the air handling company

robatherm ATEX unit.

Installation and assembly.

March 2024

English translation of the original German operating instructions

Air handling units for potentially explosive atmospheres | Type TI-50

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For reasons of better readability, we will use gender-neutral language forms. All references to persons apply equally to all genders.

Last updated: March 2024

Contents

General remarks

If the AHU is delivered in several units, they must be assembled in accordance with these instructions and properly connected to the duct system. All protective devices must be active.

If ready-to-use AHUs (complete machines) are assembled from non-operational AHUs (partly completed machines), the person responsible for this assembly must carry out conformity evaluation, issue a certificate of conformity, and attach the CE marking.

Information about these instructions

These instructions will facilitate safe and efficient use of the AHU.

All persons working on the AHU must thoroughly read and understand these instructions before starting any kind of work.

Safe working is dependent on adhering to all safety information and instructions.

Further information

The instructions describe all the available options. Whether and which options are available in the AHU depends on the options selected and the country for which the AHU is intended. The illustrations serve as an example and may differ.

The instructions consist of several parts and have the following structure:

Fig. 1: Parts of the instructions

Main operating instructions

- ➔ Transport and unloading
- ➔ Installation and assembly
- ➔ Commissioning
- ➔ Operation and faults
- ➔ Maintenance and cleaning
- ➔ Disabling and disposal

Security

General risk sources

Hazards from explosive atmosphere

WARNING

Risk of explosion from explosive atmosphere

There is a risk of explosion, as the AHU may convey a potentially explosive atmosphere. In conjunction with a source of ignition, this may result in an explosion.

- Use electrostatically dissipative safety footwear.
- Use electrostatically dissipative protective clothing.
- Use tools complying with DIN EN 1127-1 Annex A.
- Do not take sources of ignition into the danger zone (e.g. hot surfaces, spark discharge, naked flame).
- Alternatively: gauge the danger zone to eliminate a potentially explosive atmosphere.

WARNING

Risk of explosion from explosive atmosphere

There is a risk of explosion, as the AHU may convey a potentially explosive atmosphere.

- Purge the AHU with fresh air before opening to remove any potentially explosive atmosphere.
- Only open the AHU if it is certain that there is no potentially explosive atmosphere.
- Follow the instructions in the operating instructions.

WARNING

Risk of explosion from electrostatic discharge

Cleaning the AHU with a dry cloth may cause a static charge. The discharge and the resulting sparks may cause an explosion.

- Only wipe the AHU with a damp cloth.
- Follow the instructions in the operating instructions.

General hazards

WARNING

Risk of injury due to modifications or use of incorrect spare parts

Serious injuries, death, and material damage can be caused by modifications or installation of incorrect spare parts.

- Use original spare parts only.
- Do not make any modifications.

WARNING

Danger to life from falling!

If a grate above an air opening is overloaded downwards (>400kg), this will cause the structure to fail. When a person steps on the grate, the structure may fail, causing a risk to life by falling through the air opening.

- Do not exceed the maximum load (≤400kg or 2 persons).

WARNING

Danger to life from falling!

Removing the grates in the floor causes a risk to life from falling, as the opening in the floor is exposed.

- When working on air openings with removed grates, the customer must provide protection against falling.
- After the work, mount the grates again according to the instructions.

WARNING

Risk to life from falling objects

Risk to life from being struck by falling objects.

- Cordon off the endangered area under the opening to secure persons against falling objects.
- After the work, mount the grates again according to the instructions.

WARNING

Danger to life from falling!

When stepping on the protection roof, there is a risk to life from falling, as the protection roof is unsuitable for supporting loads.

- Do not enter the protection roof.

WARNING

Danger of crushing from reaching under suspended loads

When positioning the delivery sections for the installation and assembly of the AHU, there is a risk of crushing people or limbs if people are in the danger zone or limbs reach into the danger zone.

- Leave the danger zone.
- Do not reach under the delivery section.
- Do not stand below suspended loads.
- Wear safety footwear of a min. protection class S1 according to EN ISO 20345.
- Observe the safety regulations for the industrial truck and means of transport.

NOTE

Material damage due to localized weight

If more than one person enters the AHU at a time or localized loads are otherwise applied, pans and floors may be deformed.

- Do not let several persons enter the AHU at the same time.
- If this becomes necessary, take suitable measures to distribute the weight (e.g., grates, wooden boards, wood beams).

Personnel qualification

The work described in this section may only be performed if the person has the following qualifications:

- ➔ Qualified person in accordance with pressure equipment regulation
- ➔ Qualified person in explosion protection
- ➔ Qualified electrician
- ➔ Qualified electrician in explosion protection
- ➔ Crane operator
- ➔ Mechanic
- ➔ Forklift driver
- ➔ Person trained in explosion protection

What to do in case of danger

Fire protection

Solvent-welding agent (Rhenofol solvent-welding agent (THF) – tetrahydrofuran) and sealing paste (Rhenofol paste)

Solvent-welding agents and sealing paste may contain toxic and environmentally hazardous substances. Fumes can form an explosive mixture with air. Fumes are heavier than air and spread at floor level. Ignition is possible over greater distances. During thermal decomposition, harmful gases and fumes may be generated, and explosive peroxides may be formed.

- Use self-contained respiratory protection.
- Wear chemical protective suit.
- Cool endangered tanks from a safe distance using water spray.
- Do not use a direct high-pressure water spray for extinguishing.
- For extinguishing, use carbon dioxide (CO_2), extinguishing powder, or water spray. Fight larger fires with water spray or alcohol-resistant foam.
- Do not allow extinguishing water contaminated with pollutants to enter waterways or waste water system.
- Comply with the safety data sheet of the manufacturer.

What to do in case of leaks

Solvent-welding agent (Rhenofol solvent-welding agent (THF) – tetrahydrofuran) and sealing paste (Rhenofol paste)

Personal protection

- Avoid contact with skin, eyes, and clothing.
- Ensure good air exchange in the danger zone.
- Take precautionary measures against static discharge.
- Wear personal protective equipment (tight-fitting safety glasses with lateral guards, self-contained respiratory protection (filter type A-P2); chemical protective gloves (suitable material: butyl rubber; thickness of the glove material: >= 0.7 mm) and protective clothing).
- Comply with the safety data sheet of the manufacturer.

Environmental protection

- Do not allow it to enter waterways or waste water system.
- Absorb with liquid-binding material (sand, diatomaceous earth, acid binder, universal binder).
- Disposal according to official regulations. Do not dispose of the product together with domestic waste.
- In case of contamination of waterways, soil, or waste water system, inform relevant authorities.
- Comply with the safety data sheet of the manufacturer.

Installation site requirements

The AHU must not be publicly accessible. Access to the AHU must be restricted so that only personnel with the appropriate qualifications can enter the installation site (see “Main operating instructions”, “Personnel qualifications” section).

The country-specific standards for the operation and maintenance of plant rooms and control centres must be observed. The installation site must comply with the applicable building regulations. The specific functions of the AHU must be taken into account, for example, by providing ventilation and maintaining an ambient temperature of -20 °C to +40 °C.

The installation site must

- be clean.
- free of strong electromagnetic fields.
- free of aggressive media.
- have a drainage system.

The installation site of indoor units must meet the following requirements:

- must be dry.
- must be frost-free.

The installation site of weatherproof devices must meet the following requirements:

- it must be selected considering the external impact (e.g., sun, rain, snow, wind, frost) on the installation site. AHUs must be fastened to the foundation in accordance with the expected wind load. Service connections and cabling must be carried out professionally.
- It must have a suitable lightning protection system in accordance with country-specific regulations. The AHU must not be used as part of the external lightning protection system (see "Main operating instructions", chapter "Lightning protection for weatherproof devices").
- It must comply with the applicable regulations regarding protection against falls of people, tools, and materials, and suitable fall protection equipment must be in place.

ATEX units must not be used be used in the vicinity of:

- high frequency sources (e.g. transmitter systems).
- strong light sources (e.g. laser beams).
- ionising radiation sources (e.g. x-ray tubes).
- ultrasound sources (e.g. ultrasonic echo testers).

ATEX units may only be operated within the defined application limits (see ATEX labelling on the nameplate and the technical data sheet or the declaration of conformity). The installation site must comply with these requirements.

The application limits are determined by the defined ATEX requirements (internal and external) and the stipulated temperature range.

AHUs have a casing air leakage that may cause zone entrainment into the technical room. If no ATEX requirements have been defined in the external area of the ATEX unit, sufficient ventilation of the technical room must be ensured (on-site specification in accordance with DIN EN IEC 60079-10-1). If necessary, the AHU is to be purged with fresh air before opening the inspection doors.

If ATEX requirements have been defined for the outside of the ATEX unit, only ATEX-tested parts may be used on the outside of the AHU. The parts must at least fulfil the requirements of the AHU in terms of explosion protection.

Installation site requirements for certain components

Hydraulic set

In the case of weatherproof AHUs with hydraulic sets, hydraulic components must be protected against frost by the customer (e.g., pipe trace heating, frost protection circuit, frost protection agents).

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Footprint requirements

AHUs have the following footprint requirements:

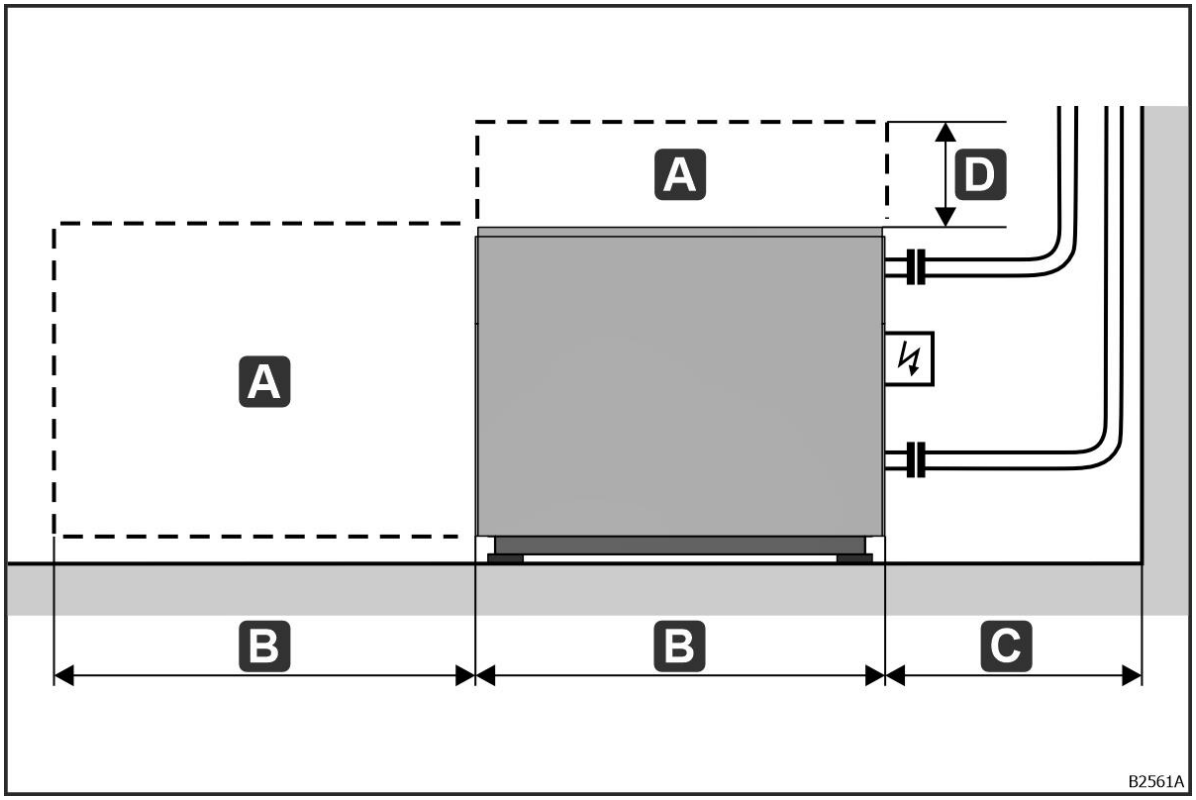


Fig. 2: AHU footprint requirements

A - revision area; B - unit width; C ≥ 875 mm; D ≥ 500 mm

- Leave ≥ 875 mm (C) free for connections and escape routes on all sides of the AHU.
- To replace components (e.g., coil, filter wall I - O, fan) on the operating side, leave one unit width (B) free as a revision area (A).
- Leave ≥ 500 mm (D) free above the AHU as a revision area (A).

HE-RAC hydraulics on stand

The HE-RAC hydraulics on stand has the following footprint requirements:

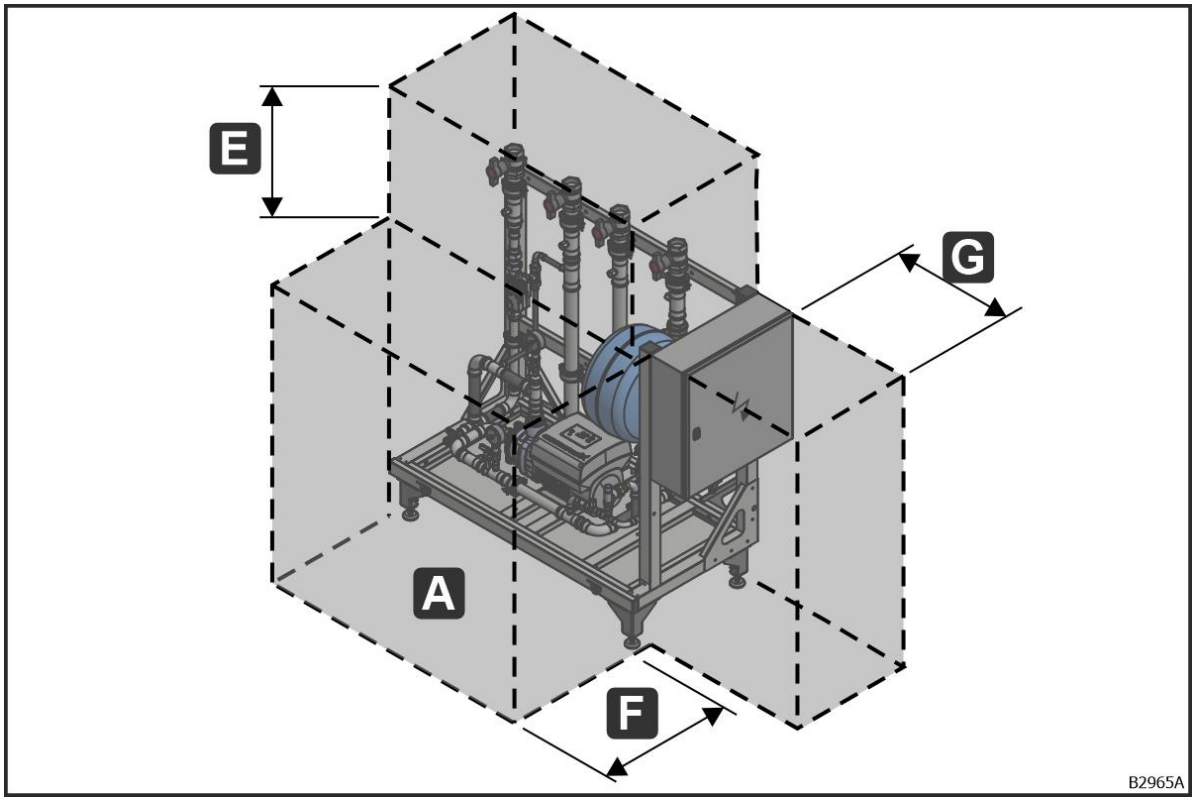


Fig. 3: Footprint requirements of HE-RAC hydraulics on stand

A - revision area; E ≥ 350 mm; F ≥ 500 mm; G - ≥ 650 mm

- Leave ≥ 350 mm (E) above the rack for the connections.
- Leave ≥ 500 mm (F) free as a revision area (A) on the operating side and ≥ 650 mm (G) in front of the control cabinet.

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Foundation

WARNING

Danger to life due to incorrect setup

Improper use of the transport lugs and brackets for permanent fastening will result in danger to life due to the AHU falling.

- Set up the AHU on a level and stable foundation.

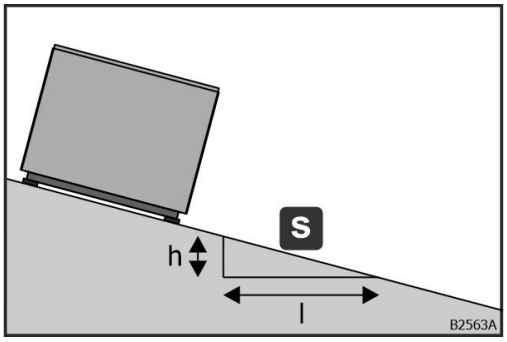
WARNING

Risk of death due to the AHU falling over

If the AHU is not secured, there is a danger to life if the AHU falls over.

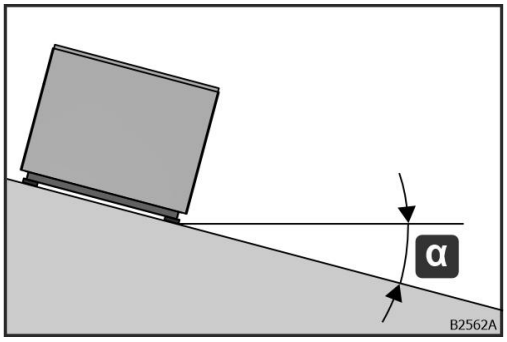
- AHUs must be secured to the foundation.
- If the center of gravity is unfavorable (e.g., height/depth ratio ≥ 2.5), further security measures (e.g., steel structure) must be taken.

AHUs must be installed on a level and stable foundation.



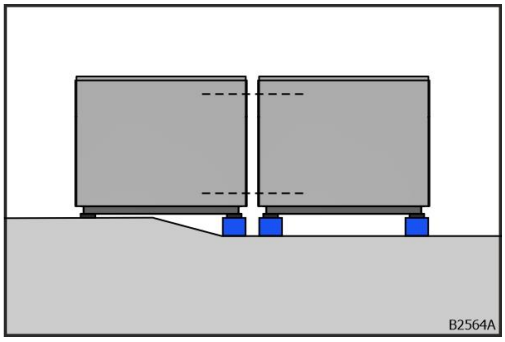
The maximum tolerance to the horizontal is s = 0.5 % (slope).

Fig. 4: Maximum incline



This corresponds to a maximum inclination angle of α = 0.3°.

Fig. 5: Maximum inclination angle



The frames of the casing connection must be parallel to each other.

Irregularities must be compensated by appropriate supports (e.g., sheet metal strips).

Fig. 6: Compensating unevenness

The foundation must meet the structural, acoustic and drainage (e.g. pan drain) requirements of the building. Set up the AHU with sufficient distance from the floor to achieve the required siphon height (see chapter "Condensate, drain and overflow lines", page 58).
The natural frequency of the support structure, especially in case of steel structures, must have sufficient distance to the excitation frequency of rotating components (e.g., fans, motors, pumps, compressors).

Beam support structure

The support execution (e.g., steel or concrete) is selected on site.

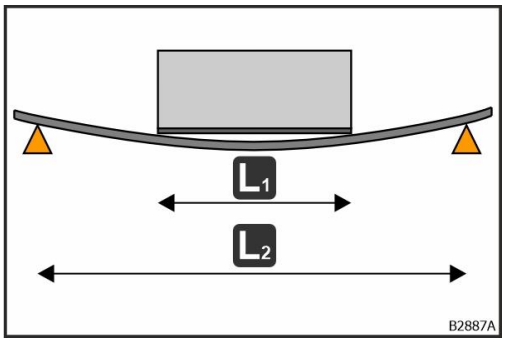


Fig. 7: Deflection of the AHU

The deflection of the AHU at the installation site must not exceed 1/500 in relation to the dimensions of the AHU (L1). If there is a higher deflection due to the on-site support structure (L_2), the deflection of the AHU can be reduced to a maximum of 1/500 by additional support points between the support structure and the AHU.

A beam support structure can be implemented with longitudinal supports or width supports. Longitudinal supports are on-site supports on which the AHU rests in the longitudinal direction. Width supports are on-site supports on which the AHU rests in the width direction.

Longitudinal support

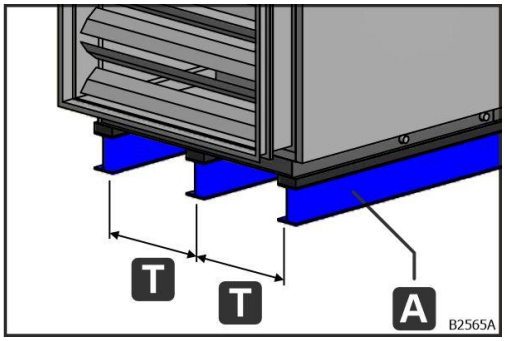


Fig. 8: Longitudinal support

The distance (T) of the on-site longitudinal supports (A) in the width direction must not exceed T ≤ 2.5 m.

Longitudinal support for units on DIN frames

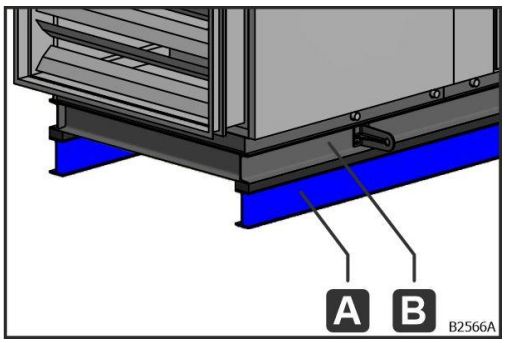


Fig. 9: Longitudinal support for units on DIN frames

For units on DIN frame, two on-site longitudinal supports (A) are required over the entire length. The DIN frame (B) of the AHU rests on these.

Width support

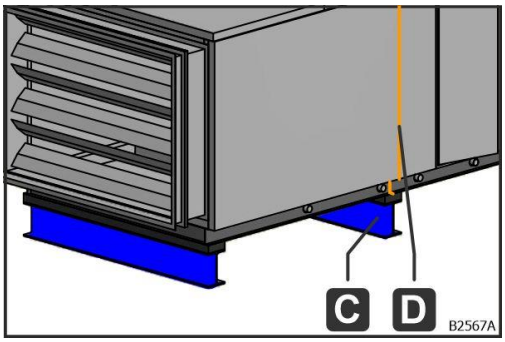


Fig. 10: Width support

The positioning of the width supports (C) depends on the AHU. A width support (C) is required at each separation point (D), for pan divisions, for heavy components (e.g., fans) and for long components l ≥ 1.5 m (e.g., silencers).

Width support for units on DIN frames

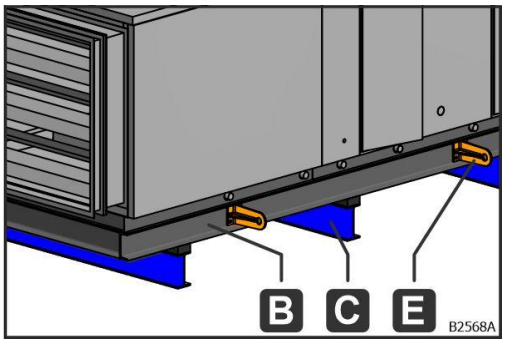


Fig. 11: Width support for units on DIN frames (identification)

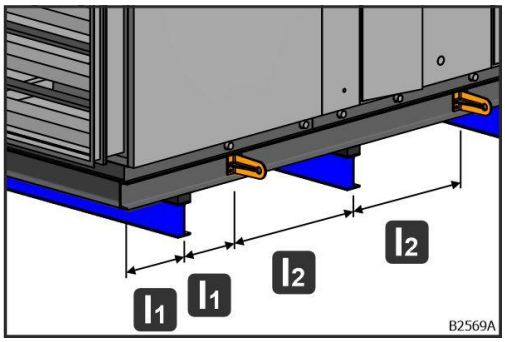


Fig. 12: Width support for units on DIN frames (dimensions)

The positioning of the width supports (C) depends on the AHU and the DIN frame (B). For units on DIN frame, a width support (C) is required centrally between the end of the unit and the transport loop (E) (l1 - l1) and centrally between two transport loops (E) (l2 - l2).

Foundation spots

A foundation spot is a localized support point for the installation of the AHU.

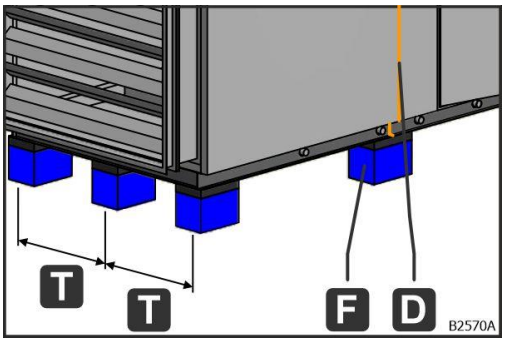


Fig. 13: Foundation spots

The positioning of the foundation spots (F) depends on the AHU. A foundation spot (F) is required at each separation point (D), at pan divisions, for heavy components (e.g., fans) and for long components of l ≥ 1.5 m (e.g., silencers). The distance (T) of the on-site foundation spots (F) in the width direction must not exceed T ≤ 2.5 m. The maximum load per foundation spot (F) is 500 kg.

Foundation spot for units on DIN frame

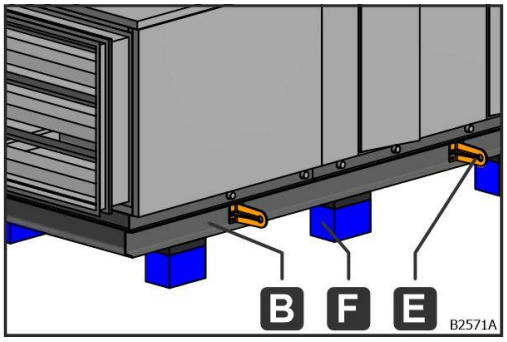


Fig. 14: Foundation spot for units on DIN frame (designations)

The positioning of the foundation spots (F) depends on the AHU and the DIN frame (B). For units on DIN frame, a foundation spot (F) is required centrally between the end of the unit and the transport loop (E) ($l_1 - l_1$) and centrally between two transport loops (E) ($l_2 - l_2$).

