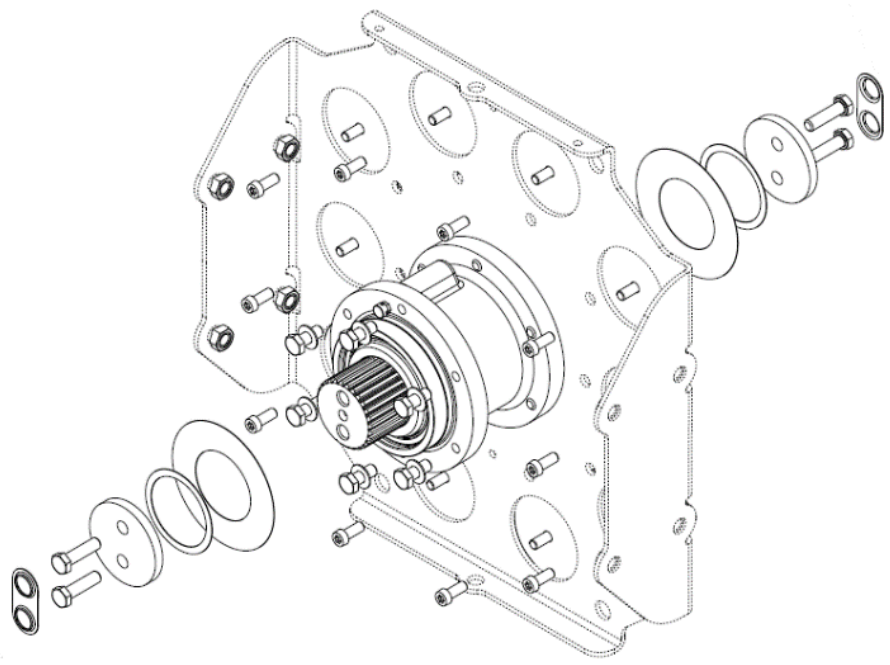
# Hub replacement on AF8 retarder range



OC441691a

**Hub replacement on Axial retarders LM/LN/LP/LR/LTxxxxxx**

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## 1. TELMA GENUINE 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 the model, engraved on the front stator housing, in the upper left corner.

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

***OC443068 Spare Parts AF8 Telma Retarder***

For more information about your TELMA product, please contact your TELMA dealer or the TELMA technical department.

## 2. SAFETY PRECAUTIONS

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

All operations and interventions for repairing this retarder will be carried out 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 following 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.



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Safety warning symbol for an 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 case of changes made 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 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 weights around 330 kg (728 lb), a rotor with coupling flange weights about 63kg (139 lb), and a hub weights 5.5 kg (12 lb).
- Put the retarder on a solid table, with the handling safety tool.
- Pay attention to the heavy parts of the retarder which can cause serious personal injury.

## 3. REQUIRED TOOLS

- Protective glasses and gloves
- Handling safety tools for retarder
- Flat screwdriver
- Torx® TX40 socket
- Click-type wrench
- 10 mm long socket and 19mm socket
- Tab washer driver (See Annexe 1)
- Hammer
- Feeler gauge
- Dial gauge with magnetic base
- Ink marker
- Torque wrench (torque values: 45Nm, 60Nm and 68Nm)
- Abrasive cloth (120 grade)



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## 4. PARTS TO BE REPLACED SYSTEMATICALLY

When removed, the following parts need to be replaced by the new ones which are supplied with the spare hub assembly:

- Shaft end screws, washers, air gap adjusting shims and lock tabs
- Screws used to secure hub
- Screws used to secure pole shoes plate
- Dust protection washers

