AIRFLOW®

Installation, use and maintenance manual

for

Duplexvent Flexi DV650, 1100,1600,2600, 3600

Installation, use and maintenance manual

Dear customer,

Thank you for choosing our product and we hope that you will be fully satisfied.

This manual contains all necessary instructions, information, hints and recommendations for safe and correct equipment installation and commissioning. Please read the manual carefully and follow the instructions contained herein.

Symbols explained

Items or sections marked with ➲ (or with a grey background) apply only to appliances manufactured in compliance with the hygienic requirements of Regulation VDI 6022 (indicated on the identification plate, see following chapters).

Important notices

- **Electrical connections, commissioning and adjustment of the appliance may only be carried out by qualified electrical engineers.**
- **Before the installation and commissioning of the appliance carefully read the installation, use and maintenance manual, the controller operation manual and, where applicable, the service documentation.**
- **The appliance and all its accessories must be installed and used in compliance with the design, technical conditions specified by the manufacturer and applicable legislation and technical standards in effect.**
- **The appliance may not be installed and operated in an aggressive environment that could damage its external and internal mechanical parts.**
- **Before putting the appliance into permanent operation an initial inspection report on the appliance´s power supply must be provided.**
- ➲ **Before putting the appliance into operation an approval test (see VDI 2079 and DIN EN V 12599) of the entire HVAC system of which the appliance forms part must be conducted. The test must include the examination of hygienic requirements as per VDI 6022 and must be documented. The user must be able to present the approval test report at any time. If the above requirements are not met, the manufacturer cannot ensure compliance with hygienic requirements.**

The manufacturer is not liable for damage caused by unprofessional installation and operation that is not in compliance with the operation and maintenance manual and general practices applied during installation and operation of HVAC equipment.

1. Contents

2. Safety instructions

2.1. General safety

- Only adults sufficiently familiar with the operation and maintenance manual may operate the equipment.
- The user must not tamper with or modify any part of the equipment, particularly the power supply lines!
- Only professional service technicians with relevant qualifications may perform equipment repairs. Unprofessional repairs are very risky and may result in loss of warranty.
- Before opening the equipment´s door for cleaning, filter replacement or general maintenance always make sure that the equipment is disconnected from power supply and prevent its reconnection by another person.
- To prevent injuries caused by the fan wheel, a duct at least 2 metres long must always be connected to the fan discharge. The duct must be fastened in such a way that it cannot be removed without tools.
- If the equipment has been out of operation for a prolonged period of time, extra care should be taken when putting it back into operation.

2.2. Operational safety

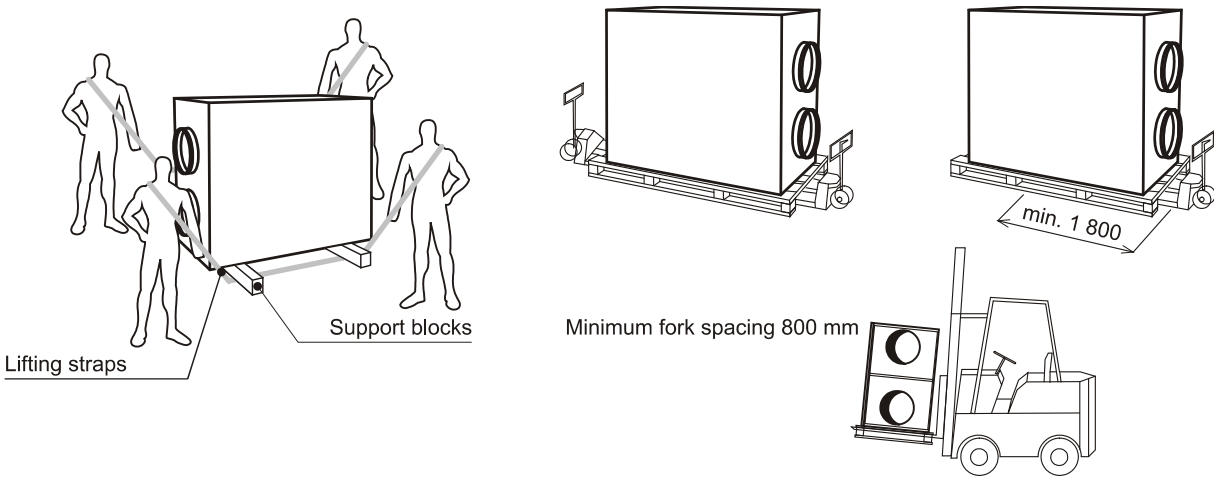
- The indoor version of the unit is intended for a basic environment - ambient temperatures must be between +5 and + 55 °C with relative humidity up to 60 % (60 % relative humidity up to 20°C). If the appliance is located elsewhere, its sufficient protection must be ensured.
- The appliance may be operated within the temperature range of ventilation air between -25 and +40 °C with relative exhaust air humidity up to 80%, in an environment where there is no risk of fire or an explosion of flammable gases and fumes, and air transported must not contain organic solvents or aggressive substances that might damage mechanical parts of the unit. If there is a danger of such gases and fumes temporarily entering the duct system (e.g. during floor bonding, painting), the unit must be switched off sufficiently in advance.
- In the event of a failure the appliance must be disconnected from power supply as soon as possible!
- The water chiller in all versions must be filled with an antifreeze solution with sufficient thermal resistance, or it must be drained for the period during which outdoor temperature might fall below +5°C. We recommend draining water from the chiller with pressurized air, not using a gravity flow!
- Appliances with hot water heaters
    - Must be permanently connected to power supply to provide for the anti-freeze protection of the hot water heater. In the case of a prolonged power outage the heating medium must be drained from the hot water heater including the control set. We recommend draining water from the heater with pressurized air, not using a gravity flow!
    - It may only be operated if the heating system including the hot water heater and control set are filled with a heating medium and air bled; also applies to periods outside the heating season! In the case when the heating system including the hot water heater and control set are not filled with a heating medium, the appliance must be drained of the remaining heating medium, dried properly and disconnected from power supply.
- The appliance is designed for environments with Class ETA 1 extract air; in environments with extract air Class ETA 2 and ETA 3 it is necessary to comply with conditions specified in the chapter 5.2.

3. Storage and transport

- The appliance may only be stored in dry, covered places with ambient temperatures between -25 and 55 °C in such a way that its surfaces that are to be in contact with transported air remain protected against the weather and stay dry and clean.
- Packaging may not be removed until immediately before the installation of the appliance in its operating position. If that is not the case, all parts must be checked for cleanliness before installation and thoroughly cleaned if necessary.
- The appliance must not contain any operational liquids (e.g. water in the hot water heater, water chiller etc.) during storage and transport.

- The appliance may only be transported on handling blocks (included). During transportation the appliance must be protected against mechanical damage and water penetration and all openings must be covered with protective covers.
- During transportation the appliance must be secured against falling. The mode of transport must also eliminate any falls of the appliance or instances of the appliance getting loose.
- Activities near the unit such as grinding, cutting and other ancillary works that could irretrievably damage the surface or individual parts of the unit are prohibited.

Solely permitted methods of handling

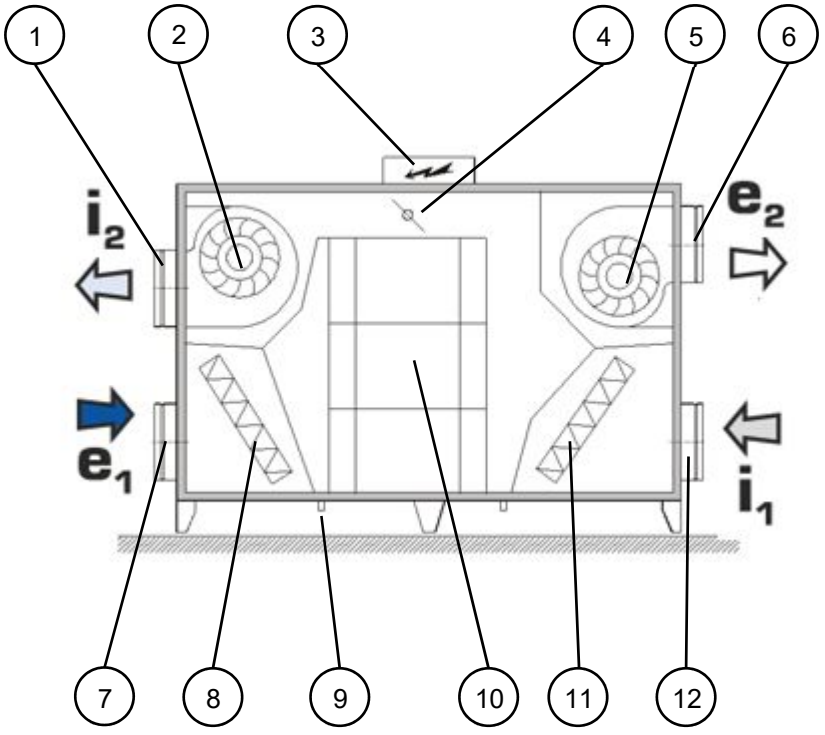


4. Description

4.1. General

DUPLEXVENT Flexi series ventilation units with heat recovery are compact appliances containing in a single cabinet two independently powered fans with flexibly mounted engines, a highly efficient heat recovery exchanger assembled from thin-walled plastic boards for the recovery of heat/cool, a by-pass damper, slide-out filters and drainage trays, and depending on accessories selected also an external heater, chiller, shut-off dampers, flexible flanges and a control system.

