Operation and Maintenance Manual for Air Handling Units

Important Note

This operation and maintenance manual contains important technical and safety-related instructions. Please read these instructions carefully before installation as well as before any work is to be performed on the air handling units.

The units are to be installed and used according to the rules in our instructions.
If the installation is carried out contrary to these instructions, and any deficiency/damage occurs resulting from an improper modification, handling, or other usage then all entitlements for compensation or warranty are void.
The buyer has to provide proof that the improper installation was not the cause of the damage incurred.

General maintenance instructions for installation, initial operation and maintenance for central air handling units for the model series S60 and T60 (C60) must be adhered to.

All work on air handling units are to be carried out exclusively by qualified personnel or appropriately trained individuals!

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1. General Safety Guidelines

1.1. Safety Symbols

The following symbols alert you to certain dangers or give you instructions for safe operation:

Warning! Hazardous Situation! Safety instruction

Danger due to electric current or high voltage!

Crush Hazard!

Danger! Stay out from under suspended load!

Caution! Hot Surface.

Danger! Explosive Atmosphere.

Attention! Industrial trucks

Important Instruction, Information.

1.2. Safety Instruction

Rosenberg-RLT units are designed and constructed to the latest technical standards available at the time of delivery.
Comprehensive material, functionality and quality controls ensure high benefits and long life of the unit. Nonetheless hazardous situations can arise when the units are used by untrained personnel or not used as intended. For the individual components the operations manuals of the corresponding component manufacturer are to be used.

Read this Operation Manual carefully before unpacking, before assembly work and before every routine maintenance!

- Only operate the RLT-unit when fully installed or with properly installed machine guards or safety guards in place. (We can supply fitted and tested guards if required upon request).

- The following work is only to be carried out by trained professionals:
  - assembly work
  - electrical connection
  - fabricating supply lines
  - startup
  - corrective maintenance

- All work must be carried out using personal protective equipment, including protective gloves due to any sharp edges that may be present, safety clothing, if applicable, respiratory and eye protection. When cleaning and disinfecting the instructions of the funds used must be observed!
- Operate the RLT-Unit exclusively within the described performance limits. These can be found in the technical data sheets or on the name plate on the unit.
- Going over the limit just one time can result in damage to components and can create a hazardous situation for the continued safe operation of the unit.

See also German guidelines:

DGUV Vorschrift 1	„Grundsätze der Prävention“
DGUV Vorschrift 3	„Unfallverhütungsvorschrift Elektrische Anlagen und Betriebsmittel“
DGUV Vorschrift 52	„Krane“
DGUV Vorschrift 68	„Flurförderfahrzeuge“
DGUV Regel 100-500	„Betreiben von Arbeitsmittel“
BetrSichV	„Betriebssicherheitsverordnung“
DGUV Information 208-016	„Handlungsanleitung für den Umgang mit Leitern und Tritten“
VDMA 24186-1	„Leistungsprogramm für die Wartung von technischen Anlagen und Ausrüstungen in Gebäuden“
VDI 3803	„Raumluftechnische Anlagen: Bauliche und Technische Anforderungen“
VDI 6022	„Hygienische Anforderungen an Raumluftechnische Anlagen“

Already a unique exceeded the specified performance limits has forced damaging the built-in parts and then the consequence is a danger for the further safety of the appliance.

- Only use approved means of transport and approved equipment. Please check your local regulations.

- Please disconnect all electronic machines and devices form the mains before working on them (switches compatible with lock out tag out procedures are generally included in the scope of delivery).

- After completion of work on the RLT-Unit, the responsible party needs to ensure that no persons are inside the unit before these will be restarted.

- Authorized personnel are to be trained in the appropriate accident prevention guidelines of the relevant occupational safety and health administration.

2. Device Description

Rosenberg-RLT-Units are constructed based on the modular design principle and can be manufactured and installed in various reasonable combinations.The units labeled "Eurovent" conform to the specifications of the EUROVENT-certification.

Der Einsatzbereich erstreckt sich je nach Baugröße über einen Volumenstrombereich von 500 m^3/h bis 100.000 m^3/h bei einer maximalen Fördermediumsdichte von 1,3 kg/m^3.

Air treatments such as filtering, heating, cooling, mixing, humidifying and moving are typical functions. In addition static and dynamic heat recovery systems with high efficiency ratings are utilized.

Weatherproof Units have been modified specfically for use outdoors. Modified or rather additional components, for example weatherproof cages, intake and outlet hoods at the air supply connections, rain canopies (usually as an additional kit with installation instructions) or PVC coating of exposed surfaces makes outdoor use possible.
The assumption of static or dynamic building functions by Rosenberg air handling units must be excluded, e.g. roof function or part of the roof by installing the unit through the roof openings.

Units in Hygienic Construction were designed specifically for the use in hygienically sensitive areas. Emphasis was placed on premium, hygienically flawless materials and components. Easy access (i.e. for periodic cleaning) is in the foreground of the design. Rosenberg RLT-Units in hygienic construction correspond to the strict hygiene rules set forth in the German norm DIN 1946 Part 4.

Unit Model with 60 mm insulation thickness

Unit Model	Outside dimensions		Recommended Air volume		
	B	H	From to	Supply Air Units v= 1,5 m/s	Exhaust Air Units v= 2,0 m/s
S60/T60-0704	770 mm	480 mm	500 m³/h	1200 m³/h	1600 m³/h
S60/T60-0707	770 mm	770 mm	1100 m³/h	2200 m³/h	2900 m³/h
S60/T60-0710	770 mm	1090 mm	1600 m³/h	3300 m³/h	4400 m³/h
S60/T60-0713	770 mm	1390 mm	2100 m³/h	4300 m³/h	5800 m³/h
S60/T60-1004	1090 mm	480 mm	900 m³/h	1800 m³/h	2400 m³/h
S60/T60-1007	1090 mm	770 mm	1600 m³/h	3300 m³/h	4400 m³/h
S60/T60-1010	1090 mm	1090 mm	2400 m³/h	4900 m³/h	6600 m³/h
S60/T60-1013	1090 mm	1390 mm	3200 m³/h	6500 m³/h	8700 m³/h
S60/T60-1016	1090 mm	1720 mm	4100 m³/h	8200 m³/h	10900 m³/h
S60/T60-1020	1090 mm	2020 mm	4800 m³/h	9700 m³/h	13000 m³/h
S60/T60-1304	1390 mm	480 mm	1100 m³/h	2300 m³/h	3100 m³/h
S60/T60-1307	1390 mm	770 mm	2100 m³/h	4300 m³/h	5800 m³/h
S60/T60-1310	1390 mm	1090 mm	3200 m³/h	6500 m³/h	8700 m³/h
S60/T60-1313	1390 mm	1390 mm	4200 m³/h	8500 m³/h	11400 m³/h
S60/T60-1316	1390 mm	1720 mm	5400 m³/h	10800 m³/h	14400 m³/h
S60/T60-1320	1390 mm	2020 mm	6400 m³/h	12800 m³/h	17100 m³/h
S60/T60-1322	1390 mm	2260 mm	7200 m³/h	14400 m³/h	19300 m³/h
S60/T60-1325	1390 mm	2570 mm	8300 m³/h	16600 m³/h	22100 m³/h
S60/T60-1607	1720 mm	770 mm	2700 m³/h	5400 m³/h	7300 m³/h
S60/T60-1610	1720 mm	1090 mm	4100 m³/h	8200 m³/h	10900 m³/h
S60/T60-1613	1720 mm	1390 mm	5400 m³/h	10800 m³/h	14400 m³/h
S60/T60-1616	1720 mm	1720 mm	6800 m³/h	13600 m³/h	18200 m³/h
S60/T60-1620	1720 mm	2020 mm	8100 m³/h	16200 m³/h	21600 m³/h
S60/T60-1622	1720 mm	2260 mm	9100 m³/h	18200 m³/h	24300 m³/h
S60/T60-1625	1720 mm	2570 mm	10400 m³/h	20900 m³/h	27900 m³/h
S60/T60-2010	2020 mm	1090 mm	4800 m³/h	9700 m³/h	13000 m³/h
S60/T60-2013	2020 mm	1390 mm	6400 m³/h	12800 m³/h	17100 m³/h
S60/T60-2016	2020 mm	1720 mm	8100 m³/h	16200 m³/h	21600 m³/h
S60/T60-2020	2020 mm	2020 mm	9600 m³/h	19200 m³/h	25700 m³/h
S60/T60-2022	2020 mm	2260 mm	10800 m³/h	21700 m³/h	28900 m³/h
S60/T60-2025	2020 mm	2570 mm	12400 m³/h	24900 m³/h	33200 m³/h
S60/T60-2028	2020 mm	2870 mm	13900 m³/h	27900 m³/h	37200 m³/h
S60/T60-2210	2260 mm	1090 mm	5500 m³/h	11000 m³/h	14700 m³/h
S60/T60-2213	2260 mm	1390 mm	7200 m³/h	14400 m³/h	19300 m³/h
S60/T60-2216	2260 mm	1720 mm	9100 m³/h	18200 m³/h	24300 m³/h

S60/T60-2220	2260 mm	2020 mm	10800 m³/h	21700 m³/h	28900 m³/h
S60/T60-2222	2260 mm	2260 mm	12200 m³/h	24400 m³/h	32600 m³/h
S60/T60-2225	2260 mm	2570 mm	14000 m³/h	28000 m³/h	37400 m³/h
S60/T60-2228	2260 mm	2870 mm	15700 m³/h	31500 m³/h	42000 m³/h
S60/T60-2510	2570 mm	1090 mm	6300 m³/h	12600 m³/h	16800 m³/h
S60/T60-2513	2570 mm	1390 mm	8300 m³/h	16600 m³/h	22100 m³/h
S60/T60-2516	2570 mm	1720 mm	10400 m³/h	20900 m³/h	27900 m³/h
S60/T60-2520	2570 mm	2020 mm	12400 m³/h	24900 m³/h	33200 m³/h
S60/T60-2522	2570 mm	2260 mm	14000 m³/h	28000 m³/h	37400 m³/h
S60/T60-2525	2570 mm	2570 mm	16000 m³/h	32100 m³/h	42800 m³/h
S60/T60-2528	2570 mm	2870 mm	18000 m³/h	36100 m³/h	48100 m³/h
S60/T60-2810	2870 mm	1090 mm	7100 m³/h	14200 m³/h	18900 m³/h
S60/T60-2813	2870 mm	1390 mm	9300 m³/h	18600 m³/h	24800 m³/h
S60/T60-2816	2870 mm	1720 mm	11700 m³/h	23500 m³/h	31300 m³/h
S60/T60-2820	2870 mm	2020 mm	13900 m³/h	27900 m³/h	37200 m³/h
S60/T60-2822	2870 mm	2260 mm	15700 m³/h	31500 m³/h	42000 m³/h
S60/T60-2825	2870 mm	2570 mm	18000 m³/h	36100 m³/h	48100 m³/h
S60/T60-2828	2870 mm	2870 mm	20200 m³/h	40500 m³/h	54000 m³/h
S60/T60-3210	3180 mm	1090 mm	7900 m³/h	15800 m³/h	21000 m³/h
S60/T60-3213	3180 mm	1390 mm	10300 m³/h	20700 m³/h	27600 m³/h
S60/T60-3216	3180 mm	1720 mm	13000 m³/h	26100 m³/h	34900 m³/h
S60/T60-3220	3180 mm	2020 mm	15500 m³/h	31100 m³/h	41500 m³/h
S60/T60-3222	3180 mm	2260 mm	17500 m³/h	35000 m³/h	46700 m³/h
S60/T60-3225	3180 mm	2570 mm	20000 m³/h	40100 m³/h	53500 m³/h
S60/T60-3228	3180 mm	2870 mm	22500 m³/h	45100 m³/h	60100 m³/h
S60/T60-3513	3480 mm	1390 mm	11300 m³/h	22700 m³/h	30300 m³/h
S60/T60-3516	3480 mm	1720 mm	14300 m³/h	28700 m³/h	38300 m³/h
S60/T60-3520	3480 mm	2020 mm	17000 m³/h	34100 m³/h	45500 m³/h
S60/T60-3522	3480 mm	2260 mm	19200 m³/h	38500 m³/h	51300 m³/h
S60/T60-3525	3480 mm	2570 mm	22000 m³/h	44100 m³/h	58800 m³/h
S60/T60-3528	3480 mm	2870 mm	24700 m³/h	49500 m³/h	66000 m³/h

2.1. Information on materials and sealing

All metallic materials used are provided with an additional corrosion protection (galvanizing, coating) or are themselves corrosion-resistant. The formation of the protective outer layer is a long-running process.
Numerous elements are machined and handmade of galvanized steel. Despite the greatest care in the entire manufacturing process, scratches can only be avoided to a limited extent and discolorations can occur at the cutting edges. These are harmless and state of the art and thus not a defect. Before complete formation of the covering layer, galvanized surfaces are prone to white rust formation. Such circumstances are as a rule unavoidable according to the state of the art and cannot be influenced by us and thus not a defect.
Affected surfaces must be cleaned and, if necessary, re-sealed. Coated surfaces are low-maintenance and a galvanizing layer is located below the coating. Damage can be remedied with commercially available varnishes. In operation, sealing joints are subject to an aging and wear process as well as environmental influences and temperature fluctuations. These lead to decreasing flexibility, shrinkage and cracks.
The joints can get cracks in spite of the greatest care during the production process, during transportation, installation or assembly of the modules, which can lead to leakage. In this case, sealant must be reworked, re-executed. Sealant joints have to be checked yearly.

3. Conditions of use

Rosenberg-RLT-units are to be solely used to treat or move air or gases based on the following criteria.

The utilized centrifugal fans are suited for treating or moving...

- clean, minimally dusty or minimally grease containing air (prefiltering min. Class M5 recommended)
- lightly aggressive gases and steam (Checking with the factory before use in this environment is necessary!)
- gaseous mediums with a density up to 1,3 kg/m³
- gaseous mediums with a max. relative humidity of 95%
- gaseous mediums in the temperature range of –20°C to +40°C. (other ranges require special modifications!)
- non-explosive gaseous mediums

Before utilizing the RLT –Unit in explosive environments or for moving explosive mediums, the requirements will have to be discussed with the factory to check the individual installed and functional components for compliance (only unit model S60).

- Clarification if unit is to be installed in an explosive environment.
- Clarification if the unit is to handle explosive mediums, FB-03-22 & FB-03-24.
- Expert determination of the zones, explosion groups and temperature classes according to DIN EN 60079 und determination of the required ignition protection category.
- Restriction of the air speed related to the installed parts to avoid static electricity buildup. Grounding of at risk parts through electrical potential equalization is necessary.
- Reduction of the maximum fan RPM by 15% of the maximum allowed circumferential velocity.
- Selection of the pairing of material between static and dynamic parts within a component.
- All electrically powered components have to conform to the respective requirements. A certificate of the national or international regulatory authority is compulsory. (i.e. in Germany: Physikalisch Technische Bundesanstalt Braunschweig or IBExU Freiberg).
- Special notes for operating and maintaining units in explosion proof construction can be found in chapter 11.

4. Delivery, Transportation and Storage

4.1. Delivery

Rosenberg-RLT-units are to be visually inspected upon delivery for damages. This should be done before unloading the individual modules from the transport vehicle. Furthermore the bill of lading should be checked to make sure all parts are in the shipment.
Missing parts or damages are to be immediately noted on the bill of lading and confirmed by the driver of the transport vehicle.

4.2. Transportation

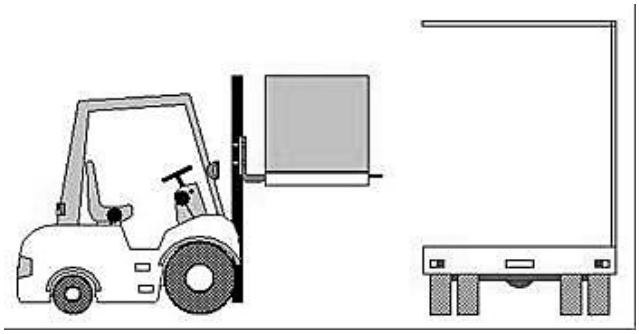
Smaller components of the Rosenberg-RLT-Units are shipped on pallets and can be handled with forklifts or pallet jacks. Larger components are affixed to wooden transport blocks that can accommodate forks for handling.
Components with an angled base frame have bore holes to insert round steel tubes (per DIN EN 10255; not included). These allow for transport via overhead or auto crane. The excess length over the edges of the component should be at least 200mm on both sides!
To prevent slippage of the lifting accessories, please attach pipe fasteners!

- Avoid torsional stresses and damage to the housing when lifting.

- Always keep the access panel doors closed during transport.

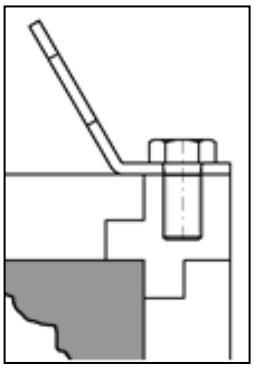
When transporting with fork lift or pallet jack please note the following:

- The ability of floor material handling vehicles to function properly require regular instruction of the responsible personnel according to the accident prevention regulations.
- Before each movement or lifting process the proper operation of the material handling equipment is to be checked!
- The length of the forks of the handling equipment must be longer than the depth of the component to be lifted. Forks that are too short cause damage to floor panels and unit frames!

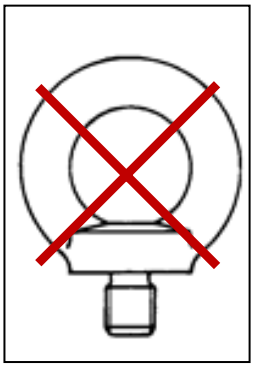


When transporting via overhead or auto crane please note the following:

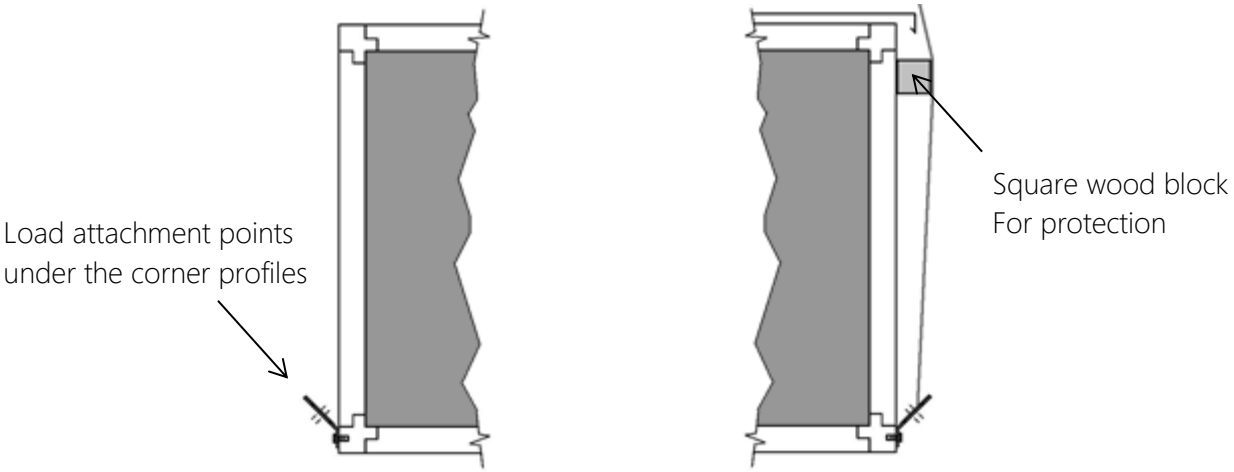
- The ability of cranes and slings to function properly require regular instruction of the responsible personnel according to the accident prevention regulations.
- Danger! Stay out from under suspended load!
- Use only permitted, undamaged, fabric slings with edge protection and sufficient area to support the load when lifting the loads directly by running slings under it.
  (i.e. slings per EN1492-1 or EN1492-2).
- The use of multi-leg sling chains or ropes for attaching loads directly to attaching points is prohibited!



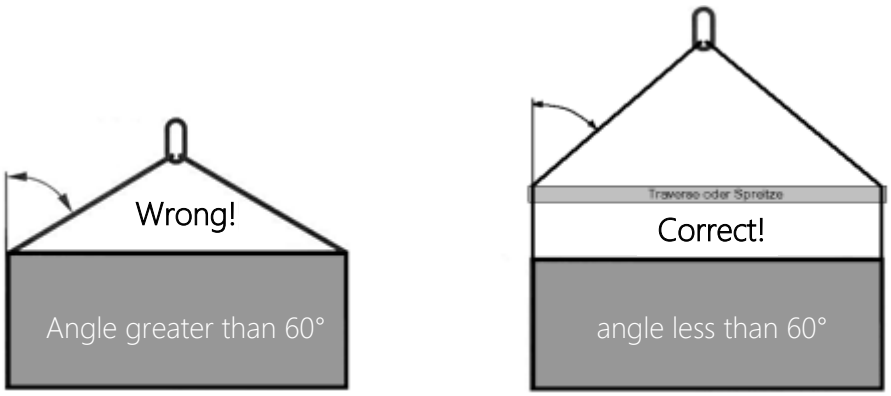
- Optional load attachment points in the form of threaded holes M20 in the corners of the modules with lifting eyes and high grade machine screws are only to be used in the delivered configuration, Series S60.
- The use of lifting eye bolts per DIN 580 – M20 C15 is not permitted!



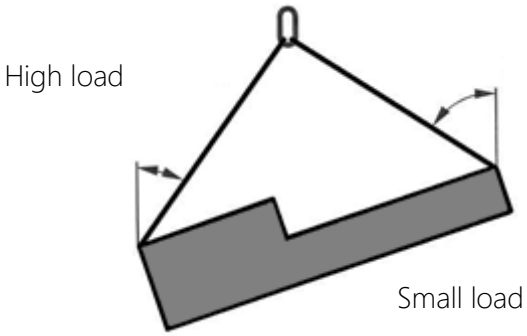
- Additional optional load attachments points can be found in the area under the horizontally running corner profiles i.e. the base frame.



- Please avoid angles greater than 60° of the rigging material!



- When lifting, please note, that the load distribution inside the unit is generally not symmetric! This is not obvious by just looking at the unit!
  For each point a separate slings should be used, looped through the crane hook is not too casual, risk of slippage.



4.3. Storage

- Please store all components in a dry and weather protected area.
- After receiving the goods, please remove all packaging, plastic wrap and tape immediately in order to prevent condensation from forming.
- Please cover exposed plates with tarps. Protect the components from dirt (i.e. sawdust, rocks, cables etc.).
- Weather resistant components also need to be covered since the weather resistance is only guaranteed after complete installation.
- Openings for cables, as well as module connections, duct connections, doors etc. are to be closed. The possible entry of moisture can lead to defects, liability will not be assumed for this.
- Please keep the storage temperature between -30°C and +40°C.
- To prevent white rust formation, ensure adequate ventilation.
- If unit has been stored for a period of longer than 12 months, please make sure the bearings are working properly in the fans, by checking the impeller for free movement.

Spin the impeller by hand
Warning! Crush hazard at the impeller and the belt drive!

5. General Installation Instructions

5.1. Installation of the Unit

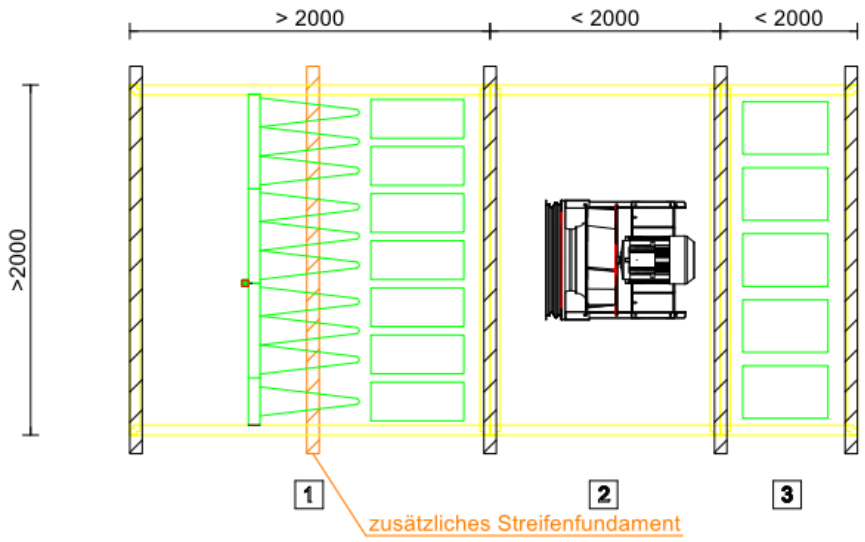
Installation, start up and maintenance work is generally only allowed by trained professionals! For inspection and cleaning according to VDI 6022 the following qualifications are necessary!

The installation of the Rosenberg- Air Handling Unit is only allowed on an appropriate foundation or substructure.

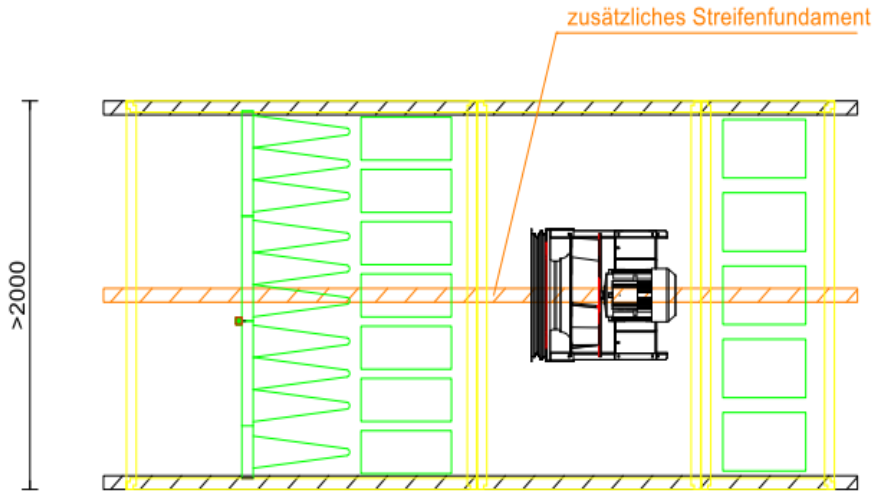
The transference of static or dynamic structural functions through Rosenberg Air Handling Units cannot be eliminated. If any damages are incurred to the units or the building the liability of Rosenberg Ventilatoren GmbH ceases. (See VDI 3803)

For the construction of the foundation or the substructure it is imperative to take the following into consideration:

- The area where the unit is to be installed needs to be level and free from twist effects.
- Foundations are to be pad foundations or strip foundations. When using strip foundations and for units wider than 2m per air stream, additional cross support beams should be installed at the ends of the units and where modules meet, or a complete longitudinal girder! The same goes for substructures made of steel!



Or:



- To reduce the transfer to the structure, the use of dampening strips (not included) is recommended. The underlayment should at a minimum be installed on the face side, at module transitions and longitudinally starting at a module length of approx. 1,000 mm under the housing or the base frame on all foundations or supports of the substructure.
- To avoid structure-borne sound between the air handling unit and the duct system an elastic connection or dampening duct (both available separately) is recommended and should be installed.
- The height of the area where the unit is to be installed and the ground needs to allow for proper drainage of condensate water.
- Beware of the siphon height! Please see chapter 8 "Special Notes for Installed Components", cooler, condensate separator.

Condensate pans are installed with slope in all directions. An anti-backflow siphon is to be installed (optional accessory) A direct connection of drain lines to the wastewater system is not permitted.

