

AP 112G-1208-13A

(Formerly AP1275A, Vol. 1,
Sect. 26, Chap. 10)

TACHOMETER GENERATORS TYPE KGA 0200 SERIES

GENERAL AND TECHNICAL INFORMATION ILLUSTRATED PARTS CATALOGUE

BY COMMAND OF THE DEFENCE COUNCIL



Ministry of Defence

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Publications authority: ATP/MOD(PE)

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the channel prescribed for the purpose in:
AP(N)140 Chap.1 Annex A (RN)
AP100B-01 Order 0504 (ARMY and RAF)

AL1, July, 76

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AMENDMENT RECORD SHEET

A.P. 112G-1208-1

Record the incorporation of an amendment list by inserting the date of making the amendments and by signing in the appropriate column.

A.L.No.	AMENDED BY	DATE
1	<i>E. V. Curtis</i>	<i>20/6/86</i>
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Chapter 1

GENERAL DESCRIPTION

INTRODUCTION

1. The tachometer generators in the Type KGA 0200 series are all basically similar in construction and are identical in operation, variations peculiar to each type of generator are described in subsequent chapters. The installation and servicing of the generators is similar in each instance. The generators are mounted on aircraft engines to provide the electrical output required to operate the appropriate tachometer indicator.

DESCRIPTION

GENERAL

2. Tachometer generators in this series comprise, basically, a permanent magnet, a 3-phase stator and an output plug or terminal block, housed in a three piece body. The generator body consists of a stator housing located between two end castings and held together by six bolts, the heads of which are lockwired together. The 3-phase, star connected stator is housed between the two end casting, the stator leads being attached to either a terminal block, or output plug.

ROTOR

3. The permanent magnet rotor, positioned coaxially within the stator, consists of a short cylinder of magnetic alloy attached to a rotor shaft, which is supported by Oilite self-lubricating bearing bushes housed in the two end castings. The rear face of the rotor bears against a sleeve, which enters the bore of the Oilite bearing bush in the rear casting. The rear end of the rotor shaft is threaded to accept a 2 BA nut and a locknut, which retain the bush in position. A driving disc abutts the front face of the rotor, restricting its lateral movement.

DRIVE SHAFT

4. A drive shaft connects with the forward end of the rotor shaft and projects through the front end of the casting. The projecting end of the drive shaft is of square section and engages with the squared drive member in the engine, or the end of a flexible drive.

