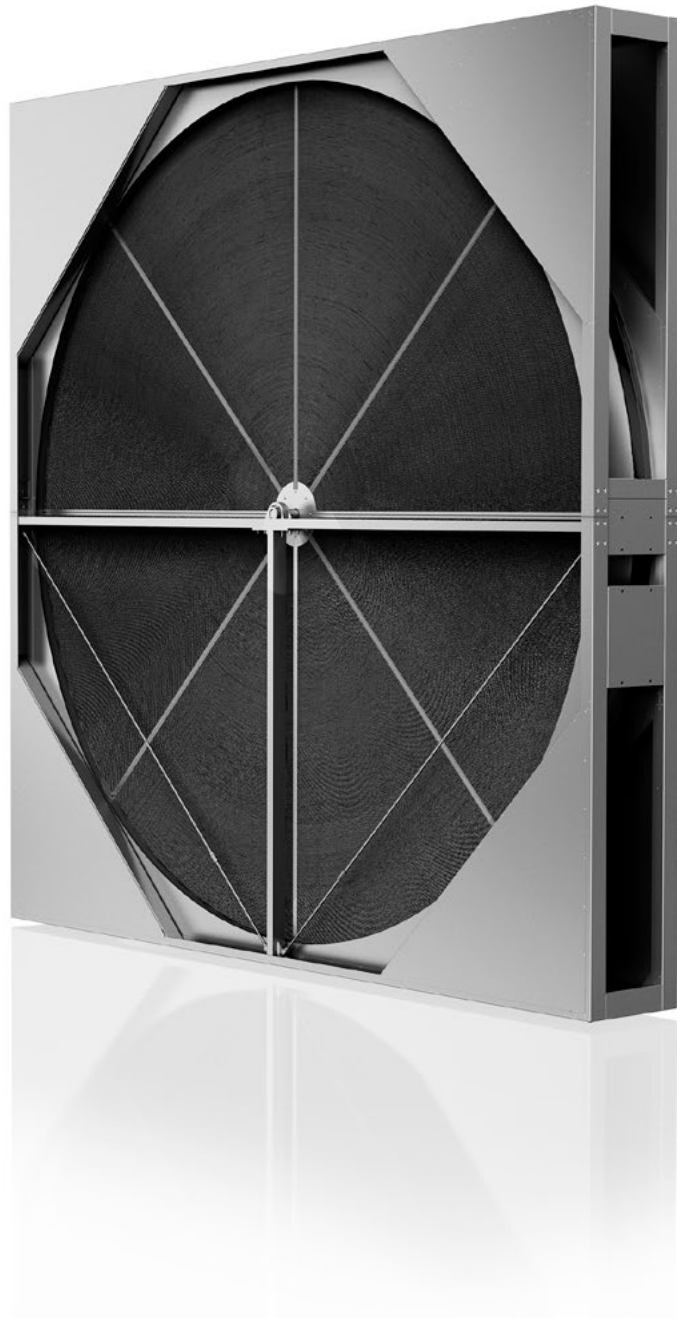


# **MODEL EQ**

## **INSTALLATION & MAINTENANCE**



**AIR-TO-AIR HEAT EXCHANGERS**

# **HEATEX**

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## DECLARATION OF INCORPORATION

Description and identification of the partly completed machinery:

**Rotary heat exchanger model EQ with casing and with a drive unit.**

The following essential requirements of EC Machinery Directive 2006/42/EC have been applied and fulfilled:

1.1.2, 1.2.1, 1.2.3, 1.2.4.1, 1.2.4.2, 1.2.4.3, 1.2.6, 1.3.1, 1.3.2, 1.3.4, 1.3.7, 1.3.8, 1.3.8.1, 1.3.8.2, 1.4.1, 1.4.2.1, 1.4.2.2, 1.4.2.3, 1.4.3, 1.5.1, 1.5.2, 1.5.4, 1.5.5, 1.5.6, 1.6.1, 1.6.3, 1.7.1, 1.7.3, 1.7.4, 1.7.4.1, 1.7.4.2, 1.7.4.3

The relevant technical documentation has been compiled in accordance with Annex VII, Part B of EC Machinery Directive 2006/42/EC. We undertake, in response to a reasoned request, to supply it in electronic form to the market surveillance authorities within a reasonable period.

The party authorized to compile the technical documentation is:

Johan Gidner, R&D Manager

The partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Machinery Directive.

Malmö, 2015-06-18

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## 1. INTRODUCTION

The Heatex Model EQ is a segmented rotary air-to-air heat exchanger. It consists of a segmented rotor made of aluminum which is mounted in a sheet metal casing.

The Model EQ can be used and operated only in vertical position. The rotor can be tailored for optimal efficiency vs. pressure drop, and coated for use in humid or corrosive air flows.

A standard Model EQ rotor is between 1600 mm (62.99") and 3800 mm (149.61") in diameter. At constant drive, the rotational speed is 10, 17 or 25 rpm, depending on the type of material. The casing varies in size from 1740 x 1740 mm (68.5 x 68.5") to 4050 x 4050 mm (159.45 x 159.45"), the depth of casing is 456 mm (17.95"), 460 mm (18.11") and 500 mm (19.69") depending on the diameter of the wheel.

Recommended pressure drop for the Model EQ is between 100 Pa (0.4" WC) and 250 Pa (1" WC), while the maximum allowed pressure drop is 250 Pa (1" WC).

Normally the Model EQ is part of a system and controlled by the system controller. Once it has been installed and started, an operator is only required for maintenance.

The Model EQ should not be used at temperatures lower than -40°C (-40°F) or higher than 65°C (149°F). Some parts of the heat exchanger are more sensitive to high temperatures. Refer to Appendix A for exact temperature limits.

This manual describes instructions for installing & handling the Heatex Model EQ. All users are required to read the whole manual before installing, handling, operating or doing any maintenance work.

## 2. SAFETY PRECAUTIONS AND WARNING SIGNS

### 2.1. General

Only authorized/trained personnel should handle, install or operate the Model EQ heat exchanger.

Gloves should always be used when the Model EQ heat exchanger is handled to avoid cutting from sharp edges.

The Model EQ heat exchanger weighs up to 1400 kg

(3086 lb), and it consists of parts that weigh up to 150 kg (330.69 lb) separately (Top half of enclosure up to 150 kg (330.69 lb), rotor segment up to 50 kg (110.23 lb)). Safety precautions must be taken when the heat exchanger is handled, moved or transported to prevent health risks for personnel.

Use a fork lift or other lifting equipment to move the heat exchanger. Make sure that the parts are securely fastened to the fork lift with slings.

### 2.2. Warning Signs

There are three warning levels in this manual:

#### WARNING:



A warning must be followed. Failing to do so can cause severe harm or death to personnel. A warning is marked with an orange warning triangle in this manual.

#### CAUTION:



A caution must be followed. Failing to do so can cause harm to personnel or severe damage to equipment. The caution is marked in the manual with a yellow warning triangle.

#### NOTE:



This is useful extra information that can be helpful.

The following warnings are included in this manual:



WARNING! General warning.



WARNING! Heavy load. Do not move or stand under a hanging load.



WARNING! Electrical current. Switch off the power supply before handling.



WARNING! Risk for squeezing or crushing of body parts.



CAUTION! Hot surface. Risk for burns.



CAUTION! Risk for particles or smoke in the air.

### 3. TRANSPORT AND UNPACKING

Inspect the package before it is opened to make sure that there are no visible damages. Do not unpack or remove wrapping. Store unit in a location that is protected from dust, dirt, water and unauthorized personnel, until assembly is about to commence. After the parts have been unpacked, make sure that all parts are included and according to specification. Refer to the check list in Appendix C. Heatex AB can only guarantee the structural integrity of the segments if they are transported and stored at temperatures above 0°C (32°F).

If any deviances are found, contact Heatex AB for information.

#### 3.1. Transport

When the Model EQ is transported or moved, it must be kept upright at all times. Make sure that it is securely fastened before you handle it.

Normally, a fork lift should be used to move the heat exchanger. Make sure that all parts are securely fastened to the fork lift with slings before you move it.



**WARNING!** Do not move the heat exchanger if it is not securely fastened. Otherwise it can topple and cause severe harm to personnel and damage equipment.

If a lifting device is used, the lifting slings must hold/manage at least 1400 kg (3086 lb).



**WARNING!** Lift only at the center axis of the rotor, so that the load is kept balanced. If it tilts, parts can fall out and cause severe harm to personnel and damage to the equipment.

If the heat exchanger is to be moved while it is still on the pallet, then fasten the lifting slings under the pallet. Make sure that the heat exchanger is securely fastened to the pallet and kept in an upright position.



**WARNING!** Do not move or stand under the heat exchanger when you lift it. If the slings break or the heat exchanger topples, this can cause severe harm or death to personnel and damage the equipment.

When a rotor segment is to be moved, two persons must carry it together, by hand. Make sure that the rotor part is lifted in a way that does not damage the aluminum sheets, and minimizes the risk for harm to personnel.



**WARNING!** Always use gloves and covered arms when the heat exchanger or its parts are handled by hand. There are sharp corners that can cause cutting.



**WARNING!** Two persons must carry a rotor segment together. A rotor segment weighs up to 50 kg (110.23 lb) and can cause crushing or squeezing if not handled correctly.

#### 3.2. Unpacking

Before the Model EQ heat exchanger is unpacked, place the package near the site where it is to be installed. Make sure it stands on a flat even surface and that it is securely fastened so that it can't topple or fall.

Remove the upper half of the casing from the pallet and put it aside for use later on.

Use slings around the center shaft to lift the bottom half from the pallet, and put it on a flat even surface. Make sure that it can't tilt. This is also the point of lifting when assembled.

