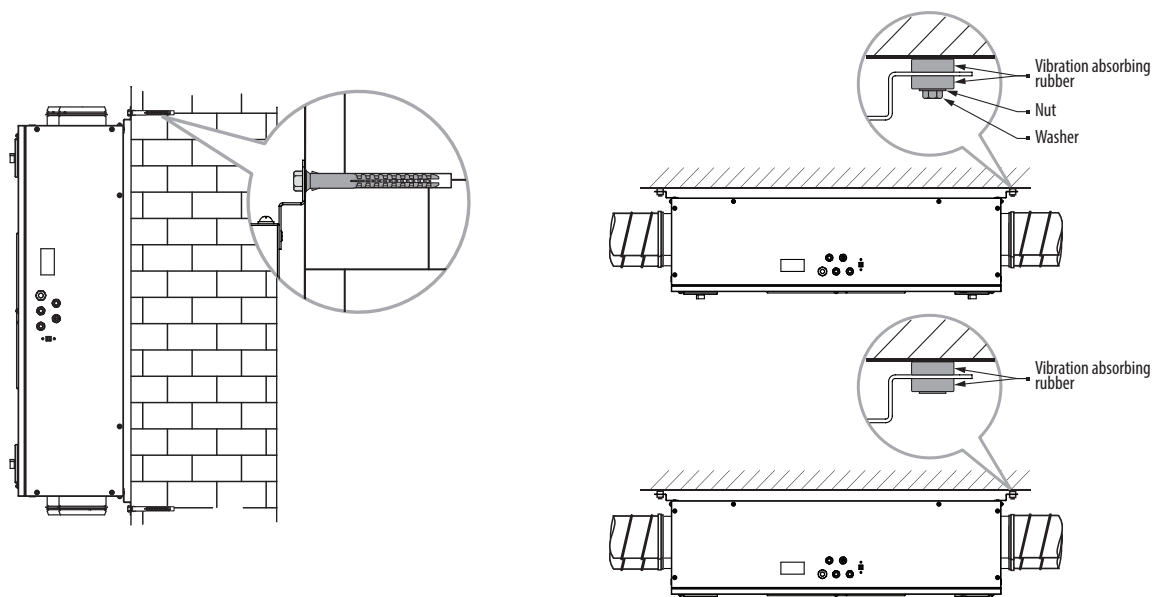
Minimum straight air duct length:

- equal to 1 air duct diameter on intake side
- equal to 3 air duct diameters on outlet side

If the air ducts are too short or not connected, protect the unit parts from ingress of foreign objects. To prevent uncontrollable access to the fans the spigots may be covered with a protecting grille or other protecting device with mesh width not more than 12.5 mm.

While installing the unit ensure convenient access for subsequent maintenance and repair. Fasteners for ceiling mounting are not included in the delivery set and should be ordered separately. While choosing fasteners consider the material of the mounting surface as well as the weight of the unit, refer to Technical data section. Fasteners for unit mounting should be selected by the service technician.

Wall and ceiling mounting examples



■ WALL-MOUNTED CONTROL PANEL INSTALLATION

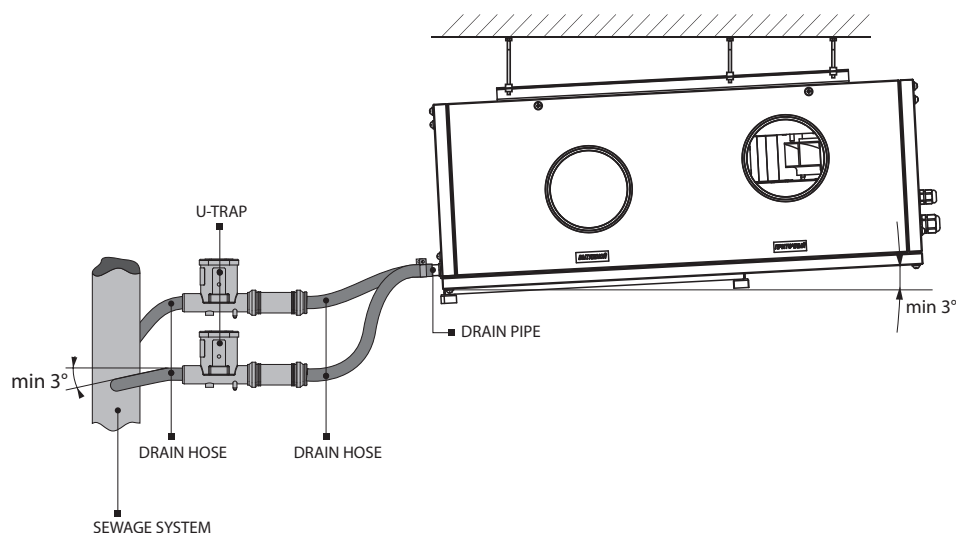
Fixing methods for control panel wall mounting:

