12-VOLT DYNAMOS

(Models C39PV, C39P, C40, C40/1, C40A, C40L, C40LA, C40T, C42, C45PV, C45P, C47 and C48)

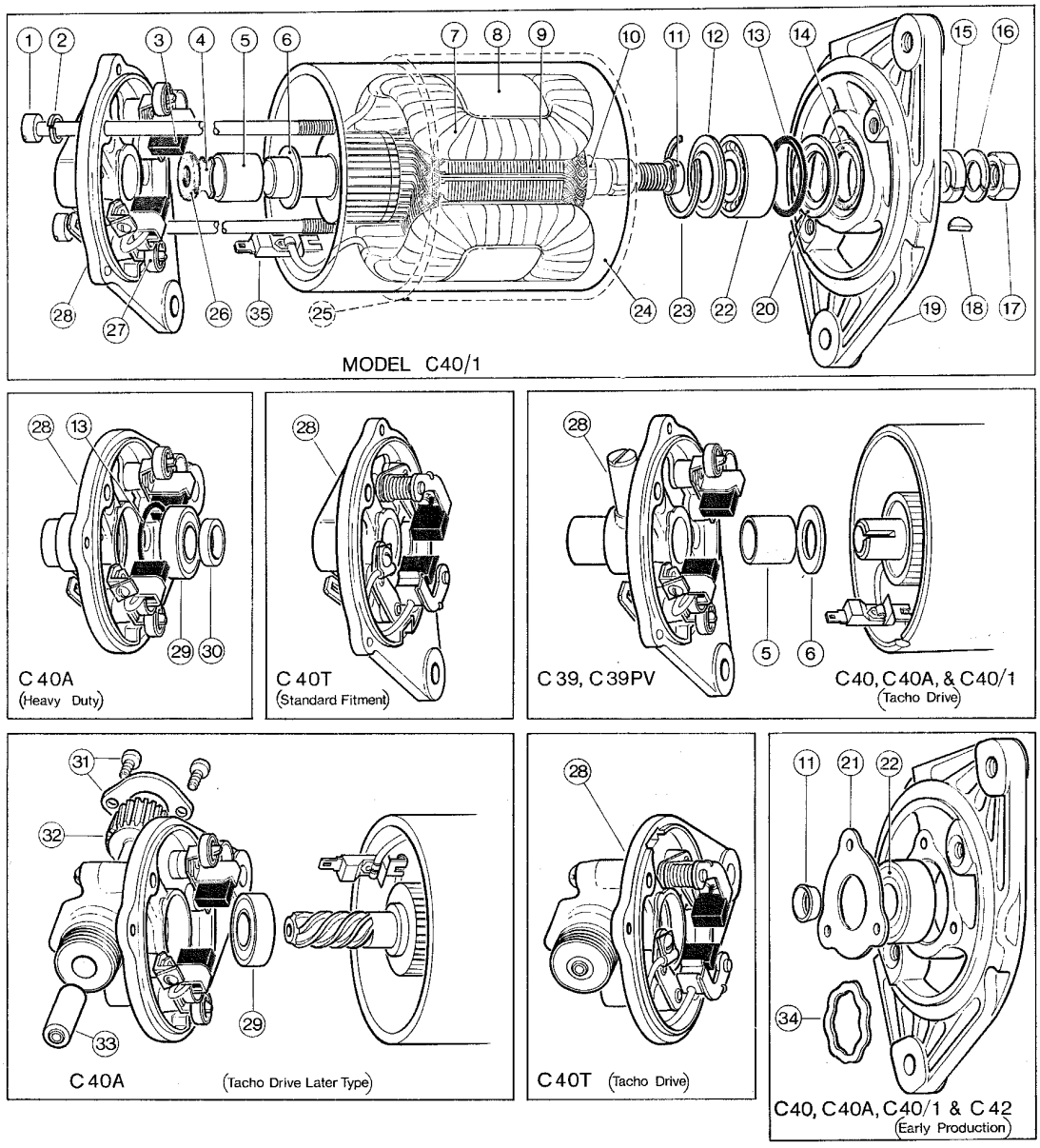
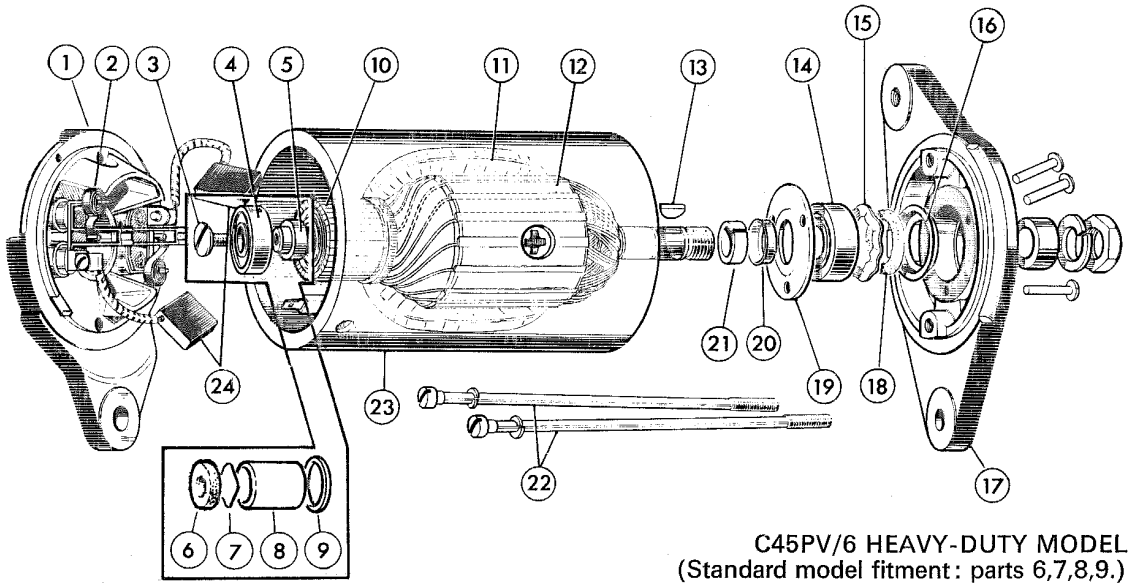


Fig. 1 Typical generator dismantled (showing alternative fittings)

1 Through bolts
2 Spring washer
3 Carbon brushes
4 Felt-oiler retainer
5 Bearing bush
6 Thrust washer
7 Field coils
8 Pole shoes
9 Armature
10 Bearing collar
11 Bearing collar thrust cup
12 Retaining plate
13 O'ring seal
14 Felt ring
15 Pulley spacer
16 Spring washer
17 Pulley fixing nut
18 Woodruffe key (pulley fixing)
19 Bracket, drive-end
20 Felt ring retainer
21 Bearing plate
22 Bearing, drive-end
23 Circlip, bearing retaining
24 Yoke, non-stepped
25 Yoke, stepped
26 Felt oiler
27 Brush springs
28 Bracket, commutator-end
29 Ball bearing (heavy duty)
30 Distance collar
31 Plate and screws
32 Worm wheel
33 Porous bronze bush
34 Corrugated washer
35 Field terminal

12-Volt Dynamos

(Models C39PV, C39P, C40, C40/1, C40A, C40L, C40LA, C40T, C42, C45PV, C45P, C47 and C48)



C45PV/6 HEAVY-DUTY MODEL
(Standard model fitment: parts 6,7,8,9.)