## 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 (retarder brackets) removed from the retarder.

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

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



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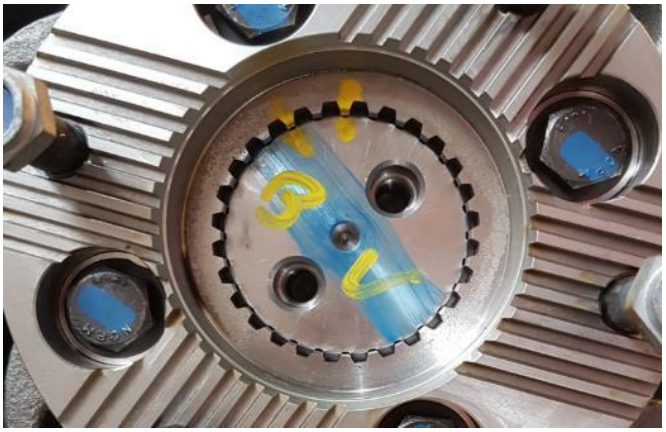
## 6. DISMANTLING STEPS

### A. REMOVAL OF ROTORS

IMPORTANT: identify all parts before dismantling in order to find their initial orientations and location during the re-assembly.

| 6A-1 | 6A-2 |
|---|---|
| Draw a mark on each rotor outer edge with an ink marker, the two marks must be aligned to find again the initial angular orientation during re-assembly. This is essential to maintain proper balancing. | On the first retarder side (for instance here the gearbox side, with the engraved part and serial numbers), remove the lock tab by using a flat screwdriver and a hammer. Caution: in order to reduce the spring effect, suppress the stress in the tab by hitting on one side and by removing the other). |

| 6A-3 | 6A-4 |
|---|---|
| Unscrew the 2 shaft end screws to remove them. Use a 19mm socket and a bar to lock the rotation of the rotor. | Draw a mark on both shaft and coupling flange with an ink marker, to find again the initial position. |





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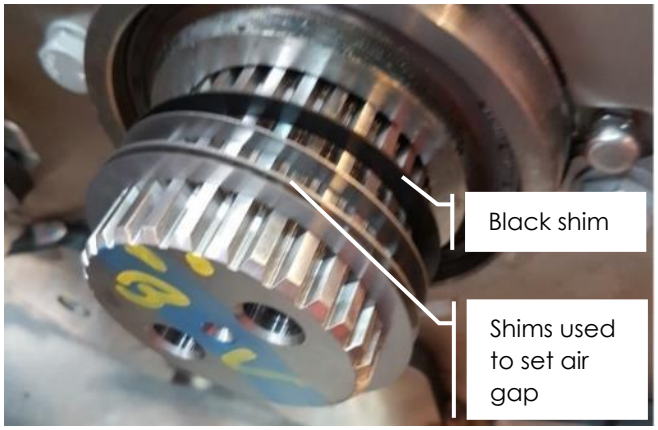
| 6A-5 | 6A-6 |
|---|---|
| Insert a lifting hook between 2 cooling fins on the frontal face of the rotor to facilitate pull off of the rotor and coupling flange assembly. | Remove the dust shield from the shaft. |


| 6A-7 | 6A-8 |
|---|---|
| Remove from the shaft the air gap adjusting shims and the 0.70mm black shim with Nuflon coating. | Do the same steps from **6A-2** to **6A-7** for the other rotor (drive axle side). |



