IMPORTANT

THIS MANUAL IS ISSUED TO

ROTOL LIMITED,
Service Department,
Cheltenham Road,
Gloucester.

0013.

TO WHOM
ALL ADDITIONS AND AMENDMENTS WILL BE SENT. ANY CHANGE OF ADDRESS MUST BE NOTIFIED TO:-

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TECHNICAL PUBLICATIONS DEPT,
CHELTENHAM ROAD,
GLOUCESTER,
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IN ADDITION TO THE PUBLICATION NUMBER, THE REFERENCE NUMBER WHICH FOLLOWS THE HOLDERS ADDRESS, MUST BE QUOTED.

If these instructions are not followed Rotol Limited cannot guarantee that the manual is completely up-to-date.

TP.7104

PUBLICATION 619 A

SERIES -01

REPAIR & SERVICE MANUAL

ROTOL

ACCESSORY DRIVE EQUIPMENT

FOR

VAMPIRE I II & IV

(NENE)

ROTOL LIMITED, CHELTENHAM ROAD, GLOUCESTER.

REF.9758

DATE: .4.12.51.

PUBLICATION 619A
SERIES .01
REF: 9758

AMENDMENT NOTICE

1. Remove and destroy BLUE DIVIDER cards for PART ADE (VAMPIRE I, II and IV) and PART SG 3/1 dated 12.9.50. Replace with the attached revised sheets dated 4.12.51.

2. Remove and destroy Section 4, Ref: 0503, PART SG 3/1.

3. On completion of the above instructions, remove and destroy Amendment Notice dated 3.10.50, replacing it with this sheet duly signed in the space provided.

AMENDMENT RECORD

DATE:	REMARKS
17.10.49	Initial issue of Pub. 619A, Series .01.
29.8.50	Issue of revised divider cards for PART ADE (VAMPIRE I, II and IV) and PART SG 3/1.
	Issue of new Chap. 5, Sect. 5, PART SG 3/1, Ref: 0480
	Issue of revised Chap. 2, Sect. 5, PART ADE (GENERAL) Ref: 0260.
3.10.50	Issue of revised divider cards for PART ADE (VAMPIRE I, II and IV) and PART SG 3/1.
	Issue of new Sect. 4, PART SG 3/1, Ref: 0503
4.12.51.	Issue of revised blue divider cards to PART ADE (VAMPIRE I, II and IV) and PART SG 3/1.
	Removal of Sect. 4, Ref: 0503, PART SG 3/1.

This Amendment dated 4.12.51 has been incorporated by the undersigned.

..... Signed.

..... Date.

Rotol Limited.
Issued : 17.10.49.
Ref : 9758.

PUBLICATION 619A
SERIES .01.

ROTOL

ACCESSORY DRIVE EQUIPMENT

FOR

VAMPIRE I, II & IV

L I S T O F C O N T E N T S

Each Part will be preceded by a detailed List of Contents printed on a blue divider page.

The four-figure reference number in the left-hand column is for Rotol use only.

Rotol Limited.
Issued : 24.8.48.
Ref : 8007.

NOTES TO READERS.

This manual is designed to give complete information on the Rotol Accessory Drive Equipment fitted to this aircraft. The layout of the book is such that certain Parts, Sections and Chapters may be issued separately, or to other publications, covering any aircraft, using any combination of Accessory Drive Equipment.

The division of the manual into Parts is clearly shown on the main List of Contents immediately preceding these Notes. Each Part is also divided into Sections and Chapters, which describe in detail the Servicing, Overhaul and Repair of that unit of equipment to which the Part relates.

The first Part deals with the Accessory Drive Equipment installed on the aircraft and is headed PART ADE (name of aircraft) for the majority of its Chapters. However certain Chapters apply to all types of aircraft and, in such cases, the heading becomes PART ADE (GENERAL).

The Parts List is contained in Section 3 of the first Part, and this Section may be issued separately to satisfy specialized demands. The Accessory Drive Equipment is listed in Major Units, Groups and Components, the complete layout being described in the General Notes.

Against certain headings on the Lists of Contents will be found the letter NR or TBIL. NR signifies NOT REQUIRED for this Part, while TBIL means TO BE ISSUED LATER. Items with the latter qualification will be issued by Amendment Action and may not be sent to every holder of the manual.

Amendment to this publication will be issued under cover of a dated Amendment Record Sheet. Instructions for incorporating Amendments are set out on the sheets and it is of the greatest importance that these should be accurately followed if the manual is to be kept up-to-date.

When Amendment Action is taken the previous Amendment Record Sheet should be removed and, at the discretion of the reader, filed or destroyed, before a new sheet is inserted in its place. The person incorporating the Amendment should then sign the new sheet in the space provided.

A List of Equipment, comprising the particular aircraft installation, is given on the next page. Also included are variants to the equipment, if any variants occur. The Schedule of Inspection for the particular Accessory Drive Equipment is given in Section 5, Chapter 2 of the first Part.

For the purpose of this manual, the terms Servicing, Overhaul and Repair are interpreted as follows :-

SERVICING consists of those operations which must be carried out to maintain the equipment in use. It covers daily and periodic inspections and certain minor repairs required to ensure efficient day to day operation of the equipment.

OVERHAUL covers the complete stripping down of the equipment to its component parts, the checking of those parts for wear and serviceability, the renewing any defective parts, and reassembling and adjusting.

REPAIR is the reconditioning of the Accessory Drive Equipment. It includes those repairs and salvage operations for which a complete repair organization is required.

Rotol Limited.
Issued : 17.10.49.
Ref : 9758.

PUBLICATION 619A.
SERIES .01.

ROTOL

ACCESSORY DRIVE EQUIPMENT

FOR

VAMPIRE I, II & IV.

L I S T O F C O N T E N T S .

1. Rotol gearbox equipment is fitted on the Vampire I, II and IV aircraft powered by None engines.

2. The type of gearbox installed is a High Speed or Special Gearbox, Type SG 3/1, incorporating an inclined drive shaft.

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Issued: 4.12.51.
Ref: 9758

PUBLICATION 619A
SERIES .01.

PART ADE (VAMPIRE I, II & IV)

ACCESSORY DRIVE EQUIPMENT

List of Contents

NR NOT REQUIRED for this PART

Each Chapter will be preceded by a detailed List of Contents.

The four-figure reference in the left-hand column is for Rotol use only.

CHAPTER 1

DETAILED DESCRIPTION

List of Contents.

List of Illustrations.

CHAPTER 1

DETAILED DESCRIPTION.

GENERAL.

1. The purpose of this Chapter is to describe in detail the installation of the Rotol Special of High-Speed Gearbox, Type SG 3/1, in the Vampire I, II & IV aircraft.

2. It is usual for an aircraft set of Rotol Accessory Drive Equipment to be designated an ADE Type Number. Certain sets however are designated with the name of the aircraft.

3. This PART ADE (VAMPIRE I, II & IV) deals with the aircraft Rotol Equipment as a whole. For a detailed account of the gearbox refer to PART SG 3/1 of this manual.

Installation.

4. This gearbox has been specially designed for installation in the Vampire where space in a vertical plane is limited.

5. The box is mounted in close proximity to the engine from which it takes its drive, self-aligning bearings allowing for small errors of alignment.

Accessories.

6. In the following description the front face of the gearbox shall be taken as that face upon which the front cover assembly is mounted.

7. Fitted, adjacent to the inclined drive shaft, on face A is a Pesco vacuum pump, Type B.3X Mk.III with a high-pressure oil pipe, and an oil separator hose connection.

8. This vacuum pump is rotated through the medium of a quill fitted in the serrated bore of the gearbox driven mainshaft.

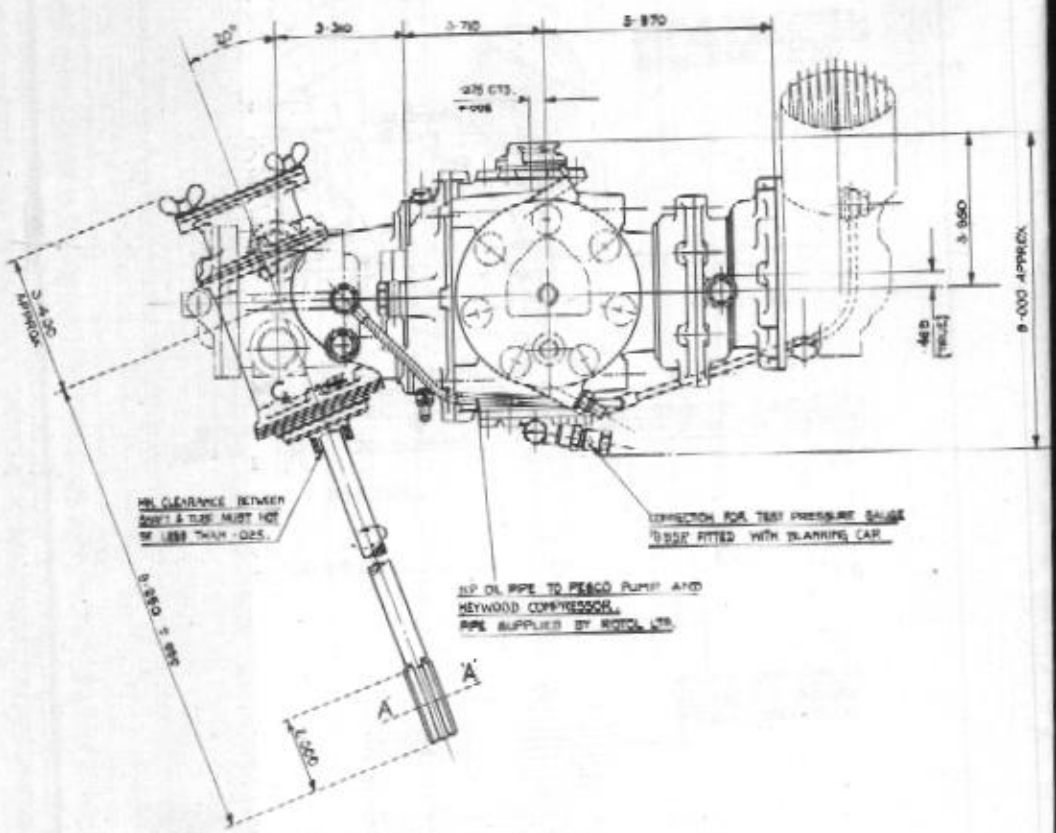
9. A Hymatic air compressor, Type SH 6/2, is mounted on the outer face M of the half-speed accessory reduction gear fitted on the rear of the gearbox.

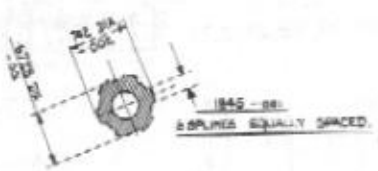
10. The air compressor is supplied with high-pressure oil. The oil seal should be removed from the compressor before fitting and drain holes plugged.

11. A 29-volt, 50-amp, electrical generator, Type "HX", Ref 5U/2700, is mounted on the end face (C) of the gearbox. A Lockheed hydraulic pump, Mk. VI, Type AIR 18000 is fitted on the opposite side face F.

Rotol Limited,
Issued : 15.11.45.
Ref : 9759.

FIRE AID (VARIOUS V, VI & VI).
Section 1 (Sheet 1 of 1 Sheets).
Chapter 4 (Installation Sheet 1 of 1 Sheets).





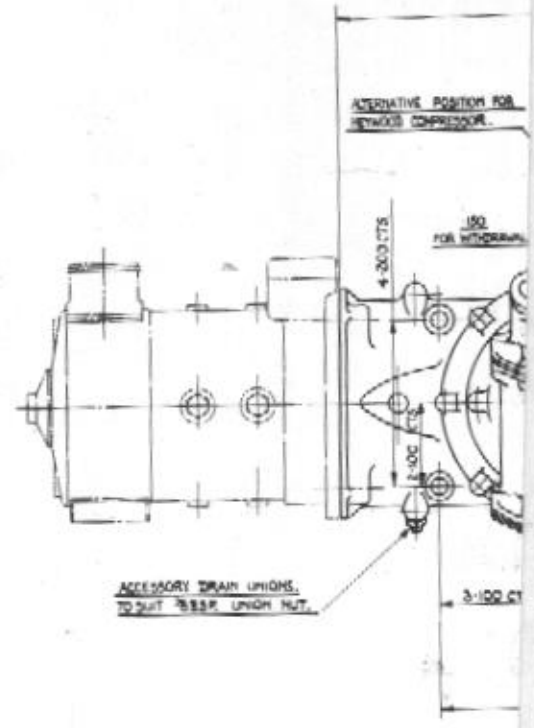
SECTION 'A A'.
SCALE = FULL SIZE.

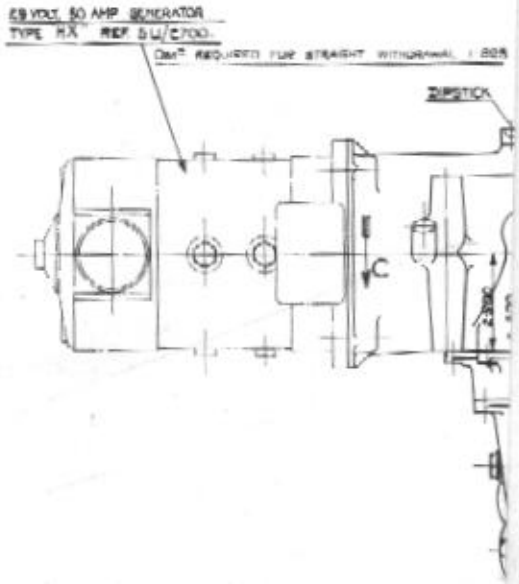
RATIO OF ACCESSORY DRIVE SPEEDS TO DRIVING SHAFT SPEED.	
FACE	RATIO
A.	½ TO 1
C.	1 TO 1
F.	½ TO 1
G.	DRIVE
H.	½ TO 1

ENGINES TO BE FILLED WITH OIL TO THE "FULL" MARK ON THE DIPSTICK IMMEDIATELY AFTER INSTALLATION AND BEFORE RUNNING. OIL LEVEL MUST BE CHECKED AND OIL REPLENISHED AS NECESSARY IN ACCORDANCE WITH MAINTENANCE INSTRUCTIONS.
USE OIL TO DEFD. SPEC. NO. 2470.

ALL ACCESSORY DRIVE COUPLINGS BUT MOUNTING & SHAFT END FOR ENGINE R.D.C. 14-35.
FOR ACCESSORIES FITTED ON FACES REQUIRED FOR STRAIGHT WITHDRAWAL.

INSTALLATION OF ROTOL ACCESSORY DR

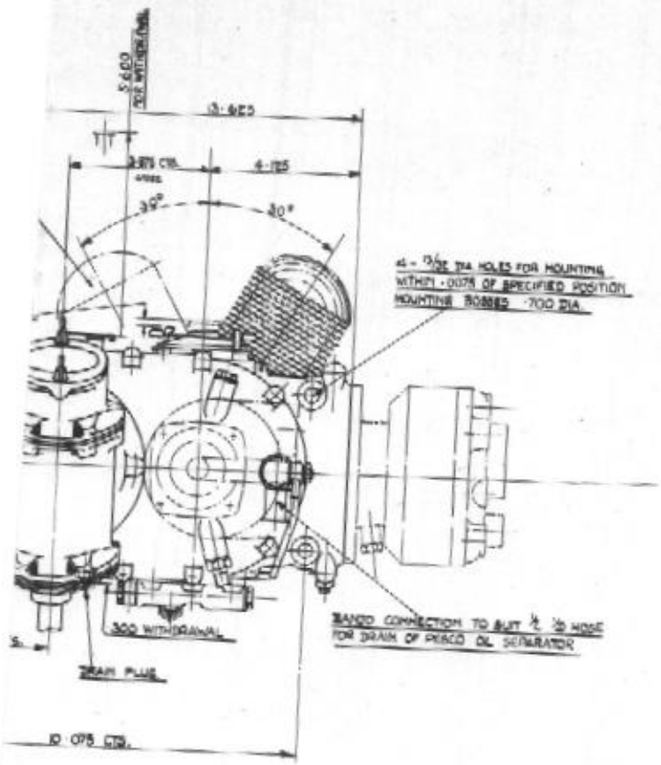


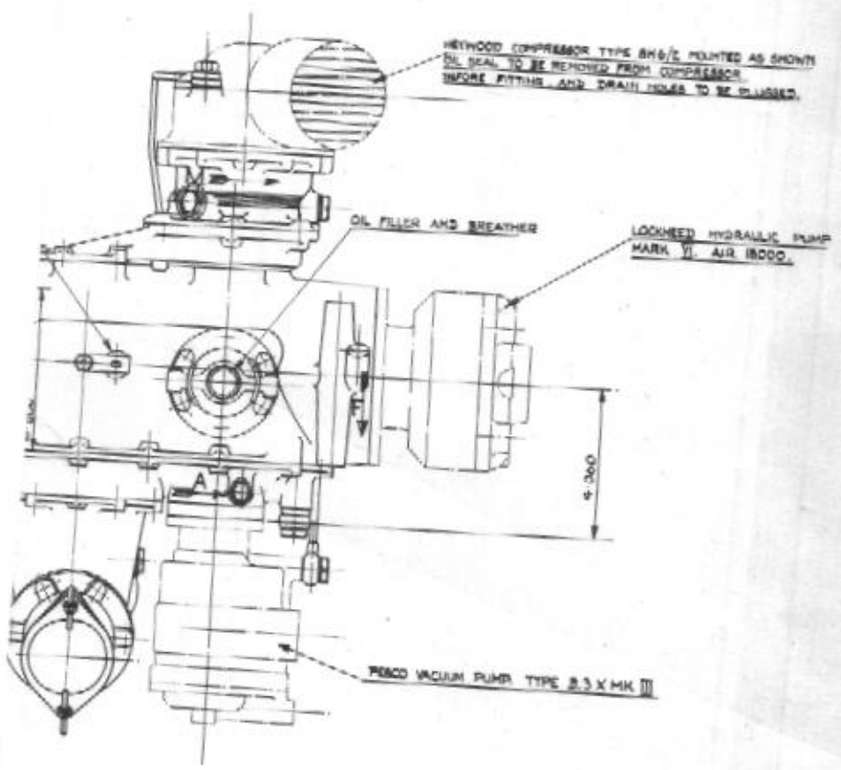


STANDARD FLANGE
DRIVEN ACCESSORIES.

F & M DIMENSION
1140.

