

MAINTENANCE MANUAL

Hub replacement on retarders AF5 and LVR5600

These instructions define how to replace the hub on:
Axial retarders LB-LE-LF-LJxxxxxxx (AF5 and LVR5600)

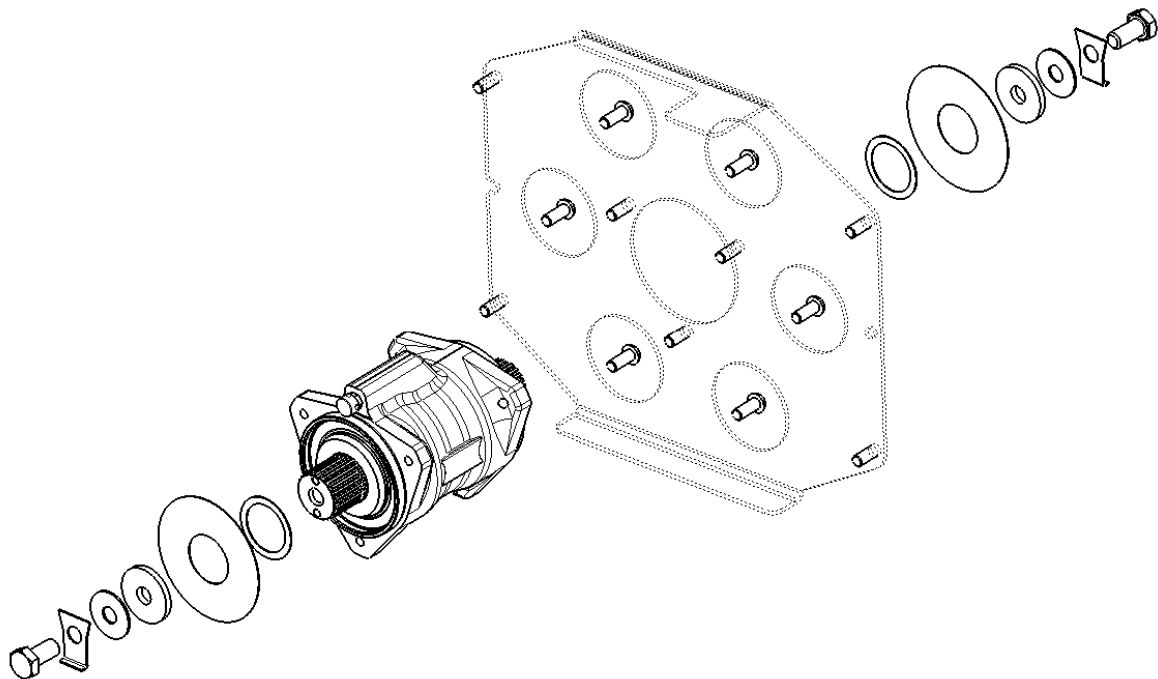


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1. TELMA ORIGINAL SPARE PART NEEDED

- Hub assembly → See spare parts catalogue for reference.

For any spare parts orders, it is necessary to specify the part number of the retarder, its serial number, and the model.

You will find the necessary information on spare parts for this equipment in the spare parts catalogue:

« SPARE PART CATALOG FOR AF / LVRS TELMA RETARDERS » OC443040

For more information about your TELMA SA product, please contact your TELMA dealer.

2. SAFETY PRECAUTIONS

Before operating your retarder you must have read this maintenance manual thoroughly.

All operations and interventions for fixing this retarder will be carried by qualified personnel.

Our technical support is available for all the information you may need.

The various operations described in this manual are accompanied by recommendations or symbols to alert the user to the risk of accidents. You must understand and respect the various warnings below.



Using and safety warning symbol, for an operation capable of damaging or destroying the retarder or surrounding equipment. The no respect of these warnings can cause injuries from mild to severe.



Safety warning symbol for an immediate danger to personnel. The no respect of this warning can cause serious injuries.



Safety warning symbol for electrical danger to personnel. The no respect of this warning can cause serious injuries.

The repair methods described by TELMA SA, in this document, are based on the technical specifications in effect at the date of this writing. They are subject to modifications in cases of changes done by TELMA SA to manufacture the various component units and accessories brand products.

The company TELMA SA reserves the right to modify the characteristics of its products at any time in order to incorporate the latest technological developments. The information contained in this document are subject to change without notice.

- We would like to draw your attention to the contents of this maintenance manual. Indeed, following the respect of important points during installation, use and maintenance of your retarder will ensure trouble-free operation for many years.
- When using lifting equipment, do not walk or stand under suspended loads.
- For information, a complete retarder weighs 101 kg (223 lb), a rotor weighs 14 kg (31 lb), and a hub weighs 5.5 kg (11 lb),
- Put the retarder on a solid table, with the handling safety tool.
- Be-careful of the heavy parts of the retarder which can cause serious personal injury.

