

## Section Na

### THE ELECTRICAL SYSTEM

The information given in this Section refers specifically to the Sprite (Mk. III and IV) and Midget (Mk. II and III) and must be used in conjunction with Section N

	<i>Section</i>
Battery (Type A9/AZ9—A11/AZ11) .. .. .	Na.8
Cigar-lighter .. .. .	Na.2
Control box (Model RB340) .. .. .	Na.7
Direction indicator/headlight flasher low-high beam switch (Midget Mk. III from Car No. G-AN5-105501) .. .. .	Na.13
Fuse unit (Type 7FJ) .. .. .	Na.9
Ignition switch (Midget Mk. III from Car No. G-AN5-105501) .. .. .	Na.14
Lamps—stop, tail, and direction indicator .. .. .	Na.6
Replacement bulbs .. .. .	Na.11
Reverse lamps .. .. .	Na.4
Starter (Type M35J) .. .. .	Na.10
Switches .. .. .	Na.1
Switches (Midget Mk. III from Car No. G-AN5-105501) .. .. .	Na.12
Tachometer—impulse type .. .. .	Na.3
Windshield wipers (later cars) .. .. .	Na.5
Wiring diagrams .. .. .	Section Nc

### Section Na.1

#### SWITCHES

##### Direction indicator switch

###### Removing

Disconnect the battery. Remove the set screws securing the two halves of the cover and disconnect the snap connections beneath the column. Remove the set screws securing the switch to the column and lift away the assembly.

###### Refitting

Reverse the removal procedure.

##### Horn switch (Early cars)

###### Removing

Disconnect the battery. Press the horn switch and turn anti-clockwise to remove.

###### Refitting

Reverse the removal procedure.

##### Ignition and starter switch

###### Removing

Disconnect the battery. Remove the bezel ring with Service tool 18G 671. Disconnect the leads and pull the switch from the rear of the instrument panel.

###### Refitting

Reverse the removal procedure.

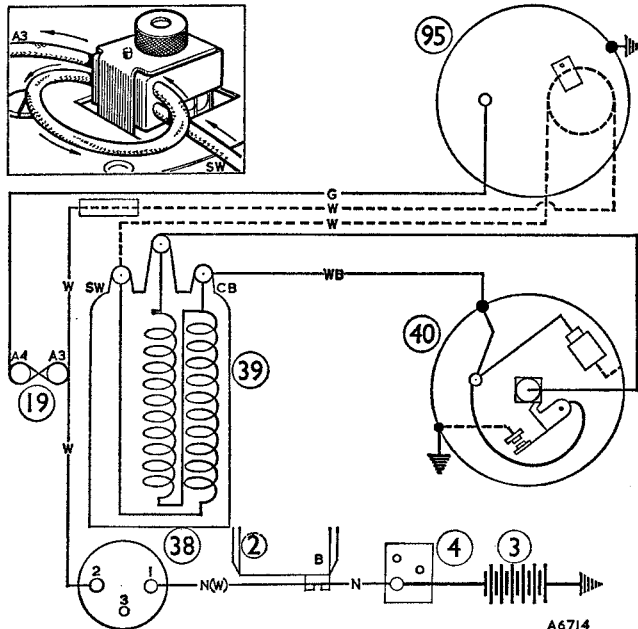


Fig. Na.1

##### Impulse tachometer circuit

- |                         |                      |
|-------------------------|----------------------|
| 2. Control box.         | 38. Ignition switch. |
| 3. Batteries (12-volt). | 39. Ignition coil.   |
| 4. Starter solenoid.    | 40. Distributor.     |
| 19. Fuse—A3—A4.         | 95. Tachometer.      |

*Inset: symmetrical loop of pulse lead*

### Na.2

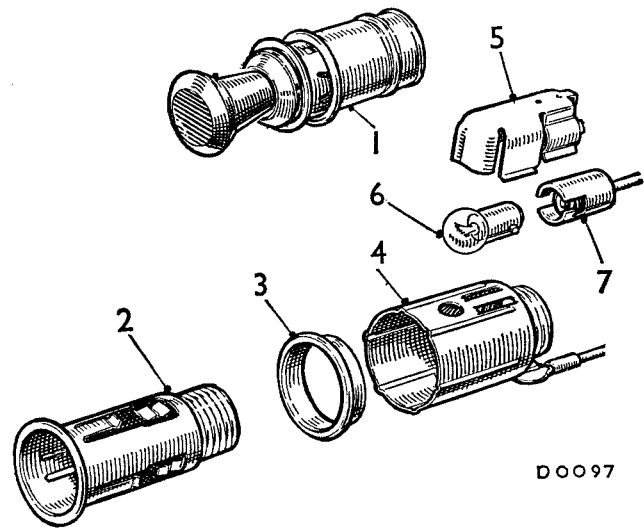


Fig. Na.2

##### The cigar lighter components

- |                         |                 |
|-------------------------|-----------------|
| 1. Pop-out heater unit. | 5. Lamp cover.  |
| 2. Switch base.         | 6. Bulb.        |
| 3. Glow ring.           | 7. Bulb holder. |
| 4. Shell.               |                 |

### Section Na.2

#### CIGAR-LIGHTER

##### Removing

- (1) Disconnect the cigar-lighter feed wire from the ignition switch terminal.
- (2) Disconnect the earth wire from the cigar-lighter.
- (3) Press in the sides of the illumination lamp cover and withdraw the lamp unit from the lighter shell.
- (4) Unscrew the lighter shell from the switch base.
- (5) Withdraw the switch base and glow ring from the front of the fascia panel.

##### Refitting

- (6) Reverse the removing procedure in (1) to (5).

### Section Na.3

#### TACHOMETER—IMPULSE TYPE

The equipment consists of an indicator head and pulse lead. The pulse lead is connected in series between the ignition switch and the ignition coil, and transmits voltage pulses to the indicator head.

##### Faulty operation

Check wiring connections to the indicator head and continuity of the circuit. Poor connections may result in faulty readings.

The pulse lead should form a symmetrical loop and not tight against the plastic forms (inset Fig. Na.1).

Section Na.4

REVERSE LAMPS

Bulb replacement

- (1) Remove the screws securing the reverse lamp to the rear panel.
- (2) Withdraw the lens.
- (3) Press the bulb down towards the lower contact and withdraw it from the lamp.
- (4) Fit one end of the bulb into the hole in the lower contact, then press the top of the bulb until the point on the bulb cap engages in the hole in the upper contact.
- (5) Refit the lens and securing screws.

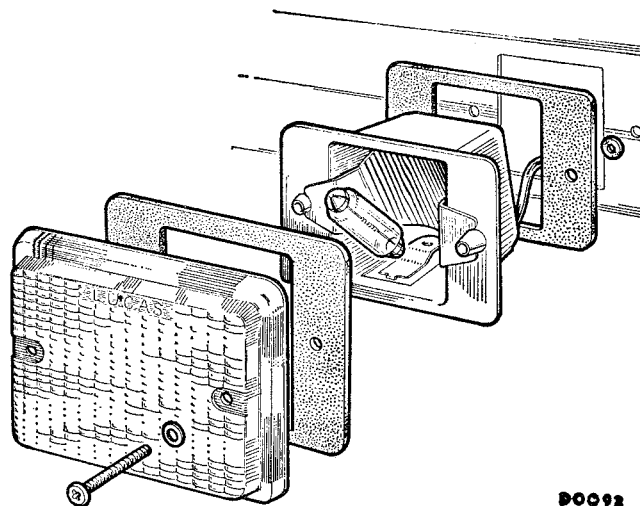


Fig. Na.3  
The reverse lamp

Section Na. 5

WINDSHIELD WIPERS  
(Later cars)

Removing

Wiper arms

Slacken the screw securing the wiper arm to the wheel-box spindle. Tap the screw head to release the splined locking wedge and withdraw the wiper arm.

Motor and gearbox assembly

- (1) Disconnect the battery.
- (2) Disconnect the wiring from the motor terminals.
- (3) Remove the wiper arms.
- (4) Remove the two motor securing nuts and bolts.

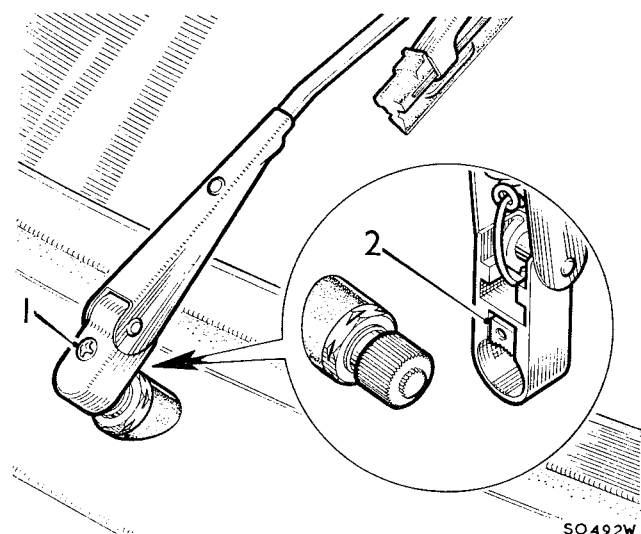


Fig. Na.4

Removal and replacement of the windshield wiper arms

1. Screw.
2. Splined locking wedge.

- (5) Withdraw the motor and gearbox assembly complete with the inner drive cable. The inner cable will rotate the wiper spindles as it is withdrawn.

Dismantling

Motor and gearbox assembly

- (6) Unscrew the four gearbox cover retaining screws and remove the cover.
- (7) Remove the circlip and flat washer securing the connecting rod to the crankpin.
- (8) Withdraw the connecting rod, taking care not to lose the flat washer fitted under it.
- (9) Remove the circlip and washer securing the shaft and gear.
- (10) Clean any burrs from the gear shaft and withdraw the gear, taking care not to lose the dished washer fitted under it.
- (11) Mark the yoke and gearbox for reassembly.
- (12) Unscrew the two fixing bolts from the motor yoke and remove the yoke assembly and armature. The yoke must be kept clear of metallic particles which will be attracted to the pole piece.
- (13) Remove the screws securing the brushgear and the terminal and switch assembly, and remove both assemblies.

Inspection

Motor and gearbox assembly

- (14) Examine the brushes for excessive wear; if the brushes are worn to  $\frac{3}{16}$  in. (4.8 mm.) the brush gear assembly must be renewed.
- (15) Check the brush spring pressure with a push-type gauge, the gauge reading should be 5 to 7 oz. (140 to 200 gm.) when the bottom of the brush is level with the bottom of the slot in the brush box. The brush gear assembly must be renewed if the springs are not satisfactory.
- (16) Test the armature for insulation and open or short circuits; renew the armature if faulty.

