

FASCIA SUPPORT BRACKET

– Remove and refit

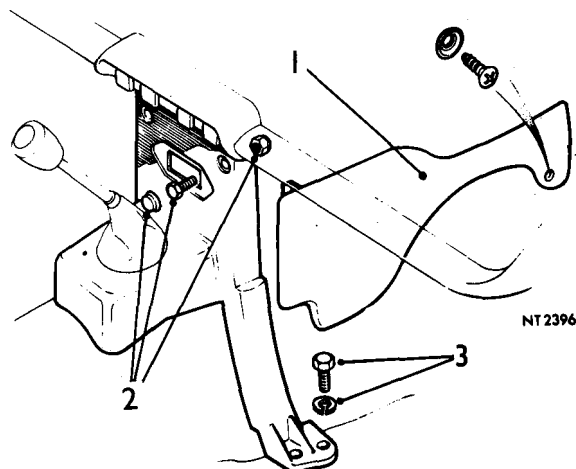
76.46.09

Removing

1. Remove the gearbox cover side trim pads 76.13.06.
2. Prise off the caps and remove the two nuts and bolts.
3. Remove the four bolts and washers securing the bracket to the floor.
4. Lift off the bracket.

Refitting

5. Reverse instructions 1 to 4.



NT2396

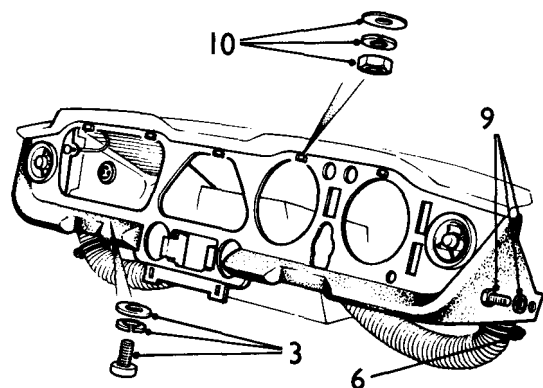
FASCIA – METAL

– Remove and refit

76.46.10

Removing

1. Remove the veneered fascia 76.46.01.
2. Remove the steering column 57.40.01.
3. Remove the two screws and washers securing the reinforcement bracket to the fascia.
4. Remove the control cowl 76.25.02.
5. Remove the fascia support bracket 76.46.09.
6. Slacken the two clips and disconnect the cold air hoses from the 'Y' pieces.
7. Pull the snap connector from the glovebox lamp switch and pull out the bulbholder.
8. Remove the buzzer (if fitted) 86.55.13.
9. Remove the two bolts and washers securing the fascia to the 'A' post.
10. Remove the five nuts and washers securing the fascia to the upper crash pad.
11. Remove the fascia from the car.



NT 2440

Refitting

12. Reverse instructions 1 to 11.

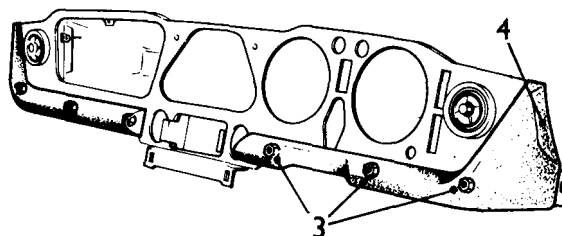
FASCIA CRASH PAD – LOWER

– Remove and refit

76.46.12

Removing

1. Remove the veneered fascia 76.46.01.
2. Remove the metal fascia 76.46.10.
3. Remove the three nuts and lock washers.
4. Pull the overlapping material away from the fascia and remove the crash pad.



NT2489

Refitting

5. Reverse instructions 1 to 4, securing the material overlap to the fascia with Dunlop S758 adhesive.

BODY

CARPET – FRONT – GEARBOX COVER

– Remove and refit 76.49.01

Removing

1. Remove the gearbox cover side trim side pads 76.13.06.
2. Remove the carpet – four fasteners.

Refitting

3. Reverse instructions 1 and 2.

CARPET – FRONT FLOOR

– Remove and refit 76.49.02

The front floor carpets are each secured by four fasteners.

CARPET – REAR FLOOR

– Remove and refit 76.49.03

Removing

1. Remove the seat 76.70.04/05.
2. Remove the seat runners 76.73.05.
3. Lift off the carpet.

Refitting

4. Reverse instructions 1 to 3.

CARPET – REAR – GEARBOX COVER

– Remove and refit 76.49.05

Removing

1. Remove the fascia support bracket 76.46.09.
2. Lift off the carpet.

Refitting

3. Reverse instructions 1 and 2.

CARPET – TRANSMISSION TUNNEL

– Remove and refit 76.49.06

Removing

1. Remove the transmission tunnel lamp 86.45.20.
2. Lift the carpet off over the handbrake lever.

Refitting

3. Reverse instructions 1 and 2.

CARPET – HEELBOARD AND SEAT PAN

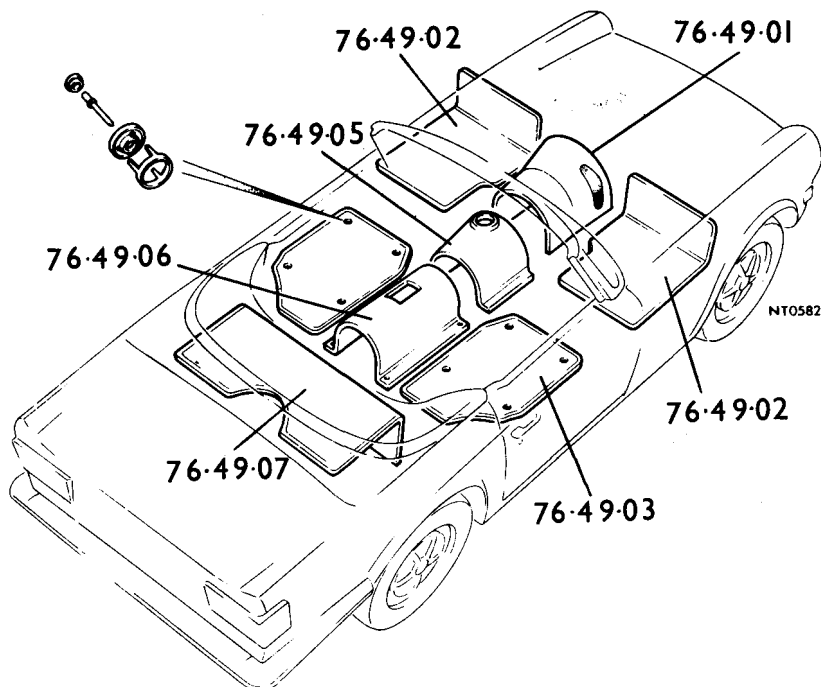
– Remove and refit 76.49.07

Removing

1. Remove the trim pad 76.13.20.
2. Lift off the carpet.

Refitting

3. Reverse instructions 1 and 2.



GLOVEBOX LID ASSEMBLY

— Remove and refit

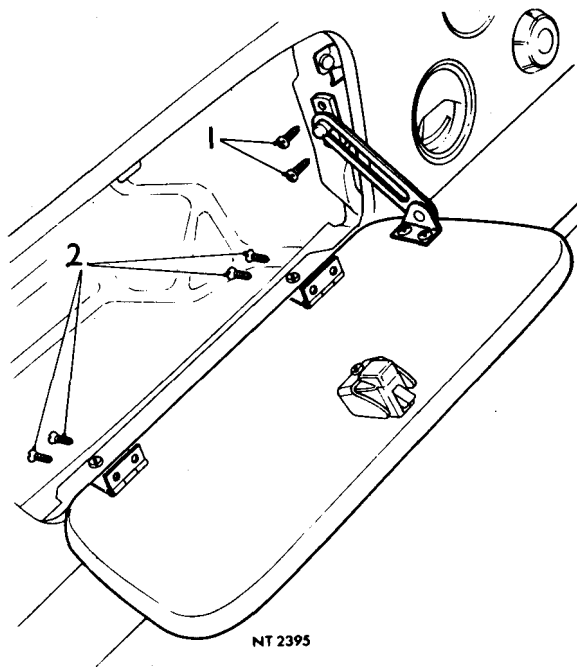
76.52.02

Removing

1. Remove the two screws securing the check link to the fascia.
2. Support the lid and remove the four screws securing the lid to the hinges. Remove the lid.

Refitting

3. Reverse instructions 1 and 2.



GLOVEBOX

— Remove and refit

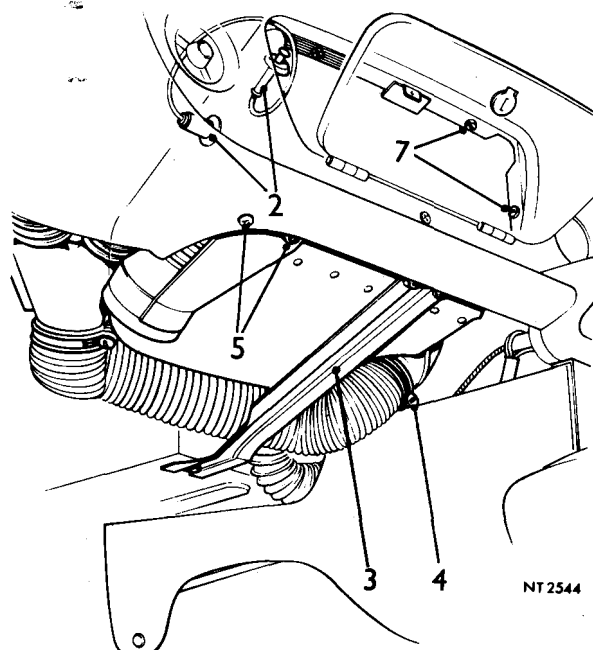
76.52.03

Removing

1. Isolate the battery.
2. Detach the bulb holder and snap connector from the glovebox.
3. Remove the fascia reinforcement bracket — one bolt and two screws.
4. Slacken the clip and disconnect the cold air hose from the heater.
5. Remove the two screws securing the floor level vent to the fascia.
6. Pull the cold air hoses and 'Y' piece away from the glovebox.
7. Remove the six screws securing the glovebox to the fascia.
8. Carefully push the glovebox downwards and remove it from beneath the fascia.

Refitting

9. Reverse instructions 1 to 8.



GLOVEBOX LOCK

— Remove and refit

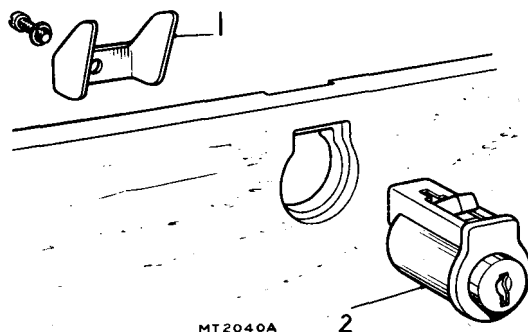
76.52.08

Removing

1. Remove the retainer — one screw and washer.
2. Withdraw the lock.

Refitting

3. Reverse instructions 1 and 2.



BODY

GRILLE FRONT

— Remove and refit

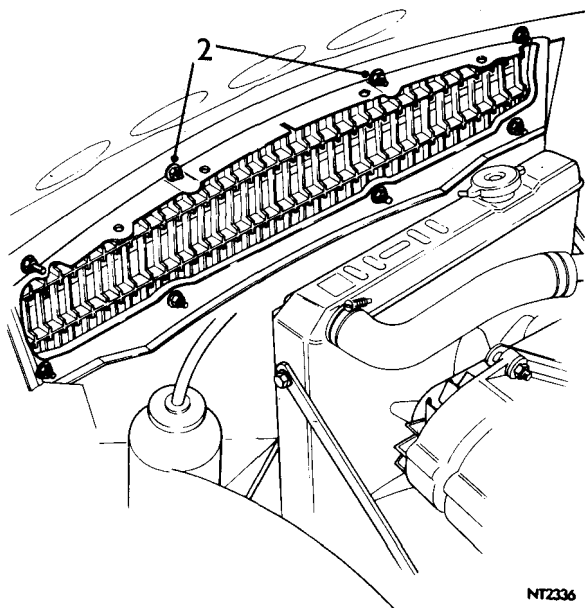
76.55.03

Removing

1. Remove the air intake valance 76.79.04.
2. Remove the eight nuts and washers and withdraw the grille assembly complete with motif.

Refitting

3. Reverse instructions 1 and 2



DOOR HANDLE

— Remove and refit

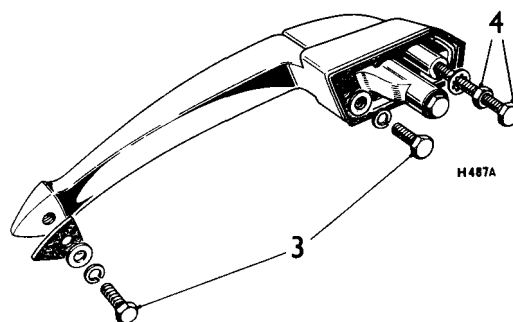
76.58.01

Removing

1. Remove the door trim pad 76.34.01.
2. Loosely refit the regulator handle and fully raise the glass.
3. Remove the two bolts and washers and withdraw the handle.

Refitting

4. Adjust the push button action if necessary by slackening the locknut, screwing the bolt in or out as required, then retightening the locknut.
5. Reverse instructions 1 to 3 ensuring that the seating washers are in position.



HARDTOP

— Remove and refit

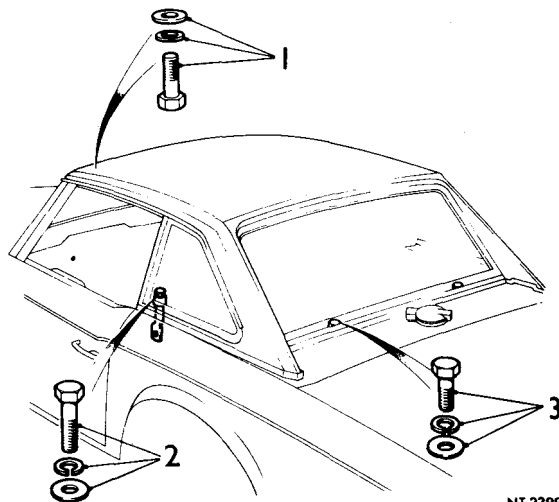
76.61.01

Removing

1. Remove the two bolts and washers securing the roof to the header rail.
2. Remove the two bolts and washers securing the side bracket to the tie bar.
3. Remove the two bolts and washers securing the rear end to the rear deck.
4. Lift off the hardtop.

Refitting

5. Reverse instructions 1 to 4.



NT 2399

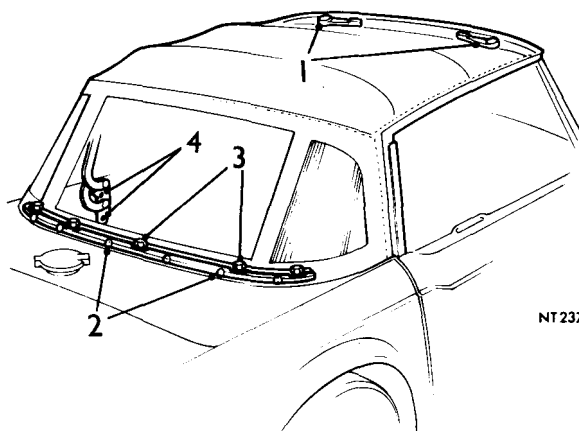
HOOD ASSEMBLY

— Remove and refit

76.61.08

Removing

1. Release the catch levers.
2. Disconnect the six fasteners.
3. Remove the five bolts and washers securing the angle bracket to the rear deck.
4. Remove the six screws securing the mounting brackets to the body.
5. Lift off the hood assembly.



NT 2372

Refitting

6. Reverse instructions 1 to 5.

ASHTRAY

— Remove and refit

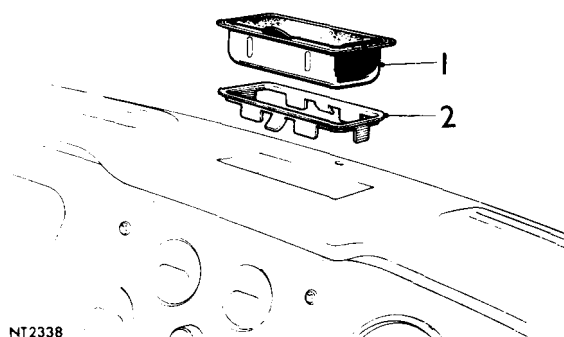
76.67.13

Removing

1. Pull the ashtray bowl out of the mounting bracket.
2. Straighten the mounting bracket legs and pull the bracket clear.

Refitting

3. Place the bracket in the ashtray aperture.
4. Bend the mounting bracket legs to secure it to the fascia.
5. Press the ashtray bowl into the mounting bracket.



NT 2338

BODY

SEAT CUSHION COVER

- Remove and refit 76.70.02

Removing

1. Remove the seat 76.70.04/05.
2. Remove the cushion cover — eight clips.

Refitting

3. Reverse instructions 1 and 2.

SEAT SQUAB COVER

- Remove and refit 76.70.03

Removing

1. Remove the seat 76.70.04/05.
2. Remove the seat catch 76.70.27.
3. Remove the seat reclining adjustment handle — one screw.
4. Pull off the cover — four clips.

Refitting

5. Reverse instructions 1 to 4.

SEATS

- Remove and refit

- Drivers seat 76.70.04

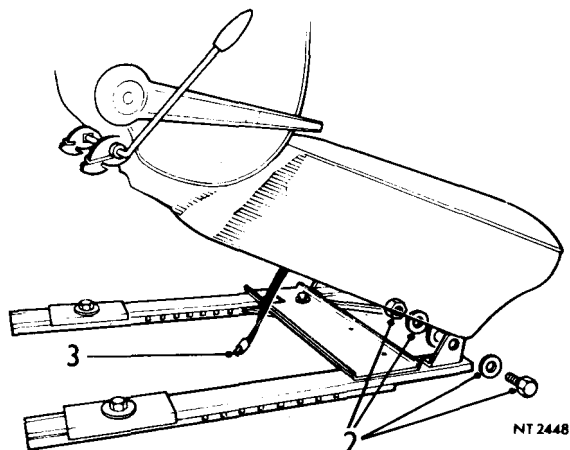
- Passengers seat 76.70.05

Removing

1. Release the squab catch and tip the seat forward.
2. Remove the two nuts, bolts and four plain washers.
3. Disconnect the harness plug (Passengers seat on U.S.A. post 1972 vehicles only).
4. Remove the seat from the car.

Refitting

5. Reverse instructions 1 to 4.



SEAT RUNNERS

– Remove and refit

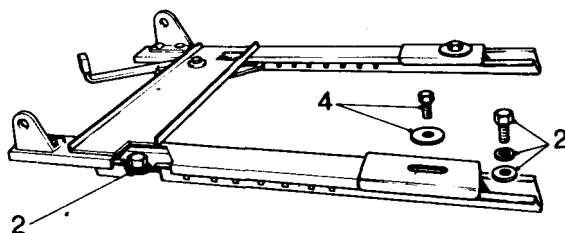
76.70.21

Removing

1. Remove the seat 76.70.04/05.
2. Remove the four bolts and washers.
3. Remove the seat runners.

Refitting

4. Reverse instructions 1 to 3. Adjust the catch plates if necessary, to ensure correct engagement of the seat squab catch.



NT 2400

SEAT SQUAB CATCH

– Remove and refit

76.70.27

The seat squab catch is secured to the seat frame by four screws, spring washers and plain washers.

SEAT BELTS – STATIC (EXCEPT U.S.A. MODELS)

– Remove and refit

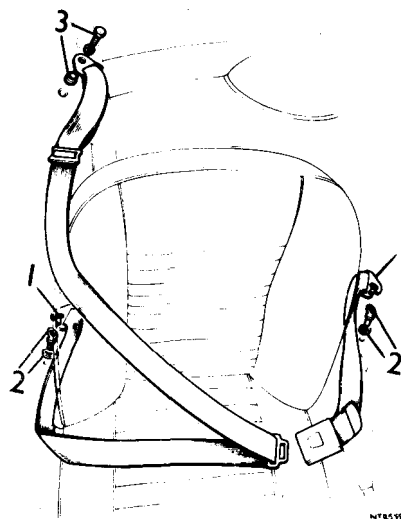
76.73.02

Removing

1. Disconnect the seat belts from the floor and 'B' post mountings.
2. Remove the eye bolts and plain washers.
3. Remove the two bolts, spring washers and spacers securing the swivel bracket to the wheelarch.

Refitting

4. Reverse instructions 1 to 3, ensuring that the swivel bracket is left free to swivel.



NT 8539

SEAT BELTS – AUTOMATIC (U.S.A. MODELS)

– Remove and refit

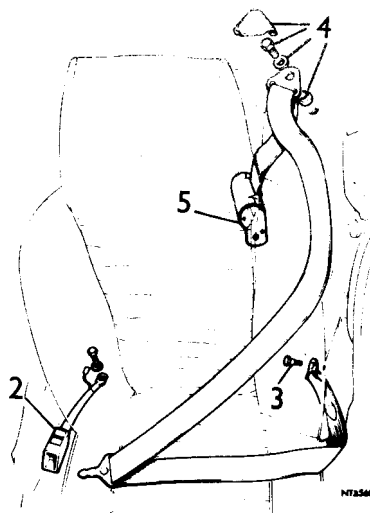
76.73.10

Removing

1. Isolate the battery.
2. Remove the buckle unit. 86.65.31/2.
3. Remove the bolt securing the swivel bracket to the 'B' post.
4. Remove the cap, bolt, plain washer, cover and spacer securing the swivel bracket to the wheelarch.
5. Remove the bolt securing the reel to the body.

Refitting

6. Reverse instructions 1 to 5, ensuring that the swivel brackets are left free to swivel.



NT 8580



BODY

VALANCE – AIR INTAKE

– Remove and refit

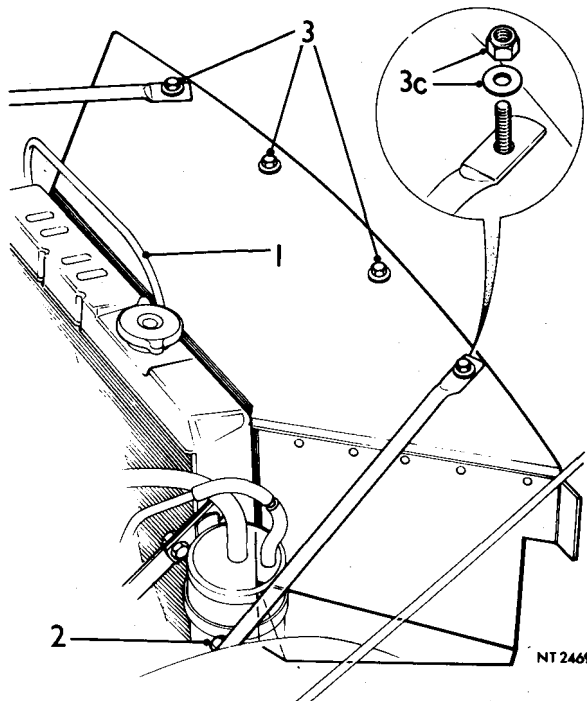
76.79.04

Removing

1. Disconnect the overflow pipe from the radiator filler neck.
2. Slacken the two nuts securing the stay rods to the wheel arches.
3. a. (Carburettor vehicles) Remove the four bolts and washers.
b. (P.I. vehicles) Remove the three bolts and washers.
c. (P.I. vehicles) remove the nut and washer securing the air cleaner support strap.
4. Lift out the valance.

Refitting

5. Reverse instructions 1 to 4.



WINDSCREEN

– Remove and refit

76.81.01

Removing

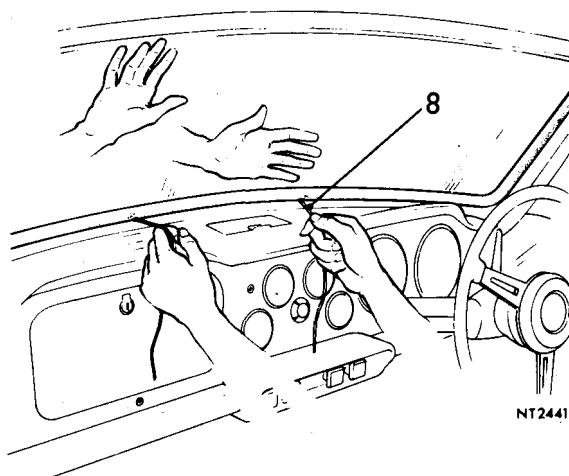
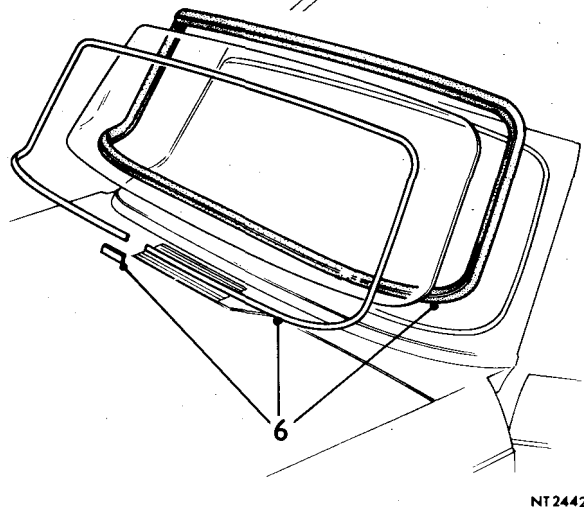
1. Remove the wiper arms 84.15.01.
2. Remove the interior mirror.
3. Remove the sun visors.
4. Break the seal, using a suitably blunt tool.
5. Push the glass outwards.

CAUTION: Take care to avoid scratching the glass, which must be steadied by an assistant.

6. Remove the finisher moulding, clip and weatherstrip noting positions for refitting.

Refitting

7. Assemble the weatherstrip finisher moulding and clip to the glass, using a new weatherstrip if necessary and applying Seelastik to the glass channel before fitting.
8. Insert a strong cord into the weatherstrip inner channel, allowing the ends to protrude from the lower edge.
9. Have an assistant position the glass centrally in the frame and maintain a steady pressure whilst the cord ends are pulled to locate the weatherstrip on the body flange.
10. Seal the outer channel of the weatherstrip to the body using Seelastik.
11. Reverse instructions 1 to 3.



76.79.04

76.81.01

WINDSCREEN FRAME ASSEMBLY

— Remove and refit

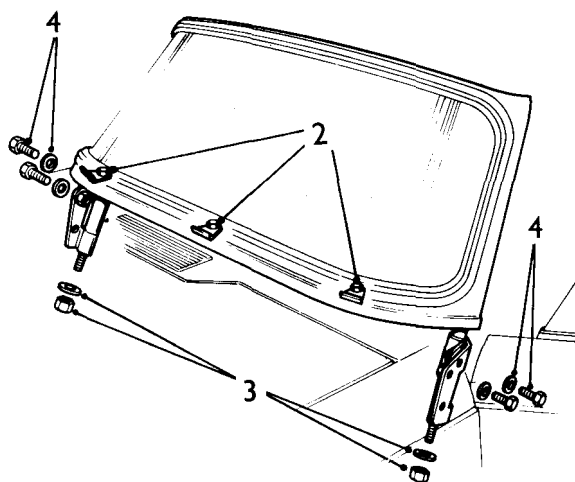
76.81.02

Removing

1. Pull the weatherstrip away from the screen pillars.
2. Remove the three bolts and cover plates.
3. Remove the two nuts and washers from the screen pillars.
4. Slacken the six nuts and bolts securing the screen pillar mounting brackets.
5. Lift out the windscreen frame assembly.

Refitting

6. Remove all traces of sealing compound from mating surfaces of the weatherstrip and scuttle panel and apply new Seal-a-strip.
7. Reverse instructions 1 to 5, ensuring uniform clearance between the door glass and windscreen frame before tightening nuts 4.



NT 2346

HEATING AND VENTILATION OPERATIONS

AIR FLOW CONTROL CABLE

– Remove and refit

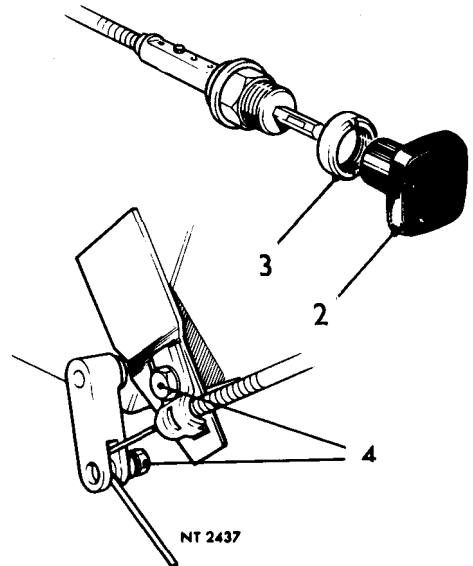
80.10.06

Removing

1. Remove the gearbox cover trim pad. 76.13.06.
2. Depress the retainer and pull off the control knob.
3. Unscrew the bezel.
4. Slacken the trunnion bolt and cable clamp bolt.
5. Remove the cable.

Refitting

6. Reverse instructions 1 to 5, ensuring that the cable is positioned to allow full operation of the flap valve.



WATER VALVE CONTROL CABLE

– Remove and refit

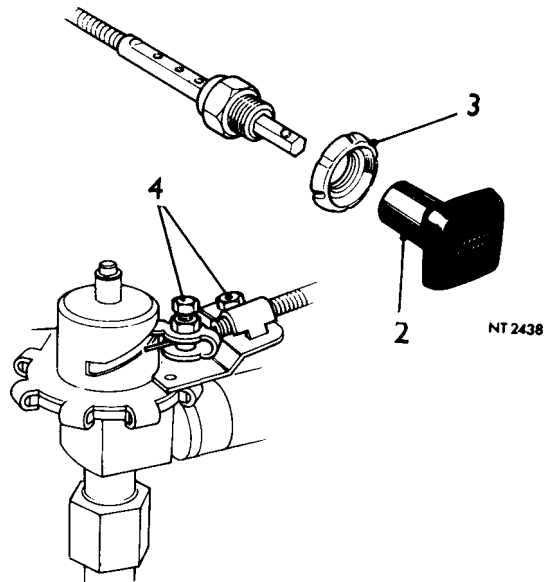
80.10.07

Removing

1. Remove the gearbox cover side trim panel 76.13.06.
2. Depress the retainer and pull off the control knob.
3. Unscrew the bezel.
4. Slacken the trunnion bolt and cable clamp bolt.
5. Withdraw the cable.

Refitting

6. Reverse instructions 1 to 5, ensuring that the cable is positioned to allow full operation of the water valve.



WATER VALVE

– Remove and refit

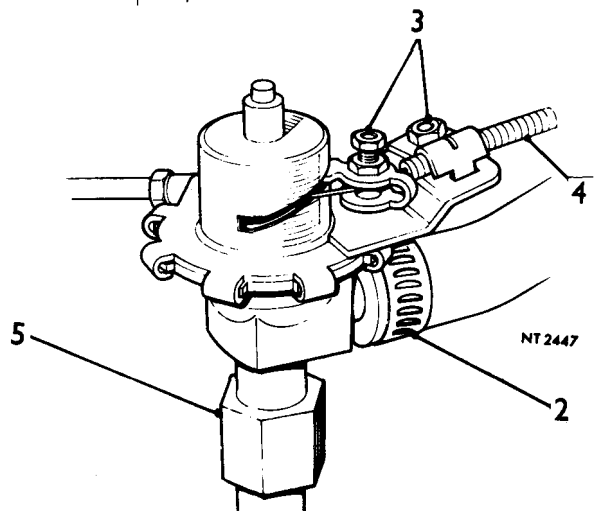
80.10.16

Removing

1. Drain coolant from the system 26.10.01.
2. Slacken the clip and disconnect the hose.
3. Slacken the trunnion bolt and clamp bolt.
4. Detach the control cable.
5. Unscrew the water valve.

Refitting

6. Reverse instructions 1 to 5 using 'Hermetite' sealing compound on the water valve threads.



HEATING AND VENTILATION

DEMISTER HOSES

— Remove and refit

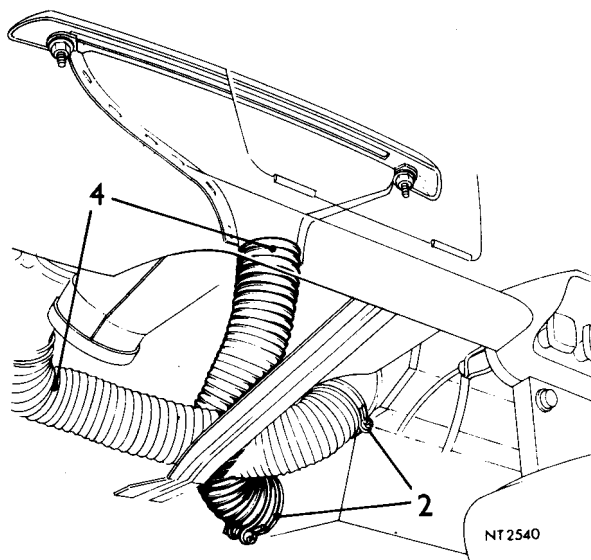
80.15.01

Removing

1. Remove the gearbox cover side trim pads 76.13.06.
2. Slacken the two clips and disconnect the hoses from the heater.
3. Remove the glovebox (passenger side hose only) 76.52.03.
4. Pull the hoses from the demister ducts.

Refitting

5. Reverse instructions 1 to 4.



DEMISTER DUCTS

— Remove and refit

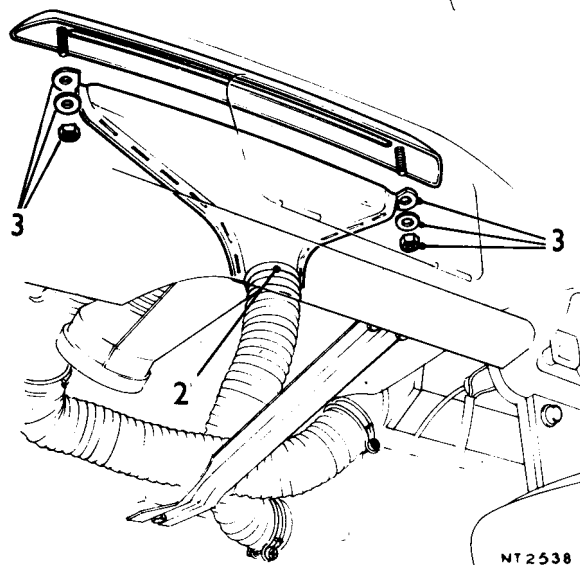
80.15.03

Removing

1. Remove the glovebox (passenger side duct only) 76.52.03.
2. Disconnect the hose from the duct.
3. Remove the two nuts and washers. Withdraw the duct and lift off the finisher.

Refitting

4. Reverse instructions 1 to 3.



SWIVELLING COLD AIR VENTS

— Remove and refit — L.H.
—R.H.

80.15.22

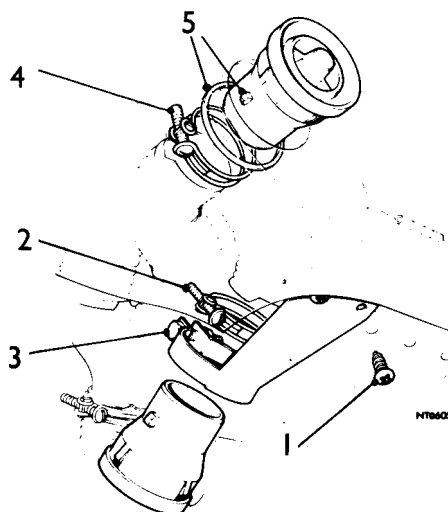
80.15.23

Removing

1. Remove the two screws securing the support bracket to the fascia.
2. Slacken the hose clip and remove the vent and bracket from the hose.
3. Slacken the clamp bolt and remove the vent from the bracket.
4. Slacken the clip and disconnect the hose from the vent.
5. Compress the three retaining lugs and withdraw the vent and sealing ring.

Refitting

6. Reverse instructions 1 to 5.



80.15.01
80.15.23

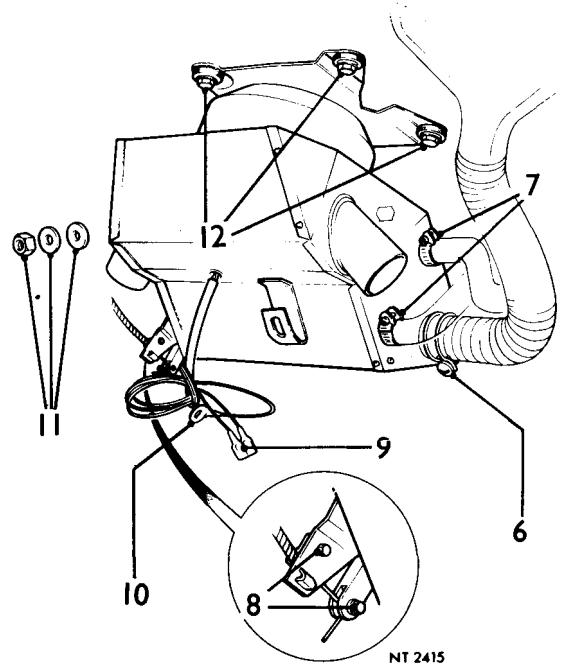
HEATER UNIT

— Remove and refit

80.20.01

Removing

1. Drain the coolant 26.10.01.
2. Disconnect the hose from the water valve and blow through it to expel coolant from the heater matrix.
3. Remove the veneered fascia 76.46.01.
4. Remove the glovebox 76.52.03.
5. Remove the gearbox tunnel cover trim pads 76.13.06.
6. Slacken the clips and disconnect the four ventilation hoses from the heater.
7. Slacken the clips and disconnect the two water hoses from the heater.
8. Slacken the trunnion bolt and clamp bolt securing the flow control cable to the heater. Detach the cable.
9. Disconnect the two Lucar connectors from the blower switch.
10. Remove the nut securing the blower earth lead to the steering column.
11. Remove the nut and washers securing the heater to the bulkhead.
12. Support the heater and remove the three bolts, washers and spacers securing it to the plenum chamber.
13. Remove the heater from the car taking care to avoid spillage of coolant from the matrix.



Refitting

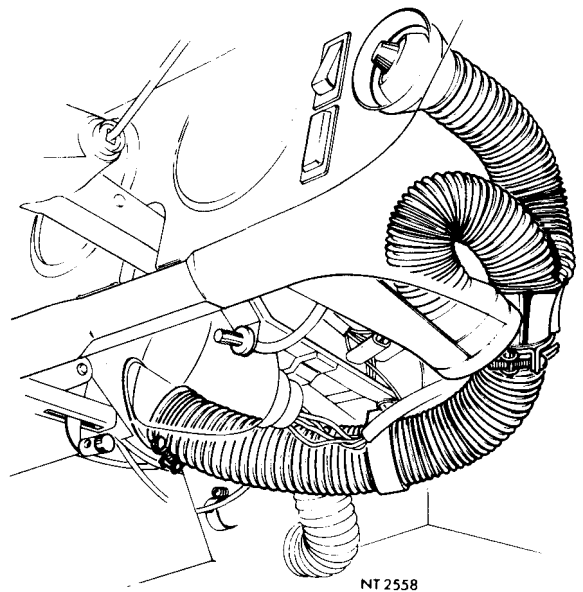
14. Reverse instructions 1 to 13.

COLD AIR HOSES

— Remove and refit

80.25.01

The cold air hoses are each secured by two clips. Remove the gearbox cover trim pads 76.13.06 to facilitate access to hoses connected to the heater unit.



WATER HOSES

— Remove and refit

Hoses — heater to engine

80.25.07

Hoses — water valve to heater

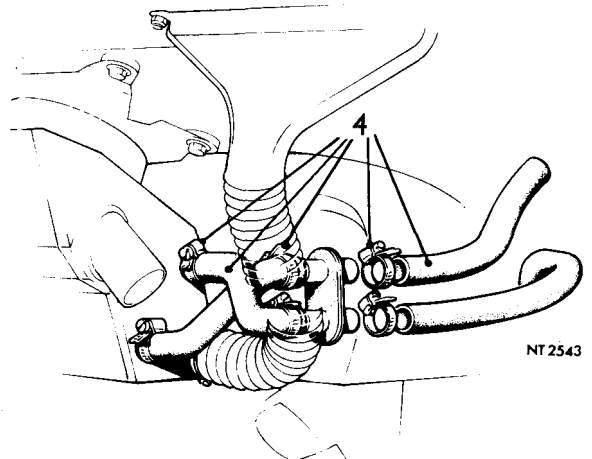
80.25.09

Removing

1. Drain the cooling system 26.10.01.
2. Remove the glovebox tunnel cover trim pad 76.13.06.
3. Remove the glovebox 76.52.03.
4. Slacken the clips and remove the hoses.

Refitting

5. Reverse instructions 1 to 4.



WINDSCREEN WIPERS AND WASHERS OPERATIONS

Windscreen washer system

| | | |
|---|---------------------------|----------|
| — jet — remove and refit | | 84.10.09 |
| — pump and reservoir — overhaul | | 84.10.24 |
| — pump and reservoir — remove and refit | | 84.10.21 |
| — switch — remove and refit | <i>refer to</i> | 86.65.40 |

Windscreen wiper system

| | | |
|--|---------------------------|----------|
| — data and description | | 84.15.00 |
| — motor — overhaul | | 84.15.18 |
| — motor — remove and refit | | 84.15.12 |
| — rack — remove and refit | | 84.15.24 |
| — switch — remove and refit | <i>refer to</i> | 86.65.38 |
| — wheelbox — left hand — remove and refit | | 84.15.28 |
| — wheelbox — right hand — remove and refit | | 84.15.29 |
| — wiper arm — remove and refit | | 84.15.01 |
| — wiper blade — remove and refit | | 84.15.05 |

WINDSCREEN WASHER JET

– Remove and refit

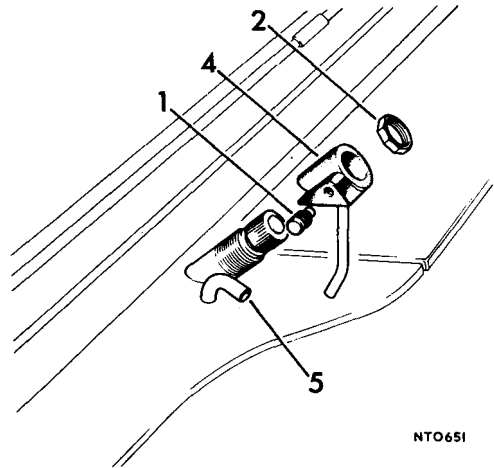
84.10.09

Removing

1. Use a pair of pliers to grip the metal jet nozzle and carefully pull it from the rubber moulding.
2. Remove the wheelbox spindle nut.
3. Carefully break the seal between the rubber moulding and vehicle body.
4. Carefully withdraw the rubber moulding. Ensure that the plastic tube is not detached from the metal pipe and lost in the body wheelbox cavity as retrieval may be difficult.
5. Pull the plastic tube from the metal pipe.

