



User manual for air handling units

Safety | Residual risks | Transport | Installation | Start-up
Operation | Maintenance | Sustainability

Version: February 2024

NB Ventilation A/S

Svanningevej 2

DK-9220 Aalborg Øst

Tel.: 98 31 52 44

nbventilation.dk

Document in original language

Only the English version is valid in case of dispute. Translated versions are not valid in case of disputes.

Overview of the content in this mandatory User Manual

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- B. Name of machines
- C. EU Declaration of conformity
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The technical documentation was delivered as printed documents with the unit.

The technical documentation about the delivered unit is available at any time by contacting NB Ventilation A/S

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A. Manufacturer

This manual covers air handling units from NB Ventilation A/S

NB Ventilation A/S
Svanningevej 2
DK-9220 Aalborg Øst

B. Name of machines

NBI for the indoor air handling unit

NBU for the outdoor air handling unit

C. EU Declaration of conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer

Manufacturer:
NB Ventilation A/S
Svanningevej 2
DK-9220 Aalborg Øst

The product:
Air handling unit: NB Ventilation type: NBI and NBU

Fulfills the provisions of the following regulations, directives and standards:

Machinery Regulation 2023/1230 EU

Technical documentation according to annex III, part B - 1.7.4.2
Technical Dossier

- **EU Regulation 1253/2014 - ECO design requirements for ventilation units**
- **EU Regulation 305/2011 – Conditions for the marketing of construction products**
- **EU Regulation - 2019/1021 – Persistent organic pollutants**
- **EU Regulation - 1907/2006 – Chemicals (REACH)**

- **Directive 2014/30/EU – Electromagnetic compatibility**
- **Directive 2014/35/EU – Low voltage**
- **Directive 2014/53/EU - EMC - radio equipment**
- **Directive 2014 /34/EU – ATEX potentially explosive atmosphere**
- **Directive 2011/65/EU - RoHS2 - hazardous substances in electrical equipment**

According to the below-mentioned European standards

- **EN 12100 – Risk assessment and risk reduction**
- **EN 13857 – Safety distances and to prevent hazard zones being reached**
- **EN 1886 – Ventilation for buildings – Air handling units – Mechanical performance**

The Declaration of Conformity continues on the next page. We make sure that both pages have the same date, and that the binding signature on the next page applies to both pages.

The Declaration of Conformity is continued from the previous page. We take care that both pages have the same date, and that the binding signature on this page applies to both pages.

- **EN 308 – Air-to-air heat recovery components**
- **EN 13141-7 – Testing of aerodynamic, thermal, acoustic and electrical performance**
- **EN 13053:2019 - Ventilation**
- **EN 60204-1:2018 – Safety of machinery - Electrical equipment of machines**
- **EN 60730-1:2022 – Testing of automatic controls**
- **EN 301489 – Electromagnetic compatibility - EMC**
- **EN 61000 – Apparatus connected to power network.**
- **EN 61010-1:2010 + A1:2019 – Electrical equipment for measurement**
- **EN 61326-1:2021 - EMC**
- **EN 61800-3:2022 – EMC – adjustable speed power drive systems**
- **EN 61800-5-1:2022 – Requirements for adjustable speed power drive systems**
- **EN 14986:2017 - ATEX fans for potentially explosive atmospheres**
- **EN 60079-0:2018, EN 60079-7:2015 + A1:2018, EN 60079-11:2012, EN 60079-15:2019 - ATEX**
- **EN 13162:2012 + A1:2015 – Thermal insulation products for buildings**

NB Ventilation A/S
Aalborg, Denmark

Rasmus Gerhardt
CEO



This declaration relates exclusively to the machinery in the state in which it was placed on the market and excludes components which are added and/or operations carried out subsequently by the final user.



NB Ventilation A/S, Svanningevej 2, DK-9220 Aalborg

January 2025

D. General descriptions, safety and warnings

NBI and NBU air handling units are order-specific machines available in thousands of different configurations. Only a few examples of configurations are described in this User Manual. If not mentioned directly in the documents that describe each air handling unit, the unit is constructed and built for the transport and treatment of air between -40° and +40°.

Maintenance of the units must be carried out by skilled technicians.

D.1 Rating plate

Each unit has a unique identification number, which is NB Ventilation A/S order number and project number for the air handling unit.

The number is printed on the rating plate, which is a durable aluminum label that is always placed on the inspection side of the unit.

Please always state the specific identification number of the unit when contacting NB Ventilation A/S to enable us to provide you with specific information regarding your request for information, spare parts and regarding updating of your unit to extend the lifetime for optimum sustainability.

On air handling units with both supply air and exhaust air sections, there are 2 rating plates:

- One with information about the supply capacity and the supply air fan/fans.
- And one with information about the exhaust air capacity and exhaust air the fans.

Information can be downloaded from the website on the rating plate - www.nbventilation.dk

Identification No.
Air handling unit
Supply air
Capacity
Fan
Motor power
Consumption

D.2 Safety - Instructions in this manual must be read and understood

Important: Prior to working on this air handling unit, you must be sure that you understand the instructions in this mandatory manual about reducing the risk of injury.

There is a serious mechanical or electrical hazard associated with improper use of the equipment covered in the unit.

To reduce any risk, and to ensure that the unit works optimally, transport, assembly at the final site, start-up, operation and maintenance must be carried out in accordance with the information in this manual, and local conditions and laws for air handling units and electrical installations must be observed.



The door with this label indicates where the printed manual is found in the unit.

Only personnel with relevant technical skills may work on the unit.

D.3 General safety in connection with work on the unit

No work may be carried out on the unit, and inspection doors may not be opened unless the unit has been stopped and disconnected from the mains supply with the automatic disconnecting device, or by removing fuses and placing a warning sign that the unit is being worked on.

You must make sure that rotating parts have stopped, and if electric heating is installed that the heating elements have cooled down. Even after power has been cut off, the impellers with sharp edges may rotate for several minutes due to airflows caused by stag effect – also called chimney effect.

When working on outdoor units, the inspection doors should be removed rather than simply left open, which would allow the wind to catch the doors, risking serious injury.

Inspection doors with locks must be locked again after work on the unit has been completed.

D.4 General safety in connection with the unit in operation

All inspection doors must be closed and locked when the unit is in operation. Pressure drops across filters must be below 300 Pascal to prevent filters from separating. Impellers must be kept clean to avoid imbalance with risk of breakdown.

D.5 Warnings

Pictograms on the inspection side of the unit show information about hazards and functions



Warning sign about electrical shock: Only access to electrical installations by authorized persons. Authorized persons must also be aware that the units may be built with fans driven by permanent magnet motors, and they create voltage and current harmful to people when they rotate - for example due to airflows caused by stag effect. See the information about residual risk in this manual in the section - Risks related to fans and the subsection of this section about risks related to permanent magnet motors.

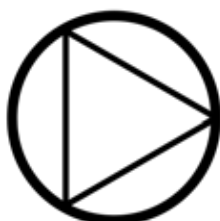


Warning sign about run-on time for fans, and risk of injury: It is dangerous to touch fans in operation. And the run-on time is at least 180 seconds when the power to the fans has been cut off. Read the information in this manual about residual risk with the

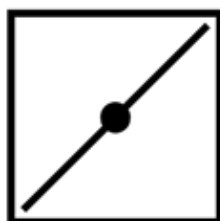
information about the risk of high rotational speeds for the fans due to airflows caused by stag effect– also called chimney effect.



Warning sign about overpressure: Press hard on the door with one hand to open the door in a controlled manner when you turn the handles with the other hand to open the door, as the potentially high overpressure inside the unit behind the door causes the door to open rapidly with the risk of serious personal injury.



Fan symbol: Indicates that there are fans in the unit behind the door. See the information above and in the section below about residual risk with rotating fans



Damper symbol: Indicates that there is a damper in the unit behind the door. See the section on residual risk in this manual.

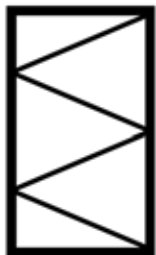


Rotary heat exchanger symbol: Indicates that there is a rotary exchanger in the unit behind the door. Be careful not to pinch fingers between the drive belt and the rotating rotary heat exchanger or between the drive belt and the pulley of the drive motor



Plate heat exchanger symbol: Indicates that there is a plate heat exchanger (cross or counter flow exchanger) in the unit behind the door.

The recovery capacity is controlled via dampers which are operated by damper motors. See the section on residual risk in this manual about the risk related to dampers



Filter symbol: Indicates that there are filters in the unit behind the door. See the section on residual risk in this manual about the changing of filters



Stepping prohibition sign: Pictogram on the upper side of the unit, which shows that stepping on the upper side (the roof) of the air handling unit is prohibited. The profiled sheets are thin and deform easily with the consequence that the roof becomes leaky.

Pictogram on the package of roof sheets, which are quite thin and easily deformed if somebody steps on the package of sheets

E. Drawings, diagrams and documentation about this specific air handling unit.

Unique drawings, diagrams, data and description of functions are delivered with the unit as printed document. All units are manufactured in compliance with the EC Declaration of Conformity, and the units are CE marked as machines. Unique Declaration of Conformity with identification number of the machine is an integral part of the machine, and the identification number is printed on the rating plate at the inspection side of the unit.

NB Ventilation A/S has filed the unique drawings, diagrams, data and description of functions under the unique identification number, and this information is always available from NB Ventilation A/S on request.

F. Staff in charge of operation/control/maintenance.

The units are constructed and built for a fully integrated control system. After start-up and hand-over from installer to operators/users, the unit will operate fully automatically.

Indications of operating status as well as indication of faults appear from a display. The operators/users can enter new parameters in the controller via a terminal. Alternatively, the controller can be connected to a Building Management System for selection of new parameters via PC, tablet or Smartphone. The operators/users do not need to open inspections doors for the operation.

Maintenance as well as repairs must carry out by skilled technicians.

G. Intended use

- NBI indoor units must exclusively be installed indoors.
- Unless otherwise stated in our documentation, the unit must exclusively be used for air that is not corrosive for galvanized steel, copper, and aluminum.

H. Unintended use

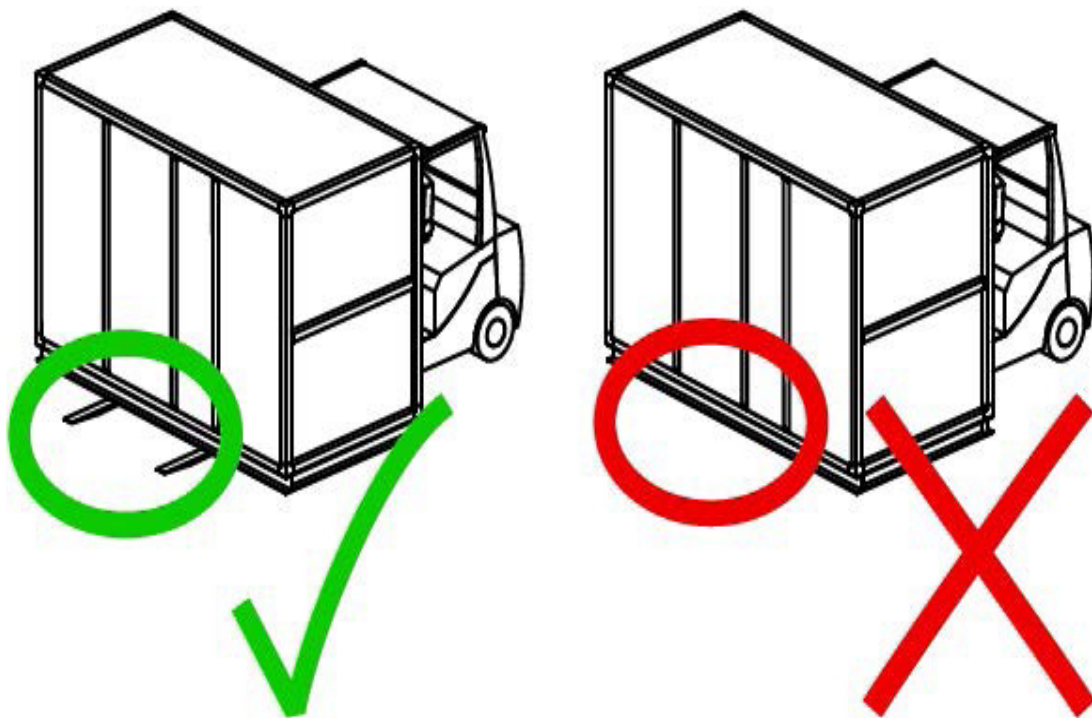
- NBI indoor units must not be installed outside.
- Unless otherwise stated in our documentation, the unit must not transport explosive air with Ex classification, and the unit must exclusively be placed in areas without Ex classification.

I. Instructions for transport, unloading at the site, installation and connection.

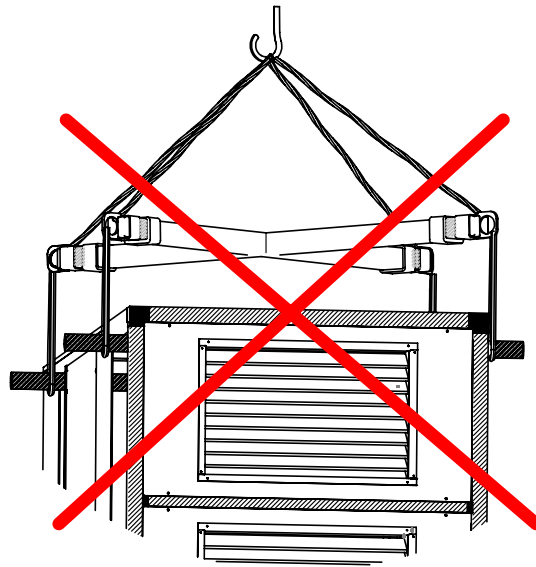
All units are delivered ex works, and NB Ventilation A/S has no responsibility and offers no warranty for transport, unloading, assembly and installation at the final site. We have without obligation the following recommendations for our partners about damage-free delivery of the units and without any injury to persons.

