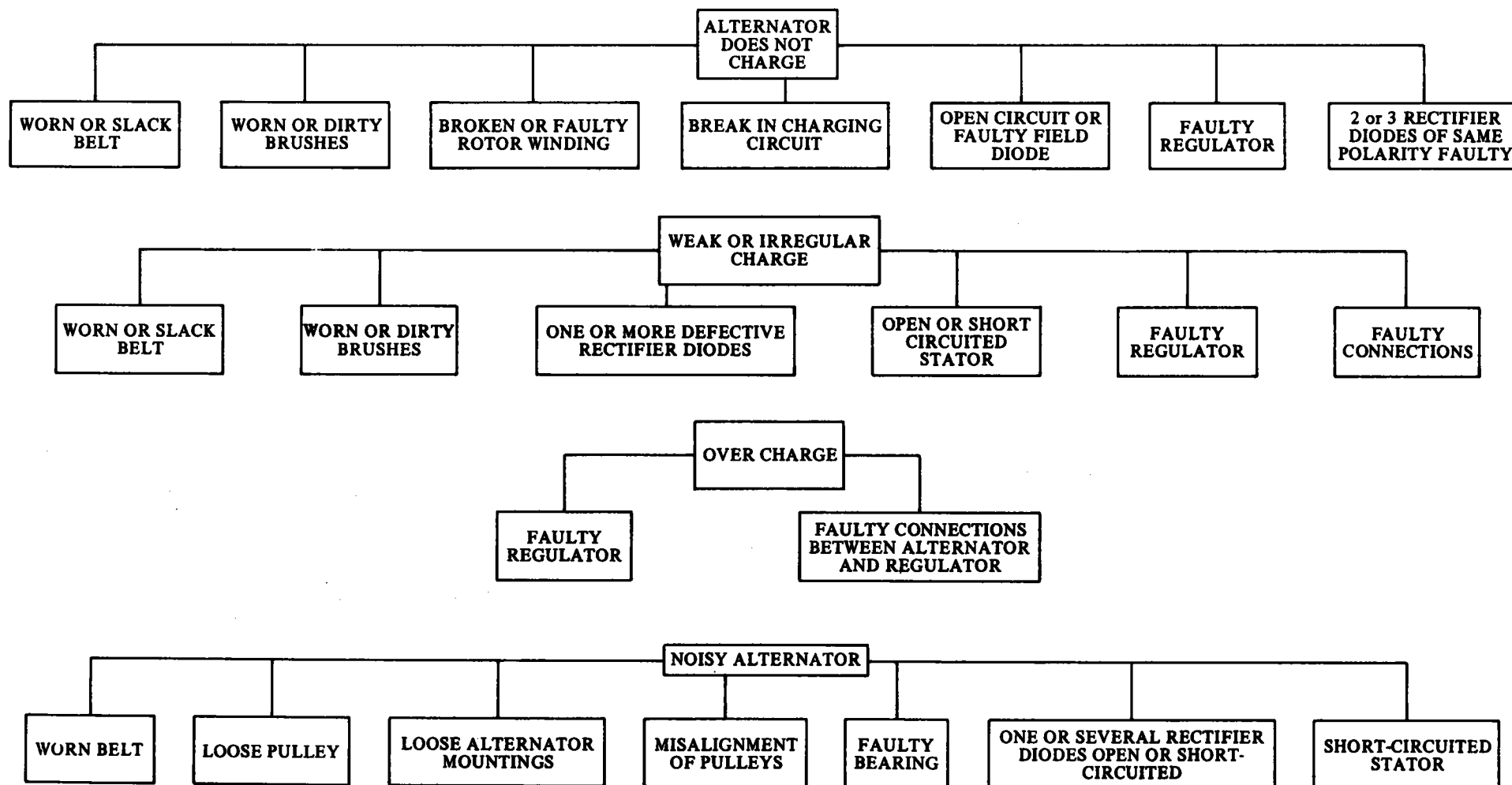


SYMPTOM AND DIAGNOSIS CHART



CHECK EACH ITEM IN TURN AND RECTIFY IF NECESSARY BEFORE PROCEEDING TO NEXT ITEM

FUSE NO. on 3.4L and 4.2L cars	CABLE COLOURS	PROTECTED CIRCUITS	FUSE MAX CONTINUOUS	RATING AMPS FUSING CURRENT	LOCATION OF FUSE	FUSE COLOURS	
						LUCAS	TDC 78
1	Red/Yellow	Fog lamps (if fitted)	10	20	Main fuse box	Blue on yellow	Orange/violet
2	Brown to Brown/Orange	Hazard warning switch	8	15		Light brown	Orange/green
3	Brown to Purple	Map and interior lights, cigar lighter, clock and boot light	17	35		White	White/sky blue
4	White to Green (2)	Instrument and transmitters, fuel pumps, reverse lamps and overdrive controls (if fitted)	8	15		Light brown	Orange/green
5	White/Pink to Green	Direction indicator system	8	15		Light brown	Orange/green
6	White/Pink to Green (2)	Stop lamps, horn relay windings, screen washer and battery cooling system	17	35		White	White/sky blue
7	Red/Blue	Panel lights	8	15		Light brown	Orange/green
8	Red/Slate to Red (2)	L.H. sidelamp and tail lamp	8	15		Light brown	Orange/green
9	Red/Orange to Red (2)	R.H. sidelamp and tail lamp and cigar lighter illumination	8	15		Light brown	Orange/green
10	Brown (2) to Brown/White (2)	Air conditioning or heater motors	25	50		Yellow	Yellow/sky blue
11	White/Pink to Light Green (2)	Windscreen wiper system	10	20		Blue on yellow	Orange/violet
12	Link to Light Green	Air conditioning (if fitted)	8	15		Light brown	Orange/green
	Blue/White	Headlamp main beam, inner and outer, RH	12	25	Small box on radiator top rail	Pink	Orange/white
	Blue/Red	Headlamp dipped beam, RH	5	10		Pale blue	Orange/black
	Blue/White	Headlamp main beam, inner and outer, LH	12	25	Small box on radiator top rail	Pink	Orange/white
	Blue/Red	Headlamp dipped beam, LH	5	10		Pale blue	Orange/black
	IN LINE FUSES						
	Purple/Brown	Horn relay	17	35	Harness on RH of bulkhead	White	White/sky blue
	White/Black	Heated rear window	17	35	Clipped below main fuse box	White	White/sky blue
	White/Pink	Radio. Fuse varies according to type of radio fitted, and may be 1½ to 2, 1.6 or 5 amp: also protects aerial motor relay windings, if fitted	—	—	In console		
	Brown/Purple	Aerial motor relay (if fitted)	5	10	Under boot floor on rear wall, near centre line car.	Pale blue	Orange/black
	Red/Orange	Rear fog guard lamps (if fitted)	5	10	Normally in console, but position may vary	Pale blue	Orange/black

ALTERNATOR

Description

86.10.00

The Lucas alternators – types 18-, 20-, or 25-ACR, fitted according to specification of car, are high output three phase machines which produce current at idling speed.

The heatsink – rectifier, terminal block assembly can be removed complete. There are six silicon diodes connected to form a full wave rectifier bridge circuit, and three silicon diodes which supply current to the rotor winding. Individual diodes cannot be removed from the heatsink assemblies. Regulation is by a Lucas control unit mounted in the slip ring end bracket. There is no provision for adjustment in service.

Individual connectors are used to connect external wiring to the alternator. The alternators main negative terminals are connected internally to the body of the machine.

Surge Protection Device

The surge protection device is a special avalanche-diode, fitted to the outer-face of the slip-ring end bracket (not to be confused with a suppression capacitor, similarly fitted in the end bracket). The avalanche-diode is connected between terminal 'IND' and frame and its purpose is to protect the regulator from damage by absorbing high transient voltages which occur in the charging system due to faulty cable connections, or when certain switching devices are operated. (The surge protection device is intended to provide limited protection for the regulator under normal working conditions and therefore the service precaution not to disconnect any of the charging system cables, particularly those at the battery, while the engine is running, should still be observed).

Alternative high output alternators, the Motorola 9AR 2512P and 9AR 2533P are fitted to some later cars; instructions for their overhaul, which differ in some details from those for Lucas alternators, are given in the appropriate sections of the manual.

CAUTION: No part of the charging circuit should be connected or disconnected while the engine is running.

When using electric-arc welding equipment in the vicinity of the engine take the following precautions to avoid damage to the semi-conductor devices used in the alternator and control box, and also the ignition system.

Disconnect battery earthed lead.

Disconnect alternator output cables.

Disconnect ignition and amplifier unit.

ALTERNATOR

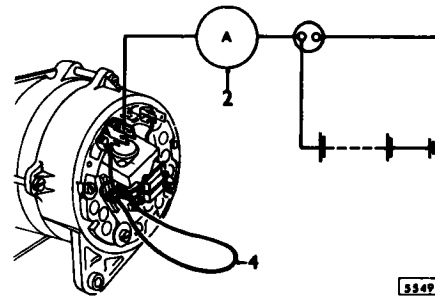
Test (in situ) Lucas alternators only

86.10.01

(a) Output Test

Equipment required: A moving coil ammeter or multi-range test meter on range 0–75 amperes.

This test should be carried out with the alternator at normal temperature. Run cold engine at 3000 rev/min for 3–4 minutes.



5549

- 1 Disconnect battery earth lead.
- 2 Connect ammeter in series with alternator main output cable and starter solenoid.
- 3 Remove connectors from alternator. Remove moulded end cover and remake connectors.
- 4 Connect jumper lead to short out the 'F' and '-' terminals of the control unit.

(This makes regulator inoperative by effectively linking 'F' green lead to alternator frame).

5 Re-connect battery earth lead.

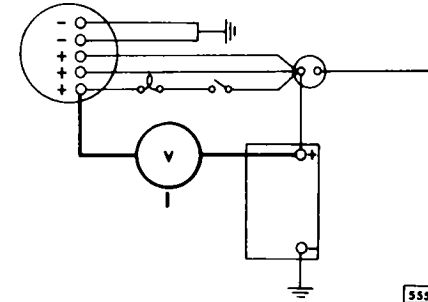
6 Switch on all vehicle lighting, headlights on main beam. Switch on ignition and check warning light is on.

7 Start engine, slowly increase speed to 3000 rev/min. Ammeter reading should equal maximum rated output of 66 amperes (45 amperes for 18 ACR alternator).

(b) Voltage Drop Test (in situ)

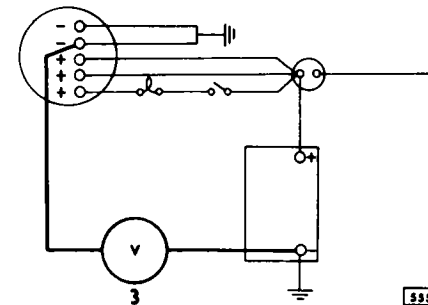
Equipment required: A moving coil voltmeter multi-range test meter on 0–30 volt range.

To check for high resistance in the charging circuit.



5550

- 1 Connect voltmeter between battery + VE terminal and alternator main output terminal.
- 2 Switch on all vehicle lighting, headlights on main beam. Start engine and run at 3000 rev/min. Note voltmeter reading. Stop engine.



5551

3 Transfer voltmeter connections to battery earth and alternator negative terminal.

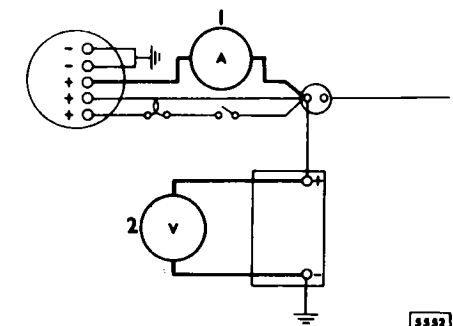
4 Repeat operation 2. Note voltmeter reading.

5 Voltage should not exceed 0.5 volts for positive side. Higher readings indicate high resistance in the circuit.

(c) Control Unit Test

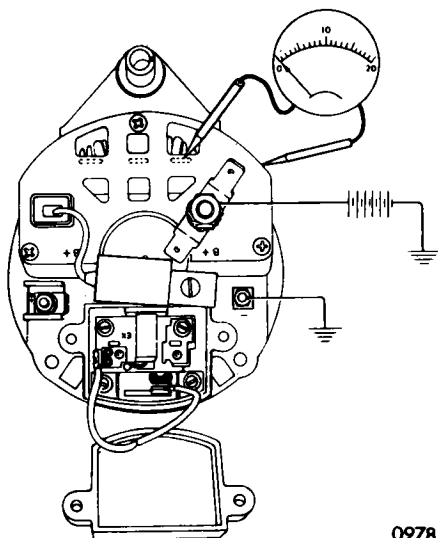
Equipment required: A moving coil ammeter and moving coil voltmeter or multi-range test meters.

Circuit wiring must be in good condition, and all connections clean and secure. The battery must be in a well charged condition or be temporarily replaced by a charged unit.

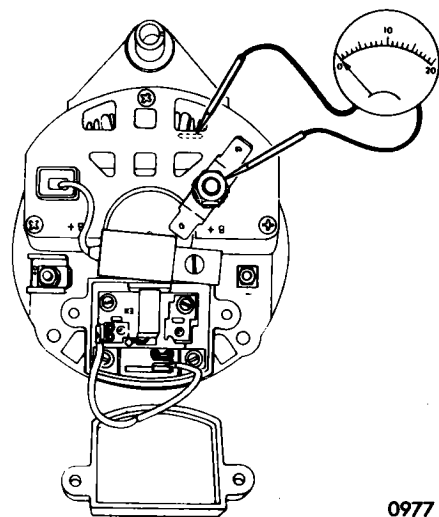


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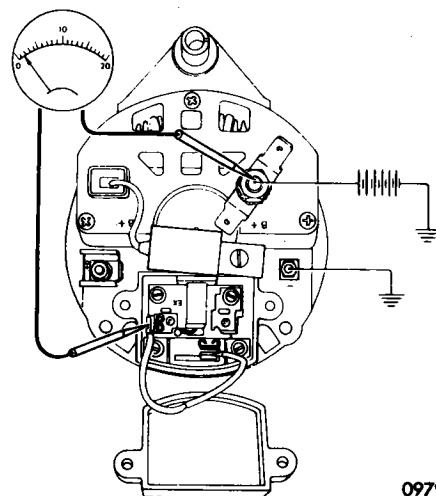
- 1 Connect ammeter in series with starter solenoid and alternator main output cable.
- 2 Connect voltmeter between battery terminals.
- 3 Start engine and run at 3000 rev/min until the ammeter reads less than 10 amperes. Voltmeter reading should be between 13.6 volts and 14.4 volts.
- 4 An unstable reading or a reading outside the specified limits indicates a faulty control unit.



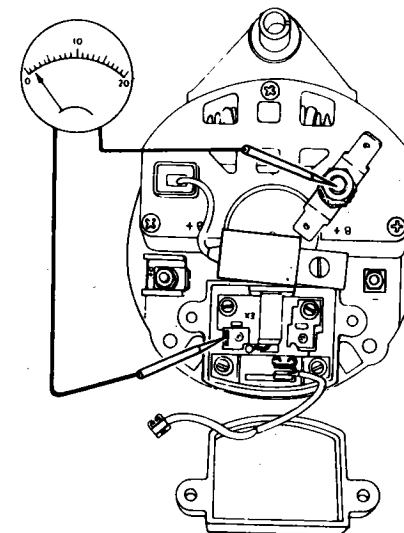
0978



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0980

ALTERNATOR

Test (in situ) Motorola alternators 86.10.01

Equipment required: Voltmeter and ammeter, field rheostat.

NOTE: Before commencing tests ensure that battery is fully charged. If not, disconnect battery before recharging it.

Never disconnect battery, alternator or regulator with engine running.

Do not earth field winding (terminal marked EX, connected to regulator by green lead).

On cars fitted with air conditioning it is advisable to remove alternator from vehicle before carrying out tests 1 and 3 and to substitute bench tests for tests 4, 5 and 6.

Always disconnect battery when removing or refitting alternator.

Test 1

Ignition switched OFF. Check of stator windings. Check voltage on one of the three phases of stator windings, accessible to a probe from voltmeter passing through ventilation hole as shown.

Connect voltmeter first between phase and earth, then between winding and positive terminal, observing correct polarity. Indication of any reading other than zero on voltmeter shows defective positive rectifier diode, necessitating changing of diode bridge, see 86.10.08

Test 2

Ignition switched OFF. Check of battery connections. Check voltage at B+ terminal on alternator and at battery positive terminal. Voltage should be the same at both points. If voltage at B+ terminal is lower than battery voltage, or fluctuates, check for broken wires, faulty connections or corroded terminals.

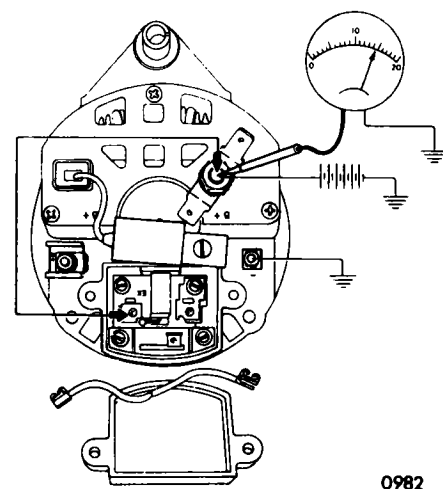
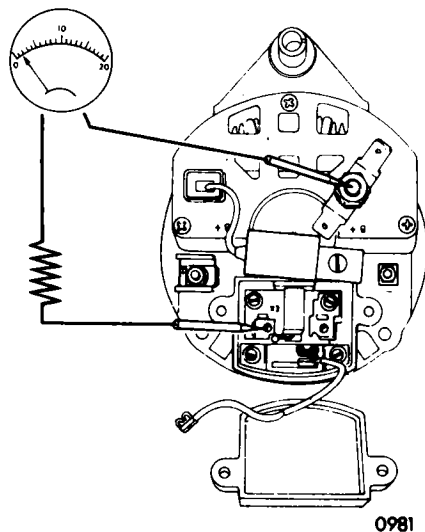
Test 3

Ignition ON, engine not running. Check of field circuit.

Check voltage at slip ring, by touching probe of voltmeter on field terminal 'EX' with regulator attachment screws removed. If voltmeter reading is higher than 2 volts, field circuit is defective; remove brush holder by detaching green regulator lead from field terminal 'EX' and remove two setscrews, with washers, securing brush holder to alternator. Check that brushes are free to slide, undamaged and not excessively worn; new brushes protrude by approximately 0.35 in. (9 mm.) from the brush holder, and complete brush holder must be renewed if either brush protrudes by less than 0.15 in. (4 mm.). Ensure that brush leads are not frayed and are securely attached to brushes, and that slip rings are clean. If in doubt, refer to 86.10.14 and check brushes electrically.

If voltmeter reads zero, check connections to regulator, ignition switch and ignition indicator lamp.

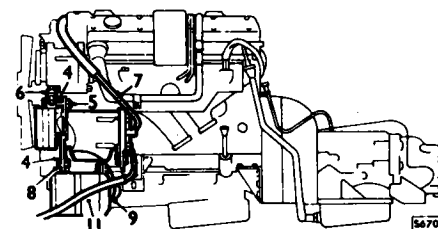
Also check regulator circuit by detaching its green lead from field EX terminal and measuring voltage across field windings, which should not exceed 2 volts. If this voltage is between 8 and 12 volts, alternator is defective. If correct proceed to test 5.



Test 4
Ignition ON, engine running faster than idle. Further check of field circuit. If incorrect readings were obtained in Test 3, retest field circuit by disconnecting regulator from field terminal EX and connecting ammeter between this terminal and output terminal B+. If meter indicates current less than 1 amp, recheck brushes, leads and slip rings.
CAUTION: Use a field rheostat in series with ammeter, so that excessive current which could flow if field is shorted will not damage ammeter.

Test 5
Ignition ON, engine running faster than idle.
Check of output voltage.
Check voltage both at output terminal (B+) and at positive terminal of battery. Correct voltage at both points is 14.2 volts \pm 0.5 volts, at 25°C (77°F).
If difference between battery voltage and voltage at B+ terminal is more than 0.3 volts check wiring and terminals for corrosion or breaks.

Test 6
Field lead disconnected, regulator disconnected, output terminal shorted to field terminal, ignition on, engine running at fast idle. Regulator and diodes check. With alternator connected as specified above and shown in diagram, check voltage between output terminal B+ and earth. If voltage rises to 14 to 16 volts in this test, but did not reach 14 volts in test 5, regulator is defective. Replace by new regulator.
If output voltage does not rise, and field circuit has been found satisfactory in tests 3 or 4, then either alternator stator or rectifier diodes are defective. Remove alternator for further attention, see 86.10.02.



ALTERNATOR

Remove and refit (Lucas or Motorola)

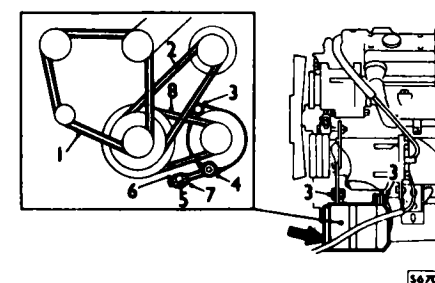
86.10.02

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Drain coolant – 26.10.01.
- 3 Remove remote header tank – 26.15.01.
- 4 Slacken air conditioning compressor mounting bolts (if fitted).
- 5 Slacken compressor drive belt adjuster trunnion retaining nut.
- 6 Slacken compressor drive belt adjustment and locknuts.
- 7 Adjust compressor as near to engine block as practicable without kinking air conditioning hoses.
- 8 Withdraw adjusting arm securing bolt from alternator end frame.
- 9 Disconnect alternator cables from lucar connections.
- 10 Withdraw alternator mounting bolts.
- 11 Ease alternator past compressor and clear of engine compartment, taking great care not to damage or disturb air conditioning pipes.

Refitting

- 12 Reverse operations 7 to 10.
- 13 Tighten adjusting nut to obtain an alternator belt tension as follows:
A load of 3.2 lbs. (1.45 kg) applied at midpoint of lower portion of belt will give a deflection of .15 ins. (4.0 mm).
- 14 Tighten adjuster locknut and alternator securing bolts.
- 15 Reverse operations 1 to 7.



ALTERNATOR DRIVE BELT

Remove and refit

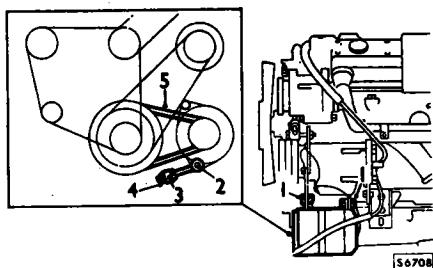
86.10.03

Removing

- 1 Remove water pump/power steering pump drive belt – 57.20.02.
- 2 Remove air conditioning compressor drive belt – 82.10.02.
- 3 Slacken alternator mounting bolt.
- 4 Slacken adjusting link securing bolt.
- 5 Slacken trunnion block securing bolt.
- 6 Slacken adjusting link locking nut.
- 7 Slacken adjusting nut.
- 8 Remove drive belt.

Refitting

- 9 Ease belt over crankshaft pulley and alternator pulley.
- 10 Adjust drive belt – 86.10.05/2.
- 11 Reverse operations 1 and 2.
- 12 Tighten all locknuts, mounting bolts and nuts.

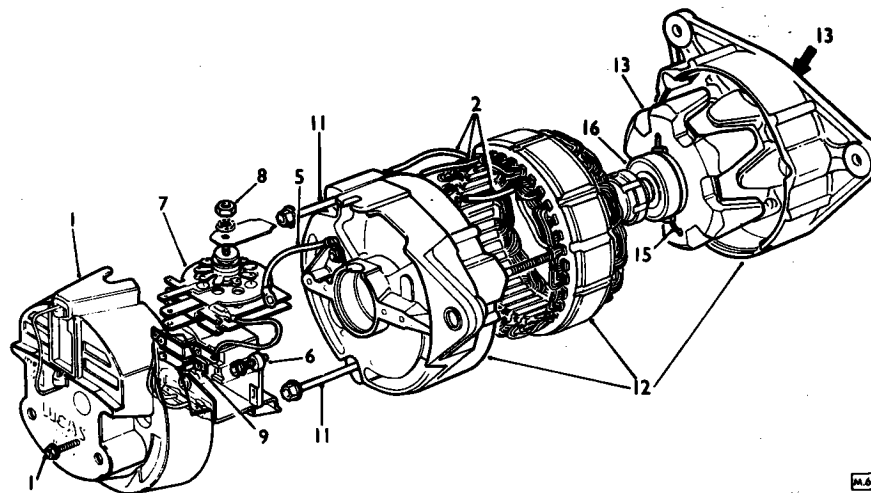


ALTERNATOR DRIVE BELT

Adjustment (Lucas or
Motorola)

86.10.05

- 1 Slacken alternator mounting bolt.
- 2 Slacken adjusting link securing bolt.
- 3 Slacken trunnion block securing bolt.
- 4 Slacken adjusting link locking nut.
- 5 Adjust belt tension with adjusting nut.
Belt tension — 3.2 (1,45 kgs) .15 in.
(3,8 mm).
- 6 Tighten all securing nuts and bolts.



ALTERNATOR — LUCAS 18 ACR

Overhaul

86.10.08

Dismantling

- 1 Withdraw two retaining screws and remove moulded slip ring end cover.
- 2 Note positions of stator winding connections to rectifier connecting pins.
- 3 Using thermal shunt and light weight soldering iron (25 watt) unsolder connections.
- 4 Note position of cable connectors to rectifier plates.
- 5 Disconnect cables.
- 6 Withdraw three hexagon headed screws securing brushbox and regulator to slip ring end bracket.
- 7 Remove brushbox moulding and regulator assembly.
- 8 Slacken rectifier securing nut and remove rectifier.

Brushgear

- 9 Renew brush and spring assemblies if brushes are worn to 0.312 in. (8 mm).
- 10 Check brush spring pressure with push type spring gauge to end of brush. Spring pressure should be 9-13 oz/f (255-368 g or 2.5-3.6 N) when brush is flush with moulding.

Slip rings

If necessary clean slip rings with petrol moistened cloth or very fine glass paper.

NOTE: Do not use emery cloth or similar abrasive.

Further dismantling

- 11 Withdraw three through bolts.
- 12 Separate alternator into its major components.
 - (a) Slip ring end bracket.
 - (b) Drive end bracket, rotor, fan and pulley.
 - (c) Stator laminations and windings.

13. Separate rotor from drive end bracket by removing pulley, fan and shaft key. Press rotor shaft from bearing.
- 14 Inspect bearings and if satisfactory pack with grease, Shell Alvania 'RA'.

NOTE: To pack slip ring end bearing with grease it is first necessary to remove slip ring moulding.

Bearings

- Slip ring end.
- 15 Unsolder field windings from slip ring moulding.
- 16 Remove slip ring moulding.
- 17 Press bearing from shaft.
- Drive end.
- 18 Remove circlip and retaining plate from drive end bearing.
- 19 Press out bearing.

Reassembly

Reverse operations 1 to 19.

ALTERNATOR – MOTOROLA 9AR 2512 P AND 9AR 2533 P

Overhaul

86.10.08

Dismantling

- 1 Detach nut, shakeproof washer and connector blade from B + terminal at end cover.
- 2 Remove setscrew and washer securing capacitor to alternator case, separate lucar and detach capacitor.
- 3 Withdraw three screws and remove moulded rear cover.
- 4 Remove two setscrews and washers, separate two Lucars and detach regulator.
- 5 Remove two setscrews and washers and lift out brush holder.
- 6 Clamp pulley, unscrew pulley nut and remove small washer, pulley, fan and large washer from alternator spindle.
- 7 Extract Woodruff key from spindle and remove spacer.
- 8 Remove four through-bolts; collect washers and square trapped nuts.
- 9 If casing halves do not readily separate, clamp alternator spindle in protected

jaws of vice and draw off rear housing, with stator and diode bridge. Rear bearing will remain on spindle.

CAUTION: Take care to avoid damage to stator and windings by rotor.

- 10 Remove alternator spindle from vice and draw off front housing. Collect short spacer adjacent to rotor.
- 11 If necessary, remove front bearing from housing by withdrawing three screws securing retaining plate and pressing out bearing.
- 12 If necessary, draw rear bearing off alternator spindle, using an extractor reacting against spindle end.
- 13 Mark position of stator ring in rear housing to ensure that it is correctly replaced.
- 14 Unsolder leads of three phase windings and D + (red) lead from diode bridge. **CAUTION:** Avoid transmitting excessive heat to diodes by incorporating a thermal shunt by using long-nosed pliers to grip each terminal as wire is unsoldered.
- 15 Withdraw two setscrews and lift out diode bridge. Collect washers.

- 16 Lift housing off stator, detach two terminals from housing and remove D + lead complete.

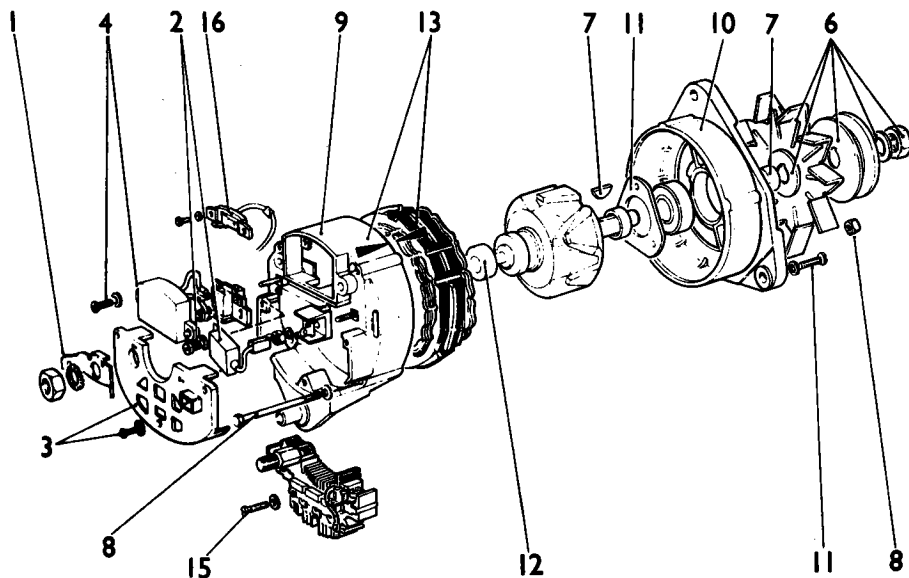
- 17 Extract O-ring from bearing housing. **NOTE:** To remove diode bridge with a minimum of dismantling, carry out operations 1, 2, 3, 14 and 15 only. Refer to 86.10.14 for details on inspection and bench testing.