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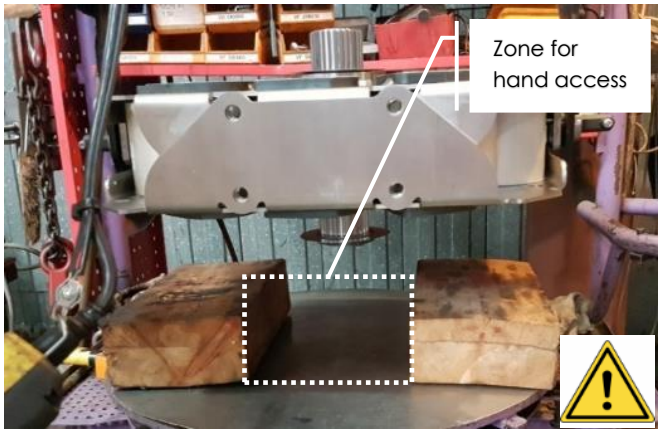
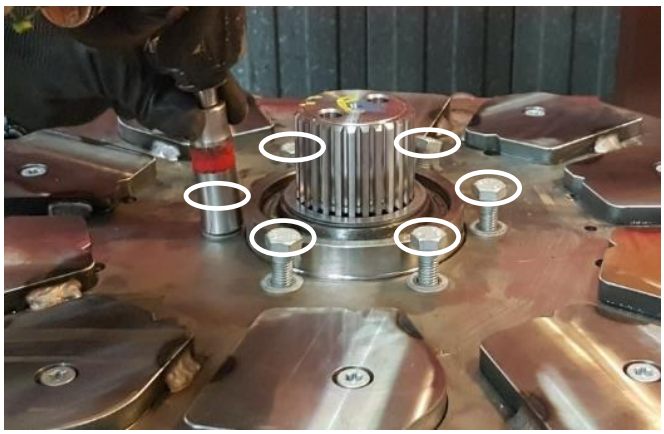
## B. RETARDER STATOR OPENING

| 6B-1 | 6B-2 |
|---|---|
| Unscrew and remove the 6 screws securing the hub on gearbox side. Use a 19 mm socket. | Put the stator in horizontal position (gearbox side with the removed hub screws down) on wooden blocks to protect the shaft. The wood beams must be thick enough in order that the shaft does not touch the table and for providing hand access for further operations. |




| 6B-3 | 6B-4 |
|---|---|
| On the upper side, unscrew and remove the 6 screws securing the hub on axle side. Use a 19 mm socket. | On the upper side, remove the 10 screws securing the pole shoes plate, using a Torx® TX40 socket. |





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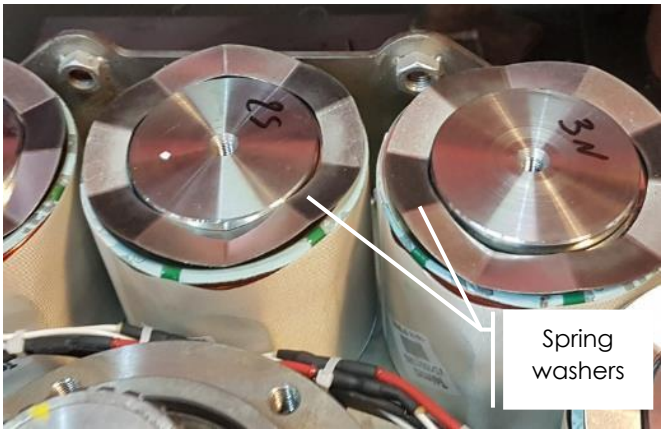
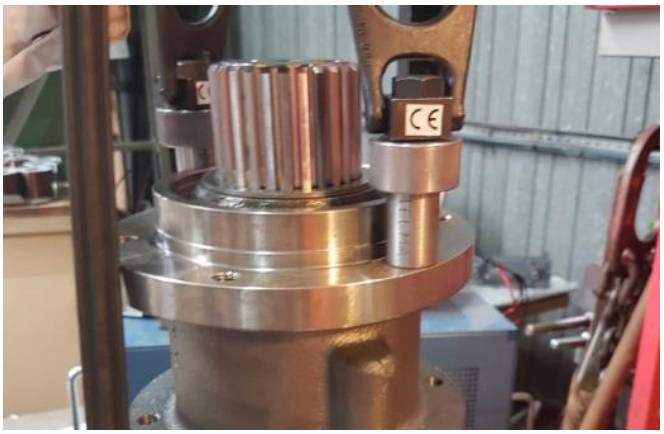
| 6B-5 | 6B-6 |
|---|---|
| Lift and remove completely the pole shoes plate. | Put aside the 10 pressure washers from the top of the coils in order not to lose or damage these parts. |




