Draft Chapter 33D

TOP WHEELCASE, REASSEMBLING

This draft chapter is issued for advance information pending the publication of the final chapter.

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GENERAL

1. As the difference in design between the 48 Mk. 1 and 48 Mk. 2 is considerable, the wheelcase for each mark is dealt with separately. The gear arrangement for the 48 Mk. 1 and 48 Mk. 2 is respectively shown in Fig. 4 and 12 in Chapter 24D. Therefore, when considering either wheelcase the figures in parenthesis, given in the text, will relate to the appropriate illustration.

2. Reconditioning is confined to operations whereby unserviceable parts are replaced by serviceable standard parts. Instructions for major repairs and rectification, and the processes essential to such repairs, are contained in Chapter 28D.

3. Consumable stores required to replace items automatically discarded during dismantling are listed at the end of the chapter. Tools are referred to in the text as they are used and are also listed at the end of the chapter. To prevent damage vice blocks should be held in protected vice jaws and protective material used between the clamp of a dial test indicator and the surface to which it is secured.

4. Throughout the text the phrase "within the limits" implies that reference must be made to the Table of Fits and clearances in Chapter 38, to ascertain the limits permissable. The term "press" implies the use of a suitable hand or mechanical press.

5. Before making any renewals prior to rebuilding, the inspection sheet must be read carefully and all work carried out as directed. Minor rectifications, which may not be entered on the inspection report, include renewing damaged or loose studs, cleaning up steel components with fine emery or on a buff, removing burrs and sharp edges, cleaning up any burrs around stud holes, stoning up gear teeth and splines, and polishing out scratches. Absolute cleanliness is essential at all stages. With the exception of gears which should be free of oil on initial assembly, components should be thoroughly

washed in clean kerosine immediately before use and then liberally coated with clean engine oil. Dirt or oil on gear teeth, however minute, will cause a false reading when backlash checks are made. Ball bearings, including new ones, must be washed in white spirit and after drying with a compressed air jet, lubricated with engine oil to prevent corrosion. After any work has been carried out the component in question must be resubmitted for inspection.

RENEWALS

6. With the exception of damaged studs, no additional work, other than that required for normal assembly, is necessary to renew any standard part; the defective parts rejected by inspection are discarded and new, serviceable, or repaired parts substituted. Correlation marks on renewed parts, where applicable, should be etched or stamped on as appropriate. To renew damaged studs, a $\frac{1}{4}$ in. B.S.F. stud box T70809, a $\frac{3}{8}$ in. B.S.F. stud box T70473, and a 2 B.A. stud box T70965 are required. Damaged studs may be removed, and serviceable replacements fitted, in accordance with standard practice.

REPAINTING

7. For the purpose of crack detection the paint will have been stripped from the top wheelcase casing, the starter gear casing, the air compressor drive and housing, and (48 Mk. 2 only) the generator drive housing. These parts must be repainted prior to assembly. Before commencing to repaint, ensure that the chromate finish is undamaged. Where the original chromate finish has been removed from small areas it may be rectified by the application of selenious acid; where large areas are affected the component must be re-chromated in accordance with D.H. process specification No. 167 contained in Chapter 32.

8. Primer and finishing coats must be applied in accordance with the requirements of D.H. process specification No. 168 (protection of magnesium alloy against corrosion).

(1) Degrease the casings by immersion in a trichlorethylene vapour degreaser; the castings should remain in the degreaser until they attain the temperature of the vapour.

(2) Turn the air-intake face upwards and using 28 special nuts T77002 and six thumb nuts T76995, assemble paint mask T76989 to the face.

(3) Turn the wheelcase casing through 180 deg. and using slave nuts, assemble paint masks to the following drive faces:—

T76989 – spare drive
T76990 – starter drive
T76991 – air compressor drive
T76992 – tachometer drive
T76993 – one each to the alternator and generator drive faces.

(4) Grease the threads of the five masking plugs T76994 and screw them into the oil-ways.

(5) Using five special nuts T77025, blank off the compressor wheelcase face with paint mask T77022.

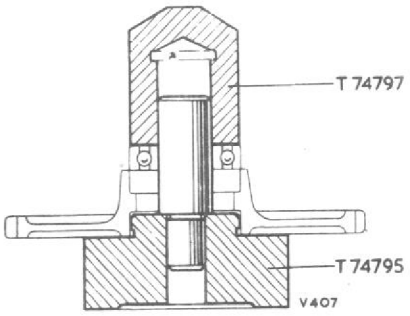


Fig. 1. Pressing the first ball bearing into the idler gear

(6) Using four thumb nuts, blank off the compressor adapter face with paint mask T77021.

(7) Using six special nuts T77016 and central bolt with thumb nut T76995, blank off the starter housing face with paint mask T77027.

(8) Grease the threads of the oil filler masking plug T77024 and screw it into position.

(9) Coat all exposed threads with grease.

(10) Place the casting face downwards and spray the external surface with approved primer; allow the primer to air dry for not less than one hour.

(11) Spray with approved lacquer and allow it to air dry for a minimum of six hours.

(12) When thoroughly dry remove all blanks in readiness for assembly.

48 MK. 1 ONLY (*fig.* 22)
ASSEMBLY OF DRIVES

Generator and starter idler gear

9. (1) Place the gear (86) on press block T74795.

(2) Assemble one of the two ball bearings over the guide mandrel followed by adapter T74797 and press the ball bearing into position (*fig.* 1).

(3) Invert the gear on the press block.

(4) Assemble the distance piece and the second ball bearing over the guide mandrel and using the adapter, press both the distance piece and the ball bearing into position (*fig.* 2).

(5) Remove the assembly from the press.

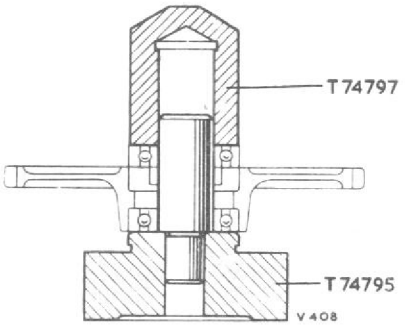


Fig. 2. Pressing the distance piece and second ball bearing into the idler gear

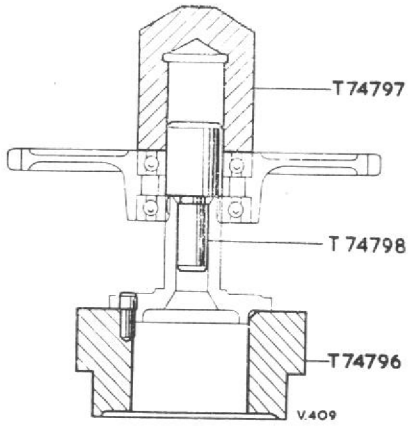


Fig. 3. Pressing the idler gear and roller bearing on to the idler gear shaft

(6) Set the gear shaft, flange downwards, on vice block T74796, locating one of the four stud holes on the dowel of the press block

(7) Insert the reduced diameter of guide mandrel T74798 into the bore of the shaft.

(8) Place the gear, complete with its ball bearings, over the guide mandrel, gear uppermost.

(9) Position guide adapter T74797 over the guide mandrel and press the gear on to the shaft (*fig.* 3).

(10) Transfer the vice block and assembly to a vice.

(11) Fit cup-washer (Part No. N2896) and screw on and tighten the ring nut using spanner T73026; lock the cup-washer to the nut by lightly tapping it into the serrations of the nut at two opposite positions.

Spare drive and starter idler gear

10. This gear (19) consists of an integral large and small gear, but the tools used and the sequence of assembly operations are identical with those described in para. 9 for the generator and starter idler gear. Starting with the large gear downwards on the press block repeat the instructions detailed in Op. (1) to (11).

Generator idler gear

11. (1) Assemble the gear (82) into the bearing with the flanged end of the bearing to the gear.

(2) Insert the retaining bolt through the gear shaft and engage the splines with the internal splines in the gear.

(3) Place the assembly in vice block T74819, gears uppermost, and locate the two brass, wedge-shaped segments of the vice block in the teeth of the smaller of the two gears.

(4) Fit the plain washer and screw on and tighten the nut; align the split-pin hole.

(5) Remove the assembly from the vice block and check the gear for freeness in the bearing.

(6) Using feeler gauges check that the end float clearance between the gear and the bearing thrust face is within the limits.

Spare drive gear

12. (1) Assemble the large gear (25) to the small gear (24) and bolt them to the gear flange with the large gear (25) adjacent to the flange using four tab-washers (Part No. AGS518E) and the nuts.

(2) Place the assembly in vice block T74799; hold the vice block firmly in a vice and tighten the nuts; lock the tab-washers.

(3) Remove the assembly from the vice block.

Air compressor drive gear

13. (1) Assemble the gear (40) to the gear flange; fit the four bolts and four tab-washers (Part No. AGS518E) and nuts.

(2) Place the assembly on vice block T74799 (*fig.* 4); hold the vice block firmly in a vice and tighten the nuts; bend up the tab-washers to lock the nuts.

(3) Remove the assembly from the vice block.

Tachometer drive gear

14. (1) Assemble the large gear (33) to the small gear (26) and bolt them to the gear flange with the large gear adjacent to the flange using four tab-washers (Part No. AGS518E) and nuts.

(2) Place the assembly vice block T74799; hold the vice block firmly in a vice and tighten the nuts; bend up the tab-washers to lock the nuts.

(3) Remove the assembly from the vice block.

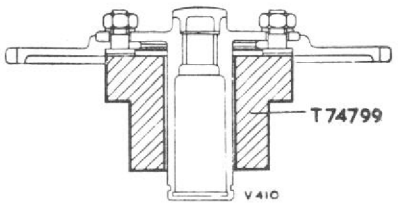


Fig. 4. Using vice block T74799 to tighten nuts on the air compressor and tachometer drives

ASSEMBLING THE PLAIN BEARINGS TO THE WHEELCASE

15. Invert the wheelcase so that the air-intake joint face is uppermost; position it on build stand T74978 and secure it with four slave bolts and nuts (*fig.* 5).