The recommended ambient temperature for installation and assembly of Rosenberg ventilation devices is + 5 ° C to + 40 ° C, to ensure the processing and subsequent function of sealants and sealing tapes for the module connection, etc. Outside of the range, adhesion problems of the adhesives are to be expected and warranty claims cannot be claimed.

Openings for cables etc. are to be sealed. The possible entry of moisture can lead to defects, liability will not be assumed for this. In addition unsealed openings can lead to increased leaks and can negatively influence the performance of the RLT-Unit.

The air intake and air exhaust openings of existing units that are perhaps already connected to the duct system are to be sealed in order to prevent dirt from getting in them, as well as air due to circulation, also if the AHU is not yet in use. Causes of circulation can be thermal lift, wind load, or the stack-effect that can lead to the introduction of moist air into the unit. Due to condensation, damages can occur at the air handling unit and its components. The Rosenberg Company is not responsible for these damages. This effect can also occur during standstill and temporary shutdown, and is to be avoided by means of additional measures (additional flaps) or control engineering.

External dampers and connectors are generally to be integrated into the on-site insulation of the duct, in order to reduce / avoid condensation and prevent the above-mentioned damage.
The insulation is to be led up to the frame air handling unit.

We want to point out that, as the case may be, required minimum distance of exhaust air and the outdoor air intake when designing the central unit are not automatically considered, because these are dependent upon local conditions. This goes for distances of these openings to adjoining buildings and rooftops, as well. The minimum requirements that are in effect must be adhered to and must be met with appropriate measures (ducts, etc).

All units are cleaned during assembly and before packing. Unfortunately, not all areas are accessible. This can lead to shavings appearing from the production process during transport. These can be removed with a vacuum cleaner or other cleaning method and do not constitute a defect!

To reduce the transmission of structure-borne sound, it is recommended to put sound dampening material between the Rosenberg-Air Handling Unit and the area where the unit is to be installed. Please follow the directions of the dampening material manufacturer during installation.

If dampening material for the reduction of structure borne sound is to be used between the Rosenberg-Air Handling Unit and the area where it is to be installed, please proceed as follows:

1. Draw the entire machine footprint on the clean area where the machine is to be installed.

2. Layout the dampening material in a single layer according to the layout plan of the manufacturer within the drawn machine footprint.

3. Setup and install individual components one after the other on the dampening material and align flush with each other.

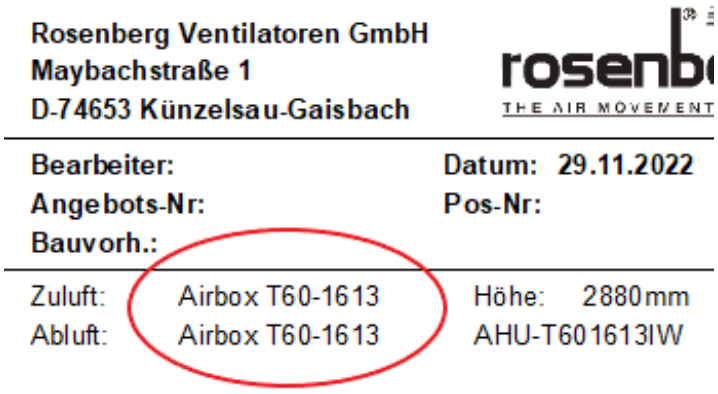
4. After alignment, the modules and components are to be mechanically connected using the included gasket and connection materials (see later chapter).

5. With the system disconnected from the mains, connect all air connections of the duct system with the supplied elastic canvas duct connectors or flexible duct connectors.

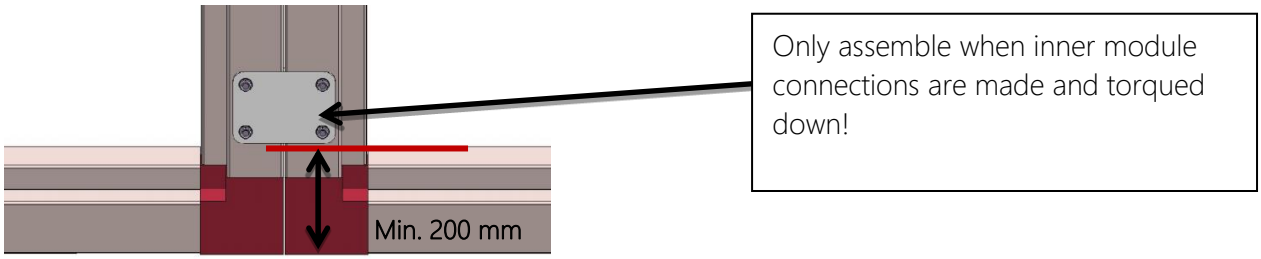
5.2. Assembly

Note:

The necessary assembly parts/connection material can be found in the fan module, or in the case of return air/supply air units with the supply air fan! This includes gasket strips, screws and, if applicable, covers for the module joints.
What follows is the description of how to connect the machine parts/modules of the series S60, T60/C60 to each other.
For weatherproof installations special instructions apply to one above the other modules, these notes can be found in Chapter 9.
In contrast to the standard units described in this section, the procedure is different for the individual units for air handling units in hygienic construction. The exact procedure can be found in chapter 10.
The construction series can be found on the technical data sheet of the unit which is also part of the included documentation.

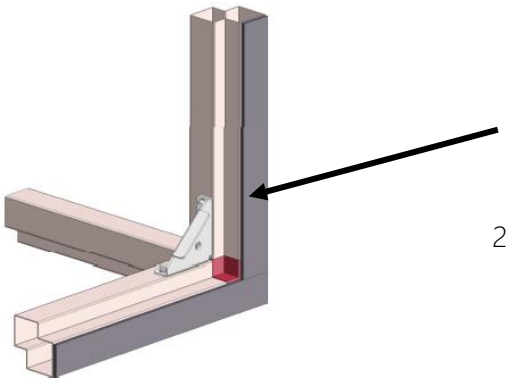


For sealing from the inside, for ex. at the joint covers of the module joints, in general, only appropriate and in accordance with VDI 6022 sealant, can be used.
For systems with multiple modules, gusset plates (corner angles) are used for the connection of the modules and connection angles. Up to size 1010 modules can be pulled together in this fashion, use Fitwasser or similar lubricant. During the whole assembling process one needs to check, that there is no torsion of the corner profiles or any other deformations. Starting with construction size 1310 this connection method is not possible due to the larger weight of the components. For this, auxiliary materials such as ratchet belts or tension belts should be used.
For example, entwine the modules, wrap around the base frame, mount the straps to the holes of the transport tube to the base frame or use the crane eyelets on the lower casing frame, if available.
The outside connections are made in all construction sizes with 80x60mm sheet metal plates, which connect the corner profiles of units stacked on top or next to each other. Watch for even distribution at the connection edges. Before this, all inner module connections are to be assembled completely and torqued down!



Self-tapping screws 4,8x19 mm, Torx-drive, are used for assembly.

5.2.1. Series S60



1. Before setting up, pulling and pushing parts together, single sided sealing tape (40x5mm) needs to be applied to all joints.

PE-sealing tape, alignment with the inner edge (self-adhesive , single sided).

2. Modules need to be flush mounted to each other. Horizontal or vertical offsets need to be avoided, if necessary use spacer plates for a flush and tight seal.

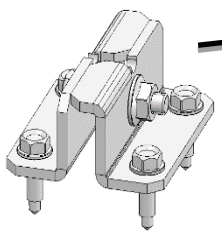
Units of the S60 series are supplied with factory installed corner angles.
Depending on the size of the housing, 2 types of corner angles can be installed:

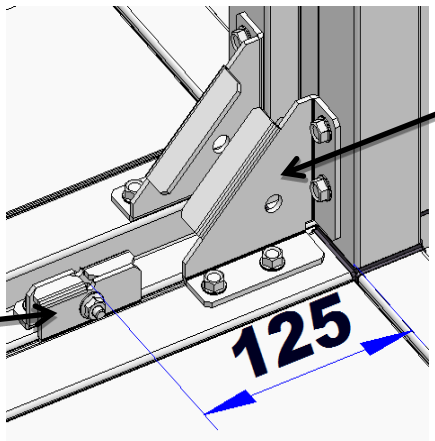
- Side length approx. 80x80 mm (Type 1)
- Side length approx. 150x150 mm (Type 2)

These serve to stabilize the module during transport and installation. Before the modules are screwed together they need to be pressed tightly against each other, pressing of the sealant tape.
With the corner angles the modules can be fixed until final assembly of the module connectors.

3. The module connectors are to be installed starting at 125 mm from the corners for corner angle type 1 or at 175 mm from the corners for corner angle type 2 in height and depth.
All others need to be distributed evenly.

Module connector with screw 6x25 with toothed washer + locking nut





Corner angle, ex works for stabilization of the units (have to be uninstalled later)

Size	No. in Height	No. in Depth	Size	No. in Hight	No. in Depth
0704,0707,0710,1007,1010	2	2	2020, 2220, 2222, 2522, 2525	4	4
1307,1310,1610	2	3	2825	4	5
1313,1316,1613,1616	3	3	2828	5	5
2010	2	4	3228, 3528	5	6
2016, 2013, 2213, 2216	3	4			

Table S60: Module connectors between the corners

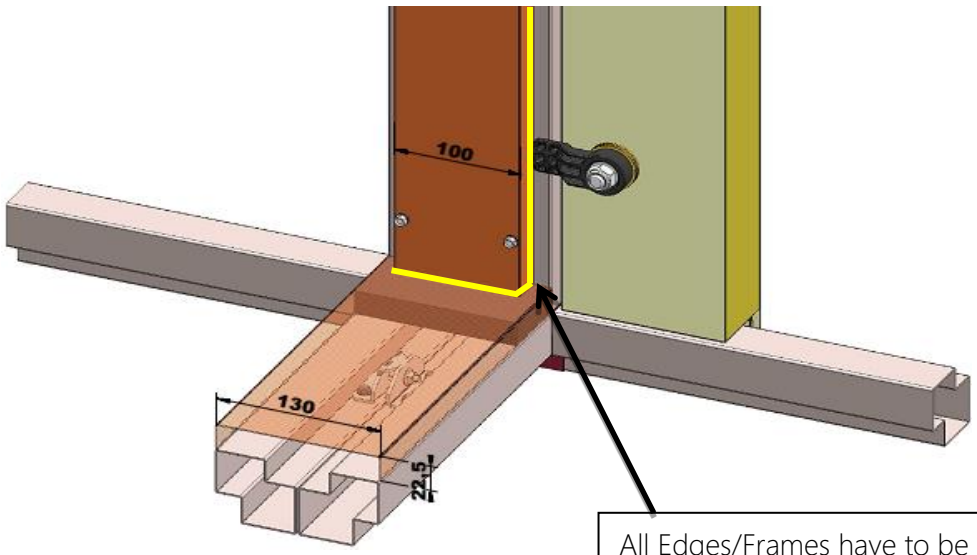
4. The module connectors are fastened using self-tapping screws 4,8x19 mm, Torx-drive.

5. After assembly, all module connectors need to be removed in order to install the joint covers.

6. The last step is to insert and fasten the cover plates with screws 4,8x38mm, hexagon-drive for the module frames. These have insulation affixed to them on the inside at the factory.

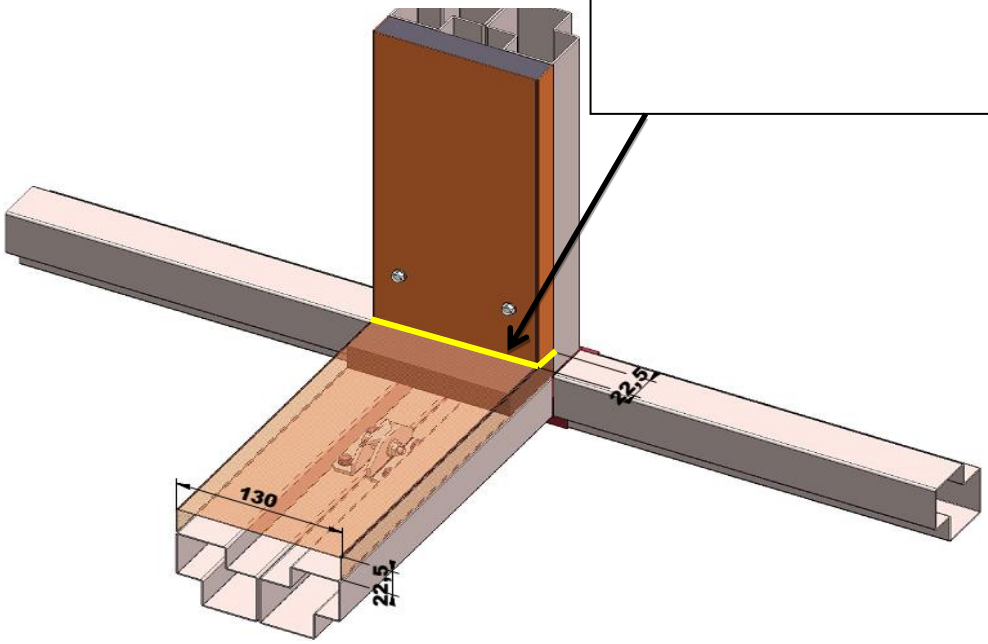
Various types of cover plates:

- Cover plates for floor and lid are approx. 45mm longer than for back wall and access wall
- Width of the cover of the access panel 100 mm
- Width of the cover for back wall cover, floor and lid 130 mm



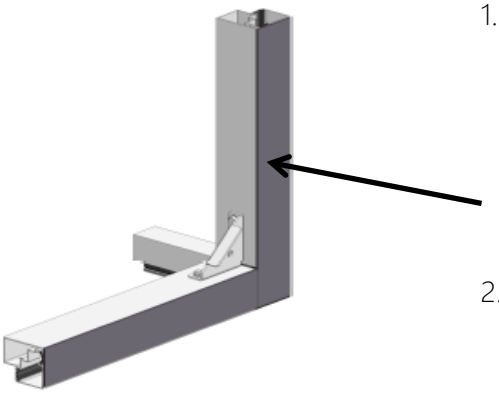
All Edges/Frames have to be sealed with sealant (based on VDI 6022).

Drawing of installed cover plates to access side



Drawing of installed cover plates to back wall

5.2.2. Series T60

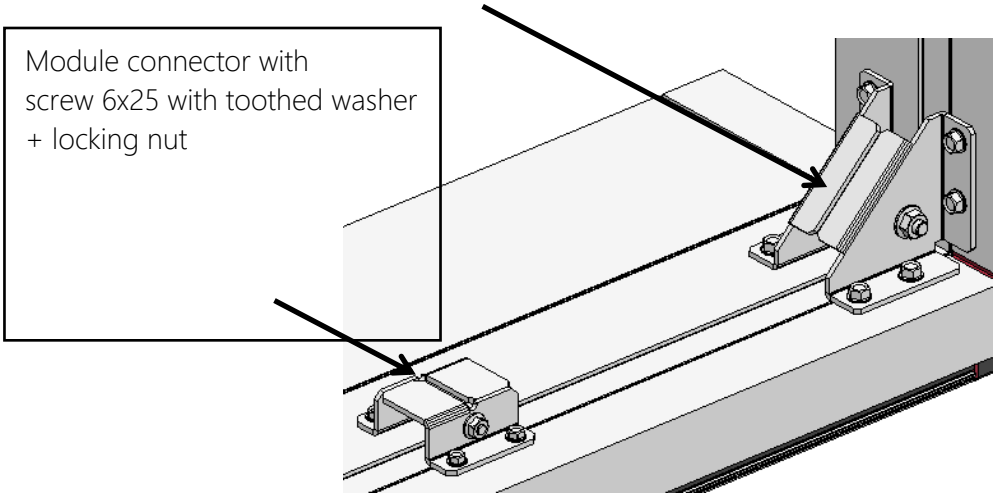


1. Before setting up, pulling and pushing parts together, single sided sealing tape (60x3mm) needs to be applied to all joints.

   PE-sealing tape, alignment with the inner edge (self-adhesive, single sided).

2. Modules need to be flush mounted to each other. Horizontal or vertical offsets need to be avoided, if necessary use spacer plates for a flush and tight seal.

3. Units of the T60/C60-Series are outfitted at the factory with corner angles as standard. With bore holes in the corner angles, the modules will be screwed to each other. (screws M8x60 with toothed washers + locking nuts)



4. In the larger construction sizes additional connection angles are used. This is meant to guarantee that the face side profiles of the module joints fit against each other for the entire length of the module frames and that the sealant tape has sufficient pressure. These are set on site in the corresponding quantity (see table) evenly distributed between the corners.

Size	No. in Hight	No. in Depth	Size	No. in Hight	No. in Depth
1310, 1307, 1610	0	1	2020 – 2525	2	2
1313 - 1616	1	1	2825	2	3
2010	0	2	2825	3	3
2013, 2213, 2216	1	2	3228, 3528	3	4
2016	1	2			

Table T60 (C60): additional module connectors between the corners

5.3. Electrical Installation

The electric connections of the electric consumer components in the unit such as electric motors for fans and pumps, electric air heaters, actuators etc. are to be connected per the information of the corresponding manufacturers as well as the relevant regulations of the energy provider and carried out in accordance with the electrical grid form and the relevant national and international standards and guidelines.

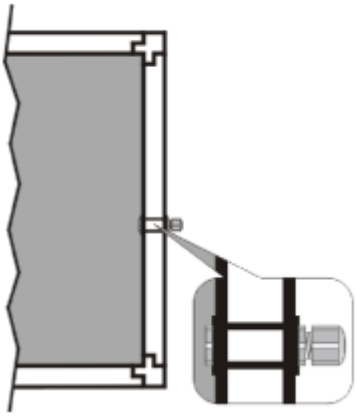
The air handling unit have to be connected only to circuits connected with an all-pole isolating switch, acc. EN 60204-1, can be switched off.

Existing partially installed equipotential bonding conductors at the elastic ducts and the rest of the duct connectors are to be professionally fastened and tested for their galvanic connection.
All electric consumers/components have to be integrated into the protective bonding circuit on site. The same goes for side panels or housing components to which electric components are attached.
Furthermore all electric non-conductive connection points have to be bridged with equipotential bonding conductors.

All electric connection work is to be carried out by trained professionals and inspected by an independent third party. This also applies to the necessary protective conductor connection.
A functional and safety check is carried out in accordance with DIN EN 60204-1 and VDE 0660 Part 500 (concerns and other electrical protective conductor and insulation testing of electrical equipment).

Test the ground conductor!

Additional cable routing through the housing walls is to be carried out with the use of standard metric wire screws and air tight.
Openings and bore holes for cables not being used need to be sealed. Any possible entry of moisture can lead to defects for which we do not assume liability.



Bore holes for cable screws		
Thread size of the cable screw	Thread size of the cable screw	Thread size of the cable screw
M12	16 mm	13 mm
M16	20 mm	17 mm
M20	26 mm	21 mm
M25	32 mm	26 mm
M32	39 mm	33 mm
M40	52 mm	42 mm
M50	62 mm	52 mm
M63	74 mm	65 mm

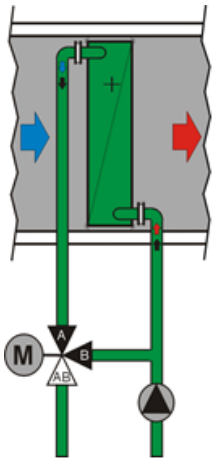
- Do not use sheet metal screws for plastic terminal boxes.
- The supply voltage has to correspond to the data on the name plate.
- When connecting a light switch, please ensure that an external power supply is used.
- Power switches are to be set to ZERO position (OFF) in order to guard against accidentally powering the unit on.
- In case of repairs or maintenance on the air handling units, power supply is to be disconnected for all phases. Auxiliary contacts (NO, NC) to report the switch position can still under voltage.
- Free running components installed afterwards (not factory installed) are to be supplied with sufficiently long cables in order to prevent these from separating.
- Pluggable electrical connections are to be checked for mechanical lockout. This also goes for subsequent installations.
- Additional information on electrical accessories of the RLT-units can be found in chapter 8.11.

5.4. Hydraulic Connection for Heat Exchangers

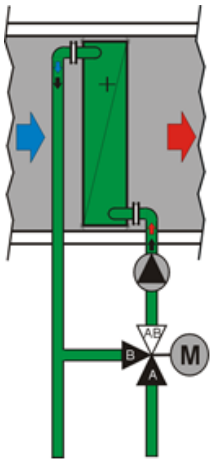
The hydraulic connection used for connecting a plate-fin heat exchanger is dependent on the existing pipe network and the possible controller strategies.

Generally, the following hydraulic connections are used:

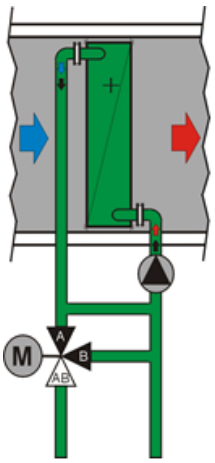
Diversion Connection



Admix Connection



Injection Connection



Diversion Connection

Control of the performance of the heat exchanger is accomplished by changing the flow volume of the medium (water or water/glycol). The flow volume in the consumption circuit is variable, in the primary circuit constant. The pressure conditions in the pipe network are near constant, so that a reciprocative influence is not expected during normal operation.

Admix Connection

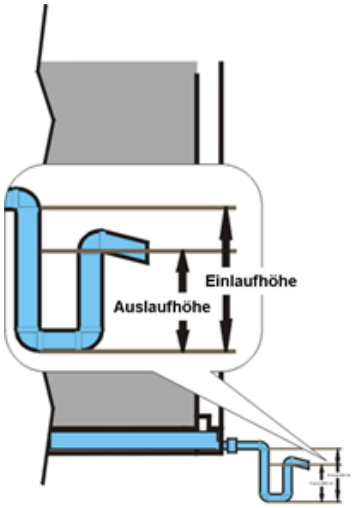
Control of the performance of the heat exchanger is accomplished by changing the flow temperature. The flow volume of the medium (water or water/glycol) in the consumption circuit is constant, in the primary circuit variable. A reciprocative influence of the circuits is possible.

Injection Connection

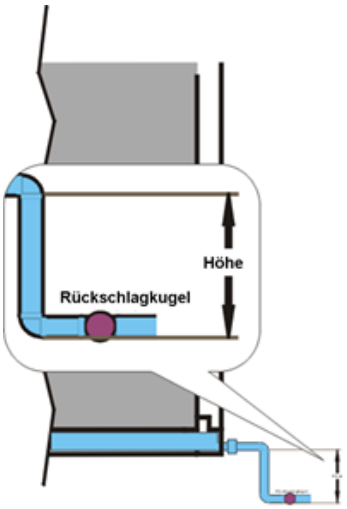
Control of the performance of the heat exchanger is accomplished by changing the flow temperature. The flow volume of the medium (water or water/glycol) is constant in the primary and consumption circuit. A reciprocative influence of the circuits is not possible.

5.5. Connecting the condensate, drain and overflow lines

If condensate, drain and overflow lines are present (for instance, at the cooling module or demister module) then care needs to be taken when connecting that the outside connection ducts are fitted with a siphon with anti-backflow and self filling. The height of each siphon has to be adjusted to the low or high pressure of the RLT-unit, so that inlet or exhaust of air from the connected drain is prevented. The condensate drain has to be without pressure. The siphon should be filled with water prior to start up and checked regularly.



Siphon, pressure side



Siphon, suction side

The dimensions described below for the installation of the siphon are valid for the included Rosenberg siphon. The siphons are only allowed to be installed with a spacing of a maximum of 1m to the flow of the condensate pan.

Dimensions for Siphon pressure side		
Positive pressure in the unit	Positive pressure in the unit	Positive pressure in the unit
1900 Pa	355 mm	325 mm
1800 Pa	340 mm	310 mm
1700 Pa	325 mm	295 mm
1600 Pa	310 mm	280 mm
1500 Pa	295 mm	265 mm
1400 Pa	280 mm	250 mm
1300 Pa	265 mm	235 mm
1200 Pa	250 mm	220 mm
1100 Pa	235 mm	205 mm
1000 Pa	220 mm	190 mm
900 Pa	205 mm	175 mm
800 Pa	190 mm	160 mm
700 Pa	175 mm	145 mm
600 Pa	160 mm	130 mm
500 Pa	145 mm	115 mm

Dimensions for Siphon suction side			
Negative pressure in the unit	Negative pressure in the unit	Negative pressure in the unit	Negative pressure in the unit
3500 Pa	410 mm	2000 Pa	260 mm
3400 Pa	400 mm	1900 Pa	250 mm
3300 Pa	390 mm	1800 Pa	240 mm
3200 Pa	380 mm	1700 Pa	230 mm
3100 Pa	370 mm	1600 Pa	220 mm
3000 Pa	360 mm	1500 Pa	210 mm
2900 Pa	350 mm	1400 Pa	200 mm
2800 Pa	340 mm	1300 Pa	190 mm
2700 Pa	330 mm	1200 Pa	180 mm
2600 Pa	320 mm	1100 Pa	170 mm
2500 Pa	310 mm	1000 Pa	160 mm
2400 Pa	300 mm	800 Pa	140 mm
2300 Pa	290 mm	600 Pa	120 mm
2200 Pa	280 mm	400 Pa	100 mm
2100 Pa	270 mm		

Additional important instructions for the individual characteristics of the components can be found in chapter 8 “Special Instructions for Installed Components”.

6. Startup

Before startup of the air handling unit the following major points need to be ensured in any case:

- air connections are open, intake openings unobstructed
- doors closed, i.e. protective door grill installed
- transport brackets of the fans are removed
- fan impellers spin freely
- valves of the heat exchange unit are closed
- all connecting fasteners of ducts are checked
- electric heat register enabled only after startup of fan
- any existing protective films are removed
- visual inspection of all seals on the unit for damages
- access doors that are installed with hinges (3D) are readjusted

WARNING: If the points listed in the above are not checked, dangerous conditions can result on initial startup of the unit!

- Measures to take when high leakage is present at the doors:
  - adjust doors
  - ensure level, non-torsioned installation of the modules
  - adjust the depth of the hinges
  - tighten locking handles by hand
  - if necessary remove washers under the locking handles

These measures are to be checked for compliance before a service call can be requested. If the above measures have been found not to have been carried out, Rosenberg Ventilatoren GmbH can invoice for any incurred costs of the service call.

In switching off or out of service of the unit is set to ensure that no air from the furnished rooms flows back into the air handling unit. Causes of the circulation can be thermal, wind loads or the chimney effect, leading to the entry of moist air into the device. As a result of condensation damage can occur to the ventilation unit and its components. Such measures, for example, Leaf dampers in the supply- and exhaust air channels or other measures to provide.

The air handling unit have to be connected only to circuits connected with an all-pole isolating switch, acc. EN 60204-1, can be switched off.

Additional information regarding startup of the air handling unit you will find in the component specific chapter 8 “Special Instructions for Installed Components”.

7. Routine Maintenance and Cleaning

7.1. General Routine Maintenance Instructions

The maintenance schedule in this manual is generally based on moving normally contaminated air. Rosenberg recommends routine maintenance and service to be carried out based on VDMA 24186 and VDI 6022. If the air handling units are to be moving especially contaminated air then the service intervals should be shortened accordingly.

Before all maintenance work:

- Fans and other electronic components need to be stopped and completely disconnected from the main power supply!
- Wait for impellers to stop completely, at least 1-3 minutes!
- Tag out lock out the unit to prevent unauthorized restarting of the system!
- Stop the water flow and secure from restarting!
- Let the heat exchanger cool off!

Instructions for servicing the components can be found in chapter 8 "Special Instructions for Installed Components".