Reassembling

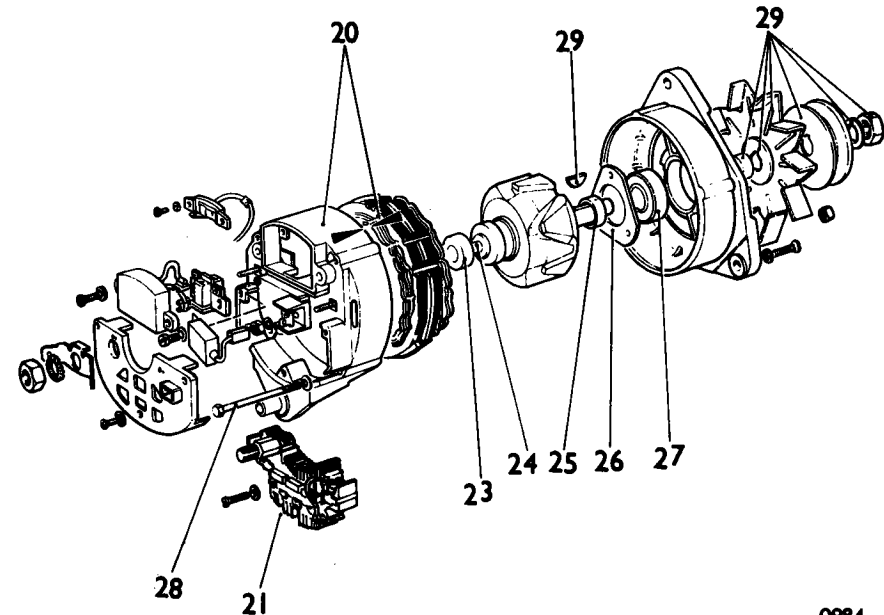
- 18 Fit new O-ring into recess in rear bearing housing.
- 19 Replace D + (red) lead assembly in rear housing, securing it with two setscrews and washers at lucar carrier and bolt and nut at D + terminal. Thread loose end of lead through hole below D + terminal.
- 20 Place stator and coils in marked position with three leads passing back through housing. Rest stator, with housing on top of it, on non-abrasive surface.
- 21 Lower diode bridge, with terminals and capacitor fitted, into position in housing, with three leads passing

through gaps between fins. Secure with two setscrews and washers, trapping capacitor connector under RH setscrew.

- 22 Using long-nosed pliers (as a thermal shunt) to grip each terminal in turn and prevent excess heat reaching diode, solder three phase winding leads and D + lead to diode bridge. Do not overheat diode bridge.
- 23 If required, press new bearing on to rear end of rotor spindle.
- 24 Press spindle and bearing into position in rear housing.
- 25 Place short spacer over front end of spindle, ensuring that its larger inside diameter is next to rotor.
- 26 If necessary, press new front bearing into front housing and secure with retaining plate; apply Loctite to screw threads and to tapped holes in plate.
- 27 Press front housing into position and insert four through-bolts with plain washers under heads.
- 28 Coat threads of through-bolts and trapped nuts with Loctite and tighten to 3.6 lbf.ft. (0.5 kgf.m.).



0983



- 29 Place plain spacer over spindle, insert Woodruff key and replace large washer, fan, pulley, small washer and nut on spindle. Tighten nut to 29 lbf.ft. (4.0 kgf.m.).
- 30 Reverse operations 1 to 5.

ALTERNATOR

Inspection and testing (Lucas alternators)

86.10.14

Brush Gear and Slip Ring Inspection

The serviceability of the brushes is gauged by the length protruding beyond the brush moulding in the free position. This amount should exceed 0.3 ins. (8 mm). If renewal is necessary care must be taken to replace the leaf spring at the side of the inner brush.

The surface of the slip rings should be smooth and free from grease or dirt. Servicing is confined to cleaning with a petrol moistened cloth or finest grade glass-paper.

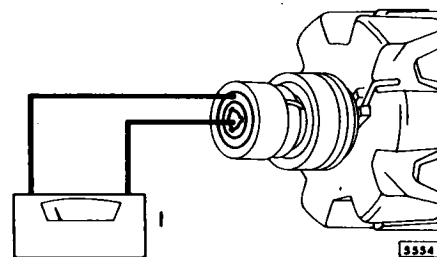
NOTE: Emery cloth or similar abrasive must not be used. The slip rings cannot be machined.

(a) Brush Replacement

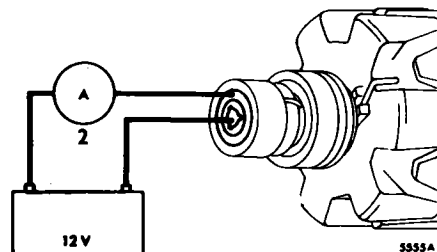
- 1 Remove the small screws securing the brush retaining plates and regulator cables.
- 2 Replace brushes with new units and refit brush retaining plates and regulator cables.
- 3 Brush spring pressure should be checked with a push type spring tension gauge. This should indicate 9-13 ozs. (255-368 grammes) when brush face is flush with the moulding.

(b) ROTOR Testing

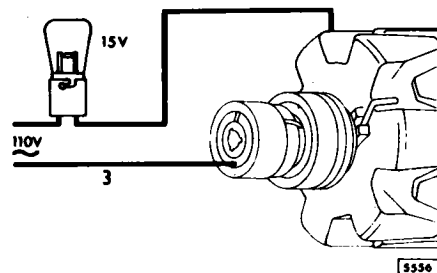
Equipment required: An ohmmeter, or a 12-volt battery and ammeter. A 110-volt a.c. supply and a 15 watt test lamp.



- 1 Connect the ohmmeter between the slip rings. Resistance should be 3.2 ohms. at 20°C.



- 2 Alternatively connect ammeter and battery between slip rings, the ammeter should read approximately 3 amperes.

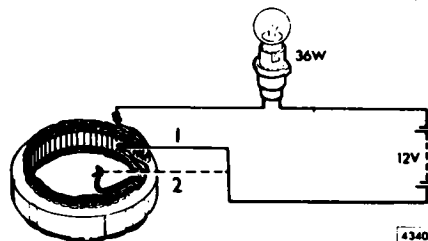


- 3 To test for defective insulation between slip rings and rotor poles connect the 110 volt supply and 15 watt test lamp between slip rings and rotor

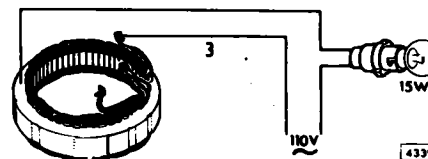
poles in turn. If the lamp lights, the coil is earthed to the rotor core. A replacement rotor, slip ring assembly should be fitted.

(c) STATOR Testing

Equipment required: A 12-volt battery and 36 watt test lamp. A 110-volt a.c. supply and a 15 watt test lamp.

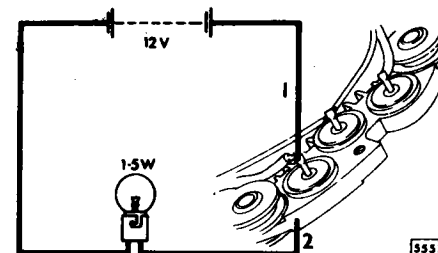


- 1 Check continuity of stator windings between any pair of wires by connecting in series a 12 volt battery and test lamp of not less than 36 watts. Failure of the test lamp to light means that part of the stator winding is open-circuit and a replacement stator must be fitted.

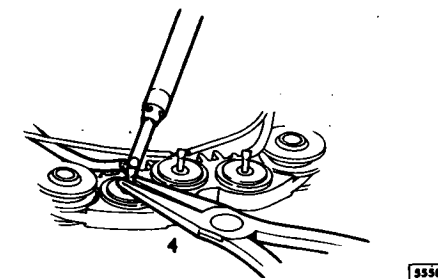


- 2 Test stator insulation with 110 volt test lamp. Connect test leads to laminated yoke and any one of the three stator cables. If the lamp lights, the stator coils are earthed. A replacement stator must be fitted.

(d) DIODES Testing



- 1 Connect one battery terminal to the heatsink under test.
- 2 Connect the other battery terminal in series with the test lamp and each diode pin in turn.
- 3 Reverse connections to heatsinks and diode pins. The lamp should light in one direction only. Should the lamp light in both tests, or not light at all the diode is defective and a new rectifier heatsink assembly must be fitted.



- 4 To prevent damage to diode assemblies during soldering operations it is important that a thermal shunt is used.

NOTE: Only 'M' grade 45-55 tin lead solder should be used.

Inspection and testing (Motorola 9 AR 2533 alternator) 86.10.14

Brush Gear and Slip Ring Inspection

Equipment required. Compressor spring testing gauge, range up to 250 g (½ lb.) 12 volt supply, test probes and indicator bulb, ohmmeter.

- 1 Remove alternator from car – 86.10.02.
 - 2 Remove brush holder by carrying out operations 4 and 5 of Alternator overhaul, dismantling – 86.10.08.
 - 3 Measure length of brushes protruding from housing; if either brush measures less than 4 mm. (0.15 in.) complete brush holder must be renewed.
 - 4 Using push-type spring tension gauge, measure load required to press each brush face in turn flush with housing. If either reading is less than 120 g (4¼ oz.) complete brush holder must be renewed.
 - 5 Using 12 volt supply, bulb and test probes, touch field lucar terminal (EX) with one probe and the adjacent brush with the other. Bulb should light and remain lit without flickering when brush is moved in holder.
 - 6 Repeat operation 5 on second brush and negative terminal plate. Again, bulb should light and remain lit without flickering when brush is moved.
 - 7 Touch each brush with one probe; bulb must not light or even flicker when brushes are moved.
- NOTE:** If failure is recorded in any of the tests made in operations 3 to 7 above, complete brush holder assembly must be renewed. Separate brushes and springs, etc., are not supplied as spares.

ROTOR

Testing

- 8 Connect ohmmeter in series with probes and touch each slip ring with one probe. Ohmmeter should record a resistance of between 3.8 and 5.2 ohms.
- 9 Touch alternator casing with one probe and each slip ring in turn with the other probe. Ohmmeter should indicate infinite resistance.

NOTE: Incorrect reading in operations 8 and 9 indicate defective wiring in field coils or between coils and slip rings; a low reading in operation 8 would imply shorting of the field coils, a high reading a wire breakage. Indication of any current flow in operation 9 implies a breakdown of insulation.

Rotor assembly must be removed for further inspection. Refer to operations 6 to 10 in 86.10.08 for removal, 10 and 11 below for further inspection and 24 to 29 in 86.10.08 for replacement of rotor in alternator casing.

- 10 Clean slip ring with a lint-free petrol-soaked cloth; wipe off any petrol adhering to rotor.
 - 11 Using micrometer, measure diameter of both slip rings. Limits of diameter of newly fitted rings are 1.244 to 1.240 in. (31.6 to 31.5 mm.) for both rings, and rotor may not be refitted if diameter of either ring is less than 1.226 in. (31.15 mm.).
- NOTE:** Replacement of worn slip rings on Motorola alternators is possible but it is most strongly urged that this work should be entrusted to specialists equipped with the special tools required for the fitting and machining of slip rings.

STATOR

Testing

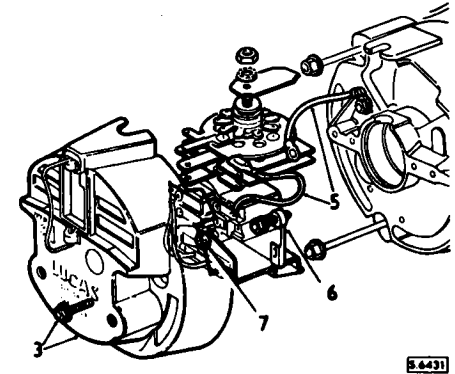
- 12 Visually inspect the portion of stator coils which can be seen through regulator housing for signs of damage due to overheating.
- 13 Check stator insulation by use of ohmmeter, touching one probe on alternator casing and the other on to each phase winding in turn. The phase windings are accessible to a probe through ventilation holes in rear moulded cover. If any current is shown to flow the stator insulation is defective and it must be removed – 86.10.08 operations 6 to 17.

DIODES

Testing

Equipment required: 12 V. supply, test probes and indicator bulb.

- 14 Remove diode bridge – 86.10.08, operations 1, 2, 3, 14 and 15.
 - 15 Check positive diodes by connecting probe from indicator bulb to each phase terminal in turn, the second probe being in contact with terminal B +. Then reverse probes. Indicator bulb should only light in one direction of circuit; if it lights in both, diode is shorted, and if it does not light in either direction, diode is in open circuit. Complete diode bridge must then be renewed. Individual diodes are not supplied as spares.
- CAUTION:** Complete circuits for shortest possible time to avoid damage to diodes.
- 16 Check negative diodes similarly, but touching second probe on diode bridge, and again reversing probes. Indications should be as for operation 15.
 - 17 Check field diodes by holding one probe in contact with D + terminal and second probe on each phase terminal, in turn. Then reverse probes and repeat. Indications should again be as in operation 15.



- 5 Note position of cables at rectifier plates and disconnect.
- 6 Remove three hexagon headed screws securing brush moulding and regulator to slip ring end bracket.
- 7 Remove brush gear and regulator from alternator.

Refitting

Reverse operations 1 to 7.

CONTROL UNIT

Remove and refit (Lucas 20ACR alternator)

86.10.26

Removing

- 1 Disconnect battery, see 86.15.20.
 - 2 Remove alternator, see 86.10.02.
 - 3 Remove alternator end cover by withdrawing two retaining screws.
 - 4 Withdraw two retaining screws and remove brush gear moulding.
 - 5 Disconnect control unit cables from brush retaining plates and '+' and output terminals.
 - 6 Withdraw control unit retaining screw and remove unit.
- NOTE:** Retain insulating spacer from beneath control unit mounting flange.

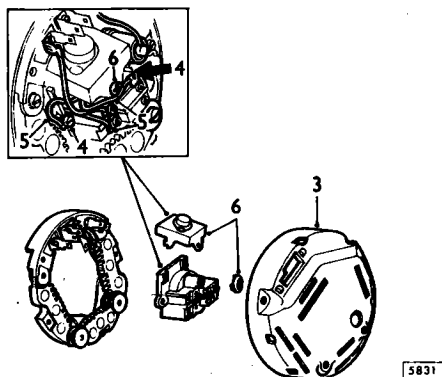
CONTROL UNIT

Remove and refit (Lucas 18ACR Alternators only)

86.10.26

Removing

- 1 Disconnect battery – 86.15.20.
 - 2 Remove alternator – 86.10.02.
 - 3 Remove alternator end cover by withdrawing two retaining screws.
 - 4 Unsolder stator winding connections at rectifier diodes.
- CAUTION:** It is essential to use a thermal shunt and a lightweight soldering iron.



Refitting
Reverse operations 1 to 6.

NOTE: The aluminium casing of the control unit must not make contact with the alternator body; this would cause the field circuit to be fully switched on and the alternator to supply maximum output regardless of battery condition.

BATTERY 86.15.00

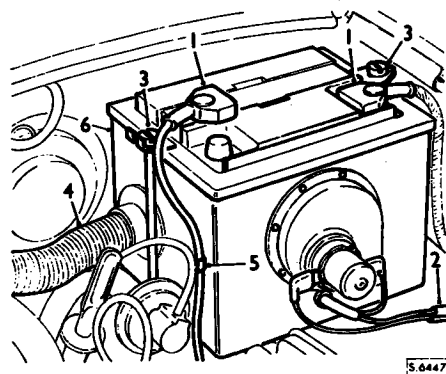
WARNING: THE BATTERY FITTED TO THIS VEHICLE HAS SPECIAL TOPPING UP FACILITIES. WHEN BATTERY CHARGING IS CARRIED OUT THE VENT COVER SHOULD BE LEFT IN POSITION ALLOWING GAS TO ESCAPE OR FLOODING OF ELECTROLYTE WILL RESULT.

Description

The battery is a special high performance type and is located in the engine compartment.

Data

Battery type: Lucas 12 volt 66 AH Pace-maker CP11.



BATTERY

Remove and refit 86.15.01

Removing

- 1 Ease back battery terminal covers, slacken pinch bolts and disconnect battery leads.
- 2 Disconnect snap connectors to battery cooling fan.
- 3 Slacken retaining bolts (these are hinged and fixed to battery tray).
- 4 Withdraw cooling inlet pipe from grommet fixing.
- 5 Release positive battery lead from clip on cooling jacket.
- 6 Ease battery and cooling jacket forward until clear of scuttle and lift

STATE OF CHARGE	SPECIFIED GRAVITY READINGS CORRECTED TO 60°F (15°C)	
	CLIMATES NORMALLY Below 77°F (25°C)	CLIMATES NORMALLY Above 77°F (25°C)
FULLY CHARGED	1.270 – 1.290	1.210 – 1.230
70% CHARGED	1.230 – 1.250	1.170 – 1.190
DISCHARGED	1.100 – 1.120	1.050 – 1.070

Electrolyte Temperature Correction

For every 18°F (10°C) below 60°F (15°C) subtract 0.007.
For every 18°F (10°C) above 60°F (15°C) add 0.007.

- 7 jacket clear of battery.
- 7 Lift battery clear of car.

Refitting

Reverse operations 1 to 7. Smear terminals with petroleum jelly before re-connecting battery leads.

NOTE: The battery must be kept level at all times to prevent spillage of electrolyte, consequent damage to vehicle finish, and possible personal injury.

BATTERY

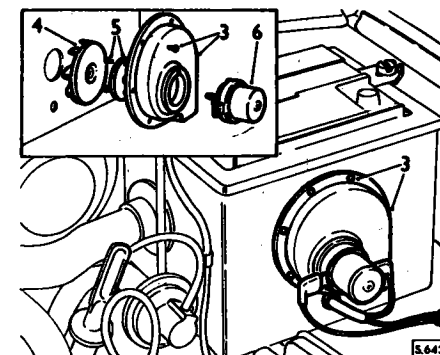
Test

86.15.02

It is NOT possible to test this battery with a high rate discharge meter, due to the location of the intercell connectors. The battery top must not be drilled in an attempt to locate the connectors. Check the specific gravity of the electrolyte in each cell using an hydrometer. A variation of more than 40 points (0.040) in any cell reading means that the battery is suspect and should be removed for testing by a battery agent. If possible prove the battery by substitution.

State of Charge – S.G. Readings

- 1 Lift and tilt the battery vent cover to one side.
- 2 Insert the hydrometer into each cell through the filling tube and note the readings.



BATTERY COOLING FAN MOTOR

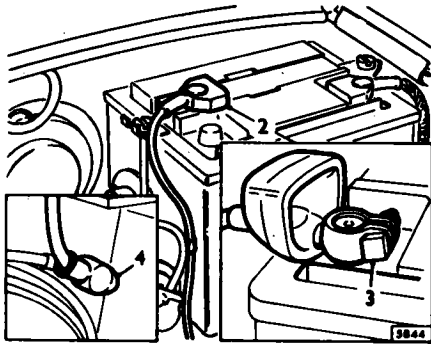
Remove and refit 86.15.03

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove battery cooling jacket – 86.15.01., Operations 1 to 6.
- 3 Withdraw seven securing screws and remove cooling fan assembly from cooling jacket.
- 4 Remove nylon impeller by carefully levering away from spindle with two screwdrivers, keeping impeller square to spindle.
- 5 Withdraw two screws from keep plate.
- 6 Remove motor from mounting grommet to duct.

Refitting

- 7 Spin motor to check that spindle and armature shaft are not distorted.
- 8 Reverse operations 5 and 6.
- 9 Carefully press impeller into position, using not more than 6 kg (14 lb) force on impeller.
- 10 Refit 'fir tree' retention piece in slot in armature shaft.
- 11 Reverse operations 1 to 3.
- 12 Connect 12-volt supply, and check for quiet running and absence of vibration.



BATTERY LEAD – POSITIVE

Remove and refit 86.15.17

Removing

- 1 Raise bonnet.
- 2 Lift plastic cover from terminal on battery post.
- 3 Release clamp bolt and remove terminal from battery post.
- 4 Remove lead from terminal post located on upper right hand engine sub-frame member.

Refitting

Reverse operations 1 to 4.

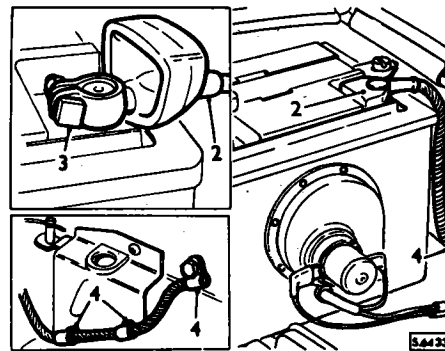
NOTE: Ensure that all connections are clean and metal to metal. Protect the battery terminal with a smear of petroleum jelly. Tighten all fixings.

BATTERY LEAD – NEGATIVE

Remove and refit 86.15.19

Removing

- 1 Raise bonnet.
- 2 Lift plastic cover from terminal on battery post.



- 3 Release clamp bolt and remove terminal from battery post.
- 4 Remove lead from bulkhead, secured by two clips, setscrew and washer.

Refitting

Reverse operations 1 to 4.

NOTE: Ensure that all connections are clean and metal to metal. Protect the battery terminal with a smear of petroleum jelly. Tighten all fixings.

BATTERY TERMINALS

Disconnect 86.15.20

- 1 Ease back terminal insulated cover.
- 2 Slacken clamp bolt.
- 3 Lift connector from terminal post.

Reconnect

Reverse operations 1 to 3.

ELECTRICALLY OPERATED WINDOWS AND DOOR LOCKS

Description 86.25.00

The electrically operated window lift system comprises four motors, drivers and passengers control panels, relay and thermal overload cut out. The electrically operated door lock circuit comprises of a solenoid for each door lock, thermal overload relay, two relays and a selector switch mounted in the centre console escutcheon.

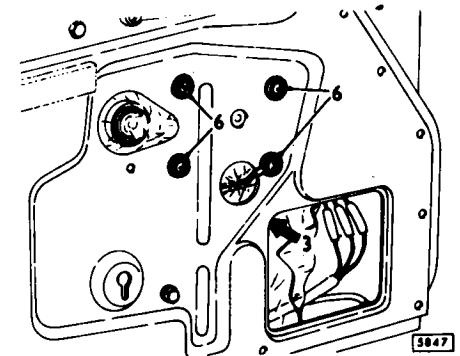
Operation

With the window lift master switch ON, operation of any of the centre 'off' two pole switches will cause the associated window lift motor to run in the selected direction. Selections can only be made on one switch at a time; the driver's window switch has first priority, followed by the front passenger's window switch, then the rear windows from the front panel, before the rear windows from the rear panel switches. The circuit is arranged so that the operation of each switch isolates the subsequent circuit, thus preventing operation of more than one motor at a time and protecting the circuit from an overload condition.

Fault conditions i.e. sticking windows, or overload will result in excessive current consumption causing the thermal cut out to operate. The cut out will reset after a short interval allowing normal operation of window lift motors to be resumed. If the condition persists a detailed examination of the system is required.

The door lock selector switch is of the centre 'off' rocker variety, operation in one direction locks the doors from inside, preventing access from outside when the car is occupied. An opposite selection on the switch will open the door locks. The door lock solenoids will remain in the last selected position when the switch is returned to the off position. Manual operation of the conventional door handles from inside the car will over-ride the door lock solenoids.

NOTE: Rapidly repeated operation of the door locks, or prolonged depression of any switch in either direction, will result in an overload condition, causing the thermal cut-out to operate, isolating the door lock solenoid circuit. A short wait is necessary before the thermal cut-out automatically resets.



WINDOW LIFT MOTOR – FRONT

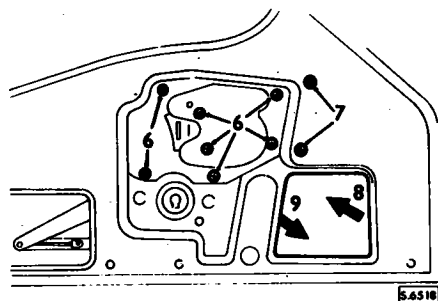
Remove and refit – 4 Door cars 86.25.01

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove the door casing and arm rest – 76.34.01.
- 3 Disconnect the cables from motor at plug and socket connection.
- 4 Remove top bolt securing glass channel to door inner panel.
- 5 Remove four pan-headed setscrews and detach regulator mechanism from door panel.
- 6 Slide mechanism towards hinge face of door to clear the regulator arm roller from channel.
- 7 Lift regulator arm to pass the outer side of glass channel.
- 8 Remove the assembly through aperture in door inner panel.
- 9 Withdraw three setscrews and washers from regulator.

Refitting

Reverse operations 1 to 9.



WINDOW LIFT MOTOR – FRONT

Remove and refit – 2 Door cars 86.25.01

Removing

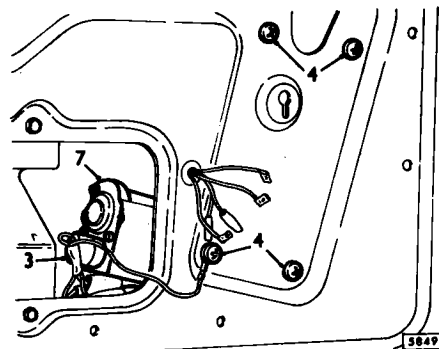
CAUTION: Before disengaging regulator from motor ensure that lifting arm and quadrant of regulator are clamped firmly together. This prevents spring from disengaging suddenly and causing possible damage or injury.

- 1 Remove arm rest and door trim panel.
- 2 Lower window to approximately 1 inch above door.
- 3 Disconnect battery – 86.15.20.
- 4 Remove two nuts securing window lift arm bobbin channel.
- 5 Slide channel off bobbin.
- 6 Remove seven set screws and 1 drive screw from regulator mounting plate.
- 7 Remove two set screws from motor mounting bracket.
- 8 Disconnect electrical cables.
- 9 Withdraw motor and regulator assembly through aperture.

Refitting

Reverse operations 1 to 9.

NOTE: If fitting a replacement motor, it should be noted that a right hand door window lift assembly has a left hand motor and vice versa.



WINDOW LIFT MOTOR – REAR

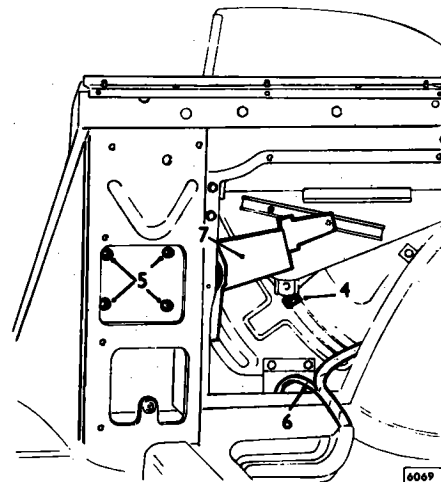
Remove and refit – 4 Door cars 86.25.02

Removing

- 1 Remove door casing and arm rest – 76.34.04.
- 2 Disconnect battery – 86.15.20.
- 3 Disconnect cables from motor at plug and socket connection.
- 4 Remove four pan-headed setscrews and detach regulator mechanism from door panel.
- 5 Adjust position of door until regulator arm can be removed from channel. Withdraw regulator through aperture in door.
- 6 If it is necessary, remove glass in order to withdraw regulator.
- 7 Withdraw three setscrews and washers and detach motor from regulator. The motor is sealed during manufacture. Faulty units must be replaced, no service repair being possible.

Refitting

Reverse operations 1 to 7.



WINDOW LIFT MOTOR – REAR

Remove and refit – 2 Door cars 86.25.02

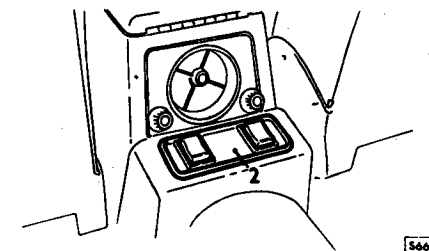
Removing

CAUTION: Before disengaging regulator from motor ensure that lifting arm and quadrant of regulator are clamped firmly together. This prevents spring from disengaging suddenly and causing possible damage or injury.

- 1 Remove rear compartment side trim – 76.13.14.
- 2 Lower window until approximately horizontal.
- 3 Disconnect battery – 86.15.20.
- 4 Fit special tool JD47 to window guide channel.
- 5 Remove four set screws securing regulators to body side panel.
- 6 Disconnect cables.
- 7 Withdraw window motor and regulator assembly through aperture.

Refitting

Reverse operations 1 to 7



REAR SWITCH PANEL WINDOW LIFT SWITCH(ES)

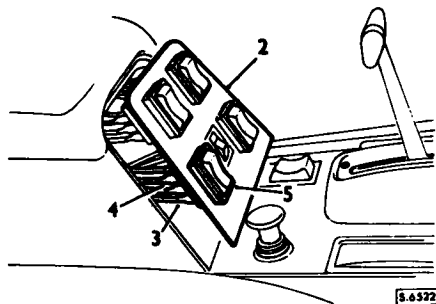
Remove and refit 86.25.12

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Lever mounting panel from rear of centre console.
- 3 Carefully note position of cables and orientation of switch.
- 4 Disconnect cables
- 5 Depress locating tags and push switch through panel.

Refitting

Reverse operations 1 to 5.



FRONT SWITCH PANEL WINDOW LIFT SWITCH(ES)

Remove and refit 86.25.13

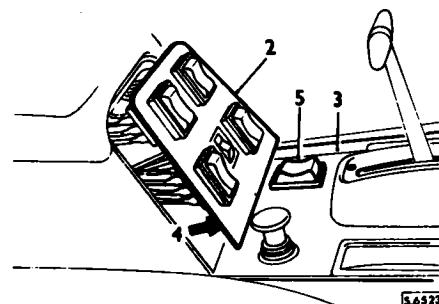
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Lever switch mounting panel from centre console.
- 3 Note position of cables and orientation of switch in panel.
- 4 Disconnect cables.
- 5 Depress locating tags and push switch through panel.

Refitting

Reverse operations 1 to 5.

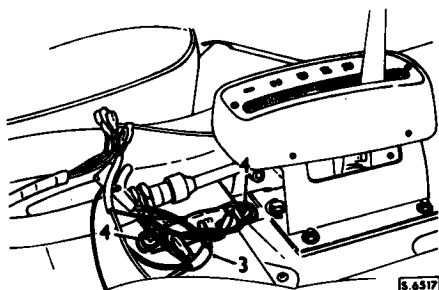
NOTE: Care must be taken to ensure correct refitting of cables.



- 3 Remove two drive and one setscrew from centre console escutcheon.
- 4 Lift escutcheon, note position of cables and disconnect.
- 5 Depress locating tags and push switch through panel.

Refitting

Reverse operations 1 to 5.



WINDOW LIFT RELAY

Remove and refit 86.26.28

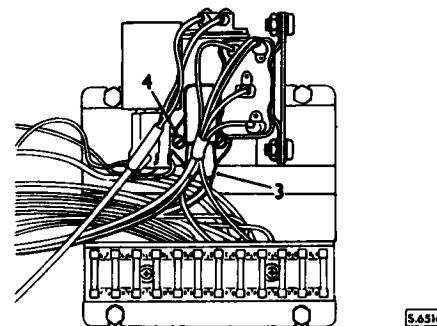
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove centre console escutcheon.
- 3 Note position of cables and disconnect.
- 4 Withdraw two retaining screws and remove relay from bracket attached to transmission selector quadrant.