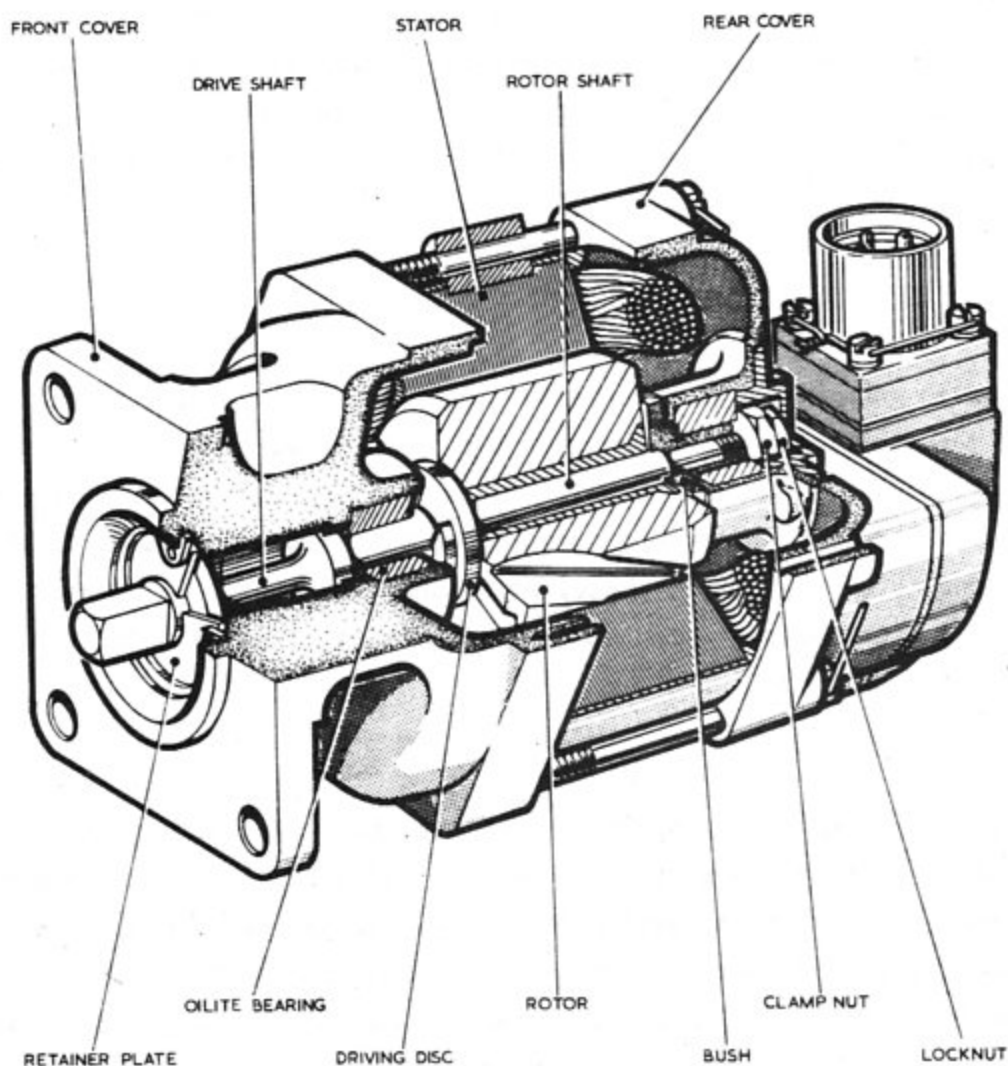


Fig.1 Tachometer generator - cutaway view (direct drive)

OPERATION

5. Rotation of the tachometer generator rotor, by the engine, induces an electrical current in the generators stator windings, this current is fed via the output plug and an inter-connecting lead, to the appropriate tachometer indicator.
6. The output frequency of the generator is governed by the speed of rotation of the generator rotor, which is directly proportional to the engine speed; hence the generators output frequency is proportional to the engine speed.

INSTALLATION

7. The tachometer generator can be mounted either directly onto the engine, providing a direct drive between the engine and the rotor shaft, or near the engine, where the drive is transmitted by a flexible drive shaft. The squared drive on the engine engages either the squared end of the rotor shaft, or the end of the flexible drive. A jointing washer is interposed between the engine and the generator mounting faces and the generator is secured to the engine by three bolts passing through the mounting flanges on the generator body.
8. When the generator is to be driven by a flexible drive, an adaptor is attached to the generator casing. This adapter consists of a sleeve mounted in a bush bearing, which is, in turn, carried in a bearing housing. The bearing housing is secured to a support bracket, which is attached to the front face of the generator casing by four 1/4 in B.S.W. bolts, fitted with plain nuts. The squared end of the drive shaft is inserted into a squared hole in the rear end of the sleeve. A similar squared end on the flexible drive enters a squared hole in the front end of the sleeve and is retained by a nut fitting over the screwed end of the bearing housing.
9. Before installing the generator, ensure that the mounting faces of the generator and the engine are clean and undamaged; also ensure that the squared shaft engages the squared drive and check the direction of rotation of the rotor shaft. For further information on the mounting of the generator, reference should be made to the Volume 1 of the Air Publication covering the engine concerned. Where a flexible drive shaft connects the