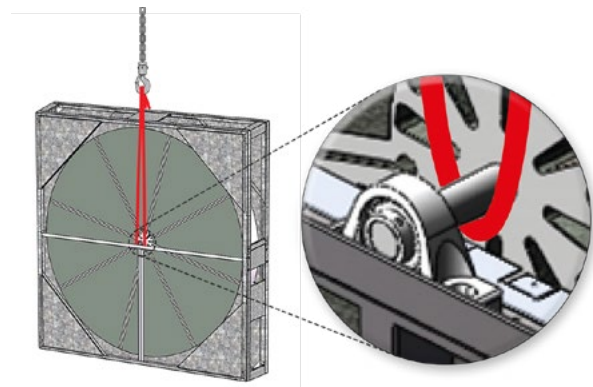


Figure 1. Slings around center shaft.



## 4. INSTALLATION

### 4.1. Before Installation

The site where the heat exchanger is to be installed needs to meet the following requirements:

- The floor must be able to carry at least the weight of the heat exchanger (up to 1400 kg (3086 lb)), plus the weight of the lifting equipment (eg a fork lift or other lifting machinery).
- The Model EQ heat exchanger should be kept at temperatures below 65°C (149°F). However, when it has been assembled, it is important that the temperature limits for each component is not exceeded. For temperature limits, refer to the Technical Data in Appendix A.
- If there is a risk for condensation, the floor must withstand water. A condensation tray can be placed under the heat exchanger to collect the condensate.
- There must be an electrical outlet for either (single phase) 230V, or (three-phase) 230V/400V, depending on what type of drive the exchanger is ordered with. The heat exchanger with a control unit requires (single phase) 230V outlet.
- Make sure that the main outlet has a lockable switch, so that the power supply can be switched off securely, while maintenance work is performed.
- The Model EQ heat exchanger can be assembled before or after it is lifted into place. If it is assembled first and then lifted into place, there must be enough room for a lifting device to lift the assembled heat exchanger into place.
- The bearings of the Model EQ heat exchanger must always be easily accessible above and below the L-shaped beam to enable any future adjustments. (H:200 mm (7.87") W:200 mm (7.87")) (See Figure 2.)
- After the Model EQ heat exchanger is built into the AHU, the gable where the motor is fitted must be accessible to secure maintenance. (See Figure 3.)
- There must be a clearance of minimum 250 mm (9.84") exceeding the casing height, to be able to mount the top/upper half of the casing. (See Figure 3.)

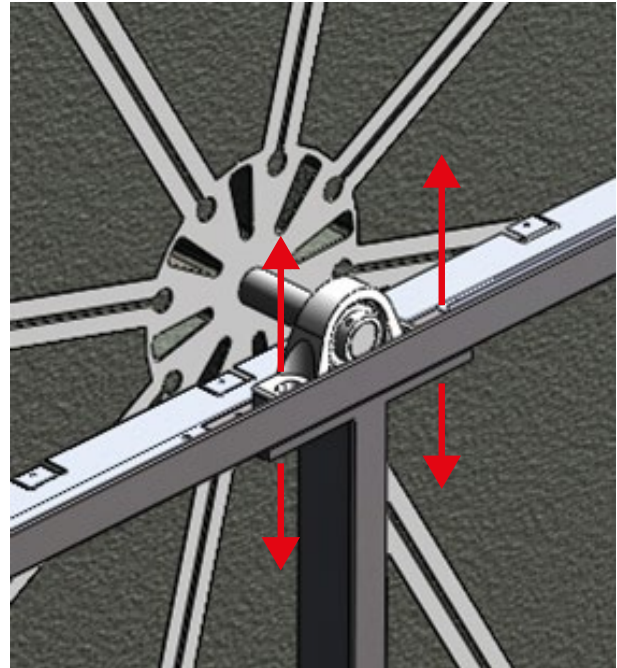


Figure 2. Model EQ beam clearance.

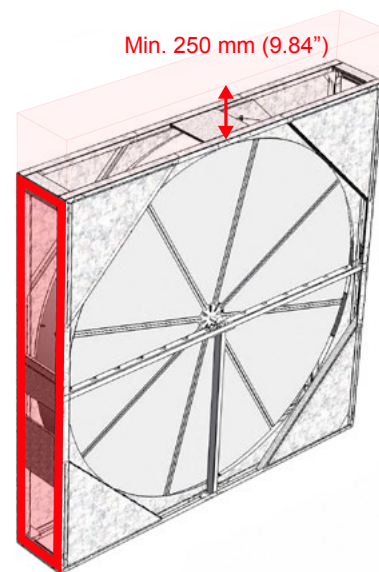


Figure 3. Model EQ gable and top clearance.

- Warranty terms are only valid as long as original parts are used.
- For a list of tools that are required for the assembly, refer to Appendix C.
- The Model EQ heat exchanger must be secured in the final product to be able to function properly. The unit surrounding the heat exchanger must withstand the force loads according to picture and chart below.

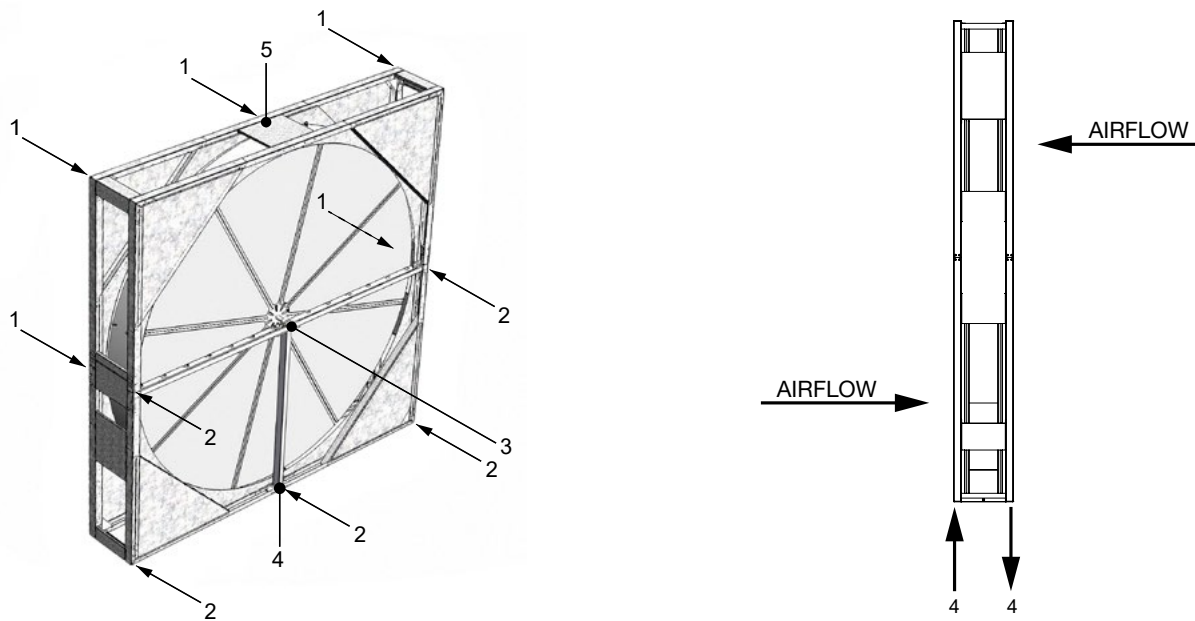


Figure 4. Model EQ force schedule.

Force	Direction of force	Up to Ø 2200 mm (Up to Ø 86.61")	Ø 2201-3000 mm (Ø 86.65-118.11")	Ø 3001-3800 mm (Ø 118.15-149.61")
1	Against the airflow	0.7 kN	1.2 kN	1.9 kN
2	Against the airflow	0.7 kN	1.2 kN	1.9 kN
3	Horizontally out from the rotor (from both sides)	20 kN	20 kN	20 kN
4	Vertically up	10.5 kN	22.5 kN	36 kN
5	Vertically up/down	0.75 kN	1.5 kN	6 kN

Table 1. Direction of forces.

## Attachment Points

The right picture show areas where the heat exchanger must be secured in the air handling unit. The heat exchanger should be fastened in the final product with screws or similar. Please notice point 4 in table 1 as it require extra attention due to large force from rotor.

Place the rotor on a horizontal surface since an uneven surface can warp the rotor and affect the factory adjustments.

When using a casing with vertical plane of intersection/ side by side flow, special attention needs to be taken to the structure on the AHU side where the beam is fastened. This is due to that large part of the force 4 in figure 4 needs to be supported by the AHU side structure.

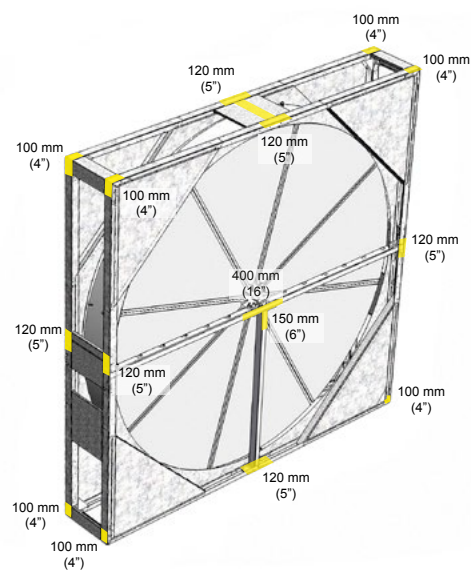


Figure 5. Model EQ attachment points.



## 4.2. Mounting the Spokes

4.2.1. Remove the transport-safety on each side of the half wheel. (Orange sheet metal.)

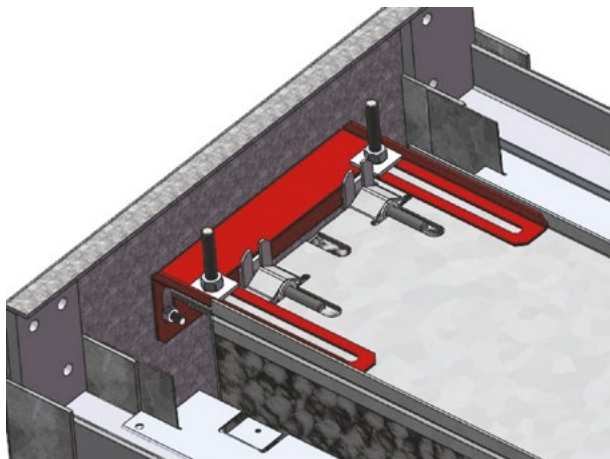


Figure 6. Transport safety sheet.