3. NECESSARY TOOLS

- Protective glasses and gloves
- Handling safety tools for retarder
- Flat screwdriver
- Torx® TX40 wrench
- Click-type wrench
- 10 mm long socket and 17 mm socket
- Tab washer driver
- Hammer
- A feeler gauge
- Magnetic dial gauge and its sensor
- Ink marker
- Torque wrench (torque values : 5.25 and 30 Nm)
- Abrasive cloth (120 grade)

4. PARTS TO BE REPLACED SYSTEMATICALLY

When they have been removed the following parts need to be changed.

- End shaft screws, washers, shims and lock tabs
- Screws used to secure hub
- Screws used to secure retarder fixation pads
- Screws used to secure pole shoes plate
- Air gap adjusting shims
- Line shaft dust shields

5. NOTES

Some parts handled during the maintenance operations are covered with a special product against corrosion. Take precautions when handling to prevent damage to these protections.

For ease and given the diversity of installations on vehicles, this procedure has been done with the retarder removed from the vehicle and its accessories (power unit and retarder brackets) removed from the retarder.

To remove power unit or retarder brackets, please refer to the appropriate procedures.

The different pictures on this procedure are generic views and are not contractual.

6. DISMANTLING

a. REMOVAL OF ROTORS

Identify all parts before dismantling in order to find their initial orientations during the re-assembly.

1-A

◆ AF5 retarder with retarder brackets removed.

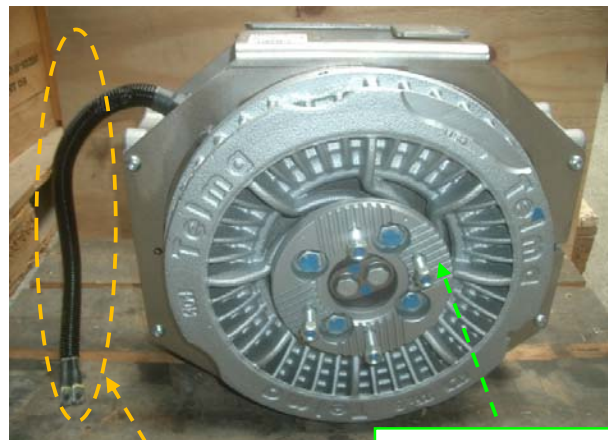


Retarder axle side.

Main connecting block on right

1-B

◆ LVRS600 retarder with retarder brackets removed.



Retarder harness on left

Retarder axle side.

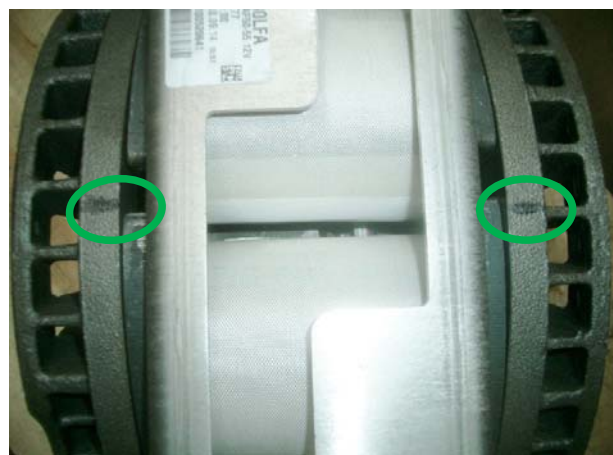
1-C

◆ Draw a mark with an ink marker on a rotor.



1-D

◆ Draw a same mark on the other rotor, the 2 marks must be aligned.



1-E

◆ On a retarder side, remove the lock tab by using a flat screwdriver and a hammer.
Caution: In order to avoid the springiness, suppress the stress in the tab by tapping on one side and by removing on the other).



1-F

◆ Remove the lock tab.



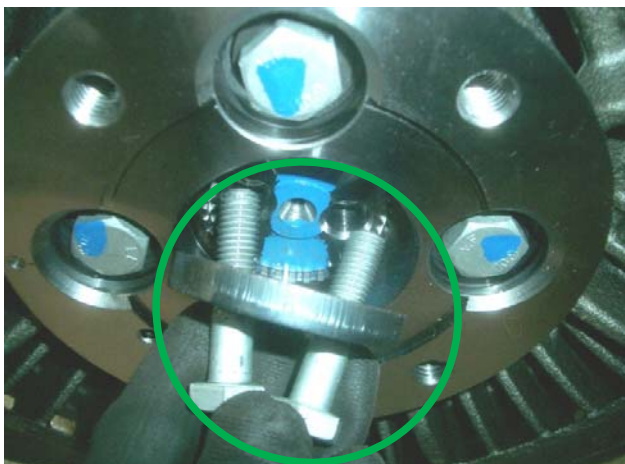
1-G

◆ Unscrew the 2 end shaft screws.
Use a 17 mm socket and a bar to lock the rotation of the rotor.