I.1 Transport

When lifting the unit with forklift: To lift the unit or unit section securely, and avoid damage or dropping, the forks must reach all the way through to the other side and lift under the base frame on both sides.



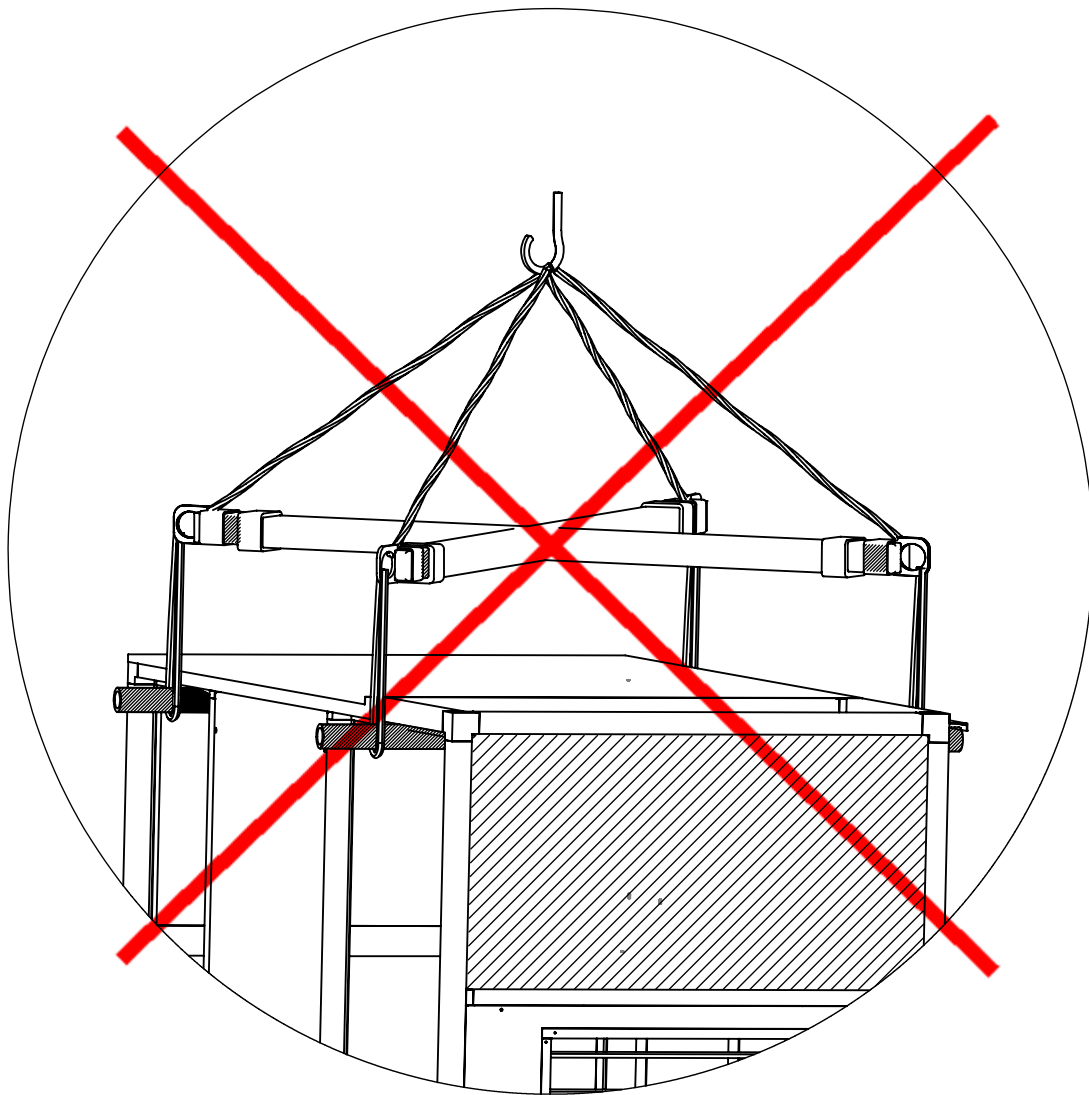
When lifting the unit via straps: A suitable lifting beam must be used to keep the straps clear of the sides of the unit, handles, pipe connections, terminal boxes, and the edge of the roof.



Lifting the unit in the roof is strictly forbidden

Many years ago, units from NB Ventilation were built of profiles that were welded together in the corners, and with the option of delivery with lifting eyes in the corners of the roof.

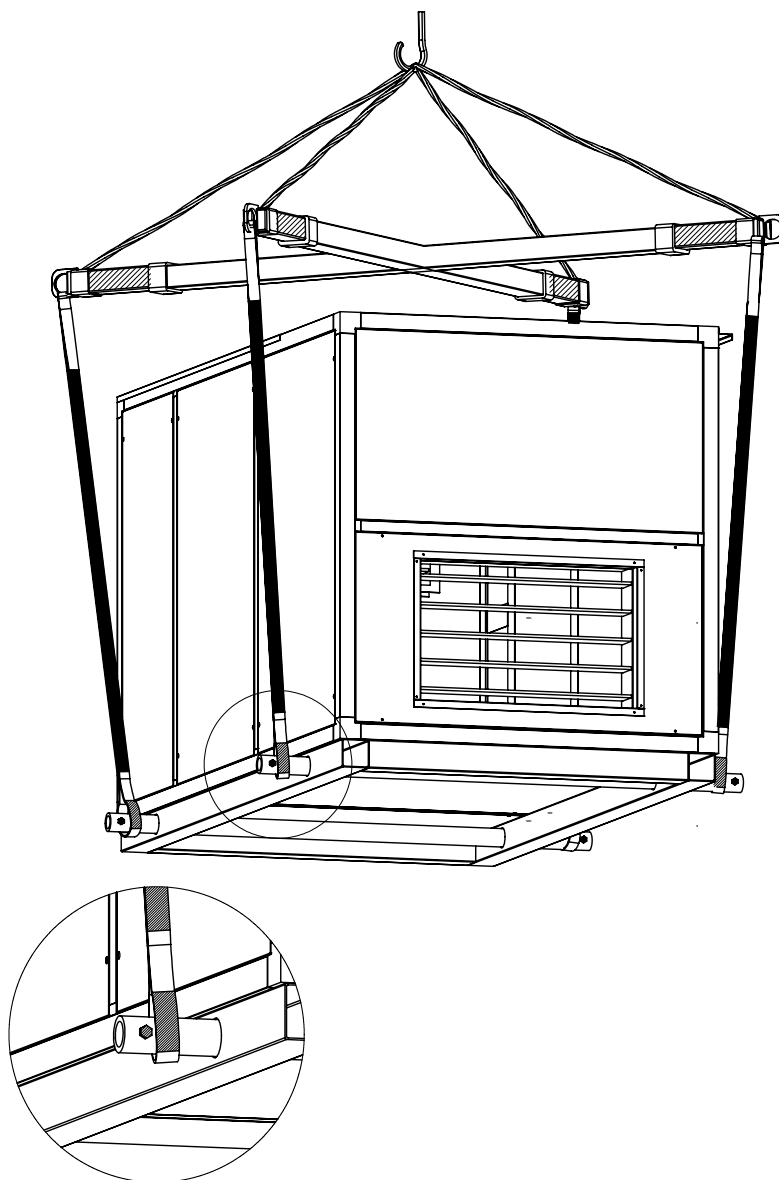
New units from NB Ventilation are built of frames that are assembled in the corners with plastic fittings, **which are not at all dimensioned to lifting the unit in the roof.**



Lifting via straps in strong transverse lifting pipes.

There are openings in the strong bottom frames for suitable strong transverse pipes that are dimensioned for the lifting of the unit via straps.

Against a charge, NB Ventilation A/S can supply the strong pipes. If the pipes are returned, the amount is credited - but not transport costs.

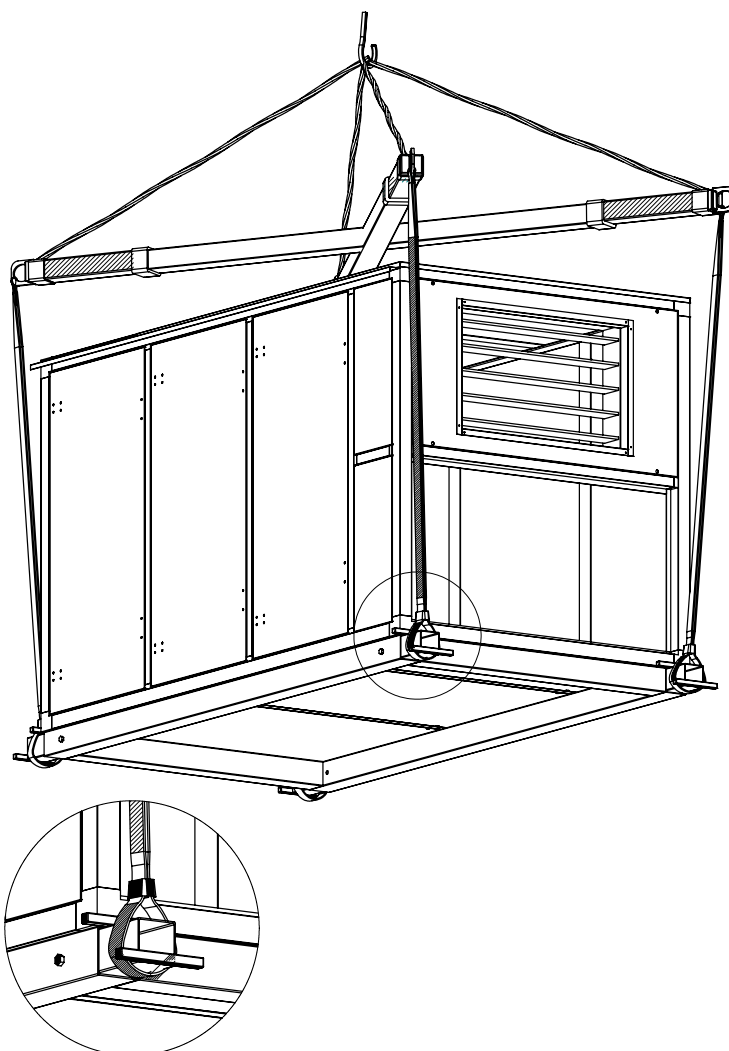


Lifting via straps in removable heavy-duty brackets

Against a charge, NB Ventilation A/S can supply the unit with removable strong lifting brackets.

The heavy-duty brackets fit tight inside the open ends of the unit's strong base frame. The brackets can be ordered to be prepared to be bolted to the unit's strong base frame.

When the unit with straps has been lifted into place, the brackets can be removed and returned to NB Ventilation. If the fittings are returned, the amount will be credited - but not the transport costs.

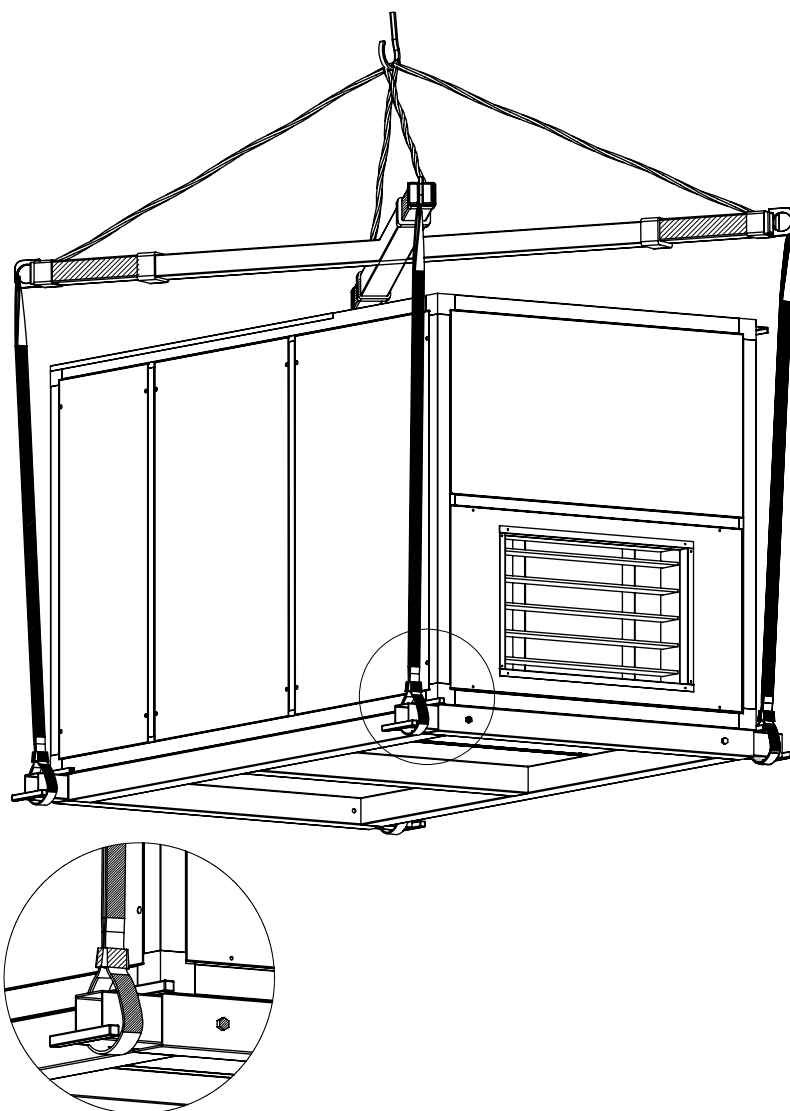


Lifting via straps in removable heavy-duty brackets

Against a charge, NB Ventilation A/S can supply the unit with removable strong lifting brackets.

The heavy-duty brackets fit tight inside the open ends of the unit's strong base frame. The brackets can be ordered to be prepared to be bolted to the unit's strong base frame.

