7. SII-Generator (yearly)

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Wind turbine type

Read the full document before you start to do work.

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Wind turbine type	Mk version
EnVentus™	Mk 0A

Change description

Description of changes
Updated the version of the document.

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1 Abbreviations and technical terms

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Table 1.1: Abbreviations

Abbreviation	Explanation
CIR	Component inspection report
LOTO	Lockout-tagout
NDE	Non-drive end
PPE	Personal protective equipment
SDS	Safety data sheet
SPRA	Standardised procedure risk assessment

Table 1.2: Explanation of terms

Term	Explanation
None	

2 Referenced documentation

2.1 Safety documents

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Table 2.1: Safety documents

Document no.	Title
0001-0410	Personal protective equipment sheets
0004-4159	Standardised procedure risk assessment (SPRA)
0092-3874	Rotor locking system
0092-3919	Safety regulations for operators and technicians
0094-2383	Mode selector system
	Relevant SDS for the chemicals used in this document
	Appropriate LOTO document

2.2 Reference documents

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Table 2.2: Reference documents

Document no.	Title
920098	Torque wrench settings
960501	Bolt connections
0001-1995	User guide operating manual

Document no.	Title
0001-1996	Service guide, menu 11–19 operating manual
0001-1997	Service guide, picture 21 and onwards
0093-3811	Lubrication and coolant chart
0097-8127	Inspection for tensioning of the tie rods in the generator rotor
0099-4153	Servicing of the generator brake

Unless it is specified differently, see 920098 ‘Torque wrench settings’ for information about bolt types and bolt lubrication, and see 960501 ‘Bolt connections’ for information about torque values.

3 Purpose

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The purpose of this document is to give instructions for how to do the yearly inspection of the generator.

4 Note

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This document gives the description of the service inspections that must be done during the yearly inspection. Unscheduled replacement procedures are not included in the yearly inspection. If it is necessary to make an unscheduled replacement, then make a note of it in the service report.

5 Rotor lock

5.1 Location of the service technician

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Operate the rotor lock system from the left-hand side of the nacelle.

The location of the service technician in the nacelle is given in the figure that follows.

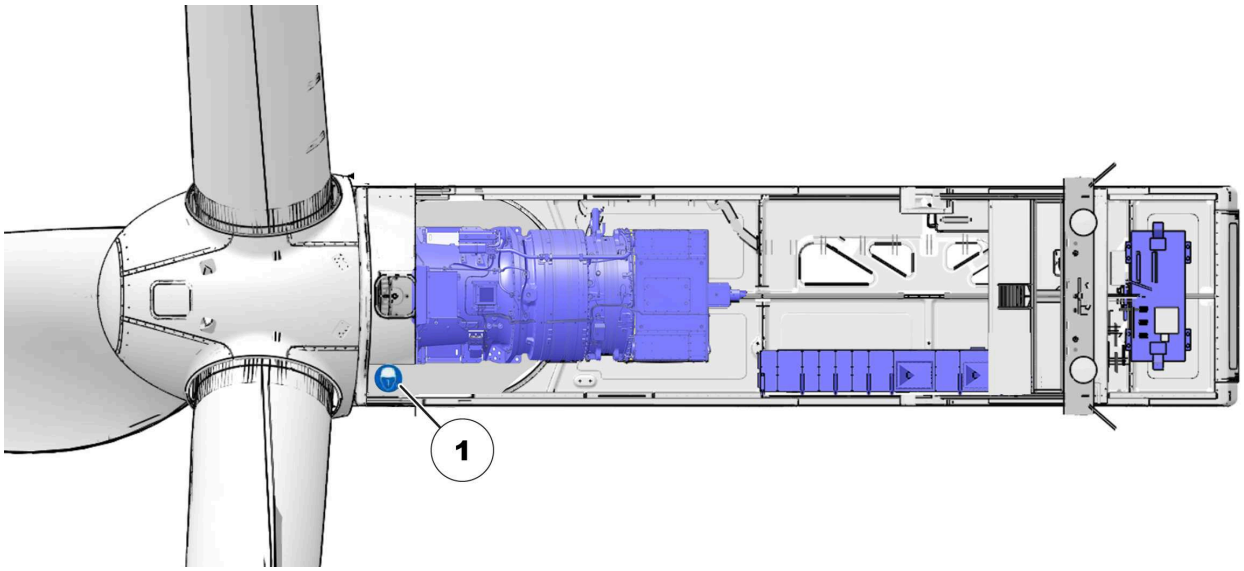

Figure 5.1: Top view of the nacelle

1 Area of operation for the service technician

5.2 Procedure to lock the rotor

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Risk related to rotating parts! SPRA ID No. 5.01