Refitting

6. Reverse instructions 1 to 5. Seal the rubber moulding to the vehicle body using an approved sealer.



NT0651

WINDSCREEN WASHER PUMP AND RESERVOIR

– Remove and refit

84.10.21

Removing

1. Disconnect two Lucas connectors.
2. Early vehicles with Lucas 5SJ unit only – pull off the outlet pipe.
3. Later vehicles with Lucas 9SJ unit only – remove the cover. Pull off the outlet pipe and withdraw it from the cover. Refit the cover.
4. Manoeuvre the unit upwards from the carrier.

Refitting

5. Reverse instructions 1 to 4. To ensure that the motor runs in the correct direction observe polarity. Connect the Lucas connectors as follows:
Light green/black wire to the positive terminal.
Black wire to the negative terminal.

WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WASHER PUMP AND RESERVOIR – LUCAS TYPE 5SJ

– Overhaul

84.10.24

Dismantling

1. Rotate the cover anti-clockwise to release the bayonet fitting. Lift the pump assembly from the reservoir.
2. Remove the screw and lift the motor from its mounting spigots.
3. Remove the coupling.
4. Using a pair of long-nosed pliers to secure the shaft, use a second pair of pliers to withdraw the coupling drive.
5. Remove two screws. Withdraw the bearing plate and rubber gasket.
6. Hold the clamping member in position during operations 7 to 9.
7. Remove the shaft distance tube
8. Remove the two terminal screws, spring washers, connector blades and nuts.
9. Using a pair of long-nosed pliers carefully lift out the two brushes.
10. Lift out the clamping member.
11. Lift out the armature and permanent magnet. Separate the two components against the action of the permanent magnet.

Brushes

12. Clean the brushes with a petrol-moistened cloth.
13. Check the brush length. Renew the brushes if less than the length given in Data.
14. Check that the brushes bear firmly against the commutator. If the pressure is low, renew the brushes.

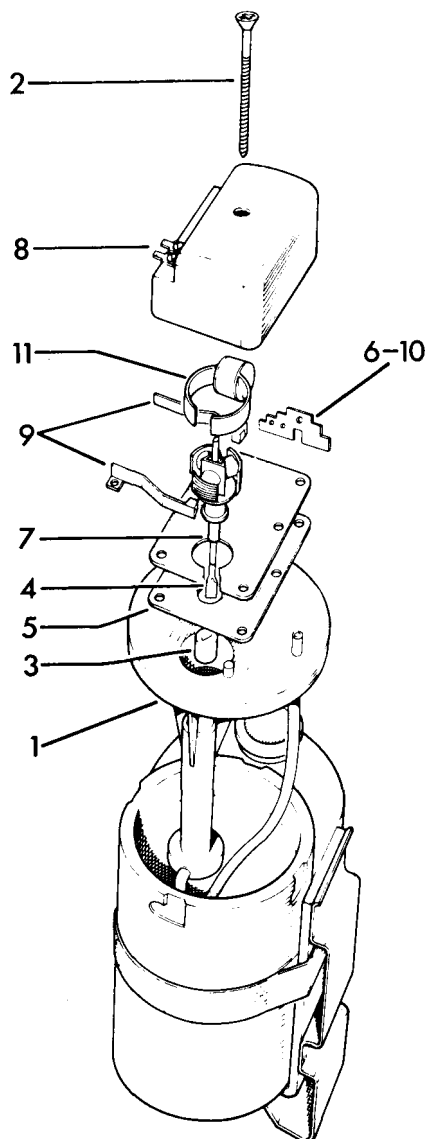
Commutator

15. Clean the commutator with a petrol-moistened cloth. If the unit is in good condition it will be smooth and free from pits or burned spots. If necessary, polish with fine glass-paper. If excessively worn, replace the armature.

Reassembling

16. Lubricate the motor case bearing by filling the recess with Rocol Molypad molybdenized grease. Wiper excess grease from the boss.
17. Position the permanent magnet. To ensure that the motor runs in the correct direction the narrower pole must be adjacent to the terminal position. Ensure that the poles locate correctly around the circular spigot.
18. Position the clamping member.
19. Hold the clamping member in position during operations 20 to 23.

20. Insert the armature and locate to the motor case bearing against the action of the permanent magnet.
21. Using a pair of long-nosed pliers, carefully position the two brushes. Ensure that the arm ends are inserted in the slits provided in the motor case. To achieve this the brush positions cannot be inter-changed.
22. Fit the two nuts, connector blades, spring washers and terminal screws.
23. Fit the shaft distance tube.
24. Reverse instructions 1 to 5.



WINDSCREEN WASHER PUMP AND RESERVOIR – LUCAS TYPE 9SJ

– Overhaul

84.10.24

It is not advisable to attempt to overhaul the pump assembly. If the pump operation is suspect repair by replacement of the complete pump and cover assembly.

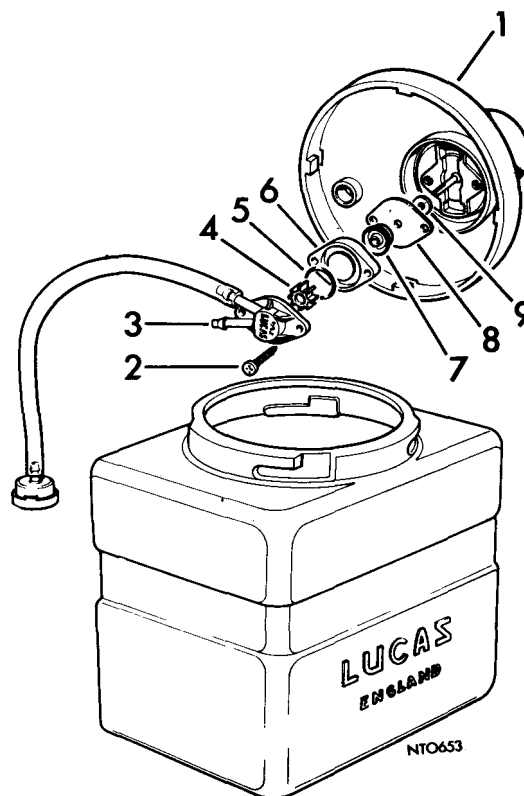
The motor is a sealed unit and can not be serviced. It is possible to dismantle and clean the interior of the pump as detailed below but no individual Stanpart spare parts are available.

Dismantle

1. Rotate the cover anticlockwise to release the bayonet fitting. Lift the pump and cover assembly from the reservoir.
2. Remove two screws.
3. Lift off the pump housing.
4. Carefully withdraw the rotor and rotor drive plate.
5. Lift out the rubber 'O' ring.
6. Lift off the seal housing.
7. Withdraw the seal from the shaft.
8. Remove the plate.
9. Withdraw the small rubber disc from the shaft.

Assemble

10. Reverse instructions 1 to 9.



WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WIPER SYSTEM

Data and description

84.15.00

Motor

| | |
|---|----------|
| Manufacturer | Lucas |
| Type | 14W |
| Lucas Part No.: motor minus gear assembly | 75664 |
| gear assembly — R.H. Steer | 54702597 |
| — L.H. Steer | 54702584 |
| Stanpart No.: motor minus gear assembly | 517621 |
| gear assembly — R.H. Steer | 517622 |
| — L.H. Steer | 517646 |

Running current — after 60 seconds from cold with connecting rod removed:

Normal speed 1.5 amp

High speed 2.0 amp

Running speed — final gear after 60 seconds from cold with connecting rod removed:

Normal speed 46 to 52 rev/min

High speed 60 to 70 rev/min

Armature end-float 0.002 to 0.008 in (0.05 to 0.02 mm)

Brush length — normal speed: new 0.380 in (9.65 mm)

 renew if less than 0.180 in (4.76 mm)

 high speed: new 0.380 in (9.65 mm)

 renew if less than 0.280 in (7.11 mm) (i.e. when narrow section is worn to step into full-width section)

 earth: new 0.380 in (9.65 mm)

 renew if less than 0.180 in (4.76 mm)

Brush spring pressure — when compressed so brush

 bottom is aligned with brushbox slot end 5 to 7 oz (140 to 200 g)

Maximum permissible force to move cable rack in

 tubing — arms and blades removed 6 lb (3 kg)

The unit consists of a two speed permanent magnet motor and a gearbox unit which drives a cable rack mechanism. Rotation of the motor armature is converted to a reciprocating motion of the cable rack by a single stage worm and gear, a connecting rod and a crosshead contained in a guide channel.

Two speed operation is provided by a third brush. When high speed is selected the positive supply is transferred from the normal speed brush to the high speed brush.

A switching feature stops the blades in the park position irrespective of their position when the fascia switch is selected off. This is effected by a two stage limit switch unit attached to the gearbox. The contacts are actuated by a cam on the final gear.

When the fascia switch is selected off the motor will continue to run until the limit switch first stage contact open. A momentary period follows during which no contact is made. The second stage contacts then close causing regenerative braking of the armature which maintains consistent parking of the blades.



- | | |
|----------------------|---------------------|
| + Supply | 3 High speed brush |
| 1 Fascia switch | 4 Commutator |
| OFF | 5 Permanent magnet |
| NORMAL | 6 Earth brush |
| HIGH | 7 Final gear cam |
| 2 Normal speed brush | 8 Limit switch unit |

Component and switch wiring diagram



General arrangement

WINDSCREEN WIPERS AND WASHERS

WINDSCREEN WIPER ARM

– Remove and refit

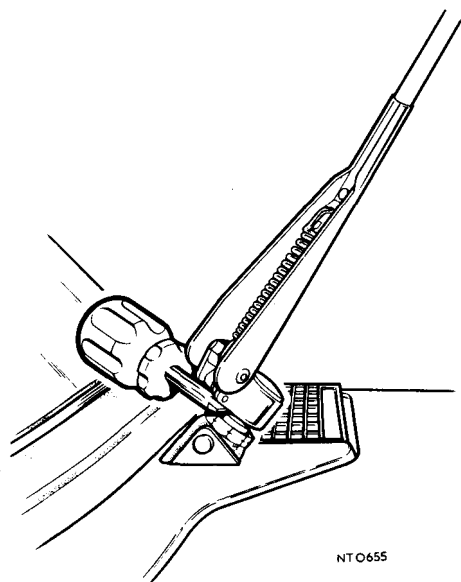
84.15.01

Removing

1. Lift the wiper arm and blade from the screen so that it falls into its service position.
2. Position a screwdriver as shown and impart a twisting action to lift the clip from the spindle groove.
3. The assembly may now be removed by hand.

Refitting

4. Ensure that the spindles are in the 'park' position.
5. Hinge the wiper arm against the spring to adopt its service position.
6. Locate the splines for a suitable 'park' position. Push on to engage the clip to the spindle groove.
7. Lower the wiper arm to the screen.



WINDSCREEN WIPER BLADE

– Remove and refit

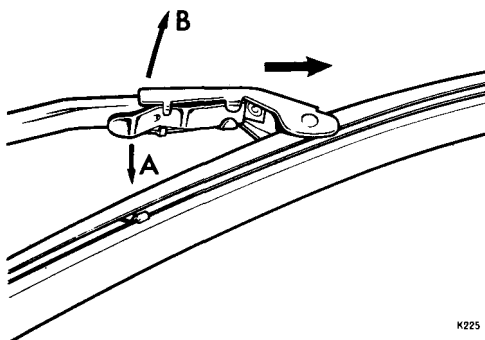
84.15.05

Removing

1. Lift the wiper arm and blade from the screen so that it falls into its service position.
2. Simultaneously lift the clip 'A', tilt cage 'B' and gently pull the wiper blade from the arm.

Refitting

3. Locate the cage and clip assembly to the wiper arm. Push on to engage 'pip'.
4. Lower the wiper arm to the screen.



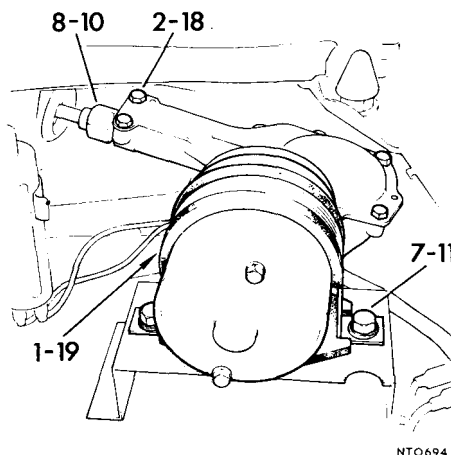
WINDSCREEN WIPER MOTOR

Remove and refit

84.15.12

Removing

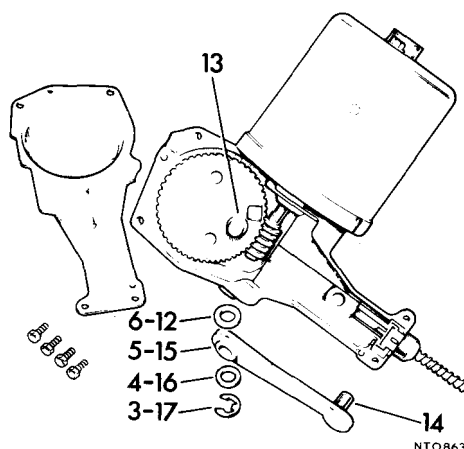
1. Remove the harness plug from the limit switch.
2. Remove four screws. Lift off the gearbox cover.
3. Remove the crankpin spring clip by withdrawing sideways.
4. Remove the washer.
5. Carefully withdraw the connecting rod.
6. Remove the washer.
7. Remove two bolts, spring washers and washers. Remove the strap and rubber sleeve. Collect up the rubber pad.
8. Manoeuvre the motor to allow the cross-head, rack and tube assembly to be released. Remove the motor from the vehicle.



NT0694

Refitting

9. Ensure that the connecting rod is removed as detailed above.
10. Position the motor so that the cross-head, rack and tube assembly are correctly located to the motor guide channel.
11. Position the rubber pad. Locate the strap and rubber sleeve. Secure with two bolts, spring washers and washers.
12. Fit the washer.
13. Lubricate the final gear crankpin with Shell Turbo 41 oil.
14. Lubricate the cross-head end of the connecting rod, including the pin, with Ragosine Listate grease.
15. Carefully insert the connecting rod.
16. Fit the washer.
17. Fit the spring clip by inserting sideways.
18. Position the gearbox cover. Secure with four screws.
19. Fit the harness plug to the limit switch.



NT0863

WINDSCREEN WIPER MOTOR

Overhaul

84.15.18

General

If the motor is not operating correctly, check the electrical supply of 12 volts on terminal 5 with normal speed selected and terminal 3 with high speed selected. Also check the electrical earth on terminal 1.

If the electrical supply and the earth is satisfactory, perform the following operations to determine if the fault is in the motor or in the rack, tube and wheelbox assembly, resulting in the motor being required to drive an excessive load.

Running current

1. Perform 84.15.12 instructions 2 to 6.
2. Connect an ammeter suitable for the running current (see data) in the supply circuit.
3. Allow the motor to run for 60 seconds. The ammeter reading should then be as given in data for normal speed and high speed respectively.
4. If the reading is not as stated, a fault in the motor is indicated.

Running speed

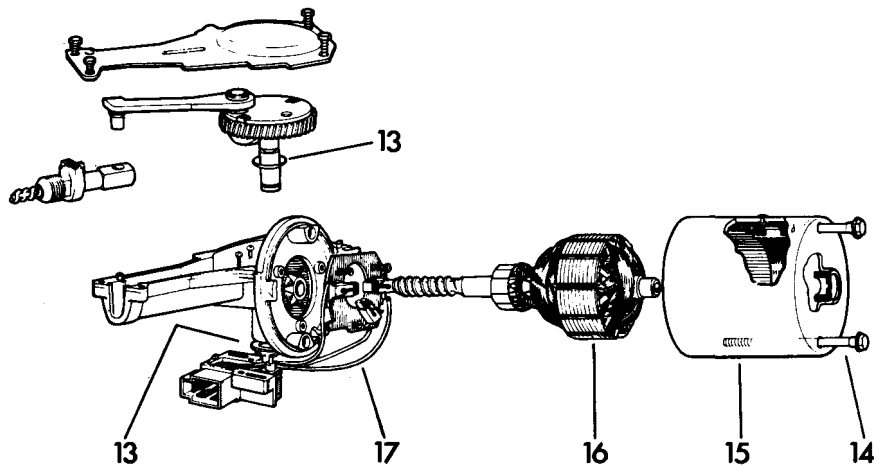
5. Perform 84.15.12 instructions 2 to 6.
6. Allow the motor to run for 50 seconds. The speed of the final gear should then be as given in data for normal speed and high speed respectively.
7. If the speed is not as stated, a fault in the motor is indicated.

Force to move rack in tube and wheelbox assembly

8. Perform 84.15.12 instructions 2 to 6.
9. Remove the wiper arms 84.15.01.
10. Attach a suitable spring scale to the hole in the cross-head. The maximum permissible force to move the rack is given in data.
11. If the required force is greater than stated, a fault in the rack, tube and wheelbox assembly is indicated.

Dismantle

12. Perform 84.15.12 instructions 2 to 6.
13. Remove the final gear shaft spring clip by withdrawing sideways. Remove the washer. Ensure that the shaft is burr free and withdraw it. Remove the dished washer.
14. Remove the through bolts.
15. Carefully withdraw the cover and armature about 0.200 in (5 mm). Continue withdrawal allowing the brushes to drop clear of the commutator. Ensure that the brushes are not contaminated with grease.
16. Pull the armature from the cover against the action of the permanent magnet.
17. Remove five screws to release the brush assembly and limit switch unit. Remove both units joined together by the wires.



NT 0701

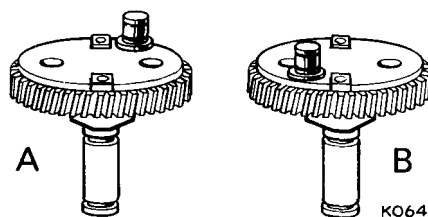
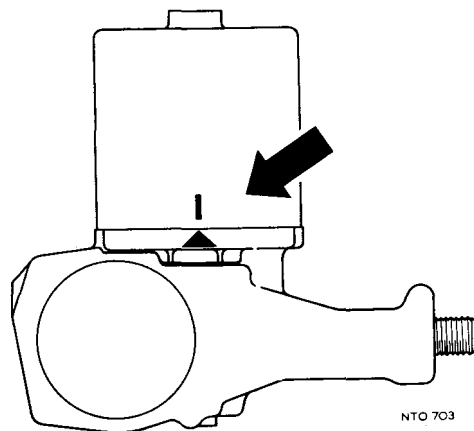
WINDSCREEN WIPERS AND WASHERS

Assemble

Note that the following lubricants are used during assembly:

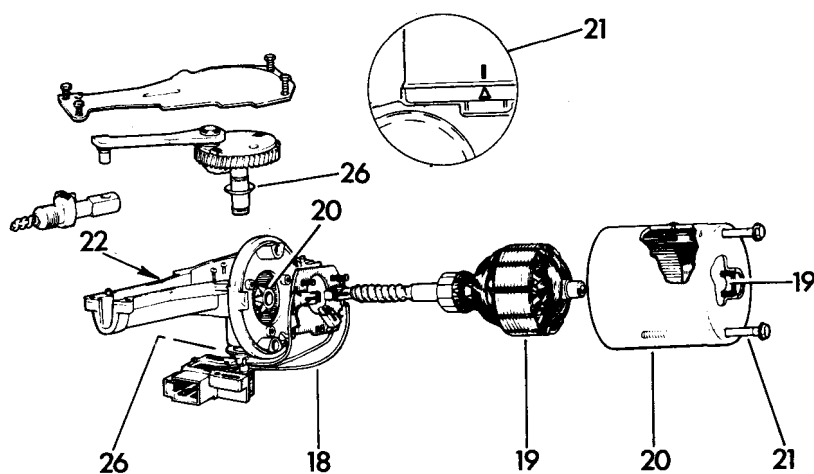
Shell Turbo 41 oil
Ragoline Listate grease

18. Position the brush assembly and limit switch unit joined together by the wires. Secure with five screws.
19. Lubricate the cover bearing and saturate the cover bearing felt washer with Shell Turbo 41 oil. Position the armature to the cover against the action of the permanent magnet.
20. Lubricate the self aligning bearing with Shell Turbo 41 oil. Carefully insert the armature shaft through the bearing. Ensure that the brushes are not contaminated with lubricant. Push the three brushes back to clear the commutator.
21. Seat the cover against the gearbox. Turn the cover to align the marks shown. Fit the through bolts.
22. Fit the thrust screw or the thrust screw and locknut as fitted.
23. If a non-adjustable thrust screw is fitted check the armature end-float as follows:
Position a feeler gauge between the armature shaft and the thrust screw.
Push the armature towards the cover. End-float should be 0.002 to 0.008 in.
In the unlikely event of adjustment being required end-float may be increased by fitting shim washer/washers under the thrust screw head or reduced by mounting the thrust screw in a lathe and removing metal from the underside of the head.
24. If an adjustable thrust screw and locknut is fitted, adjust the armature end-float as follows:
Slacken the locknut. Screw the thrust screw in until resistance is felt. Screw the thrust screw out a quarter of a turn – maintain in this position and tighten the locknut.
25. Note that the final gear is serviced only as an assembly. Normally the crankpin mounting plate is not separated from the moulded gearwheel. If they should become parted assemble so that the relationship of the crankpin to the cam is as shown.
26. Lubricate the final gear bushes with Shell Turbo 41 oil. Lubricate the final gear cam with Ragoline Listate grease. Fit the dished washer with its concave surface facing the final gear. Insert the shaft. Fit the washer. Fit the spring clip by inserting sideways.
27. Pack Ragoline Listate grease around the worm gear, final gear and into the crosshead guide channel.
28. Perform 84.15.12 instructions 12 to 18.



- A Park position – cable rack retracted – RH Steer vehicles
B Park position – cable rack extended – LH Steer vehicles

Relationship of crankpin to cam for correct park position



NT 0702

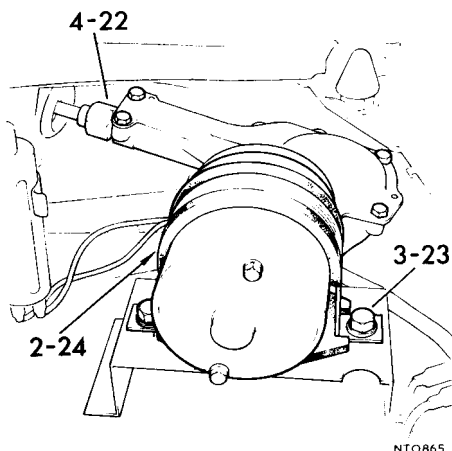
WINDSCREEN WIPER RACK

— Remove and refit

84.15.24

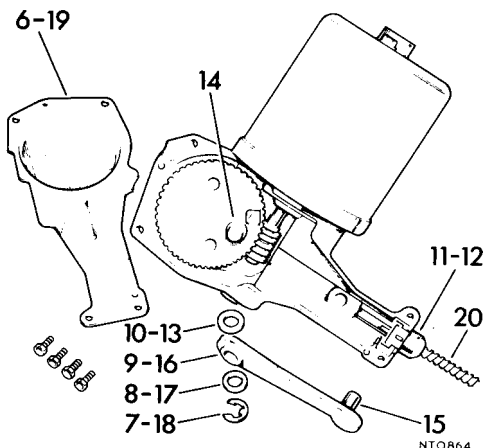
Removing

1. Remove two wiper arms 84.15.01.
2. Remove the harness plug from the limit switch.
3. Remove two bolts, spring washers and washers. Remove the strap and rubber sleeve. Collect up the rubber pad.
4. Unscrew the tubing nut.
5. Withdraw the motor and rack assembly.
6. Remove four screws. Lift off the gearbox cover.
7. Remove the crankpin spring clip by withdrawing sideways.
8. Remove the washer.
9. Carefully withdraw the connecting rod.
10. Remove the washer.
11. Remove the crosshead and rack assembly.



Refitting

12. Position the crosshead and rack assembly to the motor.
13. Fit the washer.
14. Lubricate the final gear crankpin with Shell Turbo 41 oil.
15. Lubricate the crosshead end of the connecting rod, including the pin, with Ragosine Listate grease.
16. Carefully insert the connecting rod.
17. Fit the washer.
18. Fit the spring clip by inserting sideways.
19. Position the gearbox cover. Secure with four screws.
20. Lubricate the rack with Ragosine Listate grease.
21. Insert the motor and rack assembly. It may be necessary to slightly rotate each wheelbox spindle by hand to facilitate the rack engagement.
22. Screw on the tubing nut.
23. Position the rubber pad. Locate the strap and rubber sleeve. Secure with two bolts, spring washers and washers.
24. Fit the harness plug to the limit switch.
25. Fit two wiper arms 84.15.01.

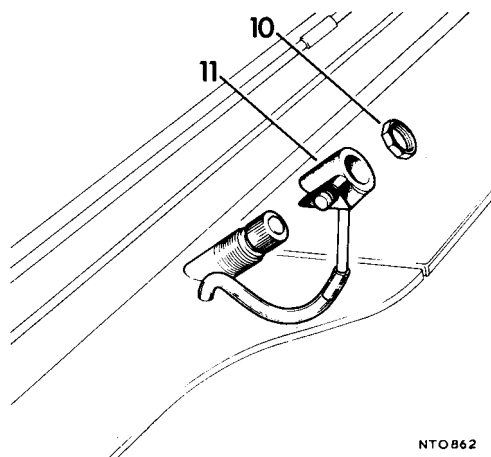
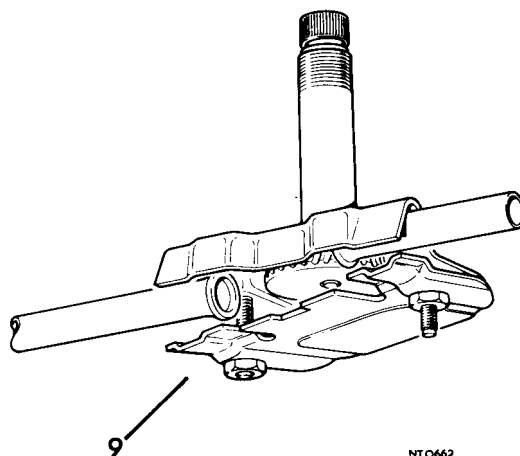


WINDSCREEN WIPER WHEELBOX

- Left hand – remove and refit 84.15.28
- Right hand – remove and refit 84.15.29

Removing

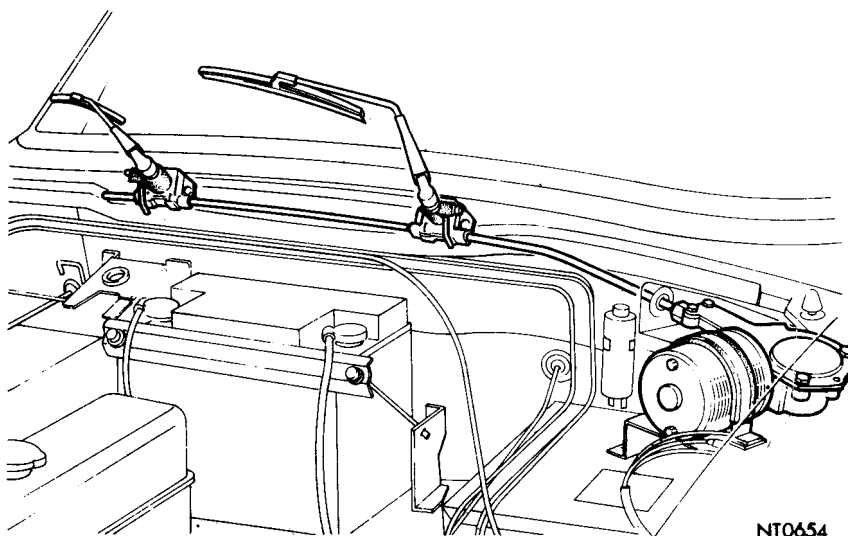
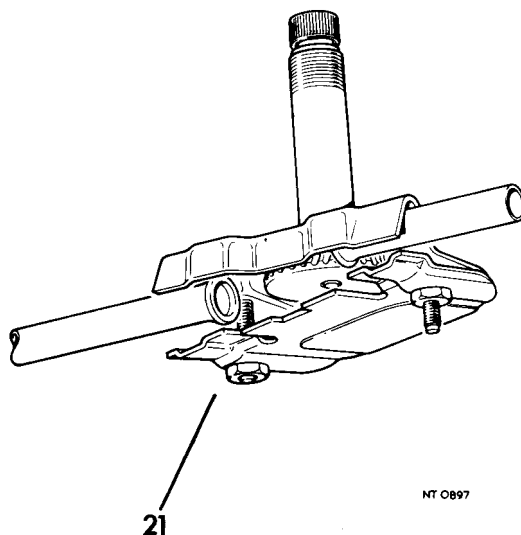
1. Isolate the battery.
2. Perform 84.15.24 operations 1 to 5.
3. To improve access remove the air inlet vent 76.15.17.
4. To improve access remove the drivers seat 76.70.04 or the passengers seat 76.70.05 as required.
5. Drivers side only –
Remove the tachometer 88.30.21.
6. Passengers side only –
Remove the cubby box 76.52.03 and the demister duct 80.15.03.
7. Remove four screws. Break the seal and remove the access plate.
8. Left hand side only –
Remove two nuts and remove the wheelbox backplate.
9. Right hand side only –
Action to prevent losing the short tubing in the plenum chamber. Slacken two nuts unequally as shown just enough to push the wheelbox to wheelbox tubing from position. Tighten two nuts to firmly trap the short tubing.
10. Remove the wheelbox spindle nut.
11. Carefully break the seal between the rubber moulding and vehicle body. Withdraw the rubber moulding. Ensure that the plastic tube is not detached from the metal pipe.
12. Withdraw the wheelbox through the access aperture.
13. Right hand side only –
Dismantle two nuts, wheelbox backplate, short tubing and wheelbox.
14. Remove the rigid tube from the wheelbox spindle.



WINDSCREEN WIPERS AND WASHERS

Refitting

15. Fit the rigid tube to the wheelbox spindle.
16. Right hand side only –
Assemble the wheelbox, short tubing, wheelbox backplate and two nuts.
17. Insert the wheelbox through the access aperture.
18. Position the rubber moulding. Ensure a good seal by using an approved sealer.
19. Fit the wheelbox spindle nut.
20. Left hand side only –
Position two lengths of tubing to the slots provided on the wheelbox. Position the wheelbox backplate and secure with two nuts.
21. Right hand side only –
Action to prevent losing the short tubing in the plenum chamber. Slacken two nuts unequally as shown just enough to push the wheelbox to wheelbox tubing into position. Tighten two nuts.
22. Position the access plate. Ensure a good seal by using an approved sealer. Secure with four screws.
23. Drivers side only –
Fit the tachometer 88.30.21
24. Passengers side only –
Fit the demister duct 80.15.03 and the cubby box 76.52.03.
25. Fit the drivers seat 76.70.04 or the passengers seat 76.70.05 as required.
26. Fit the air inlet vent 76.15.17.
27. Perform 84.15.24 operations 20 to 25.
28. Connect the battery.



ELECTRICAL OPERATIONS

Alternator

| | |
|-----------------------|----------|
| — data | 86.10.00 |
| — drive belt — adjust | 86.10.05 |
| — functional check | 86.10.01 |
| — overhaul | 86.10.08 |
| — remove and refit | 86.10.02 |

Battery

| | |
|--------------------|----------|
| — remove and refit | 86.15.01 |
|--------------------|----------|

Brake line failure and oil pressure warning system

| | |
|---|--------------------------|
| — brake line failure switch — remove and refit | 86.65.47 |
| — brake line failure warning light — remove and refit | 86.45.77 |
| — description | 86.59.00 |
| — oil pressure switch — remove and refit | 86.65.30 |
| — oil pressure warning light — remove and refit | 88.30.21 <i>refer to</i> |

| | |
|------------|----------|
| Bulb chart | 86.00.01 |
|------------|----------|

Buzzer

| | |
|--------------------|----------|
| — remove and refit | 86.55.13 |
|--------------------|----------|

Flasher units

| | |
|---|----------|
| — hazard flasher unit — remove and refit | 86.55.12 |
| — turn signal flasher unit — remove and refit | 86.55.11 |

Fuse system

| | |
|---------------------------|----------|
| — fuse chart | 86.70.00 |
| — fuse — remove and refit | 86.70.02 |

Horns

| | |
|-------------------------------------|----------|
| — horn push — remove and refit | 86.65.18 |
| — horn slip ring — remove and refit | 86.30.02 |

Ignition distributor

| | |
|---------------------------------------|----------|
| — contact assembly — remove and refit | 86.35.13 |
| — contact gap — adjust | 86.35.14 |
| — data | 86.35.00 |
| — ignition timing — adjust | 86.35.15 |
| — lubrication | 86.35.18 |
| — overhaul | 86.35.26 |
| — remove and refit | 86.35.20 |

Key warning system

| | |
|--|-------------------|
| – buzzer – remove and refit | 86.55.13 |
| – description | 86.58.00 |
| – diode – remove and refit | 86.57.10 |
| – door switch – remove and refit | 86.65.14 |
| – key light – remove and refit | 86.45.78 |
| – key switch – remove and refit | refer to 57.40.31 |

Lamps

| | |
|---|----------|
| – brake line failure warning light – remove and refit | 86.45.77 |
| – front marker lamp – remove and refit | 86.40.59 |
| – front parking and flasher lamp – remove and refit | 86.40.26 |
| – hazard warning light – remove and refit | 86.45.76 |
| – headlamp – beam aiming | 86.40.17 |
| – headlamp – remove and refit | 86.40.02 |
| – key light – remove and refit | 86.45.78 |
| – luggage boot lamp – remove and refit | 86.45.16 |
| – plate illumination lamp – remove and refit | 86.40.86 |
| – rear lamp assembly – remove and refit | 86.40.70 |
| – seat belt warning light – remove and refit | 86.45.75 |
| – transmission tunnel lamp – remove and refit | 86.45.20 |

Radio

| | |
|----------------------|----------|
| – facility | 86.50.00 |
|----------------------|----------|

Relays

| | |
|--|----------|
| – hazard relay – remove and refit | 86.55.02 |
| – horn relay – remove and refit | 86.55.09 |
| – overdrive relay – remove and refit | 86.55.04 |

Seat belt warning system

| | |
|---|----------|
| – buzzer – remove and refit | 86.55.13 |
| – description | 86.57.00 |
| – diode – remove and refit | 86.57.10 |
| – drivers belt switch – remove and refit | 86.65.31 |
| – gearbox switch – remove and refit | 86.65.28 |
| – passengers belt switch – remove and refit | 86.65.32 |
| – passengers seat switch – remove and refit | 86.65.29 |
| – warning light – remove and refit | 86.45.75 |

Starter motor

| | |
|--|----------|
| – data and description | 86.60.00 |
| – overhaul | 86.60.13 |
| – remove and refit | 86.60.01 |
| – roller clutch drive – remove and refit | 86.60.07 |

Switches

| | |
|---|--------------------------|
| – brake line failure switch – remove and refit | 86.65.47 |
| – column light switch – remove and refit | 86.65.17 |
| – cubby box illumination switch – remove and refit | 86.65.24 |
| – data | 86.65.00 |
| – dip switch – remove and refit | 86.65.11 |
| – door switch – remove and refit | 86.65.14 |
| – fuel pump inertia cut out switch – data and description | 86.65.00 |
| – fuel pump inertia cut out switch – remove and refit | 86.65.58 |
| – fuel pump inertia cut out switch – reset | 86.65.59 |
| – hazard switch – remove and refit | 86.65.50 |
| – heater switch – remove and refit | 86.65.44 |
| – horn push – remove and refit | 86.65.18 |
| – ignition/starter switch – remove and refit | 86.65.02 |
| – key switch – remove and refit | <i>refer to</i> 57.40.31 |
| – luggage boot lamp switch – remove and refit | 86.65.22 |
| – oil pressure switch – remove and refit | 86.65.30 |
| – overdrive manual switch – remove and refit | 86.65.35 |
| – overdrive gearbox switches – remove and refit | 86.65.33 |
| – panel rheostat – remove and refit | 86.65.12 |
| – reverse lamp switch – remove and refit | 86.65.20 |
| – seat belt – drivers belt switch – remove and refit | 86.65.31 |
| – seat belt – gearbox switch – remove and refit | 86.65.28 |
| – seat belt – passengers belt switch – remove and refit | 86.65.32 |
| – seat belt – passengers seat switch – remove and refit | 86.65.29 |
| – stop lamp switch – remove and refit | 86.65.51 |
| – transmission tunnel lamp switch – remove and refit | 86.45.20 |
| – turn signal switch – remove and refit | 86.65.54 |
| – windscreen washer switch – remove and refit | 86.65.40 |
| – windscreen wiper switch – remove and refit | 86.65.38 |

Wiring diagrams

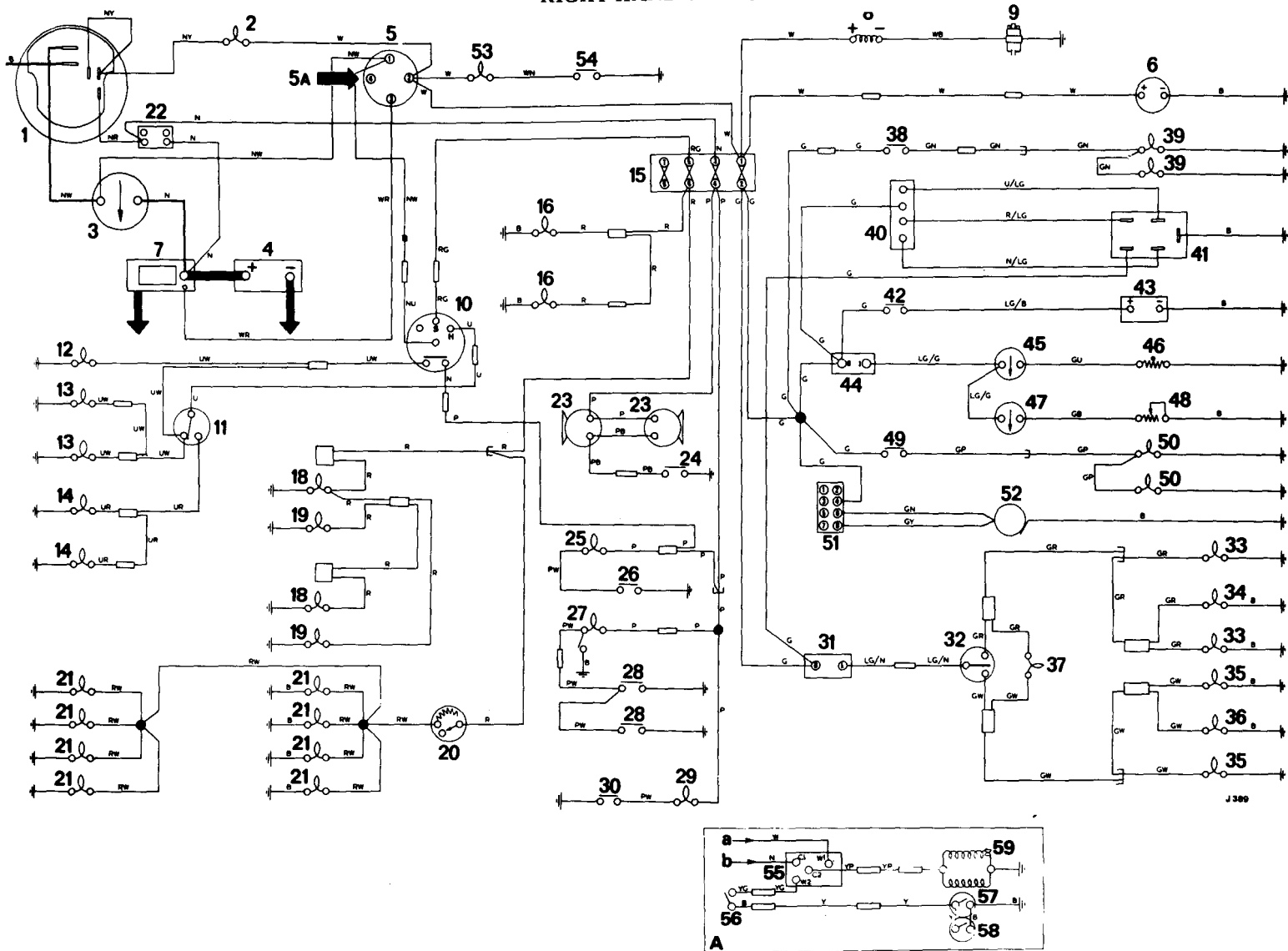
| | |
|---|----------|
| – left hand steer – except U.S.A. | 86.00.04 |
| – right hand steer | 86.00.02 |
| – U.S.A. – from introduction of 1972 model year | 86.00.08 |
| – U.S.A. – up to end of 1971 model year | 86.00.06 |

BULB CHART

| Lamp | Unipart No. | Stanpart No. | Specification | | |
|---|-------------|--------------|---------------|-------|---|
| | | | Reference No. | Watts | |
| Headlamps – L.H. dip | GLU 101 | 512231 | 54521872 | 60/45 | * |
| R.H. dip – Normal | GLB 410 | 510213 | 410 | 45/40 | |
| or | GLU 114 | 215735 | 54523079 | 60/50 | * |
| France | GLB 411 | 510219 | 411 | 45/40 | |
| U.S.A. | — | — | 54522231 | 50/40 | * |
| Front flasher lamps | GLB 382 | 502379 | 382 | 21 | |
| Front parking lamps | GLB 989 | 59467 | 989 | 6 | |
| Front flasher and parking lamps | GLB 380 | 502287 | 380 | 5/21 | |
| Flasher repeater lamps | — | 518220 | 233 | 4 | |
| Front marker lamps | — | 501436 | 222 | 4 | |
| Rear marker lamps | — | 501436 | 222 | 4 | |
| Rear flasher lamps | GLB 382 | 502379 | 382 | 21 | |
| Tail/stop lamps | GLB 380 | 502287 | 380 | 5/21 | |
| Reverse lamps | GLB 382 | 502379 | 382 | 21 | |
| Plate illumination lamps | GLB 207 | 57591 | 207 | 6 | |
| Luggage boot lamp | GLB 256 | 57599 | 256 | 3 | |
| Transmission tunnel lamp | GLB 254 | 59897 | 254 | 6 | |
| Cubby box illumination | GLB 987 | 59492 | 987 | 2·2 | |
| Instrument illumination | GLB 987 | 59492 | 987 | 2·2 | |
| Warning lights | GLB 987 | 59492 | 987 | 2·2 | |
| Seat belt warning light | GLB 281 | 513000 | 281 | 2 | |

* Sealed beam light unit

WIRING DIAGRAM – TR6
RIGHT HAND STEER





KEY TO WIRING DIAGRAM – TR6 RIGHT HAND STEER

1. Alternator
2. Ignition warning light
3. Ammeter
4. Battery
5. Ignition/starter switch
- 5A. Ignition/starter switch –
radio supply connector
6. Petrol pump
7. Starter motor
8. Ignition coil
9. Ignition distributor
10. Column light switch
11. Dip switch
12. Main beam warning light
13. Main beam
14. Dip beam
15. Fuse box
16. Front parking lamp
18. Tail lamp
19. Plate illumination lamp
20. Panel rheostat
21. Instrument illumination
22. Connector block
23. Horn
24. Horn push
25. Cubby box illumination
26. Cubby box illumination switch

