
# Installation, Operation and Maintenance Manual

Rotary heat exchangers
Type RRU-PT / HUgo NT/
ET and KT

# RRU

KLINGENBURG

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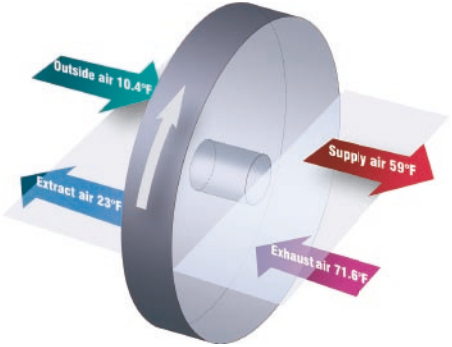
## General information




The rotary heat exchanger “rotor” is a unit to be installed in ventilation systems.

Its role is to exchange thermal energy from one air-stream to another over the rotary wheel. The two air streams entering the rotor must be counter flow to each other.

WARNING: Any use of the rotary heat exchanger different to the application described in this manual, that have not been formally agreed to by the manufacturer in writing, will result in all warranties being immediately null and void by the manufacturer.

## Transport

The rotary heat exchanger is packed and shipped in a way that is most suitable to avoid possible damage during transport. Nevertheless damages can occur due to unforeseen circumstances.

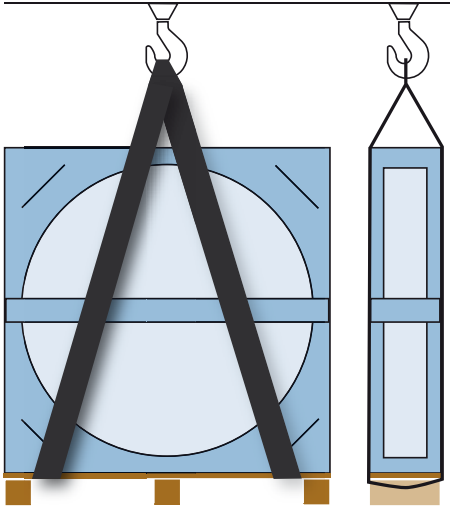
Therefore it is necessary to visually check the integrity of the rotor immediately upon receipt of delivery.

Upon receipt of the rotor, someone must verify that the delivered goods match those items listed on the packing list and original order. In case of a discrepancy or shipping damage, please contact your vendor immediately within 7 business days. If possible have available the Bill of Lading with the signature of the truck driver responsible for the shipping damage. This is required by the insurance company to establish a shipping damage claim.

## Transport on site

Lifting of the rotary heat exchanger is generally possible but only under consideration of the following rules:

- The point of application must **not** be applied onto just one point on the outer surface
- The lift point must not be applied onto only one area of the housing.

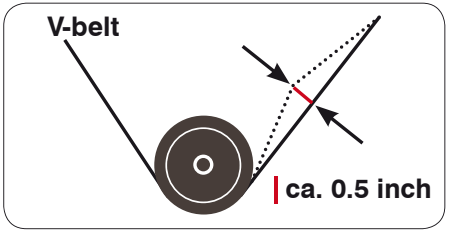


**Do not use** lifting eyes on the top of the housing, since the framework is not design to handle the weight of the rotor.
If lifting is necessary then lift one side gently enough to slide a lifting strap underneath and repeat for the other side. It is recommended to use a gantry crane with belts for lifting the rotor from one location to another.

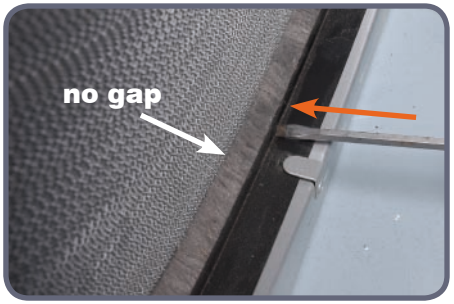
If the unit has come shipped on a pallet, please use proper fork lift procedures to offload the pallet. The media can be easily damaged by the forks on the fork lift.