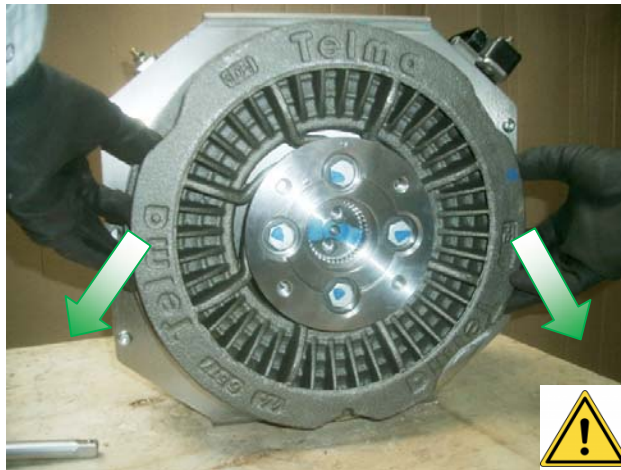
1-H

◆ Remove the 2 end shaft screws with the end shaft plate.



1-I

- ◆ Remove the rotor with its coupling flange.



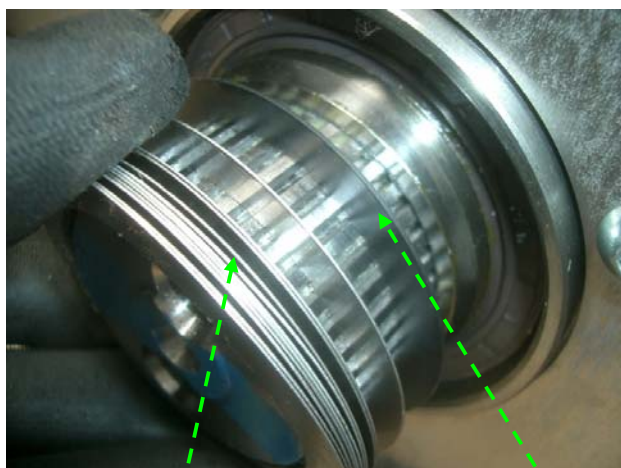
1-J

- ◆ Remove the dust shield from the shaft line.



1-K

- ◆ Remove air gap adjusting shims and the black shim, from the shaft line.



Shims used to adjust air gap

Black shim

1-L

- ◆ Do the same steps from 1-E to 1-K for the other rotor (gearbox side).



b. RETARDER STATOR OPENING

If you replace the hub on retarder LVR5600, please go directly to the picture 2-C.

➤ Specific operations in case of hub replacement on AF5 retarder.

2-A

◆ Unscrew the 2 nuts + 2 washers securing the cover to the connecting block, and remove them (use a 10 mm long socket). Remove the cover.



2 nuts + 2 washers

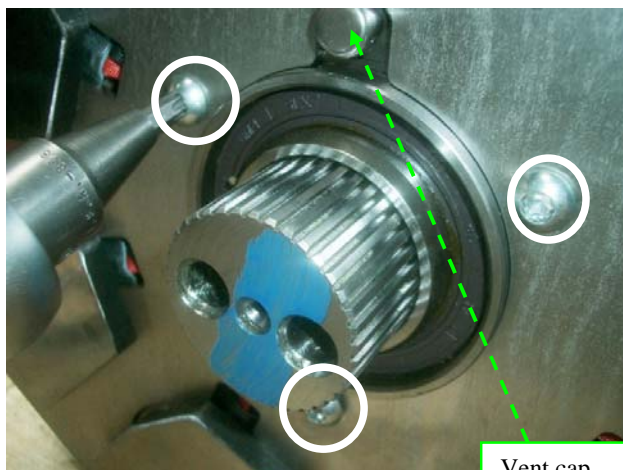
2-B

◆ Unscrew the nut securing the connecting block to the stator frame. It isn't necessary to remove nut completely. (Use a 10 mm long socket).