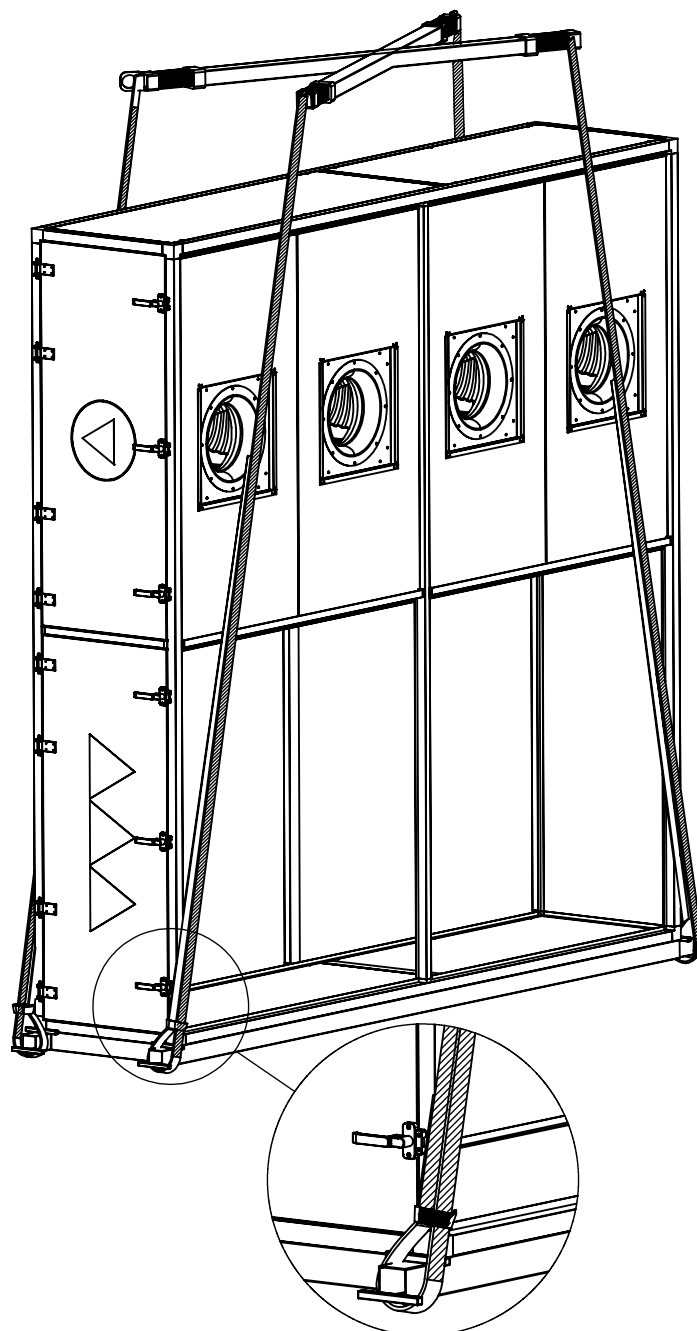
When the unit with straps has been lifted into place, the brackets can be removed and returned to NB Ventilation. If the fittings are returned, the amount will be credited - but not the transport costs.



Lifting of very short and high section via straps in removable heavy-duty brackets

Against a charge, NB Ventilation A/S can supply the unit with removable strong lifting brackets.

To prevent the section from tipping over, the straps must support the top on both sides of the section as illustrated below.



Lifting via straps in mounted brackets.

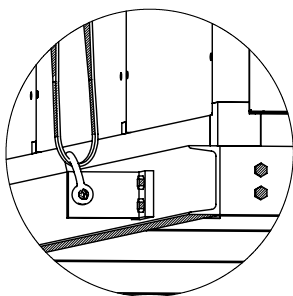
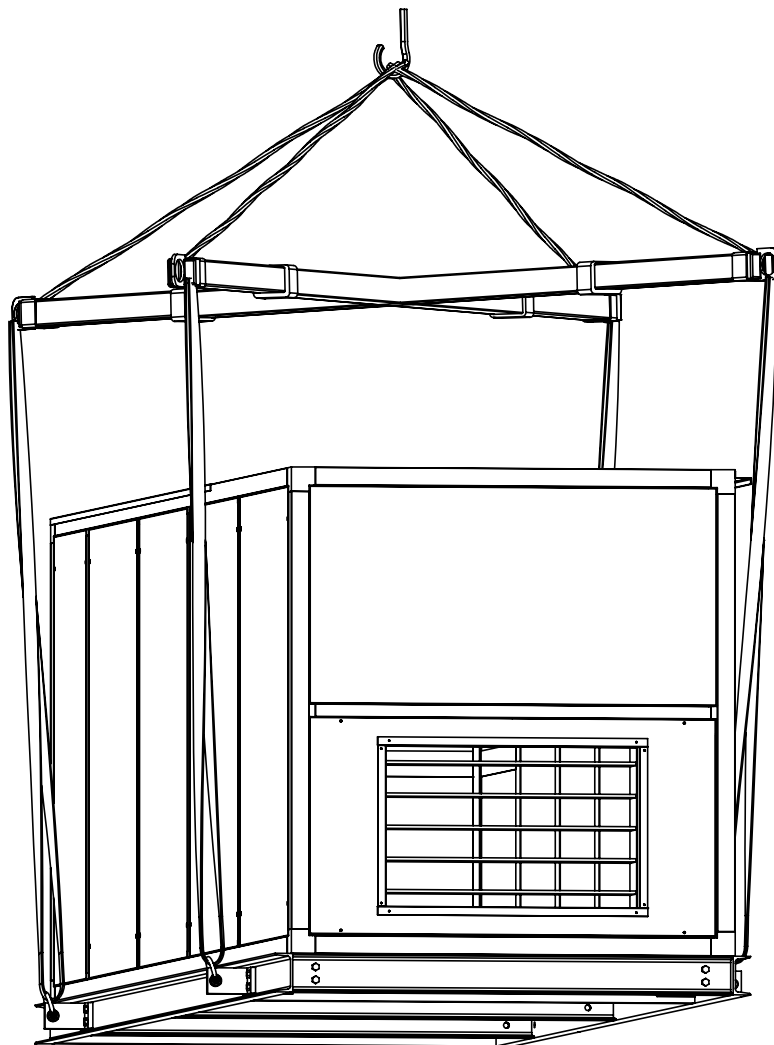
The straps must be fastened to brackets, which are bolted to the unit's strong bottom frames at NB Ventilation.

After installation these brackets must not be removed.



The unit is marked with this pictogram where brackets have been fitted

for lifting of the unit.



Lifting units with feet.

The straps are placed under the unit.

To prevent the unit from tipping and falling down, the straps must be prevented from sliding to the center by using a suitable lifting beam.

Transport of air handling unit and sections on pallets.

The unit and unit section are placed securely on the pallet prior to collection at NB Ventilation A/S.

During transport on truck, the air handling unit must be securely anchored to the truck via straps that are positioned vertically, and not at an angle.

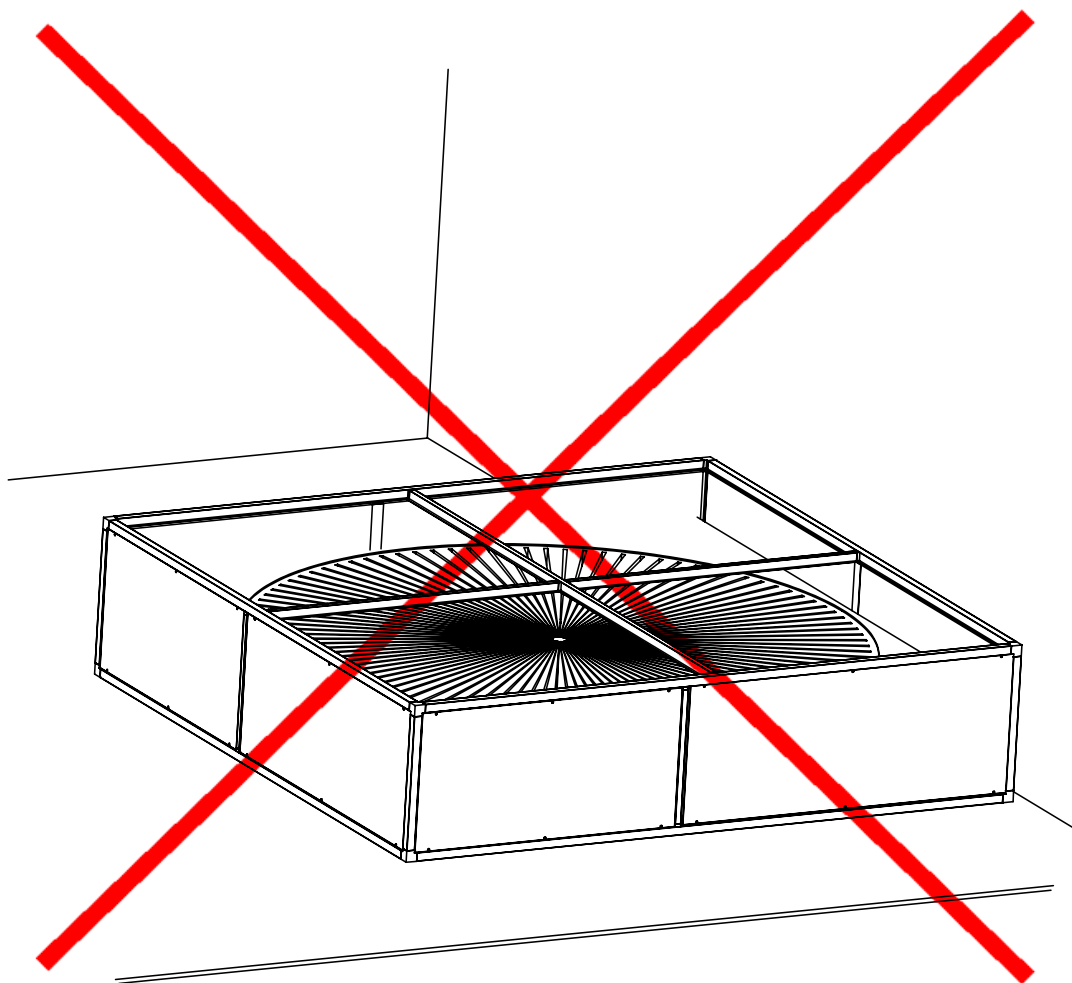
I.2 Installation

Protection of indoor units (NBI) during outdoor storage.

If an indoor unit (NBI) is to be stored outside prior to installation, the hermetically sealed packaging with which the unit was delivered from NB Ventilation A/S must be removed and replaced by a tarpaulin, which must be secured in a way that allows adequate air circulation around the unit under the tarpaulin to avoid moisture damage.

The rotary heat exchanger must always be kept in the vertical position.

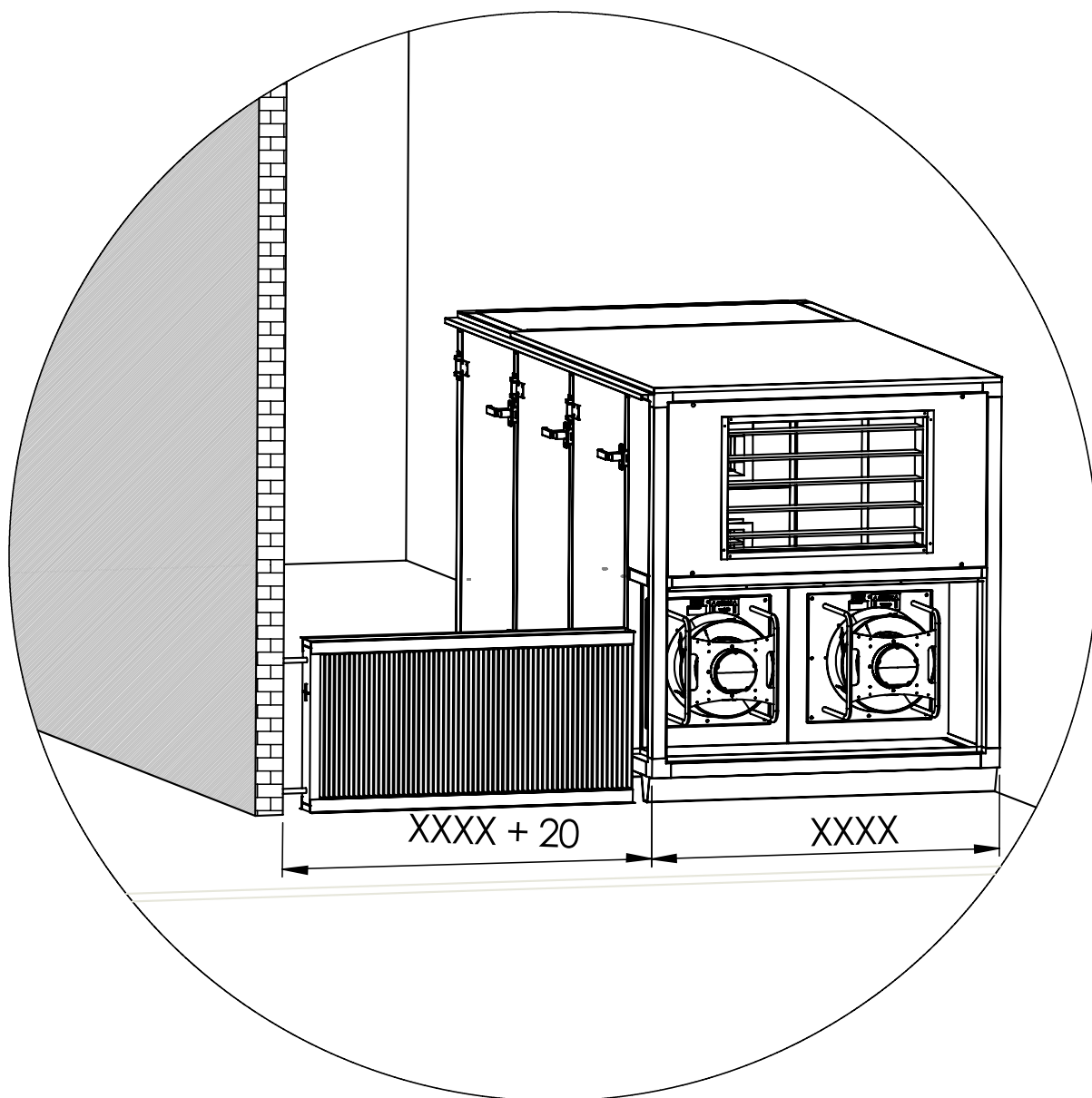
It is described in the section above, about - **Warranty between collection at NB Ventilation A/S and commissioning**, that the unit section with the rotary exchanger must always be kept in a vertical position during transport, storage, and installation. The rotary heat exchanger must also be operated weekly immediately after the collection at NB Ventilation A/S and prior to the start of regular operation.