(1) Using a compressed air jet blow through all the oil-ways in the casting.

(2) Assemble the following bearings to their respective locations:—

Spare drive (13)
Air compressor drive (35)
Tachometer drive (10)
Generator drive (95)
Alternator drive (61)

(3) Secure each bearing with two tab-washers (Part No. N1616) and two nuts; bend up the tab-washers to lock the nuts.

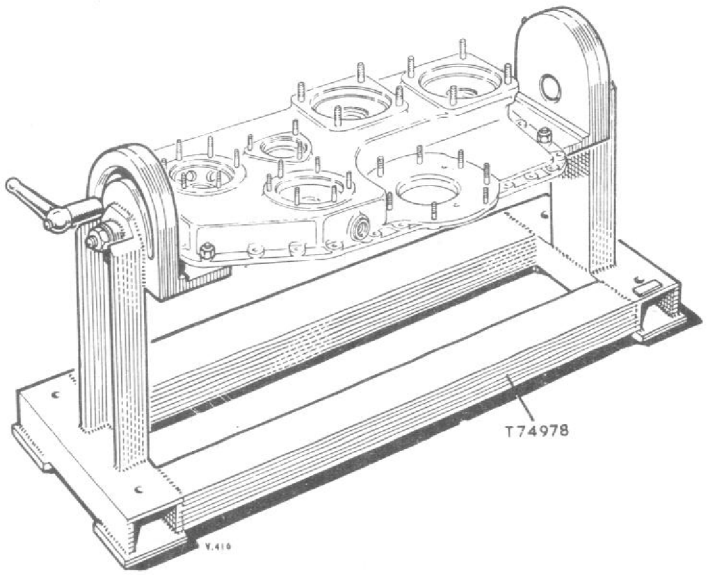


Fig. 5. Top wheelcase (48 Mk. 1) on build stand T74978

MISCELLANEOUS DETAILS

16. (1) Using two washers (Part No. AGS566B), fit the plugs to the oil gallery.

(2) Using washer (Part No. AGS1138B), screw the banjo pillar (1) into its threaded hole on the starboard side of the wheelcase, adjacent to the air compressor drive. Using two washers (Part No. AGS1138B), secure the banjo to the pillar with the cap-nut.

(3) Using washer (Part No. AGS1138B), screw the oil pressure gauge union adapter (67) into its threaded hole on the port side of the wheelcase adjacent No. 8 drive; blank off the union with nipple (Part No. 1140B) and nut and insert split pin (Part No. SP–9–C6).

(4) Using washer (Part No. AGS1139B) for the hydraulic pump oil feed, screw the banjo pillar into the oil gallery. Using two washers (Part No. AGS 1138B), secure the banjo to the pillar with the cap-nut. Fit the nipple and the nut and insert split pin Part No. SP–9–C6.

(5) Using oil pressure test trolley T78458, connect the oil supply pipe to the banjo (1) on the wheelcase and carry out a free flow check; ensure that oil flows freely at the bearings.

ASSEMBLING THE DRIVES TO THE WHEELCASE

Generator and alternator drives

17. (1) Assemble these two gears to their locations in the wheelcase.

(2) Using gauge T74980 (*fig.* 6), check the end float clearance between the crown of the gear button and the wheelcase face.

Note . . .

It must be possible to insert at least a 0·002 in. feeler gauge between the gauge and the button.

(3) Using Seeger circlip pliers, fit circlip (Part No. 25222) to secure each gear.

Generator idler gear

18. Fit the assembly to its location (82); using tab-washers (Part No. N1616), screw on and tighten a nut to each of the two studs; lock the nuts.

Checking the backlash between the generator drive gear and idler gear

Note . . .

Reference must be made to Chapter 33C which details the general requirements applicable to gear meshing and backlash checks; readings must be taken in three angular positions to ensure there are no high spots.

19. Secure backlash checking fixture T74981 in the bore of the generator drive gear (95). Clamp a dial test indicator to a convenient part of the face joint and locate the stylus on the scribed line of the checking fixture (*fig.* 7). Hold the idler gear (82) and check that the backlash between the gears is within the limits. Remove the backlash checking fixture.

Checking the backlash between the alternator drive gear and generator idler gear

20. Secure backlash checking fixture T74981 to the alternator drive gear; hold the idler gear and similarly check the backlash between the gears. Bend up the two tab-washers securing the generator idler gear bearing to lock the nuts. Remove the backlash checking fixture.

Generator and starter idler gear

21. Fit the assembly to its location and secure with four tab-washers (Part No. AGS518E) and nuts.

Checking the backlash between the generator and starter idler gear and the generator idler gear

22. (1) Clamp a D.T.I. to a convenient position on the edge of the casting and locate the stylus on a tooth of the large gear.

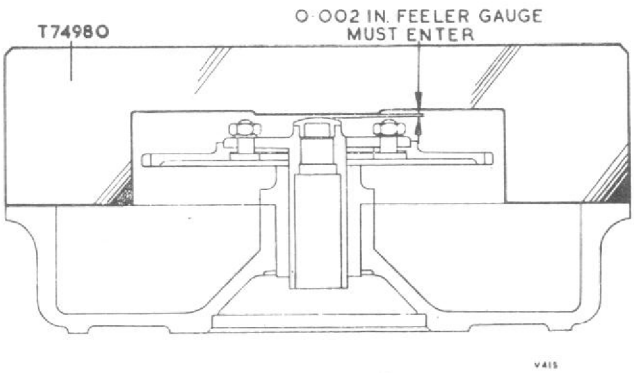


Fig. 6. Using gauge T74980 to check the end float clearance from the wheelcase face to the crown of the gear button

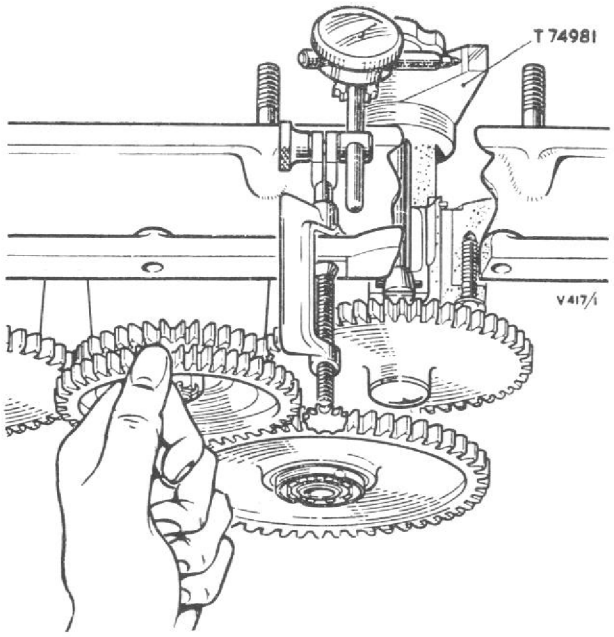


Fig. 7. Checking the backlash between the generator drive gear and the idler gear

(2) Hold the generator and starter idler gear (86) and check that the backlash between it and the generator idler gear is within the limits.

(3) Remove the dial test indicator.

Tachometer drive gear

23. (1) Position the tachometer gear (26 and 33) assembly to its location.

(2) Assemble the retaining bolt (11) through the gear from the opposite side; fit tab-washer (Part No. N3744) and screw on the thin nut finger tight.

(3) Assemble locking plate T75555, illustrated in Chapter 24D, fig. 5, to the wheelcase with its cruciform slots located over the four nuts of the tachometer gear and secure it in position with the four special waisted bolts.

(4) Clamp a D.T.I. to a convenient position on the edge of the casting; locate the stylus on the gear and check that the end float is within the limits.

(5) Remove the dial test indicator.

(6) Bend up the tab-washers to lock the four nuts.

Spare drive gear

24. (1) Assemble the spare drive gear assembly to its location (25).

(2) Using checking gauge T74980 (*fig.* 6), check the clearance between the crown of the gear button and the wheelcase face.

Note . . .

It must be possible to insert at least a 0·002 in. feeler gauge between the crown of the button and the gauge.

(3) Remove the checking gauge.

(4) Using Seeger pliers, fit circlip (Part No. 25224) to the groove in the gear shank.

Air compressor drive gear

25. (1) Assemble the air compressor drive gear (40) to its location in the wheelcase.

(2) Using checking gauge T74980, check the clearance between the crown of the gear button and the wheelcase face.

Note . . .

It must be possible to insert at least a 0·002 in. feeler gauge between the crown of the button and the gauge.

(3) Remove the checking gauge.

(4) Using Seeger pliers, fit new circlip (Part No. 25224).

Generator idler gear

26. Fit the generator idler gear (82) to its location in the wheelcase and secure with four tab-washers (Part No. AGS518E) and four nuts; do not bend up the tab-washers.

Checking the backlash between the air compressor drive gear and the small tachometer drive gear

27. (1) Insert backlash checking fixture T74982 into the bore of the compressor drive gear (40).

(2) Clamp a dial test indicator to the joint face of the wheelcase, adjacent to the gear, and locate the stylus at Station No. 1 marked on the flag of the backlash checking fixture.

(3) Hold the tachometer drive gear and check that the backlash between it and the compressor drive gear is within the limits.

(4) Remove the backlash checking fixture and the D.T.I.

Checking the backlash between the small spare drive gear and the large tachometer drive gear

28. (1) Insert backlash checking fixture T74982 into the bore of the spare drive gear (24 and 25).

(2) Clamp a dial test indicator to the joint face of the wheelcase, adjacent to the gear, and locate the stylus at Station 3 marked on the flag of the backlash checking fixture.

(3) Hold the tachometer drive gear and check that the backlash between it and the spare drive gears is within the limits.

Checking the backlash between the spare drive and the spare drive and starter idler gears

29. (1) With the backlash checking tool inserted in the spare drive gear bore and the D.T.I. clamped to the wheelcase as in the previous para., locate the stylus of the D.T.I. at Station No. 2 marked on the backlash checking fixture.

