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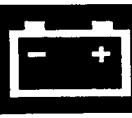

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ELECTRICAL EQUIPMENT

DESCRIPTION

The electrical system is Negative ground, and it is most important to ensure correct polarity of the electrical connections at all times. Any incorrect connections made when reconnecting cables may cause irreparable damage to the semi-conductor devices used in the alternator and regulator. Incorrect polarity would also seriously damage any transistorized equipment such as radio and tachometer etc.

WARNING: During battery removal or before carrying out any repairs or maintenance to electrical components always disconnect the battery negative lead if the positive lead is disconnected with the negative lead in place, accidental contact of the wrench to any grounded metal part could cause a severe spark, possibly resulting in personal injury. Upon installation of the battery the positive lead should be connected first.

ALTERNATOR - LUCAS A133/80

The alternator is a three phase, field sensed unit. The rotor and stator windings produce three phase alternating current, AC, which is rectified to direct current, DC. The electronic voltage regulator unit controls the alternator output voltage by high frequency switching of the rotor field circuit. Use only the correct Range Rover replacement fan belt. Occasionally check that the engine and alternator pulleys are accurately aligned.

It is essential that good electrical connections are maintained at all times. Of particular importance are those in the charging circuit (including those at the battery) which should be occasionally inspected to see that they are clean and tight. In this way any significant increase in circuit resistance can be prevented.

Do not disconnect battery cables while the engine is running or damage to the semi-conductor devices may occur. It is also inadvisable to break or make any connections in the alternator charging and control circuits while the engine is running.

The Model 15TR electronic voltage regulator employs micro-circuit techniques resulting in improved performance under difficult service conditions. The whole assembly is encapsulated in silicone rubber and housed in an aluminium heat sink, ensuring complete protection against the adverse effects of temperature, dust, and moisture etc.

The regulating voltage is set during manufacture to give the required regulating voltage range of 14.2 ± 0.2 volts, and no adjustment is necessary. The only maintenance needed is the occasional check on terminal connections and wiping with a clean dry cloth.

The alternator system provides for direct connection of a charge (ignition) indicator warning light, and eliminates the need for a field switching relay or warning light control unit. As the warning lamp is connected in the charging circuit, lamp failure will cause loss of charge. Lamp should be checked regularly and spare carried.

When using rapid charge equipment to re-charge the battery, the battery must be disconnected from the vehicle.

NOTE: For description and operation of 1992 model year electrical circuits see separate publication:- Electrical troubleshooting manual.

ANTI THEFT ALARM SYSTEM

For 1993 models a vehicle alarm system is available as original equipment. The main function of the system is to offer easy to use remote locking and unlocking of the vehicle without having to actively select the alarm function.

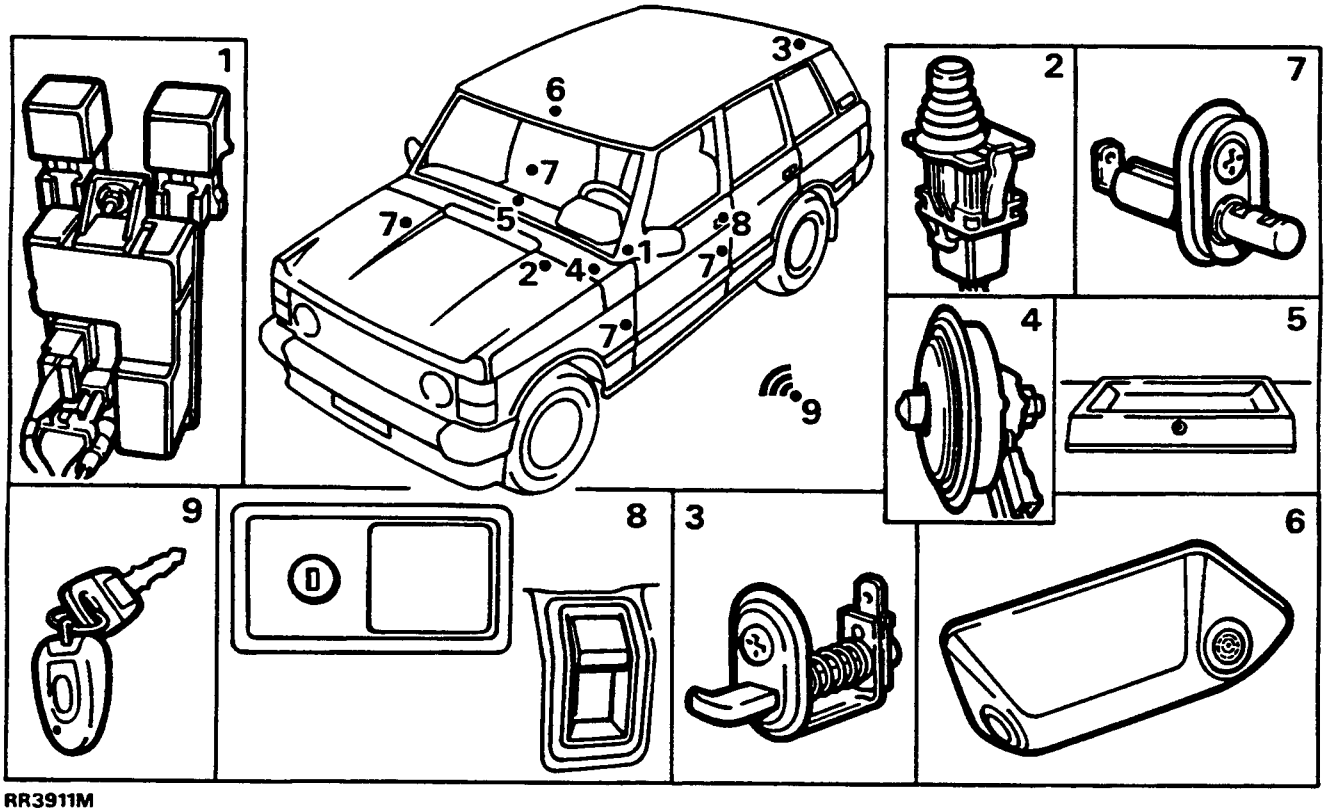
ANTI-THEFT SYSTEM FUNCTION

Perimetric protection

Using the key in the correct sequence will turn on and off perimetric protection only. When fully perimetrically armed, all doors, tailgate, and bonnet are protected against unauthorised access. If the door key is used in the normal manner the driver will be unaware of the door key sequence. The time taken to lock or unlock with the key must be less than 5 seconds. To prevent unauthorised tampering, the alarm will sound if the key is held in the unlocked position for longer than 5 seconds when armed. Cranking is disabled when perimetric protection is armed.

△ **NOTE: When key is turned left or right the keyswitch input will be activated, in conjunction with the sill button switch when links are operated.**

ALARM COMPONENTS



RR3911M

1. Electronic control unit (ECU) and relays
2. Bonnet switch
3. Tailgate switch
4. Alarm horn
5. Light emitting diode (LED)
6. Ultrasonic unit
7. Door switches
8. Lock barrel, sill buttons
9. Handset transmitter (two supplied)

Volumetric protection

Using the handset transmitter will turn on and off volumetric protection. In volumetric mode the vehicle interior is protected using the ultrasonic sensor. Using the handset also arms and disarms the vehicle perimetrically. Cranking is disabled when volumetric and perimetric protection is armed.

NOTE: If armed volumetrically the vehicle CANNOT be disarmed using the key.

Alarm horn

When an intrusion is detected the alarm horn will sound intermittently (Switzerland and Denmark continuous horn sound) and the hazard lights flash (where territorial regulations allow) for 30 seconds. The alarm must be retriggered before alarm horn will sound again.

Vehicle status indication

Vehicle status is indicated by up to three devices: (a) alarm horn, (b) hazard lights, (c) dash board LED. When the vehicle arms in either mode the hazard lights will flash three times and the LED will flash rapidly for 10 seconds. LED will then flash at a slower rate while vehicle is armed. When the vehicle disarms, hazard lights will flash once and LED will extinguish. If LED remains lit, it indicates that the alarm has been triggered. Turning on ignition or arming the alarm will extinguish LED. The LED will give a long pulse flash to indicate the ultrasonic unit being activated.

Radio frequency system

The RF system uses four frequencies according to market. If the coaxial aerial is not fitted system performance will be impaired. Both ECU and handset have a colour coded label.

Central locking

Central locking is controlled by the alarm ECU and may be operated by the key, sill button(s) or handset. The system works on both front doors on four door vehicles or driver's door on two door vehicles.

NOTE: The central door locking system will shut down for a short period after more than 15 consecutive operations.

Inertia switch

An inertia switch is incorporated in the alarm system ECU. If ignition is on and the vehicle receives an impact sufficient to activate the inertia switch, the ECU will signal to unlock central locking actuators and flash hazard lights. Central locking will remain disabled for 30 seconds. To reset turn ignition off and then on after the 30 second period has elapsed.

Ultrasonic unit

The unit operates by emitting an air pressure carrier wave and receiving the wave back. Any disturbance within the vehicle which disturbs the wave will be detected, triggering the alarm.
When the volumetric sensor is activated it monitors movement within the vehicle for 15 seconds before detecting and responding to intrusions. If the sensor detects movement within the vehicle it delays arming until a 15 seconds quiet period has elapsed. If continuous movement is detected the alarm will not arm volumetrically.

Frequency	Colour ECU/Handset	Territory
418.0 MHz	Pink/pink	UK, Ireland
224.5 MHz,	Yellow/yellow	France
433.92 MHz	Blue/blue	Europe, not France, Switzerland, Italy, Denmark
433.92 MHz	White/Blue	Switzerland, Denmark
315.0 MHz	Green/green	Rest of world, Italy, Australia
315.0 MHz	Orange/Green	Gulf, Japan

Partially armed mode

If a door, tailgate or bonnet is left open when the system is armed, the LED will not light for 10 seconds indicating a mislock condition. Hazard lights will not flash. If an open door or tailgate is causing the mislock, the starter motor is disabled. The alarm will sound if ignition is turned to start position. If an open bonnet is causing the mislock the starter motor is disabled. The alarm will arm the volumetric part of the system. If the door tailgate or bonnet is subsequently closed, after a 5 second delay, the doors will unlock and immediately lock and the system will fully arm.

Handset transmitter

The handset LED will give one short flash when button is pressed momentarily.
If button is held down the LED will light again after 2 seconds for 2 seconds, and extinguish until button is released and repressed. The handset contains unique information distinguishing it from other transmitters. It also contains a set of 'random' rolling codes programmed into the ECU before leaving the factory. Each time the handset is pressed a different code is transmitted to the ECU.
If handset is operated more than four times outside the vehicle range (6 metres) or power supply is removed, it will be necessary to re-sychronise handset and the ECU by pressing the handset three times within range and within 5 seconds.

△ **NOTE: If both handsets are lost or damaged when system is armed it will be necessary to fit a new ECU with two matching handsets.**

Handset batteries

If handset LED flashes continuously when button is pressed, the batteries need replacing. The hazard lights will flash one 3 second pulse, instead of three times upon arming vehicle.

Power up mode

The alarm system always remembers the state it was left in when power was removed. If the alarm powers up in an armed state and is subsequently triggered it will give a warning that it will fully trigger unless disarmed. This warning consists of short horn pulses every two seconds for 15 seconds.

New born mode

When the ECU is first produced, it will be in its 'new born' mode. In this mode it will respond to any remote of the right frequency. This mode will be cancelled when the ECU has received ten valid handset signals without power interruption.

Engine cranking

It is only possible to crank the engine when ignition is ON and alarm disabled.

BUILT IN TEST PROCEDURE

The built in test procedure is accessed as follows:

1. Starting conditions: ignition off, doors unlocked, bonnet switch depressed.
2. Carry out instructions 3 to 7 within 8 seconds.
3. Release bonnet switch
4. Switch ignition ON.
5. Lock doors.
6. Switch ignition OFF.
7. Switch ignition ON.

If alarm is correctly accessed, horn will sound and LED will flash. The following checks can be made:

8. Open and close any door or tailgate - LED will light.
9. Depress bonnet switch - hazards will flash.
10. Check engine cranking is disabled. Do not turn off ignition.
11. Check ultrasonic by operating handset, LED will emit one 5 second flash, and will flash if interior is disturbed.

△ **NOTE: If ECU is in new born mode any handset of the right frequency will work. If not an initialised handset is required see Handset Initialisation.**

12. Turn OFF ignition or press handset to end test procedure. Horn will sound as before to indicate end of test mode.

IN CAR ENTERTAINMENT (ICE)

For 1993 model year three levels of factory fitted in car entertainment are available.

New features are as follows:
Side screen antenna, new head units, subwoofer assembly, new speakers and new CD autochanger.

The Mid/low line radio has the following features:
Radio data system (RDS), electronic tuning, one touch memory, automatic programme control (APC), Dolby, subwoofer line output, CATS coded, manual tape deck.

High line radio is as above with the folowing exceptions:
Logic tape deck, blank skip/repeat, 5 channel line output, CD ready (this unit is fitted when the CD option is called for).

Subwoofer

The subwoofer unit is located in the right hand side of the luggage compartment. It amplifies frequencies between 20 and 150 Hz to give an enhanced bass sound.

Subwoofer amplifier

The amplifier is fitted on top of the subwoofer unit.

Speaker amplifier

A remote 4 x 20 amp speaker amplifier is part of high line ICE specification.
This is also fitted on top of the subwoofer.

Side screen antenna

The antenna is now printed into the rear side screen on four door models. For America and Japan the element is fitted in both rear side screens, known as diversity antenna system. Other markets have a single element in the right hand side screen only. Diversity reception means that if vehicle movement results in a loss of signal due to reflections from buildings (known as multipath distortion), the radio will switch to the antenna receiving the strongest signal. This results in less interference and better stereo performance.

Antenna amplifiers

New antenna amplifiers are located behind the headlining above the side screen antenna(s). Right hand side fitment is an FM + AM amplifier, left hand side, diversity, is an FM only amplifier.

Speakers

Trim level 1 - Two door vehicles have two front twin cone speakers Four door vehicles have two coaxial front speakers and two twin cone rear speakers.
Trim level 2 - Four coaxial speakers, two front, two rear and a subwoofer.
Trim level 3 - Four coaxial speakers, two front, two rear, two bass speakers and crossover unit front, a subwoofer and amplifier. Twin cone speakers have a mid range and tweeter cone driven by the same coil. Coaxial speakers have two cones and two coils. Where front doors have bass speakers a crossover unit is fitted which effectively splits the frequency between bass and coaxial.

CD autochanger

The CD autochanger is fitted underneath the subwoofer unit.

ALTERNATOR TESTING

Service repair no - 86.10.01

Charging system check

1. Check battery is in good condition, with an open circuit voltage of at least 12.6 V. Recharge or substitute battery to carry out test.
2. Check drive belt adjustment and condition, see ***See SECTION 10, Maintenance, under bonnet maintenance***
3. Check battery connections are clean and tight.
4. Check alternator connections are clean and tight.
5. Ensure there is no drain on battery from, for example, interior, under bonnet or door edge lamps.

Alternator test

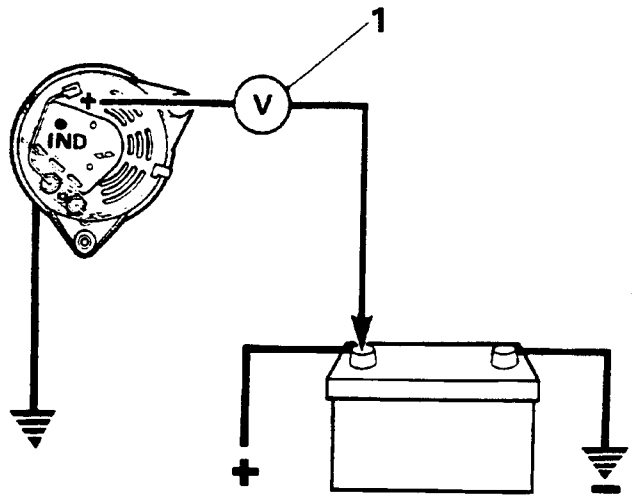
Following instructions refer to use of suitable test equipment using a carbon pile rheostat.

6. Connect test equipment referring to manufacturer's instructions.
7. Start engine and run at 3000 rev/min without accessory load.
8. Rotate carbon pile load control to achieve greatest output (amps) without allowing voltage to fall below 12.0 V. A reading in amps, of alternator output, minus 10% to allow for EFI and ignition loss, should be obtained.
9. Run engine at 3000 rev/min, switch selector to regulator test, read voltmeter. A reading of 13.6 to 14.4 V s hould be obtained.
10. Switch selector to diode/stator test, switch on headlamps to load alternator. Raise engine speed to 3000 rev/min, read voltmeter, needle must be within 'OK' range.

TESTING IN POSITION

Charging circuit resistance test.

1. Connect a low range voltmeter between alternator terminal marked + and positive terminal of battery.



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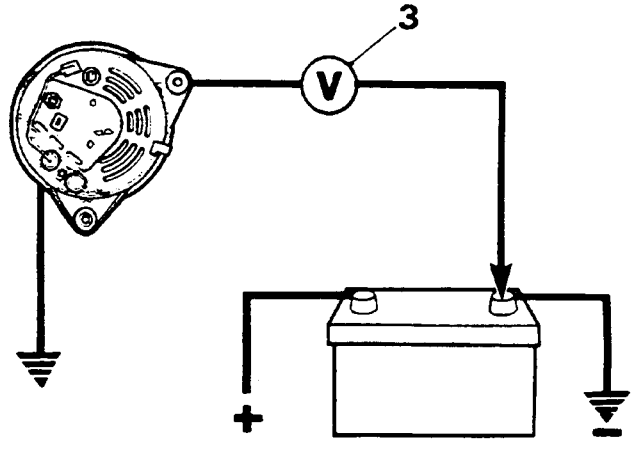
2. Switch on headlamps, start engine. Run engine at approximately 3000 rev/min. Note voltmeter reading.
3. Transfer voltmeter connections to frame of alternator and negative terminal of battery, and again note voltmeter reading.



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4. If reading exceeds 0.5 volt on positive side or 0.25 volt on negative side, there is a high resistance in charging circuit which must be traced and remedied.

LUCAS CONSTANT ENERGY IGNITION SYSTEM 35DLM8-PRELIMINARY CHECKS

Inspect battery cables and connections to ensure they are clean and tight. Check battery state of charge.

Inspect all L.T. connections, ensure they are clean and tight. Check H.T. leads are correctly positioned and not shorting to ground against any engine components. Wiring harness and individual cables should be firmly fastened to prevent chaffing.

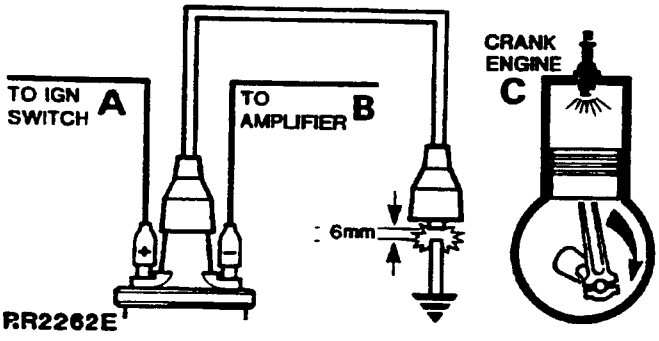
Pick-up air gap

Check air gap between pick-up limb and reluctor teeth is 0.20 - 0.35 mm, using a non-ferrous gauge.

△ **NOTE: Air gap is set initially at factory and will only require adjusting if tampered with or when pick-up module is replaced.**

TEST 1:

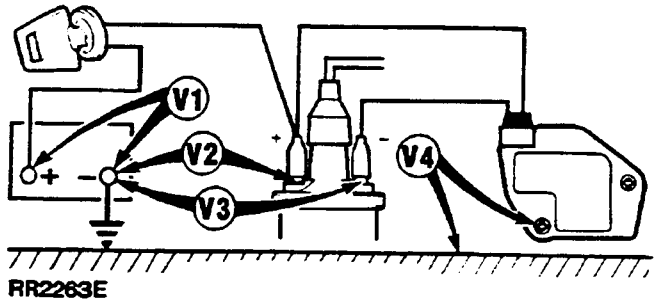
H.T. Sparking



Remove coil/distributor H.T. lead from distributor cover and hold approximately 6mm (0.25 in) from engine block, using suitable insulated pliers. Switch ignition 'On' and operate starter.
Regular sparking indicates fault in H.T. distribution, plugs, timing or fuelling, proceed to Test 6. If no spark or weak spark occurs proceed to Test 2.

TEST 2:

L.T. Voltage



Switch ignition 'On' - engine stationary.

(a) Connect voltmeter to points in circuit indicated by V1 to V4 and make a note of voltage readings.

(b) Compare voltages obtained with specified values listed below:

Expected readings

V1 More than 12 volts.
V2 1 volt maximum below volts at V1.
V3 1 volt maximum below volts at V1.
V4 0 volt - 0.1 volt.

(c) If all readings are correct proceed to Test 3.
(d) Check incorrect reading(s) with chart to identify area of possible faults, i.e. faults listed under heading SUSPECT and rectify.
(e) If coil and amplifier is suspected, disconnect L.T. lead at coil, repeat V3. If voltage is still incorrect, fit new coil. If voltage is now correct, check L.T. lead, if satisfactory fit new amplifier.
(f) If engine will not start proceed to Test 3.

1	2	3	4	SUSPECT
L	*	*	*	DISCHARGED BATTERY
*	L	L	*	IGN. SWITCH AND/OR WIRING
*	*	L	*	COIL OR AMPLIFIER
*	*	*	H	AMPLIFIER GROUND

Key

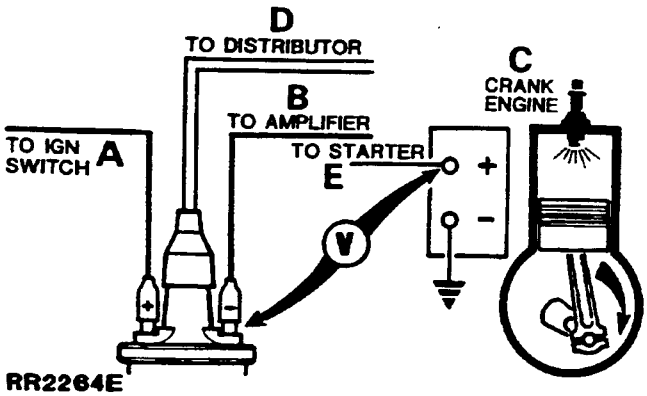
* Expected Voltage

H Voltage higher than expected

L Voltage lower than expected

TEST 3:

Amplifier Switching



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Connect voltmeter between battery positive (+ve) terminal and H.T. coil negative (-ve) terminal. Voltmeter should register 0 volts.

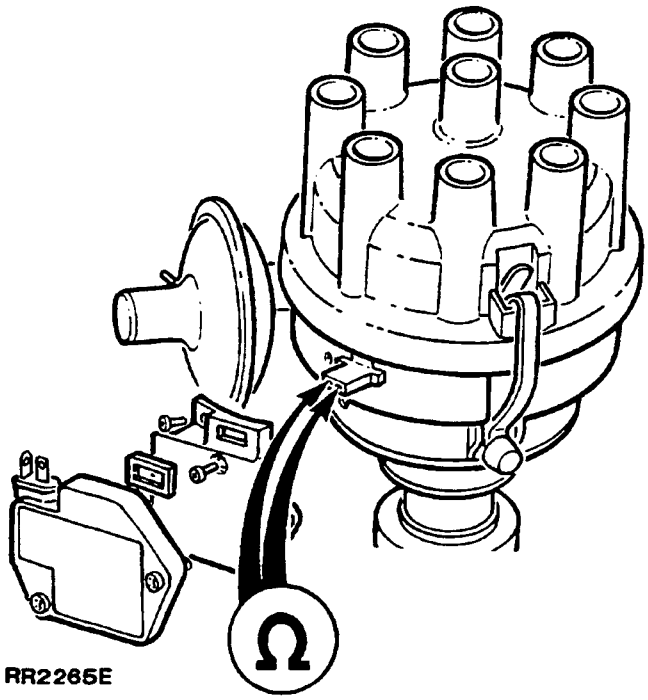
Switch ignition 'On', voltmeter should still register 0 volts.

Crank engine, voltmeter reading should increase when cranking, in which case proceed to Test 5.

If no increase in voltage during cranking proceed to Test 4.

TEST 4:

Pick-up Coil Resistance



RR2265E

Remove amplifier.

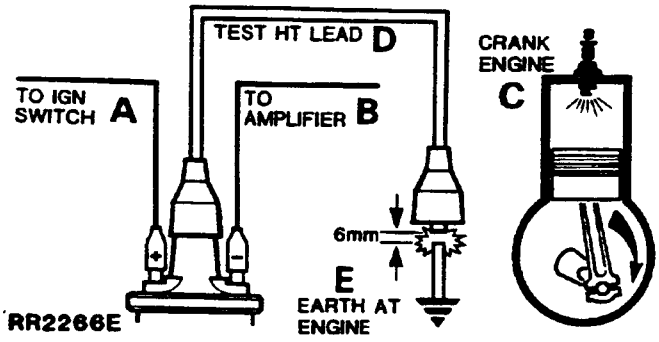
Connect ohmmeter leads to two pick-up terminals in body of distributor.

The ohmmeter should register between 2k and 5k ohm if pick-up is satisfactory. If ohmmeter reading is correct, check all connections between pick-up and amplifier, if satisfactory, fit new amplifier. If engine still does not start carry out Test 5.

Change pick-up if ohmmeter reading is incorrect. If engine still does not start proceed to Test 5.

TEST 5:

Coil H.T. Sparking



Remove existing coil/distributor H.T. lead and fit test H.T. lead to coil tower. Using suitable insulated pliers, hold free end about 6mm from engine block and crank engine. There should be good H.T. sparking.

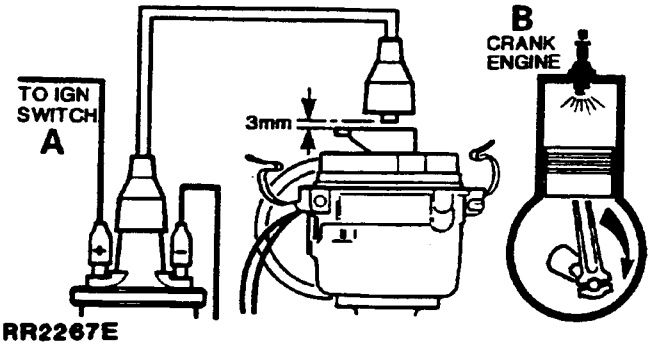
If weak or no sparking, fit new coil, repeat test.

H.T. sparking good, repeat test with original H.T. lead. If sparking is good carry out Test 6.

If weak or no sparking, fit new H.T. lead, if engine will not start carry out Test 6.

TEST 6:

Rotor Arm



Remove distributor cover. Disconnect coil H.T. lead from cover, using insulated pliers hold about 3mm (0.13 in) above rotor arm electrode and crank the engine.

There should be no H.T. sparking between rotor and H.T. lead. If satisfactory carry out Test 7.

If H.T. sparking occurs, an earth fault on rotor arm is indicated. Fit new rotor arm. If engine will not start carry out Test 7.

TEST 7:

Visual and H.T. Cable Checks

Examine:		**Should be:**
1.	Distributor Cover	Clean, dry, no tracking marks
2.	Coil Top	Clean, dry, no tracking marks.
3.	H.T. Cable Insulation	Must not be cracked, chafed or perished
4.	H.T. Cable Continuity	Must not be open circuit
5.	Sparking Plugs	Clean, dry, and set to correct gap

NOTE:

1.	Reluctor	Must not foul pick-up or leads
2.	Rotor and Insulation Cover	Must not be cracked or show signs of tracking marks

MEMORY SEAT / MIRROR SYSTEM SERVICE CHECK

The correct operation of memory position store and recall must be checked to ensure correct and safe operation of memory system

Manual transmission vehicles

Memory position, store and recall is only possible when following conditions apply:

- Driver's door open **OR** ignition AUX or IGN, **AND** park brake applied, vehicle speed less than 6 kph.

⚠ **CAUTION: It is potentially hazardous if memory store or recall is possible without park brake applied or with vehicle speed above 6 kph. The cause must be immediately investigated,** ***See ETM, M5***

1. If memory position recall/store is possible without park brake applied (vehicle stationary), it is essential to check following:

   - Park brake signal to ECU
   - ECU

2. If memory recall is possible when vehicle speed is over 6 kph, regardless of park brake position, it is essential to check following:

   - Speed signal to ECU
   - Park brake signal to ECU
   - ECU

3. Memory position store/recall function inoperative when park brake applied, check following:

   - Park brake signal to ECU
   - ECU

Automatic transmission vehicles:

Memory position, store and recall is only possible when following conditions apply:

Driver's door open OR ignition AUX or IGN, AND park brake applied, OR park/neutral engaged, vehicle speed less than 6 kph.

⚠ **CAUTION: It is potentially hazardous if memory store or recall is possible without park brake or park/neutral applied or with vehicle speed above 6 kph. The cause must be immediately investigated,** ***See ETM, M5***

1. If memory position recall/store is possible without park brake applied (vehicle stationary), it is essential to check following:

   - Park brake signal to ECU
   - Park/neutral signal to ECU
   - ECU

2. If memory recall is possible with park brake applied or park/neutral engaged, and vehicle speed above 6 kph, it is essential to check following:

   - Park/neutral signal to ECU
   - Speed signal to ECU
   - ECU

3. If memory position store/recall function is NOT possible after applying park brake or engaging park/neutral, check following:

   - Park brake signal system continuity check
   - Park/neutral signal
   - ECU

MEMORY SEAT / MIRROR SYSTEM - FAULT FINDING

△ **NOTE: The following chart lists care points referring to possible faults / remedies in the memory seat system.**

SYMPTOMS	CAUSE	REMEDY
Seat or mirrors inoperative	Fuses blown, not inserted or drivers seat load relay	Reinsert or replace fuses under seat and courtesy light fuse, main fuse panel. Refit or fit new relay.
System only operative with door open	Passenger seat relay	Refit or replace
Mirrors and clock inoperative	Mirror/clock harness not connected to main harness	Connect mirror/clock harness behind mirror switch pack and dash
Mirror or mirrors inoperative	Pins backed out in 5-way Espa connector	Repair connector in mirror mounting
Mirrors inoperative	Non connection of 24-way Sumitomo connector	Connect 24-way to memory seat ECU under driver's seat
Mirrors operative but in wrong planes	Mirror switch assy in wrong position or elevation	Fit mirror switch in correct elevation
System partially functional	ECU link harness broken	Replace ECU
Seat inoperative	Non connection of 10-way Sumitomo connector	Reconnect, under driver's seat
Seat operating in different planes and travels to that demanded	Wrongly handed link harness fitted in seat	Fit correct link harness, between seat switch and ECU
Seat pulsing to position in more than one plane	Non connection of 6-way Sumitomo Connect	6-Way, under driver's seat
Seat pulsing to position	No connection at sensor/gear box (ECU input or output)	Make connection to sensor unit, at relevant gearbox

IMPORTANT: For correct wiring installation. ***See Repair, Memory Seat - harness layout***

If fault has not been located. ***See Memory seat / Mirror system fault diagnosis***

MEMORY SEAT / MIRROR SYSTEM FAULT DIAGNOSIS

Manual and memory seat / mirror system totally inoperative -

1. Seat system losing memory position - 7.

Memory recall function inoperative - 12.

Incorrect manual electric seat control operation - 17.

Incorrect manual mirror operation/movement - 28.

Service checks - 44.

Manual and memory seat / mirror system totally inoperative

1. Are 30 amp fuses and fuse B2 inserted correctly and intact?
   Yes, go to 2.
   No, replace fuse or reinsert, check system.
2. Is drivers seat load relay inserted correctly?
   Yes, go to 3.
   No, insert correctly, check system.
3. Does system operate after replacing drivers seat load relay?
   Yes, check system.
   No, go to 4.
4. Is fusible link inserted correctly and intact?
   Yes, go to 6.
   No, go to 5.
5. Upon replacing fusible link does system operate correctly?
   Yes, check system.
   No, go to 6.
6. See memory seat system continuity checks: 4, 5, 6, 7 8 and 9.

Seat system losing memory position

7. Does the seat system lose memory positions upon IGN/AUX being switched off and door closed?
   Yes, go to 8.
   No, check system.
8. Is 3A stand alone fuse inserted correctly and intact?
   Yes, go to 9.
   No, check 11.
9. Is fusible link intact?
   Yes, go to 10.
   No, go to 11.
10. See memory seat system continuity check 3.
11. Does system retain position 24 hours after replacing or reinserting fuse or fusible link?
    Yes, check system
    No, go to 10.

Memory recall function inoperative

12. Does system attempt to go through calibration sequence?
    Yes, is recall function inoperative? Go to 7.
    No, go to 13.
13. Does system attempt to go through calibration sequence after replacing original seat switch?
    Yes, check system. Clean original switch, and recheck. ***See Repair, Memory Seat Switch - Clean***
    No, go to 14.
14. Are connectors / connections to seat switch via seat switch harness to ECU intact?
    Yes, go to 16.
    No, go to 15.
15. Does system attempt to go through calibration sequence after repairing connections to base of seat switch or reconnecting / replacing seat switch link harness, (between switch and ECU)?
    Yes, check system.
    No, go to 16.
16. See memory seat system continuity check.
    Incorrect manual electric seat control operation

Incorrect manual electric seat control operation

17. Are 30 amp fuses intact and inserted correctly?
    Yes, go to 18.
    No, reinsert / replace fuses correctly, check system
18. Is fusible link intact and inserted correctly?
    Yes, go to 20.
    No, reinsert / replace fusible link correctly, check system.
19. Does seat operate or attempt to operate under calibrate sequence?
    Yes, go to 20.
    No, go to 13, then 21.
20. Does seat move under manual electric control in all demanded directions? (pulsing or not pulsing to demanded position)?
    Yes, go to 22.
    No, go to 21.
21. Does seat switch move seat under manual electric control in all demanded directions, after replacing seat switch?
    Yes, check system
    No, go to 14 or check seat motor operation.
22. Observe non movement of seat in plane/s where seat did not go through full movement or stop at mid positions under calibrate routine.
    Go to 23
23. Does manual electric seat movement in this plane pulse to position demanded?
    Yes, go to 24.
    No, check motor operation.
24. Are connections between gearbox sensor unit and ECU secure (and electrically sound)?
    Yes, go to 25.
    No, go to 26.
25. Does manual movement in this plane pulse in demanded direction after replacing gearbox sensor unit?
    Yes, check 27.
    No, check system
26. Secure connections, re-check 22. and 23.
27. See memory seat system continuity check.

Incorrect manual mirror operation or movement

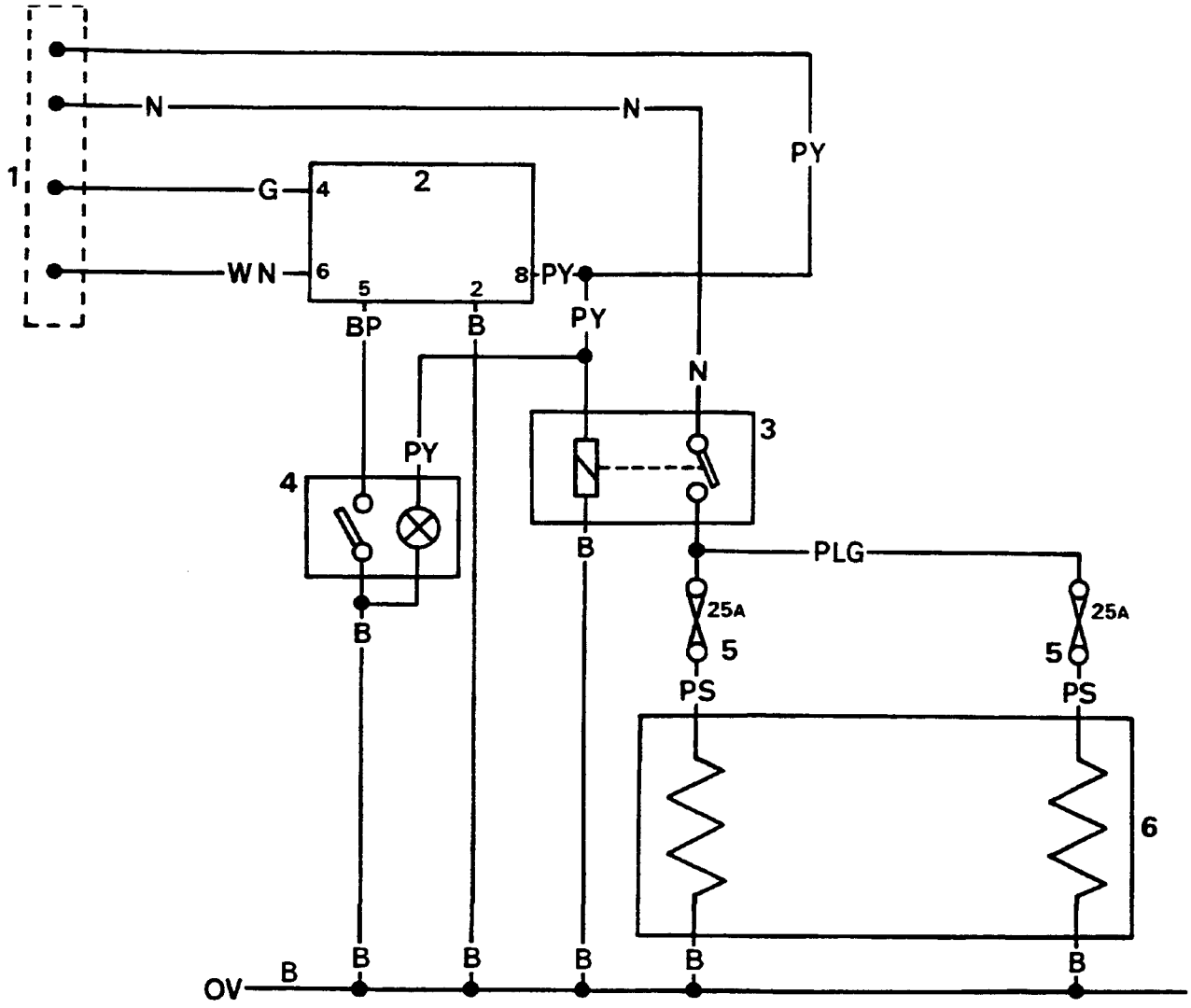
28. Are 3 amp fuses under driver's seat inserted correctly and intact?
    Yes, go to 29.
    No, replace or reinsert fuse, check system.
29. Do mirrors work correctly under calibrate sequence (both mirrors going through full movement and stopping near mid position)?
    Yes, go to 30.
    No, go to 33, 37, and 41.
30. Is mirror switch assembly mounted in correct elevation in dash?
    Yes, go to 31
    No, mount mirror correctly.
31. Does L.H. mirror work correctly under manual control without pulsing to position?
    Yes/No, go to 32.
32. Does R.H. mirror work correctly under manual control without pulsing to position?
    Yes/No, go to 33.
33. Is same fault common to both L.H. and R.H. mirrors?
    Yes, go to 34.
    No, go to 37.

34. Is connection made from manual mirror switches to main harness?
    Yes, go to 35.
    No, re-make connection and check system.
35. Do mirrors work correctly after replacing mirror joystick?
    Yes, check system
    No, go to 36.
36. See continuity checks.
37. Are connections to mirror faulty? (check for pin backout on 5 way ESPA connector)?
    Yes, re-make connections and check system
    No, go to 38.
38. Does mirror function correctly upon replacing mirror?
    Yes, check system
    No, go to 39.
39. Does mirror still exhibit same fault after replacing mirror changeover switch?
    Yes, go to 41.
    No, check system
40. See continuity checks
41. Does mirror movement still pulse in demanded direction under manual mirror electric control?
    Yes, possible feed back from mirror missing, go to 40.
    No, check system
42. Does mirror move, pulsing in opposite direction to that demanded under manual mirror electric control?
    Yes, possible feedback short to vehicle ground, check 40, continuity to vehicle ground
    No, check system
43. Are mirror or mirrors still inoperative?
    Yes, go to 40.

Service checks

44. Do seats operate under manual control when driver's door is open?
    Yes, check system fully, go to 47.
    No, go to 45.
45. Is interior light on when driver's door is open?
    Yes, check 30 amp fuses, then go to 46.
    No, go to 48.
46. Does door switch have a tendency to stick in off position when opening door?
    Yes, replace switch, check system
    No, go to 48.
47. Do manual electric seats operate when door open, but NOT when either IGN or AUX are engaged and door closed?
    Yes, check fuse and seat relays, go to 53.
    No, check 48.
48. Are connections to door switch made, including fuse B2?
    Yes, check 49.
    No, make connections, check system.
49. Does door switch make a good electrical contact?
    Yes, go to 53.
    No, replace switch, check system.
50. Does memory position recall function operate when park brake or park / neutral is not engaged?
    Yes, go to 53.
    No, is system OK?
51. Does memory position recall function operate when either park brake or park / neutral engaged?
    Yes, is system OK?
    No, go to 53.
52. Does speed signal inhibit memory recall function?
    Yes, is system OK?
    No, go to 53.
53. See memory seat system continuity check.

HEATED FRONT SCREEN - 1990



RR2593E

Circuit diagram - RR2593E

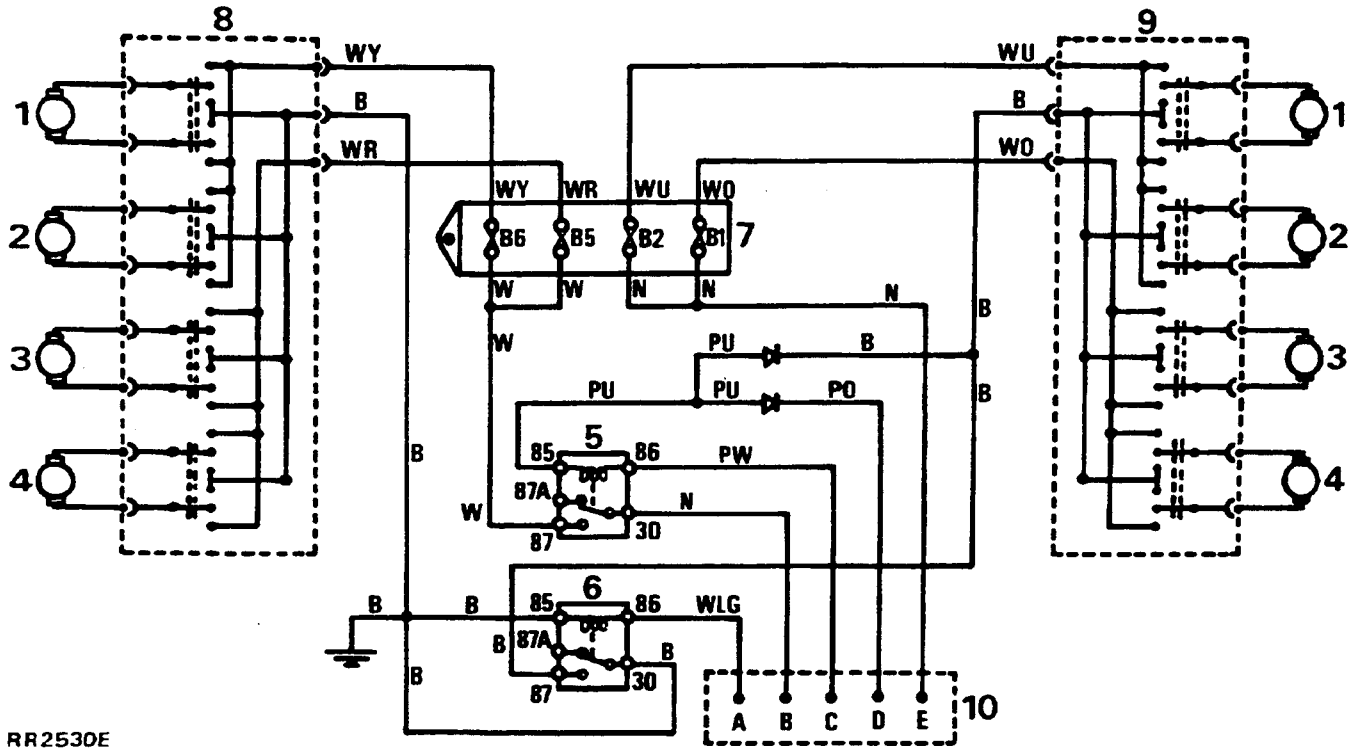
1. Main harness connections
   Brown - live positive feed
   Green - ignition positive feed
   Purple / yellow - EFI harness plug
   White / brown - oil pressure switch
   Black - earth
2. Timer unit
3. Load relay
4. Switch / warning light
5. In line fuses - 25 Amp.
6. Heated front screen

Cable colour code

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

The last letter of a colour denotes the tracer colour.

