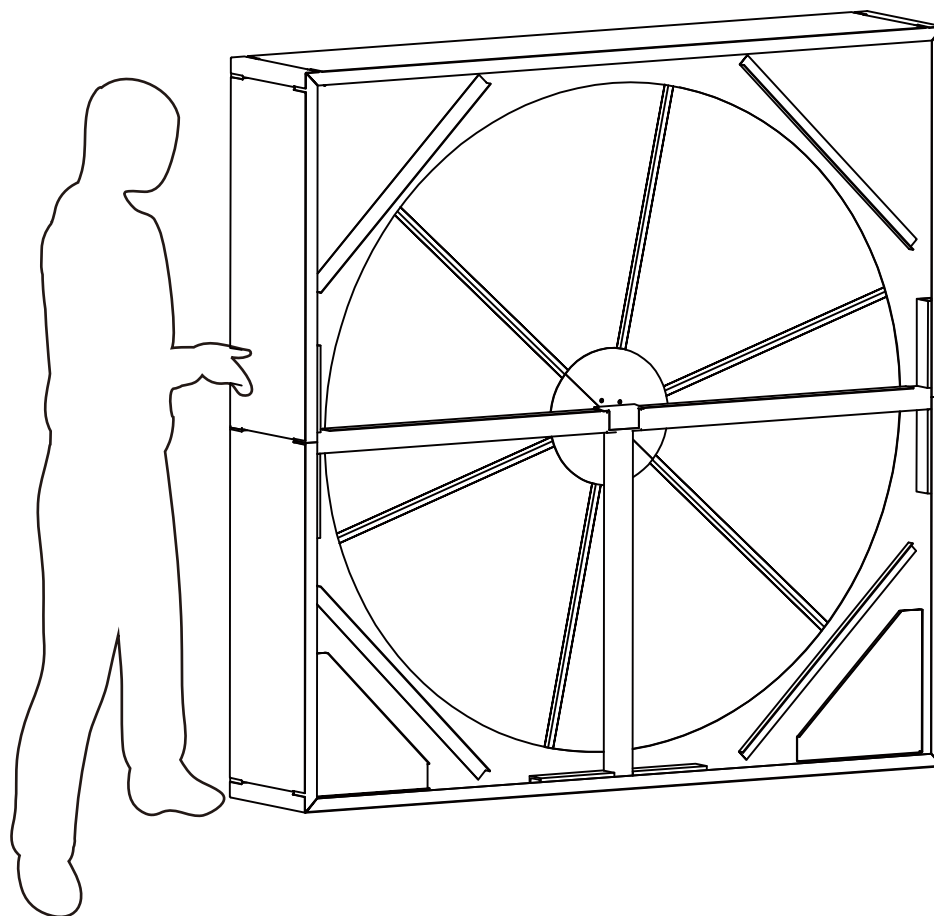


Installation and Maintenance

Energy Recovery Rotor and Casing



History of Östberg

In the 1970s Hans Ostberg, owner and founder of Ostberg was one of the inventors of the inline duct fan, which revolutionised the ventilation system design. Ostberg inline duct fans are installed in more than 2.8 million applications.

By acquisition 2004 Ostberg group became one of the largest manufacturers of Energy Recovery rotor. The last 10 years Ostberg Group has delivered over 0.5 million Energy Recover Rotors to customers in more than 80 countries.

At Ostberg, we work to continually develop our products. Our innovative power is the driving force in our company and we work to consistently maintain the very best quality on the market.

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Energy recovery involves a transfer of energy between an exhaust airstream and a supply airstream. Figure 1 illustrates the heat transfer process of an energy recovery wheel where OA is outside air; SA is supply air; RA is return air from the conditioned space and EA is exhaust air. As the two airstreams pass through the energy recovery wheel, the rotation of the wheel facilitates the transfer of energy from the higher energy airstream to the lower energy airstream. This means that the exhaust air preheats the supply air in the winter and precools the supply air in the summer. Some systems use energy recovery wheels to reheat supply air after it has been cooled—an effective means of humidity control. Some energy recovery wheels transfer only sensible energy, while others transfer sensible and latent (i.e. total) energy.

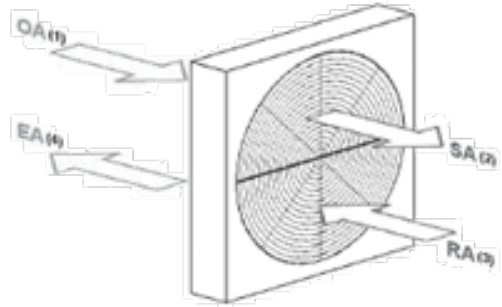


Figure 1

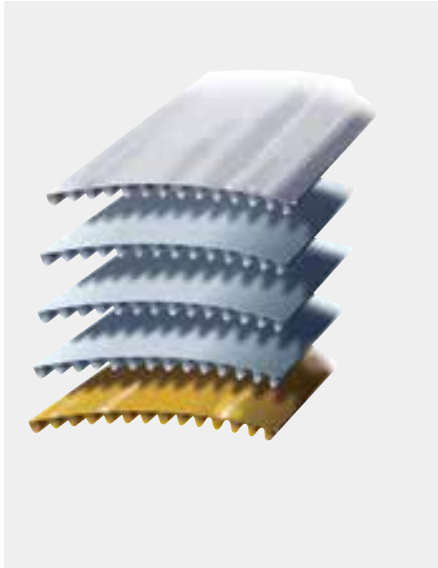
Sensible Heat Transfer

When sensible heat is transferred, the dry-bulb temperature of the colder airstream increases and the dry bulb temperature of the warmer airstream decreases. No moisture is transferred, so the humidity ratio of the two airstreams remains unchanged unless the dry-bulb temperature of the warmer airstream is decreased below its dew point, allowing condensation to occur.

Total Heat Transfer

This process involves the transfer of sensible and latent heat energy. Latent heat energy is dependent on the amount of water vapor in the air and therefore total heat transfer can only occur when water vapor is transferred from one airstream to the other. In an energy recovery wheel, this transfer is accomplished using a desiccant which absorbs/adsorbs water vapor from the higher vapor pressure airstream and releases it to the lower vapor pressure airstream. As the rotor slowly rotates between the outdoor and return air stream, the higher temperature air stream gives up its sensible energy to the aluminum. This energy is then transferred to the cooler air stream during the second half of the revolution. Just as the temperature is captured and released, so is the moisture (latent energy). This is accomplished by the wheel's desiccant coating, which has an enormous internal surface area and a strong attraction for water vapor. Since the opposing air streams have different temperatures and moisture contents, their vapor pressures differ. This vapor pressure differential is the driving force necessary for the transfer of water vapor.

Rotor Media



Sensible Energy Recovery Media / Condensation rotor / Non- hygroscopic rotor

is comprised by high quality aluminum foil suitable for applications where only sensible energy shall be recovered.

Hybrid Energy Recovery Media

is comprised by high quality aluminum foil. The Hybrid rotor is a mix between Sensible Energy Recovery Media and Sorption Energy Recovery Media. Suitable where high demand of sensible and latent energy shall be recovered.

Sorption Energy Recovery Media

is comprised by high quality aluminum foil where the foil is 100% permanently coated with a non-migrant water selective desiccant. The Sorption Energy Recovery rotor is suitable in all applications where both sensible and latent energy shall be transferred. The sorption properties give an extended performance in adsorption of water vapor (humidity).

Rotor Bearing

Type of bearings depends on the diameter of the wheel. All bearings are rated to a minimum life time of 100.000 hours. All bearings are sealed and life time lubricated.

Casing / Cassette

The framework of the energy recovery cassette is designed to securely support the rotor, provide means to secure the drive system, seal and isolate the air streams. Rotors are supported by a haft running through the hub bearings and attached to the center post of the framework on both faces. Cassettes can be supplied with adjustable purge sector.

Rotor Drive System

The rotor drive system designed for long life and minimal maintenance. The rotor drive system is the most critical component in the cassette. Damaged media and seals will still allow for some energy transfer, however if the drive system is not properly maintained and fails, the system will no longer transfer energy. Drive motors are permanently lubricated and require no maintenance.

Drive Belt

The rotor is driven by a drivebelt on its periphery, the drivebelt needs to be checked and adjusted according maintenance schedule.

Seals

Rotor seals are comprised of polypropylene brush with internal film barrier to provide separation of the air stream with minimal leakage and long service life. The sealing can be applied on the periphery of the rotor or on a flange on the casing/cassette toward the rotor surface.

Energy Recovery Casing / Cassette installation guidelines

Ostberg casing / cassettes may be located within a customer supplied air handler, within a duct system or machinery room, or as a "stand alone" component with proper exterior covers, insulation and water-proofing.

Casing / Cassette installation should ensure that the rotor and the drive are protected from elements and includes sufficient structure to adequately support the cassette from disorienting during transportation and operation.

Access doors should be provided to allow for casing / cassette and drive maintenance, as well as rotor removal. At a minimum, the full height of the drive end of the casing / cassette must be accessible for maintenance and service.

Access on both sides of the rotor media should a minimum of 600 mm to provide access to the sealing on the middle beam and full access to the attachment of the rotor to the frame work. Dividing wall attachment points to the casing / cassette should be positioned NOT to block access to the center shaft support area (shaft bolts) to the frame.

Provide clearance to adjacent walls or equipment to provide a minimum of one rotor diameter from the opening of casing / cassette frame up to a diameter of 2000 mm. Larger diameters half of the rotor diameter is requested for service area outside the unit.

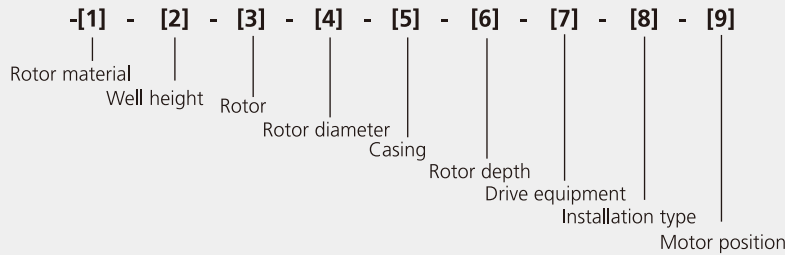
Vertical installation the casing / cassette is as standard build for vertical installation and normally do not require any additional support.

Horizontal installation is possible for rotors up to diameter 3500 mm. However, all horizontal applications request a center support along the whole middle beam and all 4 full sides of the cassette.

Casing / Cassette attachment Casing / Cassette attachment within an air handler may be by bolting, riveting or screwing. Note that the casing / cassette must be installed with care, when drilling, exercise caution not to damage rotor seals, rotor face or rotating parts. All attachment within the air handler should be additionally sealed to prevent leakage between the air streams. Attachment should result in that the casing / cassette is mounted without distortion of the frame of the casing / cassette. Distortion of the casing / cassette from improper installation may result in substantially unequal clearance between the rotor face and the casing / cassette. This can cause excessive drive torque requirements, causing wear to drive and components, seals and rotor.