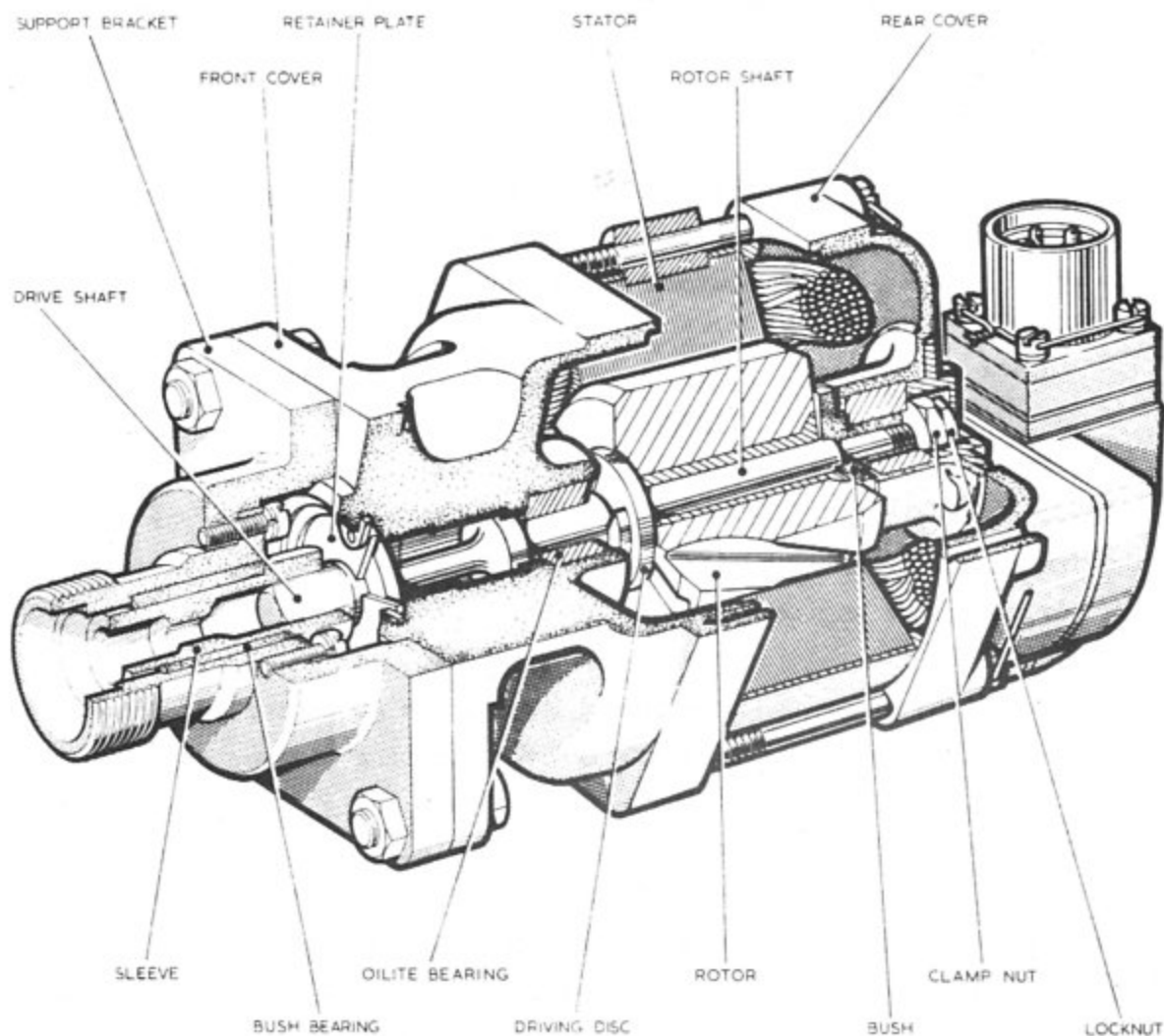


Fig.2 Tachometer generator - cutaway view (with flexible drive adapter)

generator to the engine, reference should be made to A.P.1275A, Vol. 1, Sect.26, Chap. 2.

10. Where the rotor shaft is driven in a clockwise direction; when viewed from the driving end, pins A, B and C (or terminals 1, 2 and 3) of the generator must be connected to the corresponding pins (or terminals) of the indicator. If the rotor shaft is driven in a counter-clockwise direction pins A, B and C (terminals 1, 2 and 3) should be connected to pins A, C and B

(terminals 1, 3 and 2) on the indicator. Should it be necessary to operate the generator while it is disconnected from the indicator, care must be taken to prevent short circuits between the cores of the inter-connecting cable.