ELECTRIC SEAT ADJUSTMENT - 1990



Circuit diagram - RR2530E

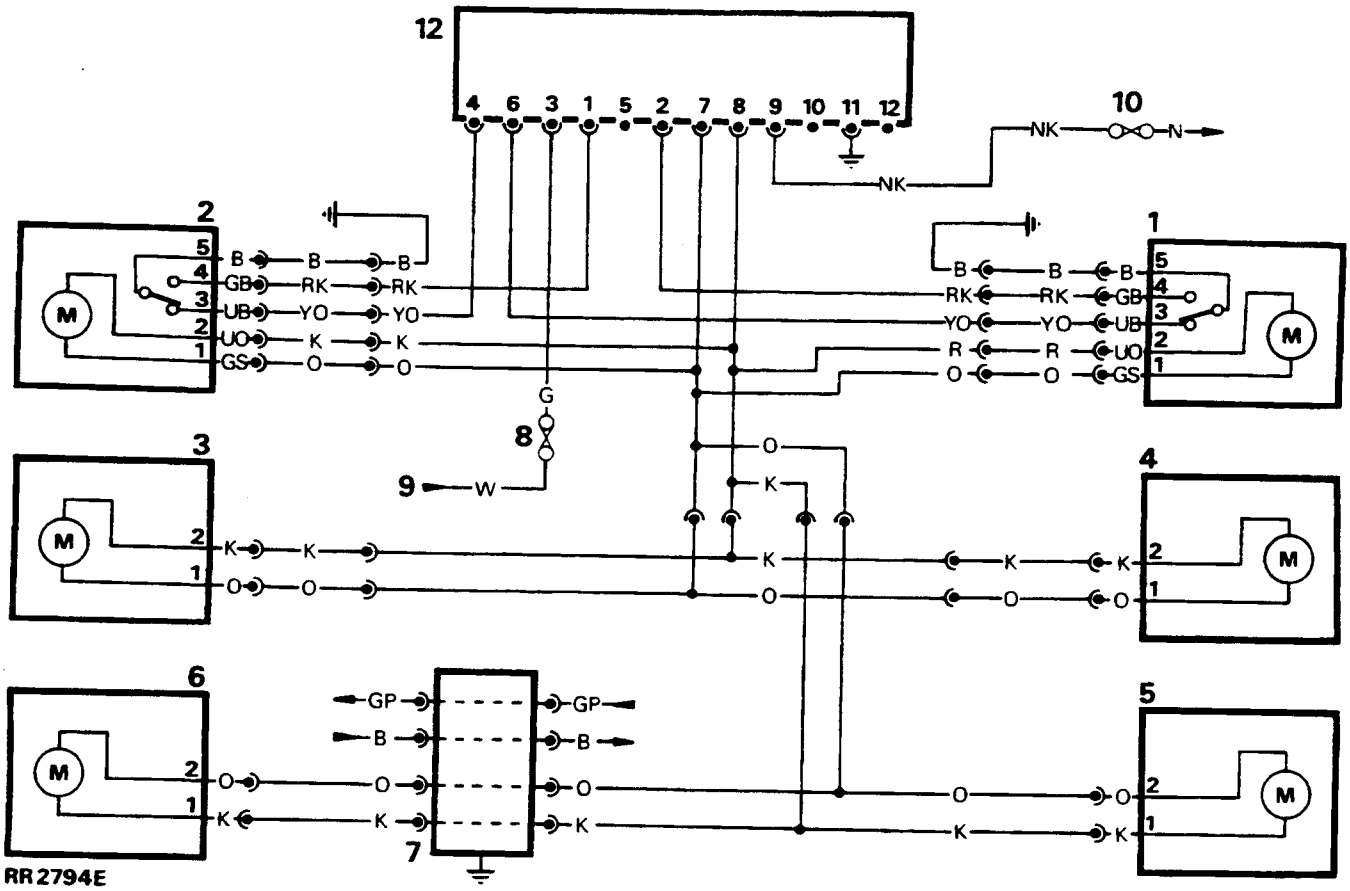
1. Seat recline motor
2. Seat height (rear) motor
3. Seat base adjust motor
4. Seat height (front) motor
5. Load relay-from driver's door courtesy switch
6. Load relay-fused auxiliary feed controled
7. Auxiliary fuse box (B)
8. Driver's seat control
9. Passenger's seat control
10. Main cable connections:
    - A: Fused auxiliary feed
    - B: Battery feed
    - C: Fused 12 volt
    - D: Courtesy switch earth
    - E: Battery feed

Cable colour code

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

The last letter of a colour denotes the tracer colour.

CENTRAL DOOR LOCKING - 1990



RR2794E

Circuit diagram - RR2794E

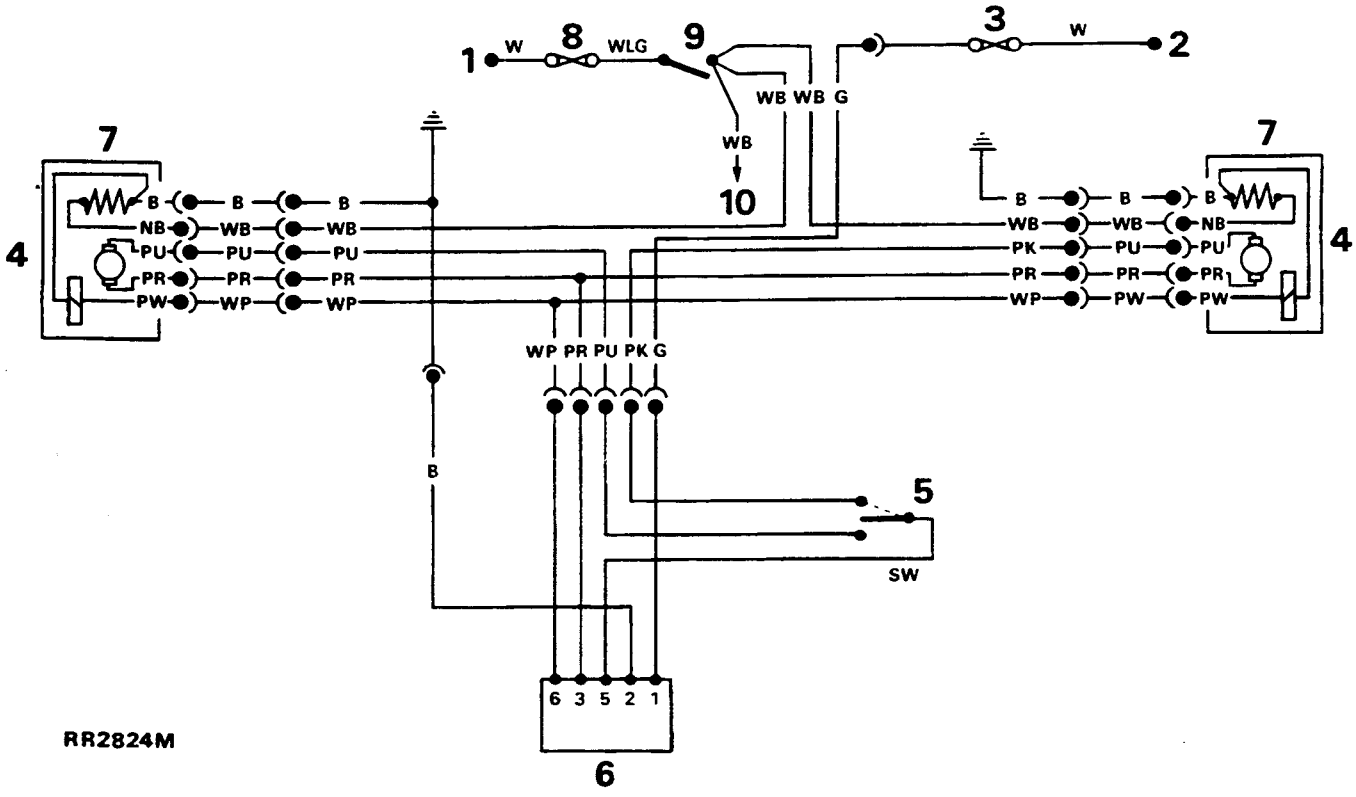
1. Switch / lock unit right hand front door
2. Switch / lock unit left hand front door
3. Lock unit left hand rear door relay
4. Lock unit right hand rear door relay
5. Fuel flap actuator
6. Lock unit tailgate
7. Suppressor
8. Fuse A5
9. Feed from ignition load relay
10. Fuse C7
11. Battery 12V + ve
12. Central door locking control unit

Cable colour code

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

The last letter of a colour denotes the tracer colour.

ELECTRIC MIRRORS - 1990



Circuit diagram - RR2824M

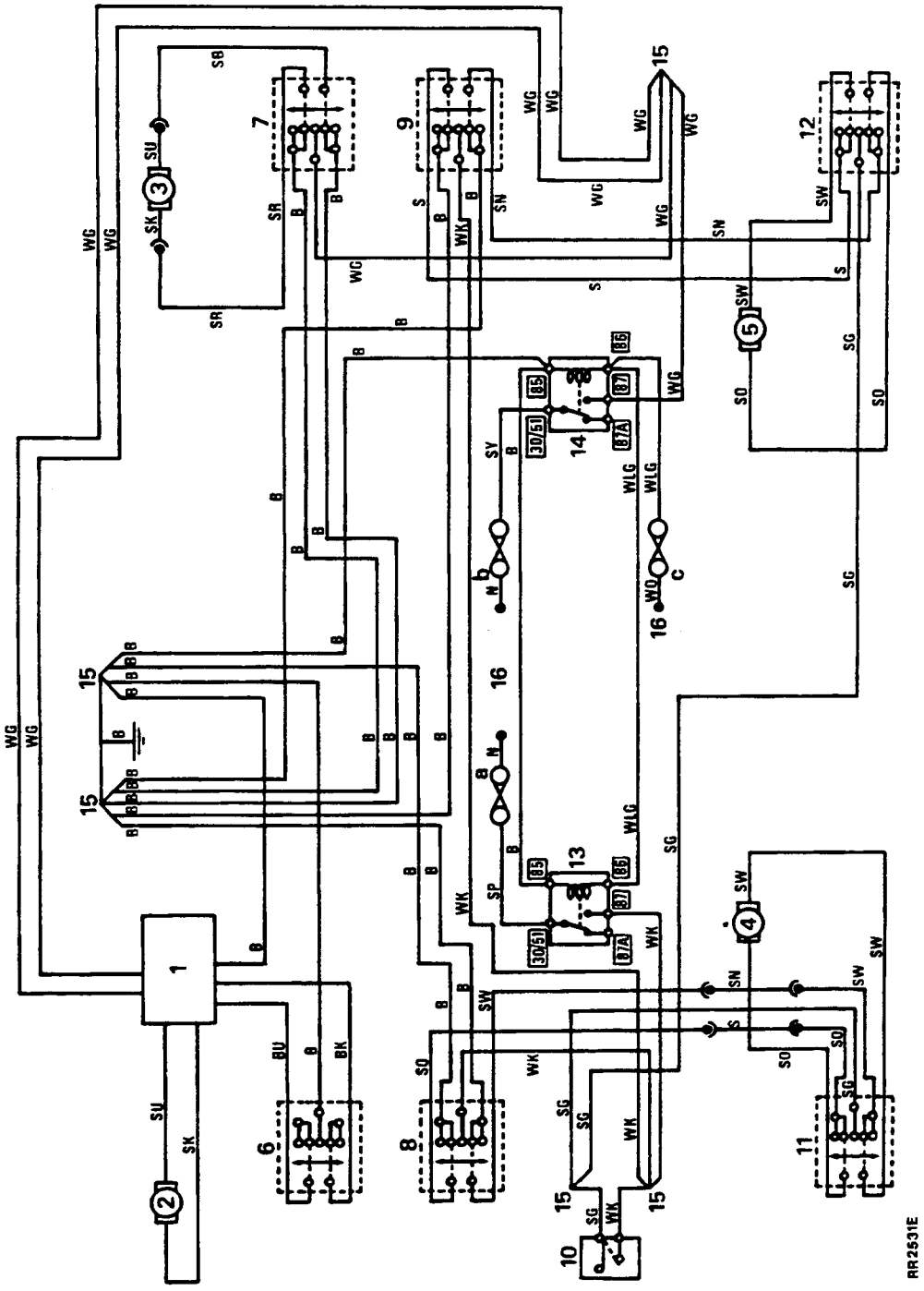
1. Ignition 12V.
2. Ignition load relay.
3. Fuse C5 - mirror motors.
4. Mirror motors.
5. Change over switch.
6. Mirror control switch.
7. Mirror heating elements - active with heated rear screen.
8. Fuse C3 - heating elements.
9. Heated rear screen switch.
10. Feed to heated screen relay.

Cable colour code

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

The last letter of a colour denotes the tracer colour.

ELECTRIC WINDOW LIFT - 1990



ELECTRIC WINDOW LIFT

Circuit diagram - RR2531E

1. One touch control unit-drivers window
2. Window lift motor-drivers window
3. Window lift motor-front passengers side
4. Window lift motor LH rear
5. Window lift motor RH rear
6. Window lift switch drivers window
7. Window lift switch front passengers window
8. Window lift switch LH rear door
9. Window lift switch RH rear door
10. Isolator switch
11. Window lift switch in LH rear door
12. Window lift switch in RH rear door
13. Relay-rear windows
14. Relay-front windows
15. Clinches
16. Main cable fuses
    - a: Fuse C2
    - b: Fuse C8
    - c: Fuse B1

Cable colour code

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

The last letter of a colour denotes the tracer colour.

CIRCUIT DIAGRAM - 1990 MY - RIGHT HAND STEERING - illustrations RR2830M & RR2831M

Numerical key

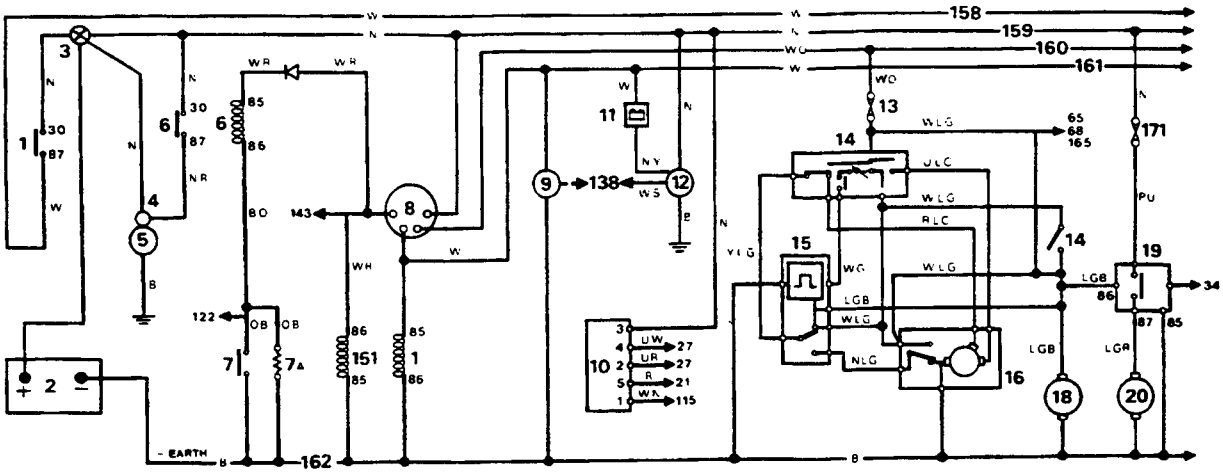
1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch
7a. Resistor (manual)
8. Ignition switch
9. Tachometer
10. Voltage transformer (dim dip)
11. Ignition warning lamp
12. Alternator
13. Fuse B1
14. Front wipe/wash switch
15. Front wipe delay unit
16. Front wiper motor
17. Headlamp relay
18. Front wash pump
19. Headlamp wash timer unit
20. Headlamp wash pump
21. Main lighting switch
22. Fuse A3
23. Fuse A7
24. LH side lamp
25. LH tail lamp
26. LH number plate lamp
26a. RH number plate lamp
27. High beam dip/flash switch
28. Fuse B2
29. RH side lamp
30. RH tail lamp
31. Rheostat
32. Fuse A8
33. Fuse A2
34. Fuse A9
35. Fuse A1
36. Rear fog switch
37. Fuse A4
38. Switch illumination (2 off)
39. Cigar lighter illumination (2 off)
40. Heater illumination (4 off)
41. Clock illumination
42. Auto gear selector illumination (2 off) - post April 1990 condition
42a. Auto gear selector illumination (2 off) - pre April 1990 condition
43. Instrument illumination (4 off)
43a. Column switch illumination
44. Rear fog warning lamp
45. LH rear fog lamp
46. RH rear fog lamp
47. LH dip beam
48. RH dip beam
49. LH high beam
50. RH high beam
51. High beam warning lamp
52. Fuel gauge
53. Fuel gauge sender unit
54. Water temperature gauge
55. Water temperature sender unit
56. Fuse B3
57. Horn switch
58. RH horn
59. LH horn
60. Under bonnet illumination switch
61. Under bonnet light
62. Clock
63. Fuse C7
64. Fuse C8
65. Pick-up point central locking/window lift
66. Fuse C1
67. Heated rear screen relay
68. Radio aerial amplifier
69. Heated rear screen
70. Heated rear screen switch
71. Heated rear screen warning lamp
72. Voltage sensitive switch
73. Fuse A5
74. Hazard switch
75. Flasher unit
76. Direction indicator switch
77. LH indicator warning lamp
77a. RH indicator warning lamp
78. LH rear indicator lamp
79. LH front indicator lamp
80. LH side repeater lamp
81. RH side repeater lamp
82. RH front indicator lamp
83. RH rear indicator lamp
84. Trailer warning lamp
85. Fuse A6
86. Stop lamp switch
87. Reverse lamp switch
88. Front auxilary lamp relay
89. LH stop lamp
90. RH stop lamp
91. LH reverse lamp
92. RH reverse lamp
93. LH front auxilary lamp
94. RH front auxilary lamp
95. Front auxilary lamp switch
96. Fuse B4
97. Dash cigar lighter
98. Glove box cigar lighter
99. Front interior lamp
100. Rear interior lamp
101. Interior lamp delay unit
102. LH door edge lamp
103. LH puddle lamp
104. RH door edge lamp
105. RH puddle lamp
106. Interior lamp switch
107. LH rear door switch
108. RH rear door switch
109. Tailgate switch
110. LH front door switch
111. RH front door switch
112. Heated washer jets (front screen)
113. Thermostat heated jets
114. Oil pressure warning lamp
115. Oil pressure switch
116. Fuse C4
117. Heated front screen connections
118. Fuel pump (petrol models)
119. Ignition coil
120. Capacitor
121. Distributor
122. EFI Harness plug
123. Fuel shut off solenoid (Diesel)
124. Sun roof relay
124a. Fuse B5
125. Radio fuse
126. Radio and four speakers
-LF-left hand front speaker
-LR-left hand rear speaker
-RF-right front speaker
-RR-right hand rear speaker
127. Sun roof pick up point
128. Auto transmission and transfer box oil temperature warning lamp
129. Auto transmission oil temperature switch
129a. Transfer box oil temperature switch
130. Fuse C3
131. Rear wash wipe switch
132. Rear wipe delay unit
133. Rear wiper motor
134. Rear screen wash pump
135. Low screen wash fluid level warning lamp
136. Low screen wash switch
137. Low coolant switch
138. Electronic speedo and instrument controls
139. Low coolant level warning lamp
140. Low fuel level warning lamp
141. Glow plug warning lamp (Diesel)
142. E.F.I. warning lamp
143. Glow plug timer unit
144. Glow plugs (Diesel)
145. ABS warning lamp
146. Handbrake/brake fluid level/pressure warning lamp
147. Handbrake warning switch
148. Brake fluid level warning switch
149. Brake pad wear warning lamp
150. Brake pad wear sensors
151. Brake check relay
152. Split charge relay (option)
153. Split charge terminal post (option)
154. Heater/air conditioning connections
155. Fuse C9
156. Coil negative (engine RPM input to ECU)
157. Not used
158. Ignition load relay (+)
159. Battery feed (+)
160. Ignition auxiliary (+)
161. Ignition on (+)
162. Earth (-)
163. Heater/air con. load relay
164. Trailer pick up point
165. Electric seats pick up point (option)
166. Fuse C2
167. Electric mirrors pick up point
168. Alarm pick up point
169. Fuse C5
170. ABS pick up point
171. Fuse B6
172. Fuse B7
173. Condenser fan relay
174. Fuse B8
175. Fuse B9
176. Inertia switch
177. Speed transducer

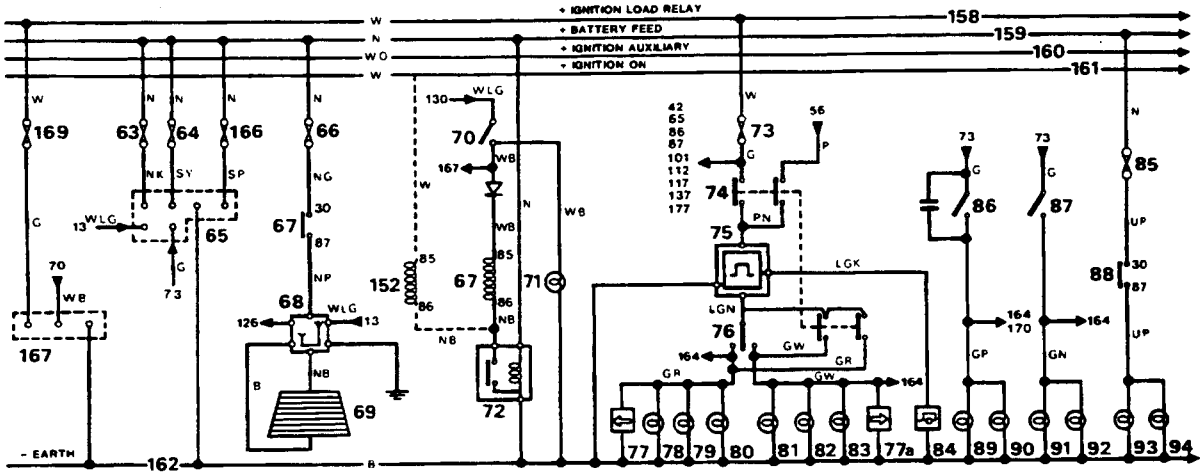
Circuit diagram - 1990 MY - RIGHT HAND STEERING - illustrations RR2830M & RR2831M

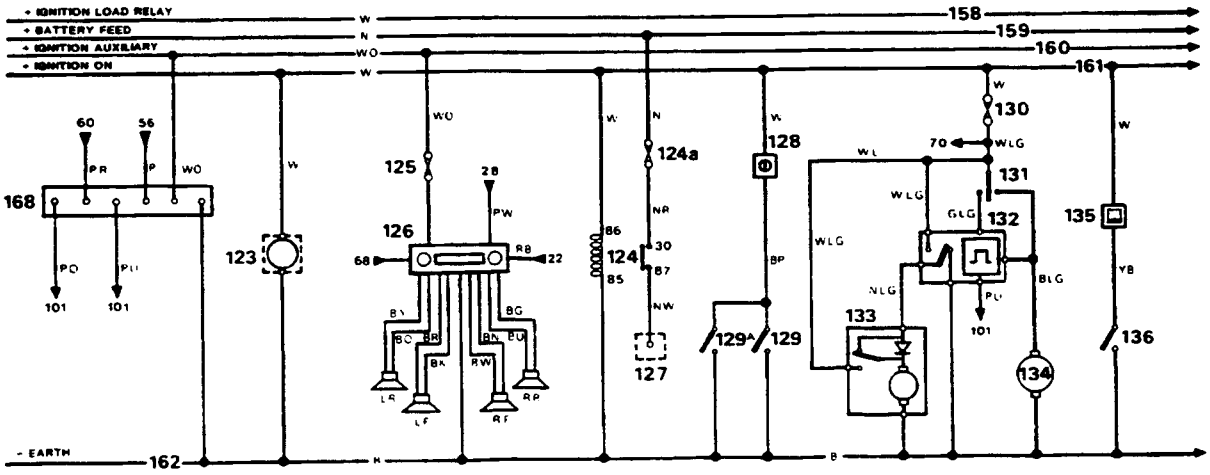
Alphabetical key

170. ABS pick up point
145. ABS warning lamp
168. Alarm pick up point
12. Alternator
42. Automatic gear selector illumination (2 off)
129. Automatic transmission oil temperature switch
128. Automatic transmission/transfer box oil temperature warning lamp
2. Battery
148. Brake fluid level warning switch
150. Brake pad wear sensors
149. Brake pad wear warning lamp
151. Brake check relay
120. Capacitor
39. Cigar lighter illumination (2 off)
62. Clock
41. Clock illumination
156. Coil negative, engine speed signal to ECU
43a. Column switch illumination
173. Condenser fan relay
97. Dash cigar lighter
76. Direction indicator switch
121. Distributor
167. Electric mirrors pick up point (option)
165. Electric seats pick up point (option)
138. Electronic speedo and instrument controls
122. EFI Harness plug
142. EFI warning lamp
75. Flasher unit
88. Front auxiliary lamp relay
95. Front auxiliary lamp switch
99. Front interior lamp
18. Front wash pump
15. Front wipe delay unit
14. Front wipe/wash switch
16. Front wiper motor
52. Fuel gauge
53. Fuel gauge sender unit
118. Fuel pump (petrol models)
123. Fuel shut off solenoid (Diesel)
35. Fuse A1
33. Fuse A2
22. Fuse A3
37. Fuse A4
73. Fuse A5
85. Fuse A6
23. Fuse A7
32. Fuse A8
34. Fuse A9
13. Fuse B1
28. Fuse B2
56. Fuse B3
96. Fuse B4
124a. Fuse B5
171. Fuse B6
172. Fuse B7
174. Fuse B8
175. Fuse B9
66. Fuse C1
166. Fuse C2
130. Fuse C3
116. Fuse C4
169. Fuse C5
63. Fuse C7
64. Fuse C8
155. Fuse C9
98. Glove box cigar lighter
144. Glow plugs (Diesel)
143. Glow plug timer unit (Diesel)
141. Glow plug warning lamp (Diesel)
146. Handbrake/brake fluid level/pressure warning lamp
147. Handbrake warning switch
74. Hazard switch
17. Headlamp relay
20. Headlamp wash pump
19. Headlamp wash timer unit
117. Heated front screen connections
69. Heated rear screen
67. Heated rear screen relay
70. Heated rear screen switch
71. Heated rear screen warning lamp
112. Heated washer jets
40. Heater illumination (4 off)
154. Heater/air con. connections
163. Heater/air con. load relay
27. High beam dip/flash switch
51. High beam warning lamp
57. Horn switch
119. Ignition coil
1. Ignition load relay
8. Ignition switch
11. Ignition warning lamp
176. Inertia switch
43. Instrument illumination (4 off)
101. Interior lamp delay unit
106. Interior lamp switch
47. LH dip beam
102. LH door edge lamp
93. LH front auxiliary lamp
110. LH front door switch
79. LH front indicator lamp
49. LH high beam
59. LH horn
77. LH indicator warning lamp
25. LH number plate lamp
103. LH puddle lamp
107. LH rear door switch
45. LH rear fog lamp
78. LH rear indicator lamp
91. LH reverse lamp
24. LH side lamp
80. LH side repeater lamp
89. LH stop lamp
25. LH tail lamp
139. Low coolant level warning lamp
137. Low coolant switch
140. Low fuel level warning lamp
135. Low screen wash fluid level warning lamp
136. Low screen wash switch
21. Main lighting switch
115. Oil pressure switch
114. Oil pressure warning lamp
65. Pick up point-central locking/window lift
68. Radio aerial amplifier
126. Radio and four speakers
125. Radio fuse
36. Rear fog switch
44. Rear fog warning lamp
100. Rear interior lamp
134. Rear screen wash pump
131. Rear wash wipe switch
132. Rear wipe delay unit
133. Rear wiper motor
7a. Resistor (manual)
87. Reverse lamp switch
48. RH dip beam
104. RH door edge lamp
94. RH front auxiliary lamp
111. RH front door switch
82. RH front indicator lamp
50. RH high beam
58. RH horn
77a. RH indicator warning lamp
26a. RH number plate lamp
105. RH puddle lamp
108. RH rear door switch
46. RH rear fog lamp
83. RH rear indicator lamp
92. RH reverse lamp
29. RH side lamp
81. RH side repeater lamp
90. RH stop lamp
30. RH tail lamp
31. Rheostat
177. Speed transducer
152. Split charge relay (option)
153. Split charge terminal post (option)
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
86. Stop lamp switch
127. Sunroof pick up point
124. Sunroof relay
38. Switch illumination (2 off)
9. Tachometer
109. Tailgate switch
3. Terminal post
113. Thermostat - heated washer jets
164. Trailer pick up point
84. Trailer warning lamp
129a. Transfer box oil temperature switch
60. Under bonnet illumination switch
61. Under bonnet light
72. Voltage sensitive switch
10. Voltage transformer (dim-dip)
54. Water temperature gauge
55. Water temperature sender unit

Circuit diagram - 1990 MY - Right hand steering

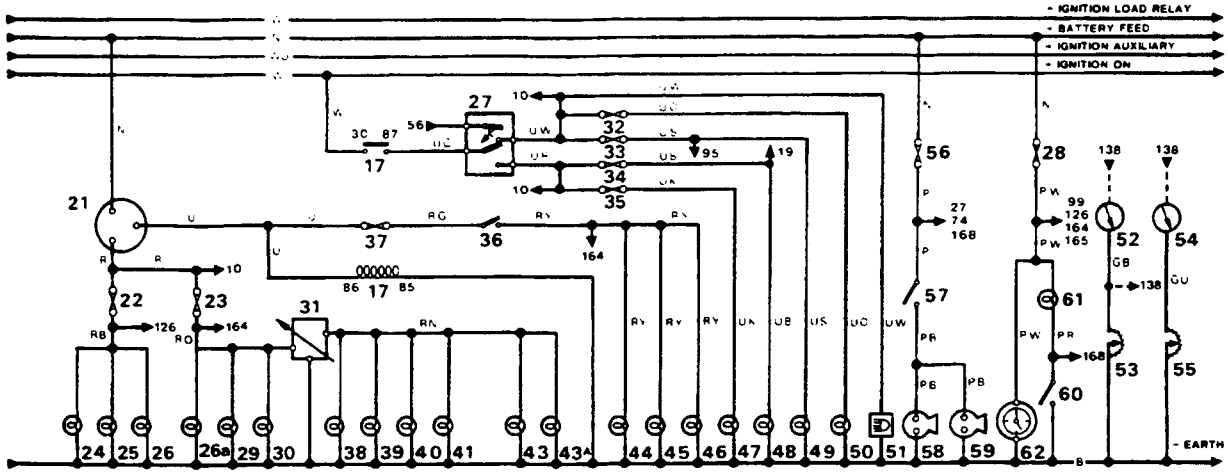


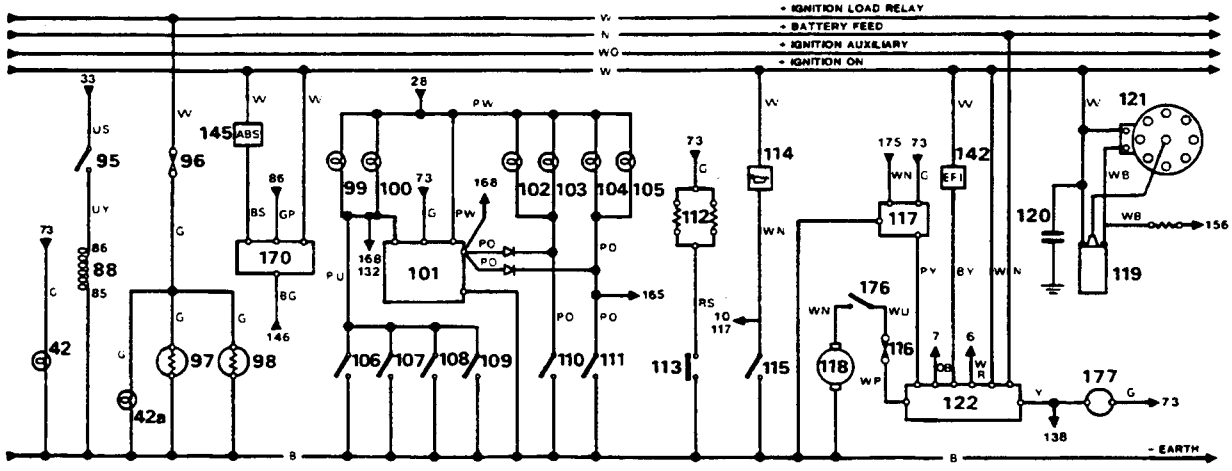


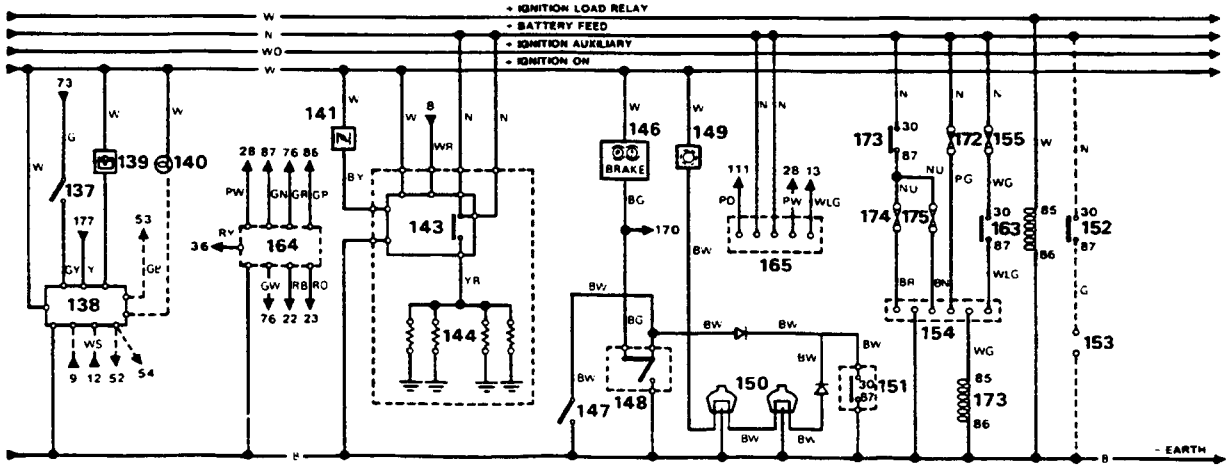


RR2830M

Illustrations RR2830M & RR2831M







RR2831M

CIRCUIT DIAGRAM - 1990 MY - LEFT HAND STEERING - illustrations RR2828M & RR2829M

Numerical key

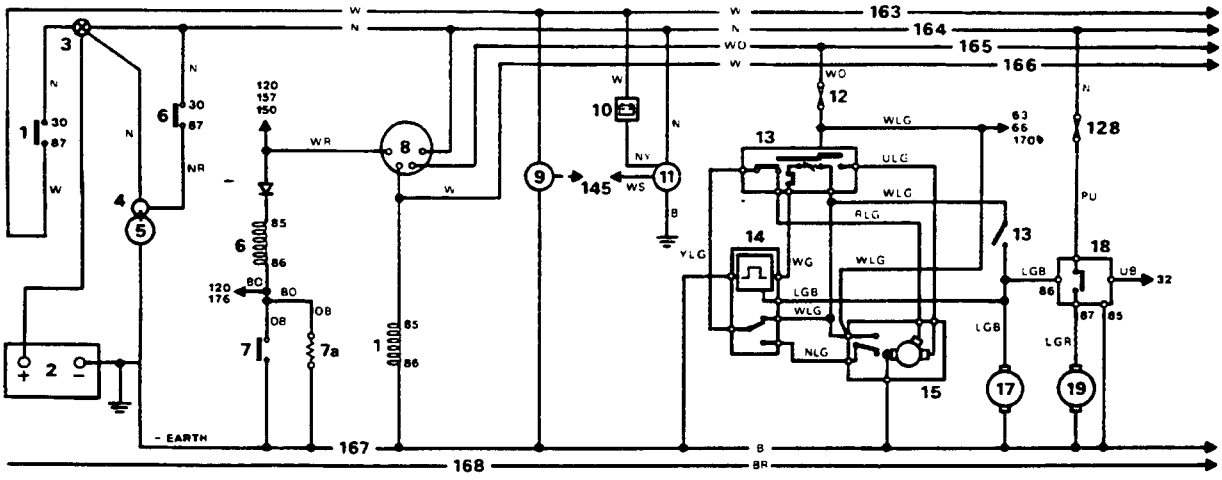
1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch (auto)
7a. Resistor (manual transmission)
8. Ignition switch
9. Tachometer
10. Ignition warning lamp
11. Alternator
12. Fuse B1
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
16. Headlamp relay
17. Front wash pump
18. Headlamp wash timer unit
19. Headlamp wash pump
20. Main lighting switch
21. Fuse A3
22. Fuse A7
23. LH side lamp
24. LH tail lamp
25. LH number plate lamp
25a. RH number plate lamp
26. High beam dip/flash switch
27. RH side lamp
28. RH tail lamp
29. Rheostat
30. Fuse A8
31. Fuse A2
32. Fuse A9
33. Fuse A1
34. Rear fog switch
35. Fuse A4
36. Switch illumination (2 off)
36a. Headlamp levelling switch illumination (Germany)
37. Cigar lighter illumination (2 off)
38. Heater illumination (4 off)
39. Clock illumination
40. Auto gear selector illumination (2 off) - post April 1990 condition
40a. Auto gear selector illumination (2 off) - pre April 1990 condition
41. Instrument illumination (4 off)
41a. Column switch illumination
42. Rear fog warning lamp
43. LH rear fog
44. RH rear fog
45. LH dip beam
46. RH dip beam
47. LH high beam
48. RH high beam
49. High beam warning lamp
50. Fuel gauge
51. Fuel gauge sender unit
52. Water temperature gauge
53. Water temperature sender unit
54. Fuse B2
55. Horn switch
56. RH horn
57. LH horn
58. Under bonnet illumination switch
59. Under bonnet light
60. Clock
61. Fuse C7
62. Fuse C2
63. Pick-up point central locking/window lift
64. Heated rear screen relay
65. Fuse C1
66. Radio aerial amplifier
67. Heated rear screen
68. Heated rear screen switch
69. Heated rear screen warning lamp
70. Voltage sensitive switch
71. Fuse A5
72. Hazard switch
73. Flasher unit
74. Direction indicator switch
75. LH indicator warning lamp
75a. RH indicator warning lamp
76. LH rear indicator lamp
77. LH front indicator lamp
78. LH side repeater lamp
79. RH side repeater lamp
80. RH front indicator lamp
81. RH rear indicator lamp
82. Trailer warning lamp
83. Fuse A6
84. Stop lamp switch
85. Reverse lamp switch
86. Front auxilary lamp relay (option)
87. LH stop lamp
88. RH stop lamp
89. LH reverse lamp
90. RH reverse lamp
91. LH front auxilary lamp (option)
92. RH front auxilary lamp (option)
93. Front auxilary lamp switch
94. Fuse B4
95. Dash cigar lighter
96. Glove box cigar lighter
97. Front interior lamp
98. Rear interior lamp
99. Interior lamp delay unit
100. LH door edge lamp
101. LH puddle lamp
102. RH door edge lamp
103. RH puddle lamp
104. Interior lamp switch
105. LH rear door switch
106. RH rear door switch
107. Tailgate switch
108. LH front door switch
109. RH front door switch
110. Heated washer jets (front screen)
111. Thermostat-heated washer jets
112. Oil pressure warning lamp
113. Oil pressure switch
114. Fuse C4
115. Inertia switch
116. Fuel pump (petrol models)
117. Ignition coil (petrol models)
118. Capacitor (petrol models)
119. Distributor (petrol models)
120. EFI Harness plug
121. Speed transducer
122. Trailer pick up point
123. Radio fuse
124. Radio and four speakers
-LF-left hand front speaker
-LR-left hand rear speaker
-RF-right front speaker
-RR-right hand rear speaker
125. Sun roof relay
125a. Fuse B5
126. Alarm pick up point
127. Overspeed warning (Saudi only)
128. Fuse B6
129. Fuse C5
130. Fuel shut off solenoid (Diesel)
131. Seat buckle switch (Saudi only)
132. Overspeed monitor (Saudi only)
133. Heated front screen pick up point (option)
134. Sunroof pick up point (option)
135. Auto transmission/transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
136a. Transfer box oil temperature switch
137. Fuse C3
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
141. Rear screen wash pump
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
144. Low coolant switch
145. Electronic speedo and instrument controls
146. Low coolant level warning lamp
147. Low fuel level warning lamp
148. E.F.I. warning lamp
149. Glow plug warning lamp (Diesel)
150. Glow plug timer unit(Diesel)
151. Glow plugs (Diesel)
152. ABS warning lamp
153. Handbrake/brake fluid level/pressure warning lamp
153a. Brake fluid level warning switch
154. Handbrake warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
157. Brake check unit
158. Split charge relay (option)
159. Split charge terminal post (option)
160. Heater/air conditioning connections
161. Fuse C9
162. Coil negative (engine RPM input to ECU)
163. Ignition load relay (+)
164. Battery feed (+)
165. Ignition auxiliary (+)
166. Ignition on (+)
167. Earth (-)
168. Warning lights supply common earth (-)
169. Warning lights supply (+)
170. Electric seats pick up point
171. Fuse B3
172. Fuse B8
173. Fuse C8
174. Electric mirrors pick up point (option)
175. Heater/air conditioning load relay
176. Cruise control pick up points (option)
177. Fuse B9
178. Condenser fan relay
179. Fuse B7
180. ABS pick up point
181. Headlamp levelling switch connection (German)
182. Headlamp levelling actuator (2) (German)

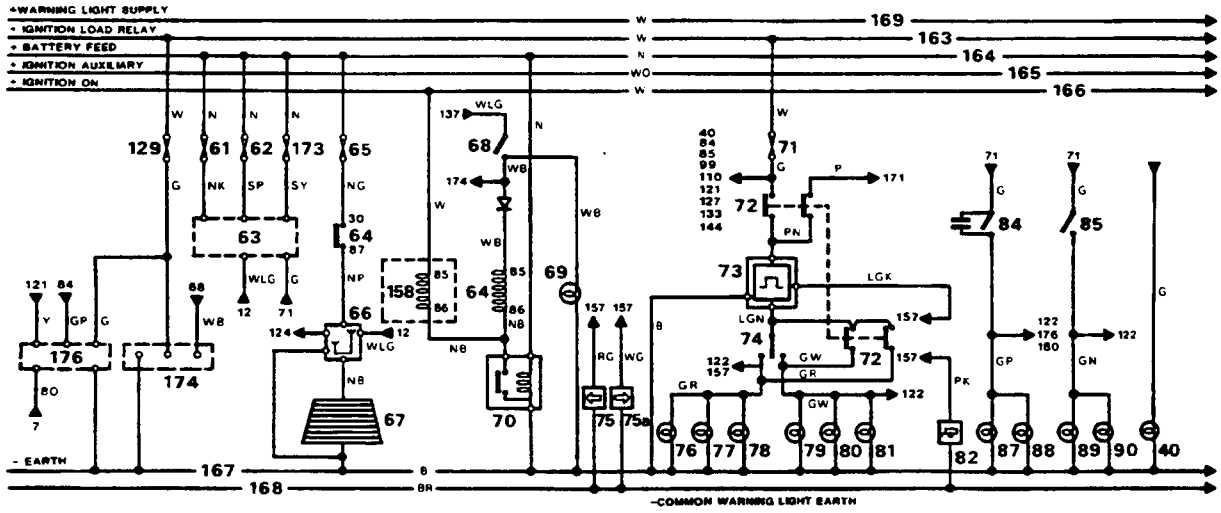
CIRCUIT DIAGRAM - 1990 MY - LEFT HAND STEERING - ILLUSTRATIONS RR2828M & RR2829M