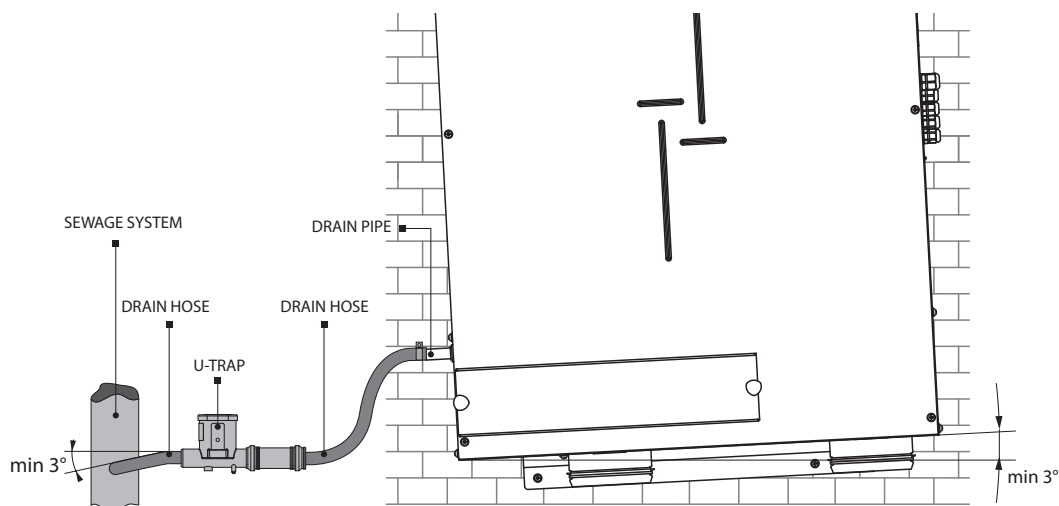
- wall surface mounting
- wall flush mounting

Example of wall flush mounting using a mounting box is shown in the control panel user's manual. The mounting box and the mounting kit must be purchased separately.

■ CONDENSATE DRAINAGE

Connect the drain pipe to the sewage system using the SG-32 U-trap kit (available upon separate order). The pipe slope downwards must be at least 3°.





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

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

■ CONNECTION TO POWER MAINS



DISCONNECT THE UNIT FROM POWER MAINS PRIOR TO ANY OPERATIONS. CONNECTION OF THE UNIT TO POWER MAINS IS ALLOWED BY A QUALIFIED ELECTRICIAN WITH A WORK PERMIT FOR THE ELECTRIC UNITS UP TO 1000 V AFTER CAREFUL READING OF THE PRESENT USER'S MANUAL. THE RATED ELECTRICAL PARAMETERS OF THE UNIT ARE GIVEN ON THE MANUFACTURER'S LABEL.



ANY TAMPERING WITH THE INTERNAL CONNECTIONS IS PROHIBITED AND WILL VOID THE WARRANTY.

The air-handling unit is rated for connection to single-phase AC 230 V / 50(60) Hz power mains. The unit has a power cord with a plug and must be connected to a standard grounded outlet. The power cord is pre-wired to the terminal block.

The external power input must be equipped with an automatic circuit breaker built into the stationary wiring to open the circuit in the event of overload or short-circuit. The trip current must be not less than the consumption current, refer to Technical data. The circuit breaker location must ensure free access for quick shutdown of the unit.

■ CONNECTION OF ADDITIONAL EXTERNAL CONTROLS

The unit has an option of connection of additional external controls:

- DX cooler
- electric actuator of outer supply and exhaust air dampers
- fire alarm panel