Important before starting the installation

There must be a free area in front of the unit which corresponds to the width of the unit + 20 centimetres in the entire length of the unit to have free space for:

- Pulling out the heat exchanger, heating coil, cooling coil, (humidifier - if installed) for cleaning, maintenance and replacement in connection with continuous updating of the entire unit for a sustainable lifetime.
- Opening of doors without blockage of pipes, cables and other objects.



Assembling of indoor units

It is always ideal if indoor units (NBI) can immediately be stored indoor prior to final installation, and that the original packaging from NB Ventilation can protect the unit for as long as possible against dirt and damage.

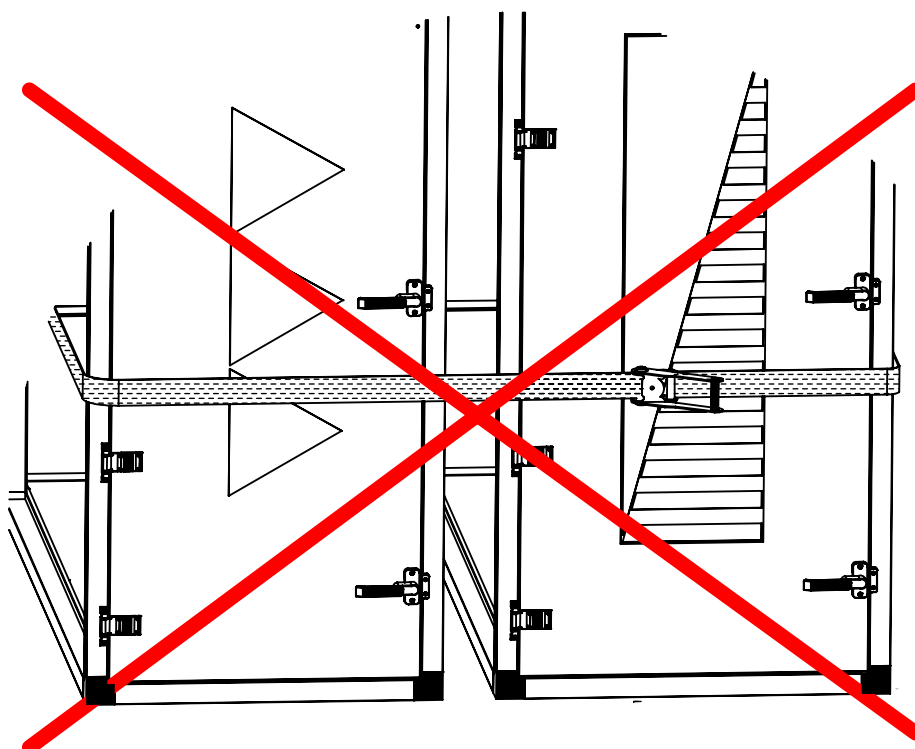
Check that the surface beneath the unit is able to withstand the load of the unit with no risk of transmission of vibrations and sound to the main rooms of the building.

Check how level the surface is and plan how to adjust the feet to achieve a completely level position for the unit so that doors of the unit will be easy to open and close.

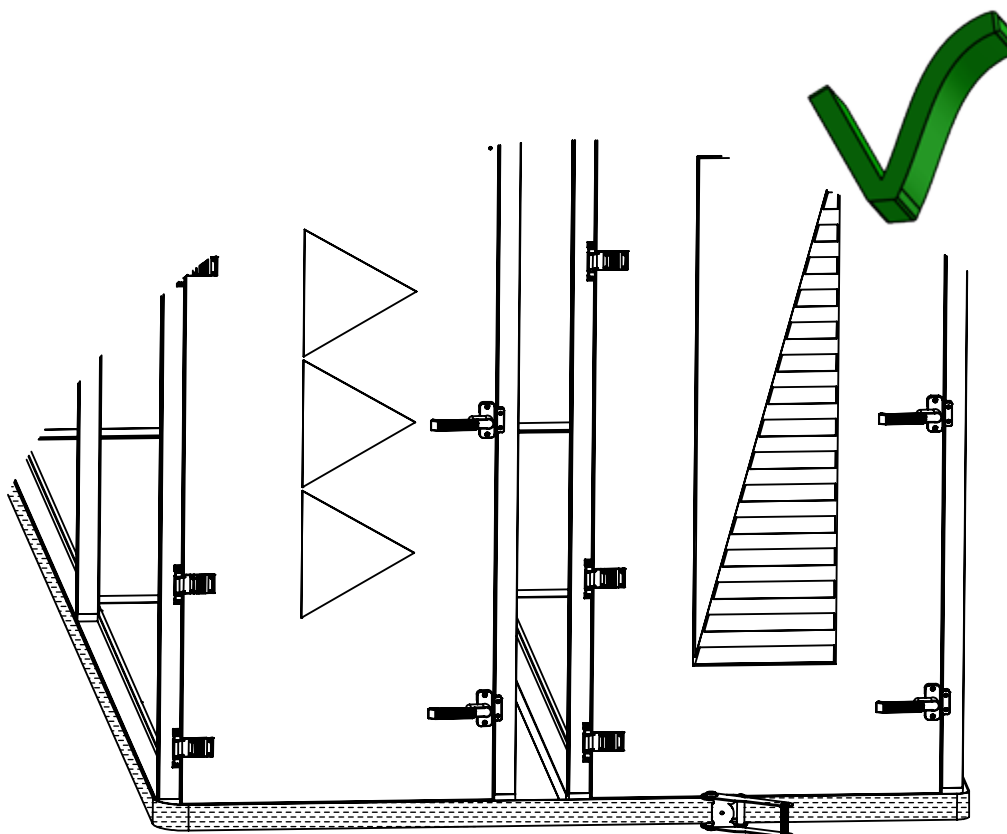
Remove the packaging prior to installation. Leave the plates that cover the openings for outside air, exhaust air, supply air and extract air on the unit until ducts have been installed.

Pulling the sections of the air handling unit together.

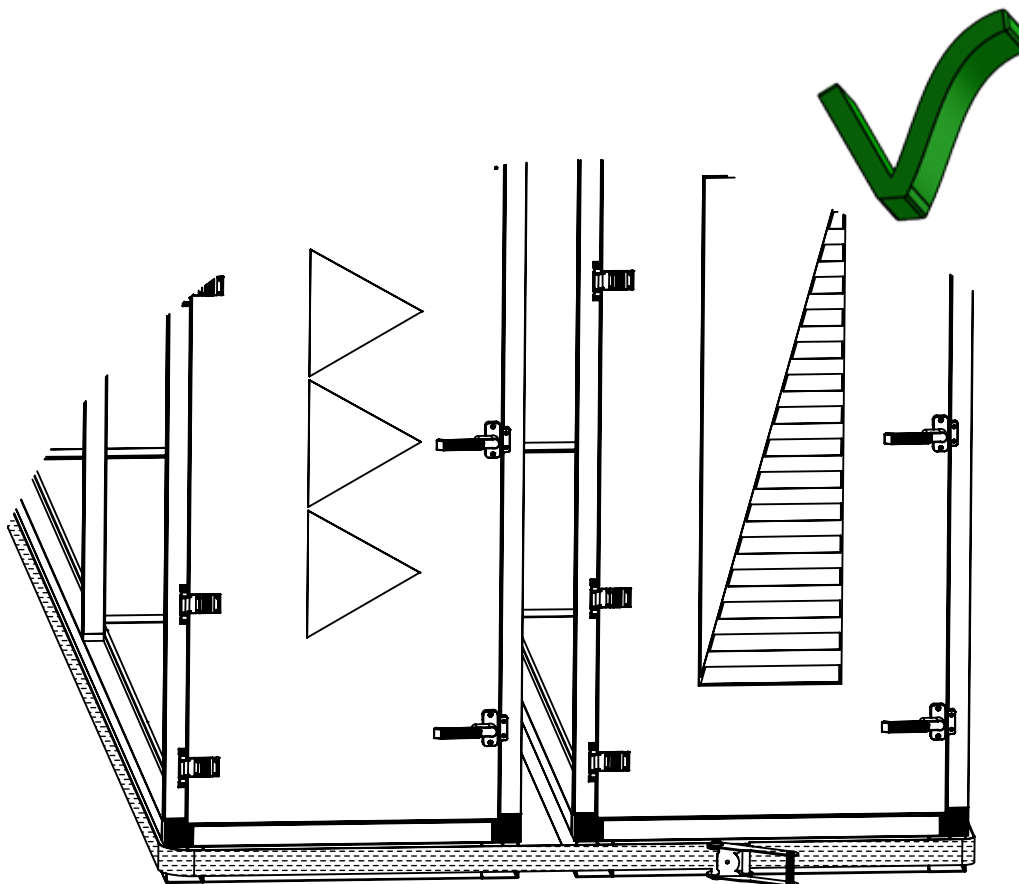
Do not pull the sections together with the strap placed on the vertical profiles because this may bend the vertical profiles with the risk that the doors cannot be opened and closed.



Place the strap on the horizontal profiles of the unit without a base frame underneath the unit to pull the sections together.

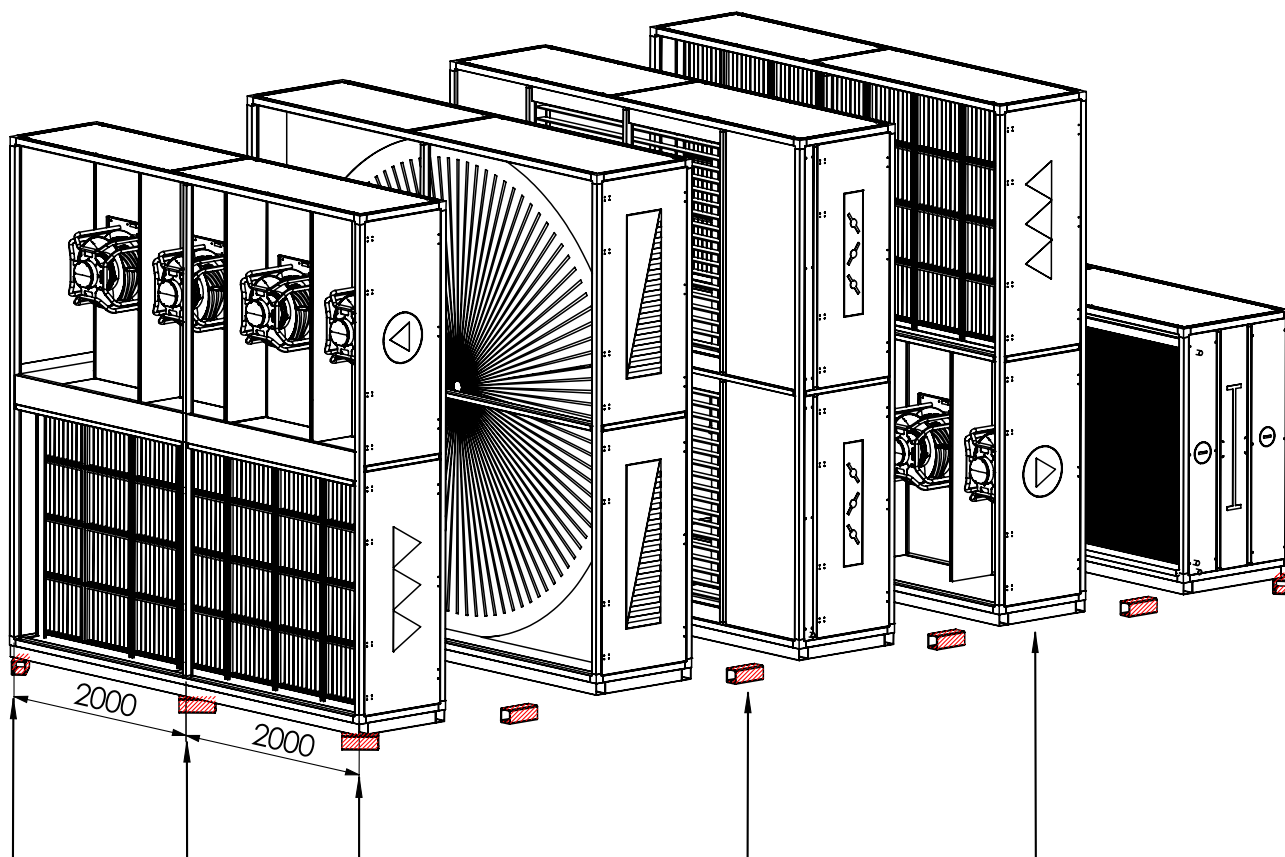


Place the strap on the frame underneath the unit to pull the sections together.



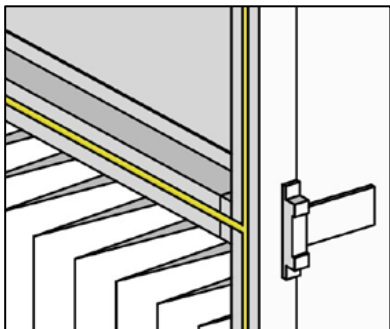
Align the sections of the air handling prior to the final assembly of the sections.

Place the adjustable blocks under the vertical profiles of the air handling unit. The horizontal profiles between the vertical profiles are not constructed to withstand the weight of the sections.

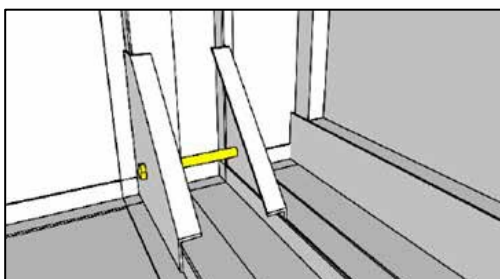


Maximum 2000 mm between adjustable blocks.