2-C

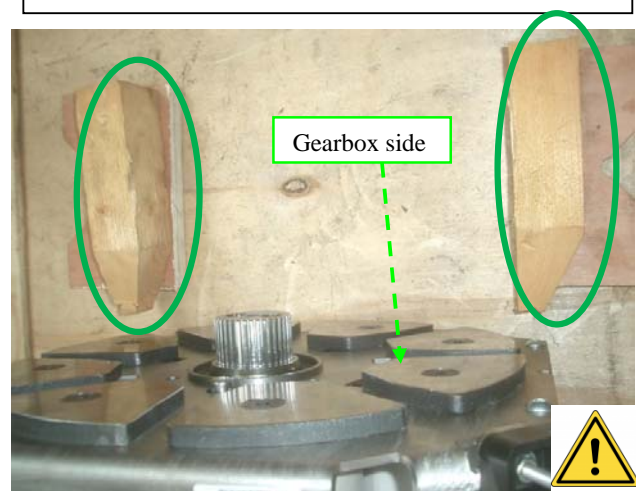
◆ Unscrew and remove the 3 screws securing the hub on gearbox side. Use a Torx® TX40 wrench.



Vent cap

2-D

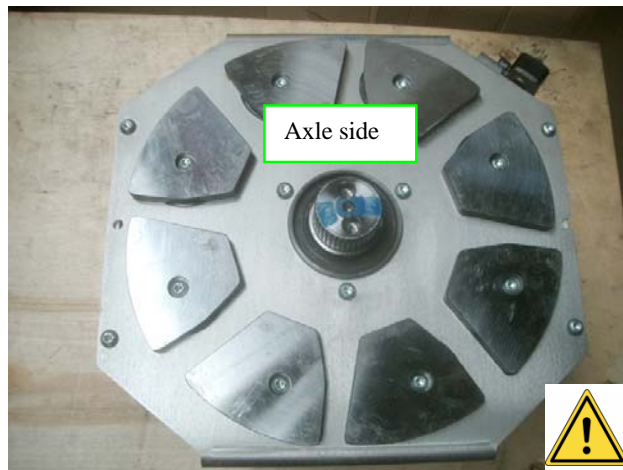
◆ Install two wood bars for toggling the retarder on them (axle side up). The wood pieces must be thick enough in order that the shaft line doesn't touch the table and for hand access for further operations.



Gearbox side

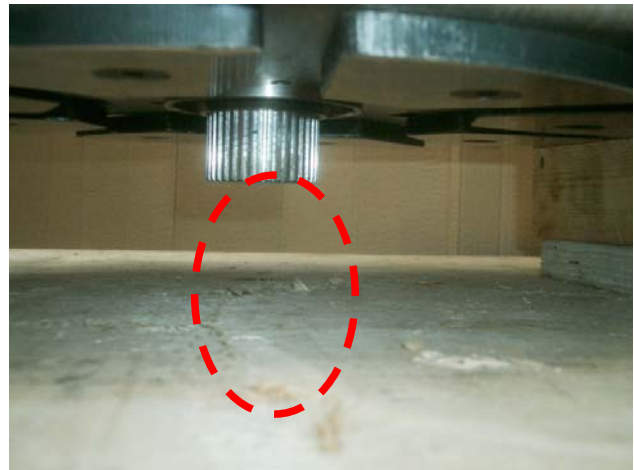
2-E

- ◆ View of the retarder toggled on the 2 wood bars (axle side up).



2-F

- ◆ The wood pieces must be thick enough in order that the shaft line doesn't touch the table and for hand access for further operations.



2-G

- ◆ Remove the 15 screws (4 + 8 + 3) securing the pole shoes plate to fixation pads, poles, and hub.



2-H

- ◆ Use a Torx® TX40 wrench to unscrew the 15 screws.



If you replace the hub on retarder LVRS600, please go directly to the picture 2-K.

➤ Specific operations in case of hub replacement on AF5 retarder.

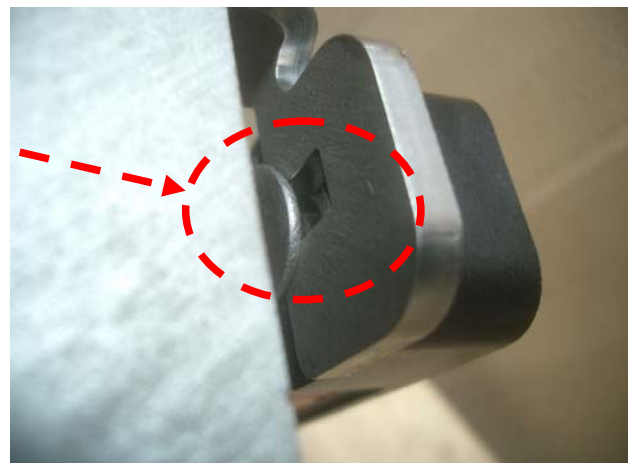
2-I

- ◆ Lift the pole shoes plate.



2-J

- ◆ During pole shoes plate lifting, lift slightly the pole shoes plate nearest the screw, which secures the connecting block to the pole shoes plate.