- Stop the wind turbine to prevent unintended start and remote operation.
- Obey the applicable LOTO procedures.
- Lock the rotor mechanically according to applicable LOTO procedures to prevent all rotation of the parts before you start to do the work.

Risk of damage to the rotor lock!

- Do not try to lock the rotor when the rotor turns.
- Always engage the mechanical brake before you lock the rotor.

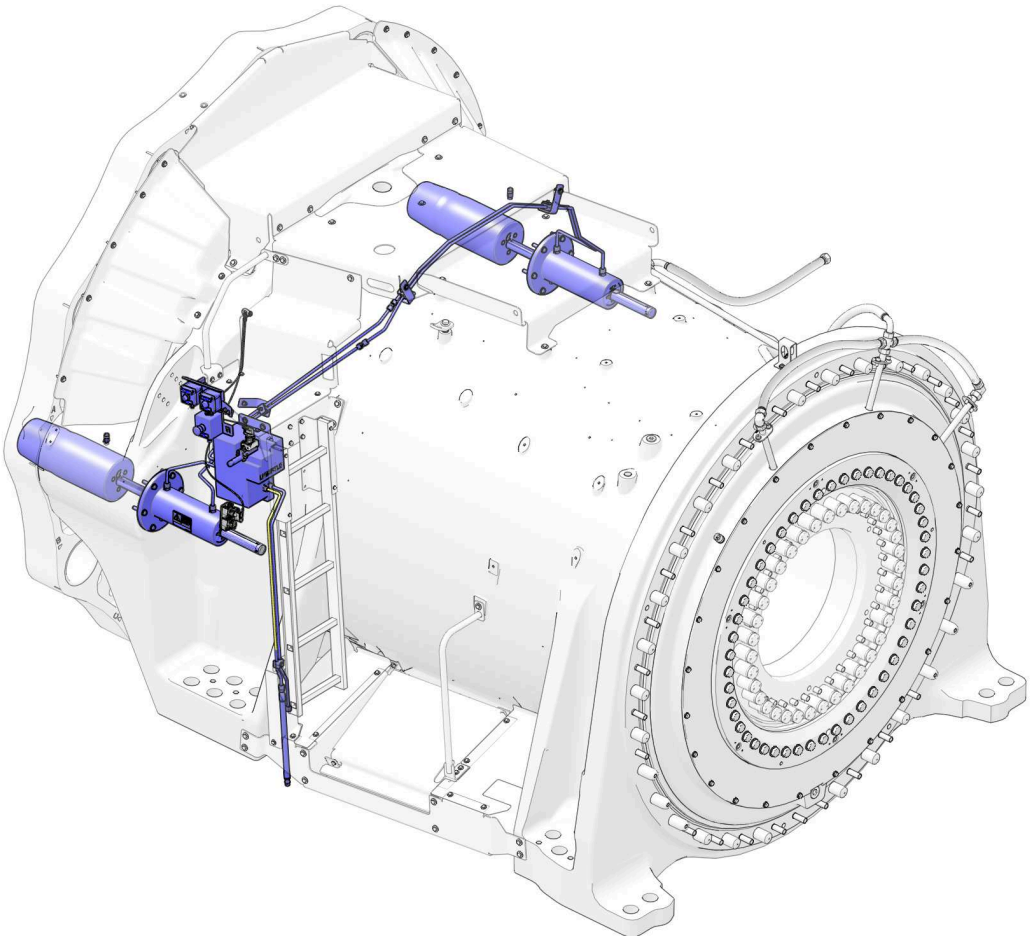
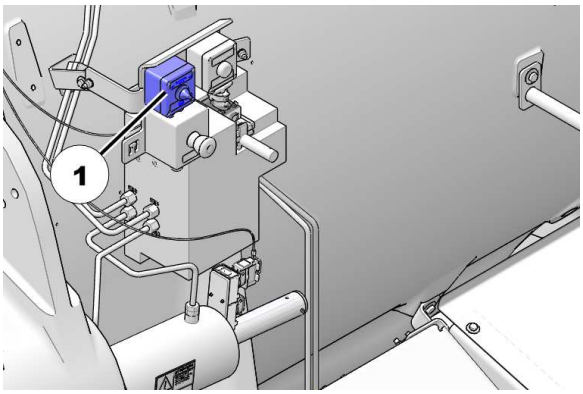