27. Transmission tunnel lamp
28. Transmission tunnel lamp door switch
29. Luggage boot lamp
30. Luggage boot lamp switch
31. Turn signal flasher unit
32. Turn signal switch
33. L.H. Flasher lamp
34. L.H. Flasher repeater lamp
35. R.H. Flasher lamp
36. R.H. Flasher repeater lamp
37. Turn signal warning light
38. Reverse lamp switch
39. Reverse lamp
40. Windscreen wiper switch
41. Windscreen wiper motor
42. Windscreen washer switch
43. Windscreen washer pump
44. Voltage stabilizer
45. Temperature indicator
46. Temperature transmitter
47. Fuel indicator
48. Fuel tank unit
49. Stop lamp switch
50. Stop lamp
51. Heater switch
52. Heater motor
53. Oil pressure warning light
54. Oil pressure switch

A Overdrive (optional extra)

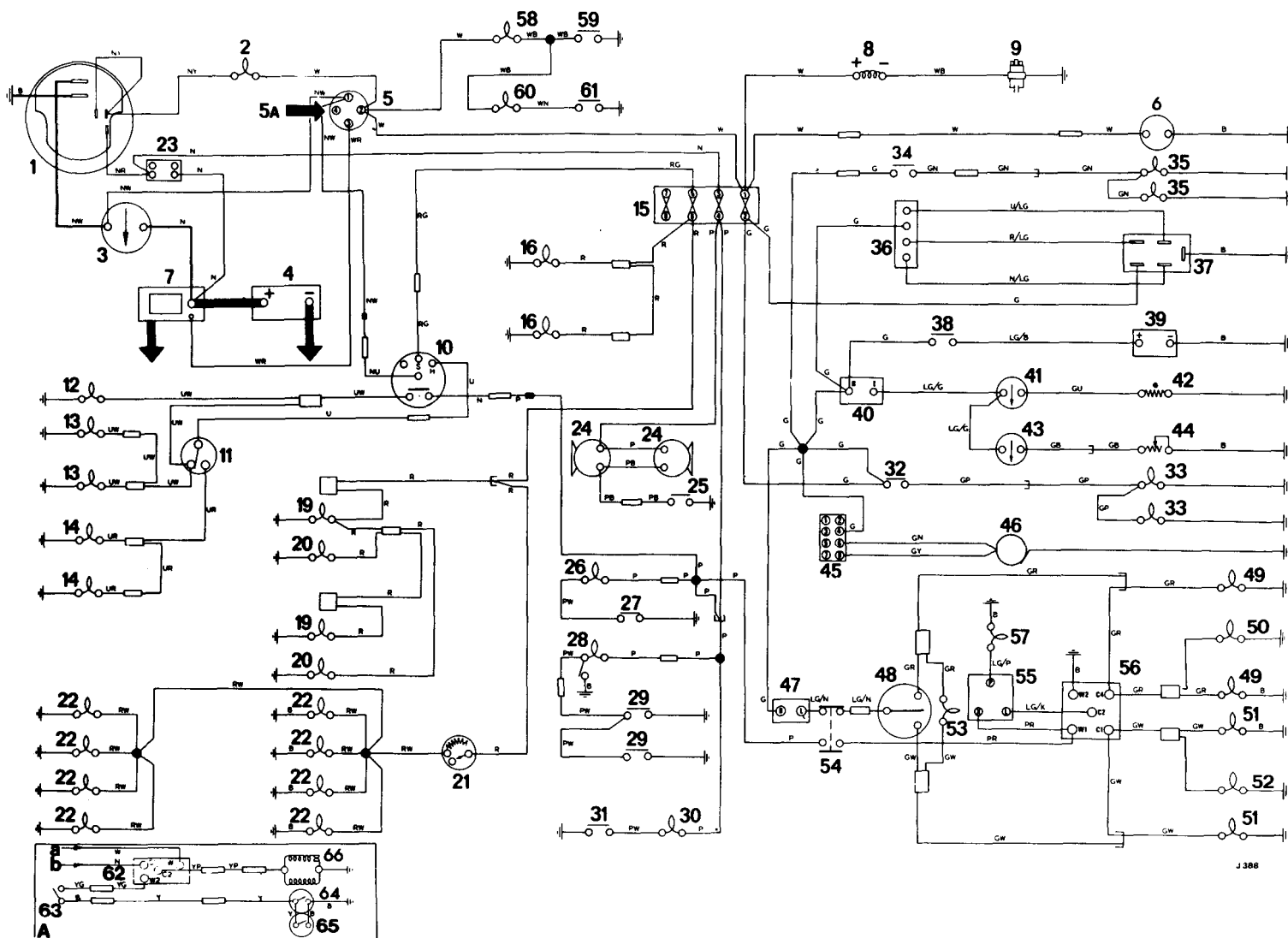
55. Overdrive relay
56. Overdrive column switch
57. Overdrive gearbox switch-
2nd gear ON
58. Overdrive gearbox switch-
3rd and 4th gear ON
59. Overdrive solenoid

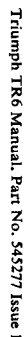
- a From fuse box
b From fuse box

COLOUR CODE

| | | | |
|----|--------|-----|-------------|
| N. | Brown | LG. | Light Green |
| U. | Blue | W. | White |
| R. | Red | Y. | Yellow |
| P. | Purple | S. | Slate |
| G. | Green | B. | Black |

ELECTRICAL



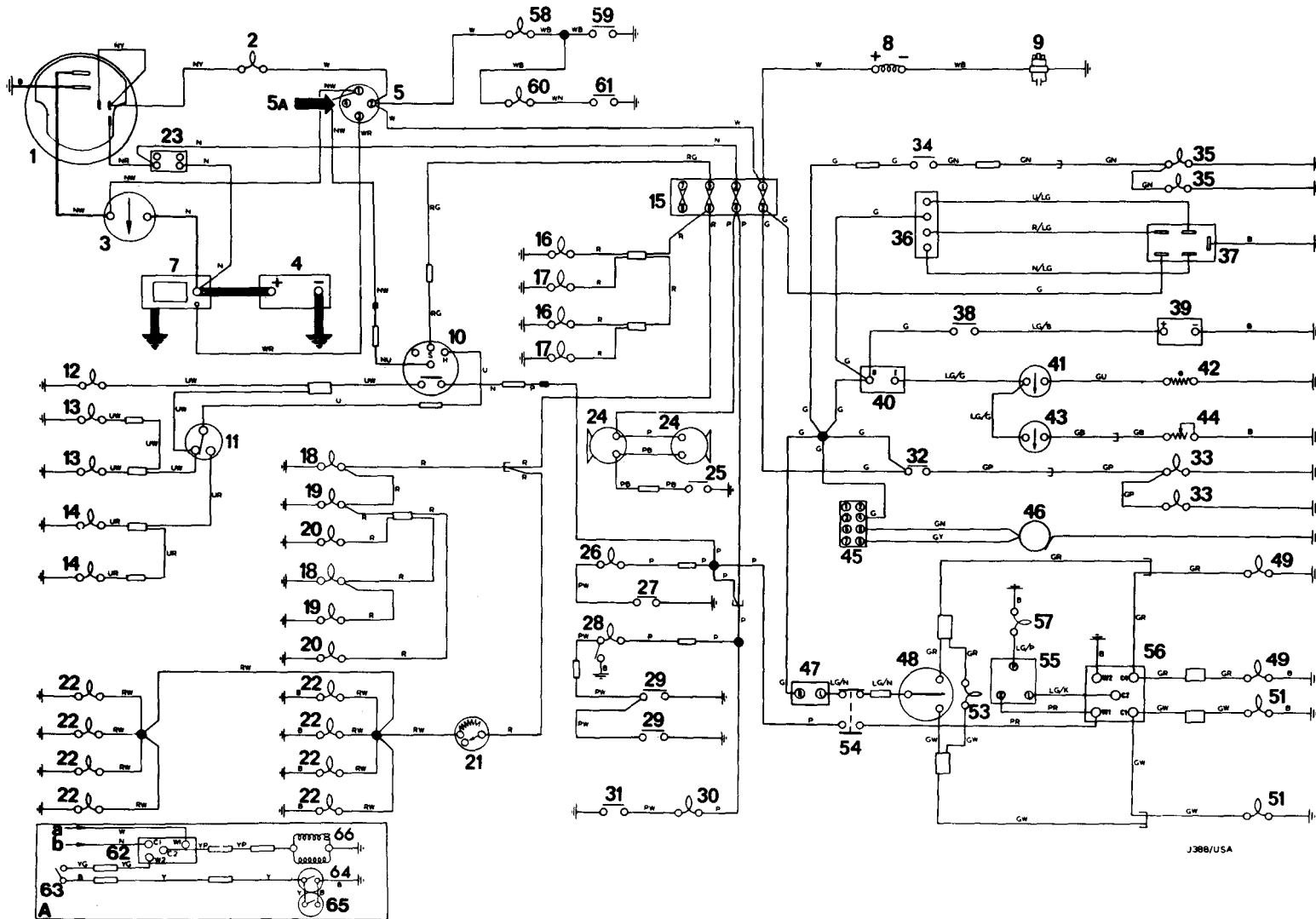


86.00.05

- COLOUR CODE**

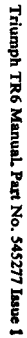
| | | | |
|----|--------|-----|-------------|
| N. | Brown | LG. | Light Green |
| U. | Blue | W. | White |
| R. | Red | Y. | Yellow |
| P. | Purple | S. | Slate |
| G. | Green | B. | Black |

WIRING DIAGRAM – TR6 U.S.A. – UP TO END OF 1971 MODEL YEAR



J388/USA

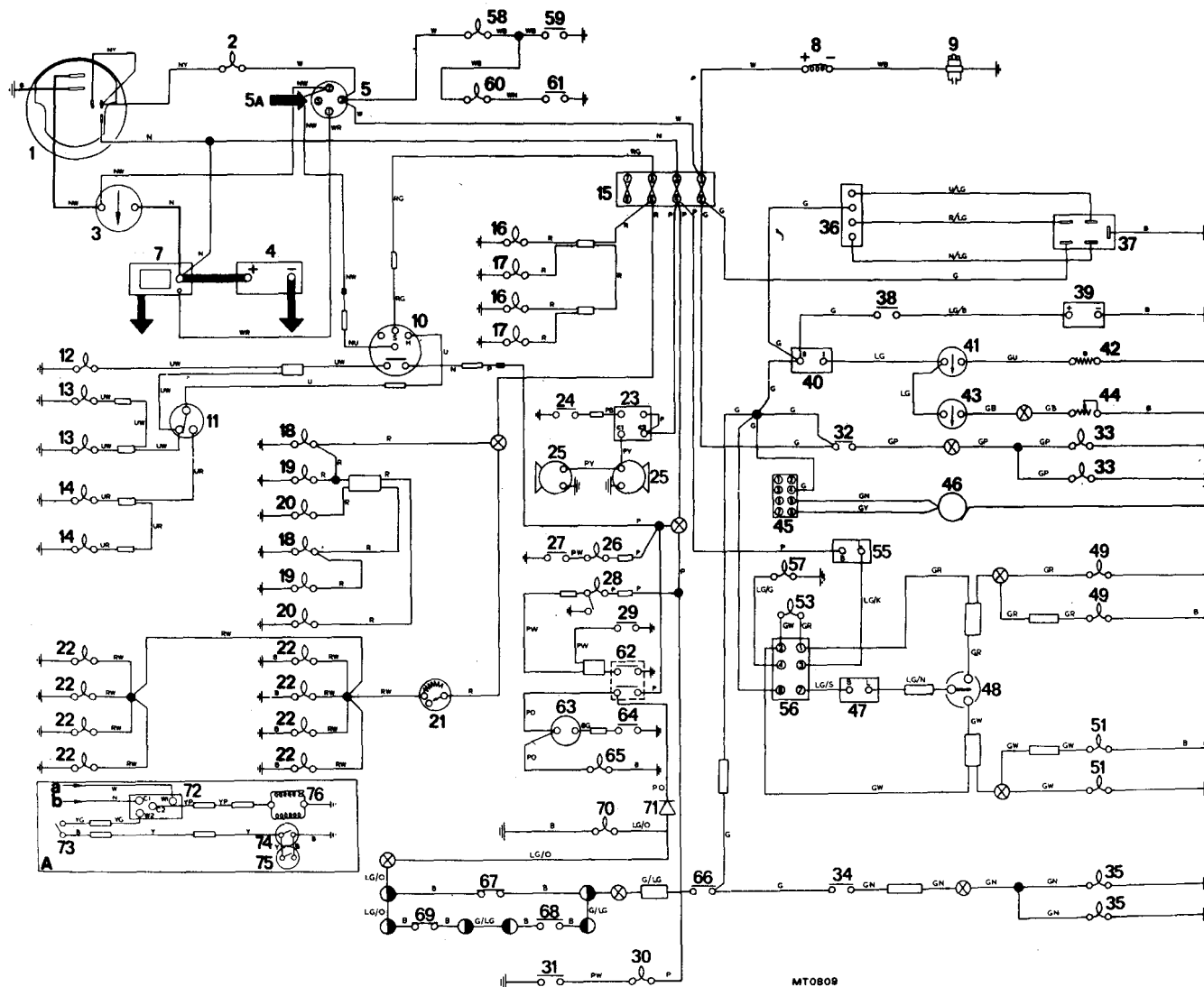




86.00.07

| | | | | | |
|-----|--|-----|--------------------------------------|-----|--|
| 1. | Alternator | 27. | Cubby box illumination switch | 55. | Hazard flasher unit |
| 2. | Ignition warning light | 28. | Transmission tunnel lamp | 56. | Hazard relay |
| 3. | Ammeter | 29. | Transmission tunnel lamp door switch | 57. | Hazard warning light |
| 4. | Battery | 30. | Luggage boot lamp | 58. | Brake line failure warning light |
| 5. | Ignition/starter switch | 31. | Luggage boot lamp switch | 59. | Brake line failure switch |
| 5A. | Ignition/starter switch-radio supply connector | 32. | Stop lamp switch | 60. | Oil pressure warning light |
| | | 33. | Stop lamp | 61. | Oil pressure switch |
| | | 34. | Reverse lamp switch | | |
| 7. | Starter motor | 35. | Reverse lamp | | |
| 8. | Ignition coil | 36. | Windscreen wiper switch | | |
| 9. | Ignition distributor | 37. | Windscreen wiper motor | A. | Overdrive (optional extra) |
| 10. | Column light switch | 38. | Windscreen washer switch | 62. | Overdrive relay |
| 11. | Dip switch | 39. | Windscreen washer pump | 63. | Overdrive column switch |
| 12. | Main beam warning light | 40. | Voltage stabilizer | 64. | Overdrive gearbox switch-2nd gear ON |
| 13. | Main beam | 41. | Temperature indicator | 65. | Overdrive gearbox switch-3rd and 4th gear ON |
| 14. | Dip beam | 42. | Temperature transmitter | 66. | Overdrive solenoid |
| 15. | Fuse box | 43. | Fuel indicator | a | From fuse box |
| 16. | Front parking lamp | 44. | Fuel tank unit | b | From fuse box |
| 17. | Front marker lamp | 45. | Heater switch | | |
| 18. | Rear marker lamp | 46. | Heater motor | | |
| 19. | Tail lamp | 47. | Turn signal flasher unit | | |
| 20. | Plate illumination lamp | 48. | Turn signal switch | | |
| 21. | Panel rheostat | 49. | L.H. Flasher lamp | | |
| 22. | Instrument illumination | | | | |
| 23. | Connector block | 51. | R.H. Flasher lamp | N. | Brown LG. Light Green |
| 24. | Horn | | | U. | Blue W. White |
| 25. | Horn push | 53. | Turn signal warning light | R. | Red Y. Yellow |
| 26. | Cubby box illumination | 54. | Hazard switch | P. | Purple S. Slate |
| | | | | G. | Green B. Black |

ELECTRICAL





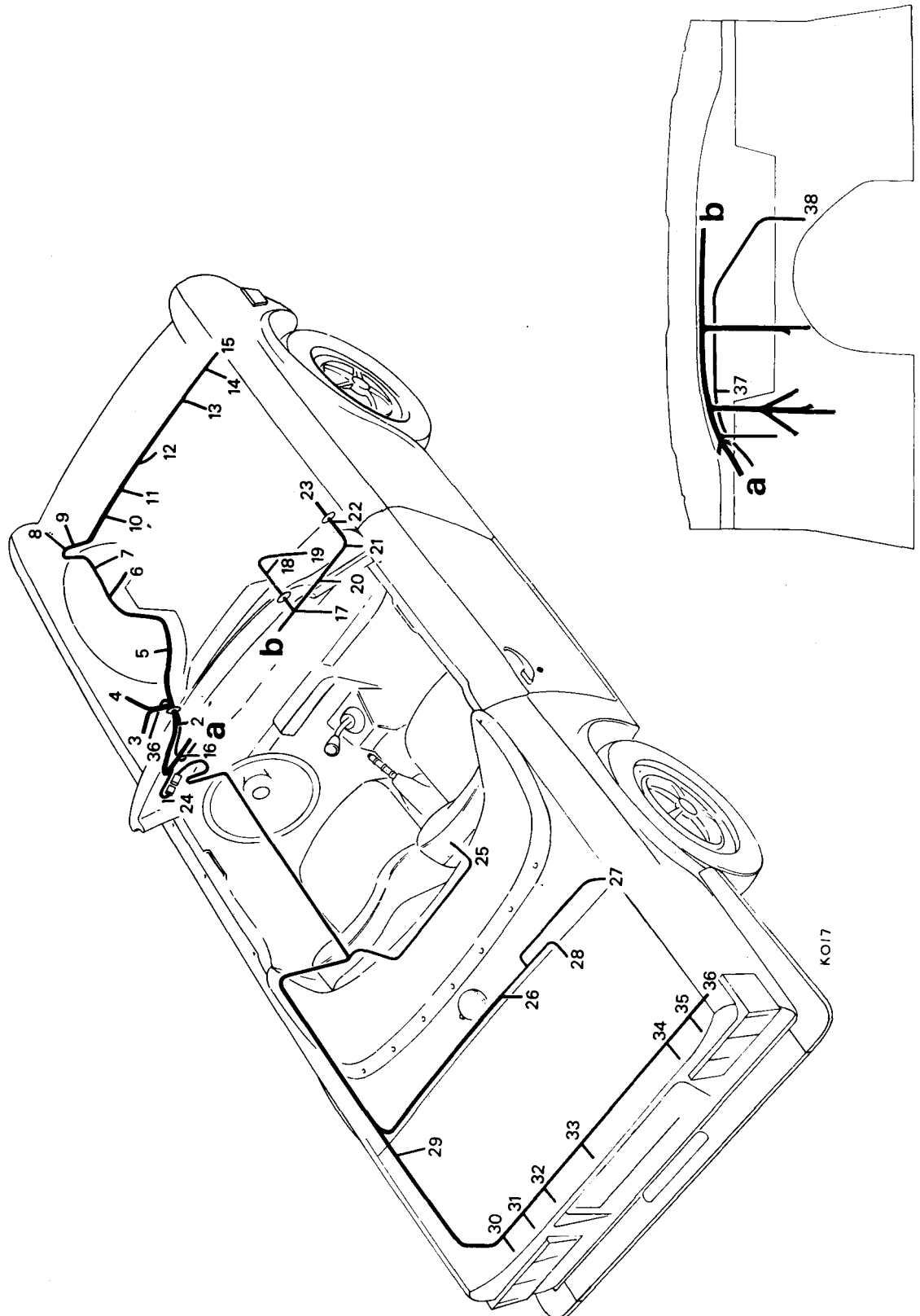
KEY TO WIRING DIAGRAM – TR6, U.S.A. – FROM INTRODUCTION OF 1972 MODEL YEAR

- | | | |
|--|--------------------------------------|---|
| 1. Alternator | 31. Luggage boot lamp switch | 63. Buzzer |
| 2. Ignition warning light | 32. Stop lamp switch | 64. Key switch |
| 3. Ammeter | 33. Stop lamp | 65. Key light |
| 4. Battery | 34. Reverse lamp switch | 66. Seat belt warning gearbox switch |
| 5. Ignition/starter switch | 35. Reverse lamp | 67. Drivers belt switch |
| 5A. Ignition/starter switch- radio supply connector | 36. Windscreen wiper switch | 68. Passengers seat switch |
| | 37. Windscreen wiper motor | 69. Passengers belt switch |
| 7. Starter motor | 38. Windscreen washer switch | 70. Seat belt warning light |
| 8. Ignition coil | 39. Windscreen washer pump | 71. Diode |
| 9. Ignition distributor | 40. Voltage stabilizer | |
| 10. Column light switch | 41. Temperature indicator | A. Overdrive (optional extra) |
| 11. Dip switch | 42. Temperature transmitter | 72. Overdrive relay |
| 12. Main beam warning light | 43. Fuel indicator | 73. Overdrive column switch |
| 13. Main beam | 44. Fuel tank unit | 74. Overdrive gearbox switch – 2nd gear ON |
| 14. Dip beam | 45. Heater switch | 75. Overdrive gearbox switch – 3rd and 4th gear ON |
| 15. Fuse box | 46. Heater motor | 76. Overdrive solenoid |
| 16. Front parking lamp | 47. Turn signal flasher unit | |
| 17. Front marker lamp | 48. Turn signal switch | a. From fuse box |
| 18. Rear marker lamp | 49. L.H. Flasher lamp | b. From fuse box |
| 19. Tail lamp | 51. R.H. Flasher lamp | |
| 20. Plate illumination lamp | 53. Turn signal warning light | |
| 21. Panel rheostat | | |
| 22. Instrument illumination | 55. Hazard flasher unit | |
| 23. Horn relay | 56. Hazard switch | |
| 24. Horn push | 57. Hazard warning light | |
| 25. Horn | 58. Brake line failure warning light | |
| 26. Cubby box illumination | 59. Brake line failure switch | |
| 27. Cubby box illumination switch | 60. Oil pressure warning light | |
| 28. Transmission tunnel lamp | 61. Oil pressure switch | |
| 29. Transmission tunnel lamp door switch | 62. L.H. door switch | |
| 30. Luggage boot lamp | | |

COLOUR CODE

| | | | |
|----|--------|-----|-------------|
| N. | Brown | LG. | Light Green |
| U. | Blue | W. | White = K |
| R. | Red | Y. | Yellow |
| P. | Purple | S. | Slate |
| G. | Green | B. | Black |

HARNESS





MAIN HARNESS

- 1 Plug connection to body harness
- 2 Dip switch
- 3 Windscreen wiper motor
Hazard relay – left hand steer only
Fuse box
- 4 Fuse box
Connector block
Hazard flasher unit – left hand steer only
- 5 Brake line failure switch – left hand steer only
- 6 Alternator
Ignition coil
Temperature transmitter
Oil pressure switch
- 7 Horn push – earth return wire
connected to steering unit
- 8 Harness earth
- 9 Front parking lamp
Front flasher lamp
Flasher repeater lamp
- 10 Headlamp
- 11 Horn
- 12 Harness earth
- 13 Horn

KEY TO HARNESS

- 14 Headlamp
 - 15 Front parking lamp
Front flasher lamp
Flasher repeater lamp
 - 16 Transmission tunnel lamp door switch
 - a Refer to Fascia connections 88.00.01 to
88.00.05 for continuation
 - b Refer to Fascia connections 88.00.01 to
88.00.05 for continuation
 - 17 Reverse lamp switch
 - 18 Harness earth
 - 19 Starter motor
 - 20 Cubby box illumination
 - 21 Transmission tunnel lamp door switch
 - 22 Turn signal flasher unit
 - 23 Windscreen washer pump
- ### BODY HARNESS
- 24 Plug connection to main harness
 - 25 Transmission tunnel lamp
 - 26 Fuel tank unit

- 27 Luggage boot lamp switch
- 28 Luggage boot lamp
- 29 Petrol pump
- 30 Rear flasher lamp
- 31 Tail/stop lamp
- 32 Reverse lamp
- 33 Plate illumination lamp
- 34 Reverse lamp
- 35 Tail/stop lamp
- 36 Rear flasher lamp

OVERDRIVE HARNESS (Optional extra)

- 36 Fuse box
Overdrive relay
- 37 Overdrive column switch
- 38 Overdrive gearbox switch – 2nd gear ON
Overdrive gearbox switch – 3rd and 4th gear ON
Overdrive solenoid

NOTE: Early left hand steer vehicle shown – other TR6 vehicles similar.



ALTERNATOR DATA CHARTS

CAUTION: The alternator contains polarity sensitive components that may be irreparably damaged if subjected to incorrect polarity.

Do not connect or disconnect any part of the charging circuit — including the battery leads — while the engine is running. Run the alternator with all connections made or with the unit disconnected.

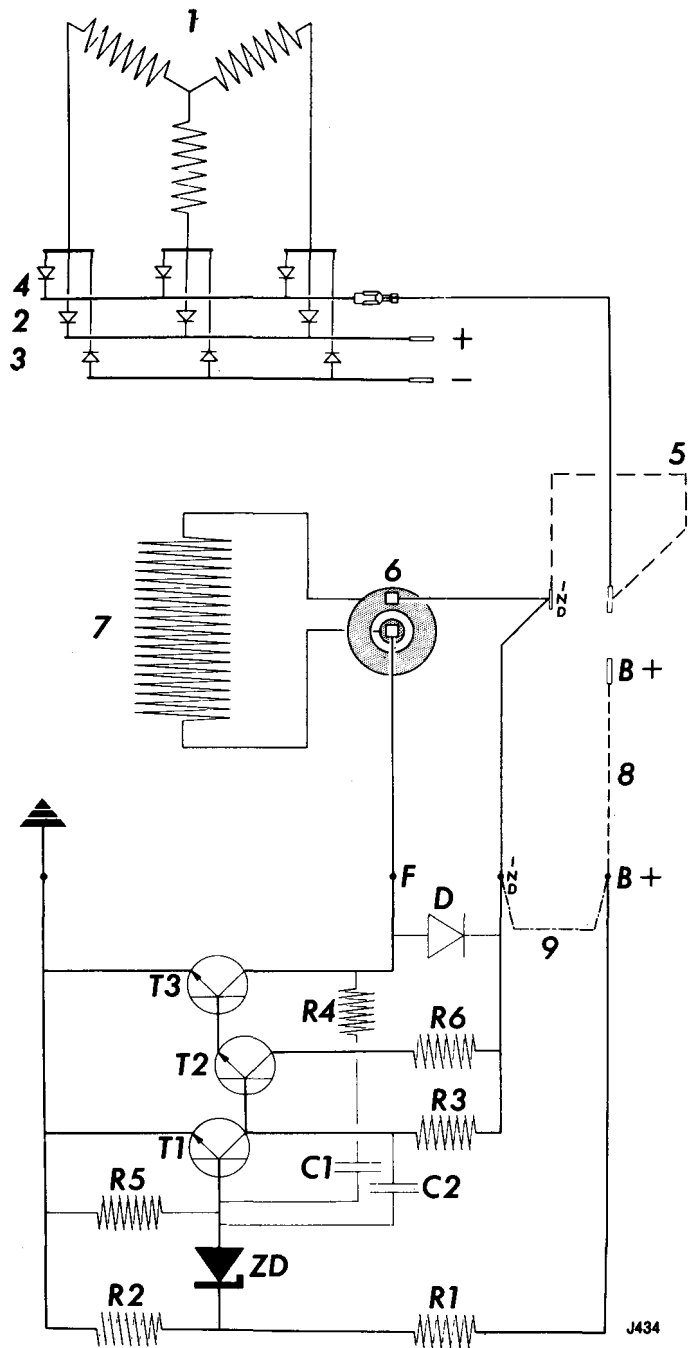
NOTE: Three Lucas alternators and two Delco Remy alternators have been fitted to the TR6 model range up to the end of the 1972 model year. Identify the unit on the specific vehicle to ensure that information obtained from this manual refers to the appropriate alternator.

| Manufacturer Type | Lucas 15 ACR Battery sensed with small lugs | | Lucas 15 ACR Machine sensed with large lugs | | Lucas 17 ACR Machine sensed with large lugs | |
|--|---|--------------|---|--------------|---|--------------|
| Part numbers — | Lucas Part No. | Stanpart No. | Lucas Part No. | Stanpart No. | Lucas Part No. | Stanpart No. |
| assembly | — | 216970 | — | 217771 | — | 217692 |
| —comprising— | 23562 | 215346 | 23634 | 217772 | 23635 | 217988 |
| alternator | 54217652 | 147990 | 54217652 | 147990 | 54217652 | 147990 |
| fan | 54218695 | 154334 | 54218695 | 154334 | 54219467 | 155948 |
| pulley | | | | | | |
| Polarity | Negative earth only | | Negative earth only | | Negative earth only | |
| Brush length — new | 0.5 in (12.70 mm) | | 0.5 in (12.70 mm) | | 0.5 in (12.70 mm) | |
| — renew if less than | 0.2 in (5.00 mm) protrudes from brushbox when free | | 0.2 in (5.00 mm) protrudes from brushbox when free | | 0.2 in (5.00 mm) protrudes from brushbox when free | |
| Brush spring pressure | 9 to 13 oz (255 to 370g) at face flush with brushbox | | 9 to 13 oz (255 to 370g) at face flush with brushbox | | 9 to 13 oz (255 to 370g) at face flush with brushbox | |
| Rectifier pack—output rectification | 6 diodes (3 live side and 3 earth side) | | 6 diodes (3 live side and 3 earth side) | | 6 diodes (3 live side and 3 earth side) | |
| —field winding supply rectification | 3 diodes | | 3 diodes | | 3 diodes | |
| Stator windings | Three phase — star connected | | Three phase — star connected | | Three phase — star connected | |
| Field winding rotor: poles | 12 | | 12 | | 12 | |
| maximum permissible speed | 12,500 rev/min | | 12,500 rev/min | | 12,500 rev/min | |
| shaft thread | 9/16 in — 18 U.N.F. | | 9/16 in — 18 U.N.F. | | 9/16 in — 18 U.N.F. | |
| Field winding resistance at 20°C | 4.33 ± 5% ohm | | 4.33 ± 5% ohm | | 4.165 ± 5% ohm | |
| Nominal output: condition | Hot | | Hot | | Hot | |
| alternator speed | 6000 rev/min | | 6000 rev/min | | 6000 rev/min | |
| engine speed | 2200 to 2900 rev/min — variations of ratio occur according to current market specification requirements | | 2200 to 2900 rev/min — variations of ratio occur according to current market specification requirements | | 2200 to 2900 rev/min — variations of ratio occur according to current market specification requirements | |
| control voltage | 14 volt | | 14 volt | | 14 volt | |
| amp | 28 amp | | 28 amp | | 36 amp | |



| Manufacturer Type | Delco Remy Delcotron DN 460 Battery sensed | | Delco Remy Delcotron DN 460 Battery sensed | |
|--|---|-----------------|---|-----------------|
| | Delco Remy Part No. | Stanpart No. | Delco Remy Part No. | Stanpart No. |
| Part numbers — | 7982648 | 217456 | 7982652 | 218042 |
| assembly | — | — | — | — |
| —comprising — | 7982515 | 519667 | 7982515 | 519667 |
| alternator | 7982645 | 217464 | 7982655 | 156364 |
| fan | | | | |
| pulley | | | | |
| Polarity | Negative earth only | | Negative earth only | |
| Brush length — new | 0·5 in (12·70 mm) | | 0·5 in (12·70 mm) | |
| — renew if less than | 0·2 in (5·00 mm) | | 0·2 in (5·00 mm) | |
| Brush spring pressure | 8 to 13 oz (225 to 370g) at normal working position | | 8 to 13 oz (225 to 370g) at normal working position | |
| Rectifier pack—output rectification | 6 diodes (3 live side and 3 earth side) | | 6 diodes (3 live side and 3 earth side) | |
| —field winding supply rectification | 3 diodes | | 3 diodes | |
| Stator windings | Three phase — star connected | | Three phase — star connected | |
| Field winding rotor: poles | 14 | | 14 | |
| maximum permissible speed | Continuous 12000 rev/min — flighting 16000 rev/min | | Continuous 12000 rev/min — flighting 16000 rev/min | |
| shaft thread | 0·669 — 20NS — 2A | | 0·669 — 20NS — 2A | |
| Field winding resistance at 20°C | 2·65 to 2·95 ohm | | 2·65 to 2·95 ohm | |
| Nominal output: condition | Hot | | Hot | |
| alternator speed | 5000 rev/min | | 5000 rev/min | |
| engine speed | 1800 to 2400 rev/min — variations of ratio occur according to current market specification requirements | | 1800 to 2400 rev/min — variations of ratio occur according to current market specification requirements | |
| control voltage | 14 volt | | 14 volt | |
| amp | 35 amp | | 35 amp | |

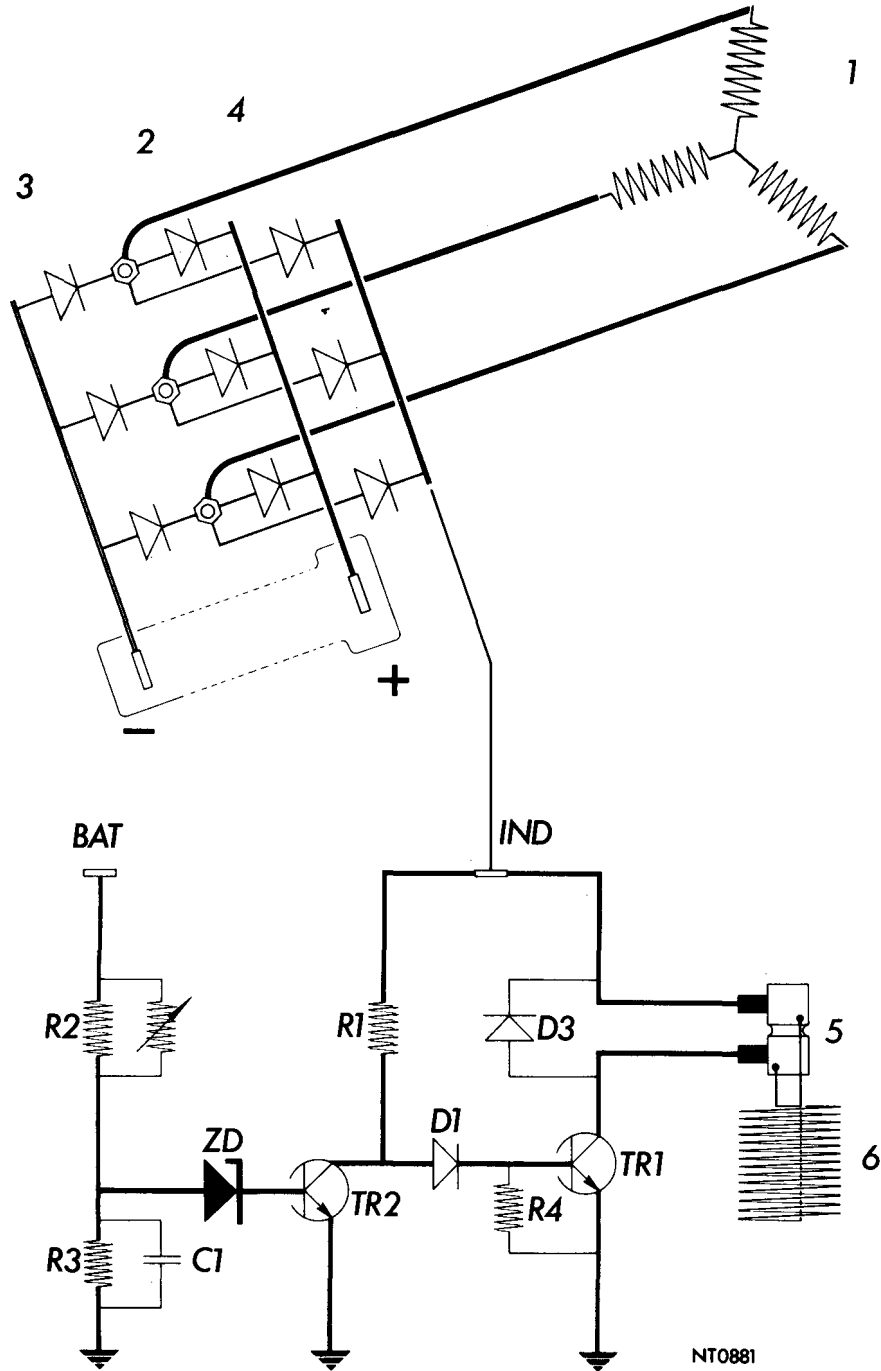
**ALTERNATOR WIRING DIAGRAM
- LUCAS TYPES 15ACR AND 17ACR**



**KEY TO ALTERNATOR WIRING DIAGRAM
– LUCAS TYPES 15ACR AND 17ACR**

| | | |
|-----------|-------------------------------------|---|
| 1 | Stator windings | |
| 2 | Live side output diodes | |
| 3 | Earth side output diodes | |
| 4 | Field winding supply diodes | |
| 5 | Harness loop | Circuit is made when multi-socket connector is fitted and broken when connector is removed |
| 6 | Brushes and slip rings | |
| 7 | Field winding | |
| 8 | Connection to external harness wire | Alternative to item 9. Fitted to battery sensed units |
| 9 | Internal B+ connection | Alternative to item 8. Fitted to machine sensed units |
| R3 | Resistor | Restricts T2 base current supplied from 'field winding supply' diodes |
| T2 | Intermediate transistor | Controls T3 base current direct |
| R6 | Resistor | Restricts T3 base current supplied from 'field winding supply' diodes |
| T3 | Output transistor | Controls field winding earth return circuit |
| R1 and R2 | Potential divider | Senses battery reference voltage |
| ZD | Zener diode | Voltage sensitive component. Opposes passage of current until breakdown voltage – approximately 8 volts – is reached. Controls T1 base current direct |
| T1 | Input transistor | Controls T2 base current by diverting current passing through R3 to earth when ZD is conducting |
| C1 and R4 | Capacitor and Resistor | Prevents transistor overheating by providing positive feed back circuit to ensure quick switching of transistors from 'fully on' to 'fully off' |
| R5 | Resistor | Path for small leakage current which may pass through ZD at high temperatures |
| D | Surge quench diode | Connected across field winding. Protects T3 from field winding high induced voltage surge and smooths field winding current |
| C2 | Condenser | Radio interference suppression |

**ALTERNATOR WIRING DIAGRAM
- DELCO REMY TYPE DN460**



**KEY TO ALTERNATOR WIRING DIAGRAM
DELCO REMY TYPE DN460**

| | | |
|----------|-------------------------------------|---|
| 1 | Stator windings | |
| 2 | Live side output diodes | |
| 3 | Earth side output diodes | |
| 4 | Field winding supply diode trio | |
| 5 | Brushes and slip rings | |
| 6 | Field winding | |
| R1 | Resistor | Restricts TR1 base current supplied from diode trio |
| TR1 | Transistor | Controls field winding earth return circuit |
| R2 R3 | Resistor and thermistor Resistor | Potential divider which senses battery reference voltage. Thermistor causes voltage to vary with temperature. |
| ZD | Zener diode | Voltage sensitive component. Opposes passage of current until breakdown voltage is reached. Controls TR2 base current. |
| TR2 | Transistor | Controls TR1 base current by diverting current passing through R1 to earth when ZD is conducting |
| C1 | Capacitor | Smooths voltage across R3 |
| R4 | Resistor | Prevents excessive current through TR1 at high temperatures |
| D3 | Surge quench diode | Connected across field winding. Protects TR1 from field winding high induced voltage surge and smooths field winding current. |
| D1 | Diode | Provides a fixed voltage drop which together with the voltage drop across the base emitter of TR1 ensures that the saturation voltage of TR2 will completely turn off TR1 |

ALTERNATOR – LUCAS TYPES 15ACR AND 17ACR

– Functional check

86.10.01

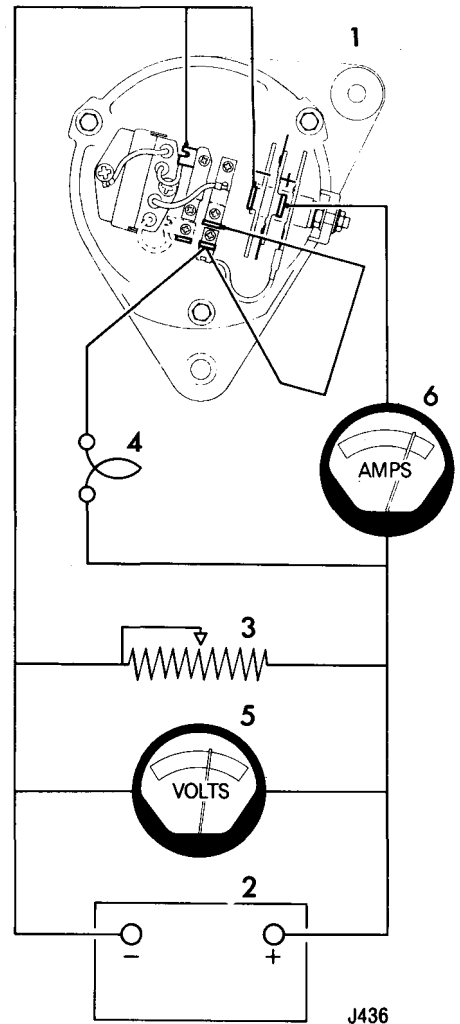
This operation must be performed in two parts. The first is to prove the alternator's capacity to produce current, while the second is to prove the performance of the integral control unit.

Check capacity to produce current

NOTE: The stated output may be exceeded slightly when the alternator is cold. To avoid misleading results, the check should be performed with the unit as near to its normal operating temperature as possible.