SERVICING

11. The rotor shaft is supported by two Oilite self-lubricating bush bearings and, therefore, re-lubrication is not required during normal service life. Routine servicing is limited to a periodic examination of the electrical cable and generator casing for damage and security of nuts and screws. Where a flexible drive is fitted routine servicing should be carried out in accordance with para. 12.

12. At routine servicing periods the flexible drive should be serviced as follows:-

- (1) Disconnect the flexible drive from the generator adapter and the engine.
- (2) Bend up one side of the slip washer and disengage it from the flexible shaft.
- (3) Remove the flexible shaft from the outer casing and clean both the shaft and the casing using gasoline, non-leaded.
- (4) Examine the outer casing for damage and the flexible shaft for kinks and frayed or worn wires in the windings.
- (5) Ensure that the squared end connectors are firmly secured to the flexible shaft.
- (6) A flexible shaft which fails any of the above checks is to be considered as unserviceable and a new drive must be fitted in its place.
- (7) Pack the outer casing with grease XG-275 and insert the flexible shaft into the outer casing.
- (8) Refit the slip washer and flatten to effect retention on the shaft.
- (9) Reconnect the flexible drive to the engine and the adapter.

13. Prior to installation, or at any time the serviceability of the generator is suspect, carry out the tests specified in Chapter 2, these tests should also be carried out at re-inspection periods at Equipment Depots. If a generator is unserviceable it must be returned, in accordance with current servicing instructions and a new generator fitted in its place.

Chapter 1-1

TACHOMETER GENERATORS

TYPE KGA 0201 AND KGA 0203

(Incorporating modifications up to and including Mod.Inst.A.507)

LEADING PARTICULARS

Max. dia.	...	...	...	...	...	...	...	3.3/16 in
Weight (KGA 0201)	...	...	...	...	...	...	...	3 lb 2 ozs
(KGA 0203)	...	...	...	...	...	...	...	3 lb 14 ozs
Speed range	...	...	...	...	...	...	...	0 to 5000 rev/min
Ref. No. (KGA 0201)	...	...	...	...	...	...	...	6A/4759
(KGA 0203)	...	...	...	...	...	...	...	6A/3056

INTRODUCTION

1. The tachometer generators, Type KGA 0201 and KGA 0203 are identical in operation and are virtually identical in construction; the only difference being that the Type KGA 0201 is connected directly to the drive member in the engine, whereas the Type KGA 0203 is driven by a flexible drive.
2. Both types are fitted with a terminal block output connection and the installation and servicing procedures are similar in each instance. A general description of this type of tachometer generator is contained in Chapter 1.

SERVICING

3. Lubrication is not required during normal service life. Routine servicing is limited to periodic examination of the electrical cable, generator casing and flexible drive (where fitted), as described in Chap. 1.
4. Prior to installation, or at any time the serviceability of the generator is suspect, carry out the tests specified in Chapter 2, these tests should also be carried out at re-inspection periods at Equipment Depots. If a generator is unserviceable, it must be returned, in accordance with current servicing instructions and a new generator fitted in its place.

MODIFICATIONS

5. Modifications applicable to the generators described in this chapter are listed in Table 1.

TABLE 1
List of Modifications

Manufacturers Mod.No.	Mod. Inst. No.	Brief Description
01		Prevention of magnet slip on shaft
02		Introduction of loctite to magnet shaft assy., lock- nuts and threads of terminal block screws.
03		Stator locking
	A.507	Introduction of improved retainer plate on generator drive shaft.

Chapter 1 - 2

TACHOMETER GENERATORS

TYPE KGA 0202 and KGA -205

(Incorporating modifications up to and including Mod. No. 04)

LEADING PARTICULARS

Max. dia.	...	...		...	...	...	...	3.3/16 in
Weight (KGA 0202)	...	...	...	...	...	...	...	3 lb 3 ozs
(KGA 0205)	...	...	...	...	...	...	...	3 lb 3 ozs
Speed range	...	...	...	...	...	...	...	0 to 5000 rev/min
Ref. No. (KGA 0202)	...	...	...	...	...	...	...	6A/2665
(KGA 0205)	...	...	...	...	...	...	...	6A/12767

KGA 0202 = 6A/4333052

INTRODUCTION

1. The tachometer generators, Type KGA 0202 and KGA 0205 are identical in operation and are virtually in construction; the only difference being that the Type KGA 0202 has a 4-pin Plessey output plug, whereas the Type KGA 0205 has a 3-pin Cannon angled output plug.
2. Both types are connected directly to the drive member in the engine and the installation and servicing procedures are identical in each instance. A general description of this type of tachometer generator is contained in Chapter 1.