7.2. General Cleaning Instructions

Recommended detergent for surface disinfecting:

- Dismozon pure (Bode Chemie)
- Melsitt (B.Braun)
- Clorina (Lysoform)

All disinfectants are recognized and listed with the Robert Koch-Institute.
(Revision 30.06.2022)

To guarantee the hygienically flawless condition of the RLT-Unit the following points have to be considered:

Cleaning work can only be carried out by qualified and especially trained professionals (in Germany per VDI 6022)!

Hygiene inspections are to be carried out on all RLT-Units according to the following intervals:

- after initial startup
- for units with humidifiers: every 2 years
- for units without humidifiers: every 3 years

  - The purpose of the regular hygiene inspections is to discover hygiene shortcomings of the RLT-Units in a timely manner and to rectify these through appropriated measures.
  - The results of the hygiene inspections, the cleaning and disinfecting of the RLT-Units are to be documented in an appropriate form (e.g. operations journal).
  - The principle guideline for the hygienic requirements of the RLT-Units is the VDI 6022. All work is to be performed according to the newest version of the VDI-Guidelines.

Instructions for cleaning and carrying out hygienic inspections of the components of the RLT-Unit can be found in chapter 8 “Special Instructions for Installed Components”.

7.3. Maintenance and Cleaning of the Housing

During periodic maintenance (generally in 3 month intervals) the following points need to be taken into consideration:

- seals of the access panel doors need to checked and replaced if necessary
- door latching mechanism (pressure side) needs to be checked for functionality
- check panels for damages and corrosion
- lubricate moving parts regularly, for ex. door handles and hinges
- remove loose dirt with a vacuum cleaner
- use damp cloths for cleaning any other dirt
- water to be used should have a neutral pH value (6-8).

8. Special Instructions for Installed Components

8.1. Air dampers and flexible connectors

Startup

Please note safety instructions in Chapter 1 and general start-up instructions in Chapter 6 and in the manufacturer's documentation!

Caution: Danger of crushing!
If the devices are freely accessible, external linkage or gears must be covered.

Before a connection is made to the power supply, an initial start-up according to VDE directive must be carried out.

Startup air dampers:

Dampers driven by servo motors are to be secured during the work on the multi-leaf damper against unintentional closing (servomotor from the power supply disconnect, disable flap control, mechanical closing lock).

All fittings and connections should be checked for adequate fixing.

The outside air dampers are internal to assemble or isolate.

Check-coupled damper linkage for proper fit and function.

The actuators or linkage must be adjusted so that the damper blades describe a rotation angle of 90 ° and reach their end position on closing.

The servo motors must be mounted within easy reach on the running axis of the flap. It should be note the installation instructions of the actuator motor manufacturer.

In internal servomotors the connection cables must be routed to the provided cable glands to the outside.

An equipment in accordance with DIN 1946 part 4 outside air damper must close automatically in case of power failure. This can be achieved via actuators with spring return.

For more information about the damper control motors are contained in Chapter 8.11.2 "Electric Equipment".

Important notes:

As part of our work all built air dampers were tested for their easy movement. To receive this free movement, it is in the assembly of great importance that the devices are properly aligned and mounted so that the air dampers retain their ease even after installation and module connection.
Should, however, to tension and stiffness, so the fixing screws of the damper have to be solved, and this is to align stress-free and smooth-running.
After the mounting screws are tightened again and the door shall be tested by tightening the screws close by once again on their way smoothly.

We expressly point out that we cost for customer service trips due to poorly running flaps into account if there is evidence that the above procedures were not carried out by the system installer.

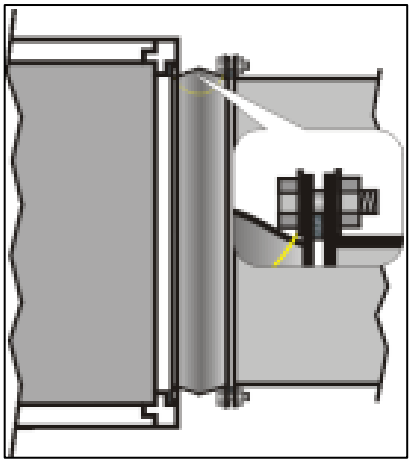
Mounting the connectors

The duct connections of an air-handling unit are vibration-decoupled perform.

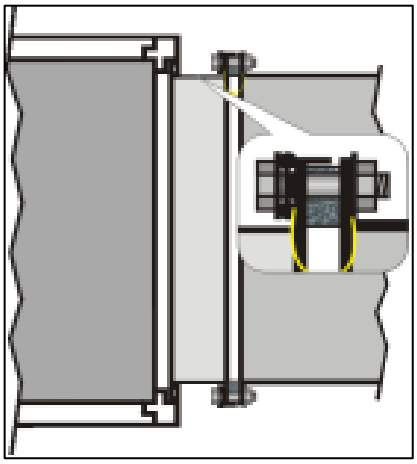
The flexible connection pieces are de-energized, movable in all directions to mount (neck stretched 140 mm, mounted 120 mm). A horizontal or vertical offset between the two nozzle frame is not allowed.

Hygienic connectors are decoupled to connect using the screws and decoupling rubber to the sewer network.

A potential compensation must be installed to bridge the non-conductive, flexible sheet or the hygienic connector according VDE regulations.



Flex connector



Insulating connector

Operation

Manual valves locking levers are adjusted according to the desired flap position and lock.

Motorized dampers are controlled by the central control device. The position of the slats of the door is externally visible through a notch on the drive axle.

Cleaning and maintenance

Air dampers are frequently moved during system operation, therefore periodic monitoring of actuators, linkages, gears and slats of storage is necessary.

Flexible and hygienic connectors are static components which have to be check for damage.

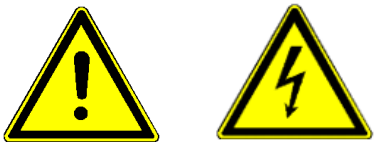
Maintenance	Periodically every 3 months	If necessary	Hygienic-inspection
Examine damper for easy movement, contamination, damage and corrosion	x		x
Check tight fit of the linkages, gears and servomotors	x		
Linkage coupled damper on positive connection and function, i.e. Direction of rotation, check end-position		x	
Check bearing design of the fins, brass bearings, if necessary, lubricate (valve with gear drive not grease or oil)	x		
Air damper cleaning		x	
Check connector for function, contamination and defects	x		x
Check tight fit of the connecting bolts, frame and potential compensations.	x		
Cleaning connector		x	

The water and/or designated cleaning agents should have a neutral pH value (6 - 8).
More Informationen as per Chapter 7.2.

8.2. Fans

Before start-up it has to be assured that the fans are equipped with a multi-speed drive or variable speed drive as described in regulation EN1253/2014.

Startup



Please note safety instructions in Chapter 1 and general start-up instructions in Chapter 6 and in the manufacturer's documentation!

Before entering the fan chamber associated equipment / service switch to zero position (OFF) shall be made and to prevent a restart.
The maximum impeller speed (type label, technical data sheet) must not be exceeded.
Before a connection is made to the power supply, carry out an initial commissioning according to VDE guidelines. The motors are factory-wired for a voltage supply of 400V / 50Hz, if the nameplate or the technical data contain no other data. Operate the fans solely in the installed condition as well as with the correctly installed safety device (door safety grille, belt drive protection, inlet and outlet protection.)
The fan-door must be closed. Impeller breakage cause serious injury and damage.

At the beginning of start-up, the available type of fan should be controlled. Pay attention to the instructions for the following specified fans according to type:

- belt-driven fans (8.2.1)
- direct driven, free running impellers (8.2.2)

Start-up must occur according to the fan type.
If external temperatures are below 5°C, before the fans start up, the heat recovery unit, the heater, as well as the frost protection unit must be checked and started up accordingly, in order to prevent frost damage to the air-handling unit and the RLT equipment.
Before start-up, the air-handling unit must be checked for any remaining tool lying around, foreign bodies, and dirt. If necessary, it must be cleaned.
Check the free running of the impeller with rotation by hand.
Caution, risk of entrapment between belt and pulley.

The start-up of the fan must be stopped immediately at exceptional vibrations!

8.2.1. Start-up of belt driven Fans

Check all fastenings for correct positioning:

- fan fastening
- motor fastening including sliding motor frame
- inlet nozzle an dimpeller (even gap dimensions as per chapter 8.2.3)
- flat and/or V-belt pulleys for engine and fan shaft (check secure positioning and alignment)
- Flach- bzw. Keilriemen (Riemenspannung s. unten, Unversehrtheit der Riemen prüfen)
- Flat and/or V-belts (for tension see below. Check the belt for any damage.)
- Anti-vibration mounts (remove the transport locks, pay attention to the levelling of the dampers)
- flexible outlet connector

Check the moving parts to ensure that they operate correctly:

- motor and fan bearing
- impeller
- anti-vibration mount

After long downtimes, the fan and motor bearings must be checked for operational smoothness and must be re-lubricated if necessary with new bearing grease. Maintenance-free and/or closed bearings must be replaced due to loss of function.

The electrical connection of the motor must be examined to ensure that the circuit, the connected voltage and the motor protection correspond to the attached data plate.

Before switching on the power supply, all unit components must be examined and adjusted to ensure that they are in working order.

The fan's rotational direction is determined by the arrow mark placed on the casing. An incorrect rotational direction can lead to the drive motor being overloaded.

The maximum fan speed stated on the data plate must not be exceeded by fan speed control drives.

After approximately ten to twelve operating hours, the flat and/or V-belt tension should be checked and if necessary retightened. The documentation of all work have tob e done in the maintenance log.
control 1: start-up + 24 h
control 2: start-up + 72 h

Any differences from the requirements documentation, operate and maintain the manufacturer's instructions have prevail.
See further points about start-up in chapter 8.2.3!

Examination of the V-belt tension

- Completely depress the drag indicator /indicator arm (1)
- Place the measuring instrument in the centre between both belt pulleys on a belt back (if possible with belt sets on the middle ones)
- Insert a finger into the loop and depress the measuring instrument carefully until there is an audible click
- Remove the measuring instrument without touching the underside of it and read off the value at the intersection of the drag indicator and the belt tension display (2)
- Increase or reduce tension according to the data on the assembly sheet (contained in the product documentation.)

If necessary, the measuring instrument can be obtained from the manufacturer. Also similar instruments may be used.

8.2.2. Start-up of direct driven, free running impellers

Check all fastenings for correct positioning:

- fan fastening
- motor fastening
- inlet nozzle and impeller (even gap dimensions per chapter 8.2.3)
- anti-vibration mounts (remove the transport locks, pay attention to the leveling of the dampers)
- flexible inlet connector

Check the moving parts to ensure that they operate correctly:

- motor and fan bearing
- impeller
- anti-vibration mounts

The electrical connection of the motor must be examined to ensure that the circuit, the connected voltage and the motor protection correspond to the attached data plate.
Before switching on the power supply, all unit components must be examined and adjusted to ensure that they are in working order.
The fan's rotational direction is determined by the arrow mark placed on the casing. An incorrect rotational direction can lead to the drive motor being overloaded.
The maximum fan speed stated on the data plate must not be exceeded by fan speed control drives.
Attention, operating door is under positive pressure, wait for standstill and perform pressure compensation.
See further points about start-up in chapter 8.2.3!

EC-FanGrid

The EC-FanGrid is a parallel operation of several EC fans. The wiring is identical to the individual fan.
The volumetric flow or pressure constant control takes place via a ring measuring line.
Defective fans can be closed with attached plates until replacement.

Attention, operating door is under overpressure, wait for standstill and carry out pressure compensation.

See further points about start-up in chapter 8.2.3!

8.2.3. Aditional points about startup

During the initial start-up, the correct function of the fan is monitoring (air delivery, smooth running, vibrations and/or imbalances).

After the initial fan start-up, the power consumption over all the connected phases must be examined and documented.

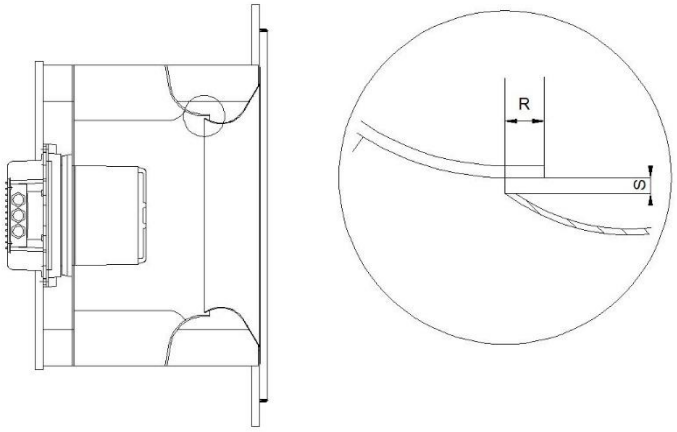
Connected frequency converters or EC controllers can be adjusted in accordance with the enclosed manufacturer's instructions for operating conditions and can be secured against unauthorised changes (programmable password).

The gap dimension and gap overlap can be examined according to the following drawing:

Examining the gap dimension and overlap between impeller and inlet nozzle.

The gap dimension S should be constant over the whole circumference of the impeller.

The gap cover R should amount to approximately 1 - 2 % of the impeller diameter.



Operation

The correct function of the fans should be monitored during operation. Vibrations, pressure fluctuations or other deviations, which depart from the intended operating parameters, must be examined in accordance with Chapter 8.2.3 "Maintenance".

For fans in air handling units to DIN 1946 T.4 a flow rate display have be to installed with the setpoint and limits. The display can be mounted directly to the fan unit or in the cabinet.

Cleaning and maintenance

Regardless of the design and size of the fan, the following points are to be monitored during the first four to twelve weeks of operation:

- smooth running, unusual noises, vibrations
- fastness of the fan, engine, and anti-vibration mounts
- with belt-driven fans check the belt drive and the belt tension

The fan, as a fast-turning component, requires regular monitoring as well as maintenance every three months. In case of deviations from the standard operating conditions (air temperature, increased dust load or generally high air humidity), and/or on-going 24-hour operation then a shorter maintenance period must be chosen.

Pollutions and depositions at the inlet have to be removed strictly by using suitable designated cleaning agents or high pressure washers. If it is necessary the inlet can be removed easily.

Maintenance fan	Periodically every 3 months	If necessary	Hygienic-inspection
examine fan for contamination, mechanical defects, and corrosion, as well as the fastenings	x		x
examine even gap distance with free-running impellers (Chapter 8.2.4)·	x		
clean fan housing and impeller if necessary		x	
examine impeller for existing imbalances	x		
check for smooth running and for noises on the suspension	x		
lubricate or replace the bearings if necessary		x	
examine flexible connectors for leak tightness and mechanical damage	x		
examine anti-vibration mount for correct operation	x		
check the presence and fastening of the safety guards	x		
examine drainage for correct operation	x		x
Maintenance belt drive	Periodically every 3 months	If necessary	Hygienic-inspection
examine belt drive for contamination, mechanical defects, belt tension, abrasion as well as fastenings	x		x
retighten belt drive if necessary		x	
change over flat or V-belts (change V-belts only in sets)		x	
clean drive belts		x	
examine the presence of and fastenings of safety guards	x		

Maintenance drive motor	Periodically every 3 months	If necessary	Hygienic-inspection
examine motor for pollution, mechanical defects,corrosion, as well as the fastenings	x		x
clean the motor		x	
examine motor's rotational direction	x		
examine motor for smooth running and for noises on the suspension	x		
lubricate or replace bearing if necessary		x	
examine the current consumption	x		
examine electrical connections for corrosion and positioning	x		
Maintenance drive clutch	Periodically every 3 months	If necessary	Hygienic-inspection
Examine drive clutch for contamination, mechanical defects, and corrosion as well as the fastenings	x		x
if necessary adjust drive clutch according to manufacturer's specifications		x	
if necessary clean drive clutch		x	
examine temperature after operation	x		
change oil if necessary		x	

The water and/or designated cleaning agents should have a neutral pH value (6 - 8).

Taking out of service

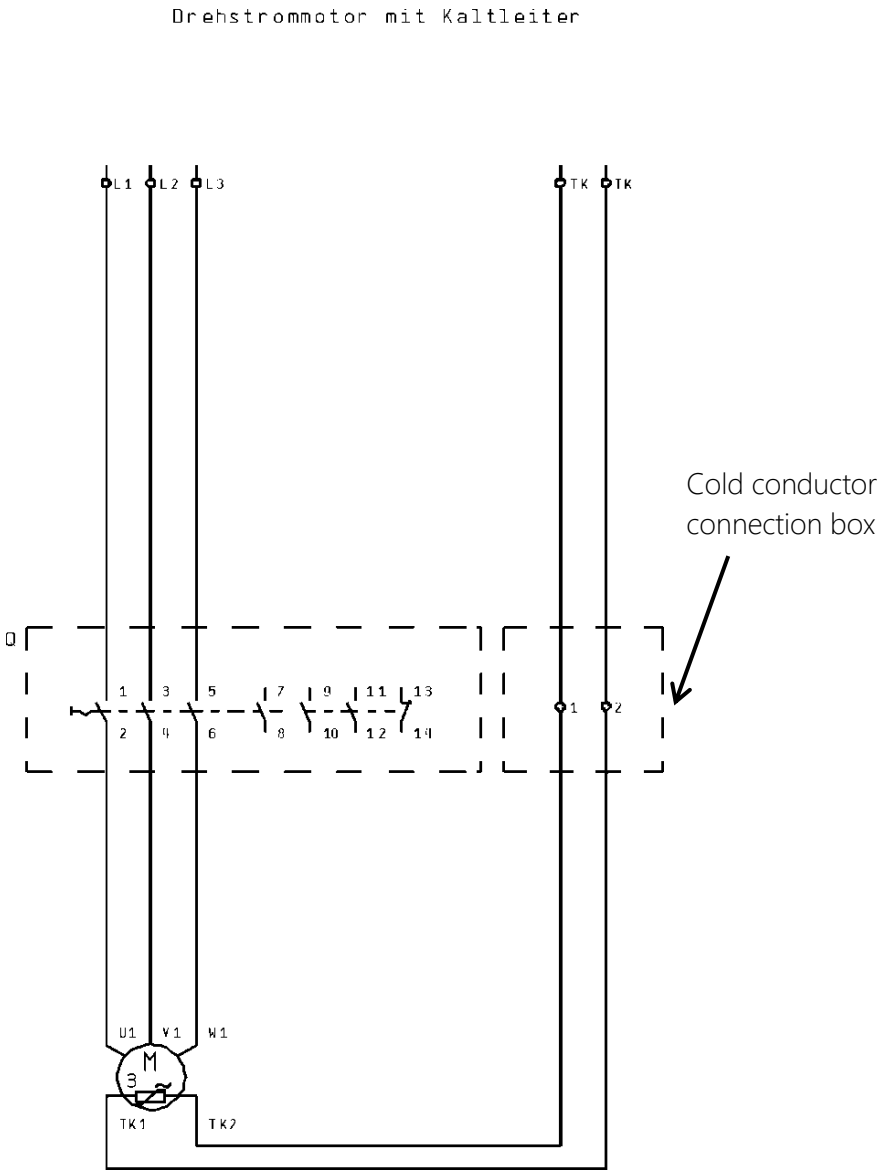
Where belts have a longer service life of more than three months, they should be removed from the disks to avoid localised bearing stress of belt-driven fans.
On restarting, the start-up instructions within this chapter must be considered.

8.2.4. Wiring of fan motors

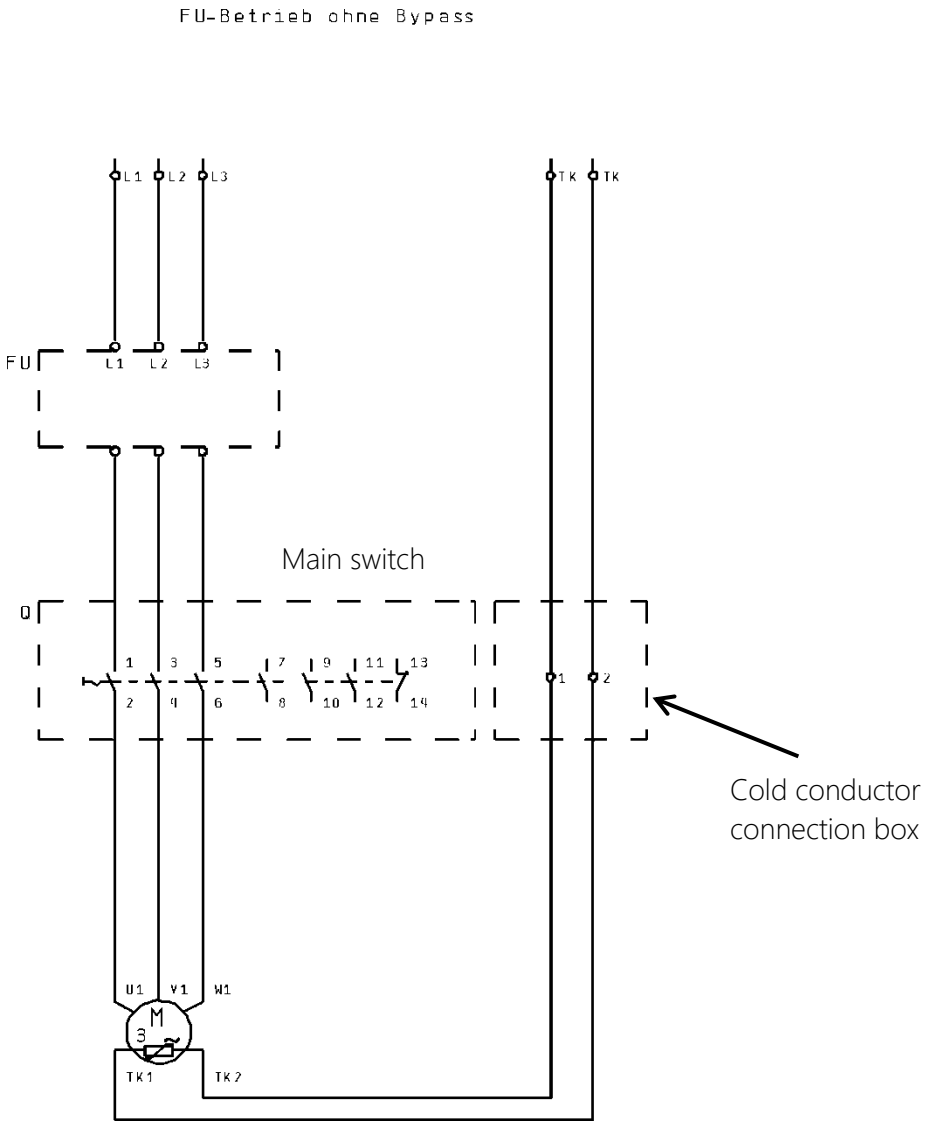
Caution:

The wiring and connection of motors may only be carried out by trained and authorized personnel. Existing guidelines must be observed.

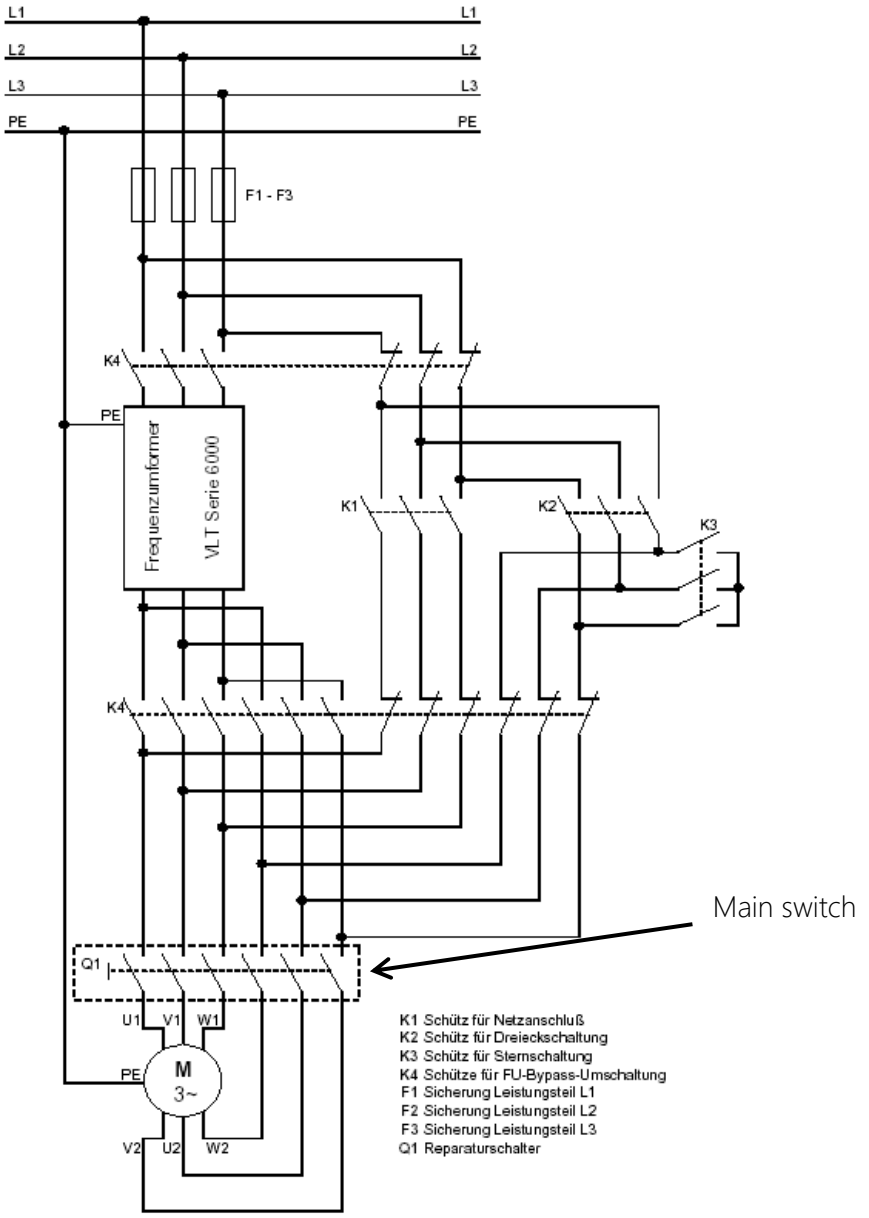
Wiring of standard single-speed motors



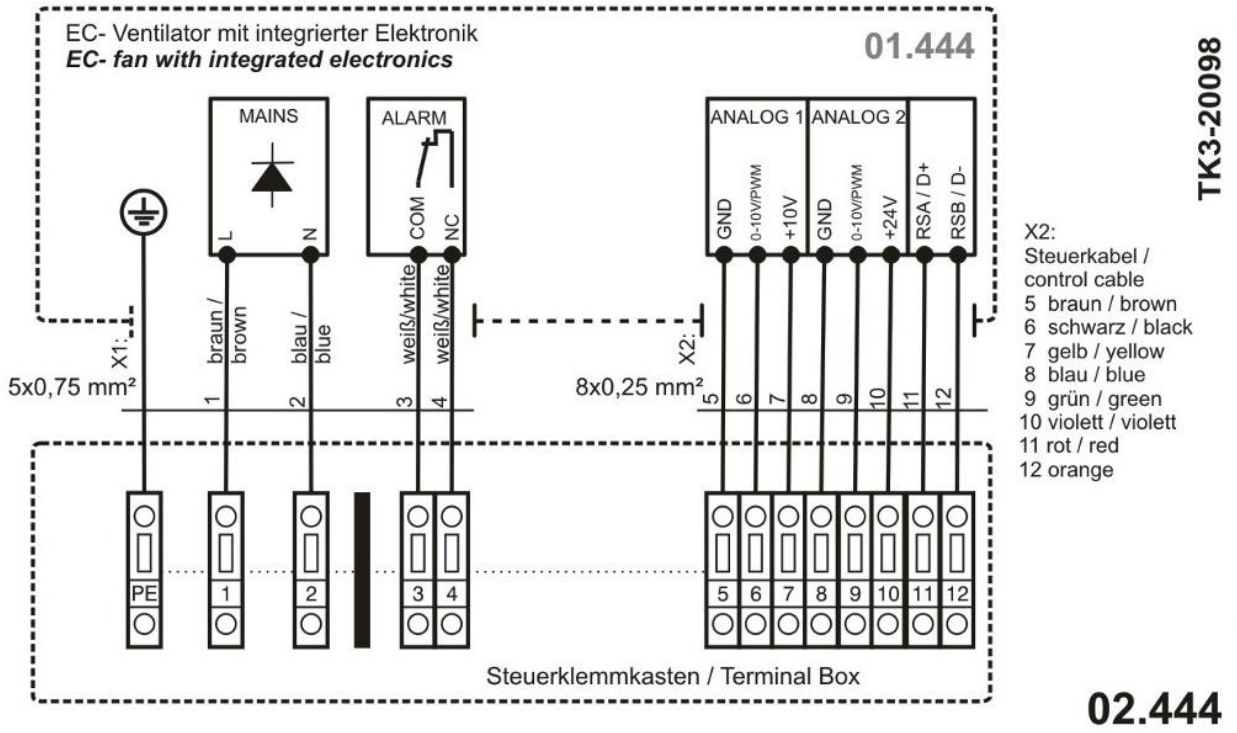
Wiring of frequency converter – direct start with cold conductor