1. Check drive belt adjustment. 86.10.05
2. Disconnect the multi-socket connectors.
3. Remove the moulded cover.
4. Provide a test circuit as shown.
CAUTION: The alternator contains polarity-sensitive components that may be irreparably damaged if subjected to incorrect polarity. Observe polarity of alternator and battery terminals.
5. Do not connect the variable resistor across the battery for longer than is necessary to perform the check.
6. Run the engine.
7. Gradually increase the speed. At 1,500 alternator rev/min (550 to 720 engine rev/min – variations of ratio occur according to current market specification requirements) the light should be extinguished.
8. Hold the speed at approximately 6000 alternator rev/min (2200 to 2900 engine rev/min). Adjust the variable resistor so that the voltmeter reads 14 volts. The ammeter reading should now be approximately equal to the nominal output given in data for the appropriate alternator.
9. If the ammeter reading is not correct, the indication is that the alternator requires overhaul or replacement.

continued

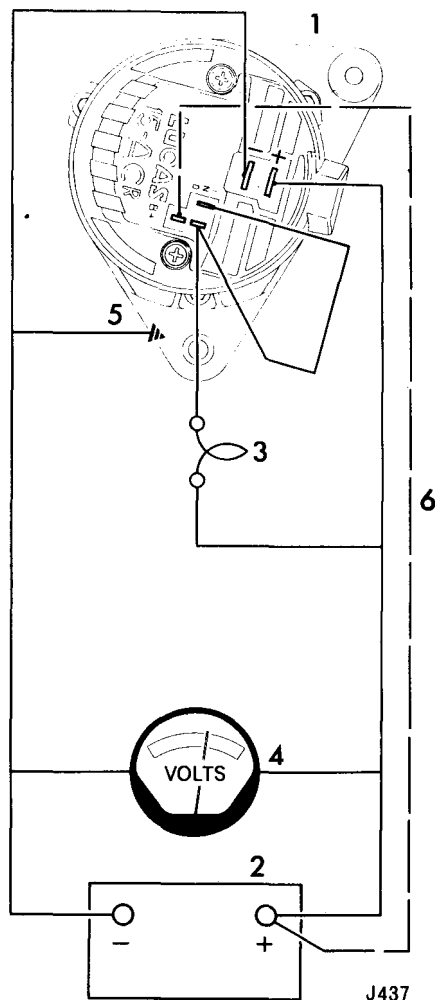


- | | |
|----------------------|--------------------|
| 1. Alternator | |
| 2. Battery | 12 volt |
| 3. Variable resistor | 0-15 ohm – 35 amp |
| 4. Light | 12 volt – 2.2 watt |
| 5. Voltmeter | 0-20 volt |
| 6. Ammeter | 0-40 amp |

Check control unit

NOTE: The stated output may be exceeded slightly when the alternator is cold. To avoid misleading results, the check should be performed with the unit as near to its normal operating temperature as possible.

10. Check drive belt adjustment. 86.10.05.
11. Disconnect multi-socket connectors.
12. Provide test circuit as shown.
CAUTION: The alternator contains polarity-sensitive components that may be irreparably damaged if subjected to incorrect polarity. Observe polarity of alternator and battery terminals.
13. Run the engine.
14. Gradually increase the speed. At 1,500 alternator rev/min (550 to 720 engine rev/min) the light should be extinguished.
15. Hold the speed at approximately 6,000 alternator rev/min (2200 to 2900 engine rev/min). The voltmeter reading should now be steady at 14.0 to 14.4 volts.
16. If the voltmeter reading is not steady at the above figure — and a satisfactory 'Check capacity to produce current' has been performed — the indication is that the control unit should be replaced.



J437

1. Alternator
2. Battery 12 volt
3. Light 12 volt — 2.2 watt
4. Voltmeter 0-20 volt
5. Earth connection to alternator body
6. This wire is only necessary for Lucas battery sensed 15 ACR alternators. It is not required for Lucas machine sensed 15 ACR and 17 ACR alternators.

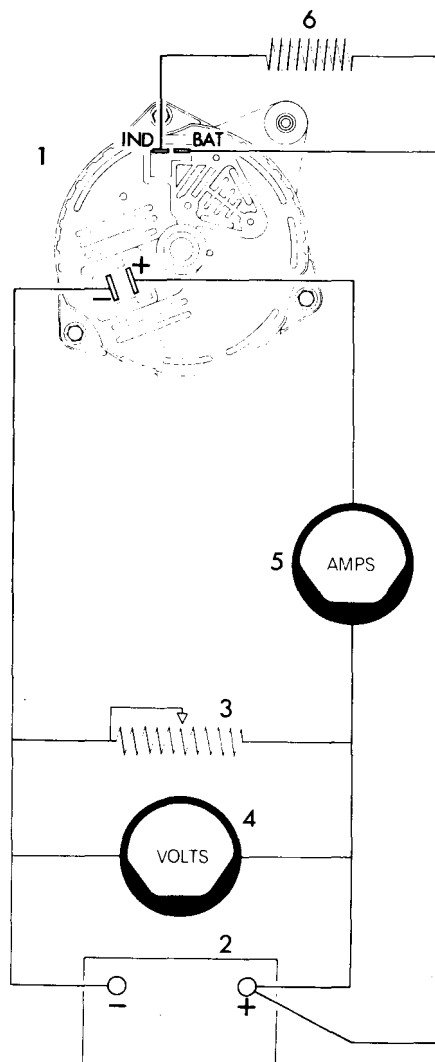
ELECTRICAL

ALTERNATOR – DELCO REMY TYPE DN 460

– Functional check

86.10.01

1. Check drive belt adjustment 86.10.05.
2. Disconnect the multi-socket connectors.
3. Provide a test circuit as shown.
CAUTION: The alternator contains polarity sensitive components that may be irreparably damaged if subjected to incorrect polarity. Observe polarity of alternator and battery terminals.
4. Do not connect the variable resistor into the test circuit until instructed and do not connect it across the battery for longer than is necessary to perform the check.
5. Run the engine.
6. If the voltmeter reading fluctuates with speed and exceeds 15.5 volt the indication is that the regulator should be replaced.
7. If the voltmeter reading is steady below 15.5 volt connect the variable resistor into the test circuit as shown.
8. Hold the speed at approximately 5000 alternator rev/min (1800 to 2400 engine rev/min). Adjust the variable resistor to obtain the maximum ammeter reading.
9. The ammeter reading should now be within 10% of the nominal output given in data.
10. If the ammeter reading is not correct the indication is that the alternator requires overhaul or replacement.



- | | |
|----------------------|-------------------------|
| 1. Alternator | |
| 2. Battery | 12 volt |
| 3. Variable resistor | |
| 4. Voltmeter | 0-20 volt |
| 5. Ammeter | 0-40 amp |
| 6. Resistor | 10 ohm – 6 watt or more |

ALTERNATOR

– Remove and refit

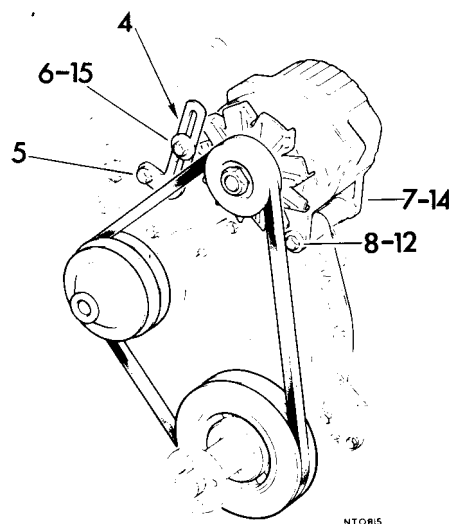
86.10.02

Removing

1. Isolate the battery.
2. To improve access to the link bolt disconnect the Lucar connector from the temperature transmitter.
3. Disconnect two multi-socket connectors.
4. Remove the adjustment bolt lock nut.
5. Slacken the link bolt.
6. Remove the adjustment bolt and two washers.
7. Remove the main mounting bolt nut.
8. Support the weight of the alternator and withdraw the main mounting bolt and washer.
9. Lift and manoeuvre the alternator from the engine mounting bracket and drive belt.
10. Collect up the large spacer and the small spacer.

Refitting

11. To facilitate the operation tap the bush in the alternator rear mounting lug slightly rearwards.
12. Assemble the main mounting bolt, washer, alternator and large spacer together. Position the assembly to the engine mounting bracket and drive belt. Insert the main mounting bolt into the engine mounting bracket to stabilize the assembly.
13. Position the small spacer and insert the main mounting bolt fully.
14. Fit the main mounting bolt nut.
15. Fit the adjustment bolt with two washers positioned either side of the link.
16. Adjust the drive belt 86.10.05.
17. Connect two multi-socket connectors.
18. Connect the battery.



ALTERNATOR

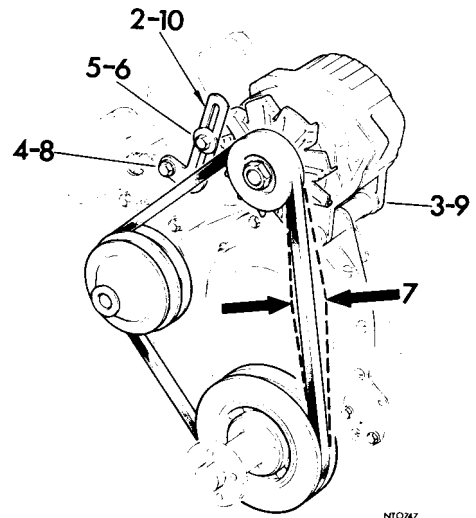
– Drive belt – adjust

86.10.05

1. To improve access to the link bolt disconnect the Lucar connector from the temperature transmitter.
2. Remove the adjustment bolt lock nut.
3. Slacken the main mounting bolt.
4. Slacken the link bolt.
5. Slacken the adjustment bolt.
6. Carefully lever the alternator away from the engine to tension the belt. Tighten the adjustment bolt.

CAUTION: To prevent bearing damage when tensioning the belt use a lever of soft material – preferably wood – applied to the alternator drive-end bracket. Do not lever on any other part of the alternator.

7. Check the belt tension. Total movement should be 0.75 to 1.00 in (20 to 25 mm) at the mid-point of the longest run.
8. Tighten the link bolt.
9. Tighten the main mounting bolt.
10. Using a spanner to hold the head of the adjustment bolt, fit the adjustment bolt lock nut.
11. Connect the Lucar connector to the temperature transmitter.



ALTERNATOR – LUCAS TYPES 15 ACR AND 17 ACR

– Overhaul

86.10.08

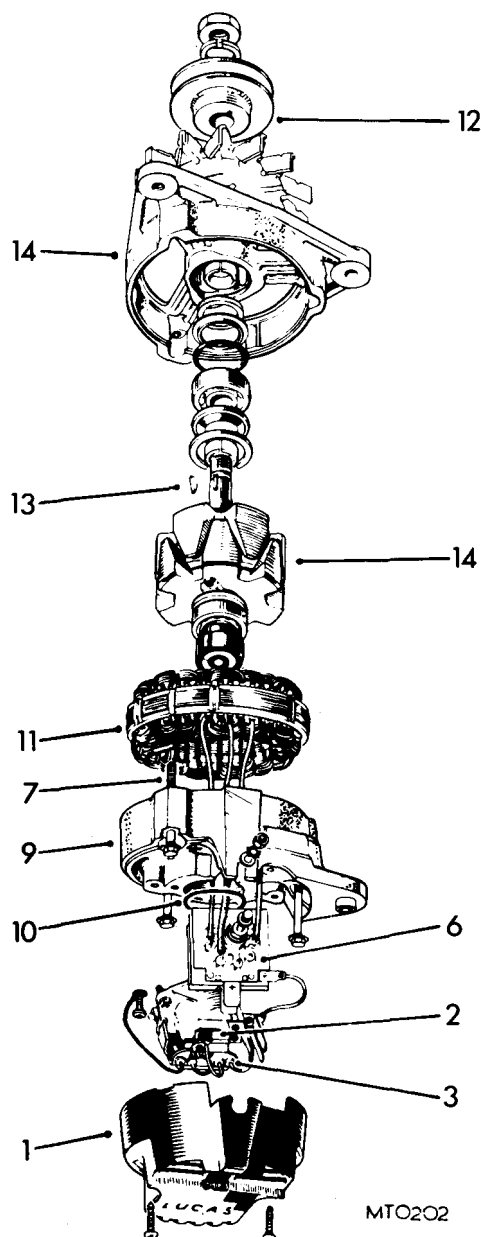
Dismantling

1. Remove the moulded cover.
2. Remove the brush box and control unit assembly by disconnecting the Lucar type connector from the rectifier pack and unscrewing three screws.
3. If required, the control unit may be detached from the assembly. Note the position of the three wire eyelets. Withdraw the screw to release the control unit and three screws to release the wire eyelets.
4. Note the position of the three stator wires on the rectifier pack.
5. Unsolder the three stator wire connections. Do not overheat the diodes or bend the diode pins. Solder quickly and provide a heat sink by gripping the diode pin with pliers.
6. Slacken the nut and withdraw the rectifier pack.
7. Remove the through-bolts.
8. Provide an extractor tool as shown.
9. To remove the slip-ring end bracket, position the extractor tool to engage with the outer journal of the slip-ring end bearing. Employ a second operator to support the slip-ring end bracket by hand. Carefully tap the extractor tool to drive the bearing from the housing.

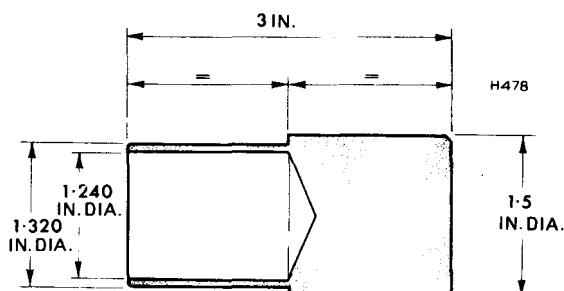
NOTE: It may be necessary to carefully file away surplus solder from the two field winding connections on the slip-ring moulding if the extractor tool will not pass over the moulding.

10. The rubber 'O' ring fitted in the slip-ring end bracket bearing housing may remain *in situ* unless replacement is contemplated.
11. Remove the stator windings from the drive end bracket.
12. Prevent the rotor turning by wrapping a scrap fan belt round the pulley and retaining by hand or vice. Remove the nut, spring washer, pulley and fan. If necessary, use a suitable extractor.
13. Remove the key.
14. Using a suitable press, remove the rotor from the drive end bracket.

CAUTION: Do not attempt to remove the rotor by applying hammer blows to the shaft end. Such action may burr over and damage the thread.



MTO202

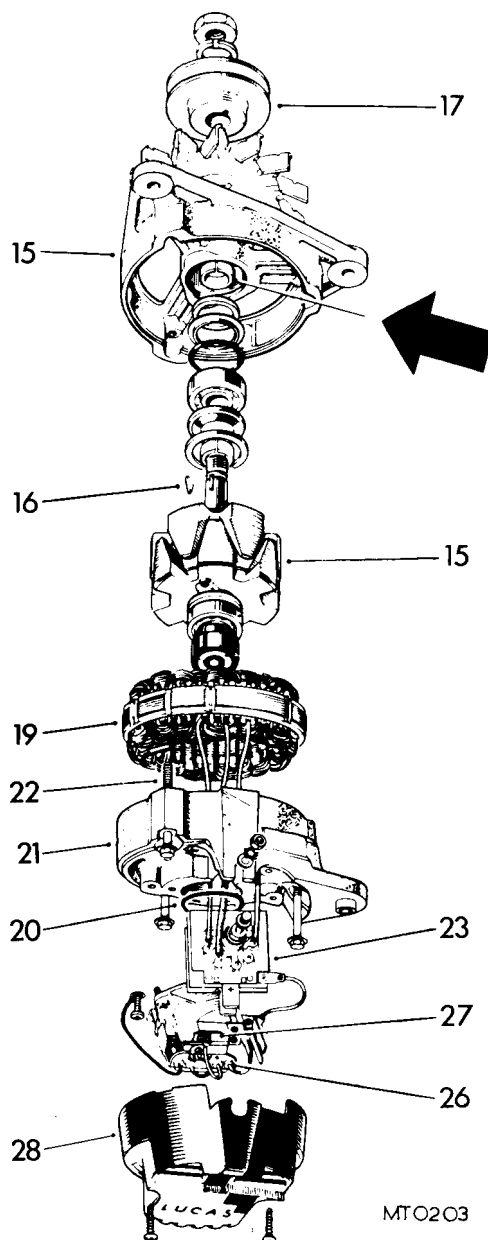


Reassembling

15. Using the spacer (arrowed) and a suitable tube, fit the rotor to drive end bracket by applying pressure to the bearing inner journal.

CAUTION: Do not use the drive end bracket as a support while fitting the rotor. If the spacer is not employed, the felt ring may be damaged.

16. Fit the key.
17. Fit the fan, pulley, spring washer and nut. Prevent the rotor turning by wrapping a scrap fan belt round the pulley and retaining by hand or vice. Torque load the nut to 25 to 30 lb ft (3.46 to 4.15 kgf m).
18. Observe the relationship of the stator windings to the drive end bracket determined by the stator wire connections, the rectifier pack position on the slip-ring end bracket, the alignment of the mounting lugs on the end brackets and the through-bolt clearances on the stator windings.
19. Position the stator windings to the drive end bracket.
20. Ensure that the rubber 'O' ring is fitted correctly in the slip-ring end bracket bearing housing.
21. Fit the slip-ring end bracket by carefully pushing the bearing into the housing.
22. Fit the through-bolts, tightening evenly.
23. Ensure that the rubber locating piece is correctly fitted to the rectifier pack. Position the rectifier pack and secure it with the nut.
24. Position the three stator wires on rectifier pack as noted operation 4.
25. Solder the three stator wire connections. Note the precautions stated in operation 5 and use 'M' grade 45-55 tin-lead solder.
26. If required, attach the control unit to the brush box. Position the three wire eyelets on the brush box as noted in operation 3. Insert the screw to secure the control unit and the three screws to secure the wire eyelets.
27. Ensure that the brushes are entered correctly in the brush box. Fit the brush box and control unit assembly by inserting three screws and connecting the Lucar type connector to the rectifier pack.
28. Fit the moulded cover.



MT0203

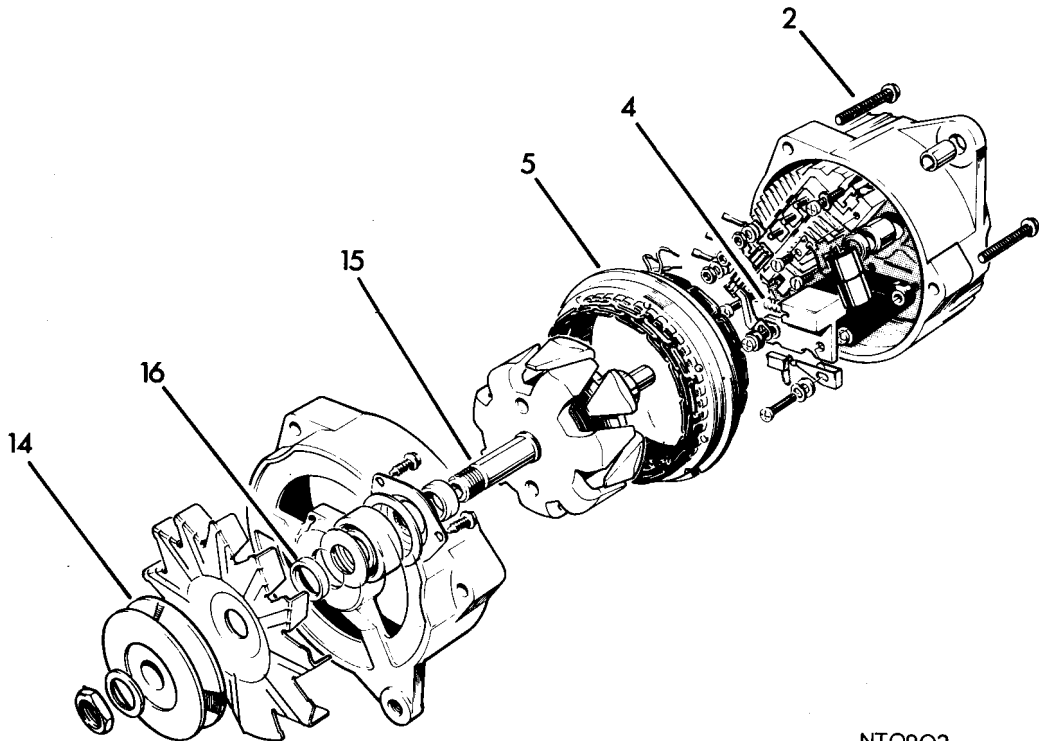
ALTERNATOR – DELCO REMY TYPE DN 460

– Overhaul

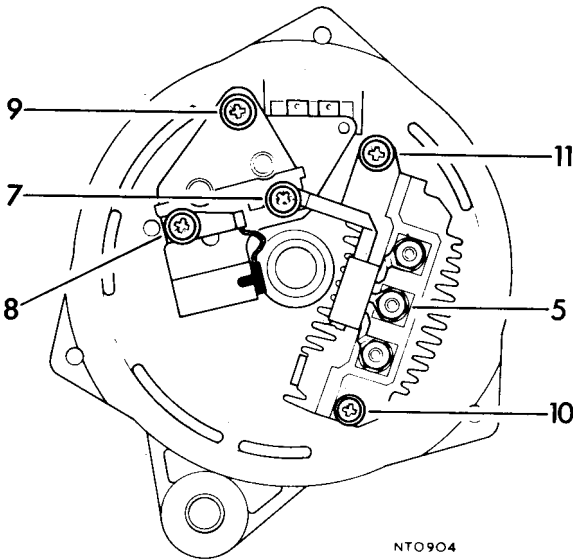
86.10.08

Dismantle

1. Scribe a line across the drive end frame, stator and slip ring end frame to facilitate assembly.
2. Remove three through bolts.
3. Separate the drive end frame and rotor assembly from the slip ring end frame and stator assembly.
4. The brush springs will push the brushes from the brushbox as the rotor is withdrawn. Collect up two brush springs.
5. Remove three nuts. Withdraw the stator taking care that the three wire tags withdraw freely from the studs.
6. Incorrect assembly of screws, washers and insulation components removed during operations 7 to 12 may affect the operation of the alternator and cause irreparable damage to components. To ensure the correct assembly of all screws, washers and insulation components it is suggested that the individual components of each screw assembly are taped together and identified with the appropriate operation number before the next operation is performed.
7. Remove single screw, washer and insulation washer. An insulation sleeve may also be fitted to the screw. Lift out the diode trio.
8. Remove single screw, washer and insulation washer. An insulation sleeve may also be fitted to the screw. Lift out the brushbox.
9. Remove short red earthing screw and washer. Lift out the regulator.
10. Remove single screw and washer securing the earth side of the rectifier bridge.
11. Remove single screw, washer and insulation washer securing the live side of the rectifier bridge. Lift out the rectifier bridge.
12. The insulation piece fitted to the rectifier bridge live side slot may remain in situ unless replacement is contemplated.
13. Mark the forward face of the pulley and fan to facilitate assembly.
14. Prevent the rotor turning by using a 5/16 in. AF hexagon wrench in the shaft socket. Remove the nut, spring washer, pulley and fan.
15. Withdraw the rotor shaft from the drive end frame bearing.
16. Remove the spacer.



NT0902

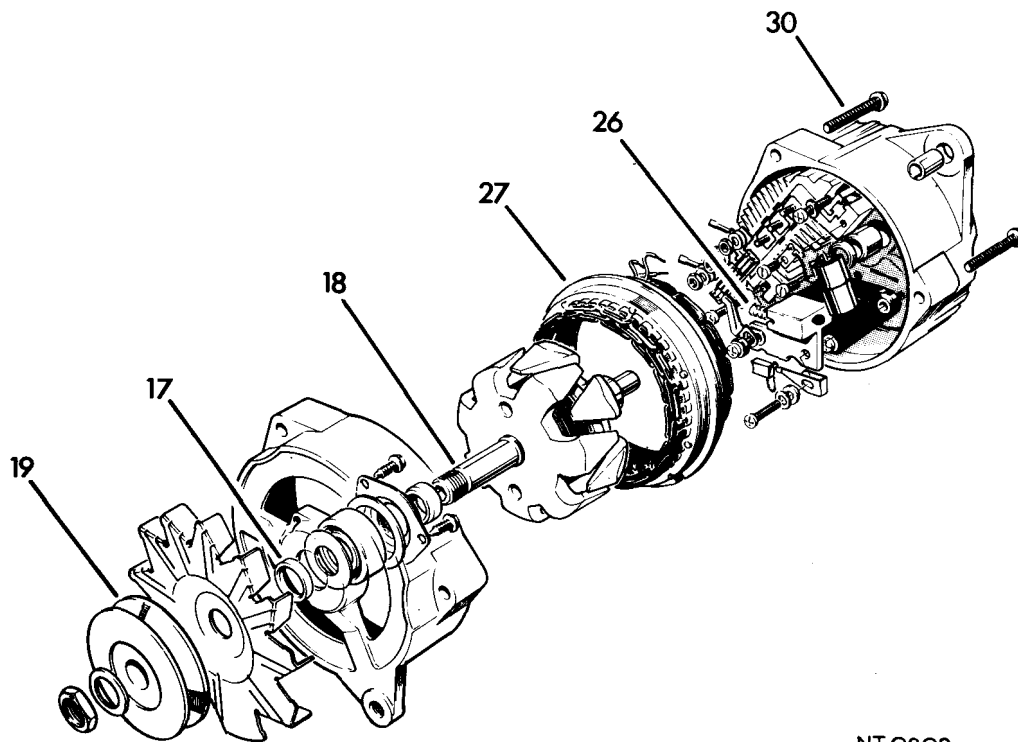


NT0904

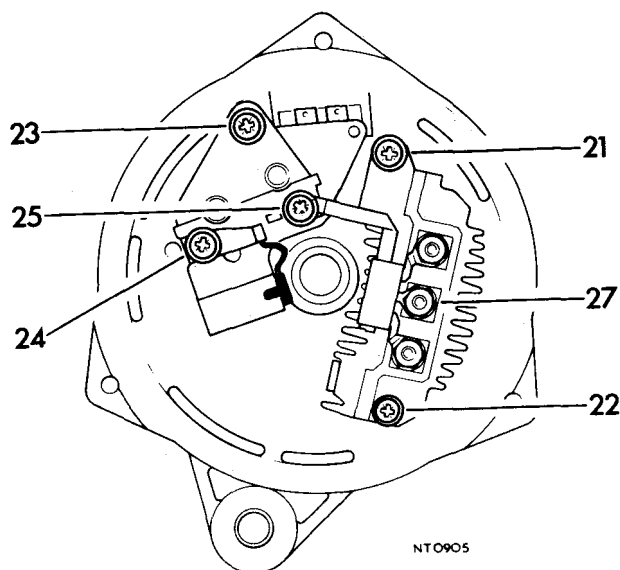


Assemble

17. Fit the spacer.
18. Ensure that the rotor shaft is clean. Insert the rotor shaft through the drive end frame bearing.
19. Fit the fan, pulley, spring washer and nut. Prevent the rotor turning by using a 5/16 in. AF hexagon wrench in the shaft socket. Torque load the nut to 40 to 60 lbf ft (5.5 to 8.3 kgf m).
20. Ensure that the insulation piece is fitted correctly to the rectifier bridge live side slot so that its flange will be assembled against the slip ring end frame.
21. Position the rectifier bridge. Use screw assembly identified operation 11. Fit single screw, washer and insulation washer to secure the live side of the rectifier bridge.
22. Use screw assembly identified operation 10. Fit single screw and washer to secure the earth side of the rectifier bridge.
23. Position the regulator. Use screw assembly identified operation 9. Fit short red earthing screw and washer.
24. Position the brushbox. Use screw assembly identified operation 8. Fit single screw, washer and insulation washer. An insulation sleeve may also be fitted to the screw.
25. Position the diode trio. Use screw assembly identified operation 7. Fit single screw, washer and insulation washer. An insulation sleeve may also be fitted to the screw.
26. Provide a suitable probe to hold back the brushes. Fit the far brush spring and brush. Insert the probe through the slip ring end frame to hold back the brush. Fit the near brush spring and brush. Insert the probe further to hold back both brushes.
27. Insert the stator taking care that the three wire tags locate freely to the studs. Fit three nuts.
28. Ensure that the rotor shaft and slip rings are clean. Carefully position the drive end frame and rotor assembly to the slip ring end frame and stator assembly.
29. Align the scribe lines made at operation 1 above.
30. Fit three through bolts tightening evenly.
31. Withdraw the probe to allow the brushes to drop onto the slip rings.



NT 0903



NT 0905

BATTERY**— Remove and refit****86.15.01****Removing**

1. Remove the battery leads.
2. Slacken the nuts and swing down the battery retaining assembly.
3. Lift the battery from the vehicle

Refitting

4. Lift the battery into the tray.
5. Swing up the battery retaining assembly. Tighten the nuts.
6. Fit the battery leads. Ensure that the earth lead is connected to the battery negative terminal. Do not hammer the terminals to the terminal posts.
7. Coat the terminals with petroleum jelly (vaseline) to prevent corrosion.

ELECTRICAL

HORN SLIP RING

— Remove and refit

86.30.02

Removing

1. Perform 86.65.17 operations 1 to 5.
2. Disconnect one snap connector.
3. Remove the horn push 86.65.18.
4. Remove the steering wheel 57.60.01.
5. Bend up two metal tags. Remove the slip ring with its wire.

Refitting

6. Thread the wire through the appropriate steering column apertures, fascia panel aperture and steering column clamp aperture. Do not disturb the position of the felt strip located below the wires in the lower half of the steering column clamp. Position the slip ring and secure by bending down two metal tags. Note that two spare metal tags are provided for use if one of the original tags should break.
7. Apply petroleum jelly (Vaseline) to the slip ring contact surface.
8. Fit the steering wheel 57.60.01
9. Fit the horn push 86.65.18.
10. Ensure that the felt strip is correctly located and rectify if necessary.
11. Connect one snap connector. Purple/black slip ring wire to purple/black main harness wire.
12. Perform 86.65.17 operations 14 to 18.

IGNITION DISTRIBUTOR APPLICABILITY, IGNITION TIMING AND FEATURES CHART

| | Normal Market – Petrol Injection Vehicle | U.S.A. Market – Carburettor Vehicle | | | | |
|---------------------------|--|-------------------------------------|--------------------|--|--------------------|--|
| | 1969 to 72 Engine units | 1969 to 70 Engine units | | 1971 Engine units | | 1972 Engine units |
| | Fitted from Engine No. CP 25001 HE | Fitted from Engine No. CC 25001 HE | | | | Fitted from Engine No. CC75001 |
| | Fitted up to commencement of CR series Engine Nos. | | | | | Fitted up to commencement of CD series Engine Nos. |
| Stanpart No. | 214459 | 308460 | 308460 | 308460 | 217521 | 218100 |
| Lucas part No. | 41219 | 41202 | 41306 | 41306 Modified by Triumph to be suitable for 1971 U.S.A. engine units. Action of vacuum advance deleted by sealing pipe with protective plug. | 41352 | 41385 |
| Ignition timing – static | 11 degree B.T.D.C. | 12 degree B.T.D.C. | 12 degree B.T.D.C. | 12 degree B.T.D.C. | 4 degree B.T.D.C. | 12 degree B.T.D.C. |
| Ignition timing – at idle | – | 4 degree A.T.D.C. | 4 degree A.T.D.C. | 4 degree A.T.D.C. | 4 degree A.T.D.C. | 4 degree A.T.D.C. |
| Idle speed | – | 800 to 850 rev/min | 800 to 850 rev/min | 800 to 850 rev/min | 800 to 850 rev/min | 800 to 850 rev/min |
| Centrifugal advance | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Vacuum advance | No | ✓ | ✓ | No | No | No |
| Retard unit | No | ✓ | ✓ | ✓ | ✓ | ✓ |
| Micrometer adjustment nut | ✓ | No | No | No | No | No |

IGNITION DISTRIBUTOR

Data

| | |
|-------------------------------|-----------------------|
| Manufacturer | Lucas |
| Type | 22D6 |
| Lucas part No. | 41219 |
| Stanpart No. | 214459 |
| Contact gap | 0.014 to 0.016 in. |
| Rotation — viewed on rotor | Anticlockwise |
| Firing angles | 60 ± 1 degrees |
| Dwell angle | 35 ± 3 degrees |
| Open angle | 25 ± 3 degrees |
| Moving contact spring tension | 18 to 24 ozs. |
| Capacitor capacity | 0.20 microfarad |
| Engine firing order | 1 - 5 - 3 - 6 - 2 - 4 |

Centrifugal advance

Check at decelerating speeds

| Distributor r.p.m. | Degrees distributor advance | | Crankshaft r.p.m. | Degrees crankshaft advance | |
|-----------------------|--------------------------------|---------|----------------------|-------------------------------|---------|
| | Minimum | Maximum | | Minimum | Maximum |
| Below 175 | No advance to occur | | Below 350 | No advance to occur | |
| 450 | 0 | 2.0 | 900 | 0 | 4 |
| 800 | 2.5 | 4.5 | 1600 | 5 | 9 |
| 1300 | 6.0 | 8.0 | 2600 | 12 | 16 |
| 2000 | 6.0 | 8.0 | 4000 | 12 | 16 |

IGNITION DISTRIBUTOR

Data

| | |
|-------------------------------|-----------------------|
| Manufacturer | Lucas |
| Type | 22D6 |
| Lucas part No. | 41202 |
| Stanpart No. | 308460 |
| Contact gap | 0.014 to 0.016 in. |
| Rotation — viewed on rotor | Anticlockwise |
| Firing angles | 60 ± 1 degrees |
| Dwell angle | 35 ± 3 degrees |
| Open angle | 25 ± 3 degrees |
| Moving contact spring tension | 18 to 24 ozs. |
| Capacitor capacity | 0.20 microfarad |
| Engine firing order | 1 - 5 - 3 - 6 - 2 - 4 |

Centrifugal advance

Check at decelerating speeds

| Distributor r.p.m. | Degs. distributor advance | | Crankshaft r.p.m. | Degs. crankshaft advance | |
|-----------------------|------------------------------|---------|----------------------|-----------------------------|---------|
| | Minimum | Maximum | | Minimum | Maximum |
| Below 375 | No advance to occur | | Below 750 | No advance to occur | |
| 450 | 0 | 1 | 900 | 0 | 2 |
| 850 | 4 | 6 | 1700 | 8 | 12 |
| 1500 | 6 | 8 | 3000 | 12 | 16 |
| 2500 | 9 | 11 | 5000 | 18 | 22 |
| 3000 | 9 | 11 | 6000 | 18 | 22 |

Vacuum advance

| Ins. of mercury vacuum | Degs. distributor advance | | Degs. crankshaft advance | |
|------------------------------|------------------------------|---------|-----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 2.5 | No advance to occur | | | |
| 3 | 0 | 0.5 | 0 | 1 |
| 4 | 0 | 2.5 | 0 | 5 |
| 6 | 2.5 | 7.0 | 5 | 14 |
| 8 | 6.0 | 9.0 | 12 | 18 |
| 15 | 7.0 | 9.0 | 14 | 18 |

Retard unit

| Ins. of mercury vacuum | Degs. distributor retard | | Degs. crankshaft retard | |
|------------------------------|-----------------------------|---------|----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 1.5 | No retard to occur | | | |
| 2.5 | 0 | 1 | 0 | 2 |
| 4.0 | 0 | 3 | 0 | 6 |
| 8.0 | 5 | 8 | 10 | 16 |
| 15.0 | 7 | 9 | 14 | 18 |

IGNITION DISTRIBUTOR

Data

| | |
|----------------|--------|
| Manufacturer | Lucas |
| Type | 22D6 |
| Lucas part No. | 41306 |
| Stanpart No. | 308460 |

| | |
|-------------------------------|-----------------------|
| Contact gap | 0.014 to 0.016 in. |
| Rotation – viewed on rotor | Anticlockwise |
| Firing angles | 60 ± 1 degrees |
| Dwell angle | 35 ± 3 degrees |
| Open angle | 25 ± 3 degrees |
| Moving contact spring tension | 18 to 24 ozs. |
| Capacitor capacity | 0.20 microfarad |
| Engine firing order | 1 - 5 - 3 - 6 - 2 - 4 |

Centrifugal advance

Check at decelerating speeds.

| Distributor r.p.m. | Degr. distributor advance | | Crankshaft r.p.m. | Degr. crankshaft advance | |
|-----------------------|------------------------------|---------|----------------------|-----------------------------|---------|
| | Minimum | Maximum | | Minimum | Maximum |
| Below 375 | No advance to occur | | Below 750 | No advance to occur | |
| 450 | 0 | 1 | 900 | 0 | 2 |
| 850 | 4 | 6 | 1700 | 8 | 12 |
| 1500 | 6 | 8 | 3000 | 12 | 16 |
| 2500 | 9 | 11 | 5000 | 18 | 22 |
| 3000 | 9 | 11 | 6000 | 18 | 22 |

Vacuum advance

Later distributors of this part number were modified by Triumph to be suitable for 1971 U.S.A. engine units. Action of vacuum advance deleted by sealing pipe with protective plug.

| Ins. of mercury vacuum | Degr. distributor advance | | Degr. crankshaft advance | |
|------------------------------|------------------------------|---------|-----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 2.5 | No advance to occur | | | |
| 3 | 0 | 0.5 | 0 | 1 |
| 4 | 0 | 2.5 | 0 | 5 |
| 6 | 2.5 | 7.0 | 5 | 14 |
| 8 | 6.0 | 9.0 | 12 | 18 |
| 15 | 7.0 | 9.0 | 14 | 18 |

Retard unit

| Ins. of mercury vacuum | Degr. distributor retard | | Degr. crankshaft retard | |
|------------------------------|-----------------------------|---------|----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 1.5 | No retard to occur | | | |
| 2.5 | 0 | 1 | 0 | 2 |
| 4.0 | 0 | 3 | 0 | 6 |
| 8.0 | 5 | 8 | 10 | 16 |
| 15.0 | 7 | 9 | 14 | 18 |

IGNITION DISTRIBUTOR

Data

| | |
|----------------|--------|
| Manufacturer | Lucas |
| Type | 22D6 |
| Lucas part No. | 41352 |
| Stanpart No. | 217521 |

| | |
|-------------------------------|-----------------------|
| Contact gap | 0.014 to 0.016 in. |
| Rotation – viewed on rotor | Anticlockwise |
| Firing angles | 60 ± 1 degrees |
| Dwell angle | 35 ± 3 degrees |
| Open angle | 25 ± 3 degrees |
| Moving contact spring tension | 18 to 24 ozs |
| Capacitor capacity | 0.20 microfarad |
| Engine firing order | 1 - 5 - 3 - 6 - 2 - 4 |

Centrifugal advance

Check at decelerating speeds.

| Distributor r.p.m. | Degs. distributor advance | | Crankshaft r.p.m. | Degs. crankshaft advance | |
|-----------------------|------------------------------|---------|----------------------|-----------------------------|---------|
| | Minimum | Maximum | | Minimum | Maximum |
| Below 500 | No advance to occur | | Below 1000 | No advance to occur | |
| 650 | 1.0 | 3.5 | 1300 | 2 | 7 |
| 900 | 6.5 | 9.0 | 1800 | 13 | 18 |
| 1100 | 8.5 | 10.5 | 2200 | 17 | 21 |
| 2200 | 12.0 | 14.0 | 4400 | 24 | 26 |
| 2800 | 13.0 | 15.0 | 5600 | 26 | 30 |

Retard unit

| Ins. of mercury vacuum | Degs. distributor retard | | Degs. crankshaft retard | |
|------------------------------|-----------------------------|---------|----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 1 | No retard to occur | | | |
| 3 | 1.0 | 4.0 | 2 | 8 |
| 4 | 2.5 | 5.0 | 5 | 10 |
| 5 | 3.0 | 5.0 | 6 | 10 |
| 8 | 3.0 | 5.0 | 6 | 10 |

IGNITION DISTRIBUTOR

Data

| | |
|----------------|--------|
| Manufacturer | Lucas |
| Type | 22D6 |
| Lucas part No. | 41385 |
| Stanpart No. | 218100 |

| | |
|-------------------------------|-----------------------|
| Contact gap | 0.014 to 0.016 in. |
| Rotation — viewed on rotor | Anticlockwise |
| Firing angles | 60 ± 1 degrees |
| Dwell angle | 35 ± 3 degrees |
| Open angle | 25 ± 3 degrees |
| Moving contact spring tension | 18 to 24 ozs |
| Capacitor capacity | 0.20 microfarad |
| Engine firing order | 1 - 5 - 3 - 6 - 2 - 4 |

Centrifugal advance

Check at decelerating speeds.

| Distributor r.p.m. | Degs. distributor advance | | Crankshaft r.p.m. | Degs. crankshaft advance | |
|-----------------------|------------------------------|---------|----------------------|-----------------------------|---------|
| | Minimum | Maximum | | Minimum | Maximum |
| Below 400 | No advance to occur | | | No advance to occur | |
| 600 | 1.0 | 3.0 | 1200 | 2 | 6 |
| 900 | 4.0 | 6.0 | 1800 | 8 | 12 |
| 1200 | 6.0 | 8.0 | 2400 | 12 | 16 |
| 2200 | 10.5 | 12.5 | 4400 | 21 | 25 |
| 2800 | 12.0 | 14.0 | 5600 | 24 | 28 |

Retard unit

| Ins. of mercury vacuum | Degs. distributor retard | | Degs. crankshaft retard | |
|------------------------------|-----------------------------|---------|----------------------------|---------|
| | Minimum | Maximum | Minimum | Maximum |
| Below 1 | No retard to occur | | | |
| 2 | 0 | 0.5 | 0 | 1 |
| 4 | 0 | 3.5 | 0 | 7 |
| 8 | 4.0 | 7.0 | 8 | 14 |
| 15 | 6.0 | 8.0 | 12 | 16 |

IGNITION DISTRIBUTOR

– Contact assembly – remove and refit 86.35.13

Removing

1. Remove the cover and rotor.
2. Remove the nut.
3. Remove the low tension wire eyelet and capacitor wire eyelet from the post.
4. Remove the lock screw, spring washer and washer.
5. Lift out the Quikafit contact assembly.

Refitting

6. Wipe preservative from the new contact faces.
7. Position the Quikafit contact assembly.
8. Fit the lock screw, spring washer and washer.
9. Position the capacitor wire eyelet and low tension wire eyelet to the post.
10. Fit the metal nut to the nylon thread finger tight. Tighten by rotating half a turn only with a spanner.
11. Adjust the contact gap. 86.35.14.

IGNITION DISTRIBUTOR

– Contact gap – adjust 86.35.14

1. Remove the cover and rotor.
2. Rotate the crankshaft to position the contact heel on a cam peak.
3. If the contact gap is correct, a 0.014 to 0.016 in (0.36 to 0.41 mm) feeler gauge will just slide between the contacts.
4. When the contact gap is correct operations 5 to 8 may be ignored.
5. If a correction is required, slacken the lock screw.
6. Move the fixed contact about the pivot to adjust the gap. This may be facilitated by inserting a screwdriver in the slots and twisting to position the fixed contact.
7. Tighten the lock screw.
8. Check that the correct gap has been maintained.
9. Fit the rotor and cover.

IGNITION DISTRIBUTOR

– Ignition timing – adjust

86.35.15

Static

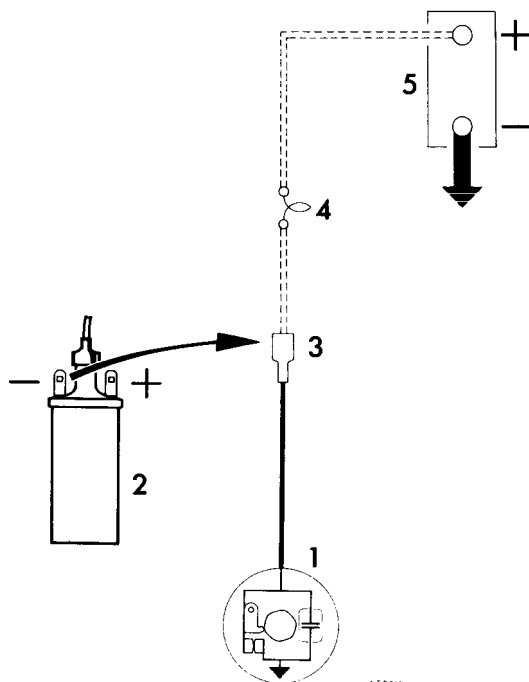
1. Adjust the contact gap. 86.35.14.
2. Disconnect the distributor lead from the coil.
3. Provide a test lamp circuit as shown.
4. Rotate the crankshaft in engine run direction to approximately align the timing cover pointer with the 24 degree BEFORE on the crankshaft pulley scale. The test lamp should now be illuminated.
5. Carefully rotate the crankshaft further until the lamp just goes out.
6. If the timing is correct the pointer will be aligned with the scale at the ignition timing – static figure given in the chart 86.35.00.
7. When the timing is correct operations 8 to 12 may be ignored.