SPECIFICATION

HOW TO READ THE ORDER KEY



Example: Ostberg OM-N-W-1500-OCS-200-K-A-1

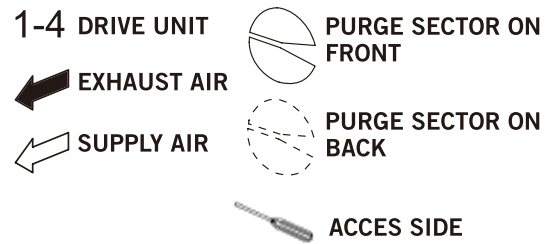
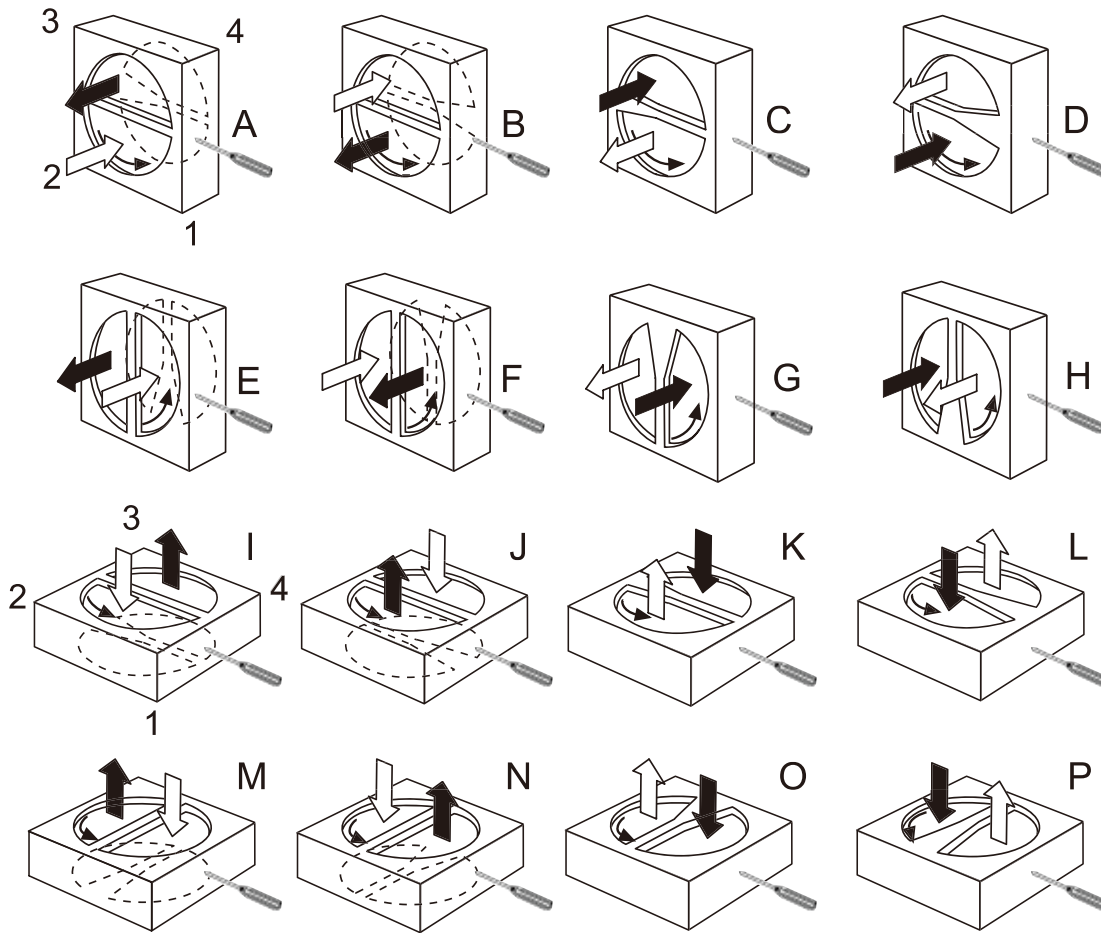
SYMBOLS

[1] Rotor material	OT	- Untreated aluminium foil
	OE	- Oxidized aluminium foil
	OC	- Epoxy-coated foil
	OK	- Seawater corrosion resistant aluminium alloy (5052) foil
	OH	- 3A molecular sieve and untreated aluminium foil
	OM	- 3A molecular sieve
[2] Well height	XL	- Extra Low
	SL	- Special Low
	L	- Low
	N	- Normal
	H	- High
[3] Rotor	W	- Winded rotor
	S	- Sectorized rotor
[4] Rotor diameter in mm		see "Dimensions"
[5] Casing	OCS	- In accordance with "Dimensions"
	CS / CSD	- In accordance with "Dimensions"
	D / DS	- In accordance with "Dimensions"
[6] Rotor depth in mm	250	250 mm
	200	200 mm (Standard)
	150	150 mm
	100	100 mm
[7] Drive equipment	V	- Variable drive, MicroMax
	K	- Constant drive
[8] Installation type	A,B,C,D,E,F...P ("Installation type and motor position")	
[9] Motor position	1,2,3,4 ("Installation type and motor position")	

Accessories

*Powder coated sheet metal, *Drain pan, *Insulation and *SST 304 complete casing

INSTALLATION TYPE MOTOR POSITION



DRIVE EQUIPMENT - TABLE SUMMARY

VARIABLE DRIVE EQUIPMENT - MICROMAX WITH MOTOR

DRIVE MOTOR		40V	AP56t	AP63t	AP71t	AP80t
Rotor diameter	mm	≤1000	<1500	1500-2399	2400-3549	3550-5000
Control unit		Micromax 180	Micromax 180	Micromax 180	Micromax 370	Micromax 750
Input voltage	V	3x230	3x230	3x230	3x230	3x230
Frequency	Hz	50/60	50/60	50/60	50/60	50/60
Motor power	KW	0,04	0,09	0,18	0,37	0,75
Rated current	A	0,39	0,74	1,10	1,92	3,34
Protection class		IP54	IP55	IP55	IP55	IP55
Weight (motor/control unit)	KG	3,4/<2,0	4,4/<2,0	5,4/<2,0	8,1/<2,0	12,6/<2,0

CONSTANT DRIVE EQUIPMENT

DRIVE MOTOR		40K	AP56	AP63	AP71	AP80
Rotor diameter	mm	≤1000	<1200	1200 - 1699	1700-2449	2450-5000
Input voltage	V	3x400	3x230/400	3x230/400	3x230/400	3x230/400
Frequency	Hz	50/60	50/60	50/60	50/60	50/60
Motor power	KW	0,04	0,09	0,18	0,37	0,75
Rated current	A	0,21	0,73/0,43	1,10/0,63	1,92/1,11	3,34/1,93
Weight	KG	3,4	4,4	5,4	8,1	12,6

**TO ENSURE TROUBLE-FREE STARTUP IT'S IMPORTANT TO FOLLOW
THE INSTRUCTIONS IN THIS MANUAL**

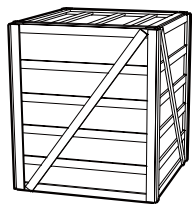
- A At receipt of the delivery check that there's no damages on the packing. Damages on packing shall be reported to the forwarder directly up on receipt of the delivery and noted on the delivery note.
- B Check the "TILT WATCH". If the Tilt watch is activated the unit shall be deemed as defect and directly reported to the forwarder and Seller (verify with photo). If the Tilt watch is activated the unit has been exposed for unreasonable large force or unnormal handling during transportation.
- C The unit shall remain in its original packing until installation. Dry intermediate storage of the delivered equipment is in any case required.
- D Do not remove the package until the unit is directly close to the location of installation, and the Air Handling Unit is ready for installation of the rotor.
- E Remain the unit inside the packing during transportation at the site.
- F Do not remove the protection of the rotor surface until commissioning.
- G The unit is in standard performance made for vertical installation. Unit for horizontal installation can be offered upon request.
- H Ensure that the unit is installed on an even base so that the rotor is completely parallel to the casing.
- I If the unit is equipped with PURGE SECTOR, ensure that the purge sector is placed in the correct position.
- J Some casings allow direct connection to duct system but ensure that the load from the duct system is neutralized at the connection point to the casing so that no load from the duct is transferred to the casing structure.
- K Ensure that Drive motor is easily accessible. Electrical connection is to be provided by the buyer.
- L Service doors shall be provided so that the unit is fully accessible for maintenance work.
NOTES adjustment of the rotor position may be required and checked at start-up to ensure that the rotor face is parallel to the casing / cassette frame and face panels.

4.1.1 WHAT IS INCLUDED UPON DELIVERY

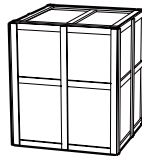


Check that the consignment matches your order and that the goods have not been damaged during transportation.

WHEN ORDERING WITH A CASING

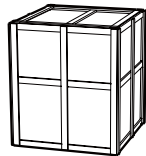


← Casing incl. hub
 ← Radial walls
 ← Drive equipment (where applicable)



← Rotor segments
 ← Remaining radial walls
 ← Periphery plates
 ← Screw kit
 ← Drive equipment (where applicable)

WHEN ORDERING A LOOSE ROTOR



← Rotor segments
 ← Hub
 ← Radial walls
 ← Periphery plates
 ← Screw kit
 ← Drive/control equipment (where applicable)

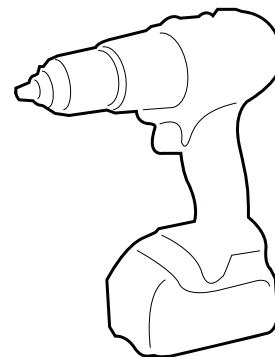
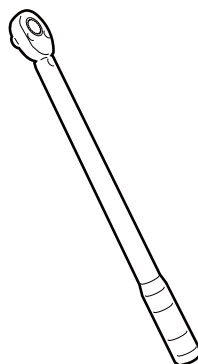
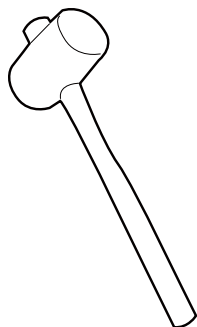
4.1.2 SAFETY

**WARNING RISK OF CRUSHING**

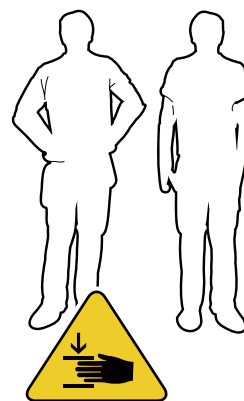
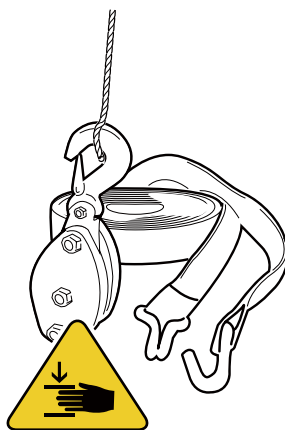
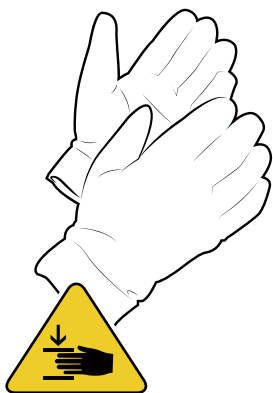
The unit has to be secured in order to prevent accidents. See sections **4.3.1** and **4.4.3** for examples of how to secure the unit.

- Uncontrolled movement of radial walls and segments may cause serious injury. Secure radial walls and segments carefully while working.
- Installation must be carried out by qualified personnel only.

4.1.3 TOOLS AND AIDS



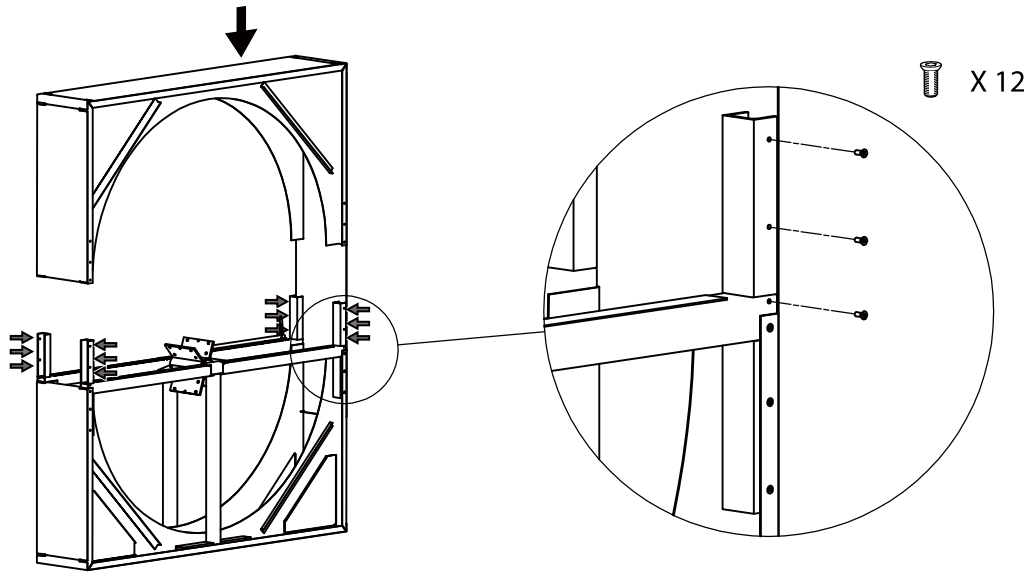
- | | |
|---|-------------------------------------|
| 1. Wrenches 13-30# | 4. Tape Ruler 5m |
| 2. Ratchet wrenches 13-30# | 5. Rubber hammer |
| 3. Torque wrench 10~50 N.m | 6. Rope or strap with hook 5m |
| 7. Pneumatic drill or electric drill | 10. Phillips screwdriver |
| 8. Rivet gun | 11. Flat tip screwdriver |
| 9. Drill bits \varnothing 3.3mm, \varnothing 4.2mm, \varnothing 5.0mm | 12. Welding tools for yellow V-belt |