1. Exhaust (extract air)
2. Exhaust fan
3. Junction box
4. Bypass flap
5. Supply fan
6. Exhaust (supply air)
7. Intake (supply air)
8. Supply air filter
9. Condensate drain
10. Heat exchanger
11. Exhaust air filter
12. Intake (extract air)



4.2. Intended use

DUPLEXVENT Flexi series ventilation units with heat recovery are intended for the comfort ventilation and possibly hot-air heating and cooling of flats and houses, small plants, workshops, schools, restaurants, cooking facilities and industrial halls with a basic environment. The use of the unit must be in compliance with the Regulation of the Commission (EU) 1253/2014. If the appliance is used for different purposes or is not operated in compliance with instructions contained in the operation and maintenance manual, the manufacturer is not liable for resulting damages.

5. Installation

5.1. Safety instructions

- During installation make sure no damage or deformation is caused to the case of the appliance (e.g. as a result of handling operations).
- After setting the appliance in place check it for stability and secure it in this position against moving.
- During handling and installation observe all rules of safe work (including work at heights and work with suspended loads) and use appropriate work and safety equipment.
- Lifting and binding equipment may only be operated by trained personnel.

5.2. Hygienic instructions and requirements

- If installation is interrupted or heavy dusting occurs, cover all openings of the appliance in such a way so as to ensure that surfaces to be in contact with transported air remain protected against the weather and stay clean and dry.
- If long-term high relative humidity (short-term more than 90 % or more than 80 % for three consecutive days) is likely to occur with the subsequent moistening of filters (e.g. in areas with frequent fogs, frequent and long rains, flying snow etc.), suitable measures must be taken to prevent microbiologic growth. Recommended measures include more frequent hygienic checks as per VDI 6022 or shorter filter replacement intervals. Another option is the preheating of air using an appropriate control devices (electrical duct heaters are an available accessory), or the appliance must be put out of operation for the period when filters are at the risk of moistening (if the type of operation allows this).
- Should such weather conditions occur at the site of installation that would cause the dew point to be exceeded in the supply air region of the heat recovery exchanger, or an independent cooling system is installed in ventilated rooms, DUPLEXVENT Flexi units may only be used provided that it has been arranged via appropriate measures that the dew point will not be exceeded in the heat recovery exchanger. The typical weather of central Europe makes this condition almost impossible.
- The e1/ODA air supply chamber has no water drain. An accessible and cleanable chamber with a drain of precipitated water must be installed upstream the outdoor air inlet into the appliance.
- The HVAC network of appliances operated in an environment with Class ETA 2 extract air must be arranged for operation in such a way so that positive pressure is on the supply air side of the heat recovery unit; in an environment with Class ETA 3 extract air must be arranged for operation in such a way so that positive pressure is on the supply side against the exhaust side. This must be [illegible] EN 13779.

➲ In compliance with hygienic standard VDI 6022 HVAC systems must be equipped with shut-off dampers to ensure the automatic closure of the system so that no air can flow freely through the system. It is recommended using shut-off dampers available as an accessory. Compliance with this requirement is the responsibility of the planner / specialist installation firm.

➲ DUPLEXVENT series appliances have a single-stage filtration system. Appliances in a hygienic version in compliance with hygienic standard VDI 6022 must have at least Class ISO ePM1 50% filter fitted on the inlet (applies to outdoor air e1/ODA Class ODA 1 and ODA 2). When outdoor air is Class 3, a Class ISO ePM10 50% filter must be fitted in the duct upstream the outdoor air inlet into the HVAC unit; alternatively, a Class ISO ePM10 50% filter may be installed in the HVAC unit and a Class ISO ePM1 50% filter in the duct at the e2/SUP outlet from the unit. Note: air filters are separately supplied accessories.

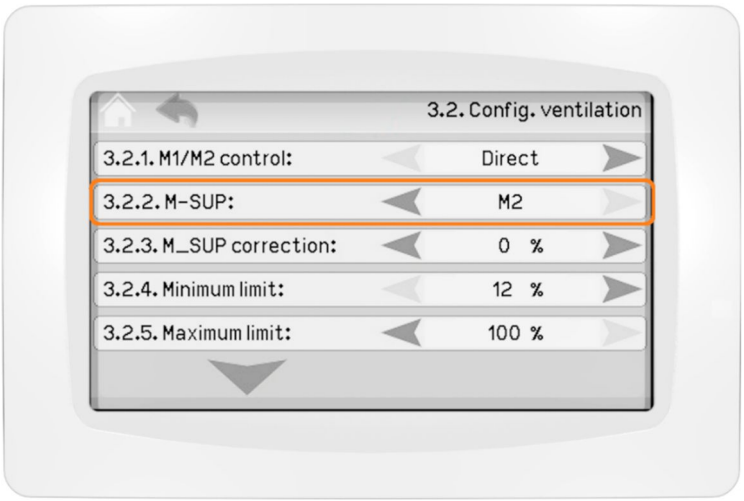
➲ Appliances in a hygienic version in compliance with hygienic standard VDI 6022 may be operated only if the use of recirculating air is suitable for hygienic reasons or the arrangement of operation

of the HVAC network ensures positive pressure in the supply section of the appliance against the extraction section

5.3. Configuring orientation of the unit

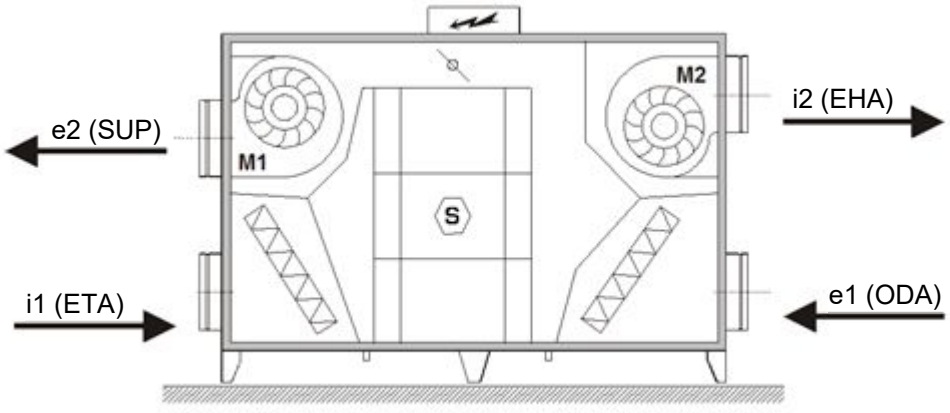
The versatile design of sizes 650, 1100, 1600, 2600 and 3600 allows adjusting the direction of air flow through the appliance; it can be configured which of the fans will be supplying and extracting the air. The direction of air flow can be configured once the unit is switched ON for the first time.

1. Open the door of the unit. Check the labels on the fans to learn which fan is marked M1 and M2.
2. Connect the control panel CP Touch to the unit. Turn the unit ON. The control panel will report an error by showing a yellow triangle on the top of the display.
3. Click on the symbol of the error. The control panel will display the message *Orientation is not set*.
4. Proceed back to the default screen, click on the cogwheel in the bottom left corner.
5. Click on the Settings symbol in the top right corner.
6. Enter the service menu password. The password is available to authorized partners.
7. Proceed to the parameter 3.2.2 on the control panel. Set up the fan M1 or M2 as M-SUP (supply fan).

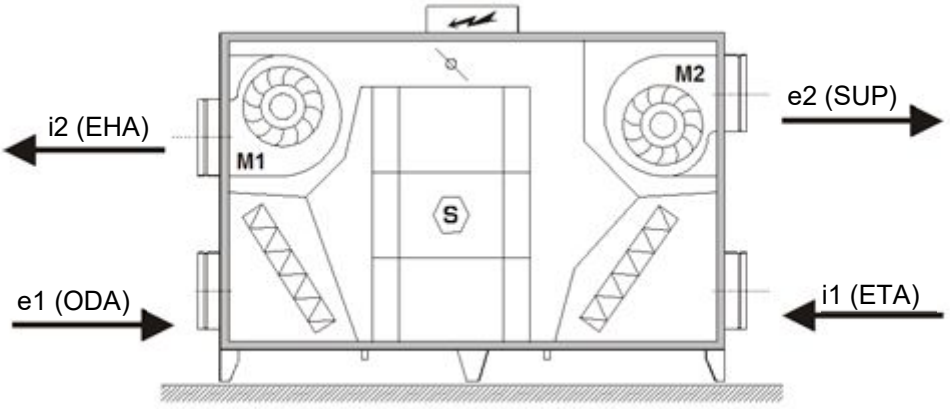


! The operation of the unit is blocked until the parameter M_{SUP} is configured to M1 or M2.