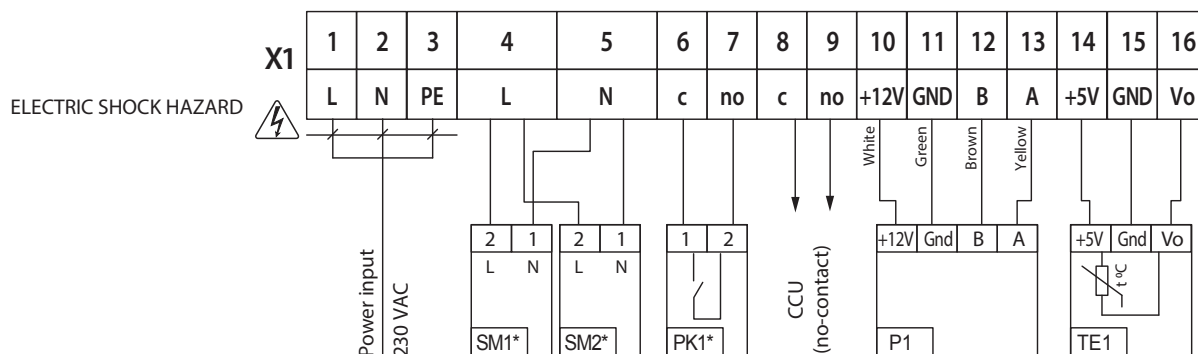
The unit controls are connected to the **X1** terminal block, which is located in the control unit. The cables are connected to the control unit via the electric lead-ins.

If intake air cooling is needed the DX cooler operating signal closes the contacts 8 and 9 (X1 terminal) to allow operating of the cooler and opens them to block the operation. The permissible current via the power contacts must not exceed 2 A, 230 V.

When connecting the supply and/or exhaust air dampers to the contacts 4 and 5 (X1 terminal) of the external connection terminals electric voltage 230 V / 50 (60) Hz is supplied to the above terminals when the air dampers must be opened and is cut off when the air dampers must be closed.

The automatic fire extinguishing system contact is connected to the contacts 6 and 7 (X1 terminal). The contact must be normally open. If the fire alarm signal turns on the contact closes that results in equipment shutdown.

External controls wiring diagram:



Designation	Name	Type	Wire**
CCU*	DX cooler	N0	2x0.75 mm ²
SM1*	Supply air damper actuator	LF 230	2x0.75 mm ²
SM2*	Exhaust air damper actuator	LF 230	2x0.75 mm ²
PK1*	Contact from a fire alarm panel	N0	2x0.75 mm ²
P1	Control panel		
TE1	Outdoor air temperature sensor		The sensor is installed by the manufacturer in the intake air duct.

*Is not included in the delivery set.

** Maximum connecting cable length is 20 m!

UNIT CONTROL

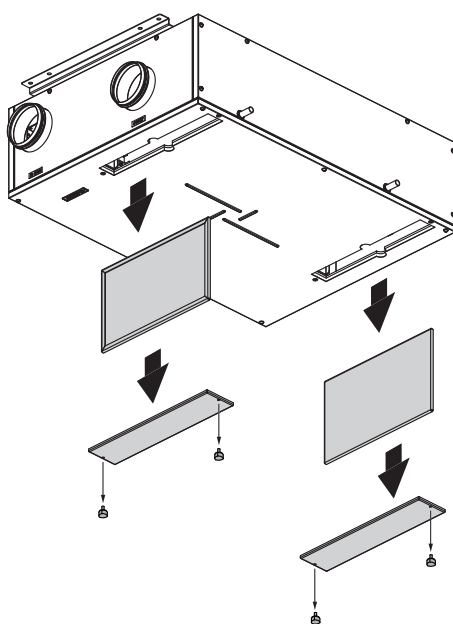
The unit is operated with the control panel. For detailed information, read the control panel user's manual.

TECHNICAL MAINTENANCE



DISCONNECT THE UNIT FROM POWER MAINS PRIOR TO ANY MAINTENANCE OPERATIONS.

The unit must undergo technical maintenance 3 to 4 times a year. Maintenance includes general cleaning of the unit and the following operations:



1. Filter maintenance (3–4 times per year).

Dirty filters increase air resistance in the system and reduce supply air volume. The filters require cleaning not less than 3–4 times per year. Vacuum cleaning is allowed. After two consecutive cleanings filters must be replaced. For new filters contact the Seller.

