



## **Installation and maintenance instructions**

# Air-handling unit AHU TE/AHUW TE

(Translation of the original)

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**For type of device, serial number and order number, see type plate on the equipment.**

**Order-related device specifications such as weights, dimensions, sound data, spare parts, energy data etc. are to be taken from the order data sheets.**

**Original Wolf spare parts can be procured at short notice, stating the order number (on the type plate), by fax to 0049 (0)8751 / 74-1574.**

**Standards**

The following standards and regulations apply to the AHU TE/AHUW TE series air-handling units:

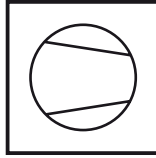
- Machine directive 2006/42/EU
- Low voltage directive 2014/35/EU
- EMC directive 2014/30/EU
- Pressure vessel directive 97/23/EU
  
- DIN EN ISO 12100 Safety of machinery; design guidelines
- DIN EN ISO 13857 Safety of machinery; safety distances
- DIN EN 349 Safety of machinery; minimum clearances
- DIN EN ISO 14120 Safety of machinery – Guards –
- DIN EN 1886 Ventilation for buildings - central air-handling units
- DIN ISO 1940/1 Mechanical vibration; balance quality
- DIN EN 60335-1 Safety of electrical appliances for domestic use and similar purposes
- DIN EN 13053 Section 6 Ventilation of buildings - central ventilation appliances Performance characteristics for appliances, components and assemblies
- VDMA 24167 Fans; safety requirements
- RLT Guideline 01
- VDI 3803 Section 5 Technical requirements for ventilation appliances

The following regulations and safety instructions are to be observed for installation and servicing:

- DIN VDE 0100 Requirements for high voltage installations up to 1000 V
- DIN VDE 0105 Operation of high voltage installations
- DIN VDE 0701-0702 Repair, modification and testing of electrical appliances

**Function symbols**

Fan section



Fan section



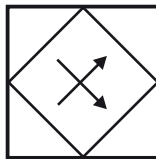
Bag filter section



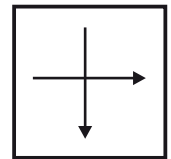
Heater section



KGXD section



KGX section



Empty section



Empty section with damper



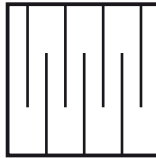
Empty section with damper and tray



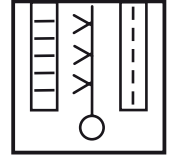
Empty section with tray



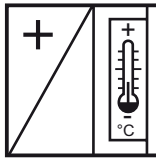
Silencer section



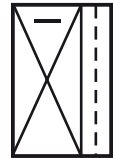
Humidifier section



Heater section with frost protection frame



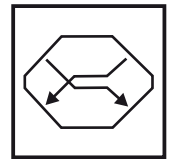
Cooling section



Rotary heat exchanger section



GS-PWT section



**General**

These installation and maintenance instructions apply only to WOLF AHU TE/AHUW TE series air-handling units.

Each person tasked with installing, commissioning or maintaining the equipment must read through these instructions before commencing work.

Compliance with these instructions is mandatory.

Only suitably trained and qualified personnel are permitted to undertake installation, commissioning and maintenance work.

The assembly and maintenance instructions are an element of the appliance supplied and must be kept in an accessible place.

Non-compliance with the installation and maintenance instructions voids all WOLF warranties.

**Symbols**

The following symbols and warnings are used in these installation and maintenance instructions. These important instructions apply to the protection of personnel and to technical operational safety.



"Safety instruction" identifies instructions that must be precisely complied with in order to avoid endangering or injuring persons and to prevent the risk of damage to the equipment.



Electric shock hazard due to electrically live components.

**Note:** Switch OFF the ON/OFF switch before removing the casing.

Never attempt to touch electrical components or contacts while the master switch is ON. Electric shock hazard with risks to health or fatal injury.

Terminals remain live even after the ON/OFF switch has been switched OFF.

**Note**

"Note" identifies technical instructions that must be complied with to prevent equipment damage and malfunctions.

In addition to the installation and maintenance instructions, labels affixed to the equipment bear information.

Compliance with these, too, is mandatory.

**Safety instructions**

- The persons tasked with installation, commissioning, maintenance and operation of the air-handling unit must be adequately qualified and must have received suitable instruction.



- Only trained and qualified electricians are permitted to undertake work on the electrical system.

- All electrical work must be in compliance with VDE requirements [or local regulations] and the regulations of the local power supply utility.

- The air-handling unit must always be operated within the range of operating parameters stipulated in the technical documentation supplied by WOLF.

- Correct use of the air-handling unit means exclusively the use for ventilation purposes.

Air is the only medium that can be handled by the equipment.

- Never remove, jumper, bypass or by any other means render inoperative safety devices and monitoring devices.

- Never operate the air-handling unit unless it is in full working order. Malfunctions and damage that impair or could impair safety must be repaired immediately and professionally.



- In the event of a fire the air-handling unit must shut down automatically by suitable means such as a fire protection damper (installed on site), as otherwise hazardous substances can be transported into the rooms downstream of the air-handling unit.

- Check the electrical equipment of the appliance regularly. Tighten loose connections and replace faulty cables immediately.

**Intended Use**

Intended use of the Wolf air conditioning units is exclusively restricted to their use for ventilation purposes. The air conditioning units are to be used only for the transport and conditioning of normal air. This includes the filtering, heating, cooling, humidifying and dehumidifying of the air. Compliance with the instructions supplied with the appliance are also part of its use for the intended purpose!

**Unintended use**

Uses of the appliance for purposes other than those described above are considered unintended. Wolf GmbH accepts no liability whatsoever for damages resulting from unintended use. The user bears the risk alone.

On no account may air be transported that contains any constituents that are injurious to health, inflammable, explosive, aggressive, corrosive or dangerous in any other way, since these substances can otherwise be spread throughout the duct system and the building and impair the health of people, animals or plants living there or even kill them.

Air conditioning units for the transport of inflammable or explosive gases must be specially designed. Normal air conditioning units may not be operated in these danger areas unless there are remarks to this effect in our technical documents.

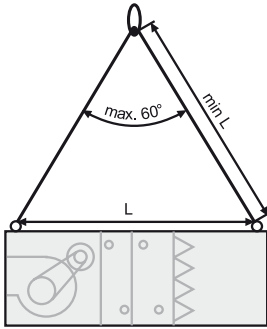
**Technical description**

Wolf air conditioning units are central air conditioning units and are used for the supply and exhaust ventilation of rooms. The modular structure of the appliances allows the most diverse requirements for air conditioning to be met by configuration. The transported air can be filtered, heated, cooled, dehumidified and humidified.

### Delivery

AHU TE air-handling units are delivered to site as transportable subassemblies. On receipt of the incoming goods, check the unit or components to ensure no damage has occurred in transit. If damage is evident or if there is a suspicion that damage might have occurred, the recipient must make a note to this effect on the freight papers and have this countersigned by the carrier. Notify WOLF immediately of such circumstances.

### Handling



#### Note

Always transport the equipment upright.

Exception: Plate-type heat exchangers (subject to type and size) and heat wheel heat exchangers are laid flat (turned 90°) for transportation.

Otherwise the internal components will suffer damage and this can result in malfunctions.

Handle the appliances with slings.

Tall appliances on a small footprint (e.g. RWT) are connected with an increased risk of tipping over during unloading and handling on site. This requires additional measures on site to prevent tipping over (e.g. securing with straps).

If a forklift or rollers are used to move the units, always ensure that the forks or rollers are located underneath the frame sections at all times, so that weight is never allowed to rest on the floor panels.

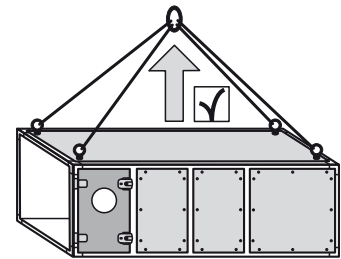
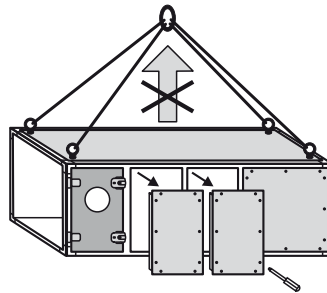
With lifting eyes (available on request), use slings at minimum centres L between lifting eyes. Ensure that the slings are of uniform length.

Always use a crane lifting beam to lift appliances with more than 4 lifting eyes.



On no account may cladding panels be removed in order to lift the device, since the cladding panels are structurally integrated in the device's bracing system.

No additional loads may be lifted together with the transport unit supplied by Wolf.



**Space requirements**

Make sure a clear space equal to at least the width of the equipment units is available on the operator side; this is the minimum space necessary for installation, operation and maintenance (see the table below).

Footprint of space required for installation, operation and maintenance:

Fan section	0.8 x appliance width
Cooling coil, heating coil, KVS	1 x appliance width + 250 mm
Filter section up to AHU TE 96	1 x appliance width
from AHU TE 130	0.5 x appliance width

In back-to-back configurations with side-by-side units, leave clearances as stated above on both sides for installation, operation and maintenance.

Install units that require a siphon (scrubber, humidifier, cooling coil, plate-type heat exchanger, mist eliminator) in such a way as to ensure correct installation and operation of the siphon (make adequate provision for the foundation height).

It is advisable to install a waterproof foundation for units with humidifiers and/ or cooling coils installed above rooms containing moisture-sensitive equipment (e.g. IT rooms, etc.).

**Final location****Note**

Always install AHU TE air-handling units in rooms where frost cannot occur. If the occurrence of frost at the final location cannot be ruled out, adopt suitable measures to prevent water-containing components from freezing. If an outside thermostat is installed ensure it is adequately insulated to prevent the air-handling unit from shutting down inadvertently (see frost protection measures, page 25).

AHUW TE air conditioning units are designed to be installed outdoors.



### Equipment installation

**Note**

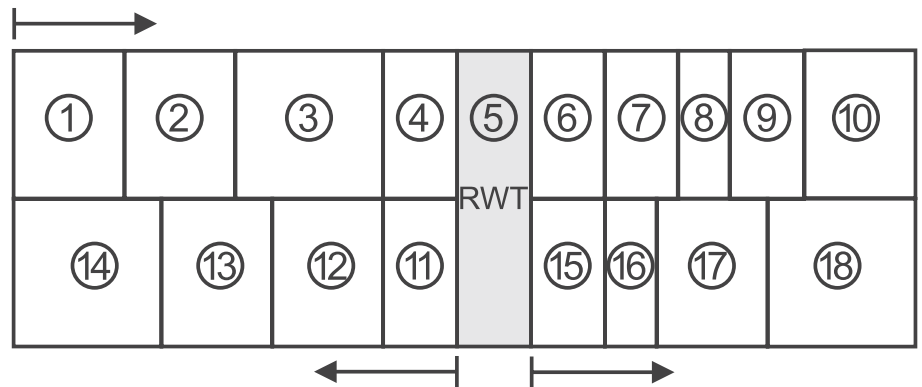
Appliances for weatherproof installation must not take on any static load or act as a substitute for the roof of the building.

**Note**

When assembling and installing combined ventilation and extract appliances with heat recovery (KGXD, RWT), observe the correct sequence of assembly and installation (see diagram). For this, one complete appliance train should always be assembled/installed completely. The second appliance should then be installed from the heat recovery onwards.