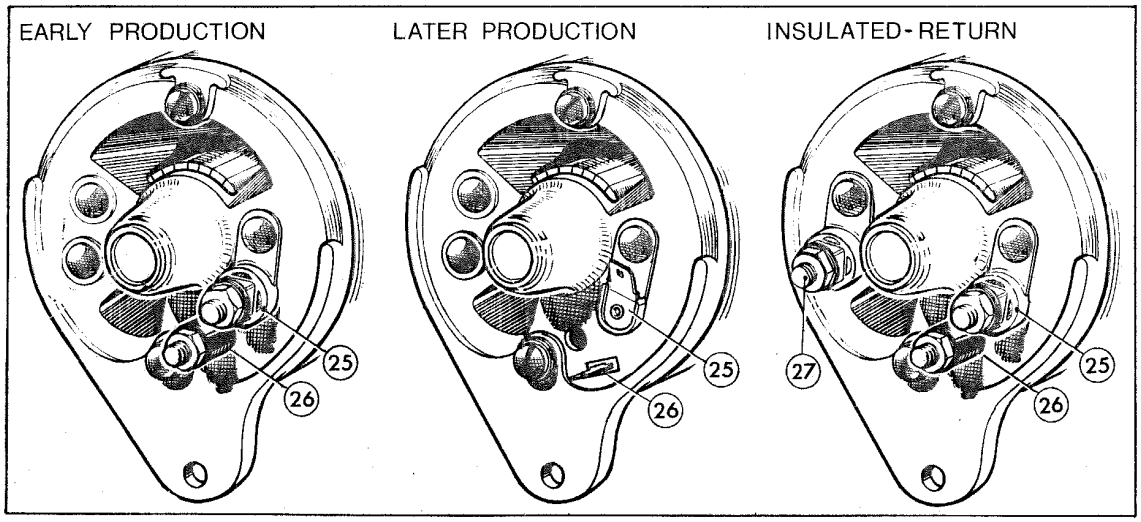


Fig. 2 Dynamo Model C45PV/6

1 Bracket assembly, commutator-end
2 Brush springs
3 Bearing retaining screw
4 C.E. bearing
5 Bearing collar
6 Felt-oiler
7 Felt-oiler retainer
8 Bearing bush
9 Thrust washer
10 Commutator
11 Field coils
12 Armature
13 Woodruffe key
14 Bearing, drive-end
15 Corrugated washer
16 Retaining cup
17 Bracket, drive-end
18 Felt ring
19 Bearing retaining plate
20 Bearing collar thrust cup
21 Bearing collar
22 Through bolts
23 Yoke
24 Carbon brushes
25 Main output terminal 'D'
26 Field terminal 'F' (small)
27 Insulated-return terminal

12-Volt Dynamos

(Models C39PV, C39P, C40, C40/1, C40A, C40L, C40LA, C40T, C42, C45PV, C45P, C47 and C48)

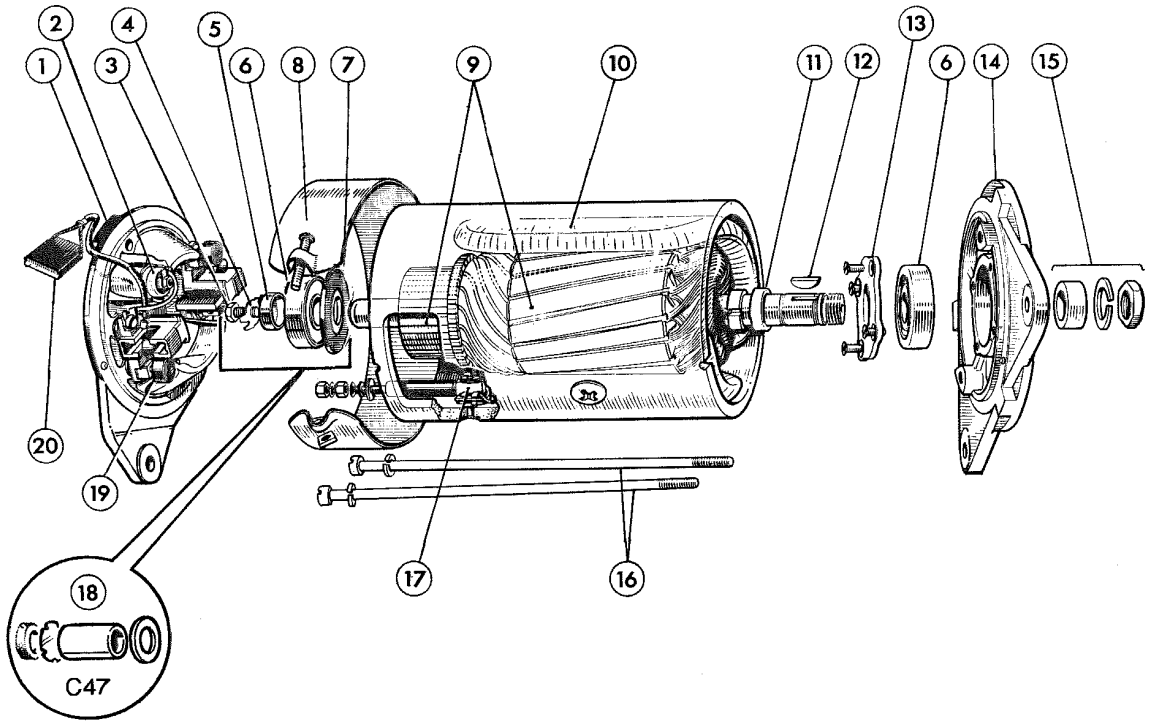


Fig. 3 Heavy-duty dynamos, Models C47 and C48

1 Bracket assembly, commutator-end
2 Radio suppression capacitor
3 Bearing retaining screw
4 Locking plate
5 Locking cup
6 Ball bearing(s)
7 Thrust washer
8 Bandcover, fixing screw and nut
9 Commutator/armature
10 Field coils
11 Bearing spacing collar
12 Woodruffe key (pulley fixing)
13 Bearing retaining plate with screws
14 Bracket, drive-end
15 Spacing collar, spring washer and nut (pulley fixing)
16 Through bolts
17 Field coil terminal
18 Felt-oiler, retainer, bush and thrust washer
19 Springs
20 Brushes

1. GENERAL

These dynamos are two-pole two-brush machines and the field circuit is shunt-connected and controlled by a separate control box.