**First steps:**

- Check delivered goods for conformance to purchase order.
- Check overall visual condition of the wheel upon delivery.
- Check the belt position around the wheel and the spring tension of belt.

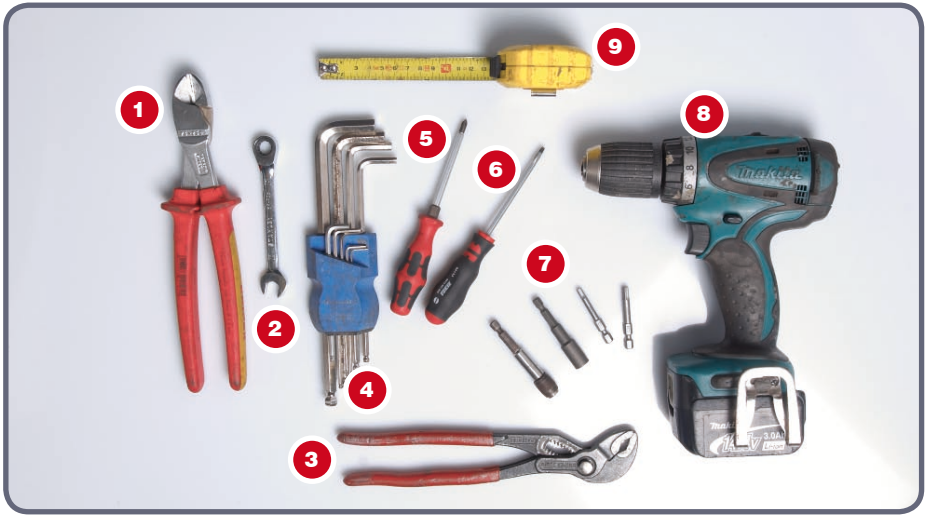



- Push all seals and gaskets lightly onto the wheel surface before completing commissioning.



**Warning: One should avoid the following:**

- Tipping the rotor housing on one of its corners can damage or change the alignment of the rotor
- Allowing any sharp, heavy, blunt object or tools to come into contact with the wheel's surface area
- Running the air handling system with both air streams being parallel to each other
- Placing one's finger between the drive belt and wheel while the rotor is in operation




**We recommend the use of the following tools for installation:**

**1)** Wire Cutter
**2)** Wrench 10mm
**3)** Adjustable pliers
**4)** **Note:** Are the allen keys metric?
**5)** Flat Blade Screwdriver
**6)** Philips Head Screwdriver
**7)** Bit Set for Cordless Drill
**8)** Cordless Drill
**9)** Metric Tape Measure

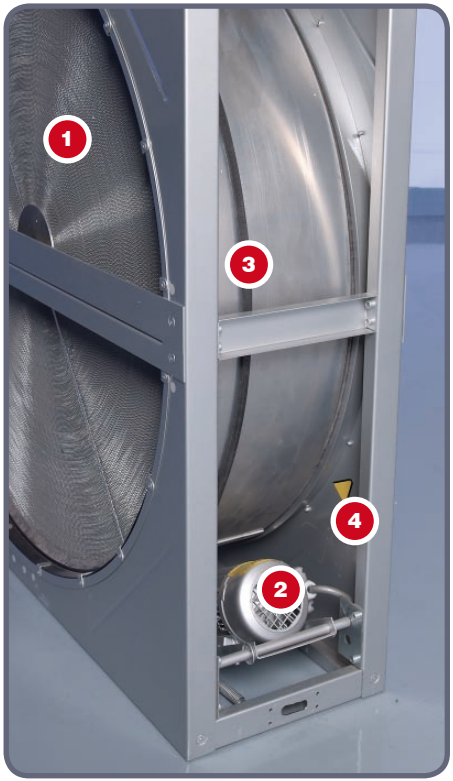
## Rotary Wheel

The rotary wheel consists of corrugated aluminum foil, epoxy coated aluminum or stainless steel foil.