! By default, the unit is equipped with filters of different filtration classes. Make sure the filters are placed correctly according to the orientation of the unit. For more information see Chapter 5.9.



DUPLEXVENT Flexi unit where M1 is set as supply fan (M-SUP)

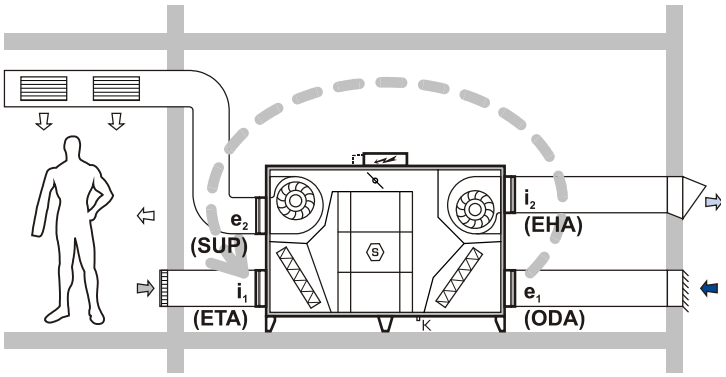


DUPLEXVENT Flexi unit where M2 is set as supply fan (M-SUP)

5.4. Identification of ports

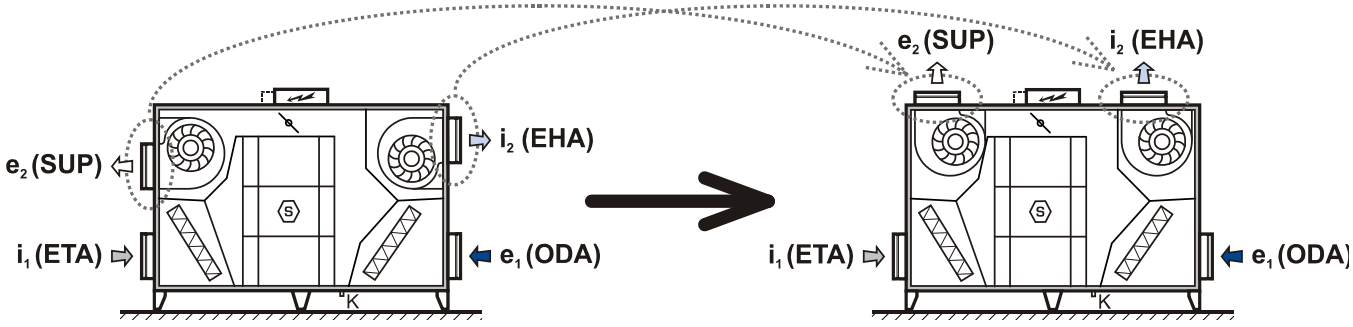
Identify and label individual ports using the pictures below (labels are included). Begin by identifying port e1 (ODA) - outdoor air inlet; continue toward the fan on the same (shorter) side of the unit with exhaust air outlet port i2 (EHA); next is the port with fan on the opposite side of the unit - supply air outlet e2 (SUP); the last (remaining) port is extract air inlet port i1 (ETA).

Note: Depending on a specific location of the unit proceed clockwise or anticlockwise.



5.5. Adjusting the unit - turning ports e2 (SUP) / i2 (EHA)

- Only units up to size 1600 can be adjusted that way.
- When making the adjustment, follow the diagram below and the visual instructions in the appendix.



5.6. Connecting the HVAC duct

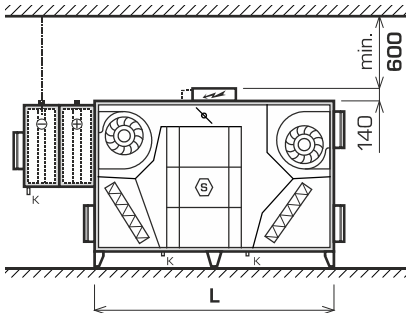
- Connect the HVAC duct following the design documentation.
- To prevent injuries caused by the fan wheel, an HVAC duct at least 2 metres long must always be connected to the unit. The duct must be fastened in such a way that it cannot be removed without tools.

! A straight duct being at least 1 meter long must be connected to all outlet ports so that the unit can reach performance levels stated by the manufacturer. The duct connected to inlet ports must be arranged in a way allowing a uniform flow rate in the entire cross section of inlet ports.

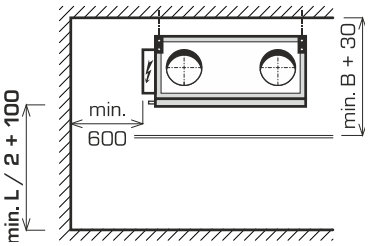
5.7. Installation

- Before installation remove the wooden transport planks.
- The versatile design of 650, 1100, 1600, 2600 and 3600 sizes allows mounting the unit under the window or under the ceiling.
- Fit the appliance in such a way that the prescribed handling spaces are observed:

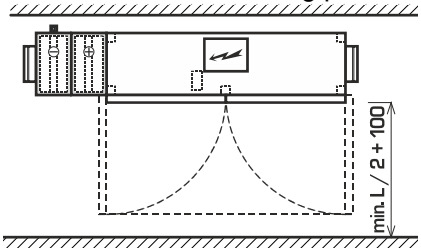
View from the operator's side – floor standing position



Ceiling-suspended position



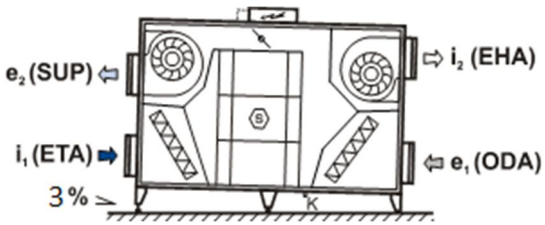
Plan view – floor standing position

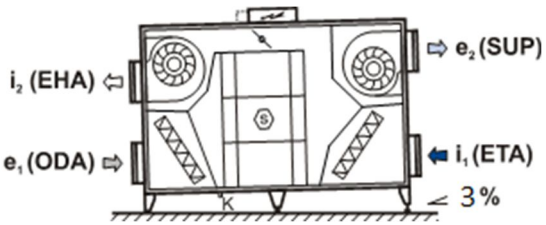


Flexi	650	1100	1600	2600	3600
L (mm)	1370	1700	2020	2150	2450
B (mm)	298	395	490	570	780

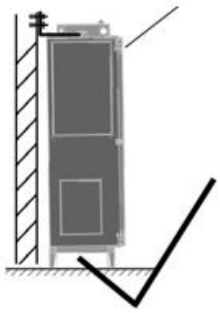
Floor standing position:

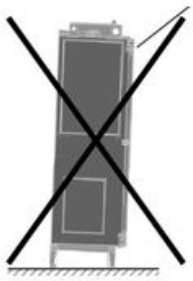
- The appliance is placed on height-adjustable feet (H_{min} = 147 mm) included in delivery (4 pieces in sizes 650 and 1100, 5 pcs in size 1600, 6 pcs in sizes 2600 and 3600).
- Due to the condensate drain the appliance must be sloped towards the section i2 (EHA). The slope can be achieved by adjustable feet.





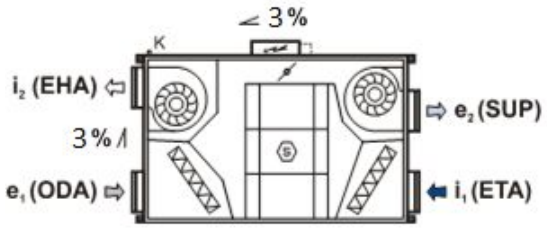
- The unit must be secured against movement.