Operations 8 to 10 apply only when the distributor is fitted with a micrometer adjustment nut.

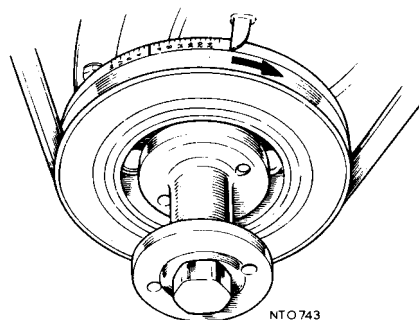
8. If a small correction is required, rotate the micrometer adjustment nut to advance or retard the timing.
9. If a large correction is required centre the micrometer adjustment nut and slacken the clamp bolt. Align the pointer with the scale at the 'ignition timing – static' figure given in the chart 86.35.00. Rotate the distributor body anticlockwise past the test lamp illumination position. Carefully rotate clockwise until the lamp just goes out. Tighten the clamp bolt with unit in this position.
10. Repeat operation 4 onwards.

Operations 11 to 12 apply only when the distributor is not fitted with a micrometer adjustment nut.

11. Slacken the clamp bolt. Align the pointer with the scale at the 'Ignition timing – static' figure given in the chart 86.35.00. Rotate the distributor body anticlockwise past the test lamp illumination position. Carefully rotate clockwise until the lamp just goes out. Tighten the clamp bolt with unit in this position.
12. Repeat operation 4 onwards



1. Distributor – diagrammatic layout
2. Ignition coil
3. Distributor fly lead removed from coil
4. Test lamp – 12 volt
5. Vehicle battery



NTO 743

Dynamic

**** U.S.A. market vehicles only.**

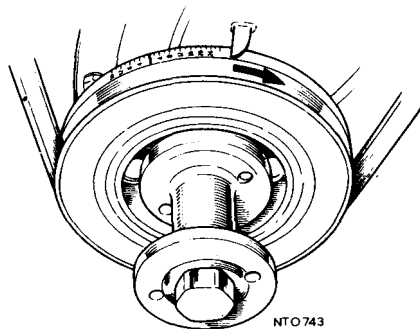
13. Adjust the contact gap 86.35.14.
14. Connect the timing light as instructed by the manufacturer. This engine is timed on No. 1 cylinder which is located at the front.
15. Run the engine at the 'idle speed' given in the chart 86.35.00. Position the timing light to illuminate the timing cover pointer and the crankshaft pulley scale.
16. If the timing is correct the equipment will show the pointer to be aligned with the scale at the 'ignition timing - at idle' figure given in the chart 86.35.00.
17. When the timing is correct operations 18 to 22 may be ignored.

Operations 18 to 20 apply only when the distributor is fitted with a micrometer adjustment nut to advance or retard the timing.

18. If a small correction is required, rotate the micrometer adjustment nut to advance or retard the timing.
19. If a large correction is required stop the engine. Centre the micrometer adjustment nut. Slacken the clamp bolt. Carefully rotate the distributor body as required. Tighten the clamp bolt.
20. Repeat operation 15 onwards.

Operations 21 to 22 apply only when the distributor is not fitted with a micrometer adjustment nut.

21. Stop the engine. Slacken the clamp bolt. Carefully rotate the distributor body as required. Tighten the clamp bolt.
22. Repeat operation 15 onwards.**



ELECTRICAL

IGNITION DISTRIBUTOR

– Lubrication 86.35.18

1. Remove the cover and rotor.
2. Apply a few drops of engine oil to lubricate the cam spindle bearing.
3. Inject a few drops of engine oil through the apertures to lubricate the centrifugal timing control.
4. Lightly grease the cam with Mobilgrease No. 1 or equivalent.
5. If the moving contact is removed from the post lightly grease post with Shell Retinax A or equivalent.

IGNITION DISTRIBUTOR

Remove and refit 86.35.20

Removing

1. Pull off the high tension connection to the ignition coil.
2. Pull off the six high tension connections to the spark plugs.
3. Remove the distributor cover.
4. Disconnect the low tension Lucar connector from the distributor.
5. Pull off the vacuum advance pipe if fitted.
6. Pull off the retard unit pipe if fitted.
7. Unscrew the knurled nut and withdraw the tachometer drive cable.
8. Remove single bolt, spring washer and washer to release the clamp plate from the pedestal.
9. Withdraw the distributor from the pedestal.

Refitting

10. Insert the distributor into the pedestal. Ensure that the coupling offset key locates correctly in the drive gear slot.
11. Reverse 1 to 8.
12. Adjust the ignition timing. 86.35.16.

IGNITION DISTRIBUTOR

— Overhaul

86.35.26

Due to the number of ignition distributors fitted to the TR6 vehicle range a precise overhaul instruction for every unit cannot be included in this manual.

By referring to this general overhaul instruction service personnel should be able to successfully overhaul the distributor of any specific vehicle.

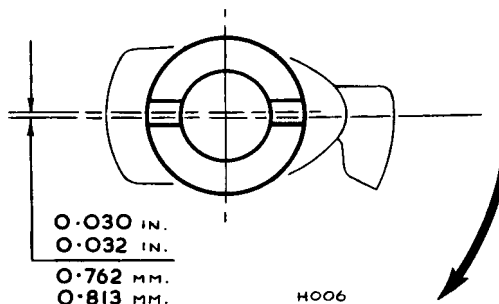
Dimantling

1. Remove the contact assembly. 86.35.13.
2. Remove the screw and lift out the capacitor.
3. Remove the two side screws and spring washers.
4. Withdraw the terminal block. Lift off the link. Withdraw the plate assembly.
5. Some units fitted with micrometer adjustment nut — Prise off the circlip. Unscrew the micrometer adjustment nut and remove the spring. Withdraw the internal component with any vacuum capsules attached. Push off the ratchet spring.
6. Some units fitted with advance unit and retard unit — Using a small screwdriver force in the retaining spring and push the vacuum advance unit against the body. With the lugs clear of the slots unscrew the retard unit. Withdraw the vacuum advance unit with the spring. Push off the retaining spring.
7. Some units fitted with retard unit but no advance unit — Using a pin punch tap out the small pin. Withdraw the retard unit.
8. Remove two screws and spring washers. Withdraw the cover, gasket and tachometer drive gear.
9. Tap out the coupling pin. Remove the coupling and thrust washer. Ensure that the shaft is burr-free and withdraw it.
10. Remove the control springs, exercising care not to distort the springs.
11. Remove the cam spindle screw. Withdraw the cam spindle.
12. Remove the weights.

Assembly

13. Lubricate the action plate sliding surfaces and cam surfaces with Rocol 'Moly pad'. Position the weights on the action plate.
14. Lubricate the cam spindle bearing and cam spindle weight pillars with Rocol 'Moly pad'. Fit the cam spindle either way round to the weights and secure it with the cam spindle screw.
15. Fit the control springs, exercising care not to distort the springs.

16. Lubricate the shaft with Rocol 'Moly pad' and insert it into the body. Fit the thrust washer and coupling. Ensure that the coupling is the correct way round so that the relationship of the coupling offset key to the rotor will be as shown. Secure with the coupling pin.
17. Lubricate the tachometer drive gear with engine oil. Insert the tachometer drive gear, gasket and cover. Secure with two screws and spring washers.
18. Reverse operation 5, operation 6 or operation 7 as appropriate.
19. Insert the plate assembly. Lift on the link. Insert the terminal block.
20. Fit the two side screws and spring washers. Include the moving plate earth lead tag in the appropriate screw assembly.
21. Position the capacitor and secure it with the screw.
22. Fit the contact assembly. 86.35.13.
23. Lubricate. 86.35.18.



ELECTRICAL

LAMPS

— Headlamp — remove and refit

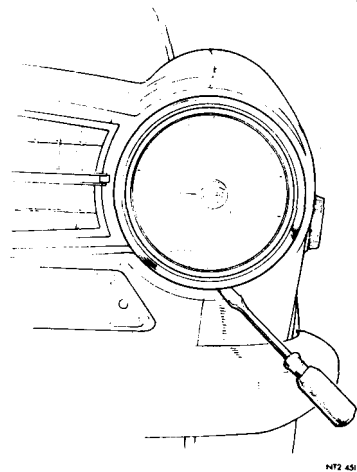
86.40.02

Removing

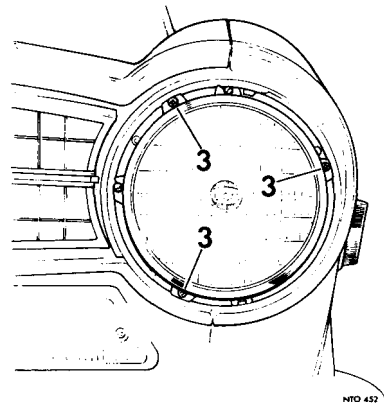
1. Insert a large screwdriver behind the rim adjacent to the clip as shown. Twist the screwdriver to release the rim from the clip.
2. Lift the rim from the upper retainers.
3. Remove three screws to release the retaining rim and light unit.
4. Pull the connector block from the light unit.

Refitting

5. Reverse instructions 3 to 4.
6. Ensure that neither of the rim clip components are bent.
7. Position the rim so that the clip components are aligned. Locate the rim behind the upper retainers and push to engage the clip.



NT2 451



NT2 452

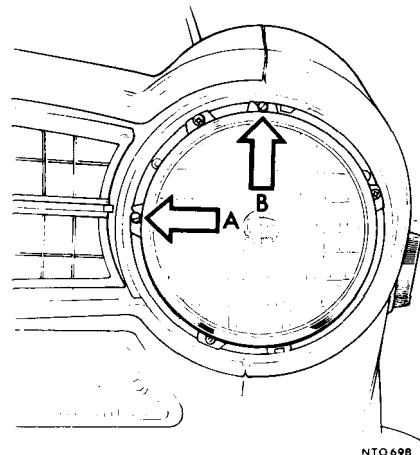
LAMPS

Headlamp — beam aiming

86.40.17

Beam aiming can best be accomplished using equipment such as Lucas 'Beamsetter', 'Lev-L-Lite' or 'Beam tester'. This service is available at Triumph distributors or dealers and will ensure maximum road illumination with minimum discomfort to other road users.

1. Insert a large screwdriver behind the rim adjacent to the clip as shown. Twist the screwdriver to release the rim from the clip.
2. Lift the rim from the upper retainers.
3. Screw 'A' positions the beam in the horizontal plane.
4. Screw 'B' controls beam height.



NT2 698

86.40.02
86.40.17

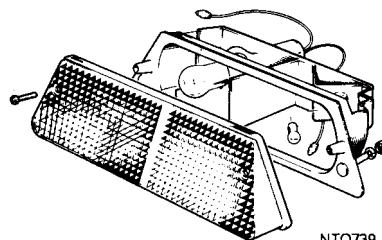
LAMPS

– Front parking and flasher lamp –
remove and refit

86.40.26

Removing

1. Remove two screws and withdraw the lens.
2. Remove the bulb/bulbs (according to market) from the bayonet fitting/fittings.
3. Remove the air intake valance 76.79.04.
4. Locate the appropriate harness break out and disconnect three snap connectors.
5. Remove two nuts, spring washers and washers.
6. Withdraw the lamp assembly from the panel.



NT0739

Refitting

7. Reverse instructions 1 to 6. Note that the lamp green wire should be connected to the harness green/red wire for the left hand lamp and to the harness green/white wire for the right hand lamp.

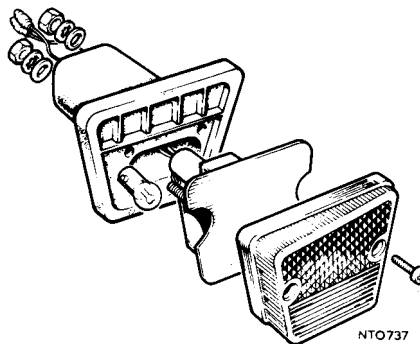
LAMPS

– Front marker lamp – remove and refit

86.40.59

Removing

1. Remove two screws and withdraw the lens.
2. Remove the bulb from the bayonet fitting.
3. Remove the air intake valance 76.79.04.
4. Locate the appropriate harness break out and disconnect two snap connectors.
5. Remove two nuts and washers.
6. Withdraw the lamp assembly from the panel.



NT0737

Refitting

7. Reverse instructions 1 to 6.

ELECTRICAL

LAMPS

Rear lamp assembly – remove and refit

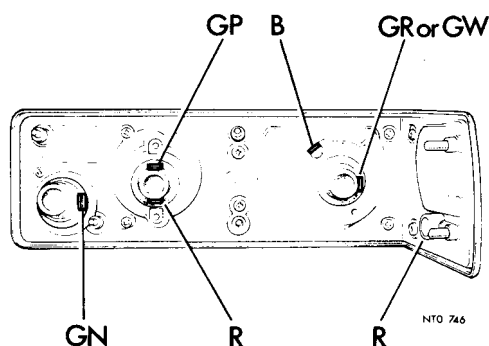
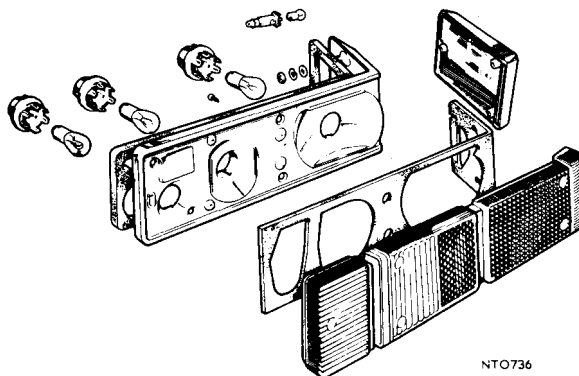
86.40.70

Removing

1. Open the luggage boot lid.
2. Remove the floor carpet.
3. Remove the spare wheel cover panel.
4. Remove six screws and withdraw the appropriate small rear trim panel.
5. Turn back the side trim panel on the appropriate side.
6. Pull four bulb holders from the lamp base.
7. Disconnect six Lucar connectors.
8. Remove the bulbs from the bayonet fittings.
9. Remove six nuts, spring washers and washers.
10. Withdraw the lamp from the panel.
11. The four lenses are attached to the lamp base with Posidrive screws. A lens may be replaced individually after removing the lamp.

Refitting

12. Reverse instructions 1 to 11. Connect the Lucar connectors as shown.



LAMPS

Plate illumination lamp – remove and refit

86.40.86

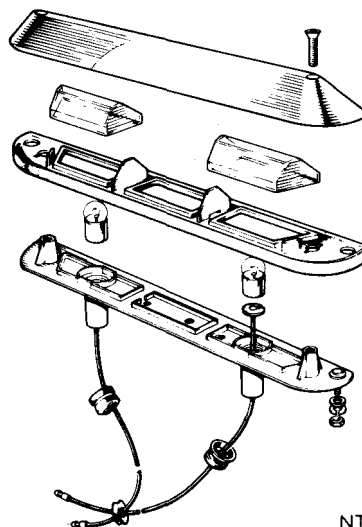
Removing

1. Remove two screws and lift off the chrome cover.
2. Disengage the small lens lugs from the rubber moulding.
3. Remove the two bulbs from the bayonet fittings.
4. Open the luggage boot lid.
5. Locate the plate illumination lamp wires at a harness brake out point accessible through an aperture in the rear valance panel.
6. Disconnect two wires from the four-way snap connector.
7. To facilitate refitting tie a suitable length of cord firmly to the wires.
8. Carefully pull the wires and cord through the panel grommet.
9. Remove two nuts, spring washers and washers. Remove the lamp base from the bumper.

Refitting

10. Reverse instructions 1 to 9. If any difficulty is experienced positioning the wires or panel grommet remove the floor carpet, spare wheel cover panel and spare wheel. A rubber plugged access hole exists on the inner panel in line with the panel grommet position.

GP Green/purple wire
B Black wire
GR Green/red wire
GW Green/white wire
R Red wire
GN Green/brown wire



86.40.70

86.40.86

LAMPS

Luggage boot lamp – remove and refit

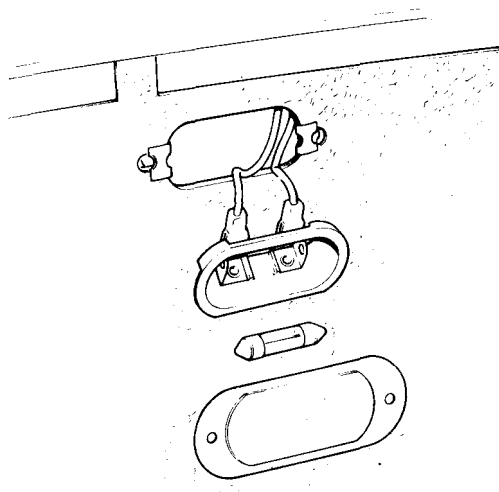
86.45.16.

Removing

1. Open the luggage boot lid.
2. Remove two screws.
3. Withdraw the lamp assembly from the petrol tank trim panel.
4. Disconnect two Lucar connectors.
5. Remove the elastic band and separate the two components of the lamp.
6. Carefully lever out the festoon bulb.

Refitting

7. Reverse instructions 1 to 6. Connect the Lucar connectors either way round.



NT0 453

LAMPS

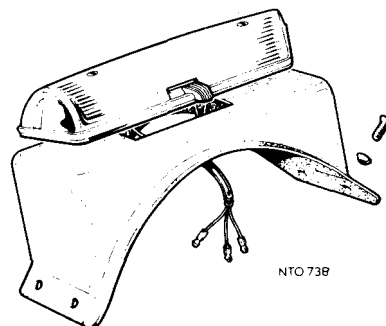
– Transmission tunnel lamp – remove and refit 86.45.20

Removing

1. Remove two screws and lift off the cover/lens assembly.
2. To renew the festoon bulb, carefully lever the bulb from the contacts.
3. Remove two screws and lift off the lamp base assembly.
4. Remove two screws on the left hand side of the plinth. Lift the plinth slightly to locate and free the harness.
5. Disconnect three snap connectors.

Refitting

6. Reverse instructions 1 to 5.



NT0 73B

ELECTRICAL

LAMPS

– Seat belt – warning light – remove and refit 86.45.75

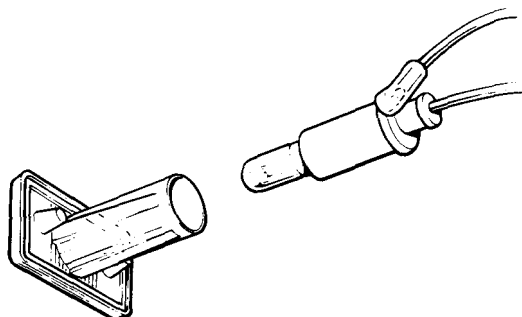
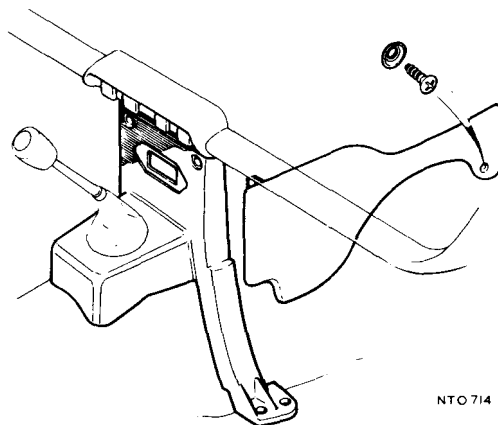
Later U.S.A. market vehicles only.

Removing

1. Isolate the battery.
2. Remove single screw and washer and withdraw the gearbox cover side trim panel on the passenger side of the vehicle.
3. Pull out the bulb holder from the projection of the 'FASTEN BELTS' unit.
4. If required remove the bulb from the bayonet fitting.
5. Push out the 'FASTEN BELTS' unit from the fascia.

Refitting

6. Reverse instructions 1 to 5.



LAMPS

– Hazard warning light – remove and refit 86.45.76

– Brake line failure warning light – remove and refit

86.45.77

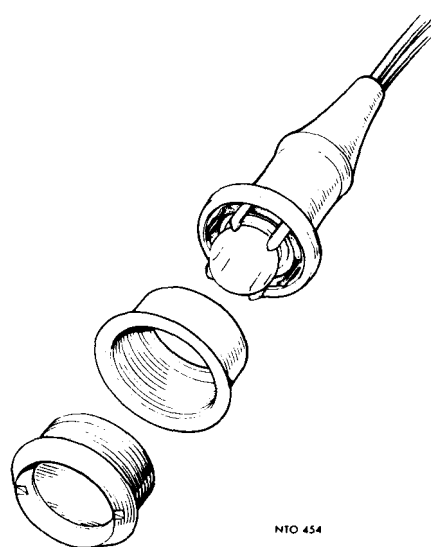
Left hand steer vehicles only.

Removing

1. Isolate the battery.
2. To gain access remove either the speedometer 88.30.01 or the tachometer 88.30.21. The choice depends entirely on which operation is preferred by the individual fitter.
3. Pull out the bulb holder from the housing.
4. If required unscrew the bulb from the holder.
5. Unscrew the lens bezel from the housing.

Refitting

6. Reverse instructions 1 to 5.



86.45.75
86.45.77

LAMPS

– Key light – remove and refit 86.45.78

Later U.S.A. market vehicles only.

Removing

1. Locate the key light adjacent to the steering column lock assembly.
2. Pull out the bulb holder from the bracket.
3. If required unscrew the bulb from the holder.

Refitting

4. Reverse instructions 2 to 3.

ELECTRICAL

RADIO FACILITY

| | |
|--------------------|-----------------|
| Description | 86.50.00 |
|--------------------|-----------------|

Early vehicles with ignition/starter switch fitted to central control cowl.

The ignition/starter switch includes a facility for this optional extra item. The two Lucar blades which make up terminal 4 provide a positive 12 volt radio supply controlled by the ignition/starter key.

To locate the terminal refer to the appropriate 86.65.02 operation.

Later vehicles with ignition/starter switch fitted to steering column lock assembly.

The ignition/starter switch includes a facility for this optional extra item. The two Lucar blades which make up terminal 5 provide a positive 12 volt radio supply controlled by the steering column lock key.

To locate the terminal refer to the appropriate 86.65.02 operation.

RELAYS

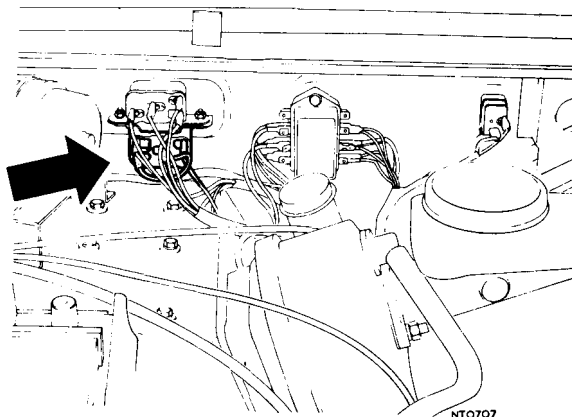
— Hazard relay — remove and refit

86.55.02

Early left hand steer vehicles with hazard circuit using relay.

Removing

1. Lift the bonnet and locate the hazard relay on the left hand front wheelarch closing panel. The hazard relay is identified by being connected to the wires listed in operation 4.
2. Disconnect five Lucar connectors.
3. Remove two nuts, spring washers, washers and screws. Lift the relay from the vehicle.



Refitting

4. Reverse instructions 1 to 3. Connect the Lucar connectors as follows:
 Purple/red wire to terminal W1
 Black wire to terminal W2
 Green/white wire to terminal C1
 Light green/pink wire to terminal C2
 Green/red wire to terminal C4

RELAYS

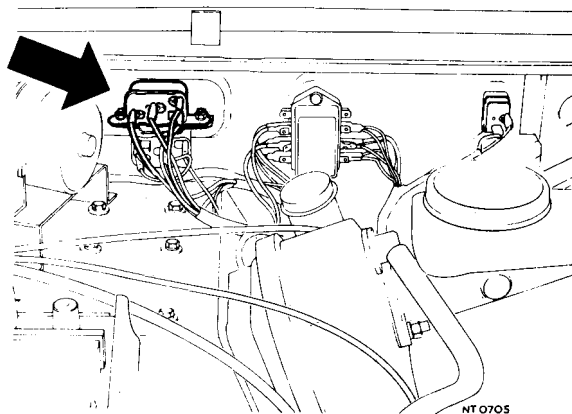
Overdrive relay — remove and refit

86.55.04

Overdrive vehicles only.

Removing

1. Lift the bonnet and locate the overdrive relay on the left hand front wheelarch closing panel. The overdrive relay is identified by being connected to the wires listed in operation 4.
2. Disconnect four Lucar connectors.
3. Remove two nuts, spring washers, washers and screws. Lift the relay from the vehicle.



Refitting

4. Reverse instructions 1 to 3. Connect the Lucar connectors as follows:
 White wire to terminal W1
 Yellow/green wire to terminal W2
 Brown wire to terminal C1
 Yellow/purple wire to terminal C2

ELECTRICAL

RELAYS

Horn relay – remove and refit

86.55.09

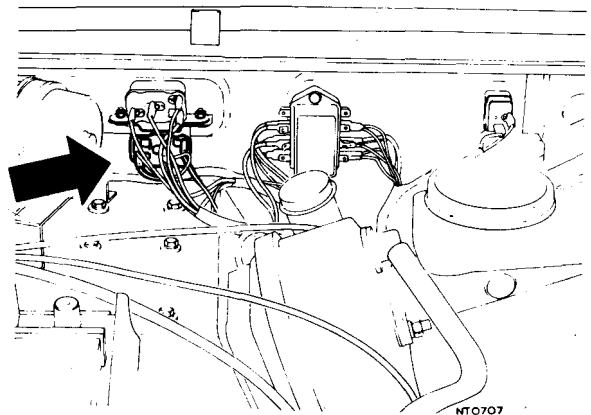
Later vehicles only.

Removing

1. Lift the bonnet and locate the horn relay on the left hand front wheelarch closing panel. The horn relay is identified by being connected to wires with purple as the primary colour.
2. Disconnect four Lucar connectors.
3. Remove two nuts, spring washers, washers and screws. Lift the relay from the vehicle.

Refitting

4. Reverse instruction 1 to 3. Connect the Lucar connectors as follows:
Purple/black wire to terminal W1
Purple wire to terminal W2
Purple/yellow wire to terminal C1
Purple wire to terminal C2



FLASHER UNIT

Turn signal flasher unit – remove and refit

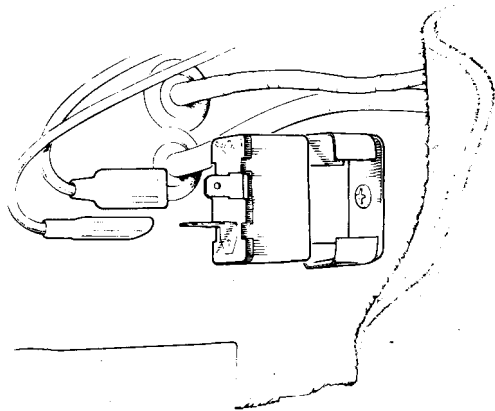
86.55.11

Removing

1. Locate the flasher unit mounted in a clip attached to the bulkhead end panel adjacent to the passengers feet.
2. Pull the flasher unit from the clip
3. Disconnect two Lucar connectors.

Refitting

4. Connect two Lucar connectors.
Green wire or light green/slate wire (as fitted) to terminal B.
Light green/brown wire to terminal L.
5. Fit the flasher unit to the clip.



FLASHER UNIT

Hazard flasher unit — remove and refit

86.55.12

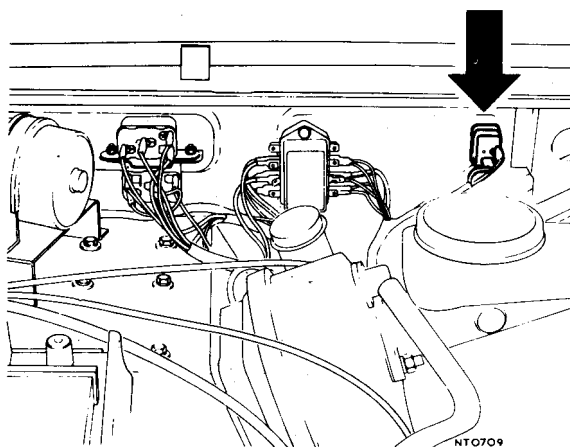
Left hand steer vehicles only.

Removing

1. Locate the flasher unit mounted in a clip attached to the left hand front wheelarch closing panel.
2. Pull the flasher unit from the clip.
3. Disconnect the Lucar connectors.

Refitting

4. Connect the Lucar connectors as detailed on the appropriate wiring diagram.
5. Fit the flasher unit to the clip.



BUZZER

— Remove and refit

86.55.13

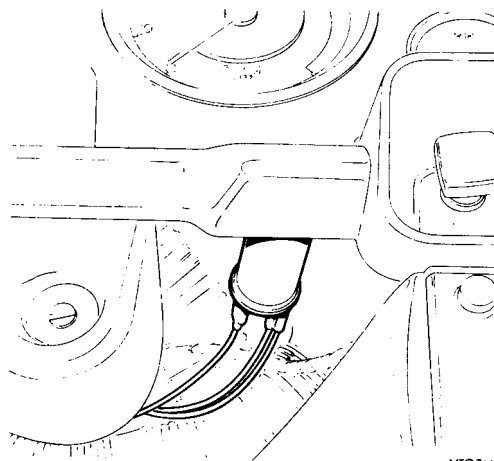
Later U.S.A. market vehicles only.

Removing

1. Locate the buzzer unit mounted to the lower edge of the fascia below the tachometer.
2. Remove single screw and spring washer.
3. Disconnect two Lucar connectors.

Refitting

4. Reverse instructions 2 to 3. Connect the Lucar connectors either way round.



ELECTRICAL

SEAT BELT WARNING SYSTEM

— Description

86.57.00

Later U.S.A. market vehicles only.

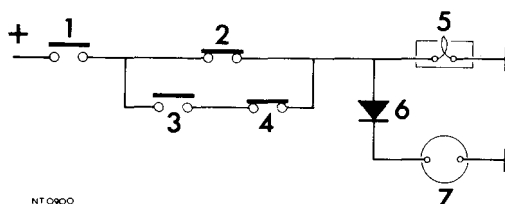
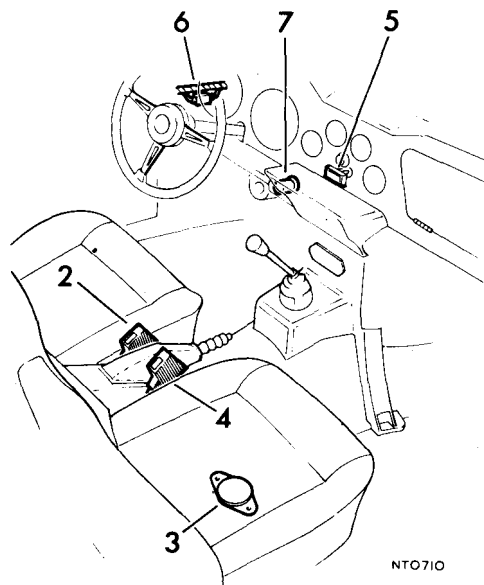
This system is designed to discourage driving the vehicle without the seat belts being in use.

The system is actuated by selection of any gear other than neutral. When the system is actuated a 'FASTEN BELTS' warning light on the fascia illuminates and a buzzer provides an audible intrusion.

With the driver only in the vehicle the system is cancelled when the drivers seat belt is fastened.

With the driver and a passenger in the vehicle, a switch built into the passengers seat is actuated. The system is then cancelled when both the drivers and passengers seat belts are fastened.

A diode in the circuit (see appropriate wiring diagram) enables the seat belt warning system and the key warning system to use the same audible buzzer unit.



NT 0900

DIODE

— Remove and refit

86.57.10

Later U.S.A. market vehicles fitted with seat belt warning system only.

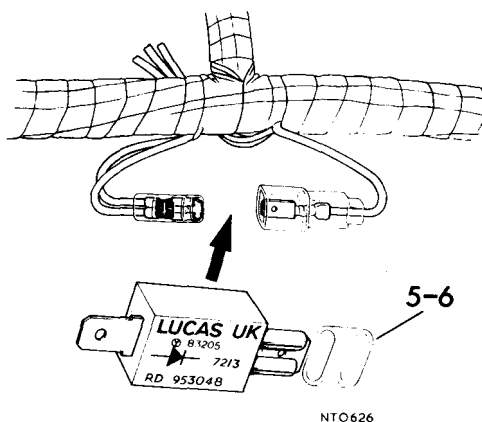
Removing

1. Isolate the battery.
2. Locate the diode taped to the harness in a position above the bonnet release handle.
3. Unwind the tape to release the diode.
4. Disconnect two Lucar connectors. Remove the diode from the vehicle.
5. Remove the insulating sleeve.

Refitting

6. Fit the insulating sleeve over the female connector.
7. Position the diode the correct way round indicated by the connectors. Connect two Lucar connectors as follows:
Light green/orange wire to diode male connector.
Purple/orange wire to diode female connector.
8. Apply the tape to secure the diode.
9. Connect the battery.

- + Supply
- 1. Gearbox switch
- 2. Drivers belt switch
- 3. Passengers seat switch
- 4. Passengers belt switch
- 5. Warning light
- 6. Diode
- 7. Buzzer



NT 0626

KEY WARNING SYSTEM

– Description 86.58.00

Later U.S.A. market vehicles only.

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

The system is actuated by opening the drivers door when the ignition key is still in the lock. When the system is actuated a buzzer provides an audible intrusion.

The system is cancelled when the ignition key is removed from the lock or when the drivers door is closed.

The drivers door switch in the circuit is a 'double function' component with two individual contact sets. One set controls the electrical supply to the key warning circuit and key light circuit. The second set provides an earth return for the transmission tunnel lamp circuit.

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

A diode in the circuit enables the key warning system and the seat belt warning system to use the same audible buzzer unit.

ELECTRICAL

BRAKE LINE FAILURE AND OIL PRESSURE WARNING SYSTEM

– Description 86.59.00

Left hand steer vehicles only.

The brake line failure indication system consists of a warning light mounted on the fascia panel and a switch which is a component part of the pressure differential warning actuator incorporated in the brake system.

The oil pressure indication system consists of a warning light housed in the tachometer and a switch fitted to the cylinder block. The switch is in communication with the main oil gallery.

The brake line failure indication circuit is amalgamated with the oil pressure indication circuit so that when the ignition circuits are energised both warning lights will illuminate faintly to indicate no bulb filament failure.

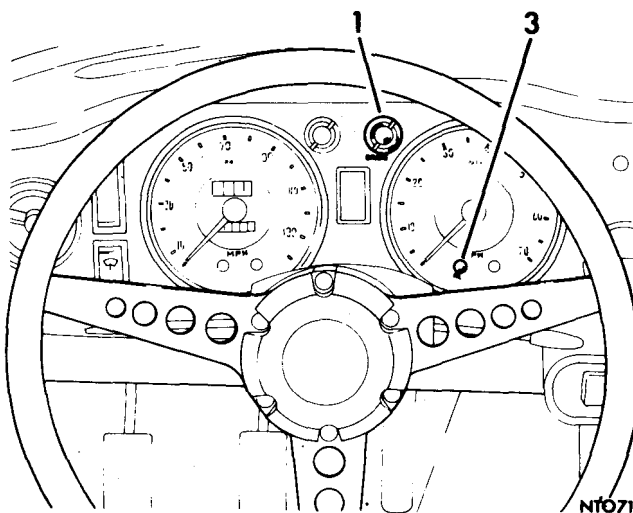
When the engine is started the oil pressure will rise causing the oil pressure switch diaphragm to be actuated outwards. The contact plate is isolated from earth. Both warning lights will extinguish.

Should pressure loss occur in either front or rear brake lines the brake line failure switch will actuate. The 'BRAKE' warning light will illuminate brightly.

Should the oil pressure fall below the safe operating pressure while the engine is running the oil pressure switch will actuate. Both the 'OIL' and the 'BRAKE' warning lights will illuminate faintly.

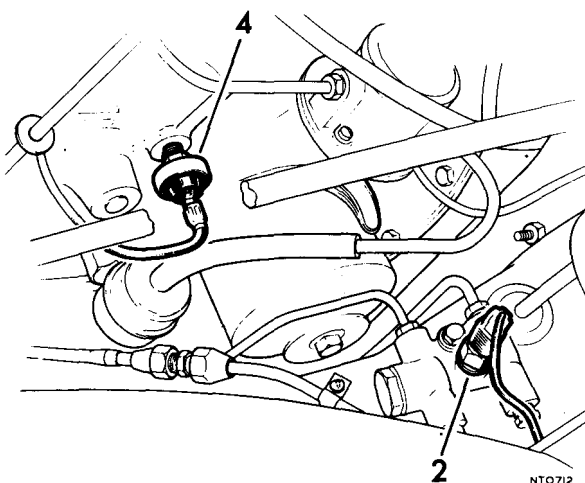
BRAKE AND OIL WARNING LIGHT SUMMARY

| Condition | 'BRAKE' warning light | 'OIL' warning light |
|--|-----------------------------|---------------------------|
| Ignition on – Engine not running | ON FAINT | ON FAINT |
| Engine running | OFF | OFF |
| Engine running – Brake line pressure low | ON BRIGHT | OFF |
| Engine running – Oil pressure low | ON FAINT | ON FAINT |

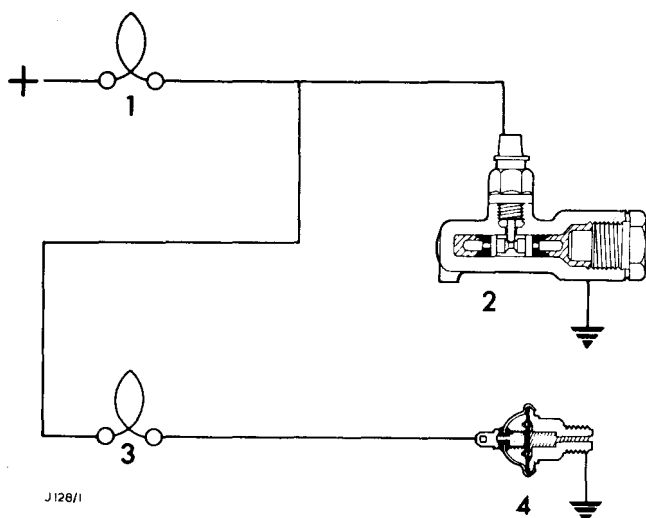


NT0711

1. Brake line failure warning light
2. Brake line failure switch
3. Oil pressure warning light
4. Oil pressure switch



NT0712



ELECTRICAL

STARTER MOTOR – TYPE M418G PE

Data and description

86.60.00

Note that two starter motors have been fitted to the TR6 model range. Ensure that information obtained from this manual refers to the appropriate starter motor for the specific vehicle. A Lucas type M418G PE unit was fitted up to engine numbers CP 53636 and CC63894. A Lucas type 2M100 PE unit was fitted from engine numbers CP 53637 and CC 63895.

Data

| | |
|----------------|----------|
| Manufacturer | Lucas |
| Type | M418G PE |
| Lucas Part No. | 25626 |
| Stanpart | 214914 |

Motor

| | |
|--------------------------------------|---|
| Yoke diameter | 4.187 to 4.218 in (106.35 to 107.14 mm) |
| Light running – speed | 5500 to 8000 rev/min |
| current | 80 amp |
| torque | Not stated |
| Load running – speed | 1000 rev/min |
| current | 280 amp |
| torque | 7 lbf ft (0.97 kgf m) |
| Locked – speed | Nil |
| current | 465 amp |
| torque | 15 lbf ft (2.1 kgf m) |
| Commutator minimum skimming diameter | 1.530 in (38.90 mm) |
| Brush length – new | 0.559 in (14.19 mm) |
| renew if less than | 0.310 in (7.90 mm) |
| Brush spring tension | 36 oz f (1000 gf) |
| Bearing renewal mandrel diameter: | |
| Commutator end cover bearing | 0.5005 to 0.4995 in (12.713 to 12.687 mm) |
| Drive end bracket bearing | 0.4734 to 0.4724 in (12.024 to 11.999 mm) |

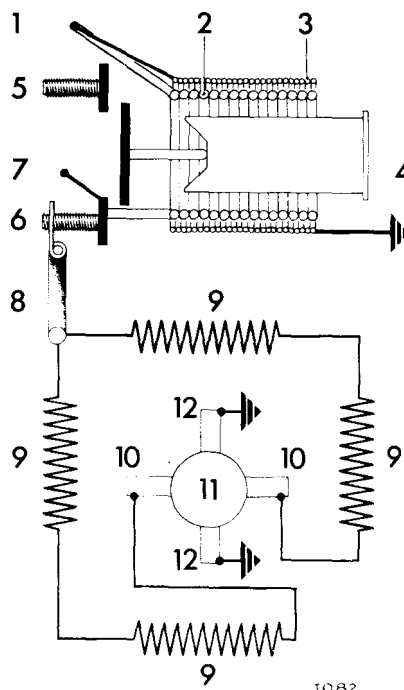
Solenoid

| | |
|--|------------------|
| Pull-in winding resistance – measured between un-marked 'WR wire' connector and 'STA' terminal | 0.13 to 0.15 ohm |
| Hold-in winding resistance – measured between un-marked 'WR wire' connector and unit body | 0.63 to 0.73 ohm |

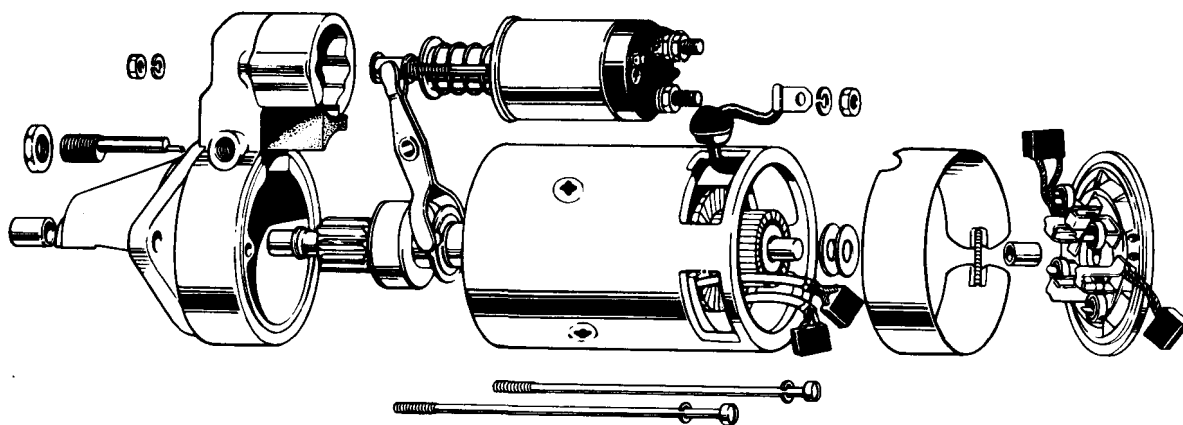
The yoke has four windows and is fitted with an external cover band. The yoke and commutator end bracket are secured by two through bolts which screw into tappings provided in the fixing bracket.