In operation the rotary wheel **(1)** is rotating.

The rotation (this direction of rotation of the rotary wheel is marked by a yellow arrow **(4)**) is driven by a motor **(2)** via a V-belt **(3)** placed around the outer casing of the rotor wheel.

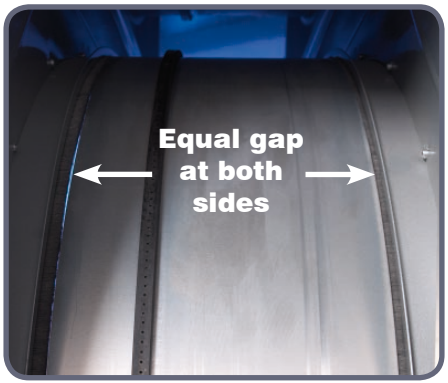
Prior to start-up, especially for vertical installed rotors, make sure that no objects or external pressures are preventing the wheel from freely moving.

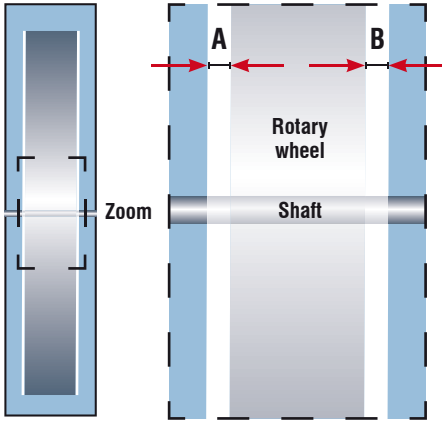



**Check rotary wheel for correct positioning and seating within housing**

After delivery, the rotary wheel must be inspected to verify that it is properly aligned and easily rotates within the housing with no obstructions of any kind.

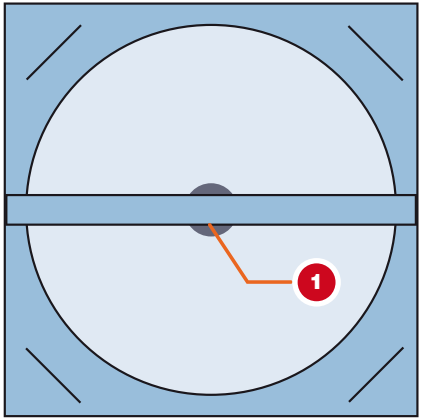
The spacing between the wheel and



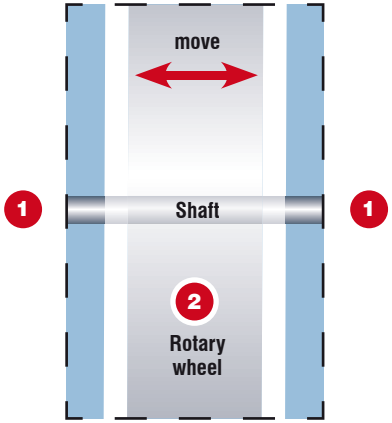



the housing seals should be equal on both sides. of the wheel.

Also the spacing **(A/B)** between the wheel and the housing seals from one edge of the circumference to the other side should be the same. If this is not the case then the following actions should be taken.




- Bolt **(1)** loosen, front side and back side


- Rotary wheel **(2)** should be moved or slid along the shaft to a point that allows it to be centered of the housing.
- Bolt **(1)** tighten, on front and back side
- Push seals against the rotary wheel, if necessary, to eliminate any noticeable gaps (page 4)

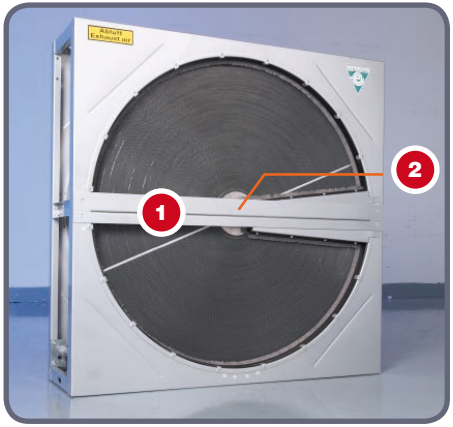
## Installation

The rotary heat exchanger is designed to be installed in a vertical position.