Two types of control boxes are used in conjunction with these dynamos:

(i) Compensated Voltage Control. (See PART B, SECTION 4).

(ii) Current Voltage Control. (See PART B, SECTION 5).

The use of either type of control box depends on the vehicle application and the electrical loading likely to be imposed on the dynamo and battery. Current Voltage Control is superior to Compensated Voltage Control.

Model Interpretation

Prefix C: Concentrically mounted armature.
39: 3.9 in. dia. yoke
40: 4.0 „ „ „
42: 4.2 „ „ „
45: 4.5 „ „ „
47: 4.7 „ „ „
48: 4.8 „ „ „

Suffix P : Two-pole field.
„ PV: Two-pole field and ventilated end brackets.
„ A : Non-ventilated end brackets.
„ L : Long yoke.
„ LA: Long yoke and non-ventilated end brackets.
„ T : Trigger-type brushgear.
„ /1 : Extruded (non-welded) stepped yoke.

12-Volt Dynamos

(Models C39PV, C39P, C40, C40/1, C40A, C40L, C40LA, C40T, C42, C45PV, C45P, C47 and C48)

2. ROUTINE MAINTENANCE

(a) Driving Belt Adjustment

Occasionally check the general condition and tightness of the fan belt. If the dynamo driving pulley can be made to slip when turned by hand, the belt needs adjusting. Adjust the tension of the belt by first slackening the dynamo fixing bolts and strap, then swivel the dynamo to obtain approximately $\frac{5}{8}$" (0.62" or 16 mm) movement of the belt when pressed with the thumb at the longest point between pulleys.

(b) Lubrication

In the majority of cases, the armature shaft bearings comprise a ball bearing at the drive-end and a bearing bush at the commutator-end. Other generators (tachometer and heavy-duty applications) incorporate a ball bearing at the commutator-end as well as at the drive-end.

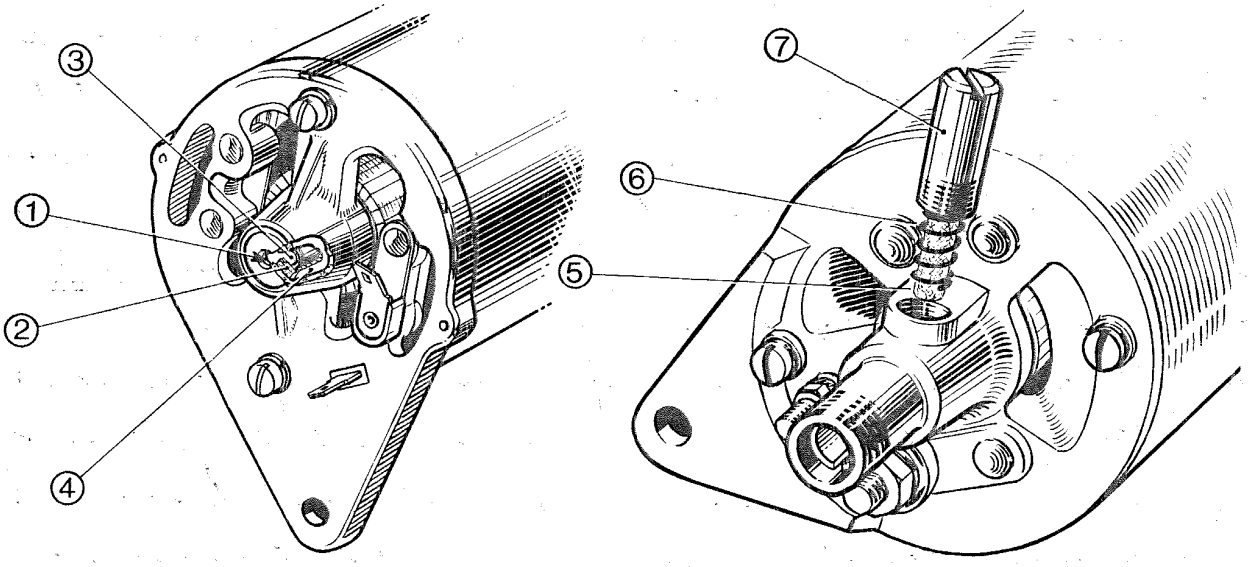


Fig. 4 Lubricator in commutator-end bracket

1 Oil injection hole
2 Felt-oiler
3 Felt-oiler retainer
4 Bearing bush
5 Felt pad
6 Spring
7 Lubricator cap

No routine lubrication of ball bearings is necessary, since these are packed with sufficient grease to provide adequate lubrication of the bearing until major overhaul of the dynamo becomes necessary.

In the case of the commutator-end, a bearing bush is incorporated which needs routine lubrication every 6 months or, alternatively, 6,000 miles cars and light commercial vehicles and 700 running hours tractors and industrial engine applications. Use a force-feed oil can and inject clean engine oil sparingly in the small hole marked 'OIL' incorporated in the end-face of the bearing bush housing of the commutator-end bracket (see Fig. 4a). Alternatively, when a screw-type lubricator is incorporated (see Fig. 4b), unscrew the lubricator assembly from the bracket, remove the felt pad and spring from the lubricator cap, half fill the lubricator cap with high melting point grease and, after replacing the felt pad and spring, refit the lubricator assembly to the bracket.

(c) Inspection of Brushgear and Commutator

To avoid unnecessary failure of the dynamo due to normal wearing of the brushes, the brushgear and commutator should be inspected every 2 years or, alternatively every 24,000 miles cars and light commercial vehicles and 2,800 running hours tractors and industrial engine applications. (Servicing the brushgear and commutator is dealt with in 4c, paras. i, ii and iii. Recommended procedure for engaging the brushes on the commutator, when re-fitting the commutator-end bracket, is dealt with in 5c Reassembly.)