2-K

- ◆ Lift and remove completely the pole shoes plate. Don't remove the spring washer on top of each coil.



Spring washers on top of the coils

2-L

- ◆ View of the retarder with the pole shoes plate removed.



c. REMOVAL OF THE DEFECTIVE HUB

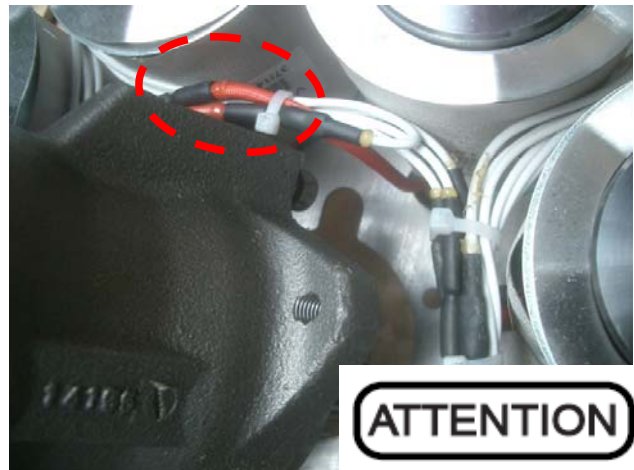
3-A

- ◆ Screw by hand a screw in the shaft line in order to facilitate hub removal.
Pull on the screw by hand to help removing the hub.



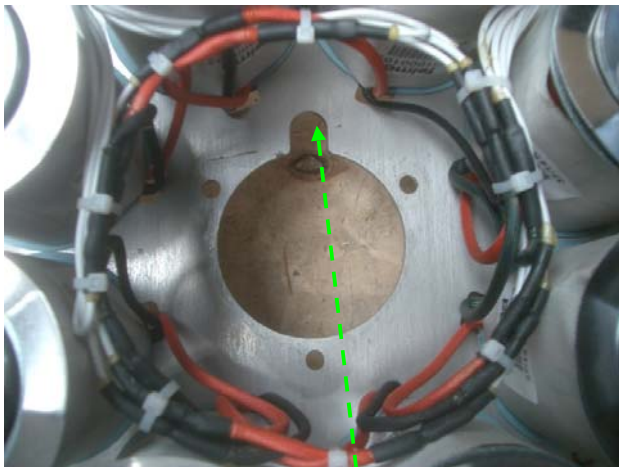
3-B

- ◆ When removing hub, be careful not to damage the coils and internal wiring.



3-C

- ◆ Internal view of retarder without its hub.



Indexing location for hub vent cap (gearbox side).

3-D

- ◆ Clean the stator in order to remove dust which could cause bad hub fitting.
Use abrasive cloth (120 grade).



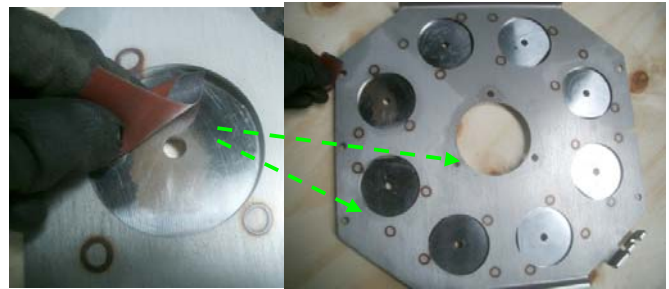
3-E

- ◆ Clean poles with abrasive cloth.
Use abrasive cloth (120 grade).



3-F

- ◆ On pole shoes plate, clean the pole shoes and surfaces where hub is in contact.
Use abrasive cloth (120 grade).



7. RE ASSEMBLING

a. INSTALLATION OF THE NEW COMPLETE HUB

4-A

- ◆ Take the new complete hub.



Vent cap (gearbox side)

Axle side

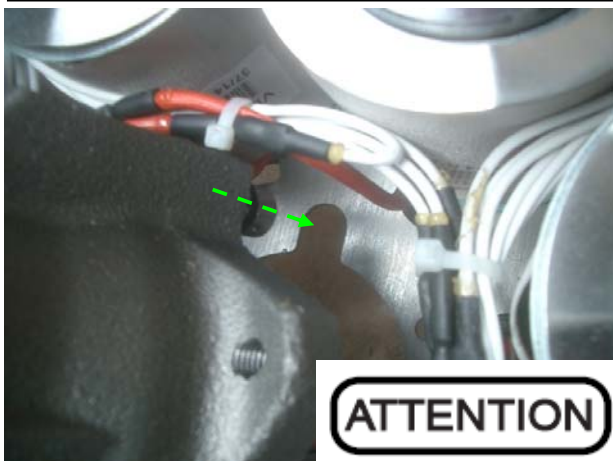
4-B

- ◆ Screw by hand a screw in the shaft line (axle side) in order to facilitate hub installation.