Figure 5.2: Rotor locking system

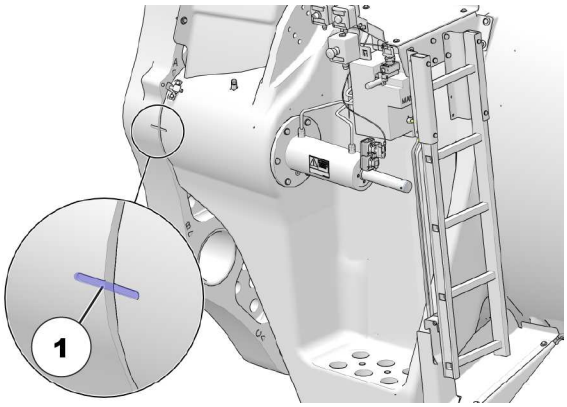
1 Operate the manual brake switch (1) to engage the mechanical brake.



2 Release the mechanical brake to adjust the rotor to align the rotor lock marks.

3 Engage the mechanical brake when the rotor lock marks (1) are aligned.

When the mark on the rotor lock disc is aligned with the reference mark, the rotor lock pins can be engaged.



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4 Use the valve handle to open the manual valve in the rotor lock manifold.

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5 Make sure to do the steps that follow before you activate the HPU in the nacelle:

a Turn the mode selector switch to position 4.

b Activate the -615 08-S4 ‘Enable Controller Outputs’ selector in the ++03 nacelle control panel.

c Push the reset button.

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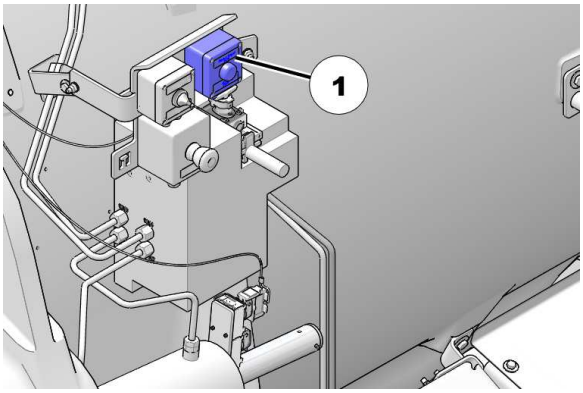
6 Push the manual pressure switch (1) constantly to activate the HPU.

The manual pressure switch is a momentary switch.

Pressurised flow to the HPU is necessary to activate the rotor lock.



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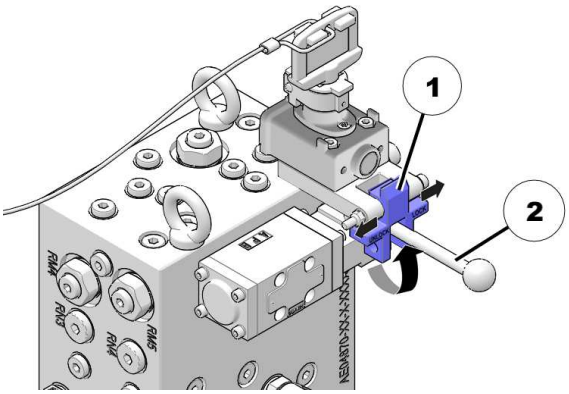
7 Lift the locking plate (1) and move the handle (2) to the lock position (engage).



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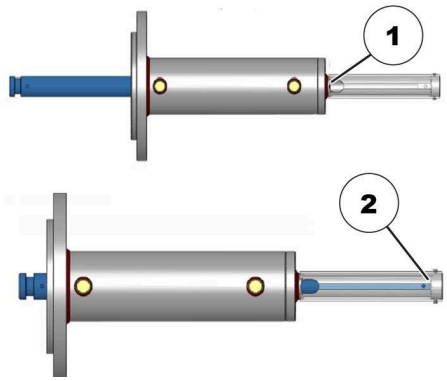
8 Do a visual inspection to see if the 2 rotor lock pins are fully engaged.