This offers the most effective prevention of alignment errors and installation inaccuracies.

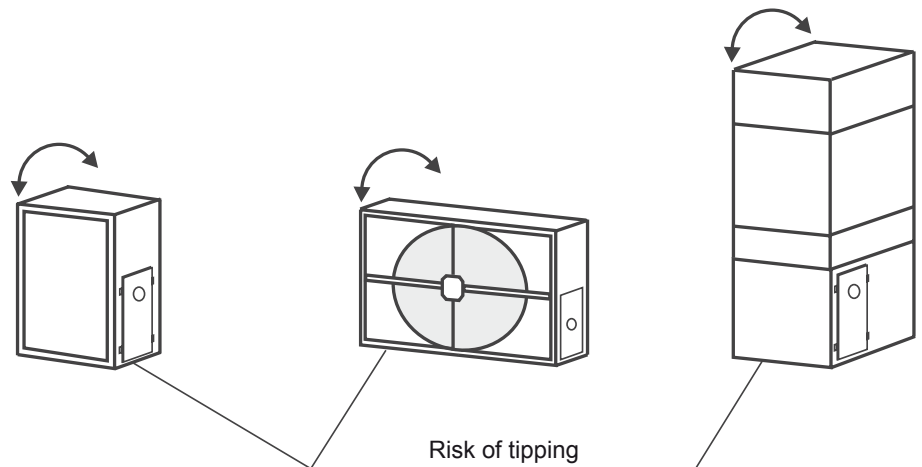
Appliance example - top view:



When installing high or perhaps smaller appliance components (e.g. RWT, RWT duct components or standing appliance layouts with several components above each other), secure these during assembly/installation against tipping until they are finally connected to other components that ensure that tipping is prevented.

**Note**

Requires permanent securing against tipping over.



### Base frame / foundation base

#### Internal unit base frame



WOLF internal unit base frames (suitable only for internal installation) are always supplied loose (in advance).

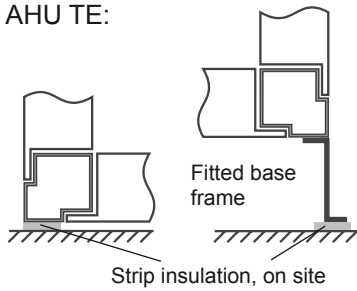
Base frames delivered loose are knocked down for shipping and must be assembled, aligned and secured to the base on site in accordance with the instructions enclosed with the base frame.

### Base frame / foundation base

**Note**

It is essential to ensure that the base on which the units and components are to be assembled and installed is level, horizontal and of adequate load-bearing capacity.

AHU TE:

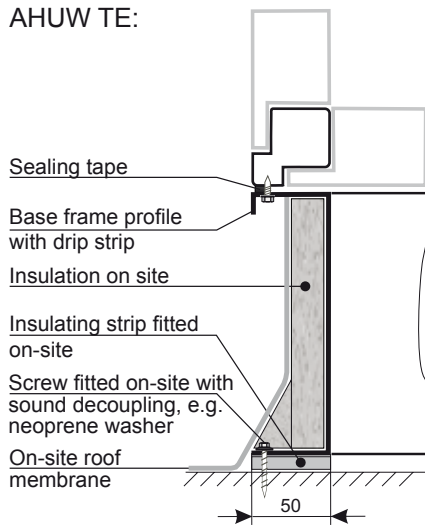


The base frame must be horizontal, and the foundation must be level and horizontal (check with browning rod).

To prevent the inspection doors from jamming, the lower base frame must make full-surface contact with the base; pad or point contact is not permissible.

Provide a permanently flexible layer between the installation surface or foundation/plinth and the air-handling unit to prevent the transmission of structure-borne noise from the appliance to the building. Preferably, this intermediate layer should take the form of insulation strips that are positioned longitudinally underneath the appliance frame or underneath the base frame.

AHUW TE:



A base frame or plinth is required for air-handling units installed as weatherproof version to support the appliances and their components.

The height of the base frame or plinth is subject to the local snow depth; however, it should be at least 180 mm.

Subject to the prevailing wind force, secure the appliances with bolts to the base frame or plinth (observe the transmission of structure-borne noise).

Base frames must be horizontal and perpendicular; the foundation base must be level and horizontal.



**Weatherproof devices may not assume any building support functions or tasks of the roof of the building (VDI 3803 5.1 / BS EN 13053 6.2).**

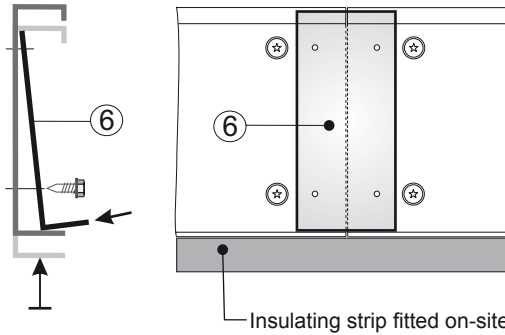
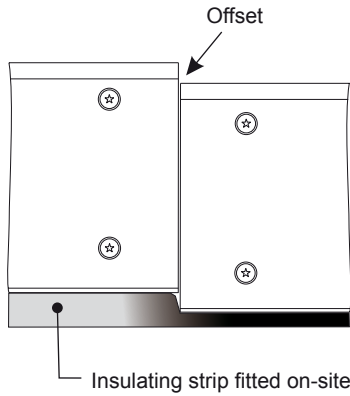
**Note**

The lower base frame must make full-surface contact with the base; pad or point contact is not permissible.

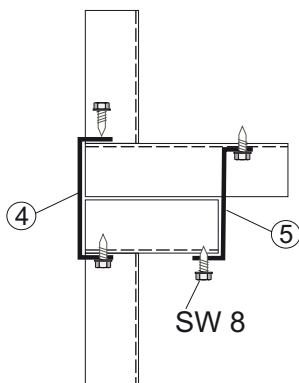
WOLF base frames (including integrated drip strip) are either permanently fixed to the appliance or supplied loose.

Base frames delivered loose are knocked down for shipping and must be assembled, aligned and secured to the base on site in accordance with the instructions enclosed with the base frame.

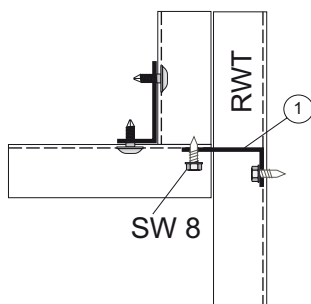
The base-frame pitch and the appliance pitch match when appliances with pre-installed base frames are split for shipping.



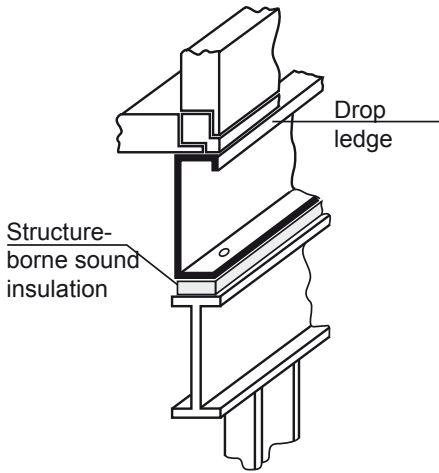
**Support bracket, item 6, in case of factory-fitted base frame, if different weights lead to an offset at cube joints (assembly on site)**



Connecting brackets, items 4 and 5, if air conditioning units are positioned next to each other (assembly on site)



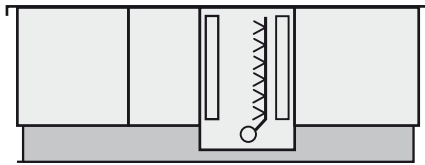
Connecting bracket, item 1, in case of connection to, for example, a rotary heat exchanger (assembly on site)



The WOLF base frame must be insulated and integrated into the roof sealing system on site.

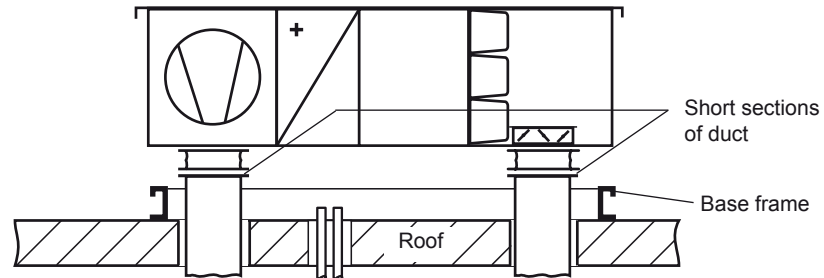
The base frame can be insulated on the inside or the outside of the base frame.

When installing the AHU TE on its own stands (AHUW TE on an on-site base frame), secure it against the wind load.

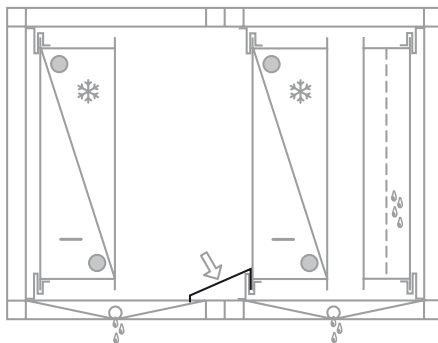


A base frame or plinth (height approx. 305 mm) is always required for AHU TE or AHUW TE appliances with scrubber, because the scrubber bottom lies lower than the underside of the remaining appliance. The required height of the base frame depends on the type of scrubber and is specified separately in the course of the design calculations.

If the unit has a bottom discharge/intake, install short sections of duct before lowering the unit onto its foundation.



### Tray bridge



The tray bridge is already fitted in the factory if the functional components are delivered as a single transport unit.

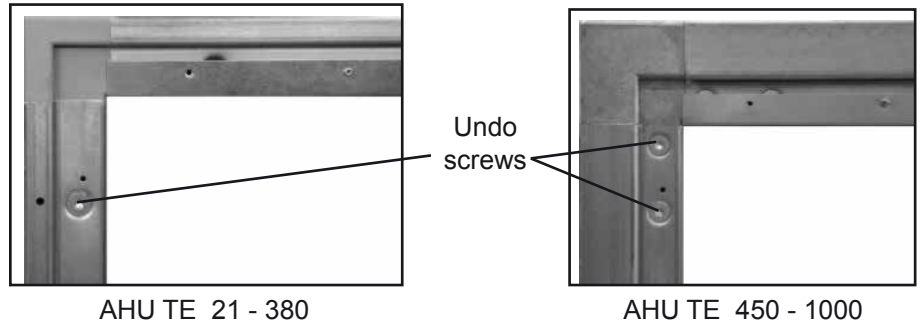
In case of delivery as separate individual function units, the tray bridge is supplied loose and must be installed on site.

If slide-in rails are in use, the tray bridge must be adapted to the local conditions.

**Appliances that can  
be dismantled**

The equipment is shipped to site preassembled. It can be disassembled before being moved into position and reassembled at the final location.