(2) Hold the spare drive and starter idler gear and check that the backlash between it and the spare drive gear is within the limits.

(3) Remove the backlash checking tool and the dial test indicator.

(4) Bend up the tab-washers securing the spare drive and the spare drive and starter idler gear housing nuts.

Assembling the oil seal to the generator drive housing

30. (1) Smear the synthetic rubber oil seal with colloidial graphite.

(2) Place the generator drive housing on press block T74983 and position the oil seal in the housing, with the spring downwards.

(3) Using adapter T74984, press the seal into position.

(4) Assemble new circlip (Part No. 2318–102A) to the housing to secure the oil seal.

(5) Remove the housing from the press block.

Assembling the oil seal to the alternator drive housing

31. Repeat the instructions detailed in para. 30, Op. (1) to (5).

Assembling the generator and alternator drive housings to the wheelcase

32. Place rubber sealing ring (Part No. 94037) over the spigot of both housings and assemble the housings to their respective positions on the wheelcase; using two screws to each housing, secure them in position.

Assembling the generator driving shaft and gear to the connecting sleeve

33. (1) Assemble the drive shaft to the bore of the gear.

(2) Fit circlip (Part No. 25231) to the groove in the bore of the sleeve.

(3) Position the sleeve over the drive shaft engaging the internal splines of the sleeve with the external splines of the shaft.

(4) Assemble the washer and secure the sleeve in position with circlip (Part No. 25229).

Assembling the alternator driving shaft and gear to the connecting sleeve

34. Repeat the instructions detailed in para. 33 Op. (1) to (4).

Assembling the air compressor driving shaft and gear to the connecting sleeve

35. (1) Assemble the drive shaft to the bore of the gear.

(2) Fit circlip (Part. No. 26066) to the groove in the bore of the sleeve.

(3) Assemble the short end of the sleeve over the drive shaft engaging the internal splines of the sleeve with the external splines of the shaft.

(4) Assemble the washer and secure the sleeve in position with circlip (Part No. 25233).

Checking the concentricity of the generator and alternator drive bores (*fig. 8*)

36. (1) Locate adapter gauge T76847 on the generator mounting face and pass the spline gauge T76848 through the adapter into the splines of the drive sleeve. Remove the spline and adapter gauges.

Note . . .

The gauge must engage in all positions to prove that the concentricity is within the limits.

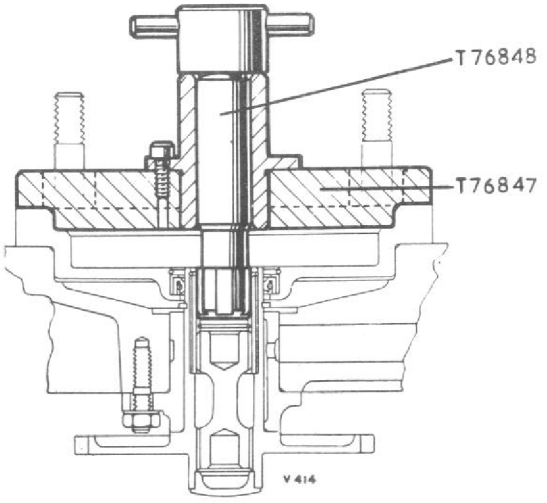


Fig. 8. Checking the concentricity of the generator and alternator gear bores

(2) Repeat the instructions contained in Op. (1) to check the concentricity of the alternator bore.

Air compressor drive

37. The air compressor housing (9), with its drives, is assembled to the wheelcase (op. 7 para. 53) after the wheelcase has been assembled to the air-intake; this is to facilitate carrying out the checks enumerated in Chapter 33B.

Priming the bearings with oil

38. Connect oil pressure test trolley T78458 to the banjo (1) on the wheelcase and prime all the bearings with approved oil; ensure that oil flows freely from all the bearings.

Blanking covers

39. (1) Secure the spare drive blanking cover to its location on the wheelcase with six plain and spring washers and nuts.

(2) Secure the generator and alternator drive blanking covers to their locations on the wheelcase with eight plain and spring washers and eight nuts.

(3) Secure the tachometer drive blanking cover to its location on the wheelcase, using the spacing collars, three plain and spring washers and nuts.

(4) Secure blanking cover T74804 to the compressor drive face with six plain and spring washers and nuts.

(5) Secure blanking cover T74974 to the wheelcase air-intake joint face with four slave bolts and nuts.

(6) Assemble joint washer (Part No. 98824) to the starter drive face and secure blanking cover T74987 with three slave nuts.

48 MK. 1 AND 48 MK. 2
ASSEMBLING THE STARTER DRIVE

Annulus to starter drive casing

40. Assemble the annulus gear (52) to the starter drive casing (53), ensuring that the two set-screw

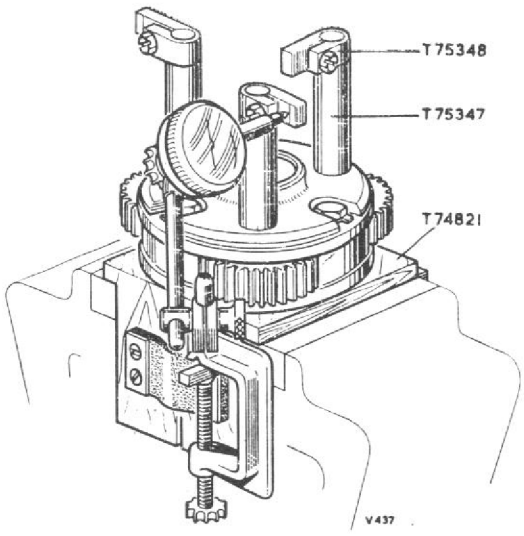


Fig. 9. Planet gear carrier secured in wooden vice block T74821 with dummy spindles fitted for backlash checks

holes of each component are aligned. If the studs have been removed, use stud box T70473 to fit the six studs to secure the annulus gear to the casing.

Planet gears and dummy spindles to the carrier for backlash check (*fig. 9*)

41. (1) Position the planet gear carrier (90) and starter drive sub-assembly in wooden vice block T74821 with the starter dog gear downwards.

(2) Place the vice block between protected vice jaws and clamp $\frac{5}{16}$ in. (approx.) square steel bar between the vice block and one of the vice jaws to accommodate a dial test indicator clamp; the bar should project approximately $1\frac{1}{4}$ in.

(3) Assemble three dummy spindles T75347 to the planet gears, one to each gear.

(4) Assemble the spindles and planet gears (43) to the carrier followed by the carrier cover; ensure that the cover locates on the dowels.

(5) Using three tab-washers (Part No. N1561) and the three bolts secure the cover to the carrier; do not bend up the tab-washers.

(6) Assemble backlash checking fixture T75348 to each of the dummy spindles and tighten the screw on each so that they can be rotated to change the angular position but are firm enough to carry out the backlash check.

(7) Clamp a dial test indicator to the square bar and locate the stylus in turn on the line marked on the backlash fixture of each gear; check in three angular positions that the backlash is within the limits in each case.

(8) Remove the dial test indicator; release the vice jaws and remove the square bar; remove the assembly from the vice block.

Planet gear and carrier to the bottom cover for backlash check

42. (1) Assemble the planet gear, carrier, and starter drive assembly with the dummy spindles and backlash checking fixtures to the bottom cover; secure the cover to the gear casing with eight set-screws.

(2) Using two set-screws, secure adapter T78397 to Hydraclamp type H.S.S.A.; secure workplate T75113 to the adapter by two slave bolts and nuts; using four plain washers and nuts, secure the starter assembly to the workplate.

(3) Using a dial test indicator clamped to a convenient stud, check that the blacklash between the planet gears and the annulus gear (*fig.* 10) is within the limits.

(4) Remove the three backlash checking fixtures from the spindles and the assembly from the workplate.

Removing the dummy spindles

43. Remove the eight set-screws and the cover from the planet gear casing. Remove the carrier assembly and separate the top cover from the carrier. Remove the three dummy spindles from the planet gears.

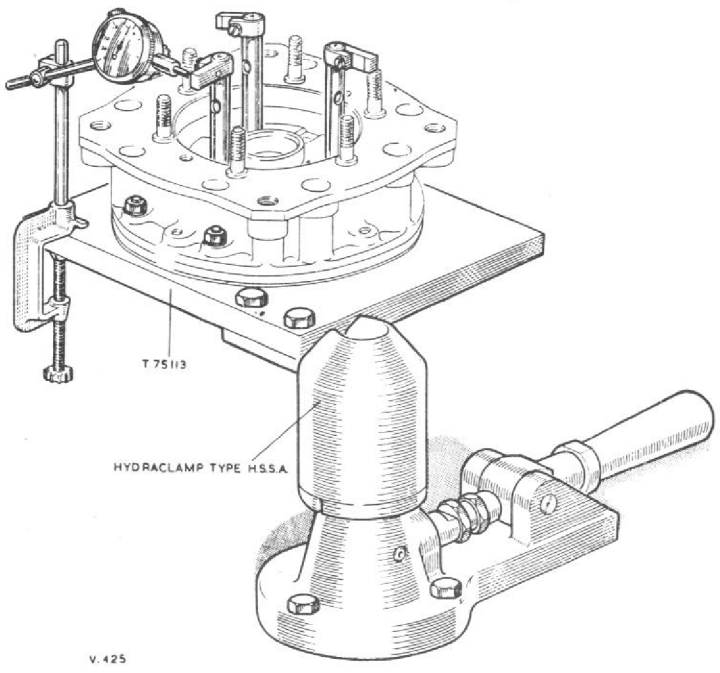


Fig. 10. Checking the backlash between the planet gears and the annulus gear

Ball bearing to the sun gear and sun gear to the carrier

44. (1) Place the sun gear (47) on the bench with the circlip groove uppermost.