4.2.2. Assemble the vertical spoke from the same side as the opposite spoke (180°) is mounted, by inserting it axially in the hub rail.

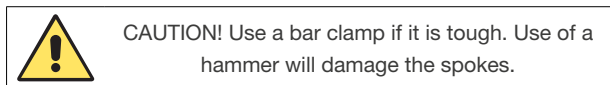


Figure 7. Assemble spokes.

4.2.3. Enter the spoke lock pins (Part 6) chamfered end first, into the spokes in the hub from the same direction as the spokes were mounted, after each spoke mounted.

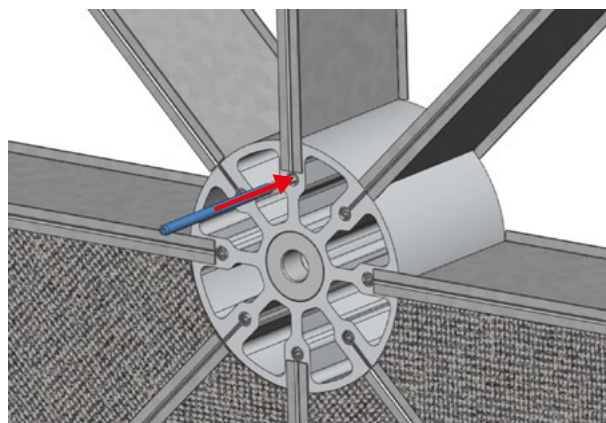


Figure 8. Enter spoke lock pins.



CAUTION! Use a bar clamp if it is tough. Use of a hammer will damage the spokes.

4.2.4. Insert a spoke in the hub rail (as described in step 4.2.2).

4.2.5. Repeat operation 4.2.2 - 4.2.4 on the third spoke.

4.2.6. Remove the cover plate from the hub, to enable use of center locking device/dowel/metal bar.

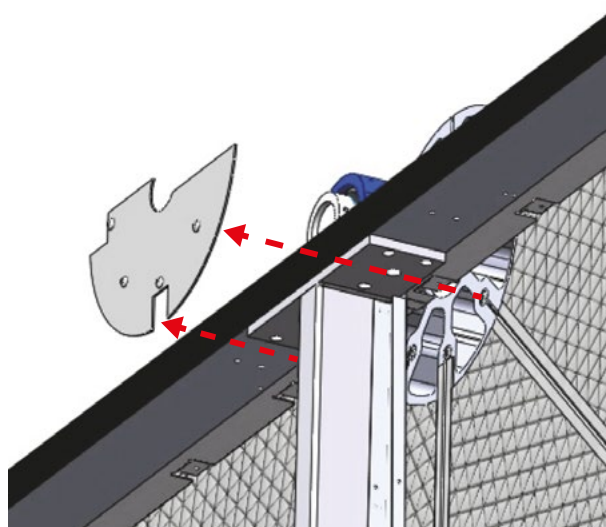


Figure 9. Remove cover plate.

### 4.3. Mounting the Cover

**4.3.1.** Disassemble the mounting loops in the corners of the lower half transverse beams. Mount these in the top of the upper section like in figure in 4.3.2 for lifting the top. (All orange parts shall be removed when the wheel is complete.)

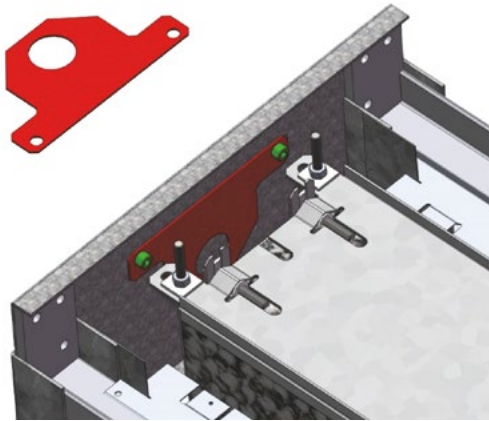


Figure 10. Disassemble loops on lower casing half.

**4.3.2.** Use mounting loops (X) or corner beam (Y) to secure lifting slings/hooks, when lifting the upper half of the casing.

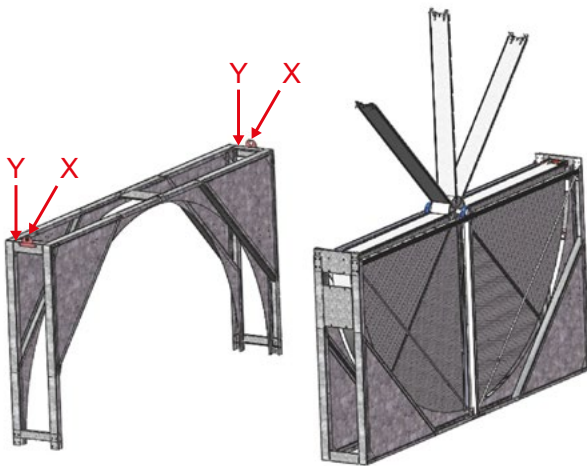


Figure 11. Mounting loops on upper casing half.



**NOTE!** Some circumstances, such as limited lifting height, may require other methods for lifting/ assembling the upper half. E.g.: splitting the upper half in 4 pieces and mounting them consecutively, as described in instruction "INS-1294, Appendix Special conditions Model EQ". Contact your Heatex representative for more information.

**4.3.3.** Lift into position over the lower part to dock the profiles against each other. Fasten the beams with article D and K.

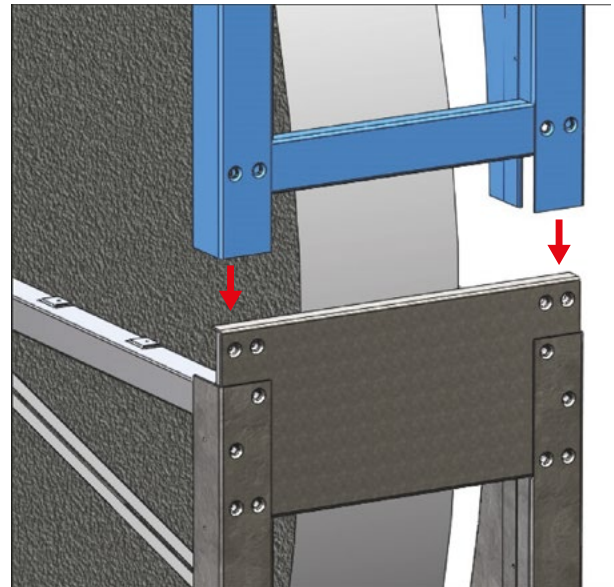


Figure 12. Docking profiles.

**4.3.4.** Insert a profile cover plate (on all 4 corners) from the outside and fasten with Article H, I, J.

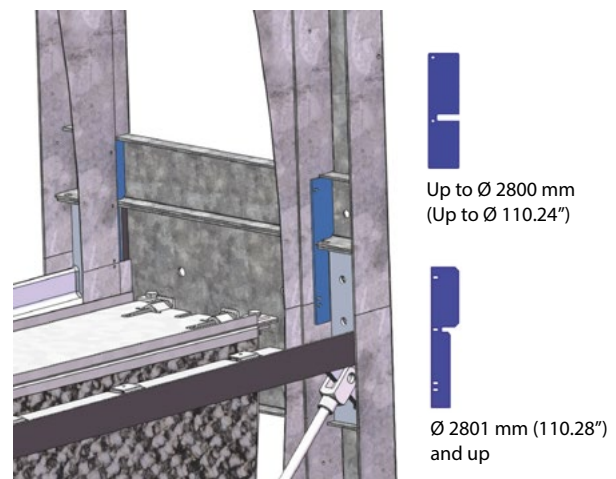


Figure 13. Insert profile cover plates.

## 4.4. Mounting the Wheel

**4.4.1.** Attach the wheel to the hoist and use it to reposition the wheel to simplify inserting the segments. The mounting loops might need to be repositioned for the last segment/segments.

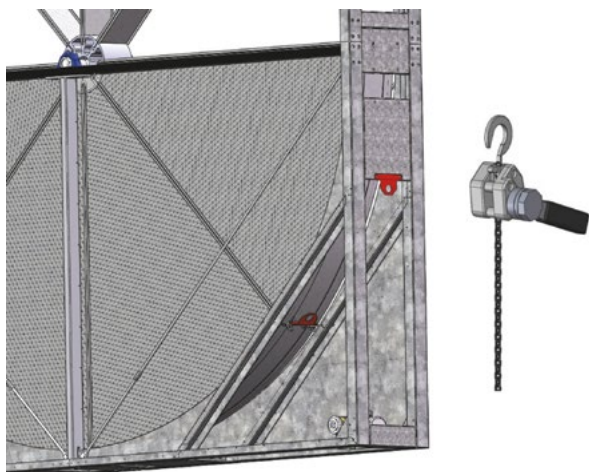


Figure 14. Attach wheel to hoist.



**WARNING:** Make sure that the parts are securely fastened before you lift them. Do not move or stand under the parts when they are lifted. If a part drops or falls, it can cause severe harm.



**CAUTION!** All screws must be lubricated with oil or grease before the assembly, to avoid seizing.



**CAUTION!** If the screws for the pre-mounted segments are tightened, loosen them before assembling the rest of the segments. When all segments are in place they will be tightened crosswise, see step 4.4.7.

**4.4.2** In step 4.4.3 - 4.4.6 it is suggested to lock the wheel with the center locking device (not included). Two dowels can be used for this, or a simple lock can be constructed. For drawings of this tool, refer to Appendix C.