- (17) Examine the gear wheel for damage or excessive wear; renew if necessary.

### Reassembling

#### Motor and gearbox assembly

- (18) Reverse the dismantling procedure in (6) to (13) noting the following points:

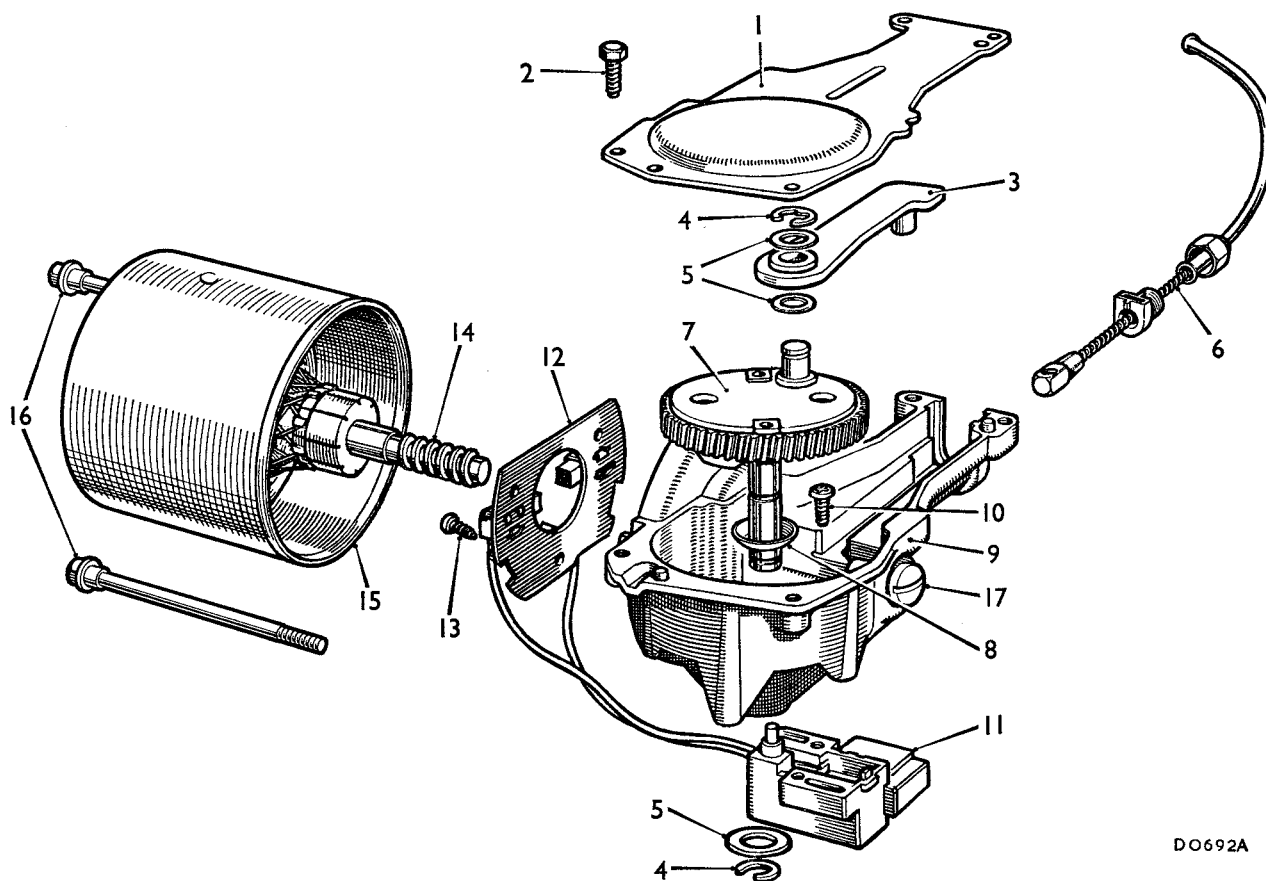
- (a) Use Ragosine Histate Grease to lubricate the gear wheel teeth and cam, armature shaft worm gear, connecting rod and connecting pin, cross-head slide, cable rack, and wheelbox gear wheels.
- (b) Use Shell Turbo 41 oil to lubricate the bearing bushes, armature shaft bearing journals (sparingly), gear wheel shaft and crankpin, felt washer in the yoke bearing (thoroughly soak), and the wheelbox spindles.
- (c) Tighten the yoke fixing bolts to a torque figure of 20 lb. in. (.23 kg. m.).
- (d) If a replacement armature is being fitted, slacken the thrust screw to provide end-float for fitting the yoke.

- (e) Fit the thrust disc inside the yoke bearing with its concave side towards the end face of the bearing.
- (f) Fit the dished washer beneath the gear wheel with its concave side towards the gear wheel.
- (g) When fitting the connecting rod to the crankpin ensure that the larger of the two flat washers is fitted under the connecting rod with the smaller one on top beneath the circlip.
- (h) With the thrust screw fully tightened against the gearbox casting, an end-float of .004 to .008 in. (.1 to .21 mm.) should exist on the armature. Adjustment of the armature end float can be achieved by adjustment of the thrust screw.

### Refitting

#### Motor and gearbox assembly

Reverse the removing procedure in (1) to (5) ensuring that the inner cable engages correctly with the wheelbox gear teeth.



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Fig. Na.5

#### The windshield wiper motor components

- |                     |                             |                               |
|---------------------|-----------------------------|-------------------------------|
| 1. Gearbox cover.   | 7. Shaft and gear.          | 13. Screw for brush gear.     |
| 2. Screw for cover. | 8. Dished washer.           | 14. Armature.                 |
| 3. Connecting rod.  | 9. Gearbox.                 | 15. Yoke assembly.            |
| 4. Circlip.         | 10. Screw for limit switch. | 16. Yoke bolts.               |
| 5. Plain washer.    | 11. Limit switch assembly.  | 17. Armature adjusting screw. |
| 6. Cable assembly.  | 12. Brush gear.             |                               |

Section Na.6

LAMPS

Stop, tail and direction indicator

Bulb replacement

- (1) Remove the two screws securing the lamp lens and remove the lens. When refitting, ensure that the lens seal is correctly positioned.

Lamp unit removing

- (2) Disconnect the battery.
- (3) Remove the nuts and washers retaining the lamp unit.
- (4) Disconnect the electrical leads at the harness connectors.
- (5) Remove the lamp.

Number-plate lamp

Bulb replacement

- (6) Remove the two securing screws and lift off the lamp hood and lens. Remove the bulb.
- (7) When reassembling, ensure that the lamp lens seal is correctly positioned. Tighten the screws evenly and progressively to compress the seal.

Lamp unit removing

- (8) Remove the two nuts and washers retaining the lamp to the mounting bracket; alternatively, remove the lamp complete with the bracket.
- (9) Disconnect the electrical leads at the harness connectors inside the boot. Remove the lamp unit.

**NOTE.**—The lamp mounting brackets are handed left- and right-hand.

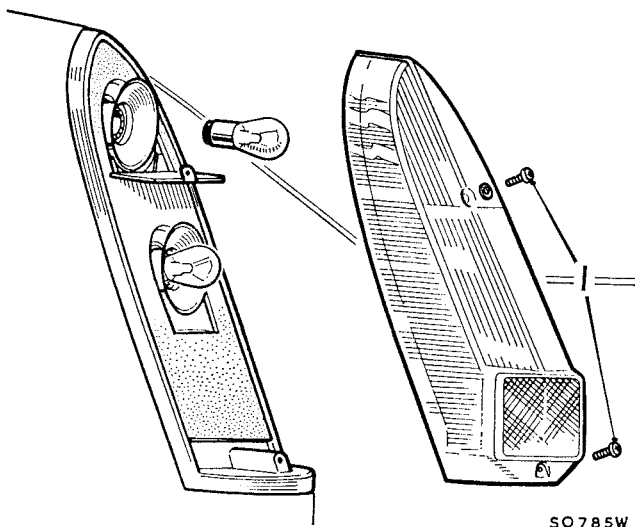


Fig. Na.6

The stop tail and direction indicator lamp

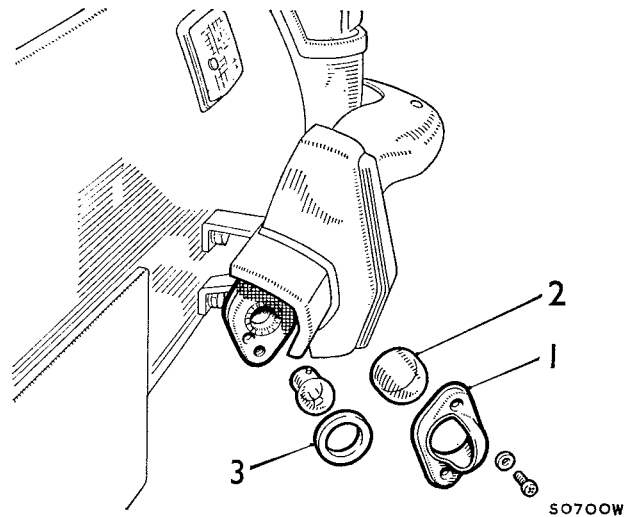


Fig. Na.7

The number-plate lamp

Interior courtesy lamp

Bulb replacement

- (10) Remove the two screws securing the lamp lens and withdraw the festoon-type bulb from the retaining clips.

Lamp unit removing

- (11) Remove the two screws, nuts and washers retaining the lamp to the mounting bracket.
- (12) Disconnect the electric leads behind the mounting bracket. Remove the lamp unit.

### Section Na. 7

#### CONTROL BOX (Model RB340)

##### General description

The RB340 control box operates on the current-voltage system of dynamo output regulation. Three units are housed in the control-box: two separate, vibrating armature-type, single-contact regulators, and a cut-out relay. One regulator is responsive to changes in current and the other to changes in voltage.

The voltage regulator and cut-out relay are temperature- and voltage-compensated. The effect of temperature fluctuation is further minimized by a swamp resistor connected in series with the shunt coils of the voltage regulator and cut-out relay.

Voltage and current adjustments are made by turning toothed cams with a suitable tool; a special tool is available from Joseph Lucas Ltd.

##### Testing and adjusting

Equipment: Hydrometer; 0-20 volt moving-coil voltmeter; 0-40 amp. moving-coil ammeter.