(2) Assemble the special thrust washer with the chamfer facing the sun gear, followed by the ball bearing; press them into position by hand.

(3) Assemble circlip (Part No. N4225) to secure the ball bearing in position.

(4) Position the carrier on press block T75793 and using adapter T75794, press in the sun gear.

(5) Remove the assembly from the press block.

Planet gears to the carrier

45. (1) Set the carrier in wooden vice block T74821; clamp the vice block in protected vice jaws.

Note . . .

A square $\frac{5}{16}$ in. steel bar clamped the full length of the vice block and projecting about $1\frac{1}{4}$ in. beyond the vice block, will provide a support for a dial test indicator clamp.

(2) Assemble the thrust washer to each of the three planet gear spindles.

(3) Assemble the spindles with their washers to the carrier.

(4) Grease the bore of each gear and assemble the 26 needle bearings into each bore.

Note . . .

The grease will retain the needle bearings in position and facilitate assembly.

(5) Assemble the three planet gears (43) to the three spindles.

(6) Place the second thrust washer over each spindle.

(7) Assemble the top cover (42) to the carrier; ensure that it locates on the dowels and that the correlation marks are aligned.

(8) Using three tab-washers (Part No. N.1561) and three bolts, secure the top cover; tighten the bolts but do not bend up to tab-washers.

(9) Using a dial test indicator attached to the steel bar clamped between the vice block and one of the vice jaws, check that the end float of each planet gear is within the limits.

Checking the backlash between the sun and the planet gears

46. Insert backlash checking fixture T75796 into the bore of the sun gear; using a dial test indicator clamped to a convenient position, check that the backlash betwen the sun gear and each of the three planet gears in three angular positions is within the limits. When the backlash is correct bend up the tab-washers to lock the nuts.

Priming the bearings with oil

47. (1) Using a compressed air jet, blow through the oil metering jet gallery.

Note . . .

The oil metering jet is a loose fit and care must be taken to ensure that it does not fall out of its gallery when assembling operations are in progress.

(2) Assemble the metering oil jet in the starter gear casing oil gallery.

(3) Using oil pressure test trolley T78458, force oil through the metering jet and ensure that oil flows freely from all the bearings.

Final assembly of the starter drive

48. (1) Secure the planet and sun gear assembly to the bottom cover with eight set-screws.

(2) Position the assembly to workplate T75113.

(3) Assemble joint washer Part No. 98824 to the top face.

(4) Assemble the top cover to the gear casing and secure it with two set-screws.

(5) Using a dial test indicator clamped to a convenient position, check that the end float of the planet gear carrier is within the limits.

(6) Using Klingerit joint washer (Part No. 96750), secure the blanking cover to the starter drive face with four spring washers and nuts.

(7) Assemble blanking cover T74976 to the starter dog gear face.

Note . . .

The starter drive assembly is now ready for assembly to the top wheelcase as described in Chapter 33B.

ASSEMBLING THE AIR COMPRESSOR DRIVES

49. (1) Clamp the air compressor housing (9) in vice block T74801.

(2) Using stud box T70809 and 2 B.A. stud box T70965, fit any new studs required.

(3) Using a compressed air jet, ensure that the oil gallery passages are clear of obstruction and using oil pressure test trolley T78458, force oil through the passages.

(4) Using three sealing washers and the three hexagon-headed plugs (Mod. No. 1097), blank off the two threaded oil gallery holes at the top of the compressor housing and the one at the bottom of the housing.

(5) Assemble the adjusting washer to the bush and push the bush into the housing.

(6) Fit tab-washer (Part No. AGS518C) to the locking peg and screw the peg into the housing; ensure that it locates the bush; do not bend up the tab-washer.

(7) Assemble the compressor housing bevel gear (76) to the bush.

Note . . .

The gear cannot be secured in the bush until after the housing has been removed from the vice block as detailed later.

Adapter drive

50. (1) Assemble the bush to the adapter.

(2) Fit tab-washer (Part No. AGS518C) to the locking peg, screw the peg into the adapter and ensure that it locates the bush; do not bend up the tab-washer.

(3) Assemble the second bevel gear (76) to the bush from the spigot side of the adapter.

(4) Assemble the retaining washer over the end of the gear shank; using Seeger pliers, fit circlip (Part No. 25225) to secure the gear in position.

(5) Using a dial test indicator clamped to a convenient position, check that the end float of the gear is within the limits; remove the dial test indicator.

(6) Bend up the locking peg tab-washer.

Checking the mating and backlash of the compressor drive gears

51. (1) Coat one of the gears with marking blue.

(2) Assemble adjusting washer (Part No. 47662) to the adapter housing.

Note . . .

Normally, the original adjusting washers will have been preserved and no difficulty in gear meshing need by anticipated; if, however, a set of new gears is to be assembled or an adjusting washer has been damaged, new washers should be used. Corrections to backlash and meshing can be made by peeling shims from, or adding shims to, the laminated adjusting washers (Part No. 47662) and (Part No. 47665); each shim is 0·002 in.

(3) Assemble the adapter housing (63) to the compressor housing (9) locating on the dowel.

(4) Secure the adapter to the compressor housing with six slave washers and nuts.

(5) Unscrew the hand-nut of the vertical gear locking fixture on vice block T74802 (*fig.* 11); insert the gear locking fixture into the bore of the vertical gear and tighten the hand-nuts to secure the vice block to the base of the compressor drive housing by the two slotted clamping blocks.

(6) Tighten the hand-nut of the locking fixture, thus locking the vertical gear with the end float taken up.

(7) Insert backlash checking tool T74802 in the bore of the horizontal gear and tighten the knurled nut.

(8) Clamp a dial test indicator to the post provided on the vice block and locate the stylus on the line marked on the flag of the backlash tool (*fig.* 11).

(9) Check that the backlash is within the limits.

(10) Remove the dial test indicator and backlash checking tool.

(11) Remove the adapter and drive and check the blueing marks on the gear teeth; if satisfactory, clean off the marking blue.

Locking the parts

52. (1) Remove the adapter from the compressor housing.

(2) Bend up both tab-washers to lock the locating pegs.

(3) Remove the compressor housing from the vice block.

(4) Assemble the retaining washer over the shank of the bevel gear in the compressor housing.

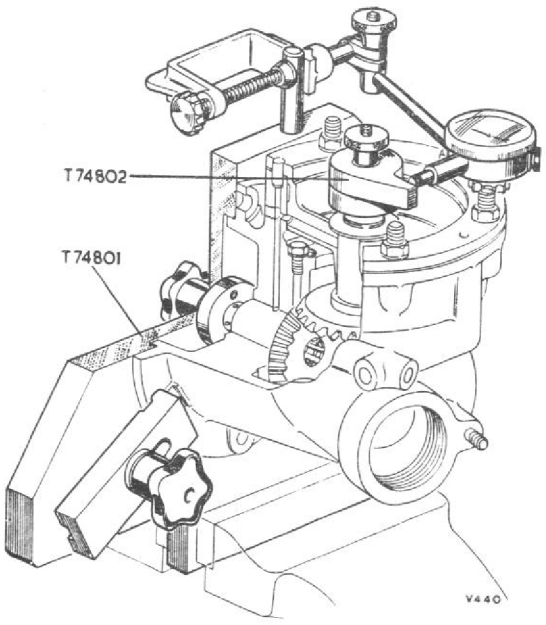


Fig. 11. Checking the backlash of the compressor drive gears

(5) Using Seeger pliers, fit circlip (Part No. 25225) into the groove on the gear shank to secure the gear.

(6) Using feeler gauges inserted between each gear and its bush, check that the end float is within the limits.

(7) Fit circlip (Part No. 26066) to the bore of the gear in the compressor housing and secure the vertical shaft.

Final assembly of the air compressor housing

53. (1) Clamp the compressor housing in vice block T74801 and secure the vice block in a bench vice.

(2) Ensure that the thickness of the adjusting washer is the same as that determined during backlash checks and assemble the adapter to the compressor housing.

(3) Screw in the oil filler (69) and tighten with spanner T74803.

(4) Fit the oil filler cap (68) and secure it with the chain tab to the stud adjacent to the oil filler, using a spring washer and nut.

(5) Using split pins (Part No. N2962); attach one end of the chain to the chain tab and the other to the oil filler cap.

(6) Remove the assembly from the vice block.

(7) Position a new Klingerit joint washer (Part No. 605343) and the air compressor housing to the wheelcase and secure it with six plain and spring washers and nuts.

48 MK. 2 ONLY (*fig.* 23)

ASSEMBLY OF DRIVES

Tachometer and generator drive idler gear and shaft

54. (1) Set the idler gear (15), with the small gear uppermost, on press block T77222.

(2) Position adapter ring T77223 over the small gear.

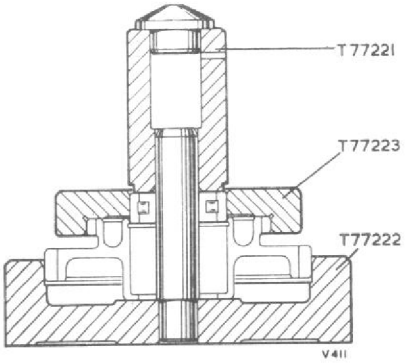


Fig. 12. Pressing the lower outer roller race into the idler gear

(3) Fit the outer race of the inner roller bearing in the bore of the adapter ring; using adapter T77221, press the outer race into position (*fig.* 12).

(4) Assemble the outer spacer, the roller bearing and the inner race to the spigot on the press block; using adapter T77221, press them into position (*fig.* 13); remove the adapter ring.

(5) Remove the assembly from the press and secure the roller bearing in position with the retaining ring.

(6) Position the gear, small gear downwards, on the press block.

(7) Assemble the inner spacer and the inner race of the inner roller bearing to the opposite end of the gear (*fig.* 14).

(8) Using the adapter, press them into position.

(9) Set the idler gear shaft (39) on press block T77217.

(10) Assemble guide adapter T77219 to the bore of the shaft.