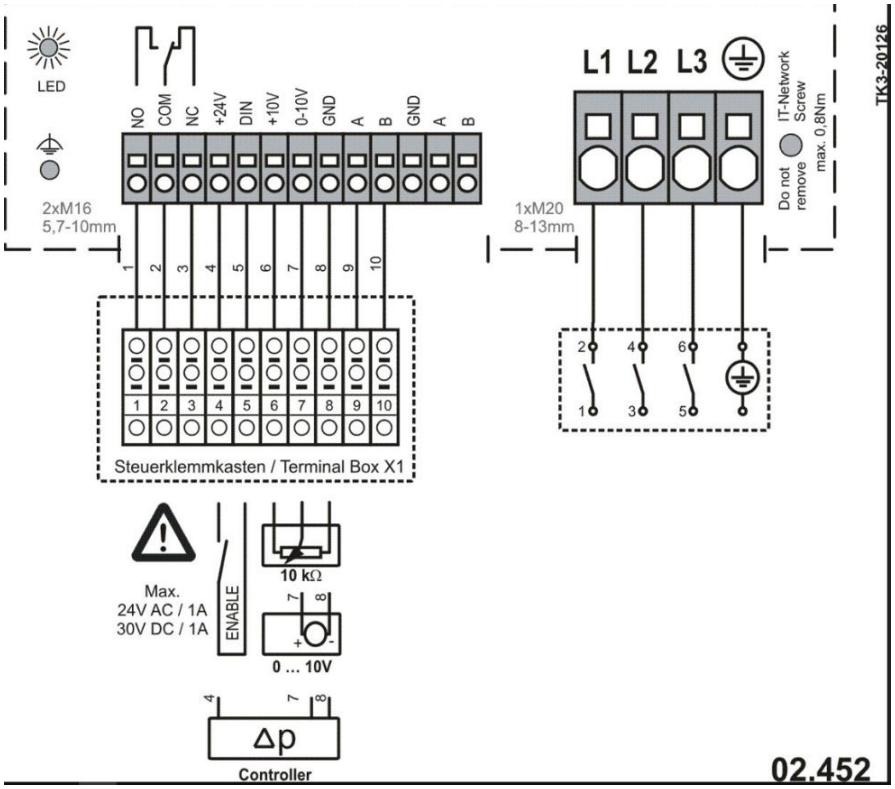
Wiring of standard motors with frequency converter and bypass



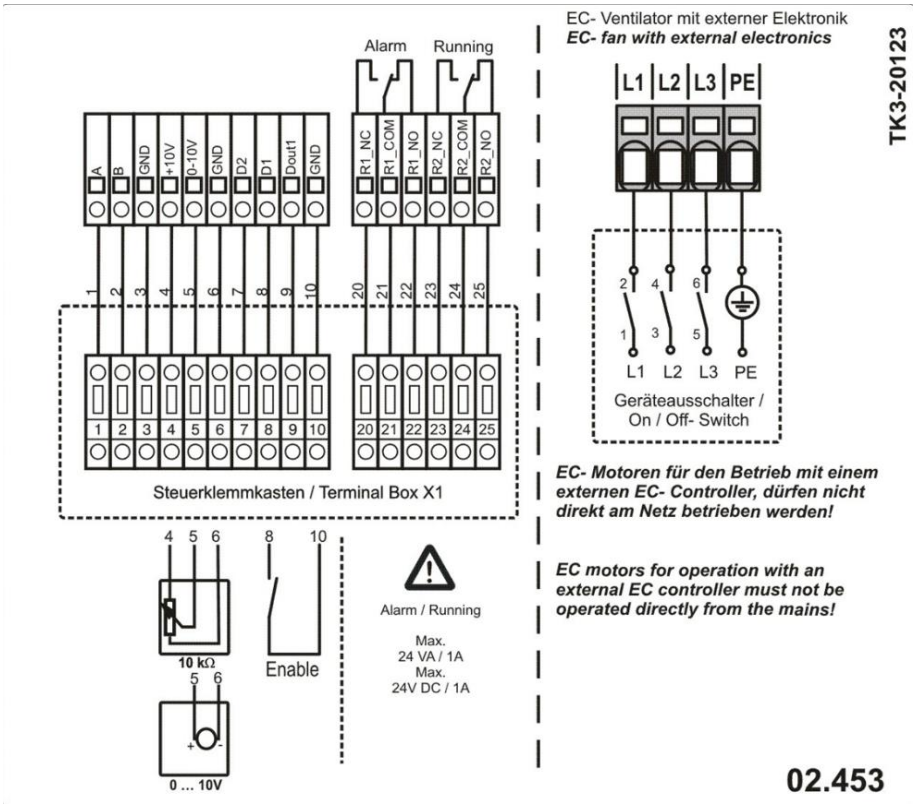
Connection diagram EC-fans single-phase



Wiring of EC-fans

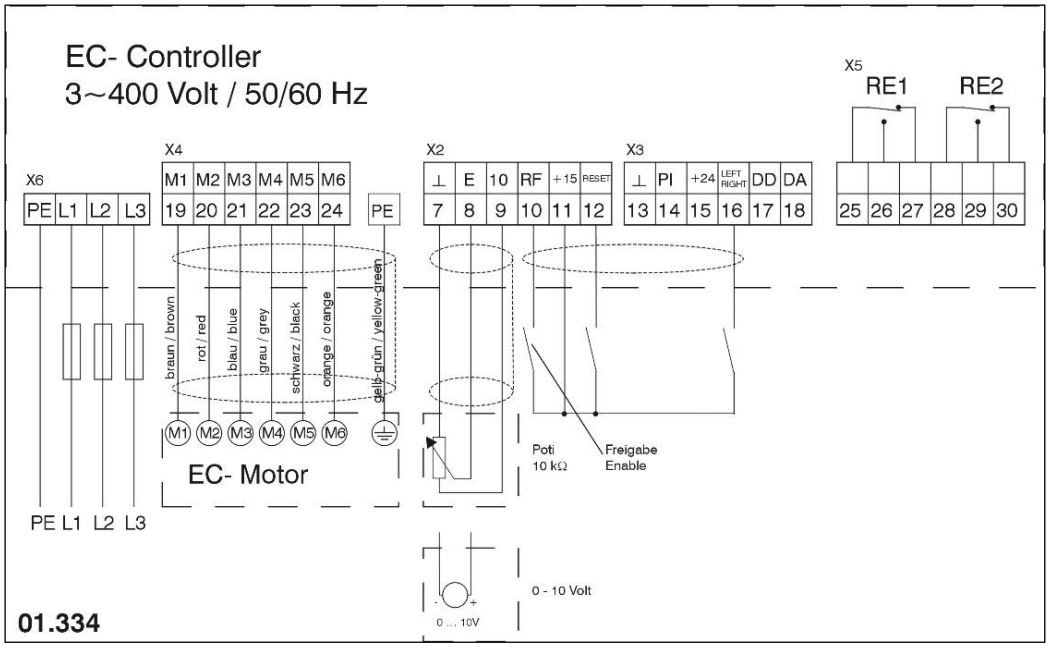


Connection diagram EC-fan with integrated control



Connection diagram EC-fan with external control

Connection diagram for EC-Controller



8.3. Filters (panel-, bag-, aktive carbon filters)

Startup

Please pay attention to the safety instructions in Chapter 1 and general start-up instructions in chapter 6.

Examine all sealing devices for correct positioning before installation of the filter. The casing floor should be cleaned.

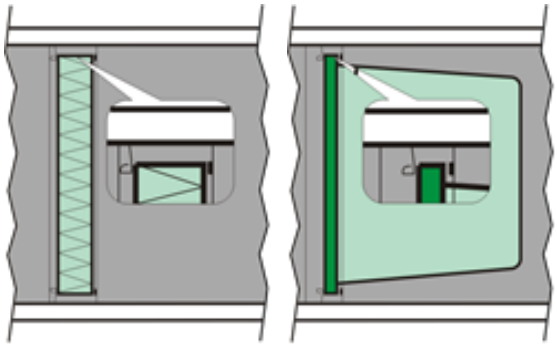
The bag filters should be installed so that the bags are set up vertically. The filter material should be examined for damage.
Special care is required to the engaging clips to the filter during installation to prevent damage.

Pay attention to the printed arrow on the filter is showing the direction of the air flow.

The degree of pollution has to be monitored by a filter-differential pressure measuring with monitor according DIN EN 13053. An inclined tube manometer, manometer with analogue display and an electronic push button switch can be used (equipment available).

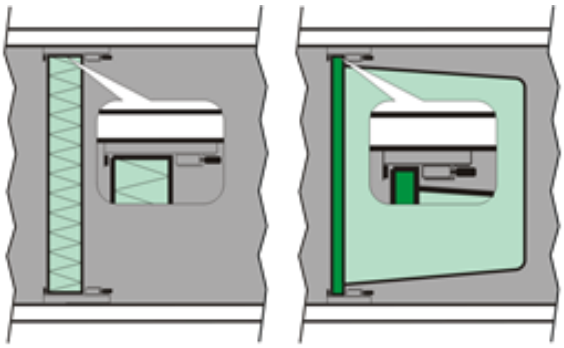
Operation

Panel, bag and compact filters are fastened with clamping brackets in the mounting frame. Attention must be paid to the correct positioning of the filter in the frame. Monitor and if necessary renew the sealing devices when changing the filters.



Standard frame

panel filter bag filter



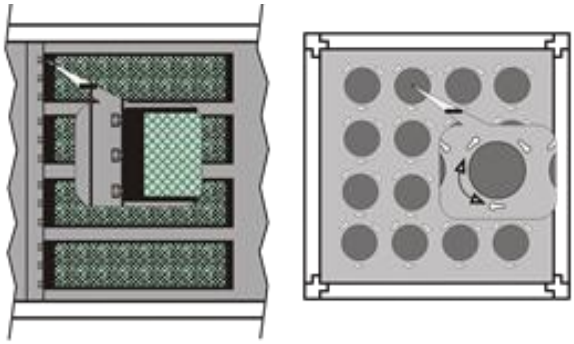
clamping rail

panel filter bag filter

On the lateral compartmented variation with clamping bars, the U-rails are set as spacers between the filter elements. The secure position of the filter is ensured after closing the clamping rail.

Carbonfilter (cartridges)

The active carbon filters are inserted with bayonet fitting in the plate frame. Pay attention to the correct position and soundness of the seal and cartridges. Filters are delivered detached in cardboard boxes. (key for bayonet lock special appliance)



carbonfilter

Maintenance and Cleaning

Maximum final pressure drop:

Coarser filters (ISO coarse)	previously G1 – G4	150 Pa
Filter class ISO $ePM_{10} \geq 50\%$	Previously M5	200 Pa
Filter class ISO $ePM_{2,5} \geq 50\%$	previously M6	200 Pa
Filter class ISO $ePM_1 \geq 50\%$	previously F7	200 Pa
Filter class ISO $ePM_1 \geq 70\%$	previously F9	300 Pa
HEPA / activated carbon filter	E10 – H14	According to manufacturer information

Filter dust may evoke allergically reactions on skin, eyes and respiratory organs.
Special protective clothes (non-returnable overall), protecting glasses and breathing mask are recommended for any operations on filter walls.

Metal filters can be cleaned with superheated steam cleaners or in the dishwasher.

Bag and panel filters are always completely replaced. The filter material is classified as special waste and disposed of accordingly.

The active carbon filters are recycled by the manufacturer and/or filled with new activated carbon. The effectiveness of the active carbon filters can be tested by means of test tubes (for the respective pollutants) for satisfactory function (refer to the manufacturer).

For air handling systems in accordance with DIN 1946 T.4 only reversible seals (plugged, clamped) allowed. Glued seals are permitted only on the filter for one-time use.
This sealing must have a document according to DIN EN ISO 846.
At the filter change the housing floor must be cleaned before the installation of the new filter.

Dirty filters affect the power and energy efficiency of ventilation units negative.

A filter change should be made at the latest after 12 months of operation or service life (first stage). For the second stage, 24 months are required. This applies regardless of the filter pressure drop. The filter change must always be carried out for the entire filter wall. The exchange of individual elements is not permitted. The filter change must be documented with name and date on the device, in the filter detection chart and in the operating log.
Further information can be found in the currently valid VDI 6022 or DIN EN ISO 16890.

After removing the filters, pollutions on the filter frame have to be removed strictly by using suitable designated cleaning agents. Depositions and residues from the cleaning agents have to be removed.

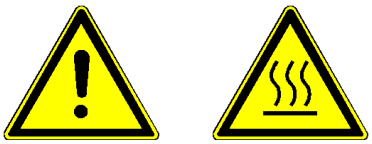
Wartung	Periodically every 3 months	If necessary	Hygienic-inspection
Examine contamination due to differential pressure monitoring	x	x	x
Examine filter for damages	x		
Change over the filter cartridge		x	
Examine filter position for leak tightness	x	x	x
Examine measuring instrument for differential pressure	x		x

Grease trap filter:

Grease trap filter and the drain drain pan must be cleaned with hot water or steam, if required use fat solvents. The filter elements and the drain pan must be dragged out of the instrument for cleaning.

Pay attention on stationary environmental and disposal specifications and observe these.

8.4. Heater (PWW)



Caution: Please note that when working on the heater, there is the danger of scalding from hot media (over 60°C).

Startup

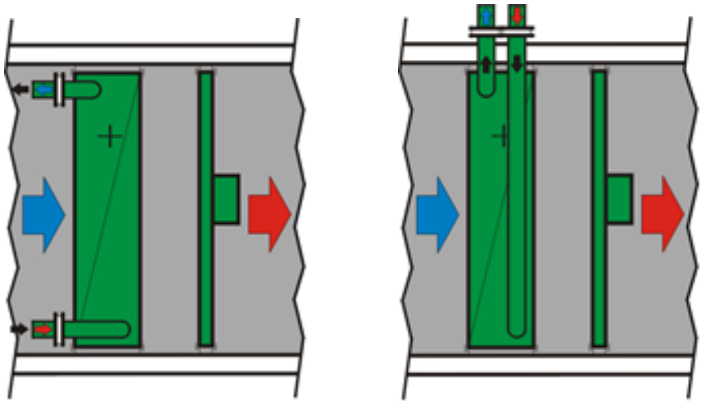
Please refer to the safety instructions in chapter 1 and to the general start-up instructions in chapter 6.

Pay attention that inspection doors can be opened at Installation and connecting pipe work. Accessibility must be guaranteed for maintenance.

The pressure changes of the pipeline and heater should be checked. The heater must show an equivalent or higher pressure stage than the pipe system.

With all piping work (attached either via flanges or screws) care must be taken to ensure that the heater pipes are fixed with a pipe wrench or similar tool.

The line connectors must be checked. If not indicated differently at the air- handling unit, the heaters are connected on the reverse return principle, i.e. the water entrance is on the air outlet side. Care must be taken when using the medium of steam to ensure that the steam connection and the condensate drainage are correct.



Counterflow principle

All pipe connections to the heater are manufactured stress- and vibration-free.
Appropriate vent and drain off facilities as well as removeable connectors (above the equipment or by the side of the heater) must be provided in the pipe for maintenance purposes. Uncompleted bleeding leads to air cushions in the heat exchanger and this leads to deficit rating.

The heater and piping should be accessible for either repair or maintenance works up to 1.6 meters.

The pipe system and the heater are filled with the specified medium in the appropriate concentration, indicated in the technical data sheet. Flushing before filling according to VDI 2035, to eleminate pollution is recommended.

Before start-up, the circulation pump must be bleeded and the position of the control and the servo-valves must be examined.
After start-up, the heater and the interfaces should be monitored for leak tightness.

The frost protection thermostat (with capillary line), which is on the air outlet side/ or the frost protection sensor in the medium return shall be examined for function and if necessary adjusted (recommendation of 4°C).

With high-flow temperatures small amounts of fumes from oil waste can inevitably occur during the first few hours of operation.

The hydraulic circuits of PWW heaters are described in chapter 5.4.

Operation

The heater is regularly examined (visual check) for leak tightness. The control of the system is carried out by the central air-handling unit controller.

During long downtimes, the heater or the pertinent heat supply should be protected from frost. If necessary the register should be completely emptied. For the heater to be completely emptied, it must be blown through with compressed air.

On restarting, the appropriate steps from chapter 3.4 should be followed.

Maintenance and Cleaning

The PWW or HW heater is a static unit, which requires little maintenance. The steam heater should be regularly examined for deposits and corrosion.

The heater may after removal of the piping by the removal of the panels, be pulled by means of the pull out rail. The pipes have to be connected so that removal of the piping is easy for/ and the removal for cleaning. The contamination of the slats can then by means of compressed air, a low- or high-pressure cleaner is removed. For larger installations, the heater can also be cleaned in the installed condition by means of compressed air against the air flow. Dirt and cleaning residue on the frame, connectors or tracks are also removed completely.

Maintenance	Periodisch 3 Monate	Bei Bedarf	Hygiene-inspektion
Check the hygienic conditions	x		x
Examine heater for contamination, damage and corrosion	x		
Clean heaters air-side		x	
CU/AL blades: blow out with compressed air or low pressure water cleaner against the direction of the air flow		x	
Steel galvanized blades: additionally also high pressure cleaner can be used		x	
Air out the heaters		x	
Examine frost protection thermostat and/or frost protection sensor for function	x		

The water and/or assigned cleaning agents should have a neutral pH value (6-8).

Note: With antifreeze agents, any displaced water may not be introduced into the sewerage system. It ist special refuse and must be treated accordingly.
With all work, care must be taken that the blades are not distorted. If necessary the blades must be reshaped with an appropriate blade-combing tool.

8.5. Electric air heater

Caution: With wire heaters there is a danger of an electric shock at the filament.
Caution: When working on the heater beware of the risk of burns.

Startup

Please pay attention to the safety instructions in Chapter 1 and general start-up instructions in Chapter 6 and in the manufacturer's documentation!
The operating and maintenance instructions of the manufacturer must be observed, this has in deviations from the Rosenberg BWA priority.

Before a connection to the power supply is made, an initial start-up is undertaken as per the VDE guideline.

A safety thermostat with hand regulation must be installed at the exhaust side of the electric heater. Performance must be checked, e.g. hot-air blower.

The electric air heater must be equipped with a flow-monitoring device (to monitor the differential pressure at the fan or flow indicators at the electric air heater on the incoming flow).

The fan must have a run-on timer, which prevents an overheating of the electric air heater after an operational disconnection. An exception can be only made for the heater, if an operating permit without run-on timer is present. Manual shut-down with the main circuit breaker without adequate cooling leads to defects because of overheating. Components must be checked before switch on.

The power consumption of all attached phases must be examined. The characteristics are taken from the data plate.

Operation

When a malfunction of the electric air heater occurs, the register must be examined and the safety temperature limiter shall be manually unlocked if necessary.

Maintenance and Cleaning

The electric air heater requires very little maintenance, as it is a static unit. During periodic maintenance work mainly checking and cleaning arises.
The operating and maintenance instructions of the manufacturer must be observed, this has in deviations from the Rosenberg-BWA priority.

Maintenance	Perodically every 3 months	If necessary	Hygienic-inspection
Checking the hygiene condition			x
Examine the function of the air flow monitoring: when removing the air tubes from the differential pressure switch, you must release the monitor (to switch the differential pressure switch).	x		
Examine electric air heater for contamination, damage and corrosion	x		
Clean electric air heater		x	x

To clean the heater, it must be drained off. Cleaning with water is allowed only at the rack and not at charged components.

The water and/or assigned cleaning agents should have a neutral pH value (6 - 8), better blow it out with air.

Eliminate all residues of detergent before switching-on.

8.6. Cooler

When carrying out work on the cooler there is danger of chemical burns from brine!

Startup

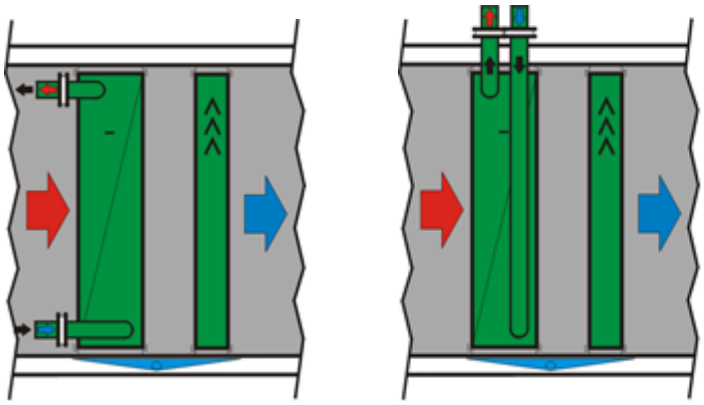
Please pay attention to the safety instructions in Chapter 1 and general start-up instructions in Chapter 6.

Pay attention that inspection doors can be opened at Installation and connecting pipe work. Accessibility must be guaranteed for maintenance.

The pressure stages of the pipeline and cooler must be examined. The cooler must have an equivalent or higher pressure than the pipe system.

With all piping work (attached via flanges or via screws) care must be taken to ensure that the cooler pipes are held with pipe wrench or a similar tool.

The line connectors must be examined. If not indicated differently on the air-handling unit, the coolers are installed in the reverse return principle, i.e. water inlet is on the air outlet side. Preferably the flow of the medium must be installed below and the return flow on top.



Counterflow principle

All pipe connections to the cooler are manufactured tension- and vibration-free.

Appropriate exhaust and drainage facilities, as well as removable connectors (above the equipment or by the side of the cooler) must be provided in the pipeline for maintenance purposes. Uncompleted bleeding leads to air cushions in the heat exchanger and this leads to reduced power.

The pipe system and the cooler shall be filled with the medium in the appropriate concentration, which is indicated on the technical data sheet. Flushing before filling according to VDI 2035, to eleminate pollution is recommended.

Before the initial start-up, the circulation pumps should be vented and the position of the control and servo-valves must be examined.

After start-up, the cooler and the interfaces should be monitored for leak tightness.

Due to the resulting condensate, air coolers have drop eliminators and drainage tanks by which the condensation is drained off. Instructions on how to connect the siphon to the condensate drainage can be found in Chapter 5.5.

The hydraulic circuits for PKW coolers are described in Chapter 5.4.

Special instructions for direct vaporizer:

Before start-up, an inert gas filling in the coil must be present. When cutting the caps off it must be clearly heard that the gas has escaped.

Operation

The cooler is regularly examined for leak tightness (visual check). The control is carried out by the central equipment control.

During long downtimes, appropriate frost protection should be ensured for the cooler or if necessary the register should be completely drained. For the cooler to be completely emptied, it must be blown through with compressed air after the refrigerant has been drained.

Cooling coils with dehumidification a drain pan is installed on all sides incline. At the end, a siphon is to install non-return valve (optional accessory).
A direct connection of water flows to the sewage system is not allowed.

On restarting, the appropriate steps from Chapter “Start-up” should be considered.

Maintenance and Cleaning

The chilled water coil or direct evaporator is a static unit, which requires little maintenance. The cooler should be regularly examined for deposits and corrosion. Additionally attention must be paid to the regular cleaning of the demister and the drainage tank.

The cooler may after removal of the piping by the removal of the panels, be pulled by means of the pull out rail. The pipes have to be connected so that removal of the piping is easy for/and the removal for cleaning. The Contamination of the slats can then by means of compressed air, a low-or high-pressure cleaner removed. The tube can then be wiped out easily with a suitable cleaning agent, if present, waste water and cleaning residue must be completely removed.

For larger installations from size 1313 the cooler can also cleaned in the installed condition by means of compressed air against the air flow. The tub is designed to allow enough room for wiping is available! Dirt on the frame, rails, etc. are to be removed also.

The droplet can be pulled out after opening the inspection door on the existing rails. The blades can be individually pulled out of the frame at the top. Frame and blades should be cleaned thoroughly afterwards. The tub can then be wiped out easily with a suitable cleaning agent, if present, waste water must be completely removed.

Maintenance Cooler	Periodically every 3 months	If necessary	Hygienic-inspection
Check the hygiene condition			x
Examine cooler for contamination, damage and corrosion	x		
Clean cooler on the air-side		x	
CU/AL blades: blow out with compressed air or low pressure water cleaner against the direction of the air flow		x	
Steel galvanized blades, additionally also high pressure cleaner can be used		x	
Air out cooler	x		
Examine frost protection for function (medium or frost protection thermostat)	x		

Maintenance Demister and drainage tank	Periodically every 3 months	If necessary	Hygienic-inspection
Check the hygiene condition			x
Examine demister and drainage tank for contamination, damage and corrosion	x		
Clean demisters: take cartridge out and brake down, then clean the sections individually. The demister must be decalcified and free of grease.		x	
Clean drainage tank		x	
Examine condensate run-off and siphon for function	x		
Clean condensate run-off and siphon		x	
Examine siphon water level and if necessary refill it	x		

The water and/or assigned cleaning agents should have a neutral pH value (6 - 8).

Note: With antifreeze agents, any displaced water and/or refrigerant may not be introduced into the sewerage system. It is special refuse and must be treated accordingly.

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8.7. Plate heat exchanger

To avoid damage the maximum pressure drop, which is allowed (flow/return flow) must not be overshooted.

Startup

Please note the safety instructions in Chapter 1 and general start-up instructions in Chapter 6.

Before start-up the operational capability and the direction of motion of the bypass damper of the plate heat exchanger should be examined in accordance with Chapter 8.1. Please note also hints for closing of the shutt-off damper in this chapter.
The bypass damper must be secured in the closed position on start-up of the fans and therefore the connected damper is open over the plate heat exchanger. During manual damper adjustment, the latch of the manual lever must be tightened.
Supplied or pre-assembled Mounting bracket for servo motors are generally suitable for Belimo Motors.

It must be ensured that any drainage tanks are connected at the foot of the plate heat exchanger unit with a siphon (inlet or pressure-side) to the condensate water pipeline. The assembly of the siphons is explained in Chapter 5.4.