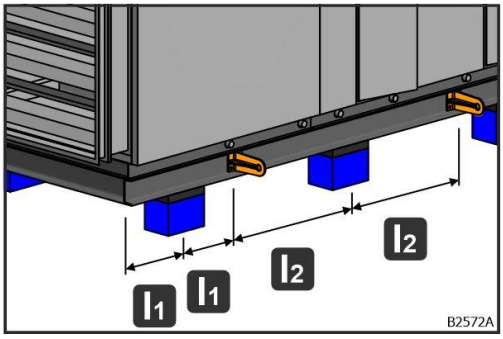


Fig. 15: Foundation spot for units on DIN frame (dimensions)

Unit foot

Unit feet are used for elevated installation and leveling of the AHU. The unit foot is adjustable in height. The adjustment range is 100 mm.

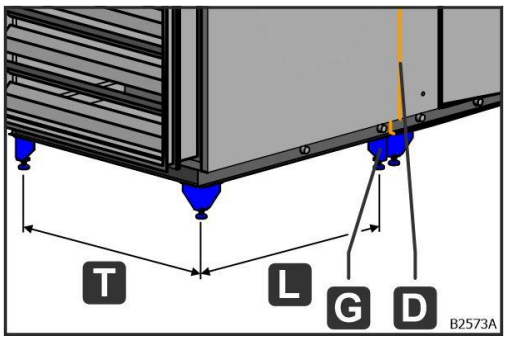


Fig. 16: Unit foot

The positioning of the unit feet (G) depends on the AHU. Four unit feet (G) must be attached per section. The maximum distance (T, L) is T, L ≤ 2.5 m. The maximum load per unit foot (G) is 500 kg.

Construction for assembly underneath the ceiling

If mounting under the ceiling, the configuration must be provided by the customer. The on-site construction must comply with the requirements for beam support structures (see chapter "Beam support structure", page 20). The on-site configuration must be carried out by a specialist, and must take into account all relevant factors (e.g., statics, load-bearing capacity, fastening, and vibrations).

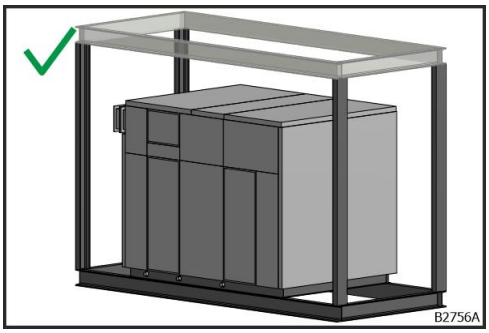


Fig. 17: Example 1

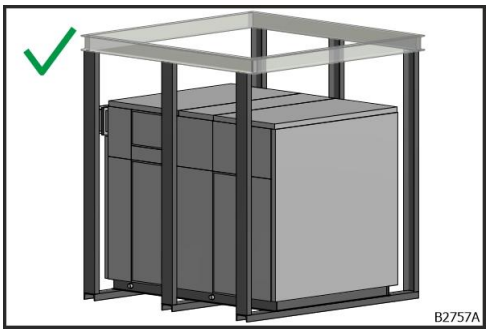


Fig. 18: Example 2

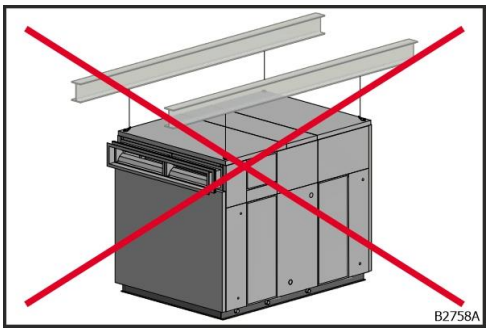


Fig. 19: Incorrect installation

Unit assembly

WARNING

Danger of crushing from reaching under suspended loads

When positioning the delivery sections for the installation and assembly of the AHU, there is a risk of crushing people or limbs if people are in the danger zone or limbs reach into the danger zone.

- Leave the danger zone.
- Do not reach under the delivery section.
- Do not stand below suspended loads.
- Wear safety footwear of a min. protection class S1 according to EN ISO 20345.
- Observe the safety regulations for the industrial truck and means of transport.

WARNING

Risk of explosion from incorrect unit assembly

Incorrect unit assembly may result in static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Take the AHU into account in the operator's explosion protection concept.
- If the air exchange rate of the room is sufficient (6 per hour or higher), an area reduction of one level can be assumed. With an internal ATEX requirement of 2G (area 1), area 2 must be assumed next to the AHU (up to a distance of approx. 0.5 metres). This means that parts attached to the AHU must have adequate explosion protection.
- Connect parts installed on the AHU on site to the equipotential bonding system. The on-site equipotential bonding system must be installed by a qualified electrician.
- Do not remove or damage the connections to the potential of the AHU provided at the factory (equipotential bonding conductor, flat ribbon grounding or earthing screws).
- Observe the applicable technical regulations on explosion protection.
- Observe the work steps set out in the operating instructions.

Check the arrangement of the sections and components and the execution according to the technical drawing before starting the unit assembly.

Lifting jack

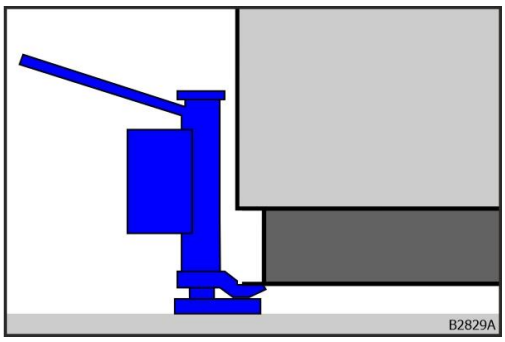


Fig. 20: Lifting jack

Always place the lifting jack on the lower edge of the base frame. Do not place the lifting jack on the edge of the panels, as this will cause deformation and damage to the panels. Make sure that the force is evenly distributed on the base frame.

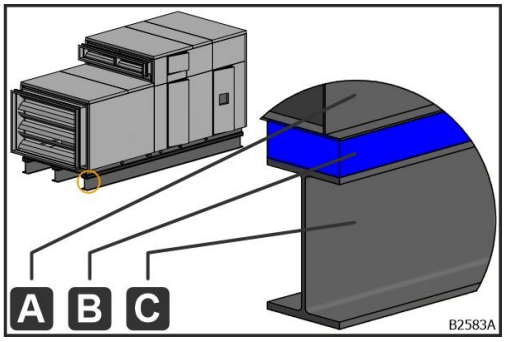
Sound reduction

To comply with the permissible sound emission values, sound-reducing components (e.g., duct silencers, noise barriers) must be provided on the intake and discharge sides or the casing if they are not integrated or not sufficiently integrated into the AHU.

Vibration damping

Use vibration dampers for vibration damping (e.g., Mafund, Sylomer, or Ilmod Kompri tape) in the length and width direction. Use the appropriate type depending on the load. The dimensioning of the vibration dampers is done by the customer. Use vibration dampers on all types of support points.

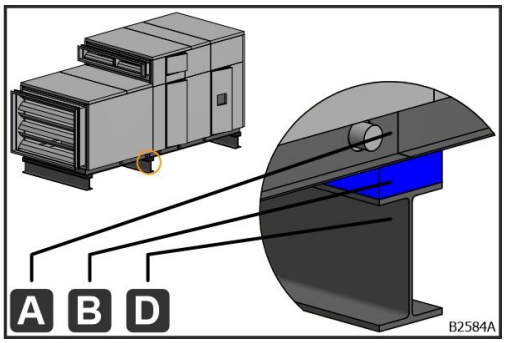
Installation on longitudinal supports



A base frame
B Vibration damper
C On-site longitudinal support

Fig. 21: Longitudinal support

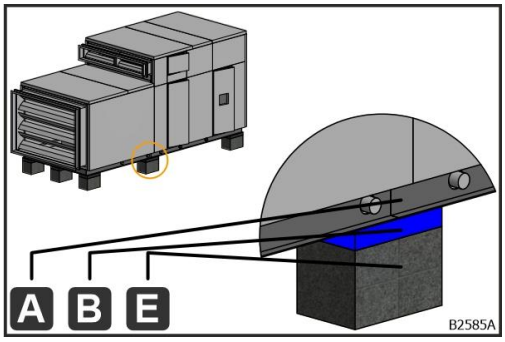
Installation on width support



A base frame
B Vibration damper
D On-site width support

Fig. 22: Width support

Installation on foundation spot



A base frame
B Vibration damper
E On-site foundation spot

Fig. 23: Foundation spots

Units on DIN frames

The transport loops (A) for units on DIN frames must be removed after installing the unit to prevent the risk of injury.

The positions of the transport loops (A) on units on DIN frames are designed exclusively for transport and cannot be used for positioning the support structure. To position support structure see chapter "Beam support structure", page 20and see chapter "Foundation spots", page 22.

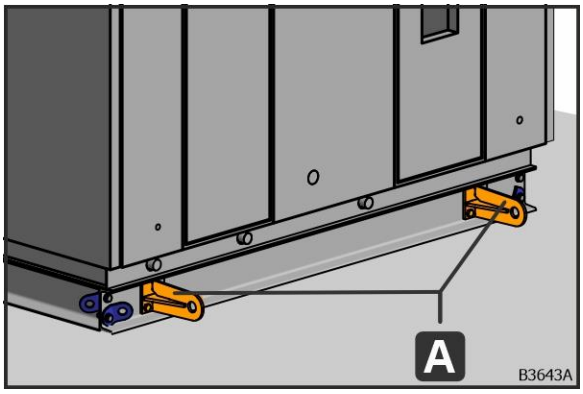


Fig. 24: Unit on DIN frame transport loops (A)

1. Remove the hexagonal screws (M16 x 50 mm) from the transport loops (A).
2. Remove the transport loops (A).
3. Screw the removed hexagonal screws (M16 x 50 mm) back into the boreholes

Casing connection

WARNING

Risk of explosion from missing screws for the casing connection

The connecting screws establish an electrical connection between the individual delivery sections and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Missing connecting screws may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Observe the work steps set out in the operating instructions see chapter "Casing connection", page 28.

WARNING

Risk of explosion from incorrect casing connection

The foam tape and the connecting screws create a connection between the individual delivery sections and minimise casing air leakage. Leakage may cause zone entrainment into the machine room. Zone entrainment may cause an explosive atmosphere outside the AHU. In conjunction with a source of ignition, this may result in an explosion.

- Observe the work steps set out in the operating instructions see chapter "Casing connection", page 28.

WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual delivery sections and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

Depending on the casing construction, the following installation material is included in the delivery for the casing connection:

- Foam tape 20 x 4 mm (A)
- Washer (ISO 7093) 8.4 mm (B)
- Hexagonal nut (ISO 4032) M 8 (C)
- Hexagonal screw (ISO 4017) M 8 x 50 mm (E)
- Hexagonal screw (ISO 4017) M 8 x 80 mm (F)
- Hexagonal screw (ISO 4017) M 8 x 110 mm (G)
- Hexagonal screw (ISO 4017) M 8 x 140 mm (H)
- Hexagonal screw (ISO 4017) M 8 x 180 mm (I)
- Special self-tapping screw with pan head (similar to ISO 10666) 6.3 x 55 mm, Torx (J)

The installation material is included in the delivery section with the fan.

For weatherproof units, additional roofing membrane stripes, solvent-welding agent, and sealing paste are included.

For stainless steel housings, use only stainless steel connecting elements.

The vibration dampers can be compressed to varying degrees due to the differences in weight of the delivery sections. This can lead to misalignment of the casing connection holes. This misalignment must be compensated for when connecting the casing (e.g. lifting jack).

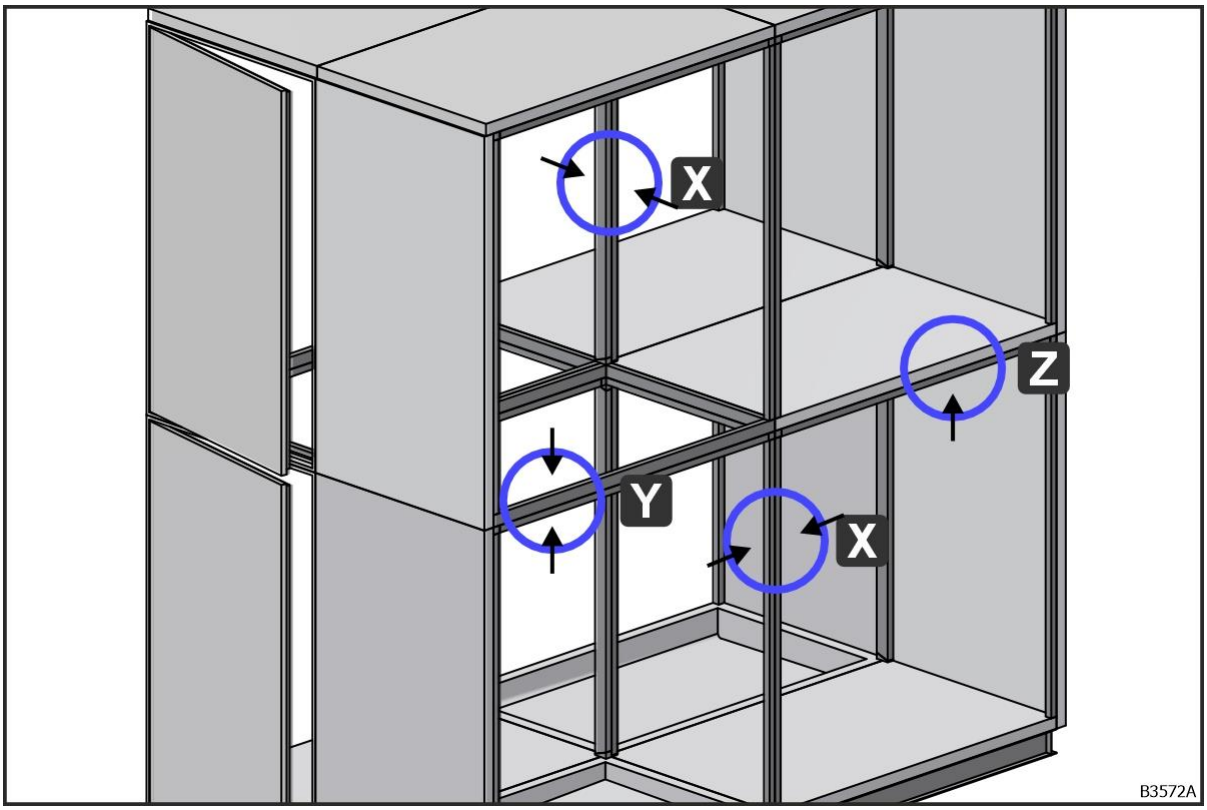


Fig. 25: Possible casing connections

X – see chapter "Casing connection of delivery sections next to each other", page 30

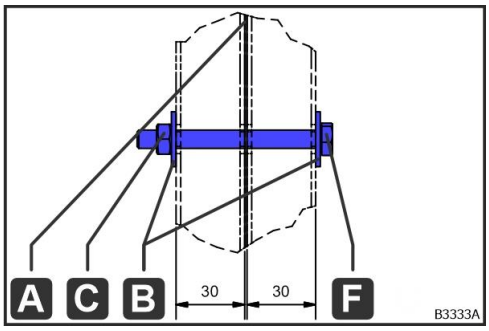
Y – see chapter "Casing connection of delivery sections on top of each other", page 33

Z – see chapter "Casing connection with unit floor in upper casing", page 35

Casing connection of delivery sections next to each other

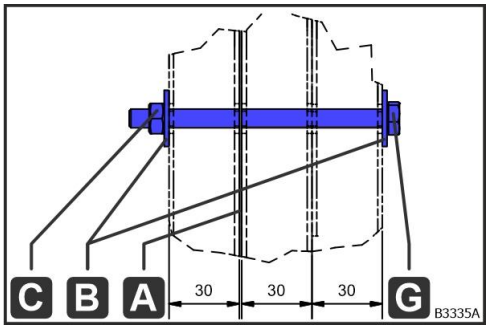
Casing connection with through screw and nut

The screw can be inserted into the boreholes from both sides, depending on the space available. Depending on the casing construction, the following options are available for connecting the casing:



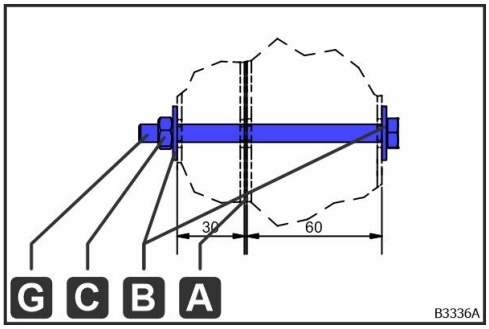
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
F – hexagonal screw (ISO 4017) M 8 x 80 mm

Fig. 26: M 8 x 80 mm



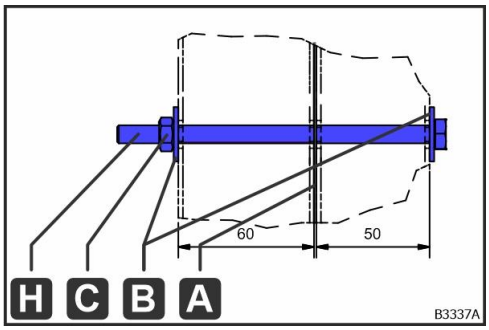
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
G – hexagonal screw (ISO 4017) M 8 x 110 mm

Fig. 27: M 8 x 110 mm



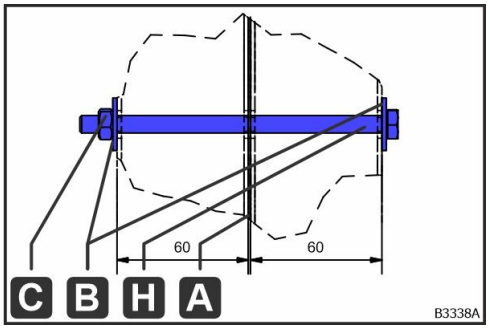
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
G – hexagonal screw (ISO 4017) M 8 x 110 mm

Fig. 28: M 8 x 110 mm



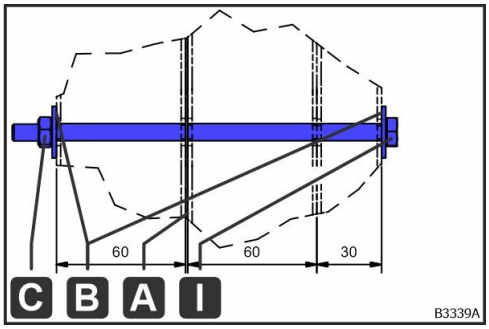
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
H – hexagonal screw (ISO 4017) M 8 x 140 mm

Fig. 29: M 8 x 140 mm



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
H – hexagonal screw (ISO 4017) M 8 x 140 mm

Fig. 30: M 8 x 140 mm



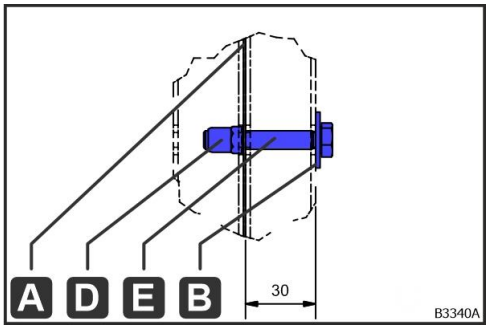
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
I – hexagonal screw (ISO 4017) M 8 x 180 mm

Fig. 31: M 8 x 180 mm

Work steps see chapter "Casing connection with through screw and nut", page 36.

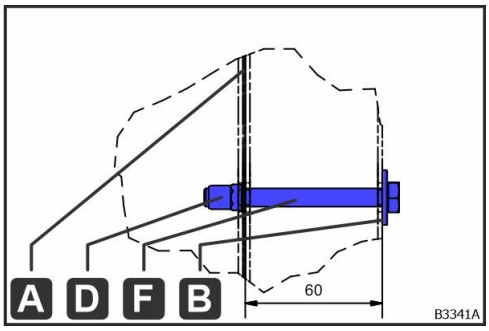
Casing connection with rivet nut

Depending on the casing construction, the following options are available for connecting the casing:



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
D – rivet nut M 8 hexagon fitting
E – hexagonal screw (ISO 4017) M 8 x 50 mm

Fig. 32: M 8 x 50 mm



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
D – rivet nut M 8 hexagon fitting
F – hexagonal screw (ISO 4017) M 8 x 80 mm

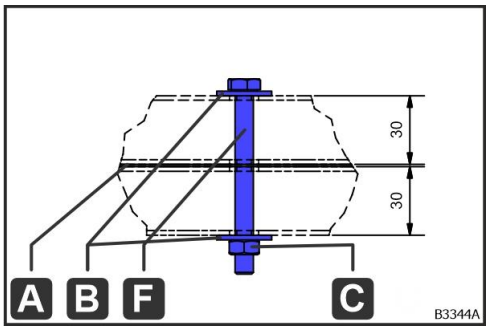
Fig. 33: M 8 x 80 mm

Work steps see chapter "Casing connection with rivet nut", page 39.

Casing connection of delivery sections on top of each other

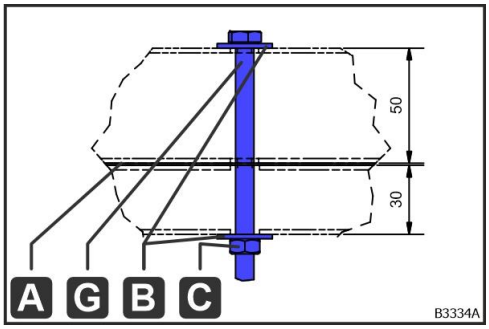
Casing connection with through screw and nut

The screw can be inserted into the boreholes from both sides, depending on the space available. Depending on the casing construction, the following options are available for connecting the casing:



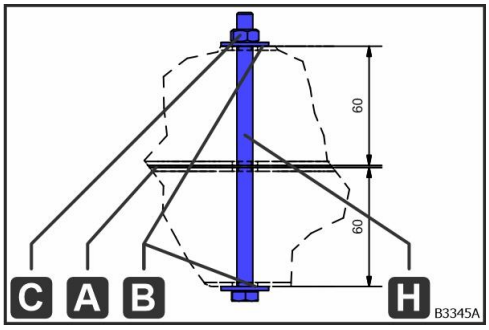
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
F – hexagonal screw (ISO 4017) M 8 x 80 mm

Fig. 34: M 8 x 80 mm



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
G – hexagonal screw (ISO 4017) M 8 x 110 mm

Fig. 35: M 8 x 110 mm



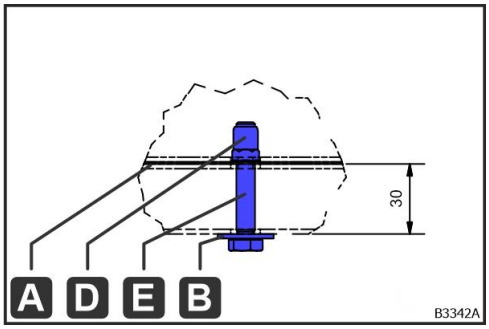
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
C – hexagonal nut (ISO 4032) M 8
H – hexagonal screw (ISO 4017) M 8 x 140 mm

Fig. 36: M 8 x 140 mm

Work steps see chapter "Casing connection with through screw and nut", page 36.

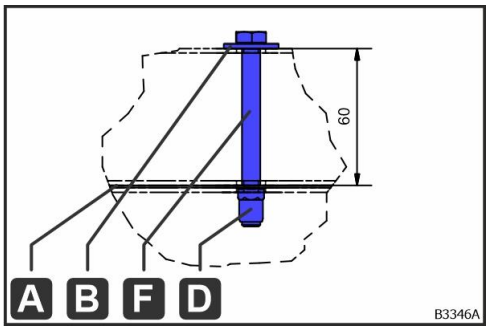
Casing connection with rivet nut

Depending on the casing construction, the following options are available for connecting the casing:



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
D – rivet nut M 8 hexagon fitting
E – hexagonal screw (ISO 4017) M 8 x 50 mm

Fig. 37: M 8 x 50 mm



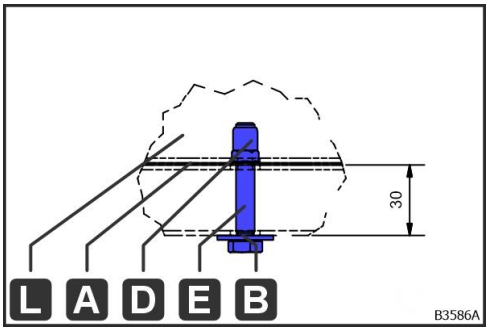
A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
D – rivet nut M 8 hexagon fitting
F – hexagonal screw (ISO 4017) M 8 x 80 mm

Fig. 38: M 8 x 80 mm

Work steps see chapter "Casing connection with rivet nut", page 39.

Casing connection with unit floor in upper casing

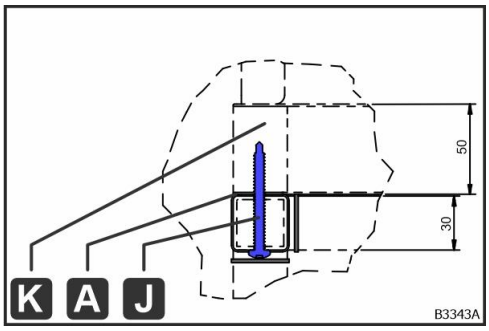
The following option is available for the casing connection of delivery sections on top of each other with unit floor in the upper casing:



A – foam tape 20 x 4 mm
B – washer (ISO 7093) 8.4 mm
D – rivet nut M 8 hexagon fitting
E – hexagonal screw (ISO 4017) M 8 x 50 mm
L – metal tray of unit floor

Fig. 39: M 8 x 50 mm

Work steps see chapter "Casing connection with rivet nut", page 39.



A – foam tape 20 x 4 mm
J – special self-tapping screw with pan head (similar to ISO 10666) 6.3 x 55 mm, Torx
K – plastic profile of unit floor

Fig. 40: special self-tapping screw with pan head

Work steps see chapter "Casing connection with unit floor in upper casing", page 42.