Refitting

Reverse operations 1 to 4.

NOTE: Cylindrical 26RA relay is fitted to later cars.



CIRCUIT BREAKERS

Remove and refit 86.25.31

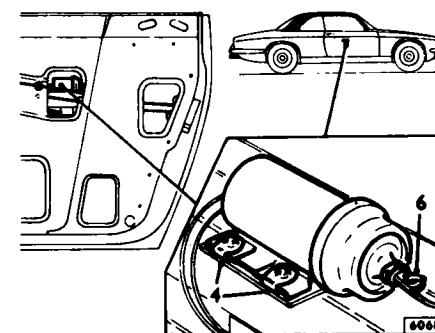
Removing

- 1 Remove facia crash roll, see 76.46.04.
- 2 Remove driver's side dash liner, see 76.46.11.
- 3 Note position of cables and disconnect at Lucas on relevant circuit breaker.
- 4 Withdraw two screws securing unit to mounting plate.

Refitting

Reverse operations 1 to 4.

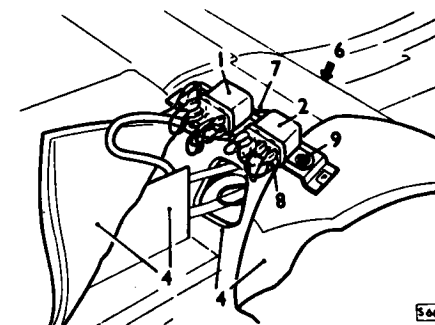
NOTE: Cylindrical 26RA relay replaces type illustrated on later cars.



- 4 Remove two setscrews securing solenoid to door stretcher.
- 5 Disconnect cables at snap connectors.
- 6 Unhook solenoid operating piston from door lock push rod and remove from door.

Refitting

Reverse operations 1 to 6.



DOOR LOCK SOLENOIDS

Remove and refit 86.25.32

Removing

- 1 Raise window to fully closed.
- 2 Disconnect battery – 86.15.20.
- 3 Remove arm rests and door trim – 76.34.01.

DOOR LOCK SELECTOR SWITCH

Remove and refit 86.25.14

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Lever drivers window lift switch panel from centre console.

DOOR LOCK SOLENOID RELAYS

Remove and refit 86.25.33

Removing

- 1 Reconnect battery – 86.15.20.
- 2 Push left hand front seat forward to its full extent.
- 3 Remove rear seat cushion.

continued

- 4 Carefully pull carpet and sound insulation material away from transmission tunnel and front of box section supporting rear seat cushion.
- 5 Support relays through aperture in front of cross member.
- 6 Remove two screws from rear outside face of cross member which secure relay assembly.
- 7 Manoeuvre relay assembly through aperture.
- 8 Disconnect suspect relay harness at Lucar connectors.
- 9 Remove two nuts and shakeproof washers securing relay to bracket.

Refitting

Reverse operations 1 to 9.

Wiring delays – relay assembly

Connect cable harness to relay lucar connectors as in chart. Note shorting links.

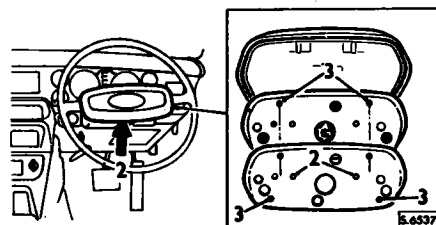
RELAY	TERMINAL	CABLE COLOUR
'1'	C1	ORANGE/RED
		BLACK
	C4	BLACK
	C2	BROWN/BLUE
		BROWN/BLUE
	W1	BLACK
		BLACK
	W2	ORANGE/RED
'2'	C1	ORANGE/GREEN
		BLACK
	C4	BLACK
	C2	BROWN/BLUE
	W1	BLACK
	W2	ORANGE/GREEN

HORNS

Description

86.30.00

Twin horns are fitted, mounted one each side of the engine block on early cars, and beneath the front bumper on later cars. Both horns operate simultaneously and are energised by a relay. The relay is connected to the battery through the ignition and switch so that the horns will only operate with ignition switched 'ON'.



HORN PUSH

Remove and refit

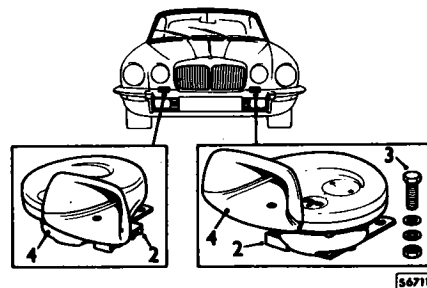
86.30.01

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Withdraw two screws from behind push and lift push from steering wheel.
- 3 Withdraw four screws from push back-plate.
- 4 Ease trim pad from push and recover push contact unit.

Refitting

Reverse operations 1 to 4. Do not overtighten screws removed in operation 2.



HORNS

Remove and refit

86.30.09

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Disconnect wiring at Lucar connectors.
- 3 Withdraw retaining bolt and washers.
- 4 Remove horn.

Refitting

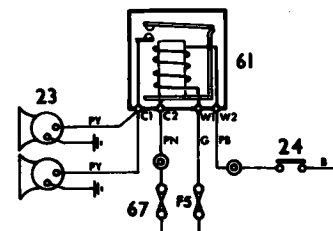
Reverse operations 1 to 4.

HORN RELAY CIRCUIT

Check in situ

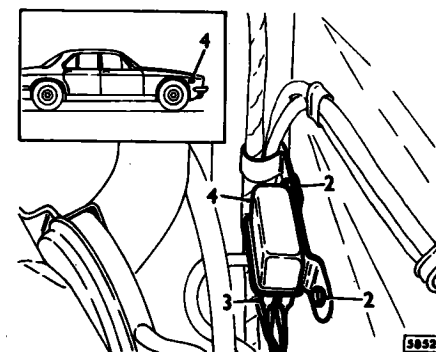
86.30.17

- 1 Switch ignition 'ON'.
- NOTE:** Avoid leaving ignition 'On' for extended periods.
- 2 With ignition 'On', a 12V test lamp between W1 and earth should light up. If lamp does not light check Fuse No.1. Horn push on, test lamp on W2 – if test lamp fails to light an unserviceable relay is indicated.
 - 3 If relay operates when horn push is pressed a test lamp between C1 and earth should light up. Failure to do so indicates that relay contacts are inoperative or fuse No.4 unserviceable.
 - 4 If checks 1 and 2 are satisfactory and horns do not operate substitute test lamp for each horn in turn. If lamp lights, horn units are unserviceable. If lamp does not light, further investigation of the horn harness will be required.



HORN CIRCUIT CODE

23 Horns
24 Horns push switch
61 Horn relay
67 Line fuse



HORN RELAY

Remove and refit

86.30.18

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove two securing nuts and lock washers.
- 3 Disconnect cables from lucar connectors. Note positions of cables.
- 4 Remove relay.

NOTE: Later cars are fitted with cylindrical relays in place of rectangular relay shown. Ensure that Lucars are correctly connected.

Refitting

Reverse operations 1 to 4. Ensure that cables are re-connected correctly – refer to wiring diagram if in doubt.

THE IGNITION SYSTEM 86.35.00

General

The ignition system comprises of a conventional high tension coil and distributor providing high tension sparking to a plug in each cylinder head. The distributor is a Lucas type 22D6 on early cars and type 45D6 on later cars.

A ballast resistor is fitted in the ignition coil circuit and has a similar resistance to that of the coil. This reduces the inductive resistance of the coil primary winding resulting in better high speed performance of the ignition coil. The coil fitted with this system is not interchangeable with normal 6 or 12 volt coils, and performance testing of the coil must be carried out in conjunction with the ballast resistor in circuit.

4.2 litre cars to Emission 'A' specification, this is, cars intended for use in North America, Canada, Sweden, Japan and Australia (the latter only after 1st January 1976) are equipped with Lucas Opus ignition systems, in which mechanical contact-breakers are replaced by electronic triggering devices.

The distributor, which is Lucas type 45DE6 (or 43DE6, for California only) differs externally from a mechanical contact-breaker unit by the presence of a rectangular block containing oscillator and amplifier, attached to its side by three setscrews, two of which serve as hinge pins for cover retaining clips; the third setscrew is adjacent to the clamp plate screw. Distributor cap and centrifugal advance mechanism are identical with those of 45D6 distributor.

A vacuum advance capsule is fitted only to 45DE6 distributors; it is retained to the

oscillator and amplifier housing by a roll pin and operates in the usual manner, advancing ignition by rotating a moveable base plate carrying the electronic pick up unit, which replaces the fixed contact point of a mechanical contact breaker.

An additional component which is essential for the correct functioning of the Opus system is a drive resistor, wired in conjunction with the transistor in the amplifier. It is located on the coil mounting plate stud adjacent to the distributor, and shares its power supply with the ballast resistor (for the coil) to which it is connected by a white lead.

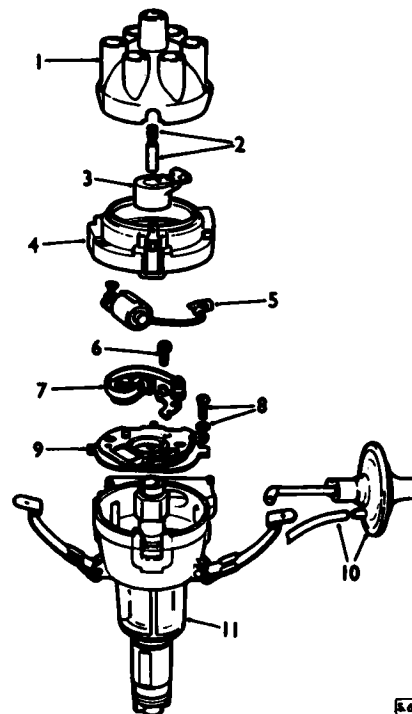
IGNITION SYSTEM DATA

Distributor — Type 22D6 or 45D6
(clockwise rotation viewed on driven end)

Compression ratio	'L', 'S' or 'H'.
Distributor contact breaker gap	0.014 in.—0.016 in. (0,36—0,41 mm.)
Spark plug type	Champion N11Y
Spark plug gap	0.025 in. (0,64 mm.)
Ignition timing (static)	
'S' comp. ratio	8° B.T.D.C.
'H' comp. ratio	8° B.T.D.C.
'L' comp. ratio	8° B.T.D.C.
(USA/Canada only)	

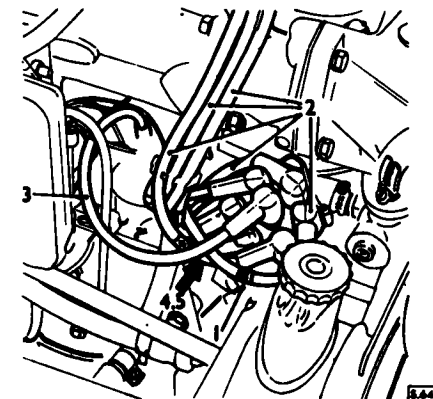
Distributor — Type 45DE6 or 43DE6

As above for Type 22D6 or 45D6 except air gap of 0.014 in.—0.016 in. (0,36—0,41 mm.) replaced contact breaker gap.



KEY TO DISTRIBUTOR DIAGRAM (22D6 and 45D6)

- 1 Distributor cap.
- 2 Centre contact.
- 3 Rotor arm.
- 4 Waterproof cap and L.T. connector.
- 5 Condenser.
- 6 Contact breaker set retaining screw.
- 7 Contact breaker set.
- 8 Contact breaker set carrier plate retaining screws and shakeproof washers.
- 9 Contact breaker set carrier plate.
- 10 Vacuum operated capsule and vacuum line.
- 11 Distributor body.



DISTRIBUTOR CAP

Remove and refit (all distributors) 86.35.10

Removing

- 1 Check all H.T. leads are adequately identified.
- 2 Detach leads from spark plugs.
- 3 Detach leads from H.T. coil.
- 4 Spring back retaining clips and lift off distributor cap.
- 5 Check carbon contact is in good condition and moving freely against spring.

Refitting

Reverse operations 1 to 5.

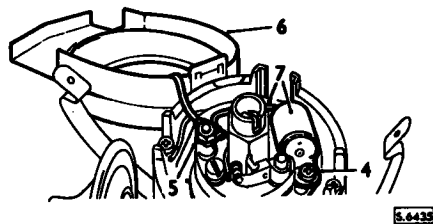
CONDENSER (22D6 & 45D6 distributors only)

Remove and refit 86.35.12

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Remove distributor cap — 85.35.10/2.
- 3 Remove rotor arm — 86.35.16/2.

continued



- 4 Withdraw crosshead screw securing condenser to contact mounting plate.
- 5 Remove nut securing contact arm to mounting post.
- 6 Lift off waterproof contact cover.
- 7 Remove condenser cable end from post and remove condenser.

Refitting

Reverse operations 1 to 7.

CONTACT BREAKER GAP (22D6 & 45D6 distributors only)

Adjust 86.35.14

- 1 Disconnect battery - 86.15.20.
- 2 Remove distributor cap - 86.35.10.
- 3 Remove rotor arm - 86.35.16.
- 4 Turn engine until contacts show maximum opening (as operating heel is on high point of cam).
- 5 Check gap is between 0.014 in. to 0.016 in. (0.35 - 0.44 mm) with feeler gauge. If not, slacken contact plate securing screw.
- 6 Insert screwdriver into slot between fixed and moving contact plates and adjust gap to correct limits.
- 7 Tighten fixed contact plate securing screw and recheck gap.
- 8 Refit rotor arm and distributor cap.

IGNITION TIMING

Adjust (45DE6 and 43DE6 distributors only) 86.35.15

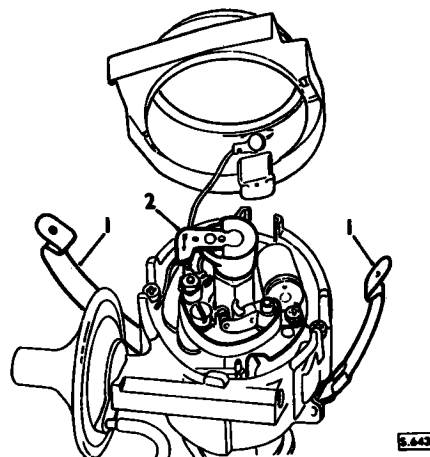
- 1 Remove distributor cap.
- 2 Remove flashover shield.
- 3 Rotate engine until rotor arm approaches No. 6 (front) cylinder segment in distributor cap.
- 4 Slowly rotate engine until ignition timing scale on crankshaft damper is at the appropriate number of degrees (see 'General Data') at pointer on lower left-hand side of timing chain cover.
- 5 Slacken distributor pinch bolt and rotate distributor body so that pick-up is lined up with nearest ferrite rod in the timing rotor.
- 6 Switch on ignition.
- 7 Position distributor cap end of centre high tension lead approximately 0.025 in. (0.64 mm.) from a good earth point on the engine and rotate distributor body slowly until a spark occurs.
- 8 Tighten distributor pinch bolt.
- 9 Switch off ignition.
- 10 Check ignition timing by repeating operations 3 to 7.
- 11 Refit flashover shield, distributor cap and centre high tension lead.
- 12 Check advance and retard characteristics by means of suitable electronic equipment.
- 13 If necessary, carry out an exhaust emission test.

ROTOR ARM

Remove and refit 86.35.16

Removing

- 1 Spring back retaining clips and lift off distributor cap.
- 2 Lift off rotor arm.



Refitting

- 3 Inject a few drops of thin machine oil into rotor arm spindle.
- 4 Replace rotor arm, ensure keyway engaged and rotor pushed fully home.
- 5 Refit distributor cap.

ELECTRONIC TIMING ROTOR

Remove and refit 86.35.17

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove distributor cap - 86.35.10.
- 3 Remove rotor arm - 86.35.16.
- 4 Detach external circlip beneath rotor.
- 5 Lift timing rotor off distributor shaft; collect washer and O-ring.

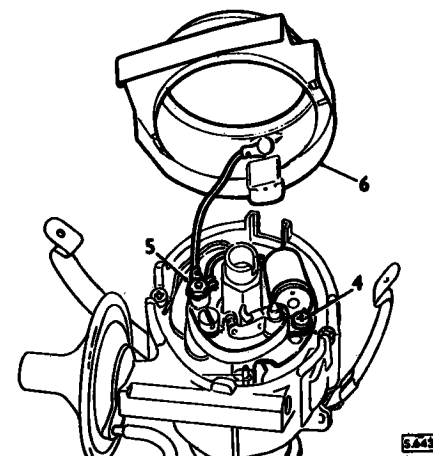
Refitting

- 6 Place timing rotor on distributor shaft, ensuring that master projection at its lower end engages with master recess in shaft.
- 7 Fit new O-ring over shaft and replace washer.
- 8 Reverse operations 1 to 4.

PICK-UP MODULE

Remove and refit 86.35.18

NOTE: The pick up module is not supplied as a separate item, but as a sub-assembly, wired to the amplifier unit. To remove and refit this sub-assembly see 86.35.30.



WATERPROOF COVER AND L.T. CONNECTOR

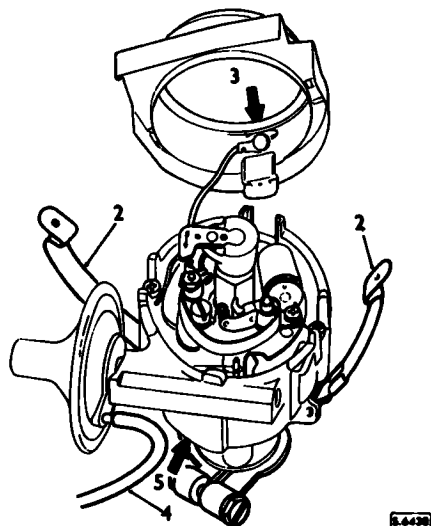
Remove and refit 86.35.19

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove distributor cap - 86.35.10.
- 3 Remove rotor arm - 86.35.16.
- 4 Withdraw crosshead screws securing condenser to contact mounting plate.
- 5 Remove nut securing contact arm to contact mounting post.
- 6 Lift off waterproof contact cover.

Refitting

Reverse operations 1 to 6.



DISTRIBUTOR

Remove and refit, 22D6 distributor
86.35.20

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Spring back retaining clips and remove distributor cap.
- 3 Disconnect low tension wire from distributor.
- 4 Disconnect vacuum pipe.
- 5 Withdraw setscrew plain and spring washer from retaining plate and withdraw distributor.

NOTE: Do not disturb clamp plate pinch bolt.

Refitting

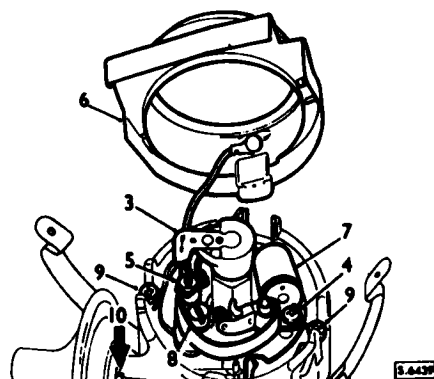
Reverse operations 1 to 5.

NOTE: If clamp plate has been slackened and it is necessary to re-time ignition refer to 'General Specification Data' section 05, for relevant figures.

DISTRIBUTOR

Remove and refit, 45D6, 45DE6 and 43DE6 distributors
86.35.20

Follow operating procedure detailed above for 22D6 distributor (omitting operation 4 for 43D6 distributor) but retime ignition after refitting, even if clamp plate has not been slackened. Refer to 'General Specification Data', section 05, for static setting figure and 86.35.15 for details of timing setting.

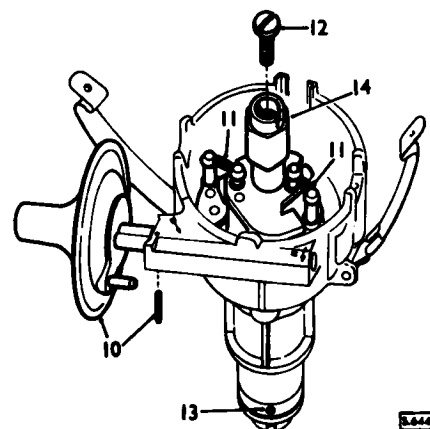


DISTRIBUTOR

Overhaul, 22D6 distributor
86.35.26

Dismantling

- 1 Disconnect battery – 86.15.20.
- 2 Remove distributor – 86.35.20
- 3 Lift off rotor arm.
- 4 Withdraw crosshead screw securing condenser to contact mounting plate.
- 5 Remove nut securing contact arm to contact assembly mounting post.
- 6 Lift off waterproof cover.
- 7 Remove condenser.
- 8 Withdraw securing screw and remove contact set.
- 9 Withdraw two screws and remove contact breaker base plate by lifting advance capsule operating arm from spigot and lifting plate from distributor body.
- 10 Using a pin punch .073 in. (1,85 mm) in diameter drive out roll pin securing vacuum unit to distributor body.



- 11 Remove advance weight springs.
- 12 Remove cam fixing screw from top of shaft, lift out cam assembly and auto-advance weights.

NOTE: Mark position of offset driving tongues in relation to rotor arm, key-way in shaft.

- 13 Clamp shank of distributor and drive out mills pin from driving dog using pin punch 0.187 in. (4,76 mm) diameter.
- 14 Remove shaft and action plate assembly from distributor body.

Reassembling

- 15 Apply clean engine oil to shaft and insert shaft and action plate assembly into distributor body.
- 16 Ensure thrust washer is fitted to shaft between driving dog and distributor shank.
- 17 If fitting a new driving dog it is necessary to carry out the following procedure.
 - (a) Position dog on shaft with driving tongues in correct position in relation to rotor arm keyway.
 - (b) Insert a 0.005 in. (0,12 mm) feeler gauge between thrust washer and driving dog.
 - (c) Using hole in driving dog as a guide pass 0.187 in. (4,76 mm) drill through shaft and other side of driving dog.

- (d) Remove feeler gauge and insert 0.187 in. (4,76 mm) diameter mills pin
- (e) Lightly rivet both ends of pin.

- 18 Smear auto advance mechanism with 'Rocol' grease.
- 19 Reverse operations 3 to 12.
- 20 Apply a few drops of Ragosine Molybdenised non-creep oil to top of shaft. Smear cam with clean engine oil. Apply one drop of clean engine oil to contact breaker pivot post and felt oiler pad of vacuum unit operating rod.
- 21 Set contact breaker gap to 0.014 in. – 0.016 in. (0,36 – 0,4 mm) – 86.35.14.
- 22 Clean distributor cap with soft clean cloth, check carbon brush and spring and refit cover.
- 23 Refit distributor.

DISTRIBUTOR

Overhaul 45D6 distributor
86.35.26

Dismantling

- 1 Disconnect battery – 86.15.20.
- 2 Remove distributor – 86.35.20.
- 3 Lift off rotor arm.
- 4 Withdraw Phillips head screw securing condenser to base plate.
- 5 Remove low tension and condenser leads from contact assembly mounting post.
- 6 Remove condenser.
- 7 Withdraw securing screw and remove contact set.
- 8 Withdraw low tension lead and grommet from locating hole on distributor body.
- 9 Withdraw earth lead from base plate.
- 10 Remove screws and shakeproof washers securing vacuum capsule, push actuating rod downwards to disengage.
- 11 Lever base plate upwards.
- 12 Clamp shank of distributor and drive out dowel pin from drive dog using pin punch 0.187 in. (4,76 mm.) diameter.
- 13 Withdraw drive dog and thrust washer.
- 14 Remove shaft and action plate assembly from distributor body.
- 15 Remove and discard 'O' ring.

continued

Reassembling

NOTE: If distributor shaft, action plate or spindle bush are found to be excessively worn, these components must be renewed together as a complete unit.

- 16 Apply clean engine oil to shaft and insert shaft and action plate assembly into distributor body.
- 17 Ensure thrust washer is fitted to shaft between driving dog and distributor shank.
- 18 To fit a new drive dog, carry out items 19 to 23.
- 19 Position dog on shaft with driving tongues in correct position relative to keyway in rotor arm.
- 20 Insert a 0.005 in. (0.12 mm.) feeler gauge between thrust washer and drive dog.
- 21 Using hole in drive dog as a guide, pass 0.187 in. (4.76 mm.) drill through shaft and other side of dog.
- 22 Remove feeler gauge and insert 0.187 in. (4.76 mm.) diameter dowel pin.
- 23 Lightly rivet both ends of pin.
- 24 Smear automatic advance mechanism with Rocol MP oil.
- 25 Reverse operations 3 to 11.
- 26 Sparingly apply clean engine oil to felt pad in top of cam. Apply oil sparingly through two apertures in contact breaker base plate.
NOTE: Do not oil felt pad fitted to contact breaker.
- 27 Smear Shell Retinax 'A' grease on working surface of cam.
- 28 Set contact breaker gap to 0.014 ins. - 0.016 in. (0.35 mm. - 0.40 mm.) - 86.35.14.
- 29 Clean distributor cap with clean, soft cloth, check carbon brush and spring for free movement; refit cover.
- 30 Refit distributor.

DISTRIBUTOR

Overhaul, 45DE6 and 43DE6 Distributors

86.35.26

Dismantling

- 1 Disconnect battery - 86.15.20.
- 2 Remove distributor - 86.35.20.
- 3 Lift off rotor arm.

- 4 Remove plastic anti-flash shield and lift out felt pad (if fitted) from distributor shaft. Do not remove flanged nylon bush.
- 5 Carefully remove two screws, with washers and lock washers, securing pick up to movable plate.
- 6 Remove two long screws and spring washers securing amplifier housing to distributor body.
- 7 Holding amplifier housing, remove its third retaining screw and spring washer from beneath housing.
- 8 Holding distributor body in one hand and amplifier housing in the other, carefully disengage vacuum advance unit link from pin in movable plate.
NOTE: This operation does not apply to 43DE6 distributors.
- 9 Ease grommet from distributor wall and remove amplifier housing and pick up, with connecting lead. Collect spring clips.
- 10 Tap out roll pin securing vacuum advance unit (45DE6 distributor only) and withdraw unit.
- 11 Remove external circlip from distributor shaft.
- 12 Carefully withdraw timing rotor, and remove washer and O-ring from it.
- 13 Remove two Phillips-head screws and lift out base plate, with movable plate attached to it.
- 14 Detach springs from centrifugal advance unit. Take great care to avoid distorting them, and note the positions of the two different springs.
NOTE: Further dismantling of unit is not recommended.

Assembling

- 15 Lubricate moving surfaces of centrifugal advance mechanism with Rocol M.P. or similar molybdenised grease.
- 16 Refit springs as removed in operation 14, again using great care to avoid distorting them.
NOTE: If either spring should be accidentally distorted it must not be refitted, as emission control could be affected; renew both springs.
- 17 Smear movable plate pin of 45DE6 distributor with molybdenised grease and replace sub-assembly of plates in

distributor body. Secure with two Phillips-head screws.

NOTE: It is possible to replace sub-assembly 180° out of position. This is of no consequence on 43DE6 distributor, but inspect through hole for advance link in 45DE6 body to ensure that pin is correctly located to pick up link.

- 18 Replace two spring clips removed in operation 9 in C-shaped lugs on distributor body.
- 19 45DE6 distributors only. Replace vacuum advance unit in amplifier housing and secure with roll pin.
- 20 45DE6 distributor only; ensure that lower grommet is in position in amplifier housing, and that lead to pick up is outside top of housing. Holding housing in one hand and distributor body in the other, rotate movable plate fully clockwise and carefully hook advance link over pin; this operation is not visible.
- 21 Fit grommets fully into slots in amplifier housing and distributor body and replace three screws and spring washers securing housing to body. Tighten screws evenly.
- 22 Carefully replace timing rotor on distributor shaft, ensuring that large master projection engages with large slot in shaft.
- 23 Place new O-ring over shaft and secure rotor with washer and circlip.
- 24 Place pick up in position, and insert two screws, with washers and lock washers. Do not fully tighten screws.
- 25 Adjust pick up air gap. - 86.35.31.
- 26 Insert felt pad, if removed in operation 4.
- 27 Lubricate with a few drops of engine oil on pad (or nylon bush) and through apertures to lubricate centrifugal advance unit; apply one drop only to each of the two D-shaped holes at movable plate pivot.
- 28 Replace anti-flash cover, with recesses adjacent to spring clips.
- 29 Press rotor on to the shaft and ensure that it is fully engaged with slot.
- 30 Replace cover.

THE IGNITION SYSTEM**Checking**

86.35.29

CAUTION: Ignition coils normally operated with ballast resistors should not be connected direct to full battery voltage without the ballast resistor in circuit.

EQUIPMENT REQUIRED:

DC Moving coil voltmeter
0-26V Scale
Hydrometer
Ohmmeter
H.T. Jumper lead

Preliminary procedure.

(a) BATTERY

86.35.29/1

Test

It is NOT possible to test this battery with a high rate discharge meter, due to the location of the intercell connectors. The battery top must not be drilled in an attempt to locate the connectors. Check the specific gravity of the electrolyte in each cell using an hydrometer. A variation of more than 40 points (0.040) in any cell reading means that the battery is suspect and should be removed for testing by a battery agent. If possible prove the battery by substitution.

State of Charge — S.G. Readings

- 1 Lift and tilt the battery vent cover to one side.

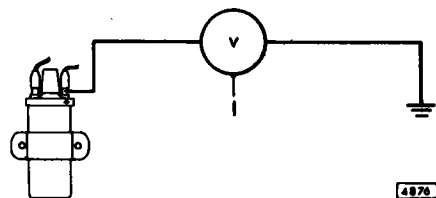
- 2 Insert the hydrometer into each cell through the filling tube and note the readings.

STATE OF CHARGE	SPECIFIC GRAVITY READINGS CORRECTED TO 60°F (15°C)	
	CLIMATES NORMALLY Below 77°F (25°C)	CLIMATES NORMALLY Above 77°F (25°C)
FULLY CHARGED	1.270 — 1.290	1.210 — 1.230
70% CHARGED	1.230 — 1.250	1.170 — 1.190
DISCHARGED	1.100 — 1.120	1.050 — 1.070

Electrolyte Temperature Correction

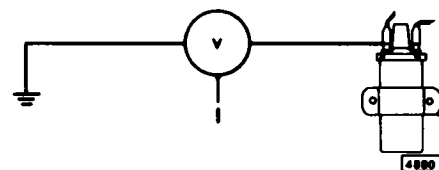
For every 18°F (10°C) below 60°F (15°C) subtract 0.007
For every 18°F (10°C) above 60°F (15°C) add 0.007

- (b) Ensure that spark plugs are checked and that fuel is available before commencing tests on the ignition system.
- (c) Check all electrical connections for security and cleanliness.
- (d) Check supply to 'SW' or '+ve' coil terminal.



- 1 Connect voltmeter between coil and earth. Black lead to a good earth and Red lead to the 'SW' (+ve) terminal of the coil.
- 2 Close distributor contact points, switch on ignition. Meter will register battery voltage*, if the supply line is in order.

* With ballasted ignition system meter reading will be approximately 6 volts.