## C. REMOVAL OF THE DEFECTIVE HUB

| 6C-1 | 6C-2 |
|---|---|
| View of the stator with the hub assembly ready to be removed. | Pull on the screw by hand to help removing the hub Fit 2 hooks or 2 screws either in the shaft end or in the hub shoulder and pull out the hub assembly with care in order not to damage the internal wiring nor the coil insulators. |





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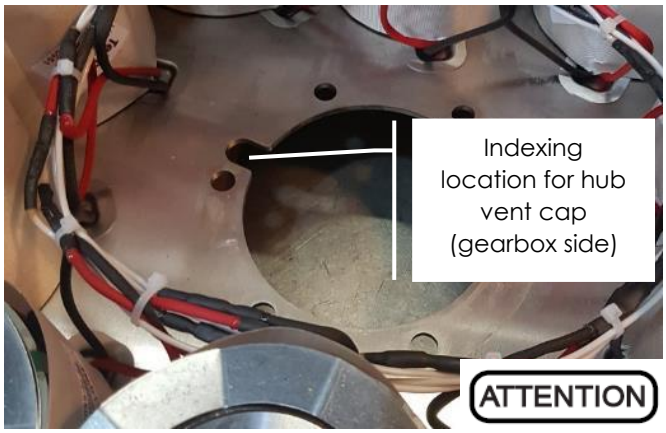
| 6C-3 | 6C-4 |
|---|---|
| After having removed the hub assembly, please note the location of the cut out in the gearbox side stator frame, towards the top, corresponding to the location of the hub vent cap. | On the mating face for the hub, remove traces of dirt using if necessary abrasive cloth. |




| 6C-5 | 6C-6 |
|---|---|
| Clean core mating faces using abrasive cloth (120 grade). | Clean as well the core mating faces on the pole shoes on the removed “drive axle side“ stator housing. |



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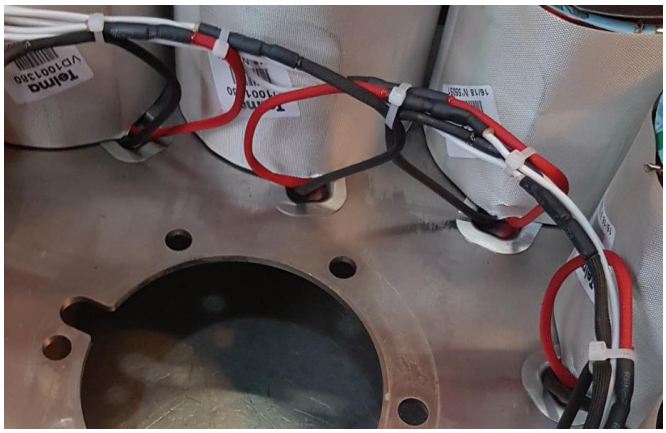
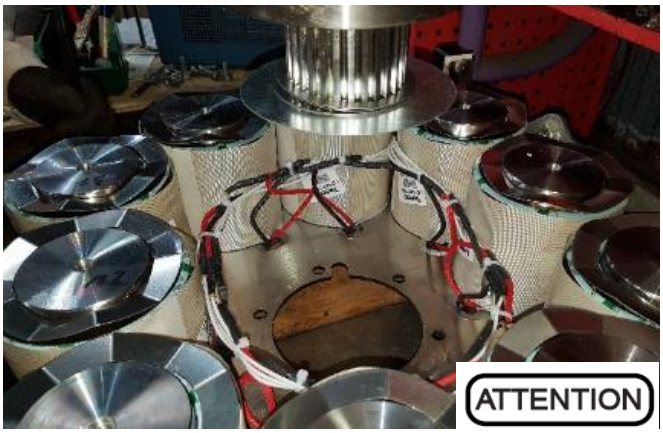
## 7. RE ASSEMBLING STEPS