RIVE EQUIPMENT TYPE SG.





3/1 FIG. 1. TP.9316

CHAPTER 1

MOUNTING

List of Contents.

CHAPTER 1

MOUNTING

GENERAL.

1. The purpose of this Chapter is to describe in detail the mounting of Rotol gearbox equipment in Vampire aircraft.

2. Due to lack of space on the aircraft it is advisable to fit the accessories to the gearbox before installation on the aircraft.

Vacuum pump.

3. Smear the vacuum pump two-piece driving quill with approved graphite grease and insert in the bore of the driven mainshaft through Face A.

4. Mount the pump so that its drive shaft fits in the serrated bore of the quill. Secure with the nuts (plain and spring washers).

5. Connect up the high-pressure oil feed to the pump. The hose connection to the oil separator may not be connected until the gearbox is mounted in the aircraft.

Hydraulic pump.

6. Smear the hydraulic pump two-piece driving quill with approved graphite grease and insert in the serrated bore of the side accessory drive shaft through Face F.

7. Mount the pump so that its drive shaft fits in the serrated bore of the quill. Secure with the nuts (plain and spring washers).

Air compressor.

8. Smear the drive shaft of the air compressor with approved graphite grease. The oil seal must be removed from the compressor before fitting and drain holes plugged.

9. Secure the compressor on the outer Face M of the reduction gear with nuts (plain and spring washers). Connect up the high-pressure oil feed.

Electrical generator.

10. The electrical generator is driven through the medium of an elongated quill and a two-piece coupling which is bolted to the generator drive shaft.

11. Smear the quill with approved graphited grease and insert it in the serrated bore of the side accessory drive through Face C.

12. Fit the coupling on the generator drive shaft with its bolt and tabwasher, grease and insert it in the serrated end bore of the quill. Secure generator with nuts (plain and spring washers).

MOUNTING IN AIRCRAFT.

13. The gearbox is secured to the airframe by four studs which pass through the gearbox casing. Lock by means of slotted nuts and split pins.

14. Connect up the gearbox accessories to the various aircraft services and check for operation of these services.

CHAPTER 2

REMOVING

List of Contents.

CHAPTER 2

REMOVING

GENERAL.

1. The purpose of this Chapter is to describe in detail the removing of Rotol gearbox equipment from Vampire aircraft.

2. Due to lack of space on the aircraft it is advisable to remove the gearbox from the airframe and then dismantle the accessories from it.

REMOVING FROM AIRCRAFT.

3. Disconnect all pipes and leads connecting the accessories to the various aircraft services. Remove split pins and slotted nuts from mounting studs. Remove gearbox.

REMOVING ACCESSORIES.

Vacuum pump.

4. Remove oil feed and hose connection. Undo nuts (plain and spring washers) securing pump to the accessory mounting face. Detach the pump.

5. The driving quill may come out with the pump or remain in the accessory driving shaft bore. If the latter is the case, extract the quill, and store it in the linen bag provided.

Hydraulic pump.

6. Undo nuts (plain and spring washers) securing pump to the accessory mounting face. Detach the pump and its driving quill.

Air compressor.

7. Undo nuts (plain and spring washers) securing the compressor to its mounting face. Remove the compressor withdrawing its drive shaft from the internal gear bore.

Electrical generator.

8. Remove generator. Detach the coupling from its drive shaft and extract the quill from the accessory drive. Store quill and coupling in linen bag.

CHAPTER 3

SERVICING

List of Contents.

CHAPTER 3

SERVICING

GENERAL.

1. The purpose of this Chapter is to describe in detail the servicing of Rotol Gearboxes fitted to Vampire I, II & IV aircraft.

2. Apart from the periodical inspections detailed in the Schedule of Inspection, the gearbox requires very little attention.

Tools.

3. Excepting standard spanners, etc., all that will be required for maintenance purpose is a drive shaft extractor, Part No. TL.2349, and a pair of internal type circlip pliers, Part No. TL.2438.

Checking inverted flight sealing disc.

4. Remove the oil filler cap, which contains the disc, and turn upside down then the disc should fall into position on the bottom of the assembly. Return to normal position when the disc should fall again on to the circlip. Repeat this two or three times. If the disc sticks in either position it should be removed.

To drain, flush and refill the sump.

5. Remove the drain plug and allow all the oil to drain out, preferably when the gearbox is warm. Pour clean oil in through the oil filler until clean oil is seen to run out of the drain hole. Refit the plug and fill up with oil to specification DED.2479.

Cleaning the relief valve.

6. Remove the plug from the oil pump body and withdraw the spring, ball cup and ball.

7. Rinse parts in clean paraffin.

8. Check ball and ball cup for defects such as indentations and ridging, renew doubtful parts.

9. Reassemble components in the gearbox.

10. It is advisable to carry out this operation after the sump has been drained and before refilling otherwise precautions must be taken to catch the oil as it drains from the sump.

Checking oil pressure.

11. Remove the blanking cap from the high pressure test connection and connect to it a suitable length of piping and a slave oil pressure gauge reading preferably from "0" to 100 lb.per.sq.in. With the engine running at 6,000 R.P.M. the gauge should show a reading of from 40 to 70 lbs.per sq.inch.

12. If the pressure does not reach the required figure this generally indicates a faulty relief valve which would be removed, check for cleanliness and defects, and after remedied a further check carried out as a test.

Running defects.

13. External defects such as damaged oil pipes, faulty lubrication, attributable to a defective relief valve, and sheared quills can be dealt with by maintenance personnel. Gearboxes should, however, be removed from the airframe for complete overhaul in the event of a mechanical breakdown of gearbox internal parts, or in the event of the aircraft in which they are installed suffering extensive damage.

14. Should an accessory fail attention must always be paid to the drive quill which may have sheared, and must be renewed. Any relative movement between the two halves of the quill will necessitate replacement with a new one.

15. The failure of an accessory quill however, is not always obvious since the two parts will often bind together and may even be quite hard to part. To check whether this has occurred look down through the bore of the quill and see whether the shaft of the pin lines up with the ends on the outside of the quill. One end of the pin is centre punched for identification.

16. Excessive oil consumption suggests a faulty oil seal or breather valve sealing disc. The former will involve dismantling the gearbox and for this purpose the gearbox should be sent to a suitably equipped Repair Depot. A faulty sealing disc is readily replaced and only involves extraction and replacement of the retaining circlip in the oil filler cap.

Cautions.

17. Make sure that the generator coupling is properly fitted and locked on the generator shaft.

18. Make sure that the quills are in place before the accessories are fitted. If an accessory is later removed, the quill may stay in place or it may come out on the accessory shaft. Be careful that it is not lost.

19. If, for any reason, the gearbox is run before the generator is fitted, the blanking cover must be detached and the generator coupling removed from it. If the coupling is left on the cover it will be driven round, and damage is almost sure to result.

20. Jointing compound should not be used on any of the face joints. Always use a new gasket if an accessory is removed and replaced or exchanged.

21. Before a Hymatic compressor is fitted to a gearbox it must first be inspected to ensure that there is NO oil seal in the crankcase where the shaft emerges. The presence of this oil seal will prevent oil fed to the compressor under pressure returning to the gearbox.

SERVICING DATA.

22. The following table gives the approved materials required for the servicing of the accessory drive equipment.

Material	Purpose.	Ref.No.	Solvent.
GEARBOX OIL.	Used for general lubrication, treatment of internal parts, oilseals, etc.	Spec. DED2479 D/O Stores Ref. No.344/187	Clean paraffin or non-loaded petrol.
GRAPHITE GREASE.	Splines & serrations.	Spec. DTD 392 Stores Ref. No.344/88.	Clean paraffin or non-loaded petrol.
INHIBITION OIL.	Required during storage of gearboxes.	Spec. DTD698 Stores Ref. No.344/180.	Dissolves in ordinary gearbox oil also clean paraffin or non-loaded petrol.
PIGMENTED LANOLIN.	For end faces of universal parts.	Spec. DTD279/B Stores Ref. No. 330/584.	May only be removed by scraping.
LANOLIN PROTECTIVE RESIN.	Generally used on unprotected metal parts.	Spec. DTD663 Stores Ref. No. 330/923.	Paraffin or non-leaded petrol, also special thinners, Stores Ref. No. 330/955.
BLACK TAPE.	Temporary covering for pipes, breathers, etc.	CS.2191 Stores Ref.No.32B/770.	Non-leaded petrol melts adhesive.
GREEN TYPE PRESERVATIVE.	Used on gearbox external surfaces.	Spec. DTD121/D Stores Ref. No.330/527.	Clean paraffin.
MINERAL JELLY	Preservative for quills & couplings.	Spec. DTD.155 Stores Ref. No.330/514.	Clean paraffin.
"WELLSEAL" JOINTING COMPOUND.	Used on all joint faces.	Spec. CS20T/15A.	Methylated spirits.

CHAPTER 4.

PACKING AND STORAGE.

List of Contents.

CHAPTER 4.

PACKING AND STORAGE.

Accessory gearbox.

1. Before packing, the accessory gearbox is flushed and drained internally with inhibitor oil (D.T.D.587). Blanking covers are fitted to all accessory drive faces, and other apertures, such as the oil breather, are sealed with black tape (C.S.2191). Unprotected parts are to be treated with Lanolin protective resin and external surfaces coated with green type preservative (D.T.D.121).

2. The wooden packing boxes vary in size according to the accessory drives fitted to the gearbox, but all boxes are lined with C.J.S. union paper and have across the bottom, yellow felt-protected formers holding four mounting studs. The accessory gearbox is secured to these studs by nuts, washers and top wooden formers. A checking sheet is included in every packing case.

Quill drives.

3. Clean each quill with White Spirit or Trichorethylene and dip in Methanol to remove finger marks. Preserve by dipping in mineral jelly (D.T.D.55) or by brushing with 34A/2 grease. Wrap each item separately in grease resisting paper and secure the packages, either to the side of the packing case, or in a linen bag to the accessory gearbox.

Gearbox drive.

4. The gearbox drive may be split at the driving shaft universal joint flange and the universal joint group fitted to the accessory gearbox. Liberally coat the rubber coupling with French chalk, then wrap the drive in waxed paper and place in a suitable carton. All excess space in the carton is packed with a cushioning material to prevent undue movement, and to provide adequate protection of the equipment against shock.

Pipe lines.

5. These should be internally treated with green preservative (D.T.D.121) and the ends sealed with black tape (C.S.2191). Dip the pipes in Lanolin protective resin (D.T.D.663) to coat the external surfaces, and overwrap with wax paper (C.S.1993). Secure to accessory gearbox by tapes.

Accessory drives.

6. If it is necessary to pack the accessory drives separately, this is done as follows. Fit blanking covers to drive faces and other orifices. Treat all external surfaces with green preservative (D.T.D.121). Wrap in paper (C.S.2193) and liberally cover all sharp edges and protusions with corrugated paper. The package is inserted into a special carton, wrapped again, and wax dipped.

CHAPTER 5

SCHEDULE OF INSPECTION.

List of Contents.

CHAPTER 5

SCHEDULE OF INSPECTION

GENERAL.

1. The purpose of this Chapter is to describe in detail the Schedule of Inspection which has been extracted from RL. AUX. 578, Issue No.2.

2. When an accessory is removed from the gearbox advantage should be taken of the opportunity to examine the floating quill, where fitted, for wear on the shear pin. When refitting the quill, coat the splines with approved graphited grease.

3. Before mounting, or remounting, a generator on the gearbox, the coupling splines must be liberally coated with approved graphited grease.

OVERHAUL PERIODS.

4. When the equipment has completed 1,000 hours running time, it must be removed from the airframe for complete overhaul.

DEFECTS.

5. In addition to the overhaul period laid down above, it is recommended that gearboxes are subjected to a complete overhaul in the event of a mechanical breakdown of internal working parts (excluding the shearing of quills due to accessory failure) or, the aircraft in which they are installed suffering extensive damage.

DAILY INSPECTION AND BETWEEN FLIGHTS.

6. Check oil level in gearbox. Top up if necessary.

7. Examine generally for oil leaks.

1st MINOR - 100 HOURS.

8. Examine the oil pipe lines for security and leaks.

9. Check the gearbox mounting bolts for tightness and security.

10. Check the inverted flight oil sealing disc in the oil filler cap for freedom of action.

2nd MINOR - 200 HOURS.

11. Repeat 1st Minor Inspection.

3rd MINOR - 300 HOURS.

12. Repeat 1st Minor Inspection.

4th MINOR - 400 HOURS.

13. Repeat 1st Minor Inspection.

MAJOR INSPECTION - 500 HOURS.

14. Repeat the 1st Minor with the following additions :-

15. Drain or flush with lubricating oil and refill the gearbox sump to "Full" level indicated on the dipstick.

16. Remove, dismantle and clean the relief valve. Inspect parts for wear or pitting.

17. Check oil pressure.

18. Check accessory holding nuts for security.

5th MINOR - 600 HOURS.

19. Repeat 1st Minor Inspection.

6th MINOR - 700 HOURS.

20. Repeat 1st Minor Inspection.

7th MINOR - 800 HOURS.

21. Repeat 1st Minor Inspection.

8th MINOR - 900 HOURS.

22. Repeat 1st Minor Inspection.

COMPLETE OVERHAUL 1000 HOURS.

23. Maximum running limit reached. Remove from airframe for complete overhaul.

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PUBLICATION 619A.
SERIES .01.
PART ADE (VAMPIRE I, II & IV)

SECTION 3

PARTS LIST

(TYPE SG 3/1)

List of Contents.

The four-figure reference in the left-hand column is for Rotol use only.

Rotol Limited.

Issued: 6.9.48.

Ref: 8099.

GENERAL NOTES.

(ADE)

1. The layout of the Parts Lists for Rotol Accessory Drive Equipment is such that the equipment is broken down by stages from Major Units to Groups and from Groups to Sub-Groups and Assemblies.

2. A List of Major Units, which will be found immediately following these Notes, details those items of equipment which, when grouped together, comprise the complete Accessory Drive Equipment Set. Each separate Major Unit is again sub-divided into Groups, Sub-Groups and Assemblies of the various individual components which make up the Unit.

3. The List of Major Units is designated by the Type Symbol of the aircraft to which it refers (i.e. ADE Firefly IV.) in the top, right-hand corner of the sheet. Against each separate Major Unit a "Group List Number" is quoted.

4. The Group Lists which follow the List of Major Units are each designated by the number quoted against the particular Major Unit. The Group Lists detail the various groups and their Component List numbers which comprise the Major Unit.

5. In the Component Lists, which call up every component used in the Group to which it is related, a system of marginal indentation is employed. This permits each item to be seen in its correct relationship to a mating part.

6. Each component is given an "Item No." in the List and, where an illustration of a sub-group or assembly is included, the balloon which is tied to a particular component contains the "Item No." by which the component is known in the list. Other information given includes the Rotol Part No., the number of components required to build one unit, and the Specification of the material used.

7. From time to time, modifications which affect the Parts List will be introduced. These will be notified to holders in two ways. Either a dated RMA or RI sheet, such as are contained in the Modification Supplement, will be issued or, where considerable alteration to a List is involved, a new List will be issued.

8. The result of Modification action may mean that the manufacture of certain components will be discontinued but that existing stocks may be used up. The introduction of an alternative component will be shown in the List by the addition of suffix numerals to follow the Item Number. Thus, "Item 1" may have as alternatives "Item 1/01" or "Item 1/02".

9. It must be remembered that, whilst Rotol Limited will do all in their power to ensure that notice of Modifications and changes which affect these lists are sent to holders of the Parts Lists, the final responsibility for keeping the information contained herein up-to-date will rest with the holder.

Rotol Limited.
Issued : 17.10.49.
Ref: 9743.

PART ADE (VAMPIRE I, II & IV).
Sect : 3 (Parts List).

MAJOR UNITS LIST

(Type S.G.3/1).

Ref.No.		
9744	ACCESSORY GEARBOX	GROUP LIST SG.3/1.

The reference number in the left-hand column is for Rotol use only.

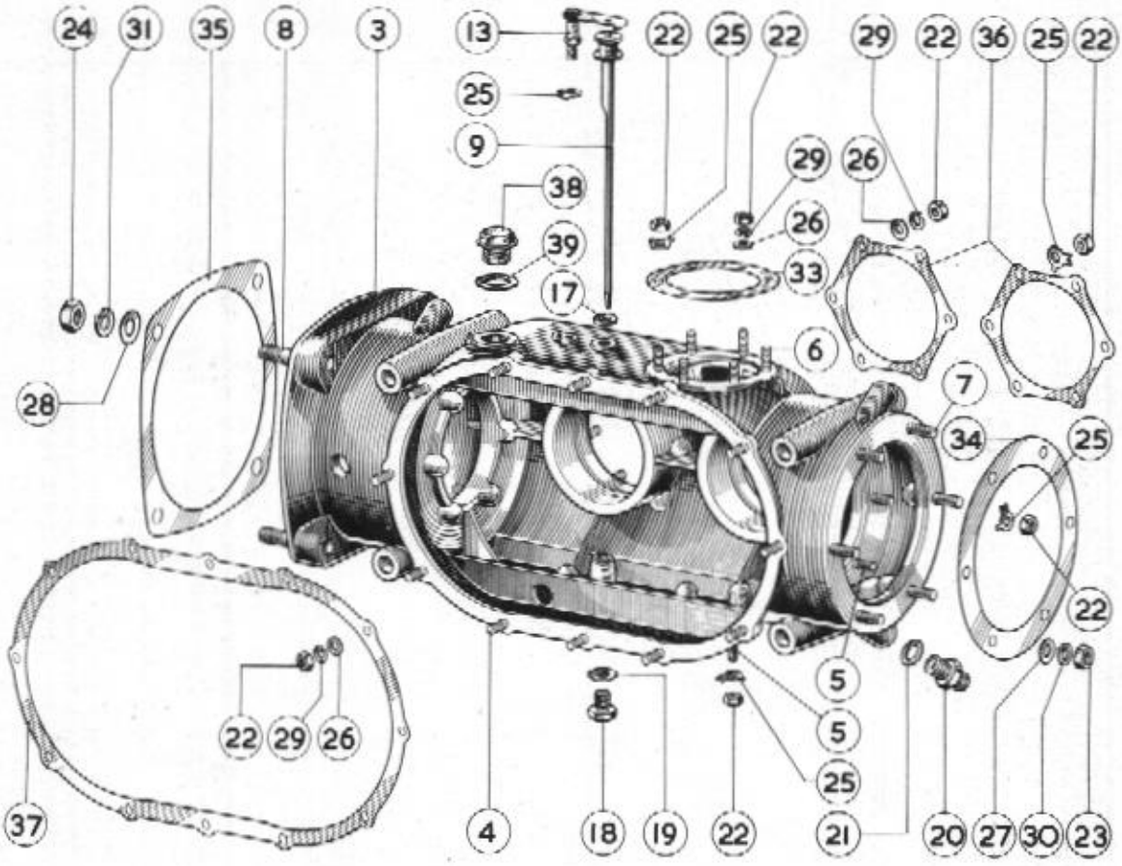
ACCESSORY GEARBOX

(Type S.G.3/1.)