Check coil primary winding 86.35.29/2

- 1 Connect voltmeter between coil and earth. Black lead to a good earth and Red lead to 'CB' ('-ve') terminal of the coil.
- 2 Open distributor contact points and switch on ignition. Meter will read battery volts, if primary winding is satisfactory.
A zero reading* may indicate open-circuited primary winding, short-circuited capacitor or the 'CB' ('-ve') line is earthed.

* With ballasted ignition system may also indicate open-circuit or short to earth on the ballast resistor.

Check distributor contacts and CB Earth 86.35.29/3

- 1 Leave voltmeter as in — 86.35.29/2.
- 2 Switch on ignition, close distributor contacts. Meter should read zero, if circuit is satisfactory.
A high reading indicates poor C.B. earth or dirty contact points.

Check coil secondary winding and capacitor 86.35.29/4

- 1 Disconnect H.T. cable from coil at the distributor.
- 2 Hold free end about 0.25 in. (6 mm) from engine block. Switch on ignition, flick the contact points. A good H.T. spark between the cable end and engine block indicates that the circuit is satisfactory.
No spark probably indicates that the H.T. cable is broken, (check with jumper H.T. cable), or faulty capacitor. Proceed to 86.35.29/5.

Check capacitor by substitution 86.35.29/5

- 1 Disconnect existing capacitor at the contact breaker.
- 2 Connect test capacitor between L.T. terminal of the distributor and a good earth.
- 3 Hold free end of H.T. cable 0.25 in. (6mm) from engine block. Switch on ignition, flick open contact points.
If a good H.T. spark is produced, the original capacitor is probably faulty. No spark indicates that the coil secondary winding is faulty.

Check rotor arm insulation 86.35.29/6

- 1 Hold free end of H.T. cable about 0.125 in. (3 mm) from rotor arm electrode.
- 2 With ignition on, flick open contact points. No spark proves that the insulation of the rotor arm is satisfactory.

Check contact point gap setting 86.35.29/7

- 1 Rotate engine until contacts are open to widest extent.
- 2 Correct gap should be 0.014 in. — 0.016 in. (0.35 mm — 0.40 mm). Check gap with all cam lobes.

Visual check of H.T. cables and Distributor cover 86.35.29/8

- 1 H.T. cables should be clean. Remove oil and grease deposits. Worn or perished cables should be replaced.
- 2 Distributor cover should be clean inside and out.
- 3 H.T. carbon brush should move freely against spring pressure in its holder. Ensure brush makes contact with the rotor arm.
- 4 If distributor cover electrodes are badly pitted, the cover should be replaced. Excessive carbon deposits on the electrodes must be removed.

OPUS IGNITION SYSTEM

Check 86.35.29/9

Before checking ignition system to locate cause of misfiring or failure to start, ensure that fuel supply is satisfactory.

CAUTION; The two following precautions **MUST** be observed or damage may be caused to the ignition system.

- 1 Never connect white leads with blue or black sleeve to positive supply.
- 2 Always ensure that ignition is 'OFF' when setting air gaps at timing rotor with feeler gauge.

TRAINING SYSTEM IN CAR TO LOCATE CAUSE OF MISFIRE

Check in the order given below, correcting any fault found before proceeding with the next test.

- 1 Check all connections. Ensure HT leads are a tight fit inside chimneys and ascertain all LT connections are clean and tight.
- 2 Test spark plugs and check gaps.

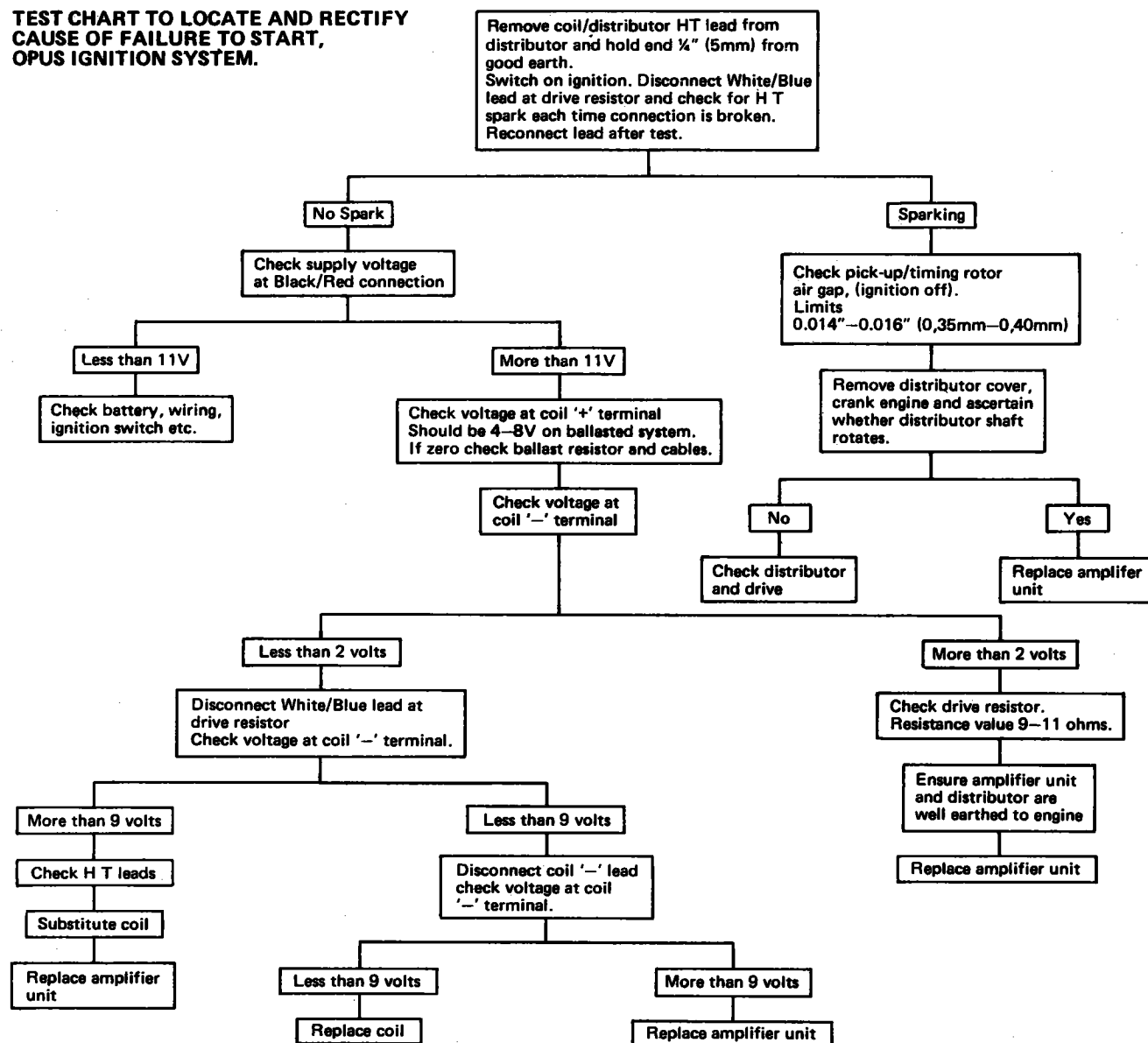
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- 3 Check HT leads. Inspect for sign of tracking, broken or damaged cables etc.
- 4 Check distributor cover for signs of tracking inside and out. Clean and examine HT brush, electrodes etc.
- 5 Check rotor arm for tracking.
- 6 Check pick-up/timing rotor air gap (ensure ignition is switched off). Limits 0.014"—0.016" (0,35mm—0,40mm)
- 7 Check coil chimney for signs of tracking etc.
- 8 Substitute ignition coil.
- 9 Substitute amplifier unit.

TESTING TO LOCATE CAUSE OF FAILURE TO START.

Equipment required: D.C. Moving coil voltmeter, 0-20V scale, hydrometer, ohmmeter and H.T. jumper lead. Refer to adjoining chart and check each item in turn, rectifying any fault found before proceeding to the next item.

TEST CHART TO LOCATE AND RECTIFY CAUSE OF FAILURE TO START, OPUS IGNITION SYSTEM.



AMPLIFIER UNIT

Remove and refit 86.35.30

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove distributor – 86.35.20.
- 3 Lift off rotor arm.
- 4 Remove plastic anti-flash shield.
- 5 Carefully remove two screws, with washers and lock washers, securing pick up to movable plate.
- 6 Remove two long screws and spring washers securing amplifier housing to distributor body.
- 7 Holding amplifier housing, remove its third retaining screw and spring washer from beneath housing.
- 8 45DE6 distributor only; hold distributor body in one hand and amplifier housing in the other and carefully disengage vacuum advance unit link from pin in movable plate.
- NOTE: 43DE6 distributors are not fitted with vacuum advance.
- 9 Ease grommet from distributor wall and remove amplifier unit and pick up, with connecting lead.

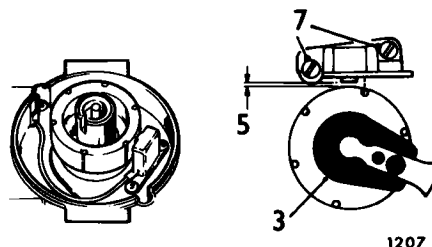
Refitting

- 10 45DE6 distributor only; ensure that lower grommet is in position in amplifier housing, and that lead to pick up is outside top of housing. Holding housing in one hand and distributor body in the other, rotate movable plate fully clockwise and carefully hook advance link over pin; this operation is not visible.
- 11 Fit grommets fully into slots in amplifier housing and distributor body and replace three screws and washers securing housing to body. Tighten screws evenly.
- 12 Place pick up in position and secure with two screws, finger tight.
- 13 Adjust pick up air gap. – 86.35.31.
- 14 Reverse operations 1 to 4.

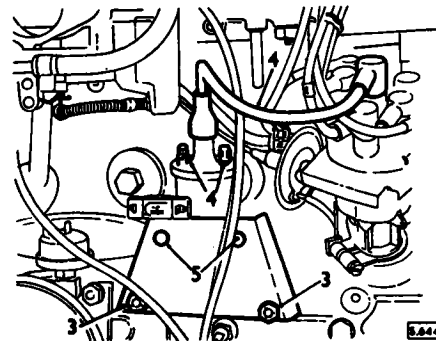
DISTRIBUTOR PICK UP GAP

Adjust 45DE6 and 43DE6 distributors 86.35.31

- 1 Disconnect battery – 86.15.20.
- 2 Remove distributor cap.
- 3 Remove rotor arm.
- 4 Remove flashover shield.
- 5 By means of feeler gauges check that gap between timing rotor and pick-up is 0.014–0.016 in. (0,35–0,44 mm.). To adjust, slacken pick-up securing screws.
- 6 Insert screwdriver into notch at base of pick-up and adjust gap to correct limit.
- 7 Tighten pick-up securing screws and recheck gap.
- 8 Refit flashover shield, rotor arm and distributor cap after wiping each with a clean dry nap-free cloth.
- 9 Reconnect battery.



1207



IGNITION COIL

Remove and refit 86.35.32

Removing

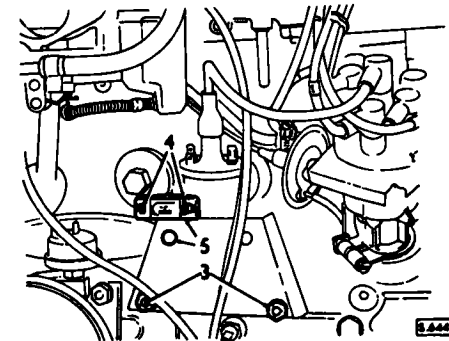
- 1 Disconnect battery – 86.15.20.
- 2 Remove air cleaner cover for access.
- 3 Withdraw two bolts securing coil mounting plate to engine block.

NOTE: Recover spacers from behind plate.

- 4 Note positions of cables and disconnect at lucars and centre H.T. connector.
- 5 Remove nuts and washer securing coil to mounting plate.

Refitting

Reverse operations 1 to 5.



BALLAST RESISTOR

Remove and refit 86.35.33

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove air cleaner cover for access.
- 3 Withdraw two bolts securing mounting plate to engine block.

NOTE: Recover spacers from behind plate.

- 4 Note positions of cables and disconnect at lucars.
- 5 Remove nut and washer securing resistor to mounting plate.

Refitting

Reverse operations 1 to 5.

BALLAST RESISTOR/STARTER RELAY

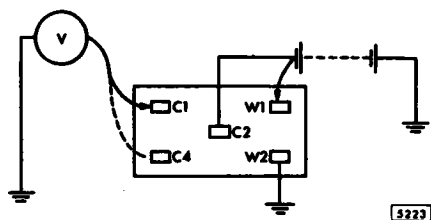
Remove and refit 86.35.34

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Note connections and pull connectors from relay.
- 3 Release two setscrews securing relay and recover plain washers and spring washers.

Refitting

Reverse operations 1 to 3, fitting earth tag beneath lower screw.



BALLAST RESISTOR/STARTER RELAY

Test (in situ) 86.35.35

If starter motor does not operate when ignition key turned initially, check as follows.

- 1 Pull cable from 'C2' and 'C4' connectors on relay and short together. Starter motor should operate showing relay at fault. If starter does not operate, no supply in brown cable or starter motor at fault, or broken earth connection to relay; although manual transmission cars have 'W2' connected directly to earth, connection on automatic transmission cars is via inhibitor switch on gear selector.

Relay removed

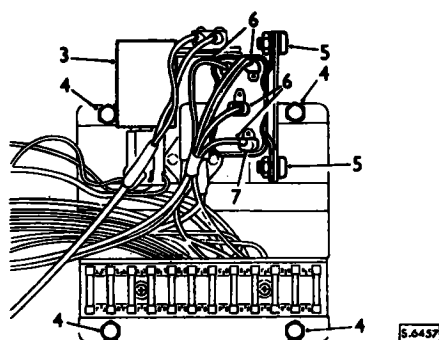
- 1 Apply 12V as shown, 12V should appear on both 'C1' and 'C4'.

IGNITION PROTECTION RELAY

Remove and refit 86.35.36

Removing

- 1 Disconnect battery, see 86.15.20.
- 2 Remove driver's side dash liner, see 76.46.11.
- 3 Remove direction/hazard warning flasher unit by lifting out of connector block.
- 4 Remove four nuts securing fuse box mounting panel and ease panel down to full extent.
- 5 Remove two screws, nuts and shake-proof washers securing relay to mounting bracket.



- 6 Note carefully position of cables.
- 7 Disconnect cables at Lucar connectors.

Refitting

Reverse operations 1 to 7.

NOTE: Later cars are fitted with cylindrical type 26RA relay.

IGNITION DRIVE RESISTOR

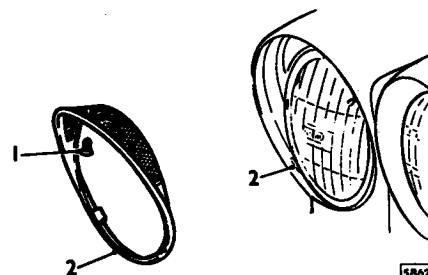
Remove and refit 86.35.37

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove air cleaner cover for access.
- 3 Withdraw two bolts securing coil mounting plate to engine block. NOTE: Recover spacers from behind plate.
- 4 Note position of cables and disconnect at lucars.
- 5 Remove nut and washers securing resistor to mounting plate.

Refitting

- 6 Reverse operations 1 to 5. NOTE: On L.H.D. cars it may be found more convenient to remove and refit resistor from beneath car, in which case operation 2 is not necessary.



HEADLIGHT RIM FINISHER

Remove and refit 86.40.01

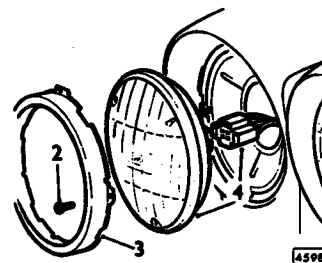
Removing

- 1 Remove top retaining screw.
- 2 Pull finisher away from two retaining lugs at lower edge.

Refitting

Reverse operations 1 and 2.

Check that finisher clears headlight retaining rim.



HEADLIGHT ASSEMBLY (OUTER)

Remove and refit 86.40.02

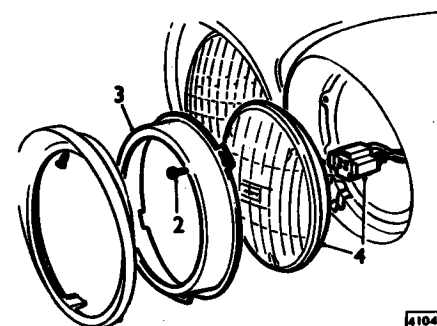
Removing

- 1 Remove headlight rim finisher - 80.40.01.
- 2 Remove three cross head screws.
- 3 Withdraw headlight retaining rim.
- 4 Withdraw headlight and disconnect adaptor at rear of sealed beam unit.

Refitting

Reverse operations 1 to 4.

NOTE: Do not disturb two beam setting screws.



HEADLIGHT ASSEMBLY (INNER)

Remove and refit 86.40.03

Removing

- 1 Remove headlight rim finisher - 80.40.01.
- 2 Slacken three cross head screws.
- 3 Rotate headlight retaining rim anti-clockwise until it can be withdrawn. NOTE: Do not disturb and disconnect adaptor at rear of unit.
- 4 Withdraw headlight and disconnect adaptor at rear of unit.
- 5 Non sealed beam unit - proceed as operations 1 to 4 then release bulb containing spring clips. NOTE: There is a raised locating piece that registers with a groove in the bulb backplate.

Refitting

Reverse operations 1 to 5.

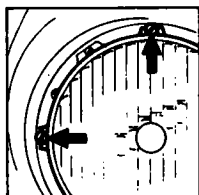
HEADLIGHT ALIGNMENT

86.40.18

Headlight beam setting should only be carried out by qualified personnel, and with approved beam setting apparatus.

Adjustment

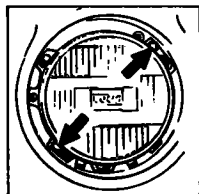
- 1 Remove headlight rim finisher — 86.40.01.



6106

Outer Headlight

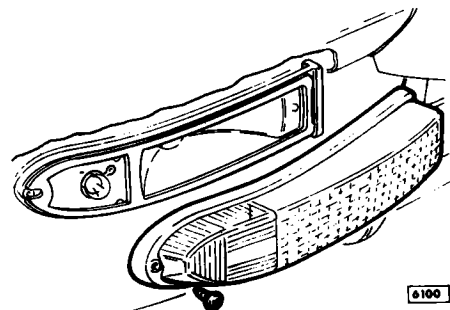
- 2 Turn top screw anti-clockwise to lower the beam, clockwise to raise the beam.
- 3 Turn side screw anti-clockwise to move beam to left, clockwise to move beam right.



6107

Inner Headlight

- 4 The adjustment screws are set diagonally opposite each other. The upper screw is for vertical alignment, the lower screw for horizontal alignment. Operations 2 and 3 refer.
- 5 Replace headlight rim finishers, see 86.40.01, and re-check alignment to ensure that settings have not been disturbed.



6100

SIDE/FLASHER LAMP LENS

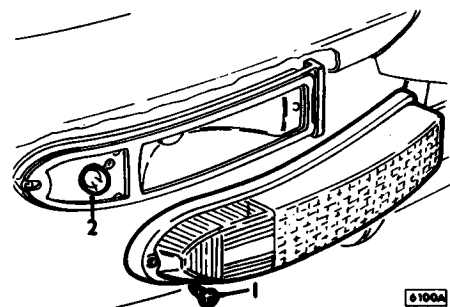
Remove and refit 86.40.24

Removing

- 1 Withdraw crosshead screw retaining lens.
- 2 Lift lens until locating flange can be easily withdrawn from slot.

Refitting

Reverse operations 1 and 2.



6100A

SIDE/FLASHER LAMP BULBS

Remove and refit 86.40.25

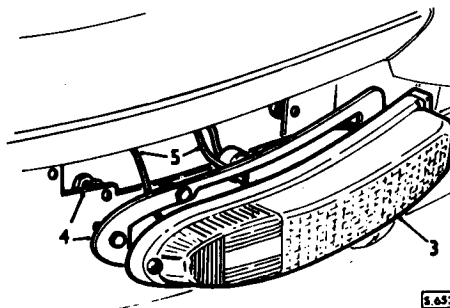
Removing

- 1 Remove lens — 86.40.24.
- 2 Withdraw bulb by pressing against spring tension and turning anti-clockwise until it releases from locating slots.

Refitting

Reverse operations 1 and 2.

NOTE: Replacement bulbs must be of correct size.



61530

SIDE/FLASHER ASSEMBLY

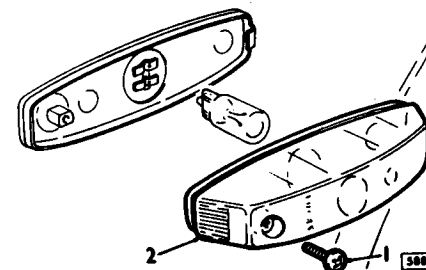
Remove and refit 86.40.26

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Withdraw two screws and remove moulded cable harness cover from related wing valance.
- 3 Remove lens — 86.40.24.
- 4 Remove four screws, nuts and shakeproof washers (or plug fasteners on later cars) securing assembly.
- 5 Disconnect cables at snap connectors on wing valance.
- 6 Secure draw string/cable to harness and pull cables through channel.
- 7 Untie draw string/cable and recover assembly.

Refitting

Reverse operations 1 to 7.



3899

FRONT FLASHER REPEATER LENS

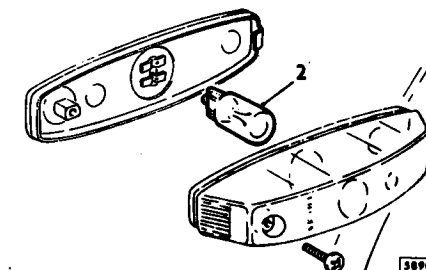
Remove and refit 86.40.51

Removing

- 1 Withdraw one crosshead securing screw.
- 2 Remove lens.

Refitting

Reverse operations 1 and 2.



3890

FRONT FLASHER REPEATER BULB

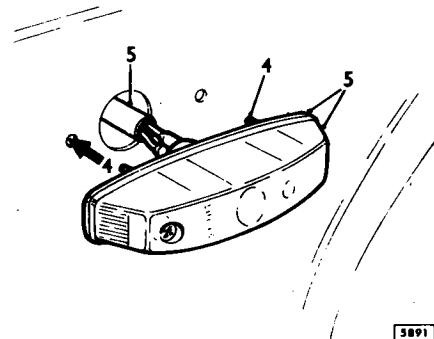
Remove and refit 86.40.52

Removing

- 1 Remove lens — 86.40.51.
- 2 Withdraw bulb.

Refitting

Reverse operations 1 and 2.



5891

FRONT FLASHER REPEATER ASSEMBLY

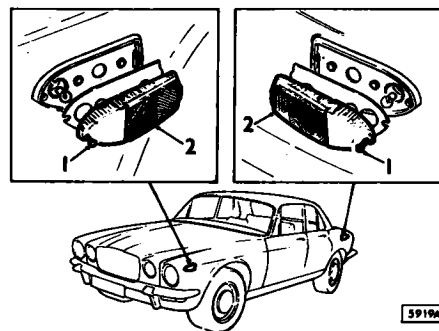
Remove and refit 86.40.53

Removing

- 1 Disconnect battery earth lead — 86.15.20.
 - 2 Remove lens — 86.40.51.
 - 3 Remove bulb.
 - 4 Remove two nuts and lock washer from captive retaining bolts.
 - 5 Disconnect cables from snap connectors.
- Check condition of seals while assembly is removed from car.

Refitting

Reverse operations 1 to 5.



5919A

SIDE MARKER LENS

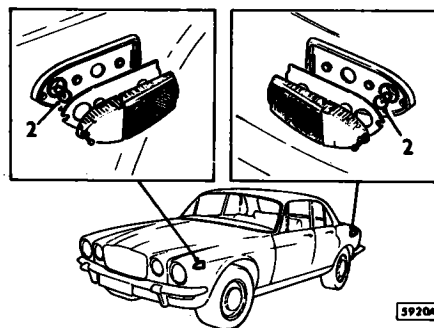
Remove and refit Front — 86.40.57
Rear — 86.40.62

Removing

- 1 Withdraw one crosshead retaining screw.
- 2 Remove lens, note retaining clip.

Refitting

Reverse operations 1 and 2.



5920A

SIDE MARKER BULB

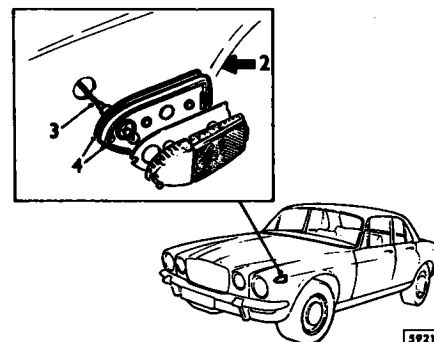
Remove and refit Front — 86.40.58
Rear — 86.40.63

Removing

- 1 Remove lens — 86.40.57.
- 2 Withdraw bulb.

Refitting

Reverse operations 1 and 2.



5921A

SIDE MARKER ASSEMBLY

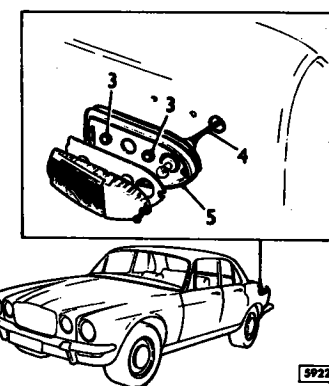
Remove and refit Front — 86.40.59

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Remove retaining nuts and lockwashers from captive retaining bolts inside wheel arch.
- 3 Disconnect cables from snap connectors.
- 4 Check condition of seals while assembly is removed from car.

Refitting

Reverse operations 1 to 4.

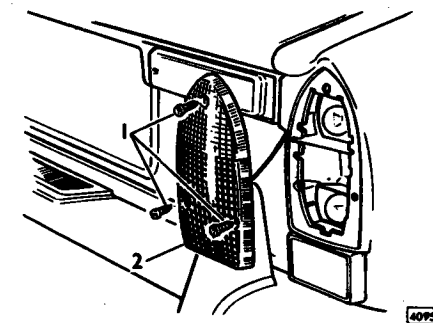


5922A

- 5 Check condition of seals while assembly is removed from car.

Refitting

Reverse operations 1 to 5.



4093B

TAIL/STOP/FLASHER LIGHTS LENS

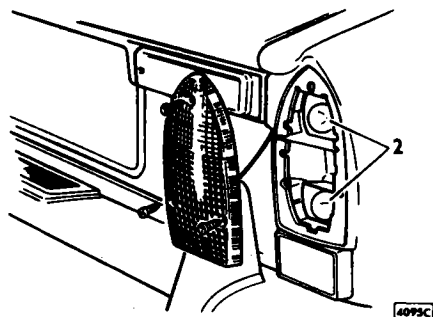
Remove and refit 86.40.68

Removing

- 1 Withdraw 3 cross head screws.
- 2 Remove lens.

Refitting

Reverse operations 1 and 2, inspect rubber seal for damage.



TAIL/STOP/FLASHER LIGHTS BULB

Remove and refit 86.40.69

Removing

- 1 Remove lens – 86.40.68.
- 2 Remove bulb.

Refitting

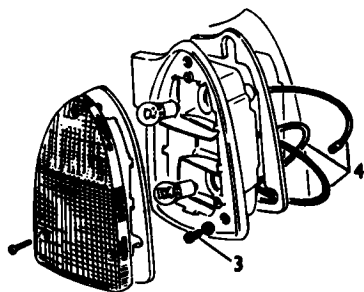
Reverse operations 1 and 2.

TAIL/STOP/FLASHER LIGHT ASSEMBLY

Remove and refit L.H. – 86.40.70
R.H. – 86.40.71

Removing

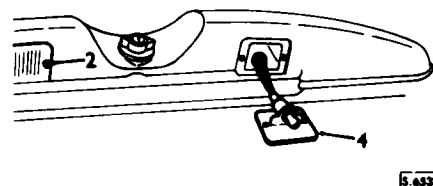
- 1 Remove lens – 86.40.68.
- 2 Remove bulb – 86.40.69.



- 3 Withdraw three slotted screws and washers.
- 4 Withdraw assembly and disconnect cables at snap connectors.

Refitting

Reverse operations 1 to 4.



NUMBER PLATE LAMP LENS

Remove and refit 86.40.84

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove two screws securing lens to number plate lamp.
- 3 Open boot and disconnect pigtail lead at snap connector.
- 4 Remove lens and bulb assembly by feeding leads through lamp assembly.

Refitting

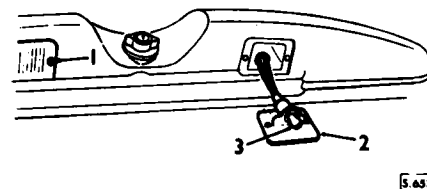
Reverse operations 1 to 4.

NUMBER PLATE LAMP BULB

Remove and refit 86.40.85

Removing

- 1 Remove two screws securing lens and bulb assembly.

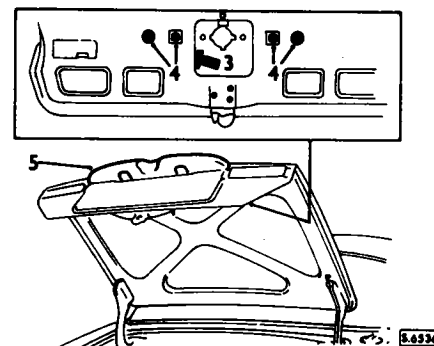


- 2 Ease lens away from lamp assembly.
- 3 Remove bulb.

NOTE: It is only necessary to exert a straight pull as lamp bulb is of capless type.

Refitting

Reverse operations 1 to 3.



NUMBER PLATE LAMP ASSEMBLY

Remove and refit 86.40.86

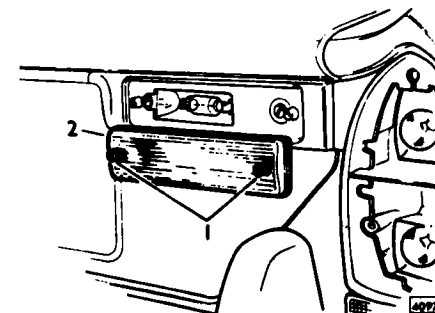
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Open boot.
- 3 Disconnect all cables at snap connectors.

- 4 Remove four nuts, plain and shake-proof washers.
- 5 Remove assembly from boot rim.

Refitting

Reverse operations 1 to 5.



REVERSE LAMP LENS

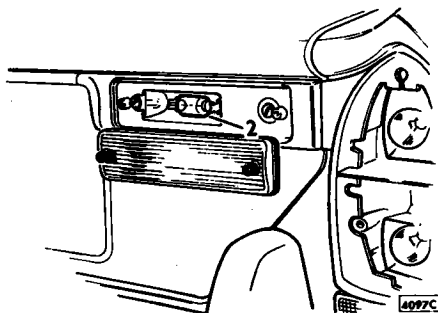
Remove and refit 86.40.89

Removing

- 1 Withdraw two screws retaining lens.
- 2 Remove lens – examine seal for condition.