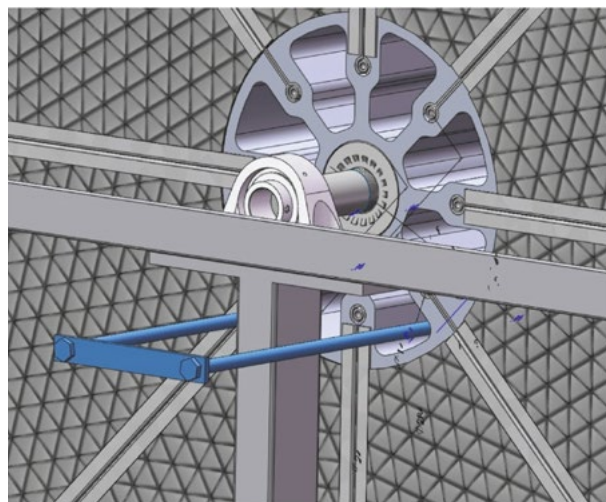


Figure 15. Center locking device.



**WARNING!** A center locking device must be used to prevent the wheel from moving and holding the wheel in position when inserting segments between the spokes or when changing attachment point for the hoist.



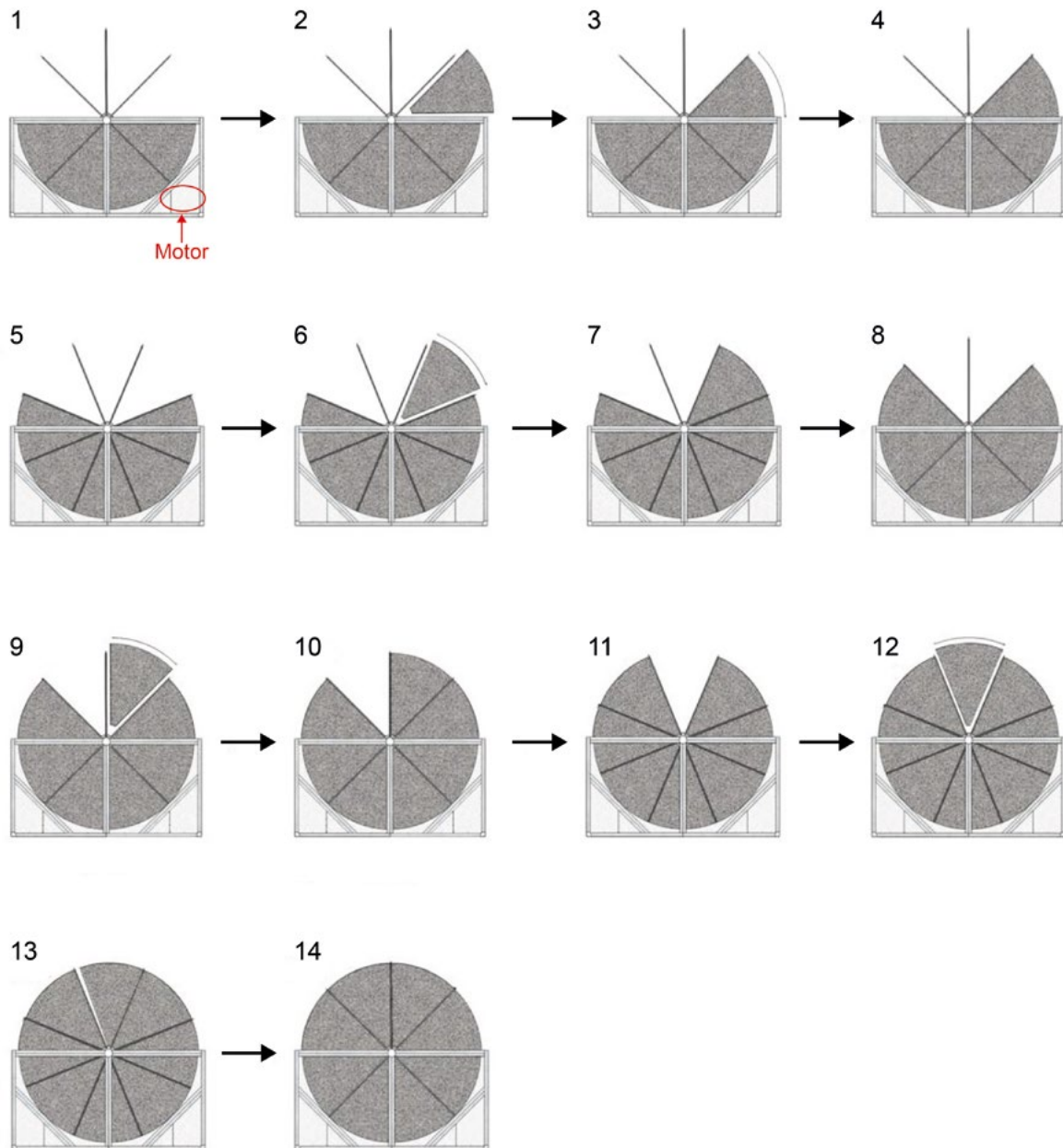


Figure 16. Segment assembly overview.



**NOTE!** Make sure that the mounting is started at the end/side where the motor is placed and that the cover is inserted as shown in picture below.

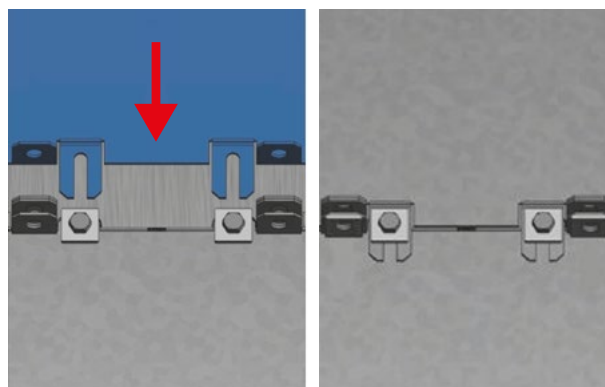


Figure 17. Inserting cover.

**4.4.3.** Insert a segment from the outside and toward the center until it stops. The numbered segments should be inserted/placed as shown in picture below.

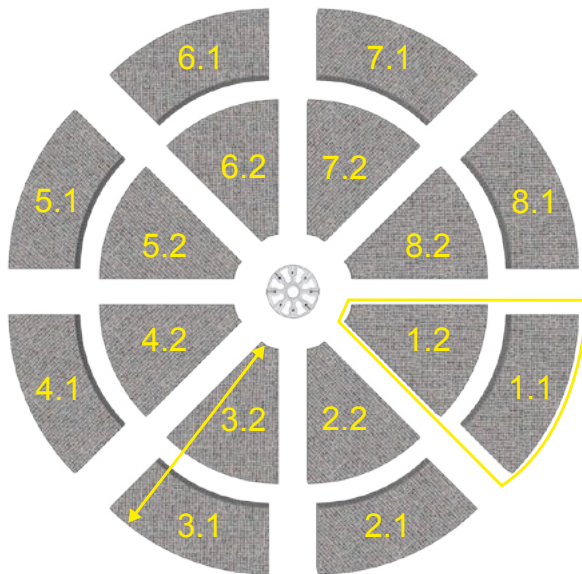


Figure 18. Segment assembly order.



**NOTE!** Make sure that the segment isn't more than 6 mm (0.236") longer than the spoke, see yellow arrow above. If longer then remove excess material/layer.



**NOTE!** Make sure that the gap between the segment and the hub do not exceed 1-2 mm (0.039-0.079").

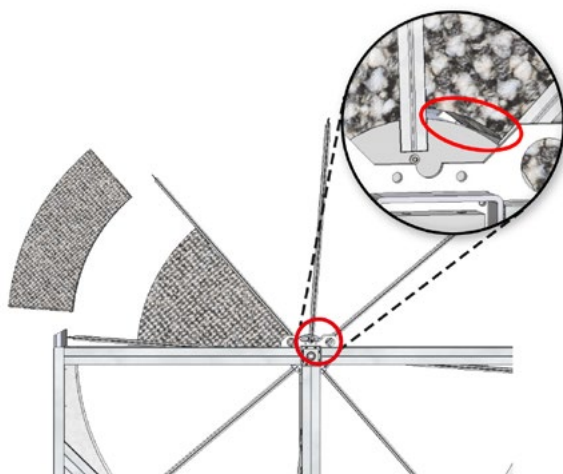


Figure 19. Gap between segment and hub.

**4.4.4.** Slide an outer cover (sweep) under the radial screw heads of the already assembled segment. Mount the brush profile holder and sweep together with the spoke (article A, B and C) without tightening the screws/segments fully. This to allow final adjustments later on.

Make sure that the mounting eyelets on the brush holder profiles and sweep are perpendicular to the surface of the wheel and that no matrix material is squeezed between fastening parts.

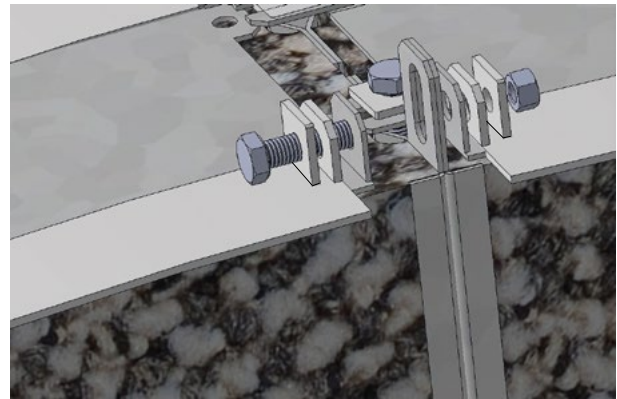


Figure 20. Fastening sweep.



**NOTE!** Don't tighten the screws in this step. This shall be done when all segments are in place.

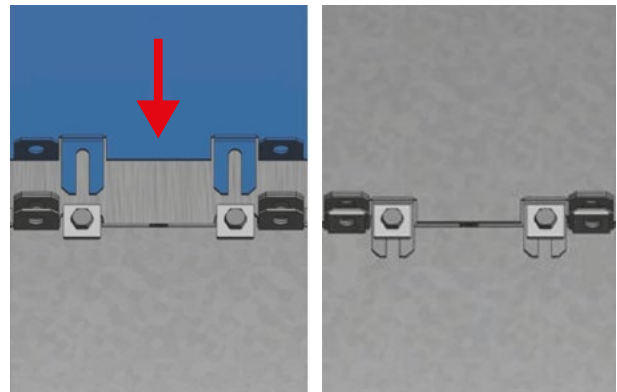


Figure 21.