(11) Set the idler gear assembly, with the small gear uppermost, to the guide adapter; using adapter T77221, press the gear into position.

(12) Remove the assembly from the press and using Seeger pliers, fit circlip (Part No. AGS2031–7) to the groove in the shaft.

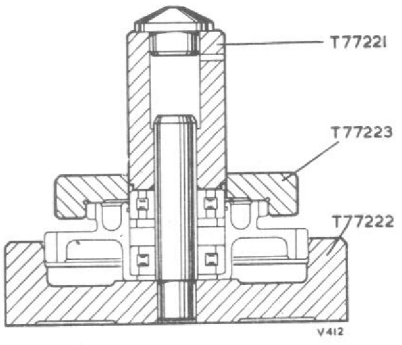


Fig. 13. Pressing the outer spacer and upper roller bearing into the idler gear

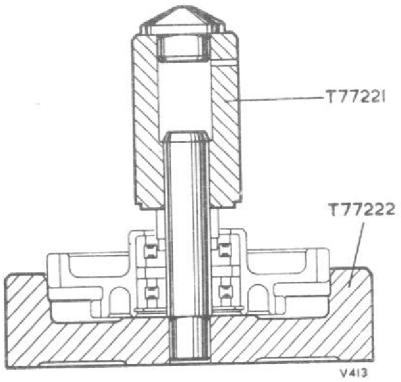


Fig. 14. Pressing the inner spacer and inner race of the lower roller bearing into the small end of the gear

Tachometer drive

55. (1) Assemble the retaining ring (14) to the first groove in the flanged end of the bore of the housing.

(2) Set the flanged end of the housing (10) on press block T77220.

(3) Assemble one of the two ball bearings (11) to the spigot of the press block and using adapter T77221, press it into position.

(4) Fit the second retaining ring (14) to secure the ball bearing in position.

(5) Assemble the spacer (13) and the second ball bearing over the spigot of the press block; using the adapter T77221, press both the spacer and the ball bearing into position.

Note . . .
When pressing in the second ball bearing, care must be taken not to apply excessive loading to the inner race of the bearing already assembled.

(6) Set the large gear of the tachometer drive (92) on press block T77218.

(7) Assemble guide adapter T77224 to the bore of the gear.

(8) Assemble the bearing housing, with the flange uppermost, to guide adapter T77221; press the housing on to the gear.

(9) Remove the assembly from the press and using Seeger pliers, fit circlip (Part No. AGS2031–7 (12) to the groove in the shaft.

Note . . .
Spin the gear by hand to ensure that it rotates freely.

Air compressor drive bush to the bearing housing

56. (1) Assemble the bush to the vertical gear housing with the locating peg holes aligned.

(2) Fit tab-washer (Part No. AGS518C) to the locating peg and screw in the peg to secure the bush; bend up the tab-washer.

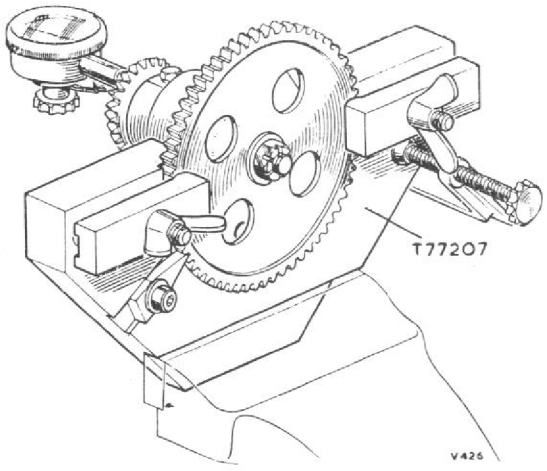


Fig. 15. Checking the end float of the air compressor drive

Air compressor drive gear

57. (1) Assemble the drive gear (96) to the flanged end of the bearing housing.

(2) Assemble the splined shaft of the pinion gear (7) into the splined bore of the drive gear from the opposite end of the assembly; secure the assembly with a plain washer and nut.

Note . . .

If necessary, shim Part No. N1141 must be fitted under the nut to obtain correct alignment of the slots with the split-pin hole.

(3) Locate the assembly on the drive gear in vice block T77207; tighten the nut.

(4) Clamp a dial test indicator to the vice block as shown in fig. 15 and check that the end float is within the limits; insert split pin (Part No. SP9–C8) and lock in the approved manner.

Note . . .

It must be ensured that the end float between the housing and the bush is not confused with that between the gear and bush.

Air compressor drive bush to the adapter

58. (1) Assemble the bush (5) to the compressor adapter with the locating peg holes aligned. Fit tab-washer (Part No. AGS518C) to the locating peg (3) and screw in the peg to secure the bush. Bend up the tab-washer.

Air compressor adapter bevel gear to the compressor adapter

59. (1) Assemble the bevel gear (4) to the adapter.

(2) Assemble the washer and using Seeger pliers, fit circlip (Part No. AGS2031–7).

(3) Using a dial test indicator suitably positioned, check that the end float is within the limits. Remove the dial test indicator.

Adapter drive to the compressor housing

Note . . .

Apply marking blue to one of the compressor bevel gears before assembly.

60. (1) Assemble adjusting washer (Part No. 95208/3) to the adapter housing.

(2) Secure the adapter housing, with the dowel located, to the compressor housing with the two set-screws.

Assembling the wheelcase to the hydraclamp

61. (1) Bolt the base of the hydraclamp to a suitable bench.

(2) Invert the wheelcase so that the air-intake joint is uppermost.

(3) Using two slave set-screws, secure adapter T78397 to the hydraclamp.

(4) Using two slave bolts and nuts, secure the wheelcase to the adapter (*fig.* 16).

(5) Blow through all the oil-ways in the wheelcase with a compressed air jet, then using oil pressure testing trolley T78458, carry out an oil flow check.

ASSEMBLING THE DRIVES TO THE WHEELCASE

Compressor drive

62. Assemble the adjusting washer (93) to the compressor drive bearing housing (94), then secure the assembly to the top wheelcase with four tab-washers (Part No. AGS518E) and nuts; do not bend up the tab-washers.

Checking the mating and backlash of the compressor drive bevel gears

63. (1) Insert backlash checking fixture T77212 in the bore of the gear on the adapter drive.

(2) Clamp a dial test indicator to a convenient part of the wheelcase flange and locate the stylus on the line marked on the flag of backlash checking tool.

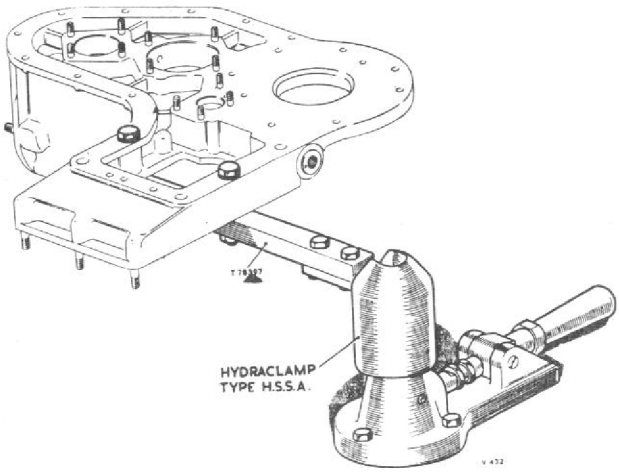


Fig. 16. Using hydraclamp to hold the wheelcase casting

(3) Lift the compressor drive gear out to its full extent to take up the end float and hold it in position; hold the adapter drive gear out as far as possible and check that the backlash is within the limits.

(4) Using a torch, visually check the meshing of the gear through the aperture in the adapter provided for this purpose.

Note . . .

The mating and backlash can be adjusted by peeling shims from, or adding shims to, the laminated adjusting washers (Part No. 95207/3 and 59208/3). Remove the adapter complete with the bevel gear from the compressor housing and examine the tooth marking. If this is correct, clean off the blueing compound.

Tachometer and generator idler gear (15)

64. Secure the idler gear assembly to the wheelcase using four tab-washers (Part No. AGS518E) and nuts; do not bend up the tab-washers.

Tachometer drive gear (92)

65. (1) Unscrew the castellated nut securing the compressor drive gear (96) well back on its thread.

Note . . .

This will allow the gear to be lifted sufficiently to allow the tachometer gear drive assembly to be assembled to the wheelcase.

(2) Lift up the compressor drive spur gear; pass the tachometer gear drive assembly under the gear and locate the housing on the studs.

(3) Engage the teeth of the small tachometer and generator idler gear (15) with those of the large tachometer drive gear (92), at the same time meshing the teeth of the small tachometer drive gear (92) with those of the compressor drive gear.

(4) Secure the tachometer drive gear housing with four tab-washers (Part No. AGS518E) and nuts. Do not bend up the tab-washers.

(5) Tighten the castellated nut securing the compressor drive and spur gear and align the split pin hole.

Checking the backlash between the compressor drive gear and the small tachometer drive gear

66. (1) Using two $\frac{1}{4}$ in. B.S.F. washers and nuts, assemble locking fixture T77213 to the two stud holes in the wheelcase flange (*fig.* 17) which are in line with the tachometer drive.

(2) Screw in the locking screw which is in line with the compressor drive gear to lock that gear.

(3) Insert backlash checking fixture T77214 in the bore of the tachometer gear.

(4) Clamp a dial test indicator to a suitable part of the wheelcase flange and position the stylus between the two lines marked on the flag of the backlash checking fixture at No. 2 Station; check that the backlash is within the limits.

(5) When the backlash is correct, bend up the tab-washers to lock the nuts.

