

SERVICING

MAINTENANCE

Cleaning

Wipe away dirt or oil which may have collected around the apertures in the slip ring end bracket and moulded cover.

Belt Adjustment

The fan belt tension should be checked at the intervals shown in the current maintenance schedule. For adjustment procedure — see Engine Section. To avoid bearing damage when adjusting alternator belt tension, apply leverage **ONLY ON THE ALTERNATOR DRIVE-END BRACKET** not on any other part of the alternator. The lever should be of a soft material, preferably wood.

Lubrication

The alternator bearings are packed with grease during assembly. No further attention is needed during service life.

TEST PROCEDURES

In Position on Vehicle

Check driving belt for condition and tension.

The nominal hot ratings are given in DATA.

These ratings may be exceeded slightly when the alternator is running cold. To avoid misleading results, the following test procedure should be carried out with the alternator running as near as possible to its normal operating temperature.

Surge Protector

A surge protection device is connected across the "IND" terminal to absorb high transient voltages. These are caused by faulty connections or removal of battery leads with the alternator running which can damage the regulator main output transistor.

If the alternator output falls to zero the fault may be caused by the surge protection device failing safe, a short circuit or a fault in the alternator circuit.

Test as follows for a faulty surge protector:—

Check that all connections are clean and tight.

Remove the connector from the back of the alternator.

Release the two set screws and remove the moulded cover from the back of the alternator.

Disconnect the surge protector terminal on the heat sink. Release the set screw and remove the surge protector.

Refit the connector to the back of the alternator. Run the alternator and check output. If the alternator output is normal fit a new surge protector.

If alternator output is still abnormal check the system as described below.

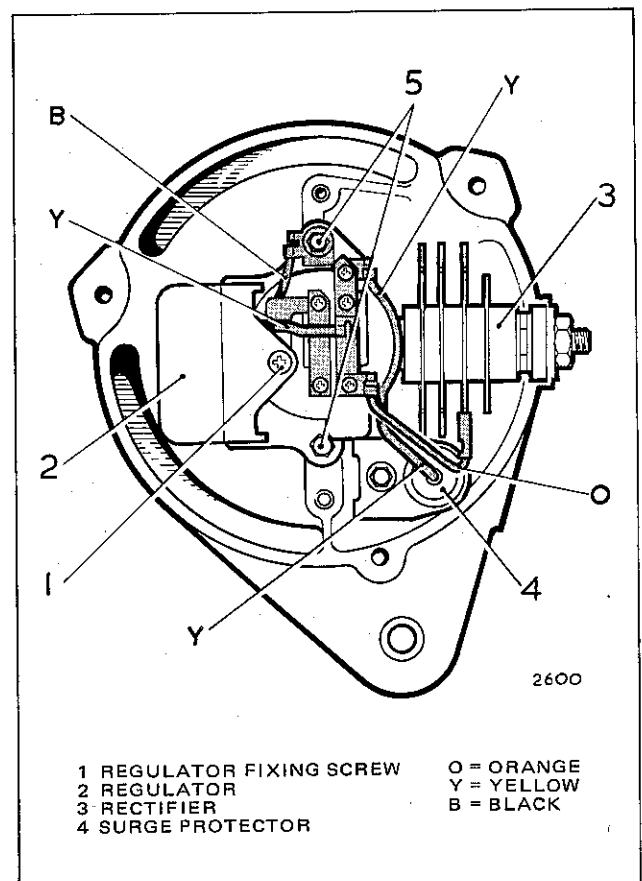


Fig. 1 End view — cover removed

Alternator Output with Regulator Inoperative

Disconnect battery —ve cables. Do not disconnect the battery or circuit cable whilst the alternator is running.

Remove the two securing screws and withdraw the moulded cover.

14 TR Regulator Models. Link the regulator field connection "F" and "—ve" with a jumper lead (metal link between regulator body and brush box and black cable connected to earth).

Connect an external test circuit as shown in the lower half of Fig. 2. Observe the polarity of battery and alternator terminals — reversed connections will damage the alternator diodes.

Re-connect the battery.

The variable resistor across the battery terminals must not be left connected for longer than is necessary to carry out the following tests.

Switch on the ignition. Check that the warning lamp is illuminated. Start the engine, and run up to 800 r.p.m. (1,500 alternator r.p.m.); the test circuit bulb should now be extinguished.