### A. INSTALLATION OF THE NEW COMPLETE HUB ASSEMBLY

| 7A-1 | 7A-2 |
|---|---|
| Unpack the new hub assembly.<br><br>The "drive axle side" is shown below on the right hand side. | On the drive axle side, fit 2 hooks or 2 screws either in the shaft end or in the hub shoulder in order to lift the hub assembly in the vertical position. |

| 7A-3 | 7A-4 |
|---|---|
| Before hub fitment, if a coil has also been replaced, ensure that the coil wires are well placed in the notch of the coil protective washer. | Orientate the hub at the correct position for the vent cap, inside its indexing location.<br>Lower the hub in stator, taking care to coils and internal wiring.<br>Remove hooks or screws after hub positioning. |





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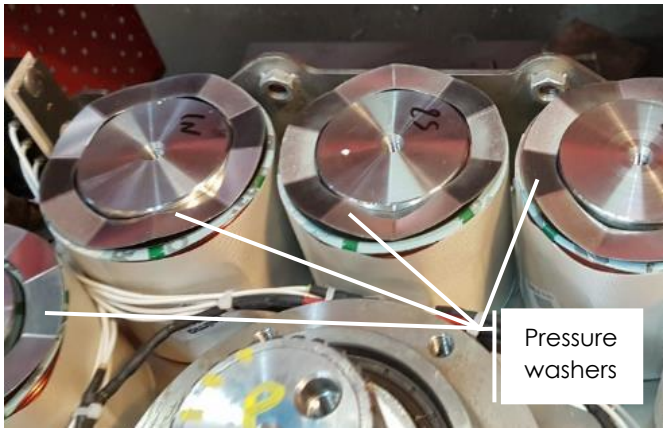
| 7A-5 | 7A-6 |
|---|---|
| From underneath, place by hand the 6 new screws with spring washers for securing the hub assembly. | View of the 6 screws under stator (gearbox side). |

| 7A-7 | 7A-8 |
|---|---|
| Check again that all output coils (black and red) of the 10 coils, are well located in the notches. | Place again the pressure washers on top of the coils and check that they are well located. |



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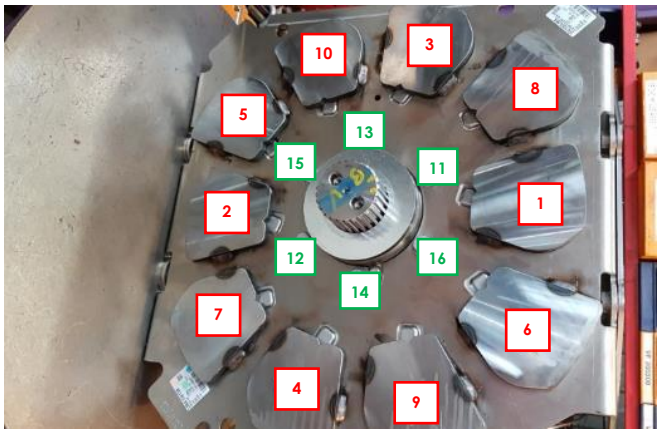
| 7A-9 | 7A-10 |
|---|---|
| On axle side, relocate the pole shoes plate over the cores.<br>Take care that the spring washers remain well in place around the cores and do not get clamped. | Put in place, by hand, 16 new screws:<br>- 6 screws with spring washers for the hub<br>- 10 screws for the pole shoes. |

| 7A-11 | 7A-12 |
|---|---|
| Using the order shown below, tighten:<br>- first the 10 pole shoe securing screws with a Torx® TX40 socket:<br>Tightening torque: 45 Nm ± 10% (33 lb.ft ± 10%)<br>- afterwards the 6 hub securing screws:<br>Tightening torque: 68 Nm ± 20% (50 lb.ft ± 20%) | Put the retarder in vertical position. |