Work steps

Casing connection with through screw and nut

To connect the delivery sections with a through hexagonal screw and nut, the following steps must be carried out:

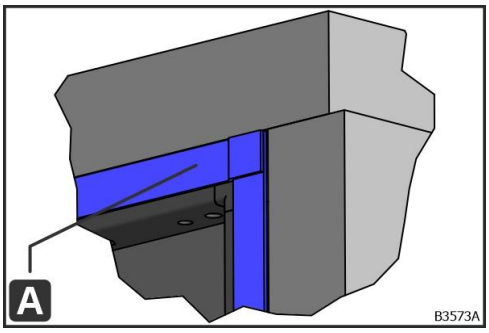


Fig. 41: Masked tube frame (30 mm)

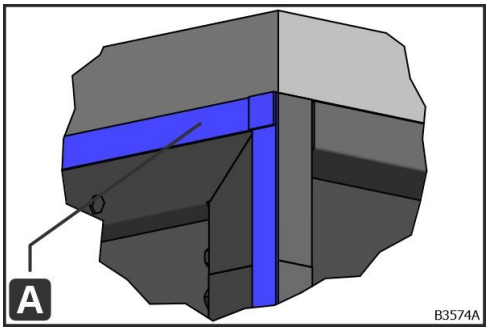


Fig. 42: Masked tube frame (60 mm)

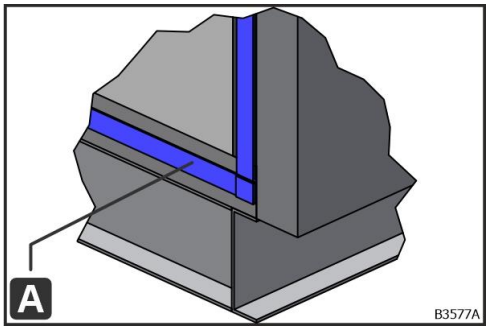


Fig. 43: Masked unit floor (50 mm)

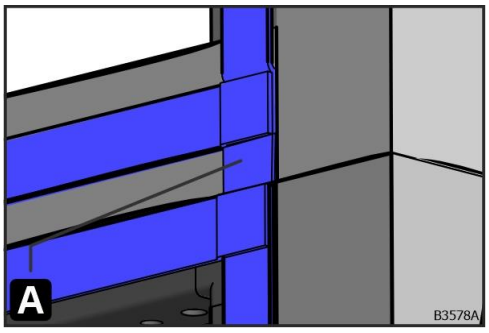


Fig. 44: Masking airflows above each other

1. Apply foam tape (A) to the tube frame all the way round each separation point on a delivery section.
   - Stick the foam tape (A) between the panel and row of holes.
   - The foam tape (A) must overlap at the corners.

2. If there is no tube frame in the floor area:
   - Stick the foam tape (A) on centrally.
   - The foam tape (A) must overlap at the corners.

3. If airflows are arranged above each other:
   - Stick the foam tape (A) on end-to-end.
   - The foam tape (A) must overlap at the corners.

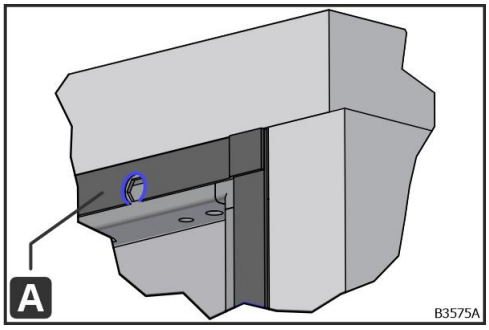


Fig. 45: Cut-out foam tape

4. If necessary, cut out the foam tape (A) where the boreholes are.

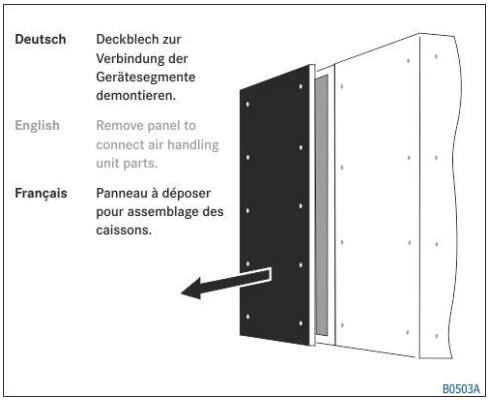


Fig. 46: Label to identify relevant panels

5. If there are no doors at the separation points, remove the panels labelled accordingly for better accessibility.

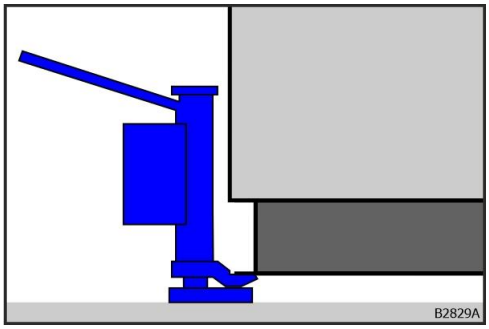


Fig. 47: Machine jack

6. If necessary, lift the delivery section with a machine jack if the casing connection holes are offset.

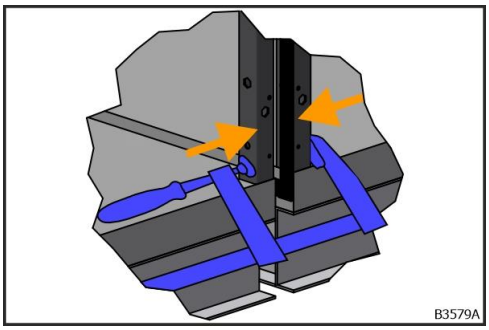


Fig. 48: Pulling the delivery sections together

7. If necessary, pull the delivery sections together with screw clamps at the bottom of the casing frame.

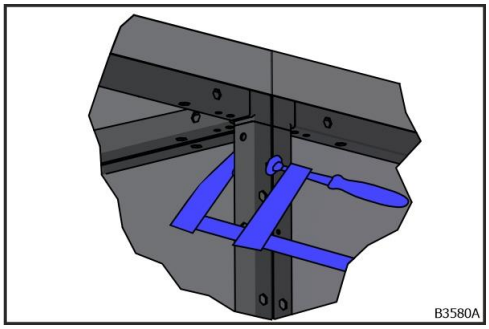


Fig. 49: Aligning the delivery sections

8. If necessary, align the delivery sections with screw clamps on the casing frame.

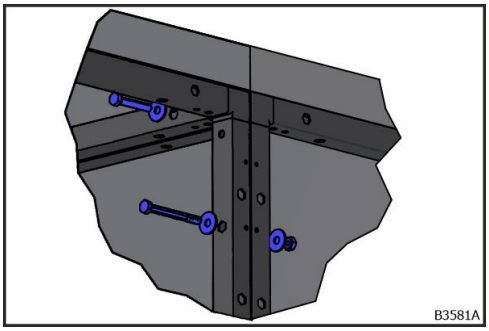


Fig. 50: Hexagonal screw, washers and hexagonal nuts

9. Connect the delivery sections from inside with hexagonal screws (E, F, G, H, I), washers (B) and hexagonal nuts (C) applying a torque ≤ 25 Nm.

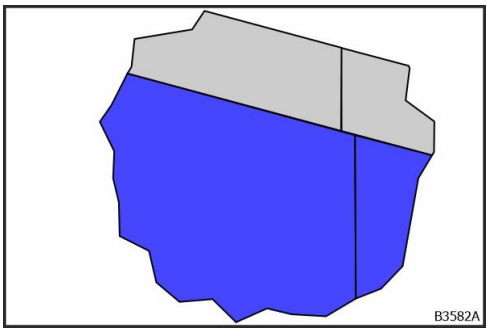


Fig. 51: Mounting the panels

10. If applicable, mount the removed panels.

11. Check the connecting elements for corrosion.
12. Replace corroded connecting elements.

Casing connection with rivet nut

To connect the delivery sections with a hexagonal screw and rivet nut (C), the following steps must be carried out:

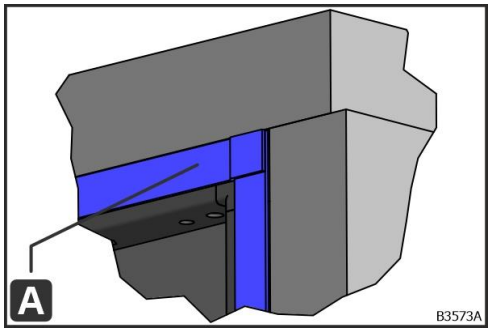


Fig. 52: Masked tube frame (30 mm)

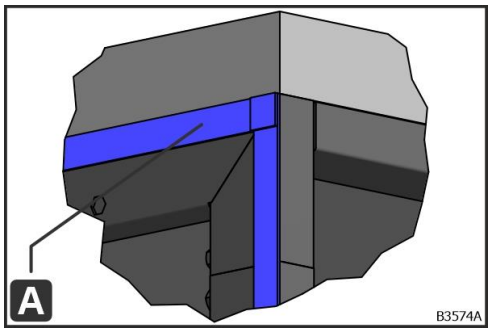


Fig. 53: Masked tube frame (60 mm)

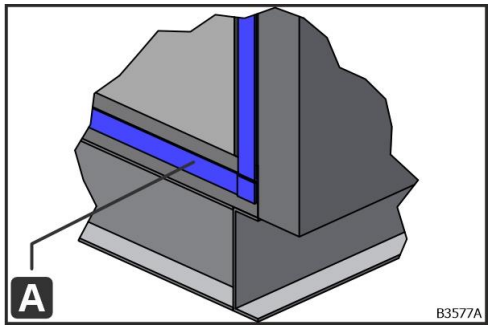


Fig. 54: Masked unit floor (50 mm)

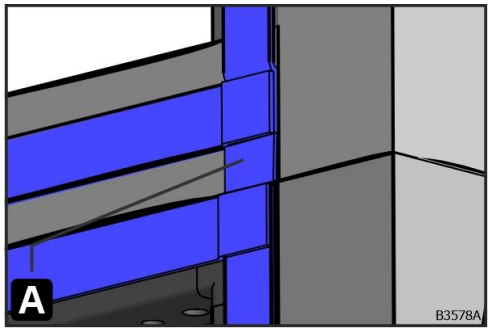


Fig. 55: Masking airflows above each other

1. Apply foam tape (A) to the tube frame all the way round each separation point on a delivery section.
   - Stick the foam tape (A) between the panel and row of holes.
   - The foam tape (A) must overlap at the corners.

2. If there is no tube frame in the floor area:
   - Stick the foam tape (A) on centrally.
   - The foam tape (A) must overlap at the corners.

3. If airflows are arranged above each other:
   - Stick the foam tape (A) on end-to-end.
   - The foam tape (A) must overlap at the corners.

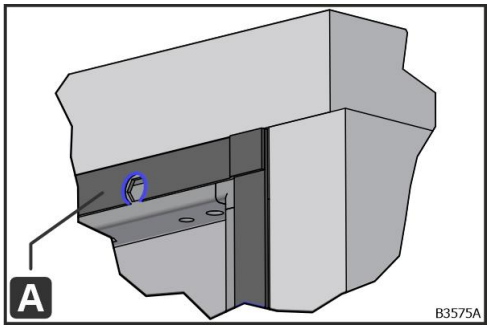


Fig. 56: Cut-out foam tape

4. If necessary, cut out the foam tape (A) where the boreholes are.

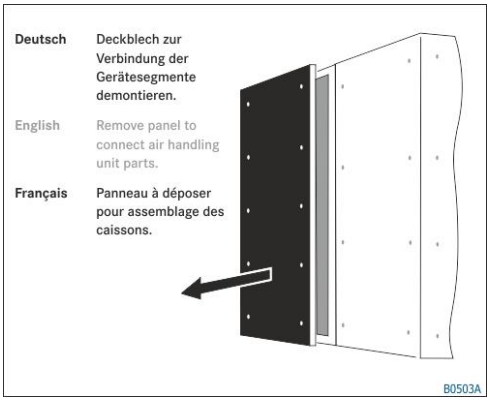


Fig. 57: Label to identify relevant panels

5. If there are no doors at the separation points, remove the panels labelled accordingly for better accessibility.

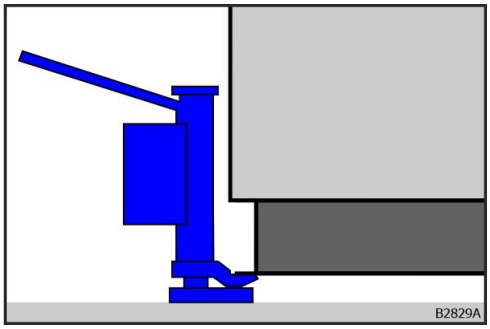


Fig. 58: Machine jack

6. If necessary, lift the delivery section with a machine jack if the casing connection holes are offset.

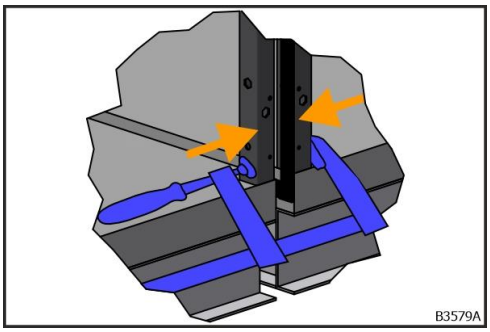


Fig. 59: Pulling the delivery sections together

7. If necessary, pull the delivery sections together with screw clamps at the bottom of the casing frame.

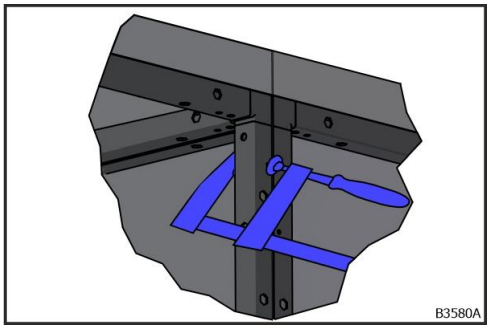


Fig. 60: Aligning the delivery sections

8. If necessary, align the delivery sections with screw clamps on the casing frame.

NOTICE

Material damage from exceeding the maximum torque

If screws are tightened with excessive torque, threads in plastic profiles or rivet nuts can tear out.

- Tighten the screws with the torque given in the instructions.

NOTICE

Material damage due to incorrect positioning of the screws in the rivet nuts

If screws are positioned incorrectly, the thread of the rivet nuts may deform.

- Position the screws by hand.

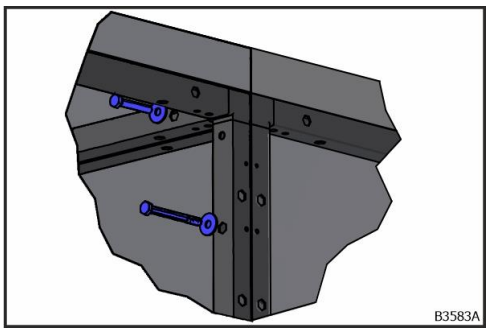


Fig. 61: Hexagonal screw and hexagonal nut

9. Position the appropriate hexagonal screws (E, F) with hexagonal nuts.
10. Screw in the hexagonal screws (E, F) a minimum of 10 mm by hand.
11. Tighten the hexagonal screws (E, F) with a torque ≤ 25 Nm.

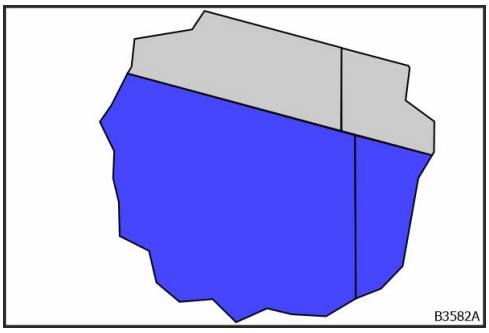


Fig. 62: Mounting the panels

12. If applicable, mount the removed panels.
13. Check the connecting elements for corrosion.
14. Replace corroded connecting elements.

Casing connection with unit floor in upper casing

To connect the delivery sections with the plastic profiles of the drain pans, the following steps must be carried out:

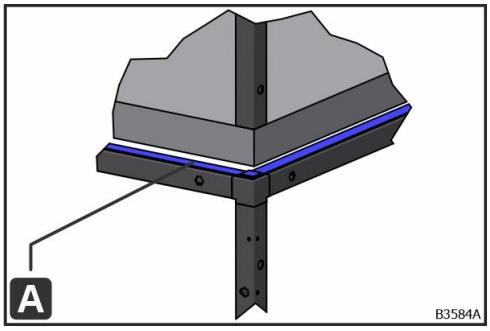


Fig. 63: Masked tube frame

1. Apply foam tape (A) to the tube frame all the way round each separation point on a delivery section.
   - Stick the foam tape (A) between the panel and row of holes.
   - The foam tape (A) must overlap at the corners.

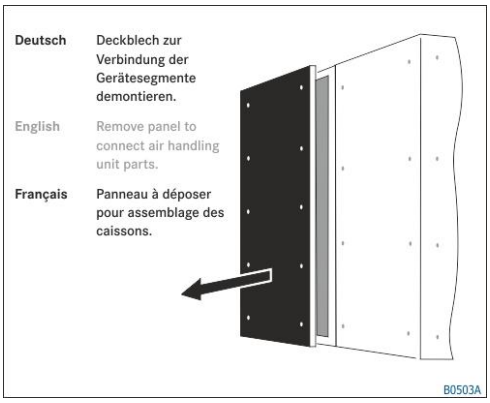


Fig. 64: Label to identify relevant panels

2. If there are no doors at the separation points, remove the panels labelled accordingly for better accessibility.

NOTICE

Material damage from exceeding the maximum torque

If screws are tightened with excessive torque, threads in plastic profiles or rivet nuts can tear out.

- Tighten the screws with the torque given in the instructions.

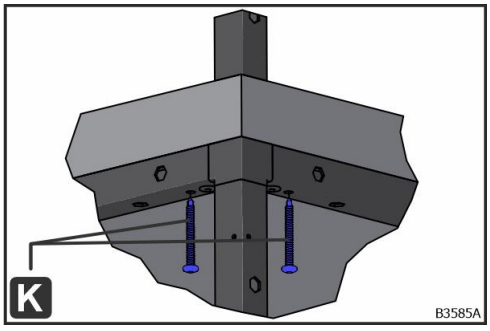


Fig. 65: Special self-tapping screw

3. Connect the delivery sections from inside with a special self-tapping screw (K) with a torque ≤ 5 Nm.

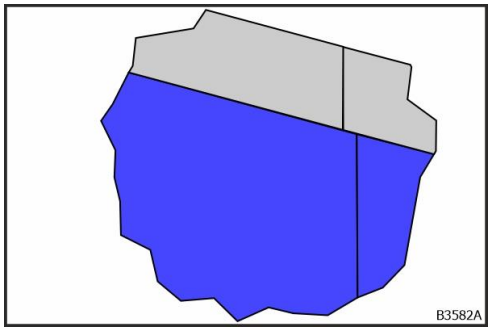


Fig. 66: Mounting the panels

4. If applicable, mount the removed panels.

5. Check the connecting elements for corrosion.
6. Replace corroded connecting elements.

Separation points in the floor area

To ensure residue-free wiping out, separation points in the floor area downstream of the casing connection must be sealed with microbially inert joint sealant according to VDI 6022.

TIP **Microbially inert joint sealant according to VDI 6022**

The manufacturer of a microbially inert joint sealant proves that the requirements of VDI 6022 are met. The test procedures are described in ISO 846.

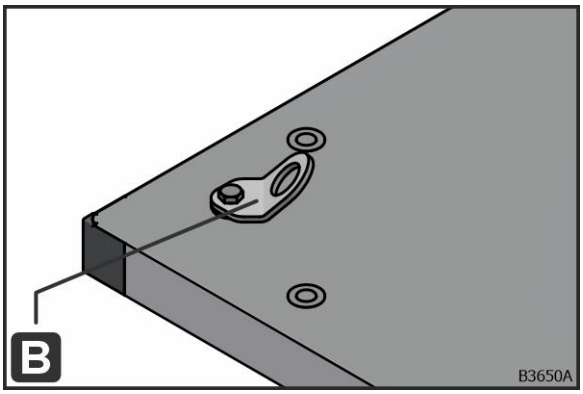
Transport lugs

Requirements

- Casing connections for the delivery sections established see chapter "Casing connection of delivery sections next to each other", page 30and see chapter "Casing connection of delivery sections on top of each other", page 33.

The following material is included in the delivery:

- Plug (grey)



B - transport lug

Fig. 67: Transport lug (B)

Work steps

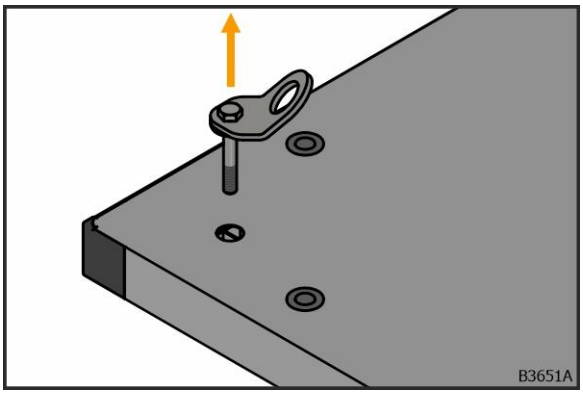


Fig. 68: Removing the transport lugs

1. Remove the transport lugs and screws.

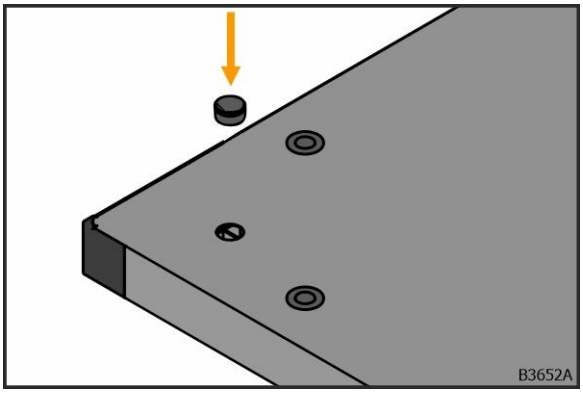


Fig. 69: Sealing the holes

2. Seal the holes from above with plugs (grey).

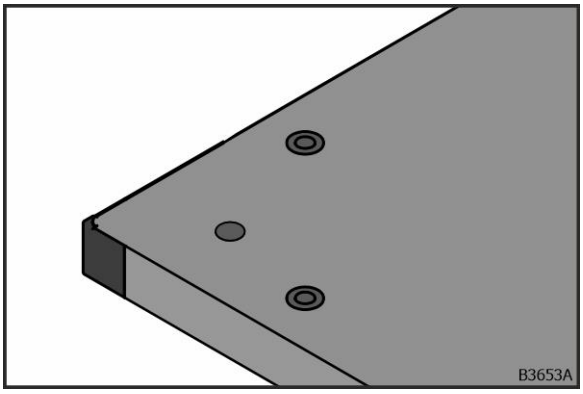


Fig. 70: Transport lug holes sealed

➔ Transport lug holes sealed

Fastening to on-site beams

Longitudinal support fastening

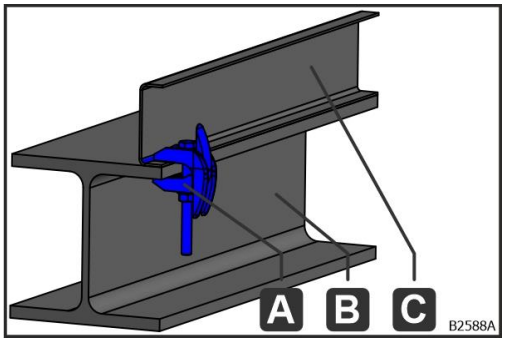


Fig. 71: Mounting with beam clamp F9 (A)

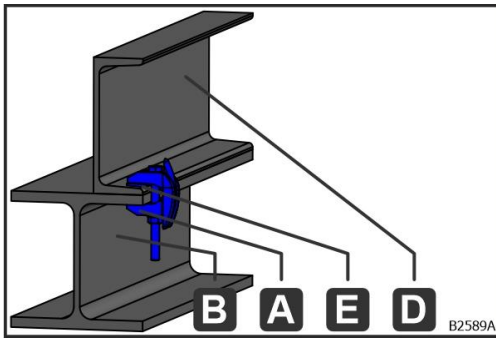


Fig. 72: Fastening with DIN 434 wedge washer (E)

F9 beam clamps (A) are recommended for fastening AHUs with on-site longitudinal supports (B). DIN 434 wedge washers (E) must be used for devices on DIN frames (D). They are used to compensate for the inclination in the flanges of the DIN frame (D).

Width support fastening

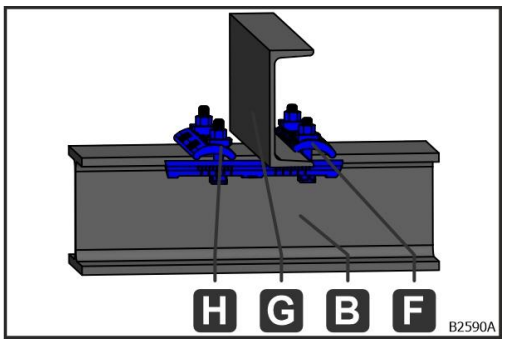


Fig. 73: Fastening with beam clamp FC (F)

B On-site support
F FC beam clamp
G Base frame/DIN frame
H Close FC beam clamp completely

FC beam clamps (F) are recommended for fastening AHUs with on-site longitudinal beams (B).

Connection of AHUs with roof rack frame

The roof rack frame is used to install two AHUs on top of each other. The sections are only connected to each other at the final installation site.

WARNING

Danger to life from suspended loads and falling objects

Danger to life from failing transport lugs or transport loops.

- No additional loads on in or on the delivery sections.
- Do not install any components in or on the delivery section before transporting it to the final installation site.
- Only use suitable permitted lifting equipment (rope, chains, lifting straps, turnbuckles) complying with BGV D6 (German employers' liability insurance association regulations) to transport and unload the delivery sections.
- Only attach lifting equipment to the transport lugs on the delivery sections.
- Lifting equipment must be approved for the weight of the delivery section.
- For transport lugs, the angle of inclination between the lifting equipment and load must be between 45° and 55°.
- For transport loops, the maximum permitted oblique pull is 10°.
- Reduce the load capacity by spreading the lifting equipment in accordance with the lifting equipment table.
- Observe the safety regulations for the conveyor vehicles and means of transport.
- Do not stand below suspended loads.

For weatherproof units with roof rack frames see chapter "Connection of weatherproof devices with roof rack frame", page 80.