Increase engine speed to 3,200 r.p.m. (alternator speed 6,000 r.p.m. approximately), and adjust the variable resistance until the voltmeter reads 14 volts. The ammeter reading should then be approximately equal to the rated output — see GENERAL DATA. Any appreciable deviation from this figure will necessitate removal of the alternator for further examination.

Failure of one or more of the diodes will be indicated in the above test by the effect on alternator output, and also in some instances by abnormally high alternator temperature and noise level. The chart overleaf shows how diode failure will influence test results. For diode test procedure, see under "Diodes".

Regulator Test

It is assumed that the alternator has been tested and found satisfactory.

Disconnect the variable resistor and remove the link bridging regulator terminals "F" and "—ve".

With the remainder of the test circuit connected as for the alternator output test, start the engine and again run the engine up to 3,200 r.p.m. (alternator speed 6,000 r.p.m. approximately) until the ammeter registers an output current of less than 10 amperes.

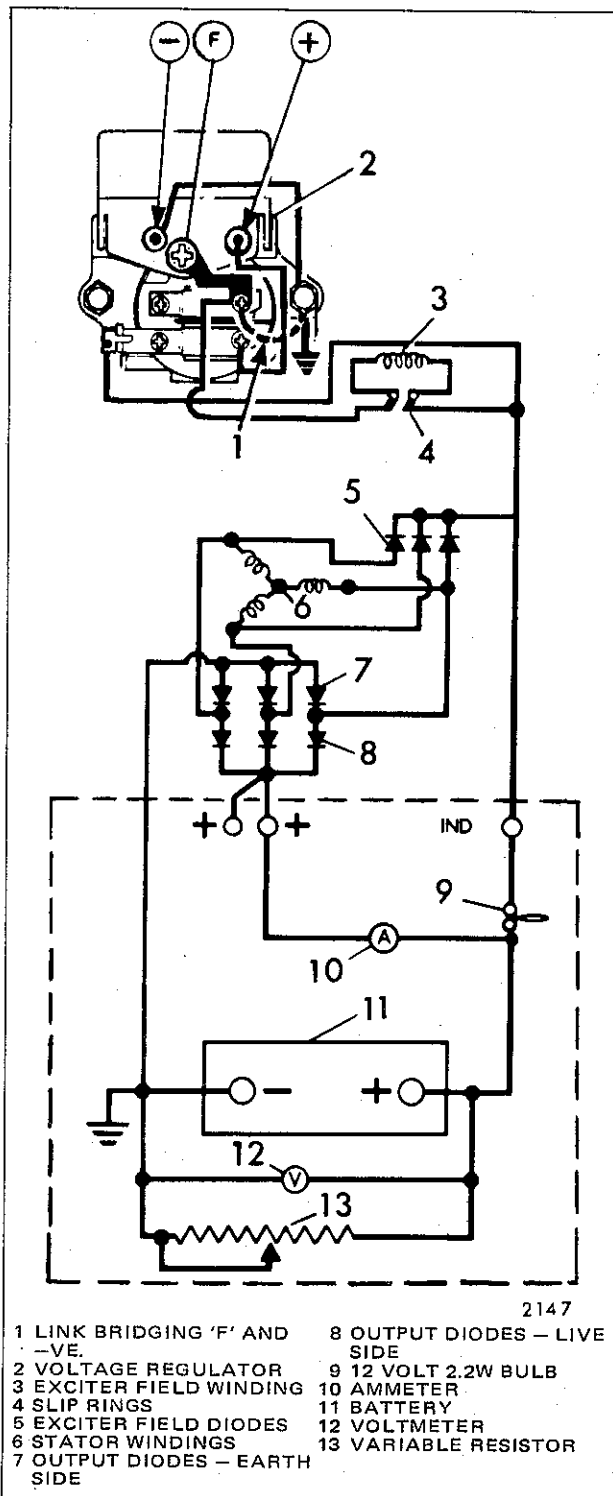


Fig. 2 Output test circuit

The voltmeter should then give a reading of 14.0-14.4 volts. Any appreciable deviation from this (regulating) voltage means that the regulator is not functioning correctly and must be replaced.

Disconnect battery and restore all harness and circuit connections. Re-connect battery.

17 ACR Alternator—Servicing**Voltage Drop Test**

Connect a low-range voltmeter between either of the positive (+ve) terminals of the alternator and the positive (+ve) terminal of the vehicle battery. Switch on the headlamps, start the engine and increase engine speed to 3,200 r.p.m. (alternator speed 6,000 r.p.m. approximately). Note the voltmeter reading.