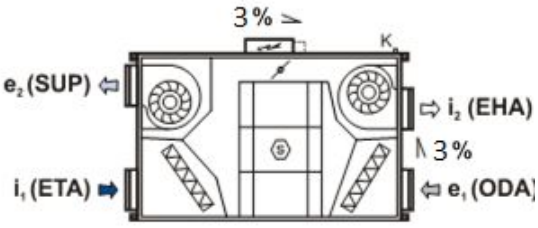




Ceiling-suspended position:

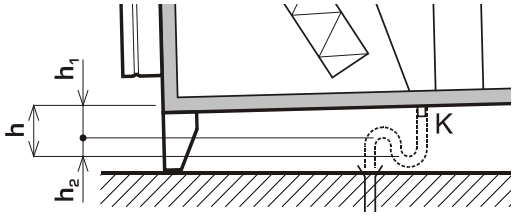
- The appliance is suspended from anchors of sufficient load bearing capacity (provided by the building contractor) using four (sizes 650, 1100, 1600 and 2600), and six (size 3600) suspension eyes (included in delivery) with Ø 11 mm holes.
- Due to the condensate drain the appliance must be sloped toward section i2 (EHA), see the picture**:**





5.8. Connecting the condensate drain pipe

- The unit is versatile and in total has 4 condensate outlets for 2 directions of air flow and 2 installation positions. A single specific condensate outlet is always used for a particular application.
- For the window position use the condensate outlet in section i2 (EHA)



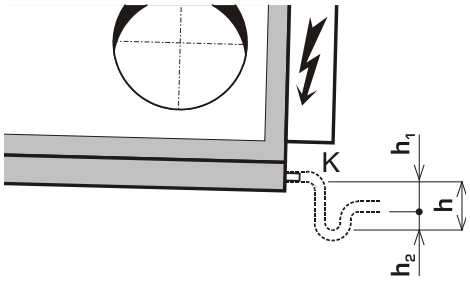
$$h_1 = \frac{\Delta p}{10} + 50\ [mm]$$

$$h_2 = \frac{\Delta p}{2 \cdot 10} + 50\ [mm]$$

$$h = 1{,}5\frac{\Delta p}{10} + 100\ [mm]$$

Δp – maximum positive / negative working pressure in the compartment of the unit. The height of condensate drain pipe h = 15 cm is sufficient for all installations.

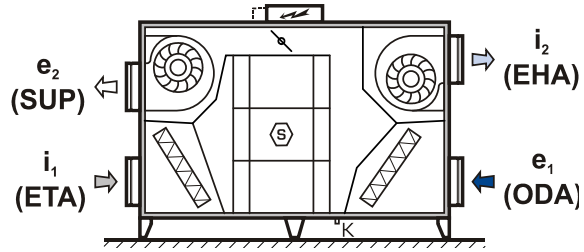
- For the ceiling position use the condensate outlet in section i2 (EHA)



- Connect a pipe or hose (not included; a standard washing machine hose is recommended) to the condensate outlet and shape it into a siphon trap with dimensions as shown in the picture. Appropriately secure the siphon trap shape and connect it to the sewer line.
- Check the entire length of the pipe including the parts inside the unit for free passage and its sloping.
- Prime the condensate drain siphon trap.

5.9. Classification of air filters

- If the unit is fitted with filters of various filtration grades (ISO EPM1 50% and ISO EPM10 50%), then the ISO EPM1 50% grade filter is an outdoor air filter (ODA) and the ISO EPM10 50% grade filter is an extract air filter (ETA).
- The outdoor air filter is installed in chamber e1 (ODA), the extract air filter in chamber i1 (ETA).

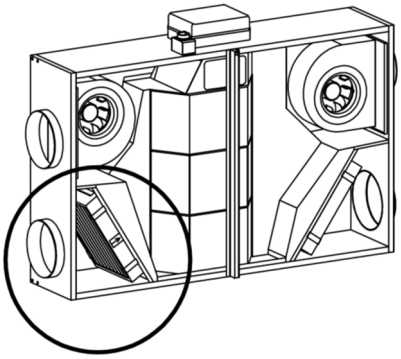


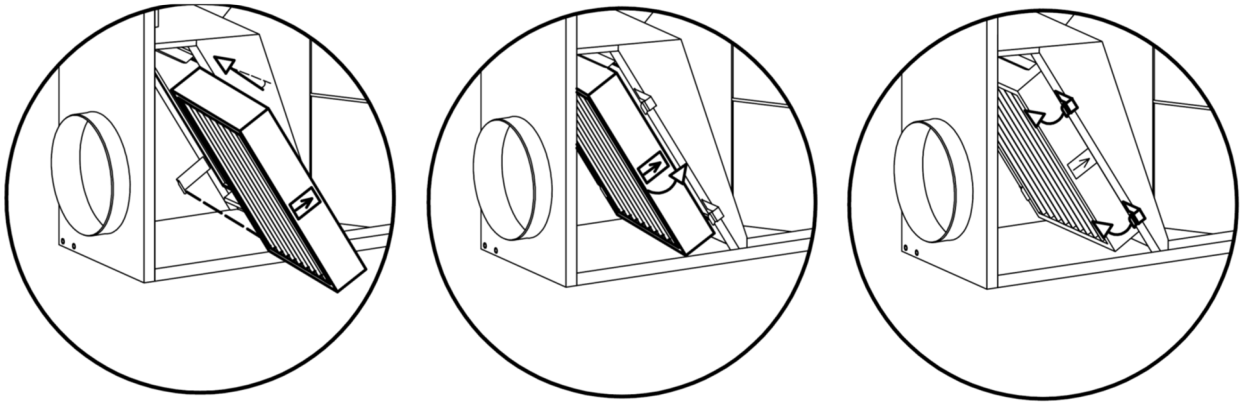
5.10. Installing air filters

- The unit is supplied with separately packaged filter cassettes. Remove and unpack the cassettes and check their condition. Then install the cassettes in their proper locations on the unit as shown in the Chapter 5.9.

➲ Unpack and install air filters last, immediately before putting the unit into service to avoid their contamination.

- Should any damage or contamination be detected, replace them with new ones. Spare filter cassettes are to be ordered from the Supplier. The supplier´s address and the spare cassette part number are shown on the identification plate of the unit.
- Insert undamaged clean filters into the guide rails and secure following the instructions in the pictures:





- Especially make sure that the arrow showing the direction of air flow through the filter cassette can be seen from the side of the operator (the arrow is by the unit´s door) and that it is always pointing toward the heat recovery exchanger!
- The unit is supplied with filter cassette labels unattached. Attach the relevant identification labels near both filters. (e.g. for the door type)

! Unpack and install air filters last, immediately before putting the unit into service to avoid their contamination.

! Use original filter cassettes only! If different cassettes were used, the manufacturer could not guarantee their proper function!

➲ Record the date of installing filters appropriately in e.g. the operational logbook.

5.11. Installing, connecting and filling liquid manometers

➲ Liquid manometers are a separately supplied accessory. Manometers are compulsory for hygienic units in compliance with VDI 6022.

- Manometers are used for measuring the pressure loss of air filters. During installation follow the visual instructions supplied with this optional accessory. After installation level the manometers horizontally.
- Connect the manometers to collection points on the unit´s surface using tubes. Connect the tube to the top of the manometer and run it to the metal bushing on the unit´s surface (also see a separate manometer installation manual). The tube must always connect two matching connection points identified by symbols “+” and “F+” and “-“ and “F-“ (cannot be combined). Make sure that tubes from just one filter are connected to the manometer.
- Attach the relevant label near each manometer. Fill out the boxes with the filter grade and record the flow rates and pressure losses of the clean filter (initial pressure loss) and when clogged (final pressure loss) using data from the table below; the values must be adjusted on the basis on actual air flow rates through the unit. The unattached label without information filled out is included.

DUPLEXVENT Flexi 650

Filter type	Flow rate (m^3/h)	150	300	450	600	700
ISO EPM1 50%	Initial pressure loss (Pa)	20	42	68	98	119
	Final pressure loss (Pa)	200	200	200	200	200
ISO EPM10 50%	Initial pressure loss (Pa)	3	10	21	35	47
	Final pressure loss (Pa)	200	200	200	200	200

DUPLEXVENT Flexi 1100

Filter type	Flow rate (m^3/h)	250	500	750	1000	1100
ISO EPM1 50%	Initial pressure loss (Pa)	8	32	71	126	153
	Final pressure loss (Pa)	200	200	200	200	200
ISO EPM10 50%	Initial pressure loss (Pa)	6	16	29	45	52
	Final pressure loss (Pa)	200	200	200	200	200

DUPLEXVENT Flexi 1600

Filter type	Flow rate (m^3/h)	400	800	1200	1500	1600
ISO EPM1 50%	Initial pressure loss (Pa)	16	43	84	126	142
	Final pressure loss (Pa)	200	200	200	200	200
ISO EPM10 50%	Initial pressure loss (Pa)	6	14	25	38	43
	Final pressure loss (Pa)	200	200	200	200	200

DUPLEXVENT Flexi 2600

Filter type	Flow rate (m^3/h)	500	1000	1500	2000	2500	2600
ISO EPM1 50%	Initial pressure loss (Pa)	10	34	60	91	125	133
	Final pressure loss (Pa)	200	200	200	200	200	200
ISO EPM10 50%	Initial pressure loss (Pa)	1	8	17	29	44	47
	Final pressure loss (Pa)	200	200	200	200	200	200

DUPLEXVENT Flexi 3600

Filter type	Volume flow rate (m^3/h)	700	1400	2100	2800	3500	3600
ISO EPM1 50%	Initial pressure loss (Pa)	14	40	77	126	186	196
	Final pressure loss (Pa)	200	200	200	200	200	200
ISO EPM10 50%	Initial pressure loss (Pa)	3	11	24	42	65	69
	Final pressure loss (Pa)	200	200	200	200	200	200

Note: Values in the tables apply to external static pressure 100 Pa. Different pressure requirements may result in a different situation. If needed, the detailed initial and final pressure loss data of the filters are available on request from the supplier of the unit.