4.2.1 INSTALLATION OF CASING OCS



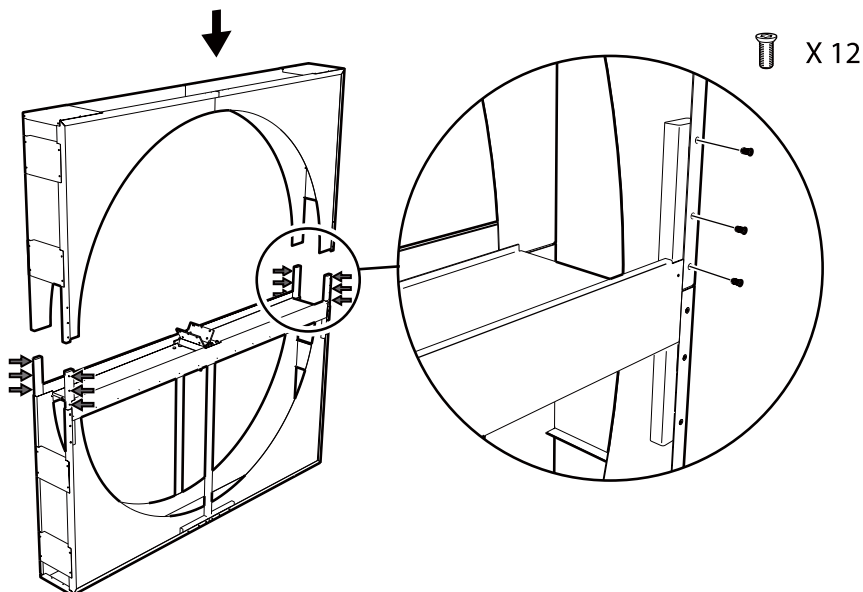
During installation, make sure that the exchanger stands flat so that the rotor is not "at an angle" in the casing.



4.2.2 INSTALLATION OF CASING CSD



During installation, make sure that the exchanger stands flat so that the rotor is not "at an angle" in the casing.

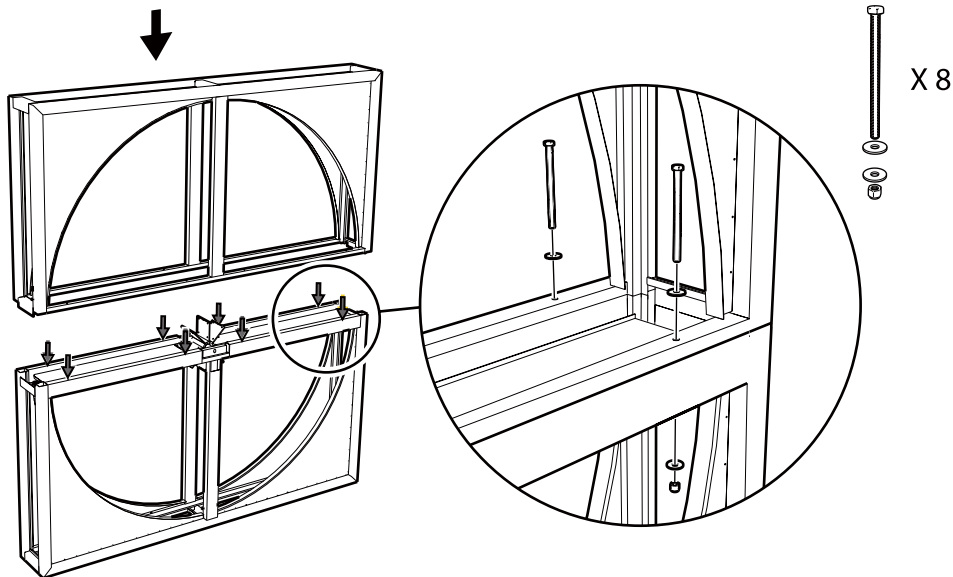


4.2.3 INSTALLATION OF CASING AND BRUSH SEALING



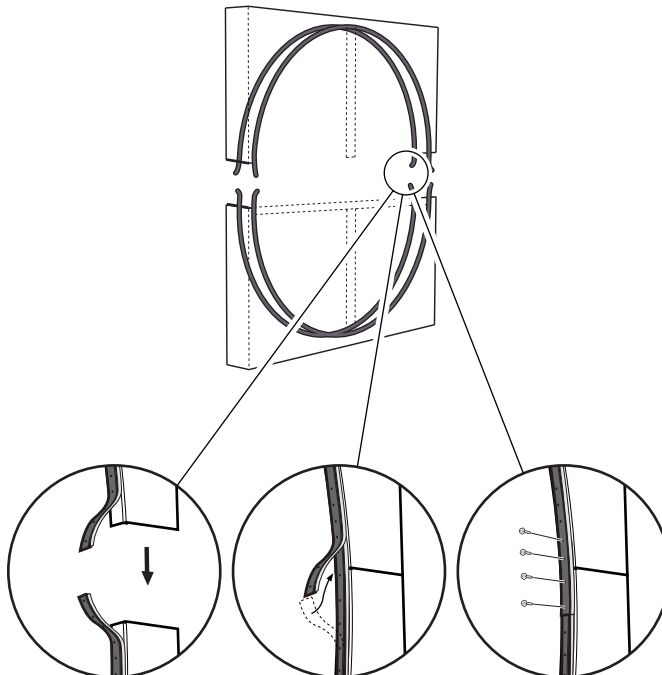
Make sure that no load is transferred from the connecting ducts if these are connected directly to the casing of the heat exchanger.

STEP 1: INSTALLATION OF CASING DS/D



STEP 2: JOINING OF BRUSH SEALING FOR MODELS DS/D

- The upper and lower overlap the ends of the brush sealing.
- Join the upper and lower brush sealing with screws.

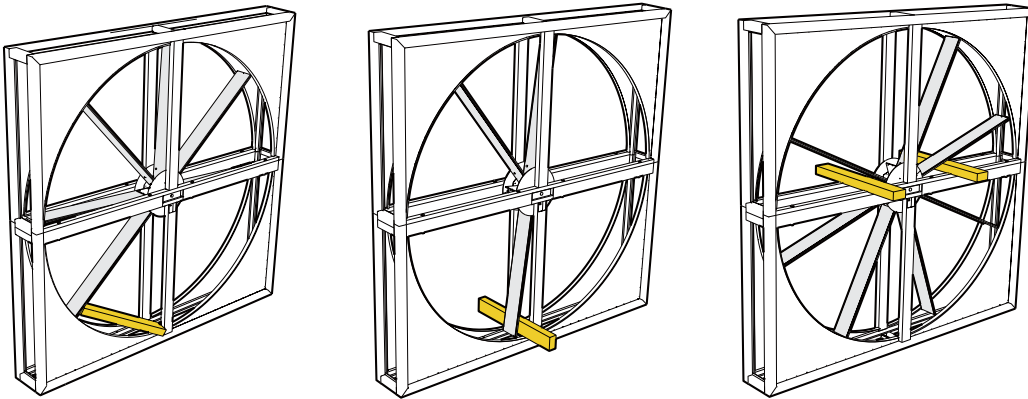


4.3.1 SAFETY

Uncontrolled movement of radial walls may cause serious injury. Secure the radial walls carefully while working. Boards must be used to secure them.



The radial walls do not need to be secured during horizontal installation.



4.3.2 INSTALLATION OF HUB

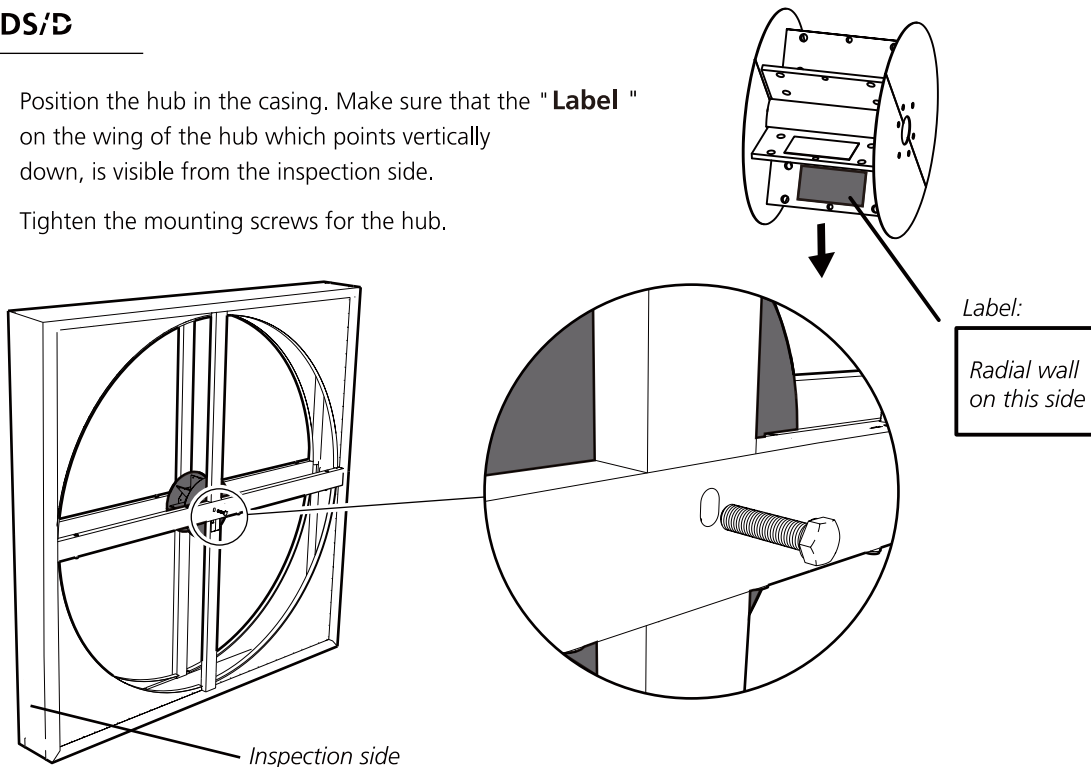


*The hub is already installed and adjusted when casing is supplied by ostberg
In this case, continue to section 4.3.7*

The suspension will vary depending on the type.

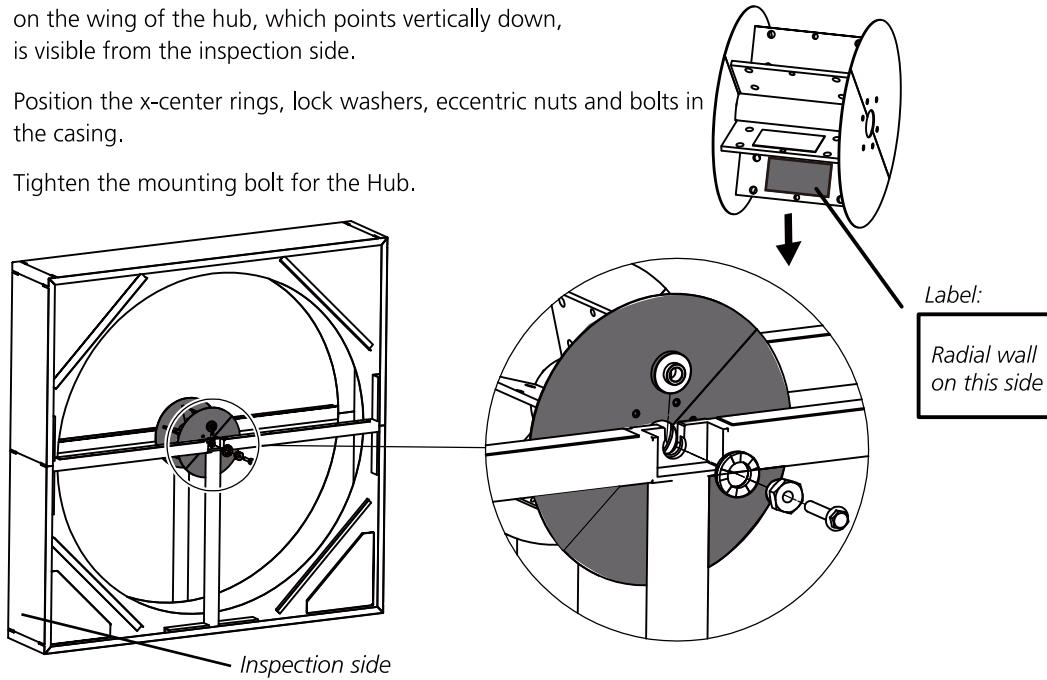
DS/D

- Position the hub in the casing. Make sure that the "Label" on the wing of the hub which points vertically down, is visible from the inspection side.
- Tighten the mounting screws for the hub.