This Accessory Gearbox consists of the following Groups:-

Ref. No.	Item No.	Part No.	Description	List No.
9745	1	GA.9979	MAIN CASING GROUP	01.018
9746	2	GA.9980	FRONT COVER GROUP	02.014
8160	3	G.090	MAINSHAFT GROUP (Driven)	04.002
9747	4	GA.9981	MAINSHAFT GROUP (Driving)	04.015
9411	5	GA.840	OIL PUMP GROUP	05.010
8812	6	GA.10480	ACCESSORY DRIVE GROUP ..... (Oil Pump Drive)	07.007
8851	7	GA.10479	ACCESSORY DRIVE GROUP	07.008
9412	8	GA.1396	BREATHER AND OIL FILLER GROUP ...	08.004
8169	9	C.0109	GENERATOR COUPLING GROUP	12.001
9502	10	GA.11474	CASING GROUP ($\frac{1}{2}$ Sp.Red.Gear)	14.009
9748	11	GA.9984	ADAPTOR CASING GROUP ..... ($\frac{1}{2}$ Sp.Red.Gear)	14.010
9749	12	GA.9983	PINION GROUP ($\frac{1}{2}$ Sp.Red.Gear)	15.005
9750	13	-	MISCELLANEOUS PARTS SUB-GROUP ...	16.050
9751	14	GA.10093	GEARBOX DRIVE GROUP	17.023
9753	15	GA.9985	BEVEL DRIVE GROUP	17.024
9752	16	GA.9982	OIL PIPE GROUP	30.003

The reference number in the left-hand column is for Rotol use only.



MAIN CASING GROUP. ITEM.1.

TP 9336

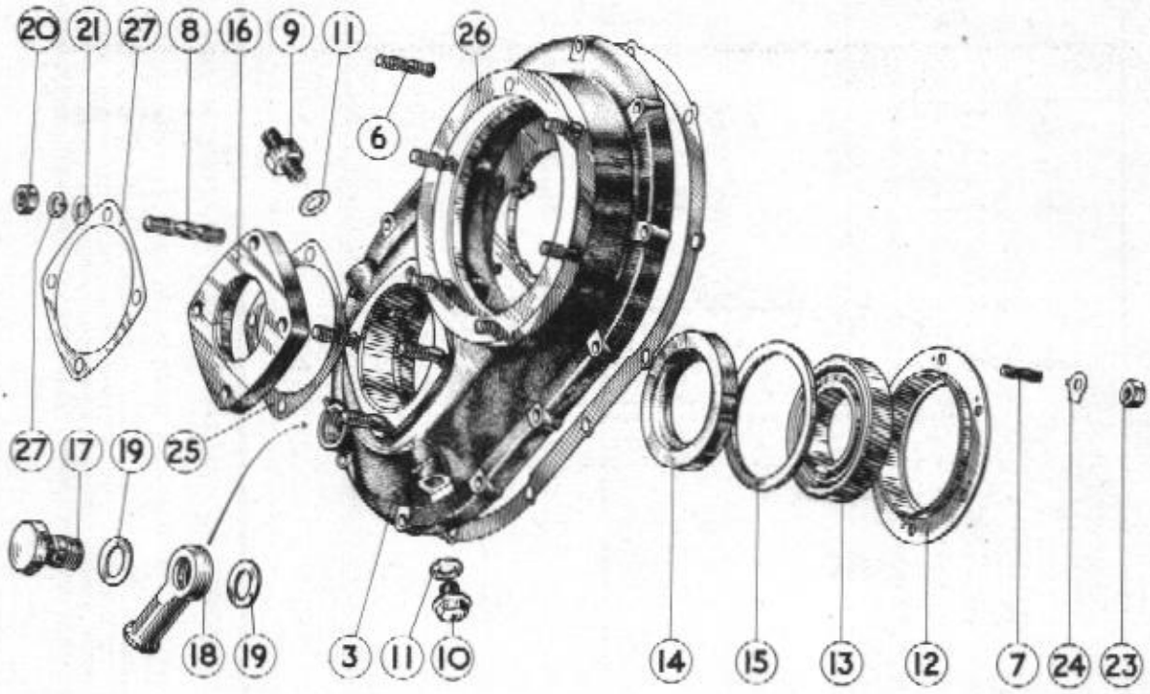
Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.9979.	MAIN CASING GROUP comprising:-		
2	G.8966.	ASSEMBLY OF MAIN CASING AND STUDS consisting of:-		
3	G.8967/1.	MAINCASING	1	DTD.133.
4	AGS.884/CC.	STUD 2 BA.	19	-
5	G.294.	STUD 2 BA.	18	S.1.
6	G.162/1.	STUD 2 BA.	11	S.2.
7	RA.28316	STUD ¼" BSF.	6	S.2.
8	AGS.887/E.	STUD 3/8" BSF.	4	-
9	G.1015.	DIPSTICK ASSEMBLY consisting of:-		
* 10	G.1016.	DIPSTICK HEAD	1	BSS.249.
* 11	G.1017.	DIPSTICK BLADE	1	S.1.
* 12	G.543.	DIPSTICK PIN	1	M.S. Wire.
13	G.797.	DIPSTICK SPRING ASSEMBLY consisting of:-		
* 14	G.794.	SPRING PILLAR	1	S.2.
* 15	G.796.	DIPSTICK SPRING	1	DTD.187.
* 16	G.795.	WASHER		

-continued overleaf-

Ref. 9745.

Item No.	Part No.	Description	No. Off.	Material Spec.
		ADDITIONAL ITEMS required to complete this Group.		
17	G.799.	WASHER (Dipstick)	1	-
18	G.804	PLUG 5/16" B.S.F.	1	BSS.249 or 251.
19	RSP.202/4.	WASHER	1	L.17.
20	AGS.627/A.	UNION (Must have locking wire holes provided).	2	-
21	RSP.202/5.	WASHER	2	L.17.
22	A.16/C.P.	NUT 2 B.A.	47	-
23	A.16/EP.	NUT 1/4" B.S.F.	6	-
24	A.16/JP.	NUT 3/8" B.S.F.	4	-
25	RA.1509	TABWASHER	29	S.84.
26	FB.5937/2.	PLAIN WASHER	19	DTD.124.
27	FB.5937/3.	" "	6	" "
28	FB.5937/5.	" "	4	" "
29	AGS.162/C.	SPRING WASHER	19	-
30	AGS.162/D.	" "	6	-
31	AGS.162/F.	" "	4	-
32	N.D.	LOCKING WIRE	A/R.	20 S.W.G.
33	G.805.	GASKET (Oil Filler).	1	Oakenstrong.
34	G.392.	" " "	1	0.006 Thick.
35	G.555.	" " "	1	" "
36	G.836.	" (Cover).	2	" "
37	G.841.	" (Front Cover).	1	" "
38	AGS.216/C.	PLUG 3/8" B.S.P.	2	-
39	RSP.202/12.	WASHER	2	-

NOTE:- Where an asterisk appears against an item number it indicates that the item is not supplied as a replacement component.



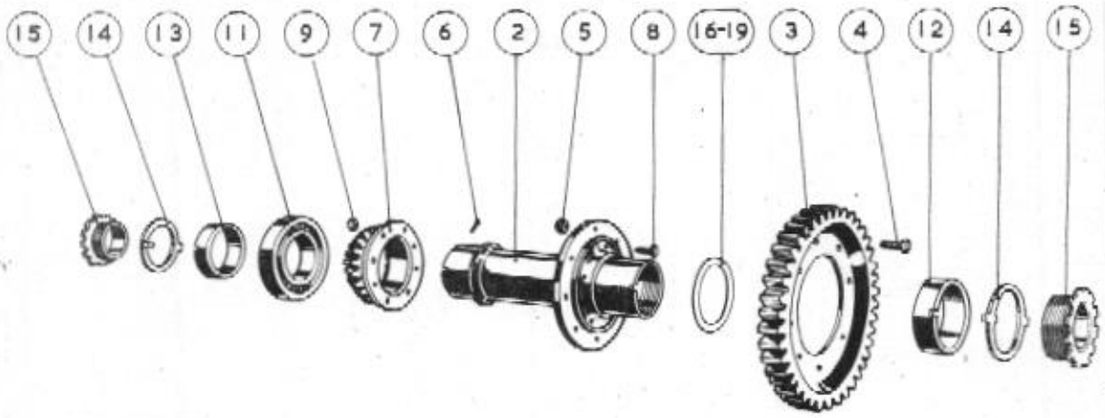
FRONT COVER GROUP **ITEM I.** **TP. 9343**

Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.9980	FRONT COVER GROUP comprising:-		
2	G.8968	ASSEMBLY OF FRONT COVER STUDS AND INSERTS consisting of:-		
3	G.8931	FRONT COVER	1	DTD.133.
4	G.428	INSERT	1	BSS.369.
5	G.430	LOCKING PEG	1	-
6	RA.28316	STUD ¼" B.S.F.	6	S.2.
7	G.137	STUD 2 B.A.	12	S.1.
8	RSP.13/12A.	STUD ¼" B.S.F.	4	-
		ADDITIONAL ITEMS required to complete this.		
9	AGS.627/A.	UNION (Must have locking wire holes provided)	1	-
10	AGS.216/A.	PLUG	1	-
11	RSP.202/5.	WASHER	2	L.17.
12	G.1109/1.	BEARING HOUSING	1	BSS.250.
13	G.11559.	BALL BEARING	1	-
14	G.9007/1.	OIL SEAL	1	Syn. Rubber.
15	G.8936.	DISTANCE RING	1	L.1.
16	G.8932.	DISTANCE PIECE	1	DTD.59.
17	G.427.	BANJO PLUG	1	S.1.
18	G.719.	BANJO CONNECTION	1	BSS.218.
19	RSP.202/7.	WASHER	2	L.17.
20	A16/EP.	NUT. ¼" B.S.F.	10	-
21	FB.5937/3.	PLAIN WASHER	10	DTD.124.
22	AGS.162/D.	SPRING WASHER	10	-
23	RSP.201/3.	THIN NUT 2 BA.	12	-
24	RA.1509.	TABWASHER	12	S.84.

-continued overleaf-

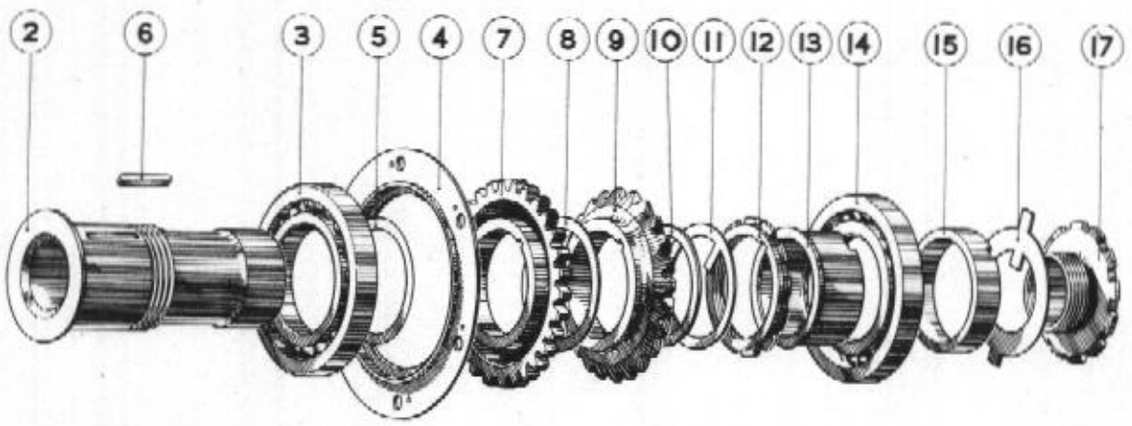
Ref: 9746.

Item No.	Part No.	Description	No. Off.	Material Spec.
25	G.8933.	GASKET	1	Oakonstrong
26	G.8934.	"	1	0.006 Thick
27	G.1560.	"	1	
28	N.D.	LOCKING WIRE	A/R.	
		ALTERNATIVE TO ITEM 13.		
29	G.393.	BALL BEARING	1	-
		ALTERNATIVE TO ITEM 23.		
30	A.16/CT.	THIN NUT 2 BA.	12	-



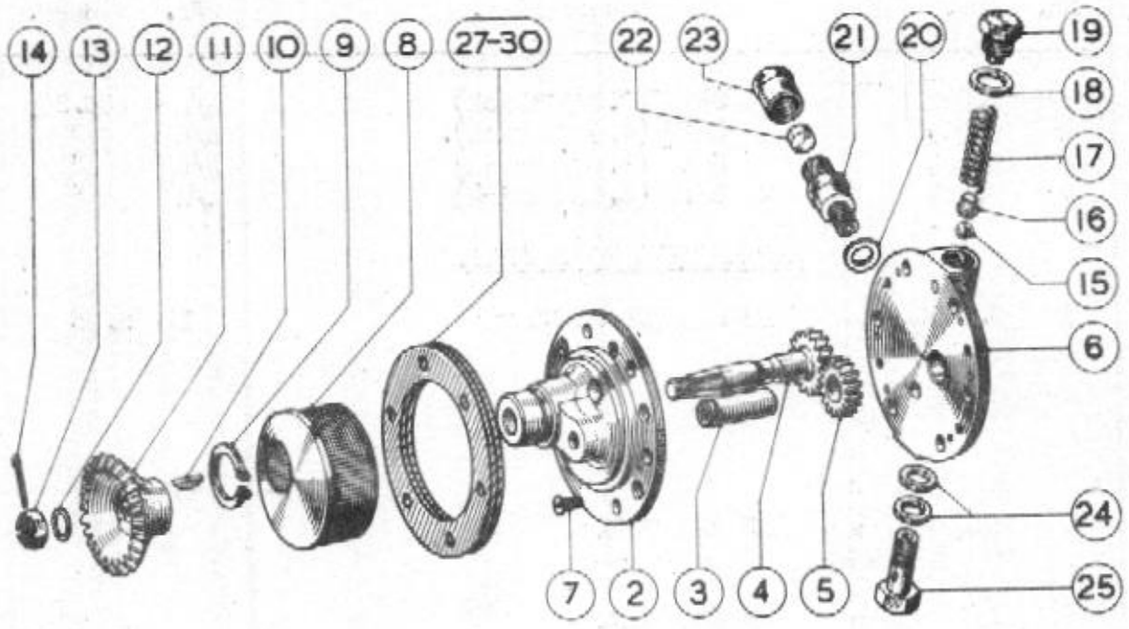
MAINSHAFT GROUP (LOWER) ITEM.I. T.P.8107

Item No.	Part No.	Description.	No. Off	Material Spec.
1	G.090	MAINSHAFT GROUP (Lower) comprising:-		
2	G.682	MAINSHAFT	1	S.11
3	G.109	SHAFT DRIVING WHEEL	1	S.15
4	C.717/1	DRIVING BOLT (SPUR GEAR)	8	S.1
5	G.136	SPECIAL SLOTTED NUT, 2 BA	8	S.1
6	AGS166/1	SPLIT PIN	8	-
7	G.112	ACCESSORY BEVEL WHEEL	1	S.15
8	G.163	DRIVING BOLT	8	S.1 or S.11
9	A.16/CS	SLOTTED NUT, 2 BA	8	-
10	AGS166/1	SPLIT PIN	8	-
11	G.393	BALL BEA RING	1	-
12	G.436	SPACING COLLAR	1	S.15
13	G.683	SPACING COLLAR	1	S.15
14	G.437	TABWASHER	2	S.84
15	G.438	NUT	2	S.2
16	G.403	SHIM (0.003 thick)	A/R	BSS.265
17	C.404	SHIM (0.005 thick)	A/R	BSS.265
18	G.405	SHIM (0.007 thick)	A/R	BSS.265
19	G.599	SHIM (0.022 thick)	A/R	S.3 or S.84 or Soft Steel
		ALTERNATIVE TO ITEM 3.		
20	G.1552	DRIVING SHAFT WHEEL	1	S.15
		ALTERNATIVE TO ITEM 7.		
21	G.1551	ACCESSORY BEVEL WHEEL	1	S.15



MAINSHAFT GROUP (DRIVING) ITEM 1. TP 9345

Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.9981.	MAINSHAFT GROUP (Driving) comprising:-		
2	G.11818.	MAINSHAFT	1	S.11.
3	G.11559.	BALL BEARING	1	-
4	G.1109/1.	BEARING HOUSING	1	BSS.250.
5	G.11806-9.	SHIM	A/R.	BSS.265.
6	G.11810.	KEY	1	S.24.
7	G.11812	SPUR PINION	1	S.15.
8	G.11806-9.	SHIM	A/R.	B SS.265.
9	G.11805.	BEVEL WHEEL	1	S.15.
10	G.966.	MAINSHAFT COLLAR	1	S.1. or T.1.
11	G.878.	TABWASHER (Gear)	1	S.84.
12	G.877.	RETAINING NUT (Gear)	1	S.2.
13	G.879.	SHAFT SLEEVE	1	S.2.
14	G.11559.	BALL BEARING	1	-
15	G.436.	SPACING COLLAR (Front End)	1	S.15.
16	G.1173.	TABWASHER (Front End)	1	S.84.
17	G.1174.	RETAINING NUT (Front End)	1	S.2.
		ALTERNATIVE TO ITEM 4.		
18	G.1109.	BEARING HOUSING	1	S.1.