The air stream separators (supply and exhaust ductwork) inside the air handling unit must be attached to the middle frame **(1)** of the rotor without exerting any pressure upon the rotor's housing. Access must be made available for any eventual service or inspection work upon the bearings and shaft **(2)**.

A clean and even seating is essential to provide a good load spread of the mass of the product.

Depending on the application, it is advisable to install air filters at the entering supply and exhaust locations of the rotor to prevent fouling from contaminants in the air, and to extend the length of time between cleanings.




The installation of the rotor must allow good access for cleaning purpose.
It is advisable to install inspection windows before and after the rotor to allow for visual checks during normal operation.

In case of condensation in the exhaust air stream and face velocity of more than 800 feet per minute (2.4 meters/second), it is possible for the condensation to be carried into the air handling unit and/or ductwork. This situation can be avoided by installing a droplet separator on the rotor.

**Warning:**
Any kind of physical load on the rotor must be avoided.

The rotor is not designed to take loads from any connecting parts such as ductwork.

The rotor frame must be sealed airtight towards connecting parts in order to prevent leakage.

Before starting up the ventilation system, verify that there is an unhindered air flow going through both sides of the rotor.

## Driving motor

Rotary heat exchangers are equipped with three-phase current back-geared motors for 3 x 380 / 220 Volt with thermal protection contacts at 140°C (284°F). Should the rotors be delivered without wiring, the motor is always star-connected. In connection with the controllers KR4/ KR7 the motors have to be run in delta wiring connection 220 Volt and connected thermal protection contacts (see page 11). Otherwise warranty is invalid.

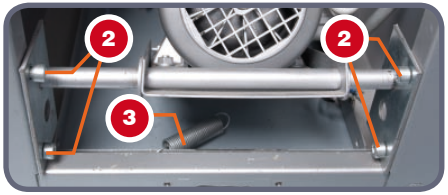
The motor may be easily mounted in another corner of the housing in cases where the motor location is unsuitable. Under normal operating conditions the motor does not require maintenance (gearing with long life grease lubrication).

**Attention:** Special motors for e.g. enamelling lines with oil filling (opening at the top).

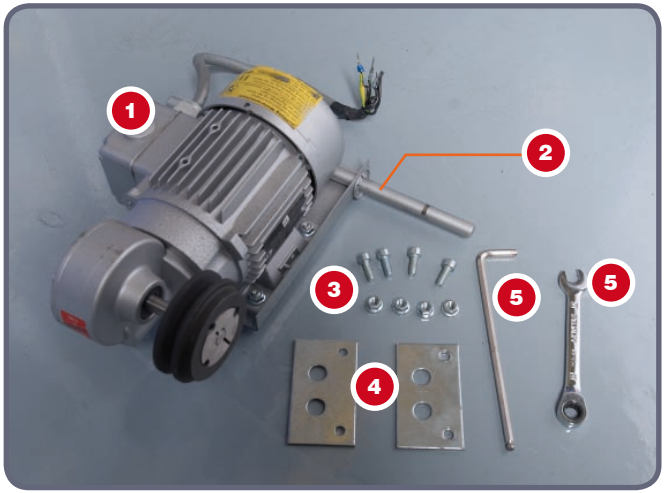
### Disassembly of the motor

- Remove the belt (1) from the motor pulley (2) by gently pushing the motor mounting plate towards the wheel which will allow the belt to be removed from the pulley.


- Loosen the 4 screws **(2)** and the tension spring **(3)** (left and right)




- Remove motor




**Parts of the driving motor**

**(1)** Motor with motor bracket
**(2)** Bracket shaft
**(3)** screws
**(4)** Motor Bracket fixture
**(5)** Allen keys and wrench are required – see tool list on page 5.