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| 7A-13 | 7A-14 |
|---|---|
| Turn the retarder in order to have the gearbox side in front of you (view on vent cap). | Tighten the 6 hub securing screws:<br>Tightening torque: 68 Nm ± 20% (50 lb.ft ± 20%) |


| 7A-15 | 7A-16 |
|---|---|
| Toggle again the stator onto the wood blocks to check the stator flatness. | Check the axial run out of the stator by using a dial gauge with magnetic base.<br>Maximum allowed value: 0.40 mm<br>Note: in case that the measured value is above this limit, check that no coil pressure washer is clamped between a core and a pole shoe or consult the TELMA technical department. |




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## B. INSTALLATION OF THE ROTORS

| 7B-1 | 7B-2 |
|---|---|
| Lift up the stator in vertical position. On both ends of the shaft, put in place a new black shim and new air gap adjusting shims with a thickness to the one removed in step 6A-7.<br>Note: the black "Nuflon" coated shim must be installed first; its presence is mandatory in any case. | Put new dust shields on both shaft ends. |

| 7B-3 | 7B-4 |
|---|---|
| Re-install both rotor with coupling flange assemblies on the shaft, ensuring that the marks painted on the shaft splines and on the coupling flange splines (refer to picture 6A-4) are aligned. | When fitting the second rotor, ensure that both marks painted on the outer edges of the rotors are aligned. |



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| 7B-5 | 7B-6 |
|---|---|
| Re-install both removed shaft end screws with the removed pressure plates, on both retarder sides.<br>Do not install lock tabs yet. | With a manual torque wrench apply a tightening torque value of 60 Nm ± 20% (44 lb.ft ± 20%) alternately on these 2 screws.<br>Use a 19mm socket and a locking bar to be inserted inside a rotor cooling canal for preventing rotor rotation. |

| 7B-7 | 7B-8 |
|---|---|
| Check the axial run out of the rotors by using a dial gauge with magnetic base.<br>Maximum allowed value: 0.28mm<br>Note: should the measured value be higher than 0,28mm, please contact the technical department at TELMA SA. | Measure the air gaps by using a feeler gauge.<br>Do not turn the rotors and measure the air gap between the rotor and each pole shoe.<br>The average of these 10 values must be conform with values mentioned in retarder technical specifications: 1.30mm $^{0}_{-0.20}$. Proceed on the same way for both retarder side). Adjust air gap by adding or removing air gap adjusting shims if the value is not correct (operations 7B-1 to 7B-7).<br>Get closer to your TELMA agent for retarder specifications.<br>For additional information related to air gap measurement, please refer to OC441692 maintenance manual |




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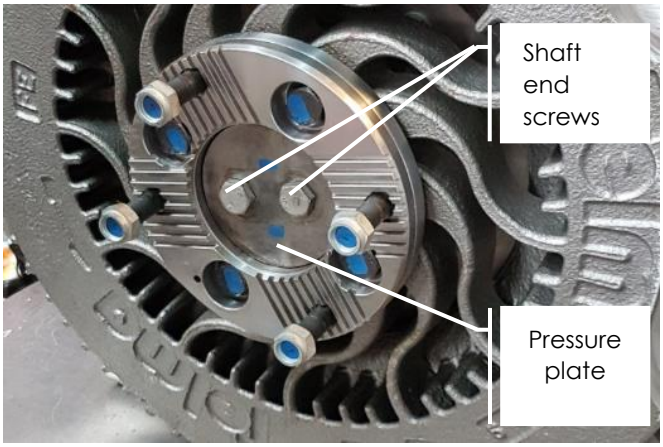
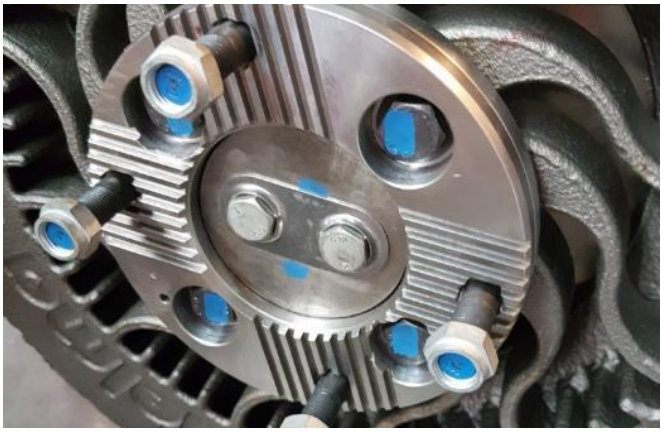
| 7B-9 | 7B-10 |
|---|---|
| After having adjusted the air gaps, on each retarder side, unscrew the removed shaft end screws and the removed pressure plate.<br>Install 2 new shaft end screws and a new pressure plate supplied with the replacement hub assembly. | With a manual torque wrench, apply a tightening torque value of 60 Nm ± 20% (44 lb.ft ± 20%) alternately on these 2 screws.<br>Use a locking bar to be inserted inside a rotor cooling canal for preventing the rotation of the rotor. |