Refitting

Reverse operations 1 and 2, ensuring that gasket is refitted with drain hole at bottom.

**REVERSE LAMP BULB**

Remove and refit

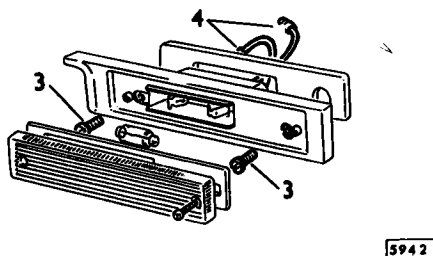
86.40.90

Removing

- 1 Remove lens - 86.40.89.
- 2 Remove bulb.

Refitting

Reverse operations 1 and 2.

**REVERSE LAMP ASSEMBLY**

Remove and refit

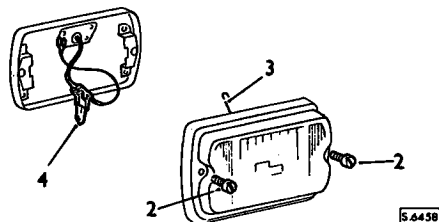
86.40.91

Removing

- 1 Remove lens - 86.40.89.
- 2 Remove bulb - 86.40.90.
- 3 Withdraw two retaining screws.
- 4 Disconnect cables at snap connectors.

Refitting

Reverse operations 1 to 4.

**FOG/SPOTLIGHT BULB**

Remove and refit

86.40.94

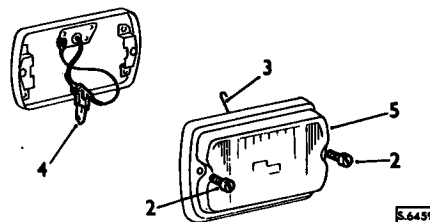
Removing

CAUTION: Under no circumstances should bulbs in these units be touched with bare hands; if any dirt or grease is present on the glass it must be removed using a lint-free cloth dipped in methylated spirits.

- 1 Disconnect battery - 86.15.20.
- 2 Remove two screws retaining beam unit.
- 3 Move bulb retaining clip to one side.
- 4 Remove bulb holder from beam unit.
- 5 Using cloth or glove pull bulb from holder.

Refitting

Reverse operations 1 to 5.

**FOG/SPOTLIGHT BEAM/LENS UNIT**

Remove and refit

86.40.95

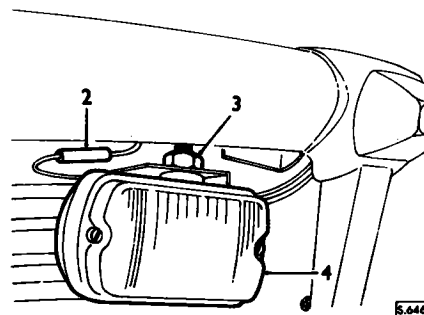
Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove two screws retaining beam unit.

- 3 Move bulb retaining clip to one side.
- 4 Remove bulb holder from beam unit.
- 5 Remove rubber retaining washers from beam unit retaining screws and separate beam and lens units.

Refitting

Reverse operations 1 to 5.

**FOG/SPOTLIGHT ASSEMBLY**

Remove and refit

86.40.96

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Disconnect cable at snap connector.
- 3 Remove nut, plain and shakeproof washer securing assembly to mounting bracket.
- 4 Remove assembly.

Refitting

Reverse operations 1 to 4.

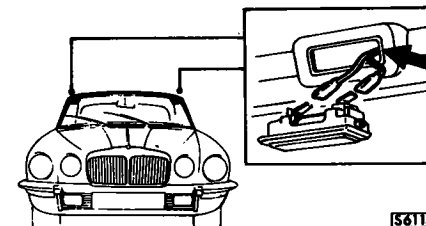
ROOF LAMP BULB

Remove and refit - 2 Door cars

86.45.01

Removing

- 1 Disconnect battery - 86.15.20.



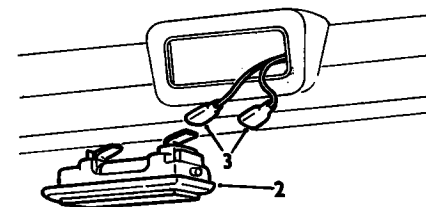
S6114A

- 2 Carefully lever interior light assembly from cantrail.
- 3 Withdraw bulb from spring retainer contacts.

Refitting

Reverse operations 1 to 3.

NOTE: Fit 6 watt bulbs only to Brycrest lamps. 10 watt bulbs may be fitted to Hella lamps.



S6461

ROOF LAMP ASSEMBLY

Remove and refit - 2 Door cars

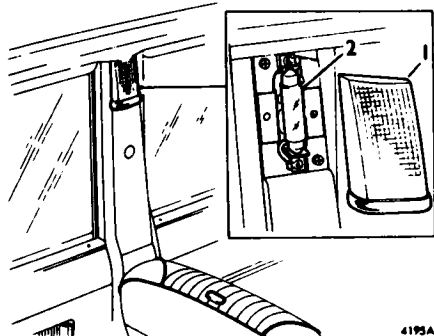
86.45.02

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Carefully lever interior light assembly from cantrail.
- 3 Disconnect cables at lucar connectors.

Refitting

Reverse operations 1 to 3.



DOOR POST LAMP BULB

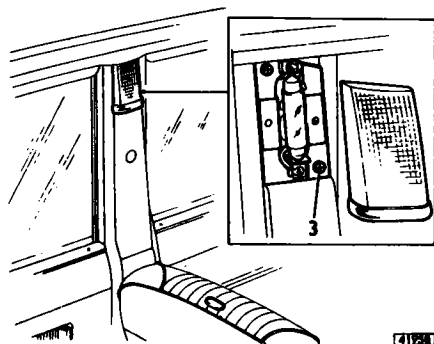
Remove and refit — 4 Door cars 86.45.03

Removing

- 1 Pull off lens and cover assembly.
- 2 Withdraw pendent-type bulb from holder.

Refitting

Reverse operations 1 and 2.



DOOR POST LAMP ASSEMBLY

Remove and refit — 4 Door cars 86.45.04

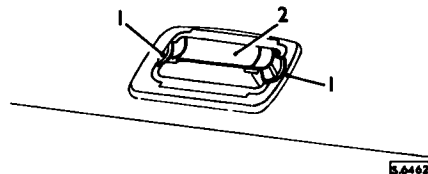
Removing

- 1 Remove lens — 86.45.03.
- 2 Remove bulb — 86.45.03.
- 3 Withdraw two retaining screws.

- 4 Disconnect cables from snap connectors.

Refitting

Reverse operations 1 to 4, ensuring that connectors are fully covered by insulating sleeves.



MAP LIGHT BULB

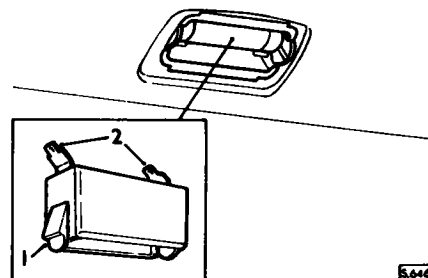
Remove and refit 86.45.09

Removing

- 1 Withdraw bulb holder by exerting pressure on side clips and pulling holder downwards.
- 2 Withdraw bulb, pendent type.

Refitting

Reverse operations 1 and 2.



MAP LIGHT ASSEMBLY

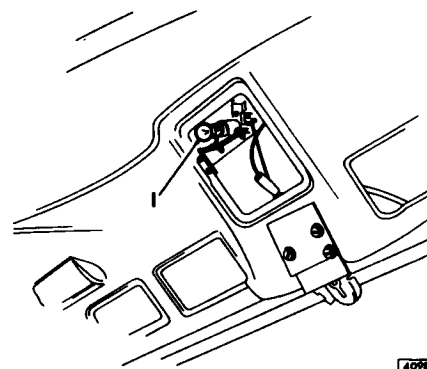
Remove and refit 86.45.10

Removing

- 1 Remove bulb holder — 86.45.09.
- 2 Disconnect cables from connectors.

Refitting

Reverse operations 1 and 2.



LUGGAGE COMPARTMENT LIGHT BULB

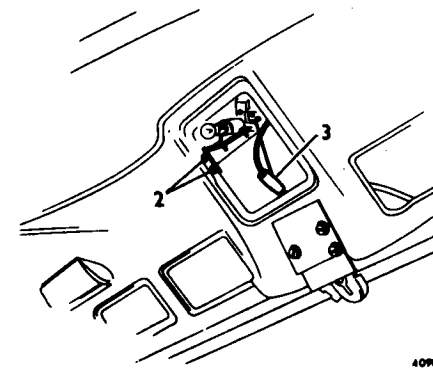
Remove and refit 86.45.15

Removing

- 1 Open luggage compartment.
- 2 Access to bulb is through aperture in luggage compartment lid.
- 3 Remove bulb.

Refitting

Reverse operations 1 to 3, using Wotan 6253 bulb.



- 2 Withdraw two screws retaining bracket.
- 3 Disconnect cable from snap connectors.

Refitting

Reverse operations 1 to 3.

NOTE: On later cars the mounting differs from that illustrated, to improve switch operation.

FIBRE OPTIC ILLUMINATION SYSTEM

Description

Consists of a centralised light source (opticell) feeding localised illumination via fibre elements and diffuser lens units to specific areas. Control switches illuminated in this way are as follows:

- 1 Ignition switch, (one element).
- 2 Lighting switch, (one element).
- 3 Heater/Air conditioning control switches, (two elements to each control).

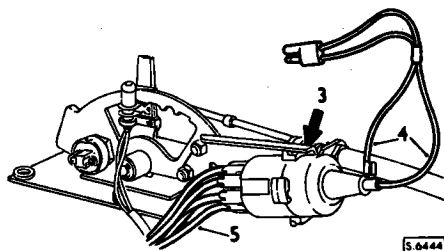
Failure of the light source will result in loss of illumination at all the above consumer units.

LUGGAGE COMPARTMENT LAMP ASSEMBLY

Remove and refit 86.45.16

Removing

- 1 Disconnect battery earth lead — 86.15.20.



OPTICELL

Remove and refit 86.45.27

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove centre console escutcheon and window lift switch panel.
- 3 Withdraw two screws securing optically to transmission selector quadrant.
- 4 Disconnect fibre elements by pulling each from optically lens hood.
- 5 Disconnect cables.

Refitting

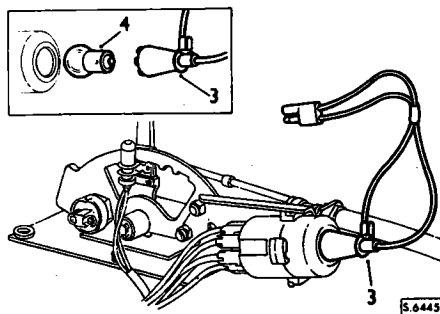
Reverse operations 1 to 5; ensure that all unused light outputs are blanked to prevent light leakage in console.

OPTICELL BULB

Remove and refit 86.45.28

Removing

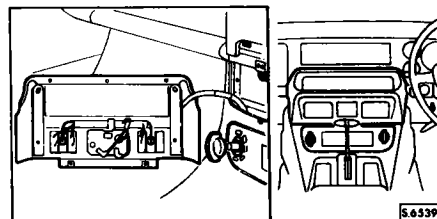
- 1 Disconnect battery – 86.15.20.
- 2 Remove centre console escutcheon and window lift switch panel.
- 3 Pull bulb holder from optically reflector.



- 4 Withdraw miniature bayonet capped bulb from holder.
NOTE: Replace with bulb of correct type if necessary (Wotan 6253).

Refitting

Reverse operations 1 to 4.



PANEL SWITCH ILLUMINATION BULB

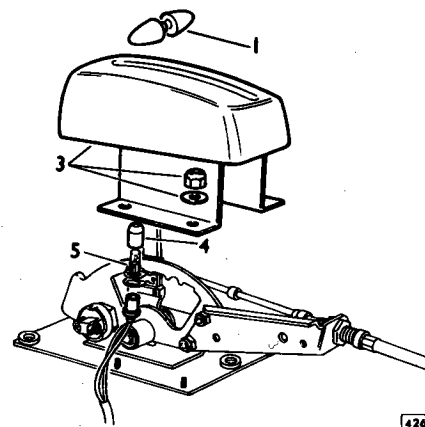
Remove and refit 86.45.31

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Drop centre oddments tray;
 - (a) Pull off air conditioning/heater control knobs and radio aperture escutcheon.
 - (b) Withdraw four screws centre oddments tray.
 - (c) Lift tray forward.
- 3 Pull bulb holder from lamp holder/diffuser.
- 4 Remove miniature bayonet capped bulb from holder.

Refitting

Reverse operations 1 to 4.



TRANSMISSION INDICATOR BULB

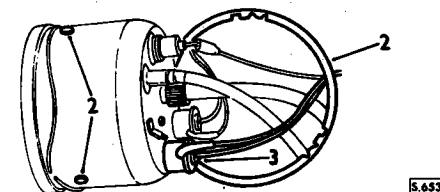
Remove and refit 86.45.40

Removing

- 1 Remove transmission selector quadrant control knob.
- 2 Remove window lift switch panel escutcheon and console escutcheon.
- 3 Remove four retaining nuts from transmission selector cover.
- 4 Remove bulb shroud.
- 5 Withdraw bulb.

Refitting

Reverse operations 1 to 5.



SPEEDOMETER ILLUMINATION BULB

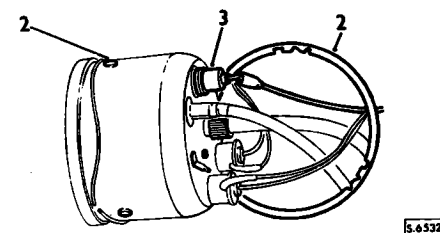
Remove and refit 86.45.49

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove speedometer – 88.30.01.
- 3 Pull bulb holder from back of speedometer and remove bulb.

Refitting

Reverse operations 1 to 3.



REVOLUTION COUNTER ILLUMINATION BULB

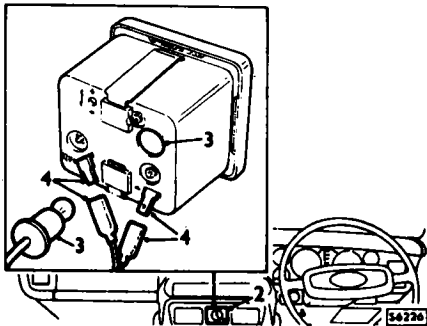
Remove and refit 86.45.53

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove revolution counter – 88.30.21.
- 3 Pull bulb holder from back of instrument and remove bulb.

Refitting

Reverse operations 1 to 3.



CLOCK ILLUMINATION BULB

Remove and refit 86.45.54

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Drop centre oddments tray.
- 3 Pull bulb holder from clock case.
- 4 Remove bulb from holder.

Refitting

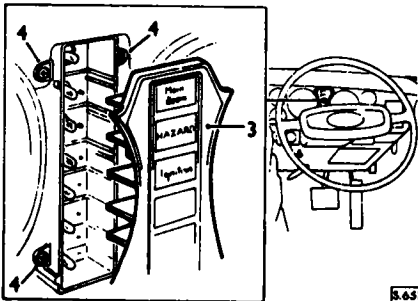
Reverse operations 1 to 4.

WARNING LIGHT CLUSTER

Remove and refit 86.45.62

Removing

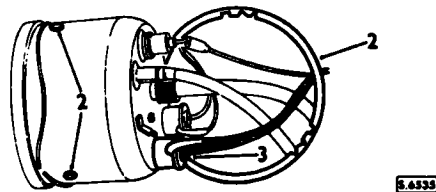
- 1 Disconnect battery – 86.15.20.
- 2 Remove fascia – 76.46.01.
- 3 Remove cluster legend plate, retained in position by spigots in nylon friction bushes.



- 4 Withdraw four screws from front of cluster.
- 5 Release 'P' Clip securing cable harness to back of fascia.
- 6 Remove cluster from fascia.

Refitting

Reverse operations 1 to 6; do not omit gasket, to prevent leakage of light.



FLASHING INDICATOR BULB

Remove and refit 86.45.63

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove speedometer or revolution counter as appropriate.
- 3 Pull bulb holder from back of instrument and remove bulb.

Refitting

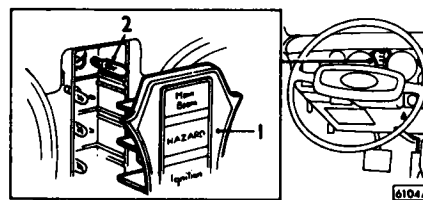
Reverse operations 1 to 3.

CHOKE WARNING BULB 86.45.71

DEMIST WARNING BULB 86.45.82

Remove and refit

Carry out operation 86.45.63.



MAIN BEAM WARNING LIGHT

BULB 86.45.65

HAZARD WARNING LIGHT BULB

86.45.68

IGNITION WARNING LIGHT

BULB 86.45.64

PARKING BRAKE WARNING

BULB 86.45.67

BRAKE WARNING LIGHT BULB

86.45.69

OIL PRESSURE WARNING LIGHT

BULB 86.45.66

SEAT BELT WARNING LIGHT

BULB 86.45.75

Remove and refit

Removing

- 1 Disconnect battery.
- 2 Remove warning light cluster legend bearing lens cover plate (retained by locating spigots in nylon friction bushes).
- 3 Remove defective bulb.
NOTE: The bulbs used in this unit are of capless design and only require a straight pull to remove them from holder.

Removing

Reverse operations 1 to 3; do not omit gasket, to prevent leakage of light.

HAZARD/TURN SIGNAL FLASHER UNIT

Remove and refit

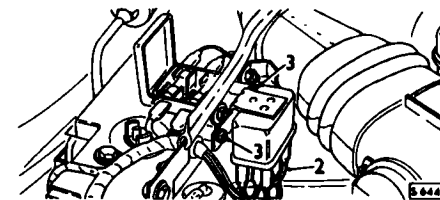
86.55.12

Removing

- 1 Remove drivers side dash liner.
- 2 Grip unit firmly and withdraw by a straight pull from its mounting socket.

Refitting

Reverse operations 1 and 2.



HEADLIGHT RELAY

Remove and refit

86.55.17

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Note positions of cables and disconnect at lucars.
- 3 Withdraw two screws securing relay. Recover spacers and washers.

Refitting

Reverse operations 1 to 3.

NOTE: Reversal of blue/white and blue/red leads at Lucars provides dipped beam flashing (legally required in Italy).

SEAT BELT WARNING AND SEQUENTIAL START SYSTEM ON EARLIER 4.2 LITRE CARS

86.57.00

NOTE: The sequential start system is not fitted to later cars, as it is no longer required by law, but is replaced by a seat belt warning system as shown in a later issue of the wiring diagram. Some earlier cars are fitted with a sequential start interlock and seat belt warning system that prevents engine starting unless the correct sequence of operations has been carried out.

To start the car carry out the following sequence of operations:

- 1 Sit in car.
- 2 Ensure handbrake is applied.
- 3 Ensure selector lever is in 'N' or 'P' position (Automatic Gearbox) or that change speed lever is in Neutral (Manual Gearbox).
- 4 Extend and fasten seat belt.
- 5 If a front seat passenger is to be carried ensure passenger's seat belt is correctly fastened.
- 6 Using manual choke if necessary, start engine with ignition in normal way.

Deviation from this sequence will prevent the engine starting. Additional audible warning will be given by a high pitched buzz, whilst a warning light in the central cluster gives visual indication of the error. These warnings are activated if either front seat belt is unfastened while the engine is running.

It is possible for a passenger to leave the car when it is stopped with the engine running. There will be warnings as the passenger seat belt is unfastened but these will operate for approximately 7 seconds only. If the driver leaves the car with the engine running (e.g. to open garage doors) warnings will operate when a gear is selected after re-entering the car.

NOTE: If there are no front seat occupants it is possible to reach into the car and start the engine, for service or test purposes. However, the belts of occupied seats must be correctly

fastened before a gear is selected. Failure to do so will activate warning signals.

SEAT BELT WARNING BUZZER/CONTROL UNIT

Remove and refit

86.57.01

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove passenger side dash liner - 76.46.11.
- 3 Remove glove box liner - 76.52.03.
- 4 Withdraw nut and washer securing unit to bracket on blower motor case.

Refitting

Reverse operations 1 to 4.

SEAT BELT WARNING AND SEQUENTIAL START SYSTEM

Testing

86.57.15

The following test procedure is divided into two sections:-

- 1 A function check of the system that requires no special equipment and designed to indicate if more intensive fault finding is required.
- 2 A test procedure using special equipment designed to prove the logic sequence of the Sequential start unit, the continuity of the electrical harness and the operation of associated switches.

TEST 1:

	PROCEDURE	RESULT
1.	(a) Occupant(s) seated (b) Ignition 'ON' (c) Forward or reverse gear selected	Audio/Visual warning - Car will not start.
2.	(a) Occupant(s) seated (b) Gear selector in 'NEUTRAL' (c) Ignition 'ON' (d) 'START' selection made	Audio/Visual warning - Car will not start.
3.	(a) Belts fastened (b) Occupant(s) seated (c) Gear selector in 'NEUTRAL' (d) Ignition 'ON' (e) 'START' selection made	Audio/Visual warning - Car will not start.
4.	(a) Belts fastened (b) Occupant(s) seated (c) Ignition 'ON' (d) Forward or reverse gear selected	Audio/Visual warning - Car will not start.
5.	(a) Occupant(s) seated (b) Belts fastened (c) Ignition 'ON' (d) Start selection made	Car will start.
6.	(a) Occupant(s) seated (b) Belts fastened (c) Ignition 'ON' (d) Ignition 'OFF' (e) Ignition 'ON' (f) Start selection made	Car will start.
7.	(a) Ignition 'ON' (b) Start selection made Note: This allows an unoccupied car to be started for service and test purposes. The transmission should be in NEUTRAL or PARK and Handbrake 'ON'	Car will start.

continued

TEST 2:

Equipment required — Smiths sequence simulator and harness test box.

- 1 Remove passenger side dash liner — 76.46.11.
- 2 Remove glove box liner — 76.52.03.
- 3 Disconnect harness connector from sequential start unit.
- 4 Insert connector of simulator harness into unit.
- 5 Connect harness test lead into harness connector removed from unit in (3).

- 6 Connect negative supply lead of test box to good earth point on car.
- 7 Connect positive supply lead of test box to positive terminal of car battery. **NOTE:** Ensure connection is firmly fixed. Battery lamp indicates correct connection. In the following test matrix ● shows lamp or buzzer 'ON'. Switches once pressed remain so until indicated otherwise.

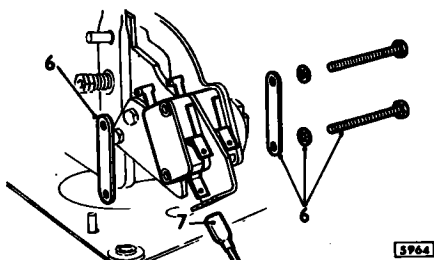
NOTE: Harness checks are powered by car supply circuits.

- 8 If unit fails any operation in test 2 it must be changed — 86.57.01.
- 9 Harness check failures must be investigated further for unserviceable components i.e. switches and connections.
- 10 Remove test equipment.
- 11 Refit glove box liner.
- 12 Refit dash liner.

Step No.	Switches operated on test box	Ignition Lamp	Start Lamp	Seat Belt Warning Lamp	Buzzer	Test Function
1.	Ignition switch ON – Start Button pressed (1-17)	●	●			'No driver' start
2.	Drivers seat switch ON	●	●	●	●	Restart circuit
3.	Ignition switch OFF					Ignition OFF does not reset latches
4.	Ignition switch ON	●	●	●	●	
5.	Drivers seat belt switch ON	●	●			Normal start logic
6.	Passenger seat switch ON	●	●	●	●	
7.	Passenger belt switch ON	●	●			
8.	Supply to 5 volts	●	●			Logic memory remains 'held' during start
9.	Supply to 11 volts	●	●			
10.	Passenger belt switch to OFF	●	●	●	●	Resets logic and Seat switch delay
11.	Passenger seat switch to OFF	●	●	After 7.7 sec. delay		
12.	Drivers belt switch to OFF	●	●	●	●	Resets logic and seat switch delay
13.	Drivers seat switch to OFF	●	●	After 7.7 sec. delay		
14.	Ignition switch to OFF					Check restart latch unlatches
15.	Drivers seat switch to ON					
16.	Ignition switch to ON	●		●	●	
17.	Select gear switch to 'in gear' and ensure start switch is UP	●		●	●	Transmission switch input functions
18.	Drivers seat switch to OFF	●		After 7.7 sec. delay		
19.	Press door push switch	●			●	Check door switch operates buzzer
20.	Release door push switch	●				

Step No.	Switches operated on test box	Ignition Lamp	Start Lamp	Seat Belt Warning Lamp	Buzzer	Test Function
21.	Passenger belt switch ON	●				Passenger side reverse logic
22.	Passenger seat switch ON	●		●	●	
23.	Passenger belt switch OFF	●		●	●	
24.	Passenger belt switch ON	●				
25.	Drivers belt switch ON	●				Drivers side reverse logic
26.	Drivers seat switch ON	●		●	●	
27.	Drivers belt switch OFF	●		●	●	
28.	Drivers belt switch ON	●				
29.	Drivers seat switch OFF and Passengers seat switch OFF	●		Wait max: seat delay		Seat switch logic lockout check
30.	Drivers seat switch ON and Passengers seat switch ON	●				
31	All switches to OFF					

Step No.	Check	Action	Battery	Ignition	Start	Gear Switch	Seats	Belts
1.	Power Supply	Ignition ON	●	●				●
2.	Gear/Transmission Switch	Select Gear	●	●		●		●
3.	Seat switch	Press down seats	●	●			●	●
4.	Belt switch	Fasten belts	●	●				
5.	Start switch	Start car	●	●				●
6.		All switches OFF	●					●



SEAT BELT WARNING GEAR BOX SWITCH

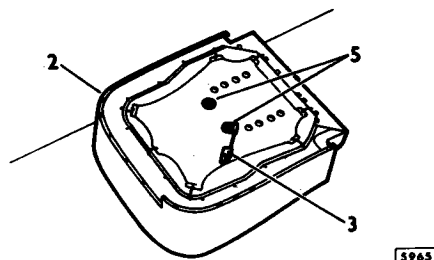
Remove and refit 86.57.19

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove electric window lift control panel.
- 3 Remove transmission selector hand-grip.
- 4 Withdraw four screws retaining console centre panel and ashtrays.
- 5 Withdraw four bolts retaining transmission selector cover.
- 6 Withdraw two bolts and keep plates from automatic transmission inhibitor switch and gearbox switch.
- 7 Disconnect seat belt warning harness from Lucar connector on gearbox switch.

Refitting

- 8 Reconnect cables to gearbox switch.
- 9 Fit switches to bracket, do not tighten retaining bolts and plates to fullest extent.
- 10 Reconnect battery leads – 86.15.20.
- 11 With ignition switch on and seat belts loose, set gearbox switch to operate buzzer alarm when any forward or reverse drive selection is made.
- 12 Tighten retaining bolts.
- 13 Test operation of gearbox switch to ensure switch has not moved.
- 14 Reverse operations 2 to 5.



SEAT SWITCH

Remove and refit – Driver's 86.57.21
– Passenger's 86.57.23

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove passenger seat cushion – 76.70.01.
- 3 Disconnect cable connector located beneath seat.
- 4 Slacken seat diaphragm using special tool (Nitool).
- 5 Withdraw two switch retaining screws and washers.
- 6 Remove seat switch.

Refitting

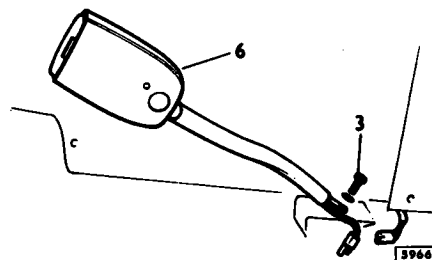
Reverse operations 1 to 6.

BELT SWITCHES (when fitted)

Remove and refit – Driver's 86.57.25
– Passenger's 86.57.27

Removing

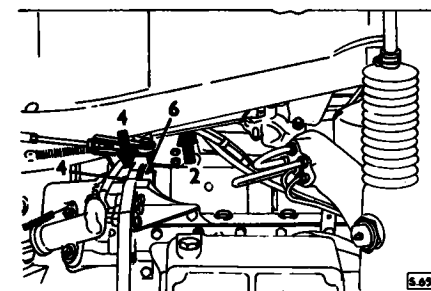
- 1 Disconnect battery – 86.15.20.
- 2 Remove seat cushion – 76.70.01.



- 3 Withdraw seatbelt anchorage bolt – 76.70.01.
- 4 Slacken two screws retaining transmission tunnel side trim.
- 5 Lift side trim slightly and pull seat belt harness and connector clear.
- 6 Disconnect cable connector and remove belt complete with its harness.

Refitting

Reverse operations 1 to 6.



STARTER MOTOR

Remove and refit 86.60.01

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Disconnect starter motor cables at terminal post (thick cable) and at lucar snap connector, (red/white braid covered cable).
- 3 Remove air cleaner – 19.10.01.
- 4 Remove two mounting bolts.
- 5 Pull starter from housing.
- 6 Retrieve spigot plate.

Refitting

Reverse operations 1 to 6.

NOTE: Ensure spigot plate is correctly positioned over locating spigots between starter motor drive end plate and bell housing.

KEY WARNING SYSTEM

Description 86.58.00

U.S.A. market

This system is designed to discourage leaving the ignition key in the lock with the vehicle unattended. While it should discourage theft, it is not a comprehensive anti-theft device.

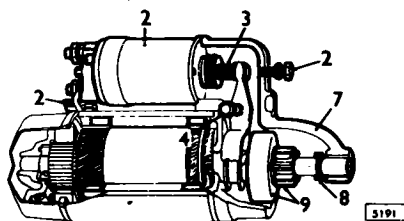
The system is actuated by opening the driver's door when the ignition key is still in the lock; when the system is actuated a buzzer provides an audible warning.

The system is cancelled when the ignition key is removed from the steering lock or when the driver's door is closed.

The driver's door switch in the circuit controls the electrical supply to the key warning circuit and the key light circuit.

The key switch is built into the steering column lock unit. Failure of the switch would necessitate the replacement of the steering column lock.

The same buzzer is used for the seat belt warning system and is an integral part of the timer module.