The transparent cover on the hydraulic cylinders shows the position of the piston rod. The cylinder cover includes additional marks for fully engaged (1) and disengaged (2) positions.



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9 After the rotor lock pins are fully engaged, use the valve handle to close the manual valve.

The manual valve must be in the open position when the rotor lock is used and must be in the closed position at all other times.

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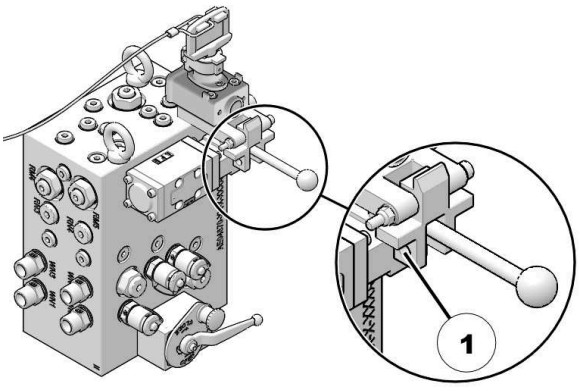
10 Do the LOTO procedure at position (1) after the rotor lock pins are engaged.



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6 Generator

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6.1 To do a check the of the tie rods

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1 Do a check of the tie rods in the generator rotor according to ‘SII for tensioning of the tie rods in the generator rotor’ in section ‘Reference documents’.

6.2 To do a visual inspection of the gearbox bearing and the pitch tube seal for oil leakage

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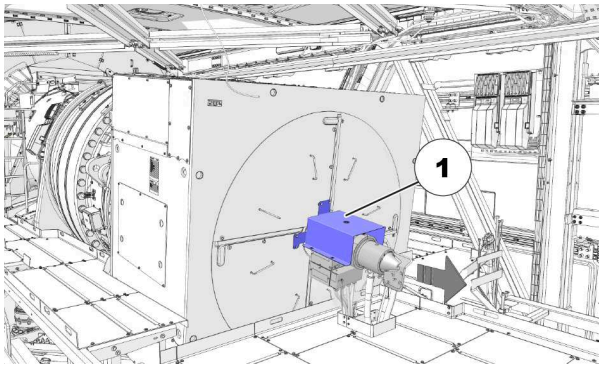
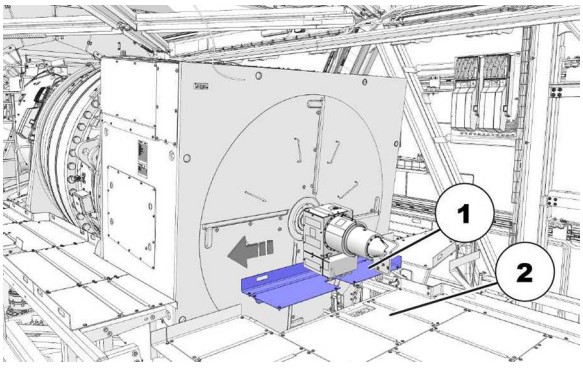
Risk of exposure to hot surfaces! SPRA ID No. 15.01

- Let the parts cool before you start work, if possible.
- If necessary, open the nacelle skylights to facilitate cooling.
- Use the necessary PPE that is given in PPE sheet 3.

1 Remove the rotating transfer module cover (1) from the generator NDE to get access to the flooring panels and the end shield covers.

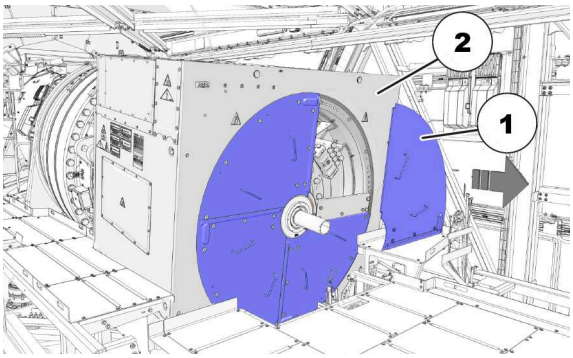


2 Remove the nacelle floor panels (1) from the nacelle floor (2) to get access to all the end shield covers.



After the removal of the nacelle floor panels, be careful not to damage the cables and hoses kept under the nacelle floor.