All screws must be lubricated with oil or grease before assembling, to avoid seizing.

**4.4.5.** Attach the outer cover (sweep) to the spokes (Article A and B). Let the screws be untightened so the next cover plate can be slid under the washers.



Figure 22. Attach sweep to spokes.



All screws must be lubricated with oil or grease before assembling, to avoid seizing.

**4.4.6.** Repeat operation 4.4.1 - 4.4.5 until all segments, cover plates (sweep) and brush profile holders are mounted.



If the screws for the pre-mounted segments are tightened, loosen them before assembling the rest of the segments. Otherwise, assembly of the last segment can't be completed.

**4.4.7.** Tighten all screws on the segments around the wheel until they reach the bottom, in a cross-wise sequence, according to picture below.

Make sure the wheel becomes round and evenly tightened. If a gap is found between the mounting points of the outer covers, please consult Heatex AB.



**CAUTION!** The tightening torque is 35 Nm. Use a torque wrench to make sure this limit is not exceeded.

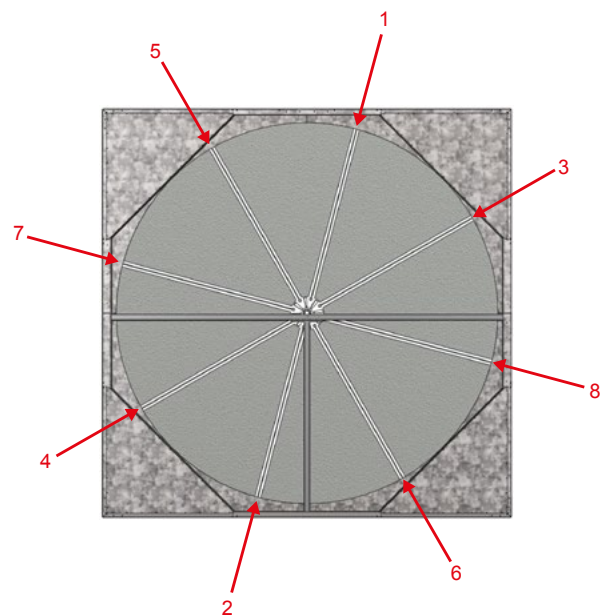


Figure 23. Screw tightening sequence.

**4.4.8.** Fasten the cover plates over the hub (Article F).

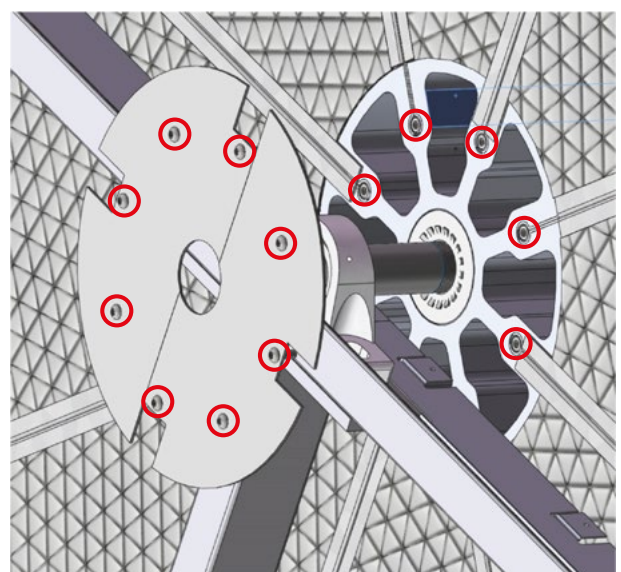


Figure 24. Fasten cover plate.



## 4.5. Adjustment

**4.5.1.** Place the heat exchanger in its final position in the air handling unit, it must be there before adjusting can be completed. Adjust the wheel until it is straight, vertically as well as horizontally.

Preferred points of measurement are described in picture below.

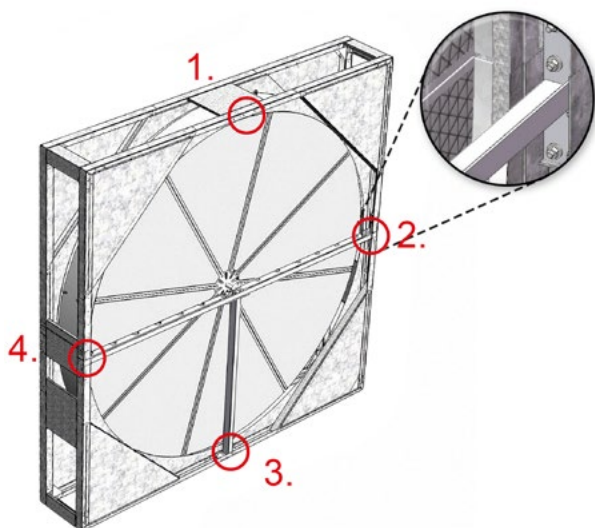


Figure 25. Measuring points.

**4.5.2.** Vertical misalignment (between point 1 & 3) can be adjusted by putting shims under the beam. Loosen all screws securing the bearing assembly (Article E and X). Insert screws (Article D) in the threaded holes and tighten them to achieve lift of the beam.

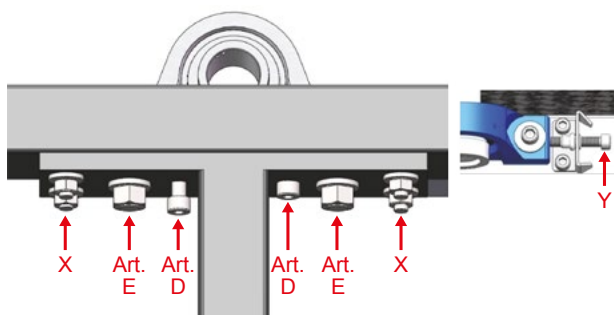


Figure 26. Adjusting misalignment.



**NOTE!** You might need to loosen the screws (Y) used for horizontal adjusting, prior to tightening lift screws (Article D).

**4.5.3.** Insert shim/shims (Part 3) under the beam. Release lifting screws (Article D) and check the vertical straightness of the wheel.

Use the below stated equation to calculate the thickness of the shim needed. Combine blades to reach the desired thickness and merge them with a piece of tape.

X= shim thickness

R= wheel radius in mm

f= movement of the wheel on outer perimeter.

$$X = 210 * \frac{f}{r}$$

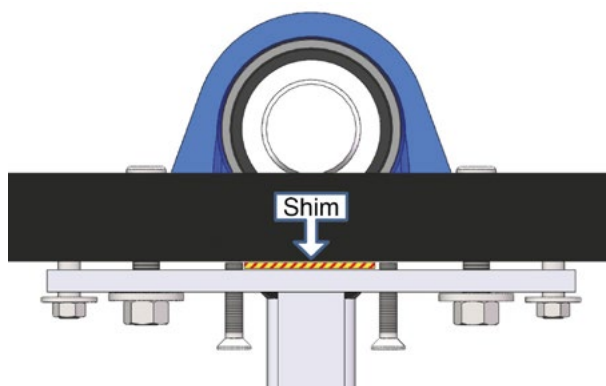


Figure 27. Shim under beam.

**4.5.4.** Tighten the screws securing the bearing assembly (Article E to 130 Nm and X to 75 Nm) and the adjuster screws (Y).

**4.5.5.** For Horizontal adjustment (misalignment between point 2 & 4): Loosen all screws securing the bearing assembly (Article E), then adjust the screws (Y) on the opposite side of the bearing, on which direction you want to move the wheel.

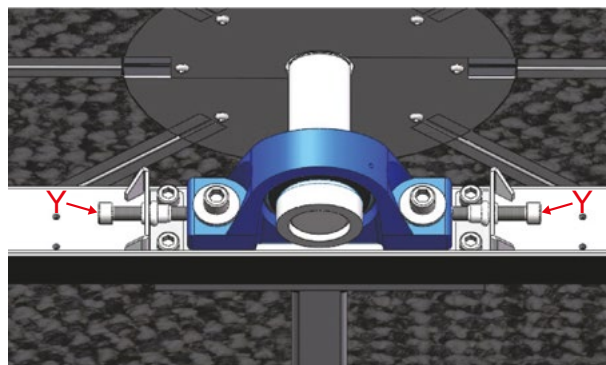


Figure 28. Horizontal adjustment.

**4.5.6.** Tighten Article E to 130 Nm when horizontal adjustment is completed.

## 4.6. Mounting the Brush Bar on the Wheel

**4.6.1.** Mount the brush bar (with oval holes) by using self-drilling screws (article G), on the inside of the brush bar holder. Use a continuous length around each side of the wheel. Let the brush bar overlap itself about 100 mm (3.94”), when the whole lap is finished. Push the brush bar towards the casing to ensure a minimum gap around the entire wheel.



Figure 29. Brush bar placement.



Figure 30. Oval holes for brush bar assembly.



**NOTE!** The ends of the brush bar profile must be sealed with a cigarette lighter before assembling, to avoid unweaving of the brush.

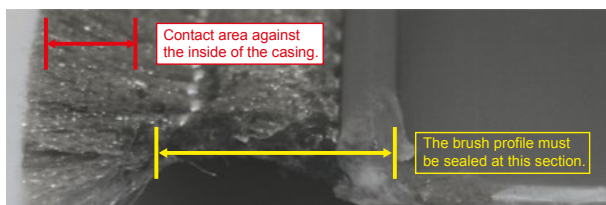


Figure 31. Brush seal.