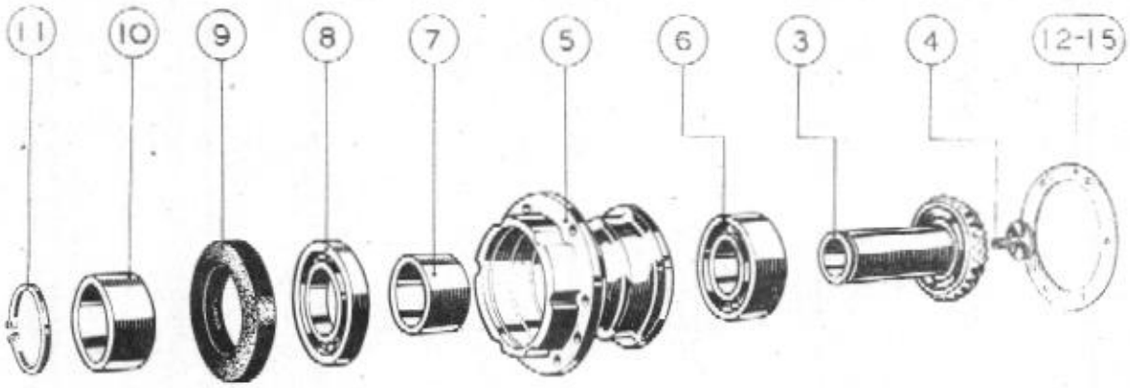
OIL PUMP GROUP. ITEM.1. T.P.9168.

Item No.	Part No.	Description.	No. off.	Material Spec.
1	GA.840	OIL PUMP GROUP comprising :-		
2	G.782	OIL PUMP BODY	1	DTD289
3	G.155/1	DOWEL	1	S.15
4	G.802/1	OIL PUMP WHEEL	1	S.28
5	G.803	OIL PUMP PINION	1	L.1
6	G.783	OIL PUMP COVER	1	B.8
7	ACS249/21	SCREW (Countersunk Head)	4	-
8	G.819	OIL PUMP FILTER	1	Brass or Monel Gauze
9	ND	CIRCLIP (Ext.Type for $\frac{3}{4}$" Dia)	1	-
10	G.150	WOODRUFF KEY	1	S.24
11	G.115	PUMP BEVEL WHEEL	1	S.98
12	FB5937/3	PLAIN WASHER	I/R	DTD124
13	A16/BS	SLOTTED NUT	1	-
14	AGS166/3	SPLIT PIN	1	-
15	ND	STEEL BALL $\frac{1}{4}$" Dia	1	Hardened Steel.
16	G.725	BALL CUP	1	BSS249
17	G.723	VALVE SPRING	1	DTD215
18	RSP202/6	WASHER	1	L.17
19	G.820	VALVE PLUG	1	BSS.249
20	RSP202/3	WASHER	1	L.17
21	G.588	SPECIAL UNION	1	BSS249
22	RSP202/2	WASHER	1	L.17
23	G.8447	BLANKING CAP (Pressure Connection)	1	-
24	RSP202/4	WASHER	2	L.17
25	G.282	BANJO PLUG	1	S.1
26	ND	LOCKING WIRE	A/R	20 SWH

Item No.	Part No.	Description.	No. off.	Material Spec.
27	G.822	SHIM (0.003 Thick)	A/R	BSS.265
28	G.823	SHIM (0.005 Thick).	A/R	"
29	G.824	SHIM (0.007 Thick)	A/R	"
30	G.825	SHIM (0.022 Thick)	A/R	"
		ALTERNATIVE TO ITEM 11.		
31	G.1586	PUMP BEVEL WHEEL	1	S.28

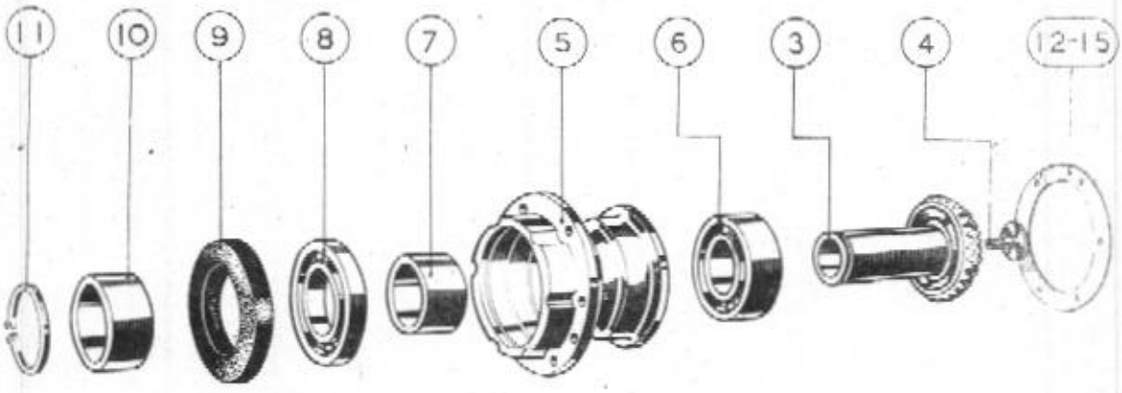
A/R = AS REQUIRED.

I/R = IF REQUIRED.



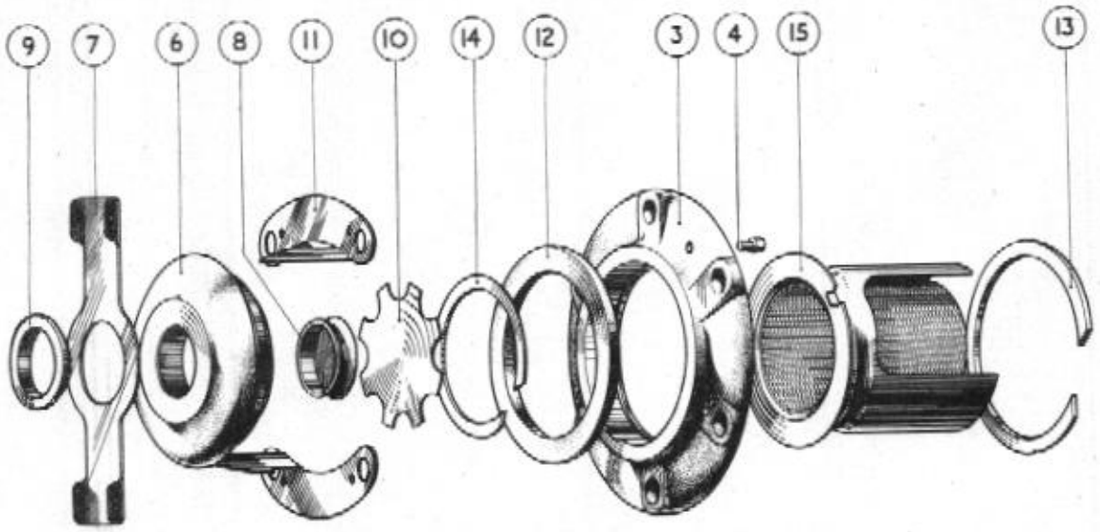
ACCESSORY DRIVE GROUP ITEM.1. T.P.8114.

Item No.	Part No.	Description.	No. Off.	Material Spec.
1	GA.10480	ACCESSORY DRIVE GROUP (Oil Pump Drive) comprising:-		
2	G.1557/1	SUB-ASSEMBLY OF OIL PUMP PINION & END PLUG consisting of:-		
3	G.8033	ACCESSORY BEVEL PINION (Pump)	1	S.28
4	G.8031/1	PINION END PLUG	1	S.14
		ADDITIONAL ITEMS required to complete this Group:-		
5	G.10447	HOUSING	1	L39 or L40
6	G.394	BALL BEARING	1	-
7	G.141	DISTANCE PIECE	1	S.1
8	G.935	BALL BEARING	1	-
9	G.10481	OIL SEAL	1	Syn. Rubber
10	G.10464	DISTANCE COLLAR	1	S.15
11	ND	CIRCLIP (Ext. Type for 25M/M Shaft)	1	-
12	G.8746	SHIM (0.003 Thick)	A/R	BSS.265
13	G.8747	SHIM (0.005 Thick)	A/R	BSS.265
14	G.8748	SHIM (0.007 Thick)	A/R	BSS.265
15	G.8749	SHIM (0.022 Thick)	A/R	BSS.265



ACCESSORY DRIVE GROUP ITEM.1. TP.8114

Item No.	Part No.	Description.	No. Off.	Material Spec.
1	GA.10479	ACCESSORY DRIVE GROUP comprising:-		
2	G.1556/1	SUB-ASSEMBLY OF PINION & END PLUG consisting of:-		
3	G.8032	ACCESSORY BEVEL PINION	1	S.28
4	G.8031/1	PINION END PLUG	1	S.14
		ADDITIONAL ITEMS required to complete this Group:-		
5	G.10447	HOUSING	1	L39 or 45
6	G.394	BALL BEARING	1	-
7	G.141	DISTANCE PIECE	1	S.1
8	G.935	BALL BEARING	1	-
9	G.10481	OIL SEAL	1	Syn.Rubber
10	G.10464	DISTANCE COLLAR	1	S.15
11	ND	CIRCLIP (Ext.Type for 25M/M Shaft)	1	-
12	G.8746	SHIM (0.003 Thick)	A/R	BSS.265
13	G.8747	SHIM (0.005 Thick).	A/R	BSS.265
14	G.8748	SHIM (0.007 Thick)	A/R	BSS.265
15	G.8749	SHIM (0.022 Thick)	A/R	BSS.265

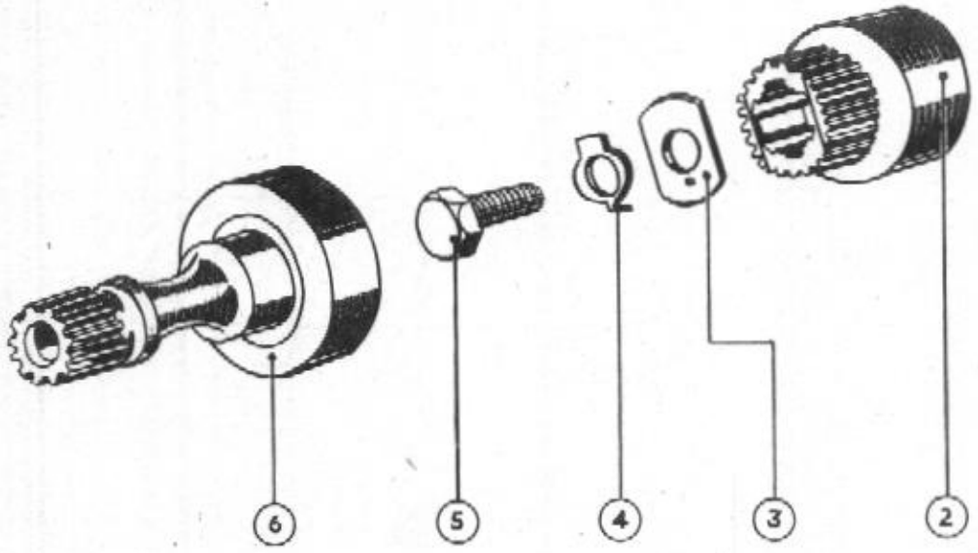


BREATHER & OIL FILLER GROUP ITEM 1. **TP 9174**

Item No.	Part No.	Description.	No. off.	Material Spec.
1	GA.1396	BREATHER AND OIL FILLER GROUP comprising:-		
2	G.1747	ASSY OF OIL FILLER BODY & LOCATING PEG consisting of:-		
3	G.1374/1	OIL FILLER BODY	1	L.40
4	G.1734	LOCATING PEG	1	L36 or 37
5	G.1379	ASSEMBLY OF CAP & SPRING consisting of:-		
6	G.1375	OIL FILLER CAP	1	DTD498
7	G.1376	OIL FILLER SPRING	1	DTD197
8	G.1377	FILTER	1	T.9
9	G.1378	DISTANCE RING	1	L.1
		ADDITIONAL ITEMS req'd to complete this Group :-		
10	G.790	SEALING DISC	1	S.85
11	G.1381	OIL FILLER CATCH	2	S.84
12	G.1380	WASHER	1	Syn.Rubber
13	G.760	CIRCLIP (Special)	1	DTD1239
14	G.791	CIRCLIP (Special)	1	DTD239
15	G.793	FILTER (Oil Filler)	1	Brass or Monel Gauze
		ALTERNATIVE TO ITEM 3.		
16	G.1374	OIL FILLER BODY	1	DTD428

Rotol Limited.
Issued : 11.5.48.
Ref : 8169.

PART ADE. (GENERAL).
Sect: 3 (Parts List).
Component List 12.001.



GENERATOR COUPLING GROUP T.P. 8116

Item No.	Part No.	Description.	No. Off.	Material Spec.
1	G.0109	GENERATOR COUPLING GROUP consisting of:-		
2	G.285	GENERATOR SHAFT COUPLING	1	S.28
3	G.286	RETAINING WASHER	1	S.1
4	G.287	LOCKWASHER	1	S.84
5	6A1/1E	SET SCREW	1	S.1
6	G.8062	GENERATOR QUILL (SHORT)	1	S.65
7	G.829	GENERATOR QUILL (LONG)	1	S.65

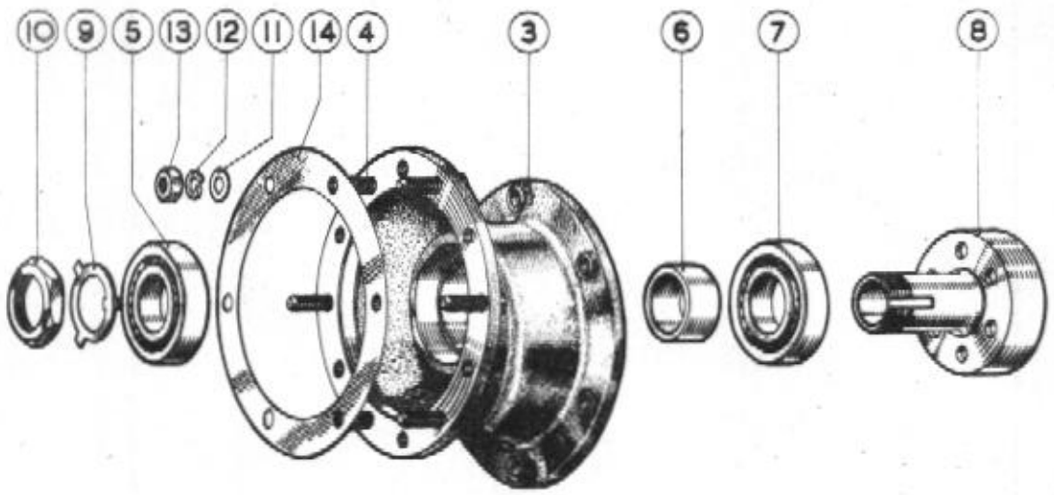
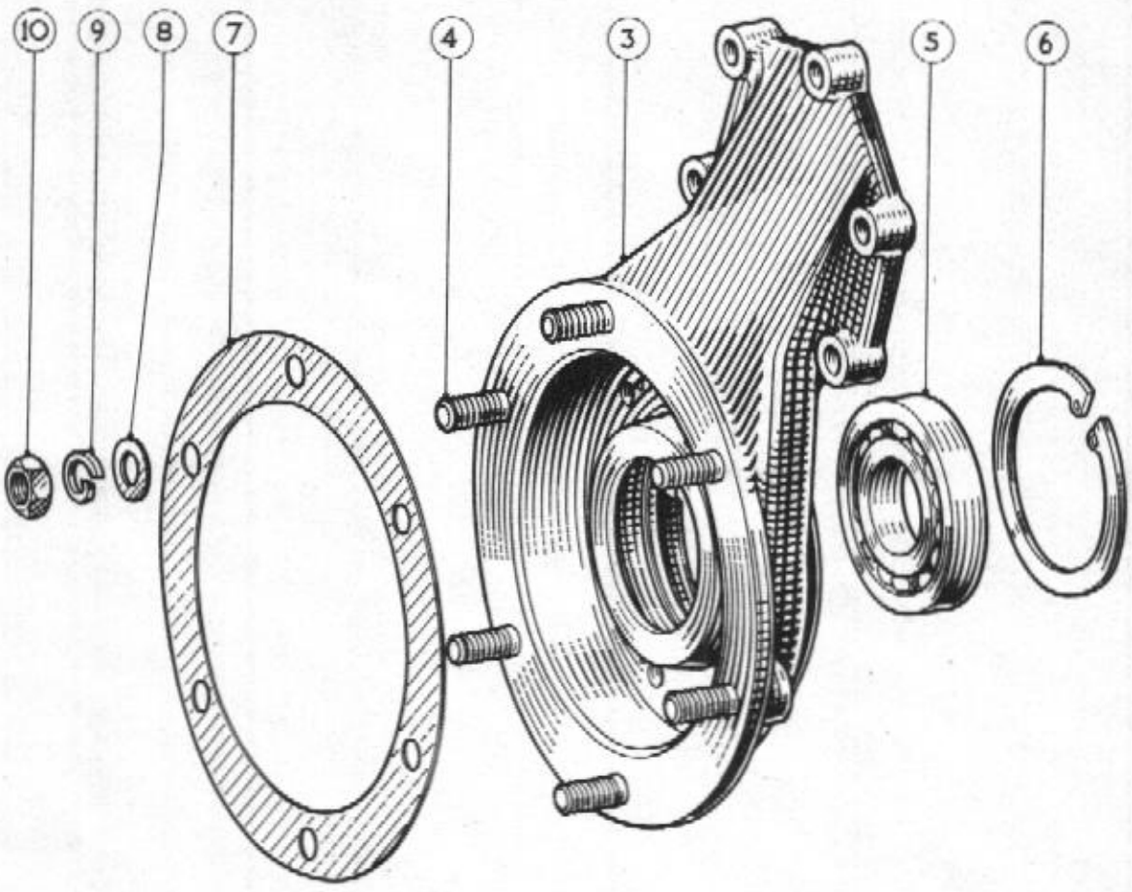