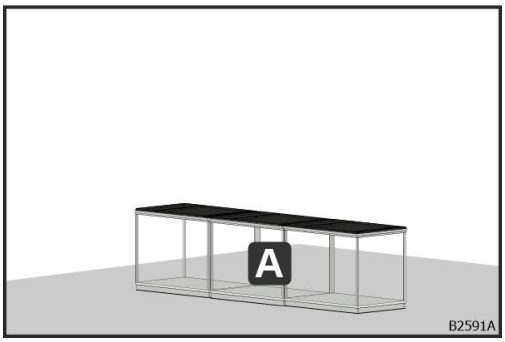


Fig. 74: Lower AHU set up

1. Set up the lower AHU (A) and fasten it to the foundation (see chapter "Foundation", page 18).

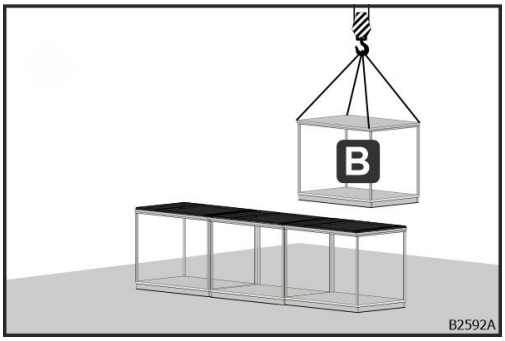


Fig. 75: Crane upper section individually

2. Place the upper AHU (B) on the roof rack frame of the lower AHU (A).

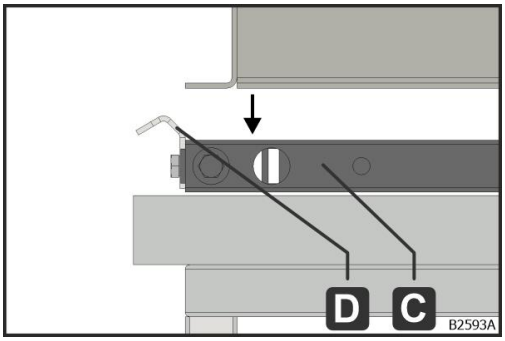


Fig. 76: Setting down the upper section

3. Roof rack brackets (D) on the roof rack frame (C) serve to guide and center the base frame of the upper AHU (B).

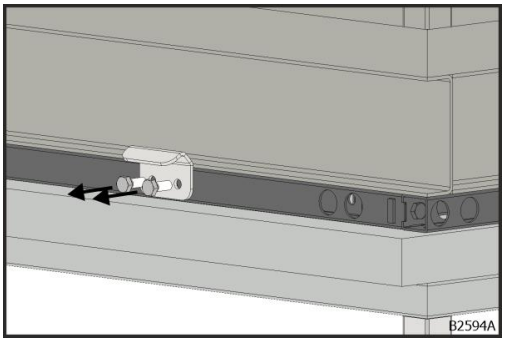


Fig. 77: Disassembling roof rack brackets

4. Remove hexagonal screws from roof rack brackets (D).

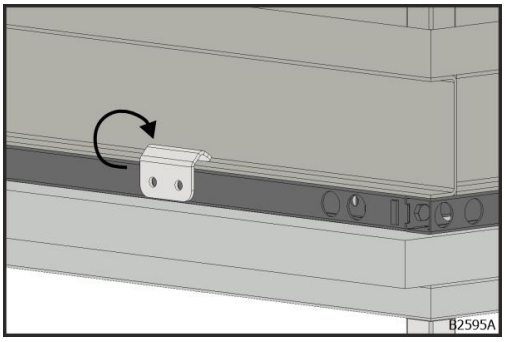


Fig. 78: Turning roof rack brackets

Turn the roof rack bracket (D) so that the roof-shaped tab faces the base frame.

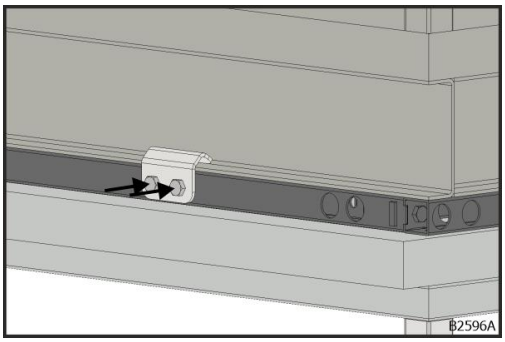


Fig. 79: Roof rack bracket assembly

Mount the roof rack bracket (D) with hexagonal screws.

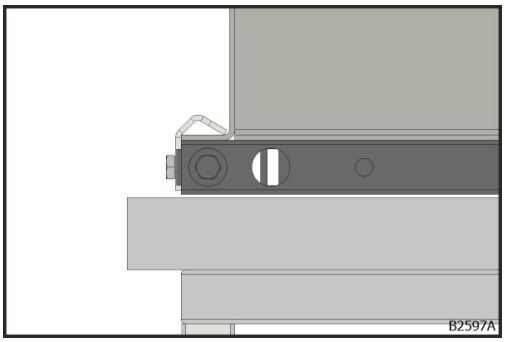


Fig. 80: Connection of upper and lower AHU

➔ The roof rack brackets (D) fix the base frame of the upper AHU (B) to the roof rack frame (C) of the lower AHU (A).

Unit connection

The ducts must be connected free of voltage. Ducts, including unit connections, must be properly insulated and protected against weather effects.

WARNING

Risk of explosion from lack of equipotential bonding

Non-existent or incorrectly connected equipotential bonding may cause components to become statically charged. The discharge may cause an explosion.

- Connect all factory installed equipotential bonding conductors and secure them to prevent them from loosening.
- Observe the work steps set out in the operating instructions.

WARNING

Risk of explosion due to the use of components with inadequate ignition protection

Using parts without adequate ignition protection may cause static charging of the AHU, for example. The discharge and the resulting sparks may cause an explosion.

- Use parts in the AHU that are at least compliant with the ATEX requirements for the inside of the AHU.
- Use parts on the outside of the AHU or next to the AHU that at least fulfil the ATEX requirements next to the AHU.
- Parts must be designed as electrostatically dissipative.

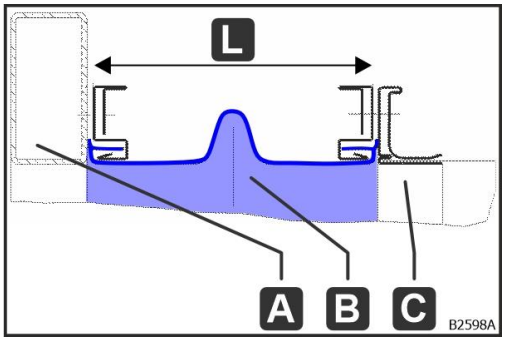
WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual components and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

Flexible connection



A Frame
B flexible connection
C On-site duct
L component length

Fig. 81: Flexible connection

The component length (L) of the flexible nozzle must in no case be the stretched length. The optimum component length (L) is 100 - 120 mm.

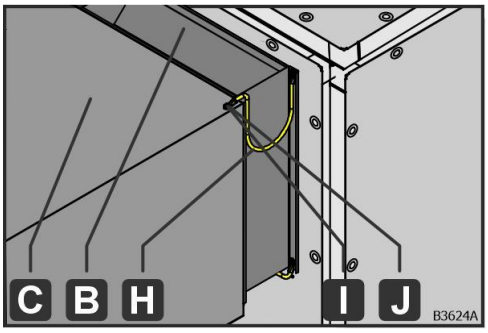


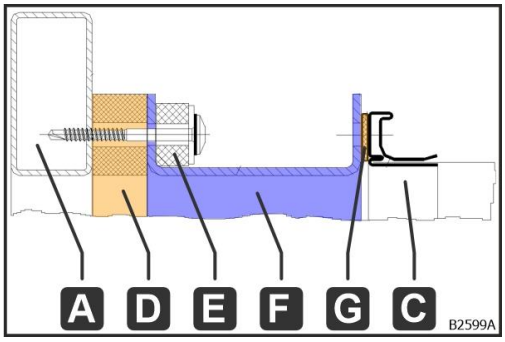
Fig. 82: flexible connection with equipotential bonding conductors

1. Route the pre-assembled equipotential bonding conductor (H) of the flexible connection (B) to the on-site duct (C).
2. Secure the equipotential bonding conductor (H) with a toothed lock washer (J) to prevent loosening.
3. Tighten the screw (I).

➔ The flexible connection (B) is connected to the AHU and to the on-site duct (C) via the equipotential bonding conductor (H).

4. Check the connecting elements for corrosion.
5. Replace corroded connecting elements.

Sound-insulated connection



A Frame
C On-site duct
D Microlen tape
E rubber buffer
F Unit connection frame
G gasket

Fig. 83: Unit connection frame

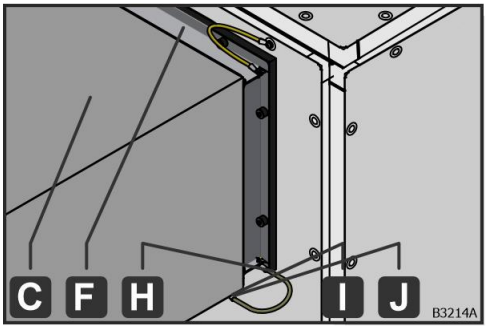


Fig. 84: sound-insulated connection with equipotential bonding conductors

1. Route the pre-assembled equipotential bonding conductor (H) of the unit connection frame (F) to the on-site duct (C).
2. Secure the equipotential bonding conductor (H) with a toothed lock washer (J) to prevent loosening.
3. Tighten the screw (I).

➔ The unit connection frame (F) is connected to the AHU and to the on-site duct (C) via the equipotential bonding conductor (H).

4. Check the connecting elements for corrosion.
5. Replace corroded connecting elements.

Air openings down

WARNING

Risk of explosion due to the grate support having an inadequate connection to the equipotential bonding of the AHU

If the grates are not adequately connected to the support point, the grates may become statically charged. The discharge and the resulting sparks may cause an explosion.

- Lay the grates on clean support points to establish equipotential bonding with the AHU.
- Do not disconnect the grates from the support point (e.g. with plastic elements).

To connect on-site ducts to downward air openings, it may be necessary to remove grating elements.

Mounting of the grating after work on air openings downwards

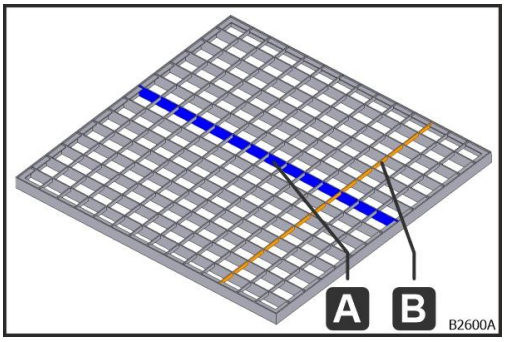


Fig. 85: A - supporting rod; B - cross rod

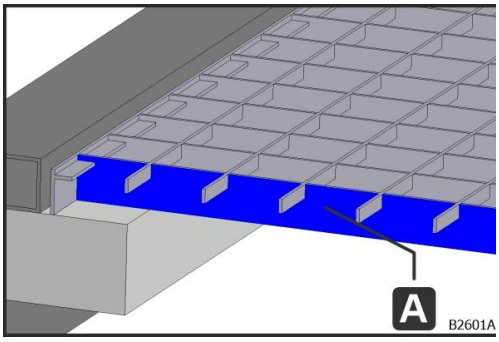


Fig. 86: A – supporting rod

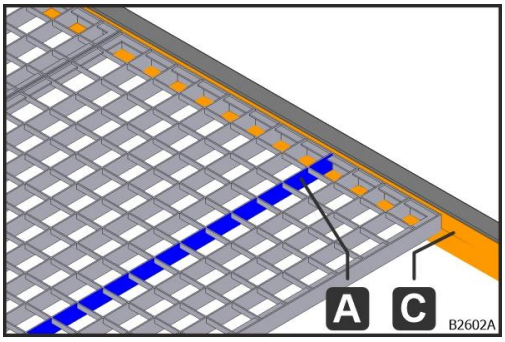


Fig. 87: A - supporting rod; C - support point

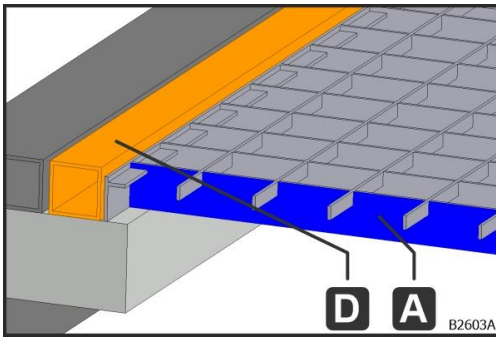


Fig. 88: A - supporting rod ; D - spacer tube

All supporting rods (A) of the individual grating elements must rest on a load-bearing substructure (e.g., support point (C)) at both ends. Spacer tubes (D) prevent the grating element from slipping.

Grating elements are available with the following dimensions:

Supporting rod (A) length

[Modules]	L03	L04,5	L06	L07,5	L09
[mm]	178	331	484	627	790

Cross rod (B) length

[Modules]	T03 - 60 mm	T06 - 60 mm	L06
[mm]	230	536	612

Door

After completion of the unit assembly, all doors must be checked for freedom of movement and aligned if necessary. Tightening torques for screws: 3 Nm.

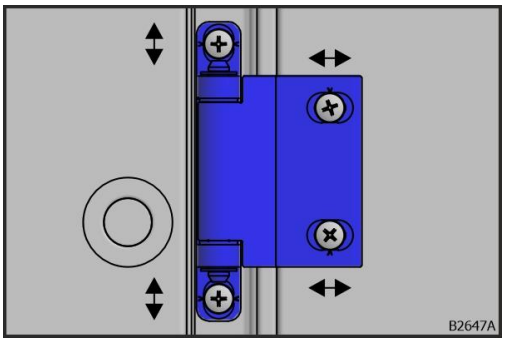


Fig. 89: Hinge of the door

- Align door leaf vertically using the slotted holes in the hinge bracket.
- Align door leaf horizontally using the slotted holes in the hinge bracket.

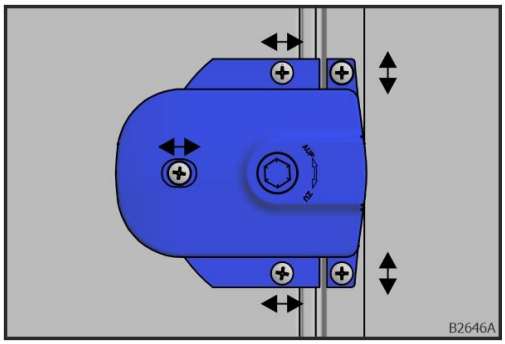


Fig. 90: External lock with key size 10 / double-bit 3

After aligning the door leaf on the hinge side, align the external latch:

- Align the locking cam bracket vertically.
- Align the lock casing horizontally.

WARNING

Risk of explosion from lack of equipotential bonding

Non-existent or incorrectly connected equipotential bonding may cause components to become statically charged. The discharge may cause an explosion.

- Connect all factory installed equipotential bonding conductors and secure them to prevent them from loosening.
- Observe the work steps set out in the operating instructions.

WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual components and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

After finishing the unit assembly, all earthing straps of the inspection doors must be checked.

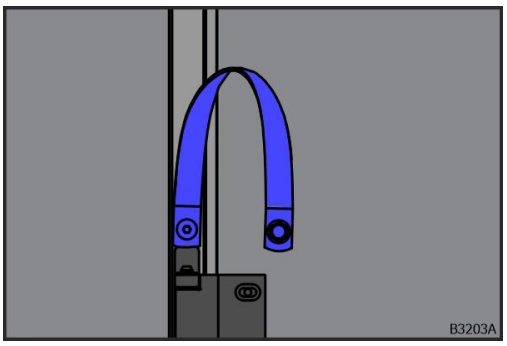


Fig. 91: earthing strap (external)

The external sheet is connected to the AHU equipotential bonding by an earthing strap.

- Check that the earthing straps are tight and secure.
- Check that the screws are tight and secure.
- Check that there are toothed lock washers.
- Check the connecting elements for corrosion.
- Replace corroded connecting elements.

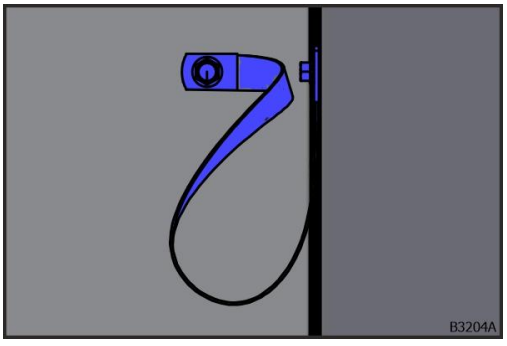


Fig. 92: earthing strap (internal)

The internal sheet is connected to the AHU equipotential bonding by an earthing strap.

- Check that the earthing straps are tight and secure.
- Check that the screws are tight and secure.
- Check that there are toothed lock washers.
- Check the connecting elements for corrosion.
- Replace corroded connecting elements.

Condensate, drain and overflow lines

WARNING

Risk of explosion due to dry siphon

Explosive atmospheres can enter the waste water system through dry siphons or escape at the free outlet. Dry siphons may result in entrainment of the area, e.g. into the machine room. Zone entrainment may cause an explosive atmosphere outside the AHU. In conjunction with a source of ignition, this may result in an explosion.

- Fill siphons with sufficient water.

Provide all pan drains with a siphon (with backflow protection and self-filling). Dispose of wastewater properly.

NOTE

Impairment of the function of the AHU due to incorrectly connected lines.

If the condensate, drain, or overflow lines are connected incorrectly, air and water will be drawn in and blown out through the lines. The function of individual components may be impaired.

- Each pan drain from a drain pan must be connected individually with its own siphon and a free outlet.
  - The stand height of the siphon must be designed for the underpressure or overpressure of the AHU.

Malfunction due to dry siphon

Only a siphon filled with water can perform its function. A siphon may dry out after a long period of inactivity.

- Fill the siphon manually before commissioning.
- Use ball siphons for underpressure or overpressure (intake or discharge side).

Pressure curve in the AHU

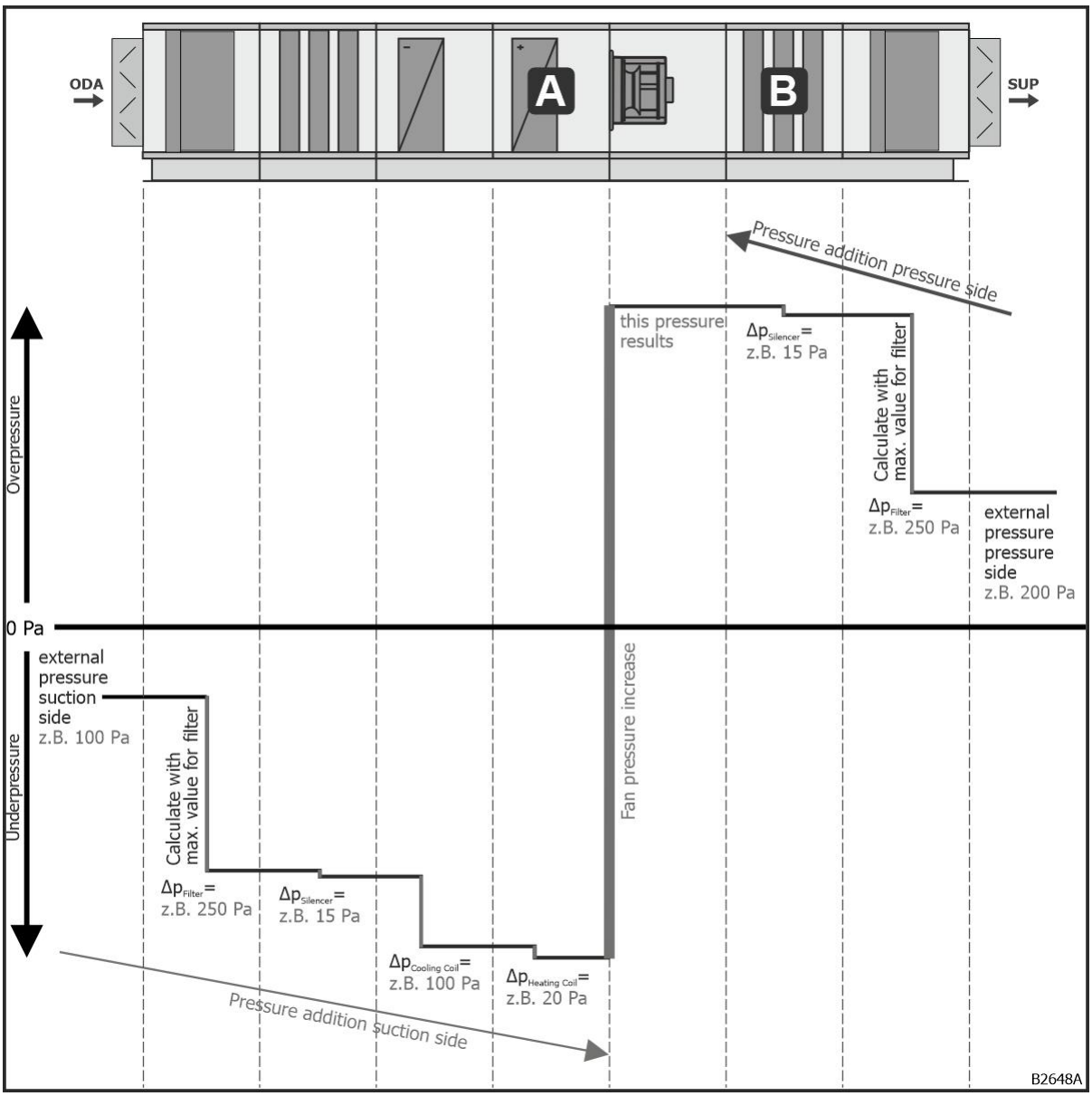


Fig. 93: Pressure curve in the AHU

To calculate the pressure in a component, depending on which part of the AHU the component under consideration is located, you need the following:

- pressure loss of individual components in the AHU (see technical data sheet), and
- the external pressure on the intake side or
- the external pressure on the discharge side.

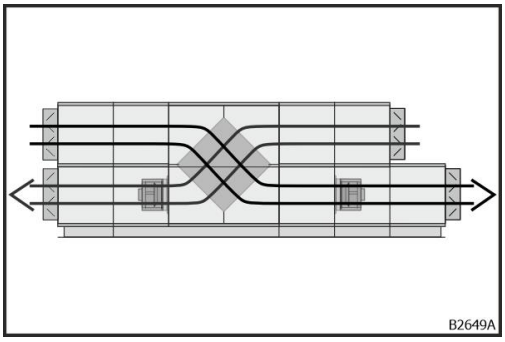


Fig. 94: Airflows in the combine unit

TIP **Plate heat exchanger**

In combine units with plate heat exchangers, the airflows cross. Trace airflow jump when calculating the pressure.

Underpressure siphon

Pressure calculation, intake side

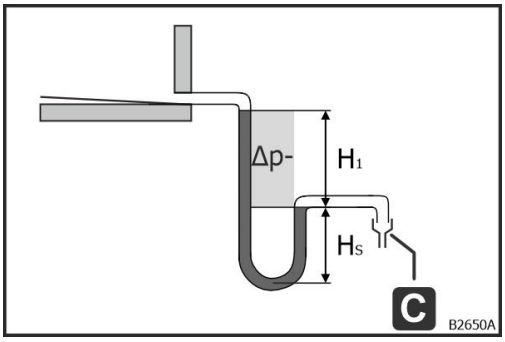
Sample calculation for heating coil (A)
This pressure and the associated siphon height apply only to the heating coil (A).
Always use the final pressure loss to calculate the filter pressure loss.

External pressure on the intake side		E.g.:	-100 Pa
Pressure loss	Filter component	E.g.:	-250 Pa
Pressure loss	Silencer	E.g.:	-15 Pa
Pressure loss	Cooling coil	E.g.:	-100 Pa
Pressure loss	Heating coil	E.g.:	-20 Pa
Total:		p_1=	-485 Pa

Table 1: Pressure calculation for underpressure siphon

This pressure is used to calculate the siphon height for the underpressure siphon (on the intake side) at the heating coil (A).

Siphon height calculation for the underpressure siphon (on the intake side)



C Free discharge at atmospheric pressure

Fig. 95: Underpressure siphon

This is a sample procedure for calculating siphon height. Use the specific heights of siphon manufacturers (see siphon data sheet).
The siphon height for an underpressure siphon is determined as follows:
H_1 [mm] = p [Pa] / 10
H_S [mm] = p [Pa] x 0.075

p [Pa] Maximum internal pressure on the intake side of the respective component
H [mm] = H1 + HS

(Sample calculation for heating coil (A) p_1 = -485 Pa)
H [mm] = H_1 + H_S = p [Pa] / 10 + p [Pa] x 0.075
H = 485/10 + 485x0.075 = 85 [mm]

Overpressure siphon

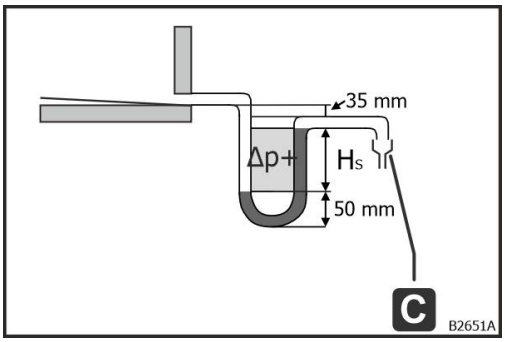
Pressure calculation, discharge side

Sample calculation for silencer (B)
This pressure and the associated siphon height apply only to the silencer (B). Always use the final pressure loss to calculate the filter pressure loss.

External pressure on the discharge side		E.g.:	+200 Pa
Pressure loss	Filter component	E.g.:	+250 Pa
Pressure loss	Silencer	E.g.:	+15 Pa
Total:		p_2=	+465 Pa

Table 2: Pressure calculation for overpressure siphon

This pressure is used to calculate the siphon height for the overpressure siphon (on the discharge side) at the silencer (B).