3. TEST DATA (Ambient temperature 20°C, 68°F)

Model	Nominal Voltage	Cut-in Speed (r.p.m.) (max.)	At Dynamo (volts)	Max. Cont. Output (amps)	At r.p.m. (max.)	At Dynamo (volts)	Field Resistance (ohms)
C39PV	12	1200	13	17	2100	13.5	6.1
C39PV/2	12	1200	13	19	2150	13.5	6.1
C39P and C39P/2	12	1200	13	11	1700	13.5	6.1
C40 and C40/1	12	1525	13	22	2335	13.5	6.0
★ C40A — 22755, 22757, 22772	12	1525	13	11	2000	13.5	6.0
★ C40A — others	12	1100	13	11	1700	13.5	6.0
C40L	12	1350	13	25	2275	13.5	5.8
C40LA	12	1320	13	13	1740	13.5	5.9
C40T — 22762, 22769	12	1100	13	18	2050	13.5	6.0
C40T — others	12	1525	13	22	2400	13.5	6.0
C42 — 22900	12	1360	13	30	2330	13.5	5.25
C42 — 22901	12	1750	13	35	2750	13.5	4.5
C45PV/4	12	1050	13	20	1700	13.5	6.0
C45PV/5	12	1250	13	22	1900	13.5	6.0
C45PV/6	12	1300	13	25	2050	13.5	5.3
C45P/4	12	1050	13	13	1350	13.5	6.0
C45P/5	12	1250	13	13	1650	13.5	6.0
C45P/6	12	1300	13	13	2050	13.5	5.3
C47	12	1050	13	30	1750	13.5	5.9
C48	12	850	13	35	1650	13.5	3.0

4. SERVICING

If a fault develops in the charging system, before removing the dynamo from the vehicle, check whether the dynamo is the cause of the fault.

(a) Testing the Dynamo in Situ

A moving-coil voltmeter (0–20V range) and a moving-coil ammeter (0–5A range) are required in the following tests.

(i) Disconnect 'D' and 'F' cables at the control box.

(ii) Connect voltmeter between 'D' cable and earth (in the case of insulated-return vehicles, connect earth side of voltmeter to control box terminal 'E').

(iii) Run engine at approximately 1500 rev/min. **Voltmeter should read 1.5 – 3V.**

(iv) Connect ammeter between 'D' and 'F' cables, leaving voltmeter still connected.

★ *Amendment to previous issue*

(v) Run engine and slowly increase speed until voltmeter reads approximately 12V. **Ammeter should read 2 – 3A.**

If voltmeter and ammeter readings are unsatisfactory, repeat the tests at the dynamo terminals. (In the case of insulated-return, the voltmeter connection to control box terminal 'E' must be transferred to the dynamo insul-return terminal, which is separately positioned on the commutator-end bracket.) If satisfactory voltmeter and ammeter readings are now obtained, a fault exists in the wiring or connections. If the voltmeter and ammeter readings are still unsatisfactory, the dynamo must be removed from the vehicle for dismantling and inspection.

(b) Dismantling

(i) If the commutator-end bracket incorporates screw-type terminals, it will be necessary to remove sundry parts from the small field coil terminal 'F' but do not disturb the larger adjacent terminal 'D'.

(ii) Unscrew and withdraw the two through bolts.

Note: Model C42 dynamos have non-magnetic through bolts. Ensure replacement bolts are those specified for that machine.

(iii) Separate from the yoke: The commutator-end bracket and the sub-assembly comprising armature, drive-end bracket and the fan-and-pulley. Take care of the thrust washer (when fitted) on the commutator-end of the armature shaft.

Note: In the case of insulated-return dynamos, one end of the field coils must be disconnected from one of the brushboxes, or brush arms, before the commutator-end bracket can be detached from the yoke.

Do not at this stage unnecessarily dismantle the sub-assembly comprising armature, drive-end bracket and the fan-and-pulley, unless it is obvious that one of the parts needs renewing. If so, proceed as follows:—

Remove fan-and-pulley and then the woodruff key from the armature shaft. Separate the armature from the drive-end bracket. To do this, carefully support the bracket and then press the armature shaft from the inner race of the ball bearing, using a wheel-operated (or lever-operated) power press. If the bearing in the bracket needs renewing, refer (c) Bench Inspection, para. (v).

(c) Bench Inspection

(i) Check the Brushes

The brushes should be renewed when worn to approximately $\frac{5}{16}$" (0.31" or 8 mm) in length.

Note: In the case of brushes fitted to model C40T dynamos and later fitment brushes with twin-flexibles fitted to models C47 and C48 dynamos, measure the length of the brush from the shoulder and not the overall length.

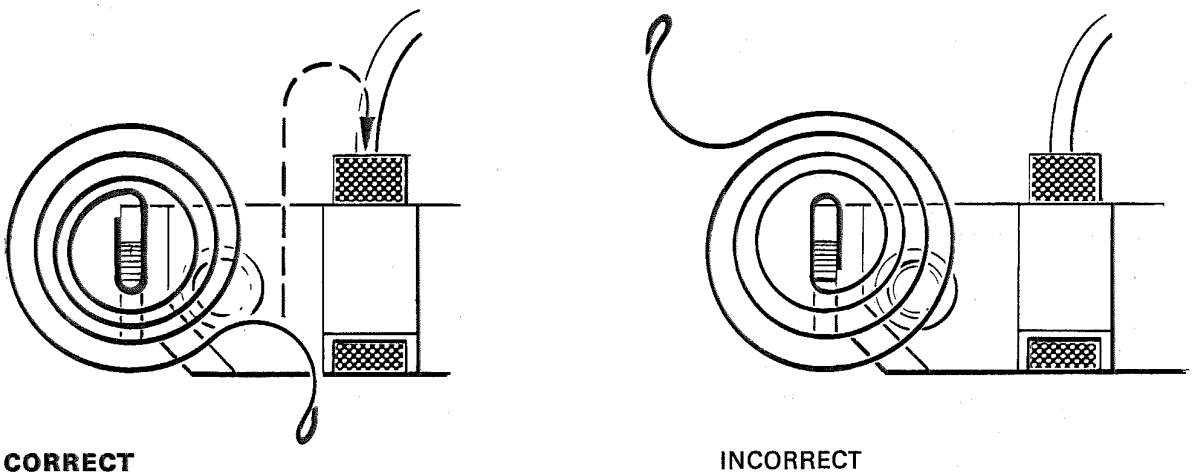
If it should be necessary to renew the brushes, use the correct brush set.