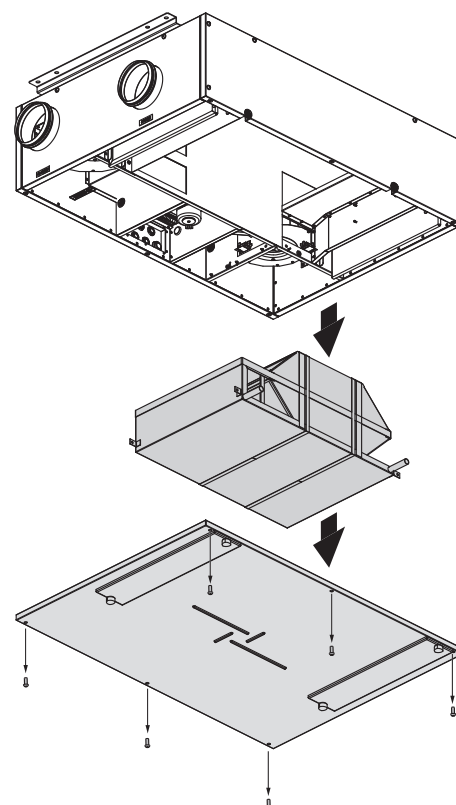
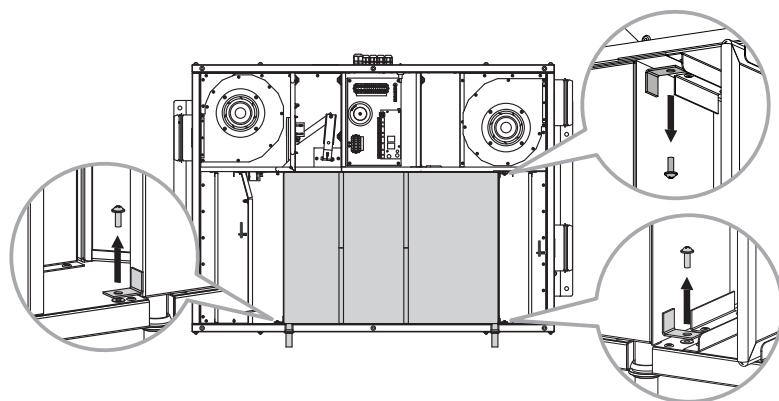
To clean or replace the filters remove the detachable plates located on the service side of the unit. After cleaning install the filters and the detachable plates in the reverse order.

2. Heat exchanger maintenance (once a year).

Some dust may accumulate on the heat exchanger block even in case of regular maintenance of the filters. To maintain the high heat recovery efficiency, regular cleaning is required.

The heat exchanger is connected with the drain pan by the fixing bands that should be removed only in case of heat exchanger replacement. The drain pan is fixed to the unit casing using three screws.

To clean the heat exchanger pull it and the drain pan out, drain the water through the pipes, then flush the heat exchanger with warm detergent solution. After cleaning install the dry heat exchanger with the drain pan back to the unit.



3. Fan maintenance (once a year).

Even in case of regular maintenance of the filters, some dust may accumulate inside the fans and reduce the fan performance and supply air flow.

Clean the fans with a soft brush or cloth. Do not use water, aggressive solvents or sharp objects as they may damage the impeller.

4. Technical maintenance of condensate drainage system (once a year).

The drain pipes may get clogged with the extracted particles. Pour some water inside the drain pan to check the pipe for clogging. Clean the U-trap and the drain pipe if required.

5. Technical maintenance of air duct system (every 5 years).

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

6. Control unit maintenance (if necessary).

The control unit is located inside of the unit casing. For accessing the control unit remove the fixing screws on the control panel and remove it.

WARNING! The control unit maintenance must be performed by an expert qualified for unassisted operations with electrical installations with the voltage up to 1000 V after careful reading of the user's manual.

■ TROUBLESHOOTING

Problem	Possible reasons	Fault handling
The fan(s) do(es) not get started.	No power supply.	Make sure the power supply line is connected correctly, otherwise troubleshoot a connection error.
Low air flow	Filters, fans or the heat exchanger are soiled.	Clean or replace the filters, clean the fans and the heat exchanger.
	The ventilation system is soiled or damaged.	Make sure the air ducts are clean and intact.
Noise, vibration	The impellers are soiled.	Clean the impellers.
	The screw connection of fans is loose.	Make sure the fastening screws are tight.
Water leakage	The drainage system is soiled, damaged or arranged not correctly.	Clean the drainage system. Check the drain line slope angle. Make sure that the U-trap is filled with water and the drain pipes are frost protected.

■ STORAGE AND TRANSPORTATION REGULATIONS

Store the unit in the manufacturer's original packing box in a dry ventilated premise at ambient temperatures from +5 °C up to + 40 °C. Storage environment must not contain aggressive vapours and chemical mixtures provoking corrosion, insulation and sealing deformation.

The unit can be carried in the original packing by any mode of transport provided proper protection against precipitation and mechanical damage.

Use suitable hoist machinery for handling and storage operations to prevent possible damage to the unit.

Follow the handling requirements applicable for the particular type of cargo.

Avoid sharp blows, scratches or rough handling during loading and unloading.