The re-assembly of the motor is executed in reverse order to the disassembly.
**The corner in which the motor is to be postioned remains the choice of the end user.**

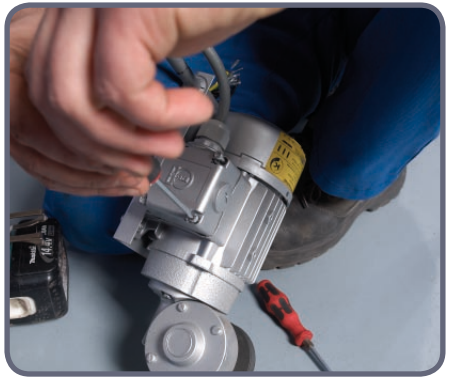
## Direction of rotation

In case of initial operation check direction of rotation.

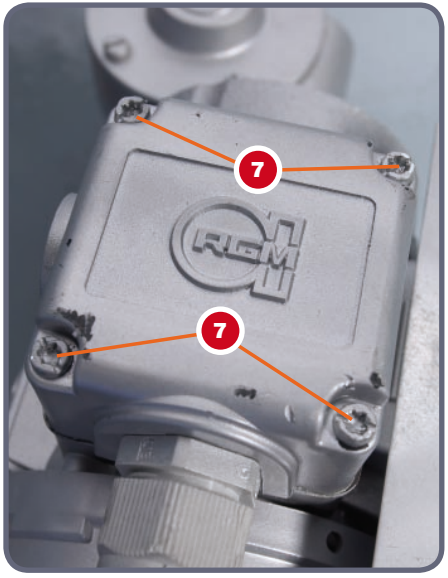
Take care that the rotor wheel is rotating from the exhaust air across the purge sector into the supply air. Also in case no purge sector is installed, the direction of rotation of the rotor is marked by a yellow arrow **(6)** on the inside panel where the motor is installed.

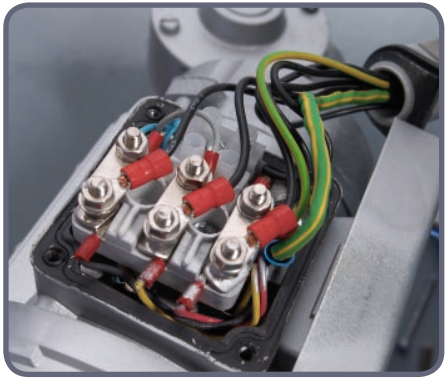
## Motor wiring

To wire the motor the following procedure should be executed:

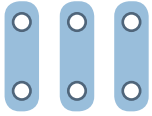


- Loosen the 4 Allen bolts **(7)** on the housing panel



- connect with delta wiring connection (see below)

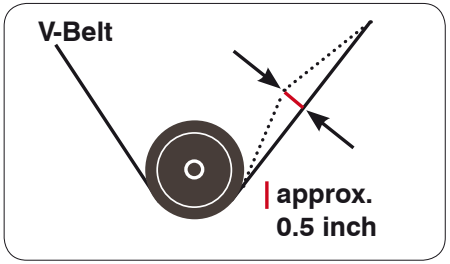


## V-Belt

The drive V-belt is designated SPZ or SPA and is commercially supplied with the designation “Endless V-belt”. Connection is done by flexible links.

Due to the fact that the V-belt is subject to natural stretching which may well exceed the size of the tensioning device it is recommended to periodically check the tension of the V-belt.

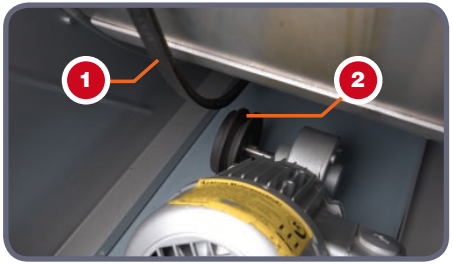
In particular in the first 400 operating hours. In case the drive of the rotary wheel can no longer be guaranteed because the V-belt has insufficient tension, the V-belt has to be shortened.