Check the brushes for freedom of movement. If brushes stick in the brushboxes, the brushes and brushboxes should be cleaned with a petrol-moistened cloth or brush. In the case of model C40T dynamos, with pivoted-arm type brushgear, after cleaning, apply clean engine oil sparingly (e.g. one or two drops) to the pivot of the brush arms.

(ii) Brush Spring Pressure

Fit the commutator-end bracket assembly to the armature, with the brushes (not less than the renewable length) contacting the armature in the simulated working position, then with a pull-type spring gauge, check the spring pressure.

Note: Ensure the brush springs are correctly fitted (see Fig. 5). Incorrect fitting causes excessive spring pressure, resulting in premature brush wear and damage to the commutator.



CORRECT INCORRECT

Fig. 5 Correct fitting of brush spring, in free position on post

Dynamo Model	*Brush Spring Pressure*	
C39 (Types PV and P)	25–15 ozf (7.0–4.0 N)	New brush varying to fully-worn brush
C40 (All types except C40T)	30–13 ozf (8.5–3.5 N)	,,
C40T	24–20 ozf (6.5–5.5 N)	,,
C42	33–16 ozf (9.0–4.5 N)	,,
C45 (Types PV and P)	44–30 ozf (12.0–8.5 N)	,,
C47 and C48	25–15 ozf (7.0–4.0 N)	,,

(iii) Armature

First, inspect the armature for obvious signs of a fault.

If the armature has markings indicating that it has fouled the pole shoes, first check that the pole shoes are tight in the yoke and, if so, suspect excessively worn bearings. (Renewing the bearings is dealt with in para. v.)

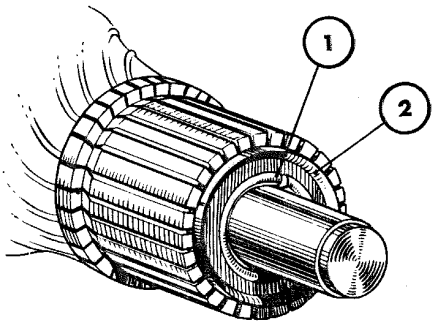
If the armature shows signs of 'thrown' solder, or lifted conductors, the armature should be renewed. (In this case the cause of armature failure should be investigated. When the dynamo has been re-fitted to the vehicle, the charging circuit wiring should be checked to ensure that it is correctly connected and the control box should also be checked for satisfactory operation as detailed in PART B, SECTION 4 or 5, of this manual.)

If the working surface of the commutator is in good condition but needs cleaning, use a petrol-moistened cloth. If necessary, rectify slight imperfections with very fine glass paper, prior to wiping the commutator clean with the petrol-moistened cloth. If the commutator is excessively worn, pitted or burnt, it will need skimming in a lathe. (Before skimming the commutator, refer 'Note.)

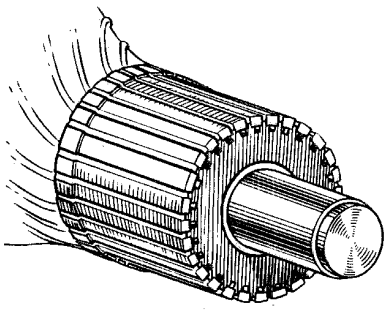
Note: (1) If the dynamo has been dismantled for inspection to determine and rectify an electrical fault, before skimming the commutator, check whether the armature requires renewing. (See later para. 'Checking the armature insulation and windings'.)

Note: (2) If the dynamo is model C40, C40/1, C40A, C40L or C40T, inspect the armature at the commutator-end and determine whether the commutator is a 'fabricated' or 'moulded' type (see Fig. 6).

Fabricated commutators: Can be skimmed providing the thickness of copper is not reduced to less than $\frac{1}{16}$″ (0.06″ or 1.5 mm). After skimming the commutator, the insulation between the segments must be undercut (see Fig. 7) to a depth of $\frac{1}{32}$″ (0.03″ or 0.80 mm) approx.



Fabricated Commutator



Moulded Commutator

Fig. 6 Identification of fabricated and moulded commutators
1 Metal roll-over **2** Insulating cone

After undercutting the commutator, rotate the armature again in the lathe and polish the surface of the commutator with very fine glass paper. Finally, use a compressed air line to clean the commutator, or wipe clean with a cloth.

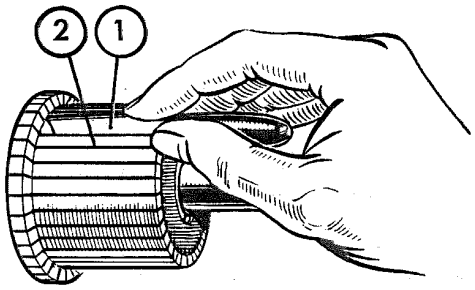


Fig. 7 Undercutting the commutator
1 Portion of standard size (12″) hacksaw blade (approx. 7″ long with both sides of teeth ground to thickness of commutator slots).
2 Slot depth $\frac{1}{32}$″ (.03″ or .80 mm) approx.

Moulded commutators: Can be skimmed providing this does not result in the diameter being reduced to less than $1\frac{29}{64}$″ (1.45″ or 37 mm). It is not necessary to undercut the commutator. During manufacture of the armature, sufficient undercut is

provided to last the maximum number of skimming operations on the commutator, or to last the expected service life of the armature. After skimming the commutator, remove copper swarf from between segments and then polish and clean the commutator as described for the fabricated type.

Check the armature insulation and windings: Check the armature insulation by connecting a 110-volt a.c. 15-watt test lamp between one of the commutator segments and the shaft. **The lamp should not light.** If the lamp lights, the armature must be renewed.

Check continuity and resistance of the armature windings, by connecting a good quality battery-operated ohmmeter alternately between adjacent commutator segments. **The ohmmeter should register the same resistance in every case.** If the ohmmeter does not register a reading (no continuity), or the ohmmeter registers either a full-scale needle deflection or a variation in resistance readings (short-circuited windings), the armature must be renewed.

Note: Interwinding short-circuits can sometimes only be detected with specialised armature testing 'Growler' equipment. If this equipment is not available, and all other components are eliminated as the cause of dynamo failure, check the armature by substitution.

