

Chapter 25

STARTER MOTOR, DELCO-REMY, TYPE 1108234

LIST OF CONTENTS

	Para.		Para.
<i>Introduction</i>	1	<i>Cleaning</i>	8
Description	2	<i>Detailed examination</i>	9
Installation	4	<i>Insulation resistance test</i>	13
Servicing	5	<i>Assembly</i>	15
<i>Dismantling</i>	6	<i>Brush bedding</i>	16
<i>Drive end bearing and seal ring</i>	7	<i>Testing</i>	17

LIST OF ILLUSTRATIONS

	Fig.
<i>Sectioned view</i>	1
<i>Circuit diagram</i>	2

LIST OF APPENDICES

	App.
<i>Standard serviceability test</i>	A

LEADING PARTICULARS

Starter motor, Delco-Remy, Type 1108234	Ref. No. 136H/438
<i>Operating voltage</i>	24V d.c.
<i>Max. current consumption (Full load)</i>	250A
<i>Min. carbon brush length</i>	0.44 in.
<i>Brush spring pressure</i>	24 ± 1 oz.
<i>Min. commutator diameter</i>	1.6 in.
<i>Mica undercut</i>	0.01 to 0.02 in. deep 0.045 in. max. wide
<i>Max. commutator eccentricity to shaft</i>	0.005 in.
<i>Rotation (viewed from drive end)</i>	clockwise
<i>Weight</i>	16.5 lb.
<i>Overall dimensions</i>	
<i>Length (to end of drive shaft)</i>	7.72 in.
<i>Diameter</i>	4.44 in.

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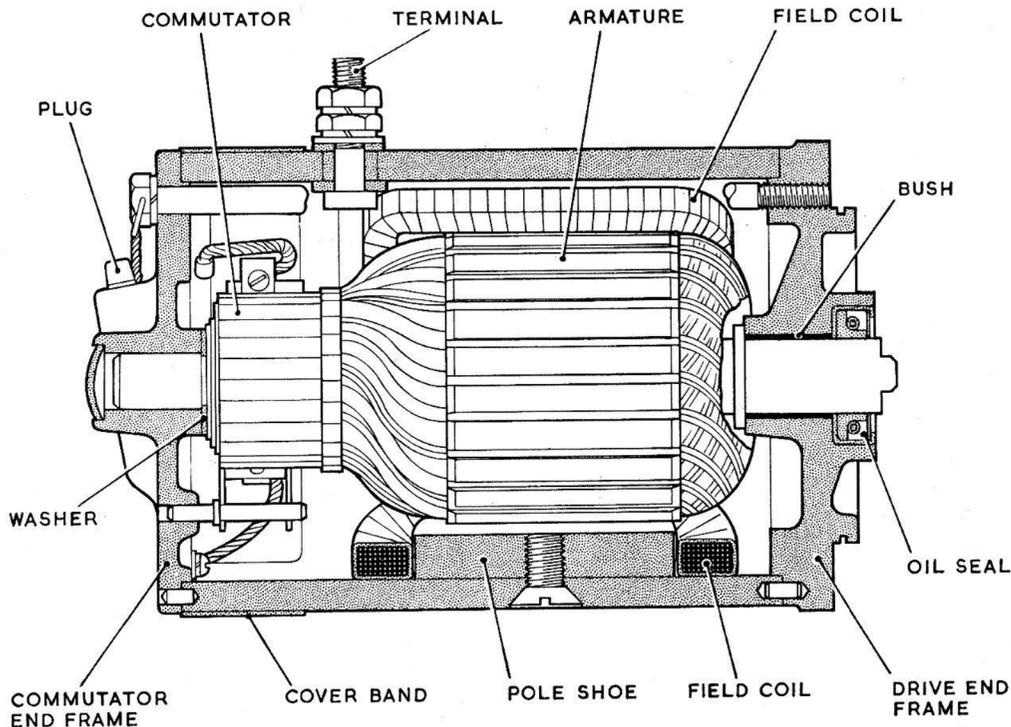


Fig. 1. Sectional view

Introduction

1. The Delco-Remy Type 1108234 starter motor is designed for electric starting of small aircraft engines. There is no provision for hand starting.