**4.6.2.** Place protective caps (article L) on all self-drilling screw tips.

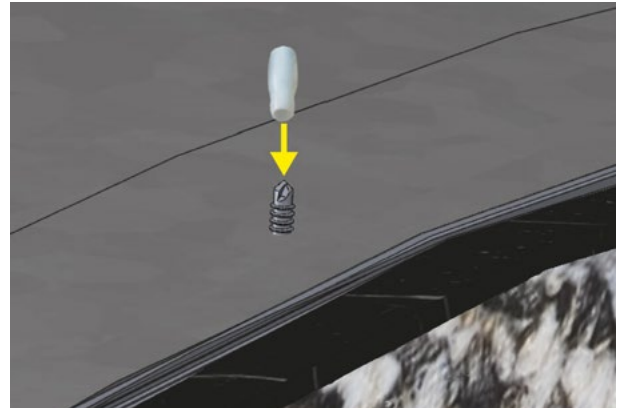


Figure 32. Protective screw caps.

## 4.7. Mounting the Brush Bar onto the Cover

**4.7.1.** Assemble the brush bar holder to the cross-beam and the purge sector, if there is one installed, with self-drilling screws (article G). Choose the length that matches the beam or the purge sector.

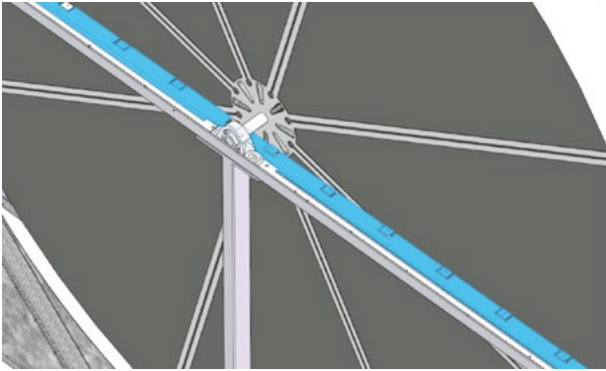


Figure 33. Brush bar holder on crossbeam.

**4.7.2.** Measure the correct length of the brush bar, from one side of the rotor to the next, along the crossbeams. Seal the ends as described in section 4.6.

**4.7.3.** Insert the brush bar between the rails of the brush bar holder.

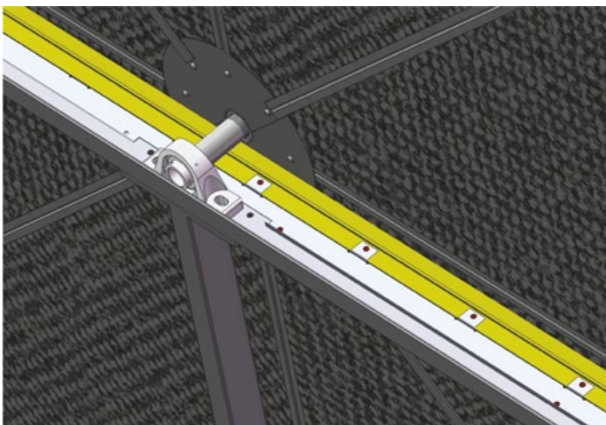


Figure 34. Brush bar on crossbeam.

**4.7.4.** Press the brush bar against the crossbeam and fasten it with screws (Article G).

**4.7.5.** Place protective caps (article L) on all self-drilling screw tips.

## 4.8. Mounting the Belt



**WARNING!** The rotor can tilt 2-3 mm (0.079-0.118"). There is a risk for squeezing of hands or fingers.

**4.8.1.** Determine the direction of the drive rotation. (See sticker/arrow on inside of the casing in the motor compartment)

**4.8.2.** Align the belt directional arrow (⇒) with the drive rotation.



Figure 35. Powerbelt.

**4.8.3.** Make sure that the motor plate is positioned closest to the wheel and that the bolts are tightened.

**4.8.4.** Put the belt around the wheel and the pulley. Make a mark where they intersect. Remove excess belt. Calculate the wheel circuit: ( $\pi \times \text{wheel } \varnothing$ ).

To obtain good tension, remove one link for each meter of wheel circuit.



Figure 36. Remove excess belt to obtain good tension.

**4.8.5.** Hold the belt with the tabs pointing outward.

**4.8.6.** Place the end tab through two links at the same time. By twisting them 90°.

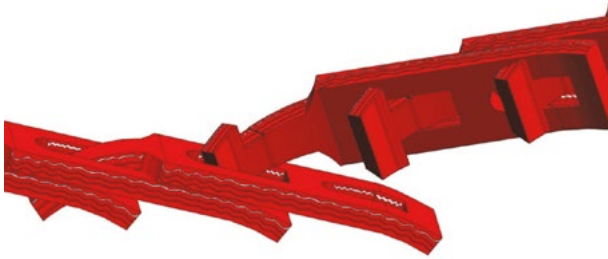


Figure 37. Connect the links.

**4.8.7.** Flex the belt further and insert the second tab through the end link by twisting the tab with your thumb.

**4.8.8.** Turn the belt with the tabs to the inside before installing.

**4.8.9.** Roll the belt onto the pulley, turning the drive slowly by hand.



**CAUTION!** Do not jog the motor.

**4.8.10.** Make sure that all tabs are still in their correct position and not twisted out of alignment.



**NOTE!** It is possible that the belt twists around over the wheel during operation, this is OK.

**4.8.11.** Check the drive tension after 5 min. running at full load. If needed tighten the belt by pulling back the engine plate.

**4.8.12.** The drive tension should be checked again after 24 hours running at full load. Pull back the engine plate away from the wheel to tighten the belt, or remove a few links from the belt if necessary.

## 4.9. Lifting into Place

The only allowed lifting point for a complete housing is under/around the shaft in the center of the rotor. Use slings/hooks and make sure that the heat exchanger is stable.



**WARNING!** Do not move or stand under the load when it is lifted. Make sure that the heat exchanger is balanced when it is lifted. If it is not, parts of the rotor can fall and cause harm to personnel.

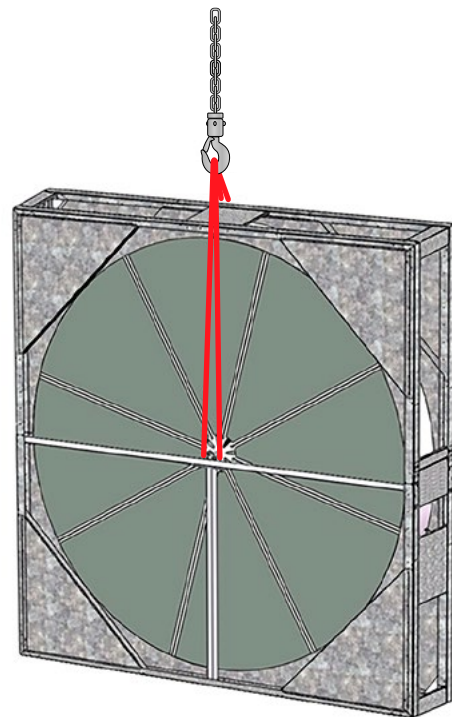


Figure 38. Use slings/hooks around the center shaft when lifting the rotor.



## 4.10. Electrical Installation

All work on the electrical installation of the Model EQ heat exchanger must be performed by authorized personnel only.



**WARNING!** The main power switch must be locked in the off position before any work is performed on the electrical installation.

**4.10.1.** The electrical installation depends on whether the heat exchanger has a controller or not:

- If it does not have a controller, it should be installed to 3-phase of either 230V or 400V. The electrical installation can be made by a  $\Delta$ -connection or a Y-connection.
- If it has a controller, then we refer to the controller manual for installations.

**4.10.2.** Assemble the rotation detector holder (Part 4) on the inside of the casing (Article H, I and J).

**4.10.3.** Mount the rotation detector in the holder. Make a mark on the outer cover (sweep) surface, directly beneath the tip of detector.

**4.10.4.** Drill a hole on the mark, suited for the screw purposed to hold the detector magnet in place.

**4.10.5.** Attach the magnet on the outer cover of the wheel (The “S” symbol facing the detector) and adjust the clearance between the magnet and the detector (maximum 15 mm (0.59”) clearance).

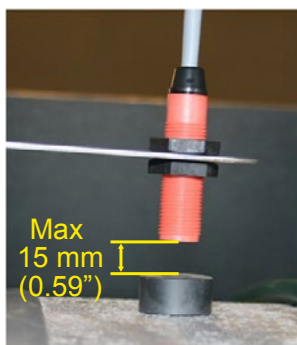


Figure 39. Maximum clearance between magnet and detector.

## 5. FIRST START-UP

The Model EQ heat exchanger is usually installed as part of a system. However, if it is possible in that particular system, it is a good idea to start only the heat exchanger first, to make sure that there are no imbalances or other problems with the installation before the whole system is started.

If it is not possible to start only the heat exchanger, you should pay attention to any unexpected noises from the heat exchanger when the system is started.



**CAUTION!** Be prepared to switch off the power to the heat exchanger when it is started for the first time after installation, in case there is some imbalance or other problems with the installation. If the power is not quickly switched off in such cases, the equipment can be damaged.

The adsorption/hybrid material is aluminum coated with a silica gel or molecular sieve based coating. There is a small amount of surplus material that might leave the matrix during the first time of usage. This will NOT affect the hygroscopic properties. The excess powder is harmless and easy to remove using a vacuum cleaner.

**5.1.** Before the power is switched on, turn the rotor a few times by hand to make sure that it rotates freely without scraping or imbalance.

**5.2.** Reinstal all safety covers over the heat exchanger.

**5.3.** Switch on the power to the heat exchanger. Be prepared to immediately switch it off again in case of any unexpected noises or other problems.



**CAUTION!** Do not inhale the heat exchanger air flow. Excess coating on the rotor can be flushed off with the first air flow.

**5.4.** Let the heat exchanger run for 5 minutes and stay prepared to switch off the power during that time. Listen for noises, vibrations or other signs of imbalance in the rotor. Check the drive tension. If needed, tighten the belt by pulling back the engine plate.