C Free discharge at atmospheric pressure

Fig. 96: Overpressure siphon

This is a sample procedure for calculating siphon height. Use the specific heights of siphon manufacturers (see siphon data sheet).
The siphon height for an overpressure siphon is determined as follows:
H_S [mm] = p [Pa] / 10

p [Pa] Maximum internal pressure on the discharge side of the respective component
H [mm] = 35 mm + H_S + 50 mm

(Sample calculation for silencer (B) p_2 = +465 Pa)
H = 35 + H_S + 50= 35 + 465/10 + 50 = 131 [mm]

Connecting several pan drains

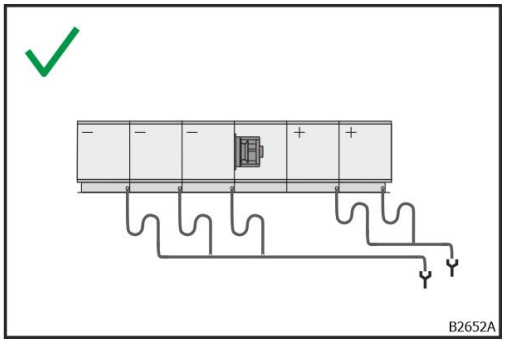


Fig. 97: Connecting several pan drains

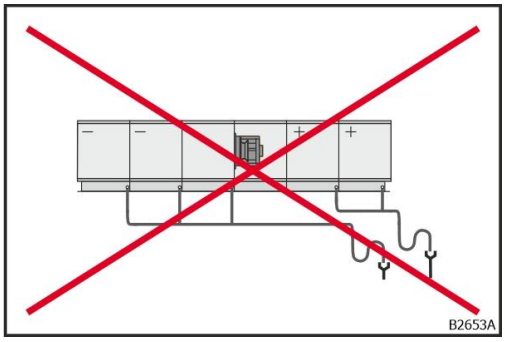


Fig. 98: Wrong connection

When connecting several pan drains, a single siphon must be connected to each pan drain. The drains can be combined downstream of the siphon. Only siphons on the discharge side or on the intake side may be connected.
The combination must end in a free outlet.

Connection of the drain and overflow lines on the circulating water spray humidifier (low pressure)

Connect the drain line of the circulating water spray humidifier (low pressure) and the pan drain of the pre-assembled pan separately to the waste water system. Do not empty the humidifier pan into the pre-assembled pan.

Weatherproof unit

Seal openings (e.g., unit connection, control cabinet) or equip them with a weather protection device to prevent water from entering the AHU.

Roof sealing

The roofs of the weatherproof units are covered with roofing membranes. If weatherproof units are supplied in individual sections, the separation points must be sealed in accordance with the workflow described below.

The following installation material is included in the delivery:

- Roofing membrane strips (G) (PVC, fibre-reinforced)
- Solvent-welding agent for roofing membrane (can)
- Sealing paste for roofing membrane (plastic flask)
- Drip edge overlapping parts (F)
- Connecting screws (window screw JD-22 3.9 x 16 mm, with drill tip, pan-head H, galvanised)
- Plug (grey)
- To seal the height offset:
  - Drip edge L-joint angle (H) (split, depending on execution)
  - Drip edge end piece (I) (right and left execution)

The following equipment is required:

- Flat brush or similar for applying the solvent-welding agent for roofing membrane
- Sand bag or similar to weigh down
- hot air blower or similar for drying and heating
- Cloth or similar for cleaning

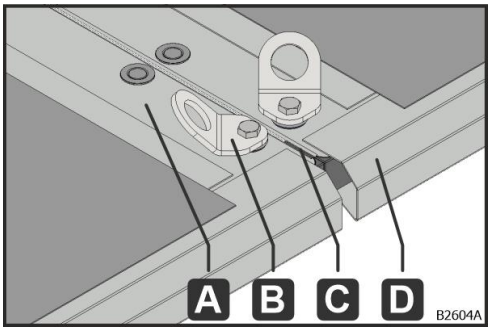


Fig. 99: Separation point before

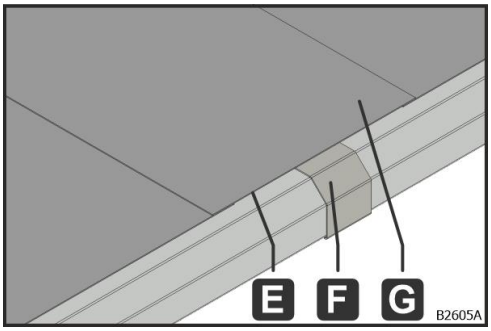


Fig. 100: Separation point after

A – panel; B – transport lug; C – separation point; D – drip edge; E – joint edge; F – drip edge overlapping part; G – roofing membrane stripes

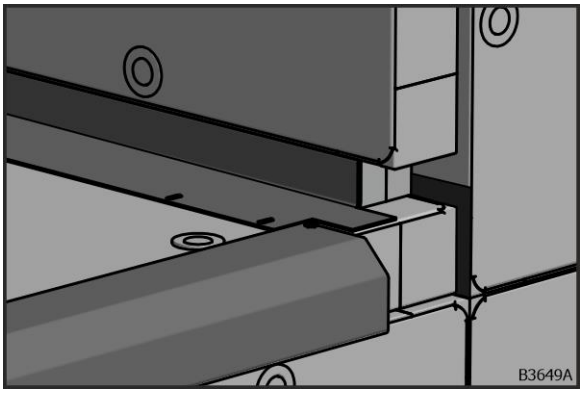


Fig. 101: Height offset before

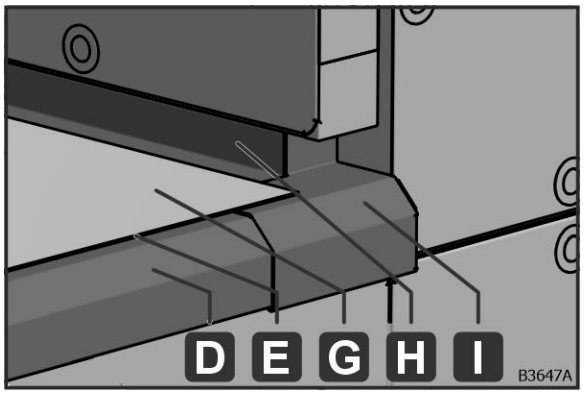


Fig. 102: Height offset after

D – drip edge; E – joint edge; G – roofing membrane; H – drip edge L-joint angle; I – drip edge end piece

CAUTION

Risk of poisoning and fire from hazardous substances

There is a risk of poisoning and fire during roof sealing. Solvent-welding agent (Rhenofol solvent-welding agent (TFH) – tetrahydrofuran) and sealing paste (Rhenofol paste) are highly volatile and flammable. Combined with air, vapours can produce an explosive mixture. Vapours are heavier than air and spread along the ground. Ignition is possible over long distances. Thermal decomposition can produce harmful gases and vapours and create explosive peroxides.

- Observe the safety instructions on the containers.
- Make sure the work area is well ventilated.
- Keep away from sources of ignition. No smoking.
- Take measures to prevent electrostatic charges.
- Only store in the original container. Keep the container tightly closed and store in a cool, well-ventilated location. Protect against direct sunlight.
- Avoid contact with skin, eyes and clothing.
- Avoid inhaling gas.
- Wear personal protective equipment (tight-fitting safety goggles with side protection, self-contained respiratory protection (filter type A-P2); chemical protective gloves (suitable material: butyl rubber; thickness of the glove material: >= 0.7 mm) and protective clothing).
- Do not allow to enter the waste water system or waters.
- Observe the manufacturer’s safety data sheet.

Use up opened containers within 24 hours.

Work steps at the separation point

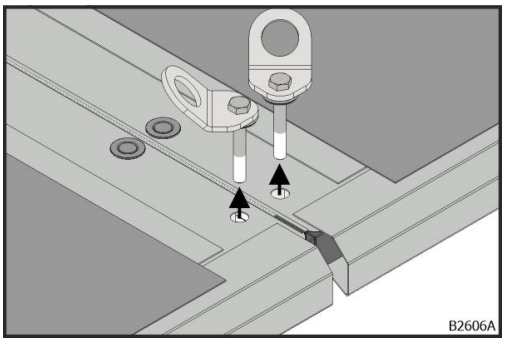


Fig. 103: Removing the transport lugs

1. Remove the transport lugs (S) and screws.

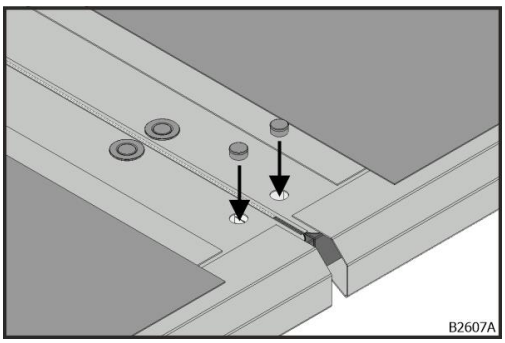


Fig. 104: Sealing the holes

2. Seal the holes from above on each casing construction with a plug (grey).

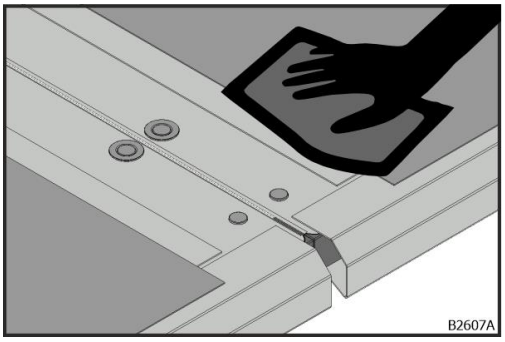


Fig. 105: Cleaning

The roofing membranes and drip edges (D) next to the separation point (C) must be clean.

3. Clean the contaminated roofing membranes and drip edges (D) with a damp cloth.

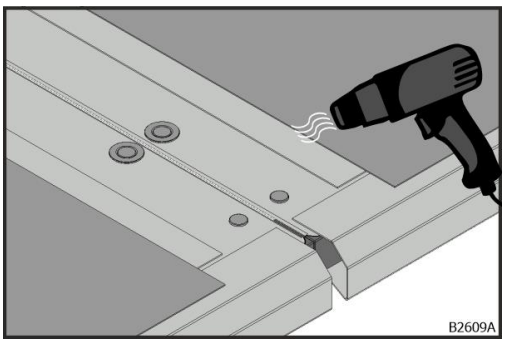


Fig. 106: Drying

The roofing membranes next to the separation point (C) must be dry.

4. Dry damp roofing membranes and drip edges (D) with hot air.

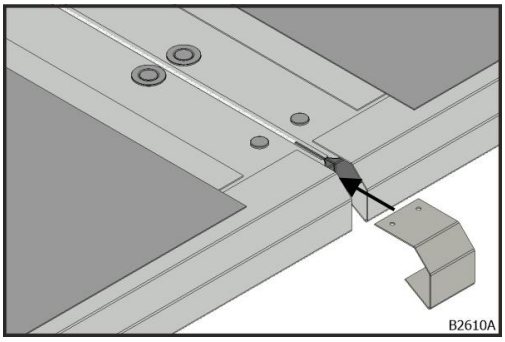


Fig. 107: Attaching the drip edge overlapping part

5. Attach the drip edge overlapping parts (F) over the drip edge (D) at the separation point (C).

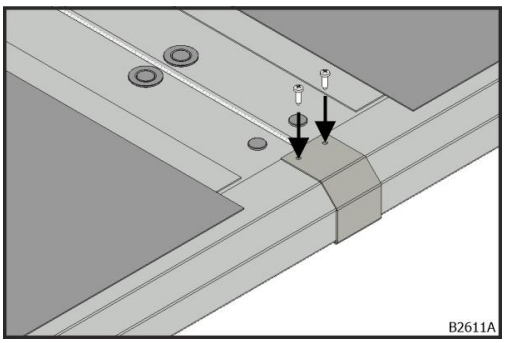


Fig. 108: Mounting the drip edge overlapping part

6. Attach the drip edge overlapping parts (F) with the supplied connecting screws (window screw JD-22 3.9 x 16 mm, with drill tip, pan head-H, galvanised).

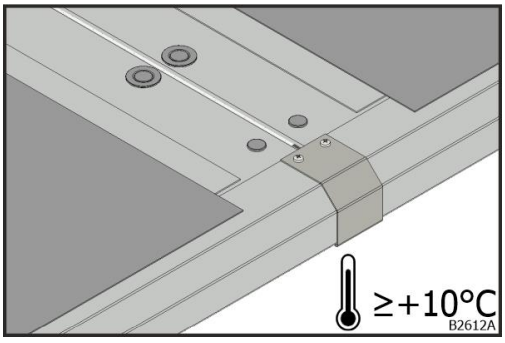


Fig. 109: Installation temperature

The installation temperature must be at least +10 °C.

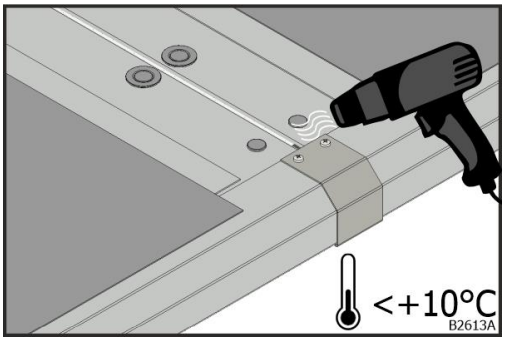


Fig. 110: Preheating

7. At temperatures below +10 °C, the roofing membranes next to the separation point (C) and the roofing membrane strips (G) must be preheated with hot air.

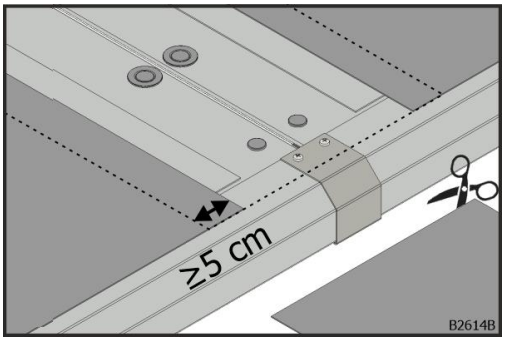


Fig. 111: Cutting the roofing membrane strips to size

8. Cut the roofing membrane strips (G) to size so that the roofing membrane strips (G) overlap the laid roofing membrane by at least 5 cm.

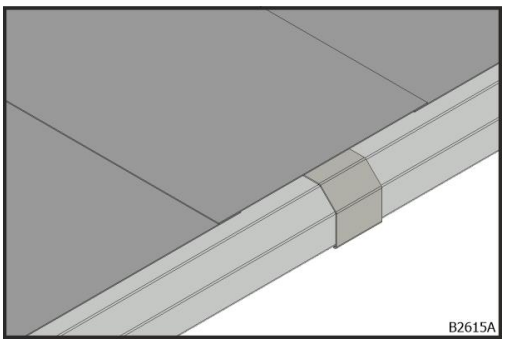


Fig. 112: Placing the roofing membrane strips

9. Place the roofing membrane strips (G).

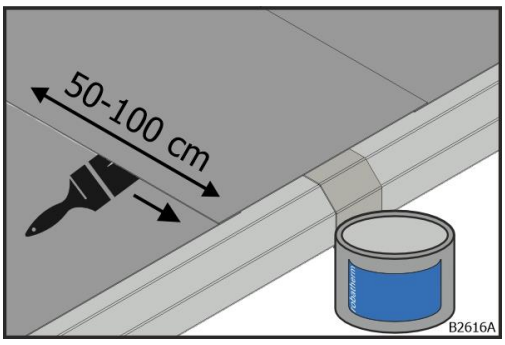


Fig. 113: Applying solvent-welding agent in sections

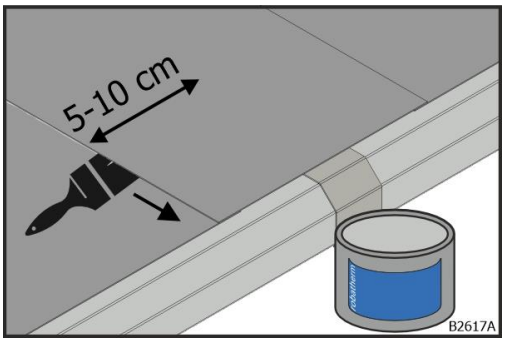


Fig. 114: Applying solvent-welding agent

10. Apply solvent-welding agent between the roofing membrane strips (G) and installed roofing membrane using a flat brush as follows:

- In short sections of approx. 50 to 100 cm lengths in laying direction
- Approx. 5 to 10 cm wide on drip edge (D) and drip edge overlapping parts (F) over the complete support point of the roofing membrane strip (G)

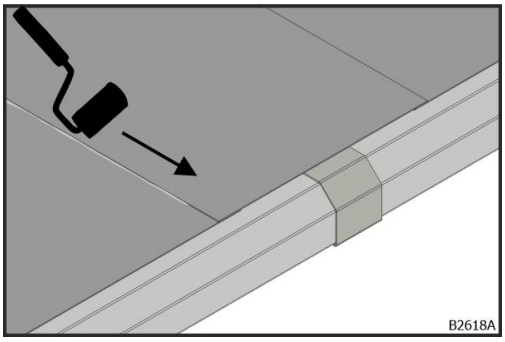


Fig. 115: Pressing on

11. Press on the roofing membrane strips (G) with a roller or the flat of your hand.

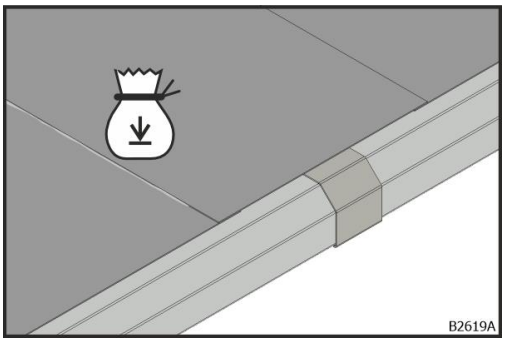


Fig. 116: Weighing down

12. Weigh down the roofing membrane strips (G) with a sand bag.

Repeat work steps 11 to 13 for the next section of the roofing membrane strip (G) 50 to 100 cm long.

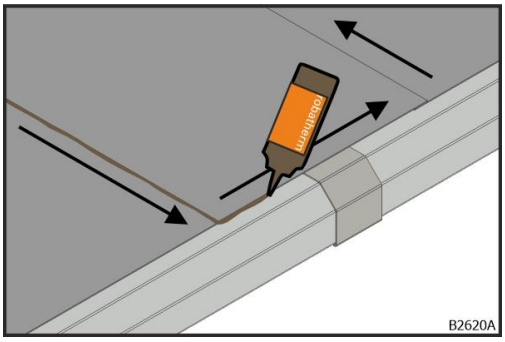


Fig. 117: Sealing paste

13. Press the sealing paste continuously into the joint edge of the roofing membrane as a thin strip.

The roofing membrane sealing paste dries into a sealed film fast.

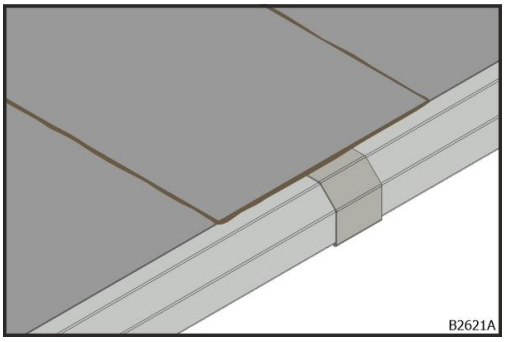


Fig. 118: Roof sealing at the separation point

➔ Roofing is sealed at the separation point (C).

Work steps at the corners

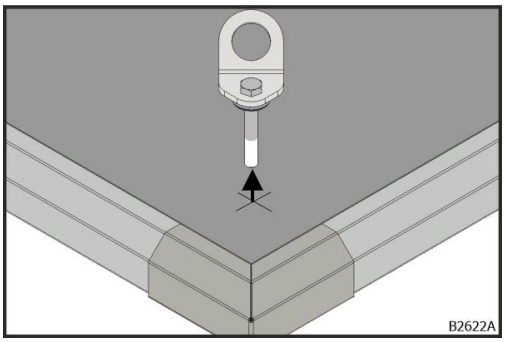


Fig. 119: Removing the transport lug

1. Remove the transport lugs (S) and screws.

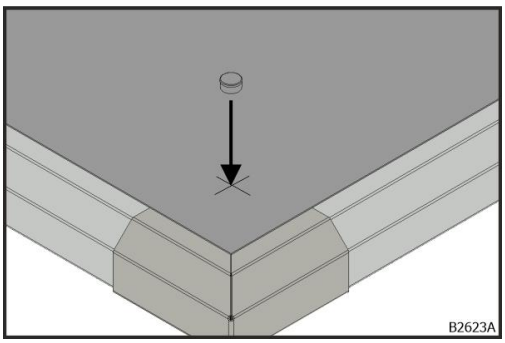


Fig. 120: Sealing the hole

2. Seal the holes from above on each casing construction with a plug (grey).

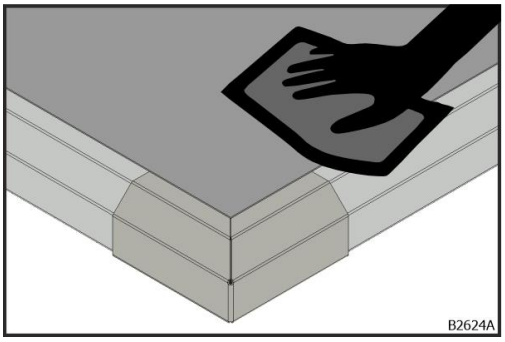


Fig. 121: Cleaning

Roofing membranes must be clean.

3. Clean the contaminated roofing membranes with a damp cloth.

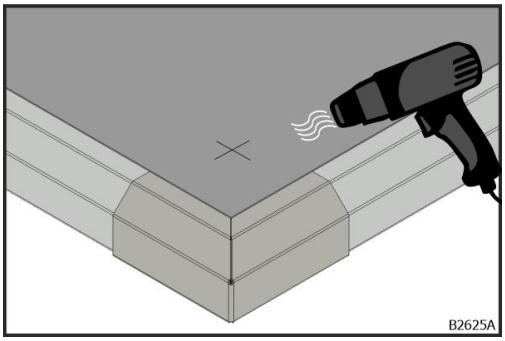


Fig. 122: Drying

Roofing membranes must be dry.

4. Dry damp roofing membranes with hot air.

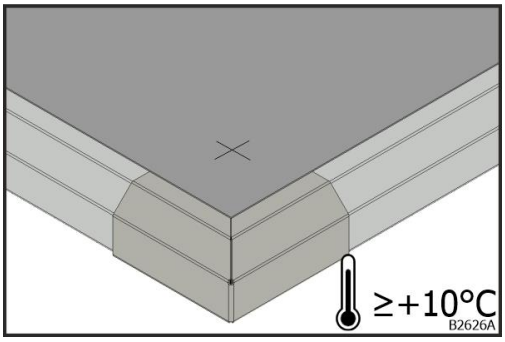


Fig. 123: Installation temperature

The installation temperature must be at least +10 °C.

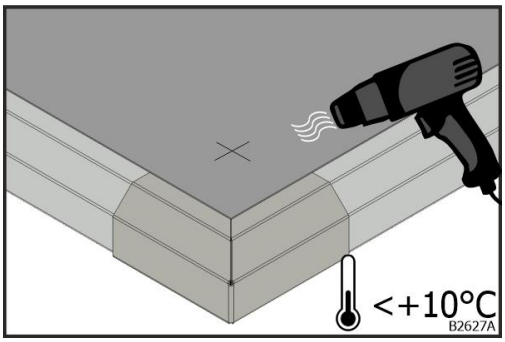


Fig. 124: Preheating

5. At temperatures below +10 °C, the roofing membranes on the corner and the roofing membrane strips (G) must be preheated with hot air.

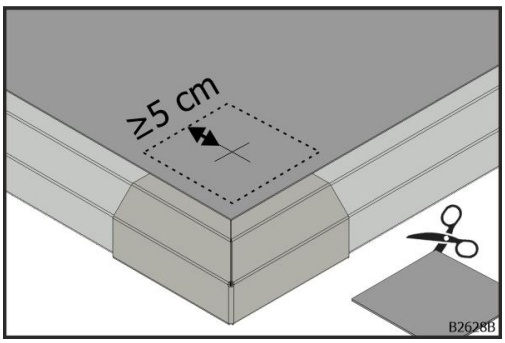


Fig. 125: Cutting the roofing membrane strips to size

6. Cut the roofing membrane strips (G) to size so that the roofing membrane strips (G) overlap the laid roofing membrane by at least 5 cm.

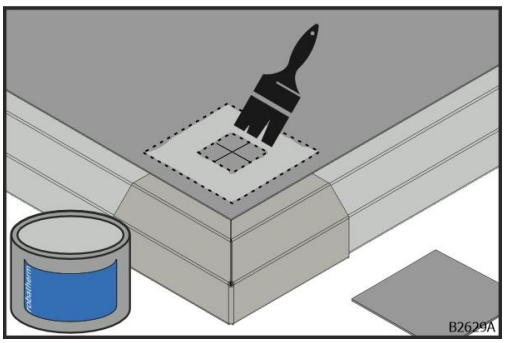


Fig. 126: Applying solvent-welding agent

7. Apply solvent-welding agent with a flat brush to the hole area the size of the cut-out on the installed roofing membrane.

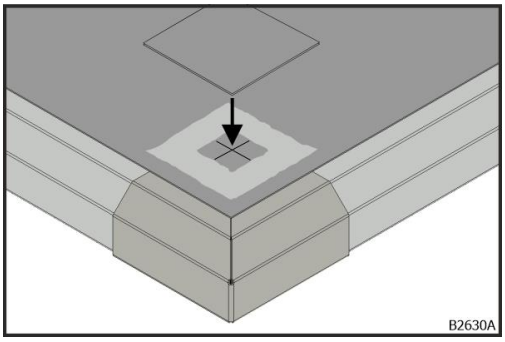


Fig. 127: Placing the roofing membrane strips

8. Place the roofing membrane strips (G).

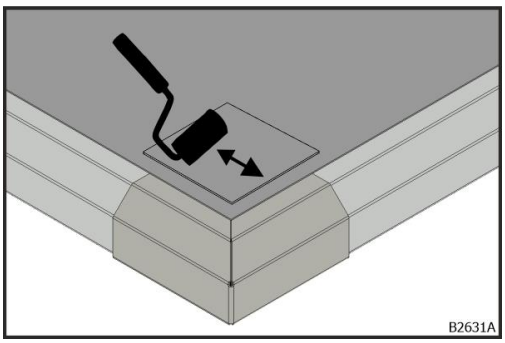


Fig. 128: Pressing on

Press on the roofing membrane strips (G) with a roller or the flat of your hand.