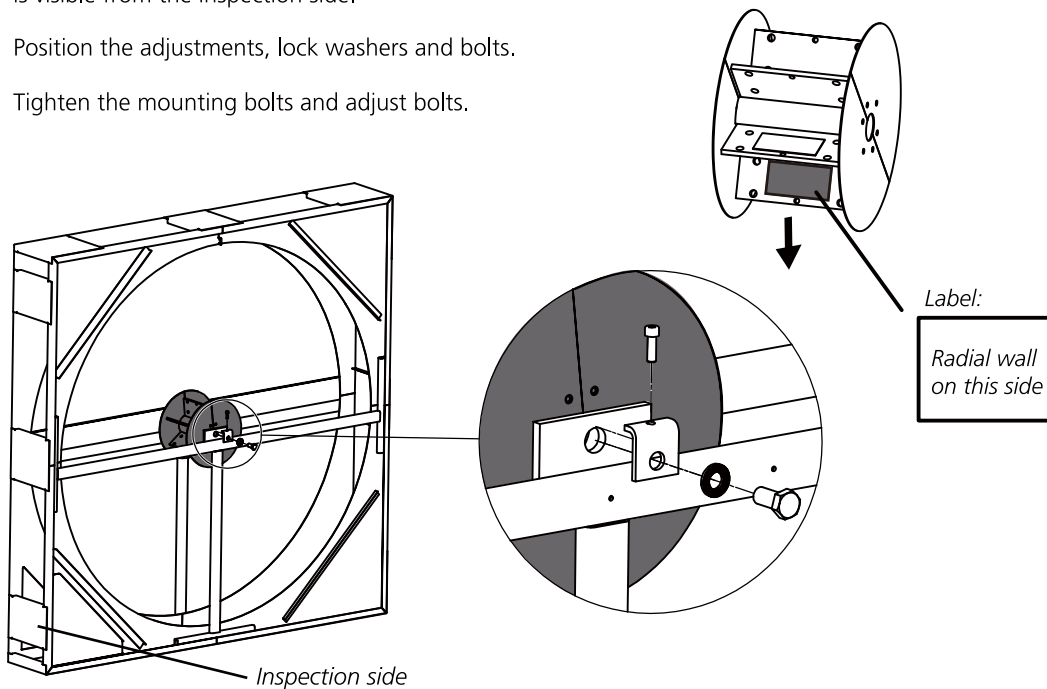
OCS

- Position the hub in the casing. Make sure that the "Label" on the wing of the hub, which points vertically down, is visible from the inspection side.
- Position the x-center rings, lock washers, eccentric nuts and bolts in the casing.
- Tighten the mounting bolt for the Hub.



CSD

- Position the hub in the casing. Make sure that the "Label" on the wing of the hub, which points vertically down, is visible from the inspection side.
- Position the adjustments, lock washers and bolts.
- Tighten the mounting bolts and adjust bolts.

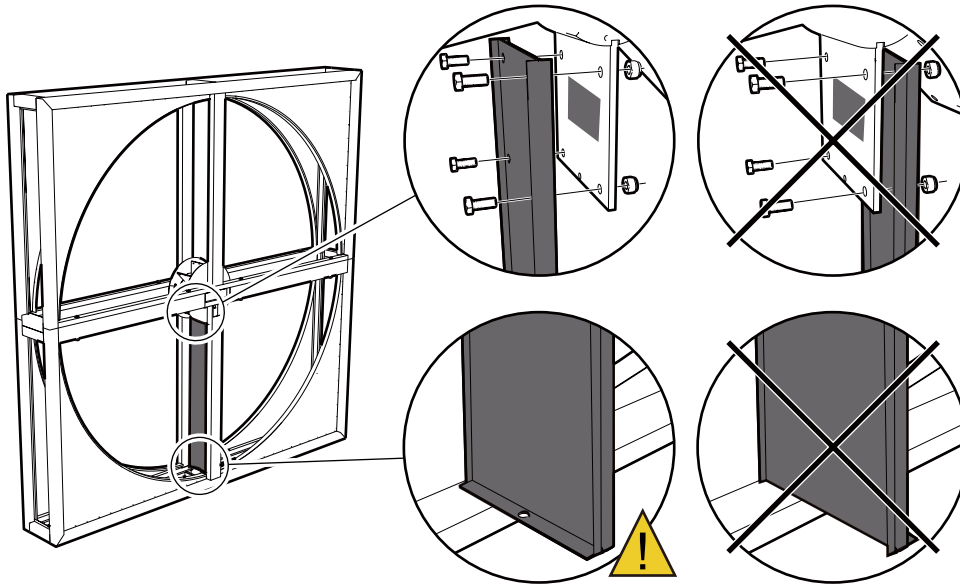


4.3.3 INSTALLATION OF RADIAL WALL NO.1

- Rotate the hub so that a wing of the hub is directed vertically down. The Label on the wing of the hub facing down must be visible from the inspection side.
- Install the radial wall against the surface marked Label side



The bent front edge of the radial walls must always face away from the wing of the hub on which the radial wall is installed. Make sure that all radial walls are installed in the same direction.

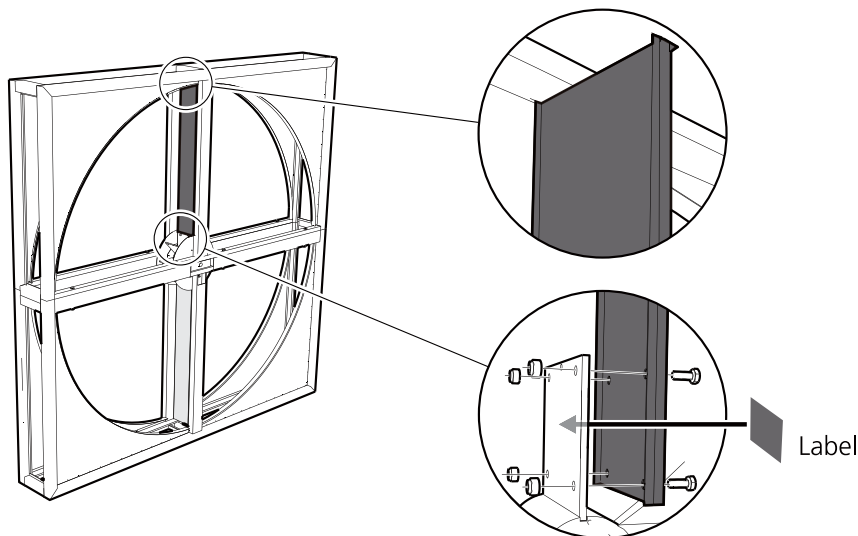


4.3.4 INSTALLATION OF RADIAL WALL NO. 2

- Install radial wall No. 2 against the surface with Label on the corresponding wing of the hub.



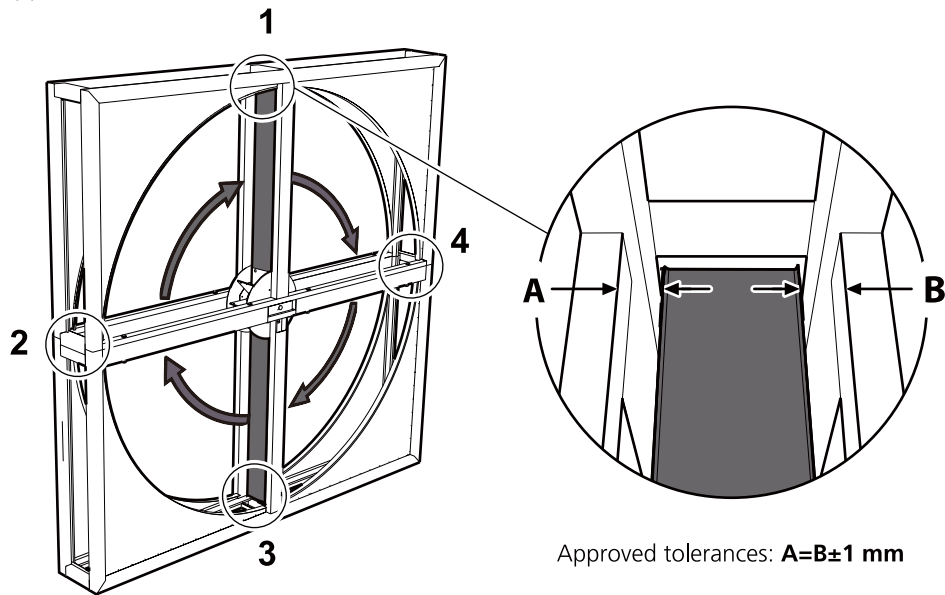
Make sure that the bent front edge of the radial wall is facing away from the wing of the hub on which the radial wall is installed.



4.3.5 MEASUREMENT

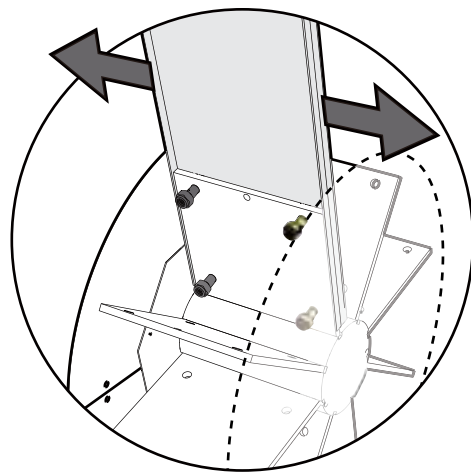
The hub with radial walls must be aligned both vertically and horizontally with the casing. If measurement indicates that there are discrepancies, the radial walls, and possibly also the hub, will need to be adjusted.

- Place two radial walls vertically.
- Measure the distances A and B between the first radial walls and the casing at points 1, 2, 3 and 4.
- Measure similar points on the next radial wall at points 1, 2, 3 and 4.
- Check that values A and B are the same for both radial walls at all points and that these values match approved tolerances.



- If the tolerance is not achieved, undo the screw at the wing of the hub and adjust the radial wall horizontally

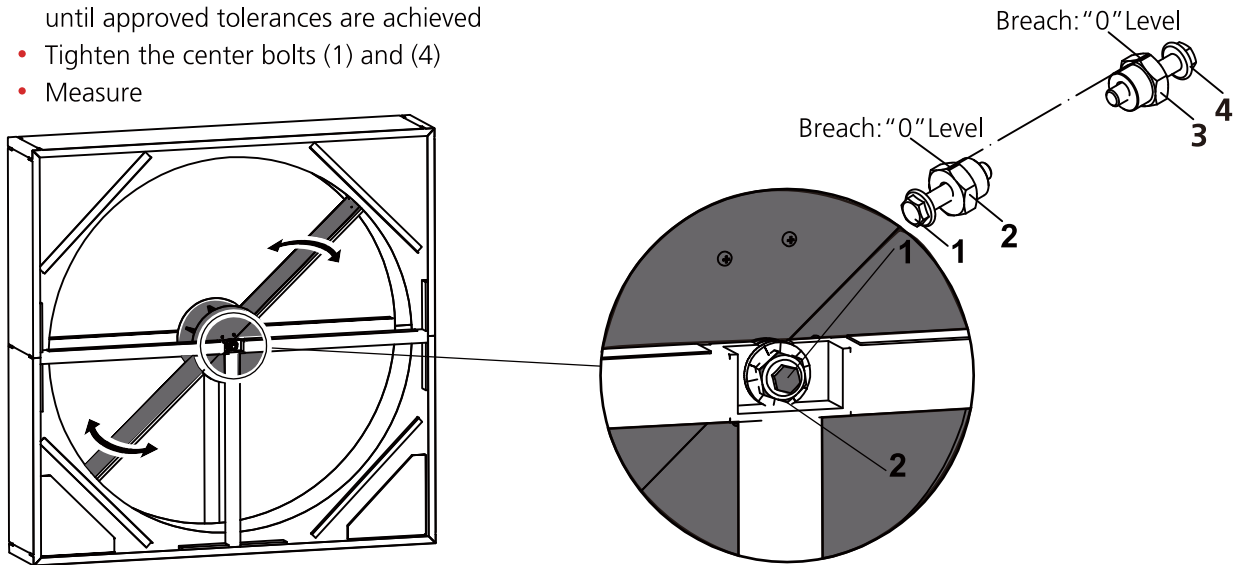
- If the tolerance is still not achieved, see section 4.3.6
- If the tolerance is achieved, see section 4.3.7