DESCRIPTION

2. The starter is a four brush, four pole compound wound electric motor. A single supply terminal is fitted in the top of the yoke, the negative supply being returned through the motor frame. The armature revolves in a plain bush in the drive end frame, and directly in a bore in the commutator end bracket. A hinged cap oiler is fitted in the commutator end cover to oil the commutator end bore.

3. The drive end frame also incorporates an O-ring and conventional lip-type seal to prevent ingress of oil mist from the crankcase when in use. The lip seal is pressed into the drive end bracket with the lip of the seal bearing on the armature shaft. A sectioned view is given in fig. 1, and a circuit diagram in fig. 2.

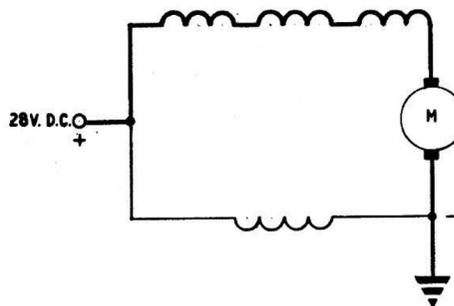


Fig. 2. Circuit diagram

INSTALLATION

4. The starter is installed to the appropriate engine crankcase by means of two fixing lugs incorporated in the drive end frame, in which are drilled two 0.404/0.414 in. diameter holes. When installed, the oiler plug should point upwards.

SERVICING

5. Servicing in situ is limited to a functional test and examination for external

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mechanical damage, cleanliness, and for security of attachment to the engine. With the item removed to a servicing bench, the following dismantling procedure may be adopted.

Dismantling

6. (1) Mark the commutator end frame and drive end frame position with respect to the yoke and field coil assembly.
- (2) Remove the brush cover retaining screw and remove the brush cover.
- (3) Note the position of the field coil connections, remove the screws and washers from the brush and field coil leads and lift out the brushes.
- (4) Remove the locking wire from the two through bolts, unscrew the bolts and remove from the commutator end frame.
- (5) Remove the commutator end frame complete with brush boxes. Remove the commutator end sealing washer from the armature shaft.
- (6) Separate the drive end frame complete with armature from the yoke and field coil assembly. Remove the drive end frame from the armature shaft.

Drive end bearing and seal ring

7. To remove the drive end bearing and seal ring proceed as follows:—

- (1) Pre heat the drive end frame to approximately 90 deg. C.
- (2) Invert the drive end frame so that the seal ring is at the bottom and using a suitable hand press and drift, press out the oil seal and bearing brush.

Note . . .

When replacing the oil seal, ensure that the seal lip faces the outside of the drive end frame.

Cleaning

8. Large deposits of grease or oil may be cleaned off using a soft bristle brush dipped in Gasoline, no lead, (Ref. No. 34C/9100454). Light oil deposits may be removed with a clean rag moistened in gasoline. Carbon dust and other small particles may be removed from the armature and field windings by using a clean, dry air blast. Do not soak the field coils or armature windings unnecessarily.

Detailed examination

Armature

9. Examine the armature windings for signs of overheating and damaged insulation. Examine the commutator for thrown solder, wear, scratches, and burns. The commutator may be skimmed to within the limits contained in the leading particulars by using the commutator/slipring surfacing and mica undercutting machine as detailed in A.P. 4343S, Vol. 1, Sect. 13, Chap. 11. Examine the armature shaft for wear on the bearing surfaces. Test the armature windings by either using a growler or voltage drop tester.

Drive end frame

10. Examine the drive end frame for mechanical damage, and the bearing bush for wear or distortion. Discard the oil seal.