Operation

Plate heat exchangers with manual bypass damper adjustment are adjusted according to the outside temperatures. Automatic bypass damper adjustment is carried out by means of a servo-motor, which is carried out by the central unit control.
For icing monitoring a differential pressure switch on the exhaust air stream is to install. The set is about 50 Pa above the design pressure loss according to technical data sheet of the exhaust stream.

In the case of tripping without icing the existing value assessment can be slightly increased, control required.

Maintenance and Cleaning

The plate heat exchanger as a static component requires very low maintenance. According VDI 6022 checks are necessary for hygienic inspection and/or maintenance purposes. In addition any existing servo-motors must be serviced in accordance with Chapter 8.1.

For cleaning with air or high pressure cleaner a flat nozzle should be used. For plate heat exchangers consisting of several units disassemble them if necessary and clean them separately.

Maintenance	Periodically every 3 months	If necessary	Hygienic-inspection
Check the hygiene condition			x
Examine plate heat exchanger for contamination	x		
Clean the plate package with air or high pressure cleaner (water or steam, always aim the jet parallel to the blade unit, from top to bottom)		x	
Clean unit chamber carefully		x	
Remove waste water completely		x	
Examine condensing tub for contamination	x		
Clean condensate tank		x	
Examine siphon for function and water level and if necessary fill up with water	x		
Examine bypass valves for easy movement and if necessary repair them	x		

The water and/or assigned cleaning agents should have a neutral pH value (6 - 8).

8.8. Rotary heat exchanger

Startup

Please note the safety instructions in Chapter 1 and general start-up instructions in Chapter 6.

The operating and maintenance instructions of the manufacturer must be observed, this has in deviations from the Rosenberg BWA priority.

Before a connection to the power supply is made, an initial start-up is undertaken as per the VDE guideline.

Before start-up of the rotary heat exchanger, it should be checked that the heat exchanger unit can rotate freely. It is important that no items block the free running of the rotor. Suitable sealing strips or materials are to be aligned in such a way that these are positioned as close as possible to the rotor unit without affecting it, or only easy grazing.

The rotor unit bearings are already aligned at the factory. Should an adjustment of the bearing be necessary due to the installation site; then this has to be undertaken in accordance with the enclosed manufacturer's documents.

The tension of the driving belt must be examined before start-up and during the first 500 operational hours.

The operating instructions of the rotor controller must be considered on start-up.
After taking the above mentioned steps,
Connect the rotor drive motor and/or the rotor controller to the mains supply.

The rotational direction of the rotary heat exchanger must be checked against the directional arrow markers on the rotor housing.

The condensation rotor speed should not exceed a maximum of 12 rpm. For rotary exchangers, which can process humidity the required rotor speed amounts to a maximum of 20 rpm.

Operation

The rotor controller is controlled by the central unit control system. The operating and breakdown displays of the rotor controller should be monitored regularly as these are not processed by the unit control.

Maintenance and Cleaning

When working at the rotor power supply must be all-pole disconnected and secured to prevent reactivation. There is the danger of bruise and abrasion because of a sudden start.

Maintenance	Periodically every 3 months	If necessary	Hygienic-inspection
Check the hygiene condition			x
Examine rotor for contamination	x		
Clean the heat exchanger unit with air		x	
The possibility using a high pressure cleaner (water or steam) for cleaning must be tested separately		x	
The jet always parallel to the axis of the rotary heat exchange and against the air flow direction		x	
Clean unit chamber carefully		x	
Remove waste water completely		x	
Examine sealing strips and/or materials for damage, pollution and correct positioning	x		
Clean and adjust sealing strips and/or materials		x	
Examine driving belts on wear and tension and if necessary tighten or exchange	x		

The rotary heat exchanger requires little maintenance as it a slow rotating built-in component. The rotor bearings, belt, and drive motor are designed for a lifetime and need no maintenance under normal operating conditions.
After opening of the access doors, the storage mass of the rotor can by means of compressed air, or a high-pressure cleaner of dirt to be cleaned. The beam is always directed at right angles to the mass memory and contrary to the air flow direction. Existing dirt on the frame must be removed by suitable cleaning agent. For existing bottom trays dirt and cleaning residue must be removed completely. For cleaning with air or high pressure cleaner a round nozzle should be used. The water and/or assigned cleaning agents should have a neutral pH value (6 - 8).
Special instructions concerning the heat exchanger unit and the materials processed there can be obtained from the manufacturer's guidelines for the rotors and must be taken into consideration. With all work attention must be paid to ensure that the blades are not distorted.

8.9. Run-around-system

Caution: When working on the run-around system there is the danger on contact with the heating/cooling agent.

Startup

Please pay attention to the safety instructions in Chapter 1 and the general start-up instructions in Chapter 6.
Pay attention that inspection doors can be opened at installation and connecting pipe work. Accessibility must be guaranteed for maintenance.

A circulating loop system is a closed cycle. During assembly the heating system regulations have to be implemented. Pressure expansion vessels as well as relief valves are integrated into the circulating system.

Ensure that the heater pipes on all piping work (connected via flanges or via screws) are held with a tubing wrench or a similar tool. All pipe connections to the register are to be manufactured stress- and vibration-free.

Examine the pipe connections. Unless specified otherwise the heaters must be connected to act up to the counterflow principle, that means the water inlet at the air outlet side. The medium flow should be preferably installed at the bottom and the return flow on top.

Appropriate exhaust and drainage facilities, as well as removable connectors (above the equipment or by the side of the heater) must be provided in the pipeline for maintenance purposes. Uncompleted bleeding leads to air cushions in the heat exchanger and this leads to deficit rating.
Ensure that the heat exchanger is extendible.

The pipeline system of the cooler and heater must be filled with the antifreeze in the appropriate concentration in the technical data sheet. Take particular care that there is sufficient frost protection in run-around system.

All further information for start-up of the heater can be found in Chapter 8.4. and for the cooler in Chapter 8.6.

Divided run-around system (heater/cooler)

Due to existing regulations, it may be necessary to split the heater and/or cooler of the run-around system (i.e. into two registers).

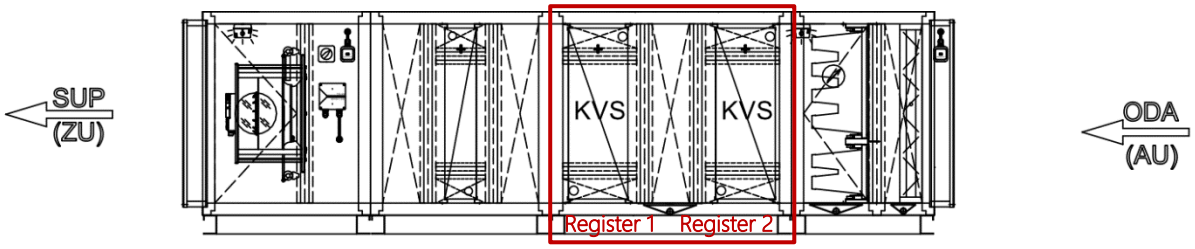


Illustration: Divided heater of the run-around system in supply air with inspection opening

Both registers (heater/cooler) are each designed with a connection for water inlet and outlet. On site, the connection for the water outlet of register 1 must be connected to the connection for the water inlet of register 2 in order to have only one connection each for the water inlet and outlet for the subsequent connection of the heater/cooler of the run-around sytstem to the hydraulic station.

Pay attention that inspection doors can be opened at installation and connecting pipe work. Accessibility must be guaranteed for maintenance.

Operation

The run-around system should be regularly checked for leak tightness (visual check). The control is carried out by the central unit control system.

During long downtimes of the circulating loop system, appropriate frost protection must be provided or if necessary the register has to be emptied completely. For complete drainage, the cooler must be blown through with air after the refrigerant material is discharged.

On restarting, the appropriate steps from Chapter 8.9.1 must be considered.

Maintenance and Cleaning

Maintenance and cleaning instructions for the circulating loop system can be found in Chapter 8.4. (Heater) and in Chapter 8.6. (Cooler).

The water and/or designated cleaning agents should have a neutral pH value (6 - 8).

Note: Antifreeze from the transferred water and/or coolant may not be discharged into the sewerage system. It must be treated as special refuse.

On all work, it must be checked that the blades are not distorted. If necessary, the blades must be straightened with the corresponding blade tool.

8.10. Sound attenuator

Startup

Please note the safety instructions in chapter 1 and the general start-up instructions in chapter 6.

Splitters must be checked for damage and contamination. Please note instructions for repair and/or cleaning.

Operation

The splitters can be removed and/or dismantled after the housing wall has been taken away. Attenuators are mounted on bars constructed to be removable, these can be removed. For dismounting of the bar, it may be necessary to press apart the housing (ground and cover) by using a spreader, so that the bar easily removed and/or can be mounted again.

When attaching the spreader on surfaces of the equipment / frame, these haven`t to damaged. The use of protection mats is recommended.

Spreader with rubber washer to avoid scratches.

Maintenance and Cleaning

Splitters with felt coverings can be cleaned with a vacuum cleaner. For those with glass coverings, a damp cloth can be used.

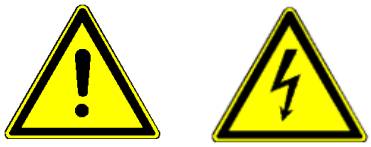
Soaked splitters are an ideal breeding ground for bacteria and fungi. Therefore they have to be replaced.

If damaged, make good the covering fleece with the repair set.

Maintenance	Periodically every 3 month	If necessary	Hygienic-inspection
Examine splitters for contamination and damage	x		x
Examine silencer chamber for humidity	x		x
Clean top surfaces of the splitters		x	

The water and/or designated cleaning agents should have a neutral pH value (6-8).

8.11. Electrical Accecoires



All electrical connection work must only be undertaken by trained technical personnel.

Please note the safety instructions in Chapter 1 and general start-up instructions in Chapter 6.

General instructions for electrical installation can be found in Chapter 5.3 of this operating manual. Every electrical component must be involved in a protective conducting system. The same applies to the side cladding or case parts where electrical components are mounted. All electrical connection work must only be undertaken by trained technical personnel.

8.11.1. Lights of the Air handling unit

If required the RLT air-handling units can be equipped with internal lighting. Normally it is completely pre-wired. Thus the connection of the lighting lead can take place directly at the light switch, which is fixed on the outside of the air-handling unit.
Exception: The lighting circuit is already connected in compact air-handling units (see Chapter 12).

The electrical supply for the lighting of the air-handling unit must be on a separate electric circuit, so that when the unit is stopped for maintenance purposes it is possible to light it.

The light switch (IP 66) has a red glow lamp, which displays the interior lighting equipment in operation. On weatherproof devices, the light switch is protected from bad weather by a protective cover.

With standard air-handling units, oval lights are installed in the air-handling unit (IP 40). The light used is an LED, 9 Watt. Alternatively, an LED lamp with 8 W and an IP 65 housing is available. Should the bulb need changing then please ensure that a bulb of the same power is used.

An LED diffuser light (IP 65) is installed in the hygiene devices as standard. When replacing it, an equivalent make must be used.

Pollution on the lighting equipment must be removed regularly by wiping with a suitable cleaning agent; this is especially the gap between the lamp and ceiling thoroughly cleaned!

8.11.2. Valve motors

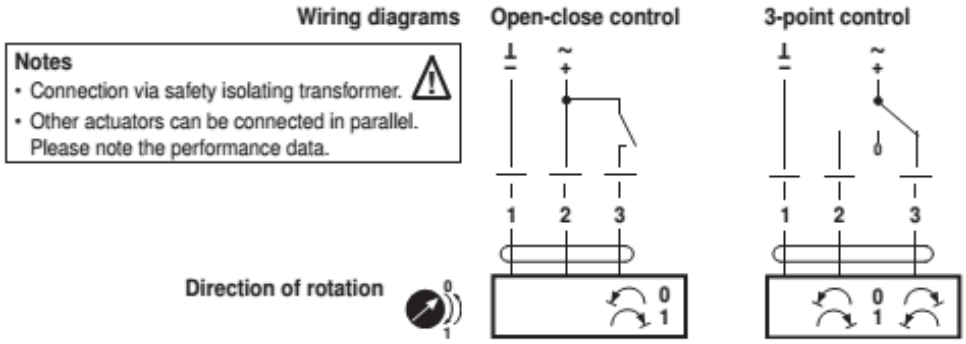
Instructions on the valves are contained in Chapter 8.1. The appropriate part refers to the connection of the pre-wired valve motors.

The standard Belimo valve motors are used in the Rosenberg air-handling units. These can be installed either attached to the outside of the unit (→interior installation) or inside the air-handling unit (→weatherproof design).

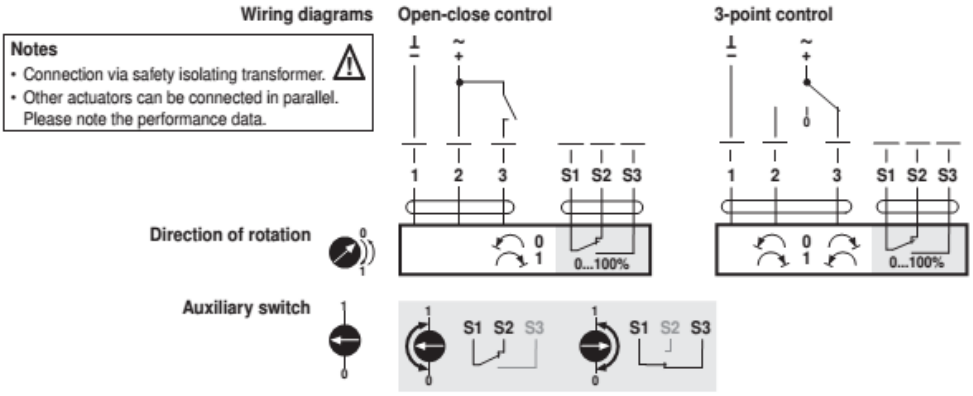
Depending upon the mains voltage and the valve size and function, there are different valve motors. The differences in the functions of the control drives (open-closed and/or constant) can be explained by the different applications of the valves e.g. as supply air or as bypass valve.

An overview of these diagrams is shown on the following page. Thus the correct connection can be found with the known type of actuator (printed on the housing).

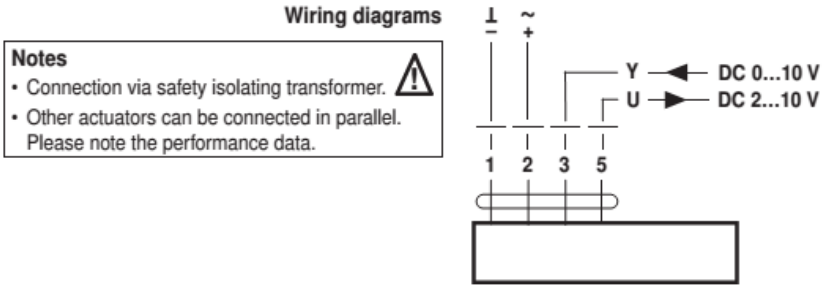
LM24A, NM24A, SM24A



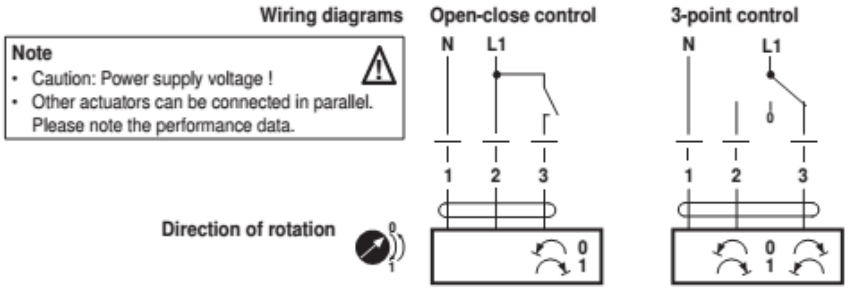
LM24A-S, NM24A-S, SM24A-S



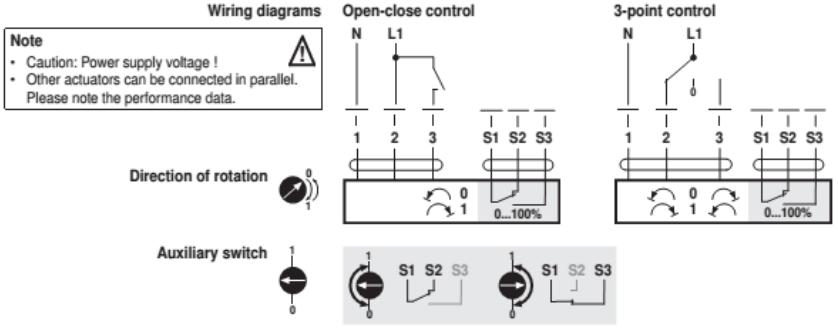
LM24A-SR, NM24A-SR, SM24A-SR



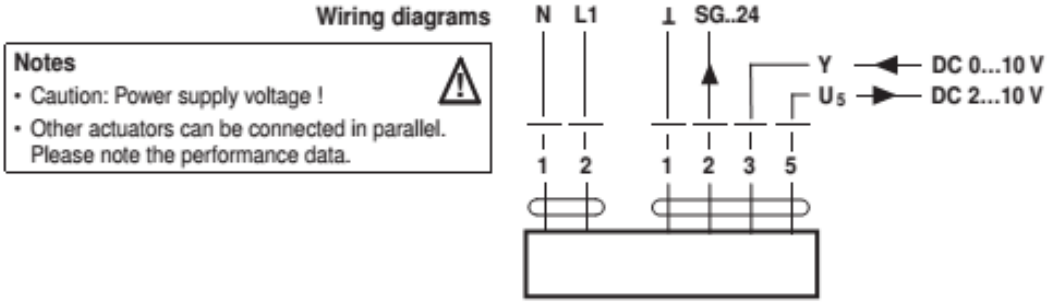
LM230A, NM230A, SM230A



LM230A-S, NM230A-S, SM230A-S

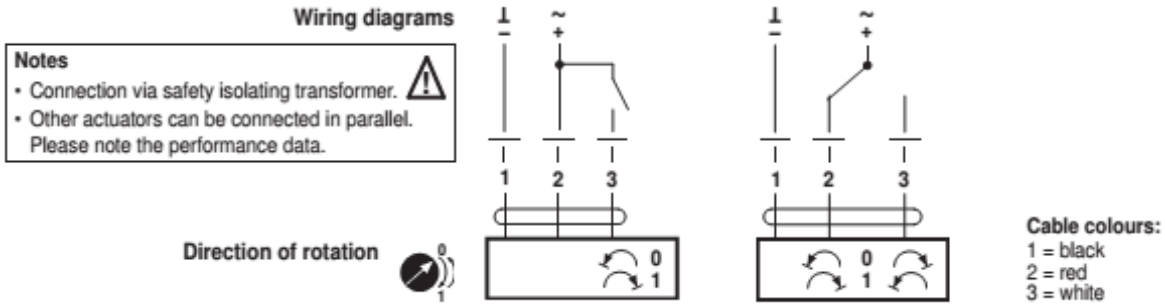


LM230ASR, NM230ASR, SM230ASR

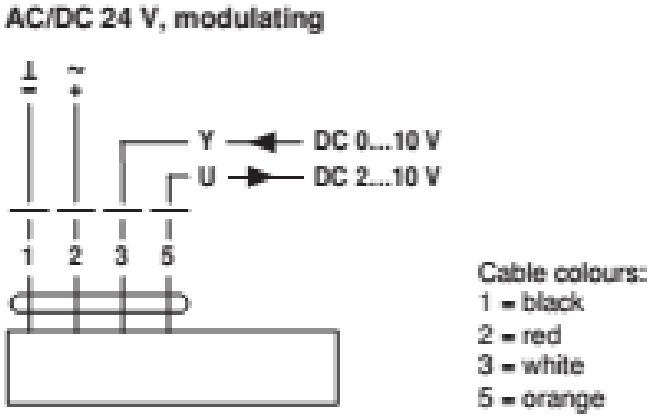


When connecting the valve actuators and on start-up, attention should be paid to ensure that automatic valve position works correctly (correct rotational direction of the valve, etc.) Possibly the valve actuator must be commutated or an adjustment of the control parameters may be necessary.

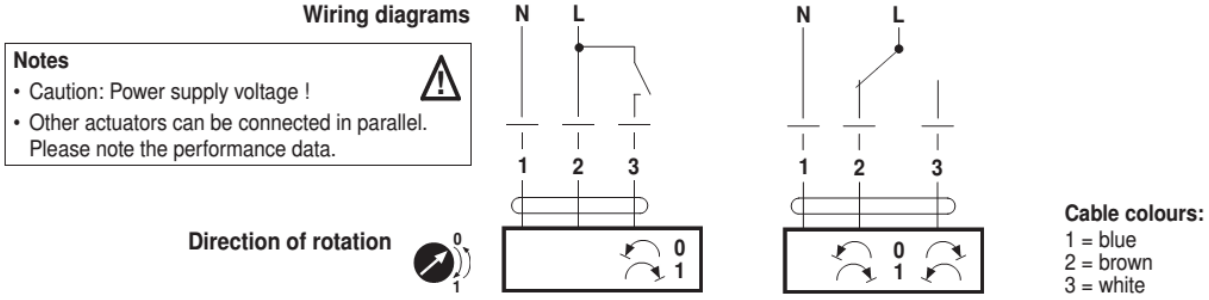
GM24A



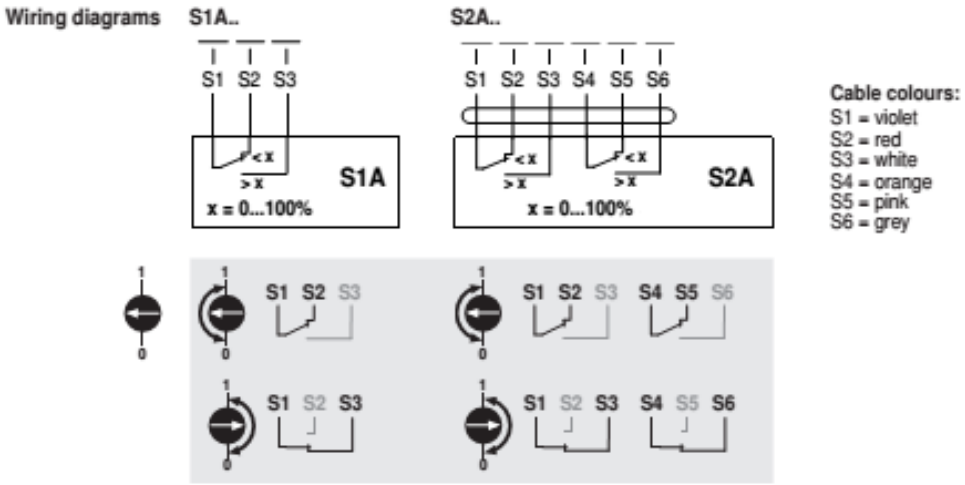
GM24A-SR



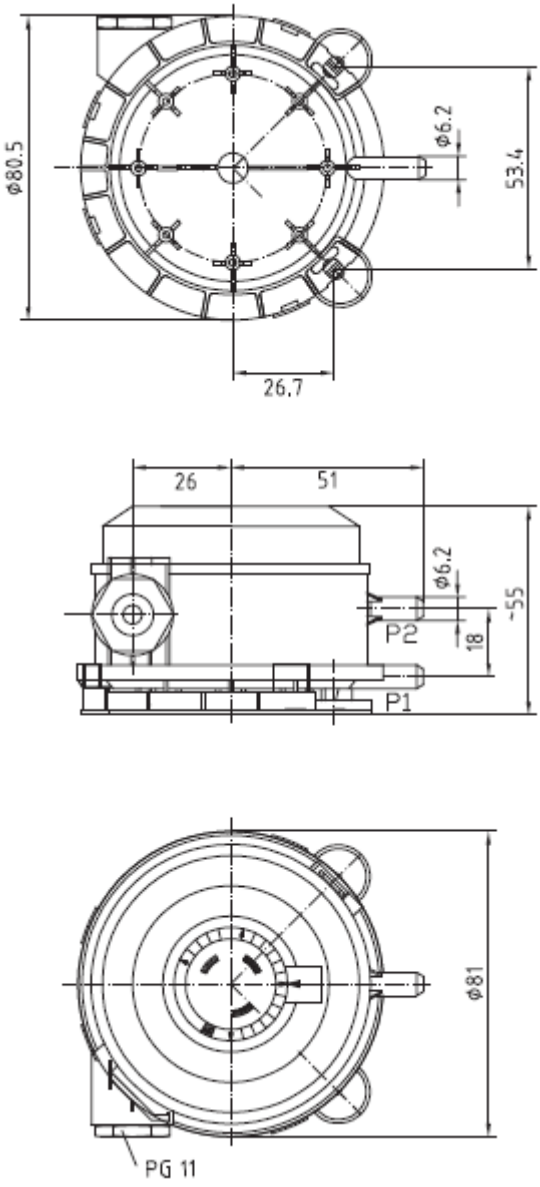
GM230A



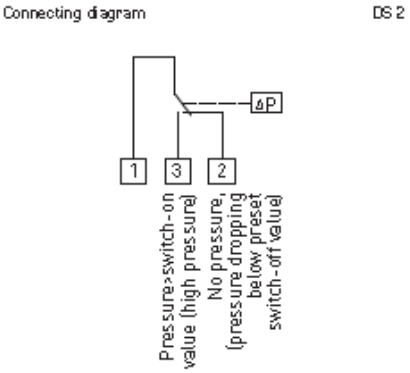
Auxiliary switch S1A.., S2A..



8.11.3. Differential pressure monitor



Drawing/draft



Wiring diagram/Connecting diagram

8.12. Humidifier

Basics

Generally the following types of air humidifiers are used in Rosenberg RLT air handling units:

- steam humidifiers
- spray/nozzle humidifiers
- evaporation humidifiers

With a **steam humidifier,** steam is produced in an external steam boiler and is distributed by means of a steam distribution pipe into the airflow. The advantage with this is that the air temperature remains constant because the water is already brought in as a gaseous form and therefore no evaporation warmth can be extracted from the air.

With a **spray humidifier**, the water, which is finely atomised through a nozzle, is sprayed into the airflow. Here the adiabatic humidification occurs.

With an **evaporative humidifier,** also known as a honeycomb humidifier, the air flows through a honeycomb structure, which is humidified by water sprayed on it. Adiabatic humidification also occurs here.

When using a humidifier, in addition to these instructions, please note the manufacturer's instructions supplied.

The injected water for the humidifier must meet the requirements of the current drinking water regulations.
A backflow into the drinking water system must be excluded.

Startup

Please note the safety advice in Chapter 1 and the general start-up advice in Chapter 6.
It is absolutely necessary to attend the operating and maintenance manual of the producer.

The operating and maintenance instructions of the manufacturer must be observed, this has in deviations from the Rosenberg BWA priority.

Before start-up, regardless of the humidification method used, the general condition of the humidifier unit has to be examined (for damage during transport and assembly).

The humidifier's water must be of the required quality as stated in the manufacturer's instructions.

Advice regarding the installation of siphons for the discharge of drainage and condensate water can be found in Chapter 5.5 of these operating instructions.

Special instructions for steam humidifiers

"Normal tap water" is ideal as feed water for steam humidifiers. The conductivity of the water should be 15°C between 200 and 500 µS/cm. Other water types can lead to quicker wear of the steam boiler's electrodes or to a reduced steam production.

Before start-up, the condensate tank must be free of foreign bodies and cleaned with water and cleaning materials (pH value 6-8).

Pay attention to the enclosed manufacturer's guidelines for the start-up of the steam humidifier.

The humidifier must be interlocked with the fan, i.e. the humidifier may only be operated when the fan is in on.