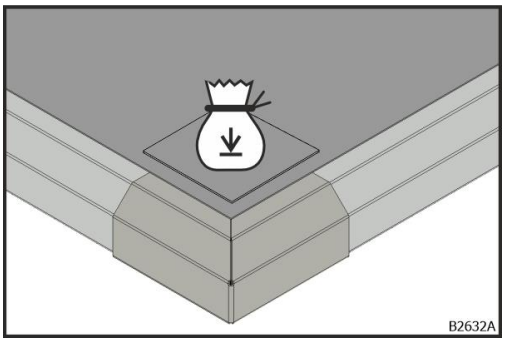


Fig. 129: Weighing down

9. Weigh down the roofing membrane strips (G) with a sand bag.

A longer load on the installed roofing membrane strips (G) is not necessary.

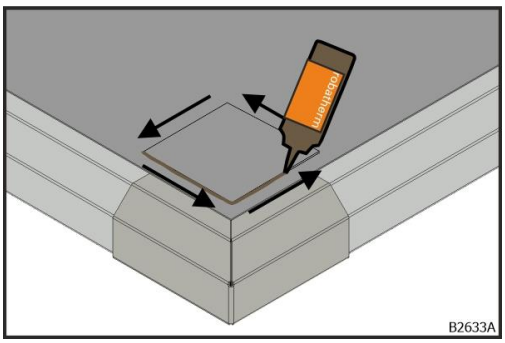


Fig. 130: Sealing paste

10. Press the sealing paste continuously into the joint edge of the roofing membrane as a thin strip.

The roofing membrane sealing paste dries into a sealed film fast.

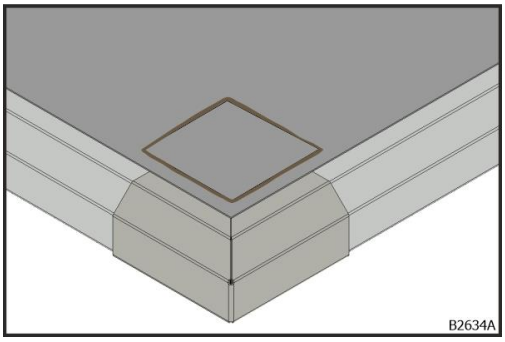


Fig. 131: Roof sealing at the corner

➔ Roofing is sealed at the corner.

Work steps for height offset

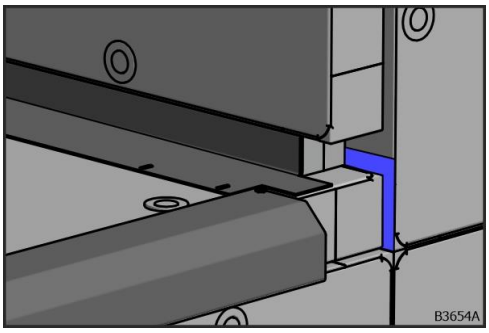


Fig. 132: Checking the foam tape on the height offset

1. Check the foam tape on the height offset for:

- correct alignment
- tight fit

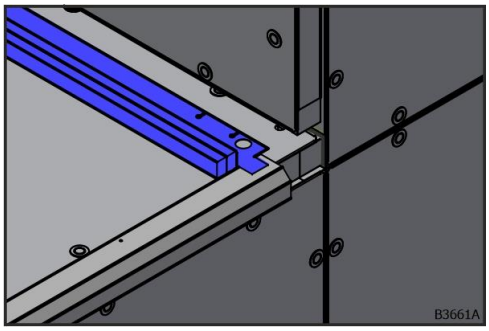


Fig. 133: Drip edge L-joint angle rotated for transport reasons

For transport reasons, the drip edge L-joint angle (H) may be supplied rotated. In this case, carry out work steps 2 to 5. Otherwise, continue with work step 6.

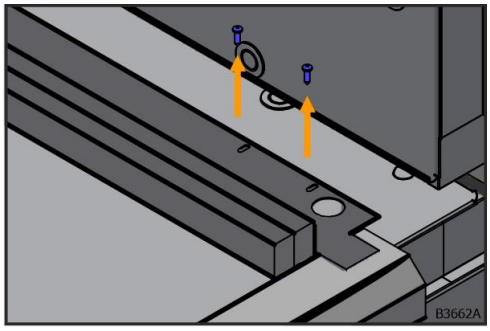


Fig. 134: Removing the drip edge L-joint angle, if necessary

2. Remove the pre-assembled drip edge L-joint angle (H).

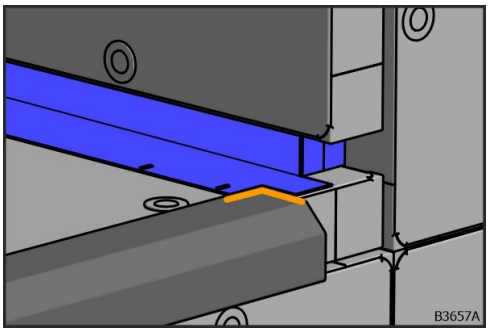


Fig. 135: Placing the drip edge L-joint angle, if necessary

3. Turn the drip edge L-joint angle (H).
4. Place the drip edge L-joint angle (H) in the centre of the panel using the factory-fitted drip edges. With a split drip edge L-joint angle (H), ensure that there is no gap at the joint.

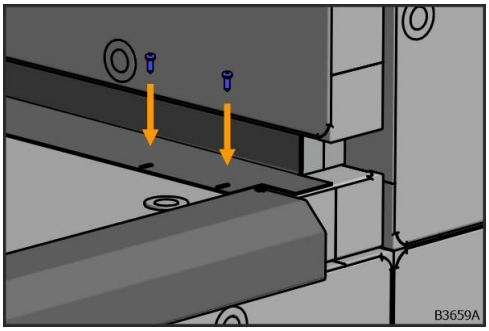


Fig. 136: Attaching the drip edge L-joint angle

5. Attach the drip edge L-joint angle (H) with the dismantled connecting screws (window screw JD-22 3.9 x 16 mm, with drill tip, pan head-H, galvanised).

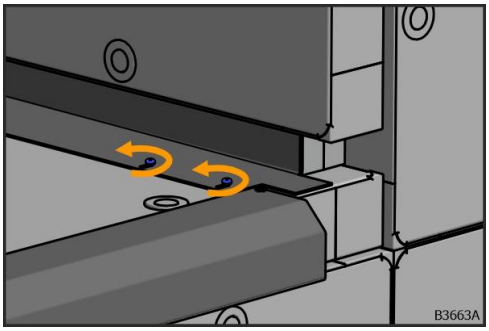


Fig. 137: Undoing the connecting screws of drip edge L-joint angle

6. If the drip edge L-joint angle (H) has already been correctly pre-assembled, undo the connecting screws.

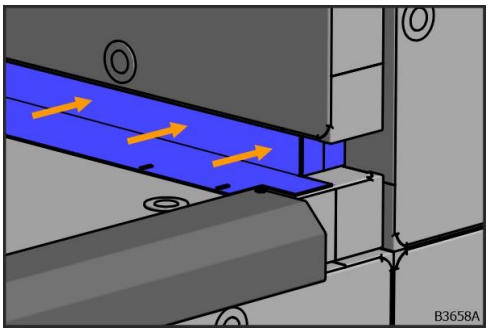


Fig. 138: Pressing on the drip edge L-joint angle

7. Press the drip edge L-joint angle (H) against the tube.

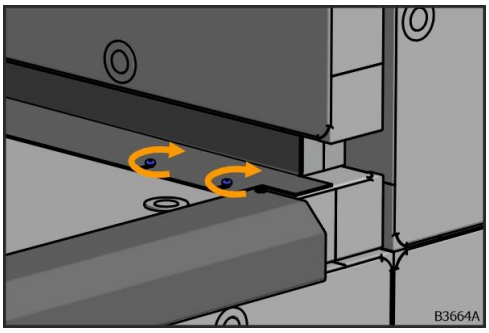


Fig. 139: Mounting the drip edge L-joint angle

8. Attach the drip edge L-joint angle (H) with the unscrewed connecting screws (window screw JD-22 3.9 x 16 mm, with drill tip, pan head-H, galvanised).

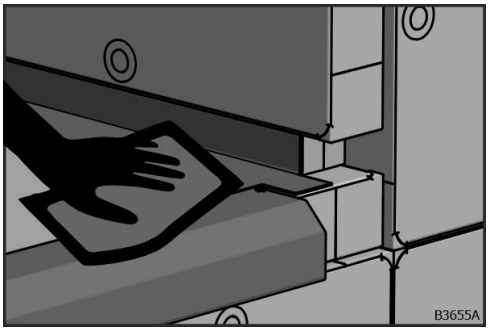


Fig. 140: Cleaning

The panel, drip edge L-joint angle (H) and drip edges (D) in the height offset area must be clean.

9. Clean the contaminated panel, drip edge L-joint angle (H) and drip edges (D) with a damp cloth.

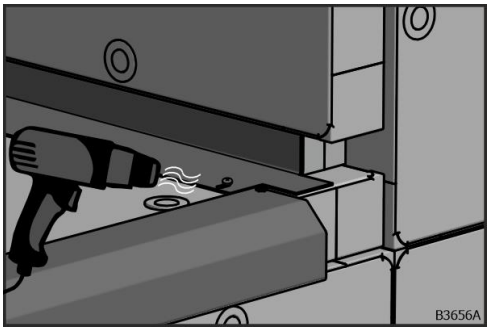


Fig. 141: Drying

The panel, drip edge L-joint angle (H) and drip edges (D) for the height offset must be dry.

10. Dry the damp panel, drip edge L-joint angle (H) and drip edges (D) with hot air.

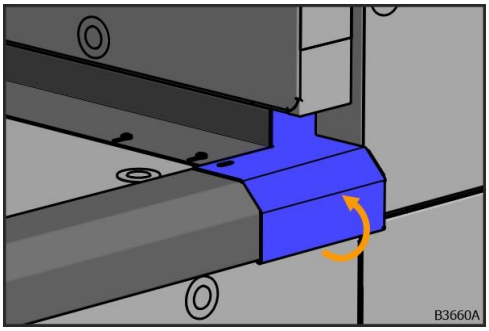


Fig. 142: Attaching the drip edge end piece

11. Attach the drip edge end piece (I) to the bottom of the drip edge and swivel upwards.

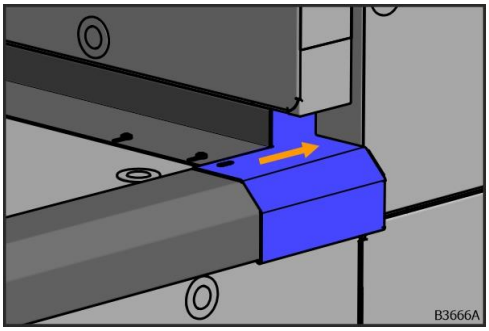


Fig. 143: Pressing on the drip edge end piece

12. Press the drip edge end piece (I) against the tube.

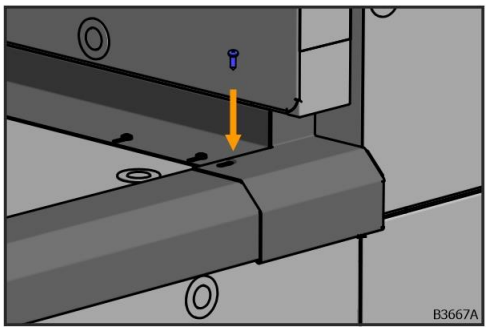


Fig. 144: Mounting the drip edge end piece

13. Attach the drip edge end piece (I) with the supplied connecting screws (window screw JD-22 3.9 x 16 mm, with drill tip, pan head-H, galvanised).

Repeat work steps 11 to 13 for the drip edge end piece (I) on the other side.

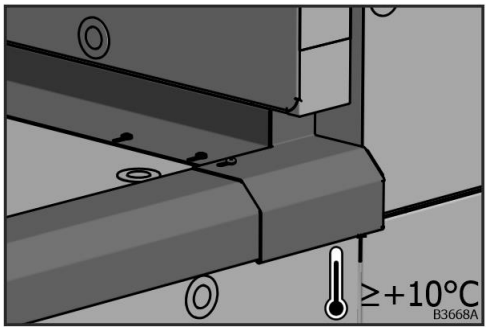


Fig. 145: Installation temperature

The installation temperature must be at least +10 °C.

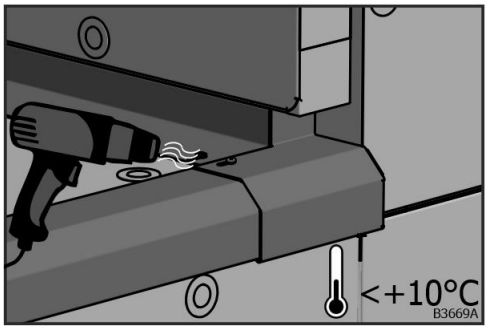


Fig. 146: Preheating

14. For temperatures below +10 °C, drip edges (D), installed roofing membrane (G), drip edge L-joint angle (H) and drip edge end pieces (I) must be pre-heated with hot air.

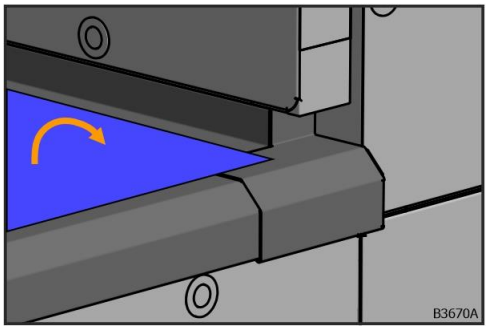


Fig. 147: Cutting the roofing membrane strips to size

15. Fold up the installed roofing membrane (G).

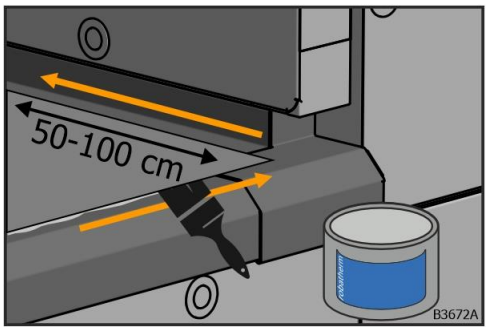


Fig. 148: Applying solvent-welding agent in sections

16. Apply solvent-welding agent between the roofing membrane strips (G) and drip edge L-joint angle (H) using a flat brush as follows:
- In short sections of approx. 50 to 100 cm lengths in laying direction
- Approx. 5 to 10 cm wide on drip edges (D) and drip edge end pieces (F) over the complete support point of the roofing membrane strip (G)

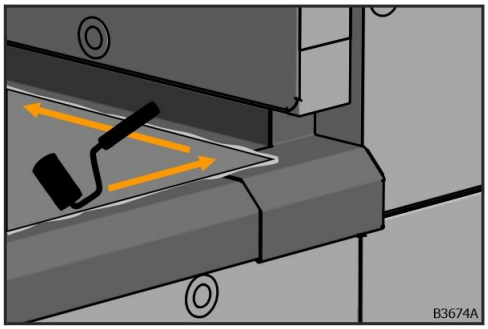


Fig. 149: Pressing on

17. Press on the roofing membrane strip (G) with a roller or the flat of your hand.

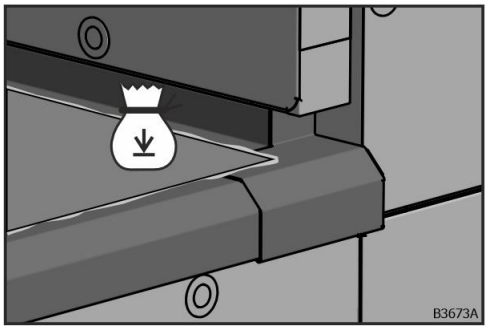


Fig. 150: Weighing down

18. Weigh down the roofing membrane strip (G) with a sand bag.

Repeat work steps 16 to 18 for the next section of roofing membrane (G) 50 to 100 cm long.

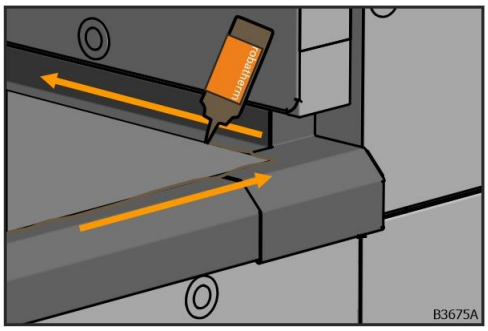


Fig. 151: Roofing membrane sealing paste

19. Press the sealing paste continuously into the joint edge of the roofing membrane as a thin strip. For a split drip edge L-joint angle (H), also seal the joint.

The roofing sealing paste dries into a sealed film.

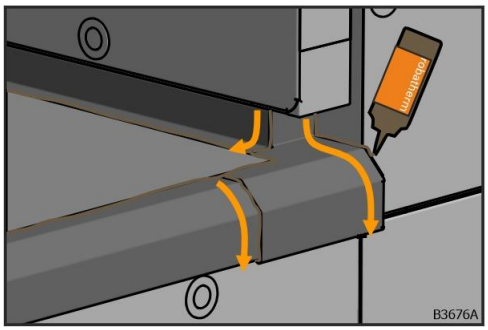


Fig. 152: Sealing paste for drip edge end piece

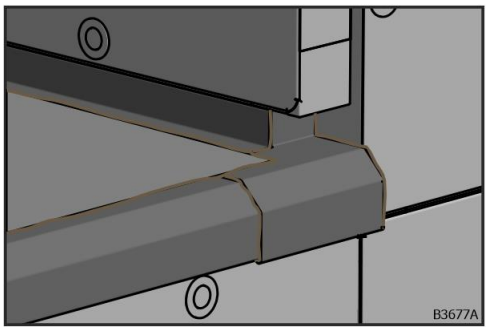


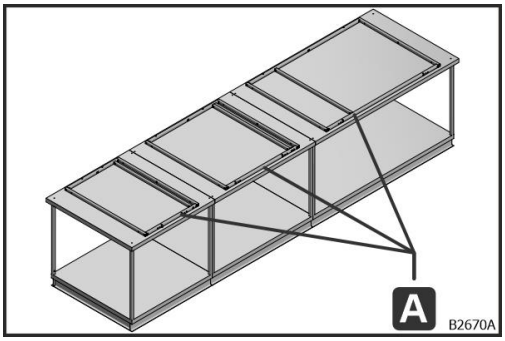
Fig. 153: Roof sealing for height offset

➔ Roofing is sealed at the height offset.

Connection of weatherproof devices with roof rack frame

Requirements

- Lower AHU is attached to the foundation (see chapter "Foundation", page 18).
- Transport lugs are removed (see chapter "Transport lugs", page 45).
- Roof is sealed at the separation points and corners (see chapter "Roof sealing", page 64).



A – main frame

Fig. 154: Lower AHU mounted with main frame

The following install material is included in the delivery:

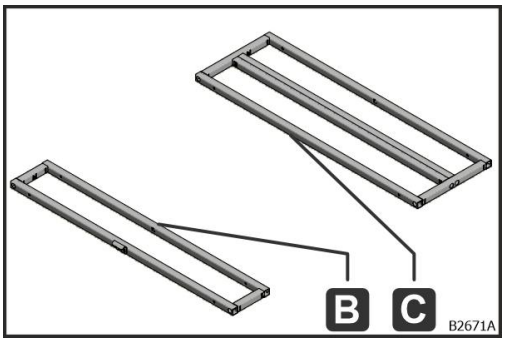


Fig. 155: Additional frame

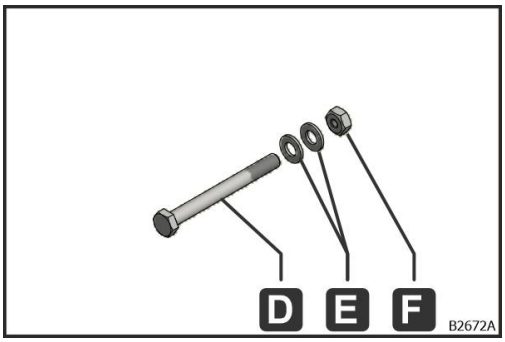


Fig. 156: Install material

B - additional frame beginning/end (204 mm); C - additional frame middle (408 mm); D - hexagonal screw M8x8 DIN 931 galvanized steel; E - washer form A; d1=8,4; d2=16 DIN 125 galvanized steel; F - hexagon nut M8 DIN 934 galvanized steel

Additional frames are delivered on a pallet or are clamped between the main frames.

Mounting additional frames

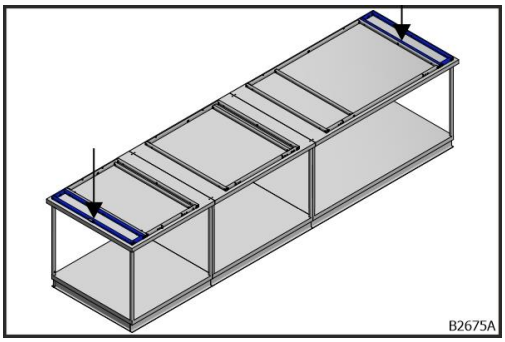


Fig. 157: Placing additional frame

1. Place the beginning/end (B) of the additional frame on the beginning/end of the AHU according to the technical drawing so that the roof rack bracket is on the outer tube.

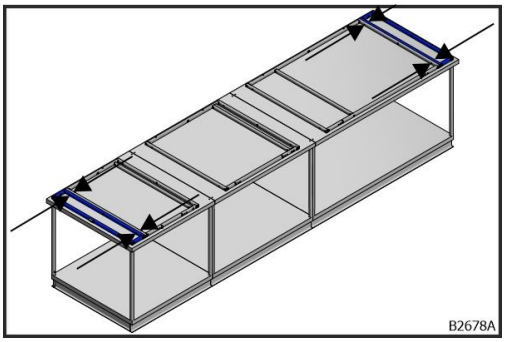


Fig. 158: Joining additional frame

2. Connect the main frame and the additional frame with hexagonal screw (D), washer (E) and hexagon nut (F).

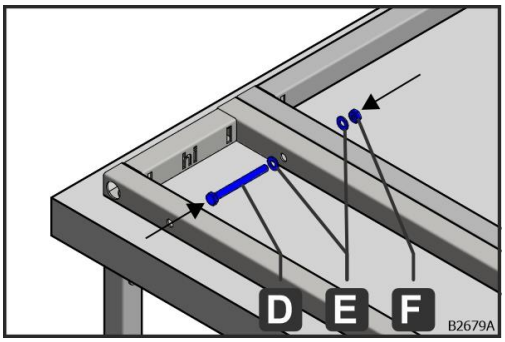


Fig. 159: Detail of the additional frame screw fitting

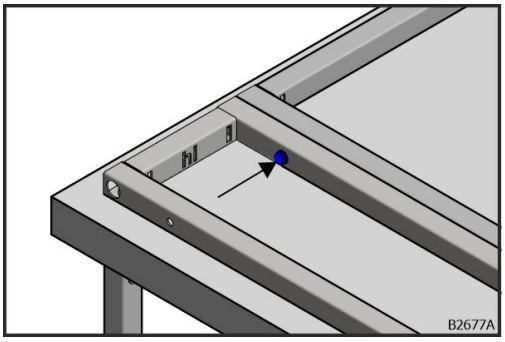


Fig. 160: Mounted additional frame

Start/end (B) of the additional frame is mounted correctly.

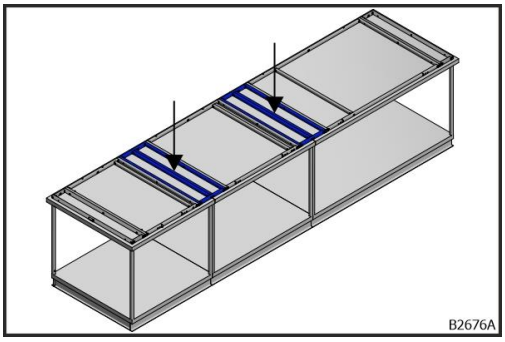


Fig. 161: Placing additional frame

3. Place the center (C) of the additional frame between two main frames (A) according to the technical drawing.

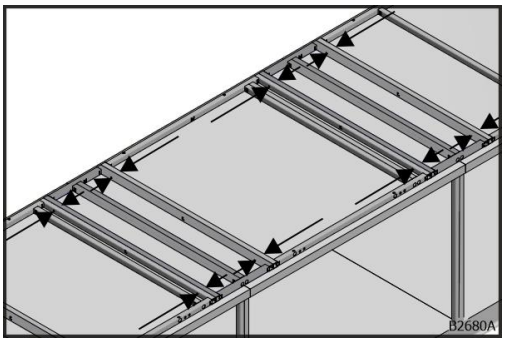


Fig. 162: Joining additional frame

4. Connect the main frame and the additional frame with hexagonal screw (D), washer (E) and hexagon nut (F).

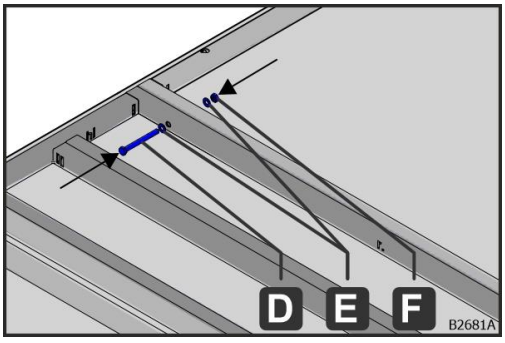


Fig. 163: Detail of the additional frame screw fitting

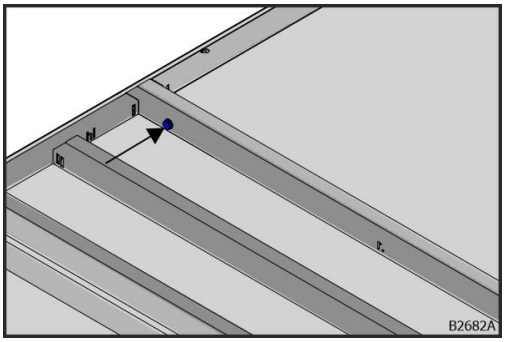


Fig. 164: Mounted additional frame

➔ Additional frame in the center (C) is mounted correctly.

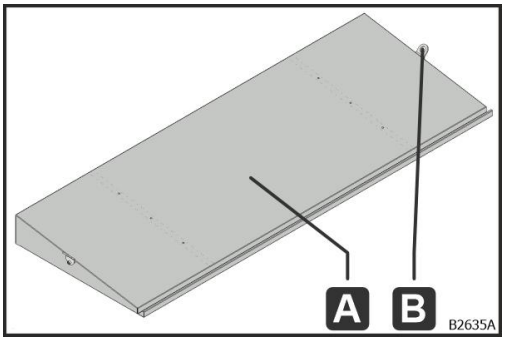
Mount upper AHU (see chapter "Connection of AHUs with roof rack frame", page 48).