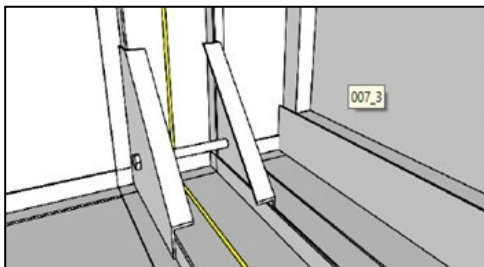
Materials for the connection and sealing between the sections are included. Inside one of the sections, you will find a box with long bolts, washers, nuts, brackets and sealant.



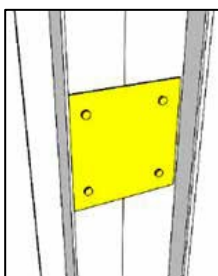
Apply sealant to all surfaces between the sections before the sections are joined together.



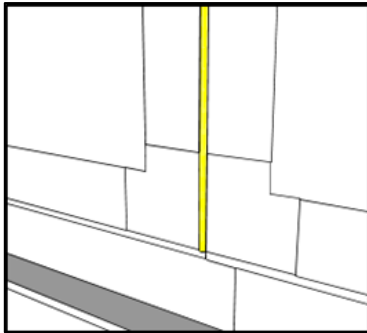
The sections are held together with the supplied long bolts - 8x130 mm - nuts and washers in the corner brackets. The brackets are not dimensioned to be able to pull the sections together. The sections can, for example, be pulled together on the outside with straps that press directly on the profiles at the bottom of the sections.



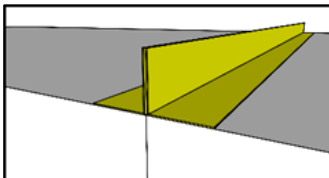
The supplied sealant must be applied to the connections between the sections - both inside and outside.



Large sections are held together with brackets that are mounted inside the sections. The galvanized steel brackets with the 4 holes must be mounted to the sections with the short screws that are delivered with the unit.

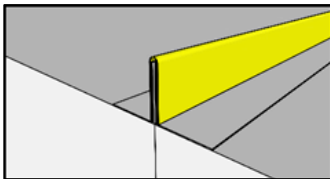


The joints between the sections must be sealed to achieve the necessary tightness - also on the outside of the unit

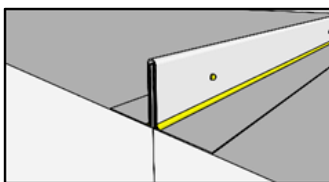


For outdoor units with sheet metal roof

The roof is equipped with angle profiles bent 90 degrees upwards at the gables which need to be connected.



When the sections are joined, the profiles come into contact with each other. U-profiles are provided and must be slid down over the joined profiles to ensure a watertight connection.



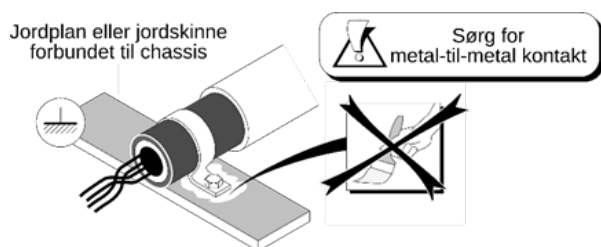
Afterwards, the U-channels are fastened with screws, and sealant is applied using the supplied sealant material.

Fans

Check that the impellers can rotate freely.

If the supplied documentation has been lost, NB Ventilation A/S can provide manuals, wiring diagrams and instructions.

If the fans are not supplied with variable-speed-drives (either built-in or connected externally), then variable-speed-drives rated for the fan power must be installed and connected to the fan motors.



The cable between motor and frequency controller must be shielded according to the guidelines of the EMC-directive. The shielding of the cable must have 360° contact with the cabinet of the motor and the cabinet of the frequency converter. Cable connectors must observe the guidelines of the EMC-directive and must create full metal-to-metal contact.

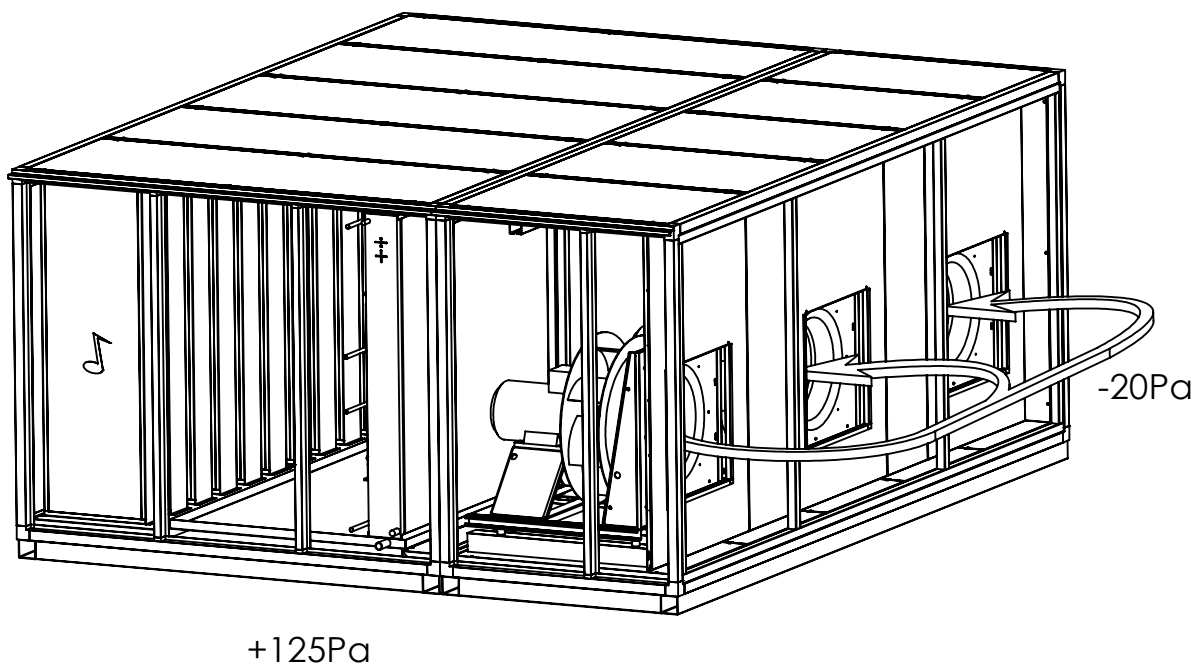
The technical documentation from NB Ventilation A/S states the maximum frequency that must not be exceeded for the motors.

Be aware of the requirements for the correct type of fuse, as frequency converters have a leakage current to ground.

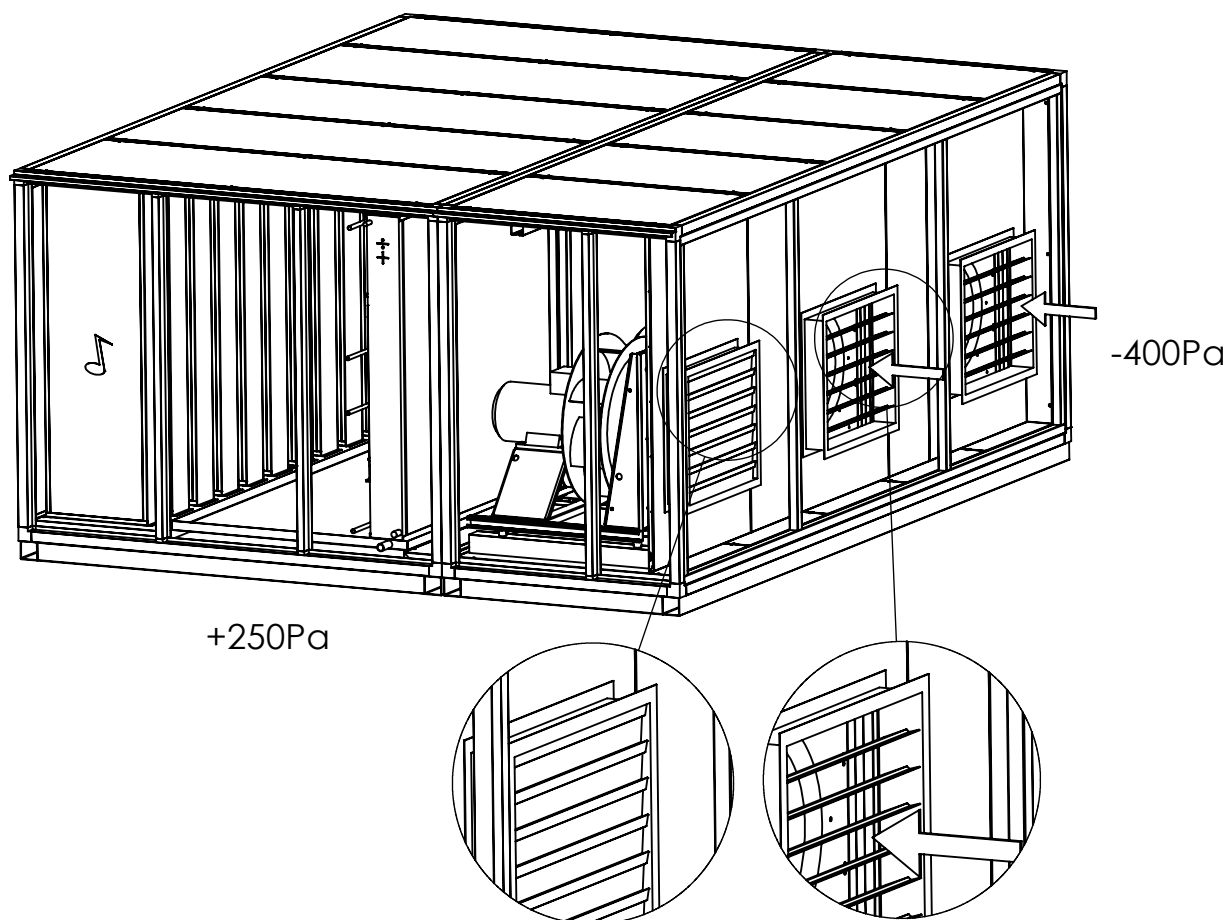
Incorrect installation may damage the fan and motor. Damage due to incorrect installation is not covered by the product warranty.

Reduce the risk of no air flow if one of several fans is out of operation.

Without backdraft dampers in front of each fan, the air will flow in the wrong direction through the fan that is out of operation. This will reduce or even eliminate the flow of air through the air handling unit.



With backdraft dampers in front of each fan, the air is flowing in the correct direction, and no flow in the wrong direction through the fan that is out of operation. The blades of backdraft dampers are turned to the open position by the fans in operation, and the blades of backdraft damper are turned to the closed position for the fan that is out of operation of the positive pressure created by the fans in operation. The designed maximum flow through the air handling unit will be reduced, if one of the fans is out of operation. Please note that air flow through the air handling unit is maintained.



Dampers

The damper actuator is mounted on the damper frame and fastened on the damper axle. Hold the release button on the actuator and turn the damper blades by hand to check that they can open and close unhindered, and that they can close tight. Adjust if needed.

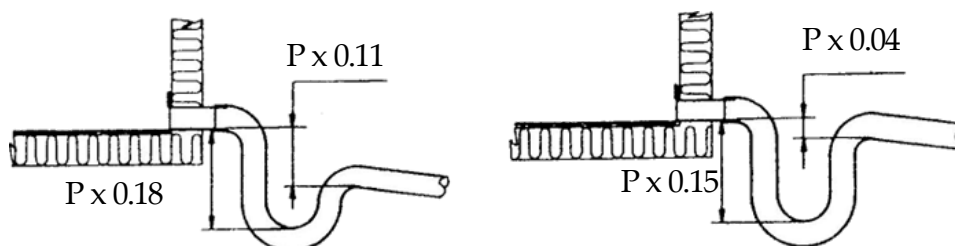
Drainage of condensate – Water Traps for Negative and Positive Pressure

Water traps must be installed on the drainage outlets of drip trays located beneath cross-flow heat exchangers, counter-flow heat exchangers, run-around coils, cooling coils, and humidifiers.

Water traps must always be filled with water to prevent the ingress of air, which would otherwise prevent proper drainage of water from the drip trays in sections with negative pressure. In the worst case, the drip trays could overflow, causing water to leak into the bottom of the unit, resulting in corrosion and possibly leaking out to damage the floor, building, and goods.

To ensure that water traps function correctly and allow for trouble-free drainage, their design and seal height must be properly dimensioned according to the pressure conditions in the ventilation unit. Below you will find calculations for water trap heights in millimeters.

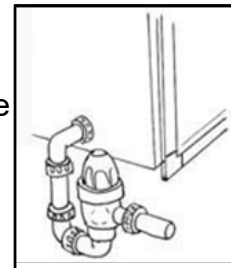
P = Negative pressure in the unit housing [Pa] P = Positive pressure in the unit housing [Pa]



Note that this type of water trap is not supplied by NB Ventilation.

Ball-type water trap, for sections with negative pressure

For sections with negative pressure, NB Ventilation can as an alternative deliver the type of water trap with a ball that blocks the air flow that will prevent the draining of water from the drip tray. It is also important for this type of water trap to have water in the trap for the blockage of air flow. The above-mentioned closing heights are also valid and important for this type of water trap.



NB Ventilation A/S can deliver this type of water trap:

- Article number: RSK 8073901 / 45710
- Pipe connection diameter Ø 32mm

Ball-type water trap, for sections with positive pressure

This type of ball water trap can be used as an alternative in sections with positive pressure to prevent air from escaping into the sewer system. It is important that there is always water in the trap to ensure proper functionality.

The seal height for this type of water trap must be the same as for the traditional water trap described above.

Note: The water trap must be oriented correctly with respect to the positive pressure. The direction marked as "Pa+" on the lid must align with the direction of water drainage.



NB Ventilation A/S can supply this type of water trap.