STARTER MOTOR ROLLER CLUTCH DRIVE UNIT

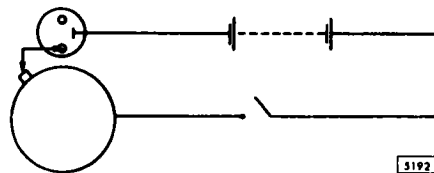
Remove and refit 86.60.05

Removing

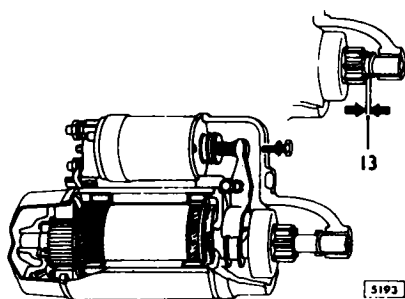
- 1 Remove starter motor — 86.60.01.
- 2 Remove solenoid complete with bridge strap (copper link).
- 3 Remove solenoid unit from drive end fixing bracket.
- 4 Remove engagement lever pivot pin.
- 5 Withdraw through bolts, but do not remove end bracket or commutator end cover.
- 6 Mount starter motor vertically in a vice, (drive end uppermost).
- 7 Withdraw drive end fixing bracket.
- 8 Remove jump ring from groove on drive shaft.
- 9 Remove collar and drive unit from shaft.

Refitting

- 10 Reverse operations 3 to 9.
Tightening torques:
Through bolts 8.0 lb.ft. (1,1 kg.m.).
Solenoid unit fixing bolts 4.5 lb.ft. (0,62 kg.m.).
- (a) Smear all moving parts of drive unit liberally with grease.
Shell SB.2628 (Home and cold climate countries).
Retinax 'A' (Hot climate countries).



- 11 Connect solenoid terminal 'STA' to starter motor casing.
- 12 Connect a 6 volt supply between solenoid operating 'Lucar' terminal and starter motor casing.



- 13 With solenoid energised and drive assembly now in engaged position, press pinion lightly back towards armature to take up any slack in drive operating mechanism and then set position of eccentric pivot pin to obtain 0.005 in. to 0.015 in. (0,127 mm. to 0,381 mm.) clearance between pinion and thrust collar.
- 14 Apply sealing compound and tighten locknut.
- 15 Refit bridge strap (copper link).
- 16 Refit starter motor — 86.60.01.

STARTER MOTOR SOLENOID UNIT

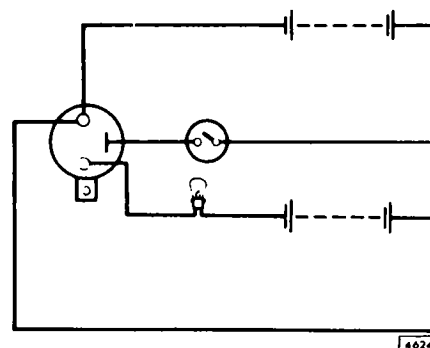
Remove and refit 86.60.08

Removing

- 1 Remove starter motor — 86.60.01.
- 2 Remove link connecting solenoid to yoke terminal.
- 3 Remove two fixings, withdraw solenoid from bracket. Collect gasket.
- 4 Release plunger from top of drive engagement lever.

Refitting

Reverse operations 1 to 4 inclusive.

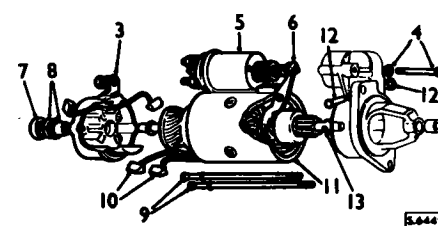


STARTER MOTOR SOLENOID UNIT

Test 86.60.09

The following checks assume that the pinion travel has been correctly set.

- 1 Remove bridge strap connecting solenoid to motor.
- 2 Connect a 12 volt D.C. supply, with switch between solenoid 'Lucar' and large terminal 'STA'.
DO NOT CLOSE SWITCH
- 3 Connect a separately energised 60 watt test lamp across solenoid main terminals.
- 4 Close switch. Solenoid should be heard to operate, and lamp should light with full brilliance.
- 5 Open switch. Lamp should go out.



STARTER MOTOR

Overhaul 86.60.13

Dismantling

- 1 Disconnect battery — 86.15.20.
- 2 Remove starter motor — 86.60.01.
- 3 Remove nut, plain and spring washers securing starter to solenoid connecting link.
- 4 Remove two bolts and spring washers securing solenoid to fixing bracket.
- 5 Lift terminal end of solenoid clear of connecting link and remove solenoid body.
- 6 Remove piston by pushing against spring and lifting from drive engagement lever.
- 7 Remove end cap seal.
- 8 Remove Spire retaining ring and bearing bush using chisel to remove some of claws on retaining ring.
NOTE: Discard Spire ring and provide new item for reassembly procedure.
- 9 Remove two through bolts and spring washers.
- 10 Remove commutator end cover by partially withdrawing cover and disengaging two field coil brushes from brush box.
- 11 Withdraw yoke and field coil assembly.
- 12 Remove mounting bracket from armature roller clutch drive and lever assembly by removing spire ring and pivot pin from drive engagement lever. Discard used spire ring.
- 13 Remove roller clutch drive and lever assembly from armature shaft by driving thrust collar from jump ring with tubular drift.

14 Renewing brushes

NOTE: Brushes which are worn to approximately 0.375 in. (9.5 mm.) in length must be renewed.

- Note which field coil conductor is fitted with long and short brush flexible connectors.
 - Cut worn brush flexible connectors from field coils.
 - Using resin cored solder, solder new brushes in position.
 - Replace brushes in moulding.
- NOTE:** Ensure brushes are positioned exactly as originally fitted.
- Check push spring pressure with push type spring pressure gauge. Press on brush until it protrudes 0.062 in. (1.5 mm.) from moulding spring pressure should be 36 oz. (10.0 N).

15 Check individual components as detailed under relevant sub-headings below.**Reassembling**

- 16** Inspect all components for wear and replace as necessary. Inspect commutator and clean with petrol soaked cloth. To remove burnt spots or grooving use a flat fine glass paper surface.

Always clean with petrol soaked cloth after rubbing down.

NOTE: Do not undercut insulation between segments.

- 17** Reverse operations 3 to 13.

NOTE: Torque figures for reassembly are as below:

- Through bolts 8.0 lb.ft. (10.84 Nm).
- Solenoid unit fixing bolts 4.5 lb.ft. (6.10 Nm).
- Solenoid terminal nuts 3.0 lb.ft. (4.1 Nm).

- 18** On completion of reassembling procedure drive spire ring on to armature shaft to a position which provides a maximum clearance between retaining ring and bearing bush shoulder of 0.010 in. (0.25 mm.).

Commutator cleaning

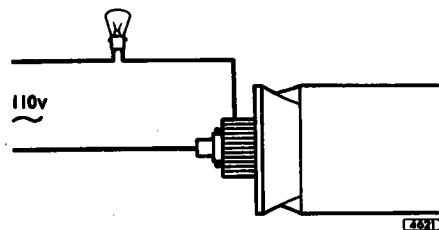
- 19** Clean the commutator if not scored with a petrol-moistened cloth. Worn commutators should be cleaned with fine glass-paper or mounted in a

lathe and a fine cut taken with a sharp tool. Finally polish with very fine glass-paper. **DO NOT UNDERCUT INSULATORS BETWEEN SEGMENTS.**

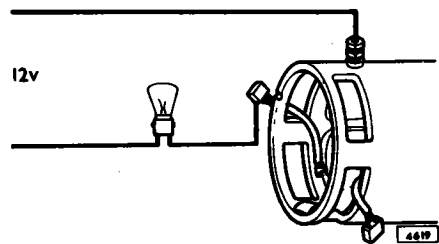
NOTE: Armatures must not be skimmed below a minimum diameter of 1.5 in (38 mm). Replace if below this limit.

Armature — checking

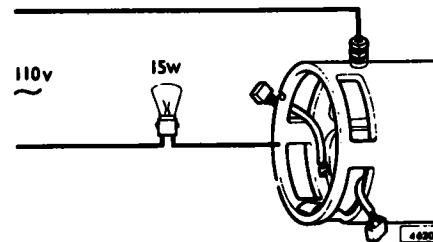
- 20** Armature conductors lifted from risers indicate overspeeding. Carefully resolder conductors or replace armature. Check clutch operation. Armatures showing signs of fouling indicate worn bearings or un-true shaft. Renew armature or bearings as required. No attempt should be made to machine an untrue shaft.

**Armature insulation test**

- 21** Connect a 110V a.c. 15W test lamp between any one of the commutator segments and the shaft. If lamp lights renew armature.

**Field coil — Test**

- 22** Check continuity of winding by connecting a 12 volt test lamp and battery between the terminal post and each brush (with the armature removed). An open circuit is indicated if lamp does not light. Replace faulty coils.



- 23** Check coil insulation with a 100 volt a.c. 15 watt test lamp connected between the terminal post and a clean part of the yoke. Renew field coils if bulb is illuminated.

- 24** To replace field coils, unscrew the four pole shoe retaining screws using a wheel-operated screwdriver.

Remove coils, pole shoes and insulation pieces.

Fit new coils over shoes, and replace in yoke, taking care that the taping around the coils is not trapped between the shoes and yoke.

Locate shoes by lightly tightening the screws, fit insulation pieces, and finally tighten screws with wheel-screwdriver.

Bearing — replacement

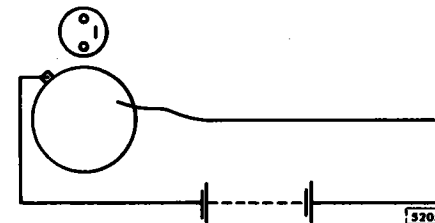
- 25** Replace bearings if excessive side play of shaft is evident.

Bushes in intermediate and drive end brackets should be pressed out, commutator end bracket bush must be withdrawn with a withdrawal tool. Soak bushes in clean engine oil for 24 hours before refitting. Refit by using a shouldered polished mandrel, 0.0005 in. (0.013 mm.) greater in diameter than shaft.

NOTE: Porous bronze bushes must not be reamed out after fitting.

Roller clutch drive — Checking

- 26** Check that pinion is free to move on shaft splines, and clutch assembly operates correctly. Replace faulty or sticking units.

**Pinion Movement Setting**

- 27** After re-assembly of the starter (cranking) motor pinion movement must be reset as follows:

Connect the 'Lucar' solenoid terminal in series with a switch to a 10 volt battery.

Connect other battery terminal to starter yoke.

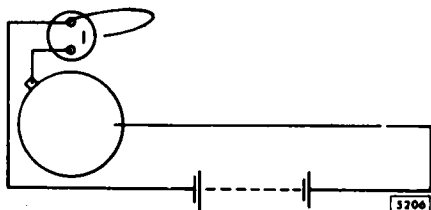
Close switch. (This throws the drive assembly forward into the engage position). Measure the distance between pinion and thrust washer on armature shaft extension.

NOTE: Pinion should be pressed lightly towards armature to take up any slack in engagement linkage. Correct setting should be 0.005 in. to 0.015 in. (0.127 mm. to 0.381 mm.).

To adjust, slacken the eccentric pin securing nut and turn pin until correct setting is obtained.

NOTE: Arc of adjustment is 180° and the head of the arrow on the pivot pin should be set only between the arrow heads on the drive end casting.

Tighten securing nut to retain pin position after setting.



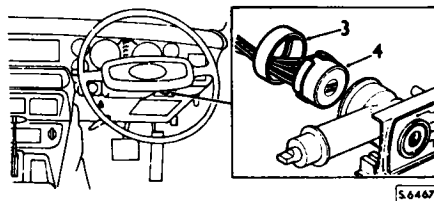
STARTER MOTOR

Bench Testing

86.60.14

The following bench tests will determine if the fault is with the motor or solenoid unit.

- 1 Clamp motor in vice.
- 2 Connect a 12 volt battery, using heavy duty cables, to the motor frame and motor terminal.
- 3 Check that motor operates under light running conditions. If necessary equipment is available check light running current and speed against figures stated under "Performance Data".
- 4 If starter motor fails test, dismantle for overhaul.
If starter operates check or replace solenoid unit as follows:—
- 5 Transfer cable from motor terminal to main solenoid terminal.
- 6 Fit jumper lead and touch to Lucar solenoid connector.
- 7 If motor does not operate, solenoid or solenoid contacts are faulty. Check and replace as necessary.



IGNITION SWITCH

Remove and refit

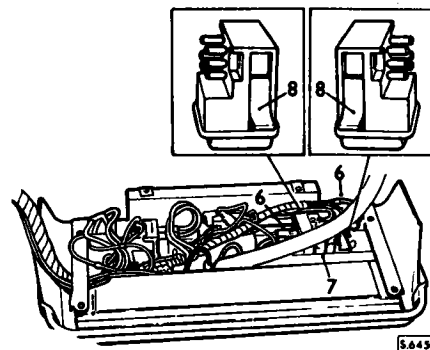
86.65.03

Removing

- 1 Disconnect battery, see 86.15.20.
- 2 Remove driver's side dash liner, see 76.46.11.
- 3 Pull retaining ring from rear of ignition/steering lock mechanism, and remove retaining screw on later cars.
- 4 Disconnect switch from harness at multi-pin connector plug.

Refitting

- 5 Reconnect switch to harness.
- 6 Push retaining ring over lock mechanism ensuring that locating segment is correctly positioned.
Reverse operations 1 and 2.



INSTRUMENT PANEL LIGHTING RHEOSTAT

Remove and refit

86.65.07

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Withdraw two screws and drop dash casing.
- 3 Depress spring loaded pin on rheostat centre shaft and remove control knob.
- 4 Unscrew retaining ring.
- 5 Remove rheostat heat shield by sliding out from under lock nut.
- 6 Disconnect cables at lucars on rheostat case.
- 7 Withdraw rheostat from dash casing.

Refitting

Reverse operations 1 to 7.

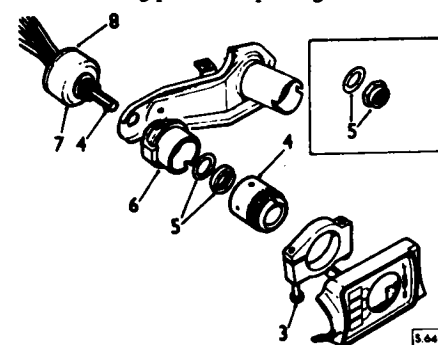
MASTER LIGHTING SWITCH

Remove and refit

86.65.09

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Remove drivers side dash liner — 76.46.11.
- 3 Slacken two screws retaining switch legend plate.
- 4 Remove control knob by inserting pin through access hole and depressing retaining pin while pulling knob.



- 5 Unscrew switch retaining bezel.
- 6 Remove switch shroud.
- 7 Push switch through mounting plate.
- 8 Disconnect switch at multi pin plug and socket.

Refitting

Reverse operations 1 to 8.

PANEL SWITCHES

Remove and refit

86.65.06

FUEL TANK SWITCH

86.65.39

BACKLIGHT HEATER SWITCH

86.65.37

MAP LIGHT SWITCH

86.65.24

INTERIOR LIGHT SWITCH

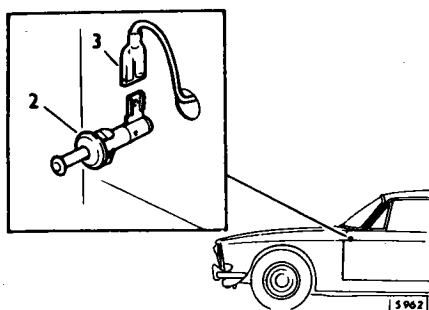
86.65.13

Removing

- 1 Disconnect battery — 86.15.20.
NOTE: On later cars it is only necessary to lever switch mounting panel from surround.
- 2 Remove heater/air condition control knobs.
- 3 Pull radio escutcheon forward.
- 4 Withdraw four screws from centre oddments tray.
- 5 Pull oddments tray forward.
- 6 Note cable positions and disconnect from related pair of switches.
- 7 Remove pair of switches and mounting panel from oddments tray.
- 8 Depress spring retaining clips at top and bottom of switch and push through mounting panel.

Refitting

Reverse operations 1 to 8.



DOOR PILLAR SWITCH

Remove and refit — 4 Door cars

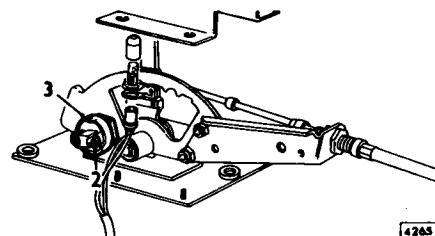
86.65.15

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Using screwdriver or other suitable tool, lever switch from door pillar. Care must be taken not to damage paintwork.
- 3 Disconnect cable from lucar connector on switch.
- 4 Secure cable to prevent it pulling back into door pillar cavity.

Refitting

Reverse operations 1 to 4.
NOTE: A different type of switch from that illustrated is fitted to later cars.



REVERSE LIGHT SWITCH

Remove and refit

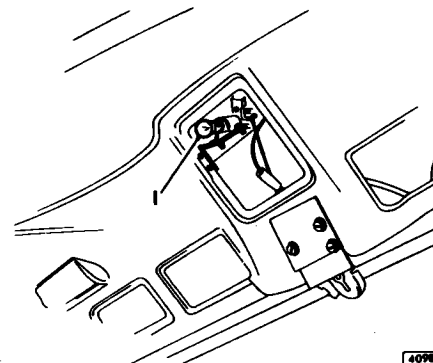
86.65.20

Removing

- 1 Carry out operation 86.57.19, items 1 to 5.
- 2 Disconnect cables from reverse light switch.
- 3 Withdraw reverse light switch, retain washer and spacers.

Refitting

- 4 When refitting reverse light switch ensure that operating plunger protrudes through mounting plate by an amount sufficient for cam to operate switch when reverse is selected.
- 5 Reverse operations 1 and 2.

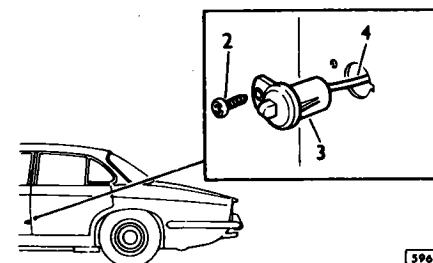


LUGGAGE COMPARTMENT LIGHT SWITCH

Remove and refit

86.65.22

The switching device for the luggage compartment illumination is an integral part of the boot light assembly. Removal and refitting is detailed under 86.45.16. No servicing is possible to this unit; defective units must be renewed.



DOOR PILLAR SWITCH (Key alarm)

Remove and refit

86.65.27

NOTE: This type of switch is used on both two- and four-door versions of Series 2 cars. Early-type switch shown.

- 1 Disconnect battery, see 86.15.20.

- 2 Withdraw retaining screw from switch.
- 3 Withdraw switch from door pillar.
- 4 Disconnect cables from lucar connectors on switch.

Refitting

Reverse operations 1 to 4.

OIL PRESSURE SWITCH

Remove and refit

86.65.30

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Disconnect cable from connector on top of switch.
- 3 Withdraw switch by unscrewing from manifold.

Refitting

Reverse operations 1 to 3.

NOTE: Installation torque must not exceed 240 lbf in (2,76 kgf m).

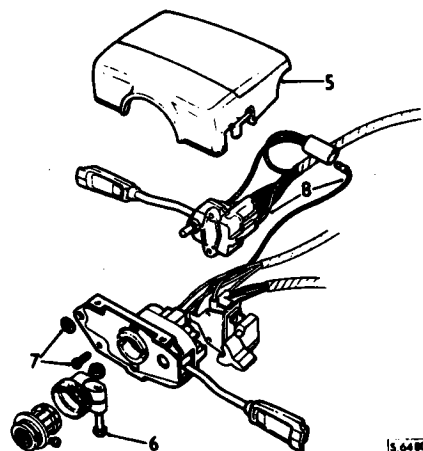
WINDSCREEN WASHER/WIPER SWITCH

Remove and refit

86.65.41

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Remove steering wheel lower shroud.
- 3 Remove steering wheel — 57.60.01.



- 4 Remove driver's side dash liner, see 76.46.11.
- 5 Remove steering wheel upper shroud.
- 6 Slacken clinch bolt and pull switch assembly from upper steering column.
- 7 Remove two screws and spire washer retaining switch.
- 8 Disconnect harness at multi pin connector and earth lead at snap connector.

Refitting

Reverse operations 1 to 8.

HANDBRAKE WARNING LIGHT SWITCH

Remove and refit 86.65.45

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove driver's side centre console side cheek, see 76.25.02.
- 3 Remove driver's side dash liner, see 76.46.11.
- 4 Withdraw two bolts and washers securing hand brake mounting bracket.

- 5 Pull trim from side of footwell to reveal handbrake warning switch.
- 6 Disconnect cables from lucars on switch.
- 7 Note number of threads above lock nut and slacken nut.
- 8 Unscrew switch from handbrake pull mounting tube.

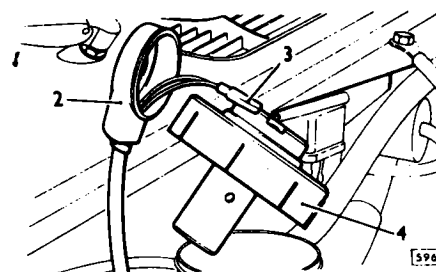
Refitting

- 9 Reverse operations 6, 7 and 8, ensuring that black lead is fitted to forward Lucar.
- 10 Re-connect battery – 86.15.20.
- 11 Operate handbrake to ensure correct operation of warning light. Adjust as necessary.
- 12 Reverse operations 1 to 5.

HANDBRAKE WARNING SWITCH

Adjustment 86.65.46

- 1 Pull footwell side casing carpet to one side and clear of handbrake control.
- 2 Slacken locknut.
- 3 With handbrake in the 'OFF' position screw in switch unit until warning light just goes out. Ensure switch is mounted lengthwise on the handbrake control rod.
- 4 Tighten locknut.
- 5 Function the handbrake to ensure that switch operates correctly. Adjust as necessary.
- 6 Replace carpet.



BRAKE WARNING SWITCH (fluid level)

Remove and refit 86.65.49

Removing

- 1 Disconnect battery – 86.15.20.
 - 2 Ease back rubber cover on the lid of brake fluid reservoir.
 - 3 Disconnect cables at lucar connectors.
 - 4 Unscrew reservoir lid.
- NOTE:** No servicing is possible on this unit. Defective units must be changed.

Refitting

Reverse operations 1 to 4.

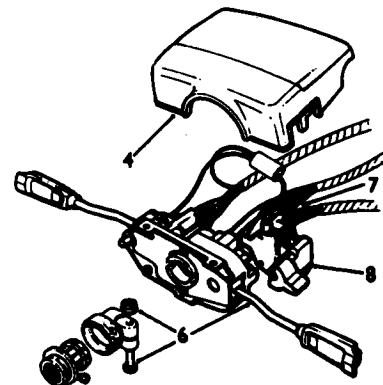
NOTE: Early type reservoir and switch illustrated.

HAZARD WARNING SWITCH

Remove and refit 86.65.50

Removing

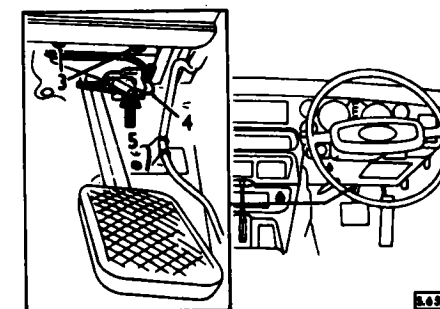
- 1 Disconnect battery – 86.15.20.



- 2 Remove steering column lower shroud.
- 3 Remove steering wheel – 57.60.01.
- 4 Remove steering column upper shroud.
- 5 Remove driver's side dash liner, see 76.46.11.
- 6 Slacken clinch bolt and pull switch assembly from upper steering column.
- 7 Note positions of cables and disconnect from lucars on back of switch.
- 8 Depress nylon retaining tags and push switch through mounting plate.

Refitting

Reverse operations 1 to 8.



STOP LIGHT SWITCH

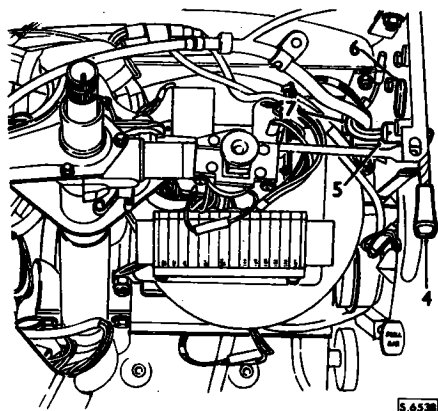
Remove and refit 86.65.51

Removing

- 1 Disconnect battery – 86.15.20.
 - 2 Remove driver's side dash liner, see 76.46.11.
 - 3 Withdraw one bolt and one dowel bolt securing switch mounting plate.
 - 4 Disconnect cables at lucar connectors on switch.
 - 5 Remove two screws and keep plate securing switch to mounting plate.
- NOTE:** Ensure position of dowel bolt is noted to facilitate correct refitting.
- NOTE:** Mark switch position before removing to ensure correct positioning during refitting.

Refitting

- 6 Reverse operations 1 to 5, ensuring leads are routed clear of pedals, etc.
- 7 Check operation of switch, adjust as necessary.



CHOKE WARNING LIGHT SWITCH (Not fitted to later cars)

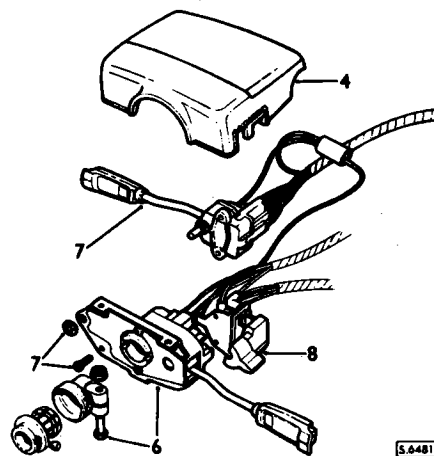
Remove and refit 86.65.53

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Remove driver's side dash liner, see 76.46.11.
- 3 Remove nut and spring washer securing choke cable outer casing to facia bracket.
- 4 Pull choke handle illumination bulb holder from choke handle.
- 5 Remove nut securing choke cable nipple to choke handle and secure choke cable to one side.
- 6 Withdraw two securing screws from micro switch, recover keep plate.
- 7 Disconnect cables at cable connectors.

Refitting

Reverse operations 1 to 7.



DIRECTION/HEADLIGHT FLASHER SWITCH

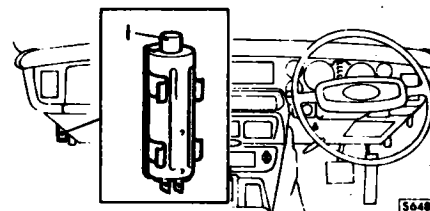
Remove and refit 86.65.55

Removing

- 1 Disconnect battery - 86.15.20.
 - 2 Remove steering column lower shroud.
 - 3 Remove steering wheel - 57.60.01.
 - 4 Remove steering column upper shroud.
 - 5 Remove drivers side dash liner - 76.46.11.
 - 6 Slacken clinch bolt and pull switch assembly from upper steering column.
 - 7 Remove two screws and spire washer securing windscreen washer/wiper switch to assembly and lay switch to one side.
 - 8 Remove two screws securing hazard warning switch mounting bracket to assembly and lay switch and bracket to one side.
 - 9 Recover remainder of assembly.
- CAUTION:** No attempt must be made to separate Direction/Headlight/Flasher switch from mounting bracket. Faulty items are changed as complete assemblies.

Refitting

Reverse operations 1 to 9.



FUEL CUT-OFF INERTIA SWITCH

Remove and refit (see

19.22.09)

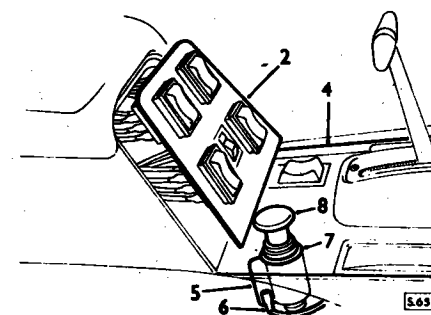
86.65.58

Reset

86.65.59

An inertia sensitive switch is fitted in the electrical supply to the fuel pumps. Should the car be subjected to heavy impact forces, the switch opens, isolating the fuel pumps, ensuring fuel is not pumped into a potentially dangerous situation.

The switch is located above the fresh air pull on the passenger side of the car. The switch can be reset by inserting finger through access point in top of switch cover, and pressing button (1) in top of switch.



CIGAR LIGHTER ASSEMBLY

Remove and refit 86.65.60

Removing

- 1 Disconnect battery - 86.15.20.
- 2 Lever off electric window switch panel.
- 3 Withdraw four screws retaining transmission console trim panel.
- 4 Lift panel away from console.
- 5 Press together the sides of cigar lighter bulb assembly and remove from cigar lighter bezel.
- 6 Disconnect cable from cigar lighter connector.
- 7 Unscrew cigar lighter bezel.
- 8 Withdraw cigar lighter assembly from console escutcheon.

Refitting

Reverse operations 1 to 8. Note that radial position of lighter socket is critical, to avoid shorting to window lift relay.

The following pages contain details of:

COMPONENT LOCATION WIRING DIAGRAMS

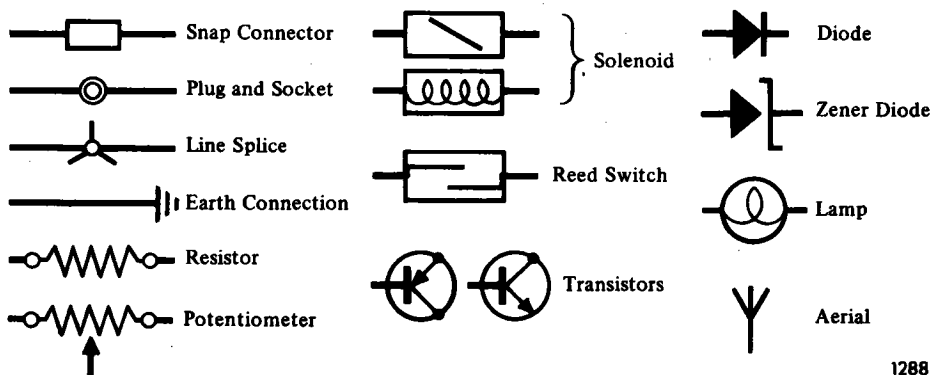
To assist in identification and location, the symbols and cable colour codes are given below. A master key to location and wiring diagrams is given with the component location chart. Extracts from this master key are given with the appropriate systems diagram.

CABLE COLOUR CODE

N. Brown	P. Purple	W. White
U. Blue	G. Green	Y. Yellow
R. Red	L. Light	B. Black
K. Pink	S. Slate	O. Orange

When a cable has two colour code letters, the first denotes the Main Colour and the second the Tracer Colour.