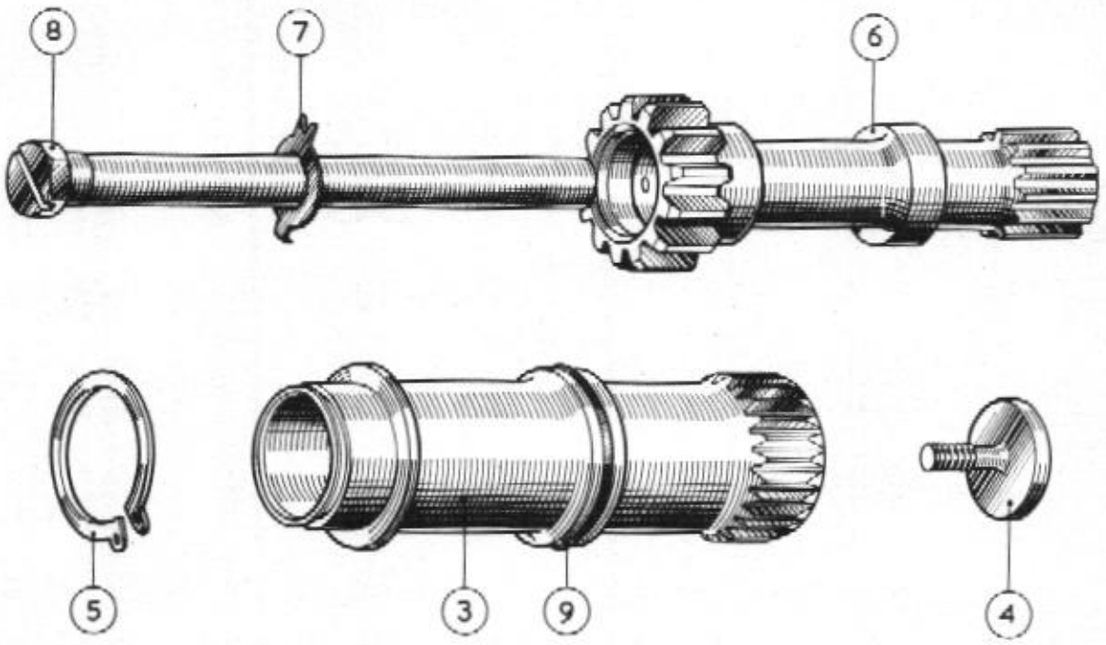
FIG. CASING GROUP (HALF SPEED REDUCTION GEAR) ITEM 1 TP 9225

Item No.	Part No.	Description.	No. off.	Material Spec.
1	GA.11474	CASING GROUP ($\frac{1}{2}$ Sp.Red.Gear) Comprising:-		
2	G.11518	ASSEMBLY OF CASING & STUDS consisting of:-		
3	G.11470	REDUCTION GEAR CASING	1	DTD133
4	AGS885/C	STUD $\frac{1}{4}$" BSF	6	DTD124
		ADDITIONAL ITEMS req'd to complete ITEM 1 :-		
5	G.11616	BALL BEARING	1	-
6	G.364	DISTANCE PIECE	1	S.1
7	G.11616	BALL BEARING	1	-
8	G.365	INTERNAL GEAR	1	S.65
9	P.633/1	TABWASHER	1	S.84
10	P.632	SHAFT NUT	1	S.1
11	FB5937/3	PLAIN WASHER	6	DTD124
12	AGS162/D	SPRING WASHER	6	-
13	A16/Y/EP	NUT $\frac{1}{4}$" BSF	6	-
14	G.392	GASKET	1	Oakenstrong 0.006 thick
		ALTERNATIVE TO ITEMS 5 and 6.		
15	P.629	BALL BEARING	2	-



ADAPTOR CASING GROUP (½ SR RED. GEAR) **ITEM.1.** **T.P.9340.**

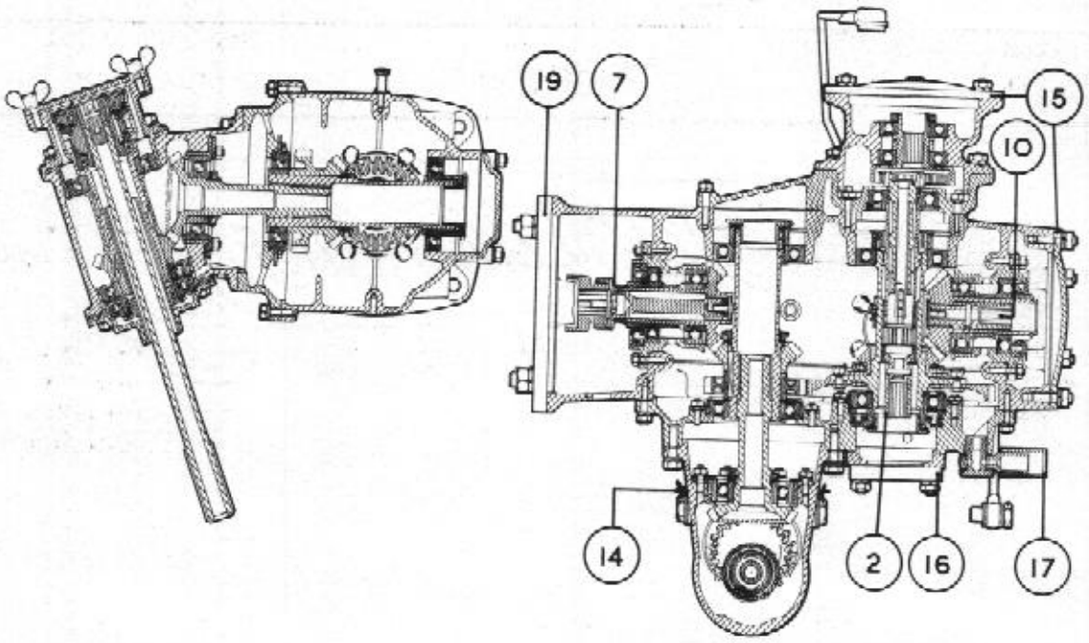
Item No.	Part No.	Description	No. Off	Material Spec.
1	GA.9984	ADAPTOR CASING GROUP (½ Sp.Red.Gear) comprising:-		
2	G.8969	ASSEMBLY OF CASING AND STUDS, consisting of:-		
3	G.8942	ADAPTOR	1	DTD.133.
4	AGS.885/C.	STUD ¼" BSF.	6	-
		ADDITIONAL ITEMS required to complete this Group:-		
5	G.11616	BALL BEARING	1	-
6	N.D.	CIRCLIP (Internal Type for 1.7/8" Bore).	1	-
7	G.392	GASKET	1	Oakenstrong 0.0006 Thick
8	FB.5937/3	PLAIN WASHER	6	DTD.126
9	AGS.162/D.	SPRING WASHER	6	-
10	A16/Y/EP.	NUT ¼" B.S.F.	6	-
		ALTERNATIVE TO ITEM 5.		
11	P.629.	BALL BEARING	1	-



PINION GROUP (½ SPEED RED. GEAR)

TP 9355.

Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.9983	PINION GROUP (½ Sp.Red.Gear) comprising:-		
2	GA.8940	ASSEMBLY OF SLEEVE AND END PLUG consisting of:-		
3	G.8939	ADAPTOR SLEEVE	1	S.65.
4	G.476	PINION END PLUG	1	S.1.
		ADDITIONAL ITEMS required to complete this Group.		
5	ND.	CIRCLIP	1	-
6	G.475	PINION	1	S.28.
7	G.474	TABWASHER	1	S.84.
8	G.8941	RETAINING SCREW	1	S.1.
9	G.1119	OIL SEALING RING	1	Natural Rubber



GA OF ACCESSORY GEARBOX TYPE SG 3/1
SHOWING MISCELLANEOUS PARTS SUB-GROUP ITEMS T.P 9344

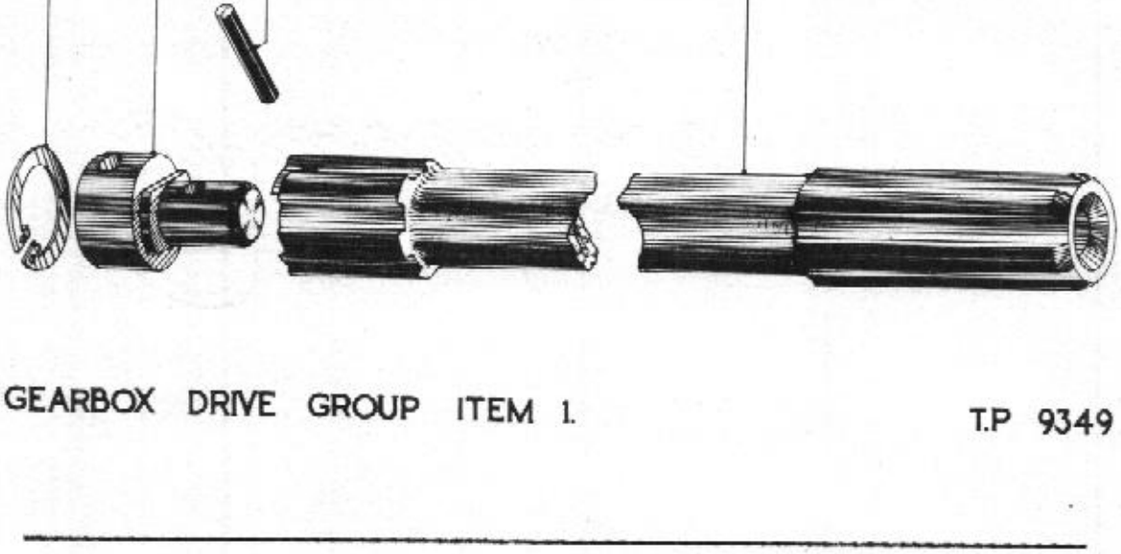
Item No.	Part No.	Description	No. Off.	Material Spec.
1	-	MISCELLANEOUS PARTS SUB-GROUP comprising:-		
2	G.612.	ACCESSORY QUILL ASSEMBLY consisting of:-		
3	G.613.	ACCESSOR QUILL MEMBER	1	S.28.
4	G.614.	GEARBOX QUILL MEMBER	1	S.65.
5	G.615.	LOCATING WASHER	1	S.1.
6	G.140/1.	SHEARING PIN	1	S.65.
7	G.828.	GENERATOR QUILL ASSEMBLY consisting of:-		
8	G.829.	GENERATOR QUILL	1	S.65.
9	G.830.	DISTANCE COLLAR	1	S.1.
10	G.009.	DRIVING QUILL ASSEMBLY consisting of:-		
11	G.138.	OUTER MEMBER	1	S.28.
12	G.139.	INNER MEMBER	1	S.65.
13	G.140/1.	SHEARING PIN	1	-
		ADDITIONAL ITEMS required to complete this Sub-Group:-		
14	ND.	LOCKING WIRE	A/R.	Staybrite.

-continued overleaf-

Ref. 9750.

Item No.	Part No.	Description	No. Off.	Material Spec.
		TRANSPORT ITEMS consisting of:-		
15	G.121.	DRIVE COVER	2	DTD.594.
16	G.1761.	COVER (Pesco Pump)	1	Waxed Cardboard
17	G.1643.	BLANKING CAP	1	" "
18	G.1651.	DRIVING PIECE	1	X.5073.
19	G.1221.	GENERATOR DRIVE COVER	1	X.5073.
* 20	G.1281.	INSERT (Included in item 19)	1	BSS.218.
21	FBS.381.	UNION BLANK	3	Syn. Rubber.

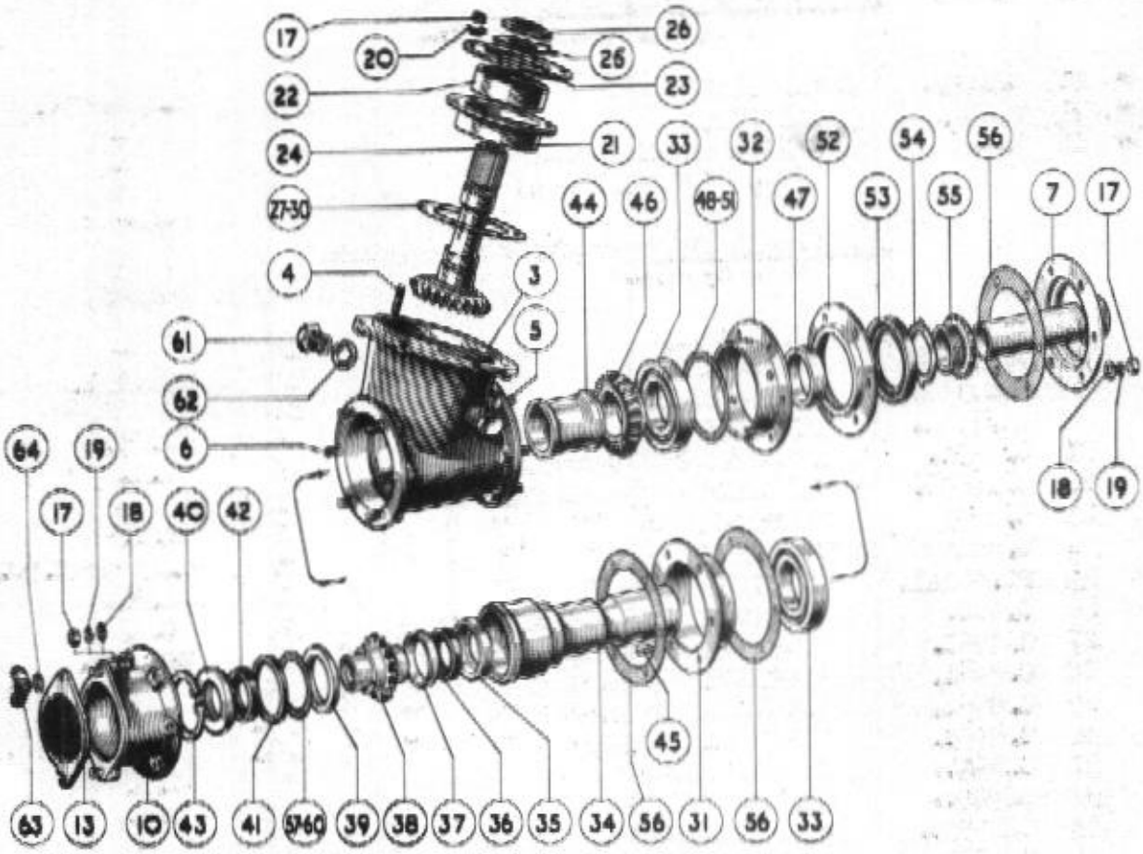
NOTE:- Where an asterisk appears against an item number it indicates that the item is not supplied as a replacement component.



GEARBOX DRIVE GROUP ITEM 1.

T.P 9349

Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.10093.	GEARBOX DRIVE GROUP comprising:-		
2	G.8979.	COUPLING SHAFT ASSEMBLY consisting of:-		
3	G.8980.	DRIVE SHAFT	1	S.2 or T.50.
4	G.8981.	PLUG	1	S.1.
5	G.8982	PIN	1	AM.71.
6	ND.	CIRCLIP (Fitted on final assembly).	1	-



BEVEL DRIVE GROUP ITEM.1. TP.9352

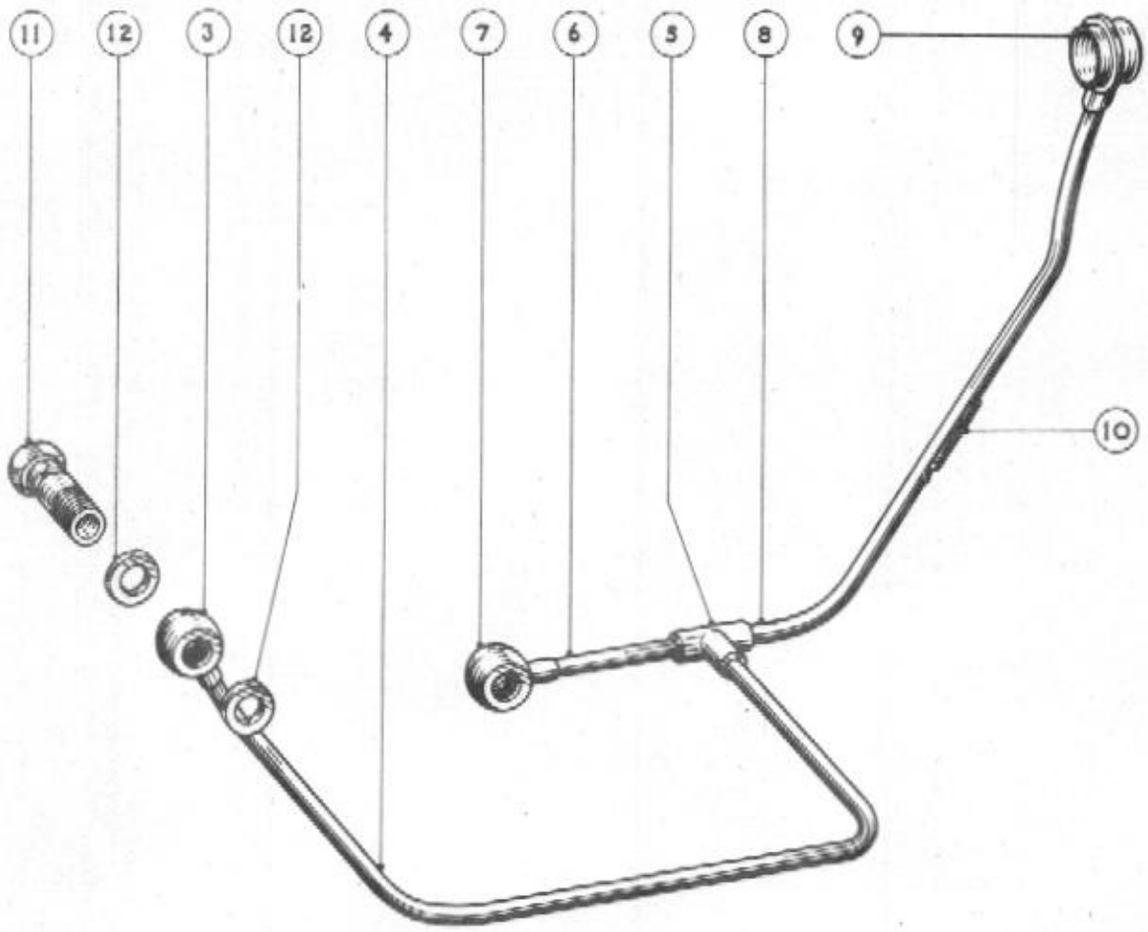
Item No.	Part No.	Description	No. Off.	Material Spec.
1	GA.9985	BEVEL DRIVE GROUP comprising:-		
2	C.8970	ASSEMBLY OF BEVEL DRIVE CASING AND STUDS consisting of:-		
3	G.8943	BEVEL DRIVE CASING	1	DTD.133.
4	RSP.12/5A.	STUD 2 B.A.	6	-
5	AGS.884/CC.	STUD 2 B.A.	6	-
6	P.135.	STUD 2 B.A.	6	S.1.
7	G.8957	ASSEMBLY OF STANDPIPE AND FLANGE consisting of:-		
* 8	G.8958	STAND PIPE	1	T.26.
* 9	G.8959	FLANGE	1	S.1.
10	G.8971	ASSEMBLY OF DISTANCE RING & STUDS consisting of:-		
11	G.8956	DISTANCE RING	1	DTD.59.
12	G.294	STUD 2 B.A.	2	