- Make sure that the position of the label makes it possible to regularly inspect the values recorded.
- Unscrew the rotating knob as much as possible to set zero on the scale (the bottom knob identified by - +), then screw it back by approximately two full turns to have leeway to make settings in both directions.
- Unscrew the FILL plug (the top knob) and keep filling the machine with measuring liquid (included in delivery) until the liquid is visible near the zero mark on the scale. Use the bottom knob to set the value on the scale precisely to zero. Screw the top filling plug in.

! After installing the manometers do not tilt the machine or the door (if they are installed on the door). Measurement liquid might leak out.

5.12. Installing hot water heating coil

During the mechanical installation of the hot water air heater follow the manual supplied with this optional accessory.

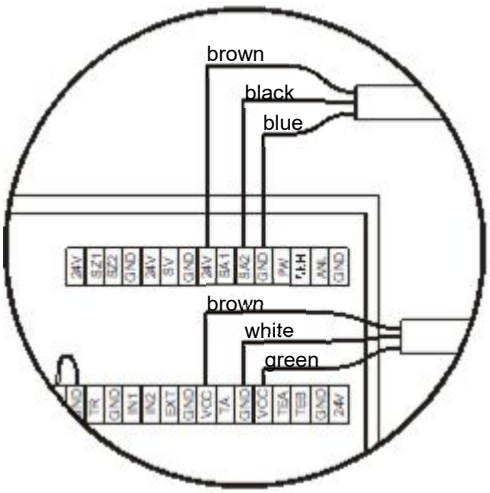
The following rules must be adhered to during the installation of the heater:

- The maximum permitted temperature of heating medium is 110 °C and operational positive pressure up to 1.0 MPa.
- For the proper operation of the control set of the hot water heater the heating system must be fitted with a circulation pump of suitable power that will fully cover its pressure losses. The pump, which is supplied with the control set, is designed solely to cover the pressure losses of the water heater!
- If the unit is not equipped with a shut-off damper on outdoor air inlet e1, a tight shut-off damper must be installed in the duct upstream the unit (a type with a servo drive with emergency stop, that is, that automatically shuts in the event of a power outage).
- The heating system must be equipped with a sludge filter in the inlet into the unit.

! A temperature sensor must be installed into the air duct to provide for anti-freeze protection of the hot water heating coil. The sensor is to be installed behind the hot water heating coil in the direction of air flow. Please follow the instructions in the guide enclosed to the temperature sensor TA when installing the sensor.

! Electrical installation may be carried out only by a person having the required electrotechnical qualification.

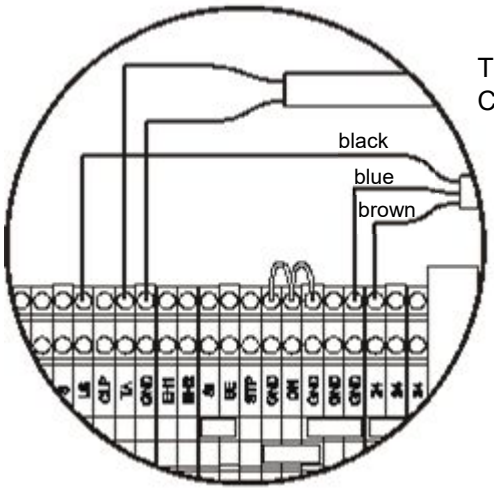
Installation scheme when using the RD regulation:



Servo drive R-HW of the mixing valve LM24A-SR
Cable: 4Ox1,5 (Germany NYM-O 4x1,5)

Temperature sensor TA placed behind the heating coil
Cable: SYKFY 2x2x0,5 (Germany JYSTY 2x2x0,6)

Installation scheme when using the DC regulation:



Temperature sensor TA placed behind the heating coil
Cable: SYKFY 2x2x0,5 (Germany JYSTY 2x2x0,6)

Servo drive R-HW of the mixing valve LM24A-SR
Cable: 4Ox1,5 (Germany NYM-O 4x1,5)

5.13. Installing mixing valve of hot water air heater

During the mechanical installation and connection of the mixing valve of the hot water air heater follow the manual supplied with this optional accessory.

5.14. Installing shut-off dampers e1, i1

During the mechanical installation and connection of the servo drive of shut-off dampers follow the manual supplied with this optional accessory.

5.15. Installing flexible flanges

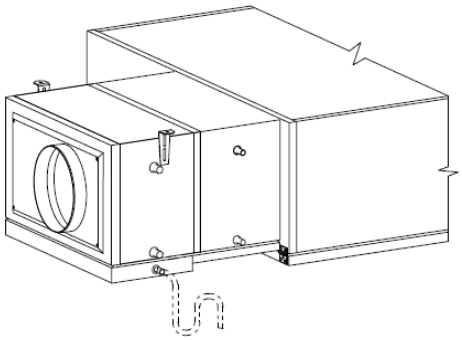
During the mechanical installation of flexible flanges follow the manual supplied with this optional accessory.

5.16. Installing and connecting water chiller to the cool source

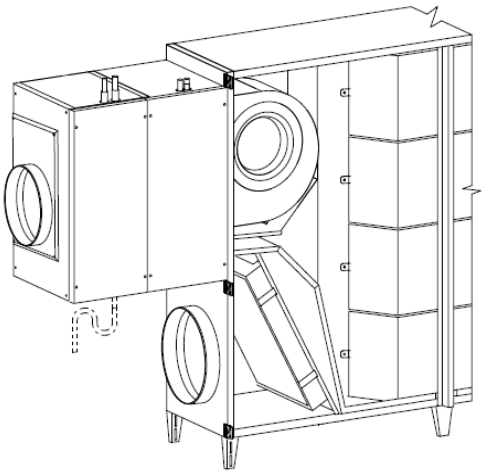
- During the mechanical installation of the water chiller follow the manual supplied with this optional accessory.

! For the appliance to work properly and safely it is necessary to correctly connect a condensate drain line!

- Connect a tube or a hose to the condensate drain outlet (not supplied; we recommend using a conventional washing machine hose) and shape it into a trap. Install the trap in the mounting position (see the pictures below), with the trap size according to chapter 5.8. Secure the trap shape suitably and run the condensate drain line into a drain outlet.



Ceiling-suspended position



Floor-standing position

The following rules must be adhered to during the installation of the water chiller:

- The water chiller in all versions must be filled with an antifreeze solution with sufficient thermal resistance, or it must be drained as long as the outdoor temperature might drop below 0°C.
- Maximum permitted operating positive pressure is 1.0 MPa!
- The inlet of the chilled water system into the unit must be equipped with a sludge filter.

5.17. Installing mixing valve of the water chiller

During the mechanical installation and connection of the control manifold of the hot water heater follow the instructions supplied with this optional accessory.

5.18. Installing direct chiller

- During the mechanical installation of the direct chiller follow the manual supplied with this optional accessory.
- During the connection of the direct chiller follow the instructions of the supplier of condensation units and connecting pipes.

5.19. Installing electric heater / pre-heater EPO-V

- During mechanical installation and electrical connection follow the manual supplied with this optional accessory.
- Electrical connections may only be made by a qualified electrician authorized to service power supply networks.
- Attention - extra care should be taken regarding the installation conditions of EOP-V heater as they cannot be installed at randomly selected locations! For specific conditions see the manual included with this optional accessory.

5.20. Installing manostats to control constant flow and constant pressure

During mechanical installation and electrical connection follow the manual supplied with this optional accessory.