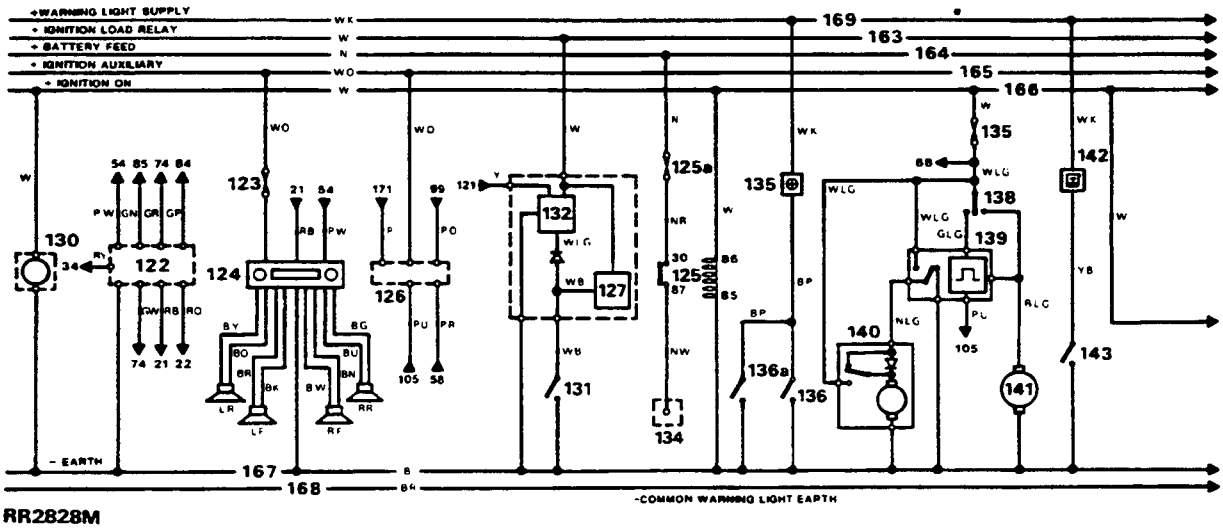
Alphabetical key

180. ABS pick up point
152. ABS warning lamp
126. Alarm pick up point
11. Alternator
40. Automatic gear selector illumination (2 off)
136. Automatic transmission oil temperature switch
135. Automatic transmission/transfer box oil temperature warning lamp
2. Battery
153a. Brake fluid level warning switch
157. Brake check unit
156. Brake pad wear sensors
155. Brake pad wear warning lamp
118. Capacitor (petrol models)
37. Cigar lighter illumination (2 off)
60. Clock
39. Clock illumination
162. Coil negative, engine speed signal to ECU
41a. Column switch illumination
178. Condenser fan relay
176. Cruise control pick up point (option)
95. Dash cigar lighter
74. Direction indicator switch
119. Distributor (petrol models)
174. Electric mirrors pick up point (option)
170. Electric seats pick up point (option)
145. Electronic speedo and instrument controls
120. EFI harness plug
148. EFI warning lamp
73. Flasher unit
86. Front auxiliary lamp relay (option)
93. Front auxiliary lamp switch
97. Front interior lamp
17. Front wash pump
14. Front wipe delay unit
13. Front wipe/wash switch
15. Front wiper motor
50. Fuel gauge
51. Fuel gauge sender unit
116. Fuel pump (petrol models)
130. Fuel shut off solenoid (Diesel)
33. Fuse A1
31. Fuse A2
21. Fuse A3
35. Fuse A4
71. Fuse A5
83. Fuse A6
22. Fuse A7
30. Fuse A8
32. Fuse A9
12. Fuse B1
54. Fuse B2
171. Fuse B3
94. Fuse B4
125a. Fuse B5
128. Fuse B6
179. Fuse B7
172. Fuse B8
177. Fuse B9
65. Fuse C1
162. Fuse C2
137. Fuse C3
114. Fuse C4
129. Fuse C5
61. Fuse C7
173. Fuse C8
161. Fuse C9
96. Glove box cigar lighter
151. Glow plugs (Diesel)
150. Glow plug timer unit (Diesel)
149. Glow plug warning lamp (Diesel)
153. Handbrake/brake fluid level/pressure warning lamp
154. Handbrake warning switch
72. Hazard switch
182. Headlamp levelling actuator (2) (Germany)
181. Headlamp levelling switch connection (Germany)
36a. Headlamp levelling switch illumination (Germany)
16. Headlamp relay
19. Headlamp wash pump
18. Headlamp wash timer unit
133. Heated front screen pick up point (option)
67. Heated rear screen
64. Heated rear screen relay
68. Heated rear screen switch
69. Heated rear screen warning lamp
110. Heated washer jets
38. Heater illumination (4 off)
160. Heater/air con. connections
175. Heater/air con. load relay
26. High beam dip/flash switch
49. High beam warning lamp
55. Horn switch
117. Ignition coil
1. Ignition load relay
8. Ignition switch
10. Ignition warning lamp
115. Inertia switch
41. Instrument illumination (4 off)
99. Interior lamp delay unit
104. Interior lamp switch
45. LH dip beam
100. LH door edge lamp
91. LH front auxiliary lamp
108. LH front door switch
77. LH front indicator lamp
47. LH high beam
57. LH horn
75. LH indicator warning lamp
25. LH number plate lamp
101. LH puddle lamp
105. LH rear door switch
43. LH rear fog lamp
76. LH rear indicator lamp
89. LH reverse lamp
23. LH side lamp
78. LH side repeater lamp
87. LH stop lamp
24. LH tail lamp
146. Low coolant level warning lamp
144. Low coolant switch
147. Low fuel level warning lamp
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
20. Main lighting switch
113. Oil pressure switch
112. Oil pressure warning lamp
132. Overspeed monitor (Saudi only)
127. Overspeed warning (Saudi only)
63. Pick up point-central locking/window lift
66. Radio aerial amplifier
124. Radio and four speakers
123. Radio fuse
34. Rear fog switch
42. Rear fog warning lamp
98. Rear interior lamp
141. Rear screen wash pump
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
7a. Resistor (manual)
85. Reverse lamp switch
46. RH dip beam
102. RH door edge lamp
92. RH front auxiliary lamp
109. RH front door switch
80. RH front indicator lamp
48. RH high beam
56. RH horn
75a. RH indicator warning lamp
25a. RH number plate lamp
103. RH puddle lamp
106. RH rear door switch
44. RH rear fog lamp
81. RH rear indicator lamp
90. RH reverse lamp
27. RH side lamp
79. RH side repeater lamp
88. RH stop lamp
28. RH tail lamp
29. Rheostat
121. Speed transducer
158. Split charge relay (option)
159. Split charge terminal post (option)
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
84. Stop lamp switch
134. Sunroof pick up point
125. Sunroof relay
36. Switch illumination (2 off)
9. Tachometer
107. Tailgate switch
3. Terminal post
111. Thermostat - heated washer jets
122. Trailer pick up point
82. Trailer warning lamp
136a. Transfer box oil temperature switch
58. Under bonnet illumination switch
59. Under bonnet light
70. Voltage sensitive switch
52. Water temperature gauge
53. Water temperature sender unit

Circuit diagram - 1990 MY - Left hand steering

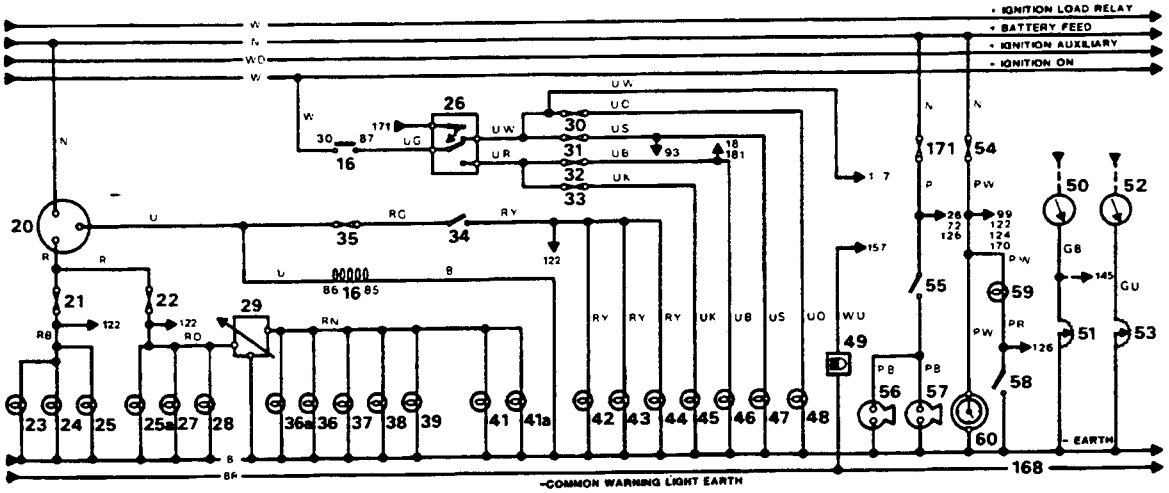


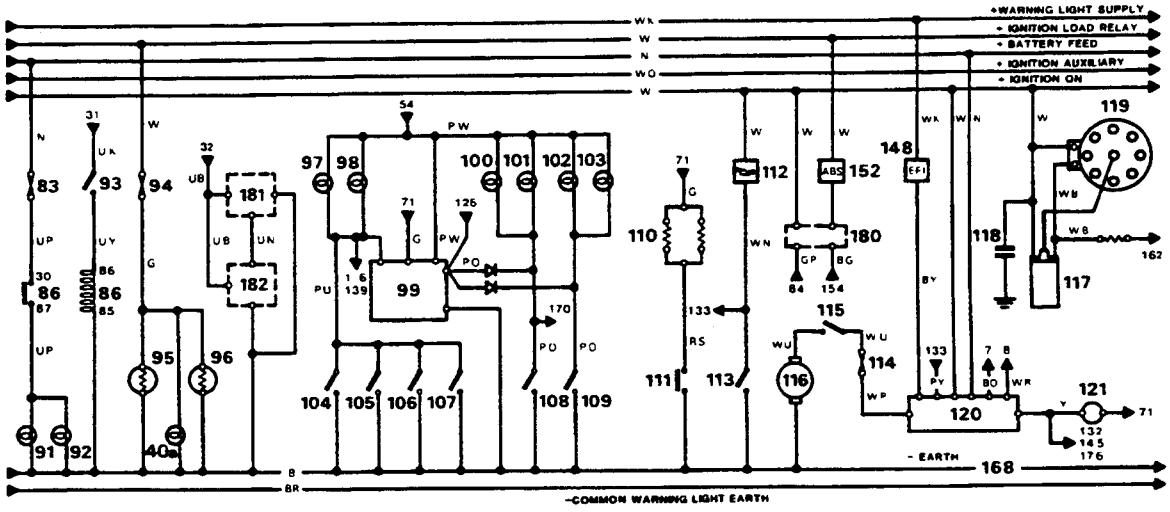


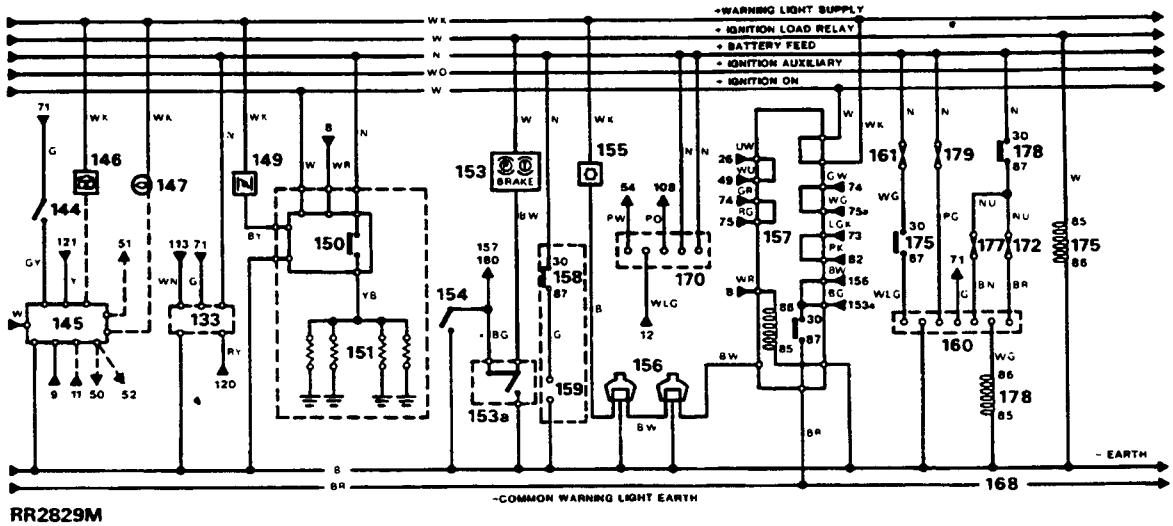


RR2828M

Illustrations RR2828M & RR2829M







RR2829M

CIRCUIT DIAGRAM - 1990 MY - USA AND CANADA - Illustrations RR2945E & RR2946E

Numerical key

1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch
8. Ignition switch
9. Tachometer
10. Ignition warning lamp
11. Alternator
12. Fuse B1
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
16. Headlamp relay
17. Front wash pump
18. Headlamp wash timer unit
19. Headlamp wash pump
20. Main lighting switch
21. Fuse A3
22. Fuse A7
23. LH side lamp
24. LH tail lamp
25. LH license plate lamp
25a. RH license plate lamp
26. High beam dimmer/flash switch
27. RH side lamp
28. RH tail lamp
29. Rheostat
30. Fuse A8
31. Fuse A2
32. Fuse A9
33. Fuse A1
34. Fuse B6
35. Not used
36. Switch illumination (2 off)
37. Cigar lighter illumination (2 off)
38. Heater illumination (4 off)
39. Clock illumination
40. Auto gear selector illumination (2 off)
40a. Auto gear selector illumination relay.
41. Instrument illumination (4 off)
42. Column switch illumination
42. Not used
43. Not used
44. Fuse C5
45. LH low beam
46. RH low beam
47. LH high beam
48. RH high beam
49. High beam warning lamp
50. Fuel gauge
51. Fuel gauge sender unit
52. Water temperature gauge
53. Water temperature sender unit
54. Fuse B2
55. Horn switch
56. RH horn
57. LH horn
58. Under hood illumination switch
59. Under hood light
60. Clock
61. Fuse C7
62. Fuse C2
63. Pick-up point central locking/window lift
64. Heated rear window relay
65. Fuse C1
66. Radio aerial amplifier
67. Heated rear screen
68. Heated rear screen switch
69. Heated rear screen warning lamp
70. Voltage sensitive switch
71. Fuse A5
72. Hazard switch
73. Flasher unit
74. Direction indicator switch
75. LH indicator warning lamp
75a. RH indicator warning lamp
76. LH rear indicator lamp
77. LH front indicator lamp
78. Not used
79. Not used
80. RH front indicator lamp
81. RH rear indicator lamp
82. Trailer warning lamp
83. Fuse A6
84. Stop lamp switch
85. Reverse lamp switch
86. Front fog lamp relay
87. LH stop lamp
88. RH stop lamp
89. LH reverse lamp
90. RH reverse lamp
91. LH front fog lamp
92. RH front fog lamp
93. Front fog lamp switch
94. Fuse B4
95. Dash cigar lighter
96. Glove box cigar lighter
97. Front interior lamp
98. Rear interior lamp
99. Interior lamp delay unit
100. LH door edge lamp
101. LH puddle lamp
102. RH door edge lamp
103. RH puddle lamp
104. Interior lamp switch
105. LH rear door switch
106. RH rear door switch
107. Tailgate switch
108. LH front door switch
109. RH front door switch
110. Heated washer jets
111. Thermostat heated jets
112. Oil pressure/level warning lamp
113. Oil pressure switch
114. Fuse C4
115. Inertia switch
116. Fuel pump
117. Ignition coil
118. Capacitor
119. Distributor
120. EFI Harness plug
121. Speed transducer
122. Trailer pick up point
123. Radio fuse
124. Radio and six speakers
125. Sun roof relay
125a. Fuse B5
126. Alarm pick up point
127. Seat belt warning lamp
128. 'Key-in switch'
129. Resistor
130. Audible warning unit
131. Seat buckle switch
132. Transfer box neutral switch
133. Heated front screen pick up point
134. Sunroof connection point (option)
135. Auto transmission and transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
136a. Transfer box oil temperature switch
137. Fuse C3
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
141. Rear screen wash pump
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
144. Low coolant switch
145. Electronic speedo and instrument controls
146. Low coolant level warning lamp
147. Low fuel level warning lamp
148. E.F.I. warning lamp
149. Low oil level logic unit
150. Low oil level probe
151. Not used
152. ABS warning lamp
153. Parking brake/brake fluid loss warning lamp
153a. Brake fluid level warning switch
154. Park brake warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
157. Warning lamp control unit
158. Check engine warning lamp
159. Emission maintenance reminder unit
160. Heater/air conditioning connections
161. Fuse C9
162. Coil negative (engine RPM input to ECU)
163. Ignition load relay (+)
164. Battery feed (+)
165. Ignition auxiliary (+)
166. Ignition on (+)
167. Earth (-)
168. Warning lights supply common earth (-)
169. Warning lights supply (+)
170. Electric seats pick up point
171. Fuse B3
172. Fuse B8
173. Fuse C8
174. Electric mirrors pick up point
175. Heater/air conditioning relay
176. Cruise control connection points
177. Fuse B9
178. Condenser fan relay
179. Fuse B7
180. ABS pick up point

CIRCUIT DIAGRAM - 1990 MY - USA AND CANADA - Illustrations RR2945E & RR2946E

Alphabetical key

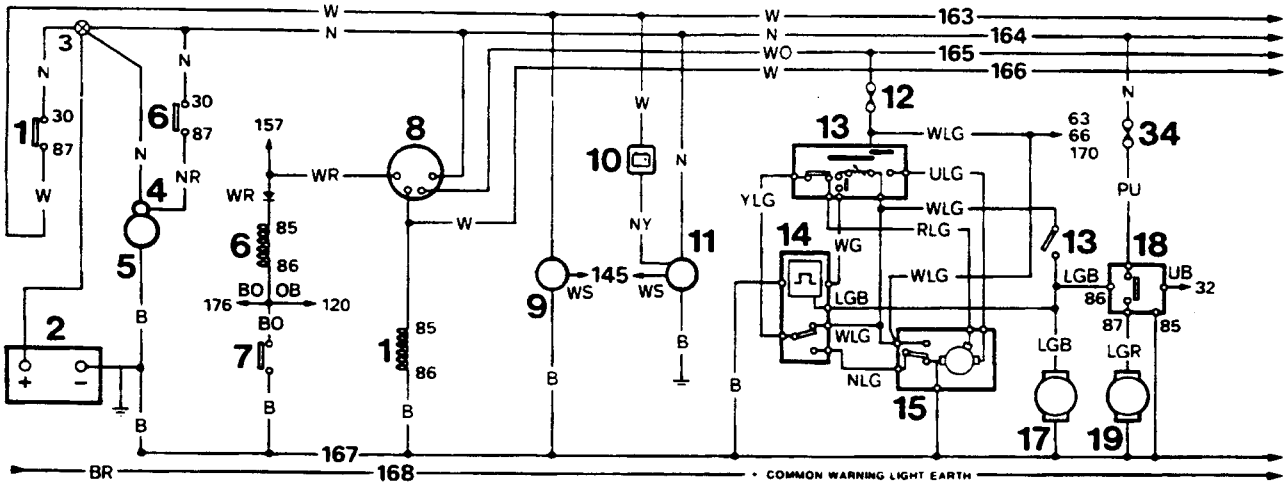
180. ABS pick up point
152. ABS warning lamp
126. Alarm pick up point
11. Alternator
130. Audible warning unit
40. Auto gear selector illumination (2 off)
40a. Auto gear selector illumination relay.
135. Auto transmission and transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
2. Battery
164. Battery feed (+)
153a. Brake fluid loss warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
118. Capacitor
163. Check engine warning lamp
37. Cigar lighter illumination (2 off)
60. Clock
39. Clock illumination
162. Coil negative (engine RPM input to ECU)
42. Column switch illumination
178. Condenser fan relay
176. Cruise control connection points
95. Dash cigar lighter
74. Direction indicator switch
119. Distributor
148. E.F.I. warning lamp
120. EFi Harness plug
167. Earth (+)
174. Electric mirrors pick up point
170. Electric seats pick up point
145. Electronic speedo and instrument controls
159. Emission maintenance reminder
73. Flasher unit
86. Front fog lamp relay
93. Front fog lamp switch
97. Front interior lamp
17. Front wash pump
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
51. Fuel gauge sender unit
50. Fuel gauge
116. Fuel pump
33. Fuse A1
31. Fuse A2
21. Fuse A3
71. Fuse A5
83. Fuse A6
30. Fuse A8
22. Fuse A7
32. Fuse A9
12. Fuse B1
54. Fuse B2
171. Fuse B3
94. Fuse B4
125a. Fuse B5
34. Fuse B6
179. Fuse B7
172. Fuse B8
177. Fuse B9
65. Fuse C1
62. Fuse C2
137. Fuse C3
114. Fuse C4
44. Fuse C5
61. Fuse C7
173. Fuse C8
161. Fuse C9
96. Glove box cigar lighter
72. Hazard switch
16. Headlamp relay
19. Headlamp wash pump
18. Headlamp wash timer unit
133. Heated front screen pick up point
68. Heated rear screen switch
64. Heated rear window relay
69. Heated rear screen warning lamp
67. Heated rear screen
110. Heated washer jets
38. Heater illumination (4 off)
175. Heater/air conditioning relay
160. Heater/air conditioning connections
26. High beam dimmer/flash switch
49. High beam warning lamp
55. Horn switch
165. Ignition auxiliary (+)
117. Ignition coil
1. Ignition load relay
163. Ignition load relay (+)
166. Ignition on (+)
8. Ignition switch
10. Ignition warning lamp
115. Inertia switch
41. Instrument illumination (4 off)
104. Interior lamp switch
99. Interior lamp delay unit
128. 'Key-in switch'
100. LH door edge lamp
108. LH front door switch
91. LH front fog lamp
77. LH front indicator lamp
47. LH high beam
57. LH horn
75. LH indicator warning lamp
25. LH license plate lamp
45. LH low beam
101. LH puddle lamp
105. LH rear door switch
76. LH rear indicator lamp
89. LH reverse lamp
23. LH side lamp
87. LH stop lamp
24. LH tail lamp
146. Low coolant level warning lamp
144. Low coolant switch
147. Low fuel level warning lamp
150. Low oil level probe
149. Low oil level logic unit
143. Low screen wash switch
142. Low screen wash fluid level warning lamp
20. Main lighting switch
151. Not used - will illuminate on initial bulb check
113. Oil pressure switch
112. Oil pressure/level warning lamp
154. Park brake warning switch
153. Parking brake/brake fluid loss warning lamp
63. Pick-up point central locking/window lift
102. RH door edge lamp
109. RH front door switch
92. RH front fog lamp
80. RH front indicator lamp
48. RH high beam
56. RH horn
75a. RH indicator warning lamp
25a. RH license plate lamp
46. RH low beam
103. RH puddle lamp
106. RH rear door switch
81. RH rear indicator lamp
90. RH reverse lamp
27. RH side lamp
88. RH stop lamp
28. RH tail lamp
66. Radio aerial amplifier
124. Radio and six speakers
123. Radio fuse
98. Rear interior lamp
141. Rear screen wash pump
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
129. Resistor
85. Reverse lamp switch
29. Rheostat
127. Seat belt warning lamp
131. Seat buckle switch
121. Speed transducer
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
84. Stop lamp switch
125. Sun roof relay
134. Sunroof connection point (option)
36. Switch illumination (2 off)
9. Tachometer
107. Tailgate switch
3. Terminal post
111. Thermostat heated jets
122. Trailer pick up point
82. Trailer warning lamp
136a. Transfer box oil temperature switch
132. Transfer box neutral switch
58. Under hood illumination switch
59. Under hood light
70. Voltage sensitive switch
157. Warning lamp control unit
168. Warning lights supply common earth (-)
169. Warning lights supply (+)
53. Water temperature sender unit
52. Water temperature gauge temperature warning lamp

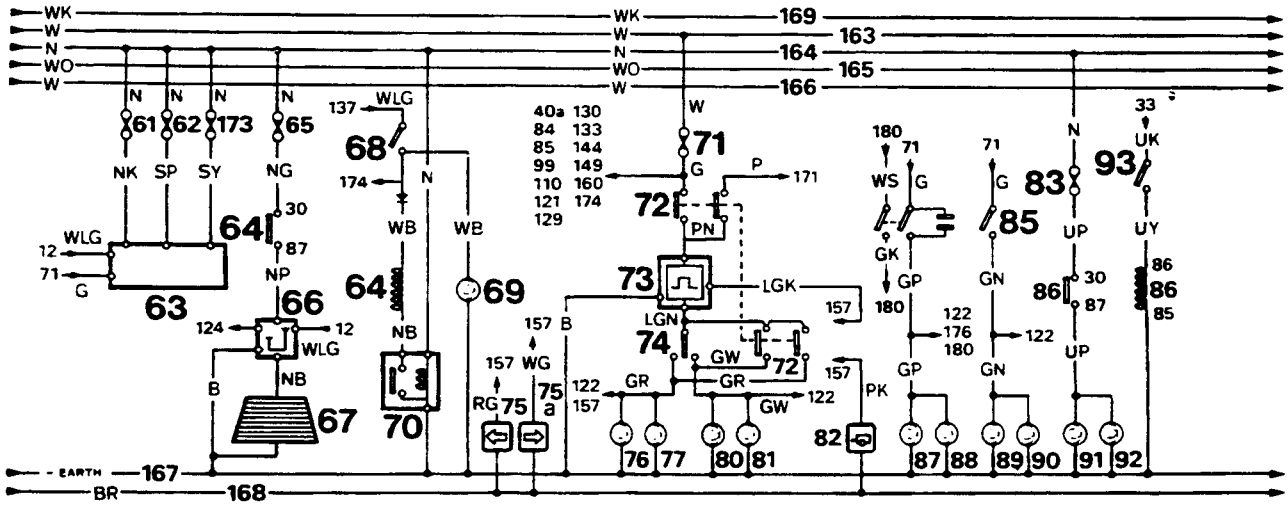
Cable colour code

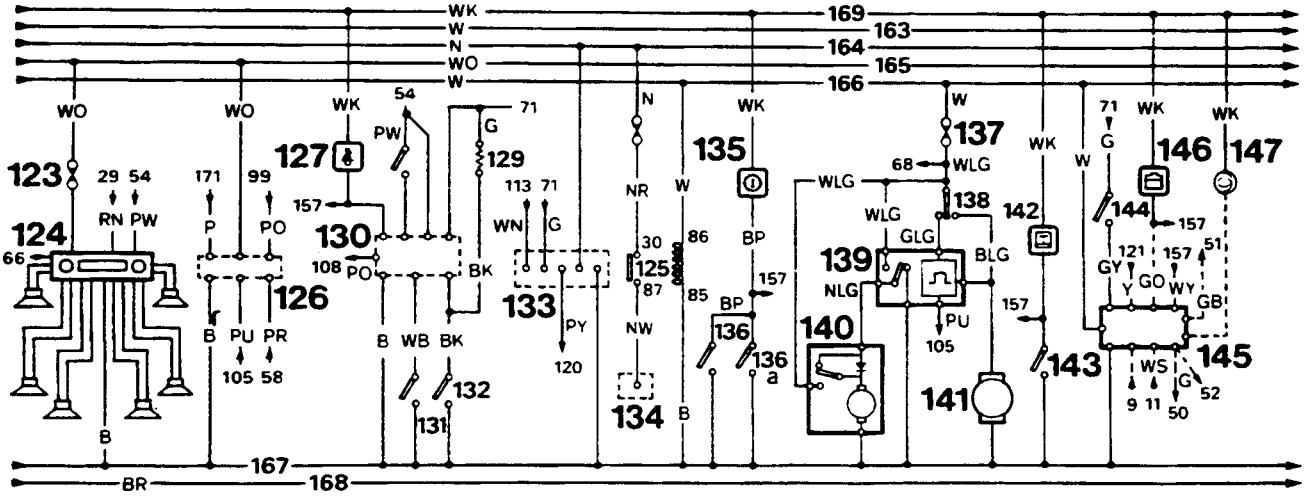
B	Black	**L**	Light	**P**	Purple	**U**	Blue
G	Green	**N**	Brown	**R**	Red	**W**	White
K	Pink	**O**	Orange	**S**	Grey	**Y**	Yellow

The last letter of a colour denotes the tracer colour.

Circuit diagram - 1990 MY - USA and CANADA

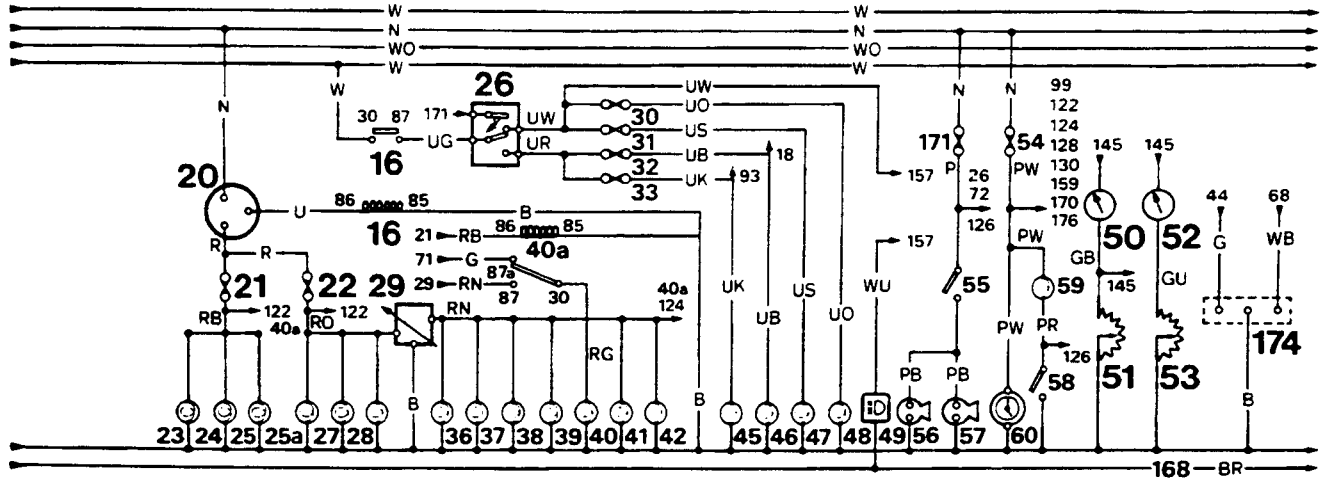


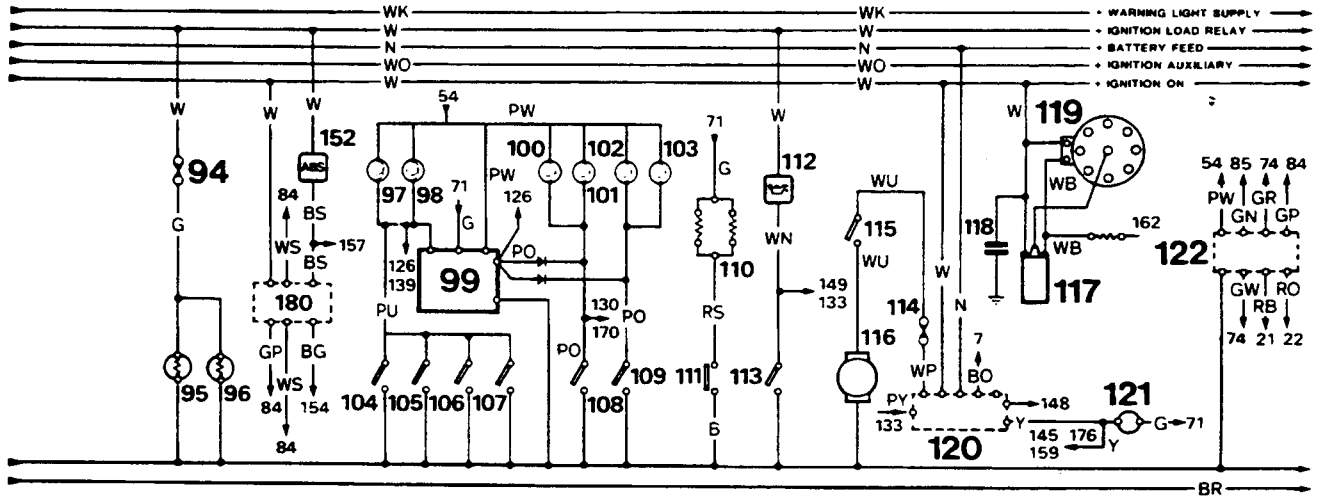


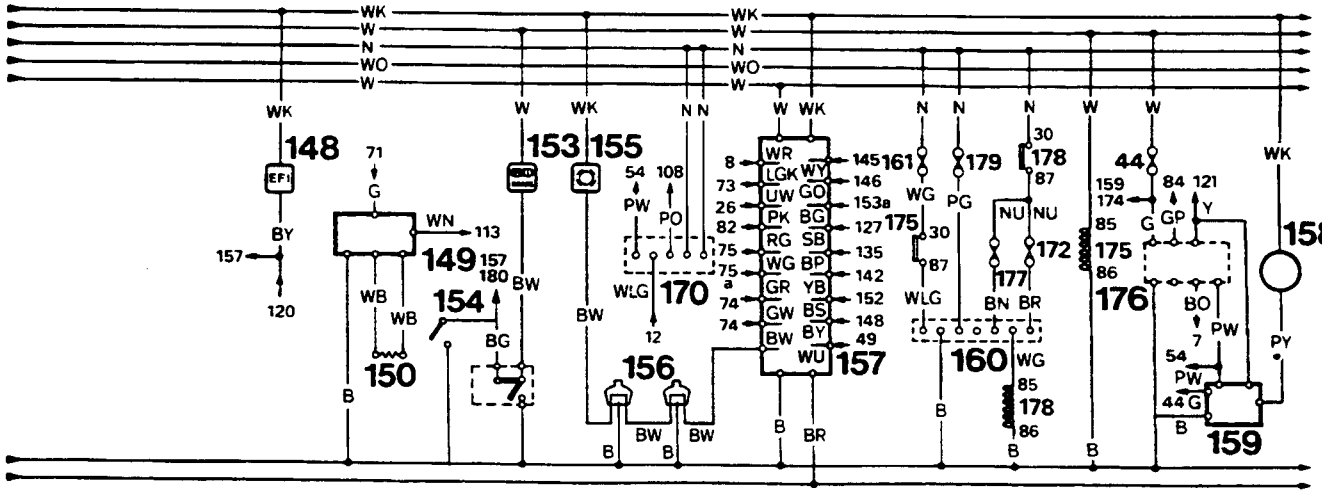


RR2945E – REVISED. SEPT. 90

Illustrations RR2945E & RR2946E

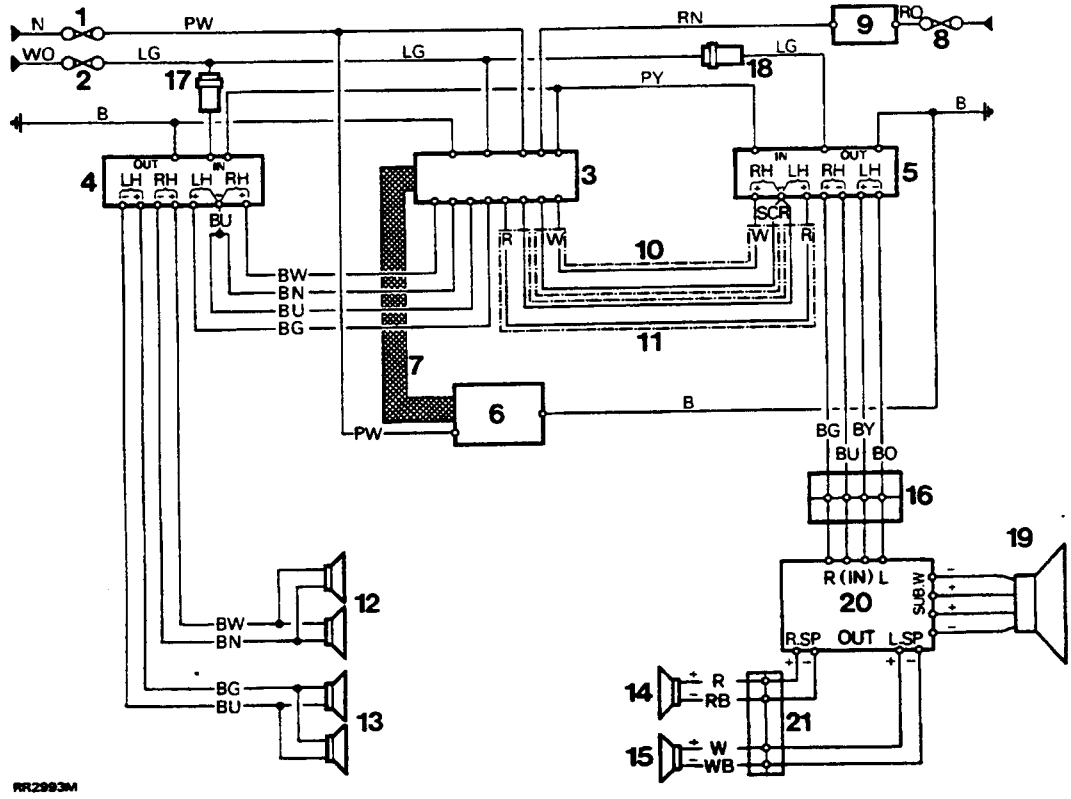






RR2946E

CD PLAYER WITH POWER AMPLIFIERS - 1991



Circuit diagram - RR2993E

1. Fuse B2
2. Fuse B4
3. Radio - head unit
4. Front power amplifier
5. Rear power amplifier
6. CD auto changer
7. Data link cable
8. Fuse A4
9. Rheostat
10. Screened cable, RH rear speaker signal
11. Screened cable, LH rear speaker signal
12. RH front door speaker
13. LH front door speaker
14. RH rear speaker
15. LH rear speaker
16. In-line connector, cross-over unit IN
17. 4 amp in-line fuse, front amplifier
18. 4 amp in-line fuse, rear amplifier
19. Sub-woofer
20. Cross-over assembly
21. In line connecter cross-over unit OUT

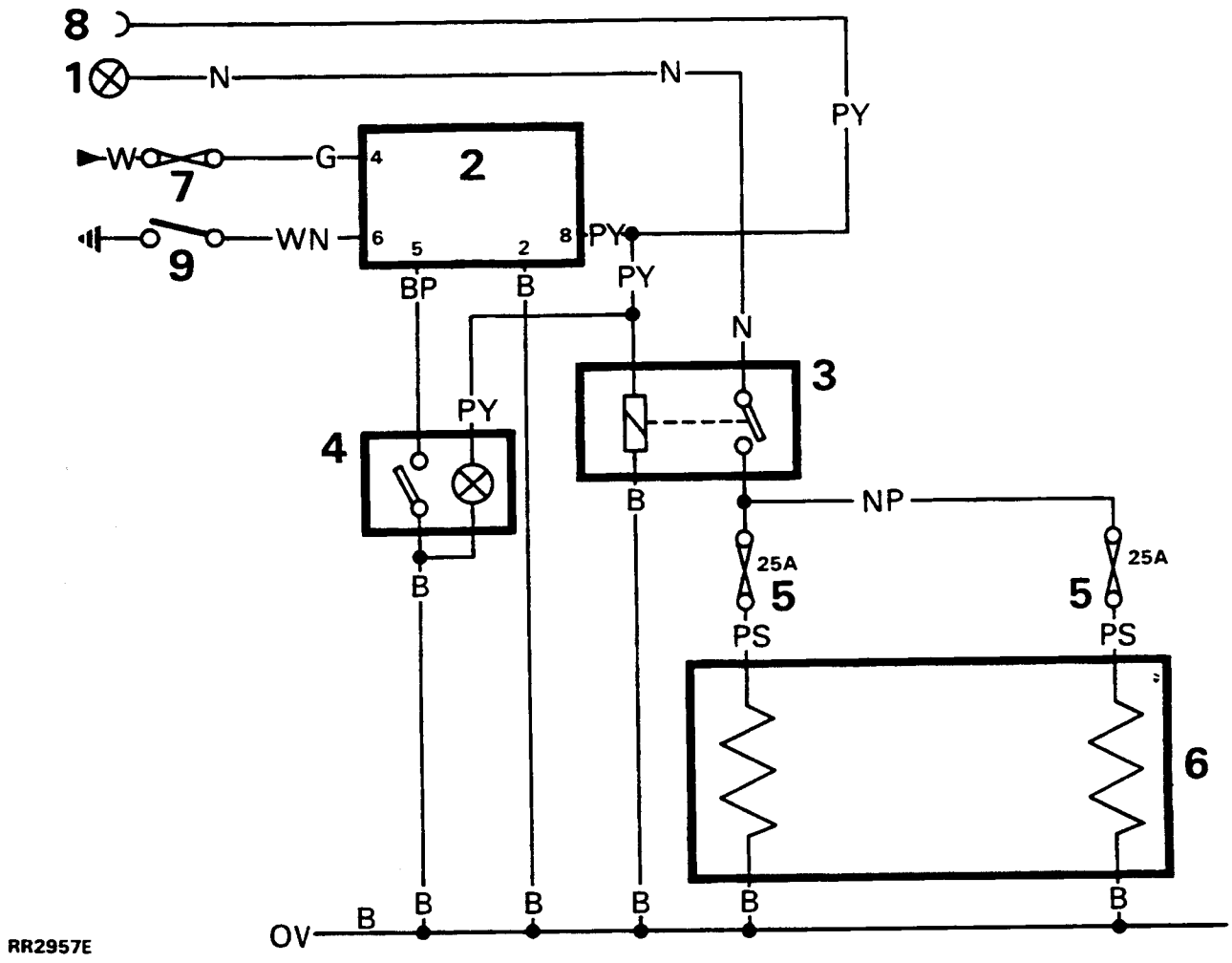
NOTE: SCR denotes screen

Cable colour code

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

The last letter of a colour denotes the tracer colour.

HEATED FRONT SCREEN - 1991



Circuit diagram - RR2957E

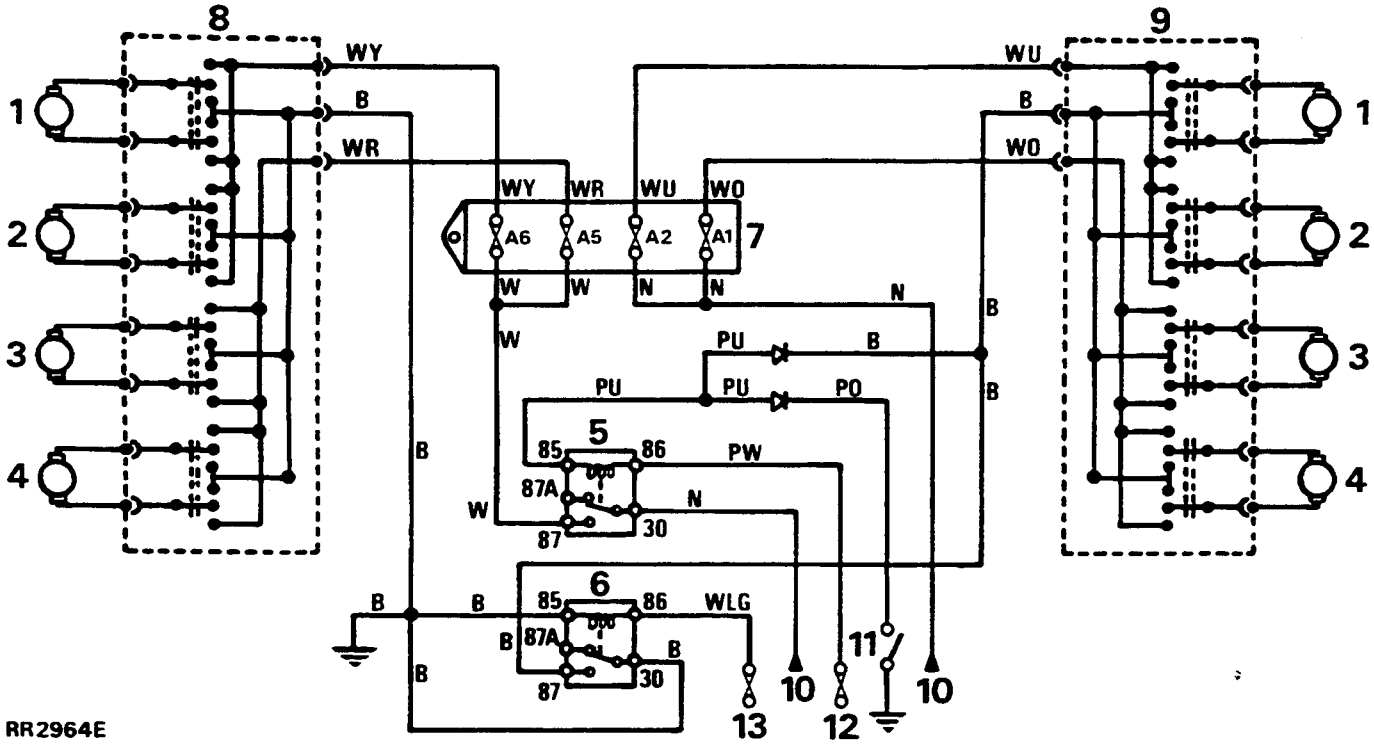
1. Terminal post
2. Timer unit
3. Load relay
4. Switch/warning light
5. In line fuses - 25 Amp
6. Heated front screen
7. Fuse A5
8. EFI ECU pin 8
9. Oil pressure switch

Cable colour code

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

The last letter of a colour denotes the tracer colour.