**IMPORTANT.**—Check and adjust as rapidly as possible to avoid errors due to heating of the operating coil. Aim for nominal setting when making electrical and mechanical adjustments. Before attempting to adjust the control box settings, the following preliminary checks must be made.

- (1) Check the state of the battery with a hydrometer.
- (2) Check the dynamo output (Section N.5).
- (3) Check the charging circuit wiring between the dynamo, control box, and ignition switch for insulation and continuity.
- (4) Check the earth connections, particularly the control box.

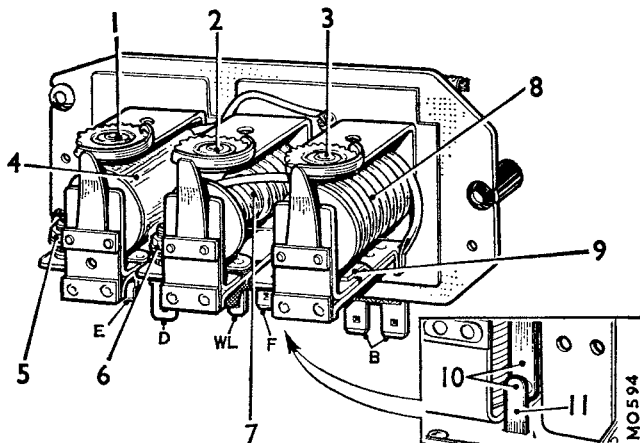


Fig. Na.8

#### Control box (RB340)

- |                            |                            |
|----------------------------|----------------------------|
| 1. Adjustment cam—voltage. | 7. Current regulator.      |
| 2. Adjustment cam—current. | 8. Cut-out relay.          |
| 3. Adjustment cam—cut-out. | 9. Armature back stop.     |
| 4. Voltage regulator.      | 10. Cut-out contacts.      |
| 5. Voltage contacts.       | 11. Fixed contact bracket. |
| 6. Current contacts.       |                            |

##### Voltage regulator

- (5) Withdraw the cables from the control box terminals 'B' and bridge the disconnected cables.
- (6) Withdraw the cable from the control box terminal 'WL' and connect the voltmeter between the terminal blade and a good earth point on the car.
- (7) Start the engine and run the dynamo at 3,000 r.p.m.
- (8) A steady voltmeter reading should be registered within the limits given according to the ambient temperature.

Ambient temperature	Voltage regulator checking limits	Voltage regulator setting limits
10° C. (50° F.)	14.5 to 15.8 volts	14.9 to 15.5 volts
20° C. (68° F.)	14.4 to 15.6 volts	14.7 to 15.3 volts
30° C. (86° F.)	14.3 to 15.3 volts	14.5 to 15.1 volts
40° C. (104° F.)	14.9 to 15.1 volts	14.3 to 14.9 volts

- (9) If the reading obtained is within the limits but fluctuates more than  $\pm 3$  volts, check for dirty contacts or foreign matter in the air gaps.
- (10) If the reading is steady but falls outside the appropriate limits, carry out the adjustment in (11) to (15).
- (11) Stop the engine and remove the control box cover.
- (12) Start the engine and run the dynamo at 3,000 r.p.m.
- (13) Turn the voltage adjustment cam clockwise to raise the voltage setting or anti-clockwise to lower it, until the correct setting within the appropriate setting limits given is obtained.
- (14) Check the setting by stopping the engine, re-starting it, and running the dynamo at 3,000 r.p.m.
- (15) Stop the engine, refit the cover and restore the original connections.

##### Current regulator

- (16) Remove the control box cover.
- (17) Short out (clip together) the voltage regulator contacts to enable the dynamo to develop its maximum rated output.
- (18) Withdraw the cables from the control box terminals 'B' and bridge the disconnected cables.
- (19) Connect the ammeter between the bridged cables and the 'B' terminal blades.
- (20) Check that no other loads are taken from the control box side of the ammeter.
- (21) Start the engine, switch on the headlamps and run the dynamo at 4,500 r.p.m.
- (22) Note the ammeter, which should register a steady reading equal to the maximum rated output of the dynamo.
- (23) If this is correct but fluctuates more than  $\pm 1$  amp., check for dirty contacts or foreign matter in the air gap.

- (24) If the reading is steady but falls outside the limits, carry out the adjustment in (25) to (26).
- (25) Turn the current adjustment cam, clockwise to raise the current setting or anti-clockwise to lower it, until the correct setting is obtained.
- (26) Stop the engine, refit the cover and restore the original connections.

*Cut-out relay—contacts closing**Cut-in voltage*

- (27) Withdraw the cable from the control box terminal 'WL' and connect the voltmeter between the terminal blade and a good earth on the car.
- (28) Switch on the headlamps.
- (29) Start the engine and slowly increase its speed and observe the voltmeter.
- (30) The voltmeter reading should rise steadily as the engine speed is increased and then drop back slightly when the cut-out contacts close. The cut-in voltage is that which is indicated immediately before the voltmeter reading drops back and should be within the limits given.
- (31) If the reading falls outside the limits, carry out the adjustments in (32) to (35).
- (32) Remove the control box cover.
- (33) Reduce the engine speed so that the cut-out contacts re-open.
- (34) Turn the cut-out relay adjustment cam, clockwise to raise the setting or anti-clockwise to lower it, until the correct setting is obtained.
- (35) Stop the engine, refit the cover, and restore the original connections.

*Cut-out relay—contacts opening*

**NOTE.**—The contact opening setting may be checked by using a voltmeter to check the 'Drop-off voltage', or using an ammeter to check the 'Reverse current'; both are given.

*Drop-off voltage*

- (36) Withdraw the cables from the control box terminals 'B' and bridge the disconnected cables.
- (37) Connect the voltmeter between the terminal blades 'B' and a good earth on the car.
- (38) Start the engine and run the dynamo at 3,000 r.p.m.
- (39) Slowly decelerate, noting the voltmeter reading. Opening of the contacts is indicated by the voltmeter reading dropping to zero, which should occur between the limits given.
- (40) If the reading falls outside the limits, carry out the adjustments in (41) to (44).
- (41) Stop the engine and remove the control box cover.
- (42) Adjust the cut-out contact gap by carefully bending the fixed contact bracket; reducing the gap will raise the drop-off voltage setting and increasing the gap will lower the setting.
- (43) Repeat the test in (38) and (39) and, if necessary, re-adjust until the correct setting is obtained.
- (44) Stop the engine, refit the cover and restore the original connections.

*Reverse current*

- (45) Withdraw the cables from the control box terminals 'B' and bridge the disconnected cables.
- (46) Connect the ammeter between the control box terminals 'B' and the bridged cables.
- (47) Start the engine and increase the speed until the ammeter registers a charge.
- (48) Slowly decelerate, noting the ammeter reading, which should fall momentarily to show a reverse current flow within the limits given.
- (49) If the reverse current reading falls outside the limits given, carry out the adjustments in (50) to (53).
- (50) Stop the engine and remove the control box cover.
- (51) Adjust the cut-out contact gap by carefully bending the fixed contact bracket; reducing the gap will reduce the reverse current and increasing the gap will raise it.
- (52) Repeat the test in (47) and (48) and, if necessary, re-adjust until the correct setting is obtained.
- (53) Stop the engine, refit the cover and restore the original connections.

*Air-gap settings*

**The electrical settings of the regulators must be checked after the air-gaps have been adjusted.**

*Voltage and current regulators*

- (54) Withdraw the cables from the control box terminals 'B' and remove the cover.
- (55) Turn the adjustment cam clockwise to the point giving minimum lift to the armature spring.
- (56) Slacken the locknut and unscrew the contact.
- (57) Insert a .054 in. (1.37 mm.) feeler gauge between the armature and the copper separation on the core face, as far back as the rivet heads on the armature.
- (58) Screw the contact in until the feeler gauge is just trapped (i.e. light resistance to removal).
- (59) Tighten the back nut.
- (60) Check that the narrowest part of the back gap between the back face of the armature is between .030 to .040 in. (.76 to 1.02 mm.) with a maximum taper of .010 in. (.25 mm.) on the current regulator.
- (61) Repeat the adjustment in (55) to (59) for the other regulators.
- (62) Check the electrical setting of the voltage regulator. The current regulator setting must be checked after the cut-out has been checked and adjusted electrically and mechanically.

*Cut-out relay*

- (63) Carry out (54) and (55).
- (64) Press the armature squarely down against the copper separation on the core face.
- (65) Check that a gap of .030 to .040 in. (.76 to 1.02 mm.) exists between the back face of the armature and the frame on both sides of the armature.
- (66) Insert a .015 in. (.38 mm.) feeler gauge between the head of the core and the armature using the nearest rivet as a datum.

- (67) Press the armature down and bend the fixed contact bracket until the contacts just touch.
- (68) With the feeler gauge still in position, adjust the armature back stop until it just touches the armature.
- (69) Using the nearest rivet as a datum, check that the top gap is from .035 to .045 in. (.9 to 1.14 mm.).
- (70) Check the electrical settings of the cut-out.
- (71) Check the electrical setting of the current regulator.

### Cleaning the contacts

#### Regulators

- (72) Use a fine carborundum stone or silicon carbide paper.

#### Cut-out

- (73) Use fine glass-paper only, never carborundum or emery cloth.
- (74) Use a cloth moistened with methylated spirit (denatured alcohol) to wipe away foreign matter.

## Section Na.8

### BATTERY

(Types A9, AZ9, A11, AZ11)

The electrolyte levels are visible through the translucent battery case or may be checked by fully raising the vent cover and tilting it to one side. The electrolyte level in each cell must be maintained so that the separator plates are just covered. To avoid flooding, the battery must not be topped up within half an hour of it having been charged from any source other than the generating system fitted to the car.

To top up the levels, raise the vent cover and pour distilled water into the trough until all the rectangular filling slots are full and the bottom of the trough is just covered. Wipe the cover seating grooves dry and press the cover firmly into position; the correct quantity of distilled water will automatically be distributed to each cell. In extremely cold conditions, run the engine immediately after topping-up to mix the electrolyte.

The manifold must be in position at all times except during the filling or topping-up operation.

Na.8

**Charging the battery with the manifold raised will cause flooding of the electrolyte.** Normal charging procedure should be followed, however, when fast charging, the manifold must still remain closed and this precludes the use of a thermostat. Fast charging may be carried out at a current in amps. not greater than the capacity in ampere-hours (20-hour rate) of the battery. The limit time for fast charging is 1 to 1½ hours.

The 'A'-type battery does not have accessible inter-cell connectors and the battery case must not in any circumstances be drilled. Twin cadmium testing probes should be used. A cell comparison test can be made with a hydrometer in the usual way.