SYMBOLS USED

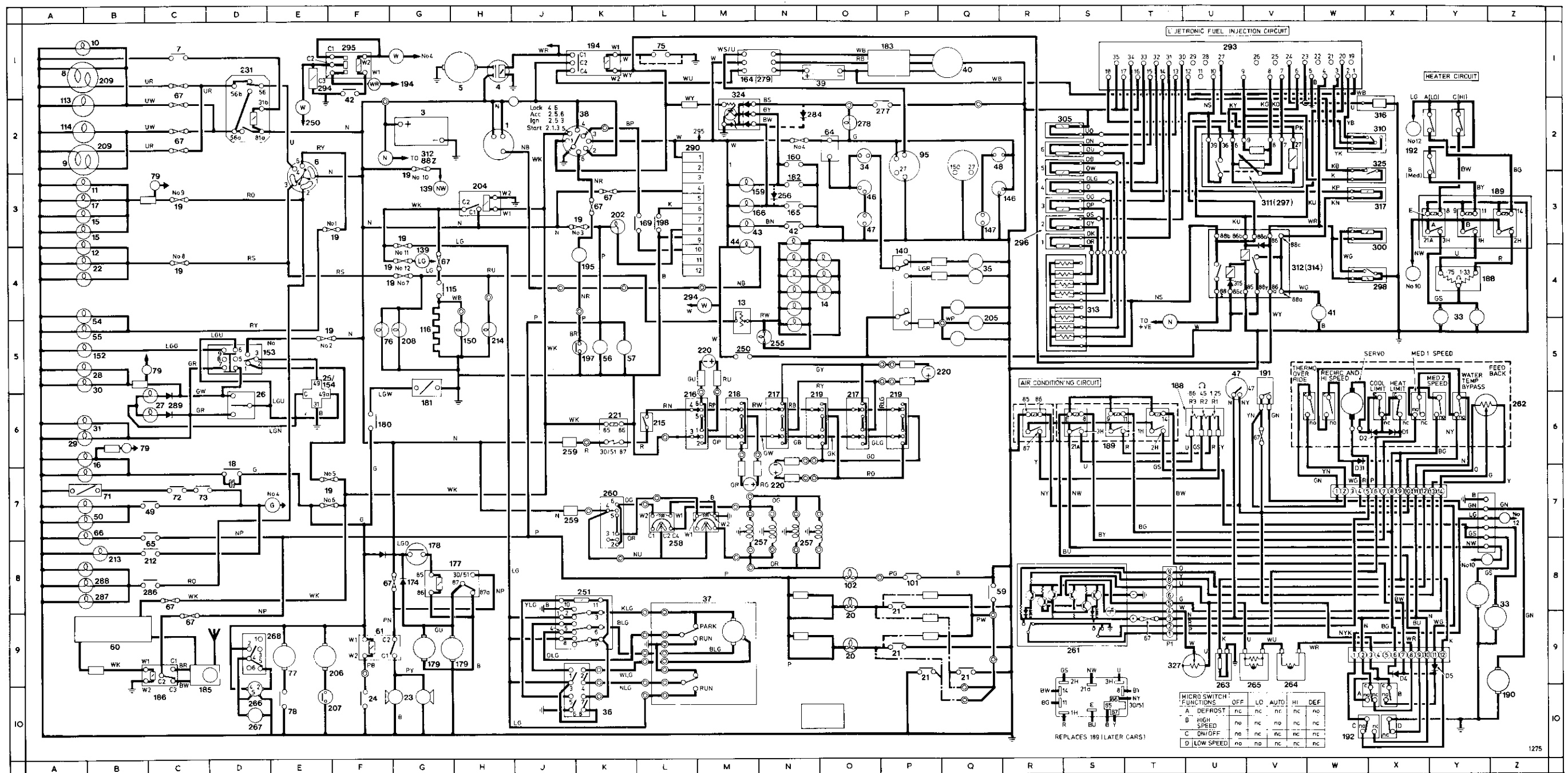


LAMP BULBS

LAMP FUNCTION	PART NUMBER	WATTS	TYPE
Outer Headlight (Main and dipped beam)	—	See local Dealer	Sealed Beam
Inboard main beam only	—	See local Dealer	Sealed Beam
Front/rear flasher lamps	GLB 382	21	Bayonet
Front flasher/side lamp	GLB 380	5/21	Bayonet
Side lamp	GLB 207	5	Bayonet
Stop/tail lamp	GLB 380	21	Bayonet
Reverse lamp	11740	21	Festoon
Number plate lamp	RTC 533	6	Capless
Side marker lamp	GLB 989	5	Bayonet
Map/interior lamps	12273	10	Festoon
Luggage compartment lamp	GLB 989	5	Bayonet
Warning lamps	GLB 286	1.2	Miniature capless
Instrument lamps	GLB 987	2.2	Bayonet
Cigar lighter	GLB 643	22	Miniature bayonet
Automatic transmission selector illumination	GLB 988	5	
Fibre optic light source	GLB 989	5	Bayonet
Catalyst/EGR warning lamp	GLB 281	2	

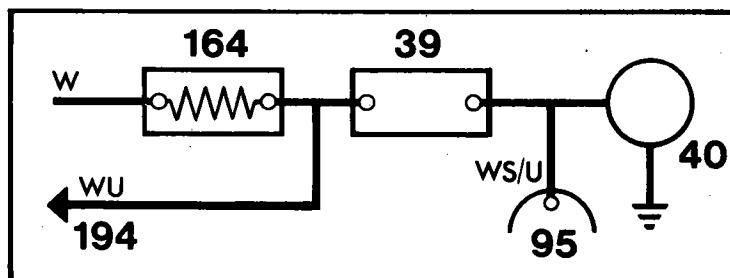
FUSES

FUSE No.	PROTECTED CIRCUITS	PART NUMBER	CURRENT CAPACITY
1	Fog lamps (if fitted)	GFS 420	20A
2	Hazard warning	GFS 415	15A
3	Map/interior lamps, cigar lighter, electric aerial (if fitted), clock, seat belt warning lamp	GFS 435	35A
4	Panel lights	GFS 415	15A
5	Direction indicators	GFS 415	15A
6	Reversing lights	GFS 435	35A
7	Panel switches, cigar lighter illumination, number plate lamp, luggage compartment lamp, fibre optic unit, gear selector illumination	GFS 415	15A
8	Side/tail lamps (LH)	GFS 415	15A
9	Side/tail lamps (RH)	GFS 415	15A
10	Air conditioning motor	GFS 450	50A
11	Windscreen wipers, air conditioning relay and clutch, windscreen washer, horn relay winding, cooling fan relay winding	GFS 450	50A
12	Heated back light	GFS 435	35A
	Headlamp (main beam)	GFS 425	25A
	Headlamp (dipped beam)	GFS 410	10A

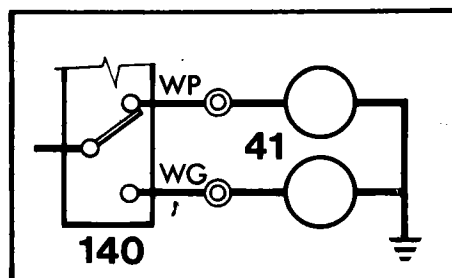


COMPONENT	No.	COMPONENT	No.	COMPONENT	No.	COMPONENT	No.	COMPONENT	No.
Alternator	1	Battery cooling fan thermostat	207	Extra air valve	317	Headlamp pilot lamp (see sidelamp)	11	Overdrive solenoid	71
Aerial motor	185	* Blocking diode — brake warning	256	Fibre optics illumination lamp	255	Headlamp relay	231	Oxygen (lambda) sensor	316
Aerial motor relay	186	Blocking diode — direction indicators	289	Flasher unit (part of 154)	25	Headlamp washer pump	267	Oxygen (lambda) sensor warning lamp (see	
Air conditioning ambient sensor	265	Blocking diode — inhibit incorrect —		Flasher lamp RH front	28	Headlamp washer/wiper switch	268	Service Interval Counter*)	
Air conditioning amplifier	261	polarity	315	Flasher lamp LH front	29	Headlamp wiper motor	266	Panel lamps	14
Air conditioning blower	33	Boot light	66	Flasher lamp RH rear	30	Horn	23	Panel lamps rheostat	13
Air conditioning blower relay	189	Boot light switch	65	Flasher lamp LH rear	31	Horn push	24	Radiator cooling fan diode	174
Air conditioning blower resistor	188	Brake differential pressure switch	160	Fog lamp RH	54	Horn relay	61	Radiator cooling fan motor	179
Air conditioning compressor clutch	190	Brake failure warning light	323	Fog lamp LH	55	Ignition amplifier	183	Radiator cooling fan relay	22
Air conditioning control switch	192	Brake fluid level switch	182	* Fuel cut off valve	294	Ignition coil	39	Radiator cooling fan thermostat	259
Air conditioning/Heater (to)	139	Brake fluid level warning light	159	* Fuel cut off relay	295	Ignition protection relay	204	Thermotime switch	298
Air conditioning in-car sensor	264	* Choke control illumination	214	Fuel gauge	34	Ignition switch	38	Throttle switch	310
Air conditioning servo	262	* Choke warning light	213	Fuel gauge tank unit	35	Inertia switch	44	Trailer socket	79
Air conditioning temperature selector	327	* Choke control warning light switch	212	Fuel injection control unit (E.C.U.)	293	Injectors	250	* Unilateral parking light switch (Early cars)	254
Air conditioning thermostat	191	Cigar lighter	57	Fuel injection main relay	312	Injector power resistors	296	Voltage stabiliser	64
Air conditioning vacuum valve	263	Cigar lighter illumination	208	Fuel injection — pressure sensor	318	Interior light	115	Water temperature gauge	46
Air conditioning water temperature sensor	47	Clock	56	Fuel pump	41	Interior light rear	116	Water temperature transmitter for gauge	47
Air flow meter	311	Cold start injectors	300	Fuel pump relay (part of 312)	20	Interior light switch	150	Window lift master switch	215
Air temperature sensor (part of 311)	297	Cold start relay (Part of 312)	299	Fuel pump solenoid	205	Inverter	50	Window lift motor	220
Altitude switch	325	Coolant temperature sensor	305	Fuel tank change-over switch	140	Line fuse	49	Window lift safety relay	221
* Anti-run on valve	195	Direction indicator switch	26	Fuse box	19	Main beam warning light	95	Window lift switch RH front	216
* Anti-run on valve oil pressure switch		Direction indicator warning light	27	Handbrake switch	165	Map light	67	Window lift switch LH front	218
(Early cars)		Distributor	40	Handbrake warning lamp	166	Map light switch	10	Window lift switch LH rear	217
* Auto gearbox kickdown solenoid	181	Door lock solenoid	257	Hazard warning flasher unit (includes 25)	154	Number plate lamp	6	Window lift switch RH rear	219
* Auto gearbox kickdown pressure switch	180	Door lock solenoid relay	258	Hazard warning lamp	152	Oil pressure gauge	102	Windscreen washer pump	77
Auto gearbox selector lamp	76	Door lock switch	260	Hazard warning switch	153	* Seat belt warning control unit (Later cars)	101	Windscreen washer switch	78
Auto gearbox start inhibit switch	75	Door switch RH	21	Headlamp dip switch	7	* Seat belt warning gearbox switch (Early cars)	15	Windscreen wiper motor	37
Ballast resistor	164	Door switch LH	22	Headlamp dip beam	209	Seat belt warning lamp	48	Windscreen wiper relay	251
* Base drive resistor (part of 164) (Later cars)	279	Door switch (buzzer alarm)	169	Headlamp inner RH	113	* Seat switch — driver (Early cars)	42	Windscreen wiper switch	36
Battery	3	* EGR warning switch	277	Headlamp inner LH	114	* Seat switch — passenger (Early cars)	147		
Battery condition indicator	146	* EGR warning lamp	278	Headlamp outer RH	8	Side lamp RH or (Headlamp pilot lamp)	43		
Battery cooling fan	206	* EGR diode	284	Headlamp outer LH	9	Side lamp LH or (Headlamp pilot lamp)	72		
						* Service Interval Counter Switch	73		

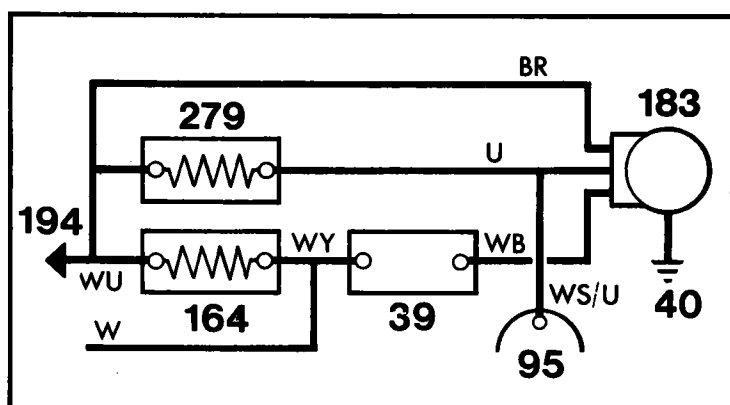
ALTERNATIVE CIRCUITS



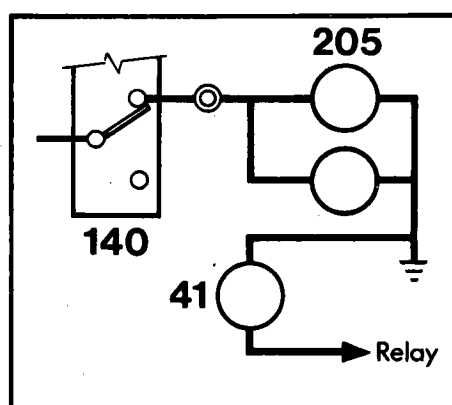
3.4 and 4.2 cars fitted with Ballast Ignition and Carburettors



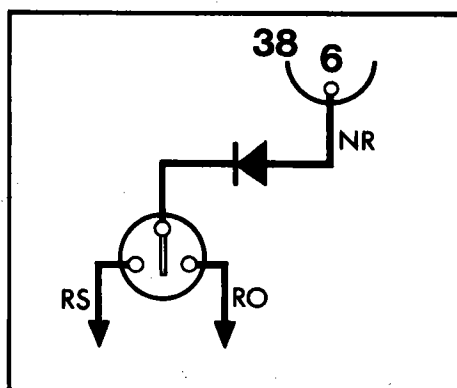
Part of Fuel Changeover switch
(cars fitted with carburettors)



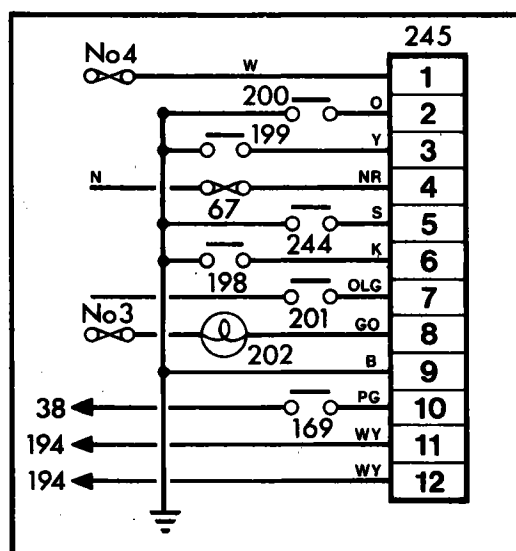
4.2 cars fitted with Ballast Ignition and Electronic Ignition
and Carburettors



Part of Fuel Changeover switch
(cars fitted with Fuel injection)
(Early cars)



Unilateral Parking Light System
(Early cars)



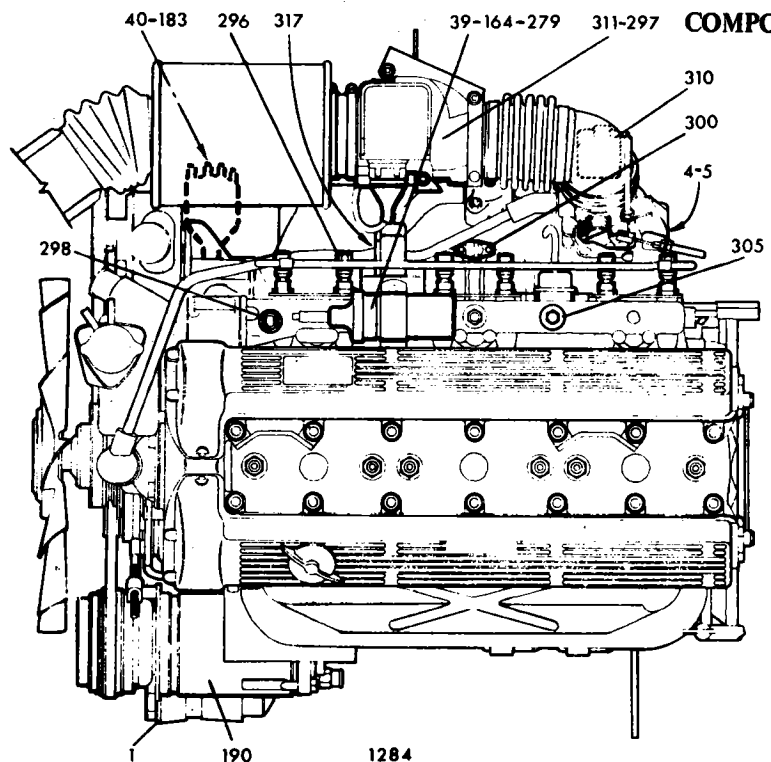
Sequential Start Control Unit
(Early cars)

CIRCUIT VARIATIONS

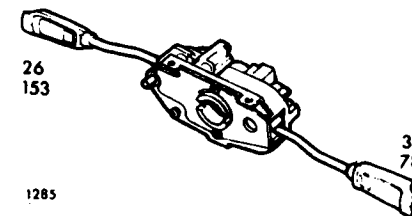
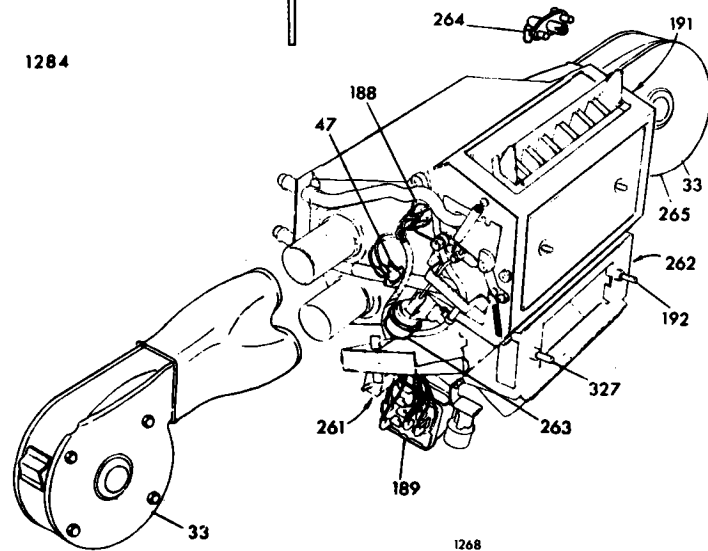
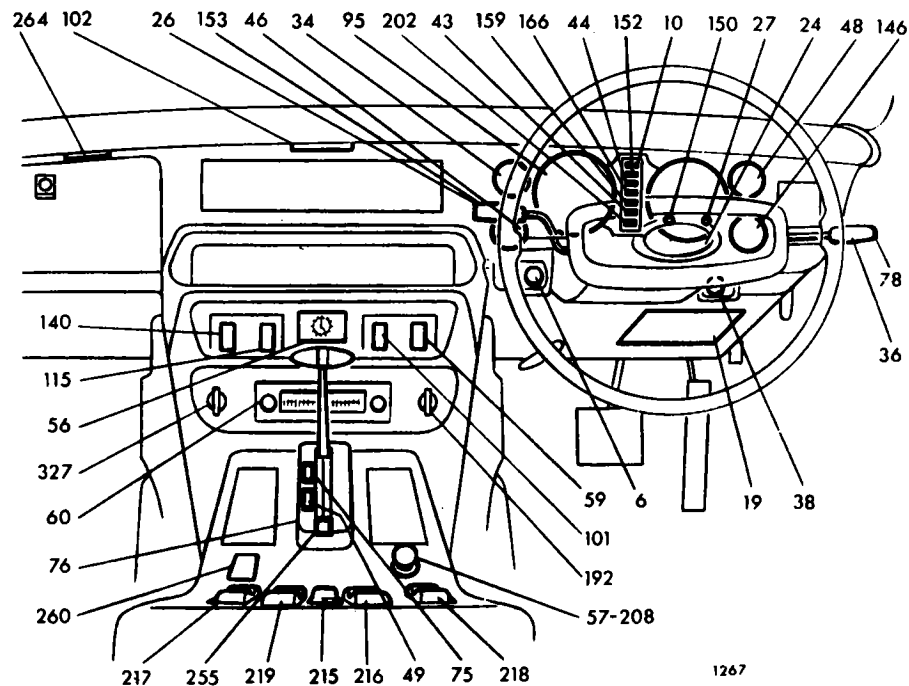
180 } Borg Warner
181 } Model 12
198 }
199 }
200 } Replaced by 290
201 } (Later cars)
244 }
245 }
254 Early cars only
256 Replaced by 324
325 if fitted

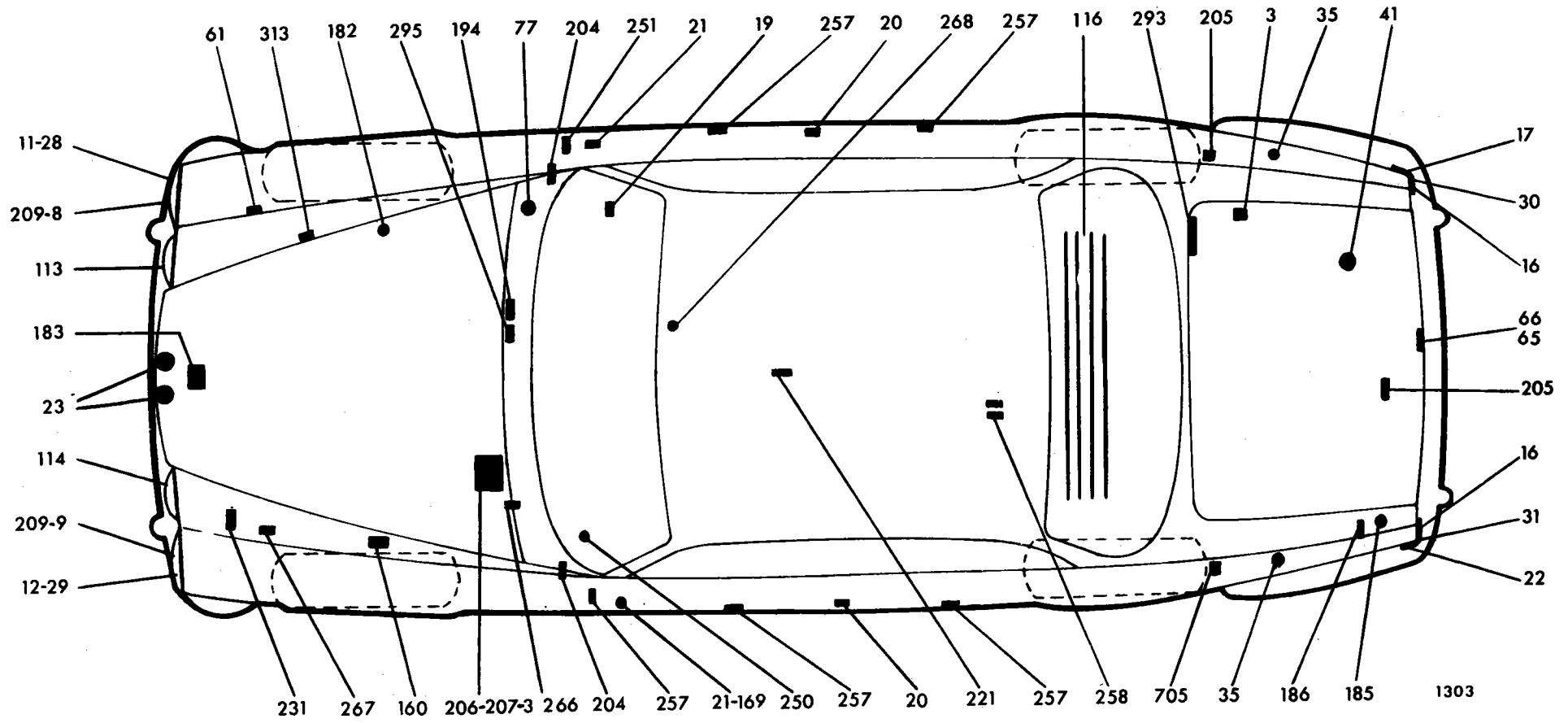
195 }
197 }
212 } Carburettor cars
213 }
214 }
266 }
267 } Scandinavia only
268 }
314 }
299 } Part of 312

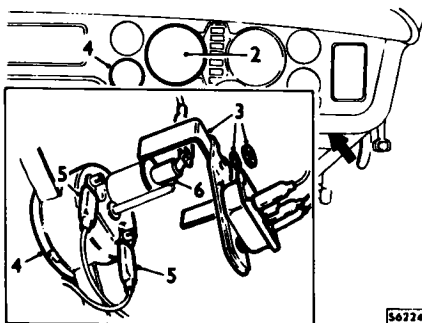
297 Part of 311
277 } Service interval counter
278 } and warning light
284 } show when EGR/Catalyst and
(later cars) Oxygen sensor
require servicing
279 Electronic ignition for
carburettors, Part of 164 for
fuel injection



COMPONENT LOCATION







56224

BATTERY CONDITION INDICATOR

Remove and refit

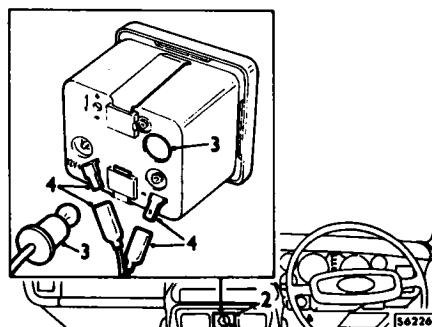
88.10.07

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove tachometer – 88.30.21.
- 3 Remove finger nut and lock washer from battery condition indicator and voltage stabiliser retaining bracket.
- 4 Withdraw indicator from fascia.
- 5 Disconnect cables at lucar connectors on rear of instrument.
- 6 Withdraw instrument lighting bulb holder.

Refitting

Reverse operations 1 to 6.



56226

CLOCK

Remove and refit

88.15.07

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Lever clock from aperture.
- 3 Pull clock illumination bulb holder from back of clock.
- 4 Note positions of lucar connectors and disconnect cables.

Refitting

Reverse operations 1 to 4.

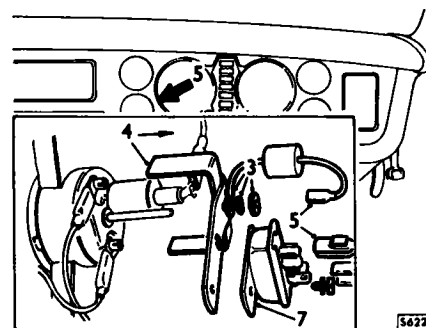
VOLTAGE STABILISER

Remove and refit

88.20.26

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove tachometer – 88.30.21.



56225

- 3 Remove finger nut, lock washer, and suppressor connector from battery condition meter retaining bracket.
- 4 Remove retaining bracket from battery condition meter.

- 5 Through tachometer aperture, note position of lucars on stabiliser and disconnect electrical connections.
- 6 Recover stabiliser and bracket.
- 7 Withdraw retaining screw and remove stabiliser from securing clip.

Refitting

Reverse operations 1 to 7.

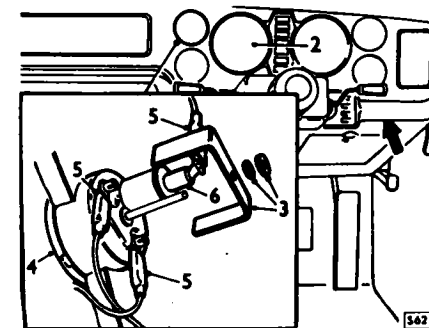
OIL PRESSURE GAUGE

Remove and refit

88.25.01

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove tachometer – 88.30.21.
- 3 Remove finger nut and lockwasher from oil pressure gauge retaining bracket.
- 4 Withdraw instrument from fascia.



56227

- 5 Disconnect cables at lucar connectors on back of instrument.
- 6 Withdraw instrument lighting bulb holder.

Refitting

Reverse operations 1 to 6.

OIL PRESSURE TRANSMITTER

Remove and refit

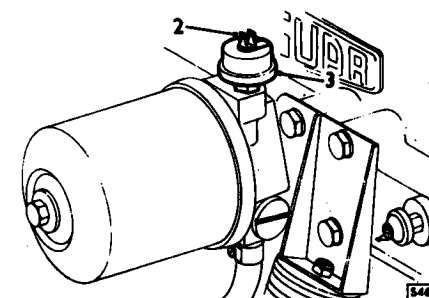
88.25.07

Removing

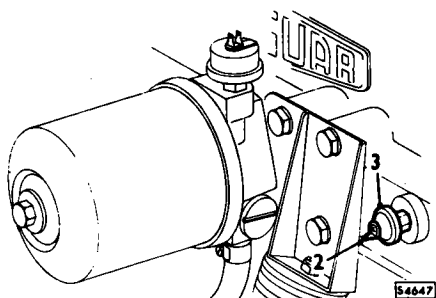
- 1 Disconnect battery – 86.15.20.
 - 2 Disconnect cable at lucar connector.
 - 3 Remove transmitter with correct size spanner.
- CAUTION:** No pressure should be exerted on the capsule.

Refitting

Reverse operations 1 to 3.



56666



OIL PRESSURE WARNING SWITCH

Remove and refit 88.25.08

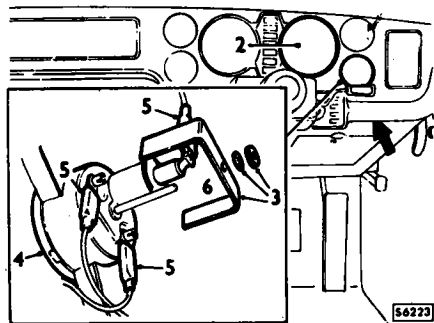
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Disconnect cable from lucar connector.
- 3 Remove oil pressure switch.

Refitting

Reverse operations 1 to 4.

CAUTION: Care must be taken not to overtighten switch.



COOLANT TEMPERATURE GAUGE

Remove and refit 88.25.14

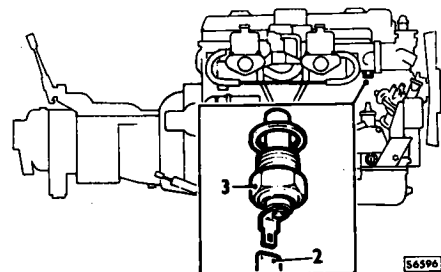
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove speedometer – 88.30.01.

- 3 Remove finger nut and lock washer from coolant temperature gauge retaining bracket.
- 4 Withdraw indicator from fascia.
- 5 Disconnect cables at lucar connectors on rear of instrument.
- 6 Withdraw instrument lighting bulb holder.

Refitting

Reverse operations 1 to 6.