ELECTRIC SEAT ADJUSTMENT - 1991



Circuit diagram - RR2530E

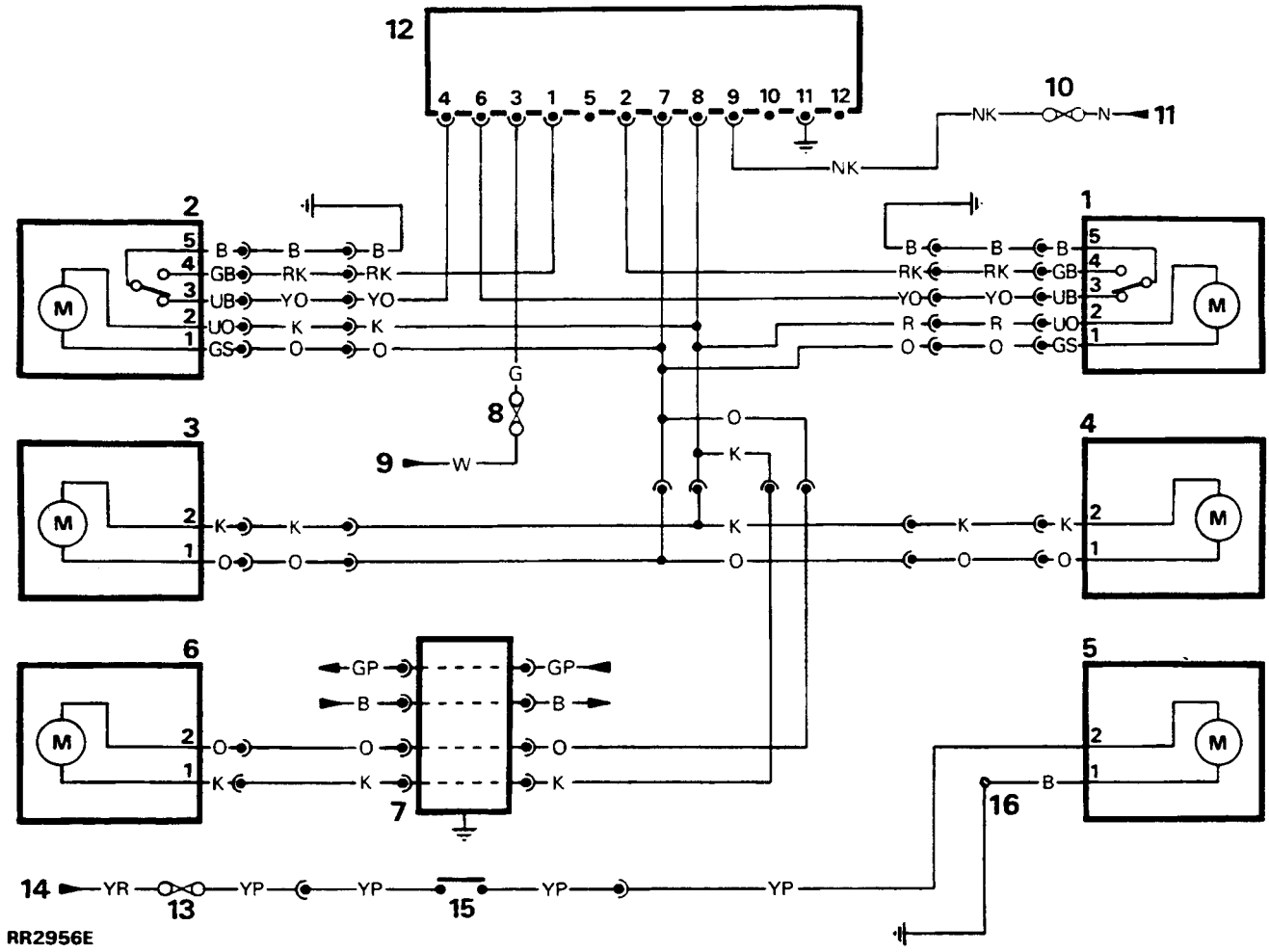
1. Seat recline motor
2. Seat height (rear) motor
3. Seat base adjust motor
4. Seat height (front) motor
5. Load relay-from driver's door courtesy switch
6. Load relay-fused auxiliary feed controled
7. Auxiliary fuse box (B)
8. Driver's seat control
9. Passenger's seat control
10. Terminal post
11. Drivers door switch
12. Fuse B2
13. Fuse B1

Cable colour code

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

The last letter of a colour denotes the tracer colour.

DOOR LOCKS / FUEL FILLER FLAP - 1991



Circuit diagram - RR2956E

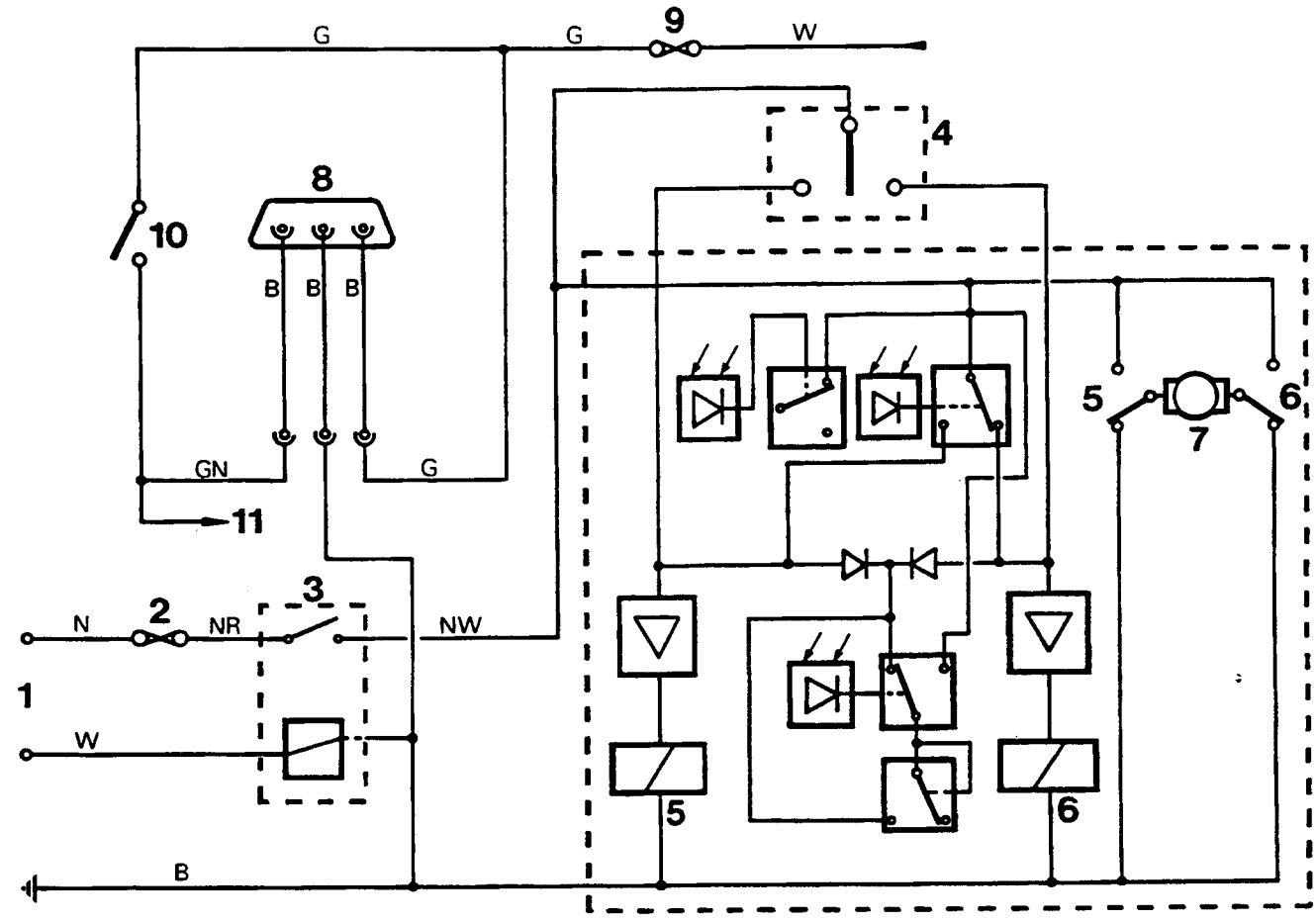
1. Switch/lock unit right hand front door
2. Switch/lock unit left hand front door
3. Lock unit left hand rear door relay
4. Lock unit right hand rear door
5. Fuel flap actuator
6. Lock unit tailgate
7. Suppressor
8. Fuse A5
9. Feed from ignition load relay - pin 87
10. Fuse C7
11. Battery 12V +ve
12. Central door locking control unit
13. Fuse C6
14. Feed from ignition load relay - pin 87A
15. Fuel flap release switch
16. Fuel tank filler pipe ground

Cable colour code

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

The last letter of a colour denotes the tracer colour.

SUNROOF / AUTOMATIC GLARE CONTROL MIRROR - 1991



RR2958E

Circuit diagram - RR2958E

1. Main harness connections
   Brown - live positive feed
   White - ignition positive feed
   Black - ground
2. Fuse B5
3. Auxiliary relay
4. Operating switch
5. Relay - tilt, open to closed
   - slide, closed to open
6. Relay - slide, open to closed
   - tilt, closed to open
7. Drive motor
8. Mirror connection
9. Fuse A5
10. Reverse lamps switch
11. Reverse lamps

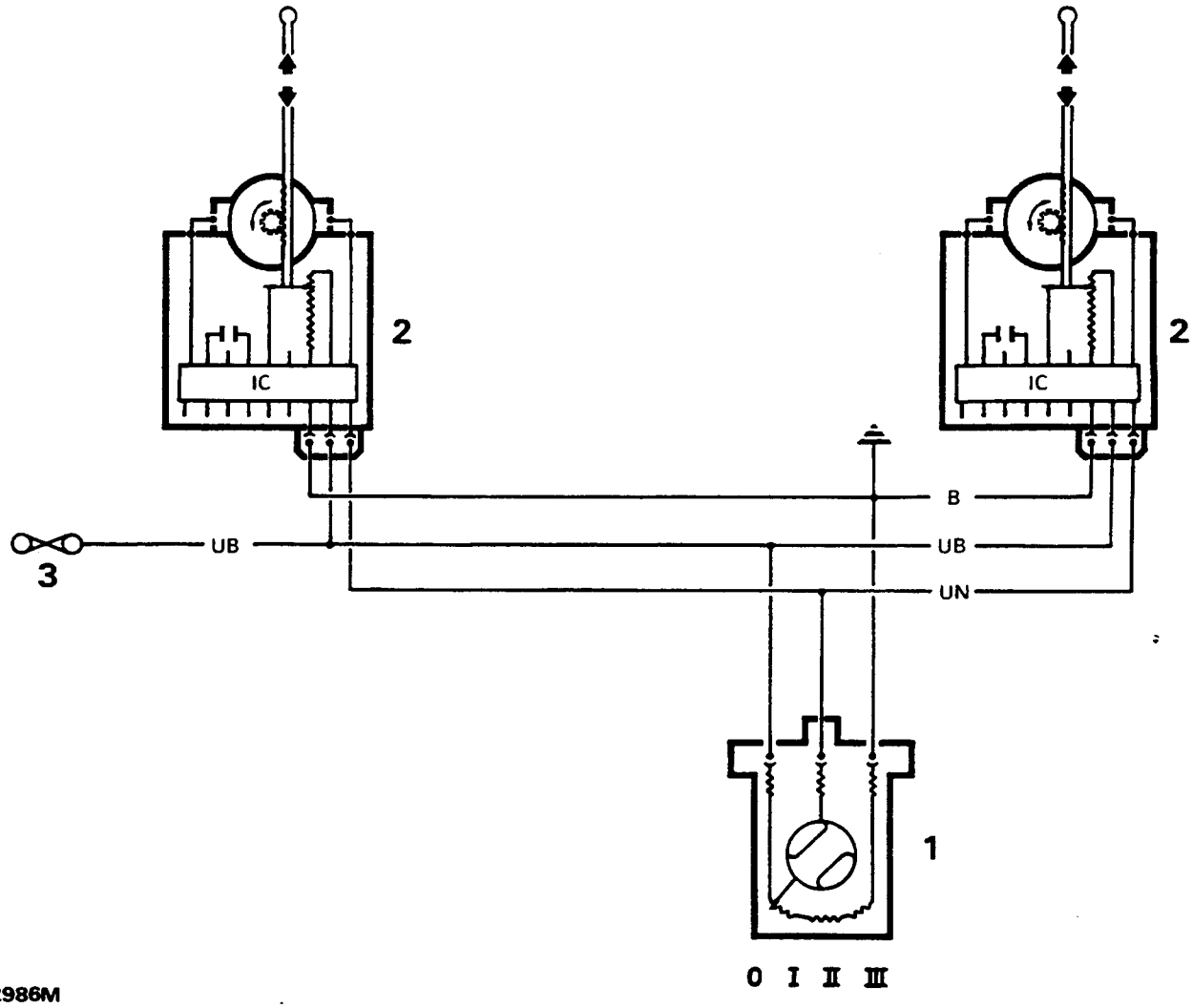
Cable colour code

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

The last letter of a colour denotes the tracer colour.

------- Denotes component enclosure

HEADLAMP LEVELLING - 1991



RR2986M

Circuit diagram - RR2986M

1. Headlamp levelling switch
2. Headlamp levelling actuator/motor
3. Fuse A9

Cable colour code

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

The last letter of a colour denotes the tracer colour.

CIRCUIT DIAGRAM - 1991 MY - RIGHT HAND STEERING - Illustrations RR2976M & RR2977M

Numerical key

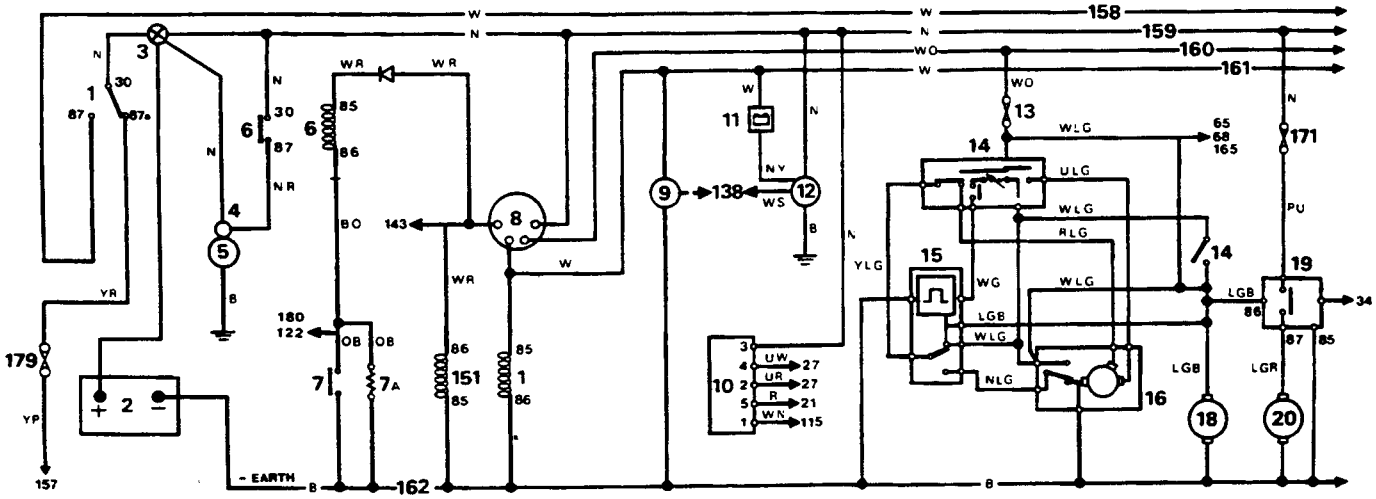
1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch
7a. Resistor (manual)
8. Ignition switch
9. Tachometer
10. Voltage transformer (dim dip)
11. Ignition warning lamp
12. Alternator
13. Fuse B1
14. Front wipe/wash switch
15. Front wipe delay unit
16. Front wiper motor
17. Headlamp relay
18. Front wash pump
19. Headlamp wash timer unit
20. Headlamp wash pump
21. Main lighting switch
22. Fuse A3
23. Fuse A7
24. LH side lamp
25. LH tail lamp
26. LH number plate lamp
26a. RH number plate lamp
27. High beam dip/flash switch
28. Fuse B2
29. RH side lamp
30. RH tail lamp
31. Rheostat
32. Fuse A8
33. Fuse A2
34. Fuse A9
35. Fuse A1
36. Rear fog switch
37. Fuse A4
38. Switch illumination (2 off)
39. Cigar lighter illumination (2 off)
40. Heater illumination (4 off)
41. Clock illumination
42. Auto gear selector illumination
43. Instrument illumination (4 off)
43a. Column switch illumination
44. Rear fog warning lamp
45. LH rear fog lamp
46. RH rear fog lamp
47. LH dip beam
48. RH dip beam
49. LH high beam
50. RH high beam
51. High beam warning lamp
52. Fuel gauge
53. Fuel gauge sender unit
54. Water temperature gauge
55. Water temperature sender unit
56. Fuse B3
57. Horn switch
58. RH horn
59. LH horn
60. Under bonnet illumination switch
61. Under bonnet light
62. Clock
63. Fuse C7
64. Fuse C8
65. Window lift pick-up point
66. Fuse C1
67. Heated rear screen relay
68. Radio aerial amplifier
69. Heated rear screen
70. Heated rear screen switch
71. Heated rear screen warning lamp
72. Voltage sensitive switch
73. Fuse A5
74. Hazard switch
75. Flasher unit
76. Direction indicator switch
77. LH indicator warning lamp
77a. RH indicator warning lamp
78. LH rear indicator lamp
79. LH front indicator lamp
80. LH side repeater lamp
81. RH side repeater lamp
82. RH front indicator lamp
83. RH rear indicator lamp
84. Trailer warning lamp
85. Fuse A6
86. Stop lamp switch
87. Reverse lamp switch
88. Front auxilary lamp relay
89. LH stop lamp
90. RH stop lamp
91. LH reverse lamp
92. RH reverse lamp
93. LH front auxilary lamp
94. RH front auxilary lamp
95. Front auxilary lamp switch
96. Fuse B4
97. Dash cigar lighter
98. Glove box cigar lighter
99. Front interior lamp
100. Rear interior lamp
101. Interior lamp delay unit
102. LH door edge lamp
103. LH puddle lamp
104. RH door edge lamp
105. RH puddle lamp
106. Interior lamp switch
107. LH rear door switch
108. RH rear door switch
109. Tailgate switch
110. LH front door switch
111. RH front door switch
112. Heated washer jets (front screen)
113. Thermostat heated jets
114. Oil pressure warning lamp
115. Oil pressure switch
116. Fuse C4
117. Heated front screen connections
118. Fuel pump (petrol models)
119. Ignition coil
120. Capacitor
121. Distributor
122. EFI Harness plug
123. Fuel shut off solenoid (Diesel)
124. Sun roof relay
124a. Fuse B5
125. Radio fuse
126. Radio and four speakers
-LF-left hand front speaker
-LR-left hand rear speaker
-RF-right front speaker
-RR-right hand rear speaker
127. Sun roof pick up point
128. Auto transmission and transfer box oil temperature warning lamp
129. Auto transmission oil temperature switch
129a. Transfer box oil temperature switch
130. Fuse C3
131. Rear wash wipe switch
132. Rear wipe delay unit
133. Rear wiper motor
134. Rear screen wash pump
135. Low screen wash fluid level warning lamp
136. Low screen wash switch
137. Low coolant switch
138. Electronic speedo and instrument controls
139. Low coolant level warning lamp
140. Low fuel level warning lamp
141. Glow plug warning lamp (Diesel)
142. E.F.I. warning lamp
143. Glow plug timer unit
144. Glow plugs (Diesel)
145. ABS warning lamp
146. Handbrake/brake fluid level/pressure warning lamp
147. Handbrake warning switch
148. Brake fluid level warning switch
149. Brake pad wear warning lamp
150. Brake pad wear sensors
151. Brake check relay (Australia only)
152. Split charge relay (option)
153. Split charge terminal post (option)
154. Heater/air conditioning connections
155. Fuse C9
156. Coil negative (engine RPM input to ECU)
157. Fuel filter flap (see door cable circuit diagram)
158. Ignition load relay (+)
159. Battery feed (+)
160. Ignition auxiliary (+)
161. Ignition on (+)
162. Earth (-)
163. Heater/air con. load relay
164. Trailer pick up point
165. Electric seats pick up point (option)
166. Fuse C2
167. Electric mirrors
168. Alarm pick up point
169. Fuse C5
170. ABS pick up point
171. Fuse B6
172. Fuse B7
173. Condenser fan relay
174. Fuse B8
175. Fuse B9
176. Inertia switch
177. Speed transducer
178. Central locking
179. Fuse C6
180. Cruise control pick-up point (option)

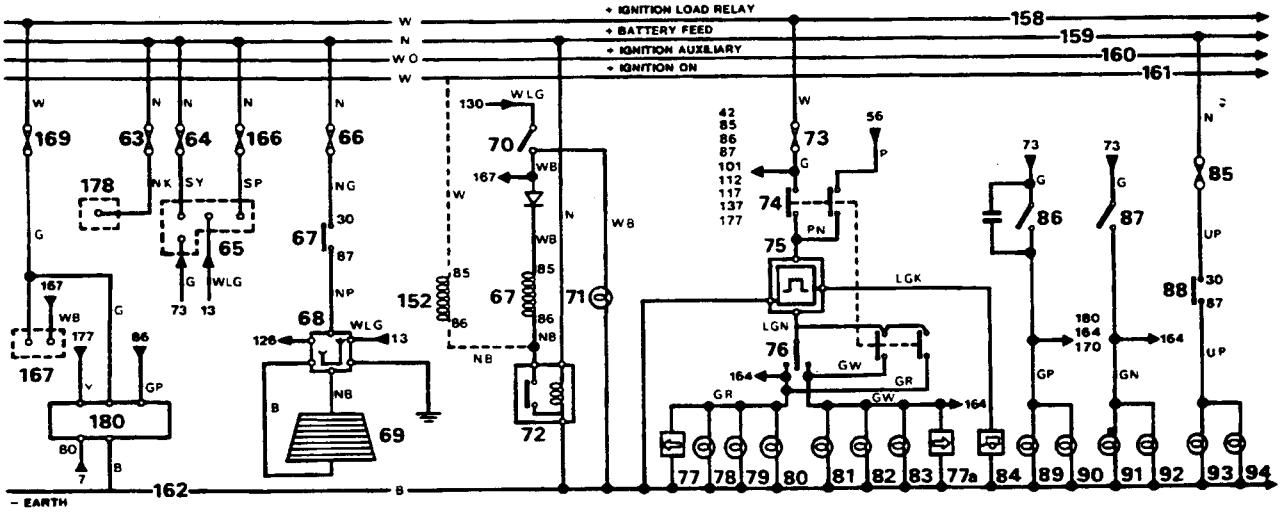
CIRCUIT DIAGRAM - 1991 MY - RIGHT HAND STEERING - Illustrations RR2976M & RR2977M

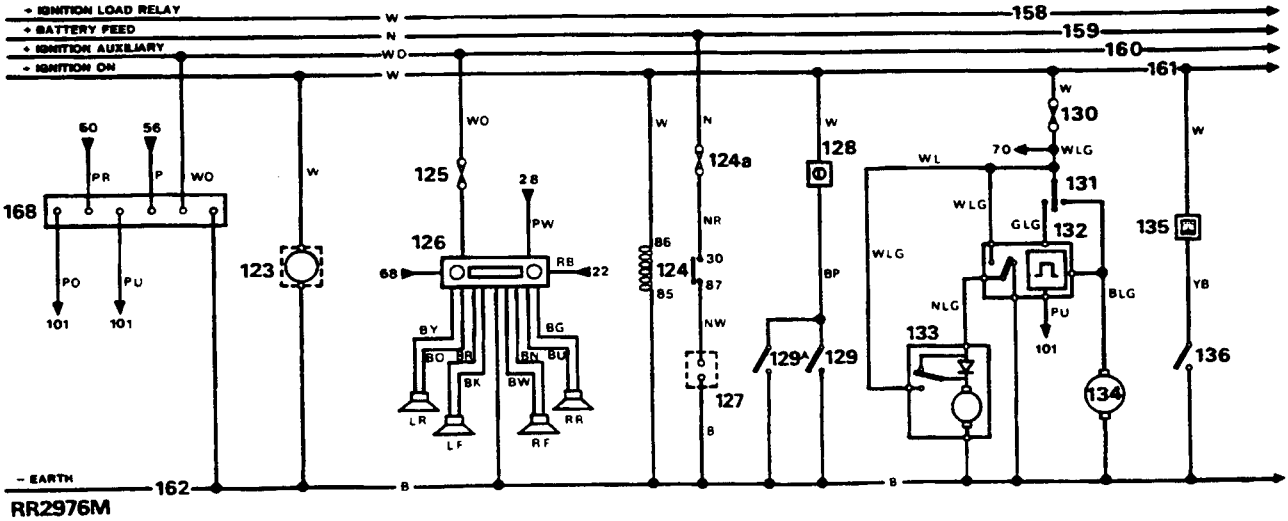
Alphabetical key

170. ABS pick up point
145. ABS warning lamp
168. Alarm pick up point
12. Alternator
42. Automatic gear selector illumination (2 off)
129. Automatic transmission oil temperature switch
128. Automatic transmission/transfer box oil temperature warning lamp
2. Battery
148. Brake fluid level warning switch
150. Brake pad wear sensors
149. Brake pad wear warning lamp
151. Brake check relay (Australia only)
120. Capacitor
178. Central locking
39. Cigar lighter illumination (2 off)
62. Clock
41. Clock illumination
156. Coil negative, engine speed signal to ECU
43a. Column switch illumination
173. Condenser fan relay
180. Cruise control pick-up point (option)
97. Dash cigar lighter
76. Direction indicator switch
121. Distributor
167. Electric mirrors
165. Electric seats pick up point (option)
138. Electronic speedo and instrument controls
122. EFI Harness plug
142. EFI warning lamp
75. Flasher unit
88. Front auxiliary lamp relay
95. Front auxiliary lamp switch
99. Front interior lamp
18. Front wash pump
15. Front wipe delay unit
14. Front wipe/wash switch
16. Front wiper motor
52. Fuel gauge
53. Fuel gauge sender unit
118. Fuel pump (petrol models)
123. Fuel shut off solenoid (Diesel)
157. Fuel filler flap
35. Fuse A1
33. Fuse A2
22. Fuse A3
37. Fuse A4
73. Fuse A5
85. Fuse A6
23. Fuse A7
32. Fuse A8
34. Fuse A9
13. Fuse B1
28. Fuse B2
56. Fuse B3
96. Fuse B4
124a. Fuse B5
171. Fuse B6
172. Fuse B7
174. Fuse B8
175. Fuse B9
66. Fuse C1
166. Fuse C2
130. Fuse C3
116. Fuse C4
169. Fuse C5
179. Fuse C6
63. Fuse C7
64. Fuse C8
155. Fuse C9
98. Glove box cigar lighter
144. Glow plugs (Diesel)
143. Glow plug timer unit (Diesel)
141. Glow plug warning lamp (Diesel)
146. Handbrake/brake fluid level/pressure warning lamp
147. Handbrake warning switch
74. Hazard switch
17. Headlamp relay
20. Headlamp wash pump
19. Headlamp wash timer unit
117. Heated front screen connections
69. Heated rear screen
67. Heated rear screen relay
70. Heated rear screen switch
71. Heated rear screen warning lamp
112. Heated washer jets
40. Heater illumination (4 off)
154. Heater/air con. connections
163. Heater/air con. load relay
27. High beam dip/flash switch
51. High beam warning lamp
57. Horn switch
119. Ignition coil
1. Ignition load relay
8. Ignition switch
11. Ignition warning lamp
176. Inertia switch
43. Instrument illumination (4 off)
101. Interior lamp delay unit
106. Interior lamp switch
47. LH dip beam
102. LH door edge lamp
93. LH front auxiliary lamp
110. LH front door switch
79. LH front indicator lamp
49. LH high beam
59. LH horn
77. LH indicator warning lamp
25. LH number plate lamp
103. LH puddle lamp
107. LH rear door switch
45. LH rear fog lamp
78. LH rear indicator lamp
91. LH reverse lamp
24. LH side lamp
80. LH side repeater lamp
89. LH stop lamp
25. LH tail lamp
139. Low coolant level warning lamp
137. Low coolant switch
140. Low fuel level warning lamp
135. Low screen wash fluid level warning lamp
136. Low screen wash switch
21. Main lighting switch
115. Oil pressure switch
114. Oil pressure warning lamp
68. Radio aerial amplifier
126. Radio and four speakers
125. Radio fuse
36. Rear fog switch
44. Rear fog warning lamp
100. Rear interior lamp
134. Rear screen wash pump
131. Rear wash wipe switch
132. Rear wipe delay unit
133. Rear wiper motor
7a. Resistor (manual)
87. Reverse lamp switch
48. RH dip beam
104. RH door edge lamp
94. RH front auxiliary lamp
111. RH front door switch
82. RH front indicator lamp
50. RH high beam
58. RH horn
77a. RH indicator warning lamp
26a. RH number plate lamp
105. RH puddle lamp
108. RH rear door switch
46. RH rear fog lamp
83. RH rear indicator lamp
92. RH reverse lamp
29. RH side lamp
81. RH side repeater lamp
90. RH stop lamp
30. RH tail lamp
31. Rheostat
177. Speed transducer
152. Split charge relay (option)
153. Split charge terminal post (option)
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
86. Stop lamp switch
127. Sunroof pick up point
124. Sunroof relay
38. Switch illumination (2 off)
9. Tachometer
109. Tailgate switch
3. Terminal post
113. Thermostat - heated washer jets
164. Trailer pick up point
84. Trailer warning lamp
129a. Transfer box oil temperature switch
60. Under bonnet illumination switch
61. Under bonnet light
72. Voltage sensitive switch
10. Voltage transformer (dim-dip)
54. Water temperature gauge
55. Water temperature sender unit
65. Window lift pick-up point

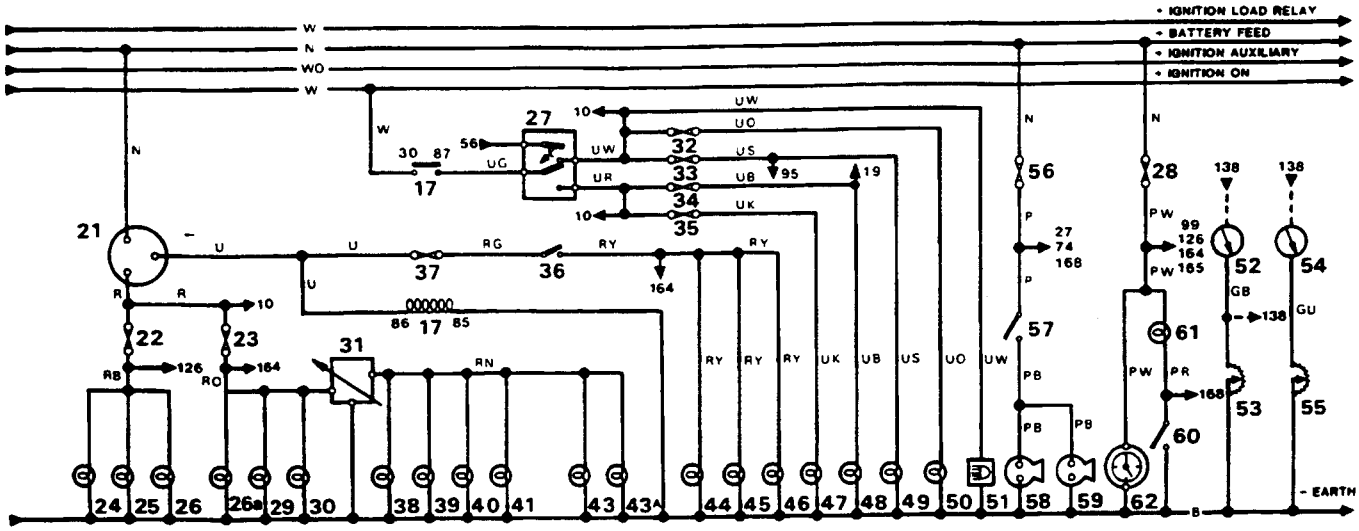
Circuit diagram - 1991 MY - Right hand steering

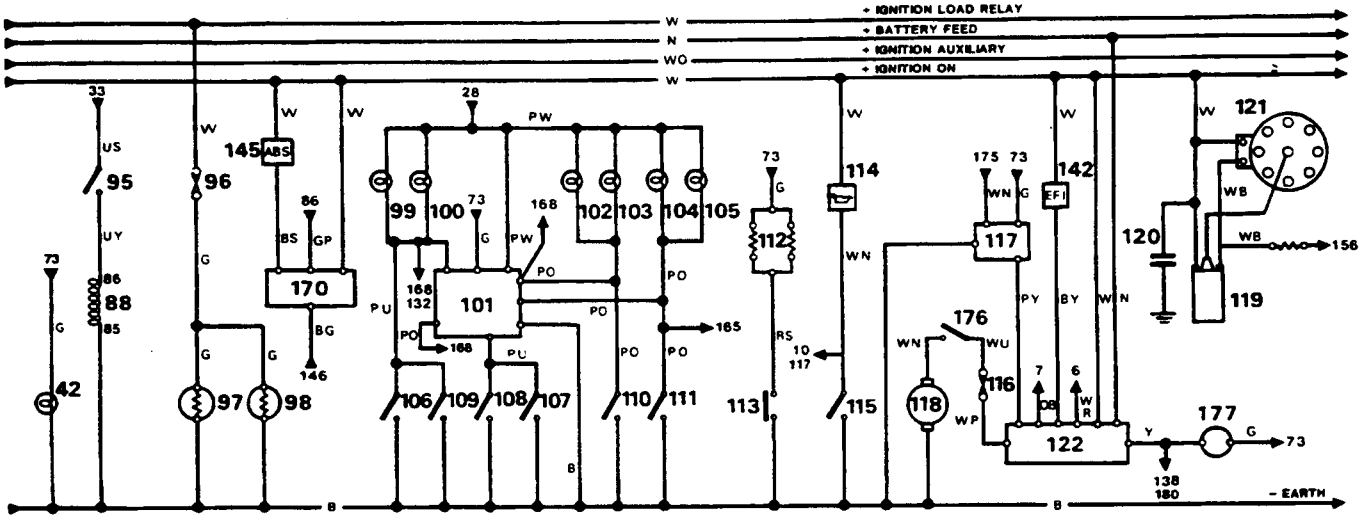


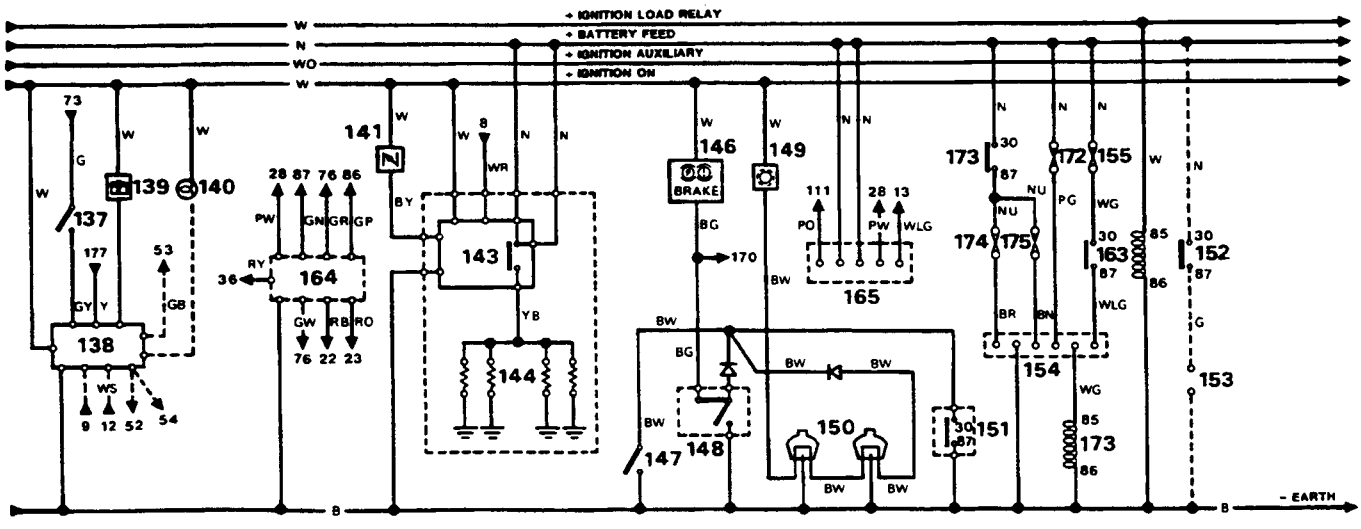




Illustrations RR2976M and RR2977M







RR2977M

CIRCUIT DIAGRAM - 1991 MY - LEFT HAND STEERING - Illustrations RR2978M & RR2979M

Numerical key

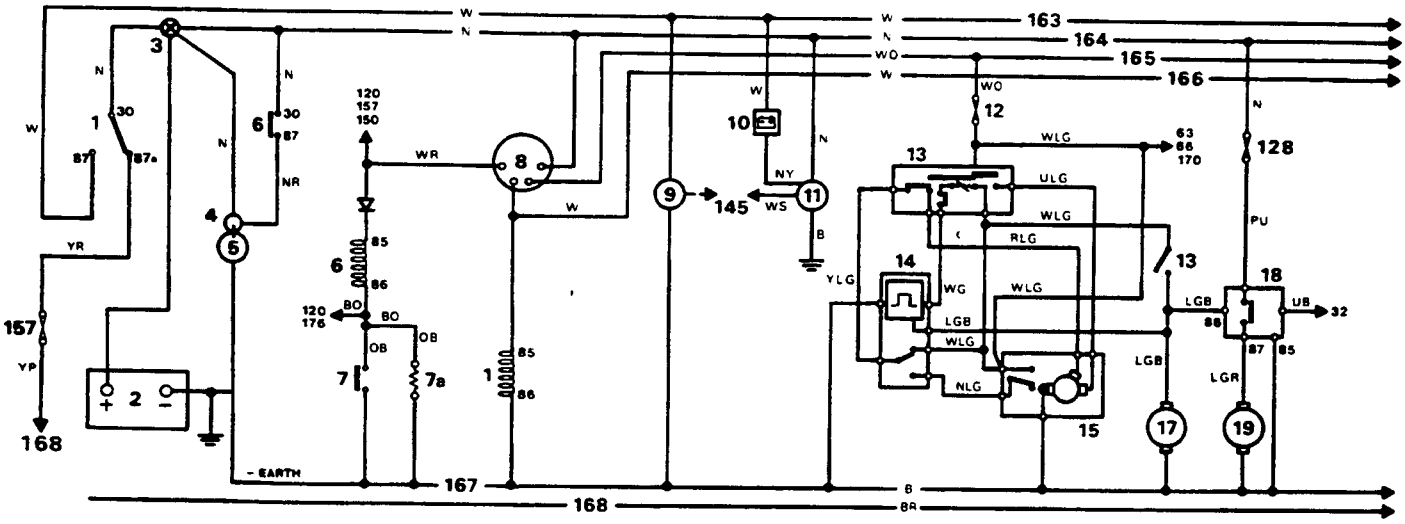
1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch (auto)
7a. Resistor (manual transmission)
8. Ignition switch
9. Tachometer
10. Ignition warning lamp
11. Alternator
12. Fuse B1
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
16. Headlamp relay
17. Front wash pump
18. Headlamp wash timer unit
19. Headlamp wash pump
20. Main lighting switch
21. Fuse A3
22. Fuse A7
23. LH side lamp
24. LH tail lamp
25. LH number plate lamp
25a. RH number plate lamp
26. High beam dip/flash switch
27. RH side lamp
28. RH tail lamp
29. Rheostat
30. Fuse A8
31. Fuse A2
32. Fuse A9
33. Fuse A1
34. Rear fog switch
35. Fuse A4
36. Switch illumination (2 off)
36a. Headlamp levelling switch illumination (Germany)
37. Cigar lighter illumination (2 off)
38. Heater illumination (4 off)
39. Clock illumination
40. Auto gear selector illumination (2 off)
41. Instrument illumination (4 off)
41a. Column switch illumination
42. Rear fog warning lamp
43. LH rear fog
44. RH rear fog
45. LH dip beam
46. RH dip beam
47. LH high beam
48. RH high beam
49. High beam warning lamp
50. Fuel gauge
51. Fuel gauge sender unit
52. Water temperature gauge
53. Water temperature sender unit
54. Fuse B2
55. Horn switch
56. RH horn
57. LH horn
58. Under bonnet illumination switch
59. Under bonnet light
60. Clock
61. Fuse C7
62. Fuse C2
63. Pick-up point central locking/window lift
64. Heated rear screen relay
65. Fuse C1
66. Radio aerial amplifier
67. Heated rear screen
68. Heated rear screen switch
69. Heated rear screen warning lamp
70. Voltage sensitive switch
71. Fuse A5
72. Hazard switch
73. Flasher unit
74. Direction indicator switch
75. LH indicator warning lamp
75a. RH indicator warning lamp
76. LH rear indicator lamp
77. LH front indicator lamp
78. LH side repeater lamp
79. RH side repeater lamp
80. RH front indicator lamp
81. RH rear indicator lamp
82. Trailer warning lamp
83. Fuse A6
84. Stop lamp switch
85. Reverse lamp switch
86. Front auxilary lamp relay (option)
87. LH stop lamp
88. RH stop lamp
89. LH reverse lamp
90. RH reverse lamp
91. LH front auxilary lamp (option)
92. RH front auxilary lamp (option)
93. Front auxilary lamp switch
94. Fuse B4
95. Dash cigar lighter
96. Glove box cigar lighter
97. Front interior lamp
98. Rear interior lamp
99. Interior lamp delay unit
100. LH door edge lamp
101. LH puddle lamp
102. RH door edge lamp
103. RH puddle lamp
104. Interior lamp switch
105. LH rear door switch
106. RH rear door switch
107. Tailgate switch
108. LH front door switch
109. RH front door switch
110. Heated washer jets (front screen)
111. Thermostat-heated washer jets
112. Oil pressure warning lamp
113. Oil pressure switch
114. Fuse C4
115. Inertia switch
116. Fuel pump (petrol models)
117. Ignition coil (petrol models)
118. Capacitor (petrol models)
119. Distributor (petrol models)
120. EFI Harness plug
121. Speed transducer
122. Trailer pick up point
123. Radio fuse
124. Radio and four speakers
-LF-left hand front speaker
-LR-left hand rear speaker
-RF-right front speaker
-RR-right hand rear speaker
125. Sun roof relay
125a. Fuse B5
126. Alarm pick up point
127. Overspeed warning (Saudi only)
128. Fuse B6
129. Fuse C5
130. Fuel shut off solenoid (Diesel)
131. Seat buckle switch (Saudi only)
132. Overspeed monitor (Saudi only)
133. Heated front screen pick up point (option)
134. Sunroof pick up point (option)
135. Auto transmission / transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
136a. Transfer box oil temperature switch
137. Fuse C3
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
141. Rear screen wash pump
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
144. Low coolant switch
145. Electronic speedo and instrument controls
146. Low coolant level warning lamp
147. Low fuel level warning lamp
148. E.F.I. warning lamp
149. Glow plug warning lamp (Diesel)
150. Glow plug timer unit(Diesel)
151. Glow plugs (Diesel)
152. ABS warning lamp
153. Handbrake / brake fluid level / pressure warning lamp
153a. Brake fluid level warning switch
154. Handbrake warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
157. Fuse C6
158. Split charge relay (option)
159. Split charge terminal post (option)
160. Heater/air conditioning connections
161. Fuse C9
162. Coil negative (engine RPM input to ECU)
163. Ignition load relay (+)
164. Battery feed (+)
165. Ignition auxiliary (+)
166. Ignition on (+)
167. Earth (-)
168. Fuel filler flap (see door locks circuit diagram)
169. Central locking
170. Electric seats pick up point
171. Fuse B3
172. Fuse B8
173. Fuse C8
174. Electric mirrors
175. Heater/air conditioning load relay
176. Cruise control pick up points (option)
177. Fuse B9
178. Condenser fan relay
179. Fuse B7
180. ABS pick up point
181. Headlamp levelling switch connection (option)
182. Headlamp levelling actuator (2) (option)

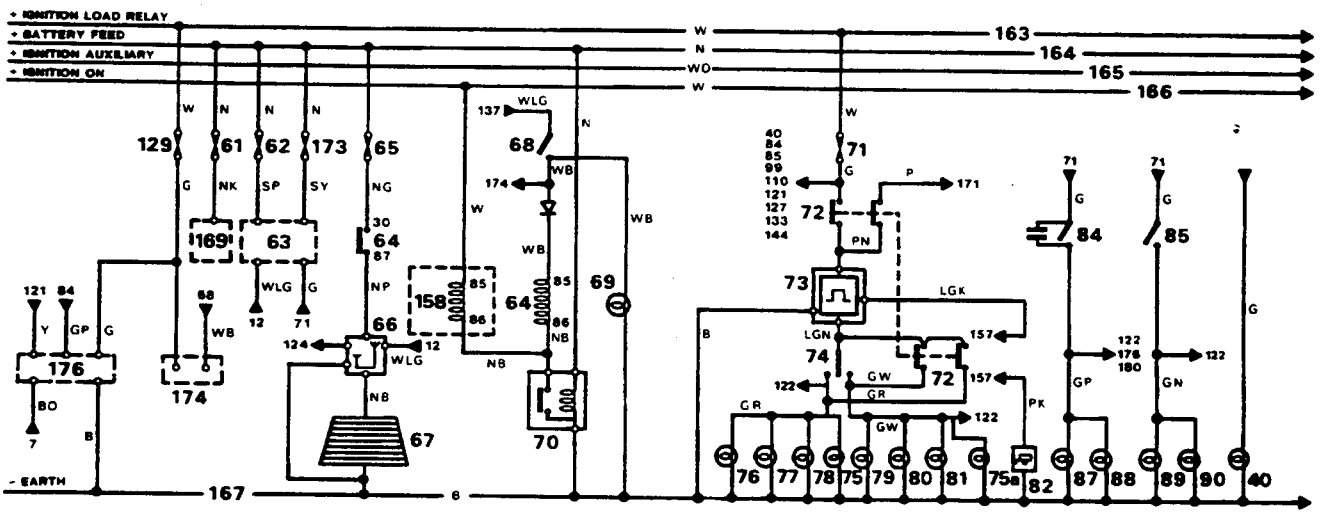
CIRCUIT DIAGRAM - 1991 MY - LEFT HAND STEERING - Illustrations RR2978M & RR2979M