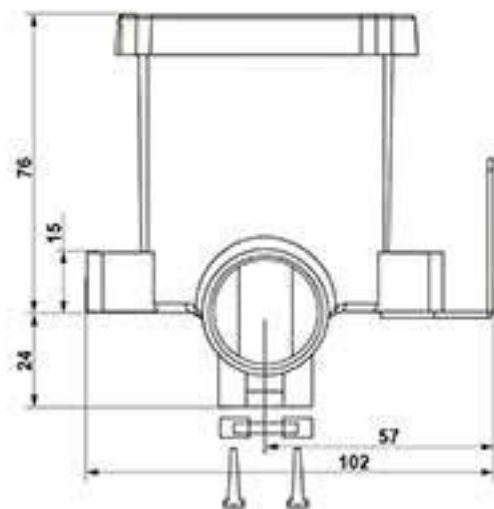
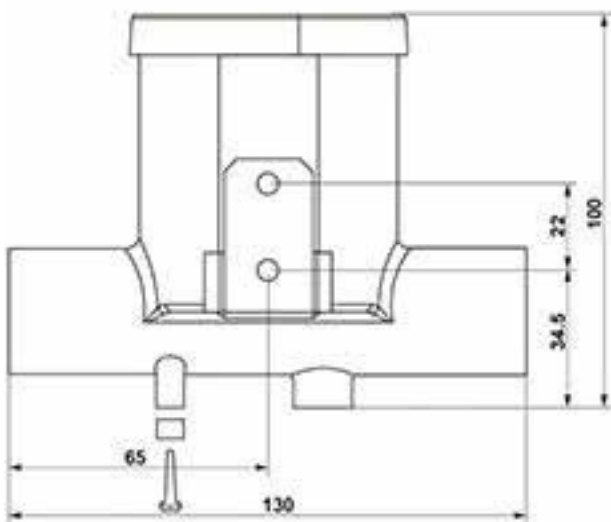
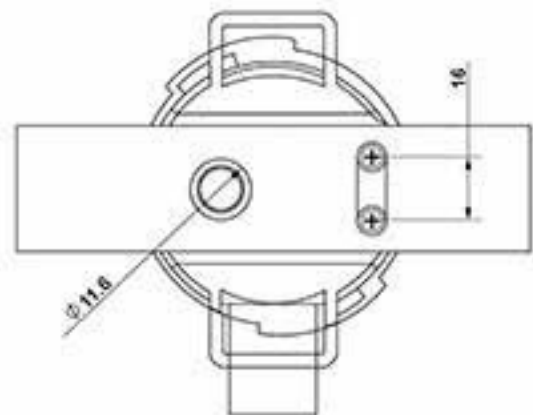
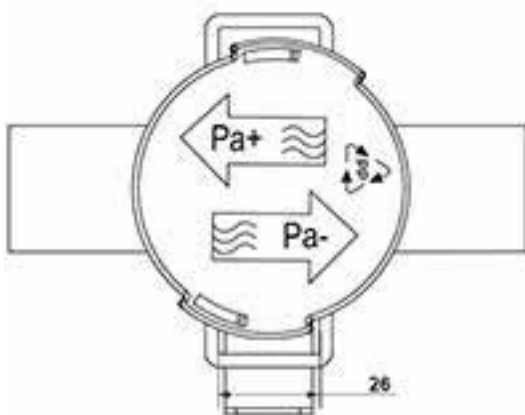


The water trap is available with electrical heating to keep it frost-free (shown with the wire under the trap in the picture to the left). The heater is an accessory and must be ordered separately. The water trap can be turned to be used for either negative pressure or positive pressure.

The water trap has $\varnothing 32\text{mm}$ (1 1/4") connections.

It is supplied with adapters for $\varnothing 38\text{mm}$ (1 1/2") connections.

Please see the drawings below.



Cross-flow heat exchangers, double cross-flow heat exchangers, and counter-flow heat exchangers

Check that the fins are not damaged. Modulating damper motors must be installed on the bypass damper system to regulate the heat recovery capacity.

Rotary Heat Exchangers

Check that the fins are not damaged.

Ensure that the rotary exchanger can rotate freely. The motor for driving the rotary exchanger is connected according to the wiring diagram, which is located in the motor controller box or can be downloaded from the website - <https://nbventilation.dk>

Run-around coil system

Check that the fins are not damaged.

The coils and pipes of the heat recovery system must be filled with antifreeze. The fluid volume of the two coils is specified in the data sheets for the coils in the technical documentation sent with the unit. In addition, the documentation includes the fluid volume of the piping system, including the fluid volume of the mixing loops.

Water Heating Coils / Water Cooling Coils

Check that the fins are not damaged.

We recommend using mixing loops for cooling coils and that antifreeze is added. A water trap must be attached to the drain outlet on the drip tray under the cooling coil. See the information above about drainage. Pipes for hot water must be insulated against frost and heat loss. Pipes for cooling must be protected with insulation to prevent condensation and to avoid heating during the summer.

The coils are not designed to withstand the weight of long pipes and insulation.

The system must be supported with durable bearings attached to the ceiling, floor, and walls.

For units delivered without control system, a frost thermostat must be installed on the heating coil to activate a frost protection system.

Electric Heating Coils

On our electric heating coils, two overheat thermostats are installed: a thermostat for control and a thermostat for alarm.

Thermostat for control

Should be set to disconnect at a lower temperature than the thermostat for the alarm.

When it disconnects, the power to the electric heating coil must be cut off. When the temperature has dropped sufficiently, the thermostat will automatically reconnect the power to the electric heating coil.

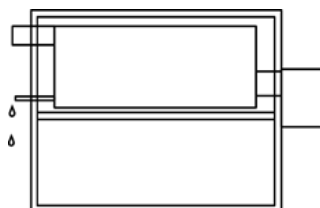
Thermostat for alarm

Should be set to disconnect the power and activate a signal for the alarm at a higher temperature than for the thermostat for control.

The thermostat must disconnect and cut off the electric heating coil when the temperature has become too high.

The thermostat for alarm does not automatically reconnect the power when the temperature has dropped. After the operator has inspected and remedied the cause of the alarm, the thermostat must be reset manually by pressing the red button.

Gas- / Oil-burner



Drainage from the boiler has a very low PH-value and is caustic. A drain must be installed. The drain must be made of either plastic or other rust-free material.

J. Installation and assembly instructions for reduction of noise and vibration

Ducts must be well sound insulated and must not be mounted directly to beams, trusses or other sound transmitting building parts. Flexible connections must always be mounted between air handling unit and ducts.

The unit must stand on or be suspended in buildings that are not transmitting vibrations. At the slightest suspicion of a risk of a vibration-transmitting building, transmission of vibrations from the unit to the building must be limited by installing the unit on springs.

K. Actions prior to start-up, commissioning and ordinary operation as condition for warranty.

Potential equalization of the air handling unit to the earth connection of the building

The installer at the site of the user must create the potential equalization between the components of the air handling unit and the casing of the air handling unit, and between the panels, doors and profiles of the casing and base frame or legs of the air handling unit. The installer at the site of the user must create and ensure that the potential equalization is connected properly to the earth connection of the building.

Strictly necessary actions prior to start-up, commissioning and ordinary operation.

The unit must not be started until all ducts and fittings have been installed, and all rooms with airflow have been cleaned to prevent the unit and ducts from being loaded with dirt during the construction phase.

After work involving assembly, maintenance, updating, and cleaning, the interior as well as the exterior of the unit must be tidied up. The unit must not be used for storing items.

The warranty will expire if the conditions in the section “Intended use” are not fulfilled and the following points are not observed in the period between collection of the unit from NB Ventilation and the final commissioning and ordinary operation:

- The rotary heat exchanger must be operated weekly immediately after the collection from NB Ventilation A/S to prevent the exchanger from being deformed by its own weight. It is recommended that the drive motor of the exchanger is connected to 230V to operate the exchanger on a weekly basis.
- The installer/end user must ensure that all rotating parts are set in motion at least once a week.

L. Residual risks – information about residual risks

Important: The information below about residual risks must be read and understood prior to any handling of the air handling unit

L.1 Risks associated with transporting the unit

Hazard source/Dangerous area:

Incorrect handling during transport may lead to unit sections being dropped.

Hazardous event:

Risk of serious personal injury and, in the worst case, death, if a unit section is dropped.

Required risk reduction:

Observe the instructions described in this manual under the section I about - Instructions for transport, unloading at the site, installation and connection - for correct handling when a unit section is moved.

No one should be below lifted unit sections at any time.

L.2 Risks associated with fans not automatically braking to a stop

Hazard Source/Dangerous Area:

When access doors are opened, the fans may continue to rotate even if the power to the fans or the entire unit has been cut off via the control system. Due to the inertia of the heavy blades, they will continue to rotate for at least 180 seconds.

Fans may also remain in motion due to so-called chimney draft, where air flows from heated rooms through open doors and dampers in the unit to the outside, as warm indoor air seeks to escape when the outdoor temperature is lower than the indoor temperature.

Hazardous Event:

Risk of cutting fingers or hands on the sharp edges of the fan impellers.

Required Risk Reduction:

Risks will only occur during maintenance and cleaning, which is performed at least once a year. Wait for at least 180 seconds after the power has been cut off before opening the

doors. Wear cut-resistant gloves when bringing the fan wheels to a stop and subsequently securing them. The blockage must remain in place until the doors have been closed and locked with the built-in locks in the handles. A suitable key for the locks is included.

At the customer's request and at an additional cost, fans can be equipped with automatic braking function when the power is cut off. This can be achieved via the braking and locking function in specific models of standalone frequency converters that are not integrated with the motors.

L.3 Risks in connection with units without an emergency stop

Hazard Source/Dangerous Area:

When the doors of the air handling unit are unlocked and opened to running fans, rotating heat exchangers in operation, and dampers driven by damper motors.

Hazardous Event:

Risk of injuries to fingers or hands, including:

- Cuts from the sharp edges of fan wheels.
- Pinching and cuts between drive belts and rotating exchangers.
- Pinching and cuts between rotary heat exchangers and the cabinet.
- Pinching of fingers between damper blades that are closing automatically

Required Risk Reduction:

To mitigate the risk, the following measures are recommended:

- Installation of nets or other guards in door openings to prevent unintended access to hazardous areas.
- Installation of switches with emergency stop function that will switch off and block motors.

Risks primarily occur during maintenance and cleaning, which is performed at least once a year. It has been agreed between suppliers and safety authorities that such work must only be carried out by trained personnel familiar with the risks.

In the industry, it is standard for units to be delivered with lockable doors as the only safety feature, without nets or emergency stop functions.

Optional Additional Safety Measures:

At the customer's request and at an additional cost, the unit can be supplied with:

- Nets and other guards for enhanced protection.

- Emergency stop functions to interrupt and brake motors using brake and locking features in specific models of standalone frequency converters that are not integrated with the motors.

L.4 Risks when the unit is started via remote control

Hazard Source/Dangerous Area:

- When doors are unlocked and opened to carry out cleaning and maintenance on a unit which appears to be out of operation but has not had its power disconnected via the main switch, the unit may suddenly be started via the remote-control system.

Hazardous Event:

Risk of cutting fingers or hands on the sharp edges of fan wheels. Pinching and cutting of fingers or hands between drive belts and rotary heat exchangers, pinching and cutting of fingers between rotary heat exchangers and the cabinet, and pinching of fingers between closing damper blades.

Required Risk Reduction:

As an absolute rule, the power to the unit must always, without exception, be disconnected via the main switch during cleaning and maintenance.

L.5 Risks related to rotating fan wheels due to natural draft (chimney effect)

Hazards/dangerous area:

In certain cases, natural draft—also called the chimney effect—may occur in the ducts. This will result in airflows that will drive the fan wheels even when the motors are switched off.

Dangerous incident:

Risk of injury to fingers, hands, and arms.

Required reduction of danger:

Prevent this airflow by installing spring-return damper motors on the dampers in both the incoming and outgoing airflows to close the dampers automatically when the unit is out of operation.

L.6 Risks associated with permanent magnet motor

Hazard Source/Dangerous Area:

Rotation of the shaft generates electricity.

**Hazardous Event:**

People who come into contact with conductive parts may suffer electric shock, internal burns, cardiac fibrillation, and other injuries.

Required Risk Reduction:

During installation or repair of the electrical components, the shaft must be blocked to prevent it from rotating.

L.7 Risks of contact with surfaces, edges, corners, and sharp screw tips

Hazard Source/Dangerous Area:

Inside the unit, there are sharp sheet metal edges and sharp edges on damper flanges. The panels are mounted with self-tapping screws, the sharp tips of which protrude through the frame profiles. To reduce the risk of cuts, caps are installed on the screw tips. However, over time, there is a risk that the caps may fall off and be lost. On the exterior side, there are no sharp edges or sharp screw tips.

Hazardous Event:

Risk of cutting fingers, hands, head, and feet.

Required Risk Reduction:

Risks only occur during maintenance and cleaning, which is performed at least once a year.

Use CE-marked cut-resistant gloves, a protective helmet, and safety shoes.

L.8 Risk of dust, viral-, and bacterial-infection

Hazard Source/Dangerous Area:

Risk of exposure to dust, viral-, or bacterial-infections during maintenance work inside the unit.

Hazardous Event:

Potential risk of viral- or bacterial-infections, or of respiratory damage.

Required Risk Reduction:

Risks only occur during maintenance and cleaning, which is performed at least once a year. The use of gloves, eye protection, respiratory protection, and a helmet are required.

L.9 Risk in connection with maintenance and cleaning of dampers

Hazard Source/Dangerous Area:

Gaps between damper blades and the connection between the damper motor and the damper blades.

Hazardous Event:

Risk of finger pinching.

Required Risk Reduction:

Risks only occur during maintenance and cleaning, which must be performed by a qualified technician familiar with the risks.

Note: Spring-return damper motors are equipped with a built-in closing function. Note that the dampers are automatically driven to the closed position when the power is cut off.

L.10 Risks in connection with maintenance and cleaning of silencers

Hazard Source/Dangerous Area:

High concentrations of dust on the surface of the baffles can be harmful to health.

Hazardous Event:

Inhalation of harmful particles.