4.3.6 ADJUSTMENT OF HUB

OCS

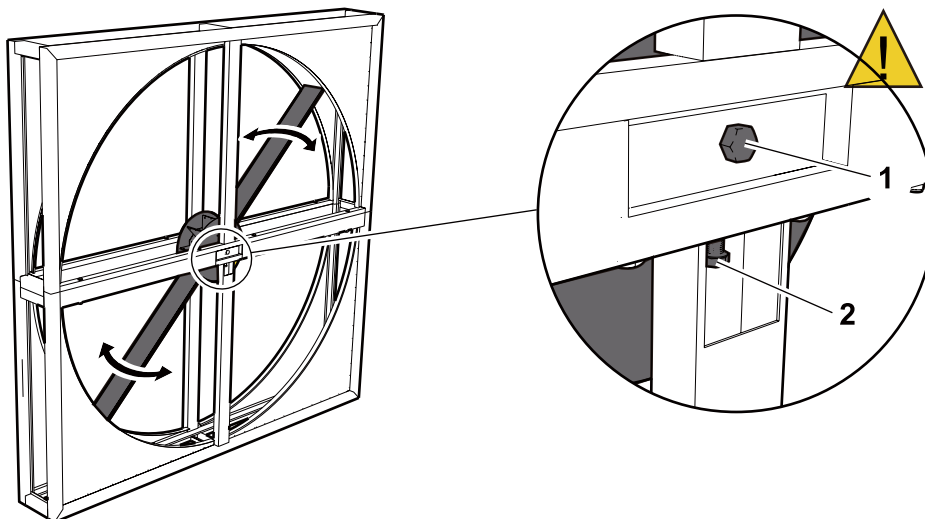
- Undo the center bolts (1).
- Put two eccentric nuts "0" level upper and check that the two eccentric nuts are horizontally.
- Ensure that eccentric nut (3) doesn't rotate and adjust the eccentric nut (2) until approved tolerances are achieved
- Tighten the center bolts (1) and (4)
- Measure

**DS/D**

- Undo the center bolt (1).
- Tighten the adjustment bolt (2) until approved tolerances are achieved.
- Tighten the center bolt (1).
- Measure.



The suspension will vary depending on the type.

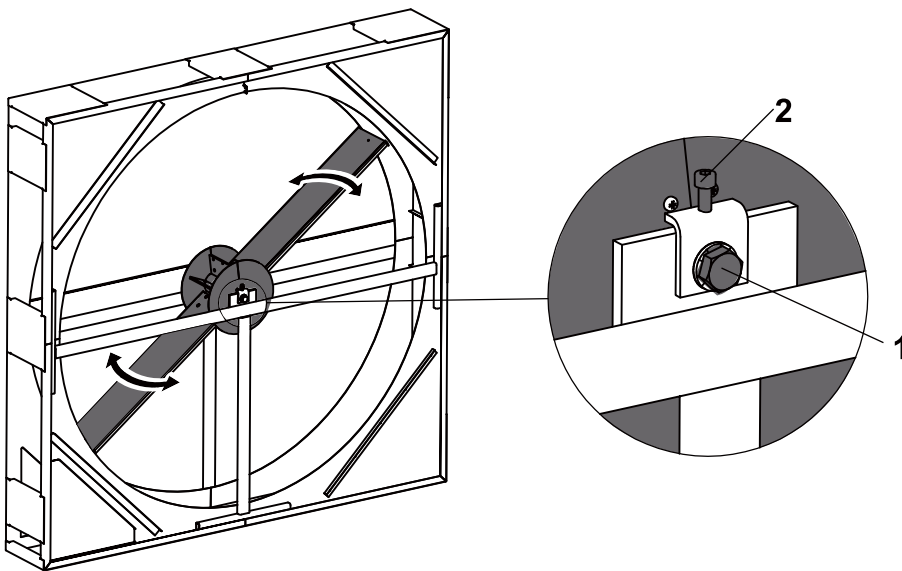


CSD

- Undo the mounting bolt (1).
- Tighten the adjustment bolt (2) until approved tolerances are achieved.
- Tighten the mounting bolt (1).
- Measure.



The suspension will vary depending on the type.

**4.3.7 INSTALLATION, OTHER RADIAL WALLS**

- Install other radial walls as stated in sections **4.3.3** **4.3.4** and **4.3.5**



Measure, and make sure that all radial walls installed achieve approved tolerances.

**WARNING RISK OF CRUSHING**

*The radial walls have to be secured in order to prevent accidents.
See section **4.3.1***

4.4.1 SAFETY



WARNING RISK OF CRUSHING

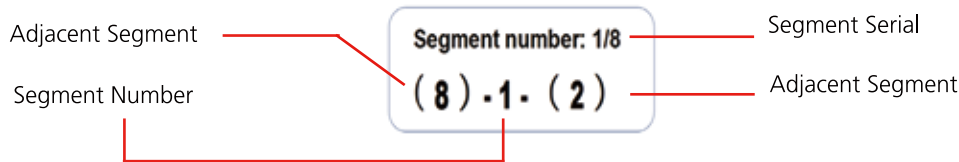
Radial walls and segments have to be secured in order to prevent accidents. See sections 4.3.1 and 4.4.3

- Uncontrolled movement of radial walls and segments may cause serious injury. Secure the radial walls and segments carefully while working.
- Use a rope or strap for controlled rotation.
- At least two workers are required when installing segments.



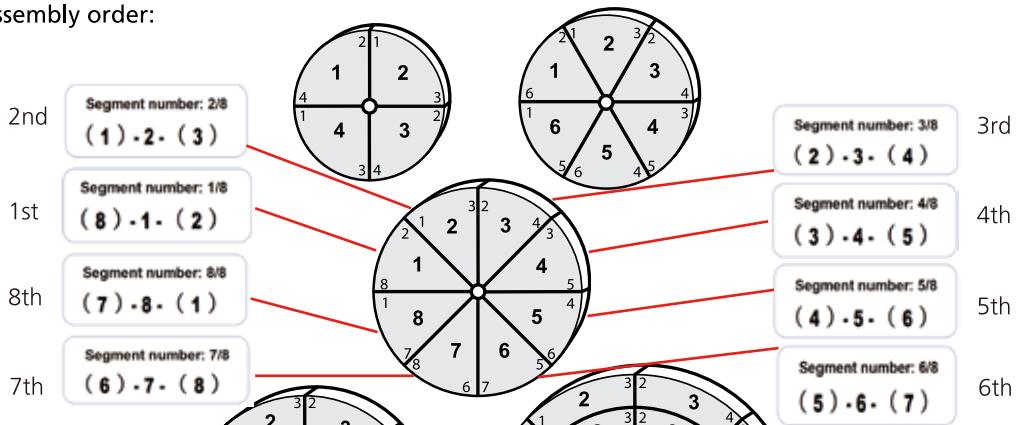
4.4.2 LABELLING OF SEGMENTS

The segments are labelled with their own individual numbers in the centre of the peripheral area which indicates the segment against which this outer edge must be installed.

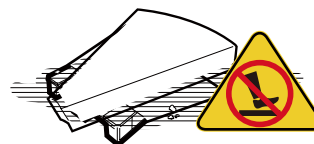


Installing segments from 1 to 8

Assembly order:

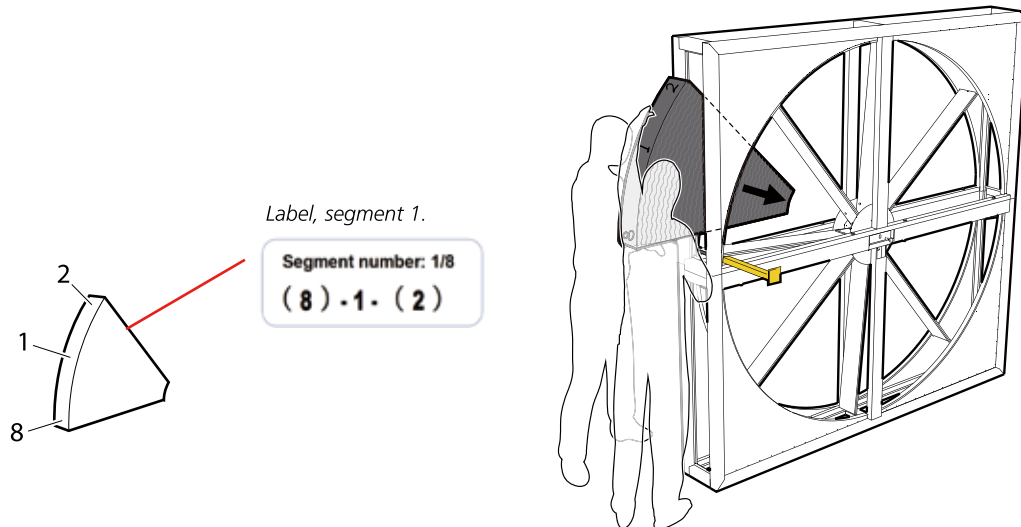


1. The segments surface must be protect by cardboards, please don't remove them in the process of handling
2. After the installation and commisioning work, please put back the cardboards to protect the rotor wheel until a formal use.

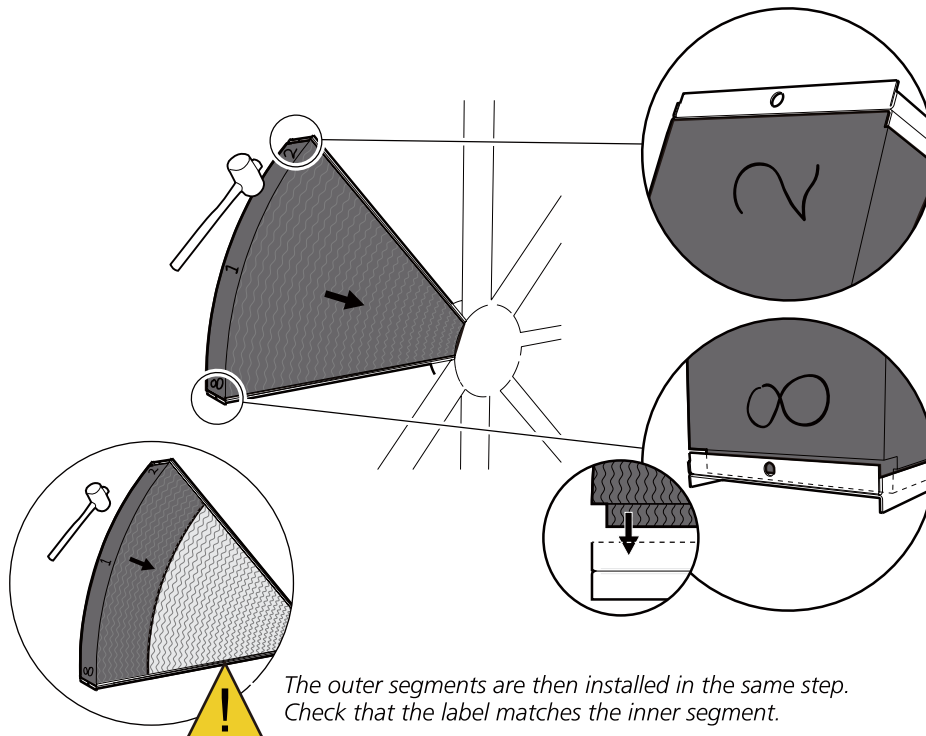


4.4.3 INSTALLATION, SEGMENT NO.1

- Secure the structure.
- Check the number. For labelling, see section 4.4.2
- Position segment No.1. ("2" on upper side, "8" in the lower side)

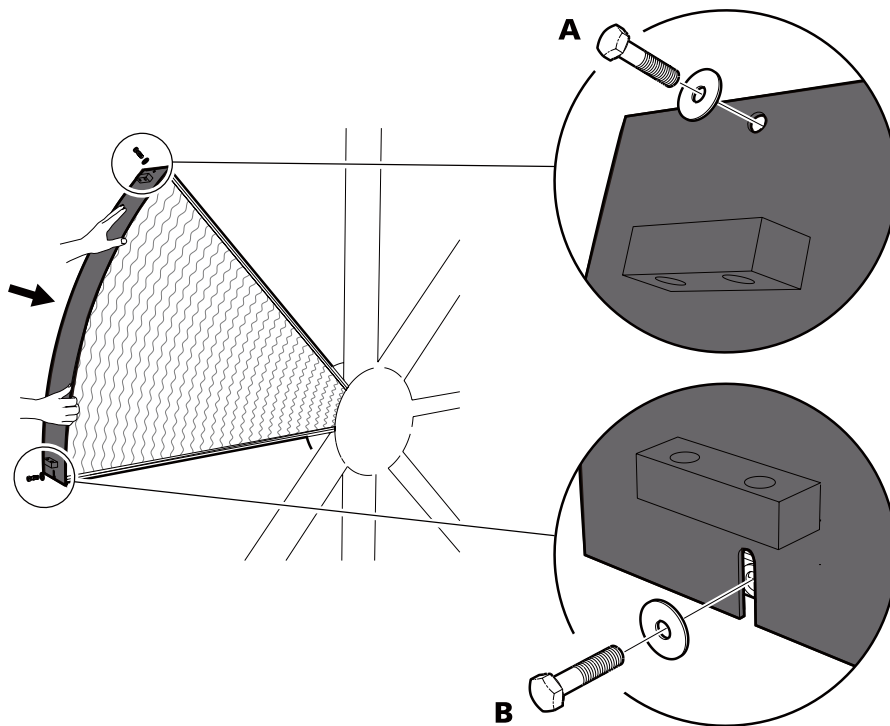


- Make sure that the upper and lower edges of the segment are located within the bent edges of the radial walls.
- Tap gently with a rubber mallet to ensure that the segment is in the right position.