-continued overleaf-

Item No.	Part No.	Description	No. Off.	Material Spec.
13	C.835.	ASSEMBLY OF COVER & NAME PLATE consisting of:-		
* 14	G.1007.	COVER PLATE	1	L.4 or 16.
* 15	G.546.	NAME PLATE	1	-
* 16	N.D.	PARKER DRIVE SCREWS (Type 'U' No.2 x $\frac{1}{8}$)	3	-
		ADDITIONAL ITEMS required to complete this Group:-		
17	A.16/Y/CP.	NUT 2 B .A.	18	-
18	FB .5937/2.	PLAIN WASHER	12	DTD.124.
19	ACS.162/C.	SPRING WASHER	12	
20	RA.1509.	TABWASHER	6	S.84.
21	G.8954.	BEARING HOUSING (Bevel Drive)	1	S.1.
22	G.11606.	BALL BEARING (Bevel Drive)	1	-
23	G.8955	THRUST PLATE (" ")	1	S.1.
24	G.8920	DRIVING SHAFT (" ")	1	S.15 or S.90.
25	FB.90241.	TABWASHER (" ")	1	S.84.
26	G.692.	RETAINING NUT (Bevel Drive)	1	S.1.
27	G.8960.	SHIM 0.003 Thick (Bevel Drive)	A/R.	BSS.265.
28	G.8961.	SHIM 0.005 Thick (" ")	A/R.	" "
29	G.8962.	SHIM 0.007 Thick (" ")	A/R.	" "
30	G.8963.	SHIM 0.022 Thick (" ")	A/R.	" "
31	G.8944.	BEARING HOUSING	1	S.1.
32	G.8945.	BEARING HOUSING	1	S.1.
33	G.11559.	BALL BEARINGS	2	-
34	G.8951.	DRIVING SHAFT	1	S.15.
35	G.8950.	OIL SEAL HOUSING (Small)	1	L.1.
36	G.8559.	OIL SEAL	1	Syn. Rubber.
37	G.8547.	SPHERICAL BEARING (Small)	1	B.8.
38	G.8953.	COUPLING	1	S.15.
39	G.8549.	SPHERICAL BEARING (Large)	1	B.8.
40	G.9785.	OIL SEAL HOUSING (Large)	1	L.1.
41	G.9786.	SEALING RING	1	Rubber.
42	G.8559.	OIL SEAL	1	Syn. Rubber.
43	N.D.	CIRCLIP (Internal Type for 48 m/m. Bore)	1	-
44	G.8952.	DISTANCE PIECE	1	S.1.
45	C.808.	KEY	1	S.24.
46	G.8919.	DRIVING SHAFT BEVEL GEAR	1	S.15.
47	G.436.	SPACING COLLAR	1	S.15.
48	G.8947.	SHIM (0.003 Thick)	A/R.	BSS.265.
49	G.8948.	" (0.005 ")	A/R.	" "
50	G.8949.	" (0.007 ")	A/R.	" "
51	G.8950.	" (0.022 ")	A/R.	" "
52	G.8946.	OIL SEAL HOUSING	1	S.1.
53	G.9394.	OIL SEAL	1	Syn. Rubber.
54	G.437.	TABWASHER	1	S.84.
55	G.438.	NUT	1	S.2.
56	G.8972.	GASKET	5	Oakenstone 0.006 Thick.
57	G.8553.	SHIM (0.003 Thick)	A/R.	BSS.265.
58	G.8554.	" (0.005 ")	A/R.	" "
59	G.8555.	" (0.007 ")	A/R.	" "
60	G.8556.	" (0.022 ")	A/R.	" "
61	ACS.216/B.	PLUG	2	-
62	RSP.202/7.	WASHER	2	-
63	N.D.	WING NUT (C.D.I.)	2	-
64	ACS.160/C.	WASHER	2	-
65	N.D.	LOCKING WIRE	A/R.	20 S.W.G.

A/R = AS REQUIRED.

NOTE: Where an asterisk appears against an item number it indicates that the item is not supplied as a replacement component.



OIL PIPE GROUP ITEM 1. T.P 9357

Item No.	Part No.	Description	No. Off.	Material Spec.
1	G.9982.	OIL PIPE GROUP comprising:-		
2	G.8938.	OIL PIPE ASSEMBLY consisting of:-		
* 3	G.833.	BANJO CONNECTION	1	B.11.
* 4	G.10096.	OIL PIPE	1	-
* 5	G.1568.	TEE PIECE	1	BSS.218.
* 6	G.10094.	OIL PIPE	1	-
* 7	G.281.	BANJO CONNECTION	1	B.11.
* 8	G.10095.	OIL PIPE	1	-
* 9	G.1567.	OIL INLET BANJO	1	S6. or S77.
* 10	G.606.	LABEL	1	BSS.265.
		ADDITIONAL ITEMS required to complete this Group:-		
11	G.834.	BANJO PLUG	1	S.1.
12	RSP.202/11.	WASHER	2	L.17.

NOTE: Where an asterisk appears against an item number it indicates that the item is not supplied as a replacement component.

CHAPTER 1

DISMANTLING

List of Contents

CHAPTER 1

DISMANTLING

GENERAL

1. The purpose of this Chapter is to describe the general procedure applicable to the dismantling of the gearbox. A detailed description of the dismantling of each unit will be found in the relevant Parts of this manual.

Special purpose tools

2. The assembly turntable fixture, gear holding fixture, extractors, drifts and the like supplied in the kit, are all designed for a special purpose. Where the use of a special tool is called for, the tool is mentioned in the text and corresponding Tools List.

Tools for general use

3. Within the practical limits of a portable tool kit, it is impossible to provide a special tool for every job, but there are certain items which should be available in every workshop.

4. These items range from hard wood blocks or sections of large diameter metal pipe (turned square at both ends), for supporting the flanges of casings or bearing housings during pressing operations, to hide mallets, and include a selection of soft metal drifts in various sizes.

5. Where possible, an arbor press should be used in preference to a hammer and drift. Steady pressure is more effective and less likely to damage parts, than the jarring action of a hammer.

Cautions on use of tools

6. No component, of however hard a metal, should ever be gripped in bare vice jaws. Clamps of some soft metal should always be used to protect the component in the vice. Steel wedges or drifts, apart from special drifts made to fit a certain component, should never be used unless the parts are to be scrapped and cannot be separated in any other way.

7. All tools should be kept in good condition. Set spanners, the jaws of which have become opened out or burred, should be replaced. The working edges of screwdrivers should be kept sharp and the corners square. An ill-fitting set spanner or rounded screwdriver will damage a nut or screw. Never use an adjustable spanner, but always the correct set spanner or box spanner.

System and cleanliness

8. If possible, a large metal tray with compartments should be provided, so that the parts may be segregated as they are dismantled. This will save much sorting and possible damage to parts when the time comes to re-assemble them. Labels and string are always useful for keeping mating parts together and identifying them for assembly.

Inspection during dismantling

9. As each part is dismantled, and before it is cleaned, it should be inspected generally for signs of scoring or burring due to friction. A more valuable indication of defects is often obtained from the condition of oil or the presence of minute particles of metal from a defective part than can be obtained after the parts have been cleaned.

Parts to be scrapped

10. All gaskets, oil seals, oil retaining rings, tabwashers, split pins and locking wire must be scrapped as they are removed, and must never be used a second time.

Removing Pipes

11. When undoing a union on a pipe, always use two spanners. Hold the union body (the hexagon nearest to the component) with one spanner and turn the union nut on the pipe with the other. If the union body is allowed to turn while the nut is tight the pipe will be twisted. If a pipe is attached at one end by a union and at the other end by a banjo, always undo the union end first. The risk of damage to a pipe if it is left attached to a component by one end is obvious. Therefore it is wiser to remove a pipe completely and tie it to the main component.

Dismantling procedure

12. Before starting to dismantle a gearbox, remove the drain plug and allow all the oil to drain out. This will prevent a lot of unnecessary mess on the bench.

13. The gearbox is provided with a turntable fixture for use when dismantling and assembling. While this is available the gearbox need never be laid on the bench to be worked on. Other components should, as a general rule, be held in a vice while they are being dismantled.

14. Shims should always be picked off carefully so that they are not creased or torn. When dismantling a shimmed component, make sure that none of the shims are stuck to the flange. The thickness of shims is always important. Therefore they should always be labelled and tied to the component to which they belong, or attached to the flange stud by two nuts.

15. When it is certain that components will be refitted to the same gearbox, it is to the operator's advantage to mark such items as accessory drives, so that they may be refitted in the same position. A light punch mark on the drive casing and a corresponding mark on the gearbox casing is the best method.

16. When cleaning the mating faces of the sump and oil pump, remove any traces of jointing compound with methylated spirits which will dissolve the compound. Never scrape the compound off the faces.

CHAPTER 2.

EXAMINATION.

List of Contents.

CHAPTER 2.

EXAMINATION.

GENERAL.

1. The examination of the various major units is described in detail in the relevant Parts of this manual. However, there are general requirements which apply to the examination of any unit, and these requirements are contained in the following paragraphs. The extent to which accessory drive equipment is to be overhauled depends largely on the reason for the rejection of the equipment. Specific cases of rejection are when the equipment has been salvaged from a crash, fire or immersion in sea water, or at such a time when the equipment has developed a defect.

2. While a gearbox is being dismantled and before the parts are cleaned, each component should be inspected for signs of scoring or burring due to friction. A more valuable indication of defects is often obtained from the condition of the oil, or the presence of metallic particles from a defective part, than can be obtained after the parts have been cleaned.

3. Score marks must be blended carefully into the surrounding surface of the metal. Do not try to stone out the score completely, because this would produce a flat spot and deprive the mating face of support. Unnecessary stoning or hand scraping should be avoided.

4. Fine grade stones only must be used for blending scores, to avoid the picking up of metal particles removed during the stoning process. Plenty of clean paraffin should be available and the stone should be dipped into it frequently during use. Fine grade emery cloth should be used for polishing. Pieces which would normally be rejected as unfit for further use should be kept for light polishing.

5. After a thorough cleaning in paraffin, all parts must be dried to prevent corrosion, and given a visual and dimensional inspection. Every component must be carefully inspected for signs of corrosion, especially when the equipment has been subjected to the corrosive effects of sea water or sea air.

Dimensional inspection

6. Dimensions of components must be checked in accordance with the Schedules of Fits and Clearances which are to be found in Section 5, Chapter 3 of the various Parts in this Manual. Parts which fail to conform to the limits laid down in the Schedules must be replaced by new parts.

7. When mating parts have been worn to the maximum figure given in the Permissible Worn Dimensions column of the Schedule, they will generally be found to have a clearance greater than the tolerance allowed in the Permissible Worn Clearance column of the Schedule. These parts must be replaced by selective assembly. For example, a worn male part must be assembled with a new female part machined to the minimum drawing limit and a worn female part assembled with a new male part machined to the maximum drawing limit.

Dismantling for spares

8. A gearbox must not be written off if the main casing is initially rejected. The casing may be renewed in the same way as any other major component such as a mainshaft. Also the internal parts of the gearbox may be segregated and built into a new casing. Only in an emergency such as lack of spares, may the internal parts become spares.

Correct meshing of gears

9. If a mainshaft bevel gear is rejected, the gears mating with it must also be renewed, except for the oil pump bevel pinion which may be renewed without regard to the accessory bevel pinion with which it meshes. The mesh of the new oil pump bevel pinion will be adjusted by the washers on the pump drive shaft. Gear wheels must not be scrapped indiscriminately. A compromise can often be reached by remeshing the gears in a different position.

Inspection procedure

10. Threads of studs, bolts and set-screws must be examined for signs of damage or over-stressing and should be checked with the appropriate type of thread gauge. Studs must be tested for security. If a stud is rejected, the thread in the tapped hole from which it is removed must be checked with a thread plug gauge.

11. Bearing housing and bearing lands on shafts must be inspected for signs of bearing creep and the dimensions checked with a plug gauge or a micrometer. Gear teeth must be examined for signs of fretting, plucking or cracks at the roots, and may be cleaned up lightly with a stone. Spacing collars must be perfectly smooth and polished to a mirror finish on the outside diameter.

Inspection after a crash or fire

12. A gearbox, which is known to have been involved in a crash or fire, must be completely stripped and inspected for distortion and cracks. All high-carbon steel parts as springs and circlips, as well as spacing collars, which have been in a fire must be rejected.

13. All light-alloy castings must be chalk-tested and all ferrous parts, except studs and nuts, must be electro-magnetically tested for cracks. Particular attention must be paid to places where a change of section occurs. In addition, ferrous parts must be Brinell tested to ensure that the hardness or heat treatment of the metal has not been affected.

Inspection after immersion in sea water

14. All parts dismantled from a gearbox which has been immersed in sea water must be inspected for signs of corrosion. High carbon steel parts, including springs and ball-bearings which are free from corrosion and dimensionally correct may be used again. Magnesium alloy castings must always be treated as suspect.

CHAPTER 4

REASSEMBLING

List of Contents

CHAPTER 4

REASSEMBLING

GENERAL

1. The purpose of this Chapter is to describe the general procedure applicable to the reassembling of the gearbox. A detailed description of the reassembling of each unit will be found in the relevant Parts of this manual.

Cleanliness and system

2. All parts must be perfectly clean before they are assembled. Rotating parts of gearboxes run at high speeds, and the smallest piece of grit or swarf may do untold damage. Never use fluffy rag. The fluff has a way of collecting in filters and clogging them. It may go further and clog oil pipes or jets with disastrous results.

3. Parts which have been machined, should be carefully washed in clean paraffin to ensure that no swarf lingers in corners or slots. They should then be blown dry with a compressed air jet.

4. The benefit of following a system, and keeping parts carefully segregated and labelled during the dismantling and examination operations, are fully realised when it comes to reassembling the components.

Lubrication of parts

5. All internal moving parts should be lubricated with D.T.D.109 or D.T.D.472 oil (Stores Ref: No. 344/32) as they are assembled. All splined or serrated components inserted into a gearbox from the outside, such as quills and drive shafts, should have their splines or serrations smeared with Whitmore's compound graphite grease before

they are inserted. Parts which are pressed into position, such as ball bearings should be smeared with oil or grease to help the pressing operation.

Parts to be renewed

6. New gaskets, oil seals, oil retaining rings, tabwashers, split pins and locking wire must always be used on assembly.

Care of shims

7. If the shims have been carefully labelled and kept together there will be no difficulty in putting them back in their proper places; but there is a danger of dirt getting trapped between them if they are not separated carefully, washed and dried. A piece of swarf may easily escape detection between two shims and will cause distortion of the flange when the nuts are tightened.

Markings

8. When accessory drives are being reassembled to the gearbox, care must be taken to fit them in their original positions. This is easily checked if light punch marks were made on the mating parts as they were dismantled. Accessory drive groups are stamped with letters indicating the faces of the gearbox to which they belong.

Tightening nuts

9. When two or more nuts secure a component, each nut should be run down finger tight and then tightened a bit at a time. If one nut is fully tightened before the others have been started, the flange is almost sure to be distorted and oil leaks or uneven meshing will result.

CHAPTER 1

TOKEN CHAPTER.

1. Parts rejected as unfit for further service need not be scrapped as they may be made serviceable by the application of an approved salvage scheme. Full information for the repair and salvage of any part or groups of parts can be obtained on application to this firm.

Rotol Limited.
Issued: 4.12.51.
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PUBLICATION 619A
SERIES .01.

PART SG. 3/1

SPECIAL GEARBOX

List of Contents

NR NOT REQUIRED for this PART

Each Chapter will be preceded by a detailed List of Contents.

The four-figure reference in the left-hand column is for Rotol use only.

CHAPTER 1

DETAILED DESCRIPTION.

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List of Illustrations.

CHAPTER 1

DETAILED DESCRIPTION.

GENERAL.

1. The purpose of this Chapter is to describe in detail the high-speed or special gearbox, Type SG 3/1, fitted to Vampire I, II & IV aircraft, powered by Nene engines.

2. This type of gearbox has been designed for installation in aircraft where space, in a vertical plane, is limited.

3. It is carried on suitable brackets mounted on the airframe in close proximity to the engine from which it takes its drive.

4. Self aligning spherical bearings at either end of the drive shaft allow for small errors of alignment between the engine and the gearbox.

Construction.

5. Running from front to rear of the light alloy gearbox casing, in a horizontal plane, are two mainshafts geared together.

6. The input drive from the bevel gear assembly is taken into one of these shaft which drives the other at half-speed and through bevel gears an accessory drive at input speed.

7. The bevel gear assembly in a casing, fitted to the front of the gearbox, receives the drive shaft from the engine and transmits the drive to the serrated bore of the driving mainshaft.

8. The driven mainshaft is geared to a second accessory bevel which it drives at half-input speed.

9. This accessory bevel is also meshed with a second bevel wheel which drives the oil pump fitted in the base of the gearbox.

10. The accessory drive groups, consist of a bevel wheel machined on an internally splined shaft, from which the accessories are driven.

11. The shaft is mounted in ball bearings contained in a light alloy detachable housing which is secured to walls in the gearbox by studs and nuts.

12. They lie in a horizontal plane at right angles to the mainshafts and drive accessories installed on the end faces of the gearbox.

13. The correct meshing of these bevel gears is effected by shims interposed between the bearing housing flange faces and the main casing.

14. The drive between mechanical accessories, excepting the Hymatic air compressor, and the gearbox is through two-piece quills which afford a safety shear section.

15. The two halves of the quill are held together with a pin designed to shear in the event of overloading or seizure.

16. Two types of quill are available, one to pick up the drive from the mainshaft, and the other of similar design for use when the drive is taken from the accessory drive.

17. The generator, however, is driven by a single piece quill, with the shear section in the reduced diameter of the shank, and functions in the same way as above.

18. When the air compresor is installed on a gearbox it is first necessary to introduce a half-speed accessory reduction gear of the internal gear and pinion type.

19. The pinion is fitted in the bore of the gearbox mainshaft and the gear carried in ball bearings in a light alloy casing which is fitted on the relevant accessory mounting face.

20. A standard accessory mounting face on this casing allows the air compressor, fitted on a similar face, to be mounted thereon.

21. The drive is a positive connection between the compressor shaft and splines machined in the bore of the internal gear shaft.