SERVICING

3. Lubrication is not required during normal service life. Routine servicing is limited to periodic examination of the electrical cable and generator casing, as described in Chapter 1.
4. Prior to installation, or at any time the serviceability of the generator is suspect, carry out the tests specified in Chapter 2, these tests

should also be carried out at re-inspection periods at Equipment Depots. If a generator is unserviceable, it must be returned, in accordance with current servicing instructions and a new generator fitted in its place.

MODIFICATIONS

5. Modifications applicable to the generators described in this chapter are listed in Table 1.

TABLE 1
List of Modifications

Manufacturers Mod. No.	Mod. Inst. No.	Brief description
01		Prevention of magnet slip on shaft.
02		Introduction of loctite to magnet shaft assy., lock-nuts and threads of terminal block screws (where fitted).
03		Stator locking
04		Introduction of improved retainer plate on generator drive shaft.

Chapter 2

STANDARD SERVICEABILITY TESTS

for

TACHOMETER GENERATORS

TYPE KGA 0200 SERIES

INTRODUCTION

1. The tests detailed in this chapter are to be applied to the above-mentioned instrument immediately prior to installation in aircraft or if serviceability is suspect. Any tolerance specified are not to be exceeded.

TEST EQUIPMENT

2. The following test equipment is required:-

- (1) Tester, insulation resistance, Type C (Ref. No. 5G/152)
- (2) A serviceable, compatible tachometer indicator
- (3) Dual tachometer tester (Ref. No. 6C/3000, 2391 or 2392)

Alternative to item (3)

- (4) Tachometer tester, bench type (Ref. No. 6C/1879 or /1880)

TEST PROCEDURE

Insulation resistance test - room temperature

3. Before the generator undergoes the synchronization and ranging tests, measure the insulation resistance between pins A, B and C (or terminals 1, 2 and 3) of the plug and the body in turn. The resistance in each instance must not be less than 20 megohms.

SYNCHRONIZATION AND RANGING TEST

4. Turn the generator by hand to ensure that it rotates freely. Mount the generator on the tester and connect the generator to the associated indicator. Switch on the test equipment, and allow the generator and indicator to run at approximately 2/3rds of the full range of indicator for 10 minutes. At the end of the exercising run, slowly reduce the speed to zero.

5. To check the synchronization of the generator and indicator, start test equipment and slowly increase the speed from zero. Check the speed at which the generator and indicator synchronize; this will be apparent by cessation of pointer oscillation, and must occur at the speed stated in the standard serviceability test applicable to the indicator being used.
6. Provided that the generator can be driven freely, and the generator and indicator synchronize at the specified speed, the generator will not possess any inherent inaccuracies, since it is frequency and not voltage which is being measured.

INSULATION RESISTANCE TEST - HOT

7. Immediately after the completion of the synchronization and ranging tests, measure the insulation resistance between pins A, B and C of the plug and body, in turn; or terminals 1, 2 and 3 and the body, in turn. The resistance in each instance must not be less than 5 megohms.

TACHOMETER GENERATOR TYPE KGA

6A/433-3052

MEMORANDUM OF INSTRUCTIONS (R. N.)

1) CONTENTS

This schedule contains a list of spare parts applicable to the equipment

2) COLUMN 1

The Item Number in Col. 1 is for sponsor departmental use.

3) DEMANDS

Items marked N. P. in Col. 6 are not provisioned as spares, but are included to assist identification of components. Requirements for these items can usually be met by demanding:-

- (i) Next Highest assembly.
- (ii) The individual components of the item required.