Solenoid and roller clutch drive

Driver release of the ignition/starter switch allows the solenoid plunger to move out under spring pressure. Contact of the main terminals is broken and disengagement of the pinion occurs.



1. Unmarked 'WR wire' connector
2. Pull in winding
3. Hold in winding
4. Plunger
5. Solenoid battery terminal
6. STA terminal
7. IGN connector for ballast ignition when fitted
8. Motor lead
9. Field windings
10. Field winding brushes
11. Commutator
12. Earth brushes



NT0910

STARTER MOTOR – TYPE 2M100 PE

Data and description 86.60.00

Note that two starter motors have been fitted to the TR6 model range. Ensure that information obtained from this manual refers to the appropriate starter motor for the specific vehicle. A Lucas type M418G PE unit was fitted up to engine numbers CP 53636 and CC 63894. A Lucas type 2M100 PE unit was fitted from engine numbers CP 53637 and CC 63895.

Data

| | |
|----------------|----------|
| Manufacturer | Lucas |
| Type | 2M100 PE |
| Lucas part No. | 25647 |
| Stanpart No. | 218053 |

Motor

| | |
|--|--------------------------|
| Yoke diameter | 4 in (101.60 mm) |
| Light running – speed | 6,000 rev/min |
| current | 40 amp |
| torque | Not stated |
| Load running – speed | 1,000 rev/min |
| current | 300 amp |
| torque | 7.3 lbf ft (1.01 kgf m) |
| Locked – speed | Nil |
| current | 463 amp |
| torque | 14.4 lbf ft (1.99 kgf m) |
| Commutator minimum skimming thickness | 0.140 in (3.56 mm) |
| Brush length – new | 0.710 in (18.03 mm) |
| renew if less than | 0.375 in (9.53 mm) |
| Brush spring tension | 36 ozf (1000 gf) |
| Shaft end-float: maximum between bush and spire retaining ring | 0.010 in (0.25 mm) |
| Bearing renewal mandrel diameter: | |
| Commutator end cover bearing | 0.4377 in (11.118 mm) |
| Drive end bracket bearing | 0.4729 in (12.012 mm) |

Solenoid

| | |
|--|------------------|
| Pull-in winding resistance – measured between un-marked 'WR wire' connector and 'STA' terminal | 0.25 to 0.27 ohm |
| Hold-in winding resistance – measured between un-marked 'WR wire' connector and unit body | 0.76 to 0.80 ohm |

Motor

A series-wound, four-pole, four-brush motor with a shaft which carries a roller clutch drive.

The armature shaft rotates in two porous bronze bushes. The armature features a face-type moulded commutator.

Shaft end-float is controlled at the commutator end cover by the internal thrust washer and the position of a Spire retaining ring fitted on the shaft extension.

A plastic brush box is riveted to the commutator end cover. It holds four wedge-shaped brushes and captive coil springs. The brushes are keyed to ensure correct fitting.

The field winding is four joined strips. One end is attached to two brush flexibles, while the other is attached to a single flexible which is earthed to the yoke.

The yoke is windowless. The yoke and commutator end cover are secured by two through bolts which screw into tappings provided in the drive-end bracket.

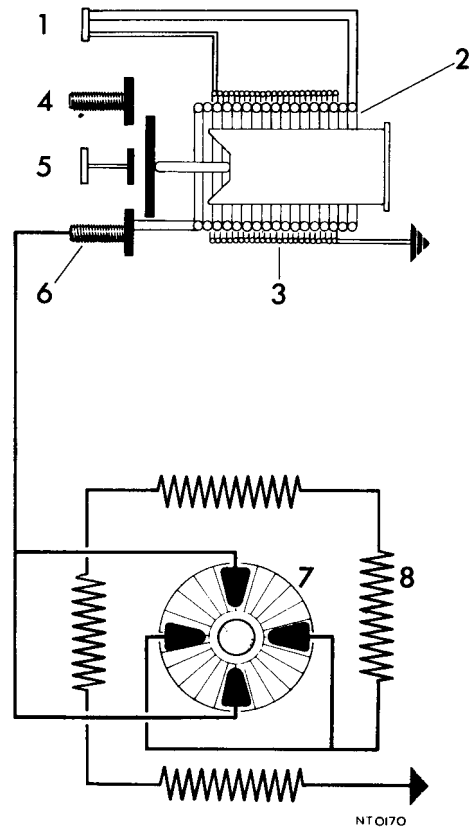
Solenoid and roller clutch drive

The starter solenoid is integral with the starter motor. The solenoid contains a heavy pull-in winding and a light hold-in winding. Applying battery voltage to the unmarked 'WR wire' connector initially energizes both windings. The combined action of both windings pulls in the plunger to cause engagement of the pinion and contact of the main terminals. The pull-in winding is now shorted-out leaving the hold-in winding to maintain the plunger position.

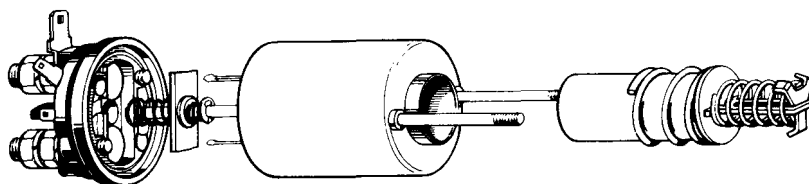
Contact of the main terminals energizes the motor. The roller clutch drive locks up and the engine is cranked.

Firing of the engine rotates the pinion at high speed. The roller clutch drive is over-ridden and damaging high-speed rotation of the armature does not occur.

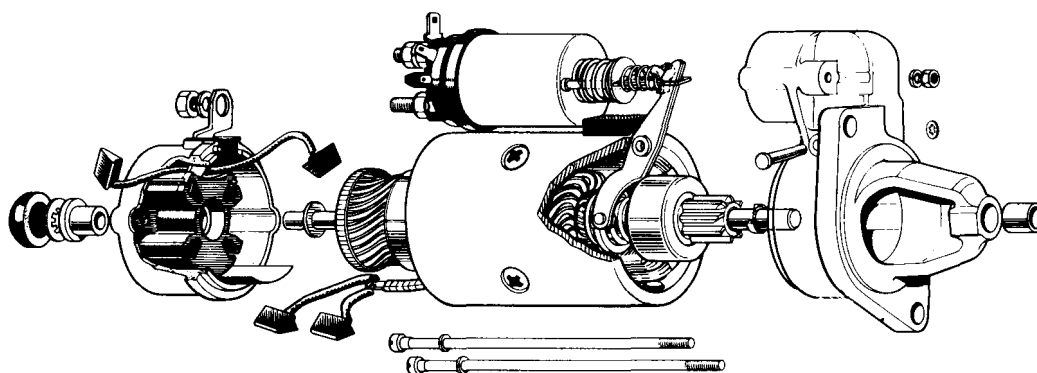
Driver release of the ignition/starter switch allows the solenoid plunger to move out under spring pressure. Contact of the main terminals is broken and disengagement of the pinion occurs.



1. Unmarked 'WR wire' connector
2. Pull-in winding
3. Hold-in winding
4. Solenoid battery terminal
5. IGN. connector for ballast ignition when fitted
6. Solenoid motor terminal
7. Brushes and commutator
8. Field windings



NT0150



NT0214

ELECTRICAL

STARTER MOTOR – TYPES M418G PE AND 2M100 PE

Remove and refit

86.60.01

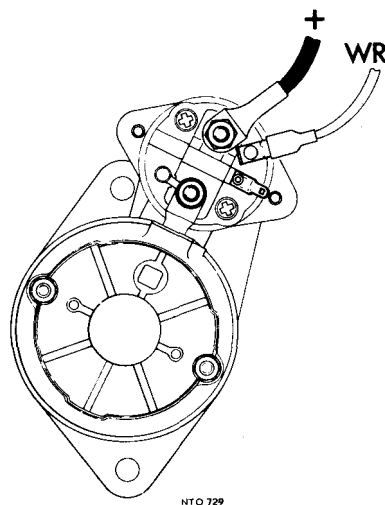
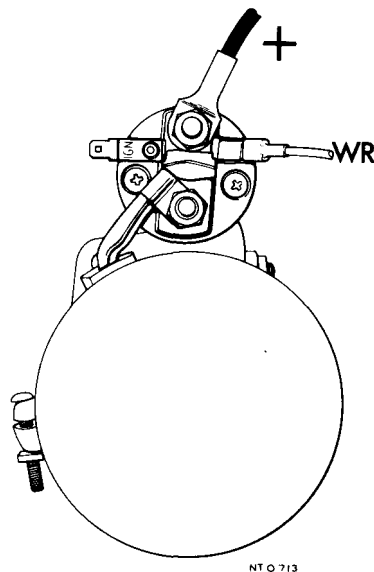
Removing

1. Drive the vehicle onto a ramp.
2. Isolate the battery.
3. Petrol injection vehicles only – Remove the air intake manifold 19.17.01.
4. Carburettor vehicles only – Remove the air cleaner 19.10.01.
5. Disconnect one Lucar connector.
6. Remove the nut and spring washer. Disconnect three large eyelets from the solenoid.
7. Working from above the engine, remove the upper mounting nut, spring washer and bolt.
8. Raise the ramp.
9. Working from below the engine, remove the lower mounting nut, spring washer and bolt.
10. Employ a second operator. With one fitter above the engine and one below, carefully manoeuvre the starter motor upwards from the vehicle.

Refitting

NOTE: Include an earthing star washer under either bolt head.

11. Reverse instructions 8 to 10.
12. Working from above the engine, fit the upper mounting bolt, spring washer and nut. This operation may be facilitated by securing the nut to an open jawed spanner with suitable adhesive or sealer so that the nut may be held in position while fitting the bolt.
13. Connect three large eyelets to the solenoid as shown. Fit the spring washer and nut.
14. Connect one Lucar connector to the solenoid as shown. Note that the 'IGN' connector is not used on TR6 vehicles up to the end of the 1972 model year.
15. Reverse instructions 1 to 4.



+ Battery lead
WR White/red wire

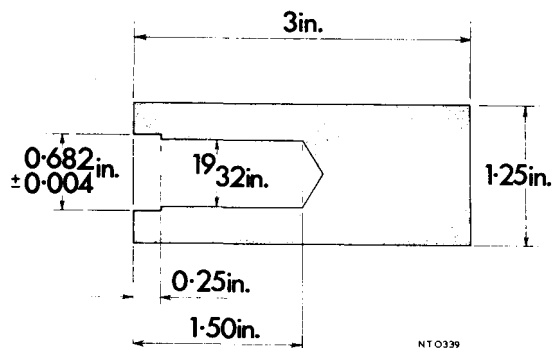
**STARTER MOTOR –
TYPES M418G PE AND 2M100 PE**

– Roller clutch drive – remove and refit

86.60.07

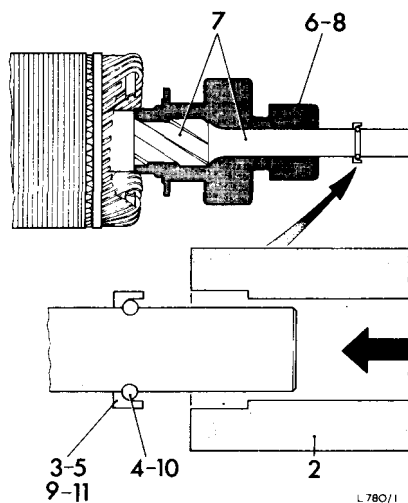
Removing

1. Dismantle the starter motor. 86.60.13.
2. Provide a special punch as shown.
3. Position the special punch over the shaft end and tap the thrust collar from the jump-ring towards the roller clutch drive.
4. Prise the jump-ring from the shaft groove.
5. Remove the thrust collar.
6. Remove the roller clutch drive



Refitting

7. Lubricate the splines and pinion bearing with grease.
8. Fit the roller clutch drive.
9. Fit the thrust collar with the open side facing the shaft end as shown.
10. Prise the jump-ring into the shaft groove.
11. Force the thrust collar over the jump-ring.



ELECTRICAL

STARTER MOTOR – TYPE M418G PE

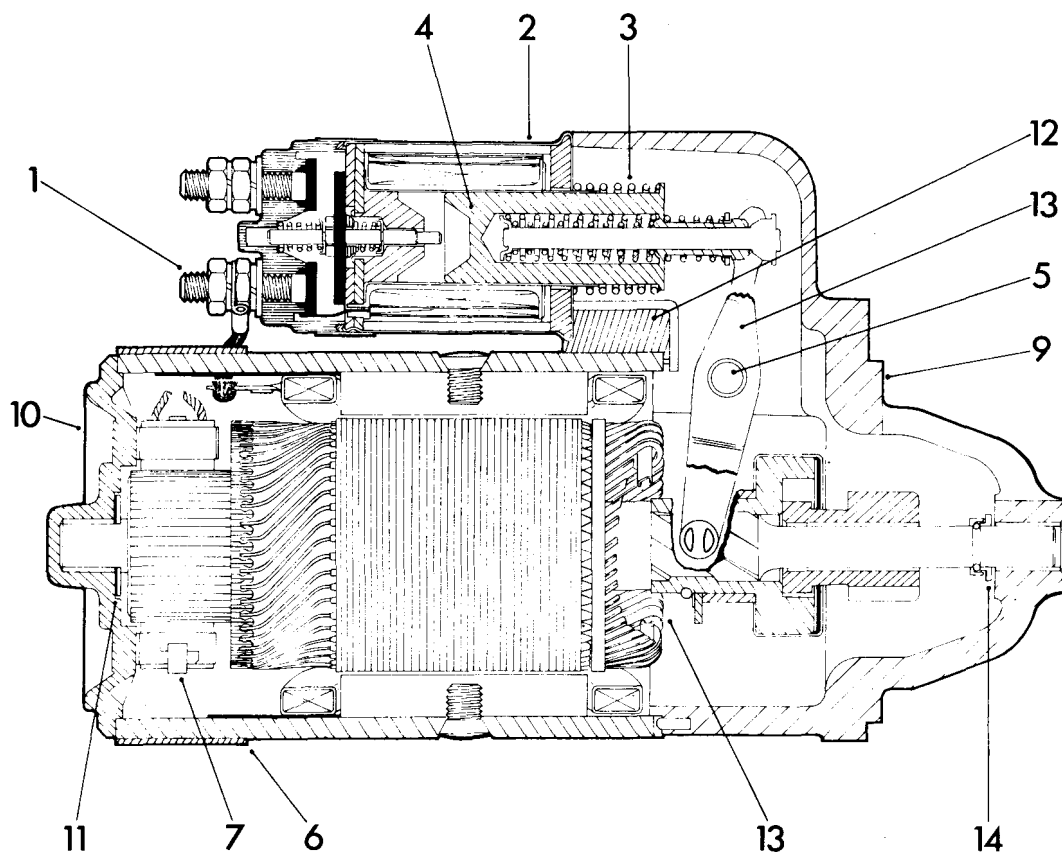
Overhaul

86.60.13

Note that two starter motors have been fitted to the TR6 model range. Ensure that information obtained from this manual refers to the appropriate starter motor for the specific vehicle. A Lucas type M418G PE unit was fitted up to engine numbers CP 53636 and CC 63894. A Lucas type 2M100 PE unit was fitted from engine numbers CP 53637 and CC 63895.

Dismantling

1. Remove the nut and spring washer. Disconnect the motor lead from the solenoid 'STA' terminal.
2. Remove two nuts and washers. Withdraw the solenoid leaving the plunger attached to the engaging lever.
3. Remove the return spring.
4. Remove the plunger from the engaging lever.
5. Slacken the locknut. Unscrew and withdraw the eccentric pin.
6. Remove the cover band.
7. Withdraw the brushes from the holders.
8. Remove two through bolts.
9. Carefully tap the fixing bracket mounting lugs to separate the yoke from the fixing bracket.
10. Separate the commutator end bracket from the yoke.
11. Remove the steel thrust washer and the fabric thrust washer.
12. Remove the rubber moulding.
13. Withdraw the armature and starter drive assembly. Remove the engaging lever.
14. Remove the thrust washer.



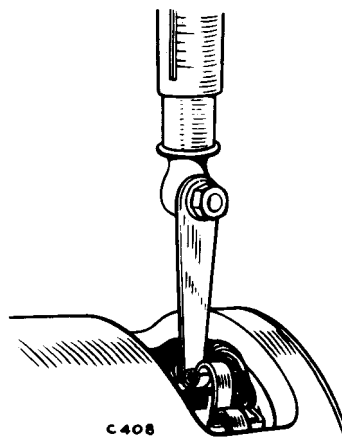
L439C

Bearings

15. Inspect the porous bronze bearing bushes for wear.
16. If necessary renew either bush as follows:
Extract the fixing bracket bush using a suitable press and mandrel. Extract the commutator end bracket bush using a suitable extractor or by screwing a 9/16 in. tap squarely into the bush and withdrawing. Prepare the porous bronze bush by immersing it in thin engine oil for 24 hours or thin engine oil heated to 100° C for two hours. Fit the bush, using a suitable press and a highly polished, shouldered mandrel of the appropriate dimension given in Data. Do not ream the bush after fitting or its porosity may be impaired.

Brushes

17. Clean the brushes and holders with a petrol moistened cloth.
18. Check that the brushes move freely in the holders.
19. Check the brush spring tension as shown. Brush spring tension should be as given in Data. Repeat for the remaining three springs. If the tension is low renew the spring set.
20. Check the brush length. Renew the brushes if less than the length given in Data.
21. If necessary, renew the field winding brushes. Unsolder the flexibles from the field windings. Position the ends of the new flexibles. Squeeze up and solder.
22. If necessary, renew the earth brushes. Unsolder the flexibles from the clips on the commutator end bracket. Open the clips and position the ends of the new flexibles. Squeeze up and solder.

**Commutator**

23. Clean the commutator with a petrol-moistened cloth. If the commutator is in good condition it will be smooth and free from pits or burned spots.
24. If necessary, polish the commutator with fine glass-paper.
25. If necessary, skim the commutator. Separate the armature from the roller clutch drive by performing 86.60.07. Mount the armature in a lathe and rotate at high speed. Using a very sharp tool, take a light cut. Polish with fine glass-paper. Do not cut below the minimum skimming diameter given in Data. Do not undercut insulators between segments.

Roller clutch drive

26. Do not wash the roller clutch in petrol as such action would remove lubricant from the sealed unit. It may be cleaned by wiping with a petrol-moistened cloth.
27. Check that the clutch locks in one direction and rotates smoothly in the other. The unit should move freely round and along the armature shaft splines.
28. The roller clutch is a sealed unit. If the above conditions are not met, repair by replacement of the roller clutch unit.

Solenoid

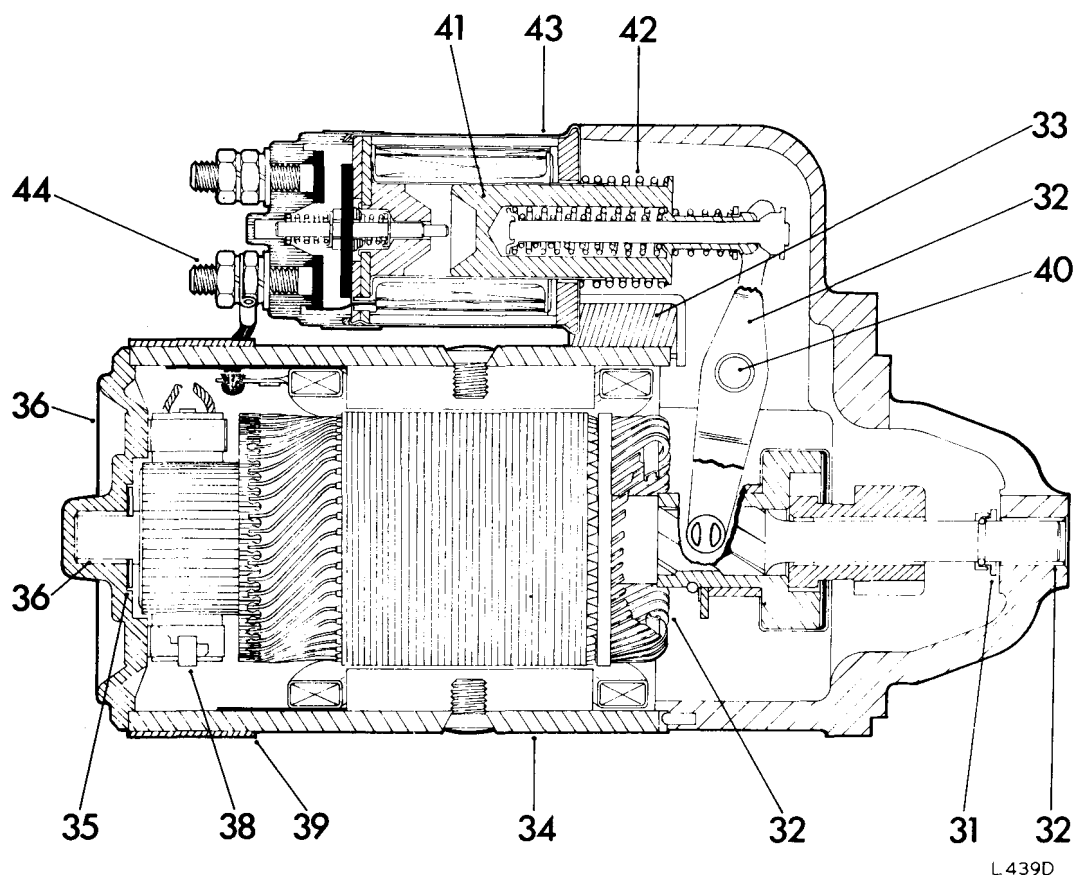
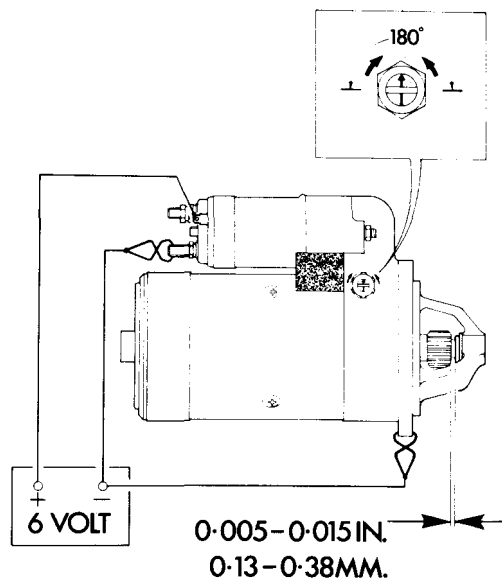
29. Assembly of the starter solenoid involves soldering and sealing complications. It is therefore not advisable to attempt to service this unit. If the solenoid operation is suspect, repair by replacement of the solenoid unit.
30. The plunger is matched with the solenoid body. The spares unit of purchase is a matched solenoid and plunger and the box also contains a return spring. All three items should be fitted as a set.

Assemble

31. Fit the thrust washer to the shaft with the lip facing the starter drive as shown.
32. Position the engaging lever either way round to the drive operating plate. Lightly lubricate the fixing bracket bearing bush with engine oil. Insert the armature and starter drive assembly with the engaging lever into the fixing bracket.
33. Position the rubber moulding.
34. Position the yoke to the fixing bracket.
35. Fit the steel thrust washer and the fabric thrust washer to the shaft as shown.
36. Lightly lubricate the commutator end bracket bearing bush with engine oil. Ensure that no brushes are inserted in the holders. Position the commutator end bracket.
37. Fit the through bolts.
38. Insert the brushes into the holders.
39. Fit the cover band.
40. Lightly grease the eccentric pin bearing surface. Insert the eccentric pin. Ensure to align it through the engaging lever. Screw it in to maintain position only.
41. Position the plunger to the engaging lever.
42. Position the return spring to the solenoid inner tube.
43. Insert the solenoid so that the 'STA' terminal is positioned adjacent to the yoke. Fit two nuts and washers.
44. Connect the motor lead to the solenoid 'STA' terminal.

45. Adjust pinion movement as follows:

Provide a six volt test circuit as shown. Slacken the locknut. Screw the eccentric pin fully in. Energise the circuit to cause the solenoid to move the starter drive to the engage position. Position a feeler gauge between the pinion and the thrust collar as shown. Press the pinion lightly towards the motor to take up any lost motion in the linkage. Rotate the eccentric pin within the indicated 180 degree arc to adjust the gap to 0.005 to 0.015 in. Tighten the locknut. Check that the correct gap has been maintained.



STARTER MOTOR – TYPE 2M100 PE**Overhaul****86.60.13**

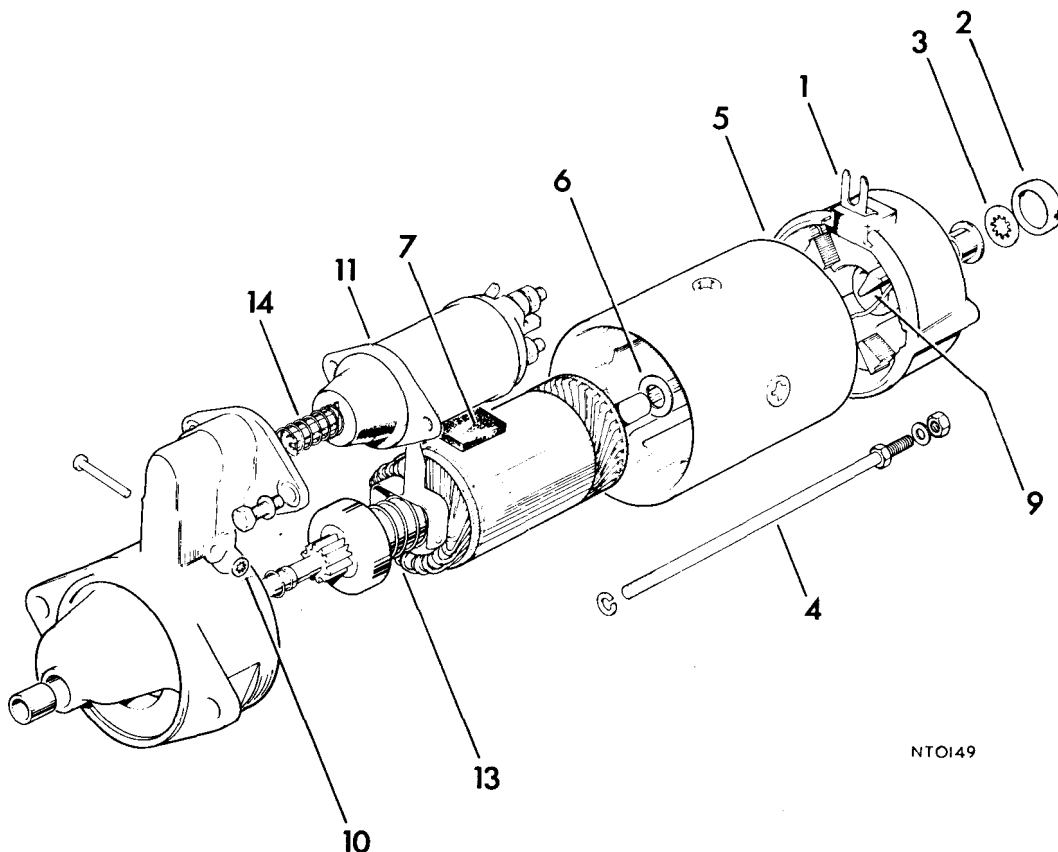
Note that two starter motors have been fitted to the TR6 model range. Ensure that information obtained from this manual refers to the appropriate starter motor for the specific vehicle. A Lucas type M418G PE unit was fitted up to engine numbers CP 53636 and CC 63894. A Lucas type 2M100 PE unit was fitted from engine numbers CP 53637 and CC 63895.

Dismantling

NOTE: Dismantling of the starter motor will necessitate the destruction of two Spire retaining rings. Ensure that a new Spire retaining ring for the armature shaft and a new Spire retaining ring for the pivot pin are available before proceeding further. Both these items are included in the Sundry Parts Kit, Lucas Part No. 54246438 or Stanpart No. 520466.

1. Remove the nut, spring washer and washer to free the connector link from the solenoid.
2. Remove the rubber end cap.

3. Use a small chisel to cut a number of claws and remove the Spire retaining ring. Do not prise off the Spire retaining ring without cutting a number of claws as such action may damage the bearing end face, armature shaft and bearing surface when the shaft is withdrawn.
4. Remove two through bolts.
5. Withdraw the yoke and commutator end cover assembly.
6. Remove the thrust washer.
7. Remove the rubber seal block.
8. Employ a second operator to support the yoke by hand. Use a length of wood of approximately 0.75 in (20 mm) diameter to tap the commutator end cover from the yoke.
9. Lift out two field winding brushes from the brush box to separate the commutator end cover from the yoke.
10. Prise off the Spire retaining ring and tap out the pivot pin.
11. Remove two bolts and spring washers. Withdraw the solenoid leaving the plunger attached to the engaging lever.
12. Remove the return spring.
13. Withdraw the armature, roller clutch drive and plunger assembly from the drive end bracket.
14. Unhook the plunger from the engaging lever.



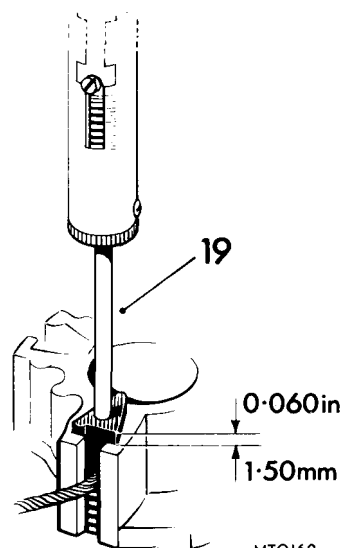
NT0149

Bearings

15. Inspect the porous bronze bearing bushes for wear.
16. If necessary, renew either bush as follows:
Extract the bush, using a suitable press and mandrel. Prepare the porous bronze bush by immersing it in thin engine oil for 24 hours or thin engine oil heated to 100°C for two hours. Fit the bush, using a suitable press and a highly polished, shouldered mandrel of the appropriate dimension given in Data. Do not ream the bush after fitting or its porosity may be impaired.

Brushes

17. Clean the brushes and brush box with a petrol-moistened cloth.
18. Check that the brushes move freely in the brush box.
19. Check the brush spring pressure as shown. Position a new brush so that the top protrudes 0.060 in (1.50 mm) above the brush box. Brush spring pressure should be as given in Data. Repeat for the remaining three springs. If the pressure is low, renew the commutator end bracket assembly.
20. Check the brush length. Renew the brushes if less than the length given in Data.
21. If necessary, renew the commutator end cover brushes. Brushes are supplied attached to a new connector link. Withdraw two brushes from the brush box. Withdraw the connector link. Position new brushes as shown. Retain the longer flexible under the flap.
22. If necessary, renew the field winding brushes. Brushes are supplied attached to a common flexible. Cut the old flexibles 0.250 in (6 mm) from the joint. Solder the new flexible to the ends of the old flexible. Do not attempt to solder direct to the field winding strip as the strip may be produced from aluminium.



MTO169

Commutator

23. Clean the commutator with a petrol-moistened cloth. If the commutator is in good condition it will be smooth and free from pits or burned spots.
24. If necessary, polish the commutator with fine glass-paper.
25. If necessary, skim the commutator. Separate the armature from the roller clutch drive by performing 86.60.07. Mount the armature in a lathe and rotate at high speed. Using a very sharp tool, take a light cut. Polish with fine glass-paper. Do not cut below the minimum skimming thickness given in Data. Do not undercut insulators between segments.

Roller clutch drive

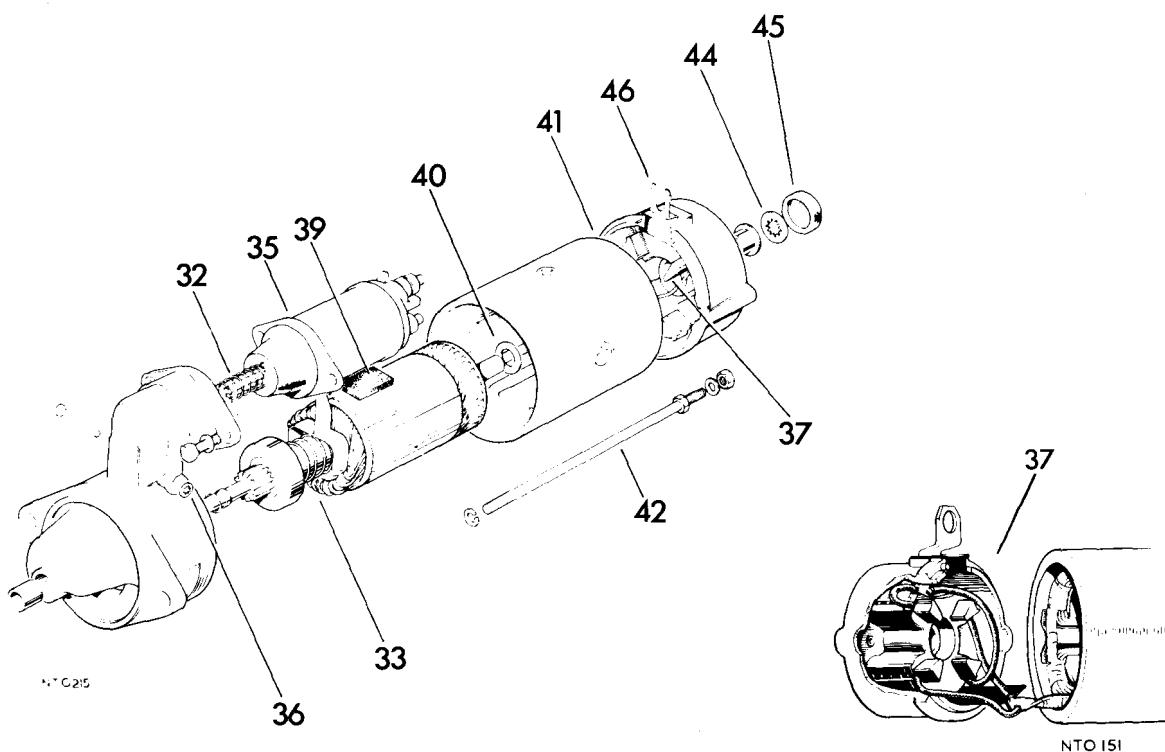
26. Do not wash the roller clutch in petrol as such action would remove lubricant from the sealed unit. It may be cleaned by wiping with a petrol-moistened cloth.
27. Check that the clutch locks in one direction and rotates smoothly in the other. The unit should move freely round and along the armature shaft splines.
28. The roller clutch is a sealed unit. If the above conditions are not met, repair by replacement of the roller clutch unit.

Solenoid

29. Assembly of the starter solenoid involves soldering and sealing complications. It is therefore not advisable to attempt to service this unit. If the solenoid operation is suspect, repair by replacement of the solenoid unit.
30. The plunger is matched with the solenoid body. The spares unit of purchase is a matched solenoid and plunger and the box also contains a return spring. All three items should be fitted as a set.

Reassembling

31. Ensure that the bearing surfaces on the armature shaft are burr-free.
32. Hook the plunger onto the engaging lever.
33. Insert the armature, roller clutch drive and plunger assembly into the drive end bracket.
34. Fit the return spring.
35. Fit the solenoid so the 'STA' terminal is adjacent to the yoke. Secure with two bolts and spring washers. Ensure that the plunger does not unhook during this operation.
36. Lightly grease the pivot pin. Align the holes and insert the pivot pin. Secure with a new Spire retaining ring. Ensure that the plunger does not unhook during this operation.
37. Insert two field winding brushes into the brush box with flexibles positioned as shown.
38. Position the commutator end cover to the yoke.
39. Position the rubber seal block.
40. Fit the thrust washer.
41. Holding the commutator end cover firmly to the yoke, insert the assembly.
42. Fit two through bolts.
43. If necessary, adjust the position of the rubber seal block.
44. Fit a new Spire retaining ring to the armature shaft.
45. Fit the rubber end cap.
46. Fit washer, spring washer and nut to secure the connector link to the solenoid.



SWITCHES

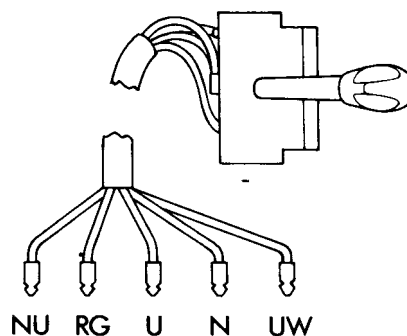
Data

86.65.00

Column light switch

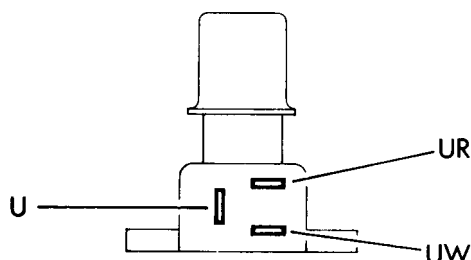
| | | |
|----------|------------|----------------|
| Position | Off | No connections |
| | Side | NU to RG |
| | Head | NU to U |
| | Head flash | N to UW |

Note that the switch harness wire colours and the vehicle harness wire colours do not totally match. See appropriate wiring diagram.



Dip switch

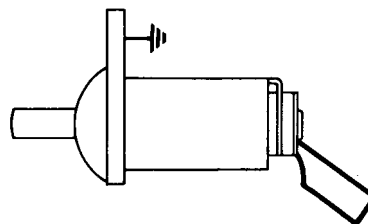
| | | |
|----------|------|---------|
| Position | Dip | U to UR |
| Position | Main | U to UW |



Door switch

Passengers door always and drivers door when key warning system is not fitted to vehicle.

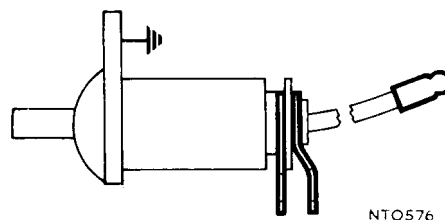
| | | |
|----------|-------------|-------------------|
| Position | Door closed | No connections |
| Position | Door open | Terminal to earth |



Door switch

Drivers door when key warning system is fitted to vehicle.

| | | |
|----------|-------------|--|
| Position | Door closed | No connections |
| Position | Door open | Snap connector bullet on attached wire to earth and Two Lucar blades connected |

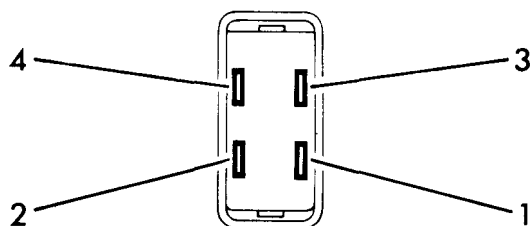


NT0576

Hazard switch

Early left hand steer vehicles with hazard circuit using relay.

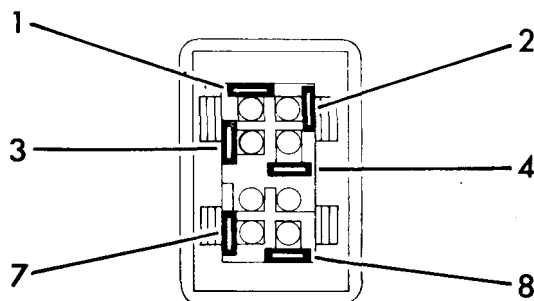
| | | |
|----------|--------|--------|
| Position | Off | 3 to 4 |
| Position | Hazard | 1 to 2 |



Hazard switch

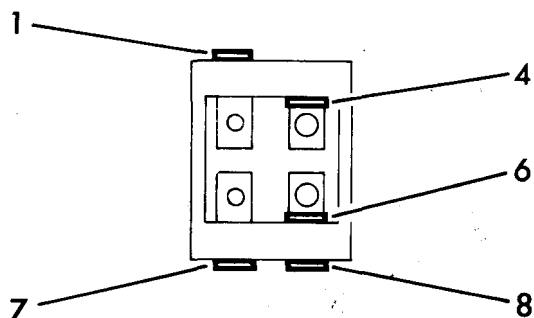
Later left hand steer vehicles with hazard circuit not using relay.

| | | |
|----------|--------|------------------|
| Position | Off | 8 to 7 |
| Position | Hazard | 3 to 1 to 2 to 4 |



Heater switch

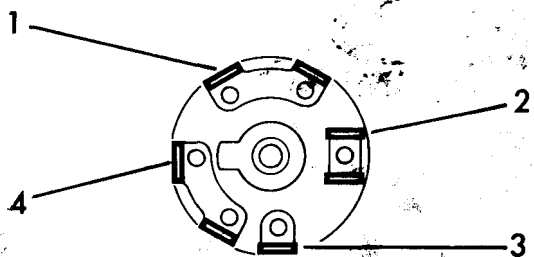
| | | |
|-------------|------------|------------------|
| Position in | Off | 1 to 6 to 7 |
| Position | | |
| first pull | Low speed | 1 to 4 to 6 to 7 |
| Position | | |
| second pull | High speed | 1 to 4 to 7 to 8 |



Ignition/starter switch

Early vehicles with ignition/starter switch fitted to central control cowl.

| | | |
|----------|-----------|----------------|
| Position | Off | No connections |
| Position | Ignition | 1 to 2 to 4 |
| Position | Start | 1 to 2 to 3 |
| Position | Auxiliary | 1 to 4 |

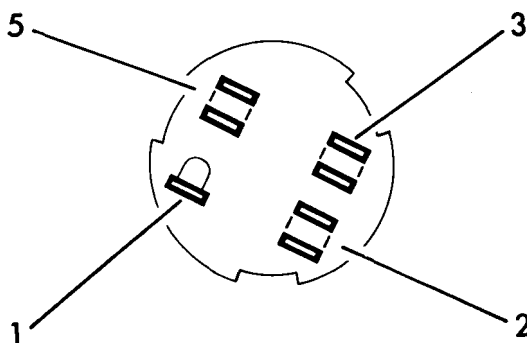


NT0577

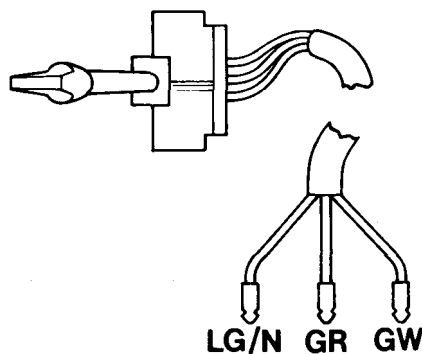
Ignition/starter switch

Later vehicles with ignition/starter switch fitted to steering column lock assembly.