Protection roof

Weatherproof devices can be equipped with protection roofs.

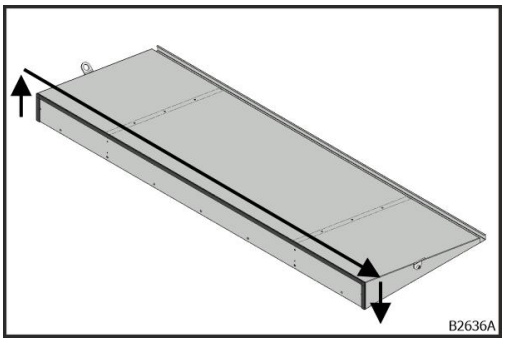
The following install material is included in the delivery:

- Protection roof with mounted transport lugs
- Foam tape, 20x4 mm, PE foam, anthracite
- Self drilling screw with lens head DIN 7504, 6.3x80 mm, Torx, galvanized steel
- Plug 13.0x11.0x5.0 PE RAL 9010/pure white



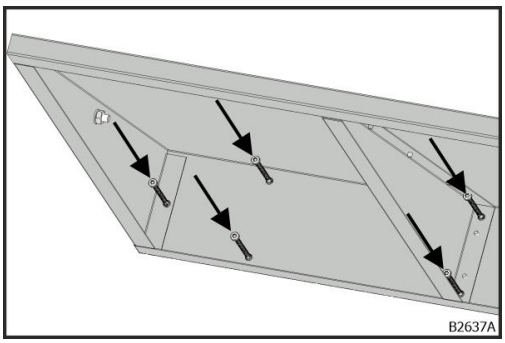
A protection roof
B transport lug

Fig. 165: Scope of delivery, protection roof



1. Cover protection roof sides and top with foam tape, 20x4 mm, PE foam, anthracite.

Fig. 166: Taping



2. Insert the supplied self drilling screw with lens head DIN 7504, 6.3x80 mm, Torx, galvanized steel.

Fig. 167: Insert screws first

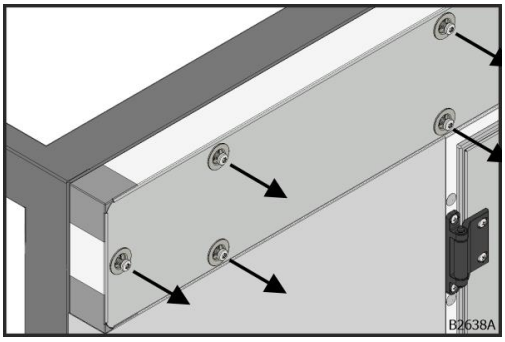


Fig. 168: Removing screws

3. Remove all screws from the corresponding panel.

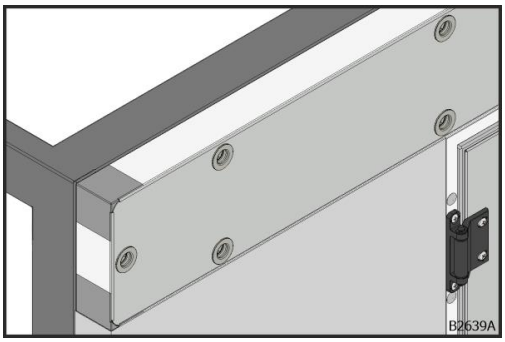


Fig. 169: Screws have been removed

➔ Screws have been removed.

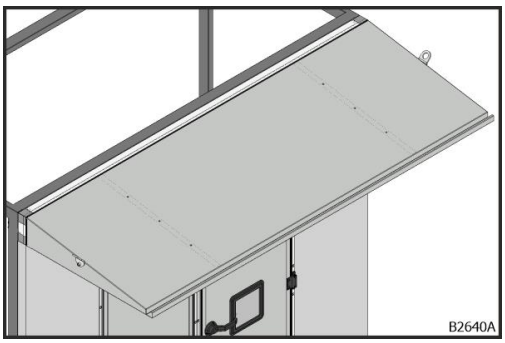


Fig. 170: Alignment

4. Align the protection roof to the panel.

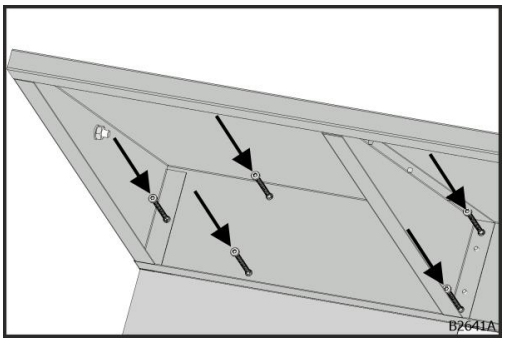


Fig. 171: Fit screws

5. Use bit extension to mount protection roof with pre-inserted self drilling screw with lens head DIN 7504, 6.3x80 mm, Torx, galvanized steel.

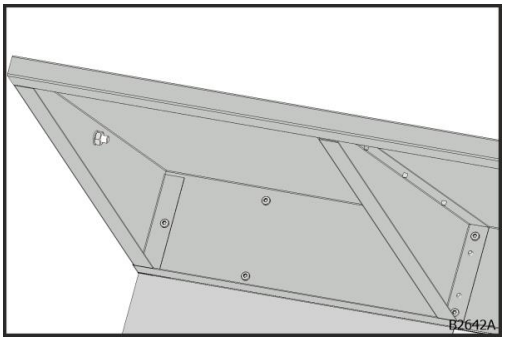


Fig. 172: Screws fitted

➔ Self drilling screw with lens head DIN 7504, 6.3x80 mm, Torx, galvanized steel, mounted.

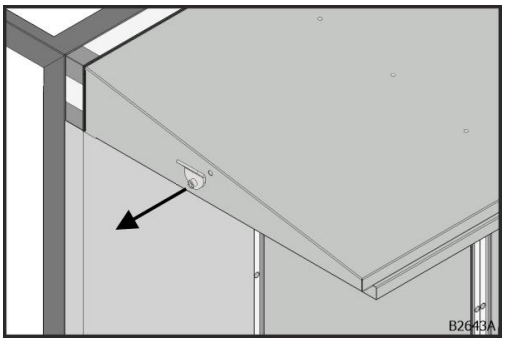


Fig. 173: Remove transport lugs

6. Disassemble transport lugs.

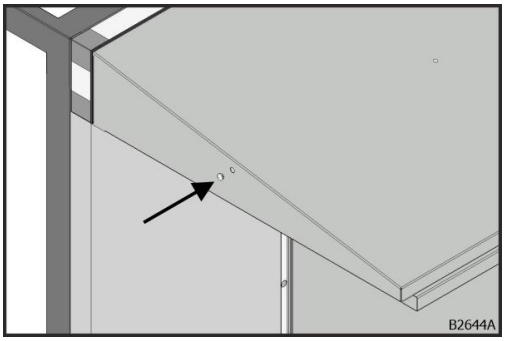


Fig. 174: Sealing holes

7. Seal holes with plugs 13.0x11.0x5.0 PE RAL 9010/pure white.

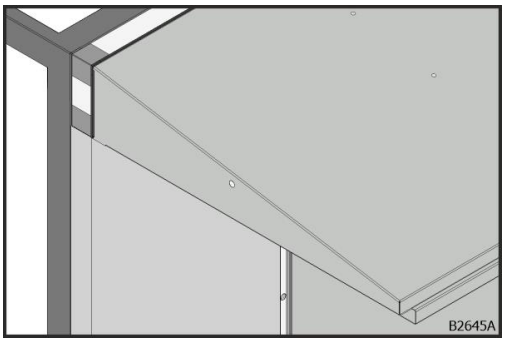


Fig. 175: The protection roof is mounted

➔ The protection roof is mounted.

Filter component

WARNING

Risk of explosion from lack of equipotential bonding

Non-existent or incorrectly connected equipotential bonding may cause components to become statically charged. The discharge may cause an explosion.

- Connect all factory installed equipotential bonding conductors and secure them to prevent them from loosening.
- Observe the work steps set out in the operating instructions.

WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual components and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

WARNING

Risk of explosion due to the use of filters with inadequate ignition protection

Using filters without adequate ignition protection may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Use filters that are at least compliant with the ATEX requirements of the AHU.

Filter installation

The following installation material is included in the delivery:

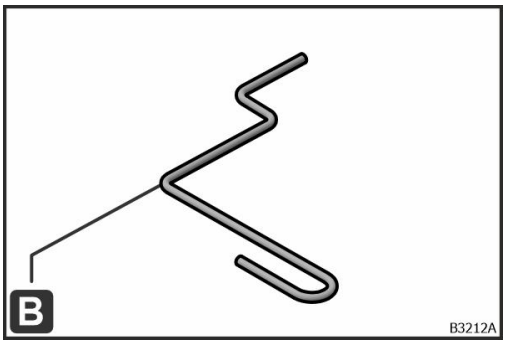


Fig. 176: installation material for filter installation

B – filter fastening spring

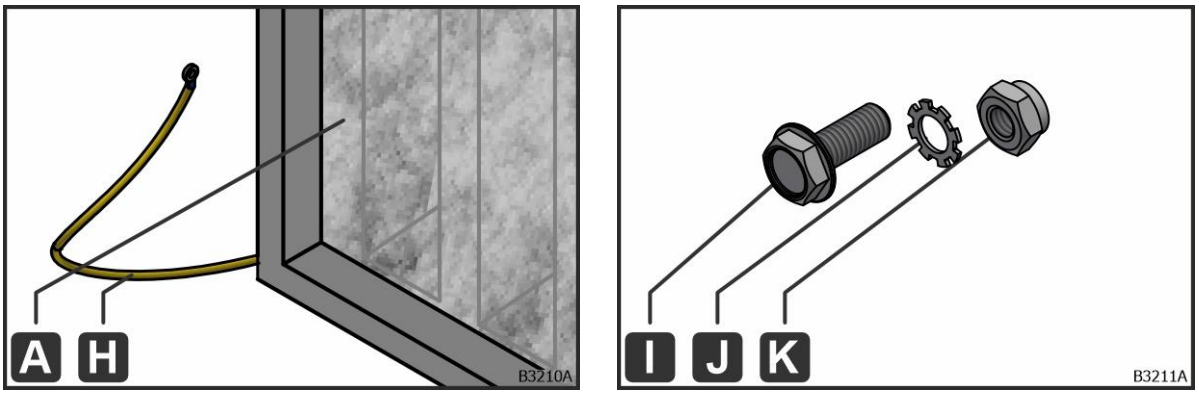


Fig. 177: installation material for filter wall with equipotential bonding

A – filter; H – pre-assembled equipotential bonding conductor; I – self tapping screw DIN 7500, shape D, M 4 x 16, galvanised steel; J – toothed lock washer DIN 6797, shape A, d = 6.4, galvanised steel; K – self locking nut DIN 985 (ISO 10511), M 4, V2A

Work steps

1. Fasten the filter in the filter mounting frame with 4 filter clamps (B) each or hand-tighten the bayonet catch.
2. Do not clamp or damage the filter.
3. Check that the filter is fitted airtight in the filter mounting frame.

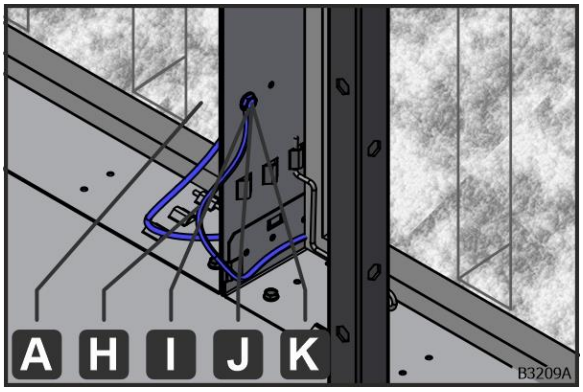


Fig. 178: filter wall with equipotential bonding

4. Run the pre-assembled equipotential bonding conductors (H) of the filters (A) to the borehole of the filter mounting frame.
5. Use the self-tapping screw (I) to connect the two equipotential bonding conductors (H) through the borehole in the filter mounting frame.
6. Place the toothed lock washer (J) on the self-tapping screw (I).
7. Screw the self locking nut (K) firmly onto the self tapping screw (I).

➔ The filter (A) is connected to the filter mounting frame and the AHU by means of the equipotential bonding conductor (H).

8. Check the connecting elements for corrosion.
9. Replace corroded connecting elements.

HEPA filter installation according to EN 1822

The preassembled filter component for HEPA filters according to EN 1822 consists of the following components:

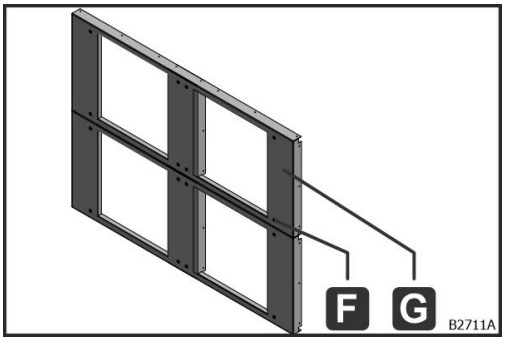
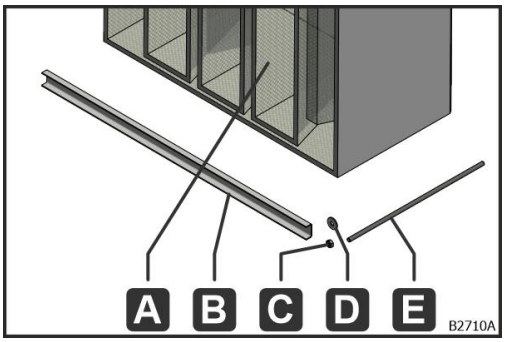


Fig. 179: F - rivet nut M8, hexagonal, V2A; G - filter wall

If robatherm AHUs are equipped with HEPA filters according to EN 1822, the following install material is included in the delivery:



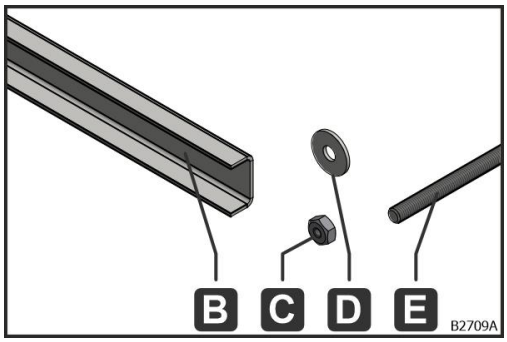
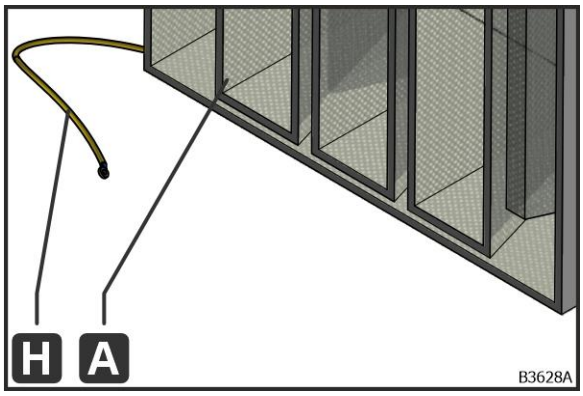


Fig. 180: Install material

A - filter; B - clamping profile; C - hexagon nut DIN 934 (EN-ISO 4032) M8 V2A; D - washer A2, DIN 9021 (EN-ISO 7093), d1=8.4mm, d2=24.0mm; E - threaded rod DIN 976, M 8 x 350 mm, grade:1.4301



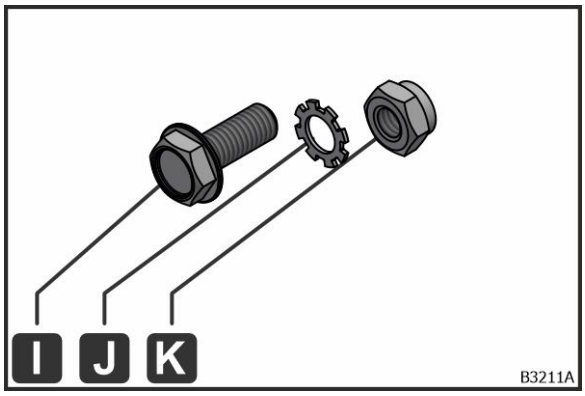


Fig. 181: installation material for filter wall with equipotential bonding

A – filter; H – pre-assembled equipotential bonding conductor; I – self tapping screw DIN 7500, shape D, M 5 x 16, galvanised steel; J – toothed lock washer DIN 6797, shape A, d = 6.4, galvanised steel; K – self locking nut DIN 985 (ISO 10511), M 5, V2A

General procedure

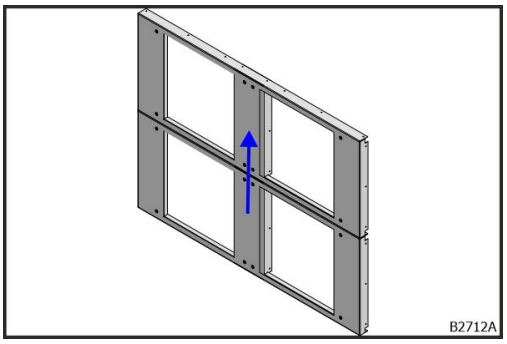


Fig. 182: Assembly sequence

- Start with the bottom row. Work from the bottom up.

HEPA filter installation work steps according to EN 1822

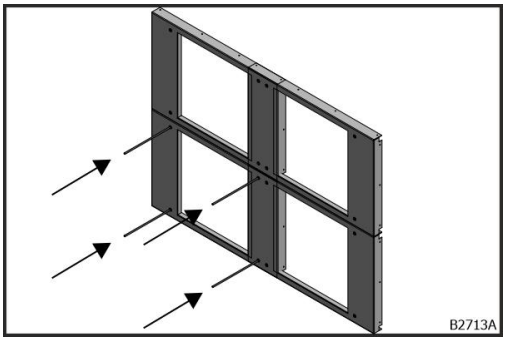


Fig. 183: installing the threaded rods

1. Screw 4 x threaded rod (E) in the rivet nut (F) 8–10 mm deep.

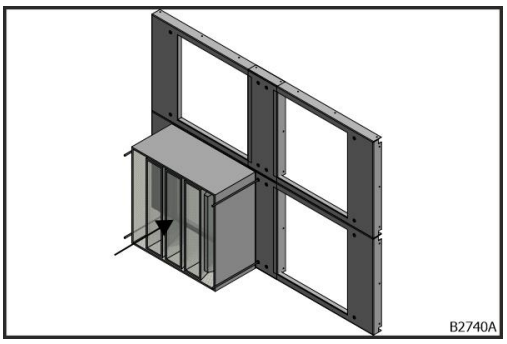


Fig. 184: placing the filter

2. Place the filter (A) between the threaded rods (E).

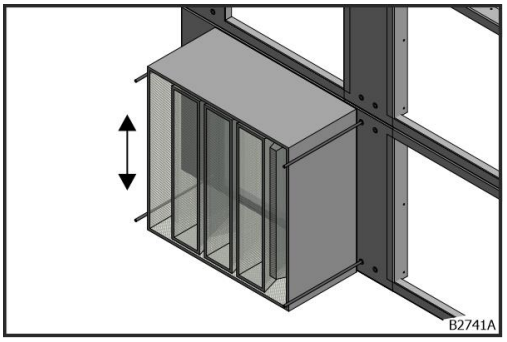


Fig. 185: aligning the filter

3. Align the filter (A) so that the lower edge of the filter finishes 1 mm above the lower edge of the filter wall (G).

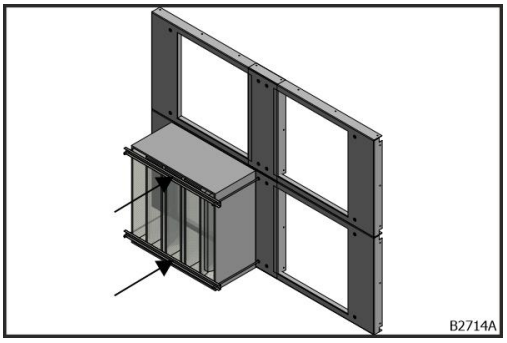


Fig. 186: sliding on clamping sections

4. Slide 2 x clamping section (B) onto the threaded rods (E).

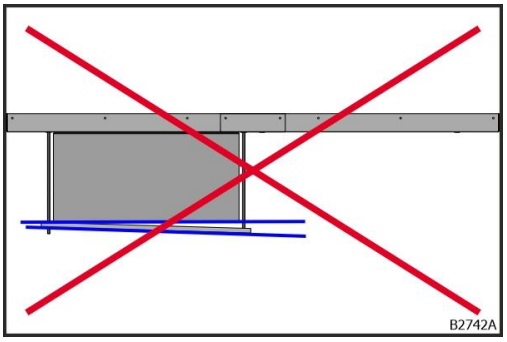


Fig. 187: incorrect alignment of clamping sections

5. Align the clamping sections (B) parallel to the filter wall (G).

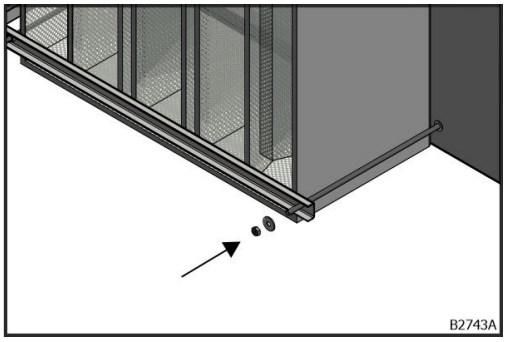


Fig. 188: screwing on the washer and nut

6. Screw 4 x washer (D) and 4 x nut (C) evenly onto the threaded rods (E).

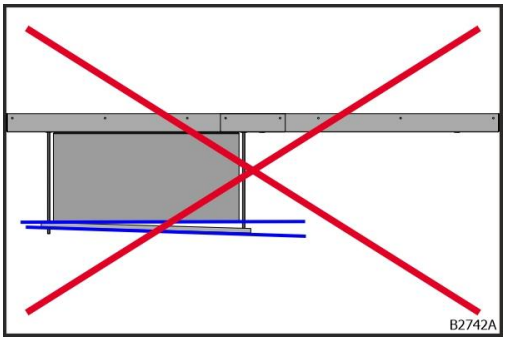


Fig. 189: incorrect alignment of clamping sections

7. Align the clamping sections (B) parallel to the filter wall (G).

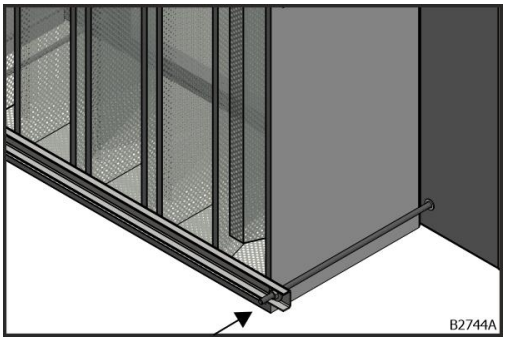


Fig. 190: 2 Nm tightening torque

8. Fasten the nuts (C) with a 2 Nm tightening torque.

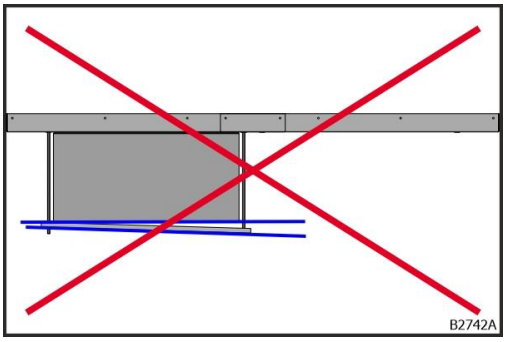


Fig. 191: incorrect alignment of clamping sections

9. Align the clamping sections (B) parallel to the filter wall (G).

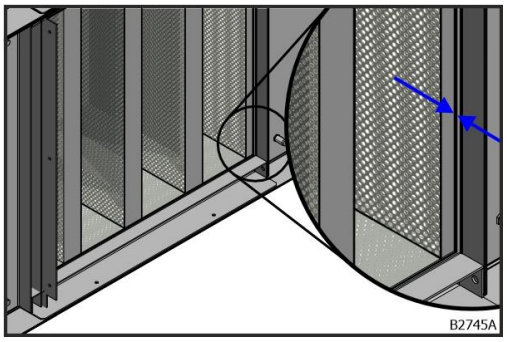


Fig. 192: mounted filter

10. Check for correct assembly: the distance between the filter and filter wall 2 ± 0.5 mm.

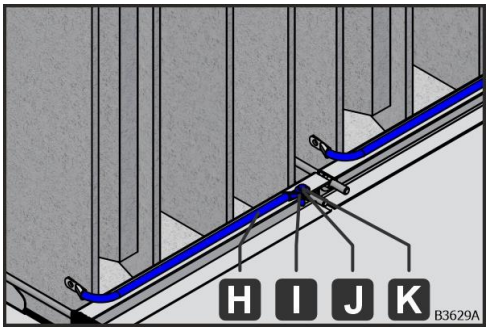


Fig. 193: filter wall with equipotential bonding

11. Route the pre-assembled equipotential bonding conductors (H) of the filters (A) to the borehole of the clamping section (B).
12. Use the self-tapping screw (I) to connect the equipotential bonding conductor (H) through the borehole in the clamping section (B).
13. Place the toothed lock washer (J) on the self-tapping screw (I).
14. Screw the self locking nut (K) firmly onto the self tapping screw (I).

➔ The filter (A) is connected to the clamping section (B) and the AHU by means of the equipotential bonding conductor (H).

Carry out the work steps for the next filters until all filters have been mounted.

15. Check the connecting elements for corrosion.
16. Replace corroded connecting elements.

Filter monitoring

To check the degree of contamination of filters (except for activated carbon filters), it is recommended to install a differential pressure measuring device on the operating side of the AHU.

Final pressure loss

Recommended final pressure loss for ISO 16890 filters

Filter class	Recommended final pressure loss (lower value)
ISO coarse	50 Pa + initial pressure loss or 3 x initial pressure loss
ISO ePM1, ISO ePM2.5, ISO ePM10	100 Pa + initial pressure loss or 3 x initial pressure loss

Table 3: Final pressure loss for ISO 16890 filters

Recommended final pressure loss for EN 779 filters

Filter class	Recommended final pressure loss
G1 - G4	150 Pa
M5 - M6, F7	200 Pa
F8 - F9	300 Pa
E10 - E12, H13	500 Pa

Table 4: Final pressure loss for EN 779 filters

Silencer

WARNING

Risk of explosion due to the splitters being installed with an inadequate connection to the equipotential bonding of the AHU

If the splitters are not adequately connected to the AHU floor, the splitters may become statically charged. The discharge and the resulting sparks may cause an explosion.