6. Electrical connection, commissioning, description of controls

- The electrical equipment of the unit is designed following standards in effect for electrical connections to power supply network TN-C, TN-S, TN-C,S. The appliance may only be connected by a qualified electrician. The appliance is provided with external connections for equipotential bonding.
- The wiring diagram of the equipment is shown in the appendix that forms an integral part of this set of documentation. Instructions for and the diagrams of electrical connections of optional accessories are included in the documentation sets of these accessories.
- The power supply line to the equipment must be provided with a disconnecting device - a service switch for disconnecting from power supply - whose opening contacts are at least 3 mm apart at all poles. This disconnecting device must be installed within an appropriate distance from the appliance. The protection device included as a standard with delivery may act as such a disconnecting device provided that the switchboard is located within reach of the appliance.
- Commissioning may vary depending on the type of control system. Commissioning is carried out by a trained technician following the separate documentation set included.
- The controls are described in the separate document titled “Operating the control system”.

! The unit is to be protected using a breaker with characteristics "**C**".

! In case of using additional overcurrent protection against accidental direct or indirect contact, it is necessary to use a **special** circuit breaker designed for frequency inverters and switching sources. It is a protector sensitive to alternating pulsed DC residual currents, resistant to current surges 5 kA.

7. Hygienic instructions for compliance with VDI 6022

7.1. General instructions

➲ Basic hygiene-related requirements are outlined in the Chapter 5.2.

➲ The appliance has been manufactured in a hygienic design that complies with all requirements of the VDI 6022 standard for the hygiene o HVAC device. In order to meet those requirements during operation it is essential to ensure for the appliance to be operated, maintained, inspected and cleaned by sufficiently qualified personnel in accordance with instructions contained in the operation and maintenance manual. It is also essential to ensure for the remaining components of the HVAC system (HVAC distribution systems, distribution elements, ancillary devices, noise silencers etc.) to meet all hygienic requirements of the VDI 6022 standard and be operated in compliance with those requirements.

➲ If long-term high relative humidity (short-term more than 90 % or more than 80 % for three consecutive days) is likely to occur with the subsequent moistening of filters (e.g. in areas with frequent fogs, frequent and long rains, flying snow etc.), suitable measures must be taken to prevent microbiologic growth. Recommended measures include more frequent hygienic checks as per VDI 6022 or shorter filter replacement intervals. Another option is the preheating of air using an appropriate control devices (electrical duct heaters are an available accessory), or the appliance must be put out of operation for the period when filters are at the risk of moistening (if the type of operation allows this).

➲ Air duct including accessories with autonomous regulation of operation is to be connected on the fresh air supply. Such duct will, in compliance with the regulation VDI 6022, provide for appropriate treatment of supplied fresh air to prevent air filter from getting wet. In case the duct is not connected or if it does not include such accessory, the appliance is to be put out of operation as long as the risk of air filters to get wet persists (thick fog, snowing).

➲ Operators must be familiar with the tasks and functions as well as the individual components of the appliance.

➲ The appliance must be regularly inspected, cleaned and maintained by sufficiently qualified personnel (see the following chapter).

➲ Regardless of their qualifications, personnel must undergo hygiene training (see the following chapter).

- ➲ The user must be able at any given time to provide evidence as to the qualifications of operators. If sufficient number of qualified operational and service staff are not available, those activities must be commissioned to a specialist company that will be responsible for the proper operation of the appliance.
- ➲ The user has an obligation to carry out regular hygiene inspections of the appliance every 3 years (see following chapters).
- ➲ The appliance may not be operated without air filters. The filter grade of supply fresh air must be at least ISO EPM1 50%. The filter grade of exhaust air must be at least ISO EPM10 50%.
- ➲ If the appliance has been out of operation for a longer period of time, it must be cleaned thoroughly before recommissioning; if stricter hygienic requirements apply, wiping disinfection must be carried out.
- ➲ After disinfecting make sure that no toxicologically suspicious or odour-active substances enter supply air!
- ➲ The user has an obligation to appropriately record the appliance's operation (e.g. in the operational logbook).

7.2. Required qualifications of personnel as per the type of activity

Activities	Operators	Inspection	Maintenance	Repairs
Required personnel qualifications	No special professional qualifications	Professional engineering qualifications in building maintenance, familiarity with measurement procedures for the hygiene inspections of HVAC devices	Professional qualifications in electrical or metal engineering with relevant experience in the field of HVAC (familiarity with equipment design, measurement technologies, equipment control and function)**	
Required hygiene training of personnel	Category B	Category A	Category B	
** simple inspection and maintenance of the equipment (e.g. replacing filter fabric, regular cleaning of equipment etc.) may be carried out by personnel without professional qualifications who received category B hygiene training				

a) Category B hygiene training of personnel

- ➲ Personnel must demonstrate familiarity with the following areas:
  (1) Need for and the importance of hygiene during the operation of HVAC equipment
  (2) Hygiene issues of individual aggregates carrying air through HVAC equipment
  (3) Maintenance of HVAC equipment, the effects of its size on determining maintenance intervals
  (4) Simple measurement methods for checking HVAC equipment
  (5) Actions to be taken in the case of occurrence of substances harmful to the environment and their removal
  (6) Personal protective measures in the area of hygiene during operation and service activities
  (7) Key regulations (in particular regulations on accident control) and technical standards
  (8) Handling chemical cleaning and disinfecting agents

b) Category A hygiene training of personnel

- ➲ Personnel must demonstrate familiarity with the areas of category B training specifications and additionally the following:
  (1) Hygiene basics
  (2) Significance of the various hygienic methods of air treatment
  (3) Physical and chemical measurement methods, hygiene and microbiological inspection methods
  (4) SBS (Sick-Building-Syndrome) issues, symptoms of problems and possible causes
  (5) Technical development and its practical applications
  (6) Hygiene regulations and technical rules for the operation of HVAC equipment

If these instructions are not adhered to, the manufacturer cannot guarantee the permanent maintenance of the unit´s hygiene parameters.

8. Inspecting the appliance

8.1. Overview of inspections and measures to ensure compliance with hygiene requirements

➲ The appliance must be regularly inspected in the areas listed below:

				Required interval in calendar months					
		Activity	**Measures to be taken**	**1.**	**3.**	**6.**	**12.**	**24.**	**Hyg. inspec-tion**
1		**Unit´s cabinet**							
	1.1	Check for impurities on air side, damage and corrosion	Clean and repair				**x**		
	1.2	Check water production	Clean, determine causes and repair			**x**			
2		**Air filters**							
	2.1	Check for unacceptable impurities and damage (leaks)	Replace affected air filters if no replacement has taken place for less than 6 months, otherwise replace the entire filter stage		**x**				
	2.2	Check differential pressure	Replace filter stage	**x**					
	2.3	Replace filters that cannot be regenerated later, clean thoroughly					**x**		
	2.4	Check hygienic conditions							**x**
3		**Drop eliminator**							
	3.1	Check for impurities, damage and corrosion	Cleaning functional maintenance	**x**					
	3.2	Check drop eliminator for deposits	Cleaning functional maintenance in case of visible deposits	**x**					
	3.3	Check hygienic conditions							**x**
4		**Heat exchangers**							
	4.1	Check for impurities, damage and corrosion	Cleaning and repair		**x**				
	4.2	Check for impurities and corrosion, check water chiller, condensate tray and drop eliminator for functionality	Repair		**x**				
	4.3	Check for impurities and functionality of siphon trap	Cleaning and repair		**x**				
	4.4	Cleaning water chiller, drop eliminator and condensate tray				**x**			
	4.5	Check hygienic conditions							**x**
5		**Fans**							
	5.1	Check for impurities, damage and corrosion	Cleaning and repair			**x**			
	5.2	Cleaning functional maintenance of air-carrying fan parts and water discharge					**x**		
6		**Heat recovery exchanger**							

				Required interval in calendar months					
		Activity	**Measures to be taken**	**1.**	**3.**	**6.**	**12.**	**24.**	**Hyg. inspec-tion**
	6.1	Check for impurities, damage and corrosion	Cleaning and repair		**x**				
	6.2	Check tightness between exhaust and outdoor air	Repair		**x**				
	6.3	Check condensate tray for impurities, corrosion and functionality	Cleaning and repair		**x**				
	6.4	Check for impurities and functionality of siphon trap	Cleaning and repair		**x**				
	6.5	Check hygienic conditions							**x**
7		**Air duct and noise silencers**							
	7.1	Check accessible sections of air duct for damage	Repair				**x**		
	7.2	Check internal air duct surfaces at two or three sample points for impurities and corrosion	Determine cause, clean relevant air duct sections				**x**		
	7.3	Check noise silencer for impurities, damage and corrosion	Repair				**x**		
	7.4	Check hygienic conditions of air duct at sample point	Determine cause, clean relevant air duct sections						**x**
8		**Air vents**							
	8.1	Check mounted perforated metal sheet, wire mesh or screens (random checks)	Clean or replace				**x**		
	8.2	Check around air vents with room air induction and extraction air outlets for solid deposits	Clean	if need-ed					
	8.3	Clean structural parts of secondary air flow					**x**		

- While checking air filters make sure the following is documented (e.g. in the operational logbook):
  - Pressure difference
  - Time of operation
  - Appearance (check for cracks in filter material and leaks between the frame and mounting wall)
- If significant contamination or cracks are present the air filter must be replaced!
- Hygiene inspections must be carried out regularly every 3 years. As per the requirements of the VDI 6022 standard the inspection must include the following steps:
  - Inspecting the application and rooms it supplies with the company´s doctor and HR representative in attendance, with attention paid to apparent deficiencies
  - Measurement of physical climatic parameters (temperature, humidity, air flow rate) at sample points of the appliance and in the rooms
  - Inspecting hygienic conditions including specific tapping on filters and heat exchangers
  - Checking the total content of Legionella germs (must be carried out by the hygiene authority)
  - A written report on the inspection results to the user with recommendations and necessary and required corrective measures during a business meeting
- The total number of Legionella germs must not exceed 1 CFU/ml.
- All inspections must be documented.