(iv) Field Coils

Inspect the inside of the yoke for obvious signs of a fault. Check the tightness of the pole shoes and closely inspect the field coils. Inspect continuity of the interconnecting wire between the field coils, and check the field coil insulation. If the interconnecting wire is bare, an insulation piece should either be folded over the wire or positioned between the wire and the yoke to provide extra protection against the possibility of short circuits. If the protective covering of the field coil windings is discoloured or damaged due to overheating or burning, the field coil assembly should be renewed without the need for testing. Although there may not be any visible sign of a field coil fault, the field coils should be tested in situ, as follows:–

Checking the field coils of earth-return dynamos: Field coil continuity resistance and insulation can be checked simultaneously, by connecting a good quality ohmmeter between the field coil terminal and a clean and unpainted part of the yoke. **The ohmmeter should register the field coil resistance given in '3. Test Data'.**

Note: Alternative to using an ohmmeter, connect a 12V battery and a moving-coil ammeter (e.g. 0–5A range, or 0–10A range in the case of a C48 dynamo) in series with the field coil terminal and the yoke. **The ammeter should read approximately, 2A for C39, C40, C47 and C45 range of dynamos (excepting C45P/6 and C45PV/6), 2.5A for C42, C45P/6 and C45PV/6 dynamos and 4A for a C48 dynamo.**

If the ohmmeter or ammeter does not register a reading, or either a low resistance or high current reading is obtained, renew the field coils.

If either a high resistance or low current reading is obtained, check the terminal assembly riveted to the yoke.

Checking the field coils of insulated-return dynamos: Carry out two separate tests, with the field coils in situ as, follows:—

Test 1. Check field coil continuity and resistance, by connecting the ohmmeter between the main field coil terminal and the insulated-return terminal eyelet on the other end of the windings. **The ohmmeter should register the field coil resistance given in '3. Test Data'.** Providing the test is satisfactory, proceed to test 2, otherwise renew the field coils.

Test 2. Check the insulation between field coils and yoke, by connecting a 110V a.c. 15-watt test lamp between either of the field coil terminal connections and the yoke. **The lamp should not light.** If the lamp lights, renew the field coils.

Renewing the field coils: Using a suitably-sized drill, remove the riveted end of the rivet securing the field coil terminal to the yoke. Next, tap the rivet out of the yoke with a pin-punch or, alternatively, prise the terminal assembly away from the yoke with the blade of a medium-sized screwdriver.

With a power-operated screwdriver, remove the pole shoe fixing screws and then withdraw the field coil assembly from the yoke.

Before discarding the faulty field coils, clean and transfer the pole shoes to the new part. Also, if the faulty field coils incorporate a screw-type terminal, the terminal and a terminal eyelet in the case of insulated-return will need to be transferred to the service replacement field coils (see 'Note').

Note: Prior to unsoldering and transferring the terminal fitting(s) from the faulty field coils to the new part, note the arrangement and colour of the leads soldered to the appropriate eyelets. This eliminates the possibility of soldering the leads of the new field coils to the wrong terminal eyelets, causing the normal rotation of the dynamo to be reversed and making the dynamo unsuitable for the vehicle application for which it was intended.

Fitting the new field coils in the yoke is facilitated, if pole shoe expanding equipment is available to press the pole shoes tight to the yoke while the pole shoe screws are tightened to a torque of 30 lbf.ft. (40.70 Nm). Ensure the interconnecting link insulation piece is correctly positioned before tightening the pole-shoe screws. (See Fig. 8). Finally, rivet the field coil terminal to the yoke.

(v) Bearings

If the armature shows signs of having fouled the pole shoes, the bearings must be renewed. This is

likely to occur when the bearings become worn and allow excessive side movement of the armature shaft. If there is no visible indication of worn bearings, each bearing should be checked separately with the bracket-and-bearing assembled to the armature shaft. Grasp the armature in one hand and each bracket in turn in the other hand and if there is appreciable side movement of the armature shaft, the bearing should be renewed. In the case of a ball bearing, extend the testing by grasping each bracket in turn in the one hand, and spin the armature sharply with the palm of the other hand. If the armature rotates smoothly and without noise in a horizontal and vertical position, the bearing is satisfactory.

If the bearings are satisfactory, they should be re-lubricated before reassembly of the dynamo.

A bearing bush should be lubricated with clean engine oil (e.g. S.A.E. 30 grade).

A ball bearing should be re-packed with high-melting point grease unless the bearing is a shielded (heavy-duty) type, which cannot be re-lubricated in service, in which case the bearing will initially have been packed with sufficient grease to last the life of the bearing.

Renewing a bearing bush in the commutator-end bracket: If the bearing housing is open-ended, support the bracket around the bearing housing and press the worn bush out of the bracket with a suitably-sized mandrel used in conjunction with a wheel-operated (or lever-operated) press. Alternatively, if a hand-operated power press is not available, after carefully supporting the bracket around the bearing housing, use a hammer and tap the bush out of the bracket with a mandrel.

If the bearing housing has an enclosed end, the worn bush must be extracted from the bracket with a special tool or, alternatively, if a suitably-sized thread tap is screwed a few turns into the bush, the bush can then be extracted from the bracket with the thread tap. For C39 and C40 range of dynamos (all types), and also C42 dynamos, use a thread tap $\frac{5}{8}$″ (0.62″ or 15.9 mm). For C45 range of dynamos (all types), and also C47 dynamos, use a thread tap $\frac{11}{16}$″ (0.68″ or 17.4 mm). After removing the worn bush, remove the metal disc and felt-oiler from the bearing housing.

Note: A new felt-oiler should be soaked in clean engine oil before being put into service and it must be placed in the bearing housing prior to the metal disc which contacts the bearing.

A new bush must be soaked in clean engine oil for 24 hours at room temperature before being fitted. Alternatively, if the lubricant is heated to a temperature of 100°C, 2 hours immersion of the bush is sufficient providing the lubricant is allowed to cool before the bush is removed. The bush must not be reamed after fitting, otherwise the self-lubricating qualities will be impaired.

Carefully support the bracket around the bearing housing and press or drive the bush squarely into the bracket until the edge of the bush is level with the top of the bearing housing, using a shouldered highly-polished mandrel with the fitting pin diameter 0.002″ (0.05 mm) larger than the armature shaft which is to fit into the bearing.

Renewing the drive-end ball bearing, and the commutator-end ball bearing (when fitted).

Note: Service replacement ball bearings are packed with grease ready for use.

The ball bearing at the drive-end can be renewed after separating the bracket from the armature.

Support the bracket, and use a wheel-operated (or lever-operated) press to extract the armature shaft from the bearing.

Remove the rivets or screws securing the bearing retaining plate to the bracket or, in the case of a circlip-retained bearing, lever the circlip from its groove with the blade of a screwdriver. In the case of a bearing retaining plate secured by rivets, use a drill to remove the riveted end of the rivets and then either tap the rivets from the bracket or lever the bearing retaining plate from the bracket with the blade of a screwdriver.