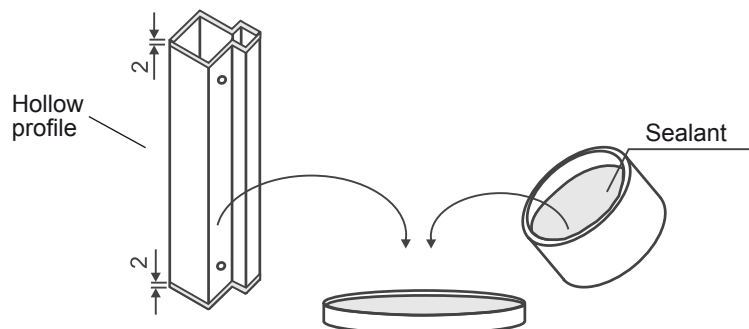
Disassembly entails removing the casing and carefully removing internal components such as heating or cooling coil (take care not to damage the components). Remove the screws from the corners of the frame to permit removal of the frame.



Immediately before assembling the vertical hollow sections with the floor and ceiling panels, seal the hollow sections with the sealant supplied. Otherwise the water tightness of the appliance cannot be guaranteed.

For this it is recommended that some of the sealant is poured into a flat vessel of adequate size, and then to dip both ends of the vertical hollow section approx. 2 mm deep into the sealant.

The appliances are assembled in reverse order.



**Roof**

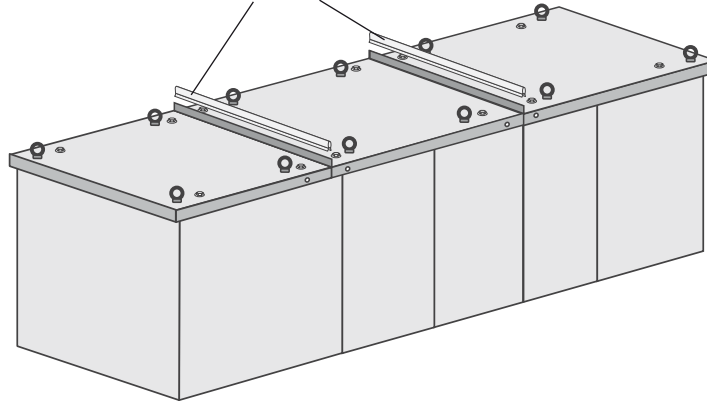
The weatherproofed AHUW TE version always has a fully installed roof made of zinc-plated sheet steel.

Split units are delivered to site with the roof sections prefitted to the individual sections. If the interface at which two units are split does not line up with the pitch of the roof sections, the requisite single roof section is supplied loose and must be installed on site once the air-handling unit has been assembled and installed. The requisite fasteners and sealing materials are supplied with the appliance.

The lifting eyes can remain in the unit as sealed in the factory.

**Note** Use a plastic-headed mallet to tap the cover strip into place.

Pack space of sealing strip with sealing compound

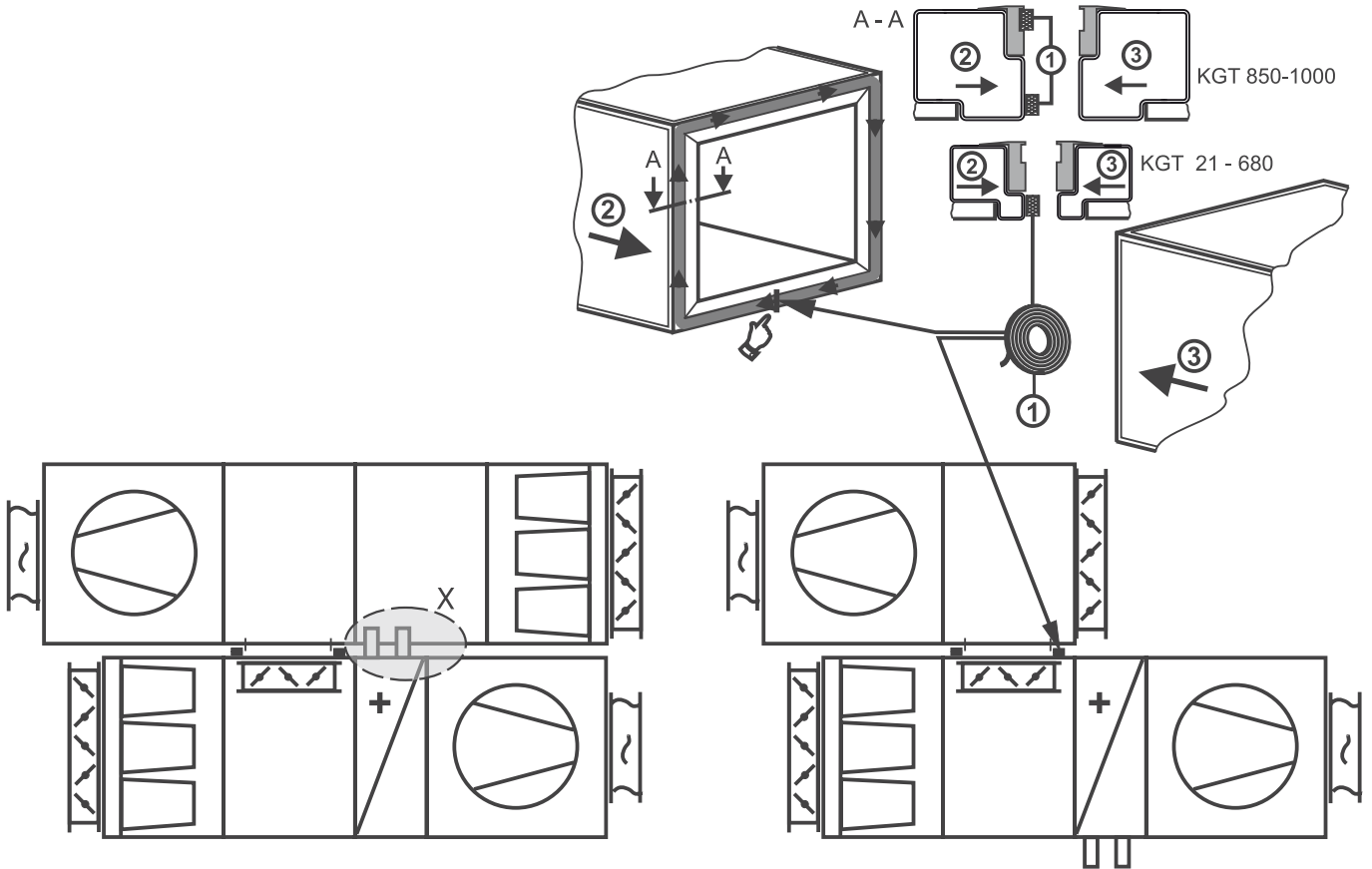


The roofs of the weatherproof appliances can be stepped on for assembly. Attention must be paid here to the area distribution of the load (boards).

No static point loads may be applied to the roofs.

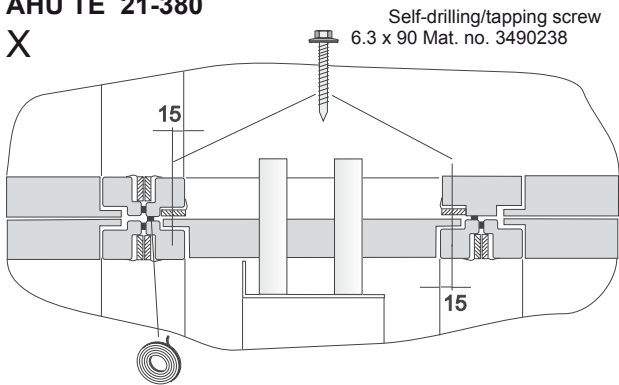
### Connecting units

All the small items required for assembly are packed inside a component with inspection door (preferably fan section), along with the accessories supplied loose. A label inscribed "Zubehör im Gerät" (Accessories inside) identifies the component in question.



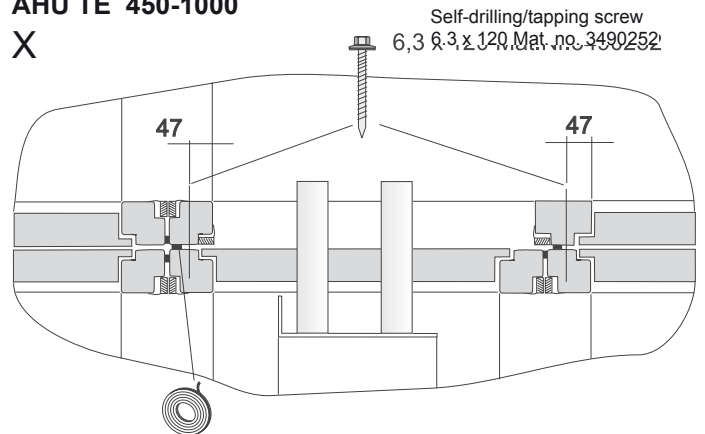
### AHU TE 21-380

X



### AHU TE 450-1000

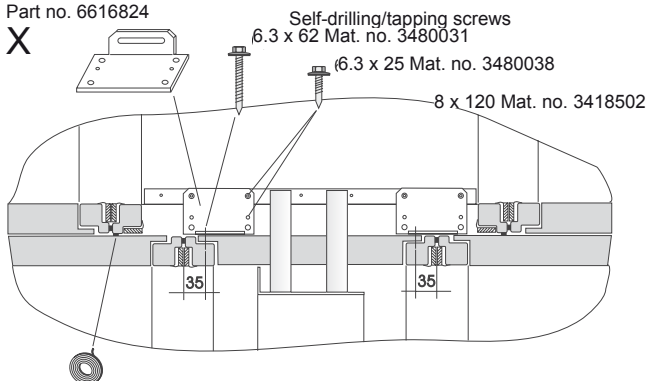
X



### Appliance connection bracket

Part no. 6616824

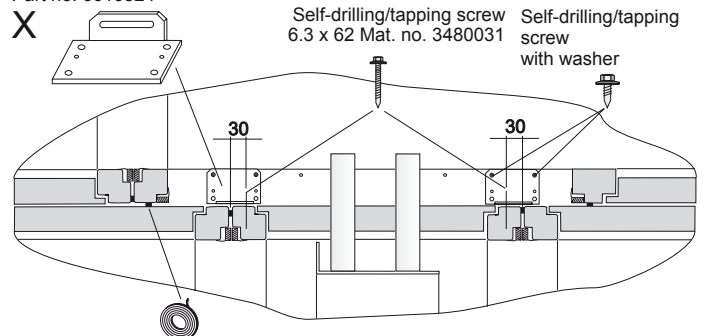
X



### Appliance connection bracket

Part no. 6616824

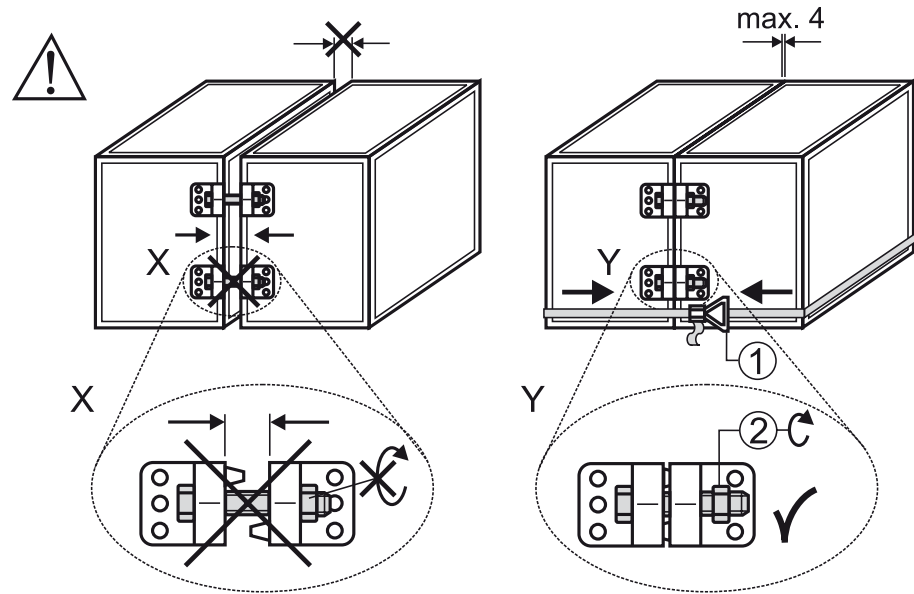
X



### Connecting units with screws

M8 screws are used to join the cubes unit. The frame sections are provided with fixing elements at the appropriate points. **Always ensure that the individual appliance parts are pushed firmly together before fitting the M8 screws.**

### External appliance connection

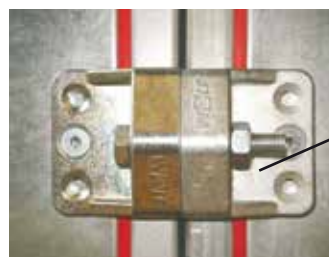


Tensioning straps may be used to make the assembly of the cube units easier. Position the appliance parts next to each other and close the gap between them with tensioning straps. Then bolt the components together by means of the connectors supplied.