Required Risk Reduction:

Risks only occur during maintenance and cleaning, which is performed at least once a year. The use of respiratory protection is mandatory. The respiratory protection must be maintenance-free, equipped with a foam seal, and must have adjustable, pre-set elastic straps.

L.11 Risks in connection with filters not been replaced in time

Hazard Source/Dangerous Area:

Failure to replace filters in time and lack of maintenance will result in reduced performance and, in extreme cases, premature break down of the fans, which are forced to operate against increased air resistance.

Hazardous Event:

With prolonged failure to replace filters and lack of maintenance, the filter bags may detach from the filter frames, causing remnants of the filter bags to adhere to the fan wheels. This may lead to break down of fans.

Required Risk Reduction:

This user manual outlines how, with which tools, and at which final pressure drop, filter replacement must be performed. If the filters are subjected to increased load, the inspection interval must be shortened to prevent premature wear of the fans, which operate against increased air resistance.

L.12 Risks in connection with filter replacement

Hazard Source/Dangerous Area:

Dust and harmful particles accumulated in filter cassettes and filter bags.

Hazardous Event:

Risk of inhaling harmful particles during filter replacement.

Required Risk Reduction:

Risks only occur during maintenance and cleaning when filter replacement is performed. The use of maintenance-free respiratory protection with foam seals and adjustable, pre-set elastic straps is mandatory.

L.13 Risks related to heating coils

Hazard Source/Dangerous Area:

Heating surfaces and pipe connections may reach temperatures of up to 80°C.

Hazardous Event:

Risk of burns from contact with hot surfaces. According to ISO 13732-1:2006, there is no immediate risk of burns for contact periods of less than 2.5 seconds, but prolonged contact may cause injury.

Required Risk Reduction:

Use heat-resistant gloves that can withstand temperatures up to 80°C when working too close to heating surfaces and pipe connections.

Insulate the piping system to protect against direct contact.

Limit the maximum inlet temperature for water to heating coils to 80°C.

L.14 Risks related to electric heating coils

Hazard Source/Dangerous Area:

Electric heating elements may reach surface temperatures of up to 500°C.

Hazardous Event:

Risk of severe burns from contact with high-temperature surfaces.

Required Risk Reduction:

Avoid direct contact with electric heating elements.

Use heat-resistant gloves that can withstand temperatures up to 500°C when working too close to electric heating elements.

L.15 Risks related to cooling coils and evaporators during cooling

Hazard Source/Dangerous Area:

The evaporator coil and piping connected to the cooling compressor may reach temperatures as low as -10°C or even lower.

Hazardous Event:

According to ISO 13732-1:2006, there is no immediate risk of frostbite for contact periods less than 2.5 seconds.

Required Risk Reduction:

None.

L.16 Risks from skin contact with glycol or equivalent antifreeze

Hazard Source/Dangerous Area:

Heating/cooling coils may contain water mixed with glycol or other antifreeze.

Hazardous Event:

Contact with glycol or other antifreeze may cause irritation or damage to skin and eyes.

Required Risk Reduction:

Use appropriate protective equipment, including gloves and eye protection, when working with systems containing glycol or antifreeze.

Inspect for leaks from heating/cooling coils, valves, sensors, or piping systems, and promptly repair any leaks.

L.17 Risks in connection with lightning strikes

Hazard Source/Dangerous Area:

Lightning strikes in the power supply system or in the immediate vicinity of the unit.

Hazardous Event:

Lightning strikes may cause arcing between phases and conductive parts, potentially resulting in fire or personal injury due to overvoltage.

Required Risk Reduction:

The installer and user must be aware of the risk of lightning strokes and ensure the installation of surge protection equipment that will safely divert lightning-induced overvoltage to the ground.

The need for surge protection will depend on the location of the unit within or on the building.

Installation and maintenance of the protective equipment must comply with applicable local guidelines and standards.

L.18 Risk of legionella

Hazard/Dangerous Area:

The water supply may be contaminated with Legionella bacteria.

Hazardous Event:

Risk of infection with Legionella bacteria through contact with or inhalation of aerosols from contaminated supply water.







Required Risk Reduction:

The water supply must be tested regularly for Legionella bacteria in accordance with applicable local regulations and standards.

If Legionella is detected, immediate corrective actions must be taken, such as disinfection or improvement of water quality.

M. Instructions on the protective measures during repair and maintenance

Use the below-mentioned personal protective equipment:

	Cut-resistant gloves for protection against injury from sharp metal plate edges. Use CE-marked gloves for this purpose.
	Helmet.
	Particulate respirator – maintenance free including foam face-seal and adjustable pre-threaded headbands – for replacing filters.
	Eye protection.
	Ear protection.
	Padlock for locking the automatic circuit breakers.

N. The essential characteristics of tools which may be fitted to the machinery

The subject in the Machinery Regulation about tools on the machine does not exist for the air handling units from NB Ventilation A/S, because those tools do not exist.

O. The conditions of stability during transportation, assembly and use

During transportation, assembly, use or other handling, it must be secured that all components in the unit are properly fastened and with additional attention to the control of anti-vibration mounts under the fans that they are un-damaged. The mounting and smooth running of the fans must be controlled and handled with great care.

O.1 Installed securely to avoid units to be tipped or moved by storm

Units installed on roofs and other places with the risk of heavy winds must be installed securely to ensure that they cannot be tipped or moved by any storm.

P. Instructions for the air handling unit when transported to another site

During transportation, installation or other handling, it must be ensured that all components in the unit are properly fastened.

Brackets for safe lifting of the unit are available by contacting NB Ventilation A/S. The brackets are:

- Brackets for mounting by bolts and nuts in the base frames
- Brackets to be pushed into the open ends of the base frames. Prior to lifting, the brackets must be fastened to the base frames by bolts (nuts are welded to the brackets by NB Ventilation A/S)

Q. The operating method to be observed in the event of breakdown. Safe restart

Use the below-mentioned procedure in the event of breakdown or blockage:

- Switch off the power and lock the automatic circuit breaker by padlocks in the off position.
- Remove the cause of breakdown or blockage.

R. Maintenance

Maintenance must be performed by qualified personnel. It improves efficiency if the same personnel carry out this work over time. Wear and irregular operation are detected earlier by experienced personnel.

A properly established maintenance routine, including regular cleaning of the ventilation unit and periodic inspections, is cost-effective in terms of the unit's lifespan and performance, as minor defects can be corrected before they cause serious operational disruptions or damage.

The unit should be inspected every six months. These intervals are guidelines. In particularly demanding environments, more frequent inspections are recommended. The best times are spring and autumn, coinciding with the transition between heating and cooling needs. At NB Ventilation we look forward to offering advice and support regarding repairs and major updates.

Always ensure that the unit is cut off from the power supply prior to working on it. Read and understand the information about residual risks in this manual.

When inspecting the unit, attention should be paid to abnormal noise, odors, and water leakage.

It is crucial for operational reliability and the longevity of the equipment that all parts are kept free from corrosion, dust, and other debris, and that surface treatments are maintained. Cleaning of ventilation units should observe general practices for mechanical equipment, such as washing, vacuum cleaning, dust removal, etc. All cleaning agents used must be environmentally friendly.

The following pages outline the maintenance tasks that must be performed.

Optimization of operation and continuous updating

To maintain the correct temperature, humidity, and air quality, the unit and the ventilation system as a whole must be continuously optimized. This means that to avoid unnecessary energy consumption and wear, the unit should not supply more air than necessary to meet the demand, since excessive air supply does not improve the air quality. But on the other hand, the air flow capacity must not be too low, as this can lead to risks of deteriorated health, increased fatigue, and increased absenteeism among users.

We recommend that the air flow capacity is controlled by sensors according to the requirements of the people and the building. We also recommend that the unit should only operate during the hours when ventilation is needed.

NB Ventilation closely follows the development of improved fans, exchangers, filters, coils, controls, and remote monitoring systems. We have filed information about units delivered during the past 25–30 years, and we can design and provide valuable upgrades to the units for better performance and lower energy consumption.

Panels and Doors



The panels on the inspection side can easily be removed to provide better access for replacing components inside the unit.

For panels, just like for doors, the inner panel plate is held to the outer panel plate with a number of rivets, so that, like a door, a panel is a complete unit that can be easily removed and reinstalled.

Note that doors and panels are quite heavy because there is heavy glass wool insulation, 50 mm thick, between the inner and outer panel plates. In addition to insulation purposes, the weight also provides good sound insulation.

The hinges on the doors and panels are mounted with screws. Both doors and panels can easily be reinstalled. See the section below regarding reinstallation.

Sealing strips



When removing panels and before reinstallation, it may be necessary to replace the sealing strips between the panel and the frames. The same type of sealing strips is used between doors and frames.

The sealing strips on the frames of the unit appear from the photo.

Rolls of new sealing strips can be obtained from NB Ventilation A/S.

Please provide these item numbers when inquiring:

- 3-01600-056 (self-adhesive gray sealing strip – thickness 8 mm – width 20 mm)
- 3-01600-096 (self-adhesive gray sealing strip – thickness 10 mm – width 20 mm)

Reinstallation of Doors

Screws for Reattaching Hinges to Rivnuts on Doors:

Use M5x25 flat-head screws (not countersunk) with an internal hex drive or alternatively screws compatible with Torx bits.

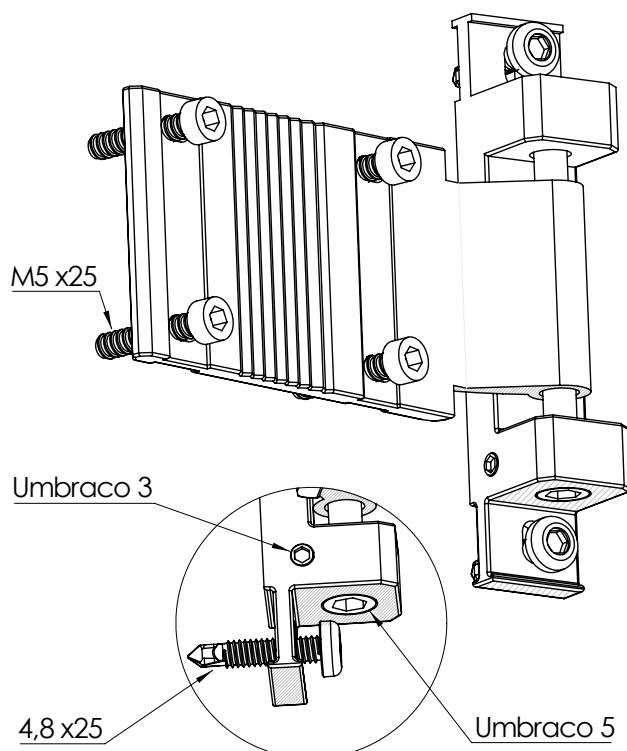
Screws for Reattaching Hinges to the Frame:

Use 4.8 x 25 mm self-tapping (self-drilling) flat-head screws (not countersunk) designed for Torx bits. (These can, for example, be delivered by Würth.)

Important: The length of the screws must not exceed 25 mm. Longer screws can drill through an additional aluminum profile in the frame, which may damage the screw and cause the head to break off.

Height Adjustment:

To facilitate the reinstallation of the doors, place a 5 mm thick material underneath the doors to raise them precisely 5 mm. This will ensure that the holes in the hinges align with the screw holes in the door as well as in the frame.



Reinstallation of Panels

Screws for Reattaching Panels to the Frames:

Use 4.8 x 19 mm self-tapping (self-drilling) flat-head screws (not countersunk) designed for Torx bits. (These can, for example, be sourced from Würth.)

Important: The length of the screws must be exactly 19 mm and no longer. This is to minimize the risk of personnel working inside the unit injuring themselves on the sharp drill tips of the screws. The screws should protrude as little as possible into the unit to ensure maximum safety.

Protective Caps for Screws

All sharp drill and cutting tips are fitted with protective caps when the unit is sent from the factory.

If the protective caps are damaged or lost during the removal of screws while removing panels, equivalent caps cannot be purchased from wholesalers. Therefore, installers, assemblers, and service technicians must ensure the protection of the sharp tips using materials with the same protective function as the factory-installed caps.



Protective caps with a size of Ø 4 mm, suitable for the self-drilling screws, can be ordered directly from NB Ventilation. These caps are designed to cover the sharp tips and ensure safety during work.

Inside the unit



To be checked every six months:

All internal surfaces should be cleaned, and any moisture should be wiped dry.

Dampers

To be checked every six months



This applies to all dampers in supply air, exhaust air, outdoor air, discharge air, and on cross-flow and counter-flow exchangers. The damper blades are mounted in nylon bushings, which do not require lubrication.

- Clean damper blades and bushings with soap and water or a cleaning agent that does not damage aluminum and rubber gaskets.
- Check that the damper operates smoothly.
- Check that the gaskets are undamaged and that the damper closes tightly. Adjust if necessary.
- Check the tension of the damper motor on the damper shaft.
- Retighten screws.
- Test the functionality of the damper motor.

Filters

To be checked as required



The filters in the unit are disposable and must be replaced with new filters that have identical performance regarding filtration efficiency and lifespan. The starting pressure for new filters must match the specifications provided with the unit from NB Ventilation to maintain the factory-calculated efficiency values.

NB Ventilation has supplied printed technical documentation with the unit, including all relevant information about the filters:

- Part number for reordering
- Filter class and type
- Frame dimensions
- Length of the filter bags
- Quantity

How often should filters be replaced?

Filters must be replaced when the recommended maximum differential pressure is reached or at least once a year.

The differential pressure can be read using a manometer or via a filter alarm from the control system. The recommended maximum pressure drop for the change of filters appears from the table below:

Filter class	Recommended final pressure drop (Pa)
Coarse 65% - G4	150
ePM10 60% - M5	200
ePM2,5 50% - M6	200
ePM1 60% - F7	200
ePM1 70% - F8	300
ePM1 85% - F9	300

Filters must as a minimum be replaced at least once a year because the potential accumulation of organic material in the filters provides a basis for particles that are highly harmful to respiratory health. Experience shows that aging organic material in filters increases the number of particles.