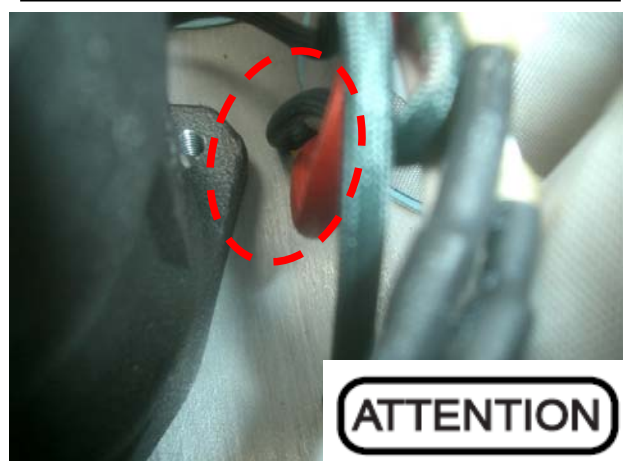
4-C

- ◆ Orient the hub at the correct position for the vent cap, inside its indexing location. Lower the hub in stator, taking care to coils and internal wiring. Remove screw after hub installation.



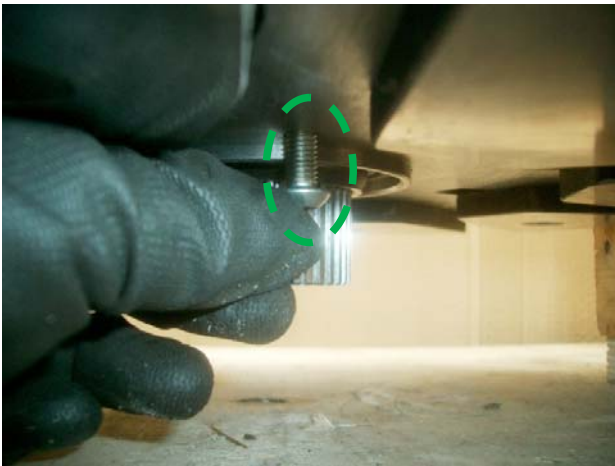
4-D

- ◆ Check that wires are not stuck.



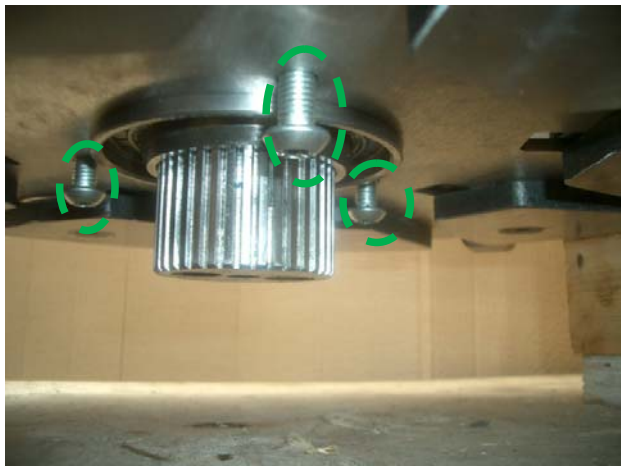
4-E

◆ On gearbox side by going under the stator, screw by hand completely 3 new screws in order to secure the hub.



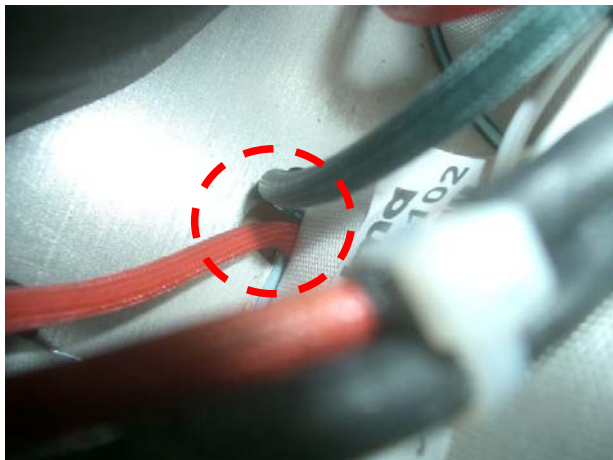
4-F

◆ View of the 3 screws under stator (gearbox side).



4-G

◆ Check that all output coils (black and red) of the 8 coils, are in front of the notch locations.



4-H

◆ Check that all the spring washers are well located on the top of the coils.