4.4.4 INSTALLATION, PERIPHERY PLATE No.1

- Position the first periphery plate. The side with a hole must face up. See figure **A**.
- Insert a bolt in the hole at the top edge of the periphery plate. See figure **A**.
Do not tighten.
- Insert a bolt in the groove at the lower edge of the periphery plate. See figure **B**.
Tighten the bolt.



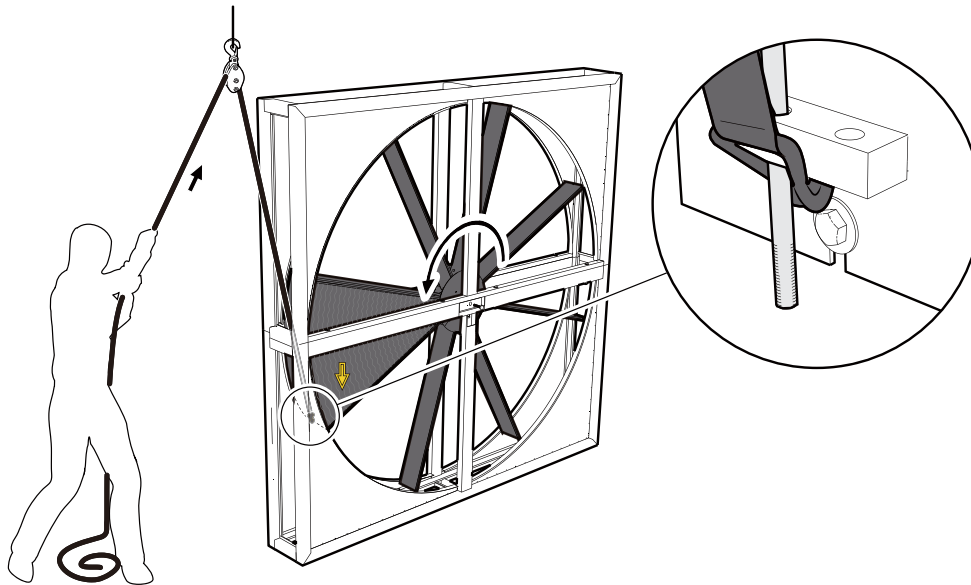
The bolts are tightened when the adjacent periphery plate has been installed.

4.4.5 INSTALLATION, SEGMENT NO. 2

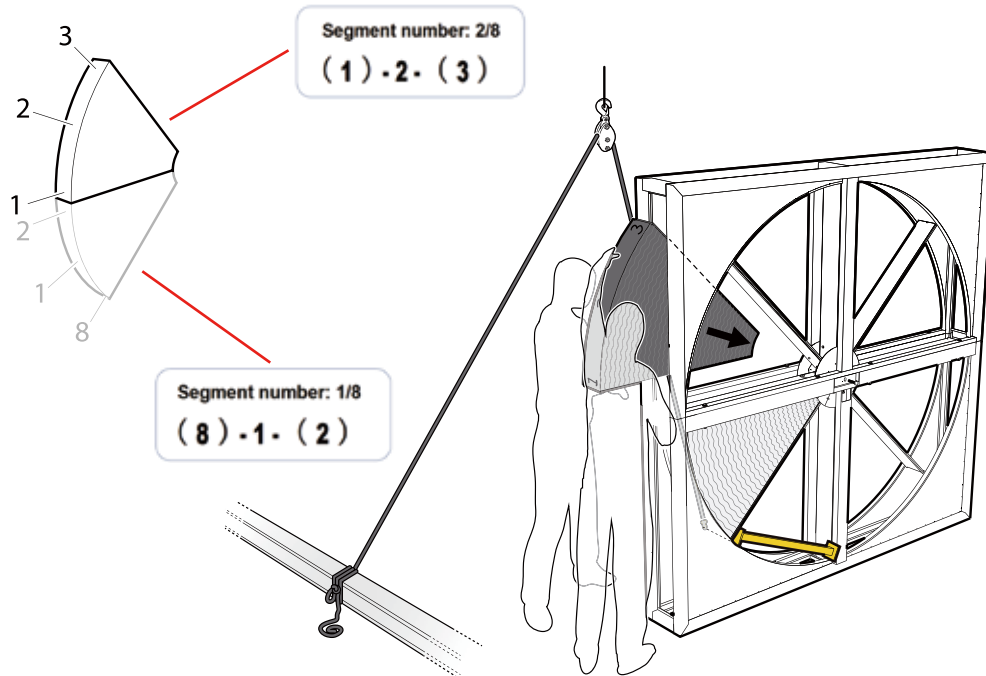
- Rotate the segment **No.1** in order to facilitate the positioning of segment No.2.



Use a pulley with a rope or strap for controlled rotation.

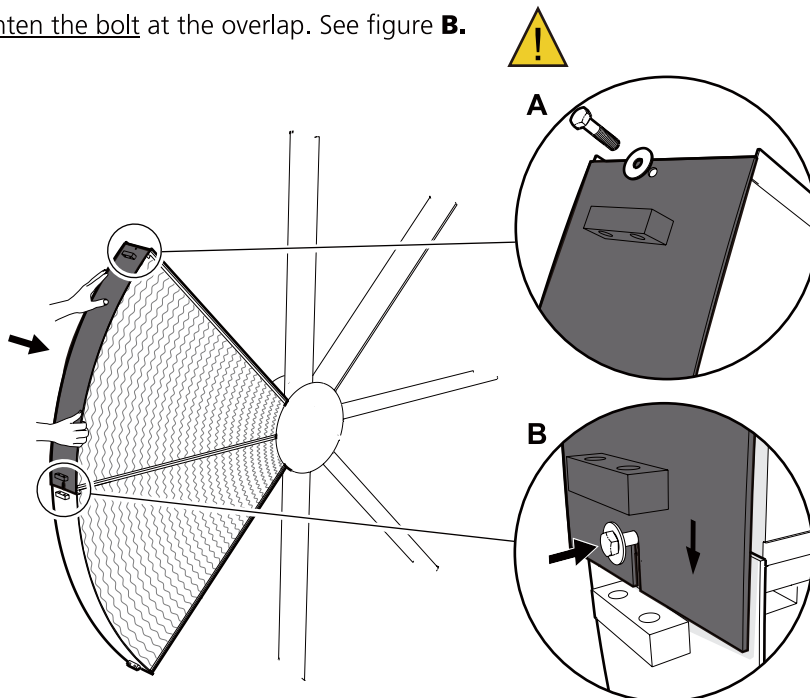


- Position segment 2 as described previously. See section 4.4.3

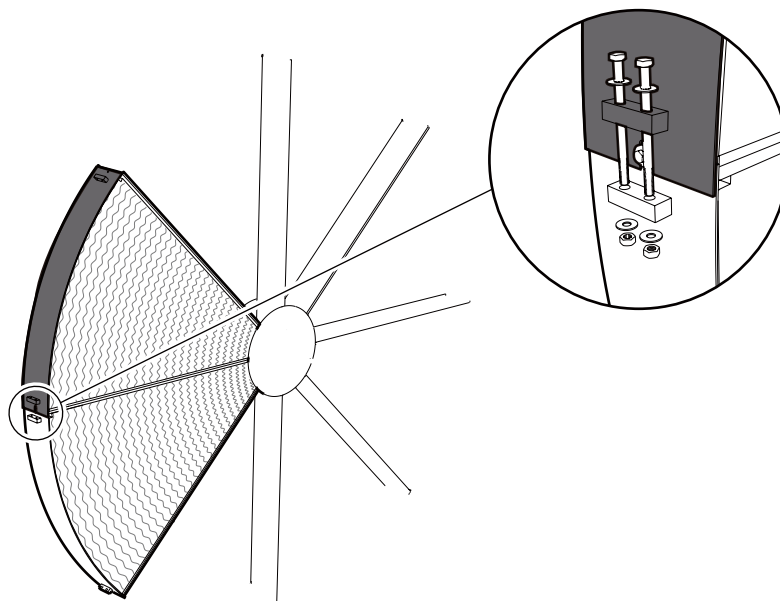


4.4.6 INSTALLATION, PERIPHERY PLATE NO.2

- Position the second periphery plate. The side with a hole must face up. See figure **A**.
- Insert a bolt in the hole at the top edge of the periphery plate. See figure **A**. Do not tighten.
- The lower edge of the second periphery plate must overlap the first periphery plate and be secured using the bolt installed previously. See figure B.
- Tighten the bolt at the overlap. See figure **B**.

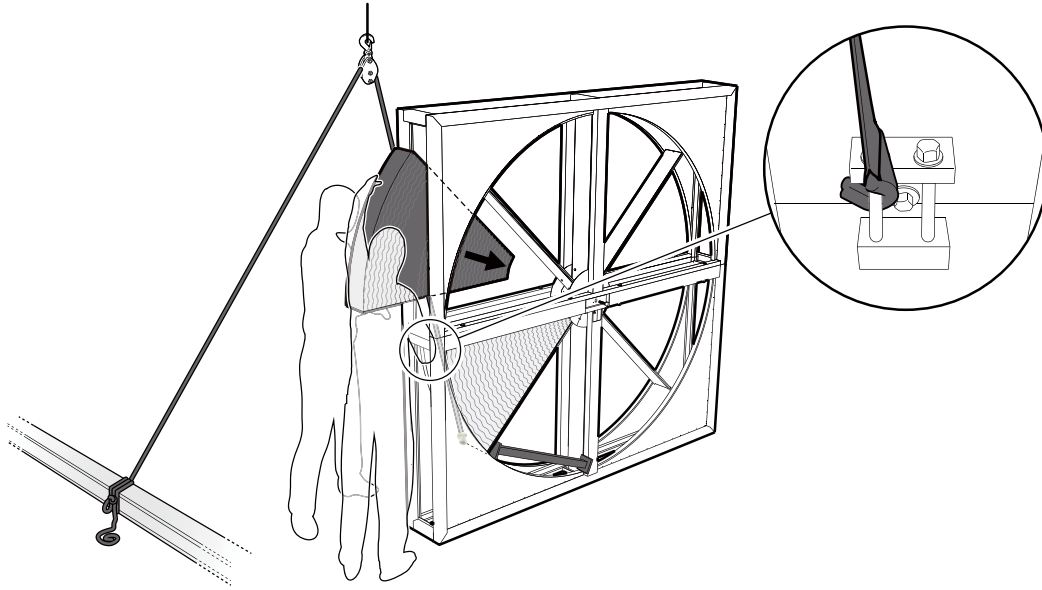


- Fasten the periphery plates together with a clamp bolt. Do not tighten.