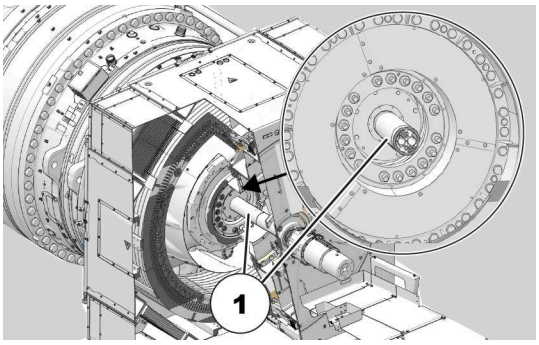
3 Remove the 4 end shield covers (1) from the generator NDE (2) to get access to the pitch tube seal.

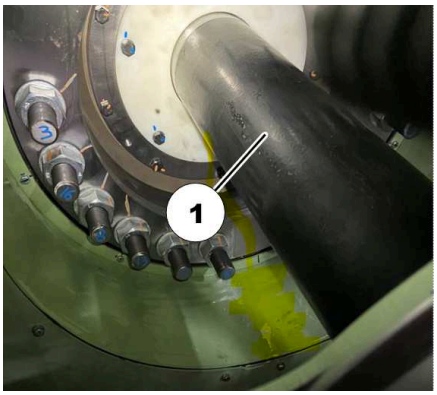


Risk of exposure to hazardous substances and mixtures, gear oil! SPRA ID No. 2.02

- See the wind turbine's 'Lubrication chart' or the label on the gearbox, or the service report to find the gear oil type.
- Read and comply with PPE sheet G and relevant SDS.

4 Use the torch to do a visual inspection on the region (1) near the gearbox bearing and the pitch tube seal for oil leakage.





► If there is any oil leakage, clean and report the oil leakage.

6.3 To do a visual inspection of the pitch tube bearing for grease leakage

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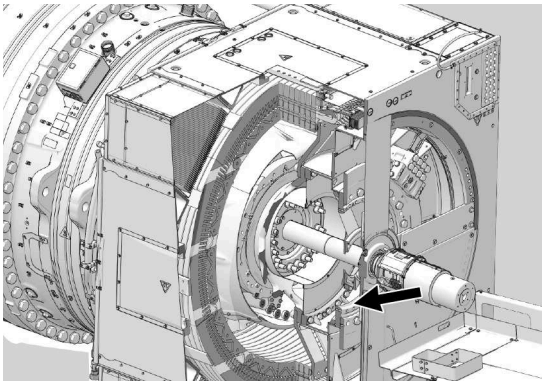
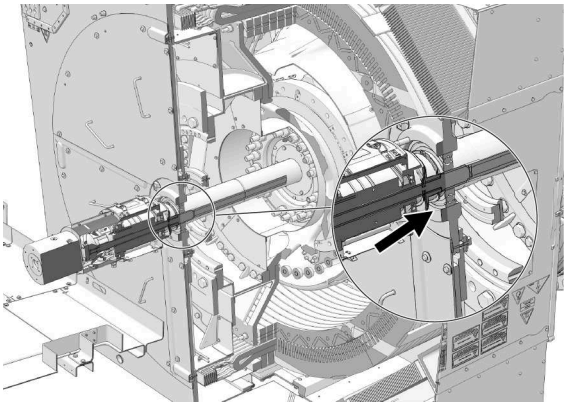
1 Use the torch to do a visual inspection inside the generator on the region near the pitch tube bearing for grease leakage.



► If there is grease leakage, clean and report the grease leakage.

2 Use the torch to do a visual inspection outside of the generator on the region near the pitch tube bearing for grease leakage.



► If there is grease leakage, clean and report the grease leakage.