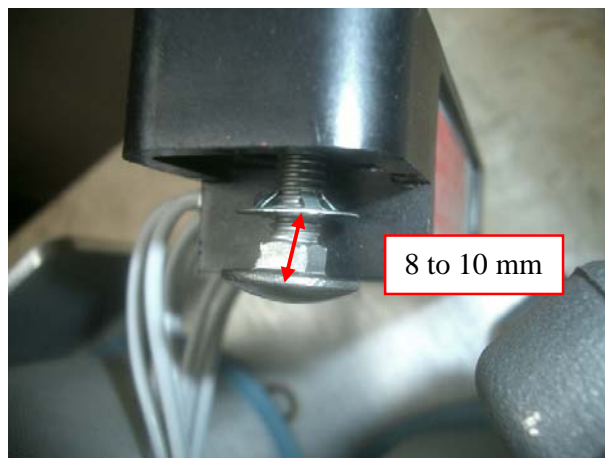


If you replace the hub on retarder LVRS600, please go directly to the picture 4-L.

➤ Specific operations in case of hub replacement on AF5 retarder.

4-I

- ◆ Check that the Vistop® lock washer steel is at 8 to 10 mm of the head screw.



4-J

- ◆ On axle side, toggle the pole shoes plate to the poles.
Take care not to wedge the spring washers with the poles during toggling.



4-K

- ◆ Take care to slide the screw correctly in the pole shoes plate slot.



4-L

- ◆ On axle side, toggle completely the pole shoes plate to the poles.
Take care not to wedge the spring washers with the poles during toggling.



4-M

- ◆ Put in place by hand, 15 new screws:
 - Put the 4 screws to the fixation pads 1st
 - Put the 3 screws to the hub
 - Put the 8 screws to the pole shoes.



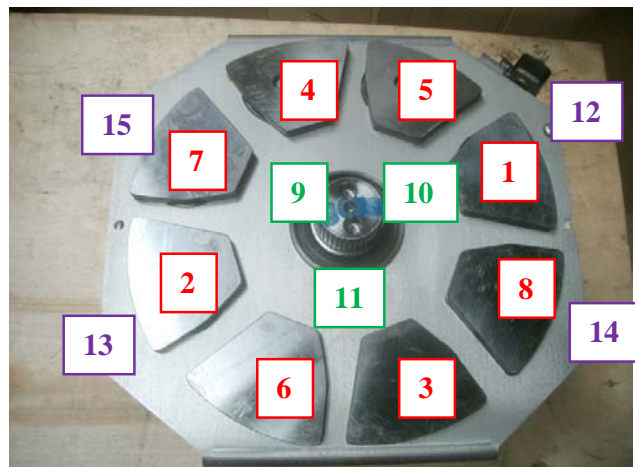
4-N

- ◆ Tighten screws at the nominal torque (25 Nm +/- 20%) (18 lb-ft±20%) following specific order, described on point 4-O.
Use a Torx® TX40 wrench.



4-O

- ◆ Tighten screws, starting by:
 - The 8 screws of the pole shoes.
 - The 3 screws to the hub.
 - The 4 screws to the fixation pads.



4-P

- ◆ Put the retarder in a vertical position.



4-Q

- ◆ Turn the retarder in order to have the gearbox side in front of you (vent cap in front of you).



4-R

- ◆ Tighten the 3 screws of the hub at the nominal torque (25 Nm +/- 20%) (18 lb-ft±20%).
Use the Torx® TX40 wrench.



4-S

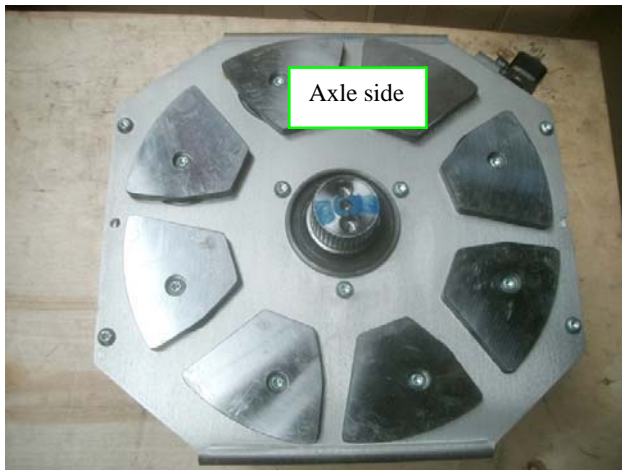
- ◆ **Specific operation for AF5 retarder only**

Tight the nut (used to secure the connecting block to the stator) at nominal torque (5 Nm +/- 20%) (44 lb-in±20%).
Use a 10 mm long socket.



4-T

◆ Toggle again the retarder (axle side up) to the wood bars in order to check the stator run out.