| 7B-11 | 7B-12 |
|---|---|
| Insert a new lock tab in the retaining tab driver<br>On each retarder side, put in place the lock tab over the screw heads and hit with a hammer. | Check that the lock tabs are well bottomed over the shaft end screw heads. |





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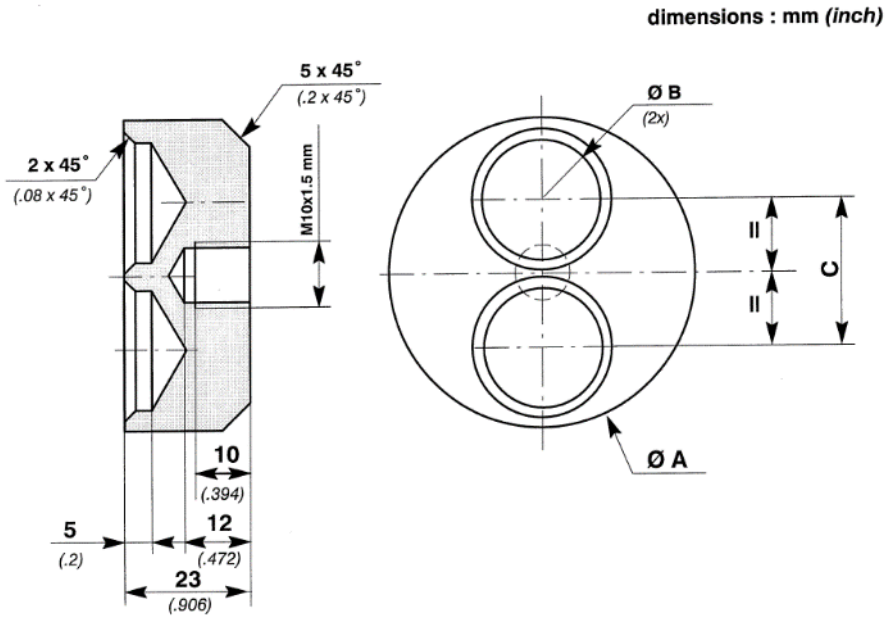
## 8. ANNEX

### A. RETARDER AIR GAP VALUES

You will find the necessary information for this equipment in the following catalogue:

***OC441692 Maintenance manual for air gap adjusting on AF8 retarders***

### B. TAB WASHER DRIVER to be made locally




**For Axial AF8 retarder:**

| | |
|---|---|
| Ø A = 75 mm | (2.953") |
| Ø A = 24 mm $^{+0.1}{}_{0}$ | (0.945" / 0.949") |
| C = 40 mm ± 0.1 | (1.570" / 1.579") |

**Material :** XC 48F (Rm = 630 N/mm$^2$ mini) (HB 230 to 280)

**General machining :** $\overset{6.3}{\sqrt{}}$ except $\overset{3.2}{\sqrt{}}$

**Protection :** Oil burnishing

**General tolerance :** ± 0.5mm *(± .019 inch)*

Break sharp edges to have a 1 mm *(.039 inch)* chamfer at 45°.



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