7 Brake system

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7.1 To do a visual inspection of the brake callipers

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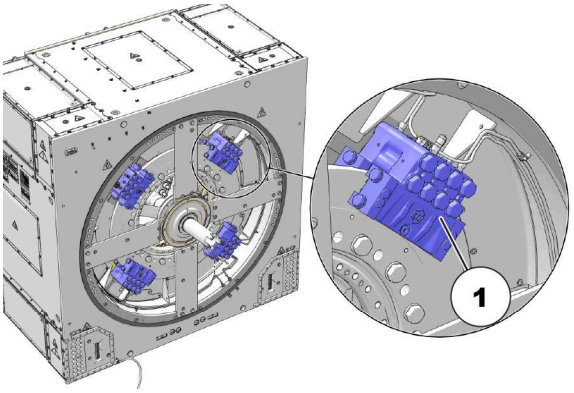
1 Do a visual inspection of all the 4 brake callipers (1) for damage.



► If damage is found, fill the CIR and replace the brake calliper. See ‘Servicing of the generator brake’ in section ‘Reference documents’.

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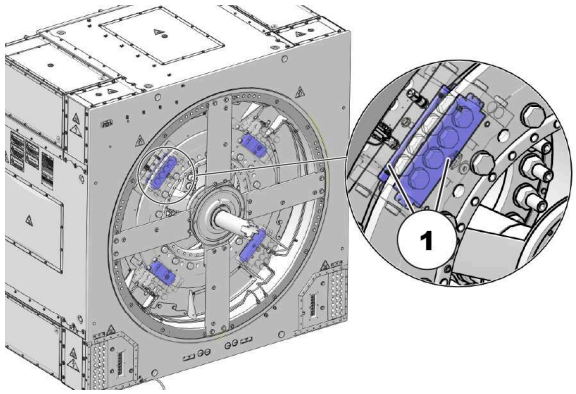
2 Do a check of all the brake pads (1) for scratch, wear, and burn marks.



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3 Do a check of the brake calliper bolts and the pad holder bolts for markings.

► If one of the bolts is loose, tighten all the bolts again.

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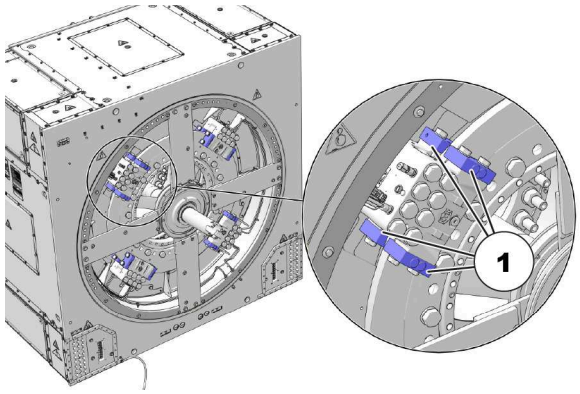
4 Do a check of the pad holder (1) and the brake calliper for signs of structural damage.



► If structural damage is found, replace the pad holder and the brake calliper.

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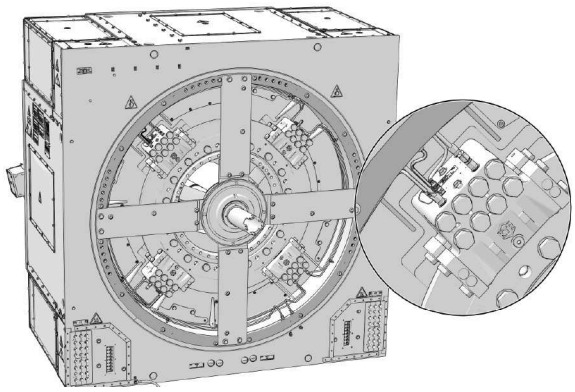
5 Do a check of the calliper sensor wires for damage such as melted cables, cables cut, cables that touch the brake disc or sharp edges, or damage on the cable routing.



► If damage is found, replace the sensor wires and sensors. See ‘Servicing of the generator brake’ in section ‘Reference documents’.

7.2 To do a visual inspection of the brake disc

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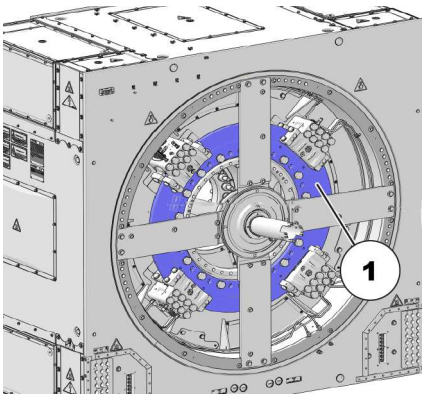
1 Do a visual inspection of the brake disc (1) for scratches on non-wearable or functional areas, and for marks or damage.