The individual transport units can always be lifted and transported when units are joined internally.

**Note**

If the connectors are on the outside, the units in question can be connected but under no circumstances can the assembly be moved as a single unit.

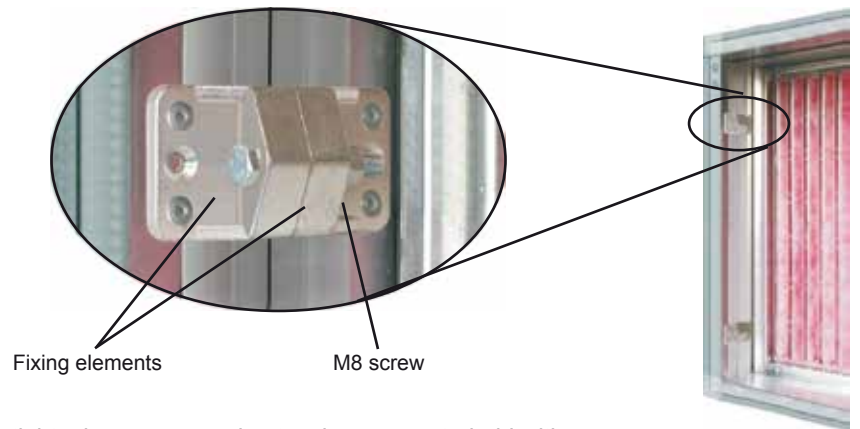


External appliance connection



**Internal appliance connection**

The individual transport units can always be lifted and transported when units are joined internally.

**Variant 1**

When tightening screws and nuts, always counterhold with a second open-ended spanner.

**Variant 2**

**Piggyback units  
(air intake/exhaust air units  
stacked one on top of the other)**

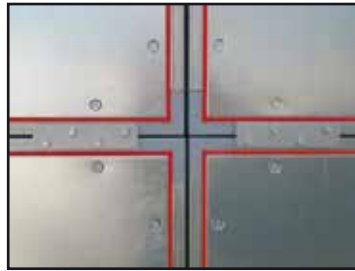
Piggyback units supplied with top and bottom units separated must be securely connected on site (after the units have been positioned) and sealed tight on the whole perimeter against rainwater penetration by means of a permanently elastic seal (weatherproof version AHUW TE).

Units are secured by means of fixing elements and Self-drilling/tapping screw 5,5x19 on the outside, as shown (on site).

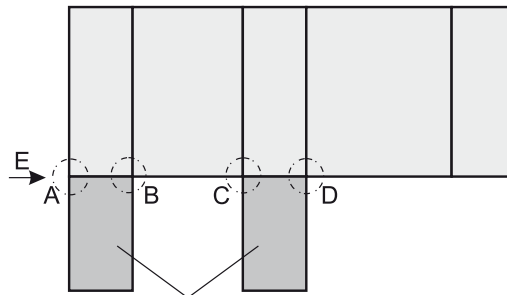
The requisite number of fixing elements is supplied with the air-handling unit.

Only secure the top and bottom units together **after** the individual cubes unit and the top and bottom units have been assembled.

**If required, install permanently resilient sealing strips or plastic sealing profiles before lowering the top unit into position on the bottom unit.**



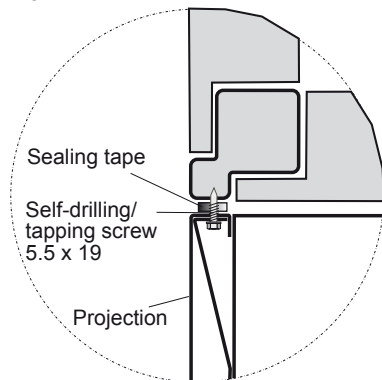
**AHUW TE projection**



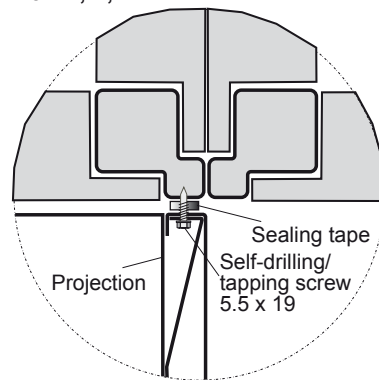
AHUW TE projection

AHUW TE view

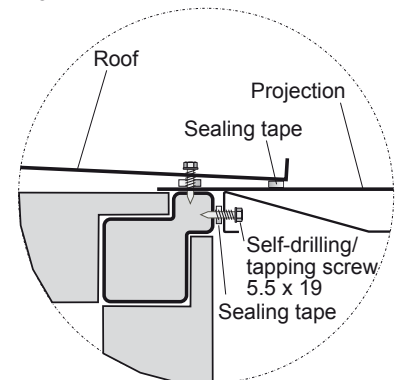
**AHUW TE 21-380  
View A**



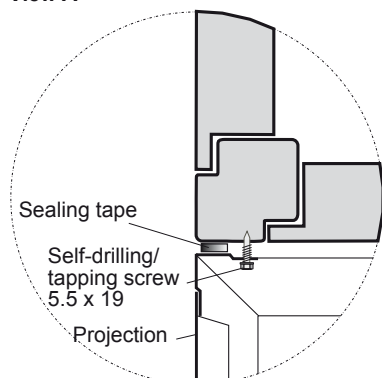
**View B, C, D**



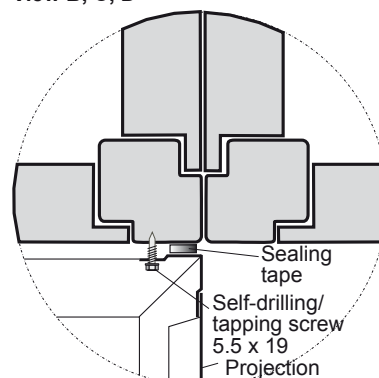
**View E**



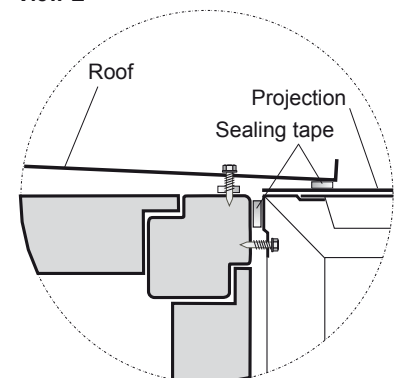
**AHUW TE 450-1000  
View A**



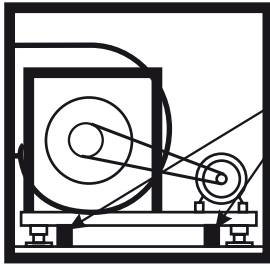
**View B, C, D**



**View E**



### Fan section



Transportation locking devices

**Note**

Ensure that the fan shaft is horizontal in its bearings. If the shaft is not perfectly horizontal the ball bearing will suffer damage and service life will be substantially reduced.

Remove the transportation locking devices from fans mounted on spring-loaded vibration dampers.

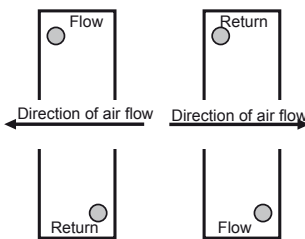
### Flexible connections

Remove the transportation locking devices. During installation ensure that the connecting flanges are no more than 100 mm apart to ensure that the flexible connections have their full range of movement.



**It may be necessary to fully insulate the flexible connections on site against acoustic emissions and condensation.**

### Heat exchanger

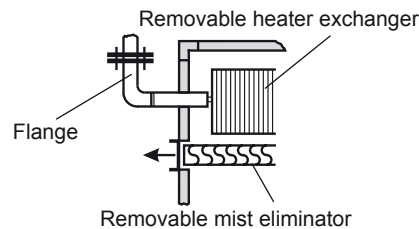


**Note**

The heat exchangers (cooling coil, heating coil) operate on the countercurrent principle. This means that the heat transfer medium or refrigerant moves in the opposite direction to the air flow. Consequently, the flow connection for the medium is always on the air discharge side of the heat exchanger.

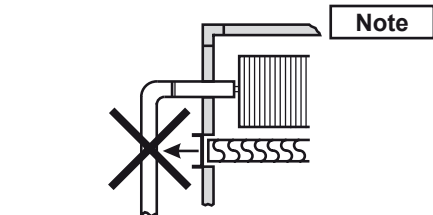
Connect the heat exchangers so that no mechanical stresses and strains are transmitted from the pipework to the heat exchangers.

It is also important to ensure that the transmission of vibrations and longitudinal expansion and contraction between the air-handling unit and the pipework is effectively prevented. Ensure that the connecting lines never obstruct access to the other parts of the unit (fan, filter, scrubber, etc.).



For the heat exchanger (with flange) it is recommended to use bends to make the connections. This configuration will ensure that the heat exchanger and the mist eliminator can be extracted to one side for subsequent cleaning.

Always install steam registers so that the steam inlet is always at the top (large diameter connector) and the condensate drain is always at the bottom.

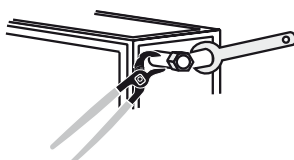


**Note**

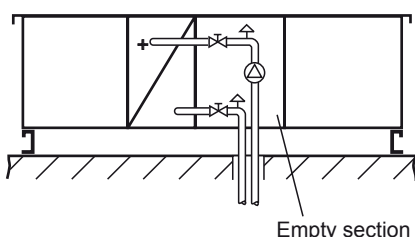
When connecting the flow and return lines, always use a wrench of correct size to counterhold the threaded connectors of the heat exchanger. Otherwise the mechanical force could separate the header from the heat exchanger. Damage of this nature would effectively ruin the heat exchanger.