Special instructions for spray humidifiers

Depending upon the water quality, spray humidifiers that use re-circulating water, must be operated with appropriate desalination and blow-down equipment as per the manufacturer's instructions.

The following points have to be checked and/or performed on commissioning:

- Humidifier tub: remove foreign bodies and clean with water and cleaning materials (pH value 6 to 8).
- Fill the humidifier tub up to about 1-2 cm below the overflow connection.
- Adjust the float valve to this water level.
- Start the fan up and afterwards connect the spray humidifier pump. Check the rotational direction of the pump. If the pump rotates in the wrong direction, disconnect the pump from the electricity. Pay attention to the pump operating instructions.

The humidifier pump can only be operated with sufficiently full tanks.

- Adjust the dry cycle protection of the humidifier pump. When the water level falls to below 2 cm above the suction pipe, the pump must be switched off.
- The spray humidifier should only be in operation for a few hours and should be checked for function and leak tightness.

The humidifier must be interlocked with the fan, i.e. the humidifier may only work when the fan is in operation. Furthermore the spray humidifier has to be run dry after use for hygienic reasons.
Therefore the fan must have a tracking function.

After start-up, the microbial count of the re-circulating water should be checked weekly for some time. If necessary the blow down device and/or the automatic hygiene control should be corrected.

Should the microbial count exceed the recommended threshold values, the unit must be cleaned immediately. It is recommended that an expert is consulted, should high microbial counts recur quickly. In addition, in certain circumstances a suitable water treatment may be necessary.

Please pay attention to the supplied operating instructions regarding start-up of the spray humidifier.

Special instructions for evaporation humidifiers

Depending upon the water quality, evaporation (honeycomb) humidifiers, which use re-circulating water, must be operated with appropriate desalination and blow down devices as per the manufacturer's instructions.

The following points must be checked and/or performed on start-up:

- Humidifier tank: remove foreign bodies and clean with water and cleaning materials (pH value 6 to 8).
- Fill the humidifier tank up to 5 mm below the overflow connection. If the water level is too low, it reduces the humidifying capability and life times of the humidifier cartridges.
- Adjust the float valve to this water level.
- Operate the evaporative humidifier pump. Check the rotational direction of the pump. Seen from above, the pump should turn in a clockwise direction. If the pump turns in the wrong direction, disconnect the pump from the electricity. Pay attention to the pump operating instructions.

The humidifier pump must only be operated with sufficiently full tanks.

- Adjust the dry cycle protection of the humidifier pump. When the water level falls to below 2 cm above the suction pipe, the pump must be switched off.
- The spray humidifier should only be operated for a few hours and should be checked for function and leak tightness.

After commissioning, the bacterial count of the circulating water should be checked weekly for some time. If necessary, the blowdown device or the automatic hygiene system must be corrected.

Should the microbial count exceed the recommended threshold values, then the unit must be cleaned immediately. An expert should be consulted if high threshold values recur quickly. In addition, in certain circumstances a suitable water treatment may be necessary.

Cleaning through

On initial start-up there are still material dust particles (production residue) on the humidifier cassettes, hence the drainage water is brown coloured. This residue does not cause problems. To wash this residue out, the cassettes must be cleaned on initial start-up as follows:

1. switch fan off
2. fill tank with clean water
3. completely open the desalination valve
4. let the pump run for half an hour
5. switch the pump off
6. clean the tank
7. refill tank again
8. switch pump on again

This procedure should be repeated until no more residue settles in the tank.

The humidifier must be interlocked with the fan, i.e. the humidifier may only work when the fan is in operation. Furthermore the evaporation humidifier has to be run dry after use for hygienic reasons. Therefore the fan must have a tracking function.

Should the microbial count exceed the recommended threshold values, then the unit must be cleaned immediately. An expert should be consulted if high threshold values recur quickly. In addition, in certain circumstances a suitable water treatment may be necessary.

Please also pay attention to the enclosed operating instructions for start-up of the evaporative humidifier.

Operation

The operation of the humidifying unit takes place in normal circumstances by automatic control. A control strategy can also be decided upon here. Information on the humidifier control can be found in the enclosed manufacturer's instructions.

During operational shutdown, the tanks, pumps and fittings of the humidifying unit must be completely emptied. Outside operational hours, the humidification tanks have to be cleaned and dry.
On re-starting the tanks, which are operated with re-circulating water, must be refilled with fresh water. Therefore please pay attention to the corresponding start-up points.

Maintenance and Cleaning

Air humidifiers require careful and regular maintenance to guarantee a hygienically flawless operation.

Humidifiers, which are insufficiently maintained, may affect the hygienic condition of the air-handling unit. The operator is responsible for the regular maintenance of the appliance. With adequate maintenance every humidifying system should work 100 % perfectly.

The maintenance period of humidifiers depends on the dust content of the air (as well as on the pre-filter system), on the quality of the fresh water and on the humidifying system. These intervals should be shortened for harsher environments.

For more information about the maintenance period look into the current VDI 6022.

Maintenance Steam Humidifier	Periodically	If necessary	Hygienic-inspection
Check the hygiene condition	x		x
Visual inspection of the electrical and mechanical connections and attachments	x		
Remove lime deposits in the steam cylinder, water drainage hose and in the blow down pump	x		
Examine electrodes in the steam cylinder for burnout	x		
Examine hose connections for leak tightness	x		
Clean and remove lime from demister and tanks	x		
Clean the siphon on the condensate tank and refill.	x		

Maintenance Spray Humidifier	Periodically *)	If necessary	Hygienic-inspection
Check the hygiene condition	x		x
Check the microbial count of the re-circulating water and compare with the permitted values (see manufacturer's guidelines)	2W		x
Empty the humidifier tanks and clean with water (also can be undertaken by automatic hygiene control)	1W		
Examine the inner surfaces for biofilm and clean and disinfect if necessary	2W		x
Examine for lime scale	2W		x
If lime scale is found, lime scale remover should be mixed into the water (see manufacturer's guidelines) and operate the re-circulation pump, until lime is removed. Afterwards flush the humidifier through with fresh water and neutralise it. Clean the suction strainer.		x	
Clean pump suction strainer with fresh water	x		
Check the float valve	x		
Dismantle and clean humidifying nozzles and if necessary remove lime	x		
Clean and refill siphon	x		
Clean and remove lime from the demister unit, tanks and flow meter	x		

*) explenations tot he abbreviation:
1W = weekly
2W = every second week
X = every three months, as with the other components
The water and/or designated cleaning materials should have a neutral pH value (6 - 8). To remove lime only use the cleaning materials recommended by the manufacturers.

Maintenance Spray Humidifier	Periodically *)	If necessary	Hygienic-inspection
Check the hygiene condition	x		x
Check the microbial count in the water and compare with the permitted values (see manufacturer's guidelines)	2W		x
Check the inner surfaces for biofilm and clean and disinfect if necessary	2W		x
Examine for lime scale	2W		x
Clean the humidifier module in the re-circulation process, remove lime and disinfect it. (Use the cleaning material as per the manufacturer's guidelines.)	x		
Where there are heavy lime scale deposits, exchange the humidifier cassettes.		x	
Clean the holes of the header		x	
Check the desalination rate	x		
Check if the contact surface of the honeycomb humidifier is uniformly wet on both sides.	x		
Clean pump filter with fresh water	x		
Check the float valve	x		
Check the drainage and if necessary clean the drainage line. Clean the siphon and refill it.	x		
Examine hose connections for leak tightness	x		
Clean and remove lime from demister unit and tanks	x		

*) explenations tot he abbreviation:
1W = weekly
2W = every second week
X = every three months, as with the other components
The water and/or designated cleaning materials should have a neutral pH value (6 - 8). To remove lime only use the cleaning materials recommended by the manufacturers.

8.13. DiBe – Therm Burner (direct heated register)

Caution

General appliance description

The Rosenberg air-handling units of the series DiBeTherm are direct-heated operational units, which are powered by gas or oil heaters.

The DiBe Therm combustion chamber consists of chrome-alloy, high-heat resistant, stainless steel. The tube bundle heat exchanger is made out of stainless steel with flue gas pipes. The combustion chamber - heat exchanger unit works in a 3 – step system. The combustion chamber and heat exchangers are bolted over a flange connection. The complete unit can be divided into two parts without difficulty. Installation in tight areas, as well as possible exchanges or partial renewals can be resolved in a problem-free and timesaving manner.
For special applications of the air handling units within the range of process engineering or direct heated supply air- handling units, the heat exchanger is supplied with condensate drainage connectors manufactured out of high-grade stainless steel.

It is absolutely necessary to attend the operating and maintenance manual of the producer. The operating and maintenance instructions of the manufacturer must be observed, this has in deviations from the Rosenberg BWA priority.

Safety instructions

Attention must be paid to the respective local building and fire safety regulations.

The air handling units...

- must only be operated by technical personnel, who have been instructed in the operation of the air handling units.
- must be installed and operated in such a way that employees are not endangered by radiant heat and that no fires can occur.
- must only be installed and operated in rooms, when a sufficient quantity of air for combustion can be fed in to them. If this cannot be guaranteed, a separate fresh air intake for the burner from the outside air supply must be installed.
- may only be installed on an non-flammable surface.
- are only allowed to be fastened to load-carrying constructions or surfaces made out of non-flammable building materials with a sufficient load-carrying capacity. The installation should be carried out with materials suited for the purpose.
- may not be installed and operated in areas where a danger of fire and explosion exists.

- have to be installed outside of areas where traffic and material handling equipment, as well as cranes are in use.
- require a safety zone of a distance of a metre.
- must not be exposed to direct jets of water.
- are not suitable for the heating of dwellings or any such similar building.
- the inlet protection grilles must always be free of dirt and of loose matter.
- the burner chamber must be kept free of foreign bodies.
- protect all electrical cables outside of the air handling units from damage (e.g. by animals etc..).
- during maintenance or repair work, the air-handling unit should be cut off from the electricity network (unscrew fuses and/or switch off the mains switch (not supplied by manufacturer)). It is not sufficient to switch the air-handling unit off by the unit's operating switch!

Installation Advise

The Federal State Building and Fire Plant Regulations (Feu-Vo) of each Federal State should be adhered to when installing the appliance. The regulations for the application of the Federal Emission Control law (BimSchG) and the ENEG legislation must also be considered.

Only prototype-tested oil burner of a WLE-design or gas burner have to be used. In the case of air handling units supplied by manufacturer that include oil or gas burners, separate manufacturer's operating instructions for the burner must be followed.

In particular the official Installation Guidelines for Air Heaters, the General Valid Safety Installation Requirements regarding Installation and Operation should be considered in accordance with DIN 4794 Part 5. The fuel supply should be connected in accordance with DIN 4755 and DIN 4756, the TRGI of the DVGW (Sheet G 600), and the VDE-regulations.

DiBe Therm air-handling units need an authorization and have to announced.

Choice of the installation place

When deciding upon the installation place, the following requirements should be taken into account:

- fire protection and operational danger.
- function (e.g. room heating, free-blowing or duct system, negative and/or positive pressure in the installation area).
- operational points (heat requirement, nominal volumetric air flow, circulating or outside air requirements, air humidity, ambient temperature, air distribution, space requirement).
- connection to the stack.
- assembly, repair and maintenance accessibility.
- sufficient supply of combustion air.

Air handling units with a nominal heat output up to 50 KW can be installed outside of boiler rooms, however this must be done in accordance with the Fire Guidance (Feu-Vo) rules in Germany or the relevant regulations in other countries.

Air handling units with a nominal heat output over 50kW should be installed in boiler rooms. This does not apply to air handling units, which must be set up to their determination in areas other than boiler rooms or in factory areas. The Survey "Guidelines for the installation of furnaces with a total nominal heat output of more than 50 KW in areas other than boiler rooms" should be followed. These guidelines forbid the establishment of furnaces near areas of hazardous working materials as per the Working Material Regulations.

Installation

During installation the safety instructions of Chapter 8.13 should be considered. In addition the air-handling units must be installed and assembled for easy access, so that repair and maintenance work are possible. Air handling units in areas other than boiler rooms must be installed in such a way that constant observation is possible. The air-handling units must not be installed and operated in rooms and areas with a risk of fire or explosion.

Combustion air intake

The air-handling units must only be installed and operated, if a sufficient air supply is guaranteed for combustion and the exhaust gases are released into the atmosphere by an exhaust gas outlet.

A natural air supply for the combustion is assumed, e.g. if the room content in m^3 corresponds to at least 10 times the nominal heat load in kW of all heaters operating in this room and a natural air change is guaranteed through windows and doors.

A good, natural ventilation and exhaust is assumed, if e.g.

a) the room content in m^3 corresponds to at least 30 times the nominal heat load in kW of all heaters operating in this room and a natural air change through windows and doors is guaranteed
or:
b) non-locking openings for supply and exhaust air exist near the ceiling and the floor, whose size in m^2 corresponds to at least 0.003 times the nominal heat load in kW of all heaters operating in this room.

The combustion air should be free of any pollutants. Should production-conditioned pollutants appear, (e.g. chlorides, CKW, FCKW etc.) which are able to reach the installation place of the DiBe Therm, then the combustion air for the burner must take in air from the outside and a burner lining (air handling unit accessory) must be used.

Sufficient supply of the combustion air is guaranteed when taking air in from:

- Installation room, if this is sufficient for the building requirements of the relationship of room content to total - nominal thermal output (4 m^3/kW).
- Installation room, if this is heated by the incoming external air or mixed air from the appliance operating with a guaranteed outside air rate. A certain space-performance relationship does not need to be observed here.

- Installation room, with non-locking openings to the external air, corresponding to the building requirements for boiler rooms.
- From outside by a continuous line of a sufficient cross-section attached to the burner or its lining. This available suction power of the burner and the line resistance (including the inlet protection grille) must be matched, so that a perfect combustion is guaranteed.

Removal of the combustion gases

The air-handling units must usually be connected to their own chimneys. The design of the chimneys must comply with DIN 18160 Part 1, which corresponds to Chimney Dimensions DIN 4705 Part 1 and/or Part 2. For furnaces to function perfectly, they should be placed near the roof ridges and be taller than these by at least 0.5 m. If impact pressures occur e.g. from down winds or from neighbouring buildings then calculation of the chimney head must be carried out.

The exhaust connection must definitely take place at permitted chimneys.

The chimneys can be made of metal or brick.

The standard DIN 1298 applies for the exhaust pipe connection pieces between the air handling unit and the chimney. Here the length of the connection pieces should not exceed 2

Fuel supply

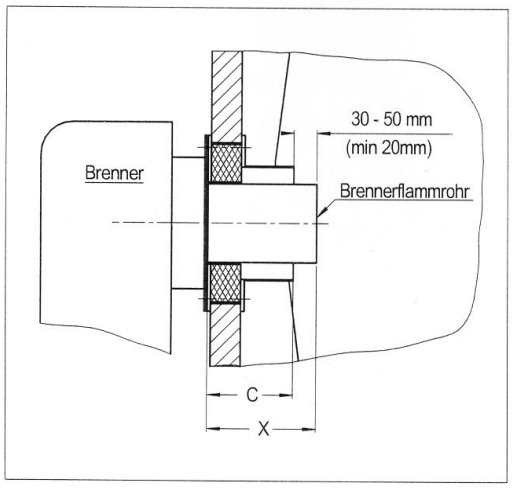
The fuel supply installation is regulated by DIN 4755 for oil-powered WLE, DIN 4756 and/or the DVGW Technical Sheet G 600 for gas-powered WLE and the TRF for liquid petroleum gas.

Burner assembly

The warm air generator must only be operated with oil forced-air burners according to DIN 4787 or gas forced-air burners according to DIN 4788 with natural gas or liquid petroleum gas. The burner has to be equipped according to DIN 4794 Sheet 2 with an automatic firing system, which is permitted for warm air production. The burner supplied by manufacturer (equipment) is assembled at the air handling unit's front with four flange screws. The operating instructions for the burner, which are supplied with it, should be consulted in any case. The assembly of burners made by other manufacturers should be done in accordance with the respective manufacturer's instructions. The combustion chamber must not be over or under-loaded.
Do not lower exhaust gas temperatures below 160 Kelvin above room temperature (condensation build-up). Two-stage burners must be operated to avoid condensation build-up only during the start-up process in the partial load range.
The fuel throughput must correspond with the thermal output in accordance with the requirement. Adjust the burner in such a way, that a regular combustion chamber load is reached. The flame tops may not hit the back wall. The recommended nozzle angle with oil burners is 60°C.

The length of the flame pipe "X" has to reach at least the dimension "C" in the table shown below. It is recommended, that the flame pipe enter from a height of 30 to 50 mm into the combustion chamber. If necessary, a flame pipe extension must be used.

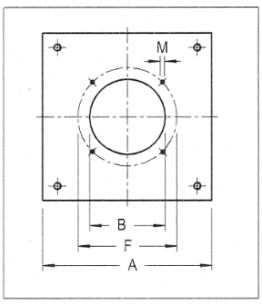
Appliance type	DiBe-Therm 25 – 105	DiBe-Therm 130 – 3400	DiBe-Therm 430 - 660
C = minimal	130 mm	150 mm	210 mm



Burner plate

The holes for the burner fitting are centrally arranged in the burner plate and pre-drilled in accordance with the following table. Other sizes for diameters B and F are only available as special orders.

Dimensions in mm C = minimal	Appliance Type DiBe-Therm 25 – 105	DiBe-Therm 130 – 340	DiBe-Therm 430 – 660
A	250	290	330
B ∅	130	130	160
F ∅	150 + 170	150 + 170	226
M	M8	M8	M10



Electrical connection of burners

ROSENBERG DiBe Therm air handling units are so designed, that each tested burner brand can normally be used. The 230 V AC electrical connection, supplied by manufacturer with the burner, is made by a rapid assembly 7-pin plug connection, which is fixed onto the air-handling unit. Hard wiring takes place starting from burner designs of 400 V.
In the case of gas or oil burners supplied by other parties, each burner has an attached 7-pin connector with 230 V and with 400 V to be installed in accordance with attached wring diagram.
For burners installed by others specify, whether it is equipped with a 230 V AC or or 400 V three-phase motor and send a valid wiring diagram, for the incorporation of the terminal marking into the equipment wiring diagram.

Fuel oil connection

A sufficient fuel supply must be guaranteed. The installation of the fuel oil supply is to be undertaken by authorized technical personnel in accordance with DIN 4755 for Oil-heated Warm Air Generators. In particular, ensure that the cross section of a line being laid out takes into consideration the complete line resistance, the suction height and the increased viscosity at lower temperatures. If required an oil producing aggregate must be used. The suction line is provided with a foot valve in the tank bottom.

Attention

Also with low external temperatures free-flowing fuel oil must be available in sufficient quantities. Paraffin formation can begin at 5°C. To avoid this, appropriate measures should be taken.

Gas connection

The necessary amount of gas and gas pressure, corresponding to the power of the appliance, must constantly be made available during the appliance's operation.
The installation of the gas connection must be carried out by authorized technical personnel in accordance with DIN 4756 and/or the DVGW Sheet G 600 for gas-heated warm air generators, as well as the TRF for LPG.

Gas pressure controllers, stopcocks and TAS (thermal shut-off protection) should be provided in principle by others.
The cross section of a line is laid out to the air-handling unit connection value and to the entire line resistance, as well as to the height of the gas form. Before the initial start-up the gas supply line must be cleaned thoroughly and be examined for air-tightness in accordance with the standard.

Three phase combination controller according to DIN 3440

The controller has 3 functions:

TR - Fan controller controls the switching on/off of the circulating air fan

TW - Temperature monitor for the burner; controls the switching on/off of the forced-air burner

STB - Safety temperature limit switch takes on the control function of the temperature monitor.

Fan controller (TR)

The switching point is adjusted via the fan-operating handle (setpoint approx. 45°C).

Temperature monitor for the burner (TW)

The switching point is adjusted via the burner's operating handle (set point approx. 75°C).

Safety temperature limit switch (STB)

The switching point is adjusted in accordance with DIN3440. A re-start lock prevents, after release, a re-start of the burner.
Before any reset, the operating conditions of the air handling unit must be checked, so that a repeated excess of the STB temperature is avoided.

Attention: The safety facilities in the air handling unit may be either bypassed or locked!

Chimneys

The air-handling units generally have to be connected to chimneys.
Every furnace has to have its own chimney.

The building of chimneys should be co-ordinated with the relevant authorities. When designing and building chimneys, the following should be taken into account:

- The respective Fire Plant Regulations (FeuVo)
- respective Federal State Building Regulations
- DIN 18160 Part 1, Domestic Chimneys
- DIN 4705 Parts 1 and 2, Chimney Dimensions
- DIN 1056, Solid Chimneys
- Technical Rules for Gas Installation DVGW-TRGI 1986

The chimney dimensions must be suited to the unit's power.
The effective chimney height must be at least 4 m.
The unit's connection must be air tight and secured against unintentional release (rivets or screw).
The shortest possible horizontal exhaust system should preferably be provided, (upward gradient 2% equivalent 2 cm per m).
The double-walled stainless steel chimney systems are certified by the Institute for Civil Engineering General Survey according to DIN 18160, Part 1. Steel sheet chimneys with lower height requirements must be approved in Germany by the local authorities.

The chimney installation and/or assembly must be carried out professionally according to the valid Regulations.

General Start-up Advice

Please note safety advice in Chapter 1 and general start-up advice in Chapter 6.

According to DIN 4794 Sheet 5, the manufacturer or another expert should carry out the initial start-up of a combustion chamber and/or the installation there of.
Oil or gas burners can be installed. The burner must be assembled according to the respective manufacturer's datasheet. Afterwards the connection of the burner at the oil and/or gas line is made. On connection, the manufacturer's operating manual should be followed exactly.

ATTENTION:

The direct-fired register must be equipped with its own emergency switch.
Heating-EMERGENCY-OFF

Connection of the flue:
The connection of the direct-fired register to the flue must correspond to the structural and official regulations.

Initial Startup

- Air out the oil and/or gas pipe.
- Check housings for damages. Tighten any possible loose connections.
- Examine the settings of the triple thermostat:
  Burner: approx. 75 °C
  Fan: approx. 45 °C
- Position of the sensor approx. 10 cm in the airflow towards the combustion chamber. Single thermostats must be adjusted to 60°C.
- Put fan into operation (see Chapter 10.2.).
- Put burner into service.
- Consider the manufacturer's guidelines. The fan must always run when the burner is in operation. The fuel supply is to be adjusted, so that that the rated output of the DiBe Therm register is not exceeded. For gas burners, a gas meter must be used. The flame must not touch the combustion chamber walls.

Checks on initial startup

1. With the triple thermostat:

- set handle on “auto”. Adjust room thermostat higher than room temperature
- start burner
- heat up the combustion chamber
- at 40 °C (= fan setting value) the fan must be connected
- at 70 °C (=burner setting value) the burner must switch off. This state is caused by the fact that the airflow temporarily becomes throttled.
- after falling below the above mentioned setpoints the burner must restart and the fan switch off again.
- Heat the burner chamber again without the fan in operation. The burner must switch off at 100 °C and the combination automatic controllers must lock. If that should not happen, then stop equipment with the emergency stop, exchange the thermostat and re-examine.

2. Single thermostat (if available): Same examination procedure as with the triple thermostat. Here however the second burner stage must switch off at 60 °C (= burner setting value).

3. Ambient temperature must be adjusted to the setpoint.

4. Determination of the exhaust gas value. Pay attention to DIN 4794 and newest version of the BimSchV. All settings are to be logged and kept.

Additional initial start-up work for DiBe Therm with Bypass:

1. Examine the bypass valve. See Chapter 10.1 "Louvred Valves"

2. Examine room /duct sensors:

- Adjust setpoint of the sensor to the minimum value (simulation of a large instantaneous value. The bypass valve must open and the burner valve close
- Adjust the setpoint of the sensor to the maximum value (simulation of a small instantaneous value.) The bypass valve must close and the burner valve open

3. If necessary, check the rotational direction of the actuator.

Operation

The control of the DiBe Therm register is a fully automated process via the controller of the air-handling unit.

The controller must be programmed in such a way, so that first the fan and then the DiBe Therm register run.

The unit may only be switched off by the controller. For manual disconnection a fan tracking of approx. 5 minutes should be guaranteed.

During operation, a regular monitoring of the register should be undertaken by visual inspection of the firing equipment and the safety fittings.

When releasing the STB the unit should be kept out of operation for a long time, until it is completely cooled down. Before manually unlatching the STB, the unit should be examined for errors and/or defects. On repeated releasing of the STB a thorough examination of the unit is necessary and should be documented by technical personnel.

Maintenance and Cleaning

The housing, in which the DiBe Therm register is enclosed, requires maintenance and cleaning in accordance with Chapter 7.3.

Any existing bypass valves should be maintained in accordance with Chapter 8.1.

Maintenance	Periodically *)	If necessary	Hygienic-inspection
Combustion chamber Dismantle burner, examine combustion chamber with strong source of light for contamination and damage.	x		x
If damaged, the manufacturer should be informed immediately. The combustion chamber may not be put into operation until repaired.	x		x
Clean the combustion chamber after cleaning the outlet side heating surfaces.	x		X

Outlet side heat surface Dismantle the revision panel and cleaning cover of the combustion chamber. Take off installed pipes and examine for soundness. Replace badly corroded pipes with new ones.	x		
Clean all pipes at the outlet side heating surfaces with suitable wire brush as above.		x	
Burner After disconnection, cleaning and maintenance of the combustion chamber burner is to be carried out in accordance with the manufacturer's documentation	x		
Examine exhaust gas in accordance with BimSchV	x		
All work and measured values are to be documented	x		

*) Maintenance:

- operation 8 to 12 hours daily:
  at least once a year
- operation 12 to 18 hours daily:
  at least twice a year
- sustainable operation:
  at least three times a year

The water and/or assigned cleaning agents should have a neutral pH value (6 - 8).

8.14. Special Instructions for using the fan motor crane

General Information and regulations

Danger to life!
The presence of persons be prohibited under suspended loads!

Before commissioning of the crane all the screws of the slide rail must be checked for tightness.

Pos. A ceiling sockets
Pos. B securing end stop
Pos. C securing running rail
Pos. D mounting end stop

If the running rail during operation of the fan causes noise by swinging, it is possible to secure the rail on each ceiling with an M10 screw further.

The mountings, stops and the construction may not be modified.

The system may only be operated, maintained and repaired by qualified and authorized persons.

Maximum allowable weight must not be exceeded.

Only undamaged and approved slings and hoists must be used.
See also:
Maschinenrichtlinie 2006/42/EG, EN 1492-1, EN 1942-2, BetrSichV, DGUV

Operation

The lateral screws pos. C on the ceiling sockets are loosened and the rail to pull up to the stop of the air handling unit.

Then the screws have to be tightened again.

Never shake attached loads! Breaking loose and oblique pulling loads are prohibited.

A transport of people is prohibited.

Loads are to be lifted and lowered slowly.

Stay in the operating area of the running rail is prohibited especially when a load attached, danger of squeezing!

Rules of lifting accessories UVV BGR 500 for attaching loads have to be noted.

After using the crane, the crane trolley can be removed, disassemble the end stop (item D) and the securing of the end stop (item C) on the door side and assemble after removal of the trolley again.

Reason:
Avoid noise caused by loose crane trolley during the operation the air handling unit (vibration).

After using the fan-motor-crane the running rail is to be inserted, the locking screws (item C) must be tightened.