Transfer the voltmeter to the frame of the alternator and the negative (–ve) terminal of the battery, and again note the reading. If the reading exceeds 0.5 volt on the POSITIVE (+ve) side or 0.25 volt on the NEGATIVE (–ve) side there is a high resistance in the charging circuit which must be traced and rectified.

If the foregoing tests show the alternator and regulator to be functioning satisfactorily disconnect the test circuit and re-connect the alternator harness connector.

Testing on Bench

Remove the alternator and dismantle as described under 'ALTERNATOR ASSEMBLY'.

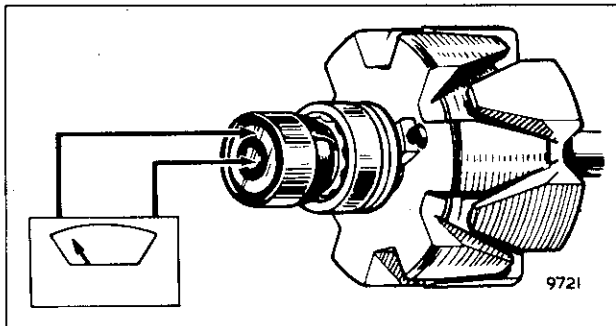
Rotor — Resistance Test

Fig. 3 Measuring rotor winding resistance with ohmmeter

Test the rotor winding by connecting either an ohmmeter or a 12-volt battery and ammeter between the slip rings. The resistance should be approximately 4.5 ohms or the value of the current be approximately 3 amperes.

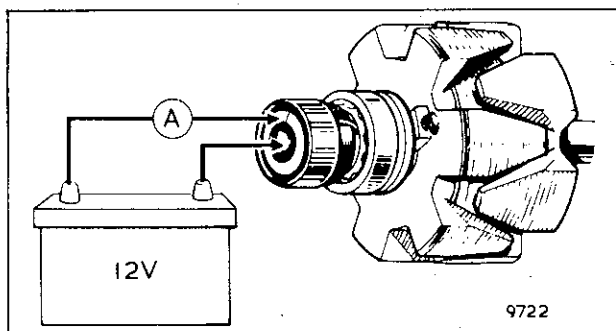


Fig. 4 Measuring rotor winding resistance with battery

Insulation Test

Test for defective insulation between one of the slip rings and one of the rotor poles using an armature tester or a 100 volt A.C. mains supply and a 15 watt test lamp. If the lamp lights, the winding is earthed to the core and a replacement rotor/slip ring assembly must be fitted. No attempts must be made either to machine the rotor poles or to straighten a distorted shaft.

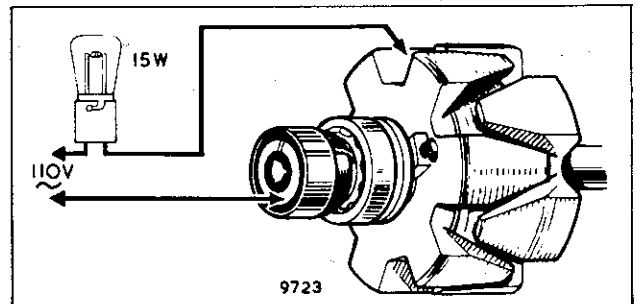


Fig. 5 Rotor winding insulation test

Stator — Continuity Test

Check the continuity of the stator windings by first connecting any two of the three stator cables in series with a 12-volt battery and a test lamp of not less than 36 watts.

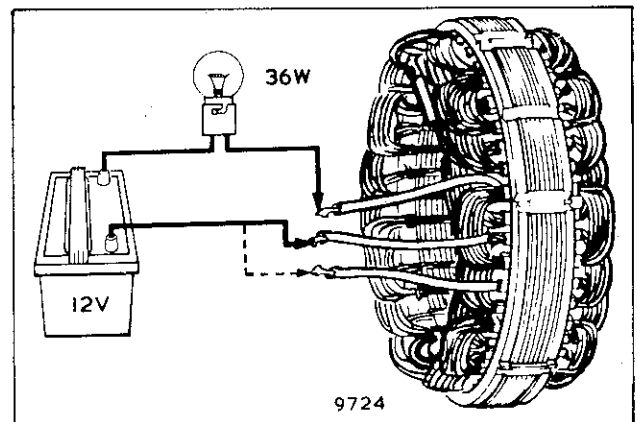


Fig. 6 Stator winding continuity test

Repeat the test, replacing one of the two cables by the third cable. Failure of the test lamp to light on either occasion means that part of the stator winding is open circuit and a replacement stator must be fitted.