It is important to ensure that facilities for venting and draining are installed on site.

Always connect a siphon to the condensate drain connector of the cooling coil drip tray (see "Siphon").



**AHUW TE:** If the heat exchanger connections are on the inside, run the pipework through the empty section provided for the purpose downstream of the heat exchanger. Make adequate provision for venting. Make suitable apertures through the removable base to accommodate the pipes. Seal these apertures by suitable means after insulating the pipework.



The weatherproof projection is not thermally insulated. **Consequently, the pipes and valves must be adequately insulated and, if necessary, heated on site. If an inverter is used for operation it is advisable to provide external ventilation in summer to prevent overheating (max. permissible temperature 45 °C). Provide suitable apertures through the removable base of the projection to accommodate the pipes.**

## Scrubber section

**Note**

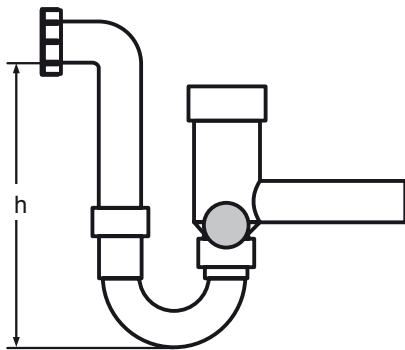
When installing the scrubber take care not to permit dirt or other foreign matter to enter the scrubber, as otherwise the pump impeller will be obstructed and this will either significantly impair pump operation or result in its destruction.

Given normal requirements, the water for the scrubber must comply at least with the minimum quality specified below:

Appearance	clear, colourless, no sediment
pH value	7 to 8.5
Total salt content	< 800 g/m <sup>3</sup>
Electr. conductivity	< 100 mS/m (at 20 °C)
Calcium ion content	> 0.5 mol/m <sup>3</sup>
Carbonate hardness	< 4.0 °d
Carbonate hardness with hardness stabilizers	< 20 °d
Chloride content	< 180 g/m <sup>3</sup>
Sulphate content	< 290 g/m <sup>3</sup>
KMnO <sub>4</sub> consumption	< 50 g/m <sup>3</sup>
Germination index	< 1000 ml-1

If the scrubber is connected to the mains water system, ensure compliance with DIN 1988 [or local regulations].

## Ball siphon



To permit reliable draining of condensate, it is important to connect a ball siphon to the condensate drain connector from the drain tray for the cooling coil / direct-expansion evaporator, plate-type heat exchanger and outside air intake tray of the AHUW TE. Also observe that each condensate drain connector must have a siphon connected to it. It is not permissible to run two or more condensate drain connectors into a shared siphon. The ball siphon is self-filling. A floating ball prevents air being inducted when the system is dry, which means that condensate initially has to fill the siphon as it is produced. The ball also acts as a non-return valve and prevents the siphon from sucking dry.

It is very important to ensure that the **foundation is of adequate height** to permit installation of the siphon.

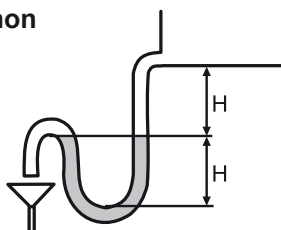
The effective siphon height H (mm) must be greater than the max. negative or positive pressure at the condensate connector (1 mm WS = 10 Pa).

$$H = 1.5 \times p \text{ (mm water column)} + 50 \text{ mm (min.)}$$

p =	Negative or positive pressure in mm of water column as per appliance design
50 mm (water column)	= Reserve (to allow for design inaccuracies, evaporation)
1.5	= Additional safety factor

Never connect the siphon discharge directly to the wastewater system. Instead, leave the end of the discharge open so that it can drain freely. Long discharge lines must be vented to prevent condensate from backing up in the pipe (provide an additional opening in the siphon discharge pipe).

## Double siphon (on site)



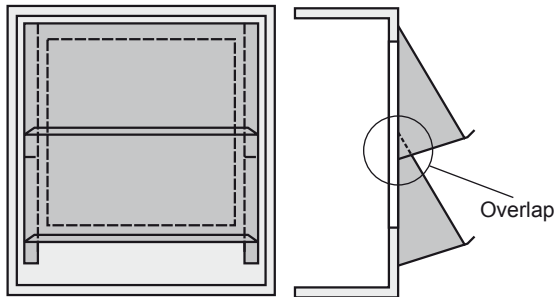
If the siphon is provided on site, calculate the height of the siphon in accordance with the sketch shown here.

The effective siphon height H (mm) must be greater than the max. negative or positive pressure (in Pa) inside the air-handling unit (1 mm WS = 10 Pa).

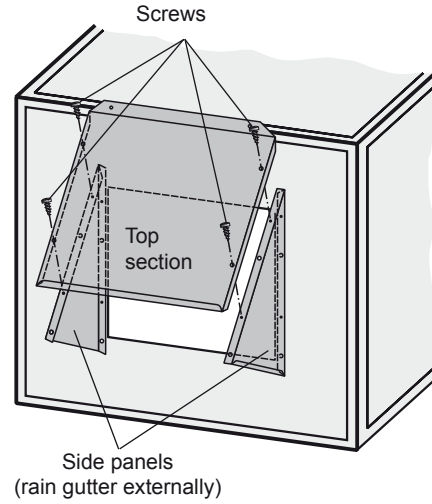
The difference in height between the unit outlet and the siphon overflow should also be equal to H (in mm).

### Intake / discharge hood

For a configuration with two or three intake/discharge hoods one above the other, the upper hood overlaps the lower hood.

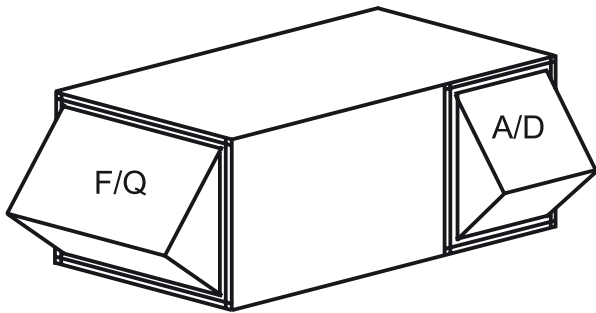


Assemble the side panels and top section as shown, using the screws supplied.

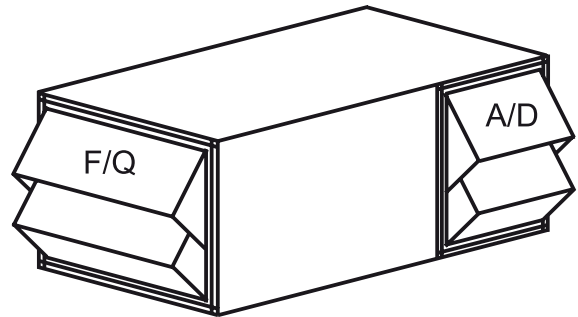


### Versions

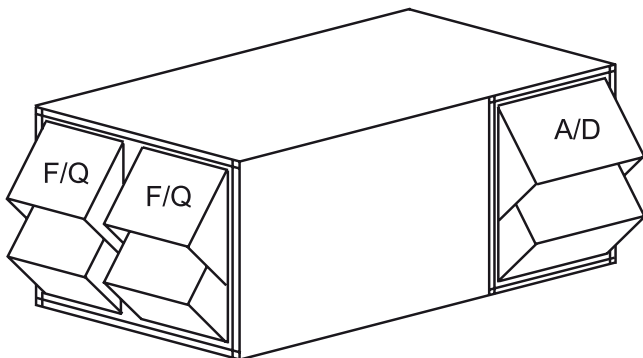
**AHU TE 21 - 210**



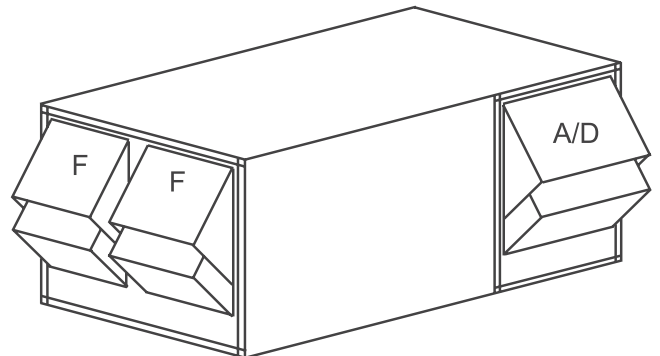
**AHU TE 270 - 380**



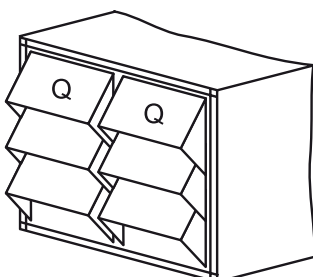
**AHU TE 450 - 600**



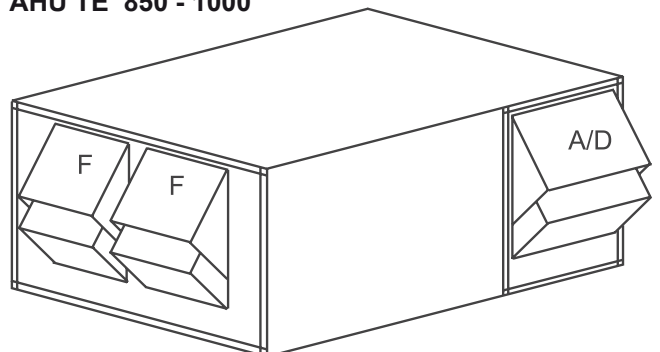
**AHU TE 680**



**AHU TE 680 - 1000**



**AHU TE 850 - 1000**



**Power connection**

The power connection must only be carried out by trained, qualified electricians to a standard compliant with the applicable regulations (VDE, local power utility, etc.).

**If the intake air / exhaust air fan shuts down or fails, all control valves must automatically close and the DHW/cold water and scrubber pumps must switch off.**

Use only control valves that close when de-energised and antifreeze thermostats without disabled reset, as otherwise components will continue to operate even if the system shuts down. Under such circumstances the built-in safety features will not be able to function as intended (e.g. no assurance of effective frost protection).

Install a lockable repair switch for each drive motor to ensure that the air-handling unit can be safely shut down.

If an additional protective equipotential bond is necessary due to structural requirements, this must be manufactured on site. It is the duty of the user or the qualified electrician to ensure that the appliance is properly earthed in accordance with the applicable national and local electrical and installation regulations.



Once the power connection has been completed, the installation must be safety-tested in accordance with VDE 0701 part 1 and VDE 0700 part 500 to check its full working order and that the safety devices are fully operational.

Use only electric motors designed to drive fans.

**Note**

**It is absolutely essential to wire the motor in accordance with the connection schematic in the terminal box. A motor that is wired incorrectly will be unable to develop its rated output and may be destroyed.**

Use a PTC thermistor trigger for each motor with PTC thermistor, an interlock contactor for each motor with thermo contacts and a thermal overcurrent relay for each motor without PTC thermistor or thermistor contacts.



Use equipotential bonding and earth straps to ensure the protective conductor connection between the air-handling unit and the ducts and between the heat exchangers and the pipework installed on site.