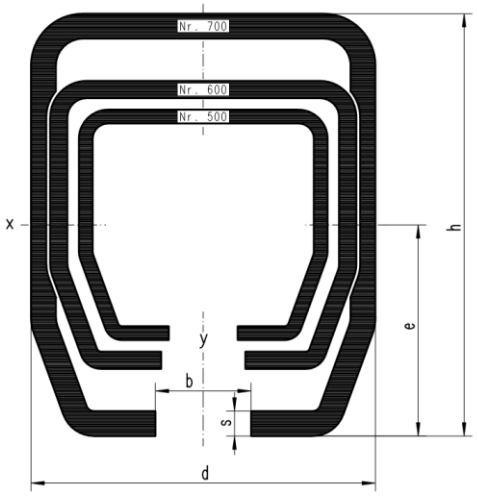
Maintenance and Cleaning

Running rail, rollers and fixing should be cleaned regularly to avoid corrosion damage and impairment of function.

The rollers and the swivel joint should be kept smooth by creepable maintenance oil.

Maximum lifting capacities

The maximum allowable loads are indicated on the crane or the running rail.



System	d mm	h mm	b mm	s mm	Max. load
Nr. 500	65	60	18	3,6	175 kg
Nr. 600	80	75	22	4,5	350 kg
Nr. 700	90	110	25	6,5	500 kg

The loads of the table correspond to the standard version. Higher loads are possible only after consultation with the technical department and strengthening methods on the construction. Higher loads have to be approved for the specific order/application.

9. Special notes for the weatherproof construction

The general instructions from chapter 5 „General Installation Instructions“ also apply. Additionally, for air handling units that are installed in an outside area, for ex. on flat roofs, some assembly work is necessary on site to protect the air handling units from the effects of the weather.

Air handling units cannot replace the protection a roof affords.

9.1. Special notes on transporting the modules

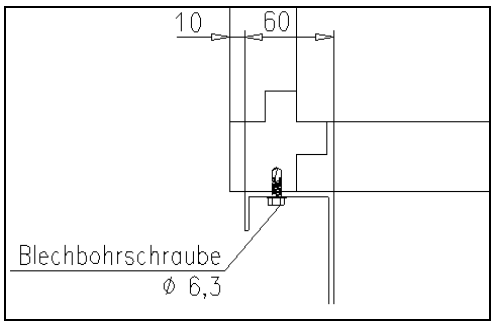
Welded base frames offer the possibility of using square pipes (100 x 60 mm) for transport. Squared metal base frames are outfitted with bore holes (50 mm) to insert round pipes. Also note chapter 4 on transporting.

9.2. Special instructions for installation of the modules

The modules are installed on a base made for the air handling unit and aligned and connected according to chapter 5.
Depending on condition at the time of delivery the following work needs to be performed:

For a loosely included or in advance delivered squared metal base frame:

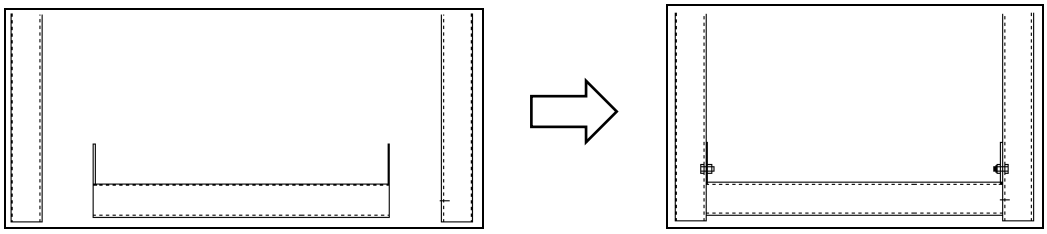
In this case, the modules of the air handling unit are aligned and connected to the previously assembled base. Afterwards the base frame is fastened to the air handling unit according to the drawing „Assembling metal base frame with module“.



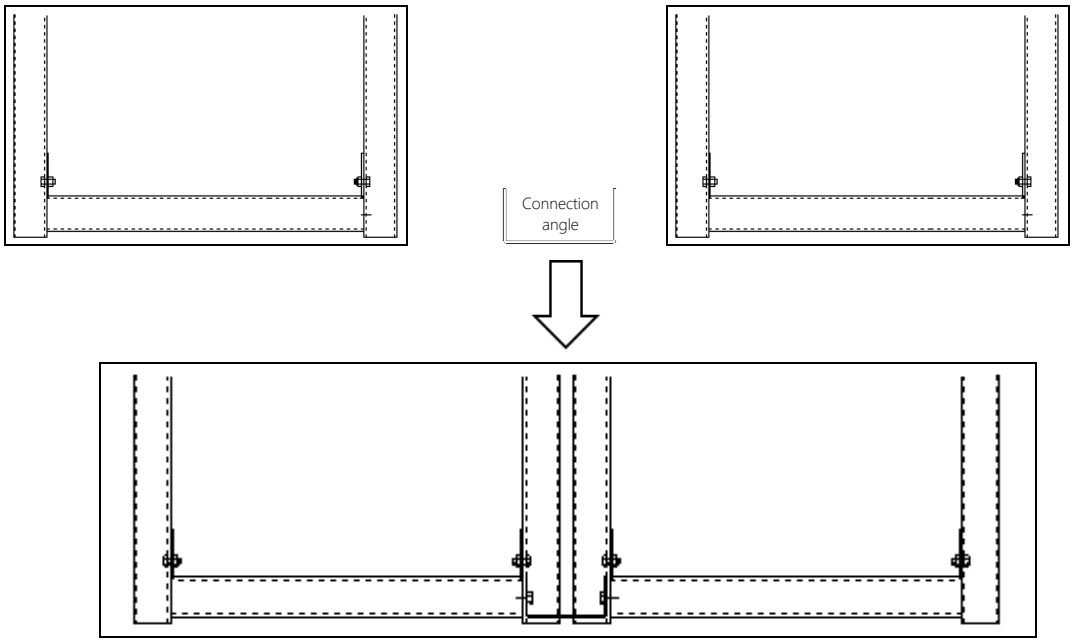
Assembling metal base frame with module

Metal base frame delivered unassembled

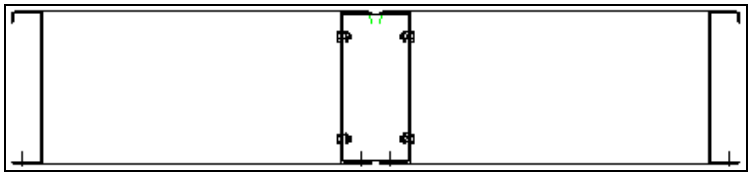
The following drawing shows the assembly of the base frame parts in the top view:



For units standing next to each other the fully assembled base frames are connected as follows:

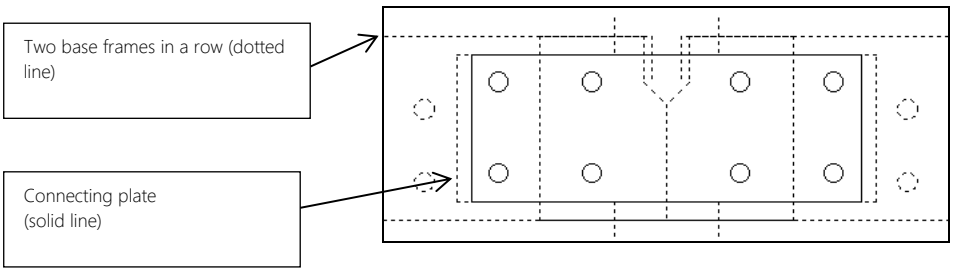


Top view



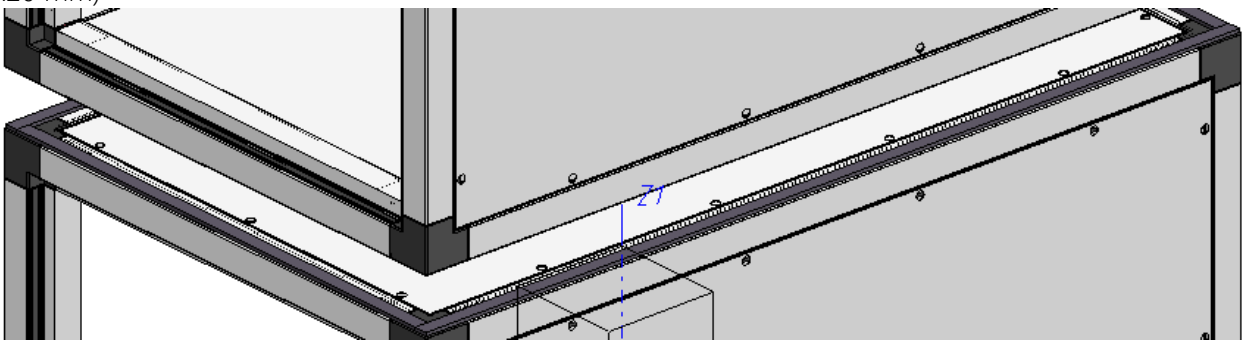
Front view

Connection of base frames in a row in direction of air flow through installation of a connecting plate on the side (side view):

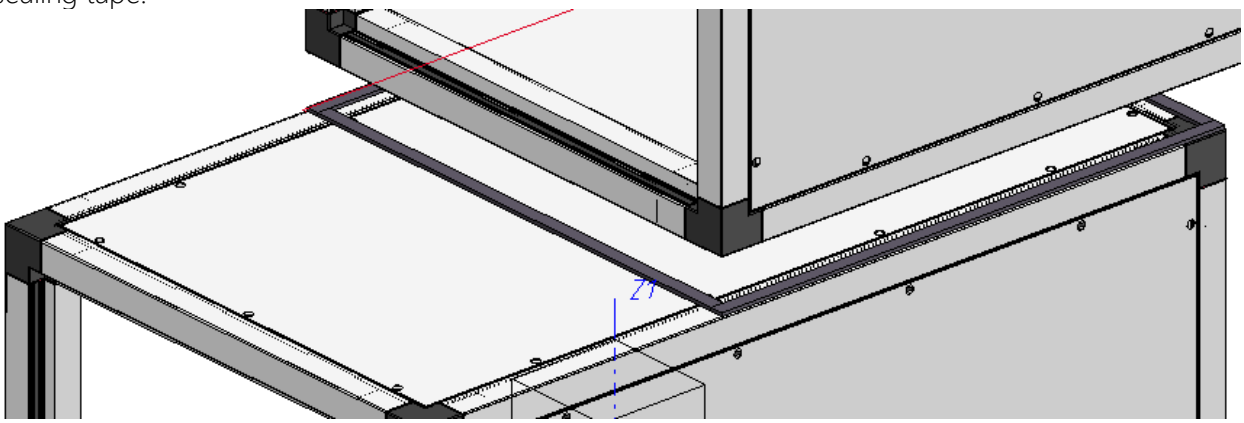


9.3. Sealing of Modules above each other

To weatherproof with superposed mounted modules additional sealing of these modules the water through capillary action between the modules is necessary to avoid leakage. Sealing is also required against an existing raised floor frame.
Given the lower modules are to glue on the top housing profiles peripherally with sealing tape. (5x20 mm)



Should an upper module even be shorter, the position of sealing tape for sticking on the bottom module must be determined and applied. The frame of the upper module must be placed on the sealing tape.



The connection of the modules takes place with rectangular plates 80x60mm, chapter 5.2.

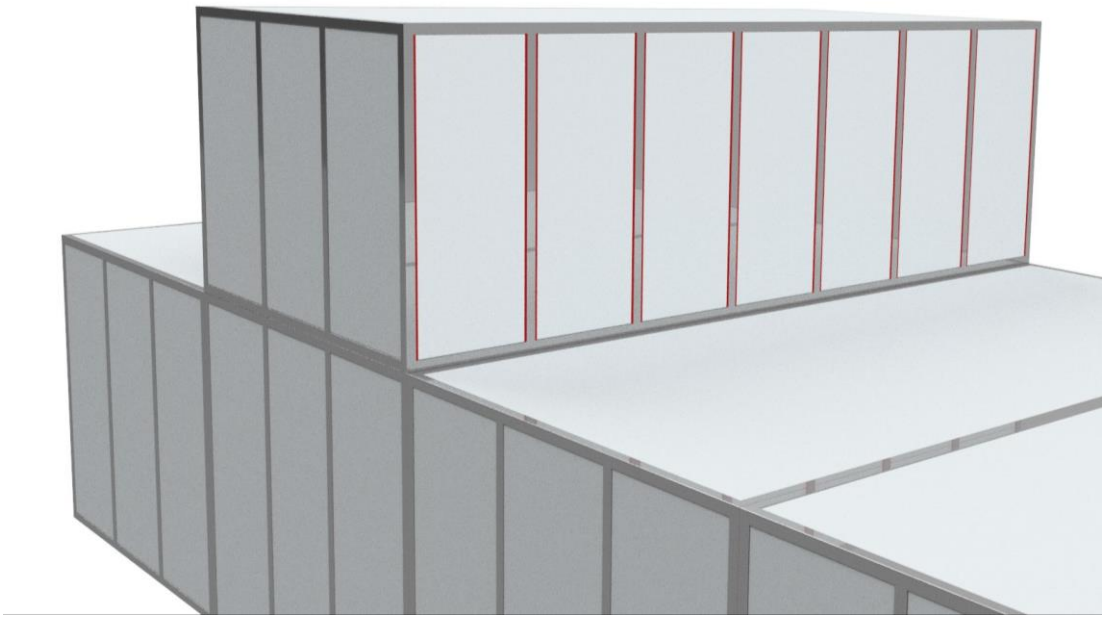
Openings of any kind which may allow the ingress of water between the modules should be closed.

9.4. Additional sealing measures for towering rotary heat exchanger moduls

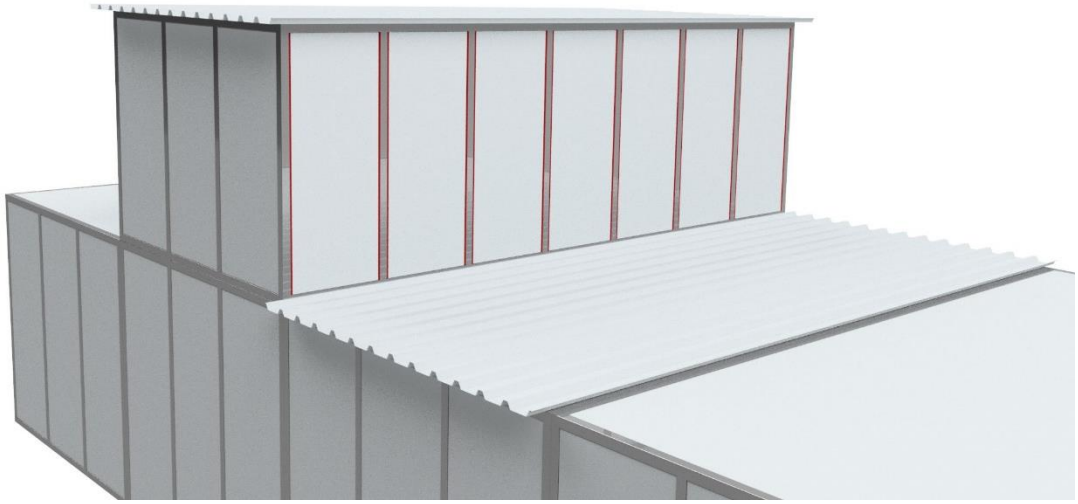
In the case of towering rotors, as it can occur in side-by-side units, these must be additionally sealed from the outside using a suitable duct sealant to prevent water ingress into the unit.

Procedure:

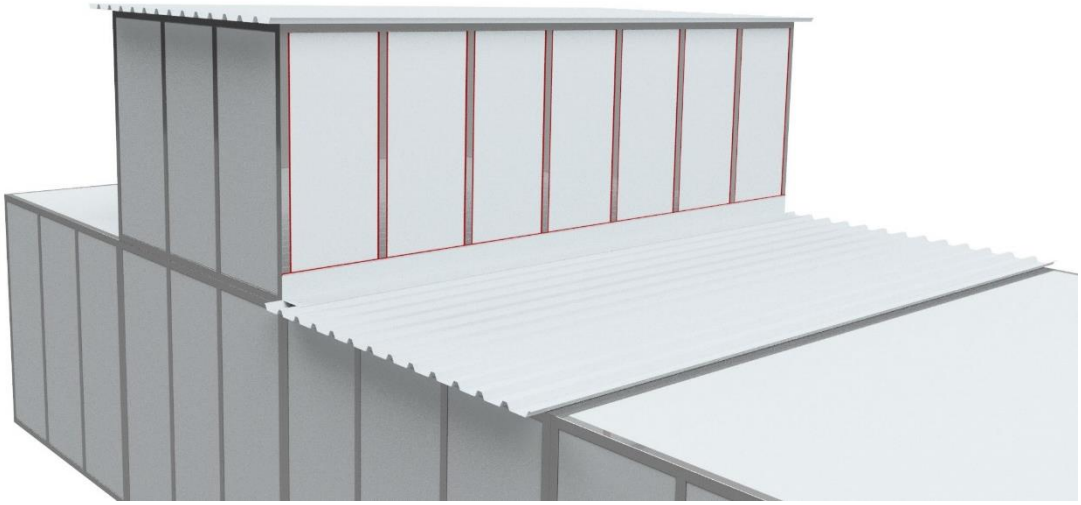
1. Seal vertical joints between panels and frame profile using duct sealant.



2. Installation of the rain cover (see following capital).



3. Installation of the wall connection plate and sealing of the horizontal connection of the wall connection plate with duct sealant.



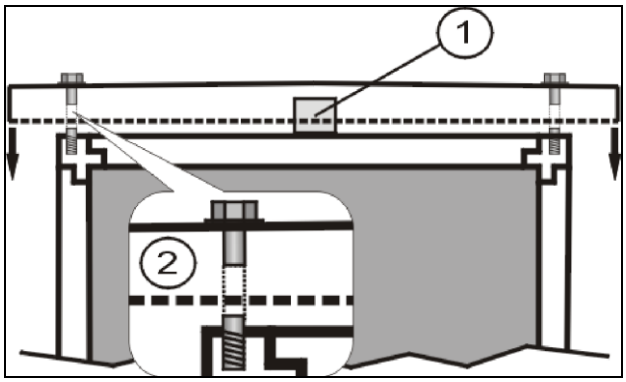
9.5. Installation of the rain cover

9.5.1. Standard roof

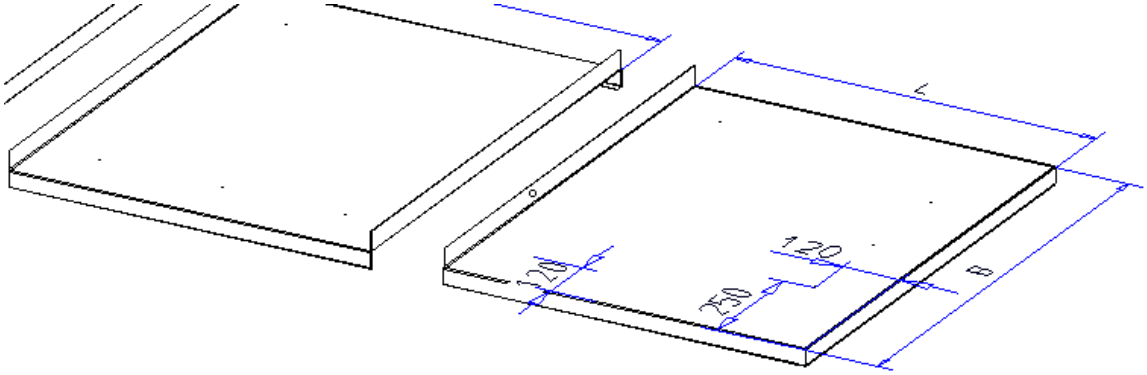
First, existing lifting brackets need to be removed and the bore holes sealed with a stopper.

Next a EPDM-strip (20 x 20 mm i.e. 20 x 30 mm) is applied in the middle on the longitudinal side of the air handling unit from the front to the back (Pos. 1 in the drawing below). This way, when installing the roof later, a small slope is created from the middle to the outside.

Then the roof components are aligned with the unit with an overhang of 100 mm all the way around and fastened with glands directly to the frame (Pos. 2). The positions of the screws are predefined through punch marks so that the rain cover can be screwed to the unit frame. Finally, the joints of the rain cover are taped with aluminum foil butyl tape which is fastened with screws or rivets (Pos. 3).

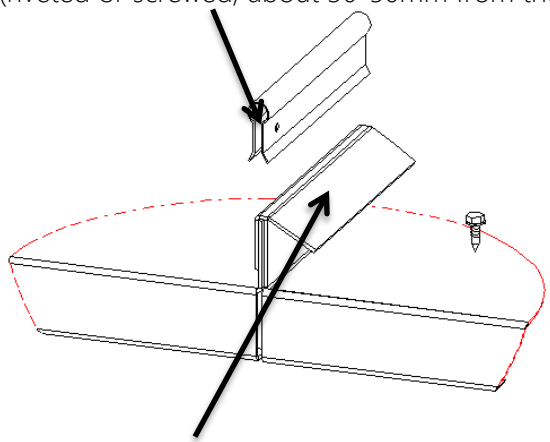


Roof assembly front view

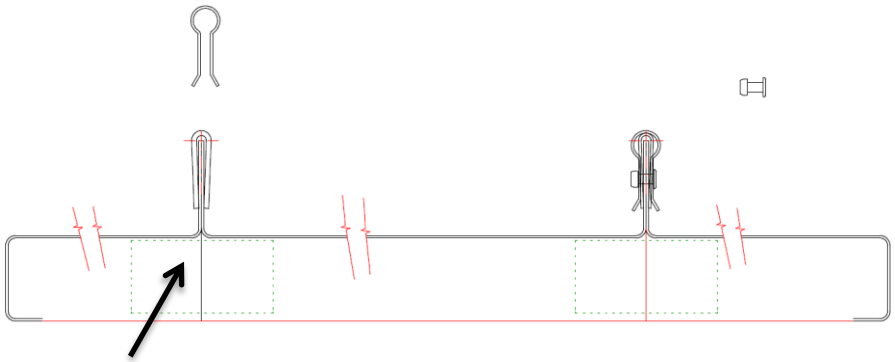


Position of the punch marks fort he screws to fix the roof

③ Stainless steel cover strip
(riveted or screwed, about 30-50mm from the outside at the ends, rivet 4x12)

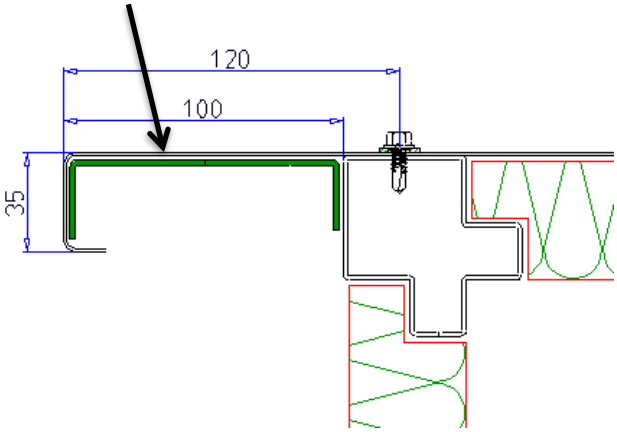


Aluminium foiled butyl tape



mask the abutting surface with alu-laminated butyl-belt and stick the inox-profile above, which is fixed by screws or rivet, approximately 30-50 mm from external edge

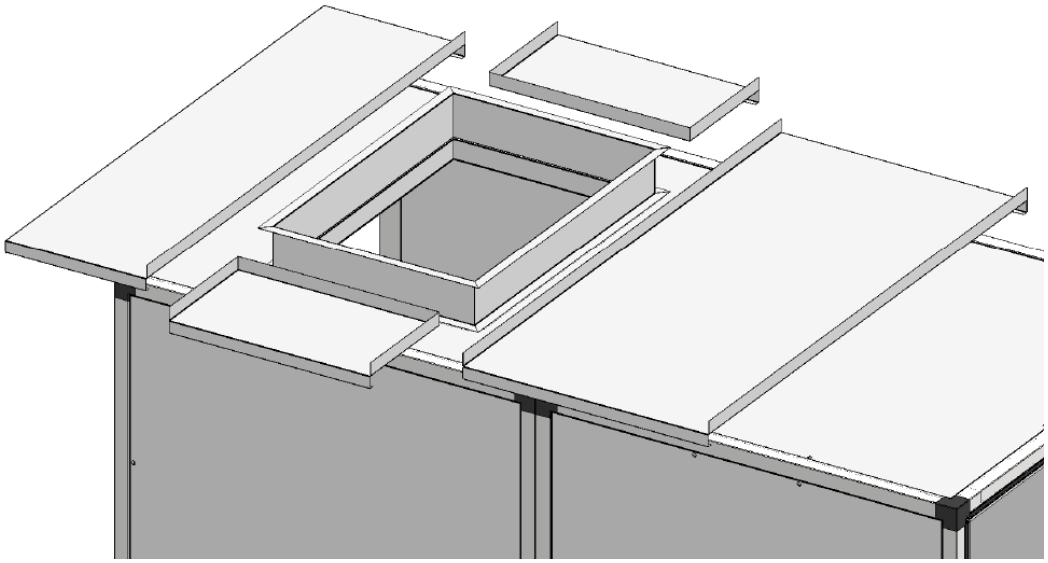
The joints are sealed from the bottom with aluminum foil butyl tape.

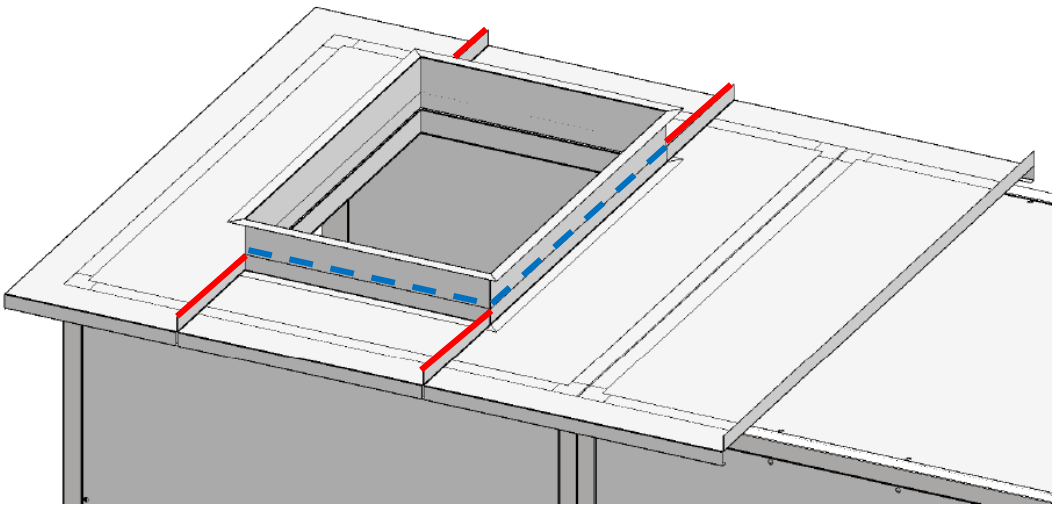


9.5.2. Attachment rain cover at vertical dust connectors

The parts of the rain cover are to set up to the duct connector, fixed with screws or rivets and to seal with the alu-laminated butyl-belt.

Mask the abutting surface with alu-laminated butyl-belt and stick the inox- profile above, which is fixed by screws or rivet (standard roof).





