

GEARBOX INSTALLATION OF FOCAL RETARDER

INITIAL PREPARATION

- Check the area around the rear of the gearbox and ensure all vulnerable pipes and cables in close proximity to the retarder are protected. Refer to the Telma Technical Note and, if necessary:
 - Provide protection by use of metal heat shields around the retarder
 - Provide protection by use of heat proof sleeving around pipes and cables
 - Reroute cables and pipes
 - Replace plastic hoses by metal piping
- Make sure that the position allocated for the retarder is clear. ie., no silencer, airtanks, spare wheels, etc.
- Fit gearbox speedometer extension and drive if required
- Check that the gearbox output flange is fully home, correctly torqued, clean and without burrs
- Check that the gearbox output flange end-float and run-out are acceptable within the manufacturers limits
- Inspect and clean the Telma Rotor Adaptor Flange and offer it up to the gearbox output flange. Check that there is a good register and that the mating holes coincide and are of the same diameter. After checking, remove the Rotor Adaptor Flange
- Fit the appropriate auxiliary gearbox support; if in doubt, consult Telma Technical Department for advice
- Should the auxiliary support be adjustable, follow these instructions:-
 - Select a datum point on the rear of the gearbox housing which will still be accessible after the retarder is installed
 - Measure the height vertically from the top of the chassis frame to this datum point on the gearbox and record this dimension.
 - After the retarder is installed, adjust the gearbox height back to this recorded dimension.

INSTALLING THE RETARDER

SAFETY NOTE: Always use suitable lifting tackle with safety lugs and chains when lifting the retarder assembly

- Fit the stator carrier to the prepared gearbox; ensure that the correct torques are maintained
- Remove the fasteners used to transport the retarder; put to one side the shouldered rotor fastener studs
- Thoroughly check and clean both the rotors and the stator pole-shoes, removing any burrs or roughness.

INSTALLING THE INBOARD ROTOR AND FLANGE ASSEMBLY

- Lay the inboard rotor (the rotor with the arrows pointing in a clockwise direction) on two lengths of wood, with the machined faces of the rotor uppermost.
- Mount the Telma Rotor Adaptor Flange on the mating machined face of the rotor; the groove around the edge of the Rotor Adaptor Flange should be uppermost. One hole in the flange is offset by 3°, and it may be necessary to rotate until the holes coincide.
- Pass the longest end of the shouldered studs through the Rotor Adaptor Flange and rotor holes until the shoulder of the stud bottoms in the groove of the Rotor Adaptor Flange
- Using a soft face mallet, ensure a complete and secure fit between the two parts
- Fit the metal locknuts supplied and tighten diagonally in turn to the correct torque

Note: This operation needs to be carried out carefully as this is essential to the accurate shimming of the retarder

- Find the triangular balance mark on the cast side of the rotor and make a chalk line on the outside diameter of the rotor to indicate its position

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- Offer the assembly up to the gearbox output flange, line up the holes and fit the fasteners. Set the torques to the correct figure as per the appropriate gearbox manual
- **Note:** If long bolts are used, feed them through the gearbox output flange with the head against the output flange register. If possible, provide a stop ring attached to the output flange to prevent the bolts from pushing back when tightening or releasing the bolts.
- Check that the machined face of the rotor is almost flush with the machined faces of the stator carrier
- Check that the run-out on the outside of the machined edge of the rotor face does not exceed 0.2mm

INSTALLING THE STATOR AND SHIMS

- Check that the terminal block is in the desired position. Offer up the retarder stator into position with the machined bosses mating with the stator carrier; line up the holes and fit all eight bolts and washers. Do not fully tighten at this stage
- Select the 'M' shaped shims, keeping each set with their appropriate label. A 1.5 mm shim, for example, is labelled 15/—
- Using the four thickest shims, fit them between the stator and carrier faces; tighten one bolt in each pair and measure the air gap between the pole-shoes and the rotor at each corner and record the four dimensions
- Check the specified air gap for the particular model of retarder and add or subtract shims until the correct air-gap is achieved for all eight pole-shoes. Remember that when all eight rotor fasteners are correctly torqued, the gap will be reduced by approximately 0.05 mm; allow for this reduction in your calculations
- Revolve the rotor through 90° - 180° and check that the air-gap remains within tolerance

INSTALLING OUTBOARD ROTOR AND SHIMS

- Take the two thickest rotor shims and fit to the protruding rotor studs
- Offer up the outboard rotor and line up the balance marks with the inboard rotor; tighten to the correct torque with plain nuts
- **Note:** The use of plain nuts eases the assembly and removal during shimming and also protects the effectiveness of the metal locknut for final tightening to the correct torque
- Measure the resulting air-gap between the outboard rotor and the pole-shoes and make any adjustments until the specified air-gap is achieved
- Check the outboard rotor air-gap remains within tolerance when the rotor is revolved through 90° - 180°
- Fit the metal locknuts to secure the outboard rotor; torque to the correct setting

FITTING THE PROPSHAFT

- Ensure that the propshaft is manufactured or modified to the correct standard and to the correct working length and is fully dynamically balanced
- Ensure joints and sliders in good condition
- Offer up the propshaft and secure with metal locknuts
- **Note:** In certain cases, access to the propshaft nuts may be restricted. It may be easier to firstly slide the outboard rotor along the prop-shaft, offer up the propshaft flange to the Rotor Adaptor Flange and tighten the propshaft nuts. Finally, return the rotor into position, secure with the metal locknuts and torque to the correct setting.

GEARBOX INSTALLATION OF FOCAL RETARDER**FINAL CHECK**

- Ensure the gearbox oil has been replaced to the correct level on retro-fit installations.
- Check that the gearbox auxiliary support is adjusted to bring the retarder height back to the original recorded dimension
- Ensure that the shielding of vulnerable pipes and cables is adequate
- Ensure that the retarder feed cable is correctly connected and the connecting block is sufficiently sealed and protected
- Ensure that the retarder earth is correctly fitted and that the chassis earth is clean and protected from corrosion
- Ensure that all wiring is suitably clipped to prevent damage at the terminals or chafing
- Carry out a full road test
- Complete Telma Installation Report if appropriate