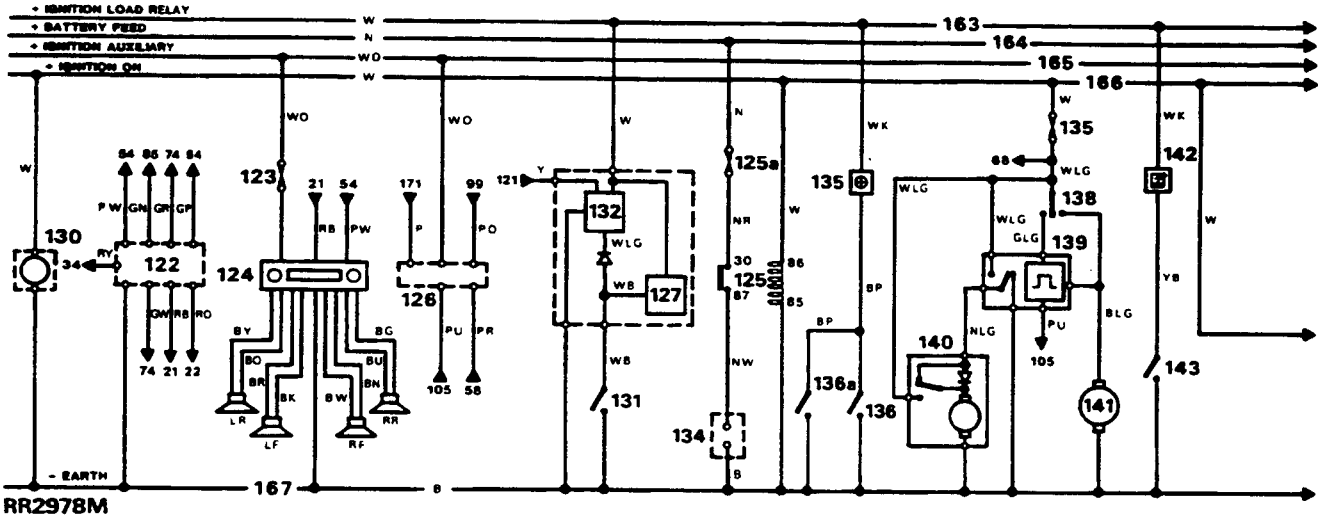
Alphabetical key

180. ABS pick up point
152. ABS warning lamp
126. Alarm pick up point
11. Alternator
40. Automatic gear selector illumination (2 off)
136. Automatic transmission oil temperature switch
135. Automatic transmission/transfer box oil temperature warning lamp
2. Battery
153a. Brake fluid level warning switch
156. Brake pad wear sensors
155. Brake pad wear warning lamp
118. Capacitor (petrol models)
169. Central locking
37. Cigar lighter illumination (2 off)
60. Clock
39. Clock illumination
162. Coil negative, engine speed signal to ECU
41a. Column switch illumination
178. Condenser fan relay
176. Cruise control pick up point (option)
95. Dash cigar lighter
74. Direction indicator switch
119. Distributor (petrol models)
174. Electric mirrors
170. Electric seats pick up point (option)
145. Electronic speedo and instrument controls
120. EFI harness plug
148. EFI warning lamp
73. Flasher unit
86. Front auxiliary lamp relay (option)
93. Front auxiliary lamp switch
97. Front interior lamp
17. Front wash pump
14. Front wipe delay unit
13. Front wipe/wash switch
15. Front wiper motor
168. Fuel filler flap
50. Fuel gauge
51. Fuel gauge sender unit
116. Fuel pump (petrol models)
130. Fuel shut off solenoid (Diesel)
33. Fuse A1
31. Fuse A2
21. Fuse A3
35. Fuse A4
71. Fuse A5
83. Fuse A6
22. Fuse A7
30. Fuse A8
32. Fuse A9
12. Fuse B1
54. Fuse B2
171. Fuse B3
94. Fuse B4
125a. Fuse B5
128. Fuse B6
179. Fuse B7
172. Fuse B8
177. Fuse B9
65. Fuse C1
162. Fuse C2
137. Fuse C3
114. Fuse C4
129. Fuse C5
157. Fuse C6
61. Fuse C7
173. Fuse C8
161. Fuse C9
96. Glove box cigar lighter
151. Glow plugs (Diesel)
150. Glow plug timer unit (Diesel)
149. Glow plug warning lamp (Diesel)
153. Handbrake / brake fluid level / pressure warning lamp
154. Handbrake warning switch
72. Hazard switch
182. Headlamp levelling actuator (2) (Germany)
181. Headlamp levelling switch connection (option)
36a. Headlamp levelling switch illumination (option)
16. Headlamp relay
19. Headlamp wash pump
18. Headlamp wash timer unit
133. Heated front screen pick up point (option)
67. Heated rear screen
64. Heated rear screen relay
68. Heated rear screen switch
69. Heated rear screen warning lamp
110. Heated washer jets
38. Heater illumination (4 off)
160. Heater/air con. connections
175. Heater/air con. load relay
26. High beam dip/flash switch
49. High beam warning lamp
55. Horn switch
117. Ignition coil
1. Ignition load relay
8. Ignition switch
10. Ignition warning lamp
115. Inertia switch
41. Instrument illumination (4 off)
99. Interior lamp delay unit
104. Interior lamp switch
45. LH dip beam
100. LH door edge lamp
91. LH front auxiliary lamp
108. LH front door switch
77. LH front indicator lamp
47. LH high beam
57. LH horn
75. LH indicator warning lamp
25. LH number plate lamp
101. LH puddle lamp
105. LH rear door switch
43. LH rear fog lamp
76. LH rear indicator lamp
89. LH reverse lamp
23. LH side lamp
78. LH side repeater lamp
87. LH stop lamp
24. LH tail lamp
146. Low coolant level warning lamp
144. Low coolant switch
147. Low fuel level warning lamp
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
20. Main lighting switch
113. Oil pressure switch
112. Oil pressure warning lamp
132. Overspeed monitor (Saudi only)
127. Overspeed warning (Saudi only)
63. Pick up point-central locking/window lift
66. Radio aerial amplifier
124. Radio and four speakers
123. Radio fuse
34. Rear fog switch
42. Rear fog warning lamp
98. Rear interior lamp
141. Rear screen wash pump
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
7a. Resistor (manual)
85. Reverse lamp switch
46. RH dip beam
102. RH door edge lamp
92. RH front auxiliary lamp
109. RH front door switch
80. RH front indicator lamp
48. RH high beam
56. RH horn
75a. RH indicator warning lamp
25a. RH number plate lamp
103. RH puddle lamp
106. RH rear door switch
44. RH rear fog lamp
81. RH rear indicator lamp
90. RH reverse lamp
27. RH side lamp
79. RH side repeater lamp
88. RH stop lamp
28. RH tail lamp
29. Rheostat
121. Speed transducer
158. Split charge relay (option)
159. Split charge terminal post (option)
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
84. Stop lamp switch
134. Sunroof pick up point
125. Sunroof relay
36. Switch illumination (2 off)
9. Tachometer
107. Tailgate switch
3. Terminal post
111. Thermostat - heated washer jets
122. Trailer pick up point
82. Trailer warning lamp
136a. Transfer box oil temperature switch
58. Under bonnet illumination switch
59. Under bonnet light
70. Voltage sensitive switch
52. Water temperature gauge
53. Water temperature sender unit

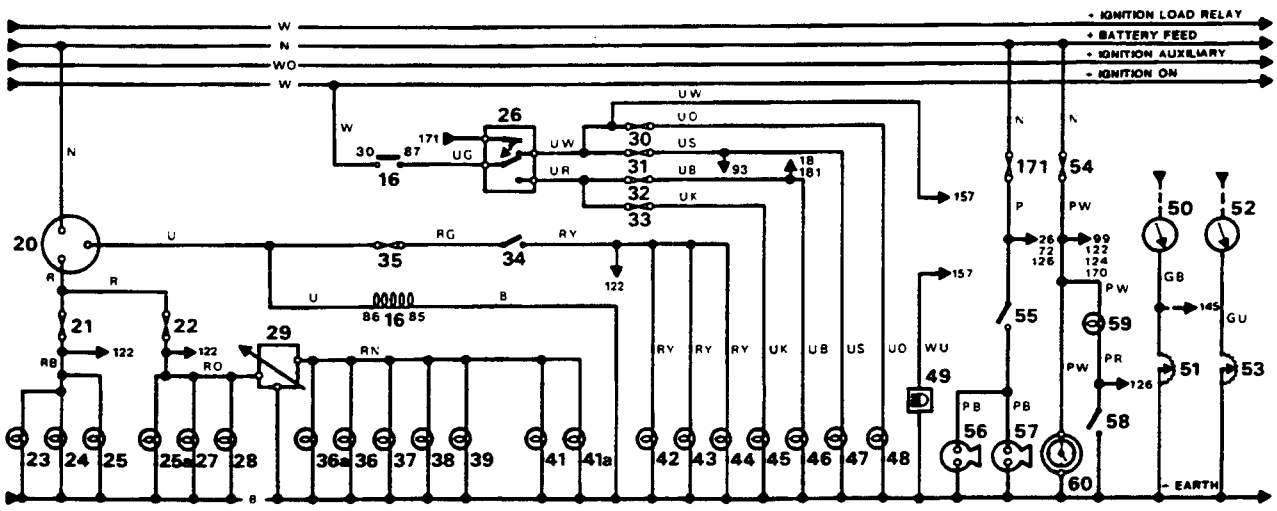
Circuit diagram - 1991 MY - Left hand steering

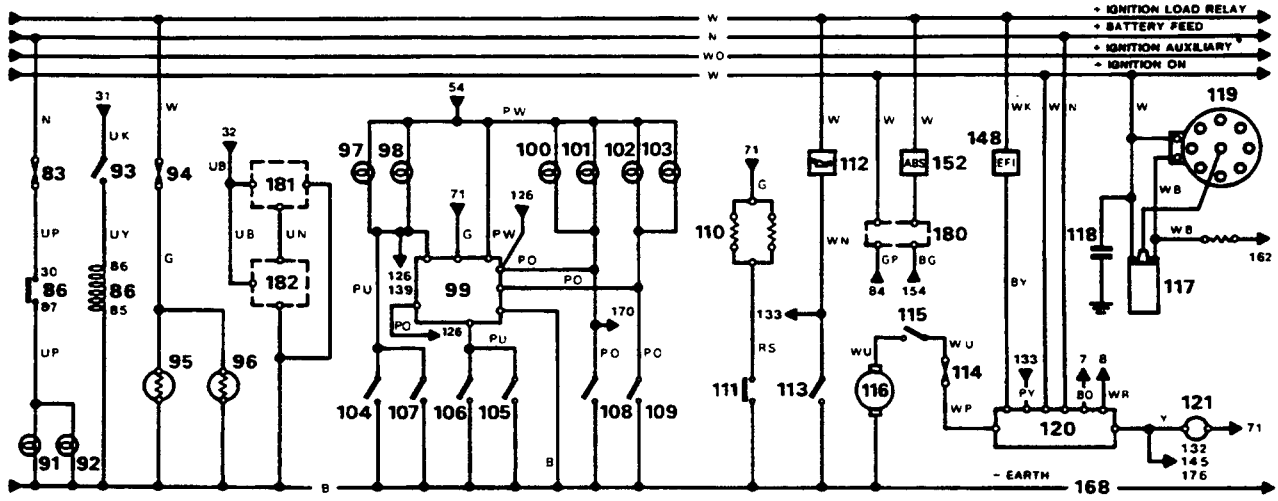


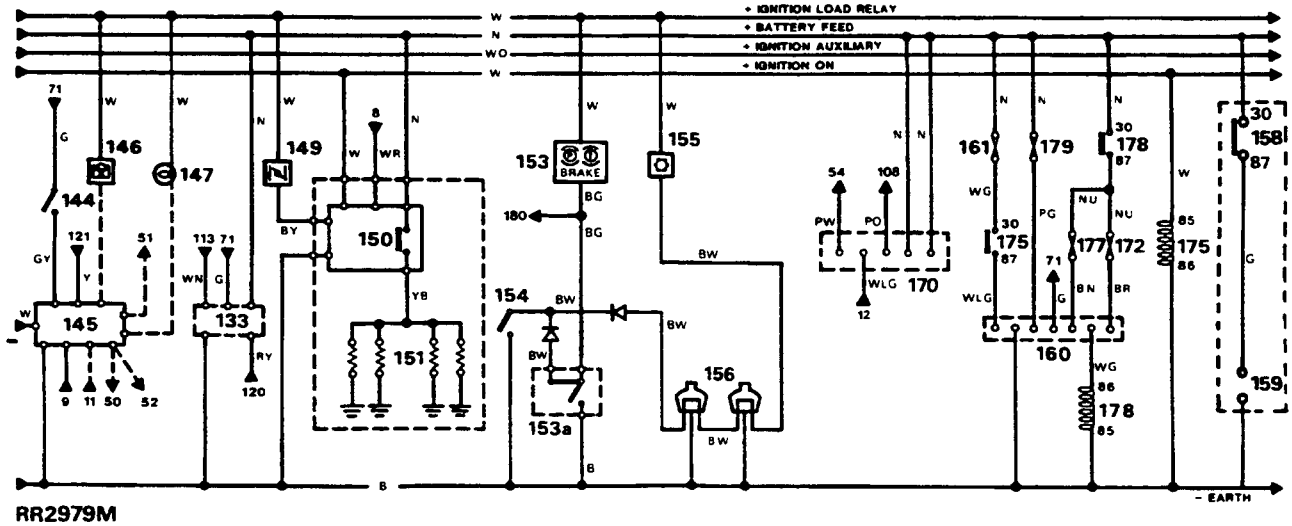




Illustrations RR2978M & RR2979M







RR2979M

CIRCUIT DIAGRAM - 1991 MY - USA AND CANADA - Illustrations RR2970E & RR2971E

Numerical key

1. Ignition load relay
2. Battery
3. Terminal post
4. Starter solenoid
5. Starter motor
6. Starter relay
7. Starter inhibit switch
8. Ignition switch
9. Tachometer
10. Ignition warning lamp
11. Alternator
12. Fuse B1
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
16. Headlamp relay
17. Front wash pump
18. Headlamp wash timer unit
19. Headlamp wash pump
20. Main lighting switch
21. Fuse A3
22. Fuse A7
23. LH side lamp
24. LH tail lamp
25. LH license plate lamp
25a. RH license plate lamp
26. High beam dimmer/flash switch
27. RH side lamp
28. RH tail lamp
29. Rheostat
30. Fuse A8
31. Fuse A2
32. Fuse A9
33. Fuse A1
34. Fuse B6
35. Window lift connections
36. Switch illumination (2 off)
37. Cigar lighter illumination (2 off)
38. Heater illumination (4 off)
39. Clock illumination
40. Auto gear selector illumination (2 off)
40a. Auto gear selector illumination relay.
41. Instrument illumination (4 off)
41a. Column switch illumination
42. Not used
43. Not used
44. Fuse B3
45. LH low beam
46. RH low beam
47. LH high beam
48. RH high beam
49. High beam warning lamp
50. Fuel gauge
51. Fuel gauge sender unit
52. Water temperature gauge
53. Water temperature sender unit
54. Fuse B2
55. Horn switch
56. RH horn
57. LH horn
58. Under hood illumination switch
59. Under hood light
60. Clock
61. Fuse C7
62. Fuse C2
63. Central door locking unit
64. Heated rear window relay
65. Fuse C1
66. Radio aerial amplifier
67. Heated rear screen
68. Heated rear screen switch
69. Heated rear screen warning lamp
70. Voltage sensitive switch
71. Fuse A5
72. Hazard switch
73. Flasher unit
74. Direction indicator switch
75. LH indicator warning lamp
75a. RH indicator warning lamp
76. LH rear indicator lamp
77. LH front indicator lamp
78. Not used
79. Not used
80. RH front indicator lamp
81. RH rear indicator lamp
82. Trailer warning lamp
83. Fuse A6
84. Stop lamp switch
85. Reverse lamp switch
86. Front fog lamp relay
87. LH stop lamp
88. RH stop lamp
89. LH reverse lamp
90. RH reverse lamp
91. LH front fog lamp
92. RH front fog lamp
93. Front fog lamp switch
94. Fuse B4
95. Dash cigar lighter
96. Glove box cigar lighter
97. Front interior lamp
98. Rear interior lamp
99. Interior lamp delay unit

100. LH door edge lamp
101. LH puddle lamp
102. RH door edge lamp
103. RH puddle lamp
104. Interior lamp switch
105. LH rear door switch
106. RH rear door switch
107. Tailgate switch
108. LH front door switch
109. RH front door switch
110. Heated washer jets
111. Thermostat heated jets
112. Oil pressure/level warning lamp
113. Oil pressure switch
114. Fuse C4
115. Inertia switch
116. Fuel pump
117. Ignition coil
118. Capacitor
119. Distributor
120. EFI Harness plug
121. Speed transducer
122. Trailer pick up point
123. Fuse A4
124. Radio and six speakers
125. Sun roof relay
125a. Fuse B5
126. Alarm pick up point
127. Seat belt warning lamp
128. 'Key-in switch'
129. Resistor
130. Audible warning unit
131. Seat buckle switch
132. Transfer box neutral switch
133. Condenser fan motors
134. Sunroof connection point (option)
135. Auto transmission and transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
136a. Transfer box oil temperature switch
137. Fuse C3
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
141. Rear screen wash pump
142. Low screen wash fluid level warning lamp
143. Low screen wash switch
144. Low coolant switch
145. Electronic speedo and instrument controls
146. Low coolant level warning lamp
147. Low fuel level warning lamp
148. Check engine warning lamp
149. Low oil level logic unit
150. Low oil level probe
151. Compressor clutch relay
152. ABS warning lamp
153. Parking brake/brake fluid loss warning lamp
153a. Brake fluid level warning switch
154. Park brake warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
157. Warning lamp control unit
158. Service engine warning lamp
159. Emission maintenance reminder unit
160. Diode pack (air con)
161. Fuse C9
162. Coil negative (engine RPM input to ECU)
163. Ignition load relay (+) circuit
164. Battery feed (+) circuit
165. Ignition auxiliary (+) circuit
166. Ignition on (+) circuit
167. Earth (-) circuit
168. Warning lights supply common earth (-) circuit
169. Warning lights supply (+) circuit
170. Fuse C6
171. Fuse C5
172. Fuse B8
173. Fuse C8
174. Fuel filler flap release
175. Heater/air conditioning relay
176. Cruise control connection points
177. Fuse B9
178. Condenser fan relay
179. Fuse B7
180. ABS ECU
181. Front amplifier audio
182. Rear amplifier audio
183. Electric seat relays
184. Heated front screen timer unit
185. Electric mirror elements
186. Glare control mirror

Cable colour code

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

The last letter of a colour denotes the tracer colour.

△ **NOTE: The following items are now incorporated into the main harness assembly, ABS, air conditioning, CD player, cruise control, electric mirrors, door locks, heated front screen and window lift. These items are shown on the main circuit diagram as a box containing the relevant number, or indicated by an arrow and the item number. Refer to the appropriate circuit diagram for details of these items.**

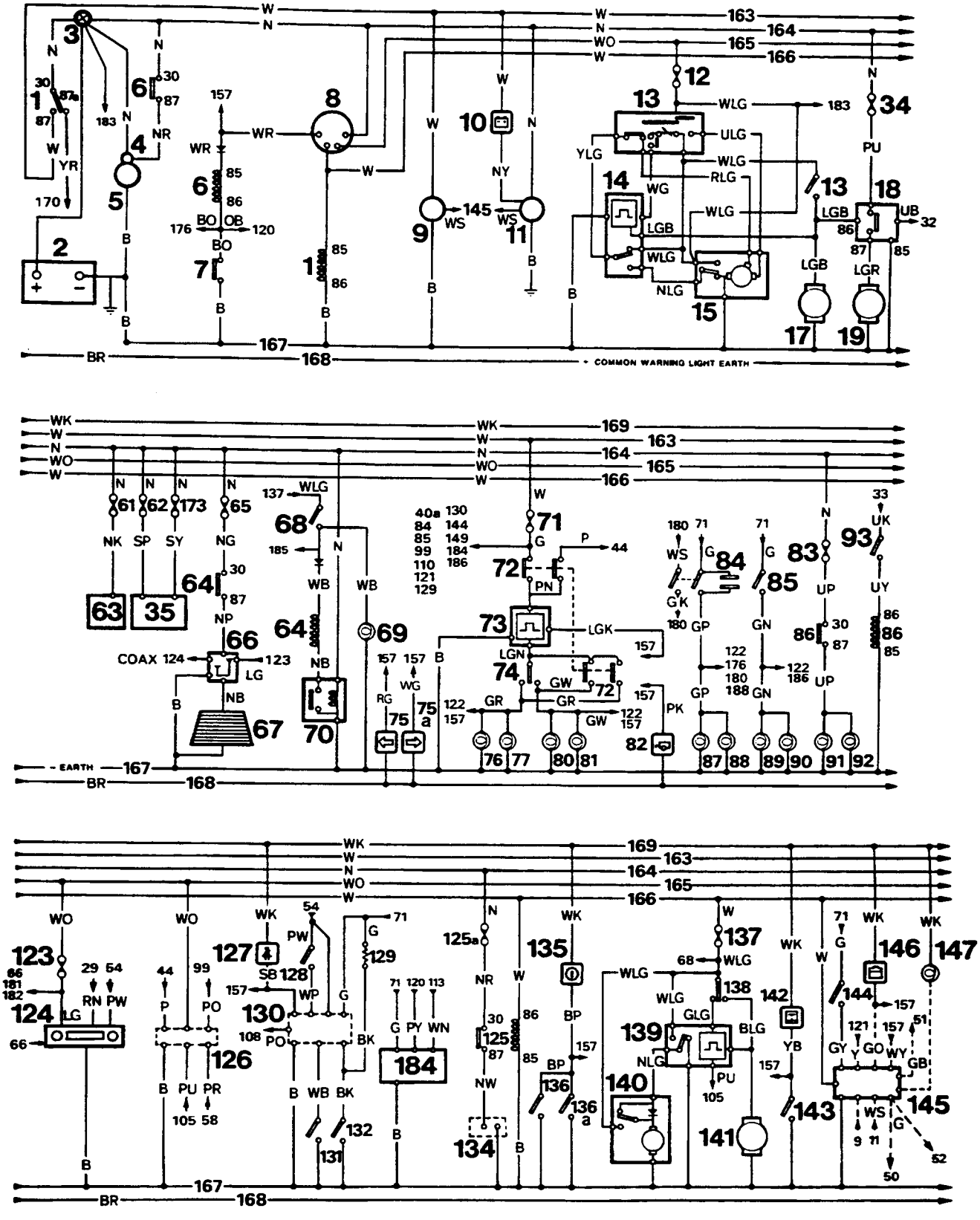
Circuit diagram - 1991 MY - USA and CANADA
Illustrations RR2970E & RR2971E

Alphabetical key

180. ABS ECU
180. ABS pick up point
152. ABS warning lamp
126. Alarm pick up point
11. Alternator
130. Audible warning unit
40. Auto gear selector illumination (2 off)
40a. Auto gear selector illumination relay.
135. Auto transmission and transfer box oil temperature warning lamp
136. Auto transmission oil temperature switch
2. Battery
164. Battery feed (+)
153a. Brake fluid loss warning switch
155. Brake pad wear warning lamp
156. Brake pad wear sensors
118. Capacitor
63. Central door locking unit
163. Check engine warning lamp
37. Cigar lighter illumination (2 off)
60. Clock
39. Clock illumination
162. Coil negative (engine RPM input to ECU)
42. Column switch illumination
151. Compressor clutch relay
133. Condenser fan motors
178. Condenser fan relay
176. Cruise control connection points
95. Dash cigar lighter
160. Diode pack (air con)
74. Direction indicator switch
119. Distributor
148. E.F.I. warning lamp
120. EFI Harness plug
167. Earth (+)
185. Electric mirror elements
183. Electric seat relays
145. Electronic speedo and instrument controls
159. Emission maintenance reminder
73. Flasher unit
181. Front amplifier audio
86. Front fog lamp relay
93. Front fog lamp switch
97. Front interior lamp
17. Front wash pump
13. Front wipe/wash switch
14. Front wipe delay unit
15. Front wiper motor
174. Fuel filler flap release
51. Fuel gauge sender unit
50. Fuel gauge
116. Fuel pump
33. Fuse A1
31. Fuse A2
21. Fuse A3
123. Fuse A4
71. Fuse A5
83. Fuse A6
22. Fuse A7
30. Fuse A8
32. Fuse A9
12. Fuse B1
54. Fuse B2
44. Fuse B3
94. Fuse B4
125a. Fuse B5
34. Fuse B6
179. Fuse B7
172. Fuse B8
177. Fuse B9
65. Fuse C1
62. Fuse C2
137. Fuse C3
114. Fuse C4
171. Fuse C5
170. Fuse C6
61. Fuse C7
173. Fuse C8
161. Fuse C9
186. Glare control mirror
96. Glove box cigar lighter
72. Hazard switch
16. Headlamp relay
19. Headlamp wash pump
18. Headlamp wash timer unit
184. Heated front screen timer unit
68. Heated rear screen switch
64. Heated rear window relay
69. Heated rear screen warning lamp
67. Heated rear screen
110. Heated washer jets
38. Heater illumination (4 off)
175. Heater/air conditioning relay
160. Heater/air conditioning connections
26. High beam dimmer/flash switch
49. High beam warning lamp
55. Horn switch
165. Ignition auxiliary (+)
117. Ignition coil
1. Ignition load relay
163. Ignition load relay (+)
166. Ignition on (+)
8. Ignition switch
10. Ignition warning lamp
115. Inertia switch
41. Instrument illumination (4 off)
104. Interior lamp switch
99. Interior lamp delay unit

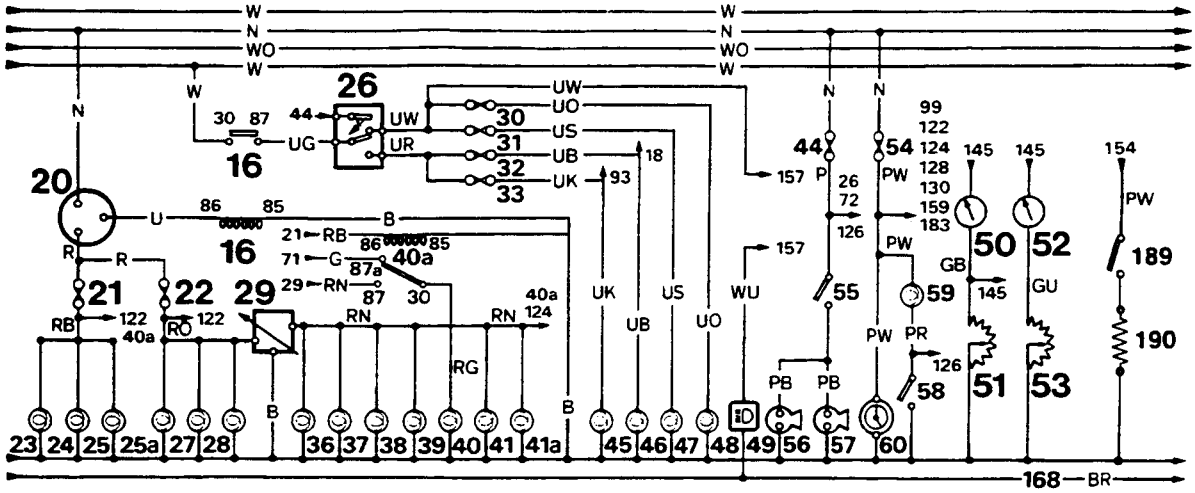
128. 'Key-in switch'
100. LH door edge lamp
108. LH front door switch
91. LH front fog lamp
77. LH front indicator lamp
47. LH high beam
57. LH horn
75. LH indicator warning lamp
25. LH license plate lamp
45. LH low beam
101. LH puddle lamp
105. LH rear door switch
76. LH rear indicator lamp
89. LH reverse lamp
23. LH side lamp
87. LH stop lamp
24. LH tail lamp
146. Low coolant level warning lamp
144. Low coolant switch
147. Low fuel level warning lamp
150. Low oil level probe
149. Low oil level logic unit
143. Low screen wash switch
142. Low screen wash fluid level warning lamp
20. Main lighting switch
151. Not used - will illuminate on initial bulb check
113. Oil pressure switch
112. Oil pressure/level warning lamp
154. Park brake warning switch
153. Parking brake/brake fluid loss warning lamp
182. Rear amplifier audio
102. RH door edge lamp
109. RH front door switch
92. RH front fog lamp
80. RH front indicator lamp
48. RH high beam
56. RH horn
75a. RH indicator warning lamp
25a. RH license plate lamp
46. RH low beam
103. RH puddle lamp
106. RH rear door switch
81. RH rear indicator lamp
90. RH reverse lamp
27. RH side lamp
88. RH stop lamp
28. RH tail lamp
66. Radio aerial amplifier
124. Radio and six speakers
123. Radio fuse
182. Rear amplifier audio
98. Rear interior lamp
141. Rear screen wash pump
138. Rear wash wipe switch
139. Rear wipe delay unit
140. Rear wiper motor
129. Resistor
85. Reverse lamp switch
29. Rheostat
127. Seat belt warning lamp
131. Seat buckle switch
121. Speed transducer
7. Starter inhibit switch
5. Starter motor
6. Starter relay
4. Starter solenoid
84. Stop lamp switch
125. Sun roof relay
134. Sunroof connection point (option)
36. Switch illumination (2 off)
9. Tachometer
107. Tailgate switch
3. Terminal post
111. Thermostat heated jets
122. Trailer pick up point
82. Trailer warning lamp
136a. Transfer box oil temperature switch
132. Transfer box neutral switch
58. Under hood illumination switch
59. Under hood light
70. Voltage sensitive switch
157. Warning lamp control unit
168. Warning lights supply common earth (-)
169. Warning lights supply (+)
53. Water temperature sender unit
52. Water temperature gauge temperature warning lamp
35. Window lift connections

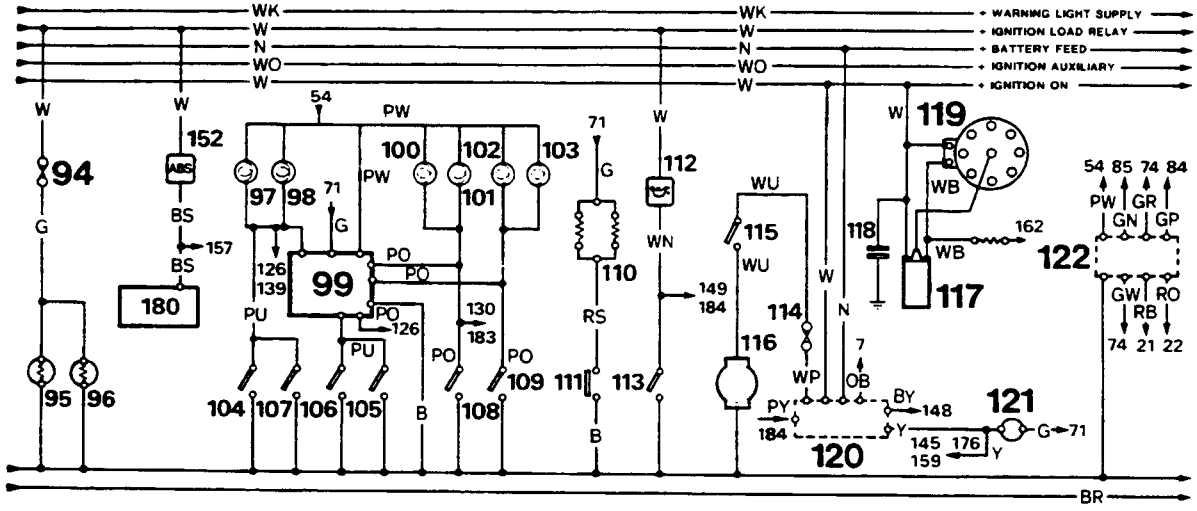
Circuit diagram - 1991 MY - USA and CANADA

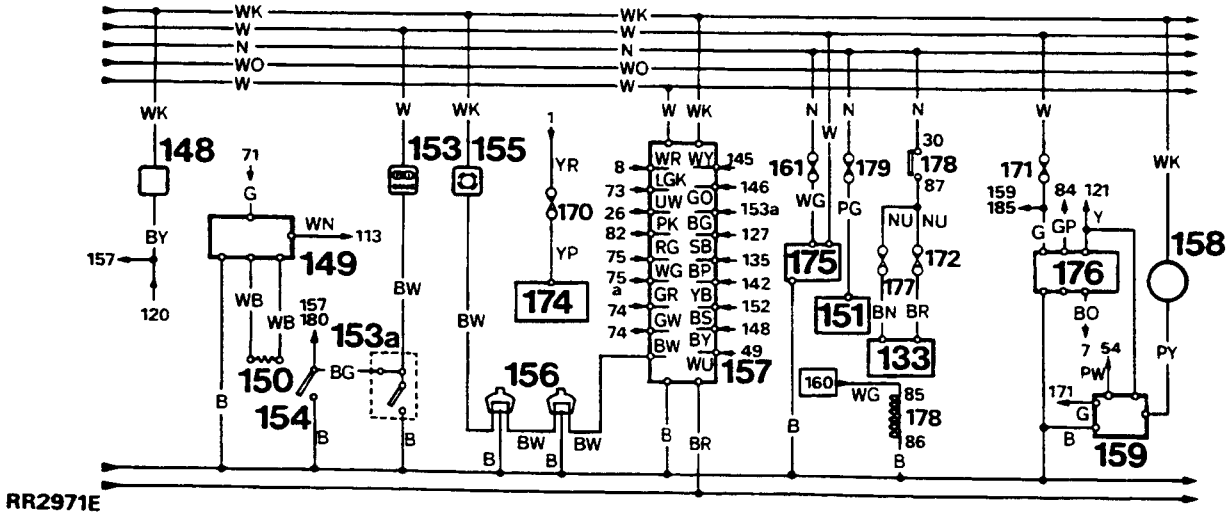


RR2970E

Illustrations RR2970E & RR2971E







IGNITION TIMING

Service repair no - 86.35.15

Adjust

1. It is essential that following procedures are adhered to. Inaccurate timing can lead to serious engine damage and additionally create failure to comply with emission regulations. If timing is being checked in vehicle, air conditioning compressor must be disengaged.
2. On initial engine build, or if distributor has been disturbed for any reason, ignition timing must be set statically to 6° B.T.D.C.

NOTE: This approximate setting is made only to ensure that engine may be started.

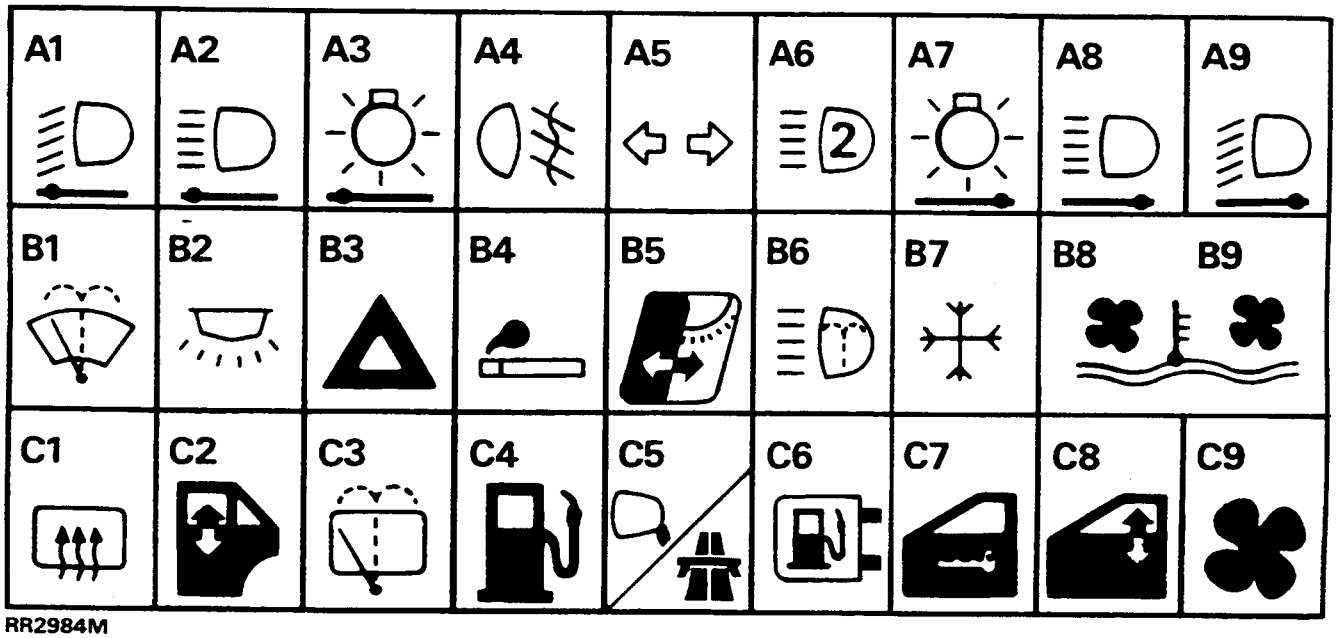
CAUTION: On no account must engine be started before this operation is carried out.

Equipment required :-

Calibrated Tachometer
Stroboscopic lamp

3. Couple stroboscopic timing lamp and tachometer to engine following manufacturer's instructions.
4. Disconnect vacuum hose from distributor.
5. Start engine. With no load, and without exceeding 3,000 rev/min run engine until normal operating temperature is reached. (Thermostat open). Check that engine idles within tolerance specified in data section.
6. Idle speed for timing purposes must not exceed 800 rev/min.
7. With distributor clamping bolt loosened, turn distributor until timing flash coincides with timing pointer and correct timing mark on rim of torsional vibration damper.
8. Retighten distributor clamping bolt securely. Recheck timing, to ensure retightening has not disturbed distributor position.
9. Refit vacuum hose.
10. Disconnect stroboscopic timing lamp and tachometer from engine.

FUSE BOX - 1990 & 91 MY



RR2984M

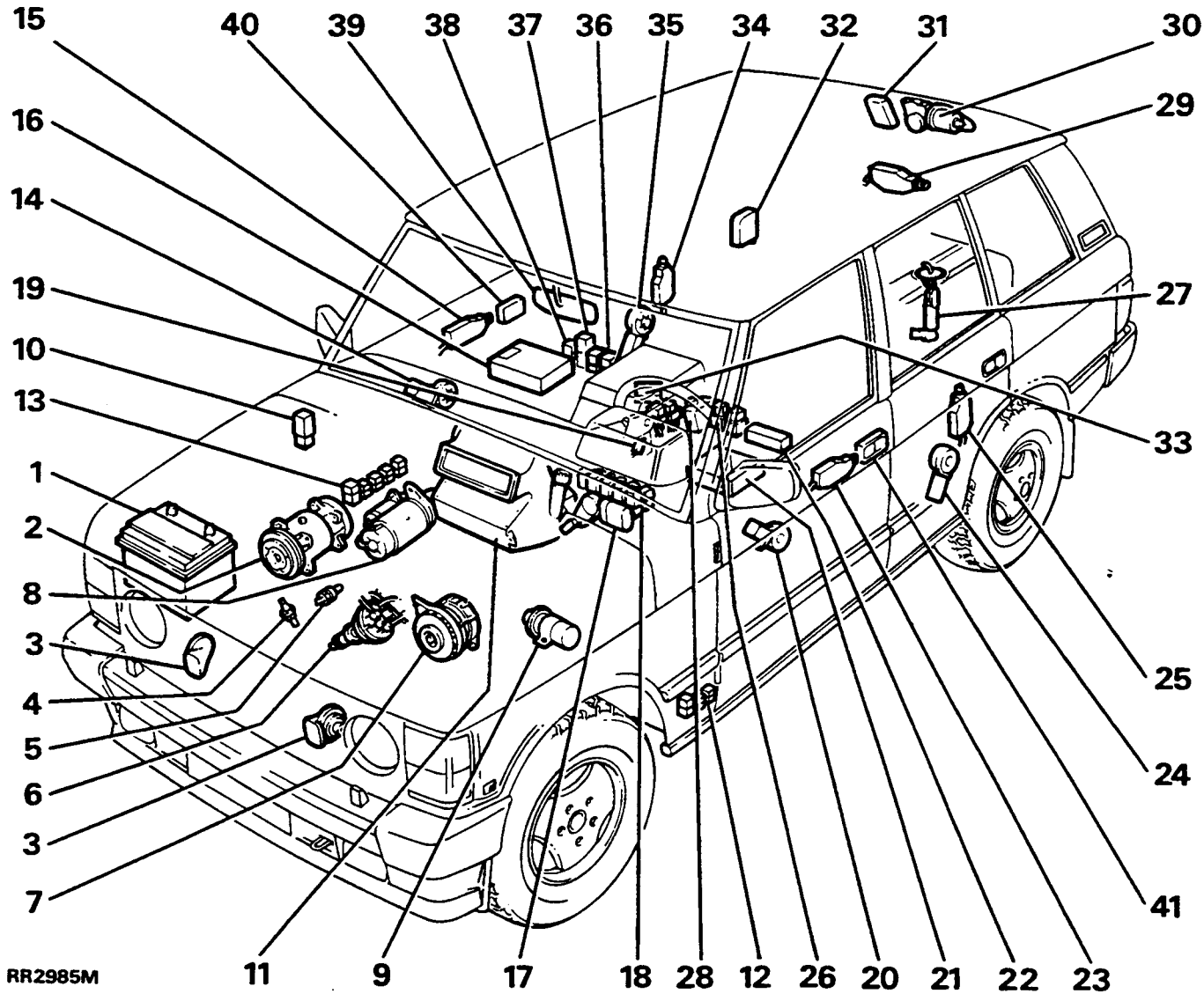
FUSE NUMBER	COLOUR CODE	RATING AMPS	IGN. KEY POSITION	FUNCTION
A1	Red	10	II	LH dipped beam
A2	Red	10	II	LH main beam, auxiliary lamp relay
A3	Tan	5	O	LH sidelamps, radio ill., trailer pickup
A4	Red	10	O	Rear fog guard (headlamp switch controlled) (Not USA)
A5	Yellow	20	II	Direction ind., resistor, heated jets, thermo., heated front screen timer, air con. low coolant, speed transducer, interior lamp delay, reverse lights, stop lights, dimming rear view mirror (1991)
A6	Red	10	II	Auxiliary driving lamps (from main beam)
A7	Tan	5	O	RH sidelamps, rheostat controlled instrument/switch illumination, trailer pick up
A8	Red	10	II	RH main beam
A9	Red	10	II	RH dipped beam, headlamp levelling (option)
B1	Yellow	20	I	Front wash/wipe, seat relays, window lift relays, antenna amplifier
B2	Yellow	20	O	Interior light, clock, underbonnet ill., elec. seat relays, radio, door lamps, heated door locks (1991)
B3	Yellow	20	O	Hazard switch, alarm, main beam/dip flash, horns
B4	Yellow	20	II	Cigar lighters
B5	Yellow	20	II	Sunroof motor
B6	Yellow	20	II	Headlamp wash
B7	Tan	5	II	Air conditioning compressor clutch
B8	Yellow	20	II	Air conditioning/radiator cooling fan
B9	Yellow	20	II	Air conditioning/radiator cooling fan
C1	Green	30	II	Heated rear screen (voltage switch controlled)
C2	Green	30	II	Window lifts - rear
C3	Red	10	II	Rear wash wipe motor, heated rear screen relay, mirror heaters
C4	Red	10	II	Fuel pump
C5	Red	10	II	Mirror motors, cruise control (option)
C6	Tan	5	O or I	Fuel filler flap (1991)
C7	Blue	15	O	Central locking
C8	Green	30	II	Window lifts - front
C9	Green	30	II	Heater/air conditioning motor

Key to RR2985M

1. Battery
2. Air conditioning compressor (option)
3. Horns
4. Oil pressure switch
5. Water temperature switch
6. Electronic distributor
7. Alternator
8. Starter motor
9. Coil
10. Headlamp wash timer unit
11. Heater
12. Relays/flasher units
13. Air con relays/diode unit (option)
14. Window lift motor (front RH door)
15. Door lock actuator (front RH door)
16. Electronic control unit (EFI)
17. Wiper motor - front screen
18. Relays/delay units
19. Park brake warning light switch
20. Window lift motor (front LH door)
21. Electronic control unit and relays (ABS) (option)
22. Seat adjustment fusebox (option)
23. Door lock actuator (front LH door)
24. Window lift motor (rear LH door)
25. Door lock actuator (rear LH door)
26. Seat adjustment relays - two (option)
27. Electrical in-tank fuel pump
28. Inertia switch
29. Tailgate lock actuator
30. Wiper motor - rear screen
31. Radio aerial amplifier
32. Fuel filler flap lock actuator
33. Window lift relays and one touch control unit
34. Door lock actuator (rear RH door)
35. Window lift motor (rear RH door)
36. EFI relays (two)
37. Condenser fan timer unit (option)
38. Cruise control relay (option)
39. Dimming mirror (option)
40. RH door lock heater
41. LH door lock heater

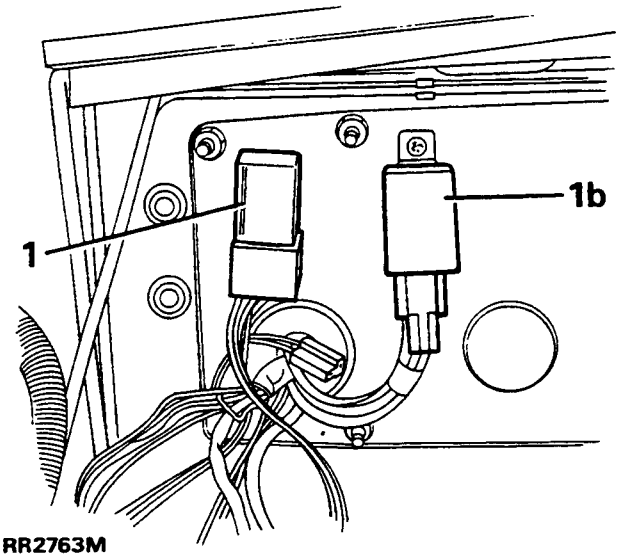
△ **NOTE: Left hand drive vehicle shown. Items 10, 12, 13, 17 and 18 located symmetrically opposite on right hand drive vehicles.**

LOCATION OF ELECTRICAL EQUIPMENT



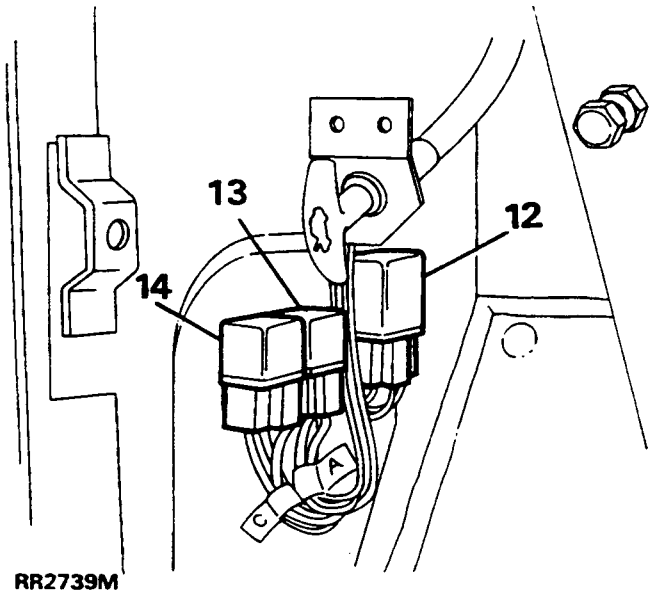
RELAYS, DELAY UNITS, TIMER UNITS, DIODE PACK - 1990 / 91 - IDENTIFICATION

Left hand drive vehicle shown, right hand drive symmetrically opposite.