**5.5.** Check the tension of the power belt after the first 24 hours of operation. Adjust the tension if necessary. Pull back the engine plate away from the wheel to tighten the belt, or remove a few links from the belt if necessary. Refer to the instructions under “Maintenance”.

## 6. OPERATION

### 6.1. Normal Operation

When the Model EQ heat exchanger has been started it does not require any further input from an operator. Follow the instructions under “Maintenance”, to make sure that it runs smoothly over time.

### 6.2. Monitor and Control

If the Model EQ is installed with a controller, this can be used to monitor the operation of the heat exchanger. Refer to the manual for the controller for instructions on how to operate it.

If the Model EQ is not installed with a controller, it can be monitored by the overall system controller.

### 6.3. Alarm Signals

If the Model EQ is installed with a controller, this sends alarm signals under some conditions. Refer to the controller manual for further information.

If it is not installed with a controller, the Model EQ can be monitored by the system controller.

However, if the internal temperature of the heat exchanger motor gets too high, i.e. above 150°C (302°F), the motor is automatically switched off. Once the temperature is cooled down, the motor automatically starts again. No action from an operator is required for this.

### 6.4. Trouble Shooting

If the rotary heat exchanger does not rotate properly, follow these steps to solve/locate the problem.

1. If the motor runs properly please jump to step 5.
2. If there is a controller installed please check controller technical specifications, chapter troubleshooting.
3. If there is a constant drive installed: Please check that the drive is correctly connected. Note that all electrical maintenance and installation must be performed by qualified personnel.
4. Disconnect the belt, is the motor running correctly?
5. If the belt is sliding please tighten the belt according to maintenance instruction.
6. Rotate the wheel by hand (belt disconnected from the motor). Is it possible to smoothly rotate the wheel or are there contact between the wheel and the casing? If there is mechanical friction, please locate the position. Check straightness of wheel and casing.
7. Make sure the connected ducts do not press on the casing making it squeeze against the wheel. Make sure the diagonal measures of the casing side where the motor is positioned are equal.
8. If necessary, adjust the bearings (tilted wheel, interacting brush profile, etc.). Refer to chapter 4.5 in this manual for instructions.
9. If there is a gap between the inside of the casing and the brush profile, or if the brush profile interacts too heavily with the casing when the wheel is pressurized, the supporting struts (present from Ø2801 mm (Ø110.28”) and up) need to be adjusted/tightened. Either until the gap is removed or until the brush profile is no longer squeezed against the casing.

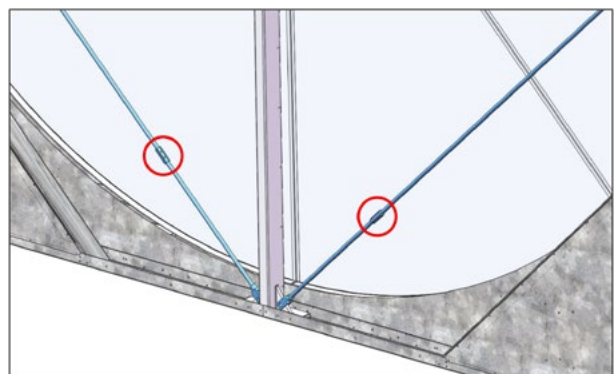


Figure 40. Adjust supporting struts to achieve the correct distance between casing and brush profile.



## 7. MAINTENANCE

General maintenance should be performed with a frequency of 3-6 months.



**WARNING!** Switch off the main power before the safety covers are removed from the heat exchanger. Make sure that the power can't be accidentally turned back on while maintenance is performed. If it is, there is a risk for electrical shock or squeezing.

Do a check of the following for general maintenance:

- Before the power is switched off:
  - Listen for unexpected noises from the rotor.
- Switch off the power. Lock the power switch in the off position.
  - Check the tension of the powerbelt. If necessary, adjust the length. Refer to 7.3/7.4 below.
  - Check the brush sealant for wear and damage. Refer to 7.5 below.

### 7.1. Matrix

To secure the function and performance, the face of the rotor has to be inspected regularly for dust and dirt. In most cases the self-cleaning due to counter flow and rotation of the matrix makes manual cleaning unneeded. If the self-cleaning is insufficient, dirt or/and dust can appear in the matrix. Depending on the degree of soiling it is recommended to use the following cleaning:

1. For only a small amount of easily removable dirt, Heatex AB recommends to use a vacuum cleaner.
2. For heavier dirt, it is also possible to use compressed air, but with caution.
3. Firmly attached dirt in the rotor is easiest removed by using hot water and a mild detergent.

### 7.2. Hybrid/Adsorption Material

The adsorption material consists of aluminum with a silica gel or molecular sieve based coating. There is a small amount of surplus material that might leave the matrix during the first time of usage. This will NOT affect the hygroscopic properties. The excess powder is harmless and easy to remove using a vacuum cleaner.

The hybrid wheel properties are obtained by a combination of a flat strip of adsorption material consisting of silica gel coated aluminum and corrugated aluminum strip which result in a moisture transfer capacity in between that of an aluminum matrix and an adsorption matrix.

Just as for the adsorption wheel a small amount of surplus material may leave the matrix during the first time of usage.

### 7.3. Power Belt

The power belt is subjected to natural stretching which may require shortening of the belt. Tension of the belt must be checked after the first 24-48 hours in operation to secure the rotational function of the wheel. The belt is made of links that can easily be added or removed without any tools. By just twisting the belt it is possible to open it and remove links to shorten the belt until the correct length and belt tension are obtained. To obtain good tension, remove one link for each meter of wheel circuit.

If it requires changing, refer to the installation chapter for instructions on how to install the belt. The required properties of the belt are listed in Appendix A. For information on how to order a new belt from Heatex AB, refer to the spare parts list in Appendix B.

### 7.4. Brush Sealants

Tightness between brush sealants and casing has to be checked during inspection. The brush sealants are easily adjusted by unscrewing the screws and moving the brush sealant into the right position.

The life length of a brush sealant depends on installation and use. When it requires changing, refer to the Installation chapter for instructions on how to install a new sealant. The required properties are listed in Appendix A. For information on how to order a new brush sealant from Heatex AB, refer to the spare parts list in Appendix B.

## 7.5. Controller

For further information regarding rotary heat exchanger equipped with controller, please see corresponding controller instructions.

## 7.6. Replacement of Bearing

The bearing in the Model EQ heat exchanger is maintenance free.

If it requires changing, make sure that it is replaced with a bearing with the same properties. For information on how to order a new bearing from Heatex AB, refer to the spare parts list in Appendix B.

## 7.7. Drive Motor

The estimated life time of a motor is 5 years or more, under normal conditions.

Accumulated dust/dirt on the motor cooling fins raises the internal temperature of the motor and may cause premature failure.



CAUTION! The drive motor temperature rises when the heat exchanger is operating. Risk for burning of hands and fingers.

## 8. END OF LIFETIME/RECYCLING

The Model EQ heat exchanger does not contain any material that can cause harm when it is destructed. For a list of exact materials, refer to Appendix A.

The Model EQ heat exchanger contains a significant amount of aluminum. Heatex AB recommends that this is recycled when the heat exchanger is to be destructed.

Make sure that all components are taken care of in accordance with local rules and regulations.

## 9. SUPPORT

For questions or information regarding this product, please communicate your order number and product code along with your message.

Heatex is available for support during office hours: 8 am – 4.30 pm (GMT +1) on weekdays.

## APPENDIX A: TECHNICAL DATA

### Dimensions

Rotor: Diameter 1600-3800 mm (62.99-149.61")  
 Casing: 1740x1740x456 mm to 4050x4050x456/460/500 mm  
 (68.5x68.5x17.95" to 159.45x159.45x17.95/18.11/19.69")  
 (depth varies depending on diameter of wheel). (Minimum rotor diameter+250 mm (9.84"))

### Materials

Rotor: Aluminum, aluminum with epoxy coating, aluminum with silica gel coating or aluminum with molecular sieve coating.  
 Casing: Galvanized steel  
 Power belt: Polyurethane  
 Brush sealant: Polypropylene  
 Other: For current data sheets on silica gel and molecular sieve, please contact Heatex AB.

### Electrical Data

Constant drive: Induction motors (180-750W) are used for all rotor sizes and rotation speeds (12 rpm for condensation/hybrid, 17 rpm for adsorption silica gel and 25 rpm for adsorption molecular sieve). All motors are equipped with thermal break contacts.

Condensation & Hybrid Rotor	Adsorption Rotor	Nominal Power (W)	Supply (V/Hz)	Nominal Speed (RPM)	Nominal current (A)	Pole number	Iso class	IP class	Mass with gear
1600-2100 mm (62.99-82.68")	-	180	3x400/50	1350	0.58	4	63	IP55	5.1 kg (11.24 lb)
-	1600-1700 mm (62.99-66.93")	180	3x400/50	2820	0.5	2	63	IP55	4.5 kg (9.92 lb)
2101-3100 mm (82.72-122.05")	1701-2500 mm (66.97-98.43")	370	3x400/50	2740	1.0	2	71	IP55	7.6 kg (16.76 lb)
3101-3800 mm (122.09-149.61")	2501-3800 mm (98.46-149.61")	750	3x400/50	2850	1.73	2	80	IP55	13.6 kg (29.98 lb)

Table 2. Electrical data.

For drives with speed control, please see separate manual for the drive and control system.

### Application Limits

Maximum pressure drop:	250 Pa
Recommended pressure drop:	100-250 Pa
Maximum allowed pressure difference:	600 Pa
Maximum temperature:	65°C
Minimum temperature:	-40°C

Table 3. Application limits.

### Temperature Limits for Mounted Components:

Bearing temperature:	-40°C to 110°C
Belt temperature:	-30°C to 80°C (power belt: maximum 110°C)
Motor temperature:	-10°C to 40°C (thermo contacts release at 150°C inner temp.)
Standard controller:	0°C to 45°C

Table 4. Temperature limits components.