- Lay the splitters on a clean unit floor to establish equipotential bonding with the AHU.

Fan

WARNING

Risk of explosion from lack of equipotential bonding

Non-existent or incorrectly connected equipotential bonding may cause components to become statically charged. The discharge may cause an explosion.

- Connect all factory installed equipotential bonding conductors and secure them to prevent them from loosening.
- Observe the work steps set out in the operating instructions.

WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual components and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

WARNING

Risk of explosion due to the use of fans with inadequate ignition protection

Using fans without adequate ignition protection may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Use fans (fully assembled fan unit comprising motor, impeller, nozzle, flexible connection and support structure) that as a minimum fulfil the ATEX requirements of the AHU.

WARNING

Risk of injury due to impeller rotation despite the fan being switched off

Risk of injury due to impeller rotation as a result of air movement caused by thermal conditions despite of the fan being switched off.

- Avoid backflows from the building (e.g., by closing the dampers).

Motor removal device with lift out device

If a motor removal device with lift out device is available, the attachments, which are only fitted on site during use, must be removed before unit assembly (see "Maintenance and cleaning" operating instructions, "Motor removal device with lift out device" section).

WARNING

Danger from misuse

Serious personal injury or even death and damage to property can be caused by misuse of the motor removal device.

The motor removal device may only be used in conjunction with the corner nodes. Any other use, in particular attaching the lever hoists to other fastening points on the casing, is not permitted.

Only use lever hoists with a maximum load capacity of 3000 kg.

The load to be moved may have a maximum weight of 800 kg.

The motor removal device must not be exposed to aggressive media.

The motor removal device must not be used in environments with a potentially explosive atmosphere (e.g. conductive dusts, explosive gases).

WARNING

Danger from misuse

Serious personal injury or even death and damage to property can be caused by misuse of the motor removal device.

The motor removal device may only be used in conjunction with the fasteners. Any other use, in particular attaching the lever hoists or the supporting arm to other fastening points on the casing, is not permitted.

Only use lever hoists with a maximum load capacity of 3000 kg.

The load to be moved may have a maximum weight of 400 kg.

The lift out device may only be installed in the appropriate door widths.

The lift out device must not be exposed to aggressive media (e.g....).

The lift out device must not be used in environments with a potentially explosive atmosphere (e.g. conductive dusts, explosive gases).

Bearing

The following storage conditions must be observed for the motor removal device:

- Do not store outdoors.
- Store in a dry and dust-free environment.
- Do not expose to aggressive media.
- Observe a storage temperature of -20 °C to +40 °C.

Transport lock

NOTE

Damage to vibration dampers due to tensile stresses

Vibration dampers may get damaged if they are subjected to tensile stress.

- Do not apply tension to the vibration dampers when removing the transport lock.
- Perform the "Remove transport lock" steps (see chapter "Removing transport lock", page 98).

Vibration dampers are secured for transport.

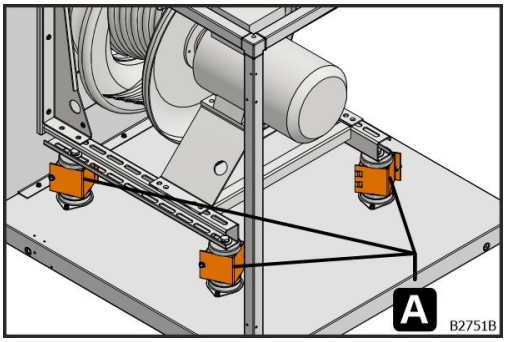


Fig. 194: Transport lock

A – transport lock

Removing transport lock

Requirements:

- The sections are set up and connected ()

Remove transport locks as follows:

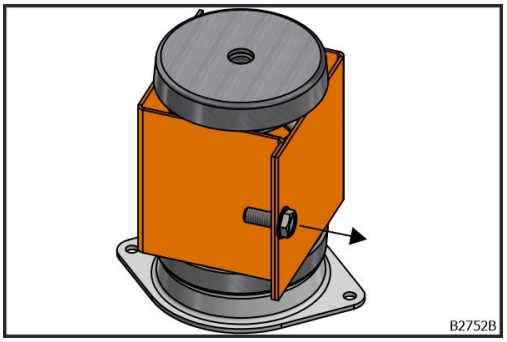


Fig. 195: Removing screws

1. Remove hexagonal screw.

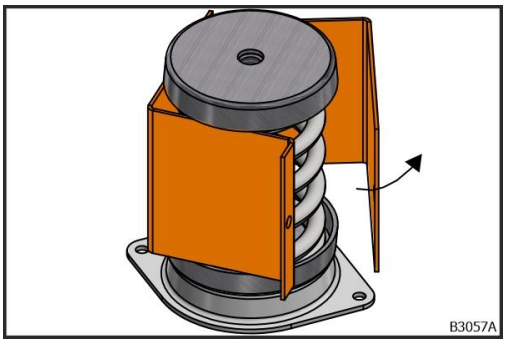


Fig. 196: Unfold transport lock

2. Fold up the two-piece transport lock.

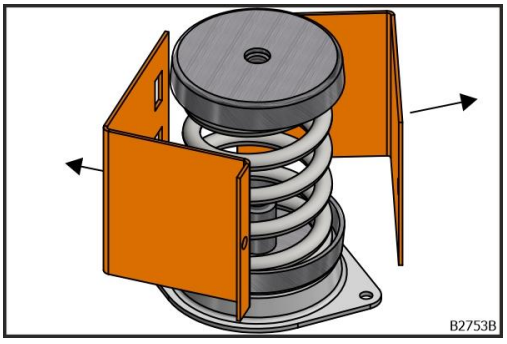


Fig. 197: Removing transport lock

3. Remove the two-piece transport lock.

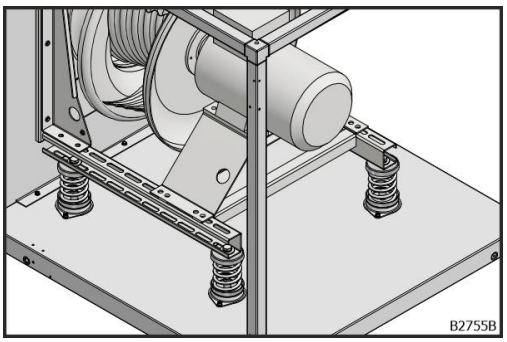


Fig. 198: Fan without transport lock

➔ Transport locks have been removed.

Inlet protection grate

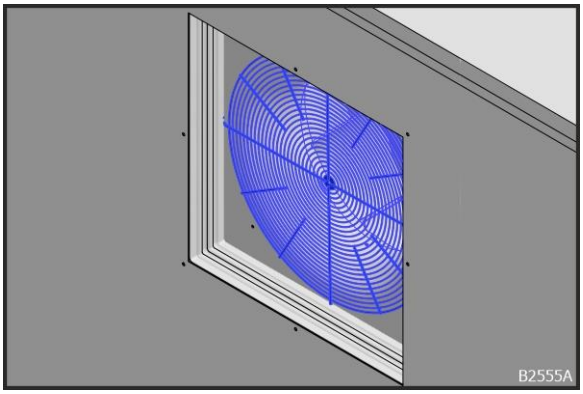


Fig. 199: Inlet protection grate

Check that an inlet protection grate is present.

An inlet protection grate is mandatory for ATEX units.

Plug fan

Check bushings and hubs for friction-locked connection (see manufacturer's instructions).

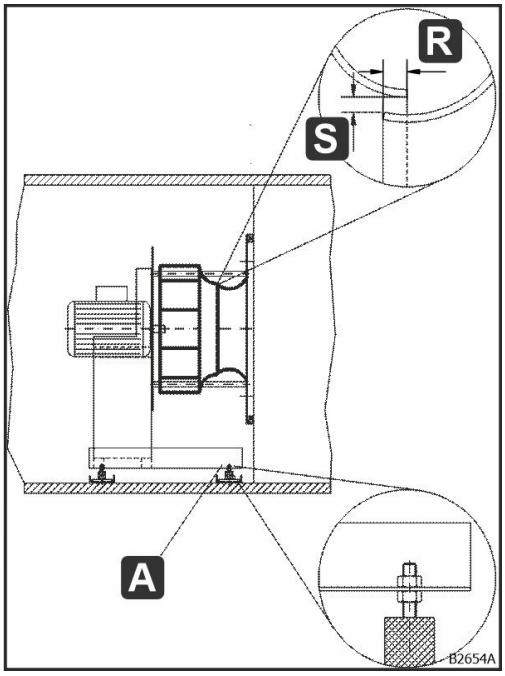


Fig. 200: Plug fan

A clearance
R gap cover
S Setting/locknut

Transport can change the circumferential gap between the impeller and the inlet nozzle. Measure the clearance (S). The gap must be present around the entire circumference and must be the same distance apart. If necessary, correct the gap on the vibration damper using the lock nut and the adjusting nut (A).

The gap overlap (R) must be approx. 1 % of the impeller diameter.

In the case of plug fan installation with flexible connections, this test is not required.

After finishing the unit assembly, the earthing strap and the equipotential bonding conductor of the fan must be checked.

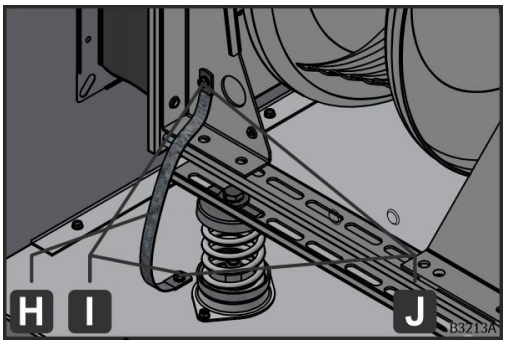


Fig. 201: earthing strap for the unit floor

The support structure of the fan is connected to the AHU equipotential bonding by an earthing strap (H) for the unit floor.

- Check that the earthing strap (H) is tight and secure.
- Check that the screws (I) are tight and secure.
- Check that there are toothed lock washers (J).
- Check the connecting elements for corrosion.
- Replace corroded connecting elements.

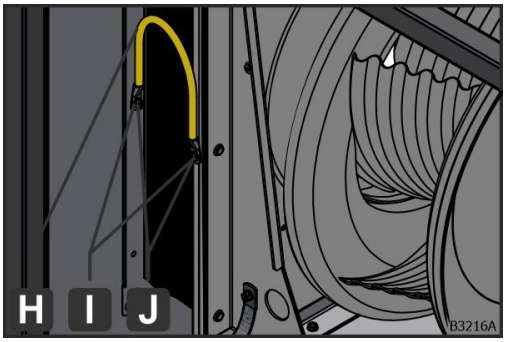


Fig. 202: equipotential bonding conductor for the flexible connection

The support structure of the fan is connected to the AHU equipotential bonding by an equipotential bonding conductor for the flexible connection.

- Check that the equipotential bonding conductor (H) is tight and secure.
- Check that the screws (I) are tight and secure.
- Check that there are toothed lock washers (J).
- Check the connecting elements for corrosion.
- Replace corroded connecting elements.

Heat recovery systems (HRS)

Run around coil

WARNING

Risk of explosion due to leakages in coils

Leakages in the area of the coil can result in a potentially explosive atmosphere reaching the hydraulic set via the pipework. In conjunction with a source of ignition, this may result in an explosion.

- Prevent frost damage by providing frost protection on site (e.g. sufficient antifreeze).
- Check the tightness of the coil, the pipework and the hydraulic set according to the instructions and the maintenance interval (see "Maintenance and cleaning" operating instructions, "Hydraulic set" section and "Heating and cooling coils" section).

Connecting run around coils

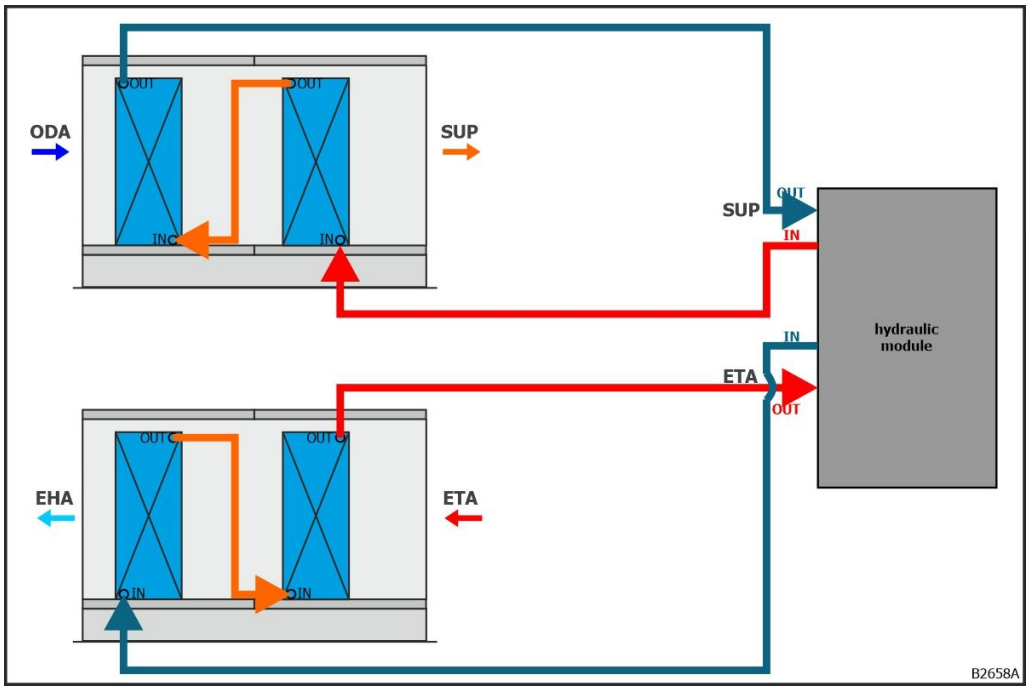


Fig. 203: The coils are to be connected according to the counterflow principle.

Information on connecting coils see chapter "Coil connection", page 105. Information on the hydraulic set see chapter "Hydraulic set", page 109.

Pipes with a risk of condensation must be fitted with diffusion-tight insulation on site.

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Heating and cooling coils

WARNING

Risk of explosion due to leakages in coils

Leakages in the area of the coil can result in a potentially explosive atmosphere reaching the hydraulic set via the pipework. In conjunction with a source of ignition, this may result in an explosion.

- Prevent frost damage by providing frost protection on site (e.g. sufficient antifreeze).
- Check the tightness of the coil, the pipework and the hydraulic set according to the instructions and the maintenance interval (see "Maintenance and cleaning" operating instructions, "Hydraulic set" section and "Heating and cooling coils" section).

Heating coil

To prevent the heating coil from freezing:

install frost protection monitoring on the air or water/condensate side, depending on the system design.

The hydraulic set must be filled with the coil medium specified in the technical data sheet in the appropriate concentration. Water quality according to VDI 2035. Too high glycol ratio causes reduced performance, too low glycol content can predispose to frost damage.

The filling process of the hydraulic set can be performed together with the filling of the piping system. Check connection points for leaks while filling is still in progress; retighten screw connections and packing glands if necessary.

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Steam heater

NOTE

Heat damage to the AHU due to steam heater

Overheating of the steam heater causes heat damage to the AHU.

- Operate the steam heater only when the fan is running.
- Provide airflow monitoring or temperature limiters.

In the case of hydraulic sets for steam heaters, the unobstructed drainage of condensate must also be checked (all condensate shut-off valves must be open).

For ATEX units, the maximum surface temperature must not override the required ignition protection (temperature class). According to DIN EN ISO 80079-36, the maximum surface temperature must not exceed the following values depending on the temperature class. Compliance with these values must be ensured on site.

Temperature class	Max. flow temperature [°C]
T1	440
T2	290
T3	195
T4	130

Table 5: Temperature classes and max. flow temperature in [°C]

To determine this maximum surface temperature, the sensor's degree of error (e.g. flow temperature sensor on the steam heater) must not exceed 2% of the measured value in °C or +/-2K, whichever is greater.

Cooling coil

To prevent the cooling coil from freezing:

consider installing a preheater at the air inlet of the cooling coil depending on the system design.

In the case of an HE-RAC with dehumidification with run around coil: Preheating the air in the HE-RAC coil does not guarantee adequate frost protection.

The hydraulic set must be filled with the coil medium specified in the technical data sheet in the appropriate concentration. Water quality according to VDI 2035. Too high glycol ratio causes reduced performance, too low glycol content can predispose to frost damage.

The filling process of the hydraulic set can be performed together with the filling of the piping system. Check connection points for leaks while filling is still in progress; retighten screw connections and packing glands if necessary.

Pipes with a risk of condensation must be fitted with diffusion-tight insulation on site.

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Coil connection

Information on flushing, filling, and venting see chapter "Hydraulic set", page 109.

WARNING

Eye injury from refrigerant-filled coils due to pressure

When opening the piping to prepare for brazing of refrigerant-filled coils, nitrogen escapes at approx. 5-10 bar. This can result in small flying parts and chips that can cause injury to the eye.

- Wear protective goggles with side protection

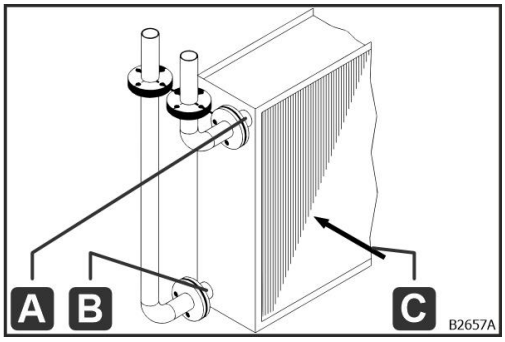


Fig. 204: Coil

When connecting the heating and cooling water pipes (medium supply and medium return), ensure that the inlet and outlet connections are not mixed up (counterflow principle with water ingress at the air outlet).

A medium return
B medium supply
C air direction

Design and construct on-site pipework so that external loads on the coil, e.g. due to weight forces, vibrations, tension or thermal expansion, are prevented. If necessary, use expansion joints.

When tightening the on-site threaded connections of the coil, use a pipe wrench, for example, to hold them in place, otherwise the internal pipes will be twisted off and damaged.

Flange the on-site pipework so that the coil can be easily removed for maintenance or replacement purposes.

Pipes with a risk of condensation must be fitted with diffusion-tight insulation on site.

Making a flange connection

Requirements

Flange contact surfaces must be clean, flat and undamaged.

Work steps

NOTICE

Material damage due to incorrect tightening of the screws

Incorrect sequence when tightening the screws may cause material damage due to stresses.

- Tighten the screws crosswise.

Tighten the flange connections with the following tightening torque using a torque wrench, depending on the nominal diameter of the screw:

Nominal diameter of screw	Tightening torque [Nm]
M10	35
M12	55
M16	120
M20	240

Table 6: Torques for flange connections

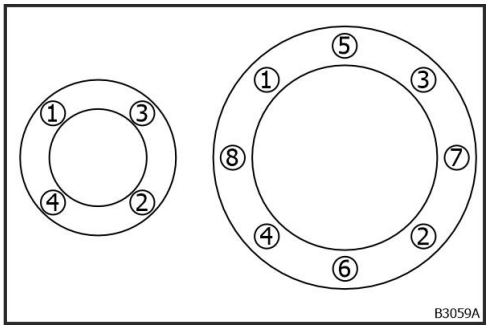


Fig. 205: tightening crosswise

The screws are tightened with a torque wrench in the sequence shown (= crosswise) in 3 passes:

1. Fix the screws crosswise with 30% of the tightening torque.
2. Tighten the screws crosswise with 60% of the tightening torque.
3. Tighten the screws crosswise with the tightening torque.

➔ The flange connection has been made correctly.

4. Check the tightening torque of all screws.

Dampers

Damper

WARNING

Risk of death due to moving parts

Risk of death when closing fins, moving coupling bars or gears due to crushing between two moving parts.

- Attach separating protective devices (e.g., downstream grid, duct) to the damper.
- Before opening the door, switch off the AHU and secure it against restarting.
- Do not reach between the fins.

WARNING

Risk of explosion from lack of equipotential bonding

Non-existent or incorrectly connected equipotential bonding may cause components to become statically charged. The discharge may cause an explosion.

- Connect all factory installed equipotential bonding conductors and secure them to prevent them from loosening.
- Observe the work steps set out in the operating instructions.

WARNING

Risk of explosion from corroded connecting elements

The connecting elements establish an electrical connection between the individual components and ensure that all conductive components of the AHU are connected to the AHU's equipotential bonding. Corrosion reduces the efficacy of the electrical connection. Corroded connecting elements may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Replace connecting elements.

WARNING

Risk of explosion due to the use of dampers with inadequate ignition protection

Using dampers without adequate ignition protection may cause static charging of the AHU. The discharge and the resulting sparks may cause an explosion.

- Use dampers that are at least compliant with the ATEX requirements of the AHU.

Check screw fittings and connections for tight fit.

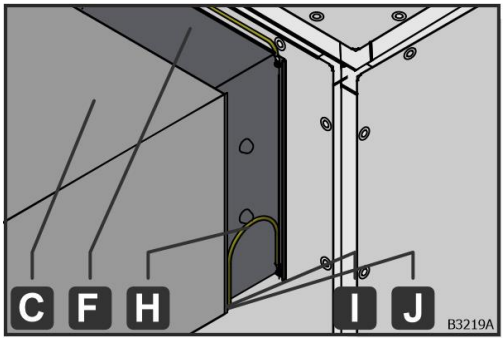


Fig. 206: damper with equipotential bonding conductor

1. Route the pre-assembled equipotential bonding conductor (H) of the damper (F) to the on-site duct (C).
2. Secure the equipotential bonding conductor (H) with a toothed lock washer (J) to prevent loosening.
3. Tighten the screw (I).

➔ The damper (F) is connected to the AHU and to the on-site duct (C) via the equipotential bonding conductor (H).

4. Check the connecting elements for corrosion.
5. Replace corroded connecting elements.

Coupled dampers

In case of coupled dampers, check connecting bars for force-locking connection and for correct function, i.e. direction of rotation and end position of the dampers.

Hydraulic set

WARNING

Risk of explosion due to leakages in coils

Leakages in the area of the coil can result in a potentially explosive atmosphere reaching the hydraulic set via the pipework. In conjunction with a source of ignition, this may result in an explosion.

- Prevent frost damage by providing frost protection on site (e.g. sufficient antifreeze).
- Check the tightness of the coil, the pipework and the hydraulic set according to the instructions and the maintenance interval (see "Maintenance and cleaning" operating instructions, "Hydraulic set" section and "Heating and cooling coils" section).

Do not exceed approved pressure rating.

Observe technical data sheet.

In the case of a run around coil, the amount of frost protection agent must be selected depending on the lowest outside air temperature (observe the manufacturer's information).

If no condensate pan is provided underneath a (HE-)RAC heating coil, the HRS system may only be operated if no condensate is produced.

Hydraulic sets have a variety of potential sources of ignition and may only be used in safe areas.

Making a flange connection

To make a flange connection see chapter "Making a flange connection", page 106.

Inspection

Check for:

- proper installation of all parts
- correct connection of flow and medium return (counterflow principle)
- tight fit of all screw connections and stuffing-box seals
- Movement of all valves, slides, and flaps

Flushing

NOTE

Material damage due to inadequate flushing

If there is no or insufficient system flushing, oil residues may remain in the coil (lubrication during the production process). Water/frost protection mixtures have lipophilic properties, which dissolves the oil in the mixture. Subsequently, an oil/water/frost protection mixture circulates inside the system and damages seals that are not oil-resistant.

- Flush the system according to VDI 2035. Oil residues are dissolved during the flushing process.
- In closed system circuits (e.g., RAC/ HE-RAC circuits) use oil-resistant seals.

The system must be flushed in accordance with VDI 2035 (removal of contamination). The oil residues must be dissolved during the flushing process, otherwise they will remain in the system.

Filling

The hydraulic set must be filled with the coil medium specified in the technical data sheet in the appropriate concentration. Water quality according to VDI 2035. Too high glycol ratio causes reduced performance, too low glycol content can predispose to frost damage.

The filling process of the hydraulic set can be performed together with the filling of the piping system. Check connection points for leaks while filling is still in progress; retighten screw connections and packing glands if necessary.

Exhaust ventilating

NOTE

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Material damage due to inadequate venting

If systems are not properly vented, air pockets will form which can lead to reduced performance or pump damage.

- Exhaust ventilate the system according to VDI 2035 during system filling at the highest point of the system.

The hydraulic set must be exhaust ventilate at the highest point of the system during system filling in accordance with VDI 2035.

- Open venting devices of the system.
- For vertical multi-stage centrifugal pumps, also open a separate vent screw.

Pressure test

Optionally, proceed according to DIN 4753, part 1.

Observe the approved pressure range.

Hydraulic system

Optionally, perform hydraulic commissioning by adjusting and balancing pressures (e.g., by means of a pressure regulating device).

Control system

WARNING

Risk of explosion due to the use of components with inadequate ignition protection

Using parts without adequate ignition protection may cause static charging of the AHU, for example. The discharge and the resulting sparks may cause an explosion.

- Use parts in the AHU that are at least compliant with the ATEX requirements for the inside of the AHU.
- Use parts on the outside of the AHU or next to the AHU that at least fulfil the ATEX requirements next to the AHU.
- When assembling parts, only use cable glands, reducers and dummy plugs with the appropriate ATEX approval.

Personnel qualification

➔ Qualified electrician in explosion protection

Wiring and connection work in potentially explosive atmospheres must be carried out by a qualified explosion protection electrician. The requirements of DIN EN 60079-14 must be taken into account in particular, but not exclusively.

Field devices

Check field devices for proper installation.

Check electrical connections on the control cabinet and the field units.

Final cleaning

WARNING

Risk of explosion from electrostatic discharge

Cleaning the AHU with a dry cloth may cause a static charge. The discharge and the resulting sparks may cause an explosion.

- Only wipe the AHU with a damp cloth.
- Follow the instructions in the operating instructions.

After completing installation and assembly, check all components for contamination in accordance with VDI 6022 and clean if necessary before commissioning. In particular, metal chips must be removed carefully, as they can lead to corrosion.

Directory

List of figures

Keyword index

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