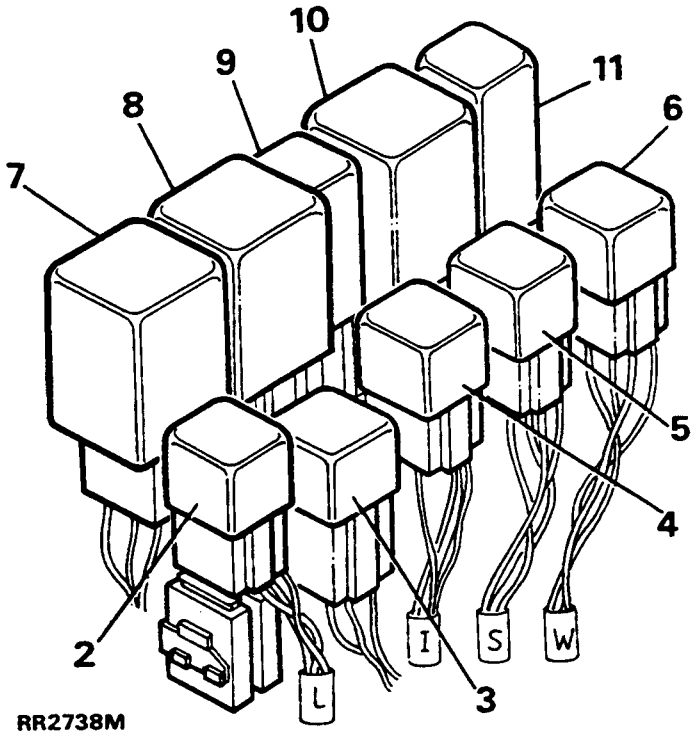
RR2763M

Closure panel viewed from the engine bay compartment, with protective cover removed.



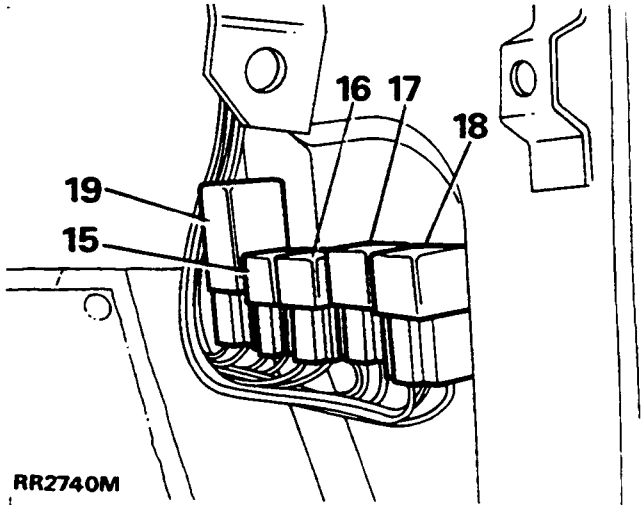
RR2739M

RR2379M shows relays mounted in left hand side of footwell, trim panel removed, left hand drive.



RR2738M

Steering column mounted relays viewed with the lower dash panel removed.



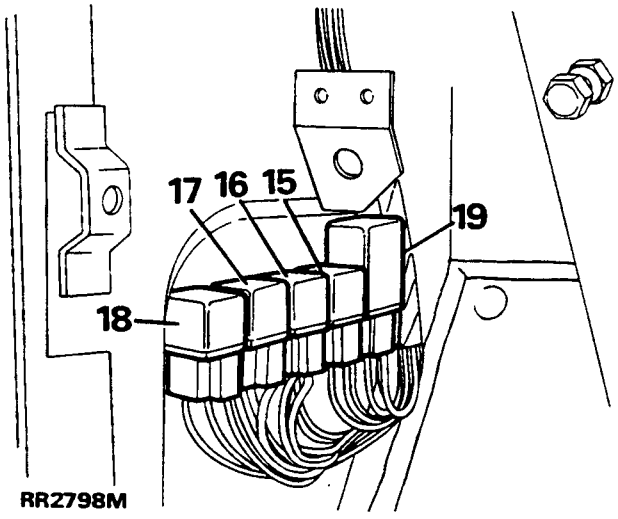
RR2740M

RR2740M shows relays mounted in right hand side of footwell, trim panel removed, left hand drive

	Relay/delay/timer/diode unit	Colour	Circuit Diagram Item Number	
			Right hand steer	Left hand steer
1.	Headlamp wash timer unit	Black	19.M	18.M
1b.	Glow plug timer unit (diesel)	Black	143.M	150.M
2.	Headlamp relay	Natural	17.M	16.M
3.	Heated front screen relay	Black	3.HF	3.HF
4.	Ignition load relay	Natural	1.M	1.M
5.	Starter soleniod relay	Natural	6.M	6.M
6.	Heated rear window relay	Natural	67.M	64.M
7.	Rear wiper delay	Blue	132.M	139.M
8.	Interior lamp delay/timer	Red	101.M	99.M
9.	Heated front screen timer unit	Grey	2.HF	2.HF
10.	Voltage sensitive switch	Yellow	72.M	70.M
11.	Front wiper delay	Red	15.M	14.M
12.	Flasher/hazard unit	Blue	75.M	73.M
13.	Auxiliary lamp relay	Natural	88.M	86.M
14.	Sunroof auxiliary relay	Natural	124.M	125.M
15.	Air con./heater relay	Natural	5.A	5.A
16.	Compressor clutch relay	Natural	11.A	11.A
17.	Heater/air con. load relay	Natural	163.M	175.M
18.	Condenser fan relay	Natural	9.A	9.A
19.	Air con. diode pack	Orange	1.A	1.A
20.	Seat adjustment relays - two	Natural	5.6.F	5.6.F
21.	Main EFI relay	Silver	22.E	22.E
22.	Fuel pump relay	Silver	21.E	21.E
23.	Cruise control relay	Natural	16.C	16.C
24.	Condenser fan timer unit	Green	33.E	33.E
25.	Rear window lift relay	Natural	13.W	13.W
26.	Front window lift relay	Natural	14.W	14.W
27.	Window lift one touch unit	Black	1.W	1.W
28.	Brake check relay (RH steering)	Natural	151.M	. . .

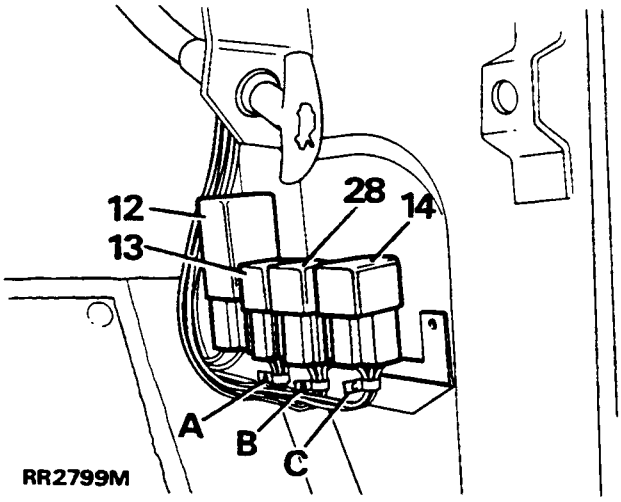
M Main circuit diagram
A Air conditioning circuit diagram
S Seat adjustment circuit diagram
HF Heated front screen circuit diagram
E EFI circuit diagram
SR Sunroof circuit diagram
W Window lift circuit diagram
C Cruise control circuit diagram

Relays cont'd



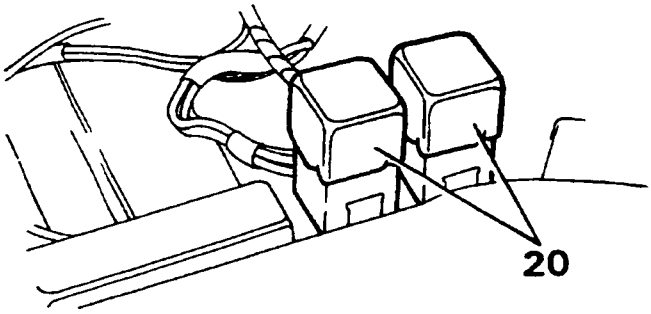
RR2798M

RR2798 shows relays mounted in left hand side of footwell, trim panel removed, right hand drive.



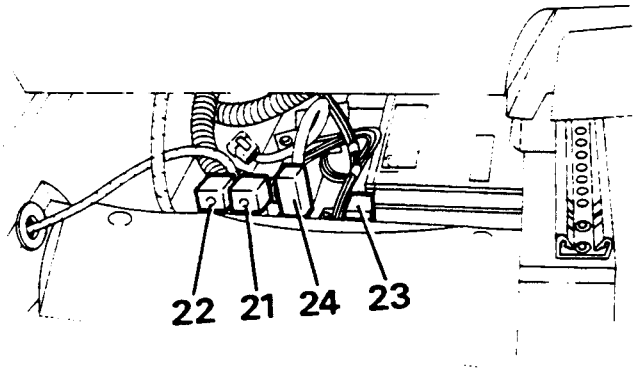
RR2799M

RR2799 shows relays mounted in right hand side of footwell, trim panel removed, right hand drive



RR2602E

Seat adjustment relays (load control) located beneath the left hand front seat adjacent to fuse box (B).

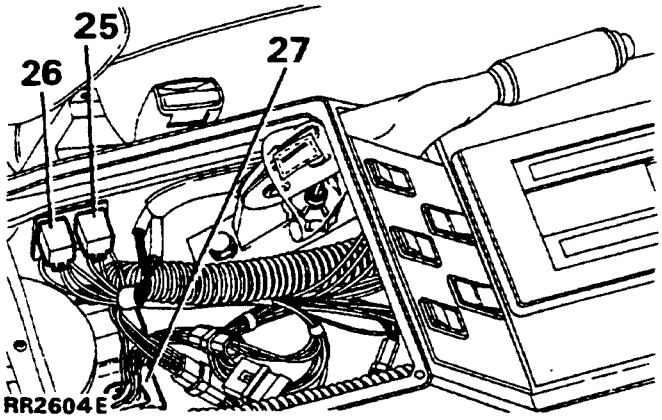


RR2765M

EFI (black terminal block) and fuel pump relays (blue terminal block) mounted beneath right hand front seat (21 and 22).

Condenser fan timer unit (24) mounted beneath right hand front seat.

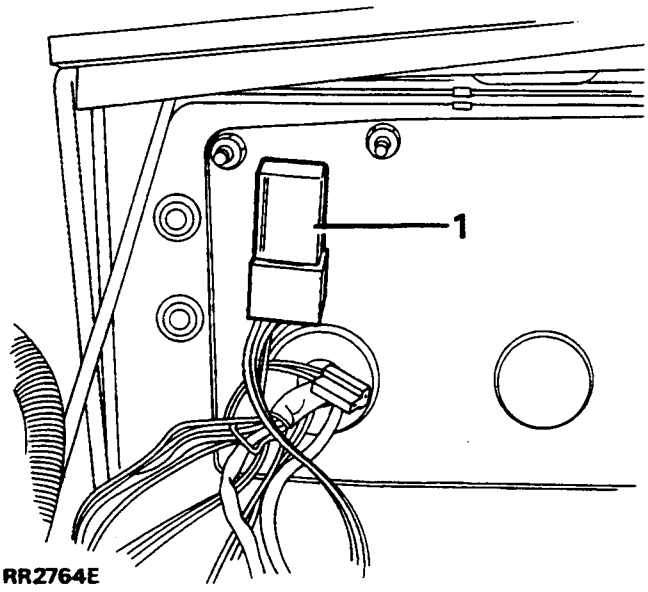
Cruise control relay (23).



RR2604E

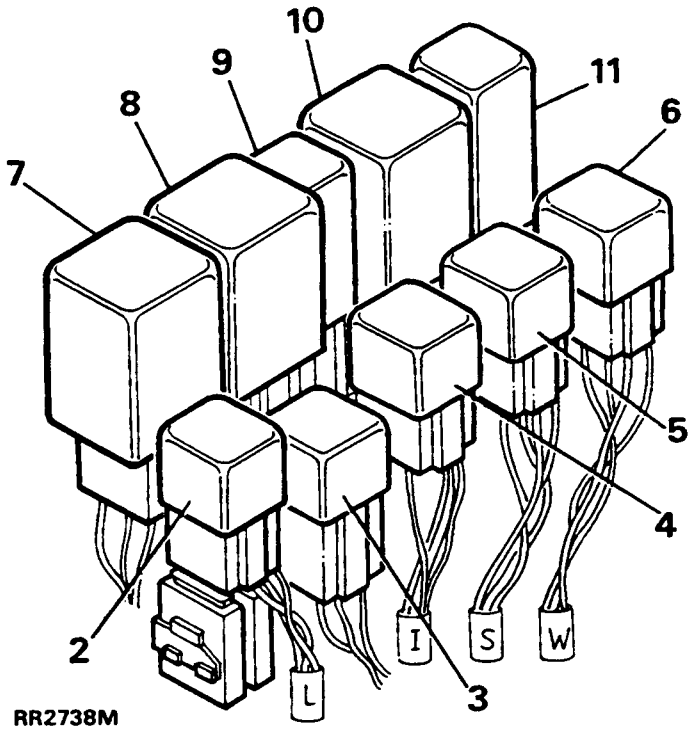
Front (black terminal block) and rear (blue terminal block) window relays. One touch control unit (27) is located inside the glove box, accessible by removing glove box liner.

RELAYS, DELAY UNITS, TIMER UNITS, DIODE PACK - USA AND CANADA 1990 / 91 - IDENTIFICATION



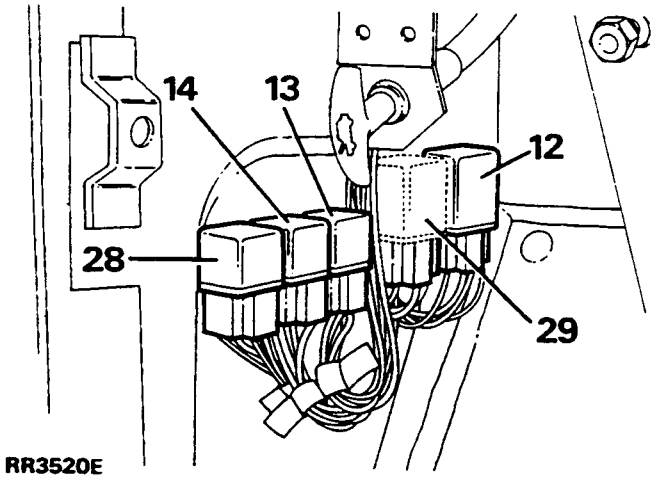
RR2764E

Closure panel viewed from the engine bay compartment, with protective cover removed.



RR2738M

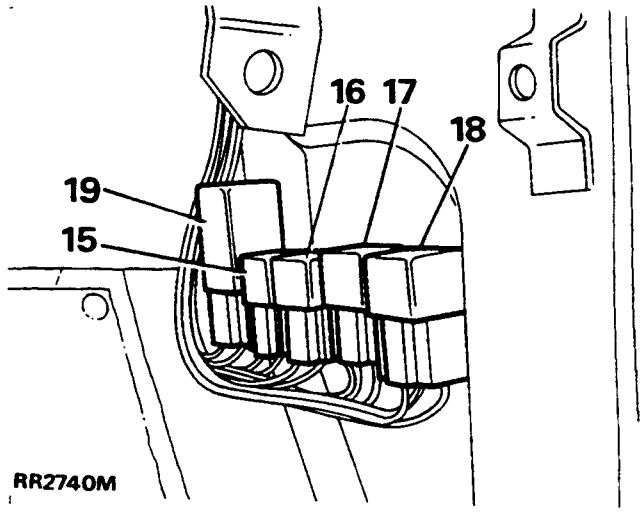
Steering column mounted relays viewed with the lower dash panel removed.



RR3520E

RR3520M shows relays mounted in left hand side of footwell, trim panel removed.

1990 vehicles have gear selector illumination (28) relay inside the glove box - see RR2906E

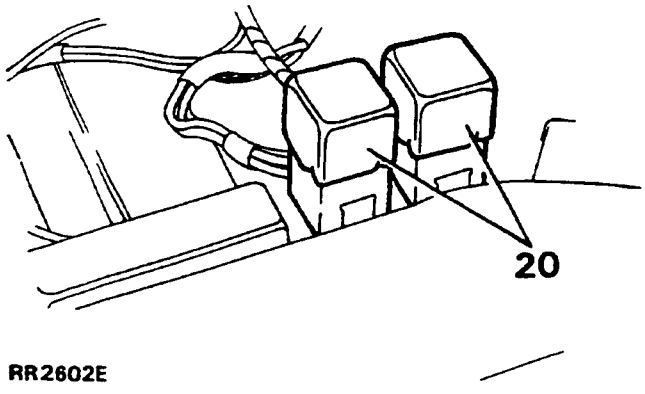


RR2740M

RR2740M shows relays mounted in right hand side of footwell, trim panel removed.

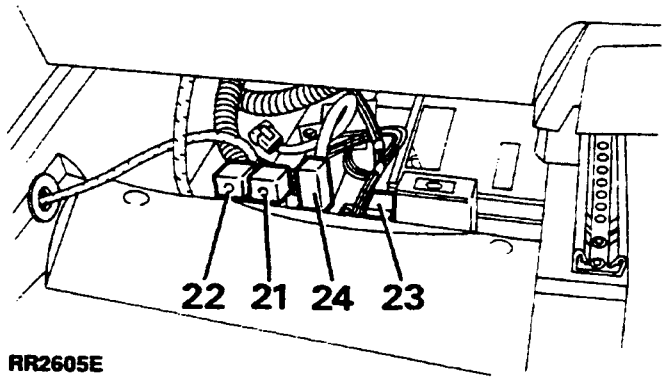
Relay/delay/timer/diode unit	Circuit diagram item number		Colour Unit	Colour Base
1. Headlamp wash timer unit	18.	Main	Black	Black
2. Headlamp relay	16.	Main	Yellow	Black
3. Heated front screen relay	3.	Heated front screen	Black	Black
4. Ignition load relay	1.	Main	Green	Black
5. Starter soleniod relay	6.	Main	Yellow	Black
6. Heated rear window relay	64.	Main	Yellow	Black
7. Rear wiper delay	139.	Main	Blue	Black
8. Interior lamp delay/timer	99.	Main	Yellow	Black
9. Heated front screen timer unit	2.	Heated front screen	Grey	White
10. Voltage sensitive switch	70.	Main	Yellow	Yellow
11. Front wiper delay	14.	Main	Red	Black
12. Flasher/hazard unit	73.	Main	Blue	Blue
13. Auxiliary lamp relay	86.	Main	Yellow	Yellow
14. Sunroof auxiliary relay	3.	Sunroof	Yellow	Yellow
15. Air con./heater relay	175.	Main	Green	Yellow
16. Compressor clutch relay	11.	Air conditioning	Yellow	Yellow
17. Heater/air con. load relay	5.	Air conditioning	Yellow	Yellow
18. Condenser fan relay	9.	Air conditioning	Yellow	Yellow
19. Air con. diode pack	1.	Air conditioning	Orange	Red
20. Seat adjustment relays - two	5 & 6.	Seat adjustment	Yellow	Yellow
21. Main EFI relay	22.	EFI	Silver	Black
22. Fuel pump relay	21.	EFI	Silver	Blue
23. Cruise control relay	16.	Cruise control	Green	Black
24. Condenser fan timer unit	33.	EFI	Green	Black
25. Rear window lift relay	13.	Window lift	Yellow	Black
26. Front window lift relay	14.	Window lift	Yellow	Blue
27. Window lift one touch unit	1.	Window lift	Black	-
28. Gear selector illumination relay	40a	Main	Green	Green
* 29. Daytime lights control (Canada)	-		Black	Black

*** Control unit ONLY fitted when daytime running lights are required.**



RR2602E

Seat adjustment relays (load control) located beneath the left hand front seat.

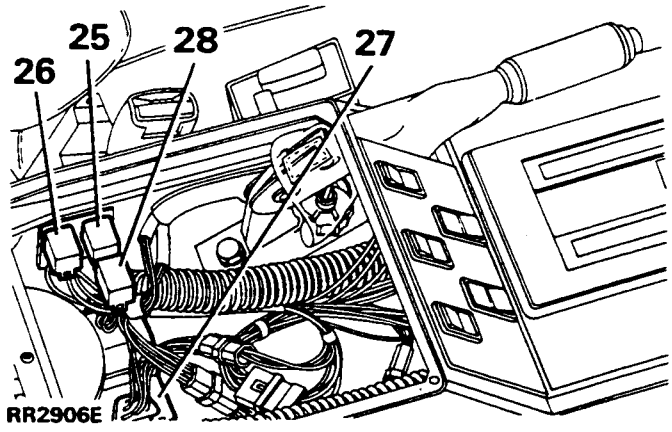


RR2605E

EFI (black terminal block) and fuel pump relays (blue terminal block) mounted beneath right hand front seat (21 and 22).

Condenser fan timer unit (24) mounted beneath right hand front seat.

Cruise control relay (23).



RR2906E shows relays located inside the glove box, accessible by removing the glove box liner. Front (black terminal block) and rear (blue terminal block) window relays (25 and 26) window lift one touch control unit (27).

Gear selector illumination relay (28) shown in 1990 position.

BATTERY

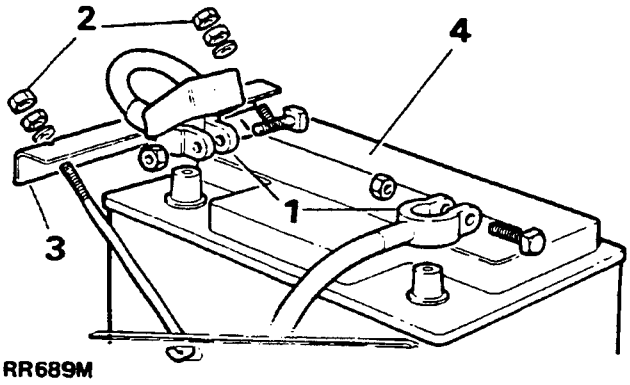
Service repair no - 86.15.01

Remove and refit

Remove

WARNING: During battery removal or before carrying out any repairs or maintenance to electrical components always disconnect battery negative lead first. If positive lead is disconnected with negative lead in place, accidental contact of wrench to any grounded metal partcould cause a severe spark, possibly resulting in personal injury. Upon installation of battery connect positive lead first.

1. Disconnect the battery negative lead. And positive lead.
2. Release four nuts securing battery bracket in position.
3. Remove bracket.
4. Remove battery.



RR689M

Refit

5. Reverse removal procedure.

NOTE: Coat battery clamps and terminals with petroleum jelly before refitting.

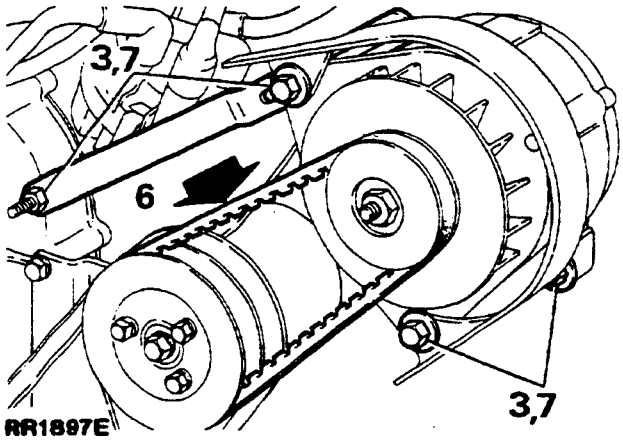
ALTERNATOR

Service repair no - 86.10.01

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Disconnect leads from alternator.



RR1897E

3. Loosen alternator pivot bolt.
4. Loosen adjusting bolt and adjusting strut pivot bolt.
5. Pivot alternator inwards, remove drive belt.
6. Remove mounting bolts and remove alternator.

NOTE: The radiator cowl has a hole to allow removal of alternator pivot bolt. Loosen cowl fixings and move cowl if hole is not sufficiently aligned to allow removal of bolt.

Refit

7. Fit alternator and mounting bolts.

NOTE: The fan guard is attached to the front mounting and adjustment bolts.

8. Fit drive belt, adjust tension. ***See alternator drive belts***
9. Partially tighten alternator fixing to adjusting strut.
10. Partially tighten mounting bolt.
11. Partially tighten adjusting strut pivot bolt.
12. Finally tighten alternator fixings to correct torque, in following sequence:

    Adjusting bolt ..... ***12 Nm.***
    Alternator mounting bolt ..... ***25 Nm.***
    Adjusting strut pivot bolt ..... ***25 Nm.***

13. Connect wiring leads to alternator.
14. Reconnect battery.

ALTERNATOR DRIVE BELTS

For Alternator drive belts ***See SECTION 10, Maintenance, Under Bonnet Maintenance***

DISTRIBUTOR-LUCAS 35 DLM8

Service parts

1. Cap
2. HT brush and spring
3. Rotor arm
4. Insulation cover
5. Pick-up module and base plate assembly
6. Vacuum unit
7. Amplifier module
8. 'O'-ring oil seal
9. Gasket

ELECTRONIC IGNITION

A Lucas 35DLM8 distributor is employed. This has a conventional vacuum advance unit and centrifugal automatic advance mechanism.

A pick-up module, in conjunction with a rotating timing reluctor inside distributor body, generates timing signals. These are applied to an electronic ignition amplifier module mounted on side of distributor body.

△ **NOTE: Pick-up air gap is factory set. Do not adjust gap unless pick-up is being changed or base plate has been moved. Use a non-ferrous feeler gauge to set air gap.**

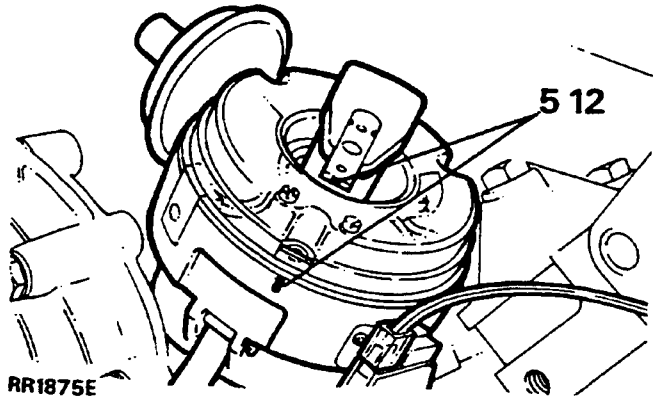
DISTRIBUTOR

Service repair no - 86.35.20

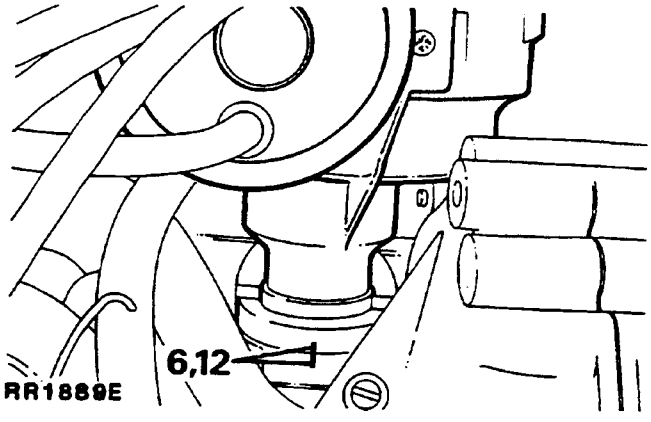
Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Disconnect vacuum hose.
3. Remove distributor cap.
4. Disconnect low tension lead from coil.
5. Mark distributor body and centre line of rotor arm.

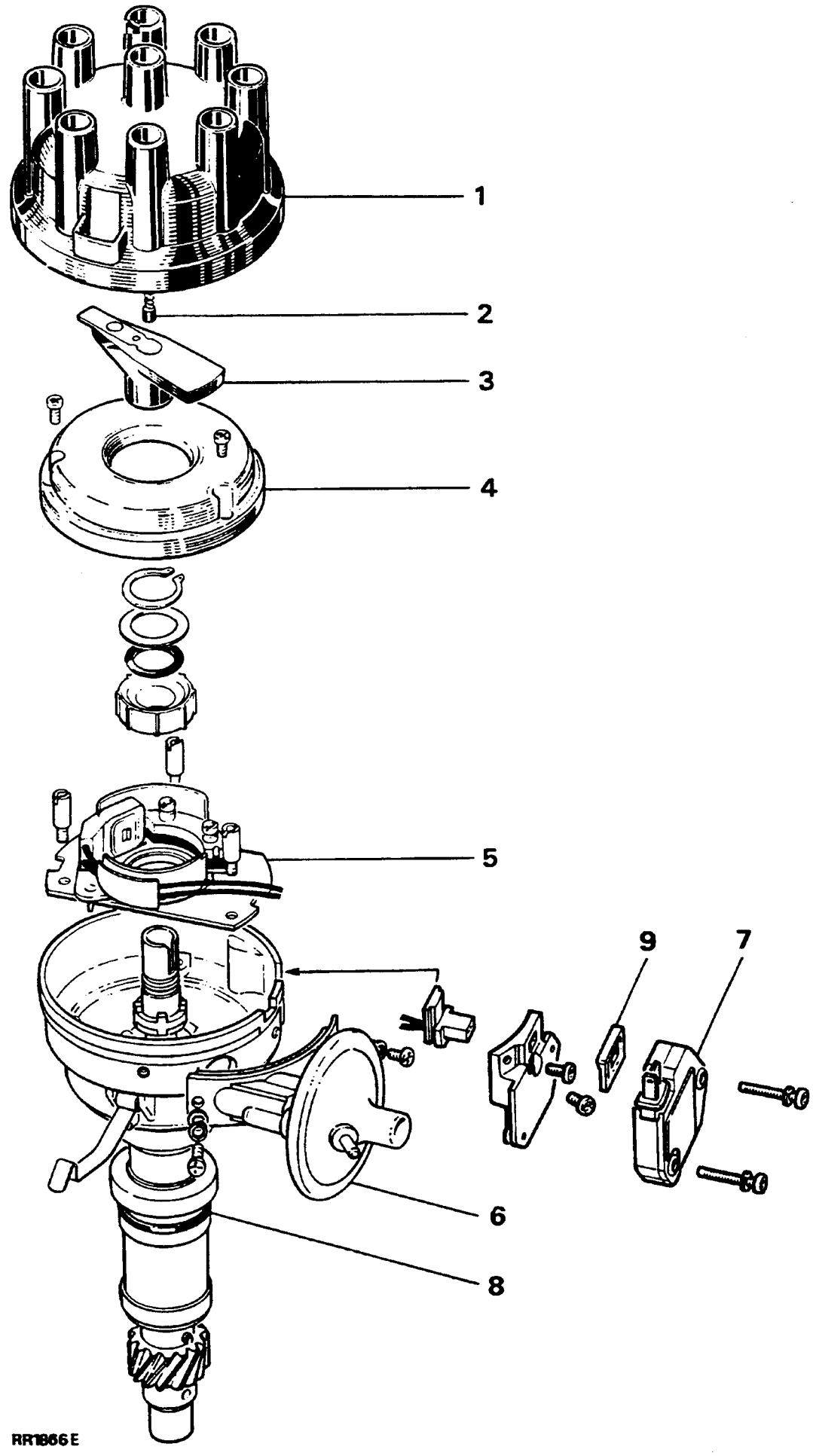


6. Add alignment marks to distributor and front cover.



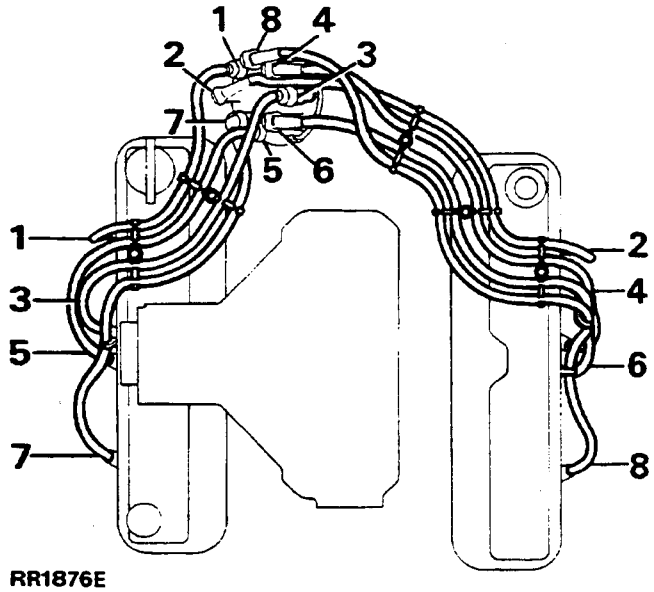
△ **NOTE: Marking distributor enables refitting in exact original position, but if engine is turned while distributor is removed, complete ignition timing procedure must be followed.**

7. Release distributor clamp and remove distributor.


1
2
3
4
5
9
7
6
8
RR1866E

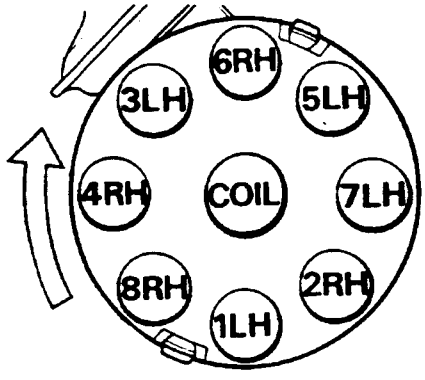
Refit

△ **NOTE: If a new distributor is being fitted, mark body in same relative position as distributor removed.**



RR1876E

8. Leads for distributor cap should be connected as illustrated.
   Figures 1 to 8 inclusive indicate plug lead numbers.
   RH-Right hand side of engine, when viewed from rear.
   LH-Left hand side of engine, when viewed from rear.



RR616M

9. If engine has not been turned while distributor has been removed, carry out instructions 10. to 17. Alternatively proceed to instruction 18.
10. Fit new 'O' ring seal to distributor housing.
11. Turn distributor drive until centre line of rotor arm is 30° anti-clockwise from mark made on top edge of distributor body.
12. Fit distributor in accordance with alignment markings.

△ **NOTE: It may be necessary to align oil pump drive shaft to enable distributor drive shaft to engage in slot.**

13. Fit clamp and bolt. Secure distributor in exact original position.
14. Connect vacuum hose to distributor and low tension lead to coil.
15. Fit distributor cap.
16. Reconnect battery.
17. Using suitable electronic equipment, set ignition timing. ***See Adjustment, IGNITION TIMING***
18. If engine has been turned with distributor removed, carry out instructions 19. to 30.
19. Set engine-No. 1 piston to static ignition timing figure. ***See ENGINE TUNING DATA, Information, Engine Tuning Data***
20. Turn distributor drive until rotor arm is approximately 30° anti-clockwise from number one sparking plug lead position on cap.
21. Fit distributor to engine.
22. Check that centre line of rotor arm is now in line with number one sparking plug lead on cap. Reposition distributor if necessary.
23. If distributor does not seat correctly in front cover, oil pump drive is not engaged. Engage by lightly pressing down distributor while turning engine.
24. Fit clamp and bolt, do not tighten.
25. Set ignition timing statically to 6° B.T.D.C.
26. Connect vacuum hose to distributor.
27. Fit low tension lead to coil.
28. Fit distributor cap.
29. Reconnect battery.
30. Using suitable electronic equipment set the ignition timing. ***See Adjustment, IGNITION TIMING***

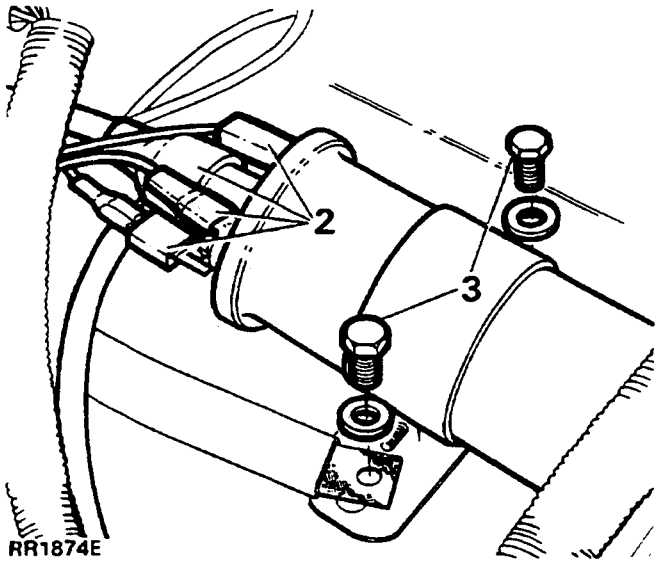
IGNITION COIL

Service repair no - 86.35.32

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Disconnect High Tension and Low Tension electrical leads from ignition coil.



3. Remove two bolts securing coil, noting position of ground strap.
4. Remove coil.

Refit

5. Reverse removal procedure. Ensure that location for ground strap is free from paint and grease. Coat area around bolt with Petroleum Jelly.

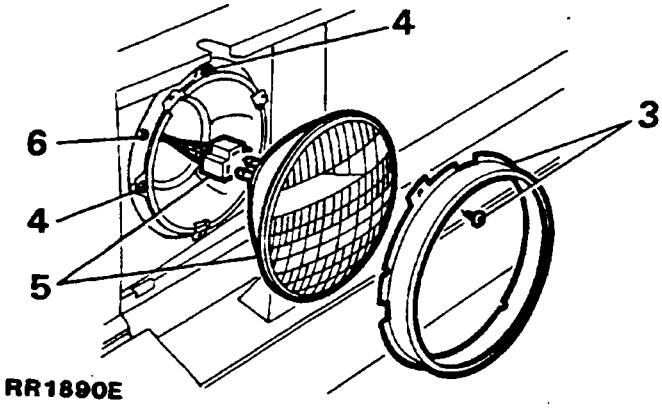
HEADLAMP ASSEMBLY / SEALED BEAM UNIT

Service repair no - 86.40.02

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove radiator grille. ***See CHASSIS AND BODY, Repair, radiator grille***
3. Remove three screws and headlamp retaining rim.



4. **DO NOT** disturb beam adjusting screws.
5. Withdraw sealed beam unit. Disconnect wiring plug from rear of unit.
6. Remove three securing screws, pry away grommet. Remove headlamp bowl.

Refit

7. Reverse removal procedure.

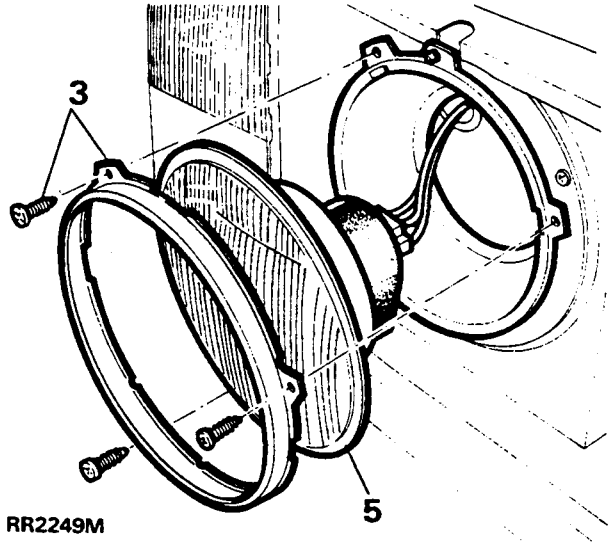
HEADLAMP ASSEMBLY/BULB RELACEMENT

Service repair no - 86.40.02

Remove and refit

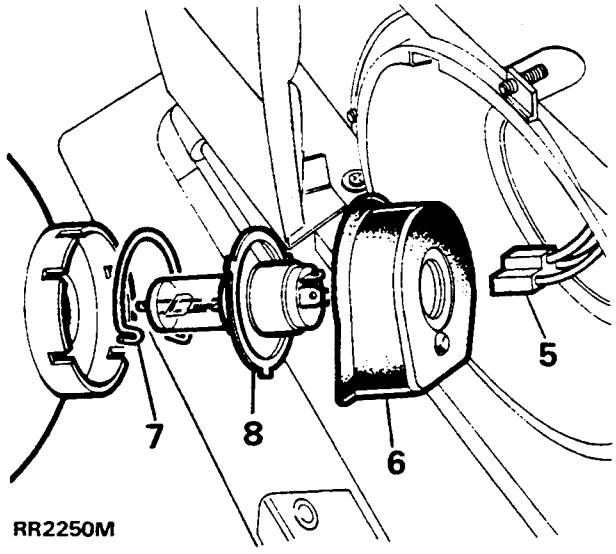
Remove

1. Disconnect the battery negative lead.
2. Remove radiator grille. ***See CHASSIS AND BODY, Repair, radiator grille***
3. Remove three screws and headlamp retaining rim.



RR2249M

4. **DO NOT** disturb beam adjusting screws.
5. Withdraw headlamp unit. Disconnect wiring plug from rear of unit.
6. Remove rubber dust cover.



RR2250M

7. Release retaining clip, remove bulb
8. Remove three securing screws, pry away grommet. Remove headlamp bowl.

Refit

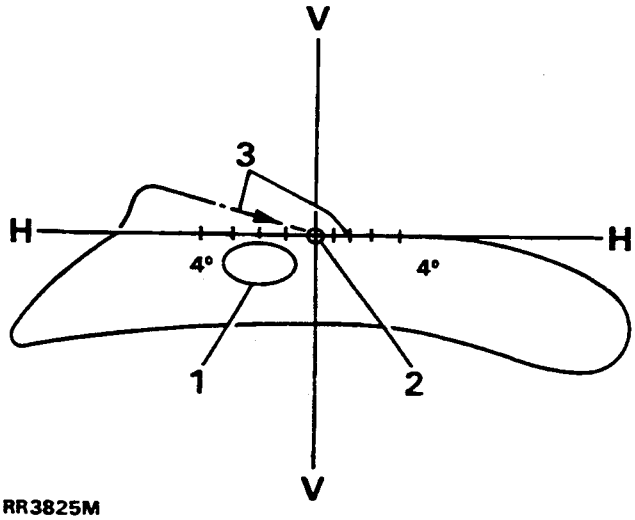
9. Reverse removal procedure. DO NOT touch quartz envelope of bulb. Gently clean using methylated spirits if contact does occur.

HEADLAMP ALIGNMENT

Service repair no - 86.40.17

Headlamp beam setting should only be carried out by qualified personnel using suitable beam setting equipment, for example the Lucas Beamtester.