4-U

◆ Check the run out of the stator by using a magnetic dial gauge and a sensor.
Maximum value allowed is 0.40 mm.
Nota: In case the maximum value is up to 0.40mm, contact technical department at TELMA SA.



4-V

◆ Toggle the retarder and put it in a vertical position.



4-W

◆ Retarder in a vertical position

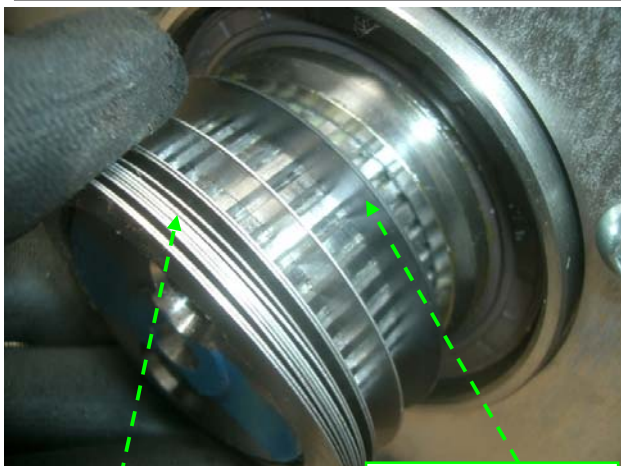


8. INSTALLATION OF THE ROTORS

6-A

◆ On the both sides of the shaft line, put in place a new black shim and new air gap adjusting shims with a thickness similar to the shims removed on operation 1-K.

NB: The black shim has to be first installed and its presence is mandatory in any case.



Air gap adjusting shims.

Black shim in first.

6-B

◆ Put new dust shields on the both shaft line sides.



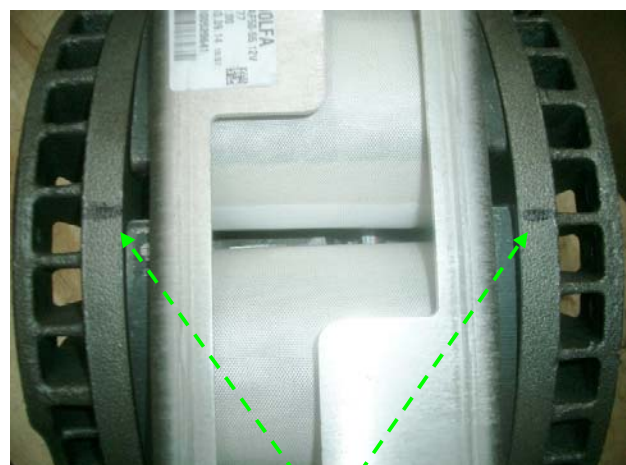
6-C

◆ Re-install the 2 rotors on the shaft line, ensuring that the 2 ink marks are aligned.



6-D

◆ Ensure that the 2 marks (1) are aligned.



1

6-E

- ◆ Re-install the 2 end shaft screws with the end shaft plates, on both retarder sides. Don't install lock tabs yet.



6-F

- ◆ Apply a tightening torque value of 30 Nm (+/- 20%) (22 lb-ft±20%) alternately on these 2 screws, and 2 times. Use a 17mm socket and a bar to lock the rotation of the rotor.



6-G

- ◆ Check the run out of the rotors by using a magnetic dial gauge and a sensor. Maximum value allowed is 0.28 mm. Nota: In case the maximum value is up to 0.28mm, contact TELMA technical department.



6-H

- ◆ Measure air gaps by using a feeler gauge. Don't turn the rotors and measure the air gap between the rotor and each pole shoe. The average of these 8 values has to be:
0.80 mm (0 / -0.15 mm) (0.026"-0.031") for AF50-60 and LVRS600
1.00 mm (0 / -0.15mm) (0.033"-0.039") for AF50-55.
Proceed on the same way for the both retarder sides.
Adjust air gap by adding or removing air gap adjusting shims if the value is not correct (operations 6A to 6G).
For additional information related to air gap measurement, please refer to technical information



6-I

- ◆ On each retarder side, unscrew the end shaft screws and remove the end shaft plates. Install 2 new end shaft screws and a new end shaft plate.



6-J

- ◆ Apply a tightening torque value of 30 Nm (+/- 20%) (22 lb-ft±20%) alternately on these 2 screws, and 2 times. Use a 17mm socket and a bar to lock the rotation of the rotor.



6-K

- ◆ Put a new lock tab in the tab washer driver.



6-L

- ◆ On each retarder side, put in place the lock tab against the screw heads, by using the tab washer driver and a hammer.



6-M

◆ Check that the lock tabs are well placed on the end shaft plates.