Insulation Test

Test for defective insulation between the stator coils and the laminated core pack using an armature tester or the mains test lamp. Connect the test probes between any one of the three cables end and the laminated core-pack. If the lamp lights, the stator coils are earthing and a replacement stator must be fitted.

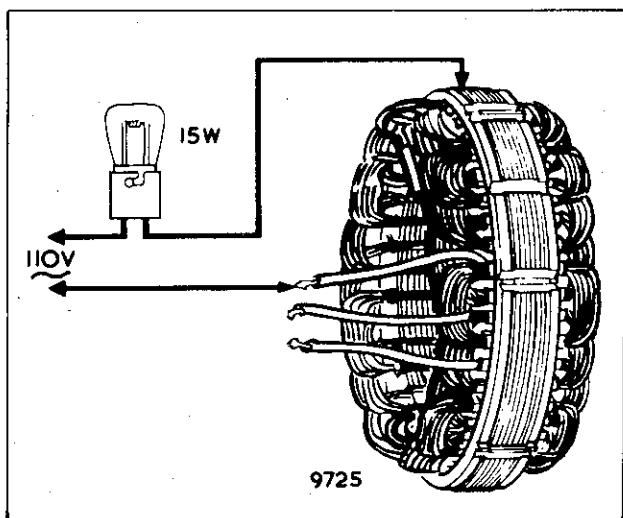


Fig. 7 Stator winding insulation test

Diodes

In the event of a fault in one of the diodes being indicated by the alternator output test, the stator winding connections to the rectifier pack must be unsoldered.

To Test a Diode

Connect each of the nine diode pins in turn in series with a 1.5 watt test bulb and one terminal of a 12-volt battery. Connect the other battery terminal to the particular heat sink on the rectifier pack into which the diode under test is soldered. Next, reverse the connections to diode pin and heat sink. The bulb should light in one diode pin only. Should the bulb light in both tests, or not light in either, the diode is defective and a new rectifier pack must be fitted.

Re-Soldering a Diode

When re-soldering the stator cables to the diode pins, use only "M" GRADE 45–55 tin-lead solder. Take great care to avoid overheating the diodes or bending the diode pins. The diode pins should be lightly gripped with a pair of long-nosed pliers (which act as a thermal shunt) and the soldering must be carried out as quickly as possible and without overheating the diode.

Brushgear

Inspection

The brush length when new is given in GENERAL DATA, under Alternator. The serviceability of a brush is gauged by measuring the amount by which it protrudes beyond the brush-box moulding when in the free position. For brush to remain service-

able, the amount protruding should not be less than 5 mm (0.2 in.). Renew the brush assemblies if the brushes are worn to or below this amount. If brush renewal is necessary, take care not to lose the leaf spring fitted at the side of the inner brush.

Check the brush spring pressure using a push-type spring gauge. The brush should be pushed back until the brush face is flush with the housing. Replace a brush assembly which gives a reading appreciably outside the limits given where this is not due to the brush movement being partially seized. Clean a sticking brush with a petrol moistened cloth, or, if necessary, by lightly polishing the brush sides on a smooth file.

