

Chapter Nineteen

STARTER, AND ENGINE-DRIVEN ACCESSORIES

UNIT REPLACEMENT

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THIS CHAPTER contains instructions for fitting and removing the turbo starter and the engine-driven accessories, reference should be made also to the relevant aircraft handbook for any instructions regarding the method of fitting aircraft items, such as cooling shrouds and ducts, and connecting up the accessories to the aircraft services. The general information contained in chapter 5 should be referred to as necessary.

TURBO STARTER.

Before fitting the turbo starter, check that it is of the correct type for the installation and that it has not been damaged whilst in store or in transit. Remove the four 7/16" B.S.F. plain nuts and spring washers, which secure the blanking cover to the starter mounting face on the top wheelcase, and remove the cover. Remove the turbo starter from the transport frame.

Having ensured that the mating faces of the top wheelcase and the turbo starter are clean and undamaged, position the joint washer (Part No. 96750) on the top wheelcase face; take great care to ensure that the oil feed hole is not blocked. If the joint washer is in any way unserviceable a new one should be fitted.

Mount the turbo starter on the top wheelcase --- the six redundant annulus gear studs will enter corresponding clearance holes in the starter flange --- and, using special spanner T74832, secure it by refitting the four spring washers and plain nuts.

When the engine is installed in an aircraft, remove the blanking covers from the exhaust and emergency outlets and connect up the exhaust system as described in the relevant aircraft handbook. Connect the electric wiring to the turbo starter ensuring that the plugs, which should be marked to correspond with the markings on the sockets, are correctly connected.

After assembly to the engine, the turbo starter gearbox must be primed with oil. The correct oil is engine oil D.E.D. 2479 and it is most important that only the correct oil is used as other grades of oil may cause the starter clutch mechanism to function incorrectly. To prime the turbo starter gearbox, unscrew the oil filler plug from the side of the clutch and reduction gear casing and inject about $\frac{1}{4}$ pint of the correct oil. Replace and securely tighten the oil filler plug.

Similarly, if the engine has not been in use for more than seven days, the turbo starter gearbox should be primed before the initial start is made.

Instructions for loading and unloading the turbo starter, and the immediate action upon failure to start, are contained in chapter 9. For further information reference must be made to the relevant specialist chapter.

TACHOMETER GENERATOR

Before fitting the tachometer generator, check that it is of the correct type for the installation and that it has not been damaged whilst in store or in transit. Having removed the transport blank, turn the splined shaft to check the generator for freedom of rotation. Remove the three plain $\frac{1}{4}$ " B.S.F. nuts, spring and plain washers, which secure the blanking cover to the tachometer generator face on the top wheelcase, and remove the blanking cover.

Having ensured that the mating faces are clean and undamaged, position a new sealing ring (Part No.N.4562) on the tachometer generator spigot and mount the tachometer generator on the top wheelcase; if necessary, turn the impeller in order to rotate the tachometer generator drive in the top wheelcase and thus facilitate the engagement of the serrations. Refit the three plain and spring washers and the plain nuts to secure the tachometer generator. If the engine is installed in an aircraft connect up the electric cables.

AIR COMPRESSOR

Before fitting the air compressor, check that it is of the correct type for the installation and that it has not been damaged whilst in store or in transit. Ensure that the spring-loaded quill shaft is correctly fitted and retained by the circlip; the large end of the quill shaft is inserted into the air compressor crankshaft, the smaller end fitting into the engine drive. Remove the oil inlet filter screw from the air compressor crankcase, and blank off the oil feed by fitting blanking cap (Part No. 49347) instead of the banjo which is fitted when an external oil feed is employed. Wire-lock the oil inlet filter screw. Remove the six $\frac{1}{4}$ " B.S.F. plain nuts and spring washers, which secure the blanking cover to the air compressor drive housing which is mounted on the top wheelcase, and remove the blanking cover.

Having ensured that the mating faces of the air compressor and the drive housing are clean and undamaged, place the gasket (Part No. 97254) over the studs in the drive housing face, ensuring that the oil feed hole in the drive housing face aligns with a hole in the gasket and is not inadvertently blanked off.

Mount the air compressor on the drive housing at an angle of 60 deg. inboard of the vertical position. Ensure that the air compressor quill shaft splines engage correctly with the drive in the housing on the engine; if necessary, turn the impeller by hand in order to rotate the drive in the top wheelcase and so facilitate engagement. Secure the air compressor by refitting the six spring washers and plain nuts.

If the engine is installed in an aircraft, ensure that the air-intake filter assembly is correctly assembled on the air compressor, fit the air compressor cooling duct and shroud, and connect the air delivery pipe to the delivery valve assembly on the air compressor.