Checking the backlash between the large tachometer gear and the small idler gear (*fig. 18*)

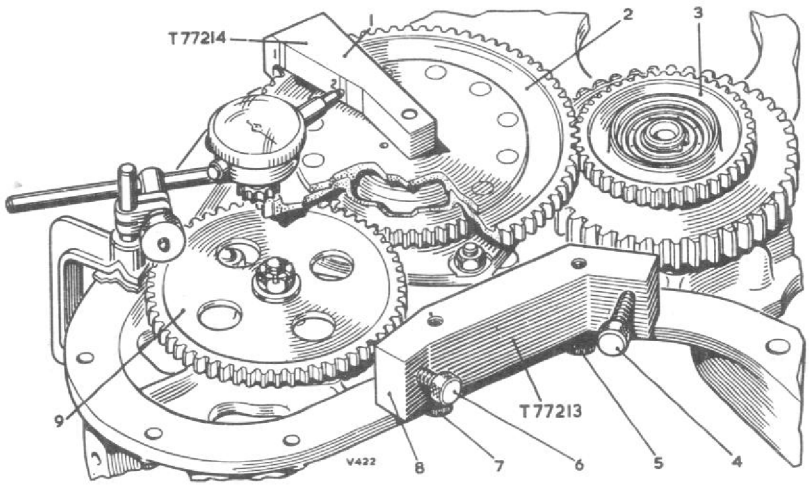
67. (1) Unscrew the locking screw clear of the compressor drive gear.

(2) Screw in the other locking fixture screw to lock the idler gear drive.

(3) With the backlash checking fixture still located in the tachometer drive gear bore as detailed in para. 66, position the stylus of the dial test indicator between the two lines marked on the flag of the backlash checking fixture at No. 1 Station; check that the backlash is within the limits.

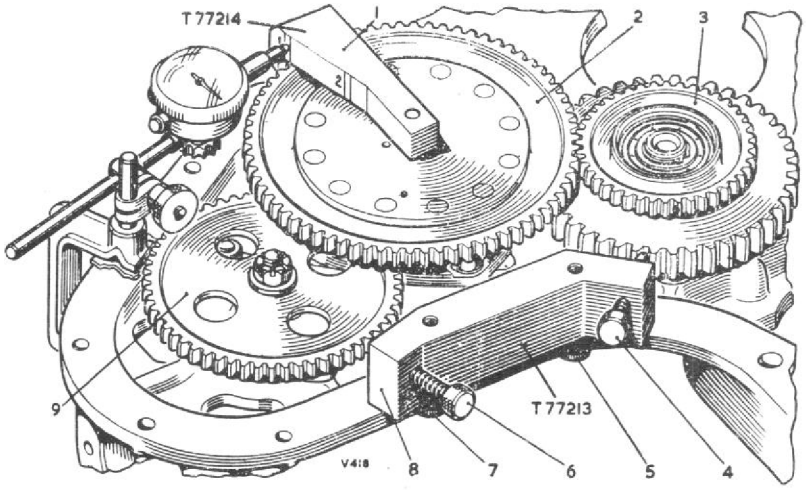
(4) When the backlash is correct, check that all the nuts on the compressor drive, the tachometer drive and the idler gear assemblies are tight and bend up the tab-washers.

(5) Using new split pin (Part No. SPG-C8) lock the nut securing the compressor drive gear in the approved manner.



1 BACKLASH CHECKING FIXTURE
2 TACHOMETER DRIVE GEAR
3 IDLER GEAR
4 IDLER GEAR LOCKING SCREW (SCREWED OUT TO CLEAR THE GEAR TEETH)
5 and 7 NUTS SECURING THE LOCKING FIXTURE TO THE WHEELCASE FLANGE
6 COMPRESSOR DRIVE GEAR LOCKING SCREW (ENGAGING BETWEEN TWO TEETH)
8 LOCKING FIXTURE
9 COMPRESSOR DRIVE GEAR

Fig. 17. Checking the backlash between the compressor drive and the small tachometer drive gears



1 BACKLASH CHECKING FIXTURE
2 TACHOMETER DRIVE GEAR
3 IDLER GEAR
4 IDLER GEAR LOCKING SCREW (ENGAGING BETWEEN TWO TEETH)
5 and 7 NUTS SECURING THE LOCKING FIXTURE TO THE WHEELCASE FLANGE
6 COMPRESSOR DRIVE GEAR LOCKING SCREW (SCREWED OUT TO CLEAR THE GEAR TEETH)
8 LOCKING FIXTURE
9 COMPRESSOR DRIVE GEAR

Fig. 18. Checking the backlash between the large tachometer and the small idler gears

Blanking covers

68. (1) Using four slave nuts secure blanking cover T77215 to the bottom face of the wheel case.

(2) Turn the wheelcase through 180 degrees.

(3) Using eight slave nuts secure blanking plate T74975 to the starter face.

(4) Using six slave nuts secure blanking plate T77216 to the generator housing face.

(5) Using three spacing collars and three plain and spring washers and nuts, secure transport blanking cover (Part No. 19138/3) to the tachometer drive face.

(6) Using six plain and spring washers and nuts, secure transport blanking cover (Part No. 49237) to the compressor drive face.

Miscellaneous details

69. (1) Assemble the washer and screw the compressor drive housing breather plug (6) into the $\frac{3}{8}$ in. B.S.F. hole on the top of the housing.

(2) Using four washers (Part No. AGS1388B) assemble the double right angle banjo (101) and the $\frac{1}{4}$ in. B.S.F. banjo to the oil supply banjo bolt; screw the banjo bolt into its position on the port side of the wheelcase.

(3) Using washers (Part No. AGS1388B) secure the banjo (102) to the air compressor housing with the banjo pillar: fit the nipple and insert split pin (Part No. SP9-C6).

(4) Assemble the oil filler (2) to the top of the air compressor housing. Connect the split ring to each end of the chain and attach one end of the chain to the pear tab on the oil filler spout.

GENERATOR DRIVE GEAR ASSEMBLY

Assembling the port side generator drive

70. (1) Place the port side generator drive bearing housing (60), flanged end uppermost, on press block T77225.

(2) Assemble the outer race of the roller bearing (58) in adapter T77226.

(3) Assemble the adapter with the roller bearing (59) over the spigot of the press block and press the bearing into position.

(4) Assemble the outer distance piece (62) to the bearing.

(5) Assemble the ball bearing (65) to the spigot on the press block and, using adapter T77227, press the distance piece and the ball bearing into position.

(6) Assemble the retaining plate (70) and, using four tab-washers (Part No. AGS518E) and nuts, secure the bearing in position; bend up the tab-washers.

(7) Assemble the inner distance piece (61) and the inner race of the roller bearing to the housing assembly.

(8) Place the generator drive gear on the vice and press block T77228 with the serrated spigot of the press block inserted into the serrated bore of the gear.

(9) Assemble adapter guide T77229 to the bore of the gear shank.

(10) Assemble the bearing housing, with the flange of the housing uppermost, over the adapter guide; position adapter T77226 over the adapter guide and press the housing into position.

(11) Remove the drive gear and bearing housing with the vice block from the press and clamp the vice block in a vice.

(12) Assemble the bearing washer with cup-washer (Part No. N2865) over the gear shaft and screw on the ring nut.

(13) Using spanner T72554, tighten the ring nut and lock it by lightly tapping the cup-washer into the serrations of the nut at two opposite positions.

(14) Remove the assembly from the vice block and fit circlip (Part No. N4215) to the groove in the serrated end of the gear.

(15) Check the security of all locking devices.

Assembling the starboard side generator drive

71. Repeat the operations detailed in para. 70.

Roller bearings to the idler gear

72. (1) Position the idler gear (38) with the lip in the bore of the gear downwards on press block T77208.

(2) Position locating ring T77210 to the gear.

(3) Assemble the outer race of roller bearing (76), *with the serial numbers outwards*, to the locating ring; using adapter T77209, press it into position.

Note . . .
This roller bearing can be identified by its straight inner race and the two lips of the outer race; these features enable the inner race to be separated from the bearing to facilitate assembly.

(4) Assemble the outer spacer (78) to the bore of the gear.

(5) Assemble the roller bearing (81) to the spigot on the press block; press the spacer and the bearing into position with adapter T77209.

Note . . .
This bearing has two lips on both the inner and outer races, thus forming an integral unit.

(6) Fit the retaining ring into the groove in the gear to secure the bearings and the outer spacer.

(7) Assemble the inner spacer (79) and the inner race (77) to the opposite end of the gear *with the serial number on the inner race facing outwards.*

(8) Lock the assembly temporarily with locking wire to retain the inner spacer and inner race of the roller bearing in position.

Generator vertical drive shaft

73. (1) Place the generator vertical drive shaft bottom bearing housing (71), with the circlip groove uppermost, on press block T77191.

(2) Assemble the outer race of the roller bearing (73), *with the serial numbers uppermost*, to adapter T77190.

(3) Place the adapter and the outer race over the spigot of the press block and press them into position.

(4) Secure the outer race with the retaining ring (72).

Note . . .
Security of the retaining ring must be submitted to inspection at this stage.

(5) Assemble the bearing housing to the generator casing bottom vertical drive bore and secure it with four tab-washers (Part No. AGS518E) and nuts; bend up the tab-washers to lock the nuts.

Note . . .
Locking of the nuts must be submitted to inspection at this stage.

(6) Place the generator drive gear (75), with the teeth downwards, on press block T77193.

(7) Position the large end of double-ended adapter guide T77192 in the bore of the gear.

(8) Assemble the inner race of the roller bearing, *with the serial numbers uppermost*, to the guide adapter.

(9) Using adapter T77190, press the inner race into position; remove the assembly from the press.

(10) Assemble the short serrated end of the vertical drive shaft (41) to the generator drive gear.

(11) Assemble cup-washer (Part No. N3176) and the ring nut (52) to the lower end of the vertical drive shaft.

(12) Using spanner T77272, tighten, but do not lock, the ring nut.

Housing and ball bearing for the generator vertical drive shaft

74. (1) Assemble the top ball bearing housing (47) to the top generator housing.

(2) Place the parts, with the flange uppermost, on press block T77195.

(3) Assemble the ball bearing (49) to the spigot of the press block; using adapter T77194, press the bearing into position.