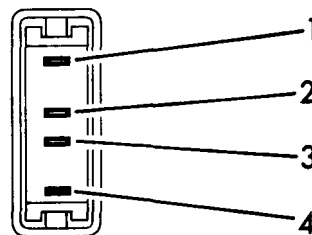
| | | |
|------------|-----------|----------------|
| Position 0 | Off | No connections |
| Position 1 | Auxiliary | 2 to 5 |
| Position 2 | Ignition | 2 to 5 to 3 |
| Position 3 | Start | 2 to 3 to 1 |

**Turn signal switch**

| | | |
|----------|------------------|----------------|
| Position | Central | No connections |
| Position | L.H. turn signal | LG/N to GR |
| Position | R.H. turn signal | LG/N to GW |

**Windscreen wiper switch**

| | | |
|----------|--------------|--------|
| Position | Park | 4 to 3 |
| Position | Normal speed | 2 to 3 |
| Position | High speed | 2 to 1 |



NT0578

ELECTRICAL

Fuel pump inertia cut out switch

Petrol injection vehicles only

Data

| | | |
|------------------|-----------|--|
| Manufacturer | | Inertia Switch Limited |
| Stanpart No. | | 153052 |
| Operating force | | 4.5 to 5.5 g |
| Current capacity | | 10 amp |
| Mounting | | Switch axis vertical with reset button uppermost |

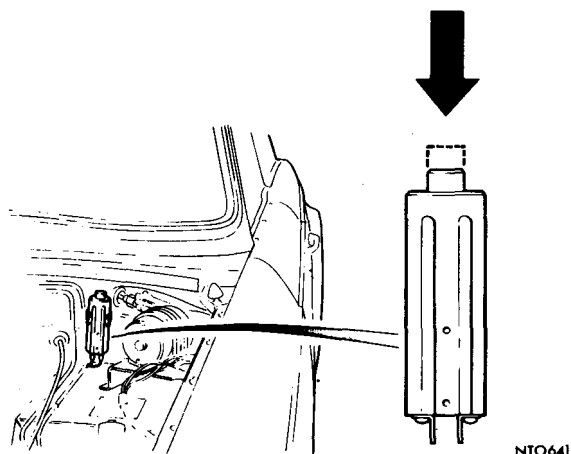
Description

This switch is electrically positioned in the supply line to the Lucas high pressure petrol pump.

The function of the unit is to cut out the electrical supply to the pump after a crash or severe stop. If the crash severs the fuel line the fuel tank contents should not be pumped into the roadway. The possibility of a petrol fire is thereby reduced.

With the button depressed the switch is in its normal operating condition with contacts closed. A shock force over the stated value will cause the switch to trip extending the button and opening the contacts.

After actuation the switch has to be manually reset as detailed, 86.65.59.



SWITCHES

Ignition/starter switch — remove and refit 86.65.02

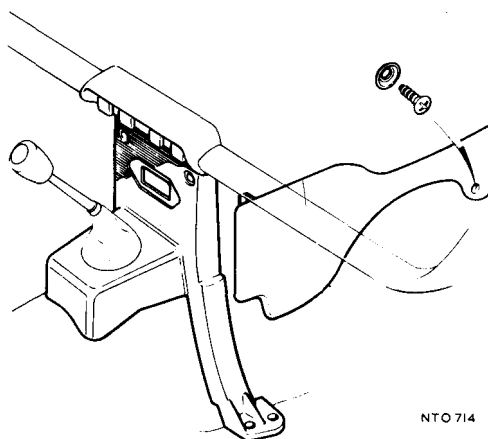
Early vehicles with ignition/starter switch fitted to central control cowl.

Removing

1. Isolate the battery.
2. Remove single screw and washer and withdraw the gearbox cover side trim panel on the right hand side of the vehicle.
3. Disconnect five Lucar connectors.
4. Unscrew the bezel. Withdraw the switch from the control cowl.

Refitting

5. Reverse instructions 1 to 4. Connect five Lucar connectors as shown on fascia connections 88.00.02.



NTO 714

SWITCHES

Ignition/starter switch — remove and refit 86.65.02

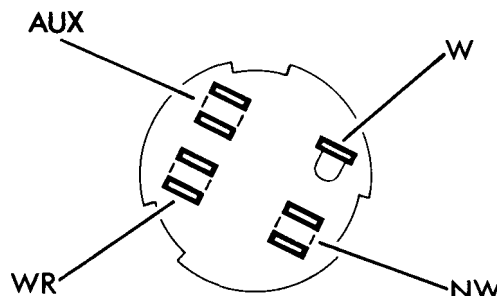
Later vehicles with ignition/starter switch fitted to steering column lock assembly.

Removing

1. Isolate the battery.
2. Carefully pull the plastic cover from the steering column lock assembly and manoeuvre along the harness.
3. Withdraw the ignition/starter switch from the steering column lock assembly.
4. Disconnect five Lucar connectors.

Refitting

5. Ensure that the plastic cover is fitted onto the harness.
6. Connect five Lucar connectors as shown.
7. Insert the switch into the steering column lock assembly. Note the keyway and ensure that the lock shaft and switch shaft align correctly.
8. Carefully fit the plastic cover to secure the switch in position.
9. Connect the battery.



NTO 728

W White wire
NW Brown/white wire
WR White/red wire
AUX Any auxiliary wire

ELECTRICAL

SWITCHES

– Dip switch – remove and refit

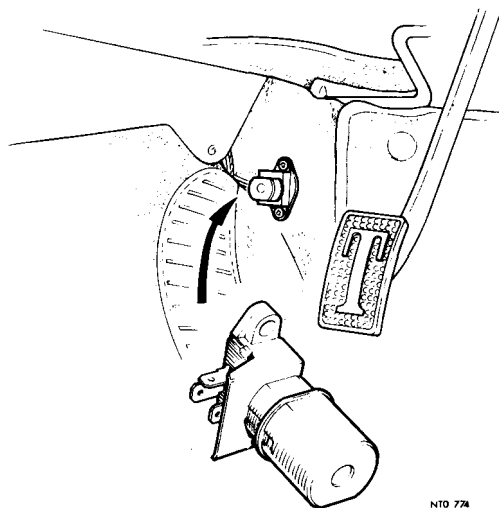
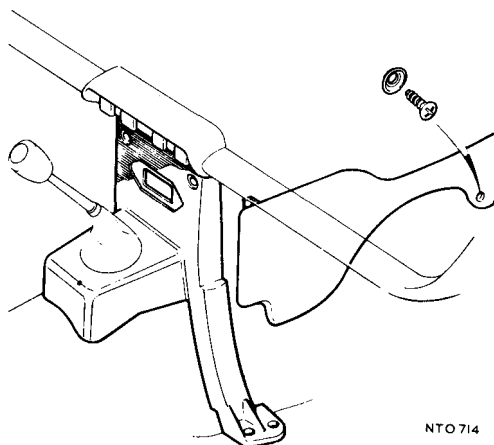
86.65.11

Removing

1. Isolate the battery.
2. Right hand steer vehicles only:—
Remove single screw and washer and withdraw the gearbox cover side trim panel on the drivers side of the vehicle to release the harness.
3. Remove two screws and spring washers.
4. Disconnect three Lucar connectors.

Refitting

5. Reverse instructions 1 to 4. Connect the three Lucar connectors as shown in data 86.65.00.



SWITCHES

– Panel rheostat – remove and refit

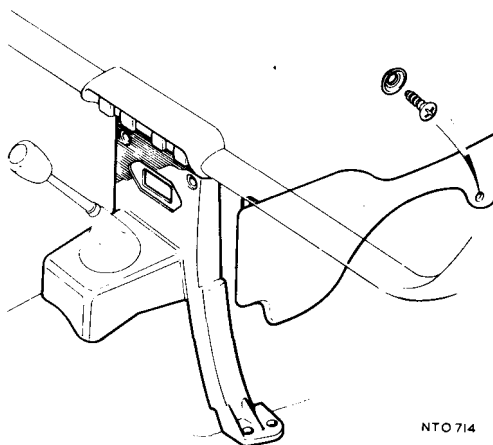
86.65.12

Removing

1. Isolate the battery.
2. Pull off the panel rheostat knob.
3. Remove single screw and washer and withdraw the gearbox cover side trim panel on the passenger side of the vehicle.
4. Note the wire positions by colour code.
5. Disconnect two Lucar connectors.
6. Using a suitable tool unscrew the bezel. Withdraw the switch from the bracket.

Refitting

7. Reverse instructions 1 to 6.



SWITCHES**Door switch – remove and refit 86.65.14**

Passengers door always and drivers door when key warning system is not fitted to vehicle.

Removing

1. Open the appropriate door.
2. Remove the single screw.
3. Withdraw the switch.
4. Disconnect the terminal end.

Refitting

5. Reverse instructions 1 to 4.

SWITCHES**Door switch – remove and refit 86.65.14**

Drivers door when key warning system is fitted to vehicle.

Removing

1. Open the appropriate door.
2. Remove five screws and turn back the dash side trim panel to obtain access to the switch connections.
3. Disconnect two Lucar connectors.
4. Disconnect one snap connector.
5. Remove the single screw.
6. Withdraw the switch.

Refitting

7. Reverse instructions 1 to 6. Connect the two Lucar connectors either way round.

SWITCHES

– Column light switch – remove and refit 86.65.17

Removing

1. Isolate the battery.
2. Later vehicles fitted with steering column lock only:–
Inspect the steering column clamp bolts and note the location of two nuts which are fitted with 'anti-theft' caps. To gain access to any cap fitted uppermost remove the adjacent speedometer 88.30.01 or tachometer 88.30.21. Using a wide bladed screwdriver lever off two caps.
3. Remove two steering column clamp nuts, washers and bolts.
4. Remove the upper half of the steering column clamp.
5. Push the harness cover down the column slightly to release the top clip. Pull the harness cover up the column to release from the steering column clamp.
6. Disconnect five snap connectors.
7. Remove two screws. Withdraw two escutcheons.
8. Remove two screws and anti-vibration washers. Remove the switch with its harness.

Refitting

9. Thread the switch harness through the appropriate steering column apertures, fascia panel aperture and steering column clamp aperture. Do not disturb the position of the felt strip located below the wires in the lower half of the steering column clamp. This operation may be facilitated by taping the ends of the wires together. Position the switch and secure with two screws and anti-vibration washers.
10. Operate the switch into the 'headlamp flash' position. Ensure that no short is possible between the switch contact and the steering column.
11. Position two escutcheons. Secure with two screws.
12. Ensure that the felt strip is correctly located and rectify if necessary.
13. Connect five snap connectors as follows:

Brown/blue switch wire to brown/white with a small blue indent main harness wire.

Red/green switch wire to red/green main harness wire.

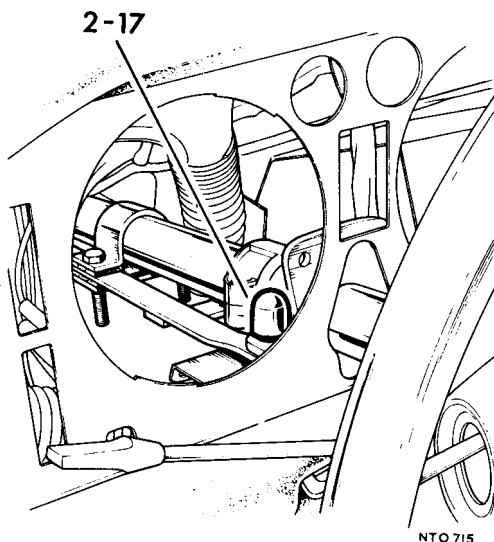
Blue switch wire to blue main harness wire.

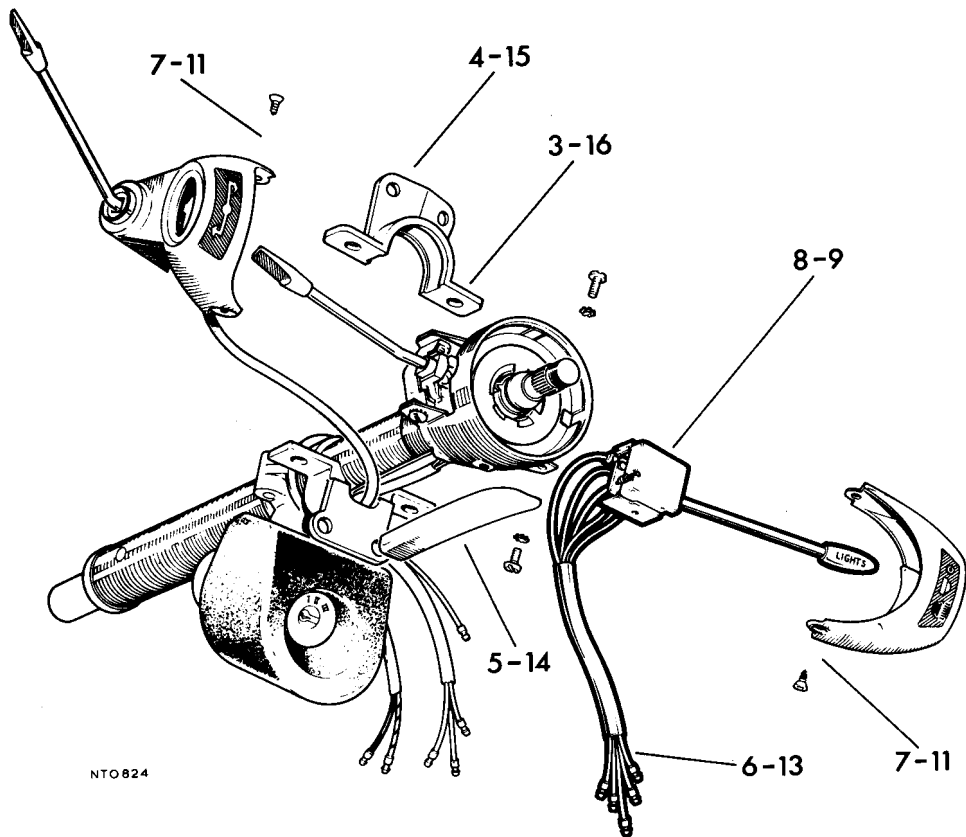
Brown switch wire to purple with a small brown indent main harness wire.

Blue/white switch wire to blue/white main harness wire.

14. Push the harness cover down the column to engage into the steering column clamp. Do not disturb the position of the felt strip. Pull the harness cover up the column slightly to engage the top clip.
15. Position the upper half of the steering column clamp.

16. Fit two steering column clamp bolts, washers and nuts. Ensure that the nuts are positioned uppermost or lowermost as noted at operation 2 above.
17. Later vehicles fitted with steering column lock only:–
Tap on two 'anti-theft' caps. Fit the speedometer 88.30.01 or the tachometer 88.30.21 as required.
18. Connect the battery.





NTO824

ELECTRICAL

SWITCHES

– Horn push – remove and refit

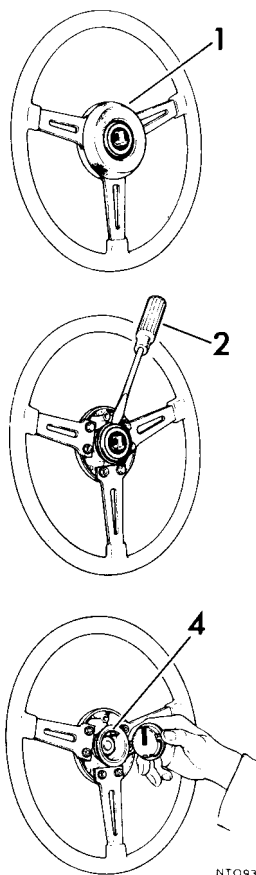
86.65.18

Removing

1. Carefully pull the horn push surround pad from its retaining flange.
2. Using a wide blade screwdriver carefully prise the horn push unit from the steering wheel boss as shown.
3. Collect up the small side claw clip (if fitted).
4. Withdraw the connection brush.

Refitting

5. Apply petroleum jelly (vaseline) to the sliding contact end of the connection brush.
6. Insert the connection brush so that the sliding contact end sweeps the slip ring.
7. Ensure that the small side claw clip is fitted (if fitted at operation 3 above).
8. Align the horn push contact strip to the connection brush. Ensure good electrical contact for the side earth clip to the steering wheel boss. Push the horn push unit into the steering wheel boss.
9. Align the six recesses in the horn push surround pad to the six steering wheel bolt heads. Carefully fit the pad to its retaining flange.



SWITCHES

– Reverse lamp switch – remove and refit

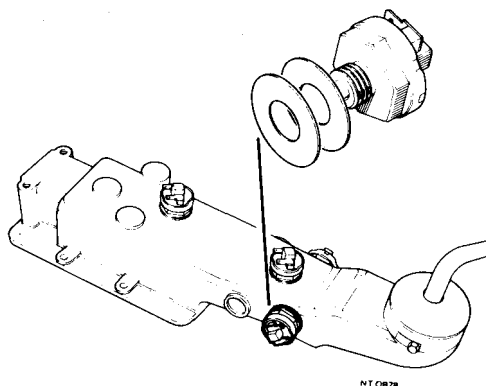
86.65.20

Removing

1. Remove the gearbox tunnel cover 76.25.07.
2. Locate the required switch.
3. Disconnect two Lucar connectors.
4. Using a spanner on the hexagon, unscrew the switch.
5. Collect up the fibre washer/washers if fitted.

Refitting

6. Assemble with the same number of fibre washers as originally fitted. Use new fibre washer/washers if available.
7. Fit the switch and fibre washer/washers to the gearbox.
8. Connect two Lucar connectors. The connectors may be fitted either way round.
9. Perform a functional check of the reverse lamp circuit.
10. Refit the gearbox tunnel cover 76.25.07.



SWITCHES

– Luggage boot lamp switch – remove and refit 86.65.22

Removing

1. Open the luggage boot lid
2. Remove the floor carpet.
3. Remove the spare wheel cover panel.
4. Remove two screws securing the luggage boot lamp.
5. Withdraw the lamp assembly from the petrol tank trim panel.
6. Disconnect two Lucar connectors.
7. Remove eight screws and withdraw the petrol tank trim panel.
8. Locate the switch adjacent to the right hand hinge.
9. Remove two screws.
10. Withdraw the switch.
11. Pull the wire through the bracket hole and disconnect the terminal end.

Refitting

12. Reverse instructions 1 to 11. Connect the lamp assembly Lucar connectors either way round.

SWITCHES

– Cubby box illumination switch

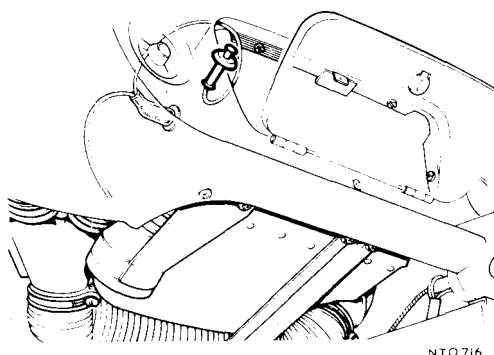
– remove and refit 86.65.24

Removing

1. Open the cubby box lid.
2. Remove the rubber buffer from the switch plunger.
3. Ease the switch outwards to release the spring claws from the bracket.
4. Pull the wire through the bracket hole and disconnect the terminal end.

Refitting

5. Reverse instructions 1 to 4.



ELECTRICAL

SWITCHES

– Seat belt – gearbox switch –
remove and refit

86.65.28

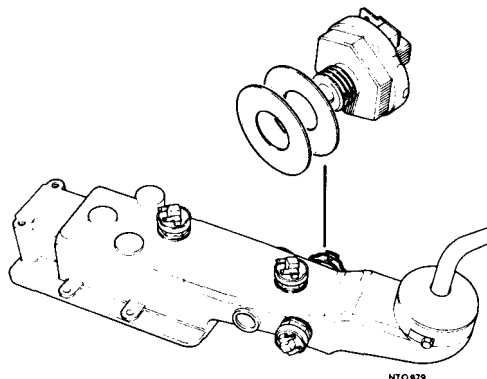
Later U.S.A. market vehicles only.

Removing

1. Remove the gearbox tunnel cover 76.25.07.
2. Locate the required switch.
3. Disconnect two Lucar connectors.
4. Using a spanner on the hexagon, unscrew the switch.
5. Collect up the fibre washer/washers if fitted.

Refitting

6. Assemble with the same number of fibre washers as originally fitted. Use new fibre washer/washers if available.
7. Fit the switch and fibre washer/washers to the gearbox.
8. Connect two Lucar connectors. The connectors may be fitted either way round.
9. Perform a functional check of the seat belt warning circuit.
10. Refit the gearbox tunnel cover 76.25.07.



SWITCHES

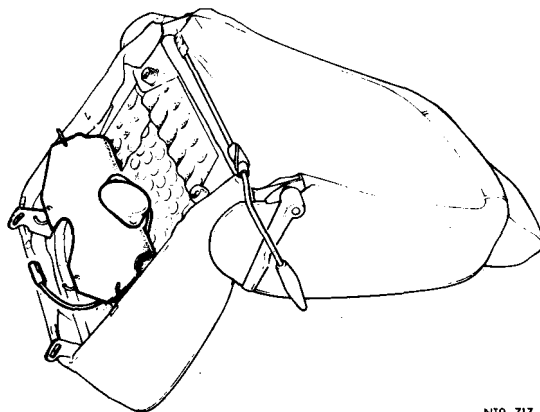
– Seat belt – passengers seat switch –
remove and refit

86.65.29

Later U.S.A. market vehicles only.

Removing

1. Remove the passengers seat from the vehicle 76.70.05.
2. Unhook two rear diaphragm attachment clips.
3. Unhook two side diaphragm attachment clips.
4. Bend four small clips upwards and remove two washers.
5. To assist refitting, note the wire run through the seat.
6. Withdraw the wires.
7. Remove the switch.



Refitting

8. Reverse instructions 1 to 7.

SWITCHES

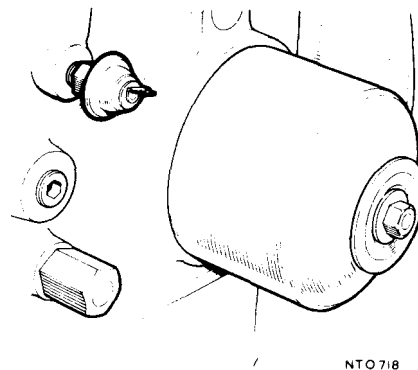
– Oil pressure switch – remove and refit 86.65.30

Removing

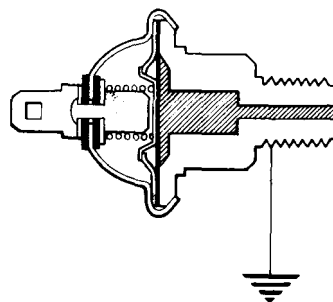
1. Locate the switch on the left hand side of the engine below the ignition distributor.
2. Disconnect the Lucar connector.
3. Using a spanner, unscrew the switch from the block.

Refitting

4. Screw the switch into the block. The thread is tapered so do not attempt to seat the switch shoulder.
5. Connect the Lucar connector.



NTO 718



NTO 159

SWITCHES

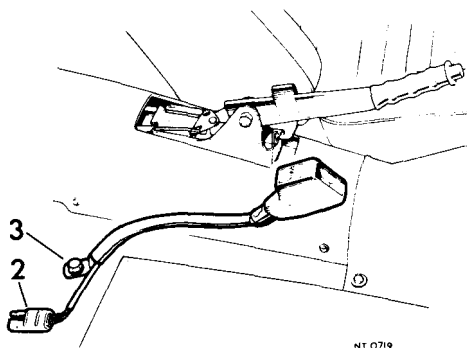
Seat belt – drivers belt switch –
remove and refit 86.65.31

Seat belt – passengers belt switch –
remove and refit 86.65.32

Later U.S.A. market vehicles only.

Removing

1. Remove the drivers or passengers seat 76.70.04 or 76.70.05.
2. Disconnect the electrical harness plug.
3. Remove single bolt and spring washer. Lift out the buckle and switch unit.



NT 0719

Refitting

4. Reverse instructions 1 to 3. Seal the large plain washer to the floor panel with an approved sealer to ensure a waterproof joint.

ELECTRICAL

SWITCHES

— Overdrive gearbox switches —
remove and refit

86.65.33

*Overdrive vehicles only up to the end of
the 1972 model year.*

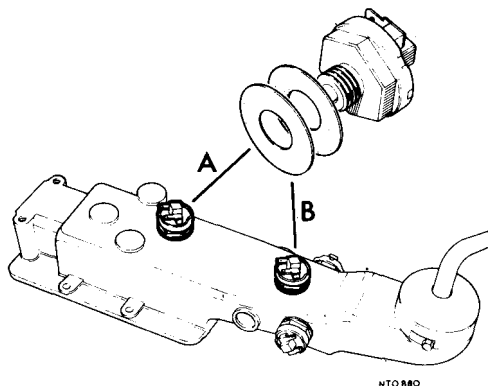
Two overdrive gearbox switches are fitted. One performs the '2nd gear on' function while the other performs the '3rd and 4th gear on' function.

Removing

1. Remove the gearbox tunnel cover 76.25.07
2. Locate the required switch.
3. Disconnect two Lucar connectors.
4. Using a spanner on the hexagon, unscrew the switch.
5. Collect up the fibre washer/washers if fitted.

Refitting

6. Assemble with the same number of fibre washers as originally fitted.. Use new fibre washer/washers if available.
7. Fit the switch and fibre washer/washers to the gearbox.
8. Connect two Lucar connectors. The connectors may be fitted either way round.
9. Perform a functional check of the overdrive circuit.
10. Refit the gearbox tunnel cover 76.25.07.



- A '2nd gear on' switch
B '3rd and 4th gear on' switch

B
S
brown + blue
brown

Dash
B
S
brown + white
purple

SWITCHES

- Overdrive manual switch
- remove and refit

86.65.35

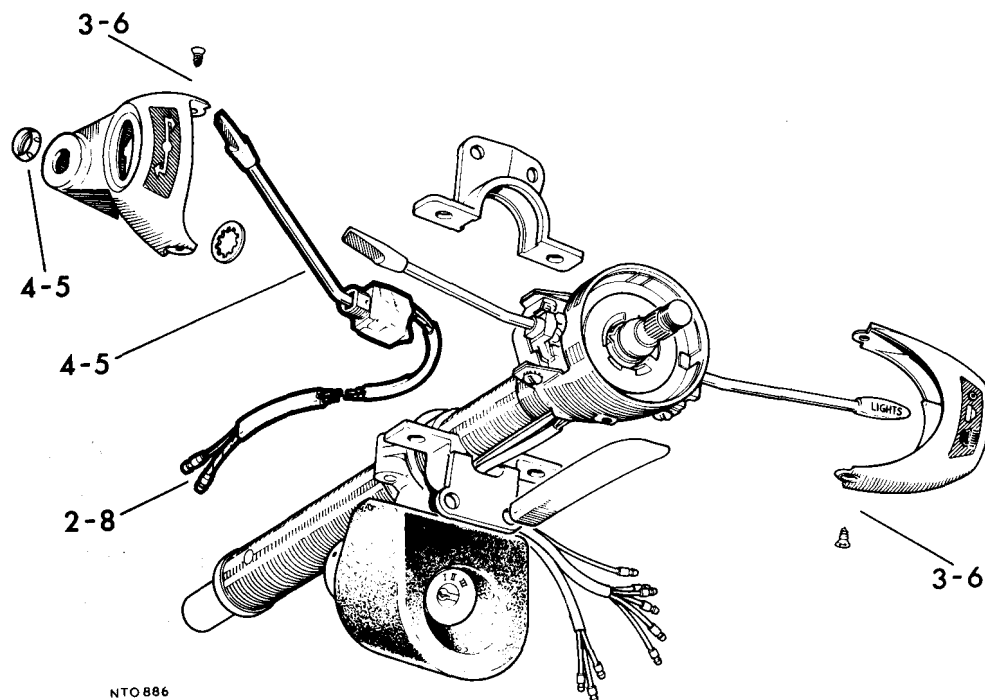
Overdrive vehicles only.

Removing

1. Perform 86.65.17 operations 1 to 5.
2. Disconnect two snap connectors.
3. Remove two screws. Withdraw two escutcheons.
4. Unscrew the bezel. Remove the switch with its harness.

Refitting

5. Thread the switch harness through the appropriate steering column apertures, fascia panel aperture and steering column clamp aperture. Do not disturb the position of the felt strip located below the wires in the lower half of the steering column clamp. This operation may be facilitated by taping the ends of the wires together. Position the switch and secure with the bezel.
6. Position two escutcheons. Secure with two screws.
7. Ensure that the felt strip is correctly located and rectify if necessary.
8. Connect two snap connectors as follows:
Yellow/green switch wire to yellow/green main harness wire.
Black switch wire to yellow main harness wire.
9. Perform 86.65.17 operations 14 to 18.



NTO 886

ELECTRICAL

SWITCHES

— Windscreen wiper switch —
remove and refit

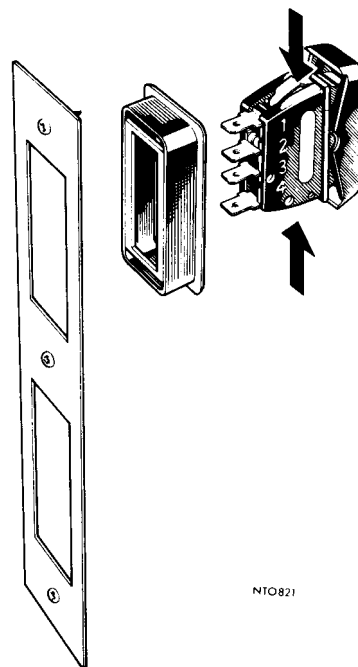
86.65.38

Removing

1. Isolate the battery.
2. Reach up under the fascia and push the switch and escutcheon assembly from the panel.
3. Disconnect four Lucar connectors.
4. Push inwards two spring clips on the switch and withdraw the switch from the escutcheon.

Refitting

5. Reverse instructions 1 to 4. Connect four Lucar connectors as shown on fascia connections 88.00.02 or 88.00.04.



SWITCHES

— Windscreen washer switch —
remove and refit

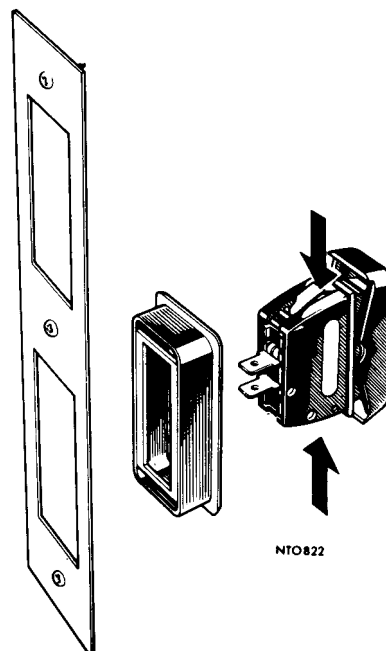
86.65.40

Removing

1. Isolate the battery.
2. Reach up under the fascia and push the switch and escutcheon assembly from the panel.
3. Disconnect two Lucar connectors.
4. Push inwards two spring clips on the switch and withdraw the switch from the escutcheon.

Refitting

5. Reverse instructions 1 to 4. Connect the Lucar connectors either way round.



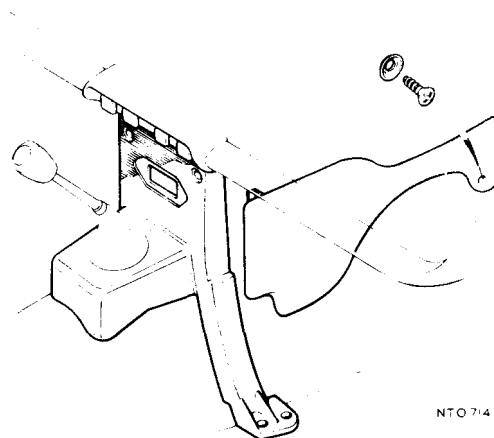
SWITCHES

Heater switch – remove and refit

86.65.44

Removing

1. Insert a suitable probe into the hole in the knob and depress the spring plunger while pulling the knob from the shaft.
2. Remove single screw and washer and withdraw the gearbox cover side trim panel on the passenger side of the vehicle.
3. Disconnect three Lucar connectors.
4. Unscrew the bezel. Withdraw the switch from the control cowl.



NT0 714

Refitting

5. Reverse instructions 1 to 4. Connect three Lucar connectors as shown on fascia connections 88.00.02 or 88.00.04.

SWITCHES

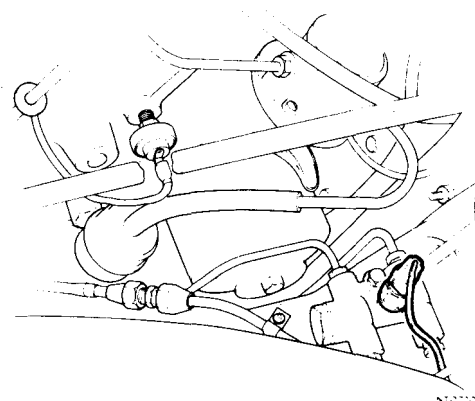
– Brake line failure switch
– remove and refit

86.65.47

Left hand steer vehicles only.

Removing

1. Open the bonnet.
2. Locate the pressure differential warning actuator mounted on the left hand front wheelarch to bulkhead panel.
3. Pull the harness plug from the switch.
4. Using a spanner on the nylon switch body carefully unscrew the switch.



NT0 715

Refitting

5. Carefully screw the switch to the actuator body. Do not overtighten. Torque load to only 12 to 15 in lbf (0.14 to 0.17 kgf m).
6. Fit the harness plug to the switch. Ensure that the plug claws are correctly located. Note that the single wire, but twin socket, harness plug may be fitted either way round as the twin switch pins are electrically common.

ELECTRICAL

SWITCHES

– Hazard switch – remove and refit

86.65.50

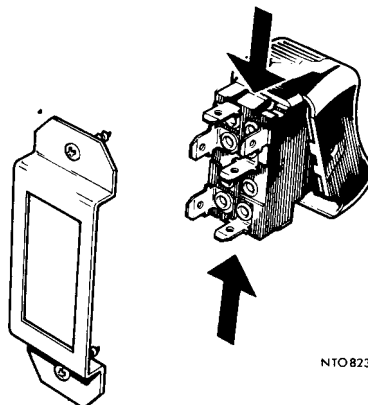
Left hand steer vehicles only.

Removing

1. Isolate the battery.
2. To gain access remove either the speedometer 88.30.01 or the tachometer 88.30.21. The choice depends entirely on which operation is preferred by the individual fitter.
3. Push inwards two plastic clips on the switch and withdraw the switch from the panel.
4. Disconnect the Lucar connectors.

Refitting

5. Early left hand steer vehicles with hazard circuit using relay –
Connect the Lucar connectors as shown on fascia connections 88.00.02.
6. Later left hand steer vehicles with hazard circuit not using relay –
Connect the Lucar connectors as shown on fascia connections 88.00.04.
7. Reverse instructions 1 to 3.



SWITCHES

– Stop lamp switch – remove and refit

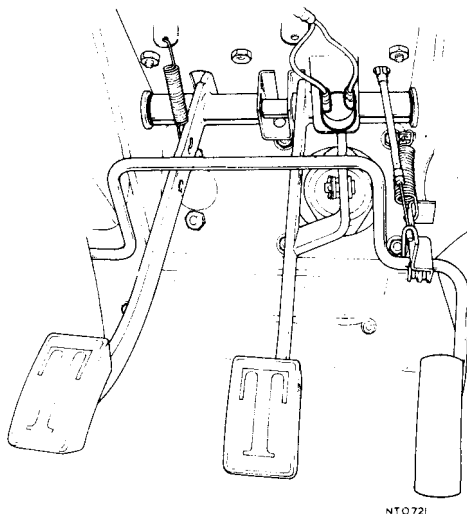
86.65.51

Removing

1. Locate the switch adjacent to the brake pedal arm.
2. Disconnect two Lucar connectors.
3. Slacken the large hexagon nut.
4. Unscrew the switch from the nut.
5. Collect up the nut and two shakeproof washers.

Refitting

6. Assemble the switch, two shakeproof washers and the nut to the bracket. A shakeproof washer should be positioned either side of the bracket. Do not overtighten the nut on the plastic threads or the switch may be damaged.
7. Connect two Lucar connectors either way round.
8. Switch on the ignition and perform a functional check of the stop lamp circuit.



SWITCHES

– Turn signal switch – remove and refit

86.65.54

Removing

1. Perform 86.65.17 operations 1 to 5.
2. Disconnect three snap connectors.
3. Remove two screws. Withdraw two escutcheons.
4. Remove two screws and anti-vibration washers. Remove the switch with its harness.

Refitting

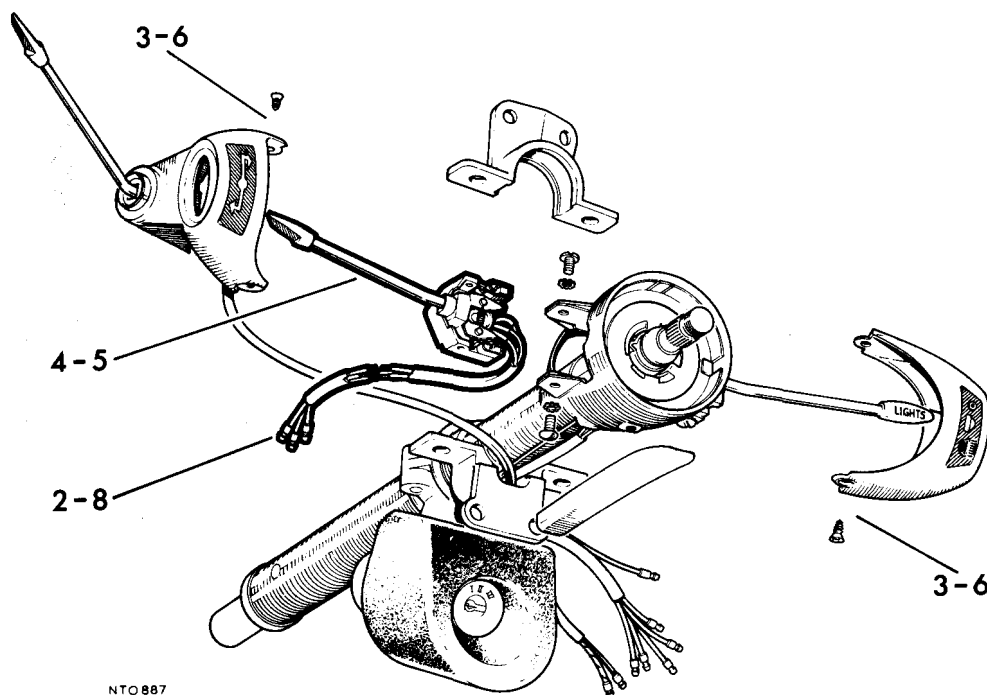
5. Thread the switch harness through the appropriate steering column apertures, fascia panel aperture and steering column clamp aperture. Do not disturb the position of the felt strip located below the wire in the lower half of the steering column clamp. This operation may be facilitated by taping the ends of the wires together. Position the switch and secure with two screws and anti-vibration washers.
6. Position two escutcheons. Secure with two screws.
7. Ensure that the felt strip is correctly located and rectify if necessary.
8. Connect three snap connectors as follows:

Light green/brown switch wire to light green/brown main harness wire.

Green/red switch wire to green/red main harness wire.

Green/white switch wire to green/white main harness wire.

9. Perform 86.65.17 operations 14 to 18.



NTO887

ELECTRICAL

SWITCHES

– Fuel pump inertia cut out switch – remove and refit

86.65.58

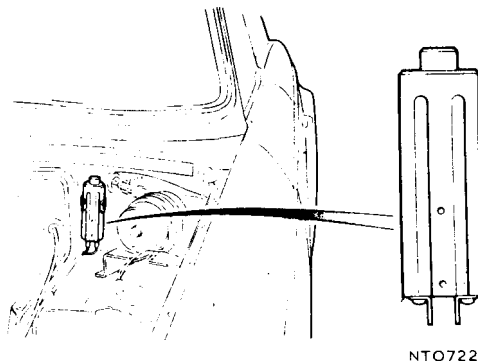
Petrol injection vehicles only.

Removing

1. Open the bonnet.
2. Locate the switch mounted in a clip attached to the bulkhead.
3. Pull the switch from the clip.
4. Disconnect two Lucar connectors.

Refitting

5. Connect two Lucar connectors either way round.
6. Fit the switch to the clip.
7. Reset 86.65.59.



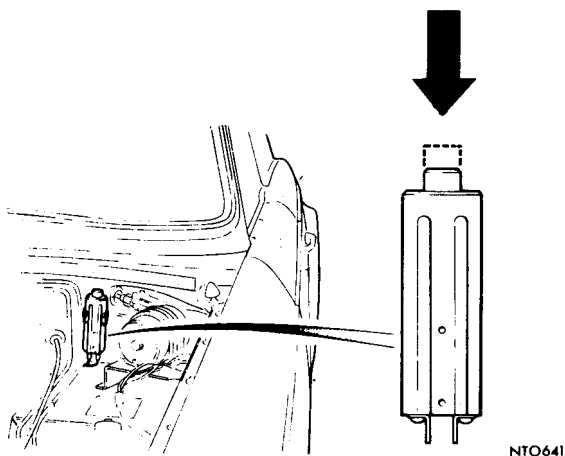
SWITCHES

– Fuel pump inertia cut out switch – reset

86.65.59

Petrol injection vehicles only.

1. Open the bonnet.
2. Locate the switch mounted in a clip attached to the bulkhead.
3. Depress the button so that the switch is in its normal operating condition with the contacts closed.



FUSE CHART

| Fuse | Circuits | Amps | Colour code | Lucas Part No. | Stanpart No. |
|-----------------------------|---|------|-------------|----------------|--------------|
| BATTERY CONTROL | Cubby box illumination Hazard (when fitted) Headlamp flasher Horn Key light (when fitted) Key warning (when fitted) Luggage boot lamp Transmission tunnel lamp | 35 | White | 188218 | 58465 |
| COLUMN LIGHT SWITCH CONTROL | Front marker lamp (when fitted) Front parking lamp Instrument illumination Plate illumination lamp Rear marker lamp (when fitted) Tail lamp | 35 | White | 188218 | 58465 |
| IGNITION CONTROL | Fuel indication Heater Reverse lamp Seat belt warning (when fitted) Stop lamp Temperature indication Turn signal Windscreen washer Windscreen wiper | 35 | White | 188218 | 58465 |

FUSE

Remove and refit

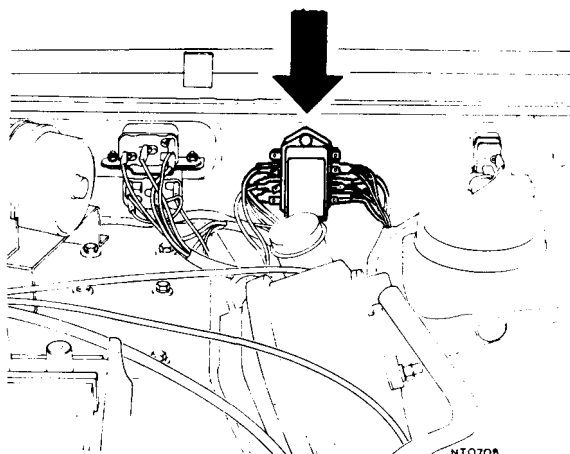
86.70.02

Removing

1. Lift the bonnet and locate the fusebox on the left hand front wheelarch closing panel.
2. Pull off the plastic cover.
3. Identify the defective fuse.
4. Carefully lever the fuse from the contacts.