## Section Na.9

### FUSE UNIT

(Type 7FJ)

The fuses are housed in a fuseblock (1) mounted in the engine compartment body adjacent to the battery.

Fuses 2 and 3 protect the side and tail lamps.

Fuse 4 protects the circuits which operate only when the ignition switch is on, viz., heater blower, stop lamps, reverse lamps.

Fuse 5 protects the equipment which operates independently of the ignition switch, viz., horns, interior lamp, cigar-lighter.

Two spare fuses (6) are provided and it is important to use the correct replacement fuse. The fusing value, current rated 17 amp. (35 amp. blow rated), is marked on a coloured slip of paper inside the glass tube of the fuse.

### Removing

- (1) Disconnect the battery.
- (2) Disconnect the electrical connections at the fuse unit.
- (3) Remove the two self-tapping screws retaining the fuse unit.

When refitting, refer to the Wiring Diagram to ensure that the correct connections are made to the fuse unit.

### Line fuse

A line fuse (7) situated above the main fuse block protects the heater blower motor and the windscreen wiper.

**NOTE.**—The heater blower motor was originally fused through Fuse 4 of the fuse unit.

Sprite and Midget. Issue 3. 80661



## Section Na.10

**STARTER**  
(Type M35J)  
(Inertia drive)

**Dismantling**

- (1) Remove the screws securing the drive-end bracket.
- (2) Withdraw the drive-end bracket complete with the armature and drive.
- (3) Remove the thrust washer from the commutator end of the armature.
- (4) Remove the screws securing the commutator end bracket.
- (5) Detach the bracket from the yoke, disengage the field brushes from the brush gear and remove the bracket.
- (6) If necessary, the drive assembly can be removed by compressing the spring, removing the jump ring and withdrawing the drive from the shaft.

**Inspection***Brush gear*

- (7) Check the brush spring tension; fit a new brush into each holder in turn, press on top of the brush with a push-type spring gauge until the brush protrudes approximately  $\frac{1}{8}$  in. (1.5 mm.) from the holder. At this point check the gauge reading against the figure given. If the spring pressures vary considerably from the figure given the commutator-end bracket assembly must be renewed.
- (8) Check the brushes for wear; renew any brush worn to, or approaching, the minimum length.
- (9) To renew the end bracket brushes, cut the brush leads from the terminal post, slot the head of the post sufficiently deep to accommodate the new brush leads and solder the new leads to the posts.

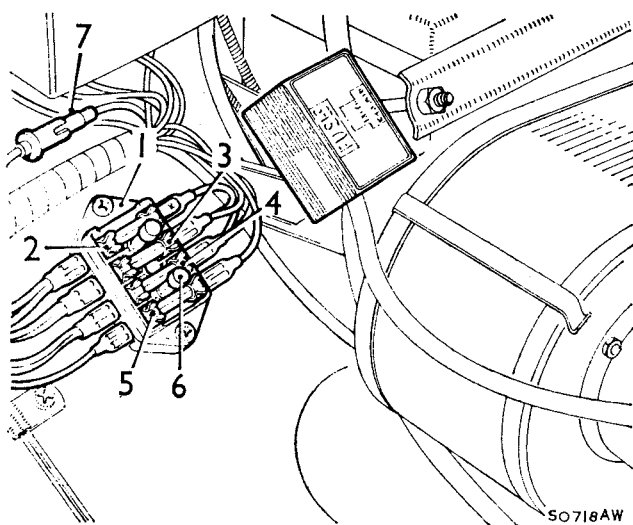


Fig. Na.9  
The fuse unit type 7FJ

- (10) To renew the field winding brushes, cut the brush leads approximately  $\frac{1}{4}$  in. (6.4 mm.) from the field winding junction, solder the new brush leads to the stumps of the old ones ensuring that the insulation sleeves provide adequate coverage.

*Commutator*

- (11) Clean the commutator with a cloth moistened with fuel and examine it for burns, pitting, and excessive wear; **provided that the amount of metal removed does not reduce the thickness of the commutator beyond the minimum thickness**, the commutator may be reconditioned as follows:
  - (a) Turn the commutator at high speed and using a very sharp tool remove the minimum amount of metal necessary to restore the surface.
  - (b) Polish the commutator with very fine sandpaper.
  - (c) Using an air blast, clean any copper residue from the armature.

**IMPORTANT.**—The commutator segment insulators must not be undercut.

*Armature*

- (12) Test the insulation of the armature windings with a 110-volt A.C., 15-watt test lamp connected between the armature shaft and the commutator; if the lamp lights the armature must be renewed.
- (13) Check the windings at their connections with the commutator for signs of melted solder or lifted conductors.
- (14) Check the shaft for distortion; if the shaft is bent or distorted the armature must be renewed. Do not attempt to straighten the shaft or machine the armature core laminations.

*Field windings*

- (15) Connect a 12-volt battery-operated test lamp between each of the field brushes and a clean part of the yoke; the lamp will light if continuity is satisfactory between the brushes, windings, and yoke connection.
- (16) Disconnect the field windings from their riveted connection with the yoke. Using a 110-volt A.C., 15-watt test lamp connected between each of the brushes in turn and the yoke, check the insulation of the field windings. If the lamp lights the windings must be renewed.
- (17) The field windings may be renewed as follows:
  - (a) Disconnect the windings from the connection with the yoke.
  - (b) Slacken the pole-shoe retaining screw using a wheel-operated screwdriver.

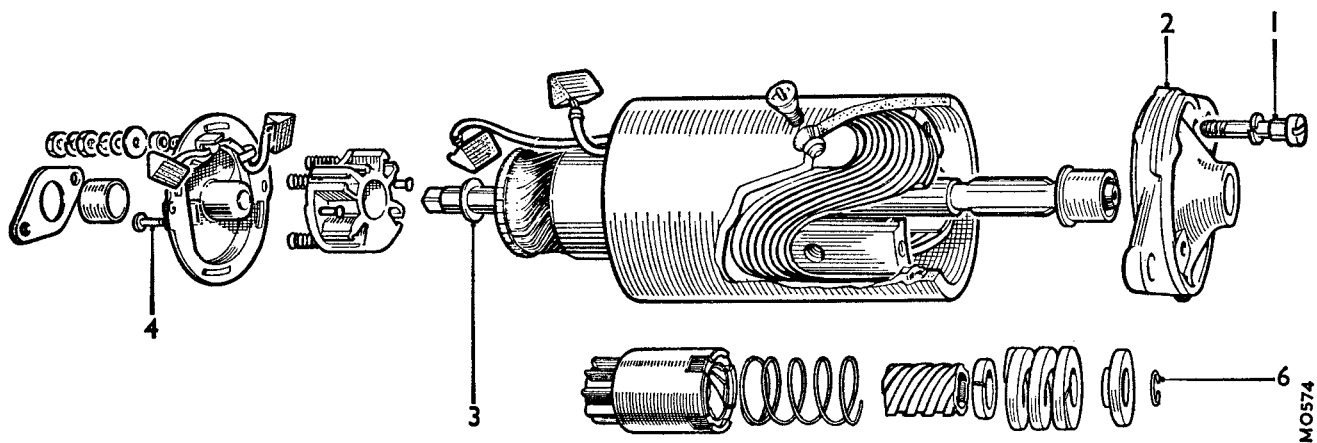


Fig. Na.10

*The starter motor type M35J*

- (c) Remove the retaining screws from one pair of diametrically opposite pole-shoes and remove the pole-shoes from the yoke.
- (d) Slide the windings from beneath the remaining pole-shoes and withdraw them from the yoke.
- (e) Clean the inside of the yoke, the pole-shoes and insulation piece.
- (f) Loosely fit the new windings and the pole-shoes and position the insulation piece between the yoke and the brush connections to the windings.
- (g) Tighten the pole-shoe screws evenly using a wheel-operated screwdriver.
- (h) Re-connect the winding junction connector to the yoke.

*Commutator end bracket*

- (18) Check the insulation of the brush springs and terminal post by connecting a 110-volt A.C., 15-watt test lamp between each spring and the terminal and a clean part of the end bracket; the lamp will light if the insulation is not satisfactory.

*Bearings*

- (19) If a bearing is worn sufficiently to allow excessive side-play of the armature shaft, the bearing bush must be renewed as follows.

*Commutator-end bracket*

- (a) Drill out the rivets securing the brush box moulding, remove the moulding, bearing seal retaining plate and felt washer seal.
- (b) Screw a  $\frac{1}{2}$  in. tap a few turns into the bush and withdraw the bush with the tap.

*Drive-end bracket*

- (c) Support the bracket and press out the bush.  
**NOTE.**—New bushes must be immersed in S.A.E. 30/40 engine oil for 24 hours or in oil heated to 100° C. (212° F.) for two hours prior to fitting. The bushes must not be reamed after fitting.
- (d) Using a polished, shouldered mandrel, the same diameter as the shaft bearing journal, press the new bushes into the brackets.

*Drive*

- (20) Wash the drive with paraffin (kerosene) and dry using an air blast.
- (21) Check the components for damage and excessive wear; renew worn or damaged parts.

*Reassembling*

- (22) Reverse (1) to (6).

*Bench testing**Light running current*

- (23) Clamp the starter firmly in a vice.
- (24) Connect a starter switch, a 0–600 amp. ammeter and a 12-volt battery, in series, to the starter, using the lug as the earth connection.
- (25) Connect a voltmeter between the starter terminal and the yoke.
- (26) Operate the switch and check the speed of the motor with a tachometer while noting the voltmeter and ammeter readings.
- (27) Check the readings obtained in 26 against the figures given in 'GENERAL DATA' for light running speed, current, and voltage.

*Lock torque and current*

- (28) With the starter connected and clamped as for the light running check, secure an arm to the driving pinion.
- (29) Connect a spring balance to the free end of the arm.
- (30) Operate the switch and note the ammeter, voltmeter, and spring balance readings. Calculate the lock torque by multiplying the reading of the spring balance in pounds by the length of the arm in feet.
- (31) Check the readings obtained in 30 against the figures given in 'GENERAL DATA' for lock torque, and voltage.

**NOTE.**—If a constant-voltage supply is used for this test, a higher voltage may be registered on the voltmeter than the figure given. If this should occur, a variable resistance must be added to the circuit and adjusted to give the required reading and the test repeated.