4.4.7 INSTALLATION, REMAINING SEGMENTS

- Install the remaining segments and periphery plates as described in sections **4.4.3 - 4.4.6**

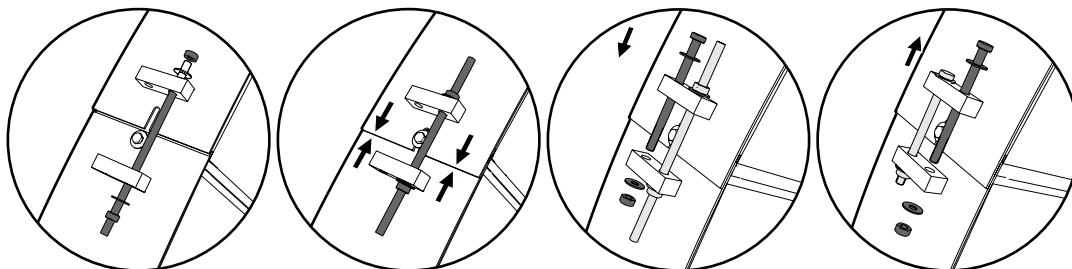


4.4.8 PREPARATION OF SEGMENTS AND PERIPHERY PLATES



The periphery plates must be mounted together for preparation of segments and periphery plates. If a standard bolt is insufficient for bringing together the first and last periphery plates, the lengthened screw mandrel can be used as described below.

- Position the lengthened screw mandrel and nut. Tighten until an overlap is achieved.
- Put a tension bolt in the free hole
- Tighten the bolt in the overlap.
- Replace the lengthened screw mandrel with clamp bolts:
- Tighten all bolts which secure the periphery plate in position. Use a torque wrench to tighten the bolts. See section **4.4.9**



4.4.9 TENSION THE TENSION BOLTS BY TORQUE WRENCH

- Tension all the tension bolts of a circle for 10 N.m
- Tension all the tension bolts of a circle for 20 N.m
- Tension all the tension bolts of a circle for 30 N.m
- Tension all the tension bolts of a circle for 40 N.m
- Tension all the tension bolts of a circle for 50 N.m

4.5 Installation of Brush sealing

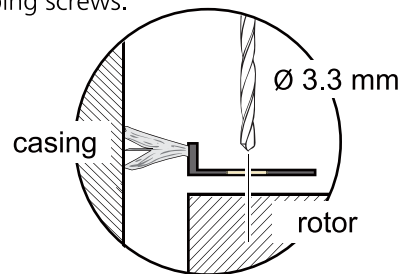
4.5.1 INSTALLATION / ADJUSTMENT OF BRUSH SEALING

OCS/CSD

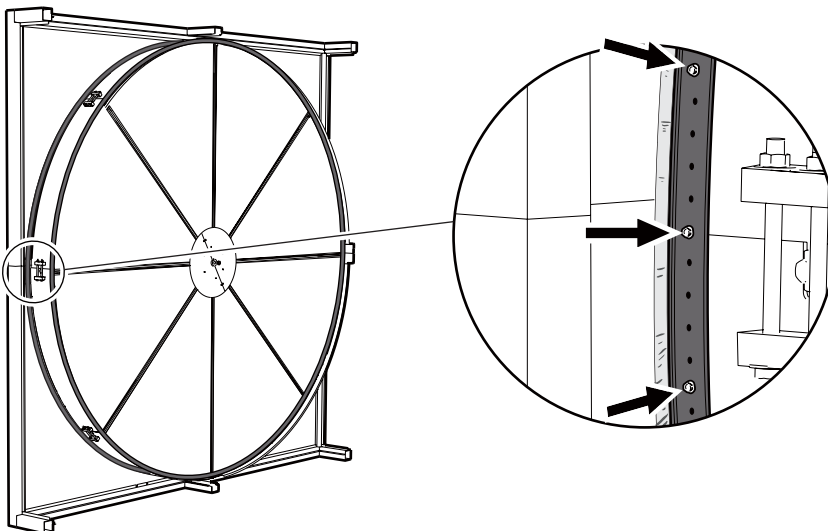
- Use a $\varnothing 3.3$ mm drill bit to drill through every fifth hole.
- Install the brush sealing using self-tapping screws.



Make sure that the brush sealing is installed with the edge facing up.

**All casings:**

- Check that the brush sealing fits tightly. The brush sealing must be adjusted if there is any leakage.



4.6.1 INSTALLATION OF DRIVE UNIT – VERTICAL INSTALLATION



*If the drive unit is already installed, continue to section **4.6.2***

*For installation of a horizontal drive unit, see section **4.7.4***

For a hanging motor bracket

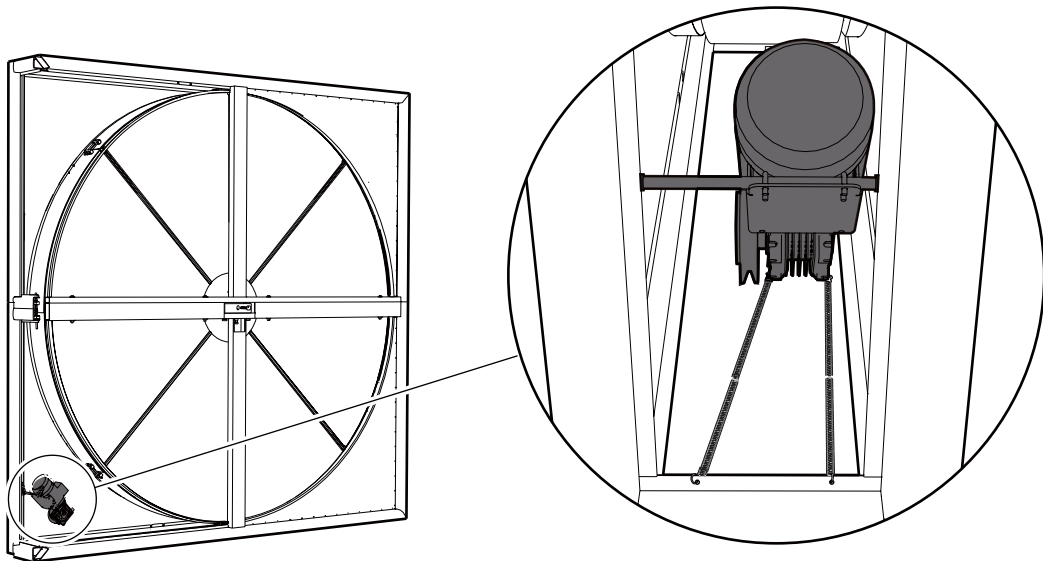
- Install shaft brackets with vibration absorb dampers.
- Secure the motor bracket to the shaft and position in the shaft brackets.
- Secure springs between the casing and the motor bracket.
- Adjust the motor position horizontally so that the drive belt is pulled alongside the periphery plate blocks.



Make sure that the motor and electrical connections are easy to access.

The cable gland must be protected, and only authorised personnel are permitted to carry out wiring.

Cables to the drive equipment and control unit are not allowed to be shortened or moved.



For a fixed motor bracket

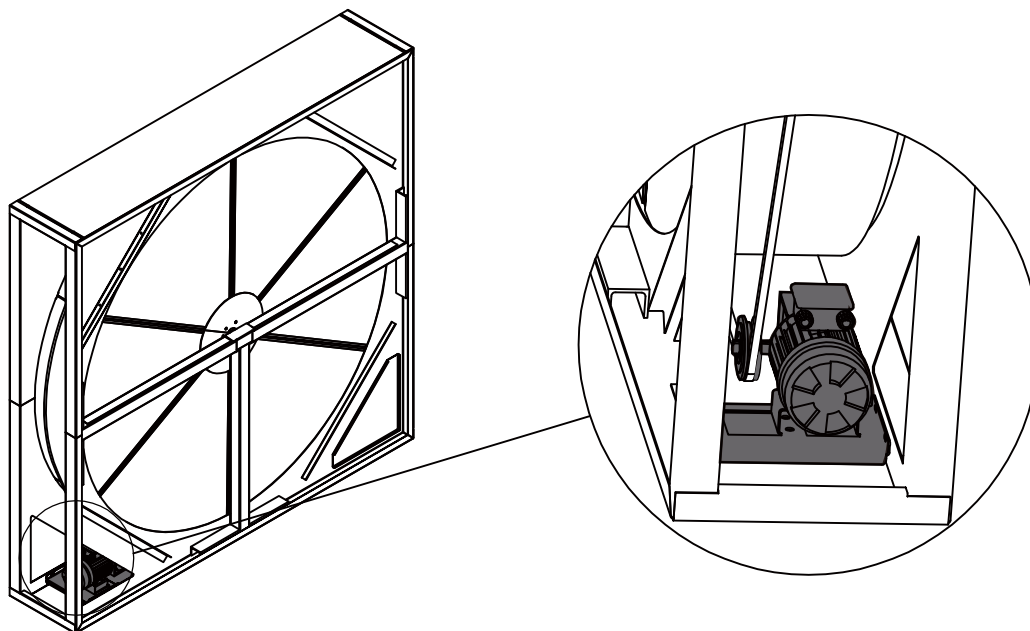
- Secure the motor bracket to the bottom of casing.
- Insert the mounting bolts in the holes of motor bracket and tighten them.
- If needed, adjust the pulley position horizontally so that the drive belt is pulled alongside the periphery plate blocks.



Make sure that the motor and electrical connections are easy to access.

The cable gland must be protected, and only authorised personnel are permitted to carry out wiring.

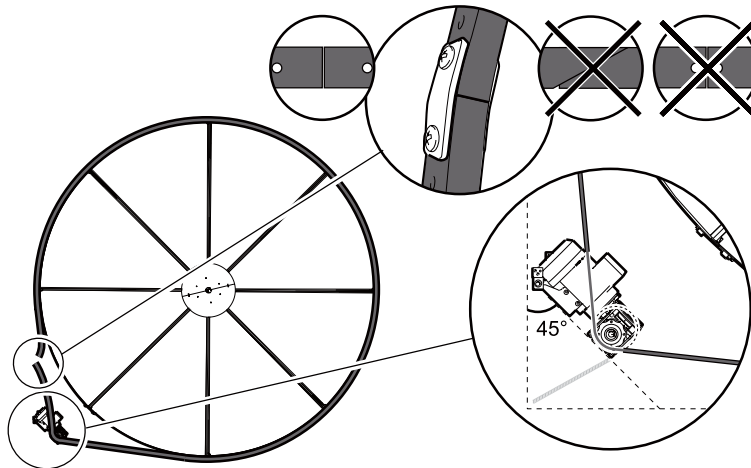
Cables to the drive equipment and control unit are not allowed to be shortened or moved.



4.6.2 DRIVE BELT

Lock type belt installation

- Install the drive belt. The drive belt should run around the rotor and belt pulley, alongside the periphery plate blocks.
- Adjust the length of the drive belt so that the motor bracket is suspended at an angle of 45°.
- Grind down the ends of the screw tips on the belt lock.

**Yellow V-belt welding**

- Tools for welding



Welding gun with paddle



Joint handle



Belt scissor

- Before welding process starts

- 1 Remove any residual material from the paddle and be careful with the protection on the paddle.
- 2 Put on the drive-belt on the wheel/rotor and the pulley. Mark the belt where the belt end meets the belt and shorten the belt with a tension rate of 4-8%. The smaller pulley the higher tension rate, e.g. 80 mm pulley needs a tension rate of 8% a large pulley (200 mm) needs a tension rate of 4%.

- Correct process for perfect welding joint.

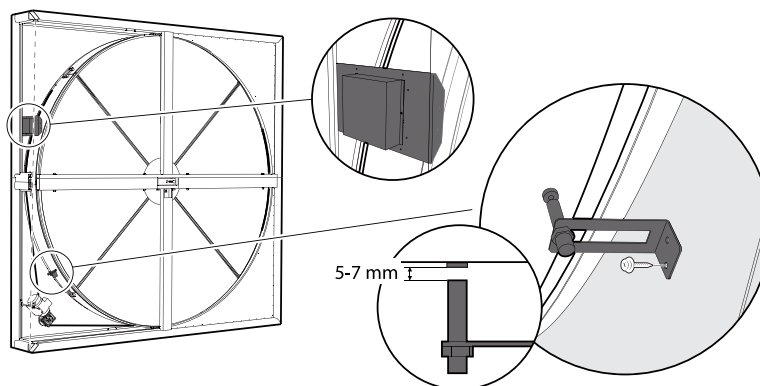
- 1) Pre- Heat the welding gun for 10 min.
- 2) Attach the 2 belt ends in the joint handle, and check that the belt positioning in the joint handle is aligned.
- 3) Position heat paddle between belt ends.
- 4) Excessive pressure must not be applied to the joiner handle. A firm contact on each side of the paddle is sufficient.
- 5) Make sure that the belt “flash” occurs around the entire circumference, or all sides, of both belt ends.
- 6) Retract the ends of the belt and remove the heat paddle. Bring the belt ends together firmly. Do not exert excessive pressure. It is important that all the melted material is not squeezed out of the joint
- 7) Leave the endless belt in the joiner for five minutes or until cool.
- 8) Remove excess flashing with knife or file.
- 9) Cool to room temperature before using.