### V-belt adjustment or shortening:

The following steps are to be executed the shorten the V-belt:

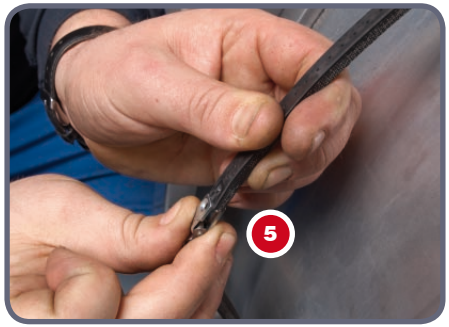
- Remove V-Belt **(1)** from Pulley **(2)**. As described by motor dissassembling





- Remove the V-belt linkage **(3)** with a small philips head screwdriver
- Cut V-belt to the required length **(4)**

- Re-attach the V-belt linkage and tighten. **(5)**




- Place the V-belt onto the Pulley and check tension.(6)


## Ball-bearings

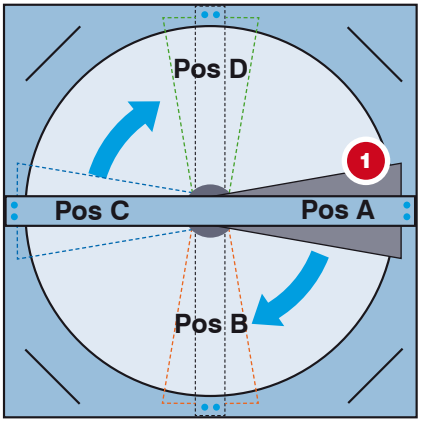
The ball-bearings used are of low-maintenance and designed for an operating time of 100.000 hours. Generally, they can be used for temperatures of up to +120°C (+248°F).

**Under normal operating conditions maintenance is not required.**

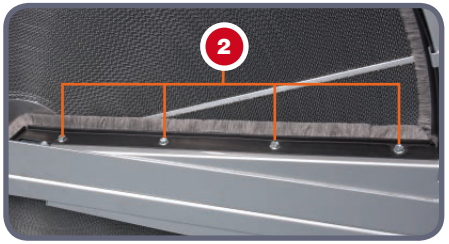
## Purge section

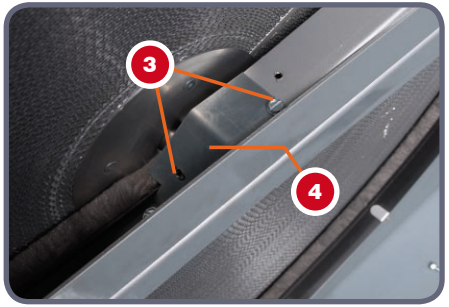
The option of the purge section positioning **(1)** remains the choice of the end user **(A-D)**.
**Caution:** The rotation of the wheel must always be from the return air into the supply air direction.

The following steps are to be executed when disassembling the purge section:

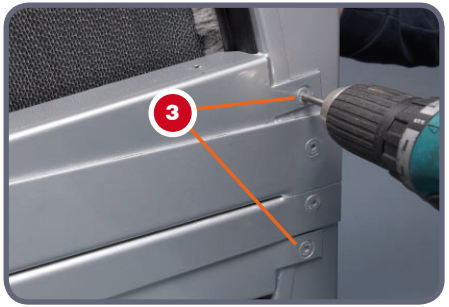



- Loosen the purge sector seals **(2)**



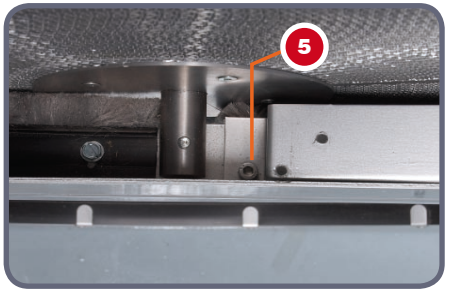



- Loosen Bolts **(3)** and remove panelling **(4)**



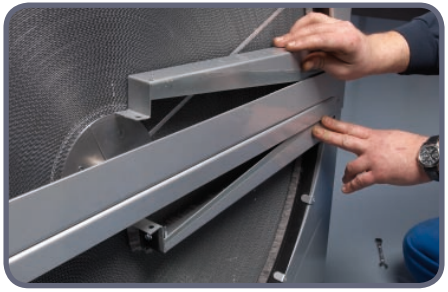

- Loosen bolt **(6)** and the nut **(7)** on the other side

purge section can be removed in the same manner as the top purge sec-




- Loosen purge section bolt **(5)**


- Remove purge section panel from wheel framework. The underside



tion. The purge section can now be re-positioned by assembling in the reverse order.

## Control

In case a Klingenburg controller is supplied please read corresponding controller instructions (attached to the controller)

## Final inspection by manufacturer

Final inspection by the manufacturer is confirmed by a yellow label being attached at the inside of the inspection door.

Among others, the completeness of the delivery (with special regard of the rotor control and its components) is confirmed. In case of questions we ask you to indicate the corresponding inspection number / date and the respective rotor size and number.

The rotor size and number are indicated on the rating plate which is attached at the outside of the inspection door. It is additionally imprinted in the frame of the inspection door.

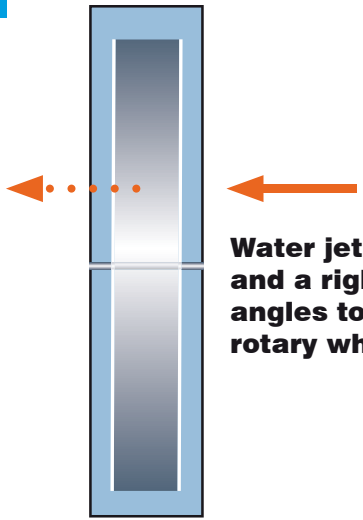
## Cleaning

In most cases, the counterflow principle will allow the rotary wheel to self-clean itself of contaminants that may adhere to the surface of the rotor.

In situations where self-cleaning is not sufficient (dependant on the degree of fouling), the rotary wheel can be periodically cleaned with compressed air or high pressure water (room temperature water only).

**Attention:**

Apply air or water jet evenly and a right angles to the rotary wheel!



**Water jet evenly and a right angles to the rotary wheel**

**Warning: Non-compliance may damage the surface of the rotor.**

During cleaning the rotor must not be damaged neither physically nor chemically.

## Icing

In winter time, it is possible that freezing may occur with a high water content in the exhaust air and at temperatures below 32°F. The resulting condensation water will not freeze immediately at 32°F. The freezing point is far below (32°F). This is a special advantage of the rotor.

In case of freezing, ice will cause a constriction of the air flow channels on the exhaust side. The icing will lead to the increase of static pressure and lower the overall effectiveness of the rotor.

Icing does not damage the rotor, but as soon as it occurs preventive measures must be taken. One important pre-condition to avoid icing is to keep the rotary heat exchanger clean.

Dirt on the rotor wheel surface can capture moisture and prevents the dispersion of water.

### Preventive Measures:

- Reduction of the amount of outside air to increase the temperature in the critical zones.
- Pre heat the outside supply air with a frost coil or equivalent

Klingenburg engineers can calculate the theoretical icing range for specific applications.

Please contact Klingenburg if you have any further questions.

We hope to be of assistance to you with this information. If there are any further questions, please do not hesitate to contact us anytime.

All given information are subject to change without prior notice

The information in this IO&M manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by Klingenburg USA, LLC. Klingenburg USA, LLC assumes no responsibility for any errors that may appear in this technical guide.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