**Electrical connection of the EC fan**

EC motors can be operated over the entire speed range with infinite adjustment via a 0 - 10 signal (DC). The motors are generally equipped with internally switched temperature controllers. Do not lay the control line of the device directly parallel to the mains supply cable. Keep them as far apart as possible. Recommendation: Distance: > 10 cm (separate cable routing)

**Note**

If the EC fan is only connected to the power supply without connecting an additional regulation or control device to the control connection of the fan, then a bridge must be inserted between the connections 0 – 10 V /PVM and +10 V. In this case, the fan runs at the maximum speed and/or air volume.

**Motor malfunction**

To restart the motor, switch the mains voltage off for at least 25 seconds, then switch it on again.

**Residual current circuit breaker**

Only universal current sensitive residual current circuit breakers (type B) are permitted.

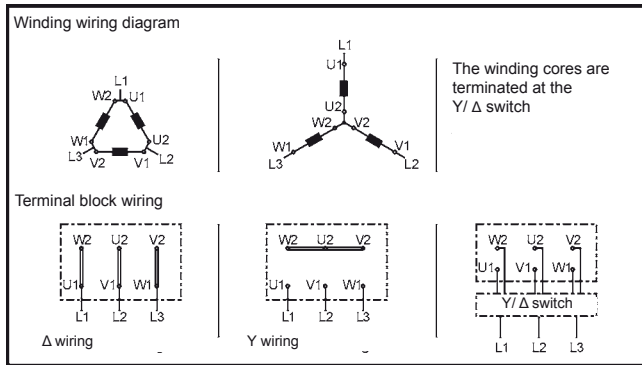
We recommend residual current circuit breakers with a trigger threshold of 300 mA.



Voltage is present on terminals and connections even when the device is switched off. Do not touch the device until at least five minutes have passed since disconnecting the voltage at all poles. If control voltage is applied or a setpoint speed is stored, the motor restarts automatically, e.g. after a mains failure.

### Wiring for single speed

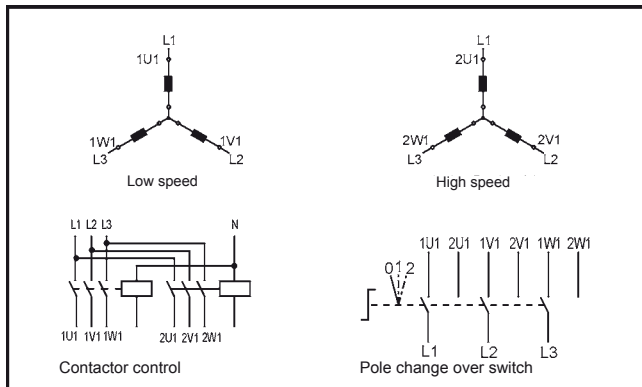
Motors up to 2.2 kW are generally started DOL, from 3 kW as in star-delta formation.



### Wiring for two speeds

(2 separate windings)

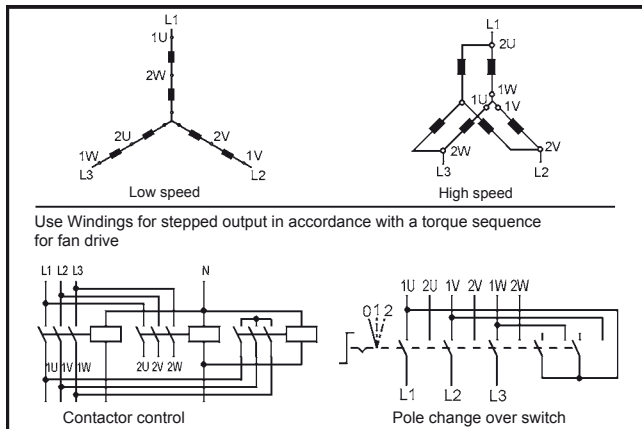
Wiring for 1000/1500 rpm or 750/1000 rpm, for example



### Wiring for 2 speeds in ratio 1:2

(winding as Dahlander pole changing circuit)

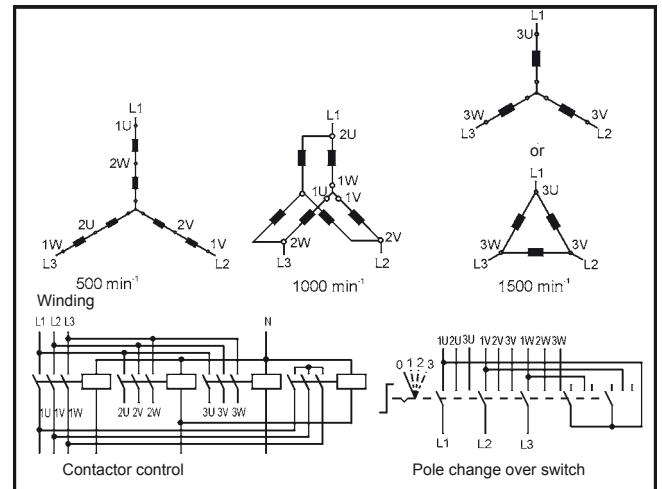
Wiring for 1500/3000 rpm or 750/1500 rpm, for example



### Wiring for three speeds

(2 separate windings, 1 as Dahlander pole changing circuit)

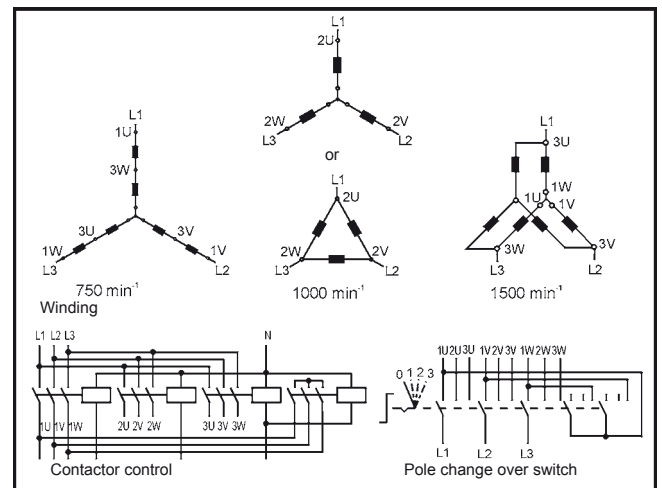
Wiring for fan drives 500/1000/1500 rpm or 500/1000 rpm as Dahlander pole changing circuit.



### Wiring for three speeds

(2 separate windings, 1 as Dahlander pole changing circuit)

Wiring for fan drives 750/1000/1500 rpm or 750/1500 rpm as Dahlander pole changing circuit.



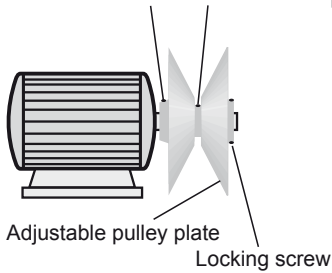
### Fan section



As required by DIN/EN 1886, tools are necessary for opening the unit. Always wait for the fan to run down to a complete standstill before opening inspection doors. The partial vacuum inside the unit could draw in loose or slack parts when the door is opened, which could cause severe damage to the fan. Severe or fatal injury could result if the vacuum sucks items of clothing inside.

Ensure that safety devices such as belt and door screens and all monitoring devices are correctly installed and in full working order.

Fixing screws for vee-belt pulley



**Note**

- Check the security of the vee-belt pulleys and the clamping screws of the clamping bush.

Adjustable belt pulleys are not set up before shipment and must be correctly adjusted on site prior to commissioning the air-handling unit.

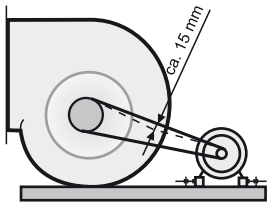
They permit a 10% variation in fan speed.

Setting:

Pulley diameter can be changed by altering the position of the adjustable pulley plate axially on a threaded adaptor (see the adjacent diagram). To adjust the pulley plate, relieve the tension on the vee-belt and undo the locking screws on the adjustable pulley with an Allen key. After adjusting the pulley plate, it is very important to tighten the locking screws correctly and to readjust the vee-belt to the correct tension.

- Check that the vee-belt is correctly tensioned. The vee-belt pulleys must be in perfect alignment.

If required, adjust the air flow by changing the belt pulleys (or by pulley adjustment if the unit is fitted with adjustable pulley(s)).



If the fan impeller is of the free running type, ensure that the maximum speed stated on the fan type plate is never exceeded even if the unit operates with an inverter. Ensure that the rated motor current consumption is not exceeded.



- Only commission the appliance if the ducts are connected and the inspection doors are closed. Failure to comply with this requirement will give rise to the risk of motor overload.

- Switch on the main isolator.



- Briefly start the drive motor and check the fan impeller direction of rotation. Correct the direction of rotation if necessary.

Proceed with extreme caution at all times as the door of the fan section must be open for these operations (if there is no sight glass). Loose or slack parts can be drawn in, which could cause severe damage to the fan. Severe or fatal injury could result if the vacuum sucks items of clothing (a necktie, for example) inside.

The airstream on the downstream side of the fan could slam an inspection door open and cause injury if the fan is installed on the pressure side.

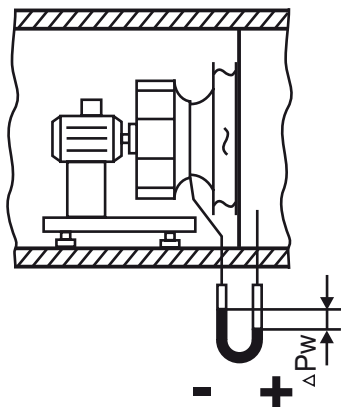
- The fan is to be checked for mechanical vibrations.

If the vibration severity is larger than 2.8 mm/s (measured on the bearing plate of the bearing at the impeller end of the motor), the motor/impeller unit must be examined by technical personnel and rebalanced if necessary.

Commissioning may take place only if all safety instructions (BS EN 50110, IEC 364) have been checked and an endangerment is ruled out.

The resonance range of the impeller is to be determined. If the range of resonance lies within the operating range, then the frequency converter is to be adjusted such that the range of resonance is driven through quickly.

Strong vibrations caused by irregular running (imbalance, over modulation of frequency converter), e.g. due to transport damage, inappropriate handling or operation within the resonance range, can lead to failure.





Frequent starting and stopping is to be avoided.

In case of operation with a frequency converter, it must be checked that the 'over modulation' function on the frequency converter does not lead to an impermissible increase in the resonance vibration within the operating range (speed range).

The over modulation must be switched off!

Check the tightening torque of the screwed connections after an operating period of approx. 1 hr.

**Note**

In the case of air-handling units with variable speed motors and/or variable recirculated air volume, it is important to measure the highest current consumption across the entire variable speed range.

**Note**

- Measure the air flow rate. Check pressure drop. The air flow rate in a unit with free running fan impeller can be measured at the pressure testing connector provided as standard.

- Measure the current drawn by the fan motor:

**Ensure that motor current and motor rating are not in excess of the figures stated on the motor type plate. Never permit the fan speed to exceed the maximum stated, otherwise the overload will destroy motor and fan and detached or flying fragments could damage other components.**

### Damper (accessory)



Check that the dampers and linkage move freely.

Check that the direction of rotation of the drive motor(s) of the damper(s) is correct; if required reverse the direction-of-rotation switch on the servomotor.

If necessary louver dampers must be insulated by the customer to prevent noise emissions and the formation of condensation water or heat losses.