2 Do a visual inspection of the bolts on the brake disc for torque markings.

► If one of the bolts is loose, tighten all the bolts again.

7.3 To measure the thickness of the brake disc

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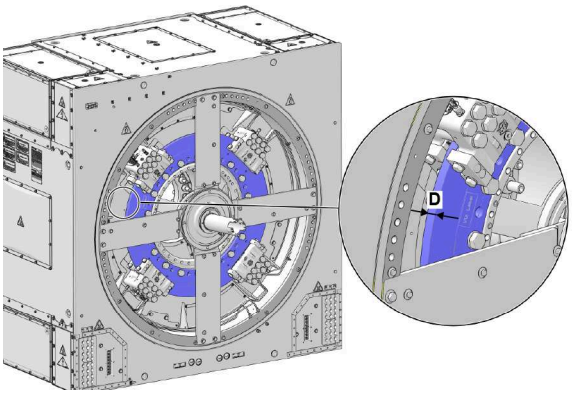
1 Measure the thickness (D) of the brake disc at 4 locations shown in the figure and record the value.



► If the thickness is below 29 mm, it shows too much wear, which is not allowed. Fill the CIR and replace the brake disc. See ‘Servicing of the generator brake’ in section ‘Reference documents’.

► If the wear is uneven, the brake disc is not aligned correctly, which reduces the life of the brake pads.

7.4 To do a visual inspection of pipes and fittings

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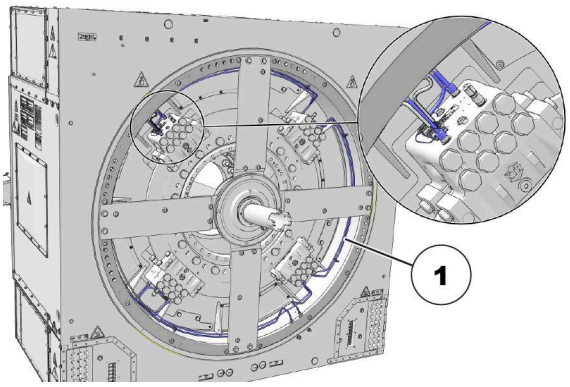
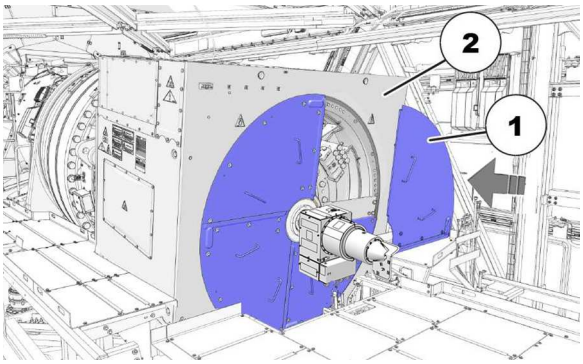
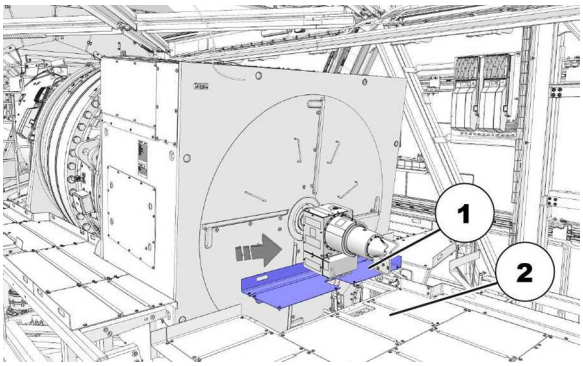
1 Do a visual inspection of all the hydraulic connections (1) on the generator frame (2 holes outside and 2 holes inside) behind the brake callipers for leakage.



2 Install the 4 end shield covers (1) on the generator NDE (2).



3 Install the nacelle floor panels (1) on the nacelle floor (2).



4 Install the rotating transfer module cover (1) on the generator NDE (2).