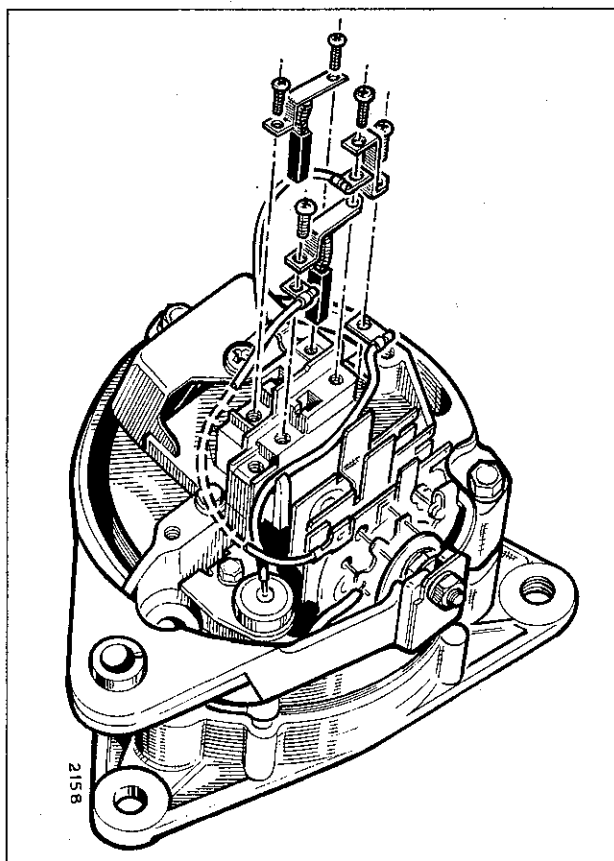


Fig. 8 Brush removal

To Renew

Remove the alternator from the vehicle as described.

Release the two set screws and remove the cover off the back of the alternator.

Release the four cross-headed screws locating the terminals on the brush box.

Carefully withdraw the brushes and examine for length (Refer to 'Data'). Renew if necessary.

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Place brushes into brush recesses and carefully ease the brush springs and terminals into position and secure.

Replace the alternator cover.

Slip Rings

The surfaces of slip rings should be smooth and uncontaminated by oil or other foreign matter.

Clean the surfaces using a petrol moistened cloth, or if there is evidence of burning, use very fine glass-paper. On no account must emery cloth or similar abrasive be used. No attempt must be made to machine the slip rings as any eccentricity in the machining may adversely affect the high-speed performance of the alternator.

ALTERNATOR ASSEMBLY**To Dismantle***Dismantling for Bench Testing*

Remove the two securing screws and withdraw the moulded cover.

Unsolder the three stator connections to the rectifier assembly, noting the order of connection. (See under "Diodes" for re-soldering procedure).

Disconnect the earth wire and brush wire at the Lucar terminals of the rectifier, and the suppressor cable if fitted. Slacken the nut on the rectifier assembly bolt and withdraw the rectifier.

Release the set screw securing the surge protection device (when fitted).

Remove the two brush moulding securing set screws and the bolt securing the regulator to the end bracket. Withdraw the brush box, regulator assembly and connections.

Further Dismantling

If, as a result of the foregoing electrical tests further dismantling is necessary, proceed as follows:

Withdraw the three through bolts. Separate the slip ring end bracket and stator assembly from the rotor and drive end bracket — preferably by

sleeving a metal tube approximately 76 mm (3 in.) long over the slip ring moulding so as to engage with the outer ring of the slip ring end bearing and then carefully drive the bearing from its housing with the alternator positioned vertically, with the fan lowermost. The tube should be 33.53 mm (1.320 in.) outside diameter and bored out to 31.5 mm (1.240 in.) for approximately half its length.

Carefully file away any surplus solder from the field winding terminals which may prevent the tubing from sleeving over the slip ring moulding.

The less preferred method of separating the slip ring end bracket and stator assembly is to insert a lever between the stator and the drive end bracket and carefully prise the two apart until the slip ring end bearing is clear of its housing.

Remove the nut, washers, pulley, fan and key from the shaft and press the rotor shaft out of the drive end bracket.

Bearings

The need for bearing renewal during the service life of the alternator is extremely unlikely provided that pulley alignment and belt tension are maintained as recommended. However, should bearing replacement become necessary, proceed as follows:

Drive-End

Dismantle the alternator (it is not necessary to unsolder the rectifier assembly) including separation of the rotor from the driven end bracket.

The drive end bearing can be withdrawn following the removal of the retaining circlip (see Fig. 1).

Slip Ring End

Dismantle the alternator as for the drive-end bearing.

Unsolder the field winding connection to the slip ring moulding assembly which can then be withdrawn from the rotor shaft.

Extract the bearing from the shaft, noting that the shielded side of the bearing faces towards the slip ring moulding assembly.

To Re-Assemble

Reassembly is a reversal of the foregoing dismantling procedure. Ensure that the slip ring bearing is properly positioned the right way round and fully home on the rotor shaft. Ensure that the brushes are entered in their housing before refitting the brush moulding. Tighten the through bolts evenly.

Pack the new bearing with Shell "Alvania R.A." lubricant. Fit the bearing (shielded side towards the slip ring) ensuring that it is fully home on the shaft and refit the slip ring moulding assembly.

If the rotor and drive end bracket have been separated, support the inner ring of the drive end bearing with the distance collar for the reassembly operation. Do not use the drive end as a support for the bearing while fitting the rotor.