COOLANT TEMPERATURE TRANSMITTER

Remove and refit 88.25.20

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Disconnect cable at connector on transmitter.
- 3 Withdraw transmitter.

Refitting

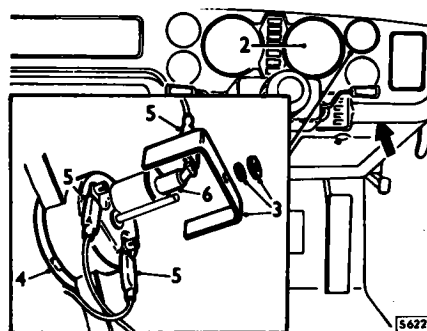
- 4 Reverse operations 1 to 3.
- 5 Top up coolant.

FUEL GAUGE

Remove and refit 88.25.26

Removing

- 1 Disconnect battery – 86.15.20.



- 2 Remove speedometer – 88.30.01.
- 3 Remove finger nut and lock washer from fuel gauge retaining bracket.
- 4 Withdraw indicator from fascia.
- 5 Withdraw instrument lighting bulb holder.

Refitting

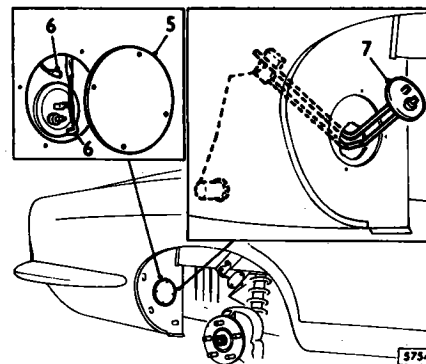
Reverse operations 1 to 6.

FUEL TANK UNIT

Remove and refit (Early cars) 88.25.32

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Drain fuel tank – 19.55.02.
- 3 Jack up car rear end.



- 4 Remove wheel.
- 5 Remove cover plate.
- 6 Disconnect lucar connectors.
- 7 Remove tank unit by pressing on mounting plate and turning anti-clockwise.

Refitting

Reverse operations 1 to 7.

WARNING: TANK UNIT SEAL SHOULD BE REPLACED BY A NEW SEAL EVERY TIME THIS OPERATION IS CARRIED OUT.

Remove and refit (Later cars with submerged fuel pumps) 88.25.32

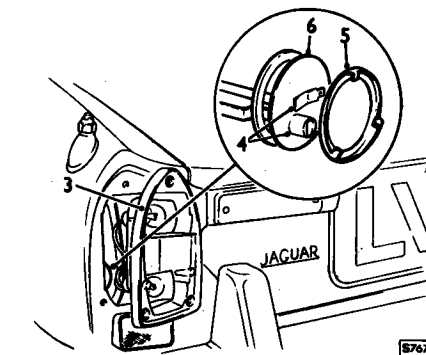
Removing

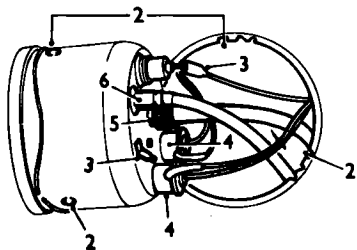
- 1 Disconnect battery – 86.15.20.
- 2 Drain fuel tank – 19.55.02.
- 3 Remove stop/tail/flasher lights assembly. (See 86.40.70 (L.H.) and 86.40.71 (R.H.).)
- 4 Disconnect lucar connectors.
- 5 Release tank unit by pressing on mounting plate and turning retaining ring anti-clockwise.
- 6 Withdraw unit rearwards from tank.

Refitting

Reverse operations 1 to 6.

WARNING: TANK UNIT SEAL SHOULD BE REPLACED BY A NEW SEAL EVERY TIME THIS OPERATION IS CARRIED OUT.





54219

SPEEDOMETER

Remove and refit

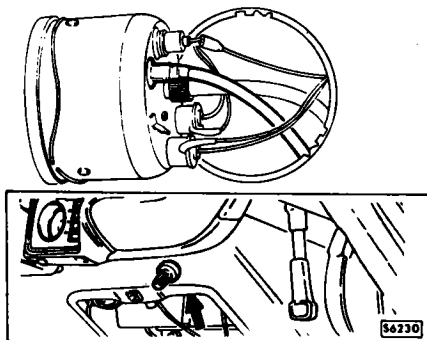
88.30.01.

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Exert pressure on rim of speedometer, turn anti-clockwise until instrument releases from locking tabs and withdraw from fascia.
- 3 Note cable positions and disconnect at lucars on back of instrument.
- 4 Withdraw bulb holders.
- 5 Unscrew speedometer drive cable.
- 6 Turn speedometer trip reset connector anti-clockwise until it releases and pull off.

Refitting

Reverse operations 1 to 6.



SPEEDOMETER TRIP RESET

Remove and refit

88.30.02

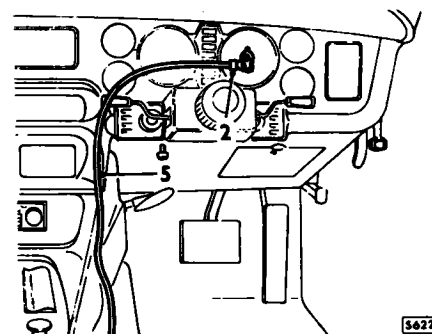
Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove retaining ring from speedometer trip reset knob in drivers side dash casing.
- 3 Remove speedometer – 88.30.01.
- 4 Withdraw trip reset cable bayonet connector from back of speedometer.

Refitting

Reverse operations 1 to 4.

NOTE: When refitting speedometer trip reset it is advisable to remove fuse block access panel to assist in location of lower end of reset cable through mounting bracket.



54220

SPEEDOMETER CABLE ASSEMBLY

Remove and refit

88.30.06

Removing

- 1 Remove speedometer – 88.30.01.
- 2 Disconnect cable at right angle drive on gearbox – 88.30.16.
- 3 Remove revolution counter (tachometer) – 88.30.21.
- 4 Remove console side casing – 76.25.02.
- 5 Release clips.
- 6 Remove drive cable complete.

Refitting

Reverse operations 1 to 6.

NOTE: Clips should be replaced in exactly the same position. No extreme angles in cable run, and lubrication carried out before installation.

SPEEDOMETER CABLE – INNER

Remove and refit

88.30.07

Removing

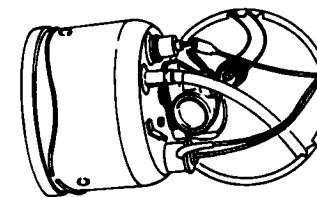
- 1 Remove speedometer – 88.30.01.
- 2 Remove inner cable.
- 3 If cable is broken the gearbox end will have to be disconnected to retrieve other half.

Refitting

Reverse operations 1 to 3. Lubricate cable before refitting.

NOTE: (a) Lubrication should not be excessive, oil should never be used. Use only T.S.D. 119 or equivalent.

(b) The inner cable should only project by 3/8 in. (9,52 mm.) from outer casing at the instrument end to ensure correct engagement at point of drive.



54229

SPEEDOMETER RIGHT ANGLE DRIVE – INSTRUMENT

Remove and refit

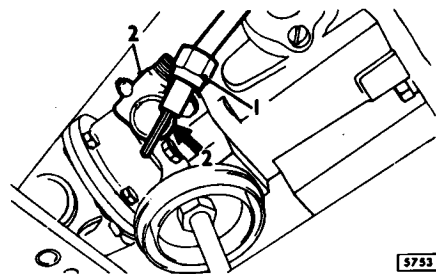
88.30.15

Removing

- 1 Remove speedometer – 88.30.01.
- 2 Unscrew knurled retaining ring withdraw drive.

Refitting

Reverse operations 1 and 2.



SPEEDOMETER RIGHT ANGLE DRIVE GEARBOX

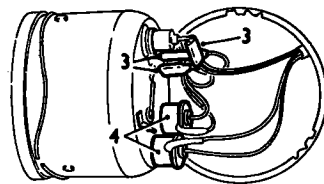
Remove and refit 88.30.16

Removing

- 1 Disconnect speedometer drive cable.
- 2 Remove right angle drive by unscrewing knurled retaining ring nut.

Refitting

Reverse operations 1 and 2.



REVOLUTION COUNTER (TACHOMETER)

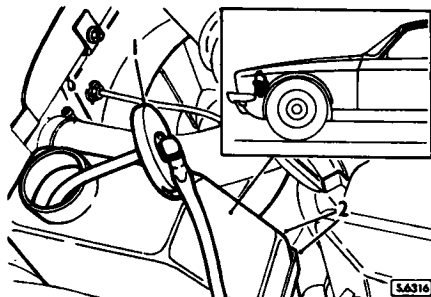
Remove and refit 88.30.21

Removing

- 1 Disconnect battery -- 86.15.20.
- 2 Exert pressure on rim of instrument and turn anti-clockwise until retaining studs release from locking ring.
- 3 Disconnect cables from lucars/connectors on back of instrument.
NOTE: Take note of cable positions.
- 4 Pull bulb holder from instrument case.

Refitting

Reverse operations 1 to 4.



WASHER RESERVOIR

Remove and refit — Early Cars 84.10.01

Removing

- 1 Pull plastic cap from neck of reservoir; withdraw cap, feed tube and filter complete from reservoir.
- 2 Withdraw reservoir from bracket.

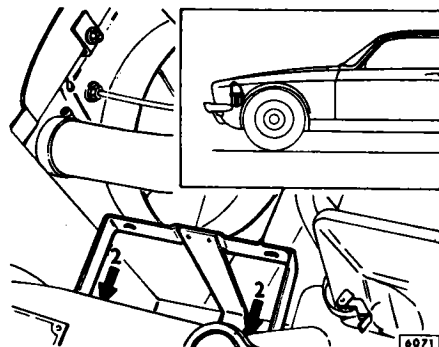
Refitting

Reverse operations 1 and 2.

NOTE: It is recommended that only soft water mixed with a proprietary cleaning fluid to the correct proportions is used when filling washer system. This will minimise the formation of deposits that affect the performance of the system.

WASHER RESERVOIR

Remove and refit — Cars fitted with headlamp washers — see 84.20.01



WASHER RESERVOIR BRACKET

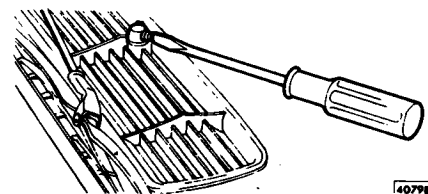
Remove and refit 84.10.02

Removing

- 1 Remove reservoir — 84.10.01.
- 2 Withdraw two set screws and remove bracket.

Refitting

Reverse operations 1 and 2.



WASHER JETS

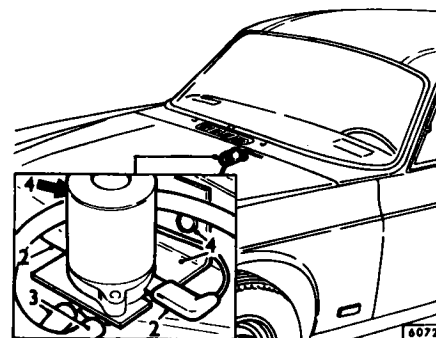
Remove and refit 84.10.09

Removing

- 1 With a screwdriver remove jet.
- 2 To clean jet use thin wire to clear hole of any deposits.
- 3 Operate washer with jets removed to flush nozzle.

Refitting

Replace jets and ensure that washer fluid strikes windscreen within wiper arc.



WINDSCREEN WASHER PUMP

Remove and refit 84.10.21

Removing

- 1 Disconnect battery — 86.15.20.
- 2 Disconnect cables from Lucar connectors on pump.
- 3 Withdraw washer tubes from adapters.
- 4 Withdraw two setscrews and remove pump complete with bracket.

Refitting

Reverse operations 1 to 4.

WINDSCREEN WASHER PUMP

Remove and refit —
Later Cars

84.10.21

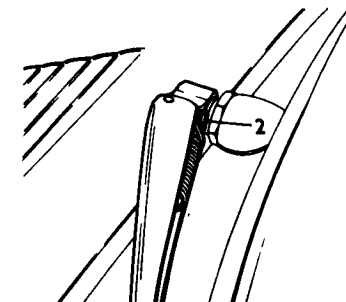
Removing

- 1 Open bonnet.
- 2 Note fitted position of leads; disconnect leads from pump.
- 3 Carefully prise washer tubing from pump nozzles.
- 4 Remove screws securing washer and tubing retaining clip to valance; withdraw pump.

Refitting

Reverse operations 1 to 4; ensure tubing is not kinked or twisted.

NOTE: Fitting of tube will be facilitated if ends of tube are warmed immediately prior to refitting.



WIPER ARMS

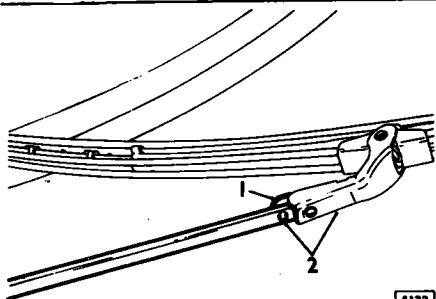
Remove and refit — L.H. 84.15.02
— R.H. 84.15.03

Removing

- 1 Note angle of parked windscreen wiper arm.
- 2 Lift spring clip and withdraw wiper arm from spindle.

Refitting

- 3 Check condition of wiper arm spindle spline.
- 4 Coat spline with water proof grease.
- 5 Press arm on to spindle at angle noted in operation 1.
- 6 Operate wipers and re-locate arm if necessary.



WIPER BLADES

Remove and refit

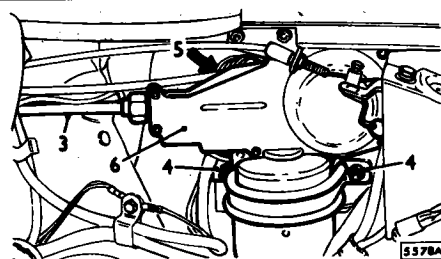
84.15.05

Removing

- 1 Hold blade in one hand and with thumb nail of the other hand depress spring clip.
- 2 Press wiper arm towards windscreen to disengage dimple from blades, slide blade from arm.

Refitting

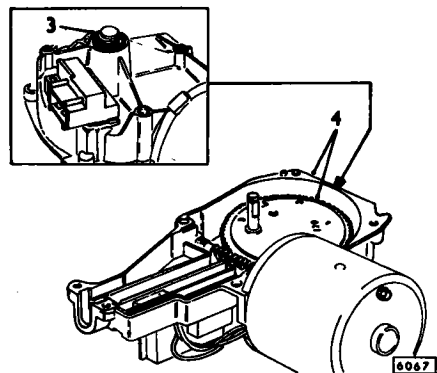
- 3 Press blade straight on to wiper arm until dimple engages spring clip.



- 4 Remove two retaining nuts and washers from motor clamp.
- 5 Tilt motor towards engine and withdraw cable connectors.
- 6 Remove motor and drive as complete assembly, drawing rack drive from conduit.

Refitting

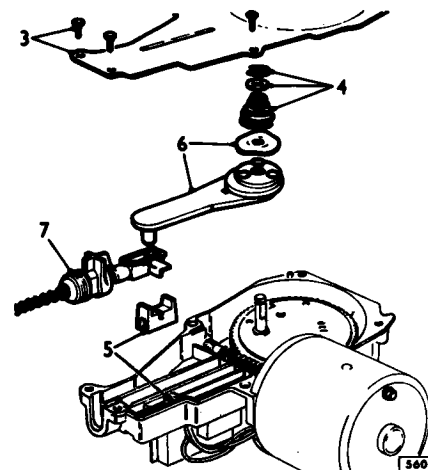
- 7 Operate wipers to check swept arc of wiper arms.
- 8 Reverse operations 1 to 6.



- 4 Mark and note position of gear assembly in relation to a chosen point on housing.

Refitting

Reverse operations 1 to 4.



WINDSCREEN WIPER RACK DRIVE

Remove and refit

84.15.24

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove wiper motor – 84.15.12.
- 3 Remove cover plate by withdrawing five hexagon headed set screws and earth lead.
- 4 Carefully remove circlip, washer and conical spring.
- 5 Mark position of slider block in relation to terminal limit switch assembly.

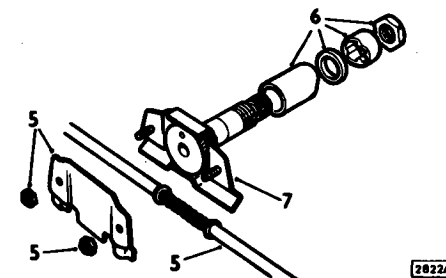
NOTE: Ensure that during this operation the gear assembly is not removed.

- 6 Remove friction plate and connecting rod.
- 7 Withdraw rack drive cable.

Refitting

Reverse operations 1 to 7.

NOTE: Ensure that rack drive, slider block and limit switch assembly is re-assembled in the same position as noted at 5.



WHEEL BOXES

Remove and refit – L.H.
– R.H.

84.15.28
84.15.29

Removing

- 1 Disconnect and remove battery – 86.15.01.
- 2 Remove screen rail facia – 76.46.04.
- 3 Remove wiper motor – 84.15.12.
- 4 Remove demister flap/actuator assembly – 80.10.37.
- 5 Remove two nuts retaining wheel box back plate and release drive conduit.
- 6 Remove nuts securing the wheel box(es) to the scuttle and remove the chrome distance pieces and sealing rings.
- 7 Remove wheel boxes.

Refitting

- 8 Smear waterproof grease on splines before refitting wiper arms.
- 9 Reverse operations 1 to 7.

NOTE: When refitting ensure that flared sections of drive rack conduit locate with slots in cover plate.

WIPER MOTOR

Remove and refit

84.15.12

Removing

- 1 Disconnect and remove battery – 86.15.01.
- 2 Withdraw wiper arms from spindles – 84.15.02.
- 3 Disconnect cable rack conduit from motor.

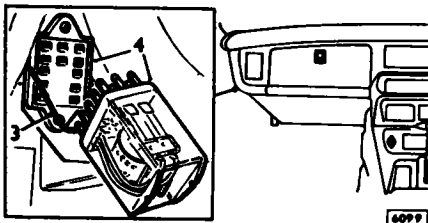
WIPER MOTOR GEAR ASSEMBLY

Remove and refit

84.15.14

Removing

- 1 Remove wiper motor – 84.15.12.
- 2 Remove rack drive cable – 84.15.24.
- 3 Remove circlip and washer on gear assembly shaft.



WINDSCREEN WIPER MOTOR RELAY

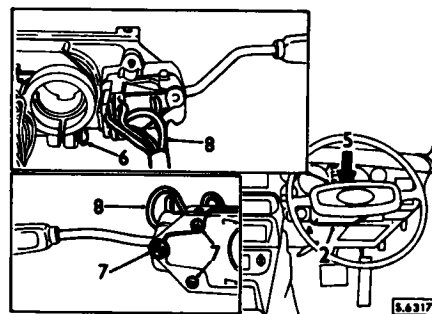
Remove and refit 84.15.32

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Drop passenger seat side dash casing – 76.46.11.
- 3 Release relay securing spring clip.
- 4 Pull relay unit from base connector block.

Refitting

Reverse operations 1 to 4.



WINDSCREEN WASHER/WIPER SWITCH

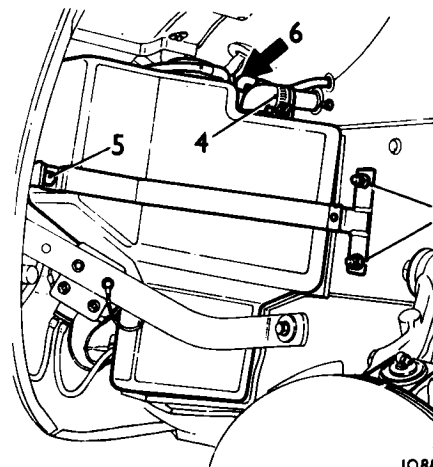
Remove and refit 84.15.34

Removing

- 1 Disconnect battery – 86.15.20.
- 2 Remove steering wheel lower shroud.
- 3 Remove steering wheel – 57.60.01.
- 4 Remove drivers side dash casing – 76.46.11.
- 5 Remove steering wheel upper shroud.
- 6 Slacken clinch bolt and pull switch assembly from upper steering column.
- 7 Remove two screws and spire washer retaining switch.
- 8 Disconnect harness at multi pin connector and earth lead at snap connector.

Refitting

Reverse operations 1 to 8.



HEADLAMP WASHER RESERVOIR

Remove and refit 84.20.01

NOTE: This reservoir supplies both windscreen and headlamp washing systems.

Removing

- 1 Raise front of car and place on stands.
- 2 Remove L.H. front wheel.
- 3 Remove three screws and detach stoneguard; collect sealing strips.
- 4 Slacken hose clip securing rubber elbow to filler neck.
- 5 Remove three screws securing mounting strap assembly, detach mounting strap and lower reservoir until screws attaching manifold assembly to reservoir are accessible.
- 6 Remove four screws securing manifold assembly; withdraw reservoir from pipes.

Refitting

- 7 Reverse operation 1 to 6, ensuring that tubes and filters enter lowest section of reservoir.

HEADLAMP WASHER RESERVOIR BRACKET

Remove and refit 84.20.02

Removing

- 1 Remove headlamp washer reservoir, see 84.20.01.
- 2 Remove screw securing bracket to wheel arch.

Refitting

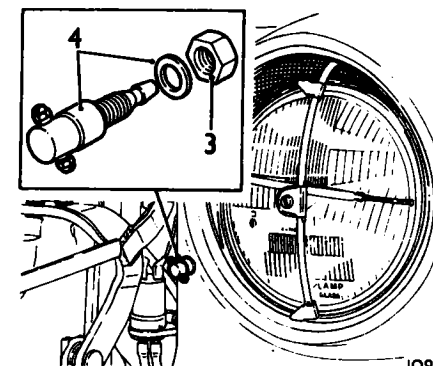
- 3 Reverse operations 1 and 2.

HEADLAMP WASHER JETS

Remove and refit 84.20.09

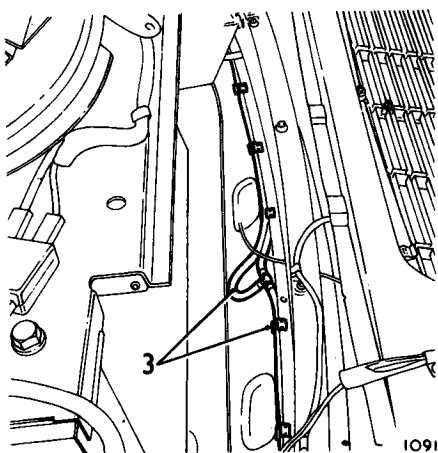
Removing

- 1 Open bonnet.
- 2 Carefully prise tubes from jets.
- 3 Restraining jets by hand outside car, detach nut securing each pair of jets to headlamp panel.
- 4 Remove jets; collect rubber washers.



Refitting

- 5 Reverse operations 1 to 4.



HEADLAMP WASHER TUBES

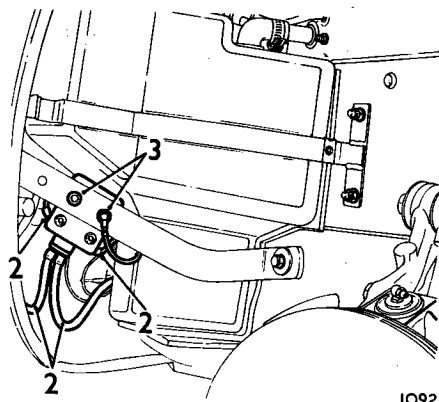
Remove and refit 84.20.15

Removing

- 1 Open bonnet.
- 2 Carefully prise washer tubes from jets and pump.
- 3 Separate washer tubes from six spring clips attaching them to flange below lower grille and remove tubes from car.

Refitting

- 4 Reverse operations 1 to 3.



HEADLAMP WASHER PUMP

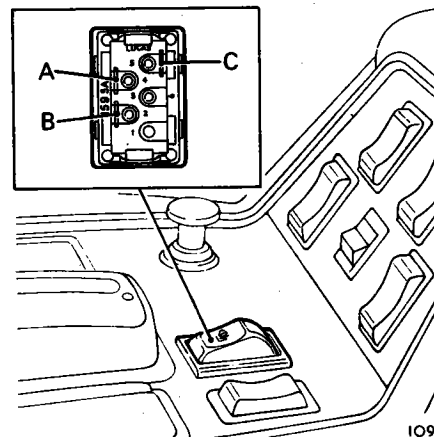
Remove and refit 84.20.21

Removing

- 1 Remove L.H. front wheel. Support front of car on stands.
- 2 Carefully prise both tubes from washer pump and detach both Lucars.
- 3 Unbolt pump from attachment plate on bumper support arm.

Refitting

- 4 Reverse operations 1 to 3.



A - Green/red
B - Green
C - Green/brown

HEADLAMP WIPER AND WASHER SWITCH

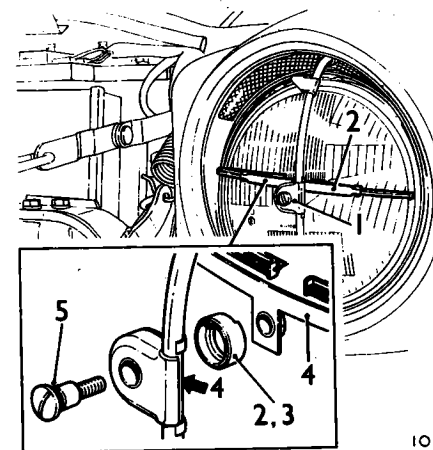
Remove and refit 84.20.27
(86.65.67)

Removing

- 1 Disconnect battery, see 86.15.20.
- 2 Remove three screws securing top panel to console.
- 3 Raise top panel, detach Lucars at washer switch and remove switch from panel.

Refitting

- 4 Connect leads to new switch as shown, through aperture in panel.
- 5 Press switch into panel aperture; replace top panel on console.
- 6 Reverse operations 1 and 2.



HEADLAMP WIPER ARM

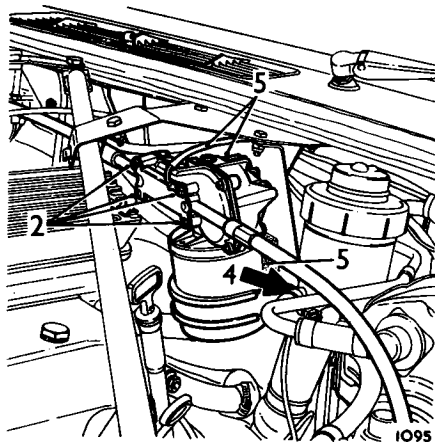
Remove and refit 84.25.02

Removing

- 1 Restrain wiper arm by hand and remove pivot screw.
- 2 Press wiper arm towards headlamp glass and withdraw. Collect spacing cup.

Refitting

- 3 Fit spacing cup to wiper arm at forward face of pivot.
- 4 Position wiper arm against drive boss.
- 5 Check that 'O' ring is fitted to pivot screw and insert screw. Do not tighten at this stage.
- 6 Turn wiper blades to 'parked' position (in line with drive tube) and fully tighten screw, restraining wiper arm by hand.



HEADLAMP WIPER MOTOR

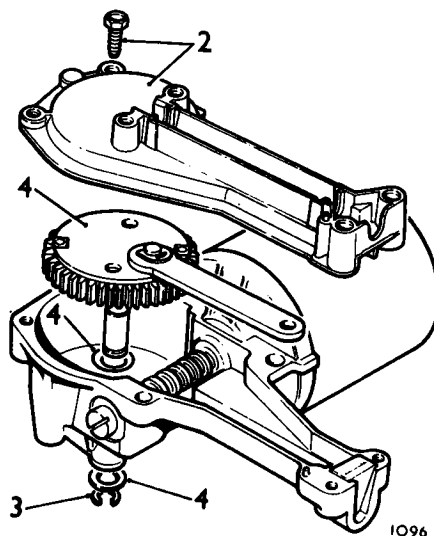
Remove and refit 84.25.12

Removing

- 1 Disconnect battery, see 86.15.20.
- 2 Remove four self-tapping screws securing cover plate to rack drive.
- 3 Remove nylon channel and lift rack drive peg from cross-head.
- 4 Remove bolts and nuts securing motor clip to mounting plate.
- 5 Disconnect leads and remove motor. Collect pad from between motor and bracket.

Refitting

- 6 Reverse operations 1 to 5.



HEADLAMP WIPER MOTOR GEAR

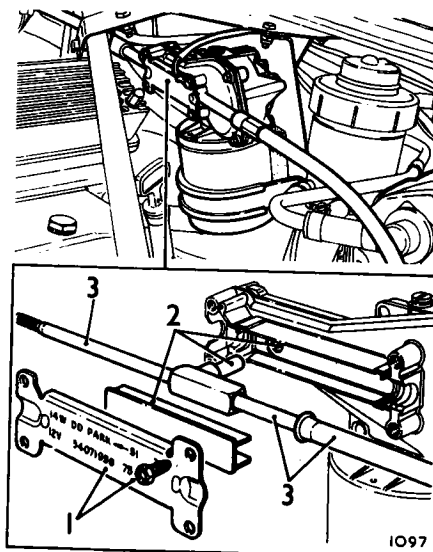
Remove and refit 84.25.17

Removing

- 1 Remove headlamp wiper motor, see 84.25.12.
- 2 Remove two self-tapping screws securing gear cover-plate to gear housing.
- 3 Detach external circlip from gear spindle.
- 4 Remove gear; collect plain and conical washers.

Refitting

- 5 Place conical spring washer on gear spindle with outer diameter contacting gear.
- 6 Reverse operations 1 to 4.



HEADLAMP WIPER RACK

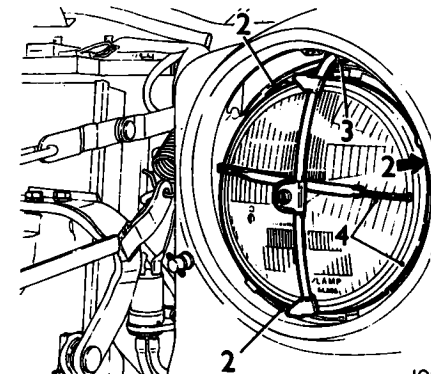
Remove and refit 84.25.24

Removing

- 1 Remove four self-tapping screws securing cover plate to rack drive at motor.
- 2 Remove nylon channel and lift out rack drive from cross-head.
- 3 Carefully withdraw rack drive cables from conduits.

Refitting

- 4 Reverse operations 1 to 3.
- Align wiper blades correctly in 'parked' position, see 84.25.02.



HEADLAMP WIPER WHEEL BOXES AND RACK TUBES

Remove and refit 84.25.27

Removing (each side)

- 1 Remove outer headlight rim finisher, see 86.40.01.
- 2 Remove three screws securing headlight rim and rack tube.
- 3 Ease rim and tube forward and slacken collet nut.
- 4 Draw rim assembly away from tube, allowing wiper blades to rotate as rack is withdrawn.

Refitting

- 5 Reverse operations 1 to 4.
- Align wiper blades correctly in 'parked' position, see 84.25.02.