## Section Na.11

## REPLACEMENT BULBS

	<i>Volts</i>	<i>Watts</i>	<i>Part No.</i>
Headlamp—Home and R.H.D. Export (English sealed beam) .. .. .	12	60/45	GLU 101
Headlamp—North America (American sealed beam) .. .. .	12	50/40	
Headlamp—Europe (except France) (European sealed beam) .. .. .	12	60/50	
Headlamp—France (bulb type 411 yellow) .. .. .	12	45/40	BFS 411
Sidelamp—all markets except North America and Italy .. .. .	12	6	GLB 989
Sidelamp (with flasher)—North America and Italy .. .. .	12	5/21	GLB 380
Stop, tail—all markets .. .. .	12	5/21	GLB 380
Reverse—all markets except France .. .. .	12	18	BFS 273
Reverse—France .. .. .	12	15	BFS 267
Number-plate lamp .. .. .	12	6	GLB 989
Direction indicator .. .. .	12	21	GLB 382
Side-marker lamp—front and rear .. .. .	14	4	BFS 222
Ignition warning—all markets except North America, Sweden and West Germany .. .. .	12	2·2	GLB 987
Ignition warning—North America, Sweden and West Germany .. .. .	12	2	GLB 281
Main beam—all markets except North America, Sweden and West Germany	12	2·2	GLB 987
Main beam—North America, Sweden and West Germany .. .. .	12	2	GLB 281
Direction indicator warning lamp .. .. .	12	2·2	GLB 987
Brake warning lamp—North America, Sweden and West Germany .. .. .	12	1·5	GLB 280
Panel illumination lamp .. .. .	12	2·2	GLB 987
Cigar-lighter illumination .. .. .	12	2·2	BFS 643
Luggage compartment lamp .. .. .	12	6	GLB 254
Interior courtesy lamp .. .. .	12	6	GLB 254
Hazard warning lamp—North America .. .. .	12	2·2	GLB 987
Seat belt warning lamp—North America .. .. .	12	2	GLB 281

## Section Na.12

## SWITCHES

(Midget Mk. III from Car No. G-AN5-105501)

**Removing**

**CAUTION:** Disconnect the battery before attempting to remove any of the switches.

*Panel and wiper switches*

- (1) Disconnect the wiring from the switches.
- (2) Remove the switches, using 18G 1201.

*Light switch*

- (3) Depress the pin in the heater knob and remove the knob.
- (4) Unscrew the heater switch bezel and remove the heater switch.
- (5) Disconnect the wiring from the light switch.
- (6) Remove the switch, using 18G 1201.

*Hazard warning switch (if fitted)*

- (7) Compress the switch retaining tags, using tool 18G 1201, and push the switch rearwards out of the fascia.
- (8) Pull the wiring harness plug off the back of the switch.

**Refitting***Panel and wiper switches*

- (9) Reverse the removing procedure in (1) and (2).
- (10) Re-connect the battery.

*Light switch*

- (11) Reverse the removing procedure in (3) to (6).
- (12) Re-connect the battery.

*Hazard warning switch*

- (13) Reverse the removing procedure in (7) and (8).

## Section Na.13

DIRECTION INDICATOR/HEADLIGHT FLASHER/  
LOW-HIGH BEAM SWITCH

(Midget Mk. III from Car No. G-AN5-105501)

**Removing**

- (1) Disconnect the battery.
- (2) Unscrew the four switch cowl retaining screws and remove the cowl.
- (3) Disconnect the switch wiring from the multi-snap connector and from the clip around the steering-column.
- (4) Remove the two screws retaining the direction indicator/headlight flasher/low-high beam switch, and remove the switch and retaining clip.

**Refitting**

- (5) Reverse the procedure in (1) to (4), ensuring that the small tongue on the switch engages in the cut-away of the outer steering-column.

## Section Na.14

## IGNITION SWITCH

(Midget Mk. III from Car No. G-AN5-105501)

**Removing**

- (1) Disconnect the battery.
- (2) Turn the key to position 'O'.
- (3) Disconnect the wiring from the switch.
- (4) Remove the two screws retaining the switch to the steering lock.
- (5) Withdraw the switch.

**Refitting**

- (6) Reverse the removing procedure in (1) to (5).

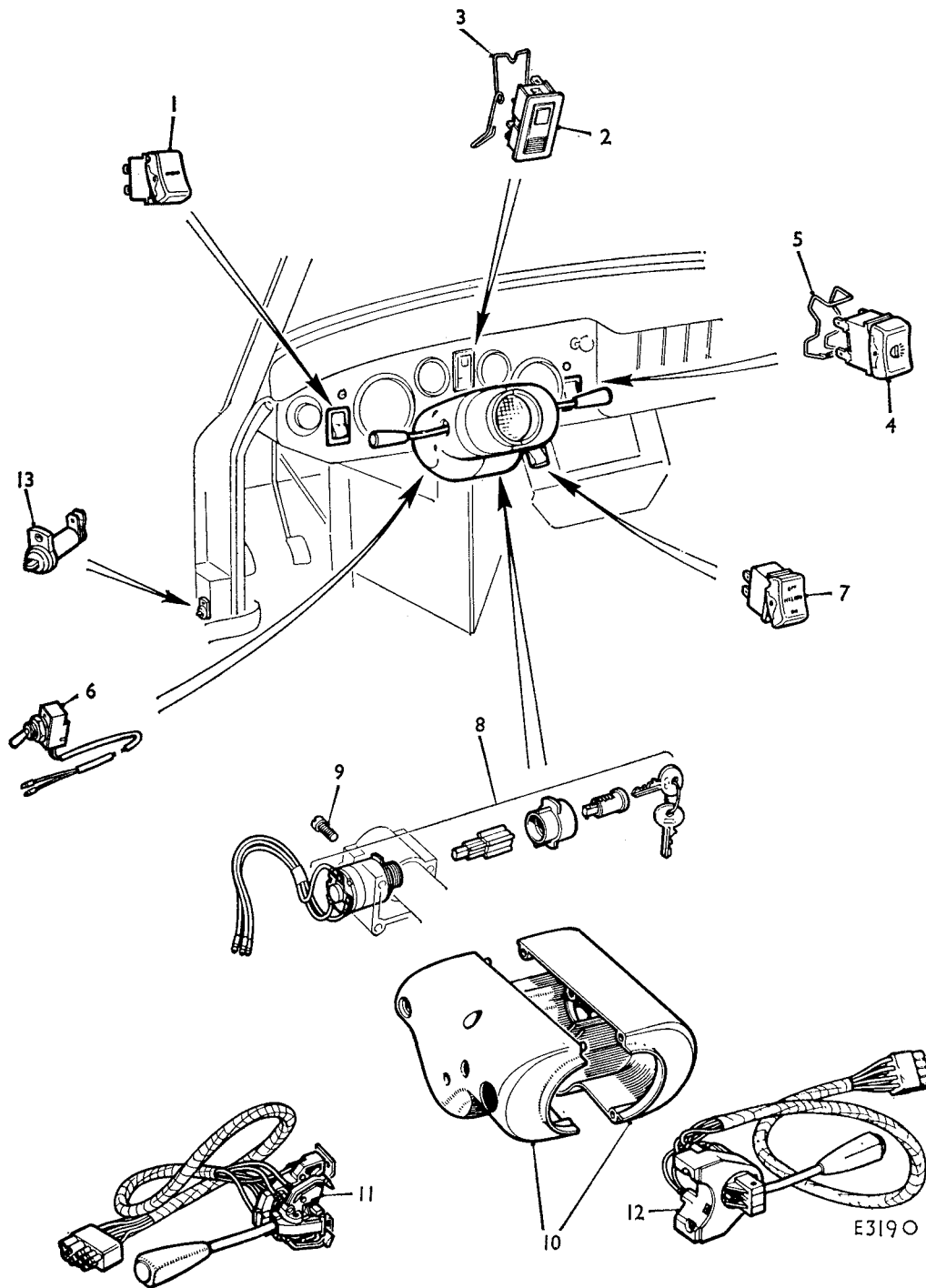
## Section Nb

### THE ELECTRICAL SYSTEM

The information given in this Section refers specifically to service operations on, or affected by, equipment fitted to the Sprite Mk. IV and Midget Mk. III in conformity with local and territorial requirements, and must be used in conjunction with Section N and Section Na.

	<i>Section</i>
Alternator (Midget Mk. III from Car No. G-AN5-105501) .. .. .	Nb.6
Audible warning buzzer .. .. .	Nb.7
Hazard warning flasher unit .. .. .	Nb.8
Instruments and switches .. .. .	Nb.1
Lamps—front and rear side-marker .. .. .	Nb.5
Seat belt warning lamp and buzzer:	
Gearbox switch .. .. .	] See page 367
Seat belt switch .. .. .	
Seat switch .. .. .	
Sequential seat belt system:	
Control unit .. .. .	] See page 368
Starter motor relay .. .. .	
Switches, warning lamps and controls (Midget Mk. III from Car No. G-AN5-123731) ..	See page 365
Testing the sequential seat belt system .. .. .	See page 370
Windshield washer motor .. .. .	Nb.2
Windshield wipers .. .. .	Nb.3
Windshield wipers (later cars) .. .. .	Nb.4

## THE SWITCHES



- | <i>No.</i> | <i>Description</i>                      |
|------------|---|
| 1.         | Heater blower switch.                   |
| 2.         | Brake pressure—warning light/test push. |
| 3.         | Retaining clip.                         |
| 4.         | Lighting switch.                        |
| 5.         | Retaining clip.                         |
| 6.         | Panel light switch.                     |
| 7.         | Hazard warning switch.                  |

- | <i>No.</i> | <i>Description</i>   |
|------------|--|
| 8.         | Ignition switch.   |
| 9.         | Screw for switch.  |
| 10.        | Steering-column switch cowl.                                     |
| 11.        | Direction indicator/headlight flasher/low-high beam/horn switch. |
| 12.        | Windshield washer/wiper switch.                                  |
| 13.        | Audible warning door switch.                                     |

## Section Nb.1

## INSTRUMENTS AND SWITCHES

## Removing

**IMPORTANT.**—Disconnect the battery before attempting to remove any of the switches or instruments.

*Tachometer*

- (1) Unscrew the two knurled retaining nuts, disconnect the earth cable and remove the retaining brackets.
- (2) Withdraw the instrument from the fascia, and disconnect the wiring.

*Speedometer*

- (3) Remove the console (Section Rb.1).
- (4) Unscrew the trip recorder reset retaining nut and disengage the reset from its bracket.
- (5) Disconnect the speedometer drive cable from the instrument.
- (6) Unscrew the two knurled retaining nuts, disconnect the earth cable and remove the retaining brackets.
- (7) Withdraw the instrument from the fascia and detach the illumination lamp.