If you follow these guidelines, you will produce strong splices

4.6.3 ROTATION GUARD AND CONTROL UNIT

- Install the rotation guard as shown in the diagram.
- The magnet is placed directly in front of the rotation guard. The distance between the magnet and the rotation guard must be 5-7 mm. Screw the magnet onto the periphery plate.
- Install the control unit in an appropriate location.
- Rotate the rotor and make sure that it can turn freely

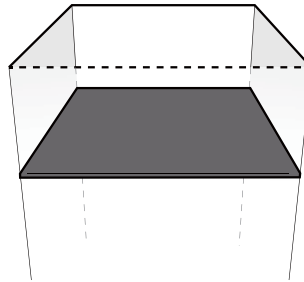


Note that the heat exchanger can only be started when all sections have been completed and a final inspection has been carried out. For details regarding final inspection, see section 5

4.7.1 SECURING

**WARNING FALLING OBJECTS**

The ventilation duct has to be secured in order to prevent accidents.

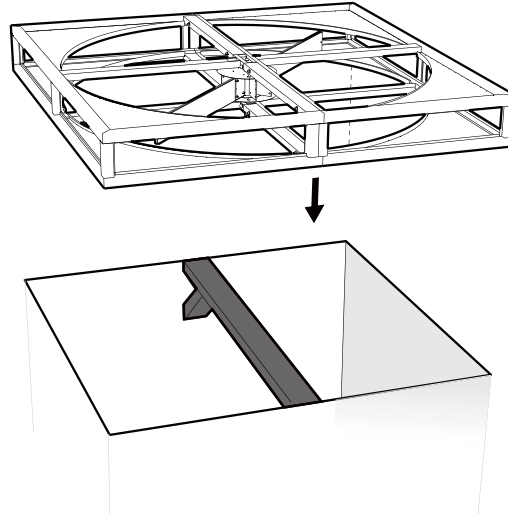


4.7.2 CENTRE SUPPORT BENEATH ROTOR

- Make sure that there is a centre support beneath the rotor.



The centre support for the rotor is not supplied by ostberg.



4.7.3 CONTINUED INSTALLATION



Installation continues in the same way as for vertical installation and begins at any of the sections below.

- Section **4.3.1**
For installation of rotor segments with independent hub and radial walls.
- Section **4.3.6**
For partial installation of rotor segments with casing (hub and two radial walls pre-installed).

4.7.4 INSTALLATION OF DRIVE UNIT – HORIZONTAL INSTALLATION

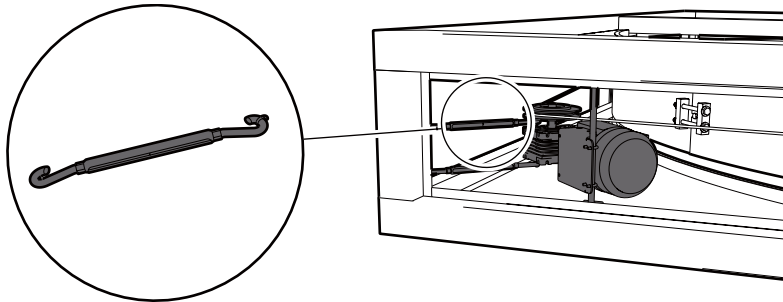


Motor is installed as described in section 4.6.1, but rigging screws are used instead of springs.

- Install rigging screws between the casing and the motor bracket.
- Adjust the rigging screws until the belt is tensioned properly.



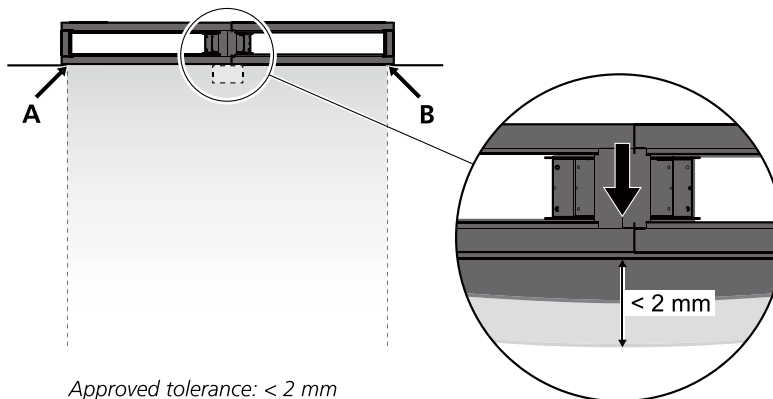
Make sure that the belt pulley faces up during installation.



For installation of the drive belt, see section 4.6.2
For installation of the rotation guard and control unit, see section 4.6.3

4.7.5 CHECKING THE WEIGHTING

- Check the weighting of the casing between points **A** and **B**.
- Make sure that any weighting is within approved tolerances.



- Inspect the Energy Recovery Casing / Cassette to ensure that it is securely mounted within the air handler and that there is no distortion of the framework.
- The rotor should be centered within the casing / cassette frame to prevent it from contacting the support structure and turn freely with light force.
- Seals should lightly contact the full perimeter and across the both faces of the rotor (along the middle beam).
- Distortion of the casing / cassette from improper installation or shipping and transportation may result in substantially unequal clearance between the rotor face and the casing / cassette. This will lead to excessive drive torque requirement, reduce the life of the drive components, result in belt and pulley wear, uneven seal wear, and reduced service or media life time.
- Inspect the drive system to ensure that the drive motor and pulley is securely installed.
- The drive belt should be taut and align properly with the drive pulley and perimeter of the rotor.
- Belts are pre-stretched at the factory, however the belt should be checked after the first 100 running hours to ensure that correct tension is still achieved. If the tension is reduced the drive belt shall be re-tensioned by cutting the belt and relocate the joint.
- Verify proper supply voltage to the drive motor prior to energizing the drive system.
- Energize the drive motor and verify proper rotation and rotation speed. Sensible rotors shall turn 10 – 12 rpm while Sorption rotors shall turn 18-22 rpm (if constant drive).
- If the unit is equipped with a purge sector verify that the rotor is turning in the correct direction. If the unit isn't equipped with purge sector the rotation can be in either directions. Air flow shall always be in "CONTRA FLOW" directions.

5.2 Check List

1	Casing / Cassette installed properly and sealed between the air streams	<input type="checkbox"/>
2	Access to the drive system	<input type="checkbox"/>
3	Access to the center support shaft / bolts	<input type="checkbox"/>
4	Access to sealings along the periphery	<input type="checkbox"/>
5	Access to sealing along the middle beam on both sides of the rotor face	<input type="checkbox"/>
6	Seals contact periphery / face of the rotor	<input type="checkbox"/>
7	Rotor turns freely	<input type="checkbox"/>
8	Drive motor and pulley properly installed and secured	<input type="checkbox"/>
9	Drive belt properly tensioned	<input type="checkbox"/>
10	Verify correct voltage to the drive system	<input type="checkbox"/>
11	Correct direction of rotation	<input type="checkbox"/>
12	Correct location of Purge sector (if any)	<input type="checkbox"/>

Routine Maintenance and Inspection

The rotor and casing / Casstte requir little in the way of routine maintenance. Following periodic inspections are required.

Routine Maintenance Schedule

Schedule	Maintancne item
At start- up	Follow section 5 in this document
After 1 week	Inspect seals Inspect drive motor Inspect drive belt and it's tension
6 months after commisioning	Tension the tension bolts (see section 4.4.9) Inspect seals Inspect drive motor Inspect drive belt and it's tension
Twice Yearly	Inspect seals Inspect drive motor Inspect drive belt and it's tension
Once Yearly	Meassure pressure drop over the rotor. Pressure drop > 1.25 × New = Clean the rotor

Rotor inspection

Bearings supplied are permanently lubricated and requier no additional maintenance. Carefully inspect the face of the rotor for signs of damage, dirt or contamination build up.

Seal inspection

Inspect the condition of the seals to ensure a positive seal between the rotor face and metallic frame structure. The seals should be intact and should slightly contact the casing / cassette structure or flanges, and face of the rotor media. Closely inspect the seals for excessive wear, especially the dividing seals between supply and exhaust air. If excessive wear is evident, the seals should be scheduled for replacement. Also inspect to ensure a good seal exists between the metallic structure of the casing / cassette and interconnecting duct work. Any significant leakage in these areas affect overall performance and should be sealed.

Drive inspection

Drive motors are permanently lubricated and require no additional maintenace. Inspect the drive system to ensure all hardware is secure, the pulley is secured to the motors shaft and that there is no significant misalignment of the drive belt on the pulley or periphery of the rotor. Check that the belt joint is in good condition, if not schedule for replacement. Check that drive belt is tentioned (taut), if not schedule for maintenance. Check that the whole length of the drive belt is in good condition, if not shcedule for replacement asap.

Original spare parts

Always use original spare parts, please contact your saleman or send your requirements to info@ca-ostberg.com.

LIMITED WARRANTY

Seller warrants to the original Purchaser of its Energy Recovery Rotors and Cassettes (“Products”), subject to the enclosed exclusions and conditions, that the Products will be free from defects in materials and workmanship as described herein.

1. **Rotor and Cassette metallic structure** including hub, shaft, spokes, perimeter band, cassette sheet metal and tubing structures (as applicable) are warranted for a period of twenty-four (24) months from the date of shipment, and are specifically warranted, in addition to being free of defects in material and workmanship, for the following:
 - a) Structures including welds and base materials shall not fail due to corrosion from normal ambient sources (corrosive industrial environments are excluded).
 - b) Structures shall not fail due to normal operating pressures and subsequent developed stresses.

2. **Media and Substrate** are warranted for a period of twenty-four (24) months from the date of shipment, and are specifically warranted, in addition to being free of defects in material and workmanship, for the following:
 - a) Material will not fail operating under normal conditions, normal conditions is equal to conditions accepted in the sellers calculation software at time for purchasing.
 - b) If installed and operated in accordance with the manufacturer’s instructions, media shall perform as per data published by the manufacturer.

3. **Additional components** such as rotor bearings & drive motors are warranted for period of 24 months from the date of shipment and are specially warranted, in addition to being free of defects in material and workmanship, for the following:
 - a) Equipment shall not fail due to insufficient torque and or rusty for selected application.
 - b) Material will not wear to the point of failure within the period from normal operating stresses.

4. **Additional components** such as seals, belts, sprockets and controls (as applicable) are warranted for period of 12 months from the date of shipment and are specially warranted, in addition to being free of defects in material and workmanship, for the following:
 - a) Material will not wear to the point of failure within the period from normal operating stresses.

Seller's sole obligation under this Limited Warranty, is to repair or replace, at its option, free of charge to the original purchaser (except as noted), F.C.A. the Seller's factory, any Product determined by the Seller (in its sole discretion) to be defective. Seller's Limited Warranty excludes defects, failures and reduced performance caused, either directly or indirectly, by improper installation, abuse, misuse, misapplication, improper maintenance, lack of maintenance, negligence, accident or normal deterioration, including wear and tear. This Limited Warranty additionally shall not apply to failures, defects or reduced performance, resulting either directly or indirectly, from any use or purpose other than energy recovery (as applicable), or from exposure to corrosive environments (liquid or gaseous) or liquid water, in the form of impingement from a moving air stream. This limited Warranty additionally excludes damages due to natural disasters and Force Majeure. This Limited Warranty does not include costs for transportation (including without limitation, freight and return freight charges, costs and insurance), cost from removal or re-installation of parts or equipment, premiums for overtime, or labor for performing repairs or replacement to equipment in the field. Seller is not responsible for damages during transport of any product to or from Seller's location. THE OBLIGATION AND LIABILITY OF THE SELLER UNDER THIS LIMITED WARRANTY DOES NOT INCLUDE LOSSES, DIRECT OR INDIRECT, FOR INCIDENTAL, SPECULATIVE, INDIRECT, OR CONSEQUENTIAL DAMAGES, RESPECTIVE OF THE FORSEEABILITY OF ANY SUCH DAMAGES. THIS LIMITED WARRANTY IS PROVIDED EXCLUSIVELY TO THE ORIGINAL PURCHASER OF PRODUCTS AND MAY NOT BE TRANSFERRED OR ASSIGNED WITHOUT THE EXPRESS WRITTEN CONSENT OF THE SELLER. THIS LIMITED WARRANTY IS IN LIEU OF, AND SELLER HEREBY EXPRESSLY DISCLAIMS, ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

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ventilation

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