Butylband
Abdeckprofil

9.5.3. Trapezoidal roof

Note:

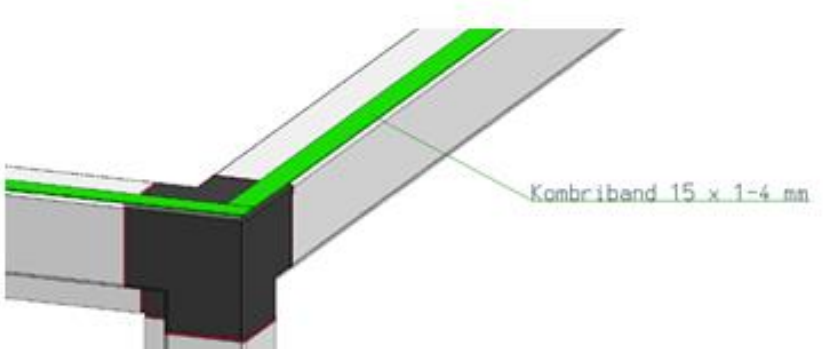
For each trapezoidal roof is a separate assembly instructions by the manufacturer of the delivery, as several options are possible, the execution of which is represented in it.

The trapezoidal roof is a special version of the rain roof. The following parts are required to build, variations in the accessories is possible to note the enclosed assembly instructions:

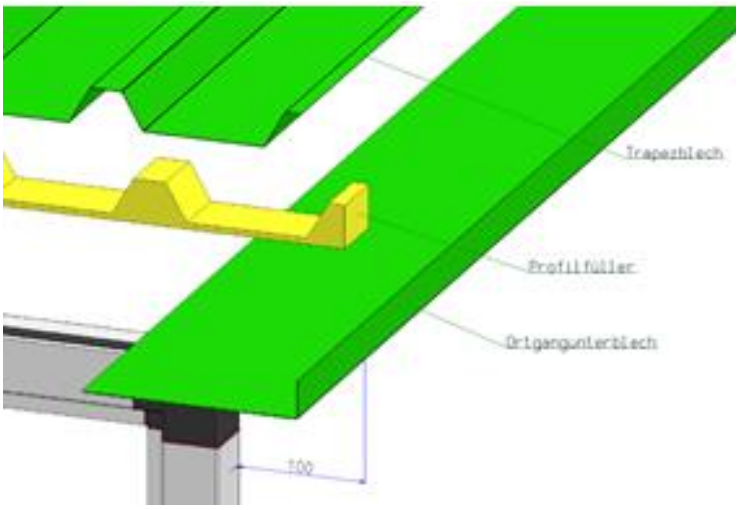
- trapezoidal sheet metal, barge flashing, barge under plate
- angle iron for systems with varying height, profile filler
- Blocoband 0,2 x 15 mm, putty butyl tape white
- formed screws 4,8 x 20 S14 RAL 7035, self-tapping screws 5,5 x 22 mm

When assembling the following steps need to be followed in order:

1. Lay the Blocoband under the barge under plate on the housing profile..

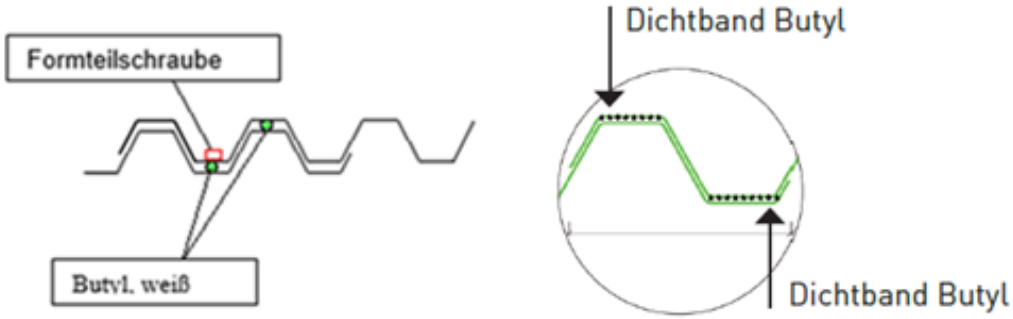


2. Mount the verge base plate with 100 mm projection on the unit end faces.
   The trapezoidal sheet metal panels are placed from the verge bottom plate.
   The trapezoidal sheets are placed at the housing depth (overhang approx. 100 mm).
   Place the profile filler between the housing frame profile and the trapezoidal sheet metal.

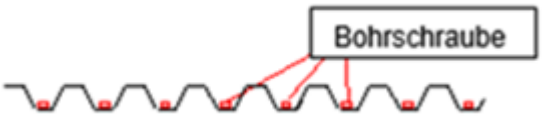


3. Lay down 2 putty butyl tape pieces between the 100 mm overlapping trapezoidal sheet metal plates.

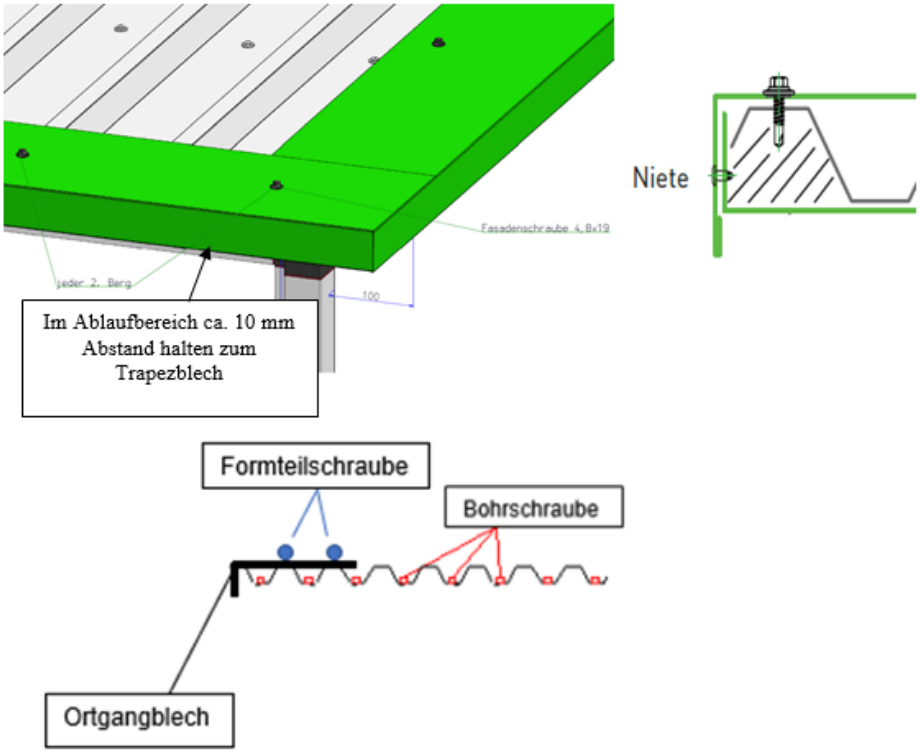
4. Connecting trapezoidal sheets to each other using shaped screws.



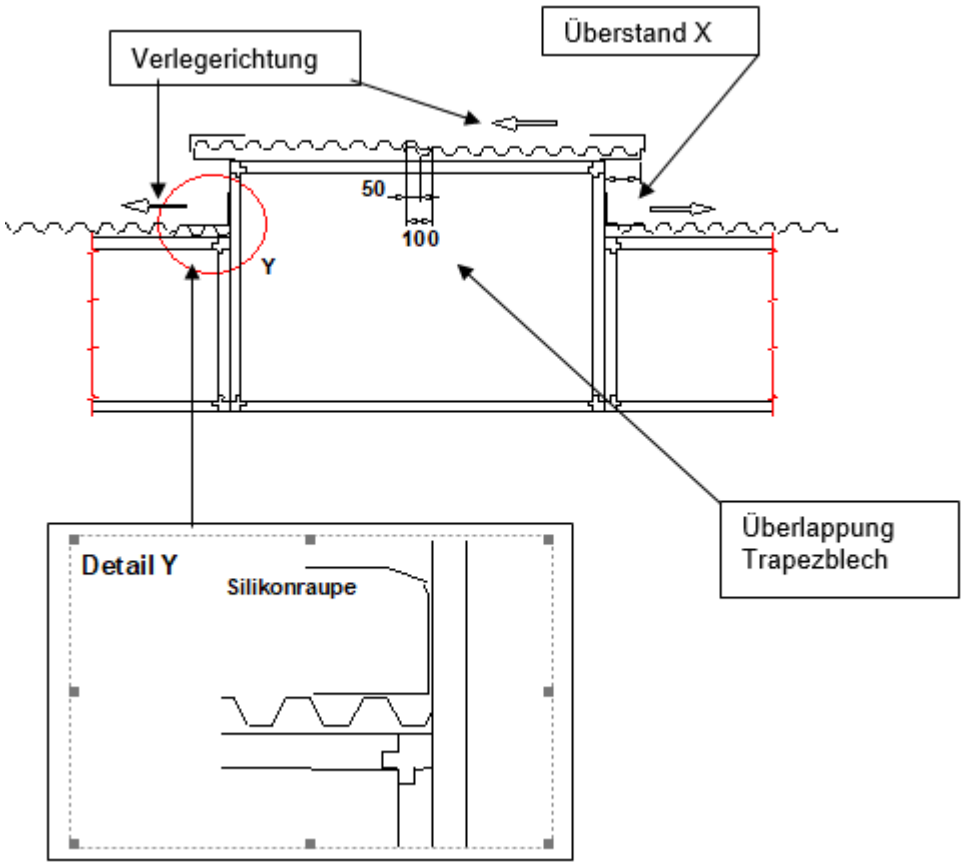
5. Screw the trapezoidal sheets to the housing frame profile all around using a self-tapping screw. (each lower bead)



6. Screw the verge plates to the upper bead of the trapezoidal sheet using a shaped screw. and rivet the end face to the verge bottom sheet.

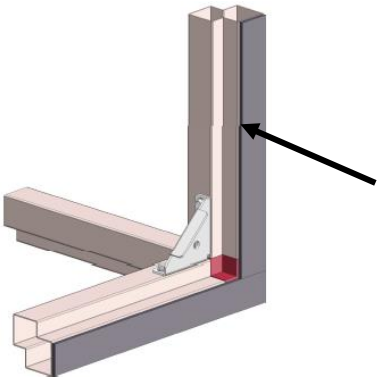

Niete
Fassadenschraube 4,8x19
jeder 2. Berg
100
Im Ablaufbereich ca. 10 mm Abstand halten zum Trapezblech
Formteilschraube
Bohrschraube
Ortgangblech

Units with varying height



10. Special instructions for hygienic devices

10.1. Series S60



1. Before setting up, pulling and pushing parts together, single sided sealing tape (40x5mm) needs to be applied to all joints.

   PE-sealing tape, alignment with the inner edge
   (self-adhesive, single sided).

2. Modules need to be flush mounted to each other. Horizontal or vertical offsets need to be avoided, if necessary use spacer plates for a flush and tight seal.

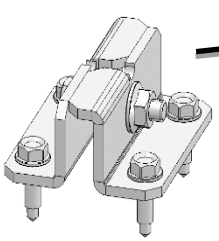
   Units of the S60 series are supplied with factory installed corner angles.
   Depending on the size of the housing, 2 types of corner angles can be installed:

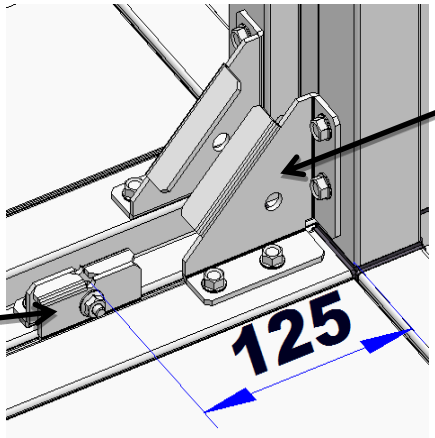
   - Side length approx. 80x80 mm (Type 1)
   - Side length approx. 150x150 mm (Type 2)

   These serve to stabilize the module during transport and installation. Before the modules are screwed together they need to be pressed tightly against each other, pressing of the sealant tape. With the help of the corner angles the modules can be fixed until final assembly of the module connectors.

3. The module connectors are to be installed starting at 125 mm from the corners for corner angle type 1 or at 175 mm from the corners for corner angle type 2 in height and depth. All others need to be distributed evenly.

Module connector with screw M6x25 with toothed washer + locking nut





Corner angle,
ex works for
stabilization of the
units
(have to be
uninstalled later)

Size	No. in Hight	No. in Depth	Size	No. in Hight	No. in Depth
0704,0707,0710,1007,1010	2	2	2020, 2220, 2222, 2522, 2525	4	4
1307,1310,1610	2	3	2825	4	5
1313,1316,1613,1616	3	3	2828	5	5
2010	2	4	3228, 3528	5	6
2016, 2013, 2213, 2216	3	4			

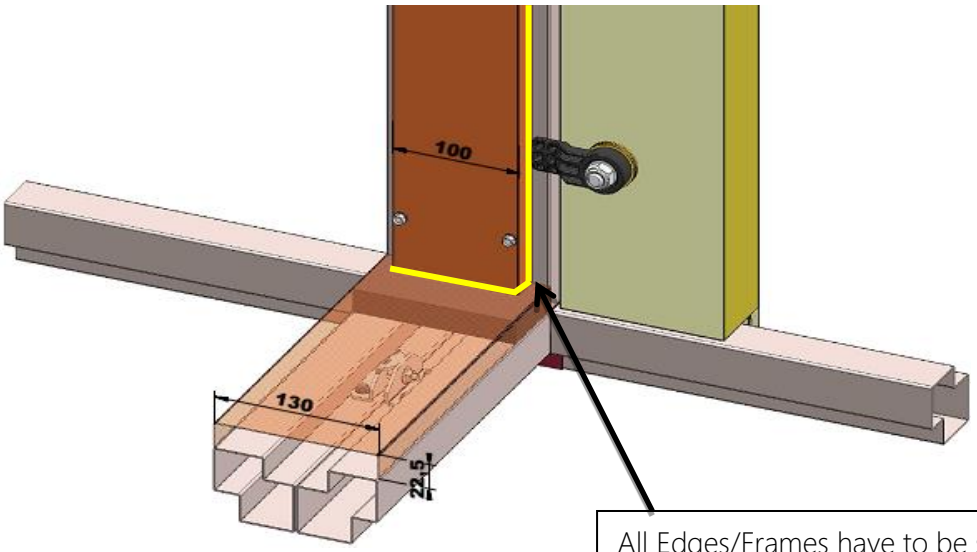
Table S60: Module connectors between the corners

4. The module connectors are fastened using self-tapping screws 4,8x19 mm, Torx-drive.

5. The last step is to insert and fasten the cover plates with screws 4,8x38mm, hexagon-drive for the module frames. These have insulation affixed to them on the inside at the factory.

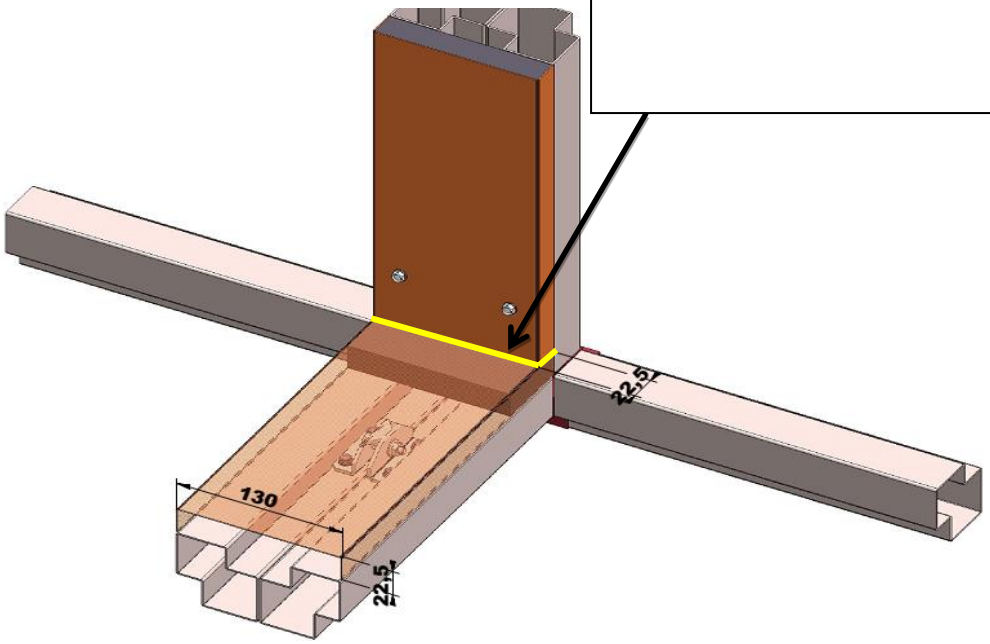
Various types of cover plates:

- Cover plates for floor and lid are approx. 45mm longer than for back wall and access wall
- Width of the cover of the access panel 100 mm
- Width of the cover for back wall cover, floor and lid 130 mm



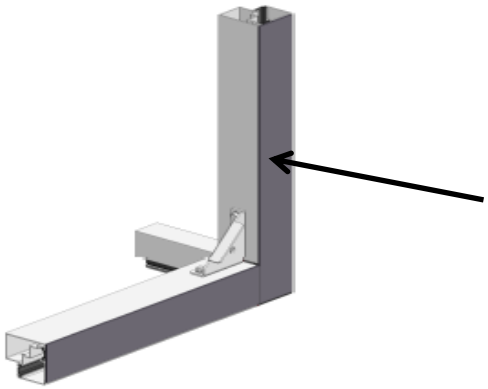
All Edges/Frames have to be sealed with sealant

Drawing of installed cover plates to access side



Drawing of installed cover plates to back wall

10.2. Series T60

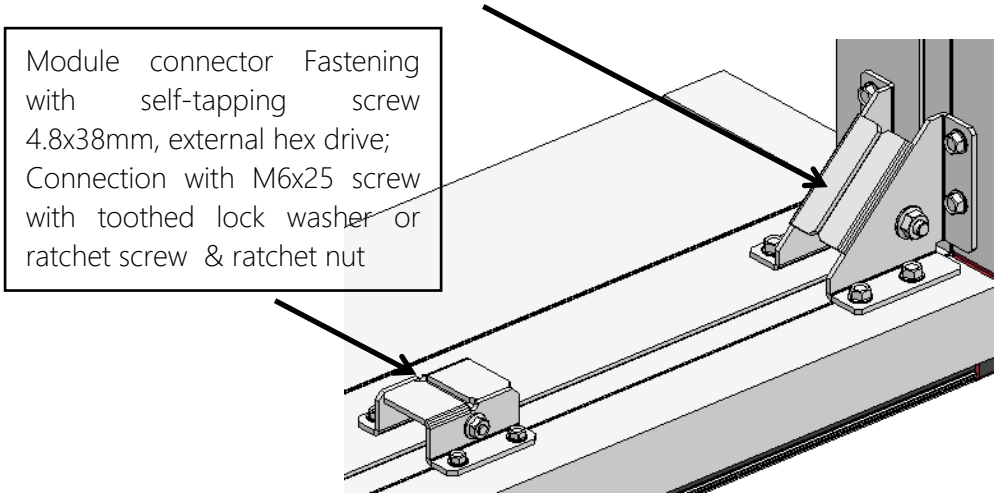


1. Before setting up, pulling and pushing parts together, single sided sealing tape (60x3mm) needs to be applied to all joints

   PE-sealing tape, alignment with the inner edge (self-adhesive, single sided)

2. Modules need to be flush mounted to each other. Horizontal or vertical offsets need to be avoided, if necessary use spacer plates for a flush and tight seal.

3. Units of the T60/C60 series are outfitted with corner angles as standard from the factory. With the help of bore holes in the corner angles the modules are fastened to each other.
   (screws M8x60with toothed washer + locking nut M8)

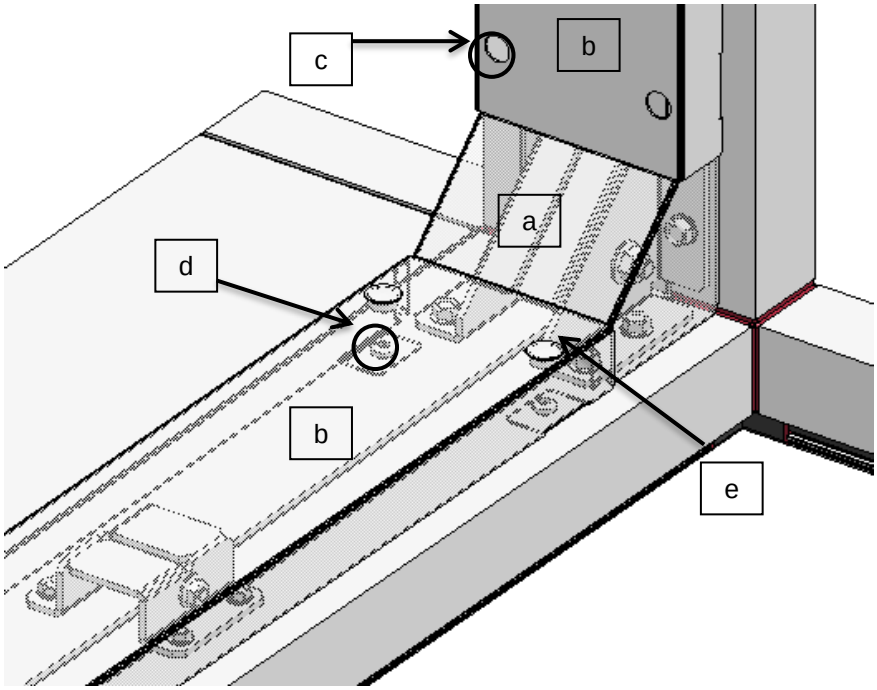


4. In the larger construction series additional connection angles at the frames of the floor and lid are used. This is to guarantee that on the face side of the module joints along the entire length of the unit the sealing tape has enough pressure acting on it for a tight seal. These are to be installed on site and in the appropriate quantities (see table) spaced evenly apart between the corners.

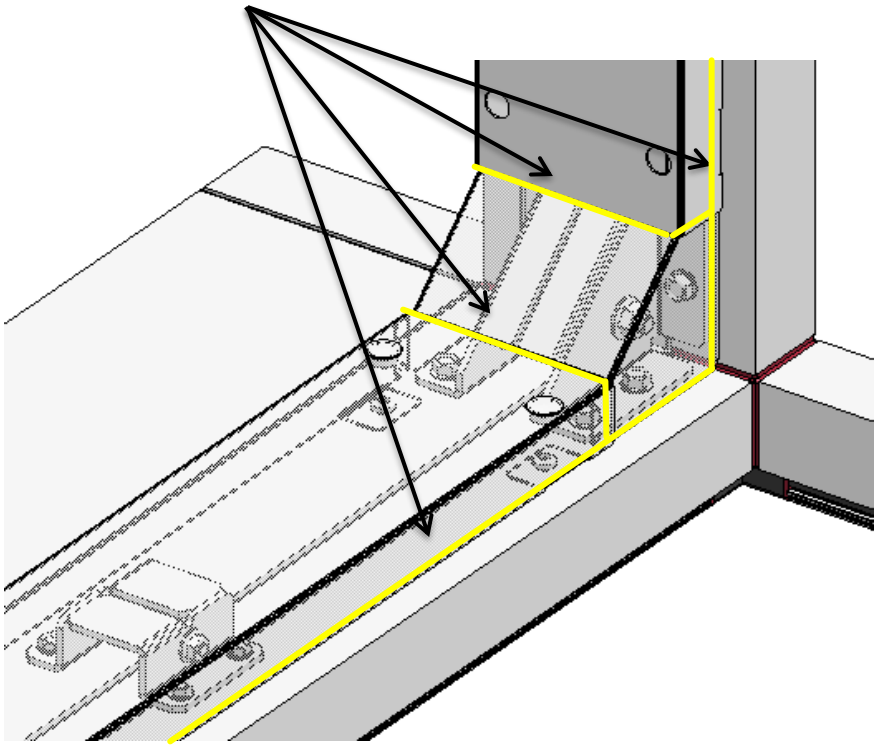
Size	No. in Hight	No. in Depth	Size	No. in Hight	No. in Depth
1310, 1307, 1610	0	1	2020 – 2525	2	2
1313 - 1616	1	1	2825	2	3
2010	0	2	2825	3	3
2013, 2213, 2216	1	2	3228, 3528	3	4
2016	1	2			

Table T60: Module connectors between the corners

5. Next the corner angles and module connectors are covered
   - Put the cover over the corner angles (a)
   - Put the long frame covers between the corner angle covers all the way around (b)
   - Fasten the cover plates through the bore holes (c) with the
   - shackles (d) at the frame using self-tapping screws 4,8x19mm, Torx-drive
   - Seal holes with cover caps (e)



- Finally, ALL edges, joints etc. must be sealed with an approved sealant



10.3. Special Instructions for cleaning

The cleaning of air handling units in hygiene construction per DIN 1946 T.4 has to done with special care. For recommended cleaning agents see chapter 7.2. This involves among other things wiping out all rails of coolers, heaters, drip separators, pull-out frost protection frames, filters, etc. If the area behind the air stream distributor is inaccessible, it will have to be disassembled for cleaning.

Instructions on cleaning components can be found in chapter 8 “Special Notes for Installed Components”.

11. Special notes for air handling units in explosions-proof design

The notes from Chapter 5, "General installation instructions". In addition, in air conditioners, which are placed in potentially explosive areas, some assembly work mandatory.

The complete ATEX - Classification according to ATEX Directive 94/9 / EC, please refer to the data sheet of the unit.

Mounting and start-up

Safety instructions in Chapter 1, the conditions in section 3 and general commissioning instructions in Chapter 6 note!

The individual units - modules must be connected to a potential equalization. Each module must additionally be connected by a potential settlement with the base frame.

With weather-proof explosion-protected equipment a professional manner lightning protection system must be installed. All metal parts are to be connected to the grounding conductor. To avoid arcing and approximations between metal parts and installation of the capture device of the lightning protection system, the installations according to DIN VDE 0815 Part 1 and are VDE 0185 Part 100 V in the lightning protection - involve potential equalization.

For explosion-protected equipment for indoor installation all electrically conductive parts must be protected with a professional grounding measure (potential equalization) to lightning currents are derived and can not lead to ignition sources.

All existing bonding lines must be checked before use. It is to perform a resistance measurement to control the conductivity.

Suitable measures (eg pre-filtering), the infiltration or act of rust inside and outside of the facility is to be prevented.

The sensors used and actuators, as well as other electrical attachments must have an appropriate device classification as the HVAC system.

The sensors and actuators used, as well as other electrical attachments must have an appropriate device classification as the HVAC system.
Frequency converter may not be used in hazardous areas. If inverters are used to power fans, only flameproof motors (Ex d, Ex de) may be used.

Operation

Before commissioning the proper installation of the system must be checked. All access doors and inspection openings must be closed.

It must be ensured that the ATEX - classification is maintained during operation. Other operating conditions are only permitted after consultation and written confirmation from the manufacturer.

For more information on using the individual components can be found in the relevant chapters of this manual.

Maintenance and cleaning

Before performing any maintenance, the system must be properly separated stopped and isolated from AC power.

It is important to ensure that no potentially hazardous atmosphere can form.

During maintenance in hazardous areas Avoid ignition sources arise. This is to ensure that all work product are approved for the corresponding zone (see EN 1127 Part 1 of Annex A and BGR 104) Otherwise, ensure that the work area is adequately rendered inert.

Fixtures and equipment components may only be replaced by the Rosenberg is shared components.

The required safety, maintenance and cleaning of the internal components of the air conditioner can be found in the relevant chapters of this manual.

It is recommended to monitor the running of the fans and, if necessary, to monitor the vibration of the fans.

Compliance with the legal, regional and customer-specific regulations is absolutely necessary.

12. Notes