If requirements for N. P. items cannot be met by (i) or (ii), demands are to be submitted after approval by the Engineer Officer, on Form S130, to M.O.D. (N) for approval.

On demands the full Reference Number shown in Col. 2 is to be used, prefixed by the appropriate Management Code where indicated in the Interservice Index.

- (b) Parts not qualified by the numeral 2 in Col. 7 are available 4th line only.
- (c) Parts qualified by the symbol LM in Col. 7 are to be manufactured by consumer units.

4) MODIFICATIONS

This publication will be amended at convenient intervals. Users should use this book in conjunction with appropriate modification leaflet.

5) COMPILATION OF TEXT (Col. 4)

The multi-indentation system has been used. The indentation is in accordance with the following outline:-

- (a) Indent 1. Main Units
- (b) Indent 2 { Sub-Assemblies
Detail parts main units.
- (c) Indent 3 Breakdown of Sub-Assembly.
- (d) Indent 4, 5, 6, 7, 8 Further breakdown
- (e) Attaching parts are listed after the indents and refer to the item directly above.

6) CLASS OF EQUIPMENT

Letters denoting Class of Stores are defined as follows:-

- 'C' Consumable items
- 'CM' Consumable with a limited repair capability
- 'PA' Permanent attractive
- 'PN' Permanent. Repairable at 2nd Line only
- 'PR' Permanent. Repairable at 2nd Line and/or 4th Line.

- 7) The Item Number and Reference Number are repeated on the Interservice Index sheet. This sheet also incorporates Management Code, Usage Code and Interchangeability Code (I.C. Y.)

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MAIN EQUIPMENT										TACHOMETER GENERATOR TYPE KGA 0202 REF 6A/433-3052									
(1) Item No.	(2) Ref. No.	(3) Part No.	(4)							(5) No. Off	(6) Remarks	(7) C of E	(8) Plate/ Cct Ref						
			1	2	3	4	5	6	7					Description					
1	6A/433-3052	KGA 0202								TACHOMETER GENERATOR	1		2P						
2	6X/901-6742	PLESSEY 2CZ84870								. PLUG ELECTRICAL	1		2C						
3	6A/71596	KGA 1104								. SCREW 6BA	4		2C						
4	6A/3631	SPW016								. WASHER 6BA s.c. spring phos. bronze black oxy.	4		2C						
5	6A/11598	SA 13747								. BOX TERMINAL	1		2C						
6	6A/11595	KGA 1103								. SCREW 6BA	4		2C						
7	6A/3731	SPW016								. WASHER 6BA sc spring phos bronze black oxy	4		2C						
8	6AA/4491	P.5790								. WASHER TERMINAL BOX	1		2C						
9	6A/11597	P.2777								. COVER	1		2C						
10	6A/11600	30-233-259-33								. SCREW 8BA x 7/32in.lg. csh.hd. brass black oxy.	3		2C						
11	6A/621-0392	P.4366								. CIRCLIP	1		2C						
12	6A/9469	KGA-A247								. PLATE ASSEMBLY RETAINER	1		2C						
13	6A/621-0395	P.6965								. SHAFT DRIVE	1		2C						
14	6A/16307	S.A. 5320								. COVER ASSEMBLY FRONT	1		2C						
15	6A/11591	GA.1061								. SCREW COVER	6		2C						
16	6A/11599	SPW.006								. WASHER	6		2C						
17	6A/11593	KGA-A221								. STATOR ASSEMBLY	1		2C						
18	6A/11594	KGA.1082								. BUSH	1		2C						
19	6A/621-0401	SPN 006								. NUT 2BA	1		2C						
20	6A/621-0402	SPN 028								. NUT LOCK 2BA	1		2C						
21	6A/11590	GA.1007								. BUSH	1		2C						
22	6A/11592	KGA-A215								. SHAFT ASSEMBLY MAGNET	1		2C						
23	6A/16308	SA.5352								. COVER ASSEMBLY REAR	1		2C						
<u>MISCELLANEOUS</u>																			
	34B/942-5139	XG276								. GREASE TO D.T.D. 900/4439	A/R		2C						