Fit new bearing, taking care to fit associated parts of the bearing assembly in the correct sequence (see Figs. 1 and 2), and ensure circlip is fully located in the groove.

5. REASSEMBLY

Dynamo reassembly is facilitated by cradling the yoke in the jaws of a vice. This will ensure the dynamo being held sufficiently firm for the purpose of reassembly but will also enable the dynamo to be easily repositioned to facilitate certain operations during the various stages of reassembly.

Reassembling the dynamo is simply a reversal of the dismantling procedure. The following information is of special interest.

(a) Tightening Torques

Through bolts: 72 lbf.in. (8.13 Nm) max.
Driving pulley: 25 lbf.in. (2.82 Nm) max.

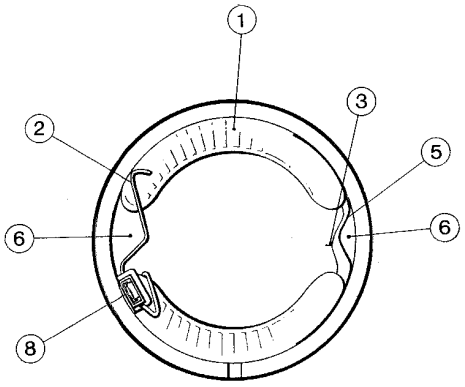
(b) Correct Positioning of the Through Bolts in Relation to the Field Coil Connections

When fitting the commutator-end bracket, carefully position the through bolts so as to avoid fouling the field coil connections. This is particularly important in the case of the through bolt which fits adjacent to the interconnecting link, which in some cases is a bare wire.

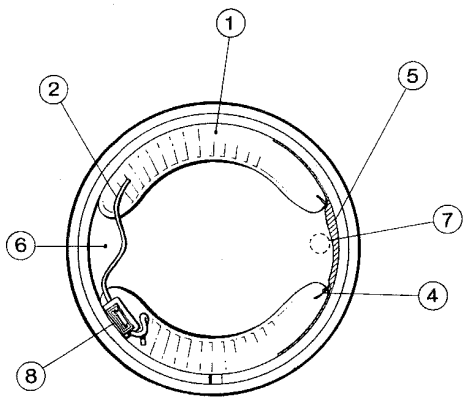
Before fitting the commutator-end bracket, inspect the inside of the yoke and check for satisfactory insulation and positioning of the field coil connections (see Fig. 8).

12-Volt Dynamos

(Models C39PV, C39P, C40, C40/1, C40A, C40L, C40LA, C40T, C42, C45PV, C45P, C47 and C48)



(a) Early type



(b) Later type

Fig. 8 Insulating and positioning of field coil connections

1 Field coils
2 Earth lead
3 Interconnecting link (centre joint)
4 Interconnecting link (offset joint)
5 Insulation piece (folded over wire, later type)
6 Through bolt entry point – ½" (0.5" or 12 mm)
7 Position of through bolt
8 Field ('F') terminal

The method of insulating and positioning the field coil interconnecting link may vary, according to the type of field coil assembly fitted, as follows:—

(i) If the interconnecting link is covered with insulated sleeving, it should be positioned the same as the field coil earth-lead (see Fig. 8, item 2).

(ii) If the interconnecting link is a bare wire, joined at the centre, position the interconnecting link and insulation piece as shown in Fig. 8 (a), items 3, 5 and 6.

(iii) If the interconnecting link is a bare wire, with an offset joint adjacent one of the field coils and an insulation-piece folded over the wire, position the interconnecting link and insulation-piece flat to the yoke as shown in Fig. 8 (b), items 5 and 4.

(c) Recommended Procedure for Engaging the Brushes on the Commutator

To fit the commutator-end bracket to a model C40T dynamo, engage the brushes on the commutator by manipulating the brushgear pivoted arms with the fingers inserted between the bracket and the edge of the yoke.

The majority of dynamos will have a commutator-end bracket incorporating the usual type of brushgear with brushboxes. In such cases, before the bracket can be fitted, it will be necessary to wedge the brushes in a fully lifted position in the brushboxes. The working surface of each brush should be positioned in turn level with the edge of the brushbox, the brush should then be wedged in this position by applying the brushspring pressure to the side of the brush (see Fig. 9).

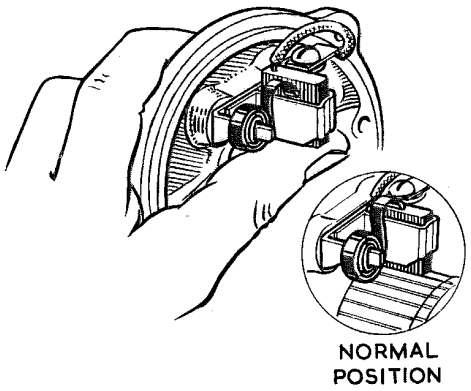


Fig. 9 Wedging the brushes with the brush springs, prior to fitting the commutator-end bracket

After the brushes have been wedged in the brushboxes, the bracket is prepared for fitting in accordance with one of the following paras. (i), (ii), (iii).

(i) Bandcover type dynamo with windows in the yoke

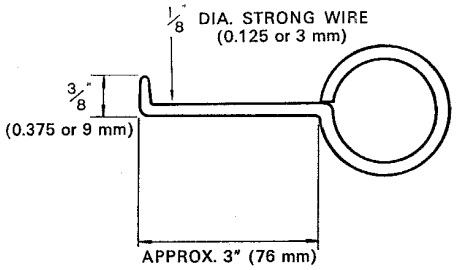


Fig. 10 Brush spring hooking tool

Assemble the commutator-end bracket on the armature shaft and secure the bracket with the

through bolts. Next, insert a hook tool (see Fig. 10), through one of the appropriate windows in the yoke and release each brush in turn on the commutator, by hooking and transferring the brush spring from the side of the brush to its normal position on top of the brush (see Fig. 11).