### Noise

The Model EQ heat exchanger does not emit noises that exceed 63 dB at any time during operation under normal conditions.

## APPENDIX B: SPARE PARTS

Please contact Heatex AB for more information or to order spare parts. Always specify serial number or order number for the heat exchanger, when ordering spare parts.

Spare part	Article No	Comment
Power Belt	41054	Specify required length
Brush profile (wheel)	41837	Specify required length
Brush profile (cross beam)	41738	Specify required length
Screws	-	See Appendix C
Motor	-	Contact Heatex AB
Bearing RASEY 30 EQ	43732	
Bearing RASEY 45 EQ	43733	
HUB BUSHING 30 EQ	43700	
HUB BUSHING 45 EQ	43702	
TRACKRING SGA 30	21514	
TRACKRING SGA 45	43734	
Spoke lock pin (part 6, App.C)	41776	
Hub cover (part 5, App.C)	41773	
Wheel	-	Contact Heatex AB

Table 5. Spare parts.

## APPENDIX C: CHECK LIST AND REQUIRED TOOLS FOR INSTALLATION

### Check List

Before the Model EQ heat exchanger is unpacked, inspect the package for damage. During unpacking, make sure that the following articles are included. Quantity within (Parentheses) is usage for rotors with Ø up to 2000 mm (78.74"). Quantity marked with \* is extras (Included in Qty).

#### Fasteners

Article	No	Qty	*	Check
A. MC6S 12.9 M8x60	42830	16 (8)	4	[ ]
B. S4B FZV 9x25	31542	20 (10)	2	[ ]
C. M6M FZB M8, Cl. 12	44471	10 (6)	4	[ ]
D. M8x40 CTSK	44330	11	1	[ ]
E. DIN 912 M12x60	44331	4		[ ]
F. MRT FZB M6x10	41073	10 (6)	2	[ ]
G. HB FZB 4.8X16	42832	App. = $\frac{7 \times \text{wheel } \varnothing}{100}$		[ ]
H. M5x20 MC6S FZB	44472	23	1	[ ]
I. BRB 5,3x10x1 FZB	44473	23	1	[ ]
J. Lock Nut M5 DIN985	44474	23	1	[ ]
K. Lock Nut M8, DIN 985	44332	9	1	[ ]
L. Protective cap	43754	App. = $\frac{7 \times \text{wheel } \varnothing}{100}$		[ ]

#### Parts

Article	No	Qty	*	Check
1. Spokes		3 (1)		[ ]
2. Covers		4 (2)		[ ]
3. Shims (Feeler gauge)	44455	1		[ ]
4. Rotation detector holder (if ordered)		1		[ ]
5. Hub Cover		2		[ ]
6. Spoke Locks		3 (1)		[ ]
7. Purge sector (if ordered)		2		[ ]
8. Brush holder (for purge sector)		2		[ ]
9. Brush holder (for crossbeam)		4 (3 if purge sector)		[ ]
10. Brush holder (for wheel)		16 (8)		[ ]
11. Brush		App. = $\frac{\text{wheel } \varnothing}{100}$ (m)		[ ]
12. Power Belt		App. = $\pi \times \text{wheel } \varnothing + 2$ meters		[ ]
13. Profile cover plate		4		[ ]

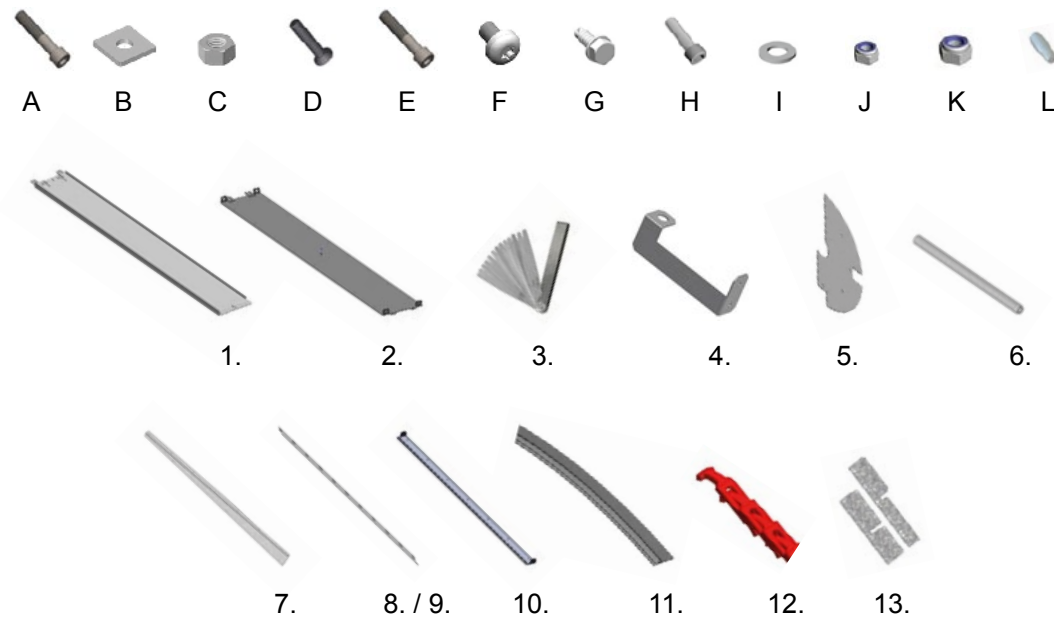


Figure 41. Fasteners and parts.

### Tools Required During Installation

	Qty	Tool
1.	1	Spanner key No. 13 with locking function
2.	1	Spanner key set 10-19 mm, with locking function
3.	1	Lifting hoist 500 kg with a 8 m chain
4.	1	Torque wrench with min. 0-200 Nm
5.	1	Bits magnetic-holder socket 8mm for screw article G
6.	1	Screw clamp min. 400mm
7.	1+1	Screwdriver: Torx® T 30 and PH2
8.	1	Lifting slings, length: more than 4 m, lift capacity: more than 1000 kg
9.	1	Electrical screwdriver ( 2 batteries are recommended )
10.	1	Socket, deep, No. 13 (Same fitting as torque wrench)
11.	1	Scissor
12.	1	Hex keys (mm)
13.	1	Lighter
14.	1	Measuring tape
15.	1	Pop Rivet tool





Figure 41. Tools needed for installation.

## Center Locking Device

In order to make sure that the rotor does not move during installation of the rotor segments, the rotor should be locked. A simple locking device to use for this could be constructed using the drawing below.

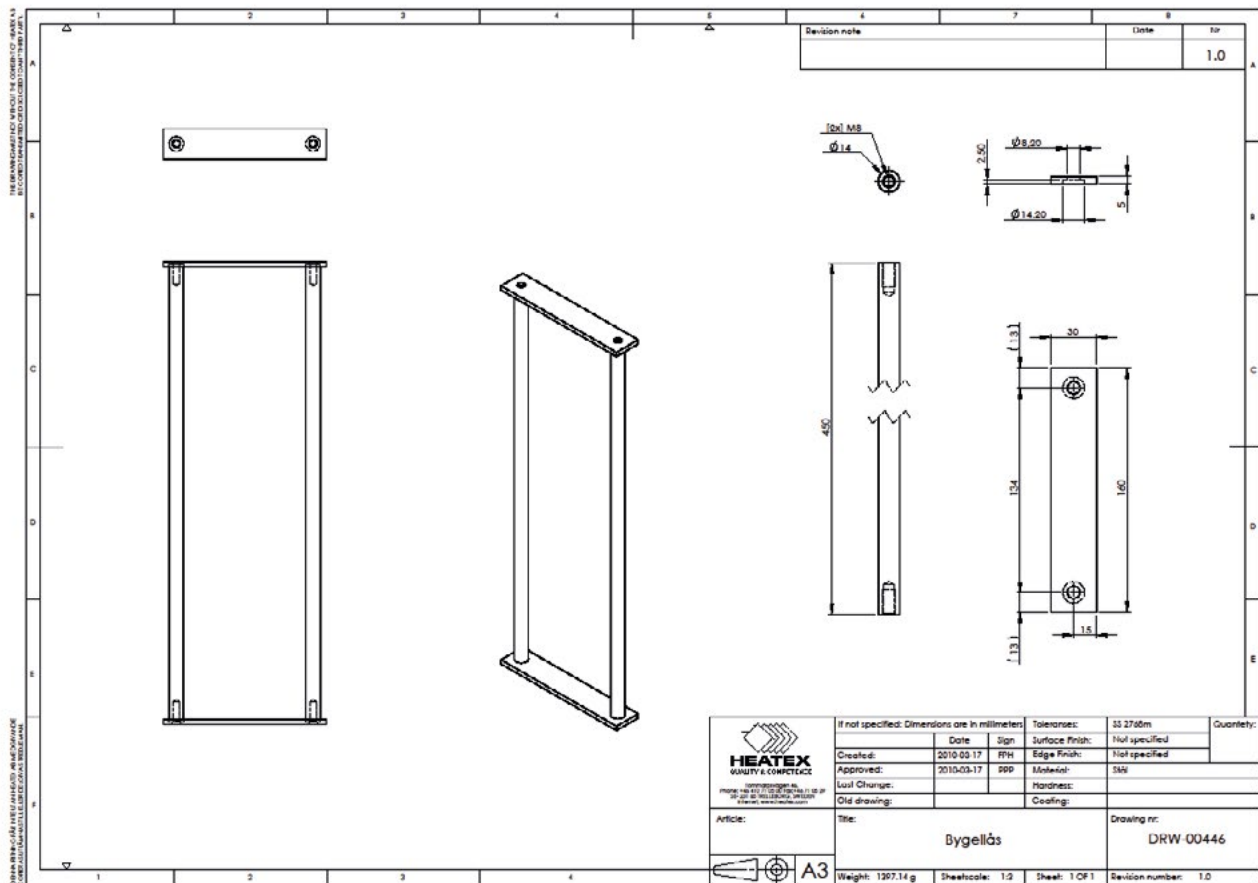


Figure 42. Drawing locking device.