22. This reduction gear is mounted on the rear face of the gearbox and receives its drive from the driven mainshaft with the resultant output ratio of .25:1.

23. The various gearbox faces are identified by lettering on the main casing in close proximity to the relevant faces.

Lubrication.

24. Lubrication is by splash and oil mist created by the large spur gear dipping in the oil which is contained in the base of the gearbox.

25. Pressure lubrication of accessories fitted to the gearbox is provided by a gear type pump on the base of the sump through an external oil pipe at 40 - 70 lbs.per sq.in.

26. Beneath the pump is a union, normally blanked off, which is used, when occasion demands, for the purpose of checking the oil pressure.

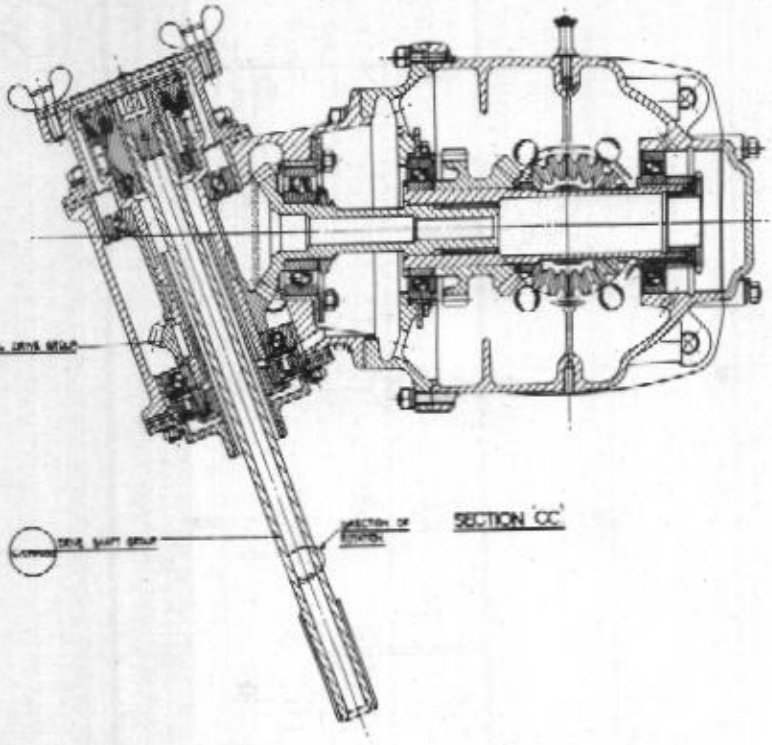
27. This test is carried out by connecting the union to a slave oil pressure gauge and running the gearbox at the speed laid down in the relevant schedule.

28. The combination oil filler and breather assembly is located in the top of the gearbox and is retained by a bayonet type fastening.

29. This oil filler and breather assembly incorporates a disc-type non-return valve to prevent the escape of oil during inverted flight or aerobatics.

30. The oil level in the gearbox is gauged by means of a graduated dipstick housed in close proximity to the filler and retained by a flat spring.

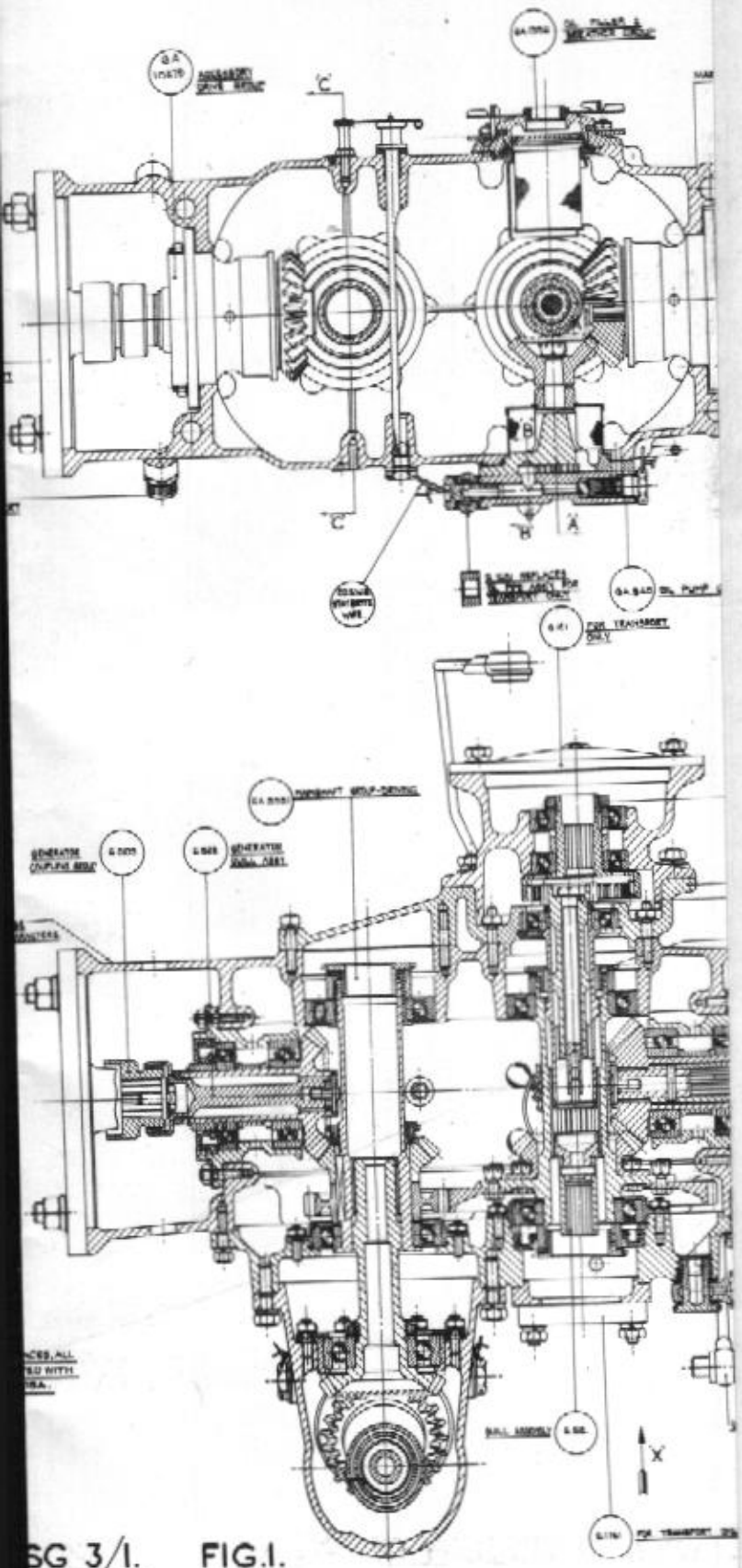
31. Oil to Specification DED 2479 is recommended and the gearbox should be filled to the FULL mark on the dipstick.



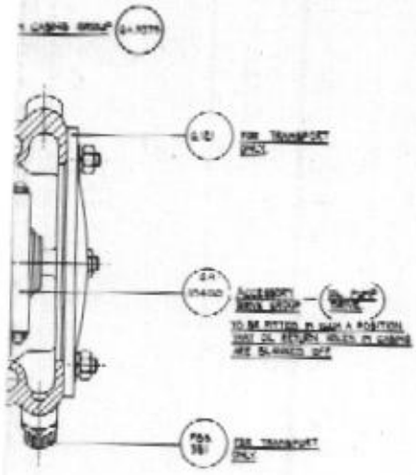
SECTION 'CC'

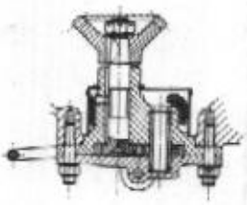
SCRAP SECTION 'BB'

GA OF ROTOL ACCESSORY GEARBOX.

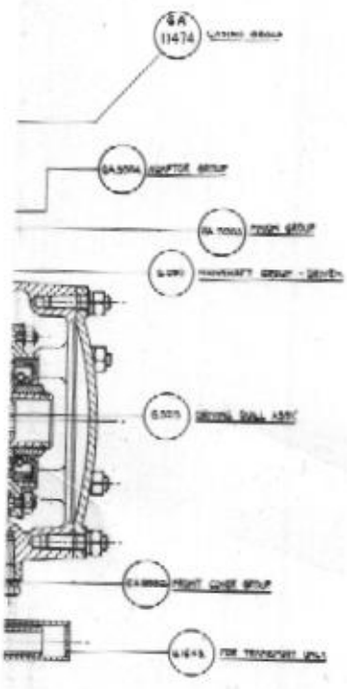


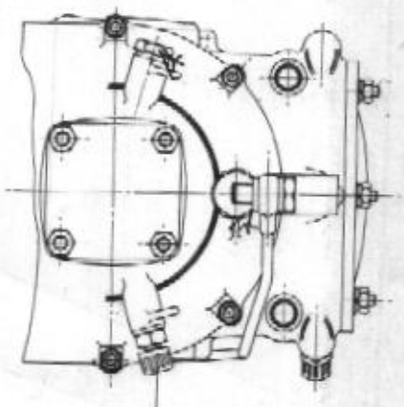
SG 3/1. FIG.1.





SCRAP SECTION 'AA'





PART VIEW IN DIRECTION OF ARROW 'X'

TP.9317

CHAPTER 1

DISMANTLING

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CHAPTER 1

DISMANTLING

GENERAL.

1. The purpose of this Chapter is to describe in detail the dismantling of the special gearbox, Type SG 3/1, which process will be dealt with in two parts.

2. General dismantling notes, concerning system, cleanliness, segregation of parts, etc., are given in PART ADE (GENERAL), Section 5, Chapter 1.

DISMANTLING THE GEARBOXES INTO GROUPS.

3. Remove all blanking covers. Undo the nuts securing the bevel drive group and the accessory reduction gear to the gearbox and remove these for separate dismantling.

4. The side accessory drives are secured to the gearbox internal walls by a ring of nuts locked by tabwashers. Remove these drives, and the oil pump group from the gearbox base.

5. Undo the tabbed locknuts at the rear ends of the mainshafts and the front cover nuts. With drifts inserted in the rear of the mainshafts, tap the complete assembly clear.

DISMANTLING THE GROUPS.

6. The gearbox has now been dismantled into its respective groups. These groups may now be split up into components.

Main casing group.

7. The rear mainshaft ball bearings may have been withdrawn with the mainshafts or remained behind in the gearbox casing.

8. If the latter is the case, the bearing should be pressed out rearwards after removing the internal circlip in the casing bore.

9. Remove all wired plugs, dipstick assembly and the oil filler and breather group from the top of the gearbox casing.

Bevel drive group.

10. This group incorporates two bevel gears each with an integral shaft. One shaft fits in the serrated bore of the mainshaft while the other is coupled to the drive shaft.

11. To remove the bevel gear driving the mainshaft undo the nuts securing its bearing housing in the bore of the bevel drive casing.

12. Undo the tabbed ring nut on the threaded portion of the bevel gear integral shaft and press the gear out of its ball bearing assembly. Wire shims together and store in safety.

13. The drive shaft assembly with its bevel gear may be dismantled from the bevel drive casing.

14. Remove the top end cover secured to the casing by butterfly nuts. Remove the circlip and extract the drive shaft assembly.

15. Undo the nuts retaining the "chimney stack" in the bevel gear casing. Remove the nut retaining the female coupling integral shaft, oil seal, ball bearing, bevel gear and distance piece.

16. Withdraw from the top end of the drive shaft the oil seal housing and seal rubber ring, shims, if fitted, the large spherical bearing, male driving end and small bearing.

Front cover and mainshaft groups.

17. Remove the tabwasher and locknut retaining the double gear on the driving mainshaft. Press mainshaft out of its bearing which may be removed from the front cover.

18. Remove locknut, oil seal and ball bearing assembly from the driven mainshaft and extract from front cover. Dismantle the spur and bevel gears.

19. It should be noted that shims are placed under certain components to affect the meshing of bevel gears.

20. These shims should always be carefully dismantled, stored and re-assembled to ensure efficient operation of the gearbox.

Oil pump group.

21. Remove the split pin, slotted nut and bevel gear from the top of the pump drive shaft, taking care to extract the Woodruff key.

22. Removal of the sump cover will allow the driving and driven gears to be withdrawn.

23. Remove the circlip from the pump drive boss body and lift out the gauze filter.

24. Unwire and remove the relief valve cap nut. Remove the valve spring, ball cup and ball. Store all parts carefully.

Breather and oil filler group.

25. Remove all circlips and withdraw the filler filter , clack valve and locking assembly.

Accessory drive groups.

26. Each group consists of a bevel gear with an integral shaft carried in a pair of ball bearings, separated by a distance piece, the whole assembly being retained by a circlip.

27. Remove this circlip from the end of the integral shaft and press the shaft out of its bearings and oil seal collar. Press the bearings out of the

housing counterbores.

Accessory reduction gear.

28. The driving pinion is removed by untabbing and undoing the retaining bolt from the peg fitting in the end of the driven mainshaft adapter.

29. The internal gear may be removed from its ball bearings in the gear casing by undoing the retaining nut and pressing out the gear integral shaft.

30. Press the bearings out of the counterbores in the gear casing, removing the distance-piece between them during this process.

CHAPTER 2

EXAMINATION.

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CHAPTER 2

EXAMINATION

GENERAL.

1. The purpose of this Chapter is to describe in detail the examination during overhaul of the special or high-speed gearbox, Type SG 3/1.

2. Notes referring to the general examination procedure to be followed on all gearbox components are given in the first Part of this manual.

Main casing.

3. Examine generally for cracks and material defects, particular attention being paid to those places where a change of section occurs.

4. Examine all housing bores for signs of bearing creep. Check all studs for security and examine the external threads for damage and overstressing by gauges.

5. When a stud is rejected as faulty, or removed as insecure, a check on the thread in the hole, from which it has been removed, must be made before a new stud is fitted.

6. If a stud hole is tapped right through the casing the fast end of the stud must be smeared with approved, jointing compound before the stud is fitted.

7. Check the relief valve and high-pressure connection for security. Should the casing threads be faulty the holes must be salvaged by the application of approved salvage scheme.

8. Inspect all oil drains for security and any external threads for damage and overstressing by gauge. Ensure cleanliness of oil ducts by syringing with clean paraffin and blowing out with compressed air.

9. Examine the dipstick for general condition. Check the blade for straightness. If bent it may be straightened by bending. After straightening check for material defects.

10. Check the spring for general condition and freedom from cracks. Check spring for action and, when assembled, free circular movement. If doubtful replace.

11. Examine circlips for general condition, flatness and spring. If faulty, reject and replace. Ensure that each circlip is a good fit in its groove.

12. All removed gaskets and oil seals must be renewed on assembly, particular care being taken that the replacements are approved.

13. Check screw threads of nuts and bolts to ensure that they are in good condition for further service. All studs and bolts with waisted shanks must be rejected.

14. Rounding of the corners of hexagons of nuts and bolt heads to such an extent that efficient spannering is affected is cause for rejection.

15. Spring washers must be carefully examined for general condition and freedom from cracks. Plain washers must be perfectly flat and free from cracks.

Front cover.

16. Examine the casing for general condition, apply the chalk test for cracks and carefully examine those places where a change of section occurs.

17. Check all studs for security. If a stud is removed for any reason the thread in the stud hole must be checked before a new stud is fitted.

18. In cases where the stud hole is drilled right through the casting the fast end of the stud must be smeared with jointing compound before it is screwed in.

19. Examine all machined surfaces for scores and burrs and lightly dress locally with a hand scraper. Ensure cleanliness and blow over with compressed air.

20. Inspect bearing housing for general condition and lightly dress any scores or burrs. Examine bore for signs of bearing creep and, if evident renew the housing.

21. After dismantling all ball bearings are to be thoroughly cleaned in clean paraffin. For this operation they must not be mixed with other gearbox or engine parts.

22. Do not spin the races but rotate them slowly in order to thoroughly clean, after which the bearing should be allowed to drain and then dried with compressed air.

23. Examine bearings for general condition. Slight corrosion on the end faces, in the bore or on the outer race is not detrimental so long as it does not affect fit and may be polished out.

24. Corrosion of the balls or tracks, however slight, is a possible cause of early bearing failure and necessitates replacement of the bearing.

25. Races which have been "blued" due to excessive heat or which are cracked or chipped also call for the rejection of the bearing.

26. Check with Schedule of Fits and Clearances, given in the next Chapter. Finally dip the bearing in approved gearbox oil as a prevention against corrosion.

Mainshafts.

27. Electro-magnetic test the mainshafts for cracks. Examine the bore serrations for general condition and check dimensionally with the Schedule of Fits and Clearances.

28. Check the bearing land at either end of the shafts for signs of bearing creep and verify that the bearings are a good fit.

29. Examine flange bolt holes for ovality and reject the shaft if worn beyond limits laid down in the Schedule of Fits and Clearances.

30. Examine the two keys and keyways in the driving mainshaft to ensure that these are a good fit. Reject the shaft if the keyway is worn.

31. Electro-magnetic test the gear wheels for cracks. Examine teeth for signs of plucking or fretting and clean up lightly by using a fine hard stone.

32. Examine all driving bolts for damage or overstressing of threads, wear or shanks, and rounding off of hexagon head corners.

33. Examine outer and inner diameters of all spacing collars and distance pieces, and if, evident, machine down to the dimensions stated.

34. Outside diameters must be perfectly smooth, free from scores and polished to a mirror finish. Examine for scores and burrs on side faces.

35. Inspect all shims for cleanliness and ensure that they are free from cracks and folds. Replacements should be of the same thicknesses as the rejected shims.

36. The requirements for end float, backlash, dimensions, etc., laid down in the Schedule of Fits and Clearances must be complied with.

37. Check the backlash between the mainshaft spur gears, by fitting the mainshaft holding tool in one of the mainshafts mounted in the front cover.

38. Clamp the assembly in a vice by the crosspiece of the holding tool and mount a dial indicator so that the button touches a gear tooth of the free mainshaft.

39. Check backlash. Release the holding tool and repeat the operation four times, giving the gears a quarter of a turn each time.

40. In the event of excessive backlash being the cause for rejection of straight spur gears, the gear with greatest tooth wear should first be rejected.

41. This wear can be measured by a vernier tooth caliper gauge. Should this not restore backlash to the required limits, then the mating gear must also be renewed.

42. The above test is not always reliable and a visual examination of the tooth flanks may have to be resorted to determine tooth wear.

43. It should be remembered that gearboxes are originally assembled with gears in perfect alignment and normally only replacement of components affects meshing.