9. Cleaning and maintenance

9.1. General

- During the maintenance of the appliance follow instructions from the previous chapters, observe the basic rules of safety at work and proceed in compliance with the working regulations and use suitable means of access to the HVAC equipment (ladders, mobile stepladders, platforms etc.).
- Maintenance consists particularly in the visual inspection of the appliance, a regular replacement of air filters and cleaning the heat recovery exchanger.
- Observe personal hygiene during the maintenance of the appliance. We recommend using personal protective equipment (face masks, rubber gloves etc.).
- We recommend commissioning the maintenance and cleaning of the appliance to a specialist service company.

9.2. Cleaning the cabinet

- After opening the door of the unit vacuum clean all impurities, possibly carry out wiping disinfection.
- Check the condition of the door seal.
- Check the condensate drain for cleanliness and flooding. A blocked drain might cause serious problems.

9.3. Air filters, replacing filter cassettes

- As standard, the appliance contains outdoor (e1/ODA) and extraction air filters (i1/ETA), which must be kept dry and clean (for details see 7.1). (Please wear protective devices such as respiration protection, gloves, etc.).
- The filters are designed to capture dust particles and thus protect your health as well as the other parts of the appliance from contamination; therefore make sure they are control and replaced regularly!
- Carry out filter replacement operations only provided that you do not suffer from allergies to dust particles. Avoid replacing filters when persons with such allergies are present.
- Replacement is carried out depending on the dust load of the external and internal environment and the subsequent contamination of filters and an increase in air resistance indicated by the differential manostats every 500 to 2000 running hours.

➲ The filter cassettes are replaced when the final permitted difference between filter pressures or the time interval for replacement have been reached, or if the filters show technical or hygienic functional defects. Earlier replacement or shorter replacement intervals are desirable if the results of a hygiene inspection show it appropriate.

➲ When replacing the filter cassettes, avoid the contamination of the surroundings, other air-handling parts of the appliance as well as the rooms being ventilated. In particular make sure that the newly installed filters have not been contaminated by dust from the old ones!

- Spare filter cassettes are to be ordered from the manufacturer. Please include in your order the order code of the cassette (the code is shown on the identification plate of the appliance).
- After opening the unit door, slide out the contaminated cassettes from the guide rails and insert new ones.
- During insertion make sure that the arrow showing the direction of air through the cassette is visible from the operator´s side and always points toward the heat recovery exchanger!
- Make sure that each section (supply, exhaust) has filter cassettes with the correct filter grade as indicated in Chapter 5.9.
- Dispose of the contaminated cassettes with general municipal waste.

➲ Always record the date of replacement of filter cassettes in a suitable way, e.g. in the operational logbook.

! Use original filter cassettes only! If different cassettes were used, the manufacturer could not guarantee their proper function!

9.4. Cleaning the coils (heater / chiller)

➲ It is necessary to clean the coil when it shows only minimum signs of contamination.

- After opening the door vacuum clean all impurities.

- If the vacuum cleaning of impurities while the coil remains in its place does not suffice, disconnect it from the heating / cooling medium, remove it and clean it using a high-pressure cleaner. Proceed with care so as not to damage the coil.
- When cleaning the coil proceed in such a way so as to prevent impurities or moist from entering the other parts of the appliance.

9.5. Cleaning the plastic heat recovery exchanger

- The recommended period for cleaning the exchanger is approximately 30 to 50 thousand running hours depending on the nature of the operating environment.

➲ It is necessary to clean the exchanger when it shows only minimum signs of contamination.

- After opening the door and unlocking the fixing elements, slide individual recovery exchanger blocks out of the guide rails in the following order: size 650 – 1,2; 1100 – 1,2; 1600 - 1, 2; 2600 and 3600 - 1, 2, 3. Rinse the individual blocks with hot water containing detergent with maximum temperature 70°C, alternatively use disinfectant in concentration recommended by the producer.
- After letting them dry thoroughly, slide the individual heat recovery exchanger blocks back in in the reversed order and secure them in place.
- Check for the tight fit of the exchanger in the guide rails.
- Do not expose the exchanger to ultraviolet light, store it in darkness if necessary.

! • Never clean the exchanger with agents that might contain organic solvents - there is a risk of irreversible damage to the exchanger!!

9.6. Draining and inspection of the condensate collection tank (not included in delivery)

- If the condensate is drained into a sufficiently large and accessible tank, make sure it is inspected regularly and timely drained.
- Make sure the tank is easily accessible; keep it clean!

9.7. Other minor maintenance

- When replacing the air filters also check the following:
  - Cleanliness of the condensate drain. A blocked drain might cause serious problems.
  - Condensate drain flooding.
  - Door seal condition.
- Regularly check the level of measurement liquid in the manometers, if necessary adjust the zero value using the bottom knob (marked with - +). Before adjusting to zero make sure that no pressure enters the manometer by disconnecting both hoses located on the top of the appliance.
- Also regularly check the condition of the sludge filter (part of the heating / cooling system) on the inlet of heating / cooling water into the hot water heater / water chiller.
- Keep the heating/cooling system including the heater / chiller and the control set bled of air. Check pressure in the heating / cooling system.

10. Failures and troubleshooting

Failure	Symptoms	Possible causes	Troubleshooting
Appliance will not start up		Power supply is not connected	Connect to power supply (switch on primary circuit breakers)
		Power supply or interconnecting electric cables are interrupted	Disconnect from power supply and contact a service technician
		Not found	Disconnect from power supply and contact a service technician
Appliance supplies insufficient air volume	The appliance supplies considerably lower air volumes	Clogged air filters	– Switch off the appliance – Disconnect from power supply – Replace air filters
		Mechanical obstruction in fresh air intake or supply air outlets	– Look for mechanical obstructions of fresh air inlet ports – Look for mechanical obstructions of supply air outlets – Remove obstructions, if any
		Not found	Disconnect from power supply and contact a service technician
Appliance does not heat at all or heats insufficiently	Cool air is supplied continuously	Air in hot water heater	– Check heating water temperature – Bleed air
		Heating water temperature in the hot water heater too low	Check heating water temperature
		Heating water flow rate too low	Check the condition of the sludge filter on the heating water inlet; clean the filter
		Maximum heater capacity too low	No failure (incorrect design capacity too low)
		Not found	Disconnect from power supply and contact a service technician
Appliance does not cool at all or cools insufficiently	Warm air is supplied continuously	Air in water chiller (only in CHW version)	Air bleed the water chiller
		Cooling water temperature too low (only in CHW version)	Check cooling water temperature
		Cooling water flow rate too low (only in CHW version)	Check the condition of the sludge filter on the cooling water inlet; clean the filter
		Condensation unit is not running (only in CHF version)	Switch on the condensation unit
		Maximum chiller capacity too low	No failure (incorrect design capacity too low)
		Not found	Disconnect from power supply and contact a service technician
Water dripping from appliance	Drops of water form between the door and frame of the appliance during operation	Condensate drain siphon trap is insufficiently filled with water	Disconnect from power supply and fill the condensate drain siphon trap with water
		Condensate drain is blocked	Disconnect from power supply and clean the condensate drain including the siphon trap and pipes
		Damaged door seal (the symptoms might include a whistling sound caused by air flowing through the gap)	– Disconnect from power supply and check the condition of the door seal – If serious damage is discovered, contact a service technician
	Water drops from at the condensate drain connection point	Condensate drain seal or pipes damaged	Disconnect from power supply and contact a service technician
		Not found	Disconnect from power supply and contact a service technician

! If the unit is disconnected from the electricity supply, follow the instructions given in chapter 2.2 Operational safety.

- For further description of possible problems and troubleshooting contact your supplier of the control and measurement system.

11. Repairs, spare parts

All warranty and post-warranty repairs are performed by the supplier or an authorized service company. Service technicians have an updated list of spare parts; you can also contact the manufacturer/supplier.