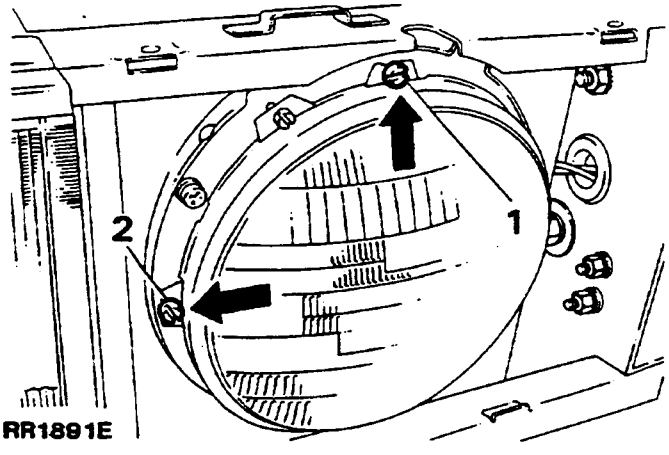
RR3825M shows right hand drive beam pattern, left hand drive is symetrically opposite.



RR3825M

Guide to beam pattern:

1. Maximum intensity zone.
2. Beam aim kink point.
3. Aiming datum lines.



RR1891E

Adjust

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

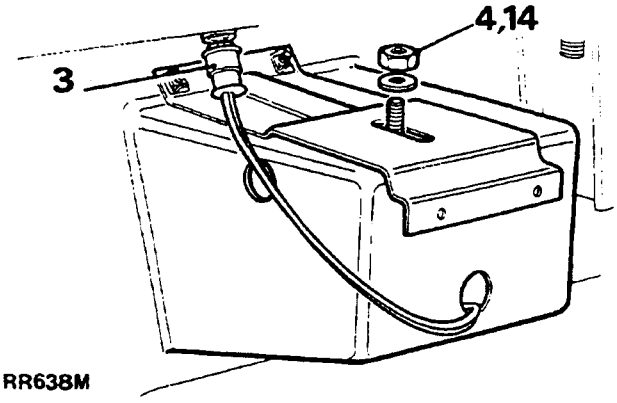
AUXILIARY DRIVING LAMP

Service repair no - 86.40.96

Remove, refit and adjust

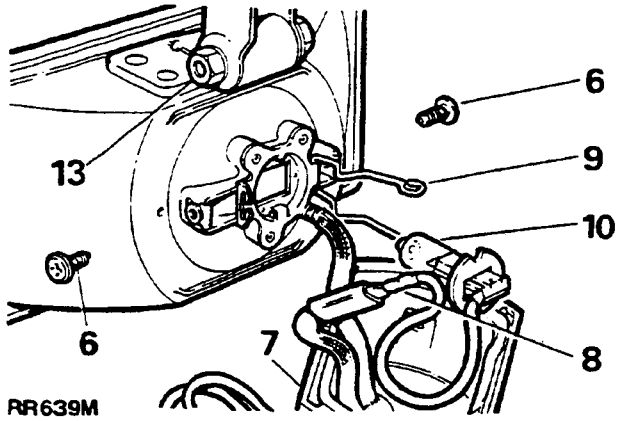
Bulb replacement

1. Disconnect the battery negative lead.
2. Securing nut is located beneath front bumper, adjacent to front body fixing. Access to lamp is gained through front wheel arch.
3. Disconnect electrical plug.
4. Remove single nut and washer.



RR638M

5. From front of vehicle, manoeuvre lamp. Remove lamp from spoiler opening.
6. Remove two screws securing cover to rear of lamp.
7. Withdraw cover.
8. Disconnect lucar connector.
9. Release spring clip securing bulb to lamp unit.
10. Remove bulb.



Refit

11. Fit a new bulb. Ensure two notches on bulb body locate with registers on lamp unit.
12. Reverse removal procedure.

Adjust

Correct adjustment is beam horizontal (parallel to ground) and parallel to vehicle axis.

13. Loosen lamp adjusting bolt to lower or raise beam.
14. Loosen lamp securing bolt to move beam to left or right.
15. Tighten fixing bolts to ***15 Nm.***

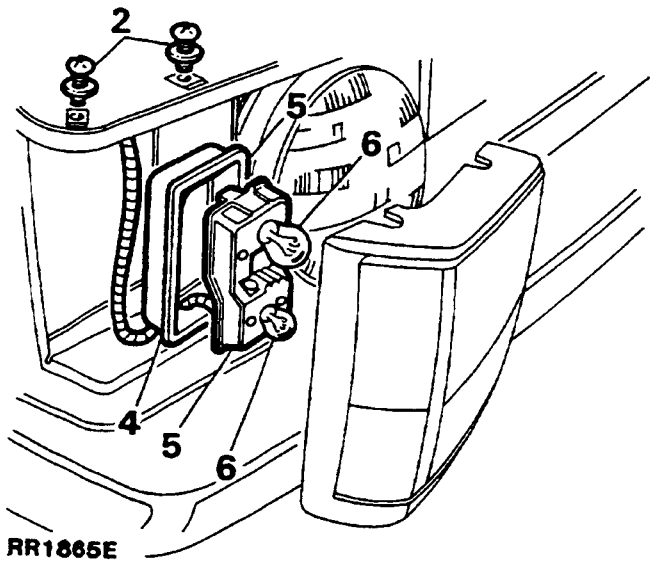
SIDELIGHT AND FLASHER LAMP ASSEMBLY AND BULB

Service repair no - 86.40.24

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove two screws and plain washers securing lamp assemly.
3. Lift assembly away sufficiently to gain access to rear of lamp.
4. Remove waterproof cover.
5. Depress two retaining clips and withdraw bulb holder.
6. Remove required bulb. Direction indicator bulb is located in upper section of bulb holder, side lamp bulb in lower.
7. Disconnect multi-plug. Remove complete assembly.



Refit

8. Reverse removal procedure. Ensure waterproof cover is correctly located.

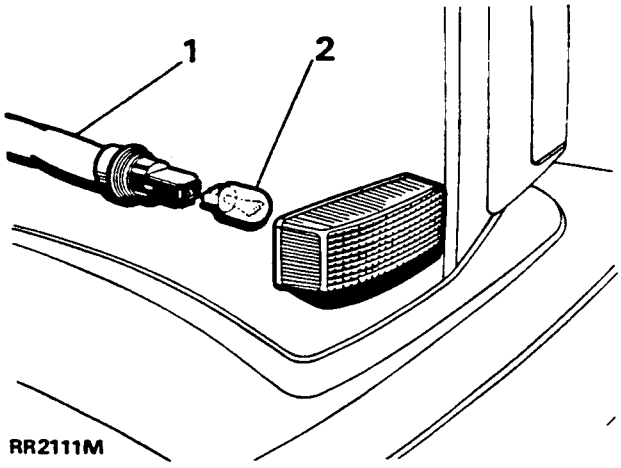
DIRECTION INDICATOR SIDE REPEATER LAMP BULB REPLACEMENT

Service repair no - 86.40.65

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. At back of lamp, twist bulb holder anti-clockwise to remove from lamp assembly.
3. Remove bulb.



Refit

4. Reverse removal procedure. Correct bulb type is 5 watt wedge base.

TAIL LAMP ASSEMBLY

Service repair no - 86.40.74

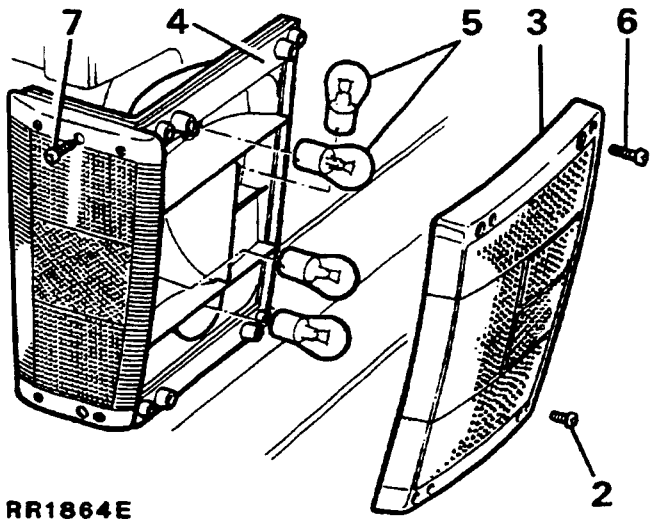
Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove four lens retaining screws.
3. Remove lens.
4. Remove sealing rubber, if required.

△ **NOTE: To remove sealing rubber complete it is necessary to remove side marker lens.**

5. Remove bulbs.
6. Remove four screws securing lamp unit to body.
7. Remove two through-screws from reflector side, which also secure lamp unit to body.
8. Ease lamp unit forward and disconnect leads at moulded connectors.



Refit

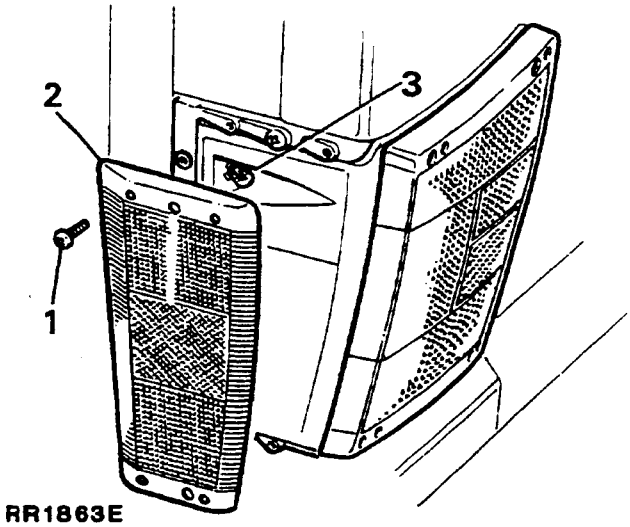
9. Reverse removal procedure.

REFLECTORS/SIDE MARKER LAMP ASSEMBLY AND BULB

Remove and refit

Remove

1. Remove four screws securing lens.
2. Remove lens.
3. Remove bulb.



RR1863E

△ **NOTE: To remove rubber seal completely it is necessary to remove tail light lens.**

Refit

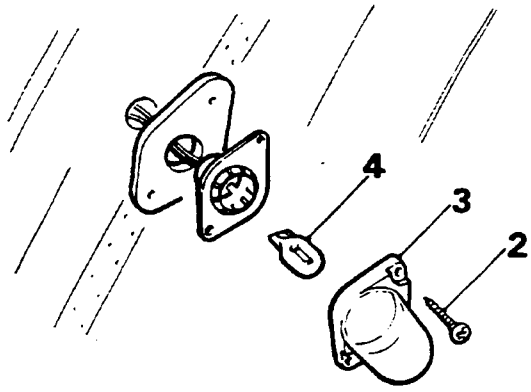
4. Reverse removal procedure.

UNDER BONNET LAMP ASSEMBLY

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove two securing screws.
3. Remove lamp glass.
4. Pull five-watt 'wedge' type bulb from bulb holder.



RR483M

5. Disconnect electrical leads located below bonnet lamp switch attached to inner fender.
6. Pull rubber grommet off leads and pull lamp and leads up through hood stiffener channel.

Refit

7. Reverse removal procedure. 1 to 6.

△ **NOTE: A piece of bent wire will be needed to pull electrical leads out of channel exit hole when fitting a new lamp assembly.**

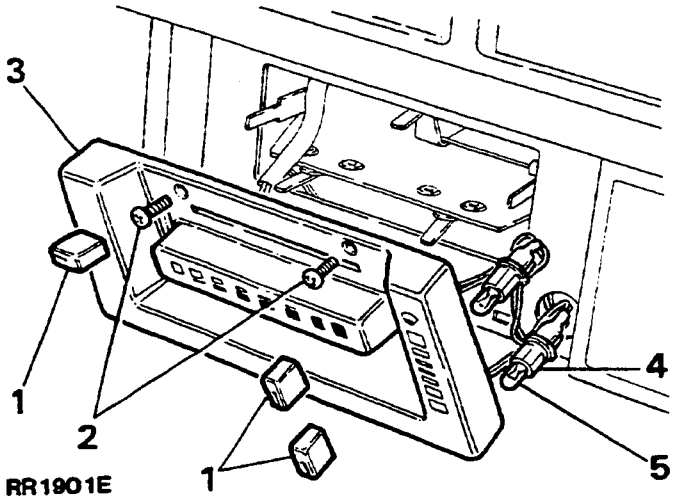
HEATER/VENTILATION AND AIR CONDITIONING CONTROL PANEL

Service repair no - 86.45.73

Bulb replacement

The heater/ventilation control panel is illuminated by four 12-volt 1.2 watt 'wedge' type (capless) bulbs.

1. Pull five finger tip knobs off control levers.
2. Remove two screws at top of panel.
3. Carefully ease panel away from centre console only as far as electrical leads will permit.
4. Pull appropriate bulb holder out of rear of panel.
5. Pull bulb from holder.
6. Fit a new bulb and push bulb holder firmly back into its location at rear of panel.



RR1901E

Refit

7. Ensuring that electrical leads do not become trapped between panel console and operating levers, refit panel.

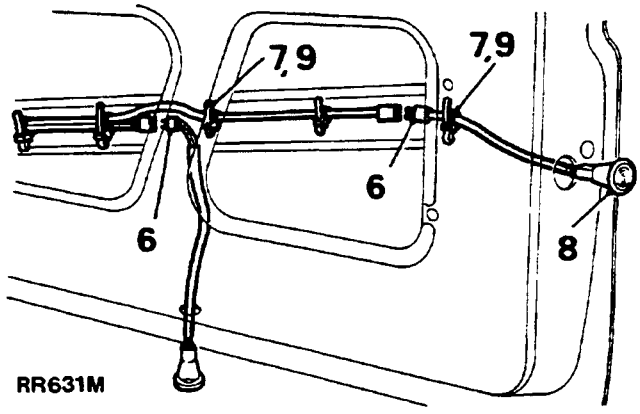
DOOR EDGE LAMPS / PUDDLE LAMPS

Remove and refit

Incorporated into front door assemblies are door edge lamps and puddle lamps, located on door edge and bottom of door. The lamps are activated by courtesy light switches when either front door is opened and will immediately switch off when both doors are closed.

Remove

1. Ensure side door glass is fully closed.
2. Disconnect the battery negative lead.
3. Remove interior door handle and arm rest/door pull from door.
4. Carefully release interior door trim pad from inner door panel.
5. Peel back lower half of plastic vapour barrier.
6. Disconnect electrical connectors within door, accessible through lower centre and outer openings of inner door panel.
7. Release door edge lamp electrical leads from retaining clips.
8. Remove lens and pry lamps out of door and withdraw electrical leads.



RR631M

Refit

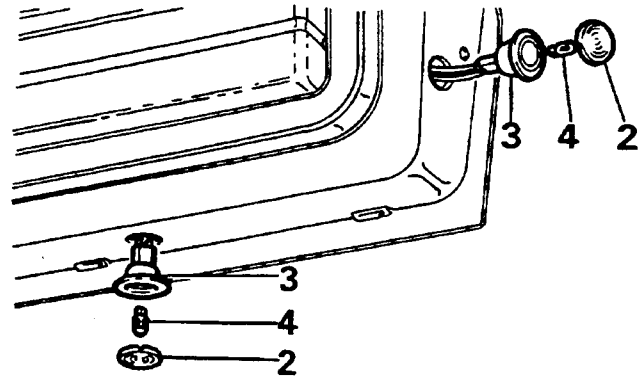
9. Reverse removal procedure.

△ **NOTE: Ensure door lamp wiring harness is securely clipped to lower stiffener plate within door to prevent damage occurring to electrical leads when door glass is in its lowest position.**

DOOR EDGE LAMPS/PUDDLE LAMPS

Bulb replacement

1. Disconnect the battery negative lead.
2. Carefully pry out lamp lens.
3. Withdraw lamp body from door **ONLY** as far as electrical leads will permit.
4. Pull bulb from holder.



RR2120E

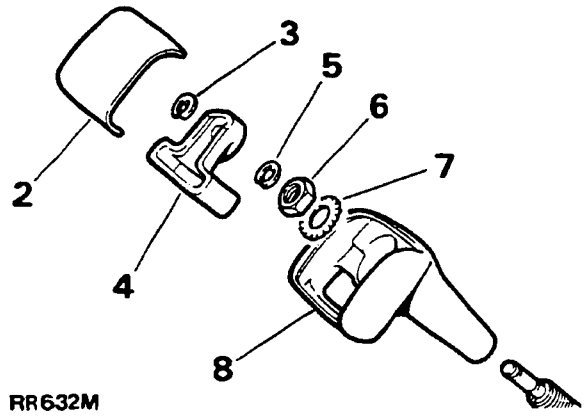
5. Fit new bulb, refit lamp lens. Correct bulb type is a 12-volt, 5-watt capless.
6. Push lamp into door.

AUTOMATIC GEAR SELECTOR-PANEL ILLUMINATION

Service repair no - 86.45.40

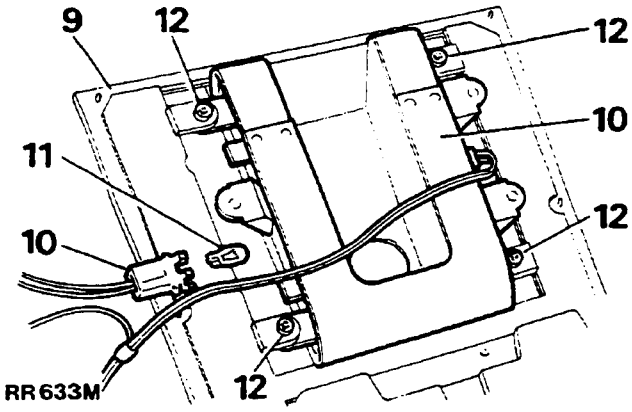
Bulb replacement

1. Disconnect the battery negative lead.
2. Unclip cover from top of gear selector knob.
3. Remove circlip retaining detent button.
4. Withdraw detent button.
5. Remove lower circlip above gear selector knob securing nut.
6. Remove securing nut.
7. Withdraw serrated washer.



RR632M

8. Slide selector knob off shaft.
9. Pry inset panel out of floor mounted console. Remove complete with selector illumination panel and ash tray.
10. Two bulbs are located on reverse side of illumination panel.
11. Pull appropriate bulb holder from its location.
12. To facilitate removal of bulb holders, remove four screws securing illumination panel to outer surround panel.



13. Remove bulb from holder. Correct bulb type is a 24-volt, 5-watt 'wedge' base (capless).

Refit

14. Reverse removal procedure. Ensuring electrical leads beneath console do **NOT** become trapped between mating surfaces.
15. To prevent damage to gear selector knob on reassembly do **NOT** overtighten retaining nut.

NUMBER PLATE LAMP ASSEMBLY AND BULB

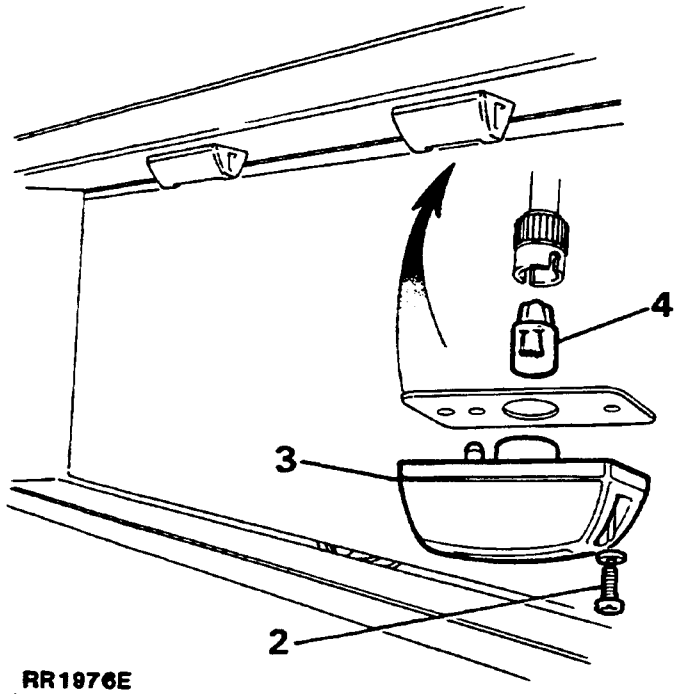
Service repair no - 86.40.86

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove two self-tapping screws with washers.
3. Remove lamp assembly.
4. Disconnect bulb holder, remove bulb.

△ **NOTE: Carefully pull electrical leads out of bottom of lower tailgate panel to reveal snap connectors.**



5. Disconnect electrical connections located at bottom of lower tailgate.
6. Remove bulb holder.
7. Carefully pull electrical leads up through inside of lower tailgate panels.

Refit

8. Reverse removal procedure. Correct bulb 'type' is 12-volt, 5 watt wedge base (capless).

INTERIOR ROOF LAMPS

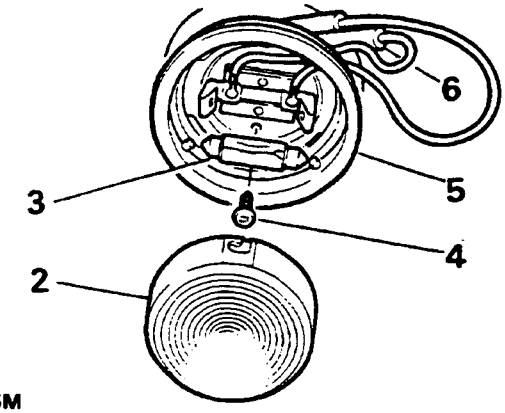
Service repair no - 86.45.01

Remove and refit

Remove

Interior roof lamps are operated automatically via side door and tailgate courtesy switches or by an independent switch in auxiliary switch panel.

1. Disconnect the battery negative lead.
2. Remove lens from courtesy lamp by pressing upward and turning it counter-clockwise.
3. Withdraw bulb from spring clip holder.
4. Remove screws securing lamp base to roof panel.
5. Lower lamp to reveal cable snap connections.
6. Disconnect electrical connections.



RR485M

Refit

7. Reverse removal procedure.

INTERIOR ROOF LAMPS CIRCUIT DELAY

Service repair no - 86.45.49

Remove and refit

Remove

The roof lamp circuit incorporates a delay function which is designed to allow lamps to remain on for 12 to 18 seconds after either front door is closed.

△ **NOTE: Switching on ignition (with both doors closed) will immediately over-ride this feature, switching interior lamps off.**

1. Disconnect the battery negative lead.
2. Remove six screws securing lower dash panel.
3. Lower dash panel to gain access to delay unit attached to steering column support bracket.
4. Remove delay unit from retaining bracket.
5. Pull multi-plug off delay unit.

Refit

6. Reverse removal procedure.

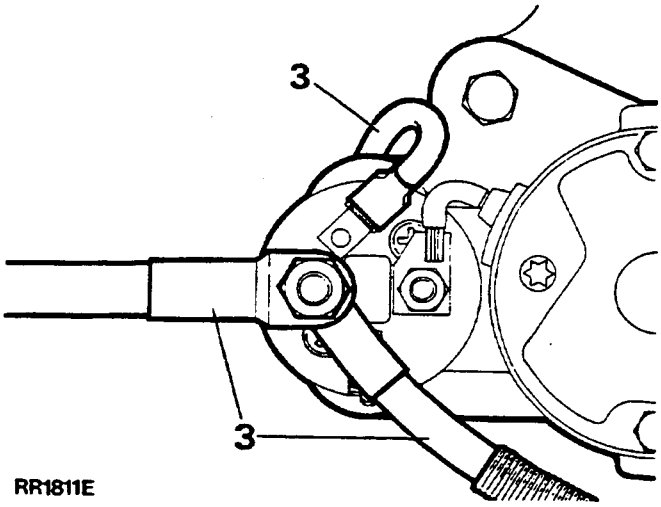
STARTER MOTOR-LUCAS M78R

Service repair no - 86.60.01

Remove and refit

Remove

1. Place vehicle on a suitable hoist.
2. Disconnect the battery negative lead.
3. Disconnect leads from solenoid and starter motor. Remove exhaust heat shield.
4. Remove two bolts, starter motor to flywheel housing.
5. Remove starter motor.



RR1811E

Refit

6. Reverse removal procedure.

AUXILIARY SWITCH PANEL

Remove and refit

The auxiliary switch panel contains up to six switches depending on vehicle specification. Each switch incorporates integral symbols for identification. Unused switch openings are fitted with blank covers, which are removable, to facilitate fitting extra switches if required.
The symbols are illuminated by two bulbs which become operational when vehicle lights are on.

The heated rear screen switch is provided with an individual warning light, illuminated when the switch is operated.

Remove

1. Disconnect the battery negative lead.
2. Carefully pry auxiliary switch panel surround away from centre console.
3. Withdraw switch panel as far as electrical leads will permit.
4. Unclip multi-plugs at rear of switches by depressing retaining lugs.
5. Pull plugs from the switches.
6. Remove switch assembly complete.
7. Depress small retaining lugs on top and bottom of switch and push switch(es) through front of switch surround.

Refit

8. Reverse removal procedure.

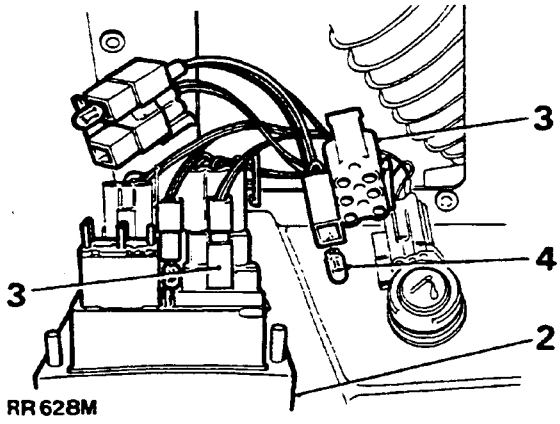
△ **NOTE: To aid identification and location of multi-plug to switch, a coloured plastic tab is attached to each body which corresponds with an appropriate coloured multi-plug. If removed, switches must be refitted in original positions.**

AUXILIARY SWITCH PANEL WARNING LIGHT

Service repair no - 86.45.29

Bulb replacement

1. Disconnect the battery negative lead.
2. Carefully pry switch panel surround away from centre console.
3. Unclip multi-plug from rear of switch, disconnect plug.



RR628M

4. Warning light bulb is located in multi-plug. Remove by pulling bulb from its location.
5. Fit a new bulb and refit multi-plug.
6. Press auxiliary switch panel into centre console. Correct bulb type is an amber 12-volt 1.2-watt 'wedge' base (capless).

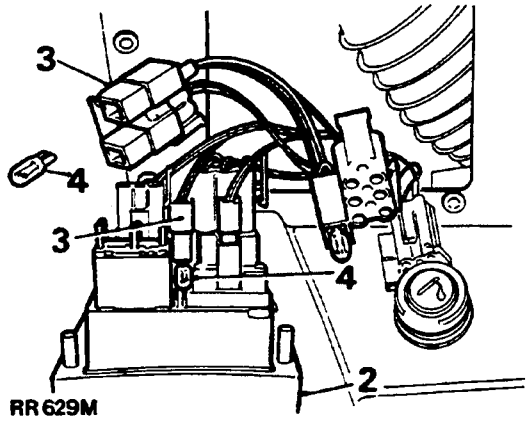
AUXILIARY SWITCH PANEL ILLUMINATION

Service repair no - 86.45.29

Bulb replacement

Auxiliary panel green illumination bulbs are located in interior lamp/heated rear screen multi-plugs. Each bulb is positioned in centre of four switches.

1. Disconnect the battery negative lead.
2. Carefully pry switch panel surround away from centre console to give access to multi-plugs at rear of switches.



RR629M

3. Unclip and pull multi- plugs from rear of appropriate switch.
4. Pull green illumination bulb from its location.
5. Fit new bulb, refit multi-plug.
6. Press auxiliary panel surround back in to centre console.
   Correct bulb type is a 12-volt 1.2-watt 'wedge' base (capless).

STEERING COLUMN CONTROLS

Steering column switch layout is as follows:

LEFT HAND CONTROLS

Lower switch-Main lighting switch.
Upper switch-High and low beam, direction indicators and horn.

RIGHT HAND CONTROLS

Lower switch - Rear screen programmed wash/wipe.
Upper switch - Windscreen programmed wash/wipe.

STEERING WHEEL

The following operations for steering column controls show steering wheel removed, this is for clarity only, and is not a necessary part of procedure. If steering wheel removal is required. ***See STEERING, Repair, Steering wheel***

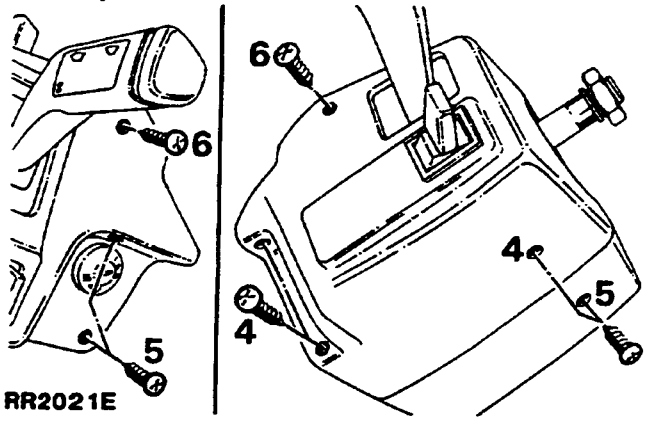
STEERING COLUMN SHROUD

Remove and refit

Certain operations within this section necessitate removal of steering column shroud. Unless removal of both sides of shroud is required, remove ONLY side necessary for access.

Remove

1. Disconnect the battery negative lead.
2. Remove lower dash panel. ***See CHASSIS AND BODY, Repair, Lower dash panel***
3. Disconnect electrical connections to either master lighting switch or rear screen wash wipe switch. (Disconnect both if removing complete shroud).
4. Left hand shroud - remove three securing screws and remove shroud over indicator/high beam switch.
5. Right hand shroud - remove three securing screws and remove shroud over windscreen wash wipe switch.
6. To facilitate reassembly remove screw securing two halves of shroud together from one side only.



RR2021E

Refit

7. If both sides of shroud have been removed ensure that plate on steering column is correctly located in slot in shroud.
8. Reverse removal procedure.

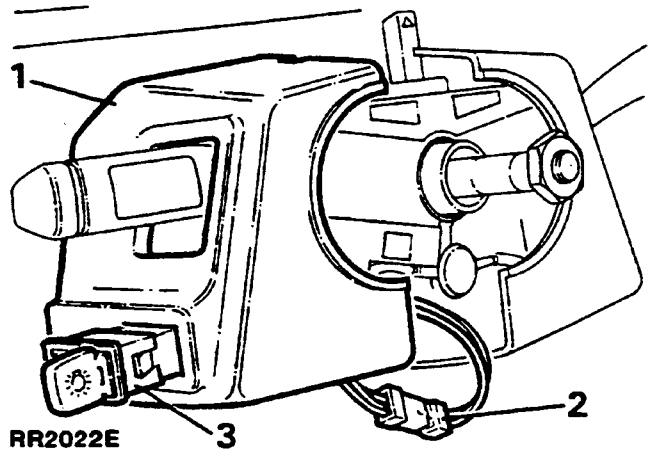
MAIN LIGHTING SWITCH OR REAR SCREEN PROGRAMMED WASH WIPE SWITCH

Service repair no - 86.65.10/84.35.34

Remove and refit

Remove

1. Remove steering column shroud from required side.
2. Disconnect cables at snap connectors.
3. Push two spring clips locating switch inwards and remove switch from mounting.



RR2022E

Refit

4. Reverse removal procedure.

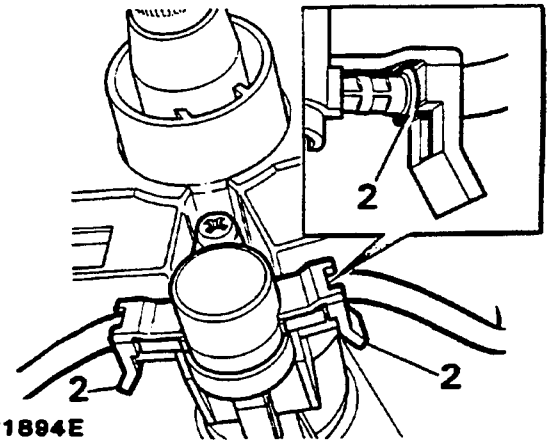
WINDSCREEN PROGRAMMED WASH WIPE SWITCH OR HIGH AND LOW BEAM, DIRECTION INDICATORS AND HORN SWITCH

Service repair no - 84.15.34/86.65.55

Remove and refit

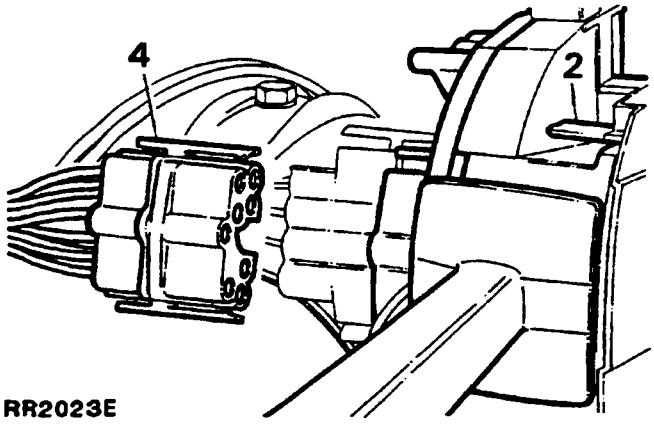
Remove

1. Remove steering column shroud from required side.
2. Release appropriate retaining clip and pull fibre optic guide from housing.



RR1894E

3. Depress retainers at top and bottom of switch and pull combined switch assembly away from steering column switch housing.



RR2023E

4. Lighting, indicator and horn switch: release two harness multi-plugs from back of switch and remove switch assembly.
   Wiper and washer switch: release harness multi-plug from back of switch and remove switch assembly.

Refit

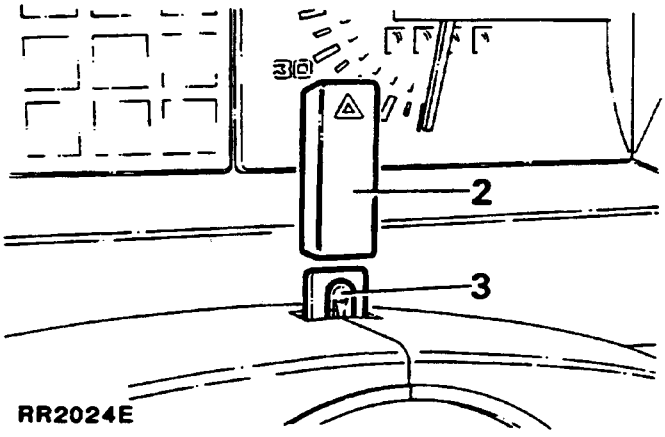
5. Reverse removal procedure.

HAZARD WARNING SWITCH BULB REPLACEMENT

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Pull hazard switch cover upwards, remove it to gain access to bulb.



3. Remove bulb by pulling it upwards. A piece of rubber tubing or adhesive tape attached to bulb may facilitate removal and refitting.

Refit

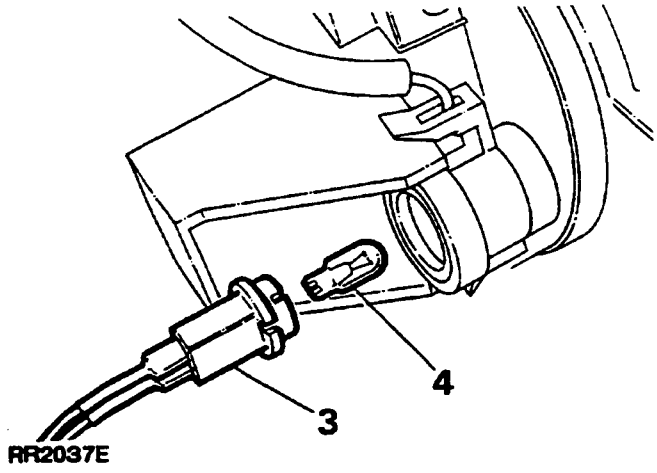
4. Locate bulb in its holder and reverse instructions 1 to 3.
   Correct bulb is a 12V, 1. 2 watt 'wedge' base (capless).

COLUMN SWITCH ILLUMINATION BULB REPLACEMENT

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove left hand side steering column shroud.
3. Working behind column switch housing twist bulb holder through 90° to remove.
4. Remove bulb.



Refit

5. Reverse removal procedure. Correct bulb type is a 12-volt, 1.2-watt 'wedge' base (capless).

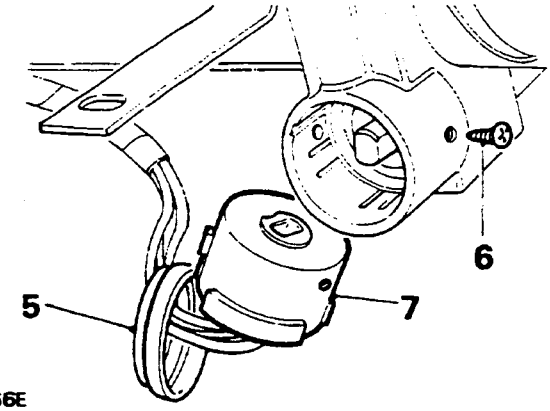
IGNITION STARTER SWITCH

Service repair no - 86.65.02

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove lower dash panel.
3. Remove steering column shroud, left hand side.
4. Disconnect ignition switch cable at multi-plug.
5. Remove rubber cover protecting switch.



RR1966E

6. Remove single screw securing ignition/starter switch to housing.
7. Remove switch.

Refit

8. Reverse removal procedure.

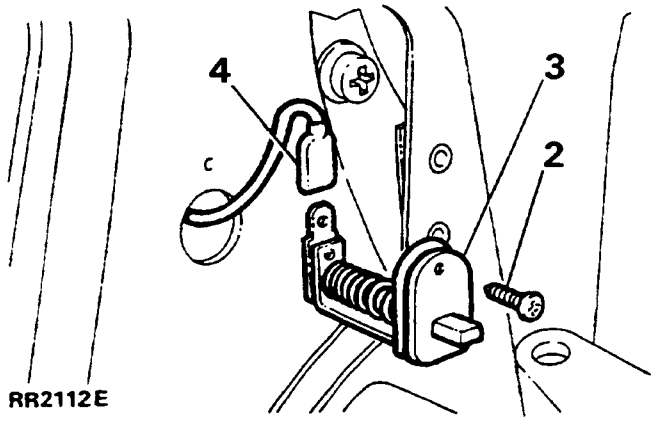
DOOR PILLAR SWITCH

Service repair no - 86.65.15

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove screw securing switch to door pillar.
3. Remove switch.
4. Disconnect electrical lead from connector blade.



RR2112E

Refit

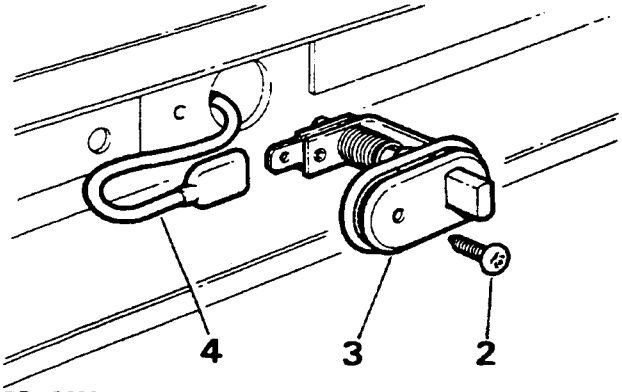
5. Reverse removal procedure.

REAR TAILGATE SWITCH

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove single screw securing switch to tailgate opening.
3. Withdraw switch.
4. Disconnect electrical lead.



RR498M

Refit

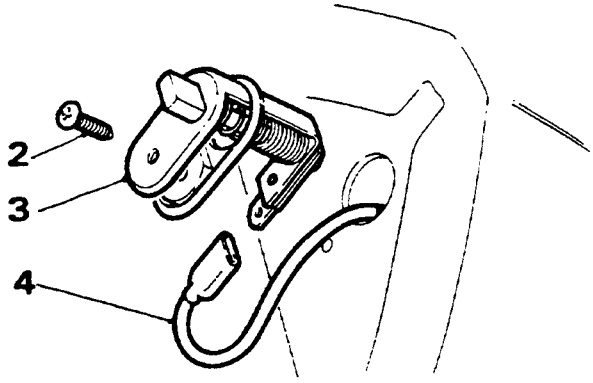
5. Reverse removal procedure.

UNDER BONNET ILLUMINATION SWITCH

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove single screw securing switch to decker panel.
3. Withdraw switch.
4. Disconnect electrical lead.



RR499M

Refit

5. Reverse removal procedure.

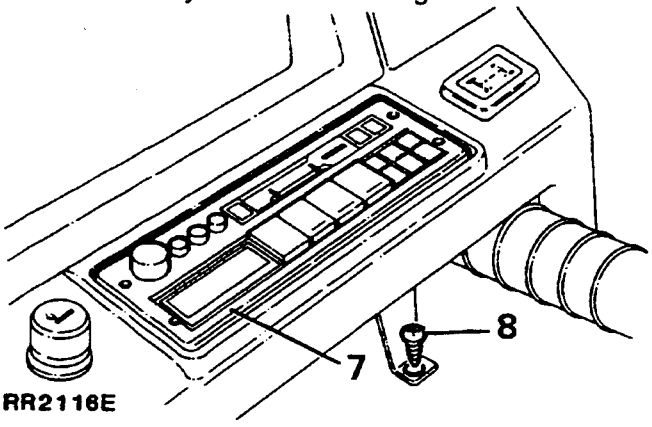
CIGAR LIGHTER-RADIO HOUSING

Service repair no - 86.65.60

Remove and refit

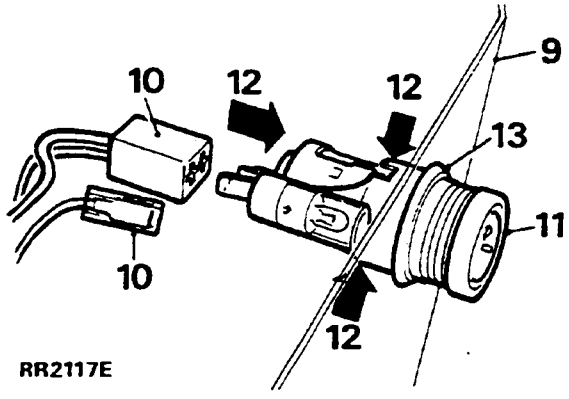
Remove

1. Disconnect the battery negative lead.
2. Remove transfer gear lever knob.
3. Remove main gear lever knob. ***See Automatic gear selector-panel illumination***
4. Remove glove box liner. Release park brake cable from lever. Pry inset panel out of floor mounted console. Pull two illumination bulbs from selector panel.
5. Release glove box from four fixings.
6. Raise front of glove box and console assembly, ease away from radio housing.



RR2116E

7. Remove radio, referring to Manufacturer's instructions.
8. Remove single screw securing housing to top of gearbox tunnel.
9. Pull housing away from lower dash panel.
10. Disconnect electrical leads at rear of cigar lighter.
11. Remove push in switch from lighter outer body.
12. Depress outer plastic surround where denoted by arrows and push outer body through surround.
13. Manoeuvre plastic surround, remove from radio housing.



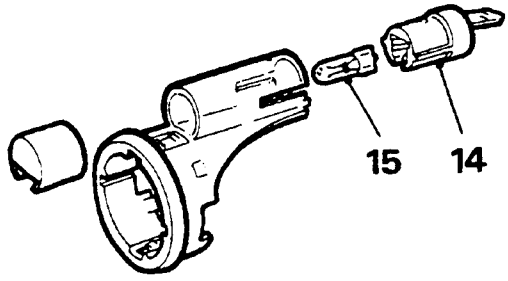
RR2117E

Refit

14. Reverse removal procedure.

CIGAR LIGHTER ILLUMINATION - BULB REPLACEMENT
Service repair no - 86.45.55

15. Remove bulb holder from plastic surround.
16. Pull bulb from holder. Correct bulb type is a 12V 1.2-watt wedge base (capless).



RR2118E

Refit

17. Reverse removal procedure.

CIGAR LIGHTER - GLOVE BOX

Service repair no - 86.65.61

Rear cigar lighter is located in bottom of glove box, access to rear of lighter is gained by removing glove box liner.
Follow instructions 10 to 16 of **CIGAR LIGHTER-radio housing** to remove lighter from glove box. ***See CIGAR LIGHTER-radio housing***

REVERSE LIGHT SWITCH

Service repair no - 37.27.01

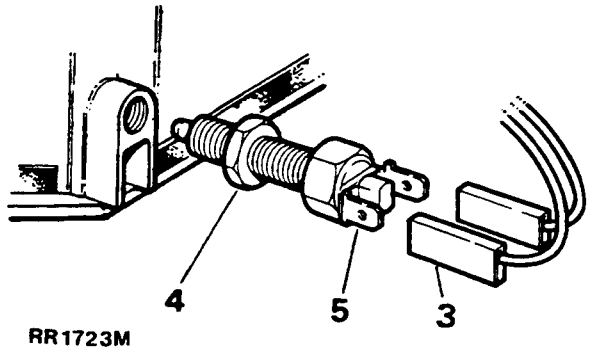
Remove and refit

Manual gearbox

Remove

Reverse light switch is located at rear of selector housing, accesible from beneath vehicle.

1. Place vehicle on suitable ramp.
2. Disconnect the battery negative lead.
3. Disconnect electrical leads.
4. Release lock-nut.
5. Remove switch.



RR1723M

Refit

NOTE: Reverse light switch requires re-setting on reassembly.