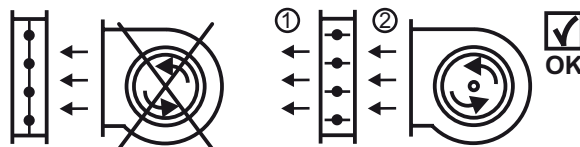
If the unit is fitted with dampers, comply with the separate installation instructions for the damper positioning motor supplied.

Damper drive shaft: □ 15 x 15 mm

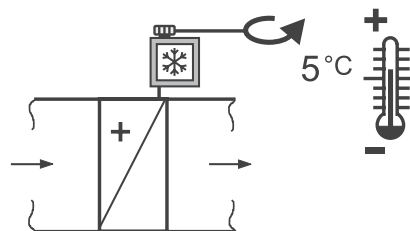


**Fully open the dampers prior to starting the fan if they are arranged on the pressure side.**

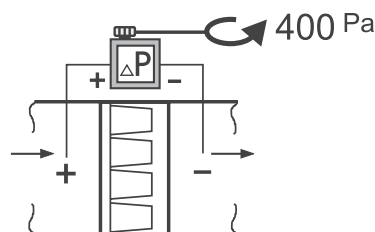
Starting the fan against closed dampers can result in damage to the appliance.



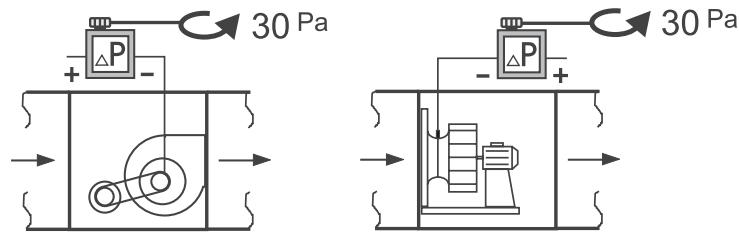
### Frost stat



### Filter monitor



### Flow rate monitor



### Heating coil (warm water/hot water/steam)

- Before starting the air-handling unit, check the entire pipework for leaks.
- Vent the heat exchanger and the pipework.
  - Ensure that condensate can always drain freely from steam registers, to prevent steam hammer from damaging the register.
  - To prevent overheating due to inadequate heat transfer, ensure that the fan is running before you switch on the heating water pump or open the water/steam valve.
  - Check the air discharge temperature; max. air discharge temperature with heating coil on intake side is 40 °C; otherwise risk of motor overheating.



**Always bear in mind that surfaces of heat exchangers and connecting adaptors become hot.  
Risk of burns and scalding.**

### Plate-type heat exchanger with dampers

The recirculating air damper must be open and the bypass damper must be closed if a plate-type heat exchanger with bypass dampers (and extra recirculating air damper) operates in recirculating air mode. This means that the fresh air induced into the system is preheated. The outside air damper can be partially closed in recirculating air mode.

Closing the bypass damper means that the outside air is preheated. Opening the bypass damper provides a means of defrosting the plate-type heat exchanger if ice forms in winter.

### Electric heating coil

To prevent overheating, ensure that the air flow rates comply with the minimum value specified below (figures are in m<sup>3</sup>/h):

Appliance type AHU TE/AHUW TE	21/43	64/96	130/170	210/270	320/380	450
	2200	3200	5700	9000	12500	22500

The minimum airflow velocity over the electric heating coil is 1.5 m/s (otherwise risk of overheating).

**Note**

If the motor is of the multi-speed or variable-speed type, irrespective of the heating power of the electric heating coil it is important to ensure that the airflow velocity does not drop below the specified minimum even when the motor is operating at its lowest speed.

It is permissible to install an electric heating coil on the intake side (upstream of the drive motor/fan as viewed in the direction of air flow) only if the heating coil's air discharge temperature does not exceed 40 °C.



**Note**

Always comply with the applicable safety regulations for electric heating appliances.

Always ensure that the electric heating register shuts down automatically if the air flow stops. In addition, the electric heating register must be switched by one or more switching devices (contactors) having a control circuit wired through the series connected safety temperature limiter. Ensure that at least one safety temperature limiter is installed at the top inside of the heating coil.

Ensure that the electric heating register is protected against humidity and water.

### Cooling coil (cold water)

- Before commissioning the air-handling unit, check the entire pipework for leaks.
- Vent the heat exchanger and the pipework.
  - Ensure that condensate can drain off, to prevent the condensate tray from overflowing.
  - If appropriate, before commissioning a chilled water cooling coil check whether the antifreeze concentration in the chilled water is adequate for the anticipated temperature range. When antifreeze is added to the chilled water, the cooling coil's power decreases in proportion to the increase in antifreeze concentration.

- Check the cold water temperature: min. cold water temperature +2 °C; if the evaporation temperature is < +2 °C there is a risk of ice forming on the heat exchanger fins which would obstruct or prevent the air flow.



Antifreeze agents are hazardous to health. Always comply with the safety instructions issued by the manufacturer of the antifreeze used on site.

### Cooling coil (direct-expansion evaporator)

Before filling the refrigerant system with refrigerant, take suitable measures to ensure that no traces of residual moisture remain in the pipework (e.g. evacuate or purge the pipework with dry nitrogen).

Check evaporation temperature: min. evaporation temperature +2 °C; if the evaporation temperature is < +2 °C there is a risk of ice forming on the fins of the heat exchanger obstructing or preventing the air flow.

**Note**

The direct-expansion evaporator will be unable to achieve its rated performance unless the refrigerant used is the same as that on which the design was based (R22 or R134a).



Never permit refrigerant to escape to the environment, as otherwise there is a risk of environmental pollution. Use a vacuum extractor of suitable design.

### Scrubber

- Check all pipes and the pump for leaks.
  - Check that the nozzle assembly and the nozzles are secure.
  - Ensure that the siphon drain is unobstructed.
  - Fill the siphon with water.
  - Fill the scrubber tray until water drains off through the siphon.
  - Briefly start the motor to check the scrubber pump direction of rotation; if required correct the direction of rotation.
- Check the power consumption of the pump motor.

**Note**

**Never permit the scrubber pump to run dry.  
The pump can suffer irreparable damage if it runs dry.**

- Switch on the air intake fan
- Switch on the scrubber pump
- Adjust the float: Tray water level at least 10 mm above the pump intake , max. 10 mm below the overflow outlet
- If installed: adjust dry run protection and automatic T.D.S. (in accordance with separate instructions supplied)

**Note:** On account of their production-related surface structure, mist eliminators are subject to disruptive discharges for a limited time.  
This is not an engineering defect.

### Contact humidifier

To maximise the service life of the humidifier medium, note the following:

- adequate supply of circulating water (approx. 3 x evaporated volume)
- permanent humidifying of the entire surface
- air temperature, water temperature < 40 °C
- always clean in good time
- operate only with fresh water (clear in appearance, without sediment).

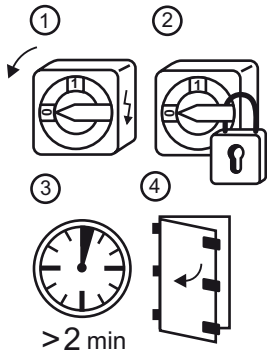
Changing the humidifier medium:

Removal and installation through the inspection door:

- remove the cover plate
- remove the humidifier medium
- install new blocks.

**Note**

Take care to install the humidifier medium right way round as otherwise mist will be entrained in the airflow and the humidifier performance will fall significantly short of requirements.



Before undertaking maintenance work, always ensure that the system main isolator and the repair switch(es) are OFF and locked to prevent unintentional reactivation. Activation without the knowledge and consent of everyone working on or near the machine could expose them to risks due to rotating and moving parts.

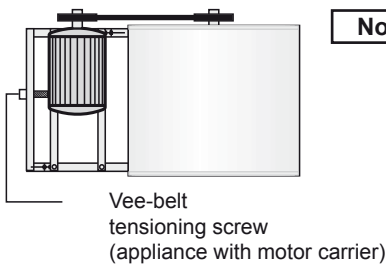
Always wait for the fan to run down to a complete standstill before opening inspection doors (waiting time at least 2 minutes). The partial vacuum inside the unit could draw in loose or slack parts when the door is opened, which could cause severe damage to the fan. Severe or fatal injury could result if the vacuum sucks items of clothing (such as a necktie) inside. The airstream of the fan could slam an inspection door open and cause injury if the fan is installed on the pressure side.

### Fan section

Fan bearings which can be lubricated must be lubricated with lithium based grease for the first time after approx. 50 hours run and thereafter every 2500 hours run. Maintenance-free bearings have lifelong lubrication and bear labels to that effect.

Standard three-phase motors are maintenance-free.

In the case of special motors, always comply with the maintenance instructions issued by the motor manufacturer.



#### Note

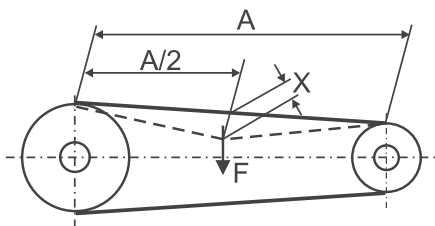
Retension the vee-belts for the first time after approximately one hour in use. Subsequently check the belts regularly: The interval between checks depends on operating conditions, but should not exceed 4 months.

Always replace the belts of multi-groove drives as a complete set.

Large drive motors are mounted on adjustable square sections or a motor carrier. To tension the vee-belt, undo the fixing screws of the square sections and undo the locknuts on the tensioning screw. Tighten the tensioning screw until the belt is correctly tensioned, ensuring that the vee-belt pulleys remain in perfect alignment. Tighten the locknuts and the fixing screws.

Check that the vee-belt pulleys are in perfect alignment.

### Vee-belt drive



Always replace the complete set of vee-belts if one or several vee-belts require replacement on a multi-groove drive.

Never use vee-belts from different manufacturers

In a single set of vee-belts.

Check the security of the vee-belt pulleys and the clamping screws of the clamping bushes.

Check that the vee-belts are correctly tensioned.

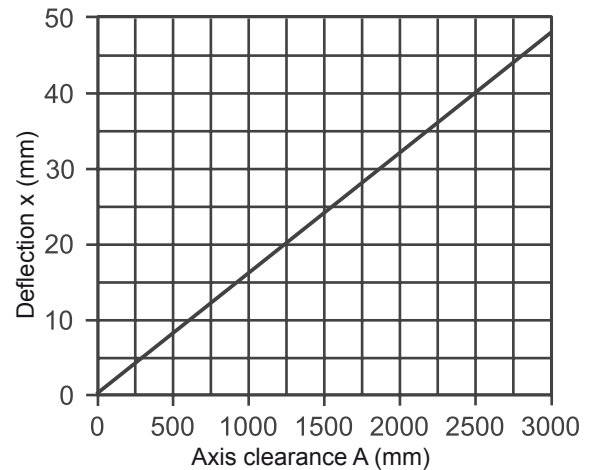
Vee-belts tensioned too tightly or too slack can result in fan or motor bearing damage.

Ensure the vee-belt pulleys are correctly aligned to prevent unnecessary vee-belt wear and unnecessary bearing loads.

Regularly check the vee-belt tension.