The guide on disassembling the unit is published at www.airflow.com in compliance with the Regulation of the Commission (EU) 1253/2014.

12. Warranty

The product is covered by warranty according to general delivery terms and conditions and the warranty conditions of the supplier, which are a part of the accompanying documentation.
The supplier is not liable for damage caused by unprofessional installation and operation that is not in compliance with the operation and maintenance manual and general practices applied during installation and operation of HVAC equipment and control systems.

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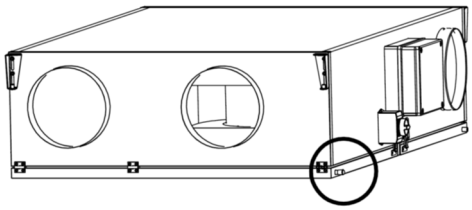
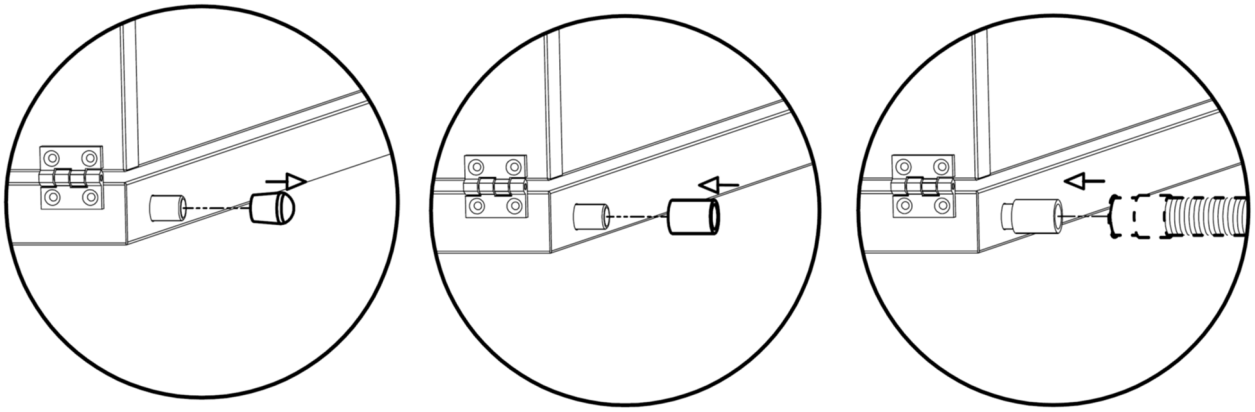
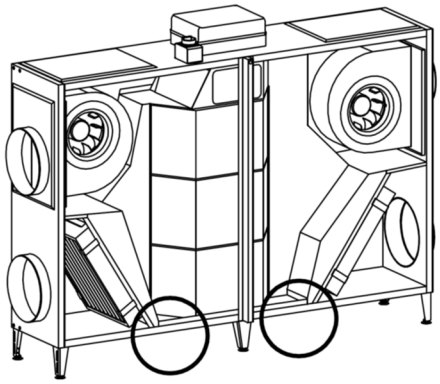
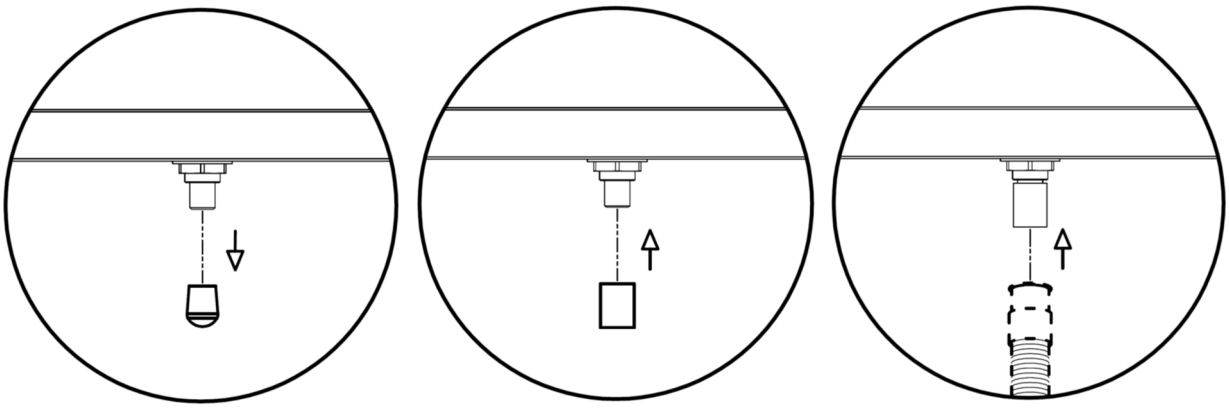
13. Visual appendix - manuals

13.1. Connecting the condensate drain line



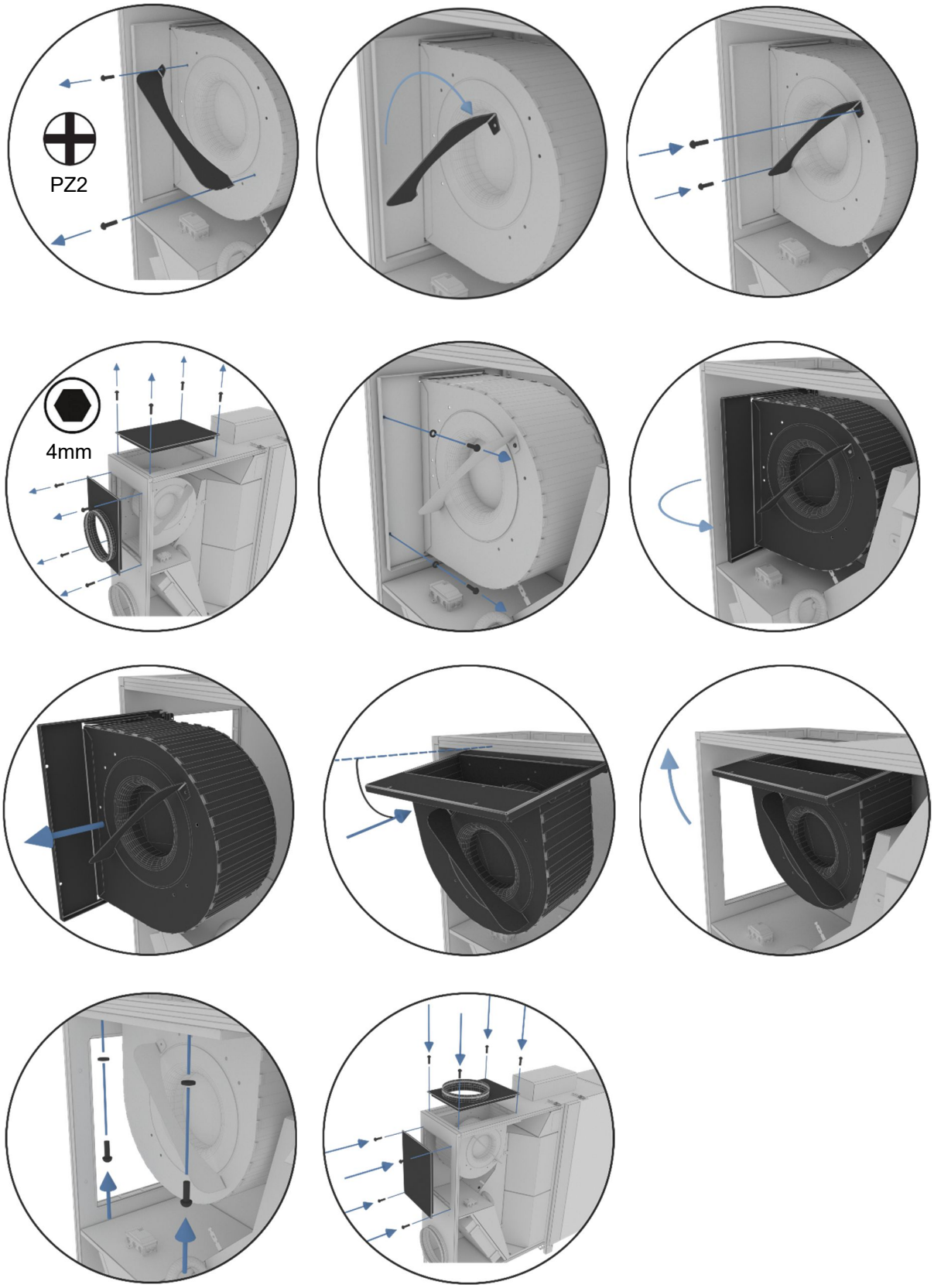






13.2. Rotating the fan

The option is available for the model DUPLEXVENT Flexi 1600 only.



13.3. Fitting the filters