*Fuel gauge*

- (8) Remove the speedometer as in (3) to (7).
- (9) Remove the knurled retaining nut and disconnect the earth cable.
- (10) Remove the retaining bracket, withdraw the instrument from the fascia and disconnect the wiring.

*Brake failure warning lamp assembly*

- (11) Remove the speedometer as in (3) to (7).
- (12) Remove the fuel gauge as in (8) to (10).
- (13) Disconnect the wiring from the back of the switch.
- (14) Disengage the spring retaining clip and withdraw the switch.

*Lighting switch*

- (15) Remove the console (Section Rb.1).
- (16) Disconnect the wiring from the back of the switch.
- (17) Using a short, wide-bladed screwdriver or similar tool carefully press in the two lugs on the interior of the switch and withdraw the interior from the switch case.
- (18) Disengage the spring retaining clip from the switch case and withdraw the case.

*Heater blower switch*

- (19) Remove the tachometer as in (1) and (2).
- (20) Disconnect the wiring from the back of the switch.
- (21) Carry out operations (17) and (18) as for the lighting switch.

*Air control*

- (22) Press in the knob retaining button located behind the lettering 'ON'.
- (23) Unscrew the control retaining nut and disengage the control from the fascia.
- (24) Disconnect the control inner cable from the heater air valve.
- (25) Detach the outer cable from its clip on the heater unit.

- (26) Attach a piece of cord to the inner cable to assist refitting and draw the cable through the bulkhead from the inside of the car.

*Hazard warning switch*

- (27) Remove the console (Section Rb.1).
- (28) Disconnect the wiring from the switch.
- (29) Press in the four retaining lugs on the switch outer case and withdraw the switch.

*Direction indicator/horn switch*

- (30) Remove the steering column pinch bolt.
- (31) Remove the three toe-plate to column securing bolts.
- (32) Note the location, quantity and thickness of the packing washers fitted between the column upper fixing flanges and the body brackets, remove the three securing bolts and nuts and collect the packing washers. **If the packing washers are mislaid or their fitting positions are not recorded the steering column must be aligned as described in Section Ja.3 when refitted.**
- (33) Pull the steering column back sufficiently for the switch cowl to clear the fascia.
- (34) Unscrew the four switch cowl retaining screws and remove the cowl.
- (35) Remove the two screws securing the direction indicator/horn switch to the steering column.
- (36) Disconnect the switch wiring at the multi-snap connector below the fascia and remove the switch complete with its wiring.

*Windshield wiper/washer switch*

- (37) Carry out operations (30) to (34).
- (38) Remove the two screws securing the windshield wiper/washer switch to the steering column.
- (39) Disconnect the switch wiring at the multi-snap connector below the fascia and remove the switch complete with its wiring.

*Ignition switch*

- (40) Carry out operations (30) to (34).
- (41) Unscrew the four screws securing the switch retaining saddle and remove the saddle.
- (42) Disconnect the switch wiring at the snap connectors below the fascia and remove the switch complete with its wiring.

*Panel light switch*

- (43) Carry out operations (30) to (34).
- (44) Remove the switch retaining nut.
- (45) Disconnect the switch wiring at the snap connectors below the fascia and remove the switch complete with its wiring.

**Refitting***Tachometer*

- (46) Reverse the removing procedure in (1) and (2).

*Speedometer*

- (47) Reverse the removing procedure in (3) to (7).

*Fuel gauge*

- (48) Reverse the removing procedure in (3) to (10).

*Brake failure warning lamp assembly*

- (49) Reverse the removing procedure in (3) to (14).

*Lighting switch*

- (50) Reverse the removing procedure in (15) to (18).

*Heater blower switch*

- (51) Attach the end of the control cable to the end of the cord pulled through the bulkhead when removing and carefully pull the cable through to the heater unit.
- (52) Reverse the removing procedure in (22) to (25).

*Hazard warning switch*

- (53) Reverse the removing procedure in (27) to (29).

*Direction indicator/horn switch*

- (54) Reverse the removing procedure in (34) to (36).
- (55) Enter the steering gear pinion into the steering column sleeve as far as it will go.
- (56) Fit the packing washers in their original positions between the column fixing flanges and the body brackets; fit the three securing bolts and nuts tightening them by hand until the packing washers are just pinched.
- (57) Screw in and tighten the three toe-plate to column securing bolts.
- (58) Tighten the three column upper fixing bolts to the torque figure given in 'GENERAL DATA'.
- (59) Fit and tighten the pinion pinch bolt to the torque figure given in 'GENERAL DATA'.

*Windshield wiper/washer switch*

- (60) Reverse the removing procedure in (34), (38), and (39).
- (61) Carry out the operations in (55) to (59).

*Ignition switch*

- (62) Reverse the removing procedure in (34), (41), and (42).
- (63) Carry out the operations in (55) to (59).

*Panel light switch*

- (64) Reverse the removing procedure in (34), (44), and (45).
- (65) Carry out the operations in (55) to (59).

**Section Nb.2****WINDSHIELD WASHER MOTOR****Removing**

- (1) Disconnect the battery.
- (2) Disconnect the wiring from the pump.
- (3) Disconnect the water tubes from the pump.
- (4) Unscrew the two pump mounting screws and remove the pump.

**Refitting**

- (5) Reverse the removing procedure in (1) to (4).

**Nb.4****Section Nb.3****WINDSHIELD WIPERS****Removing***Motor and gearbox assembly*

- (1) Disconnect the battery.
- (2) Disconnect the wiring from the motor terminals.
- (3) Remove the wiper arms.
- (4) Remove the two motor securing nuts and bolts.
- (5) Withdraw the motor and gearbox assembly complete with the inner drive cable. The inner cable will rotate the wiper spindles as it is withdrawn.

*Right-hand wheelbox*

- (6) Remove the fascia (Section Rb.2).
- (7) Remove the right-hand demister duct.
- (8) Remove the wheelbox cover plate and slide the outer cable from the inner.
- (9) Remove the spindle housing securing nut.
- (10) Slide the wheelbox from the inner cable.

*Left-hand wheelbox*

- (11) Remove the motor and gearbox as in (1) to (5).
- (12) Remove the fascia (Section Rb.2).
- (13) Remove the left-hand demister duct.
- (14) Remove the wheelbox cover plate and detach the outer cable.
- (15) Remove the spindle housing retaining nut.
- (16) Withdraw the wheelbox.

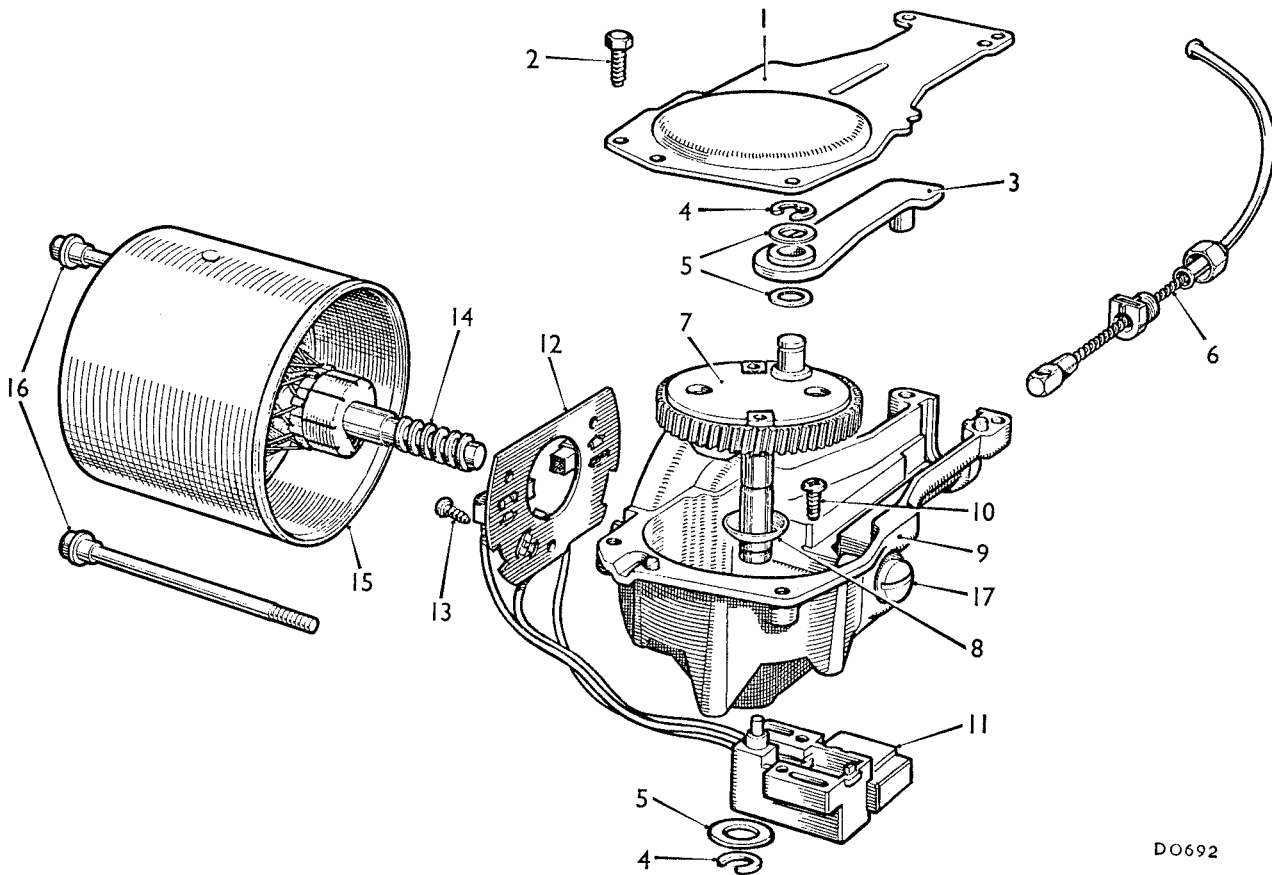
**Dismantling***Motor and gearbox assembly*

- (17) Unscrew the four gearbox cover retaining screws and remove the cover.
- (18) Remove the circlip and flat washer securing the connecting rod to the crankpin.
- (19) Withdraw the connecting rod, taking care not to lose the flat washer fitted under it.
- (20) Remove the circlip and washer securing the shaft and gear.
- (21) Clean any burrs from the gear shaft and withdraw the gear, taking care not to lose the dished washer fitted under it.
- (22) Mark the yoke and gearbox for reassembly.
- (23) Unscrew the two fixing bolts from the motor yoke and remove the yoke assembly and armature. The yoke must be kept clear of metallic particles which will be attracted to the pole piece.
- (24) Remove the screws securing the brushgear and the terminal and switch assembly, and remove both assemblies.