### Test forces (F) and deflection value (x) for narrow high performance vee-belts DIN 7753

Belt profile	Effective diameter of the small pulley (mm)	Force F (N / belt)
SPZ	67 - 95	10 - 19
	100 - 140	15 - 20
	150 - 200	19 - 27
SPA	100 - 132	20 - 27
	140 - 200	28 - 35
	224 - 315	35 - 50
SPB	180 - 224	40 - 52
	236 - 315	46 - 60
	315 - 400	55 - 76
	400 - 500	67 - 90



### Flat belt drive

#### Note

Check the precise parallelism of the fan drive shaft to the motor drive shaft.

Check the precise alignment of the pulleys.

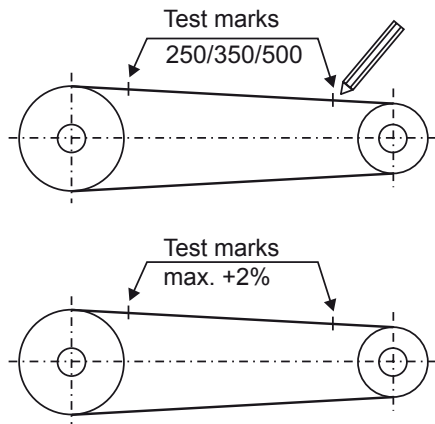
Clean the pulley belt faces thoroughly to remove dirt, oil and grease.

Using a pencil, apply measuring marks to the belt at distances of, for example, 250 mm, 350 mm, 500 mm, 750 mm and 1000 mm.

Prior to the test run, turn the pulleys manually to check the belts run correctly.

Check the belts after a test run lasting 30 to 60 minutes and increase the pretension (max. 2%) if required.

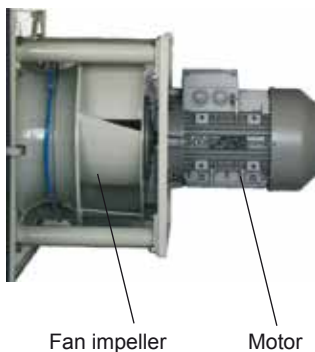
When using collared/welded pulleys ensure that the belt has no permanent contact with the collar or weld during operation. This would lead to the destruction of the belt.



Examples - test mark clearances:

Unstretched	250 mm	350 mm	500 mm	750 mm	1000 mm
Stretched + max. 2%	max. 255 mm	max. 357 mm	max. 510 mm	max. 765 mm	max. 1020 mm

### Free running fan impeller



### Observe safety and employment regulations (BS EN 50110, IEC 364) when carrying out repair and maintenance work!

Motor and bearing are maintenance free.

Check the fan for mechanical vibrations in accordance with BS ISO 14694 every 12 months. The max. permissible vibration severity is 2.8 mm/s (measured on the bearing plate of the bearing at the impeller end of the motor).

Deposits on the impeller can lead to imbalance and thus to damage (danger of a fatigue fracture – impeller can break up – danger to life).

Clean the impeller with soapy solution if required.

## Heat exchanger (heating coil / cooling coil / KGX)

Check periodically for contamination and clean as necessary.  
Clean the heat exchanger by:

- Vacuum extraction
- Blowing down with compressed air
- Spraying with water or steam

**Note**

Ensure that the air/water/steam pressure for cleaning is not in excess of 5 bar, otherwise there is a risk of mechanical damage to components.

Check the condensate drain.  
Open the siphon, clean it and refill it.  
Use a commercially available descaling agent to clean the drop-eliminator sections.

## Dampers

Never oil dampers. Oil could damage the plastic used. In that case the damper function would no longer be ensured.  
Blow the dampers clean with compressed air; no other maintenance is required.

## Scrubber

Regularly clean the scrubber and the mist eliminator. Cleaning intervals are subject to operating method, air condition and water quality.  
Maintenance involves draining the tray and rinsing it with clean water or a high pressure cleaner.

Spray pipework and nozzle assembly only with reduced water pressure.  
Parts could be damaged by a jet of water at excessive pressure.

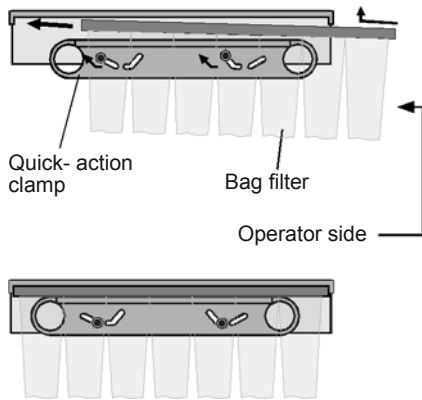
**Note**

Commercially available descaling agents can be used.  
Never use foaming cleansers.  
The scrubber pump is maintenance free.  
However, when cleaning the scrubber it is advisable to flush the pump and the pipework with clean water.

**Note**

If the scrubber is out of use for a longer period of time, start the pump weekly and allow it to run for approx. 5 minutes to prevent the bearings from seizing (never run the pump dry).

## Filter



Wear protective clothes, protective gloves and a respirator when exchanging the filter!

Contaminated filters are dangerous to human health. Contact with filter dust can cause allergic reactions of the skin, eyes and respiratory organs



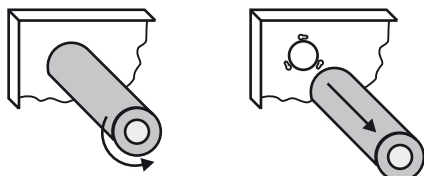
If filter inserts require cleaning or replacement, open the inspection door and pull them to the side and out of the casing.

Category G4 synthetic fibre filter mats used as filter inserts can be regenerated. The mats can be tapped clean, blown clean, vacuum cleaned or washed out in a solution of commercially available fine detergent and lukewarm water. Never wring out the mats.

Bag filters cannot be regenerated. Replace the bag filters when the pressure drop exceeds the permissible maximum because of clogging.  
When bag filter inserts require replacement, open the inspection door and release the quick action clamp, then pull the bag to the side and out of the casing.  
(pull quick action clamp with a tool = remove filter;  
(push quick action clamp with a tool = filter tensioned)

**Note:** Pull the swallow tail seals off the spent filters and push them into position on the replacement filters. This is important to ensure that the new filters are reinstalled correctly.

## Activated charcoal filter



Replace the activated charcoal filters (cartridges) if they are saturated (expiry of the specified operating time).

The cartridges are fastened with special bolts (bayonet connection). Rotate the cartridges and pull them towards you out of the frame. When exchanging the activated charcoal filter cartridges, the pre-filters should also be renewed in order to achieve optimum service lives of the activated charcoal filters.

**Frost protection measures****Heat exchanger**

LPHW / MPHWP heating coils, chilled water cooling coils, plate-type heat exchangers:

- Always install AHU TE air-handling units in rooms free from the risk of frost.
- Operate with commercially available antifreeze and frost stat.
- When the heating system is shut down drain all water-retaining parts and use compressed air to blow out residual water.
- Plate-type heat exchanger with bypass: operate in bypass mode to defrost.

**Steam coil:**

- When the heating system is shut down drain all water-retaining parts and use compressed air to blow out residual water.

**Electric heating coil:**

- No frost protection measures required.

**Scrubber section**

Insulate the water supply pipe on site; install pipe ribbon heater if required.

Drain the tray and the pipework; blow out the pipework with compressed air.

Drain the pump (see the pump manufacturer's separate instructions supplied).

**Siphon**

Protect the siphon on site against the risk of frost.

**Shutdown****Seasonal shutdown:**

Operate heat-wheel heat exchanger periodically to clean off the surface.

**Short-term shutdown:**

Run down the system to minimum output by means of the control system.

Set the dampers to recirculating air mode and close the outside air damper to prevent cooling and the risk of frost.

Switch off recirculation pumps and close the control valves.

Drain internal components that could be damaged by frost, for example the heat exchanger.

Use compressed air to blow out heat exchanger and connecting lines installed on site until they are fully drained.

Allow the fan to run on until all surfaces are completely dry.

Drain all siphons.

Switch off the main isolator and lock the system.

**Long-term shutdown:**

Adopt the same procedure as for a short-term shutdown.

In addition, relieve the tension on fan vee-belts if installed, or remove the vee-belts to prevent damage to the shaft bearings.

**Restarting:**

Visually inspect and check for signs of damage.

Follow the commissioning routine (as described in the "Commissioning" section).

**Fire**

The equipment as such does not present a direct fire hazard.

External influences could cause the seals installed in small numbers in the equipment to burn.



Disconnect the system from the power supply in the event of a fire.

Persons involved in fire fighting must wear suitable breathing apparatus.

The usual extinguishers such as water, extinguishing foam or extinguishing powder can be used for fire fighting.

Flammable seals are installed only in small quantities. In the event of a fire only correspondingly small quantities of pollutants can be produced.

**Disposal and recycling:**

When it has reached the end of its useful life the system must be disassembled by suitably trained and qualified personnel.



Isolate the system from the power supply before commencing disassembly work.

Trained, qualified electricians must remove the power cables.

Fully drain all components containing media (heating coil, cooling coil, etc.). Dispose of such media (e.g. water containing antifreeze, refrigerant etc.) professionally in accordance with local regulations.

The system can then be disassembled into its component parts.

Metal and plastic parts must be sorted and disposed of in the correct, environmentally responsible manner. (weight reduction)



Be aware that load-bearing metal and plastic components may have aged and thus no longer reach the original structural load limit.

Attention should be paid to this in particular with weatherproof appliances due to the constant weathering and UV radiation.

If load-bearing metal and plastic components have aged, they must be transported using safe, modern Wolf lifting equipment.

Metal and plastic components should be sorted and disposed of separately according to the local regulations. Electrical and electronic components must be disposed of as electrical waste.



Suitable protective clothing, protective gloves and respirators must be worn when handling components that are contaminated with dust (e.g. filters, mineral wool products, etc.).

Filters and mineral wool products must be disposed of in an environmentally friendly manner according to the local regulations.



Recommended checklist for hygienic operation and the maintenance of air-handling systems

Activity	Possible measure	Months
<b>Outside air/expelled air apertures</b>		
<b>Chamber internals/appliance casing</b>		
Check for contamination, damage and corrosion	Clean and repair	12
<b>Air filter</b>		
Check for excessive contamination and damage (leaks)	Change the air filters concerned if the last change was not more than 6 months ago, otherwise change the entire filter stage	3
<b>Steam humidifier</b>		
Wash with cleaning agents Rinse and dry the humidifier chamber, disinfect if necessary		6
Check steam wand for deposits	Clean	6
Check hygiene condition		6
<b>Heat exchanger</b>		
Check for contamination, damage and corrosion	Clean and repair	3
Check siphon function	Repair	3
Check hygiene condition		6
<b>Fan</b>		
Check for contamination, damage and corrosion	Clean and repair	6
<b>Heat recovery</b>		
Check condensate tray and mist eliminator for contamination, corrosion and function	Repair	3
Check siphon function	Repair	3
Check hygiene condition		12
<b>Ductwork and attenuator</b>		
Check for contamination, damage and corrosion	Clean and repair	12
<b>End units</b>		
Check end units with outside air filter for contamination	Replace air filters, clean appliance	3
Check heat exchangers in end units without air filters for contamination	Clean (vacuum cleaner)	6
Replace air filters		12

**Genuine WOLF spare parts can be ordered at short notice by faxing the requisite information, accompanied by the order number (see rating plate) to this number: +49 8751/74-1574.**





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