HYDRAULIC PUMP

Before fitting the hydraulic pump, check that it is of the correct type for the

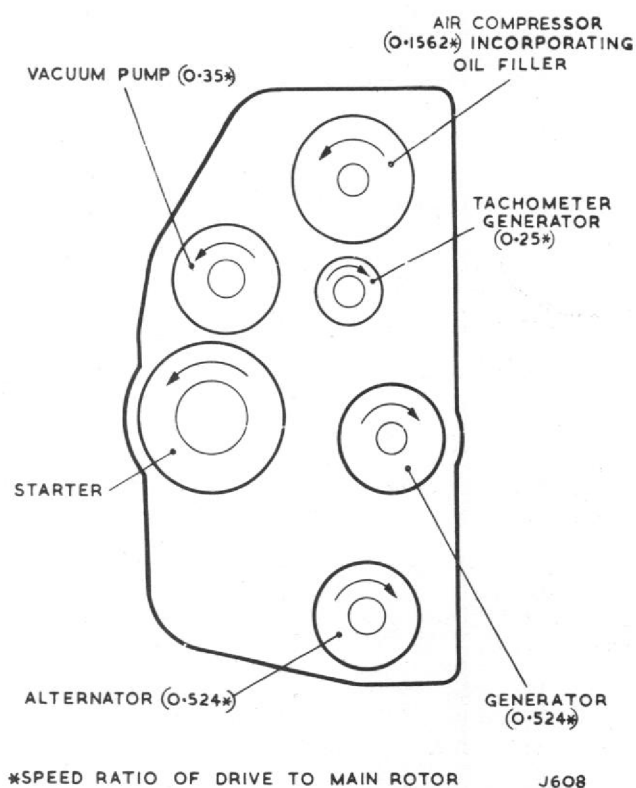


Fig.1 Top wheelcase drives

installation and that it has not been damaged whilst in store or in transit. Unless these parts are in position already, prepare the hydraulic pump for installation by fitting the drain banjo (Part No.AGS.1129A) with a banjo washer (Part No.AGS.1139A) on either side of it, on to the banjo bolt (Part No.N2310) and screwing the banjo bolt into the drain hole in the hydraulic pump. Tighten the banjo bolt until finger-tight only, to facilitate alignment of the banjo with the drain pipe when fitting the latter after the hydraulic pump is mounted on the engine. Place a new synthetic rubber sealing ring (Part No.N4571) on the hydraulic pump spigot.

Remove the six $\frac{1}{4}$ " B.S.F. plain nuts and the spring and plain washers, which secure the blanking cover to the hydraulic pump adapter on the bottom wheelcase, and remove the blanking cover. Ensure that the two set-screws which fasten the adapter to the wheelcase are tight. Ensure that the hydraulic pump drive quill and the splined sleeve are in position in the gear in the bottom wheelcase and that they are retained by an internal wire-type circlip. Check both this circlip and the smaller circlip within the splined sleeve for correct fitting and security.

Having ensured that the mating faces of the hydraulic pump and the adapter on the bottom wheelcase are clean and undamaged, and that the sealing ring is correctly positioned on the hydraulic pump spigot, mount the hydraulic pump on the bottom wheelcase. Ensure that the splined hydraulic pump shaft engages with the drive within the engine correctly; if necessary, turn the impeller by hand in order to rotate the drive in the wheelcase and so facilitate engagement. Secure the hydraulic pump by refitting the six plain and spring washers and the plain nuts.

Remove the blanking cap from the hydraulic pump drain connection on the drain box, which is mounted on the diffuser casing; it is the second connection counting from the port side of the engine. Position the heat resisting rubber sleeve (Part No.47084) on the hydraulic pump drain pipe (Part No.48225) and position the mild steel clip (Part No.46835) over the sleeve. Remove one of the $\frac{1}{4}$ " B.S.F. plain nuts and spring washer from the adjacent fuel pump flange and connect the drain to the banjo on the hydraulic pump and the connection on the drain box. Position the pipe clip over the stud in the fuel pump flange and secure it by refitting the spring washer and plain nut. Securely tighten the banjo bolt, the union nut at each end of the drain pipe and the nut on the fuel pump stud. Wire-lock the two union nuts and the banjo bolt.

Ensure that the hydraulic pump inlet and outlet ports are properly blanked off, unless the engine is installed in an aircraft in which case the relevant pipes must be coupled up before the engine is run.

ELECTRIC GENERATOR/ALTERNATOR

The method of fitting and removing either the electric generator or the electric alternator is similar and, therefore, instructions for fitting and removing one of these engine-driven accessories only are given.

Before fitting the electric generator or alternator, check that it is of the correct type for the installation and that it has not been damaged whilst in store or in transit. Remove the four plain $\frac{3}{8}$ " B.S.F. nuts, and the spring and plain washers which secure the blanking cover to the relevant generator mounting face on the top wheelcase, and remove the blanking cover. Ensure that the short driving shaft, splined sleeve, and washer are correctly assembled in the generator driving gear in the top wheelcase. These parts should be retained in the gear by an internal wire-type circlip immediately above the washer, and there should be a second circlip within the splined sleeve; ensure that these circlips are correctly fitted and secure.

Having ensured that the mating faces of the generator, or alternator, and the top wheelcase are clean and undamaged, and that the recess into which the generator spigot fits is also clean and free from burrs, etc., apply a protective coating of approved graphite grease to the inside of the splined sleeve in the wheelcase, and to the splines on the generator armature spindle; the coating of grease must not be excessive or it may enter the generator during subsequent running. This is necessary to prevent corrosion as the oil seal in the top wheelcase prevents engine oil reaching and protecting these parts; the coating of grease should, therefore, be renewed whenever the generator is removed for any purpose. Because of the oil seal just mentioned, jointing compound is not necessary between the generator and the top wheelcase. Mount the generator on the top wheelcase - - if necessary, turn the impeller in order to rotate the generator drive in the top wheelcase and thus facilitate engagement of the splines --- and refit the four plain and spring washers and the $\frac{3}{8}$ " B.S.F. nuts to secure the generator.

Do not fully tighten the nuts until the generator flange is seated properly on the mounting face and all four plain and spring washers and nuts have been refitted.

If the engine is installed in an aircraft, connect the screened leads to the generator and couple up the air cooling ducts.

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