**Inspection***Motor and gearbox assembly*

- (25) Examine the brushes for excessive wear, if the main brushes (diametrically opposite) are worn to  $\frac{3}{16}$  in. (4.8 mm.) or if the narrow section of the third brush is worn to the full width of the brush the brush gear assembly must be renewed.





DO692

Fig. Nb.1

*The two-speed windshield wiper motor components*

- |                     |                               |
|---------------------|-------------------------------|
| 1. Gearbox cover.   | 9. Gearbox.                   |
| 2. Screw for cover. | 10. Screw for limit switch.   |
| 3. Connecting rod.  | 11. Limit switch assembly.    |
| 4. Circlip.         | 12. Brush gear.               |
| 5. Plain washer.    | 13. Screw for brush gear.     |
| 6. Cable assembly.  | 14. Armature.                 |
| 7. Shaft and gear.  | 15. Yoke assembly.            |
| 8. Dished washer.   | 16. Yoke bolts.               |
|                     | 17. Armature adjusting screw. |

- (26) Check the brush spring pressure with a push-type gauge, the gauge reading should be 5 to 7 oz. (140 to 200 gm.) when the bottom of the brush is level with the bottom of the slot in the brush box. The brush gear assembly must be renewed if the springs are not satisfactory.
- (27) Test the armature for insulation and open or short circuits, renew the armature if faulty.
- (28) Examine the gear wheel for damage or excessive wear; renew if necessary.

**Reassembling**

*Motor and gearbox assembly*

- (29) Reverse the dismantling procedure in (17) to (24) noting the following points:
  - (a) Use Ragosine Histate Grease to lubricate the gear wheel teeth and cam, armature shaft worm gear, connecting rod and connecting pin,

- cross-head slide, cable rack, and wheelbox gearwheels.
- (b) Use Shell Turbo 41 oil to lubricate the bearing bushes, armature shaft bearing journals (sparingly), gear wheel shaft and crankpin, felt washer in the yoke bearing (thoroughly soak), and the wheelbox spindles.
- (c) Tighten the yoke fixing bolts to a torque figure of 20 lb. in. (·23 kg. m.).
- (d) If a replacement armature is being fitted, slacken the thrust screw to provide end-float for fitting the yoke.
- (e) Fit the thrust disc inside the yoke bearing with its concave side towards the end face of the bearing.
- (f) Fit the dished washer beneath the gear wheel with its concave side towards the gear wheel.
- (g) When fitting the connecting rod to the crank-

pin ensure that the larger of the two flat washers is fitted under the connecting rod with the smaller one on top beneath the circlip.

- (h) With the thrust screw fully tightened against the gearbox casting, an end-float of .004 to .008 in. (.1 to .21 mm.) should exist on the armature. Adjustment of the armature end float can be achieved by adjustment of the thrust screw.

### Refitting

#### Right-hand wheelbox

- (30) Reverse the removing procedure in (6) to (10).

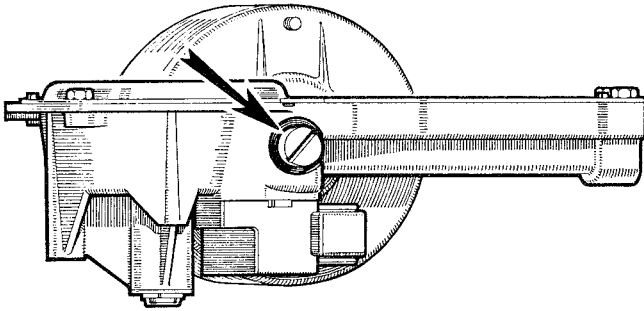


Fig. Nb.2

DO668

The armature end-float adjusting screw

#### Left-hand wheelbox

- (31) Reverse the removing procedure in (11) to (16) ensuring that the inner cable engages correctly with the wheelbox gear teeth.

#### Motor and gearbox assembly

- (32) Reverse the removing procedure in (1) to (5) ensuring that the inner cable engages correctly with the wheelbox gear teeth.

## Section Nb.4

### WINDSHIELD WIPERS

(Later cars)

Later cars have a three-blade wiper system; the additional wheelbox is fitted in the centre position.

### Removing

#### Centre-position wheelbox

- (33) Remove the fascia (Section Rb.2).  
 (34) Remove the wheelbox cover-plate and slide the outer cable from the inner.  
 (35) Remove the spindle housing securing nut.  
 (36) Withdraw the wheelbox.

### Refitting

- (37) Reverse the removal procedure.

## Section Nb.5

### LAMPS

#### Front and rear side-marker lamps

##### Removing

- (1) Disconnect the battery.
- (2) Remove the two nuts, and four washers securing the lamp.
- (3) Partially remove the lamp and disconnect the electrical leads at the harness connectors.

##### Bulb replacement

**Front (amber).** To renew a bulb, remove the securing screw (1) and lift off the lamp lens, noting that one end is secured by a locating tab (2). When refitting, ensure that the sealing rubber is positioned correctly and that the lens tab (2) is located beneath the lamp body rim before refitting the securing screw.

**Rear (red).** To gain access to the bulb (3), the rubber lips retaining the chrome bezel and lamp lens should be eased open with a screwdriver and the bezel (1), and lens (2), removed. When refitting ensure that the thick end of the wedge-shaped lens faces rearwards.

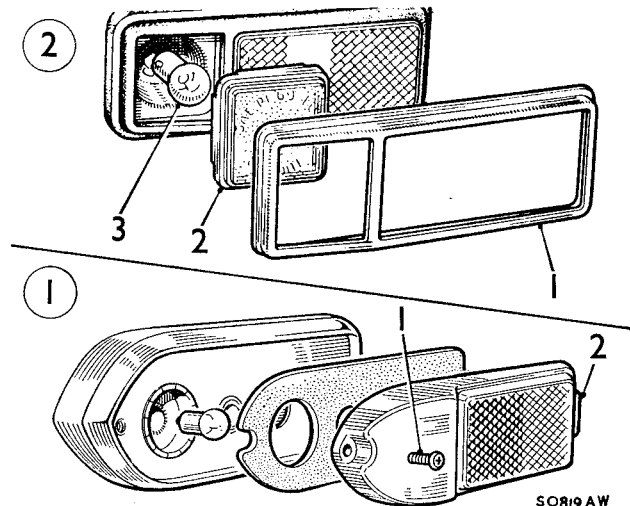


Fig. Nb.3

The front (1) and rear (2) side-marker lamps

Section Nb.6

**ALTERNATOR—Lucas Type 16ACR  
(Midget Mk. III from Car No. G-AN5-105501)**

**Service precautions**

*Polarity*

Ensure that correct battery polarity is maintained at all times; reversed battery or charger connections will damage the alternator rectifiers.

*Battery connections*

Do not disconnect the battery while the engine is running.

*Testing semi-conductor devices*

Never use an ohmmeter of the type incorporating a hand-driven generator for checking the rectifiers or transistors.

**Testing the charging circuit**

*Test conditions*

Alternator drive belt adjusted correctly, battery terminals clean and tight, battery in good condition (electrolyte specific gravity readings consistent), and cables and terminal connections in the charging circuit in good condition.

Test	Procedure	Remarks
1. To check that battery voltage is reaching the alternator	Remove the cable connector from the alternator. Connect the negative side of a voltmeter to earth. Switch on the ignition. Connect the positive side of the voltmeter to each of the alternator cable connectors in turn.	(a) If battery voltage is not available at the 'IND' cable connector, check the no-charge warning lamp bulb and the warning lamp circuit for continuity.  (b) If battery voltage is not available at the main charging cable connector, check the circuit between the battery and the alternator for continuity.  (c) If battery voltage is available at the cable connectors mentioned in (a) and (b) proceed with test 2.
2. Alternator test	Reconnect the cable connector to the alternator. Disconnect the brown cable with eyelet from the terminal on the starter motor solenoid. Connect an ammeter between the brown cable and the terminal on the starter motor solenoid. Connect a voltmeter across the battery terminals. Run the engine at 6,000 alternator rev/min and wait until the ammeter reading is stable.	(a) If a zero ammeter reading is obtained, remove the end cover and disconnect the surge protection device lead from its terminal on the alternator. If the alternator output is normal, renew the surge protection device. If the reading is still zero, remove and overhaul the alternator.  (b) If an ammeter reading below 10 amps. and a voltmeter reading between 13.6 and 14.4 volts is obtained, and the battery is in a low state of charge, check the alternator performance on a test bench. The alternator output should be 34 amperes at 14 volts, at 6,000 r.p.m.

### Testing the charging circuit (continued)

		<p>(c) If an ammeter reading below 10 amps. and a voltmeter reading below 13.6 volts is obtained, remove the alternator and renew the voltage regulator.</p> <p>(d) If an ammeter reading above 10 amps. and a voltmeter reading above 14.4 volts is obtained, remove the alternator and renew the voltage regulator.</p>
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### Removing

- (1) Disconnect the battery.
- (2) Unclip and withdraw the wiring harness plug from the alternator.
- (3) Detach the temperature gauge capillary tube from the clip mounted on the alternator rear pivot bolt.
- (4) Remove the alternator adjusting link nut.
- (5) Remove the alternator pivot bolts and nuts, noting the temperature gauge capillary tube clip.
- (6) Detach the drive belt from the alternator pulley and withdraw the alternator.
- (7) Remove the set bolt to release the adjusting link from the alternator.