44. Apart from seeing actual meshing, a skilled fitter can tell by the feel of the gears, when they are turned by hand, whether they are right or not.

45. Gears too deeply meshed will feel stiff to turn, whereas gears too far out of mesh will feel rough.

46. It is quite possible to obtain the correct backlash reading with one gear too far in and the other too far out, but they will not turn sweetly.

Accessory drives.

47. Visually examine housings for general condition and chalk test for cracks. Examine for bearing creep and clean up any scores or burrs on the flange faces.

48. Inspect the pinion shaft and end plug for cracks. Examine all teeth and serrations, and, if necessary, clean up lightly using a fine hard stone.

49. Check dimensions of internal serrations against Schedule and examine the shaft for scores, cleaning up lightly using a fine hard stone.

50. Examine the shaft for general condition and signs of bearing creep. Ease any burrs or scores by stoning. Verify that the bearings are a good fit on the bearing lands.

51. Inspect all circlip grooves for burrs and clean up lightly as necessary. Check the security of the pinion and plug.

52. Check the condition of the threads on this pinion and plug by ensuring that the mating number is a good fit on it.

53. Fill the bore of the gear with Fluid DTD 447. Hold this assembly in a vertical position and check for leaks past the plug, which can only be replaced by an approved scheme.

54. The side accessory bevel gears mate with two sets of gears, the bevel gears on the driving and driven mainshafts and the oil pump drive bevel gear.

55. Correct alignment, or meshing of these bevel gears is achieved by an adjustment of meshing shims of various thicknesses.

56. It cannot be too strongly emphasised however that excessive backlash, due to wear, must not be reduced by an alteration of the shim thickness.

57. The process of trial and error may involve the removal and refitting of the front cover assembly and accessory drive groups several times.

58,. Each time a group or assembly is fitted temporarily the full number of nuts, etc., need not be fitted. Use half the nuts, equally spaced.

59. Housings should not be pulled down by the nuts, but should first be tapped fully home with a hide mallet to prevent the risk of distorting the flange.

60. When checking backlash, it is of great importance that the mating gears are perfectly clean and dry. They therefore must be free from lubricant.

61. Refit the mainshafts, front cover and accessory drive shaft. Immobilize the gearbox mainshaft with the holding tool.

62. Fit the combination checking arm and extractor tool in the bore of one of the accessory drive pinions. Mount the indicator button on the arm with the dial at zero.

63. Move the accessory pinion through the available backlash. On satisfactory completion of the check, transfer the equipment to the opposite drive group and repeat operation.

64. For the checking of the oil pump bevel pinion, fit the accessory drive with the long-toothed pinion with its original shims and secure temporarily.

65. Fit the pump drive group also temporarily. Immobilize the accessory pinion and fit the backlash checking arm on the end of the pump drive shaft.

66. Mount a dial indicator. Move the checking arm through the available backlash to register on the dial indicator.

Oil pump.

67. Visually examine the pump drive bearing for general condition and chalk test for cracks. Inspect condition of faces.

68. Electro-magnetic test the pump shaft and gear for cracks. Check thread at top of shaft for damage or overstressing using available thread gauge.

69. Examine the key and keyway for damage and burrs. Clean up lightly as necessary. Check this assembly in accordance with the Schedule of Fits and Clearances.

70. Examine all gear teeth for signs of fretting or plucking, and the end face for any marks or burrs. Clean up lightly using a fine hard stone.

71. The circular gauze filter must be perfectly clean and the gauze free from damage. Any damage to the gauze calls for renewal of the component.

72. It should be noted that filter must not be cleaned with rag but should be sprayed with clean paraffin.

73. Examine the relief valve body for general condition. Check all external threads for damage and overstressing with a guage.

74. Examine the ball valve seat in the relief valve bore for scoring indentations or any other undesirable defect. Check for general cleanliness.

75. Inspect the spring for general condition and ensure that the ends are square to the axis. Examine the other internal parts for general condition.

76. Inspect the cap and banjo nuts for condition, damage and wear, checking the screw-threads with a gauge. If hexagon corners are rounded off, reject the nut.

77. Check the clearance of the oil pump wheels in the oil pump body. If worn beyond the limit stated in the Schedule, it will be necessary to replace either gears or body.

78. To check end float of the gears lay a straight edge across the face of the pump body and gear and ascertain the gap with a feeler gauge.

Oil filler and breather.

79. Visually examine the breather body for general condition and freedom from cracks. Ease any scores or burrs on faces by hand scraping.

80. Verify that the gauze filters are serviceable and secure. Ensure that each filter is clean and free from any foreign matter.

81. Ensure that the cap catch is secure and operates easily. Test the clack valve for any signs of sticking and inspect the filter shroud for damage.

Bevel gear.

82. Examine the drive shaft for general condition, freedom from cracks, absence of bow or twist, condition of end throttle and integral shoulder.

83. Inspect the end nut for condition of threads and for the rounding off of hexagon corners. If such is the case, replace the nut with a new one.

84. Examine the male and female coupling members for condition and fit. The male member fits on the drive shaft while the female member is keyed to the driving mainshaft.

85. All diamantled oil seals should be renewed. Check the spherical bearings for fit and condition and clean up, if necessary, by light stoning.

86. Electro-magnetic test for cracks on the bevel gear wheels. Examine all gear teeth for signs of "fretting" or "plucking" and clean up lightly using a fine hard stone.

87. Examine the bores for burrs and clean up lightly as necessary. Score marks on the face of the gears are to be eased by light stoning.

88. Examine the end face of the distance piece, between the bevel gear and the upper ball race, for burrs and clean up lightly as necessary.

89. Check all gears for excessive backlash and the fit of splined shafts in the serrated bores of their mating members. Examine all casings for cracks and screw threads for condition.

Accessory reduction gear.

90. Examine the casing for cracks by the chalk test. Inspect the bearing housings for signs of bearing creep and inserts for security and condition of threads.

91. Test the internal gear for cracks by the electro-magnetic method. Examine the teeth for signs of fretting or plucking. Clean up lightly with a stone.

92. Examine the distance piece, between the ball races, for general condition. If either of the end faces are burred, clean up lightly with a stone.

93. Inspect the adapter sleeve for cracks by the electro-magnetic test. Clean up any external burrs with a stone and check fit in bore of mainshaft.

94. Check the end plug for security. Tighten by peening or rolling. Check the end plug thread. The retaining bolt should be a good fit.

95. Examine the driving pinion for cracks by the electro-magnetic test. Check land diameters for scores or burrs. Clean up lightly with a stone.

96. Inspect the splines for burrs. Clean up lightly with a fine hard stone and check fit in the adapter sleeve.

Quills and couplings.

97. Examine the accessory drive quill for cracks by the electro-magnetic test. Check all splines for bore and dimensions. Check all mating fits.

98. Check the shearing pin for security. The pin may be found by the punch mark on one end.

99. If there is any relative movement between the two parts of the quill a new pin must be fitted. If this does not remedy the fault the quill must be rejected.

100. It is forbidden to use an oversize pin or one of a different material to the original as this would affect the shearing qualities of the drive.

101. The generator is driven through a quill and coupling. Examine these for general conditions and electro-magnetic test for cracks.

102. Check all splines for signs of fretting or plucking. Clean up lightly with a stone and check with a gauge.

103. Inspect coupling rivets for security. If there is any movement between the two parts, replace rivets or fit a new coupling.

104. Examine the threads of the generator drive pinion and plug and the coupling attachment bolt for condition. Reject if nut hexagons corners are rounded off.

Oil pipes.

105. Oil pipes must be thoroughly cleaned out by syringing through with paraffin and blowing out with compressed air.

106. Check the security of end fittings and if insecure the faulty part should be re-brazed to approved workshop standards and the assembly cadmium plated.

107. Examine the pipes for cracks and pressure test them byapproved workshop standards to 100 lbs. per sq.in.

CHAPTER 3

FITS AND CLEARANCES.

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CHAPTER 3

FITS AND CLEARANCES.

Ref No.	Parts and Description.		Dimensions New.	Permissible Worn Dimensions.	Clearances New	Permissible Worn Clearance.	Remarks.
1	BALL BEARINGS ON DRIVING MAINSHAFT.	End float between inner & outer races.	-	-	-	0.008	
2	DRIVING QUILL IN ACCESSORY DRIVE.	Splineways, chordal thickness.	0.072 / 0.074	0.080	0.002 / 0.005	0.010	
		Splines, chordal thickness.	0.069 / 0.070	0.062			
3	BALL BEARINGS IN ACCESSORY DRIVES.	End float between inner & outer races.	-	-	-	0.010	
4	OIL SEALS IN ACCESSORY DRIVES.	Oil seal to suit shaft diameter	1.250	-	-	-	Scores on collar may be removed by polishing or grinding, reduction in dia: allowed down to "Permissible Worn Dimension."
		Collar diameter	1.247 / 1.250	1.237			

Ref. No.	Parts and Description.		Dimensions New.	Permissible Worn Dimensions.	Clearances New.	Permissible Worn Clearances.	Remarks.
5	SPLINEWAYS IN OUTER MEMBER OF SIDE ACCESSORY DRIVE QUILL.	Splineways, width	0.125 0.126½	0.128½	-	-	
6	SPLINEWAYS IN OUTER MEMBER OF MAINSHAFT DRIVEN QUILL.	Splineways, width	0.125 0.126½	0.128½	-	-	
7	ACCESSORY DRIVE QUILL IN DRIVEN MAINSHAFT.	Driven mainshaft serrations (Dimensions over parallel faces)	0.631 8/10 0.632 8/10	0.636	0.000 8/10 0.002 8/10	0.005	
		Driving quill (Serrations)	0.630 0.631	0.627			
8	MAINSHAFT DRIVING GEARS	Backlash	-	-	0.001½ 0.005	0.008	
9	COUPLING GROUP IN BEVEL DRIVE.	Serrations, width	0.185 0.186	0.189½	0.000½ 0.002½	0.005	
		Serrations, width	0.183½ 0.184½	0.180			
10	BEVEL DRIVE GEARS.	Backlash.	-	-	0.004 0.008	0.015	Adjusted by shims.
11	ACCESSORY BEVEL WHEEL & ACCESSORY BEVEL PINION.	Backlash.	-	-	0.004 0.008	0.015	Adjusted by shims.
12	DRIVING BOLTS IN DRIVEN MAINSHAFT FLANGE.	Dia. of holes in gears and mainshaft flange.	0.187½ 0.188 8/10	-	0.000½ 0.002½	-	If max. new clearance is exceed, new bolts are to be fitted. Should this not restore correct clearance the faulty part must be renewed & the old one returned for Salvage.
		Bolts diameter.	0.186½ 0.187				
13	OIL PUMP GEARS IN PUMP CASING	Recess, bore	0.850 0.851	0.855½	0.000½ 0.002½	0.006	
		Oil pump wheel, dia.	0.848½ 0.849½	0.844			
14	OIL PUMP GEARS.	Backlash.	-	-	0.008 0.012	0.020	
15	OIL PUMP GEARS IN CASING-END FLOAT.	Recess, depth	0.200 0.201	0.205½	0.000½ 0.002	0.006	
		Oil pump wheel, thickness.	0.199 0.199½	0.194			
16	OIL PUMP WHEEL SHAFT IN OIL PUMP BODY.	Oil pump body, bore	0.375 0.375½	0.377½	0.000½ 0.001½	0.005	
		Pump wheel shaft, dia.	0.374 0.374½	0.372			
17	OIL SEALS ON MAINSHAFT.	Oil seal to suit shaft, dia.	1.625	-	-	-	Scores on collar maybe removed by polishing or grinding, reduction in diameter allowed down to "Permissible Worn Dimensions."
		Collar, dia.	1.622 1.625	1.612			
18	BALL RACES ON DRIVEN MAINSHAFT.	End float between inner and outer races.	-	-	-	0.008	

Ref No.	Parts and Description.		Dimensions New.	Permissible Worn Dimensions.	Clearances New.	Permissible Worn Clearances.	Remarks.
19.	ACCESSORY BEVEL PINION & PUMP BEVEL PINION.	Backlash.	"	"	0.004 / 0.008	0.015	Adjusted by shims situated between the oil pump body & gearbox casing & also between the flange on the accessory drive housing and gearbox wall.
20	SPHERICAL BEARING BACKLASH.	Backlash.	"	"	0.005 / 0.009	0.012	
21	SPHERICAL BEARING TOOTH CLEARANCE.	Clearance between teeth and bearing.	"	"	0.040 / 0.070	0.030	Clearance decreases with wear.
22	BALL BEARING ON INTERNAL GEAR SHAFT.	End float between inner and outer races.	"	"	"	0.010	
23	INTERNAL GEAR.	Splinoways, width.	0.125 / 0.126	0.128	"	"	For male splines see accessory manufacturer's Schedule of Fits, Clearances and Repair Tolerances.
24	ADAPTER SLEEVE IN DRIVEN MAINSHAFT.	Mainshaft, bore 1.050 / 1.050 6/10 Adapter sleeve, dia. 1.049 1/10 / 1.049 7/10	1.050 / 1.050 6/10 1.049 1/10 / 1.049 7/10	1.054½ 1.045	0.000 3/10 / 0.001½	0.005	
25	ADAPTER SLEEVE IN DRIVEN MAINSHAFT.	Mainshaft serrations (Dimensions over parallel faces) 0.631 8/10 / 0.632 8/10 Adapter sleeve serrations. 0.630 / 0.631	0.631 8/10 / 0.632 8/10 0.630 / 0.631	0.636 0.627	0.000 8/10 / 0.002 8/10	0.005	
26	DRIVING PINION & ADAPTER SLEEVE SPLINES.	Backlash.	"	"	0.002 / 0.005	0.008	
27	INTERNAL GEAR & DRIVING PINION.	Backlash.	"	"	0.002 / 0.006	0.010	

CHAPTER 4

REASSEMBLING.

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CHAPTER 4

REASSEMBLING.

GENERAL.

1. The purpose of this Chapter is to describe in detail the reassembling of the special or high-speed gearbox, Type SG 3/1. General reassembling notes may be found in the first Part of this manual.

REASSEMBLING THE GROUPS.

2. Each group is made up of component parts. These parts must first be assembled into groups before fitting into the gearbox.

Oil filler and breather group.

3. Reassemble the clack valve, the cylindrical gauze filter with its shroud in the oil filler and breather body, and secure them with their respective retaining circlips.

Oil pump group.

4. Insert the driving and driven gears in the pump body and temporarily secure the cover. A circlip on the drive bearing boss retains a scavenge filter.

5. Fitted on top of the pump drive shaft is a bevel pinion with a Woodruff key, and retained by a slotted nut locked by a split pin. Reassemble relief valve.

Accessory drive groups.

6. Reassemble the ball bearings, distance pieces, spacing collars and new oil seals into the counterbores of the bearing housings.

7. Press the bevel pinion, with its integral shaft, into the bore of these components and secure the group together with a circlip on the pinion shaft.

Front cover and mainshaft groups.

8. Press the mainshaft ball bearings in their respective housings and secure the housings in the bores of the front cover. Fit oil seal to driven mainshaft.

9, Fit the mainshafts in their bearings. Secure the double gear, and spur and bevel gears to the driving and driven mainshaft respectively.

Bevel drive group.

10. Fit inner ball bearing, distance piece, bevel gear and outer ball bearing and oil seal in the bevel drive casing. Secure female coupling and "chimney stack" by respective nuts.

11. Reassemble the housings, oil seals, spherical bearings, male coupling and rubber ring into female coupling. Lock this assembly by means of the circlip. Fit drive shaft.

Main casing group.

12. Reassemble the relevant covers, rear ball bearings, etc, in the main casing. Also fit the dipstick with its attendant spring assembly.

REASSEMBLING THE GROUPS INTO THE GEARBOX.

13. Fit the mainshaft and front cover group, securing the ends of the mainshaft by ring nuts and tabwashers, and the front cover by nuts, plain and spring washers. Insert bevel drive shaft in mainshaft bore and secure by nuts.

14. Fit the accessory drive group with their adjustment shims. The flanges are secured by nuts locked by tabwashers.

15. Fit the assembled oil pump in the base of the gearbox and the combined oil filler and breather, locking both groups by nuts, plain and spring washers.

Accessory reduction gear.

16. The pinion adapter is secured in the driven mainshaft bore by the front end ring nut which is locked by a tabwasher.

17. A threaded inwardly-projecting plug in the adapter end bore engages with the driving pinion retaining bolt whose head is locked by a tabwasher.

18. The driving pinion engages with and drives the internal gear fitted in the gear casing which is secured to the front cover by a ring of nuts, plain and spring washers.

CHAPTER 1

TOOLS LIST

Item No.	Rotol Tool No.	Description.
1	TL. 2350	Spanner, open-ended, 2 B.A. x 4 B.A.
9	TL. 2357	Spanner, box $\frac{1}{2}$ in. B.S.F.
15	TL. 2362	Tommy bar, $\frac{1}{4}$ in. dia.
16	TL. 2394	Tommy bar, $\frac{5}{8}$ in. dia.
17	TL. 2438	Pliers for internal circlips.
18	TL. 2439	Pliers for external circlips.
19	TL. 2390	Gear holding fixture.
20	TL. 2393	Turntable assembly fixture.
24	TL. 2539	Adaptor for turntable.
30	TL. 2366	Mandrel (mainshaft)
31	TL. 2367	Box spanner for mainshaft nuts.
32	TL. 2368	Dummy bearings (two).
33	TL. 2369	Mainshaft holding tool.
34	TL. 2370	Drift (mainshaft spacing collars).
35	TL. 2371	Turning hand (mainshaft).
36	TL. 2372	Ball bearing extractor (mainshaft).
37	TL. 2373	Drift (mainshaft) (1 off).
39	TL. 2531	Drift (assemble mainshaft sleeve).
40	TL. 2532	Locking tool for driving mainshaft (backplash checking).
41	TL. 2533	Holding tool for driven mainshaft.
42	TL. 2540	Pad and support (press mainshaft into coupling)
43	TL. 2541	Extractor (withdraw double gear from mainshaft).
44	TL. 2671	Extractor (withdraw shaft sleeve).
45	TL. 2375	Backlash checking tool and extractor for accessory drive groups.
46	TL. 2395	Holding tool for accessory drive groups.
86		Extractor for oil pump drive bevel pinion.
88	TL. 2534	Backlash checking tool for oil pump bevel wheel.
97	TL. 2349	Extractor for gearbox drive.