Commutator end frame and brushgear

11. Examine the commutator end frame for mechanical damage and the bearing surface of the endframe for scoring or evidence of wear. Examine the positive brushbox for deterioration, cracking or overheating. Check the brush spring pressure which should be 24 oz. min. and measure the carbon brush length which should be not less than 0.44 in. Ensure that the oil plug and wick are serviceable.

Field coil assembly

12. Examine the field coil assembly for signs of overheating, deterioration of insulation, cleanliness, and for security of attachment to the pole shoes. Examine the supply terminal for security, split or broken insulation, and serviceability of the screwthreads.

Insulation resistance test

13. Before reassembly, with the field coils disconnected from the frame, test the insulation resistance of the armature to shaft, field coils to yoke, and positive brushbox to the commutator end frame. Using a 250V insulation resistance tester Type C, the reading obtained should be not less than 20 megohms.

14. Should the minimum reading for the armature and field coil assembly be unobtainable, clean the item thoroughly in gasoline, no lead, and allow to air dry for several hours in a warm, well ventilated room.

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Complete the drying process by baking in an air circulated oven at a temperature of approximately 176 deg. F (80 deg. C) for a minimum of four hours. Remove the armature from the oven, allow to cool, and re-test the insulation resistance.

Assembly

15. (1) Position the drive end frame over the armature drive shaft.
- (2) Slide the yoke and field coil assembly over the armature, ensuring correct alignment with the drive end frame.
- (3) Replace the commutator end sealing washer over the armature shaft and replace the commutator end frame ensuring correct alignment with the yoke and field coil assembly.

Note . . .

It may be necessary to remove the oiler wick to prevent fouling of the armature shaft in the bearing bore. Ensure that the brush boxes do not scratch the commutator.

- (4) Replace the two through bolts

complete with locking washers, and tighten. Wirelock the bolts.

- (5) Replace the carbon brushes in their correct boxes and connect each brush lead and field coil lead.

Note . . .

The negative brush is connected direct to the commutator end frame.

- (6) Lubricate the oil wick with engine oil W100. Ensure that the wick bears on the bearing shaft.

Brush bedding

16. Brush bedding should be effected in accordance with A.P.4343, Vol. 1 and Air Diagram 7903. A blast of cooling air should be applied to the motor for the brush bedding run. When the brushes are correctly bedded, replace the brushbox cover band.

Testing

17. The starter may be tested in accordance with the standard serviceability test, Appendix A to this chapter.

Appendix A

STANDARD SERVICEABILITY TEST for STARTER MOTOR, DELCO-REMY, TYPE 1108234

Introduction

1. The following tests may be applied to ascertain the serviceability of the starter.

heating is liable to cause serious damage to the motor. A minimum cooling off period of 2 minutes must be allowed between tests.

TEST EQUIPMENT

2. The following test equipment will be required:—

- (1) Variable 12-24V, 250A d.c. supply.
- (2) Ammeter 0-250A d.c. (Input current).
- (3) Voltmeter 0-25V d.c. (Input voltage).
- (4) Stroboscope Ref. No. 6H/2001.
- (5) Suitable torque test set.
- (6) Insulation resistance tester, Type C. Ref. No. 5G/152.

No load test

4. Hold the motor in a suitable bench clamp and connect the variable d.c. supply. Set the supply to 22.9V and switch on. Note the values of input current and armature speed. The input current should be not more than 52A max., and the armature speed should be between 4,500 and 6,000 rev./min

5. During this test ensure that there is no excessive vibration. Should vibration be evident, it is a general indication of wear in the bearings.

TEST PROCEDURE

3. Note . . .

The following tests should not be applied for more than 30 seconds or over-

Torque test

6. Connect the starter to a suitable torque tester and apply a torque of 12 lb. ft. Reduce the supply voltage to 12V d.c. and switch on. The maximum input current should be not more than 250A.

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