Procurement

NB Ventilation can deliver new filters. Please provide the inquiry with the part numbers of the filters, which can be found in the technical documentation supplied with the unit.

Safety

Always use approved respiratory protection when removing used filters from the unit. Carefully place the used filter in a sealed bag to minimize release of particles.

Dispose of used filters responsibly to avoid environmental pollution.

Procedure

When replacing filters, take care to avoid damaging the bags on new filters or the filter cassettes.

- Release the locking mechanism using the blue handles and remove the filter from the frame.

- Filters in guide rails should be pulled out of the guide rails.
- Clean the filter frames/guide rails by vacuum cleaner.

Sealing Strips

The sealing strips for the filter frames must be inspected for damage and replaced if they are damaged.

Rolls of new sealing strips can be obtained from NB Ventilation.

The sealing strips are 8 mm thick and available in two different widths: 20 mm and 40 mm. The 40 mm wide sealing strips are used on the vertical frame between two filters.

Part numbers for inquiries to NB Ventilation:

- **3-01600-056** for 20 mm wide strips
- **3-01600-058** for 40 mm wide strips

Guide Rails

The guide rails should be lubricated before new filters are slid into place.

Guide rails must be replaced if they do not provide a tight seal around the filters. New guide rails can be supplied by NB Ventilation.

Heating Coil, Cooling Coil, Rotary Exchanger, Cross-Flow Exchanger, and Run-around coils

To be checked every six months:

Brush all surfaces and exchanger inlets and outlets with a soft brush and vacuum clean them. It is important not to scratch or scrape the surface with hard objects, as this can easily cause damage and lead to corrosion.

If very dirty, the surface can be cleaned carefully with water (not high pressure), possibly with a detergent that does not attack aluminum. Be aware that the unit is not waterproof unless there is a drip tray in the respective section of the unit. Surfaces should be dried as needed.

Ensure that water traps are installed on all drains and that all water traps are filled with water.

Rotary heat exchangers

Inspection Schedule:

- Inspect immediately after start-up.
- Inspect again after 200 hours of operation.
- Thereafter, inspection every six months.

Drive belt

Check that the drive belt is undamaged. Over time, the drive belt will stretch, especially during the first days of operation. If the belt is too loose, it must be shortened, and the assembly brackets must be mounted in the next hole on the belt.

Friction

Check manually that the rotor can rotate freely and smoothly.

Drive motor

Bearings are pre-lubricated ball bearings and do not require further lubrication. The drive motor is maintenance-free. Manuals can be downloaded from <https://nbventilation.dk>

Brush strips

The seals between the rotor and the unit casing are made with brush strips. These brush strips can be adjusted a few times to maintain light contact and adequate sealing capability.

Note that for the sealing system a leakage between exhaust air and supply air of more than 3% and up to 6–7% of the airflow must be generally accepted.

Brush strips can be ordered from NB Ventilation:

Part number	620033365	620017652
Number of stitches	2	2
Hole spacing for mounting screws	112 mm	100 mm
Adjustment range	3 mm	4 mm (in both directions)
Approx. width of holding profile	25 mm	30 mm

Fans

To be checked every six months

Important: Read the information about safety and residual risk regarding the fans on the previous pages of this manual. The unit must be disconnected from the power supply, stopped, and secured against reconnection.

The impeller and motor may be mounted on a shared vibration-dampened frame.

Unless otherwise specified in our technical specifications, the motor is fitted with factory-lubricated bearings that require no maintenance.

Cleaning

Inspect the impeller for dirt and deposits. Dirt and deposits may cause imbalance and vibrations during operation, which will over time increase wear and, in the worst case, damage the wheel and the motor bearings.

Cleaning should be performed with a damp cloth or a vacuum cleaner. The fan must not be cleaned using high-pressure washing. Aggressive solvents must not be used for cleaning the fan.

Vibrations and Noise

Check the fan and motor for vibrations and noise in the wheel bearings and replace them if necessary. If the fan is equipped with vibration dampers, check that they are functioning correctly and replace them if needed.

Belt-Driven Fans

Adjusting belt tension on belt-driven fans:

- Loosen the locking screw on the motor sled.
- Tighten/loosen the V-belts by turning the bolt below the motor sledge in or out.
- When replacing V-belts, the belt tension should be loosened so that the V-belts can be removed or installed without forcing them over the pulleys.
- Tighten the locking screw once the desired belt tension has been achieved.

S. Spare parts – overview.

Overview of the spare parts mentioned above.

The below-mentioned spare parts are on stock with NB Ventilation A/S for immediate dispatch.

New sealing strips between panels and frames delivered in rolls.

Please provide these item numbers when inquiring:

- 3-01600-056 (self-adhesive gray sealing strip – thickness 8 mm – width 20 mm)
- 3-01600-096 (self-adhesive gray sealing strip – thickness 10 mm – width 20 mm)

Screws for Reattaching Hinges to Rivnuts on Doors:

M5x25 flat-head screws (not countersunk) with an internal hex drive or alternatively screws compatible with Torx bits.

Screws for Reattaching Hinges to the Frame:

4.8 x 25 mm self-tapping (self-drilling) flat-head screws (not countersunk) designed for Torx bits.

Screws for Reattaching Panels to the Frames:

4.8 x 19 mm self-tapping (self-drilling) flat-head screws (not countersunk) designed for Torx bits.



Protective caps with a size of Ø 4 mm, suitable for the self-drilling screws. These caps are designed to cover the sharp tips and ensure safety during work in the air handling unit .

Filters:

Information about number, filter class and size are available in the printed technical documentation delivered with the unit. Please contact NB Ventilation A/S if the printed technical documentation is not available.

Filter class	Recommended final pressure drop (Pa)
Coarse 65% - G4	150
ePM10 60% - M5	200
ePM2,5 50% - M6	200
ePM1 60% - F7	200
ePM1 70% - F8	300
ePM1 85% - F9	300

Sealing strips between filters and the frames of the air handling unit:

The sealing strips are 8 mm thick and available in two different widths: 20 mm and 40 mm. The 40 mm wide sealing strips are used on the vertical frame between two filters.

Part numbers for inquiries to NB Ventilation A/S:

- **3-01600-056** for 20 mm wide strips
- **3-01600-058** for 40 mm wide strips

Brush strips for rotary heat exchangers:

- The seals between the rotor and the unit casing are made with brush strips. These brush strips can be adjusted a few times to maintain light contact and adequate sealing capability.
- Note for the sealing system with brushes a leakage between exhaust air and supply air of more than 3% and up to 6–7% of the airflow must be generally accepted.

Dependent of the size of the rotary heat exchanger, the rotary heat exchanger is provided with the one or the other of 2 different alternative types of brush strips. Please examine which of the 2 types are used in the air handling unit prior to ordering the brush seals.

Part number	620033365	620017652
Number of stitches	2	2
Hole spacing for mounting screws	112 mm	100 mm
Adjustment range	3 mm	4 mm (in both directions)
Approx. width of holding profile	25 mm	30 mm

T. Sustainability

Easy access for repairs, maintenance, and replacement by new, improved components

All doors and panels on the inspection side of the air handling unit can be removed to provide good access for replacing all components, control systems, remote monitoring equipment, and wiring. In the photo below, all panels and doors have been removed from an existing air handling unit.



Updating control systems and improving remote monitoring systems

NB Ventilation A/S has continuously focused attention on whether new control and new remote monitoring systems will be able to improve existing units.

In connection with the updating, data about the unit is revised in the archives of NB Ventilation A/S to ensure ongoing support for maintenance and supply of spare part.

Spare parts for maintaining optimal operation of existing air handling units

NB Ventilation offers suitable spare parts. If parts originally used in the air handling unit are no longer manufactured, NB Ventilation A/S provides new parts that replace the original parts.

When spare parts are delivered by NB Ventilation A/S, data about the air handling unit in archives of NB Ventilation A/S will be updated to ensure continuous support for maintenance and the supply of spare parts.

General upgrades for existing air handling units

NB Ventilation A/S offers a high priority to updating existing air handling units from NB Ventilation A/S with new and improved types of fans, exchangers, filter systems, extensions with humidifiers, additions of heat pumps, etc.

NB Ventilation A/S offers brackets, consoles, and installation frames for all new components.

U. Environmental Product Declaration measures – (EPD) and certification according to DGNB, LEED and BREEAM.

NB Ventilation A/S has purchased the software from LCA.no for automatic generation of the third-party verified EPD for each unit. The software is being integrated into the systems at NB Ventilation A/S. In August 2025, NB Ventilation A/S will be able to forward the specific number of kilo CO₂ equivalents in units delivered after March 1, 2025.

By request, NB Ventilation A/S can, at a charge, publish the entire EPD with all parameters on the ECO Platform and epd Norway.

Certification of sustainability according to DGNB, LEED and BREEAM

As mentioned above, NB Ventilation A/S will soon be able to provide the specific EPD for the delivered unit for customers' LCA calculations, which improves certification rating according to DGNB, LEED and BREEAM.

V. End of service life

NB Ventilation recognizes that buildings and their technical installations are increasingly being certified for sustainability with a lifespan of 50 years.

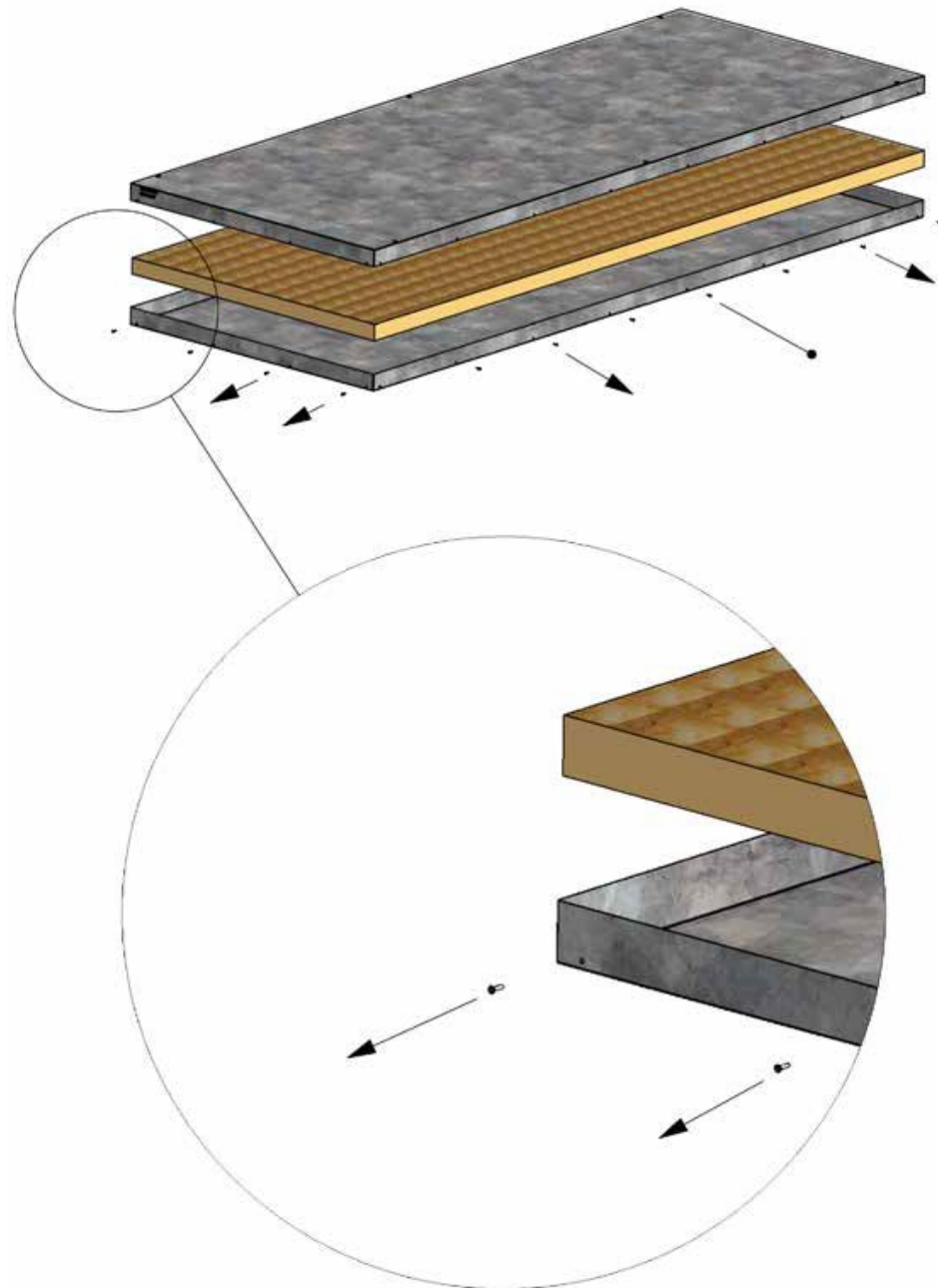
All doors and panels on the inspection side of the air handling unit can be removed to provide good access

V.1 Disassembly

At the end of its service life, nearly all materials from the air handling unit can be separated and sorted for recycling after disassembly.

Notably, the glass wool inside all doors and panels can be easily and affordably exposed by separating the sandwich panel plates. This is done by drilling out all rivets and pulling the plates apart.

Afterwards, the glass wool and panel plates can be sorted separately for direct recycling of both materials.



V.2 Sorting for recycling

Upon disassembly at the end of its service life, the weight of the materials in large air handling units from NB Ventilation A/S are approximately distributed as shown in the table below:

Steel	60%
Aluminum	20%
Glass wool	6%
Plastic	<4%
Motor housing alloy	2%
Copper	2%
Stainless steel	1%
Cables	1%
Zinc	<1%
Brass	<1%
Screws, nuts	<1%
Adhesive	<0.05%
Batteries	<0.01%

Annex

The technical documentation was delivered as a number of separately printed documents with the unit.

This complete and specific technical documentation is not part of this User Manual. Documents with information about capacities, consumption, components as well as wiring diagrams are printed as separate documents.

The complete and specific technical documentation about the delivered unit is available at any time by contacting NB Ventilation A/S.

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