### Dismantling

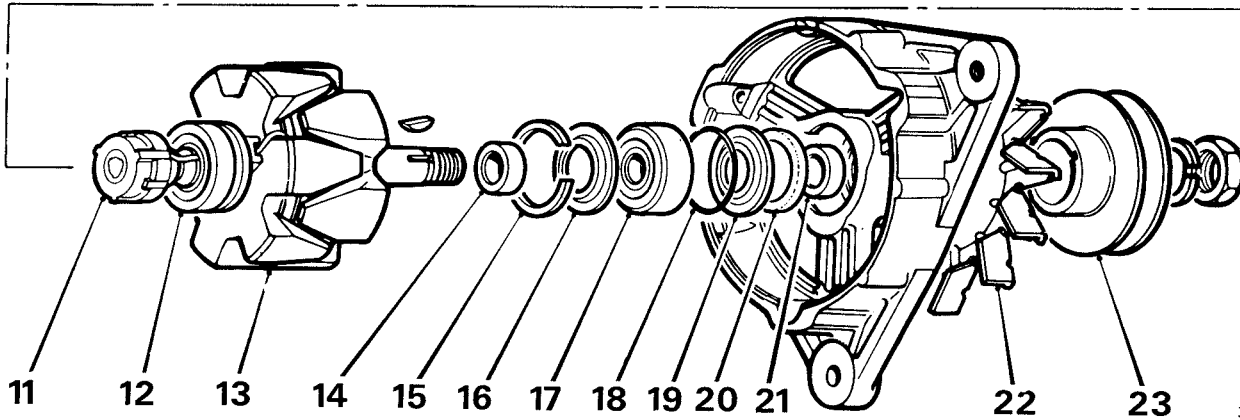
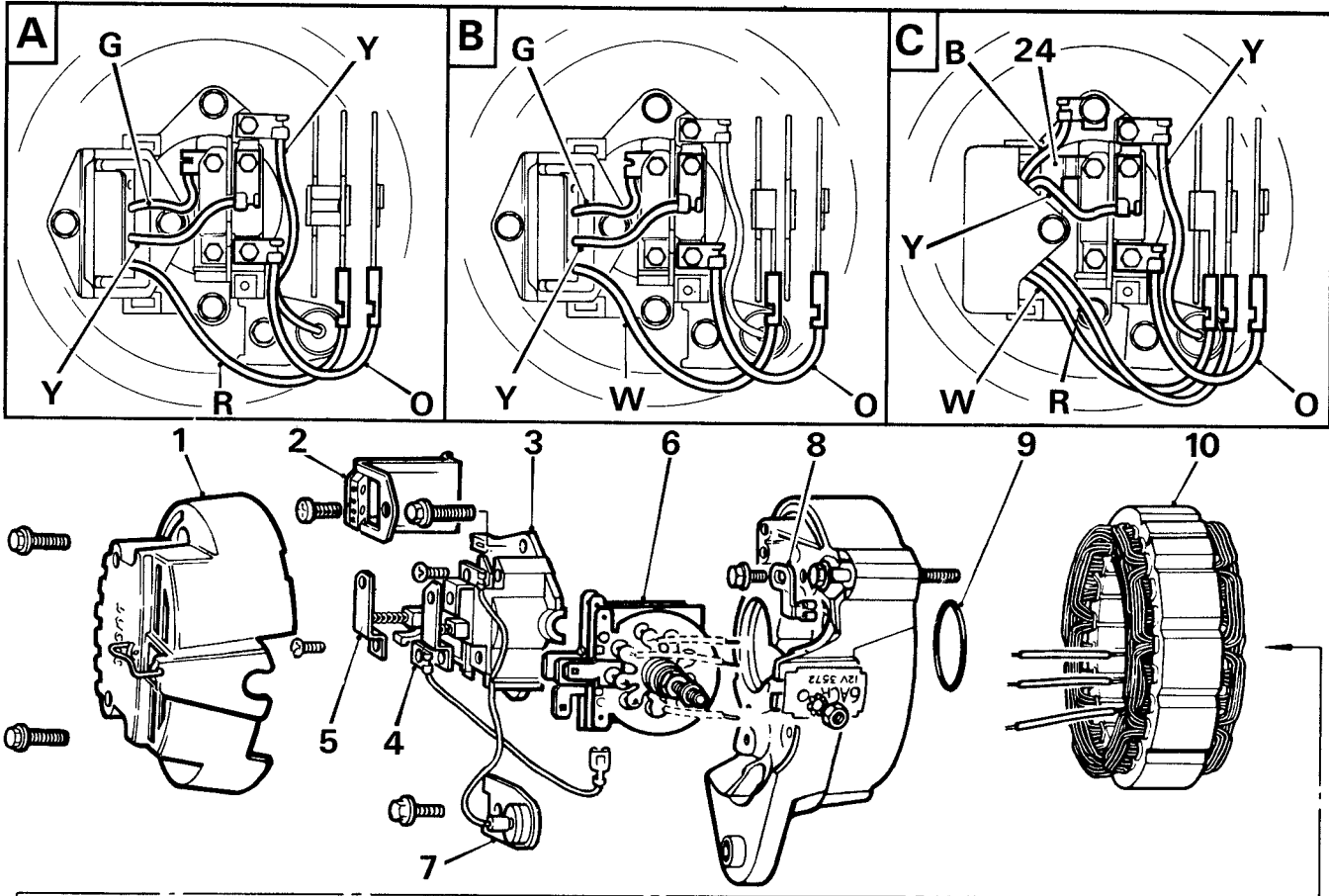
- (8) Remove the two screws to release the end cover from the alternator.
- (9) Detach the leads from the terminal blades on the rectifier plates.
- (10) Remove the four screws to release the two brush assemblies and the leads from the brush holder, noting the leaf spring fitted at the side of the inner brush.
- (11) Remove the screw to release the surge protection device lead from the brush holder.
- (12) Alternator type 23717 and 23750: Remove the bolt securing the regulator to the slip-ring end bracket.
- (13) Remove the two bolts to release the brush holder complete with regulator from the slip-ring end bracket.
- (14) Remove the screw to release the regulator from the brush holder, noting the connector link and the distance piece fitted to alternator type 23795.
- (15) Remove the set bolt securing the surge protection device to the slip-ring end bracket.
- (16) Remove the set bolt securing the rectifier earthing link to the slip-ring end bracket.

- (17) Using a pair of pliers as a thermal shunt to avoid overheating the diodes, unsolder each of the three stator cables in turn from the rectifier.
- (18) Slacken the nut to release the rectifier assembly from the clip-ring end bracket.
- (19) Mark the drive-end bracket, the stator lamination pack, and the slip-ring end bracket to assist re-assembly.
- (20) Remove the three through-bolts and withdraw the slip-ring end bracket and the stator lamination pack.
- (21) Remove the 'O' ring from inside the slip-ring end bracket.
- (22) Remove the nut and withdraw the pulley and fan from the rotor shaft.
- (23) Remove the pulley key and withdraw the distance piece from the rotor shaft.
- (24) Press the rotor out of the drive-end bracket bearing.
- (25) Withdraw the distance piece from the drive end of the rotor.
- (26) Remove the circlip to release the bearing, bearing cover-plates, 'O' ring, and felt washer from the drive-end bracket.

### Inspection

- (27) Check the bearings for wear and roughness; if necessary, repack the bearings with Shell Alvania RA grease. To renew the slip-ring end bearing, unsolder the two field connections from the slip-ring and withdraw the slip-ring and the bearing from the rotor shaft. Reassemble ensuring that the shielded side of the bearing faces the slip-ring assembly. Use Fry's H.T. 3 solder to remake the field connections to the slip-ring.
- (28) Clean the surfaces of the slip-ring, removing any evidence of burning using very fine glass paper.

THE ALTERNATOR COMPONENTS



3NCIO53

- | No. | Description              |
|-----|--------------------------|
| 1.  | End cover.               |
| 2.  | Regulator.               |
| 3.  | Brush holder.            |
| 4.  | Outer brush.             |
| 5.  | Inner brush.             |
| 6.  | Rectifier.               |
| 7.  | Surge protection device. |
| 8.  | Earthing link.           |

- | No. | Description             |
|-----|-------------------------|
| 9.  | 'O' ring.               |
| 10. | Stator lamination pack. |
| 11. | Slip-ring.              |
| 12. | Bearing.                |
| 13. | Rotor.                  |
| 14. | Distance piece.         |
| 15. | Circlip.                |
| 16. | Cover plate.            |

- | No. | Description           |
|-----|-----------------------|
| 17. | Bearing.              |
| 18. | 'O' ring.             |
| 19. | Cover plate.          |
| 20. | Felt washer.          |
| 21. | Distance piece.       |
| 22. | Fan.                  |
| 23. | Pulley.               |
| 24. | Metal connector link. |

Rectifier, brush holder and regulator arrangement  
 A = Alternator type 23717.      B = Alternator type 23750.      C = Alternator type 23795.

CABLE COLOUR CODE

- |            |           |            |
|------------|-----------|------------|
| B. Black.  | W. White. | R. Red.    |
| Y. Yellow. | G. Green. | O. Orange. |

- (29) Check the field winding insulation, connecting the test equipment (see 'GENERAL DATA') between one of the slip-rings and a rotor lobe.
- (30) Check the field windings against the specification given in 'GENERAL DATA', connecting the test equipment between the slip-rings.
- (31) Check the stator windings for continuity, connecting the test equipment (see 'GENERAL DATA') between any two of the stator cables, then repeating the test using the third cable in place of one of the first two.
- (32) Check the stator winding insulation, connecting the test equipment (see 'GENERAL DATA') between any one of the three stator cables and the stator lamination pack.
- (33) Check the nine rectifying diodes, connecting the test equipment (see 'GENERAL DATA') between each diode pin and its associated heatsink in the rectifier pack in turn, and then reverse the test equipment connections. Current should flow in one direction only. Renew the rectifier assembly if a diode is faulty.
- (34) Check the brush spring pressure and the brush length against the specification given in 'GENERAL DATA'.

#### Reassembling

- (35) Reverse the procedure in (8) to (26), noting:
- Support the inner track of the bearing when refitting the rotor to the drive-end bracket.
  - Use 'M' grade 45-55 tin-lead solder to re-make the stator to rectifier pack connections, using a pair of pliers as a thermal shunt to avoid overheating of the diodes.
  - Tighten the alternator pulley nut to 25 lb. ft. (3.46 kg. m.).
  - Refer to the illustration on page Na.14 when

reconnecting the regulator and surge protection device leads to the rectifiers and the brushes.

#### Refitting

- (36) Reverse the procedure in (1) to (7), applying leverage to the alternator drive-end bracket only when tensioning the drive belt. A correctly tensioned drive belt can be deflected a total of  $\frac{1}{2}$  in. (13 mm.) by hand pressure at the middle of the belt's longest run.

### Section Nb. 7

#### AUDIBLE WARNING BUZZER

##### Removing

The audible warning buzzer is positioned under the fascia behind the air-flow rotary control.

- Disconnect the battery.
- Disconnect the wiring from the buzzer.
- Remove the screw retaining the buzzer.

##### Refitting

- Reverse the removing procedure in (1) to (3).

### Section Nb. 8

#### HAZARD WARNING FLASHER UNIT

##### Removing

- Disconnect the battery.
- Remove the centre console—Section Rb.1.
- Withdraw the flasher unit from its retaining clip.
- Disconnect the wiring plug from the flasher unit.

##### Refitting

- Reverse the removing procedure in (1) to (4).