Do not expose the unit to sudden changes in temperature.

Such changes can lead to condensation of moisture inside the unit and performance disturbance when the unit is switched on.

Prior to the initial power-up after transportation at subzero temperatures allow the unit to warm up at room temperature for at least 2 hours.

■ MANUFACTURER'S WARRANTY

The manufacturer hereby warrants normal operation of the unit for 24 months after the retail sale date provided the user's observance of the transportation, storage, mounting and operation regulations.

Should any malfunctions occur in the course of the unit operation through the Manufacturer's fault during the guaranteed period of operation the user is entitled to elimination of faults by the manufacturer by means of warranty repair at the factory free of charge.

The warranty repair shall include work specific to elimination of faults in the unit operation to ensure its intended use by the user within the guaranteed period of operation. The faults are eliminated by means of replacement or repair of the unit components or a specific part of such unit component.

The warranty repair does not include:

- Routine technical maintenance;
- Unit installation / dismantling;
- Unit setup.

To benefit from warranty repair the user must provide the unit, the user's manual with the purchase date stamp and the payment document certifying the purchase.

The unit model must comply with the one stated in the user's manual.

Contact the Seller for warranty service.

The manufacturer's warranty does not apply to the following cases:

- User's failure to submit the unit with the entire delivery package as stated in the user's manual including submission with missing component parts previously dismantled by the user.
- Mismatch of the unit model and the brand name with the information stated on the unit packing and in the user's manual.
- User's failure to ensure timely technical maintenance of the unit.
- External damage to the unit casing (excluding external modifications as required for installation) and internal components caused by the user.
- Redesign or engineering changes to the unit.
- Replacement and use of any assemblies, parts and components not approved by the manufacturer.
- Unit misuse.
- User's violation of the unit installation regulations.
- User's violation of the unit control regulations.
- Unit connection to the power mains with a voltage different from the one stated in the user's manual.
- Unit breakdown due to voltage surges in the power mains.
- Discretionary repair of the unit by the user.
- Unit repair by any persons without the manufacturer's authorization.
- Expiration of the unit warranty period.
- User's violation of the unit transportation regulations.
- User's violation of the unit storage regulations.
- Wrongful actions against the unit committed by third parties.
- Unit breakdown due to circumstances of insuperable force (fire, flood, earthquake, war, hostilities of any kind, blockades).
- Missing seals if provided by the user's manual.
- Failure to submit the user's manual with the unit purchase date stamp.
- Missing payment document certifying the unit purchase.



FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE UNIT.



USERS' WARRANTY CLAIMS SHALL BE SUBJECT TO REVIEW ONLY UPON PRESENTATION OF THE UNIT, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE PURCHASE DATE STAMP.

■ ACCEPTANCE CERTIFICATE

Unit Type	Heat recovery air handling unit
Model	VUT____PB EC A11
Serial Number	
Manufacture Date	
<p>is compliant with the technical specifications and is hereby declared ready for service. We hereby declare that the product complies with the essential protection requirements of Electromagnetic Council Directive 2004/108/EC, 89/336/EEC and Low Voltage Directive 2006/95/EC, 73/23/EEC and CE-marking Directive 93/68/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.</p> <p>This certificate is issued following test carried out on samples of the product referred to above.</p>	
Quality Inspector's Stamp	

■ SELLER INFORMATION

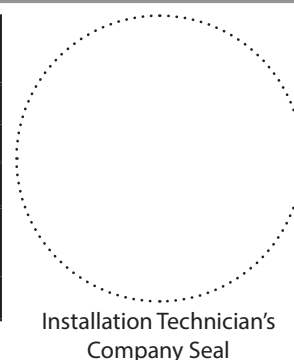
Seller	
Address	
Phone Number	
E-mail	
Purchase Date	

This is to certify delivery of the complete unit with the user's manual.	
Customer's Signature	



■ CONNECTION CERTIFICATE

The VUT ____ PB EC A11 heat recovery air handling unit has been connected to power mains pursuant to the requirements stated in the present user's manual.	
Company Name	
Address	
Phone Number	
Installation Technician's Full Name	
Installation Date:	Signature:



This is to certify that the works specific to the unit installation has been performed in accordance with all the applicable provisions of local and national construction, electrical and technical codes and standards. The unit operates normally as intended by the manufacturer.	
Signature:	

■ WARRANTY CARD

Unit Type	Heat recovery air handling unit
Model	VUT____PB EC A11
Serial Number	
Manufacture Date	
Purchase Date	
Warranty Period	
Seller	