Note . . .
Assembly of the ball bearing must be submitted to inspection at this stage.

Vertical drive bevel gear, the ball bearing and the breather chamber

75. (1) Set the vertical drive bevel gear (42), teeth downwards, on press block T77196.

(2) Position the small end of the double-adapter guide T77192 in the bore of the gear.

(3) Set the ball bearing assembly, with the flange of the housing uppermost, on the guide adapter; using adapter T77190, press the ball bearing assembly into position.

(4) Remove both the adapter and the adapter guide.

(5) Set the breather chamber (50), with the flange uppermost, on the serrated spigot of adapter T77197 (*fig.* 19).

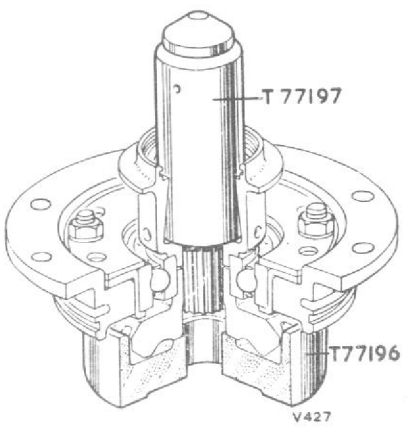


Fig. 19. Assembling the breather chamber to the bore of the generator vertical drive bevel gear

(6) Assemble the serrated spigot of the adapter with the breather chamber to the bore of the bevel gear.

(7) Press the breather chamber into position.

Assembling the ball bearing and the bevel gear assembly to the generator casing

76. (1) Fit the rubber sealing ring to the groove in the generator top bearing housing.

(2) Apply jointing compound to both sides of adjusting washer (Part No. 95183/3) and assemble the washer to its location in the top bearing housing.

(3) Assemble the ball bearing and bevel gear assembly to the generator casing.

(4) Assemble the retaining plate and, using four new tab-washers (Part No. AGS518E) and nuts, secure the ball bearing in position; bend up the tab-washers to lock the nuts.

Note . . .
Security of the nuts must be submitted to inspection at this stage.

(5) Using packing ring T77198 and slave nuts, temporarily secure the top drive housing to the generator casing.

Assembling the vertical drive shaft to the generator casing

77. (1) Assemble the outer race of the roller bearing to the lower bearing housing and fit retaining ring to the groove in the housing.

Note . . .
Security of the retaining ring must be submitted to inspection at this stage.

(2) Secure the bearing housing to the generator casing using four new tab-washers (Part No. AGS885C) and nuts; bend up the tab-washers to lock the nuts.

(3) Assemble adapter T77192 to the generator drive gear; place the roller race, *serial number facing uppermost*, over the adapter; using adapter T77190, press the roller race on to the gear shank.

(4) Engage the short serrated end of the vertical drive shaft (41) with the internal serrations of the gear; assemble cup-washer (Part No. N3176) and the serrated ring nut.

(5) Pass the drive shaft from the outside of the casing, through the cover bearing housing, and engage the external splines of the shaft with the internal splines of the bevel gear.

(6) Assemble cup-washer (Part No. N3176) to the top of the vertical drive shaft and screw on the ring nut.

(7) Using spanner T77272, tighten the ring nut.

(8) Position locking fixture T77199 to the bottom drive gear; using slave nuts, secure the bridge of the fixture to the generator casing (*fig.* 20).

Note . . .
The nuts are located inside the casing.

(9) Using spanner T77272, finally tighten, but do not lock, the ring nuts at each end of the vertical drive shaft; remove the locking fixture.

Assembling the port and starboard generator drives to the generator casing

78. The two drives are identical and the following instructions are equally applicable. Before assembling to the generator casing apply the marking blue to the vertical drive bevel gear.

(1) Position adjusting washer (Part No. 95168/3) to its location on the generator drive housing.

(2) Smear the spigot of the housing with approved grease and assemble it to the generator casing; ensure that the correlation marks correspond.

(3) Using two tab-washers (Part No. AGS518E) and nuts, temporarily secure the housing to enable backlash checks to be undertaken.

(4) Assemble locking fixture T77200 to the bottom generator drive gear; secure the bridge of the fixture to the generator casing with slave nuts.

Note . . .
The slave nuts are located on the inside of the casing.

(5) Tighten the side screw of the fixture to lock the bottom generator drive gear.

Checking the mating and backlash of the port and starboard drive bevel gears

79. (1) Rotate the gears in both directions to obtain a marking on both sides of the gear teeth.

(2) Insert backlash checking fixture T77201 in the bore of the port side drive.

(3) Clamp a dial test indicator to the flange of the casing and locate the stylus on the line marked on the flag of the backlash checking fixture; check that the backlash is within the limits.

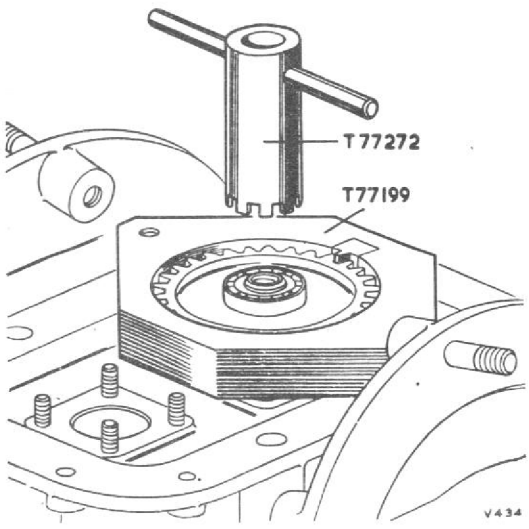


Fig. 20. Tightening the ring nut, using locking fixture T77199 to hold the bottom drive gear of the generator vertical shaft

Note . . .

Normally, the original adjusting washers will have been preserved and no difficulty in gear meshing need be anticipated; if, however, a set of new gears is to be assembled or an adjusting washer has been damaged, new washers should be used. Corrections to backlash and meshing can be made by peeling shims from or adding shims to the laminated adjusting washers (Part No. 95183/3 and Part No. 95168/3); each shim is 000·2 in.

(4) Transfer the backlash checking fixture to the starboard side drive and repeat the instructions detailed in Op. (3).

(5) Remove the backlash checking fixture from the starboard side drive, and the two tab-washers and nuts from each housing.

(6) Remove the drive assembly from each side and inspect the marking on each of the three gears; if satisfactory, clean off the marking blue.

Completing the assembly of the vertical drive shaft

80. Lock the ring nuts (52) at both ends of the vertical shaft by lightly tapping the cup-washer into the serrations of each ring nut at two opposite positions.

Note . . .

Security of locking must be submitted to inspection at this stage.

Idler gear shaft to generator casing

81. Assemble the idler gear shaft (39) to its location on the bottom face of the generator casing and secure with four tab-washers (Part No. AGS518E) and nuts; bend up the tab-washers to lock the nuts.

Generator idler gear to the idler gearshaft (*fig. 21*)

82. (1) Remove the locking wire used to retain the inner spacer and inner race of the roller bearing.

(2) Pass guide draw bolt T77202 through the bore of the gear shaft.

(3) Fit retaining key T77203 in the groove at the end of the draw bolt, inside the casing, to retain the bolt in position.

(4) Assemble the idler gear (38), with the circlip groove outwards, to the guide draw bolt.

(5) Using adapter T77204 and spider nut T77205, draw the gear on to the shaft; ensure that gear teeth are fully engaged with those of the generator drive gear.

(6) Remove the spider nut, the adapter, the retaining key and the draw bolt; *ensure that the retaining key is removed from inside the casing.*

(7) Secure the idler gear assembly with circlip (Part No. AGS2031–9).

Checking the backlash between the generator idler gear and the generator drive gears

83. (1) Assemble bridge locking fixture T77200 to the generator drive gear.

(2) Tighten the side screw of the locking fixture to lock the generator drive gear.

(3) Clamp a dial test indicator to a convenient position on the casing and locate the stylus on a tooth of the idler gear; check that the backlash between the gears is within the limits.

(4) Remove the dial test indicator and the locking fixture.

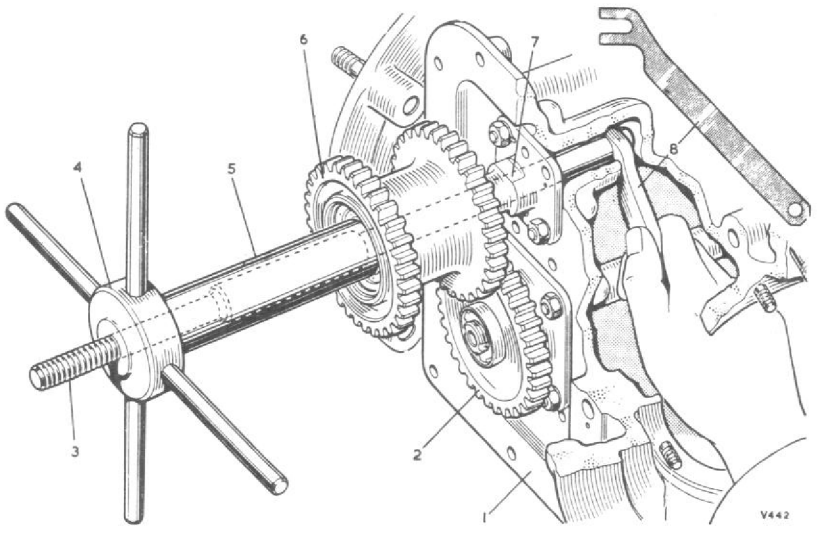
84. Secure blanking cover T77206 to the bottom face of the generator housing with two slave nuts.

ASSEMBLING THE PORT AND STARBOARD DRIVES TO THE GENERATOR CASING

85. Ensure that the thickness of the adjusting washers is the same as that determined during backlash checks and, using six tab-washers (Part No. AGS518E) and nuts, secure each drive in position; do not lock the tab-washers.

Note . . .