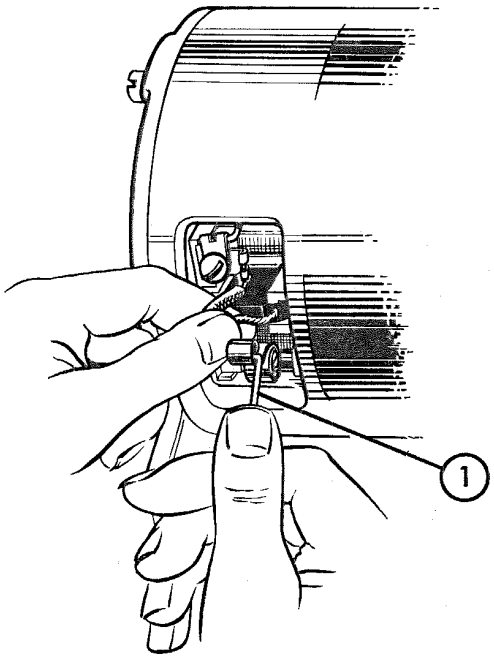


Fig. 11 Engaging the brushes on the commutator (Bandcover type dynamos)
1 Brush spring hooking tool (see Fig. 10)

(ii) Windowless-yoke type dynamos with ventilated end brackets

Assemble the commutator-end bracket on the armature shaft and secure the bracket with the through bolts. Next, use a six inch length of steel rod, approx. $\frac{1}{8}$" (0.125" or 3 mm) diameter (a small electricians type screwdriver is suitable), and insert the end of the rod, or the shaft of the screwdriver, through one of the ventilating slots in the bracket (see Fig. 12). Release each brush in turn on the commutator, by transferring the brush spring from the side of the brush to its normal position on top of the brush.

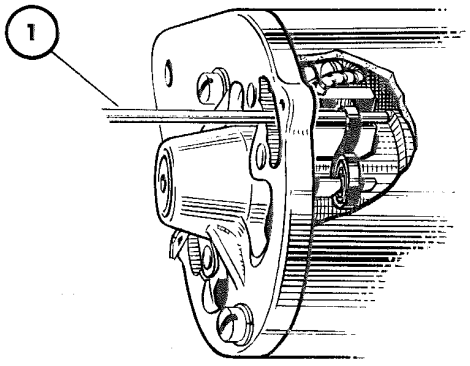


Fig. 12 Engaging the brushes on the commutator (windowless-yoke dynamo with ventilated end-brackets)
1 Steel rod – $\frac{1}{8}$" (.125" or 3 mm dia.) approx.

(iii) Windowless-yoke type dynamos with non-ventilated end brackets

Assemble the commutator-end bracket on the armature shaft, with the field coil terminal partially engaged in the bracket and the brushboxes just overlapping the edge of the commutator. Next, insert a hook tool (see Fig. 10) between the bracket and the edge of the yoke and release each brush in turn onto the commutator, by hooking and transferring the brush spring from the side of the brush to its normal position on top of the brush.

(d) Testing the Dynamo Following Reassembly

Rotate the driving pulley by hand and check that the armature is free to rotate and does not foul the pole shoes.

(i) Preliminary test, dynamo functioning as a motor

Note: For the purpose of this test it is advisable to observe correct polarity when connecting the battery to the dynamo, otherwise it may be necessary to repolarise the dynamo to suit the polarity of the vehicle electrical system (see following para. iii).

Cradle the dynamo in the jaws of a vice.

Connect a test link between the two adjacent terminals 'D' and 'F' on the commutator-end bracket.

Using a 12V battery, connect one side of the battery to the dynamo frame (earth-return), or alternatively connect one side of the battery to the large individual terminal on the commutator-end bracket (insulated-return), and in both cases connect the other side of the battery to either the dynamo 'D' or 'F' terminals (terminals connected together with a test link). **The dynamo should function as a motor.**

(ii) Dynamo performance test

The dynamo performance should be checked with a calibrated resistance load (provided by a variable resistor connected across the dynamo) instead of a battery. Using a variable resistor (instead of a fixed value resistor) enables the circuit load to be adjusted to suit any particular type of dynamo.

A suitable circuit for testing earth-return dynamos is shown in Fig. 13, which comprises a moving-coil voltmeter (V) 0–20V range, a moving-

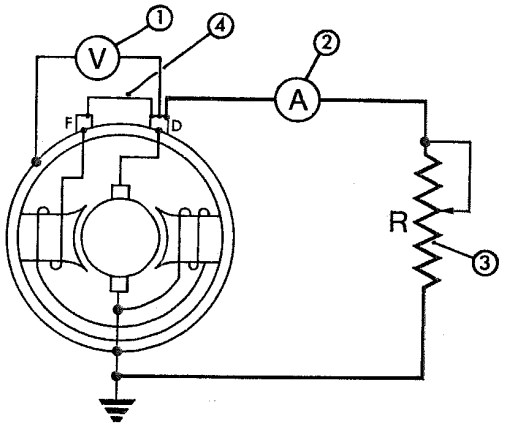


Fig. 13 Test circuit for checking the performance of earth-return dynamos

(For insulated-return refer text, section 5(d) para. ii)

1 Moving-coil voltmeter (0–20V range)
2 Moving-coil ammeter (0–50A range)
3 Variable resistor (500-watt)
4 Test link

coil ammeter (A) 0–50A range and a variable resistor (R) 500-watt, with the dynamo terminals 'D' and 'F' linked to provide full output.

In the case of insulated-return, the voltmeter connection to the yoke, and the variable resistor connection to the yoke-and-earth, should be connected instead to the insul-return terminal individually positioned on the commutator-end bracket.

The value of the load resistance can be calculated by dividing the maximum continuous output current figure of the dynamo (refer 3. TEST DATA) into 13.5.

Note: The connecting leads must be capable of carrying the maximum output current of the dynamo without overheating.

Dynamo testing speed and performance details are given in 3. TEST DATA.

Run the dynamo in the normal direction of rotation at a progressively increasing speed and when the voltmeter registers 13.0V, check the cutting-in speed (refer 3. TEST DATA, column 3).

Increase the dynamo speed and adjust the variable load resistor to give a voltmeter reading of 13.5V with the dynamo running at its maximum output speed (refer 3. TEST DATA, column 6), the maximum continuous rated output current of the dynamo should then be as detailed in 3. TEST DATA, column 5.

(iii) Repolarising the dynamo in situ

If the dynamo fails to function when fitted to the vehicle, it may require repolarising to suit the polarity of the vehicle electrical system.

To repolarise the dynamo in situ: Insulated-return dynamos, first check that the insul-return terminal on the dynamo commutator-end bracket is connected to the vehicle wiring, then repolarise the dynamo in the same way as for earth-return dynamos, as follows:—

Attach a suitable length of cable to the insulated terminal side of the battery (or main supply terminal of the battery in the case of insulated-return) and 'flick' the other end of the cable two or three times to the small 'F' (field) terminal of the dynamo.