Refitting

5. Reverse instructions 1 to 4.



INSTRUMENT OPERATIONS

| | |
|---|----------|
| Ammeter — remove and refit | 88.10.01 |
| Fascia connections | 88.00.01 |
| Fuel indicator — remove and refit | 88.25.26 |
| Fuel tank unit — remove and refit | 88.25.32 |
| Oil pressure gauge — remove and refit | 88.25.01 |
| Speedometer cable — complete — remove and refit | 88.30.06 |
| Speedometer cable — inner remove and refit | 88.30.07 |
| Speedometer — remove and refit | 88.30.01 |
| Tachometer cable — complete — remove and refit | 88.30.23 |
| Tachometer cable — inner — remove and refit | 88.30.24 |
| Tachometer — remove and refit | 88.30.21 |
| Temperature indicator — remove and refit | 88.25.14 |
| Temperature transmitter — remove and refit | 88.25.20 |
| Voltage stabilizer — remove and refit | 88.20.26 |

FASCIA CONNECTIONS

Due to the number of permutations possible, a fascia connections diagram for each market cannot be included in the manual.

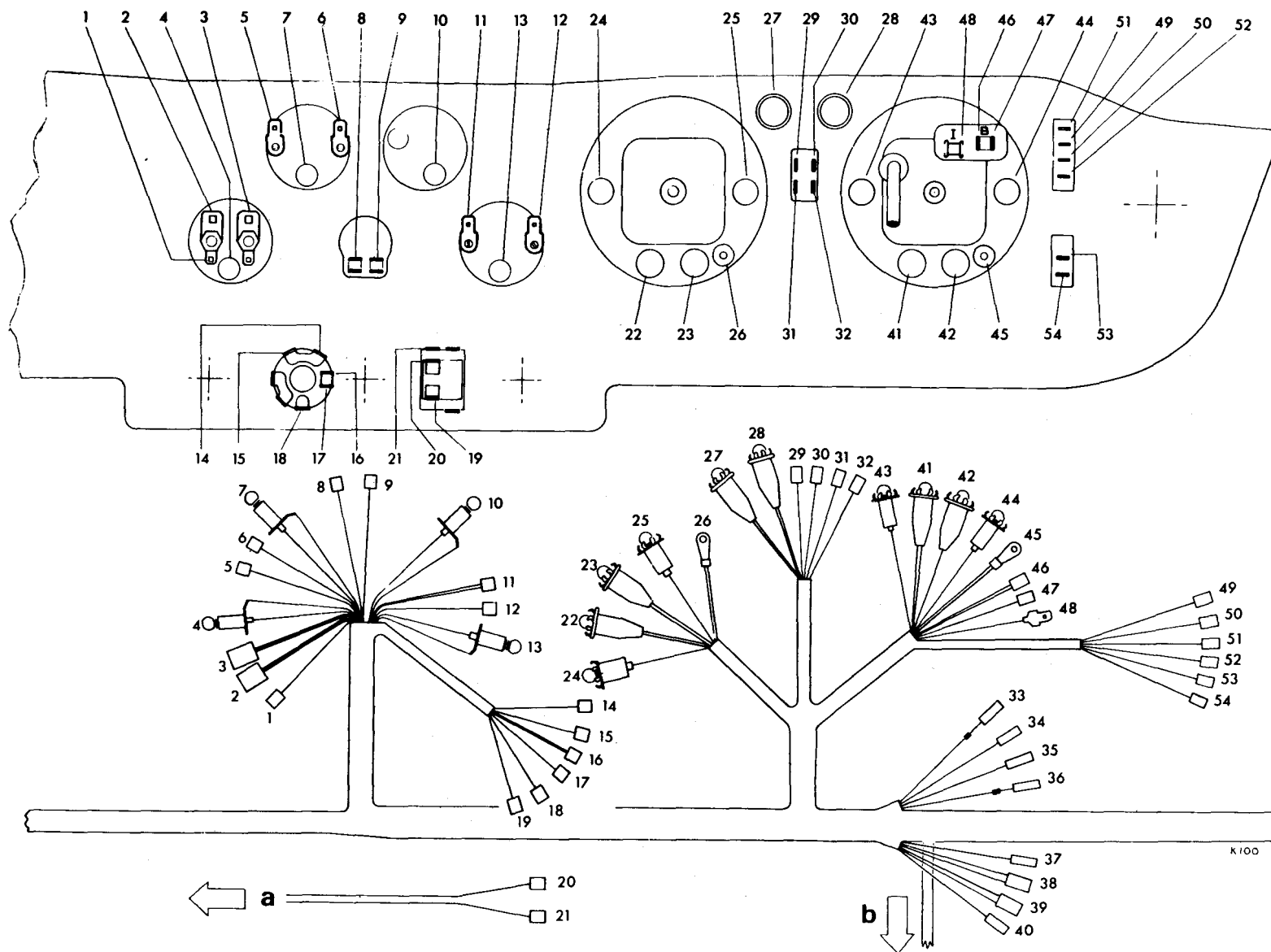
To provide full information, two fascia connections diagrams are featured. One shows the 'Early minimum equipment condition' while the other indicates the 'Later maximum equipment condition'.

By referring to both diagrams, service personnel may easily obtain the required information for any specific vehicle.

A summary of the variations involved is given below:

| EARLY MINIMUM EQUIPMENT CONDITION – DIAGRAM 1 | LATER MAXIMUM EQUIPMENT CONDITION – DIAGRAM 2 |
|---|--|
| Ignition/starter switch fitted to central control cowl. | Ignition/starter switch fitted to steering column lock assembly. |
| Hazard warning circuit with relay. | Hazard warning circuit without relay. |
| No key warning system. | Key warning system. |
| No seat belt warning system. | Seat belt warning system. |

FASCIA CONNECTIONS – DIAGRAM 1





FASCIA CONNECTIONS – DIAGRAM 1

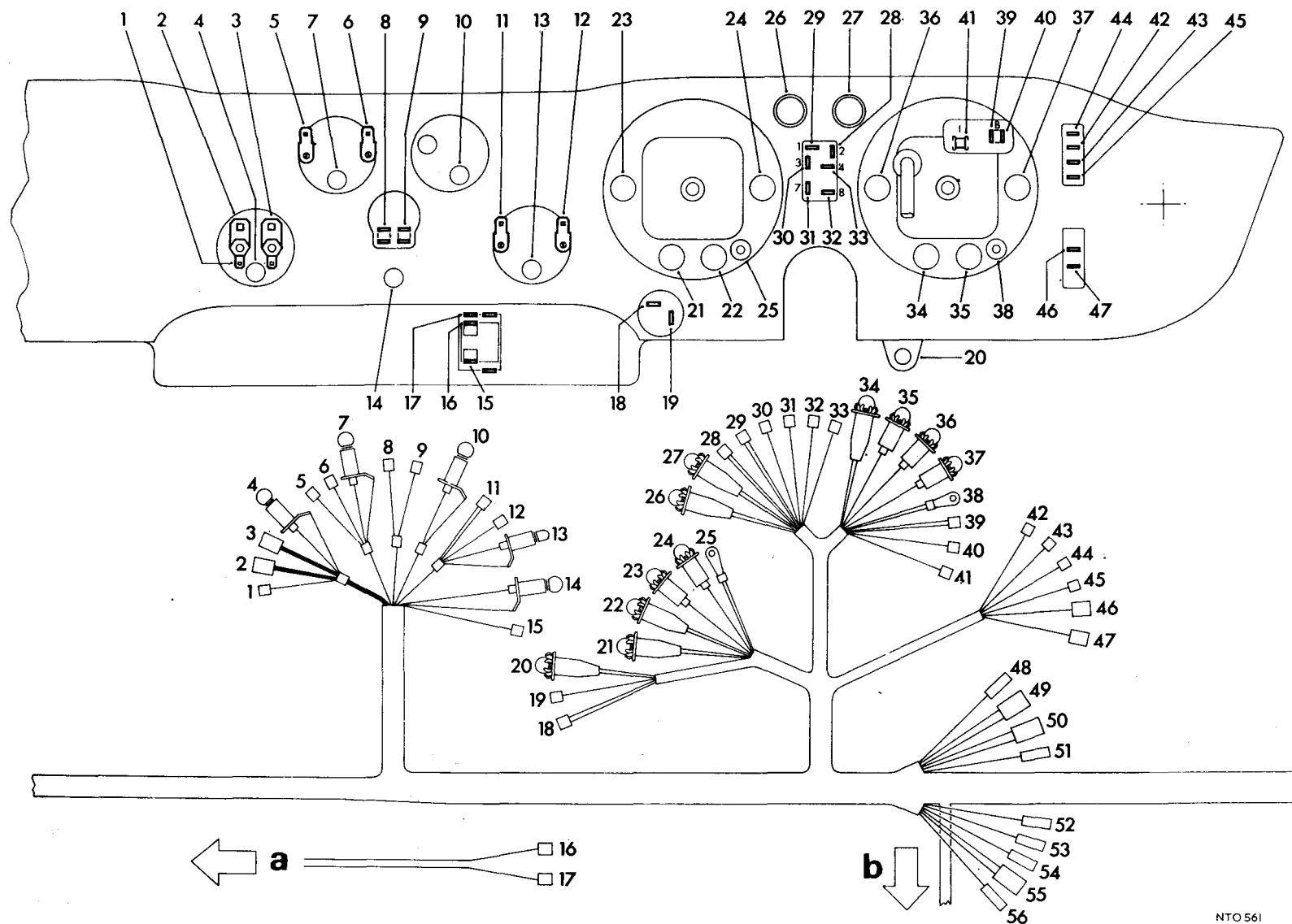
Left hand steer shown – Right hand steer – similar

| No. | Colour Code | Connection | Components | No. | Colour Code | Connection | Components |
|-----|-------------|-----------------|---|-----|---------------------|--------------------------------|---------------------------------------|
| 1 | NW | Lucar | Ammeter | 29 | LG/N | Lucar | Hazard switch – left hand steer only |
| 2 | NW | Lucar | Ammeter | 30 | LG/N | Lucar | Hazard switch – left hand steer only |
| 3 | N | Lucar | Ammeter | 31 | P | Lucar | Hazard switch – left hand steer only |
| 4 | RW and B | Bulb holder | Ammeter | 32 | PR | Lucar | Hazard switch – left hand |
| 5 | LG/G | Lucar | Fuel indicator | 33 | NW with blue indent | Snap connector | Column light switch |
| 6 | GB | Lucar | Fuel indicator | 34 | RG | Snap connector | Column light switch |
| 7 | RW and B | Bulb holder | Fuel indicator | 35 | U | Snap connector | Column light switch |
| 8 | R | Lucar | Panel rheostat | 36 | P with brown indent | Snap connector | Column light switch |
| 9 | RW | Lucar | Panel rheostat | 37 | LG/N | Snap connector | Turn signal switch |
| 10 | RW and B | Bulb holder | Oil pressure indicator | 38 | GR | Double snap connector – 2 wire | Turn signal switch |
| 11 | LG/G | Lucar – 2 wire | Temperature indicator | 39 | GW | Double snap connector – 2 wire | Turn signal switch |
| 12 | GU | Lucar | Temperature indicator | 40 | PB | Snap connector | Horn push |
| 13 | RW and B | Bulb holder | Temperature indicator | 41 | GR and GW | Bulb holder | Speedometer-turn signal warning light |
| 14 | NW | Lucar | Ignition/starter switch | 42 | UW | Bulb holder | Speedometer-main beam warning light |
| 15 | NW | Lucar | Ignition/starter switch | 43 | RW | Bulb holder | Speedometer |
| 16 | W | Lucar – 2 wire | Ignition/starter switch | 44 | RW | Bulb holder | Speedometer |
| 17 | W | Lucar | Ignition/starter switch | 45 | B | Eyelet – 2 wire | Speedometer |
| 18 | WR | Lucar | Ignition/starter switch | 46 | G | Lucar – 2 wire | Voltage stabilizer |
| 19 | G | Lucar | Heater switch | 47 | G | Lucar | Voltage stabilizer |
| 20 | GN | Lucar | Heater switch | 48 | LG/G | Lucar blade | Voltage stabilizer |
| 21 | GY | Lucar | Heater switch | 49 | G | Lucar | Windscreen wiper switch |
| 22 | W and NY | Bulb holder | Tachometer-ignition warning light | 50 | R/LG | Lucar | Windscreen wiper switch |
| 23 | WB and WN | Bulb holder | Tachometer-oil pressure warning light | 51 | U/LG | Lucar | Windscreen wiper switch |
| 24 | RW | Bulb holder | Tachometer | 52 | N/LG | Lucar | Windscreen wiper switch |
| 25 | RW | Bulb holder | Tachometer | 53 | G | Lucar | Windscreen wiper switch |
| 26 | B | Eyelet – 2 wire | Tachometer | 54 | LG/B | Lucar | Windscreen wiper switch |
| 27 | W and WB | Bulb holder | Brake line failure warning light – left hand steer only | | | | |
| 28 | LG/P and B | Bulb holder | Hazard warning light – left hand steer only | | | | |

a GN and GY – to heater motor

b G and GP – to stop lamp switch

FASCIA CONNECTIONS – DIAGRAM 2



NTO 561





FASCIA CONNECTIONS – DIAGRAM 2

Left hand steer shown – Right hand steer – similar

| No | Colour code | Connection | Component | No. | Colour code | Connection | Components |
|-------|-------------|-----------------|---|-----|-------------------|--------------------------------|---|
| 1 | NW | Lucar | Ammeter | 30. | LG/K | Lucar | Hazard switch – left hand steer only |
| 2 | NW | Lucar | Ammeter | 31. | LG/G <i>green</i> | Lucar | Hazard switch – left hand steer only |
| 3 | N | Lucar | Ammeter | 32 | LG/S <i>late</i> | Lucar | Hazard switch – left hand steer only |
| 4 | RW and B | Bulb holder | Ammeter | 33 | G | Lucar | Hazard switch – left hand steer only |
| 5 | LG | Lucar | Fuel indicator | 34 | GR and GW | Bulb holder | Speedometer – turn signal warning light |
| 6 | GB | Lucar | Fuel indicator | 35 | UW | Bulb holder | Speedometer – main beam warning light |
| 7 | RW and B | Bulb holder | Fuel indicator | 36 | RW | Bulb holder | Speedometer |
| 8 | R | Lucar | Panel rheostat | 37 | RW | Bulb holder | Speedometer |
| 9 | RW | Lucar | Panel rheostat | 38 | B | Eyelet – 2 wire | Speedometer |
| 10 | RW and B | Bulb holder | Oil pressure indicator | 39 | G | Lucar – 2 wire | Voltage stabilizer |
| 11 | LG | Lucar – 2 wire | Temperature indicator | 40 | G | Lucar | Voltage stabilizer |
| 12 | GU | Lucar | Temperature indicator | 41 | LG | Lucar blade | Voltage stabilizer |
| 13 | RW and B | Bulb holder | Temperature indicator | 42 | LG/B | Lucar | Windscreen wiper switch |
| 14 | LG/O and B | Bulb holder | Seat belt warning light | 43 | R/LG | Lucar | Windscreen wiper switch |
| 15 | G | Lucar | Heater switch | 44 | U/LG | Lucar | Windscreen wiper switch |
| 16 | GW | Lucar | Heater switch | 45 | N/LG | Lucar | Windscreen wiper switch |
| 17 | GY | Lucar | Heater switch | 46 | G | Lucar | Windscreen washer switch |
| 18 | PO | Lucar – 2 wire | Buzzer | 47 | LG/B | Lucar | Windscreen washer switch |
| 19 | BG | Lucar | Buzzer | 48 | PB | Snap connector | Horn push |
| 20 | PO and B | Bulb holder | Key light | 49 | GW | Double snap connector – 2 wire | Turn signal switch |
| 21 | W and NY | Bulb holder | Tachometer – ignition warning light | 50 | GR | Double snap connector – 2 wire | Turn signal switch |
| 22 | BP and WN | Bulb holder | Tachometer – oil pressure warning light | 51 | LG/N | Snap connector | Turn signal switch |
| 23. | RW | Bulb holder | Tachometer | 52 | P | Snap connector | Column light switch |
| 24. | RW | Bulb holder | Tachometer | 53 | U | Snap connector | Column light switch |
| 25. | B | Eyelet – 2 wire | Tachometer | 54 | RG | Snap connector | Column light switch |
| 26. | W and BP | Bulb holder | Brake line failure warning light – left hand steer only | 55 | UW | Lucar – 2 wire | Column light switch |
| 27. | LG/G and B | Bulb holder | Hazard warning light – left hand steer only | 56 | NW | Snap connector | Column light switch |
| 28. ✓ | GW | Lucar – 2 wire | Hazard switch – left hand steer only | | | | |
| 29. ✓ | GR | Lucar – 2 wire | Hazard switch – left hand steer only | | | | |

a. GN and GY To heater motor b. G and GP To stop lamp switch

INSTRUMENTS

AMMETER

– Remove and refit

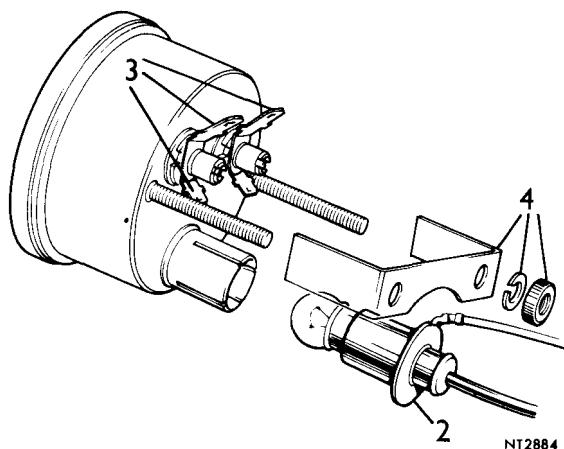
88.10.01

Removing

1. Obtain access to the rear of the ammeter by reaching over the gearbox cover side trim panel.
2. Pull out the panel light bulb holder.
3. Disconnect the three Lucar connectors.
4. Remove the two knurled nuts, spring washers, and clamp bracket.
5. Withdraw the ammeter from the fascia.

Refitting

6. Reverse instructions 1 to 5.



VOLTAGE STABILISER

– Remove and refit

88.20.26

Removing

1. Remove the speedometer 88.30.01.
2. Remove one screw and lift off the voltage stabiliser.

Refitting

3. Reverse instructions 1 and 2.

OIL PRESSURE GAUGE

– Remove and refit

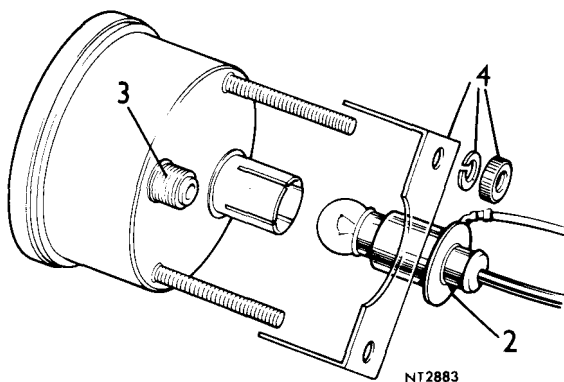
88.25.01

Removing

1. Lower the veneered fascia to the service position. Operation 76.46.01 instructions 1 to 6.
2. Pull out the bulb holder.
3. Unscrew the nut securing the oil pipe to the gauge.
4. Remove the two knurled nuts, spring washers and clamp bracket.
5. Withdraw the gauge from the fascia.

Refitting

6. Reverse instructions 1 to 5.



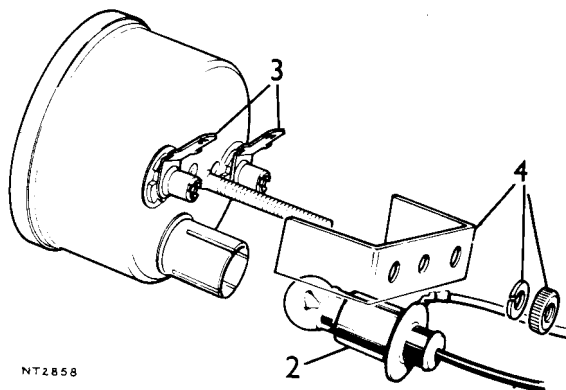
TEMPERATURE INDICATOR

– Remove and refit

88.25.14

Removing

1. Obtain access to the rear of the indicator by reaching over the gearbox cover side trim panel.
2. Pull out the bulb holder.
3. Disconnect the two Lucar connectors.
4. Remove the knurled nut, spring washer and clamp bracket.
5. Withdraw the indicator from the fascia.



Refitting

6. Reverse instructions 1 to 5.

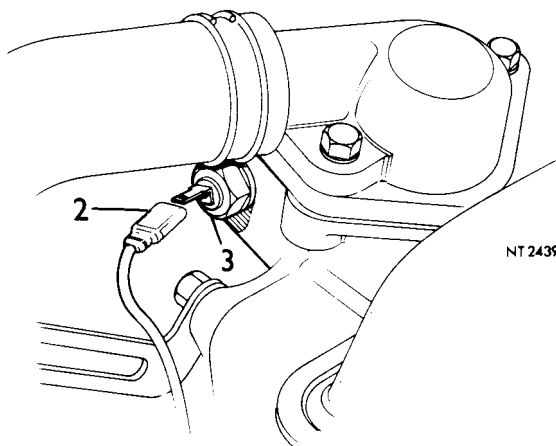
TEMPERATURE TRANSMITTER

– Remove and refit

88.25.20

Removing

1. Drain part of the coolant 26.10.01.
2. Disconnect the Lucar connector.
3. Unscrew the transmitter.



Refitting

4. Reverse instructions 1 to 3.

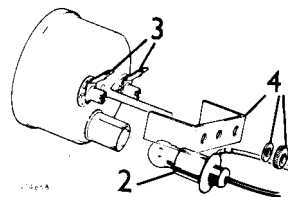
FUEL INDICATOR

– Remove and refit

88.25.26

Removing

1. Lower the veneered fascia to the service position. Operation 76.46.01 instructions 1 to 6.
2. Pull out the bulb holder.
3. Disconnect the two Lucar connectors.
4. Remove the knurled nut, spring washer and clamp bracket.
5. Withdraw the indicator from the fascia.



Refitting

6. Reverse instructions 1 to 5.

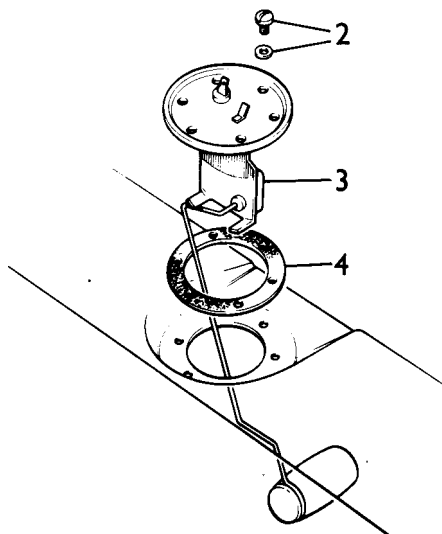
FUEL TANK UNIT

– Remove and refit

88.25.32

Removing

1. Remove the fuel tank 19.55.01.
2. Remove the six screws and fibre washers.
3. Carefully withdraw the tank unit.
4. Remove the sealing washer.



Refitting

5. Reverse instructions 1 to 4.



INSTRUMENTS

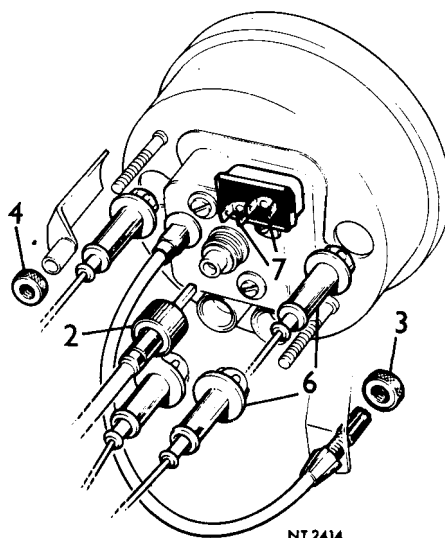
SPEEDOMETER

– Remove and refit

88.30.01

Removing

1. Isolate the battery.
2. Unscrew the knurled nut securing the cable to the speedometer.
3. Unscrew the trip reset knurled nut.
4. Unscrew the two knurled nuts securing the clamp legs and earth lead.
5. Withdraw the speedometer.
6. Pull out the four bulb holders.
7. Disconnect the two Lucar connectors from the voltage stabiliser.



Refitting

8. Reverse instructions 1 to 7.

SPEEDOMETER CABLE – COMPLETE

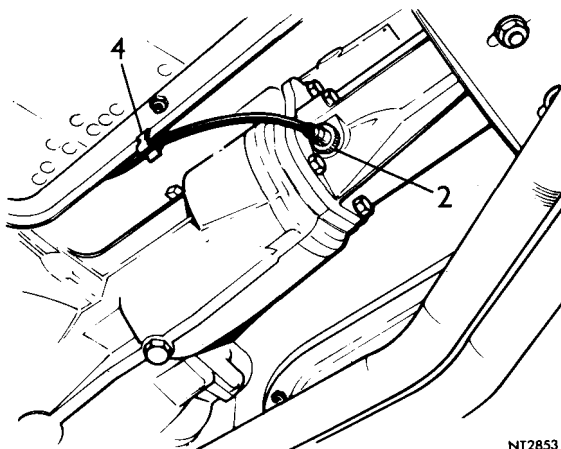
(Non overdrive models)

– Remove and refit

88.30.06

Removing

1. Unscrew the knurled nut securing the cable to the speedometer.
2. Working from below the vehicle, unscrew the knurled nut securing the cable to the gearbox extension.
3. To assist refitting, carefully note the cable position relative to other components.
4. Detach the cable from the clip securing it to the body.
5. Manoeuvre the cable downwards through the grommet aperture and detach it from the vehicle.



Refitting

6. Reverse instructions 1 to 5. Seal the grommet to the bulkhead with Seelastik SR51.

SPEEDOMETER CABLE – COMPLETE

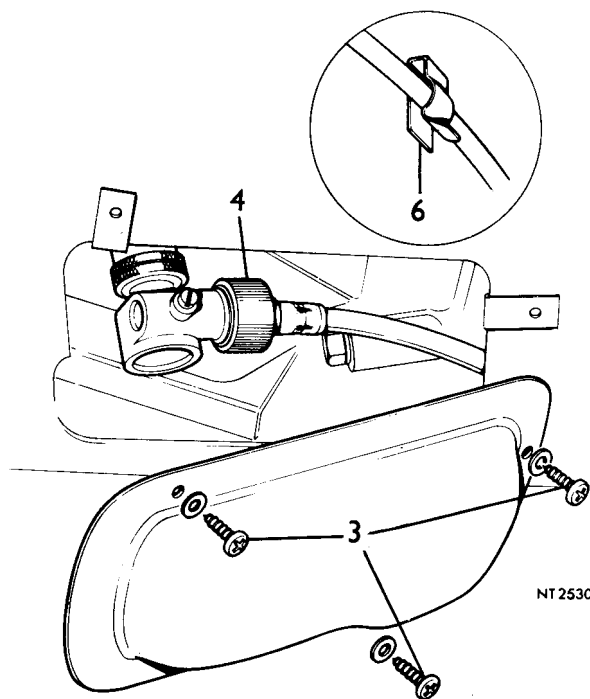
(Overdrive models)

– Remove and refit

88.30.06

Removing

1. Unscrew the knurled retainer securing the cable to the speedometer.
2. Raise the right hand side of the rear gearbox cover carpet.
3. Remove the three screws and washers. Pull the access plate away from the gearbox cover.
4. Unscrew the knurled retainer securing the cable to the angle drive.
5. To assist refitting, carefully note the cable positions relative to other components.
6. Working from below the vehicle, detach the cable from the clip securing it to the body.
7. Manoeuvre the cable through the grommet aperture and detach it from the vehicle.

**Refitting**

8. Reverse instructions 1 to 7. Seal the grommet to the bulkhead with Seelastik SR51.

SPEEDOMETER CABLE – INNER

– Remove and refit

88.30.07

Removing

1. Unscrew the knurled retainer securing the cable to the speedometer.
2. Using long nosed pliers, withdraw the inner cable. Take care not to contaminate the upholstery or fittings with grease.

Refitting

3. Sparingly grease the inner cable. Do not use oil.
4. Feed the inner cable into the outer cable rotating it slightly to assist operation.
5. Withdraw the inner cable about 8 ins (200 mm) and wipe off surplus grease. Re-insert the inner cable, rotating it slightly to assist engagement of the squared end to the drive gear.
6. Engage the inner cable to the speedometer.
7. Refit the knurled retainer.

INSTRUMENTS

TACHOMETER

— Remove and refit

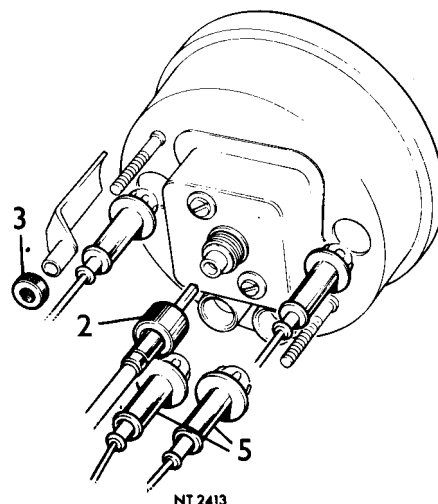
88.30.21

Removing

1. Isolate the battery.
2. Unscrew the knurled retainer securing the cable to the tachometer.
3. Unscrew the two knurled nuts securing the clamp legs and earth lead.
4. Withdraw the tachometer.
5. Pull out the four bulb holders.

Refitting

6. Reverse instructions 1 to 5.



TACHOMETER CABLE — COMPLETE

— Remove and refit

88.30.23

Removing

1. Unscrew the knurled retainer securing the cable to the distributor.
2. Unscrew the knurled retainer securing the cable to the tachometer.
3. Pull the cable through the grommet aperture and detach it from the vehicle.

Refitting

4. Reverse instructions 1 to 3. Seal the grommet to the bulkhead with Seelastik SR51.

TACHOMETER CABLE — INNER

— Remove and refit

88.30.24

Removing

1. Unscrew the knurled retainer securing the cable to the tachometer.
2. Using long-nosed pliers, withdraw the inner cable. Take care not to contaminate the upholstery or fittings with grease.

Refitting

3. Sparingly grease the inner cable. Do not use oil.
4. Feed the inner cable into the outer cable, rotating it slightly to assist operation.
5. Withdraw the inner cable about 8 ins (200 mm) and wipe off surplus grease. Re-insert the inner cable, rotating it slightly to assist engagement of the squared end to the drive gear.
6. Engage the inner cable to the tachometer.
7. Refit the knurled retainer.

SERVICE TOOLS

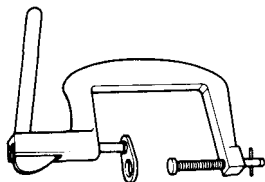
| Tool No. | Description | Tool No. | Description |
|-------------|---|---|---|
| 18G.106 | Valve spring compressor | ** OVERDRIVE TOOLS – 'A' Type ** | |
| 47 | Multi-purpose hand press | L.178 | Freewheel assembly ring |
| MS51 | Trim fastener clamp | L.182 | Accumulator piston housing remover |
| 60A | Valve guide remover/replacer | L.183A | Pump barrel remover |
| S.60A-2A | Valve guide remover/replacer adaptor set | L.183-1 | Adaptor |
| S.60A-7 | Valve guide replacer adaptor | L.184 | Oil pump body replacer |
| S.69B | Gearbox mainshaft circlip remover | L.185A | Dummy drive shaft |
| M.84B | Pinion bearing setting gauge | L.187 | Tailshaft bearing remover/replacer |
| M.84B-1 | Pinion and dummy bearing set | L.188A | Hydraulic test equipment |
| M.86C | Rear hub remover | L.188-4 | Pressure test hose |
| S.98A | Pre-load gauge | ** OVERDRIVE TOOLS – 'J' Type | |
| S.101 | Differential case spreader | L.178A | Freewheel assembly ring |
| S.101-1 | Differential case spreader adaptor | L.188A | Hydraulic test equipment |
| S.123A | Pinion bearing outer cup remover | L.188A-2 | Pressure take-off adaptor |
| S.144 | Gearbox mainshaft circlip remover | L.354A | Oil pump plug spanner |
| S.167A | Circlip installer | L.401A | Relief valve body and dashpot sleeve remover/replacer |
| S.306 | Brake adjusting tool | L.402 | Pressure adaptor spline release ** |
| S.314 | Mainshaft ball bearing replacer | | |
| 316X | Valve seat cutter handle | | |
| S.317 | Rear hub adjusting nut wrench | | |
| S.318 | Halfshaft assembly holding jig | | |
| 335 | Con rod aligning jig | | |
| S.336-4 | Con rod arbor adaptor | | |
| S.341 | Rack mounting compressor | | |
| S.351 | Petrol Injection pressure test adaptor | | |
| RG.421 | Coupling flange holding wrench | | |
| 550 | Driver handle | | |
| 642 | Electronic tachometer | | |
| S.4221A-5 | I.F.S. Coil spring remover and replacer adaptor | | |
| S.4221A-10 | Differential bearing remover/replacer | | |
| S.4221A-11 | Pinion bearing cone remover/replacer adaptor | | |
| S.4221A-15A | Gearbox ball race remover/replacer adaptor | | |
| S.4221A-16 | Outer taper bearing remover/replacer adaptor | | |
| 4235A | Impact remover | | |
| S.4235A-2 | Constant pinion remover adaptor | | |
| 7066 | Circlip pliers | | |

All Service Tools mentioned in this Manual must be obtained direct from the manufacturers:

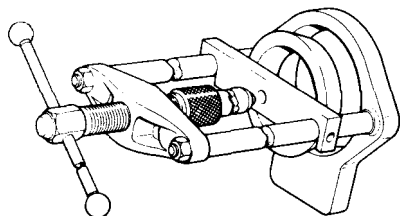
Messrs V.L. Churchill & Co. Ltd.
P.O. Box No. 3
London Road,
Daventry, Northants.



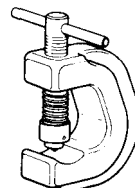
SERVICE TOOLS



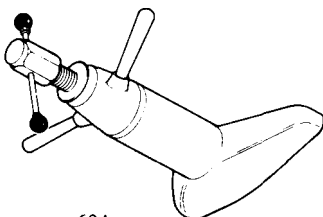
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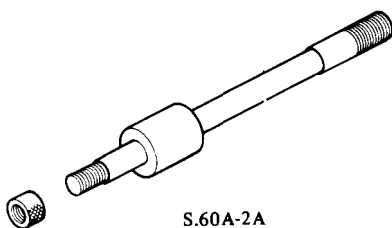
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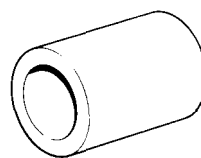
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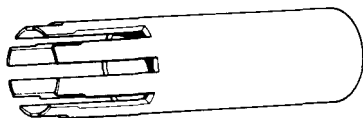
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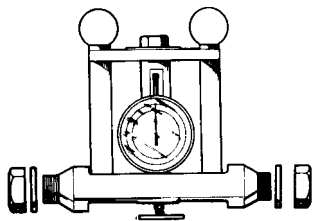
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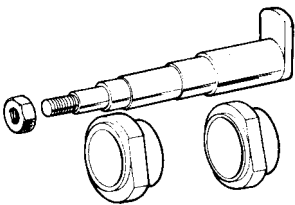
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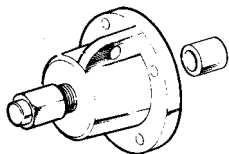
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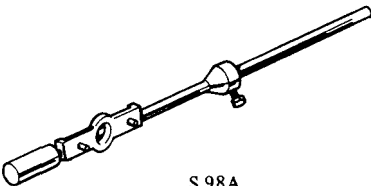
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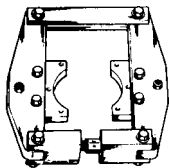
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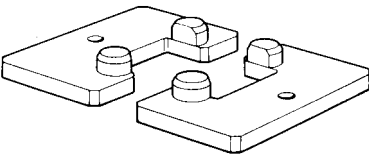
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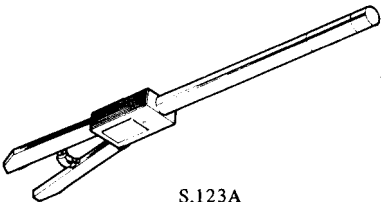
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S.101

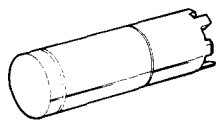


S.101-1

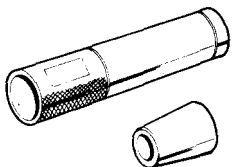


S.123A

SERVICE TOOLS



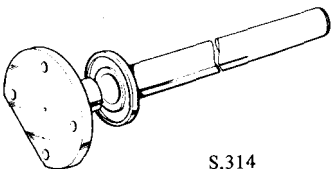
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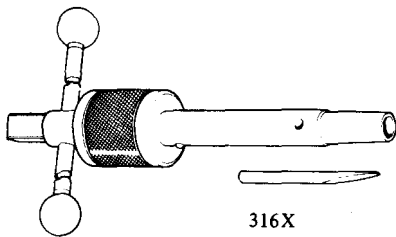
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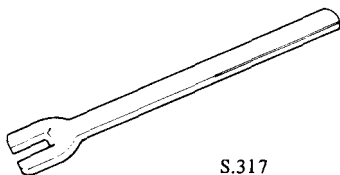
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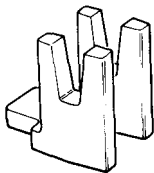
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316X



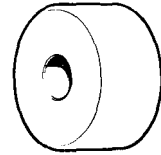
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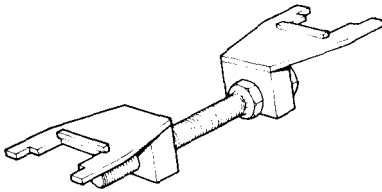
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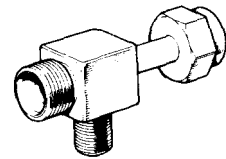
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S.336-4



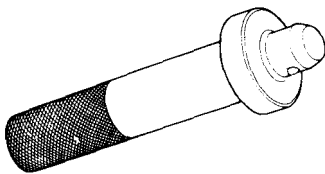
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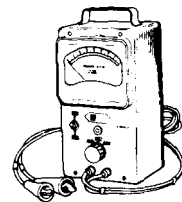
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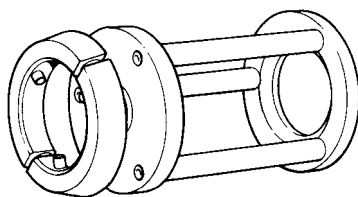
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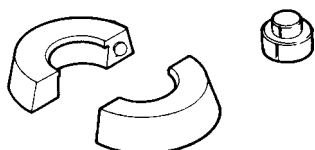
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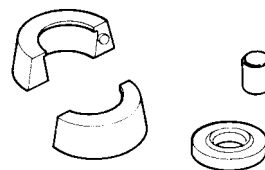
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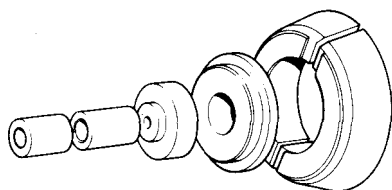
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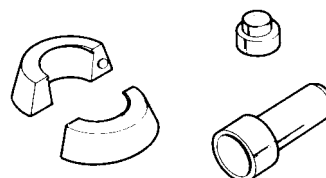
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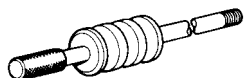
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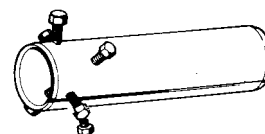
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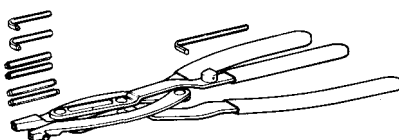
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4235A



S.4235A-2

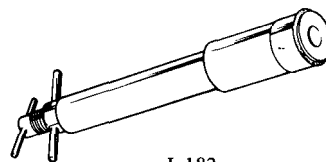


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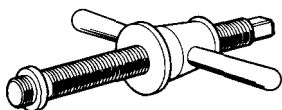
**** OVERDRIVE – 'A' TYPE ****



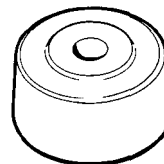
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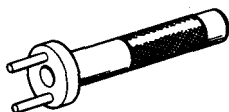
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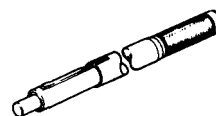
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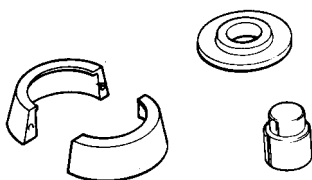
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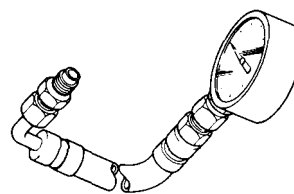
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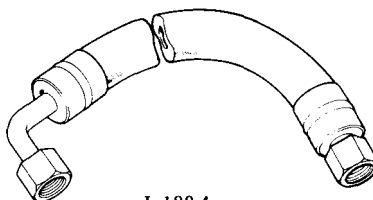
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L.187



L.188A

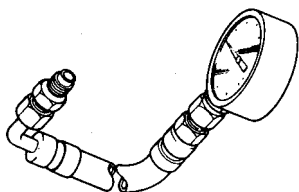


L.188-4

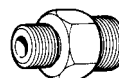
OVERDRIVE - 'J' TYPE



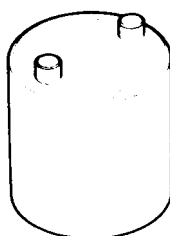
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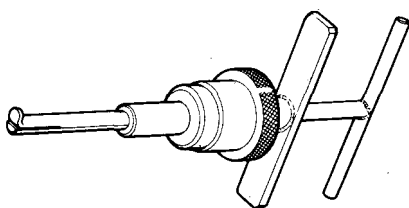
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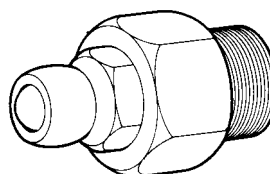
L.188A-2



L.354A



L.401A



L.402

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