These drives are subsequently removed in order to secure the generator drive casing to the top



1 GENERATOR DRIVE CASING
2 GENERATOR DRIVE GEAR
3 DRAW BOLT T77202
4 SPIDER NUT T77205
5 ADAPTER T77204
6 IDLER GEAR
7 IDLER GEAR SHAFT
8 RETAINING KEY T77203

Fig. 21. Assembling the idler gear to the idler gear shaft

wheelcase; they will also be removed to facilitate inspection of the gear teeth after the motoring rig test of the air-intake described in Chapter 33B.

Drive shaft and coupling to the generator drives

86. (1) Assemble the drive shaft (56) to the bore of the port generator bevel gear.

(2) Fit circlip (Part No. N4215) to the groove in the centre of the bore of the coupling.

(3) Assemble the coupling over the drive shaft and secure in position with circlip (Part No. N4252).

(4) Repeat the instructions detailed in Op. (1) to (3) on the starboard generator gear.

Port and starboard drive blanking covers

87. Using sixteen plain and spring washers and nuts, secure blanking covers (Part No. 98170) to each of the generator drive faces.

Top cover to the generator casing

88. (1) Remove packing ring T77198, which has been used as a temporary expedient to retain the top drive housing to the generator casing.

(2) Position the gasket to the top bearing housing; ensure that the off-set hole aligns with the hole in the housing.

(3) Assemble the top cover to the generator casing; ensure that the off-set hole aligns with the holes in the gasket and the housing.

(4) Assemble seven plain washers to any seven of the eight studs and one lockwire tab (Part No. 27851) to the remaining stud; follow with eight spring washers and nuts; using a suitable spanner, tighten the nuts.

Details to the generator casing top cover

89. (1) Assemble tab-washer (Part No. N3963) to the breather banjo pillar and screw the pillar into the top cover; tighten the pillar and bend up the tab-washer.

(2) Using two washers (Part No. N1470), assemble the breather banjo (53) to the pillar; screw on and tighten the cap-nut.

(3) Using washer (Part No. AGS1138B), screw the oil feed union into the generator casing.

90. Unscrew the slave nuts securing the wheelcase to the hydraclamp adapter; remove the bolts and the wheelcase from the adapter.

ASSEMBLING THE STARTER DRIVE

91. This assembly is identical with that used on the 48 Mk. 1; and the instructions detailed in para. 40 to 48 are applicable.

LIST OF CONSUMABLE PARTS (48 Mk. 1)

92. The following consumable parts will be required during the assembly of the 48 Mk. 1 top wheelcase.

Part No.	Description	Quantity
N4227	Circlip	1
N4225	Circlip	1
25231	Circlip	2
25233	Circlip	1
25222	Circlip (Seeger)	2
25224	Circlip	4
25225	Circlip	3
26066	Circlip	2
25229	Circlip	2
2318–102A	Circlip	2
AGS518C	Tab-washer	2
AGS518E	Tab-washer	20
N1616	Tab-washer	12
N1561	Tab-washer	3
N3744	Tab-washer	1
N2896	Cup-washer	2
AGS1138B	Banjo and union washers	7
AGS784–3	Split pin	1
SP–9–C6	Split pin	3
GACO E60	Oil seal	As required
94037	Rubber sealing ring for generator and alternator drives	2
94348	Oil seal	2
98824	Joint washer for starter top cover	1
94037	Rubber sealing ring	2

LIST OF CONSUMABLE PARTS (48 Mk. 2)

93. The following consumable parts will be required during the assembly of the 48 Mk. 2 top wheelcase.

Part No.	Description	Quantity
AGS2031–7	Circlip	3
N4227	Circlip	1
N4225	Circlip	2
N4215	Circlip	4
N4252	Circlip	2
AGS2031–9	Circlip	1
AGS518C	Tab-washer	2
AGS518E	Tab-washer	44
N2971	Tab-washer	1
N1561	Tab-washer	6
N3176	Cup-washer (Mod. No. 833)	2
N2865	Cup-washer	2
AGS1138B	Banjo and union washers	6
N1470	Banjo washer	2
SP–9–C6	Split pin	1
SP–9–C8	Split pin	1
GACO 60	Oil seal	As required
95181	Gasket for generator cover	1
97931	Rubber sealing ring	1
98824	Joint washer for starter top cover	1
605343	Klingerit joint washer	1

LIST OF TOOLS (48 Mk. 1)

94. The following tools are required for assembly of the 48 Mk. 1 top wheelcase.

Tool No.	Description	Application
T74795	Press block	Generator idler gear; spare drive
T74796	Vice block	Generator idler gear; spare drive
T74797	Adapter	Generator idler gear; spare drive
T74798	Guide mandrel	Use with T74796
T74819	Vice block	Generator idler gear; spare drive
T74978	Build stand	Top wheelcase
T74980	Checking gauge	Button clearance
T74981	Checking fixture	Backlash
T75555	Locking plate	Tachometer drive
T74982	Checking fixture	Backlash checks
T74893	Press block	Oil seals to generator and alternator drive housing
T74984	Adapter	
T76847	Adapter gauge	Checking concentricity of generator and alternator gear bores
T76848	Spline gauge	
T74987	Blanking cover	Starter drive face
T74979	Press block	Generator gear
T73026	Spanner	Generator idler gear
T74799	Vice block	Tachometer drive; compressor drive
T74800	Press block	Spare drive; compressor drive
T74801	Vice block	Air compressor housing
T74802	Checking fixture	Backlash checks
T74803	Spanner	Oil filter
T74804	Blanking cover	Compressor housing
T76181	Guide adapter	Distance piece
T74974	Blanking plate	Bottom face
T76988	Paint mask (group)	Wheelcase air-intake face
T76989	Paint mask	Spare drive joint face
T76990	Paint mask	Starter drive joint face
T76991	Paint mask	Air compressor joint face
T76992	Paint mask	Tachometer joint face
T76993	Paint mask	Alternator and generator joint face
T76994	5 masking plugs	Oil galleries
T76995	6 thumb nuts	Use with T76989
T77002	28 nuts	Use with T76989
T77021	Paint mask (group)	Air compressor
T77022	Paint mask	Compressor wheelcase face joint
T77016	6 nuts	Starter paint mask
T77024	Paint mask	Filler cap orifice
T77025	5 special nuts	Use with T77021
T77026	Paint mask (group)	Turbine starter housing
T77027	Paint mask	Use with T77026
T77016	6 special nuts	Use with T77026
T76995	Thumb nut	Use with T77026

LIST OF TOOLS (48 Mk. 2)

95. The following tools are required for assembly of the 48 Mk. 2 top wheelcase.

Tool No.	Description	Application
T77222	Press block	Idler gear
T77223	Adapter ring	Idler gear tachometer drive and generator drive
T77221	Adapter	Tachometer drive gear
T77217	Press block	Idler gear shaft, tachometer drive and generator drive
T77219	Guide adapter	
T77220	Press block	Tachometer drive housing
T77218	Press block	Tachometer gear
T77224	Guide adapter	Tachometer gear
T77207	Vice block	Air compressor drive gear
T77212	Backlash checking fixture	Air compressor gears
T77213	Locking fixture	Use with T77214
T77214	Backlash checking fixture	Backlash between idler and tachometer drive gears
T77215	Blanking cover	Bottom face of wheelcase
T74975	Blanking cover	Starter housing face
T77216	Blanking cover	Generator housing face
T77225	Press block	Generator drives
T77226	Adapter	Generator drives
T77227	Adapter	Generator drives
T77228	Press block	Generator drives
T77229	Adapter	Generator drives
T72554	Spanner	Generator drive ring nuts
T77208	Press block	Idler gear
T77209	Adapter	Idler gear
T77210	Location ring	Idler gear
T77190	Adapter	Generator drive vertical drive shaft
T77191	Press block	Generator drive vertical drive shaft
T77192	Adapter guide	Generator drive vertical drive shaft
T77193	Press block	Generator drive vertical drive shaft
T77272	Spanner	Generator drive vertical drive shaft ring nut
T77194	Adapter	Generator drive vertical drive shaft
T77195	Press block	Generator drive vertical drive shaft
T77196	Press block	Generator drive vertical drive shaft breather chamber
T77197	Adapter	Generator drive vertical drive shaft
T77198	Packing ring	Top drive housing to generator casing
T77199	Locking fixture	Vertical drive shaft to generator casing
T77189	Work plate	Use with hydraclamp
T77200	Locking fixture	Port side generator drive
T77201	Backlash checking fixture	Generator drive backlash check
T77202	Guide draw bolt	Idler gear to shaft
T77203	Retaining key	Use with T77202
T77204	Adapter	Use with T77202
T77205	Spider nut	Use with T77202
T77206	Blanking cover	Bottom face of generator

LIST OF TOOLS COMMON TO BOTH 48 MK. 1 AND 48 MK. 2 TOP WHEELCASE

96. The following tools are used when assembling both 48 Mk. 1 and 48 Mk. 2 top wheelcase.

Tool No.	Description	Application
T70965	2 B.A. stud box	Air compressor
T70809	$\frac{1}{4}$ in. B.S.F. stud box	Air compressor
T70473	$\frac{3}{8}$ in. B.S.F. stud box	Starter gear casing
T74975	Blanking cover	Vertical drive aperture
T78397	Adapter	Use with hydraclamp
Standard	Hydraclamp Type H.S.S.A.	Wheelcase and starter housing
Standard	Edgwick arbor press	Assembly of drives
Standard	Dial test indicator	End float and concentricity checks
Standard	Seeger circlip pliers	Seeger circlips
T75793	Press block	Turbine starter
T75794	Adapter	Turbine starter
T75796	Checking fixture	Turbine starter
T74821	Vice block	Turbine starter
T75113	Work plate	Turbine starter use with hydraclamp
T74976	Blanking cover	Turbine starter dog gear face
T78458	Oil pressure test trolley	Oil flow check
Standard	Swivel box spanner	Plain nuts (use T2500–39)