6. Select reverse gear.
7. Connect 12 volt supply and test lamp across switch terminals.
8. Screw switch into housing until test lamp is illuminated. Screw switch in a further half turn, tighten locknut.
9. Connect electrical lead.
10. Reconnect battery.

START INHIBIT / REVERSE LIGHT SWITCH

Service repair no - 44.15.19

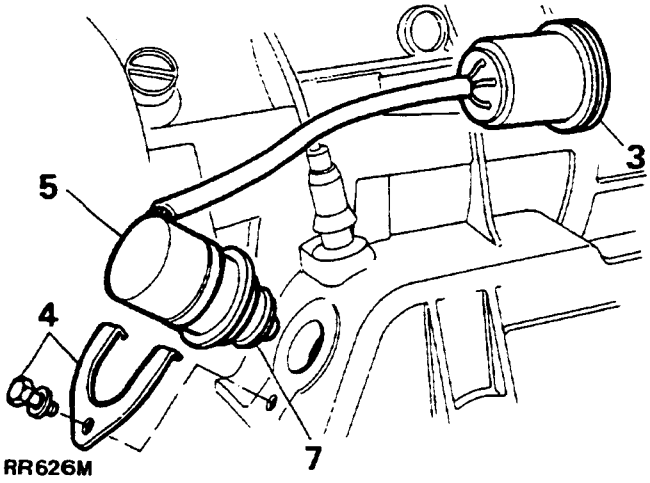
Remove and refit

Automatic gearbox

Remove

Reverse light switch is an integral part of start inhibitor switch. It is located on left hand side of gearbox, accessible from beneath vehicle.

1. Place vehicle on suitable ramp.
2. Disconnect the battery negative lead.
3. Disconnect multi-plug.
4. Release clamp bolt, remove clamp.
5. Remove switch.



RR626M

Refit

6. Fit a NEW 'O' ring to switch.
7. Reverse removal procedure.

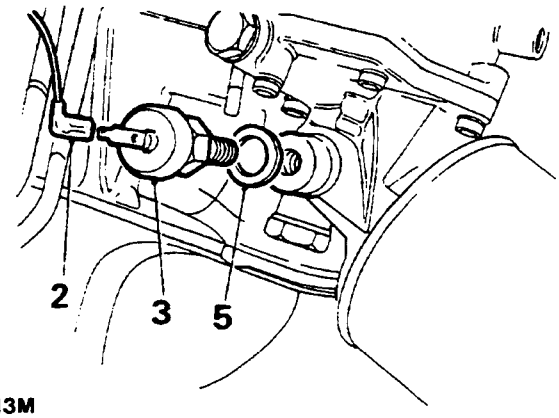
OIL PRESSURE WARNING SWITCH

Service repair no - 86.65.30

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Disconnect electrical lead.
3. Unscrew switch unit.
4. Remove switch and sealing washer.



RR513M

Refit

5. Reverse removal procedure. Using a NEW sealing washer.

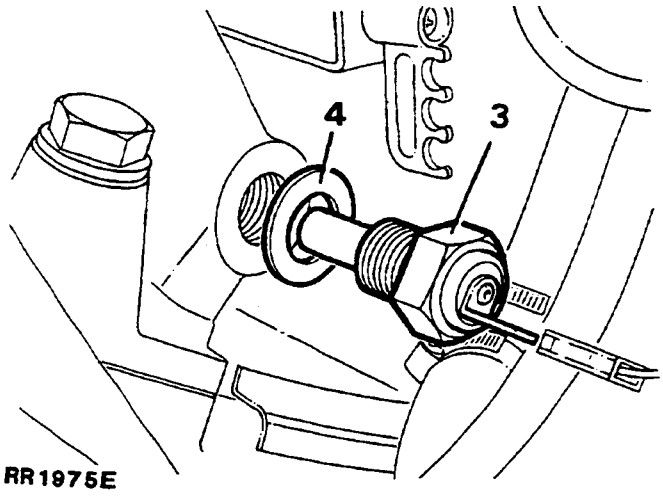
COOLANT TEMPERATURE TRANSMITTER

Service repair no - 26.10.02

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Disconnect electrical lead.
3. Remove transmitter from inlet manifold.



RR1975E

Refit

4. Reverse removal procedure. Using a **NEW** sealng washer.

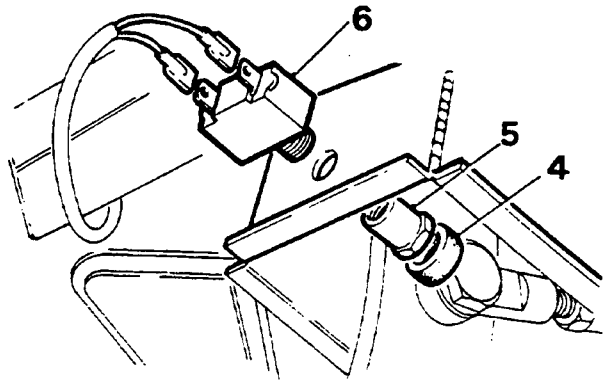
STOP LIGHT SWITCH

Service repair no - 86.65.51

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove lower dash panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
3. Depress foot brake.
4. Remove rubber protector from switch, if fitted.
5. Remove hexagon nut.
6. Withdraw switch.
7. Disconnect electrical leads.



RR509M

Refit

8. Reverse removal procedure.

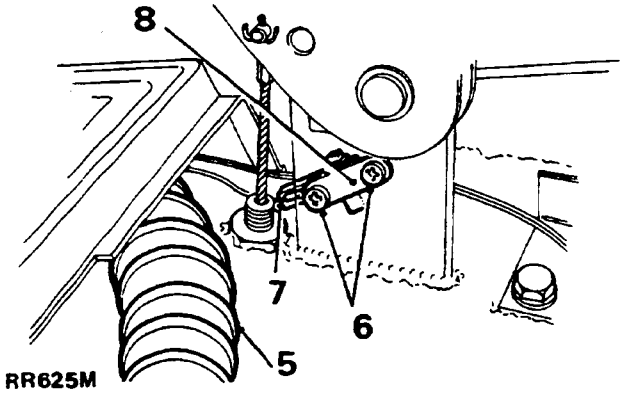
PARK BRAKE WARNING SWITCH

Service repair no - 86.65.45

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Apply park brake.
3. Remove four screws.
4. Remove glove box liner.
5. Carefully pull hose away from side of park brake mounting bracket.
6. Remove two screws.
7. Manoeuvre switch around front of mounting bracket. Disconnect electrical lead.
8. Remove switch.



RR625M

Refit

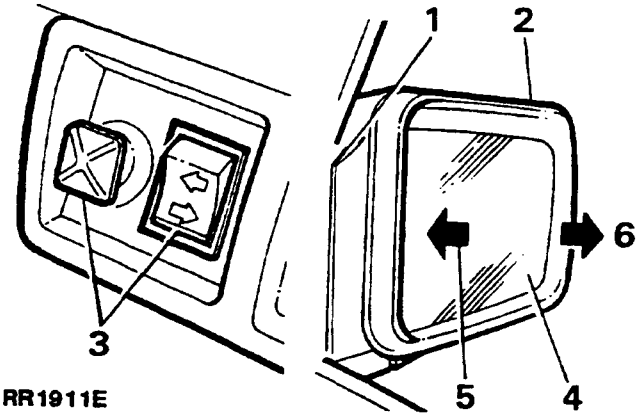
9. Reverse removal procedure.

EXTERIOR DRIVING MIRRORS

1. Mirror housing is hinged vertically. It should be set in one of two fixed angle positions provided to suit left or right side location.
2. For safety and convenience, mirror housing is designed to fold completely forwards or rearwards against vehicle body.

Adjust

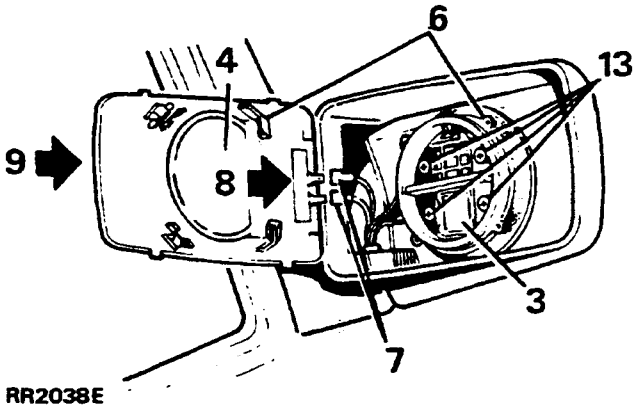
3. Adjustment is controlled by an electric motor inside mirror housing. This is operated by two controls fitted in dash panel. To adjust, select left or right hand mirror. Move head of finger tip control to left, right, up or down as required.
4. Mirror also incorporates a demist facility, activated by operation of rear window demist switch.



RR1911E

Replacing mirror glass

5. Press inner (wider) end of glass to full extent inwards.
6. Insert fingers under outer (narrower) end of glass. Pull outwards until glass is released from four retaining clips.
7. Disconnect two leads from back of glass.
8. To replace glass, locate inner (wider) end in mirror housing.



RR2038E

9. Carefully press outer (narrower) end of glass inwards until it locates on four retaining clips.
10. Adjust mirror as required.

ELECTRIC MOTORS

Remove and refit

Remove

11. Disconnect the battery negative lead.
12. Remove mirror glass, as described in items 5 to 7.
13. Remove four self-tapping screws securing motor assembly to mirror body.
14. Manoeuver motor assembly to reveal electrical connections on rear of motor.
15. Pull leads from rear of motor assembly.

Refit

16. Reverse removal procedure. 11 to 15, ensuring that electrical leads are correctly refitted.

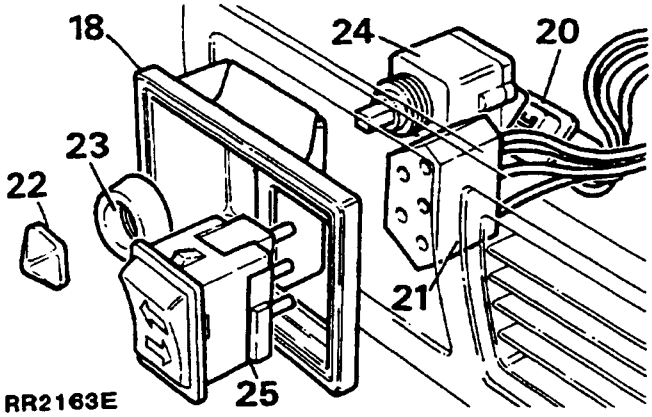
CONTROL SWITCHES

Service repair no - 86.65.75

Remove and refit

Remove

17. Disconnect the battery negative lead.
18. Remove switch retaining panel from fascia.
19. Withdraw panel to access electrical leads.



RR2163E

20. Pull multi-plug from rear of fingertip switch.
21. Disconnect multi-plug at rear of selector switch. Remove panel.
22. Carefully pry off fingertip button from switch.
23. Unscrew black plastic retaining collar securing switch.
24. Remove switch from panel. Note position of locating hole in panel retaining clip.
25. Depress two spring clips securing selector switch, push it through panel.

Refit

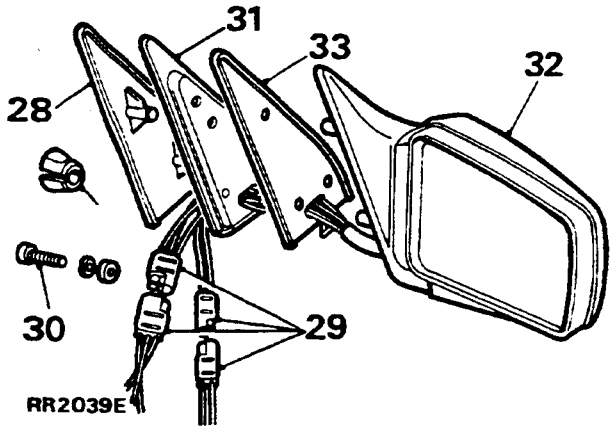
26. Reverse removal procedure. 17 to 25.

COMPLETE ASSEMBLY
Service repair no - 76.11.10

Remove and refit

Remove

27. Disconnect the battery negative lead.
28. Pry off interior finisher plate.
29. Disconnect two electrical plugs.
30. Support exterior mirror assembly, remove three securing screws, plain and spring washers.
31. Pull inner mounting plate from inner door frame complete with two retaining clips.
32. Detach mirror assembly from outer door frame.
33. Remove sealing rubber.



Refit

34. Reverse removal procedure. 27 to 33.

CAUTION: To prevent damage to electrical wiring do not push leads down inside door casing.

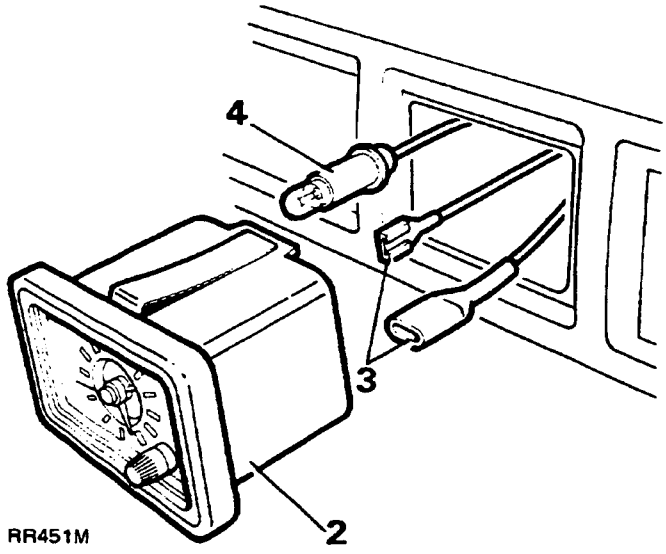
CLOCK

Service repair no - 88.15.07

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Carefully pry clock out of dash panel.



3. Disconnect electrical leads.
4. Remove bulb holder and bulb. Correct bulb is a 2-watt bayonet type.

Refit

5. Reverse removal procedure.

WARNING LAMP CONTROL UNIT - USA

Service repair no - 86.55.45

Remove and refit

Introduction

The fifteen warning light symbols in binnacle will all be illuminated when ignition key is turned to position II as an initial check to ensure that all bulbs are operational. All bulbs, except for Brake Failure / Parking Brake, ABS (if fitted), Engine Oil Pressure' and 'Ignition On' symbols will estinguish automatically after 12 + 4 seconds.

If engine is cranked during bulb check, check will terminate in 0,75 + 0,25 seconds.

'Engine Oil Pressure' and 'Ignition On' symbols will remain on when engine is cranked extinguished when engine is running.

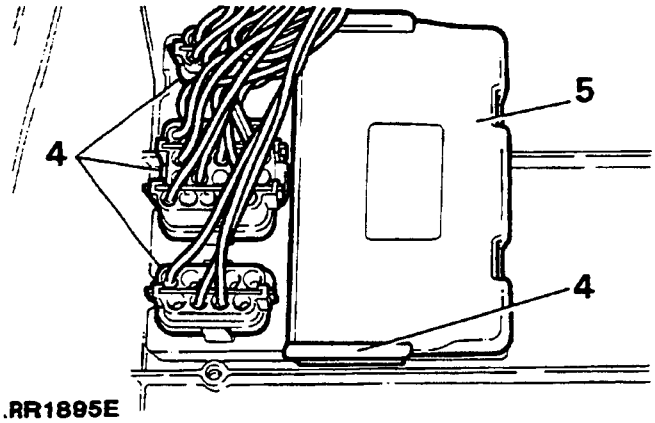
ABS symbol will estinguish when vehicle reaches 8 kph (5 mph).

The 'Brake Failure/Transmission Parking Brake' symbol will extinguish when parking brake lever is released.

△ **NOTE: Should ignition key be turned directly to engine crank position, bulb check procedure will be overridden.**

Remove

1. Disconnect the battery negative lead.
2. Remove six screws from lower dash panel.
3. Lower dash panel, disconnect multi-plug from rheostat switch.
4. Pull warning lamp control unit from spring clip on underside of dash panel, disconnect three multi-plugs from unit.
5. Remove warning lamp control unit.



RR1895E

Refit

6. Reverse removal procedure. Ensure multi-plugs and unit are securely located.

INSTRUMENT ILLUMINATION ELECTRONIC DIMMER / RHEOSTAT

Service repair no - 86.65.07

Remove and refit

Electronic dimming control switch is located on lower dash panel adjacent to steering column. Rotate control upwards to fully illuminate instruments and downwards to reduce intensity.
Dimmer control unit also controls clock, heater and cigar lighter illumination.

Remove

1. Disconnect the battery negative lead.
2. Remove lower dash panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
3. Disconnect dimmer control multi-plug.
4. Remove two screws securing dimmer control switch.

Refit

5. Reverse removal procedure. 1 to 4.

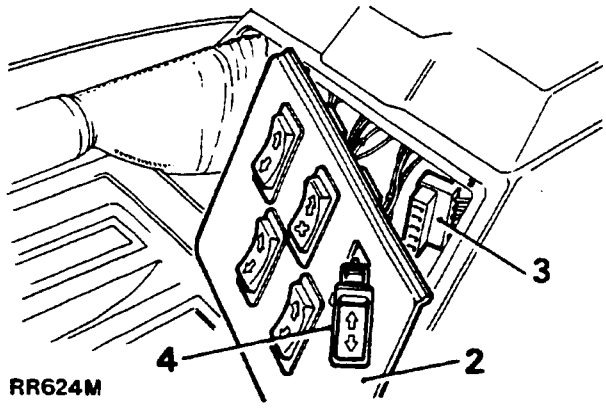
WINDOW LIFT SWITCHES

Service repair no - 86.25.16

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Pry window lift switch surround from glove box.
3. Disconnect multi-plug at rear of switch(es).
4. Apply pressure to rear of switch, push it through surround.



RR624M

Refit

5. Reverse removal procedure.

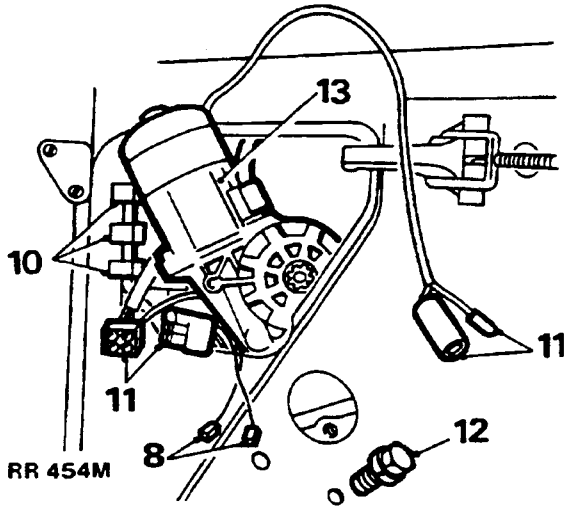
WINDOW LIFT MOTOR - FRONT DOORS

Service repair no - 86.25.04

Remove and refit

Remove

1. Ensure that side door glass is fully closed, secure with adhesive tape.
2. Remove front door trim panel. ***See CHASSIS AND BODY, Repair, front door - trim panel***
3. Peel back front top corner of plastic vapour barrier to reveal window lift motor.
4. Release window lift motor wiring harness from three retaining clips to allow harness to be pulled out of opening at front of inner door panel.
5. Disconnect window lift motor multi-plug from main door harness.



6. Support motor, remove three securing bolts.
7. Remove motor through top front opening of door.

Refit

8. Reverse removal procedure. 1 to 7.

△ **NOTE: Ensure that drive gear is engaged and correctly aligned with window lift linkage before fitting securing bolts.**

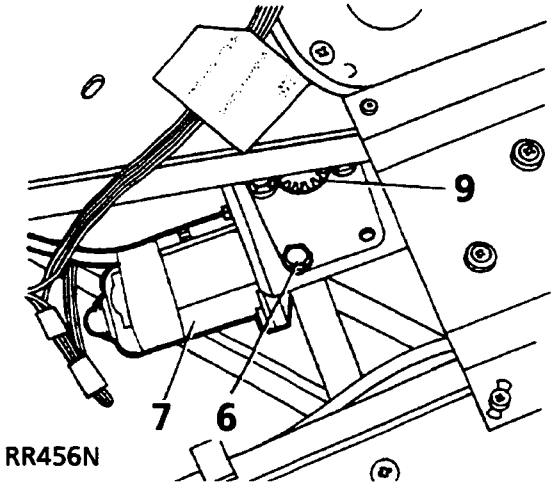
WINDOW LIFT MOTOR - REAR DOORS

Service repair no - 86.25.09

Remove and refit

Remove

1. Ensure that side door glass is fully closed, secure with adhesive tape.
2. Remove rear door trim panel. ***See CHASSIS AND BODY, Repair, rear door - trim panel***
3. Carefully detach bottom half of vapour barrier to reveal window lift motor.
4. Release motor wiring harness from retaining clips.
5. Disconnect lift motor harness snap connections from main door harness.
6. Support motor, release three securing bolts.
7. Remove lift motor from lower opening in inner door panel.



Refit

8. Reverse removal procedure. 1 to 7.
9. Ensure lift motor drive gear is engaged and correctly aligned with window lift linkage before fitting securing bolts.

CENTRAL DOOR LOCKING

The central door locking system on four door models is activated from both driver and front passenger doors. A switch/lock actuator is fitted in both front doors. The system is controlled by an electronic unit situated on steering column support bracket.

Locking or unlocking front doors from outside by key operation, or from inside by sill knob automatically locks or unlocks all four doors, upper tailgate and, vehicles up to 1991 model year fuel filler flap.

Vehicles from 1991 model year: Fuel filler flap is released by pressing button on steering column shroud.

Front and rear passenger doors can be independently locked or unlocked from inside vehicle by sill knob operation but can be overridden by further operation of driver's door locking control.

On rear doors only, a child safety lock is provided which can be mechanically pre-set to render interior door handles inoperative.

Failure of an actuator will not affect locking of remaining three doors, tailgate or fuel filler flap. A door with inoperative actuator can still be locked or unlocked manually, but not fuel filler flap.

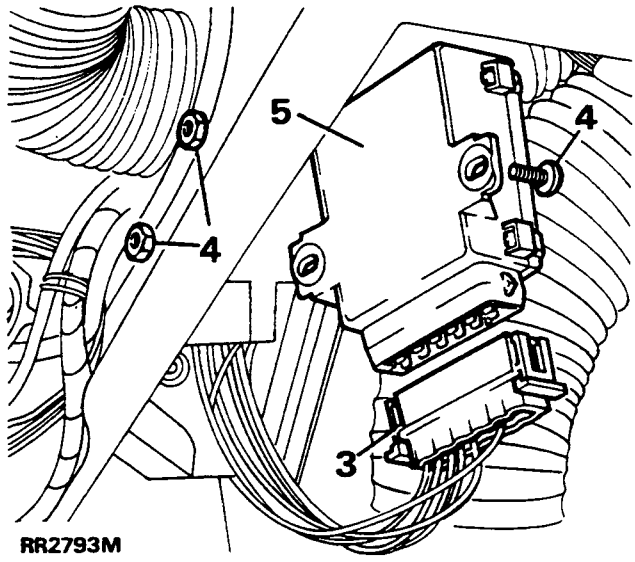
△ **NOTE: Actuator units contain non-serviceable parts. If a fault occurs, fit a new unit.**

CENTRAL DOOR LOCK CONTROL UNIT

Remove and refit

Remove

1. Disconnect the battery negative lead. .
2. Remove the lower fascia panel.
3. Disconnect the harness multi-plug.
4. Remove the securing screws.
5. Remove the control unit.



RR2793M

Refit

6. Reverse removal procedure.

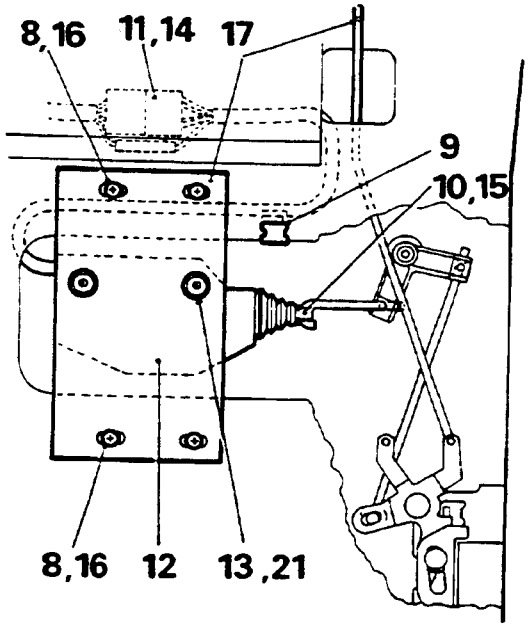
FRONT DOOR ACTUATOR UNIT

Service repair no - 86.26.08

Remove and refit

Remove

1. Ensure window is in its fully closed position.
2. Remove front door trim panel. ***See CHASSIS AND BODY, Repair, front door - trim panel***
3. Peel back plastic vapour barrier to expose actuator unit.
4. Remove four screws and plain washers securing lock actuator mounting plate to inner door panel.
5. Release cable tie, at trailing edge of door, retaining electrical cable.
6. Manoeuvre actuator assembly from actuator link.



RR369M

7. Withdraw actuator assembly, disconnect multi-plug.
8. Remove actuator assembly.
9. Remove actuator unit by loosening two screws securing it to mounting plate.

Refit

10. Fit actuator unit to mounting plate.
11. Connect multi-plug.
12. Manoeuvre actuator assembly to engage actuator link.
13. Loosely fit actuator mounting plate to inner door panel with four screws. Set mounting plate in centre of slotted holes.
14. Ensure that manual operation of sill locking control is not restricted by operation of actuator operating rod and vice versa. Reset mounting plate as necessary.
15. Reconnect vehicle battery.
16. Check that electrical operation of door lock occurs when sill locking control is moved through half of total movement. Reset mounting plate if necessary, tighten four screws.

△ **NOTE: Above adjustment ensures that full tolerance on switching operation is utilised.**

REAR DOOR ACTUATOR UNITS

Service repair no - 86.26.09

Remove and refit

Instructions as for front doors with following exceptions:

17. Electrical cable and plug is retained and is accessible through large opening in door.
18. Instruction 16 does not apply to rear actuator units which are not fitted with switches.

△ **NOTE: Actuator may be detached from mounting plate to facilitate removal of lock actuator from connector rod.**

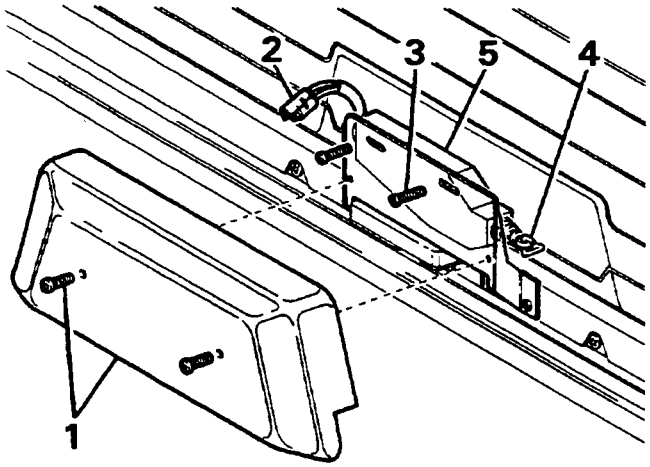
UPPER TAILGATE ACTUATOR UNIT

Service repair no - 86.26.10

Remove and refit

Remove

1. Remove two screws and trim covering to gain access to actuator.
2. Disconnect electrical connection.
3. Remove two actuator retaining screws.
4. Manouevre actuator assembly link from actuator link.
5. Withdraw tailgate actuator unit.



RR2570E

Refit

6. Reverse removal procedure.
7. Check operation of central locking system.

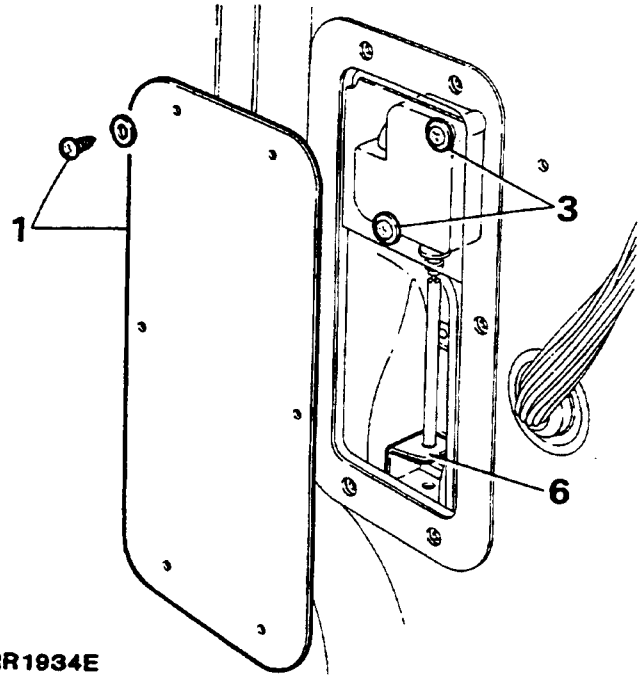
FUEL FILLER FLAP ACTUATOR UNIT - PRE 1991 MODEL YEAR

Service repair no - 86.26.16

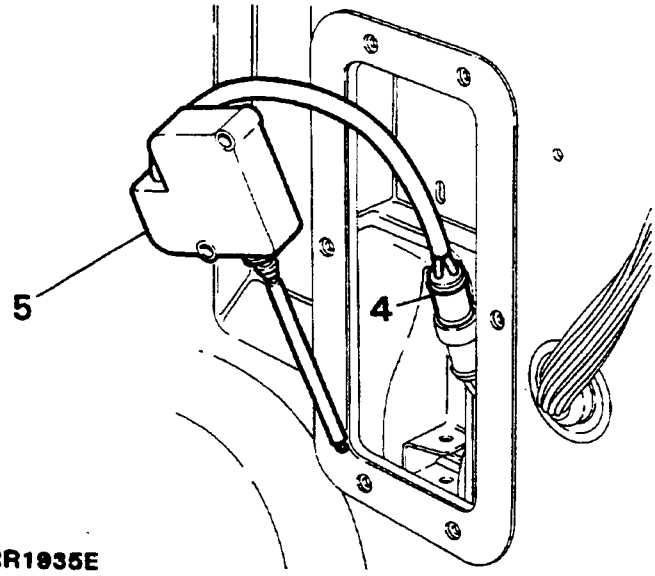
Remove and refit

Remove

1. Remove six screws to withdraw closure panel, situated in tool stowage area.
2. Ensure that actuator is in unlocked position and fuel filler flap is open.
3. Release two screws and manoeuvre actuator unit clear of its mounting.



RR1934E



RR1935E

4. Disconnect wiring plug.
5. Withdraw actuator.

Refit

6. Reverse removal procedure. Actuator mounting holes in body are elongated. Adjust position of actuator to ensure that rod will pass through guide brackets without fouling.
7. Check operation of central locking system.

FUEL TANK GAUGE UNIT - PRE 1991 MODEL YEAR

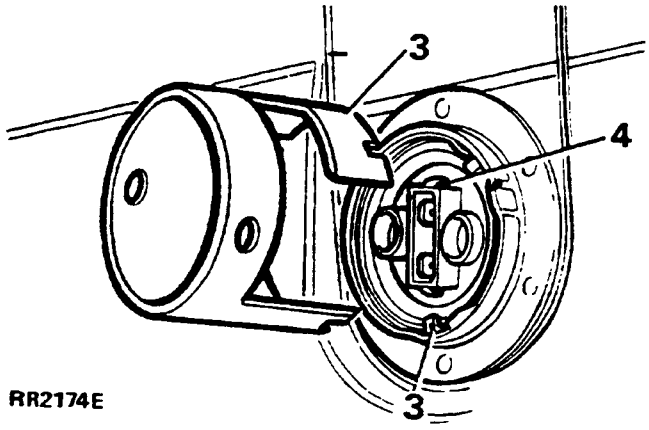
Service repair no - 88.25.32

Remove and refit

Remove

Service tool-RO 600964 Locking wrench.

1. Disconnect the battery negative lead.
2. Remove fuel tank. ***See FUEL SYSTEM, Repair, fuel tank - pre 1991***
3. Release tank unit locking ring, using service tool RO 600964.
4. Remove gauge unit and sealing washer.



RR2174E

Refit

5. Coat mating faces with Bostik 772 adhesive. Fit a NEW sealing washer. Locate gauge unit ensuring that notch in gauge unit locates with register in tank.
6. Retighten locking ring.
7. Refit fuel tank.

TRAILER SOCKET

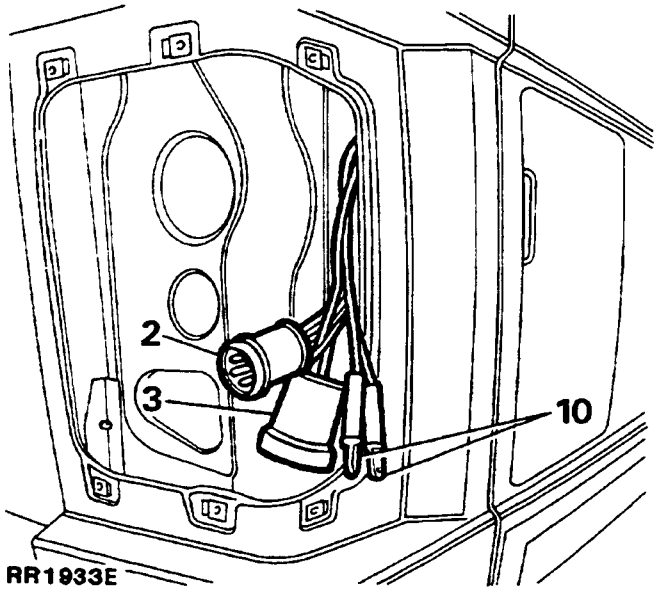
Incorporated in vehicle electrical harness is a facility for fitting a seven pin trailer lighting socket.
Pick-up point is located behind right hand tail lamp cluster assembly.
Pick-up point consists of a seven pin pre-wired plug, a separate auxiliary fused line feed and reverse light lead.

⚠ **CAUTION: Fitting trailer socket and associated wiring MUST be carried out by a qualified vehicle electrician.**

1. Disconnect the battery negative lead.
2. Remove tail lamp. ***See tail lamp assembly***
3. Remove protective cap from trailer pick-up point plug.

△ **NOTE: Cable colours in this plug correspond to main circuit diagram. Red / yellow is unused.**

4. Feed seven core cable Part No. PRC4143 (fitted with a pre-wired plug to one end-suitable for connection to pick-up point) down between inner and outer body panels through rear light opening.



5. Feed cable alongside existing rear lighting harness.
6. Pull cable through opening between chassis side member and fuel tank.
7. Fit two retaining clips to cable and secure it to rear end cross member.
8. Connect electrical leads to vehicle trailer socket. (Refer to current trailer wiring regulations).
9. Secure trailer socket to tow bar.
10. Two extra leads in rear light opening provide a line feed and reverse light feed.

Electrical lead identification

Single leads - item 10, RR1933E.

Pink - Fused auxiliary line feed.
Green/Brown - Reverse light feed.

Pre-wired cable and plug - Part No. PRC4143

Yellow - Left indicator.
Green - Right indicator.
Red/Yellow - Unused.
White - Ground.
Brown - Right-hand tail lights.
Black - Left-hand tail lights.
Red - Stop lamps.

11. Refit tail lamp.
12. Reconnect battery.

AUDIBLE WARNING UNIT - USA

Service repair no - 86.55.13

Remove and refit

Audible warning unit will sound with varying notes to warn driver of following conditions:

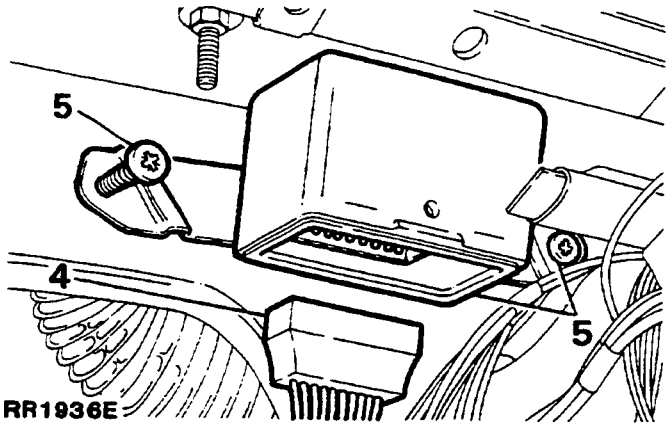
(a) Intermittent high and low notes for a period of 4 to 8 seconds:
- key in ignition position 'II' AND driver's seat belt unfastened.

(b) Interrupted low note:
- driver's door open with key in switch but not in ignition position.

(c) Constant high note:
- ignition switched on with transfer gearbox lever in neutral.

Remove

1. Disconnect the battery negative lead.
2. Remove steering column shroud. ***See steering column shroud***
3. Remove lower dash panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
4. Disconnect multi-plug.
5. Remove two securing screws, remove audible warning unit.



Refit

6. Reverse removal procedure.

LOW OIL LEVEL SENSOR UNIT - USA

Service repair no - 12.60.54

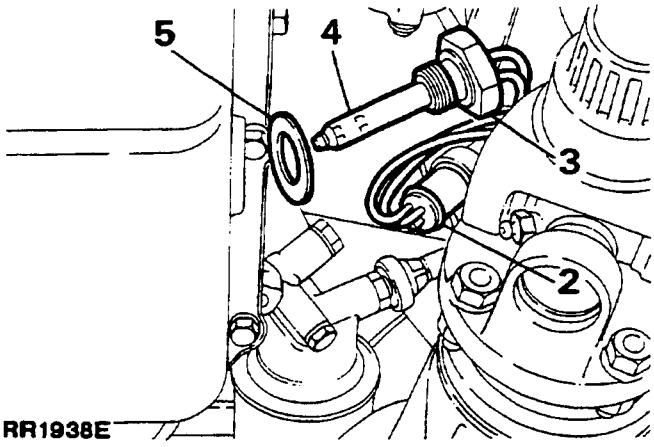
Remove and refit

The low oil level sensor unit is fitted into right hand side of engine sump.

Remove

△ **NOTE: Ensure oil level is below sensor before removal.**

1. Disconnect the battery negative lead.
2. Disconnect wiring connector.



3. Remove securing nut.
4. Remove sensor unit.

Refit

5. Fit new sealing washer.
6. Reverse removal procedure.
7. Top up engine oil level. Run engine and check for leaks around sensor unit.

LOW OIL LEVEL WARNING LOGIC UNIT - USA

Service repair no - 86.55.64

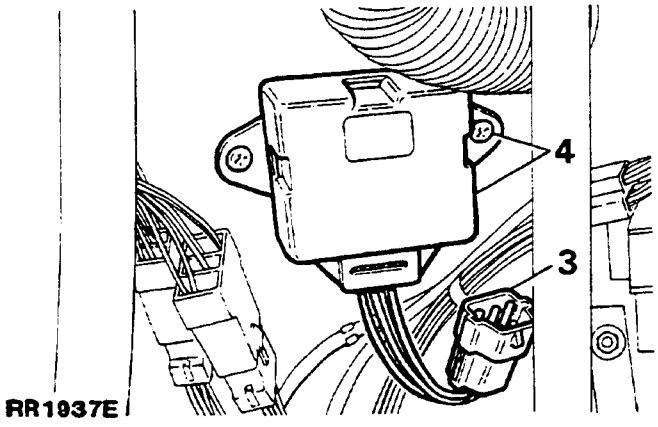
Remove and refit

When ignition is switched **'ON'** warning lamp in binnacle will flash for 10 to 20 seconds if low oil level is detected. Warning will not be repeated until ignition is again switched **'ON'.**

If ignition is switched **'ON'** within 15 to 30 seconds of preceeding sequence, warning lamp will not operate.

Remove

1. Disconnect the battery negative lead.
2. Remove lower dash panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
3. Disconnect wiring at multi-plug.
4. Remove securing screws, remove logic control unit.



Refit

5. Reverse removal procedure.

FRONT SEAT - MOTORS

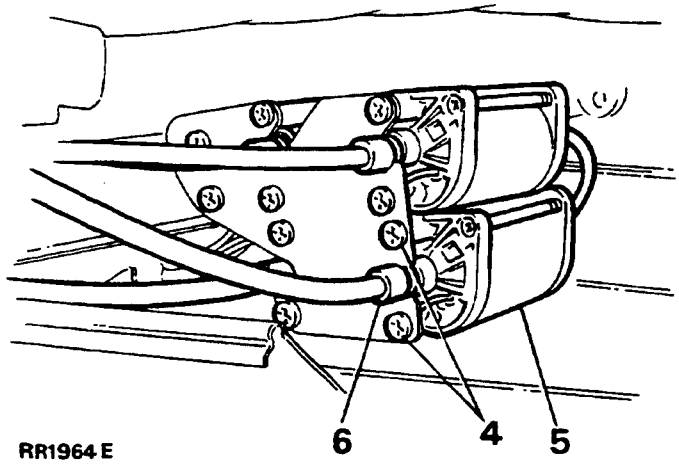
Service repair no - 86.75.06

Remove and refit

Remove

Four electric motors, mounted beneath each front seat, control fore and aft movement, cushion height front and rear, and angle of recline. Adjustment is possible with either front door open, or with ignition switched **ON.**

1. Position seat to give access to motors.
2. Disconnect the battery negative lead.
3. Remove seat base trim.
4. Remove two securing screws from each side of required motor.



5. Remove motor from mounting.
6. Disconnect drive cables by unscrewing ferrule.
7. Disconnect wires from multi-plug, remove motor.

Refit

8. Reverse removal procedure.
9. Check seat adjustment for correct operation.

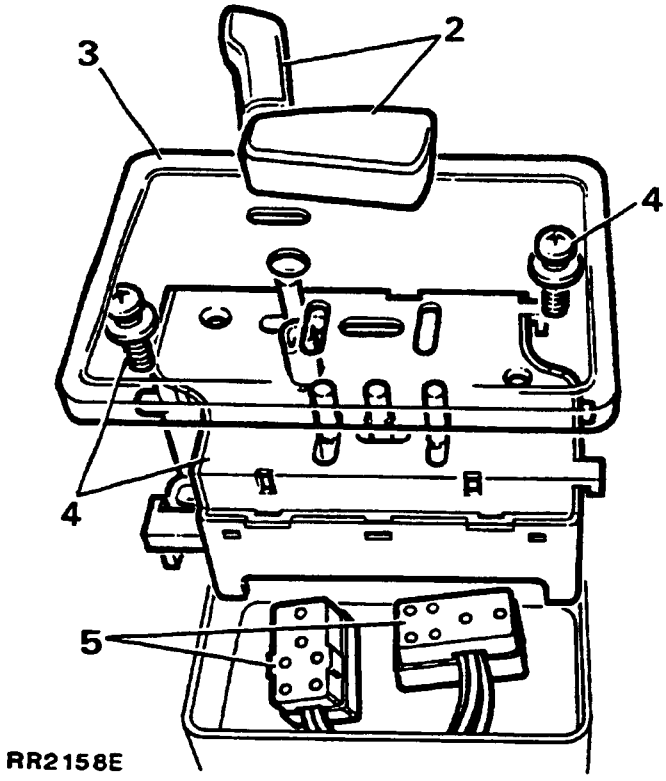
FRONT SEAT - SWITCH

Service repair no - 86.75.03

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Pry two finger tip controls from switch housing.
3. Remove switch housing cover by lightly depressing sides of cover to disengage clips. Remove diaphragm fitted to later models.
4. Remove two crosshead screws and washers. Lift switch assembly to gain access to two multi-plugs.
5. Disconnect multiplugs, remove switch assembly.



RR2158E

Refit

6. Reverse removal procedure. 1 to 5.

△ **NOTE: If switch housing removal is required it is necessary to remove seat to gain access to two securing screws. *See CHASSIS AND BODY, Repair, front seat electrical.***

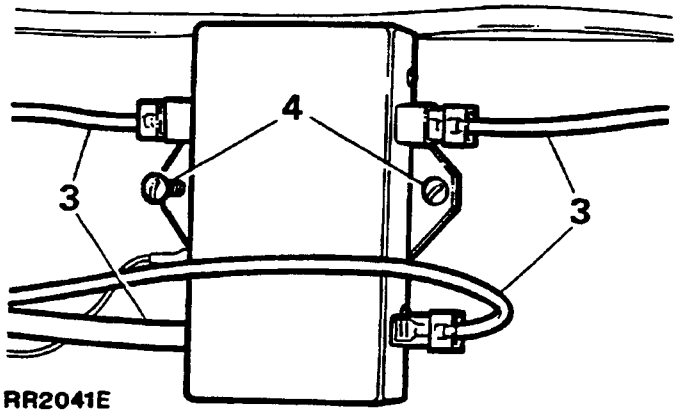
RADIO ANTENNA AMPLIFIER

Service repair no - 86.50.29

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Lower or remove headlining. ***See CHASSIS AND BODY, Repair, Headlining***
3. Remove electrical leads and radio antenna lead.
4. Remove two screws, remove amplifier unit.



RR2041E

Refit

5. Reverse removal procedure.

RELAYS

To identify individual relays. ***See Relays, delay units, timer units, diode pack - 1990 / 91 - identification See Relays, delay units, timer units, diode pack - USA and Canada 1990 / 91 - identification***

For relays 1992 onwards ***See ETM, Z5***

Mounted on engine compartment closure panel.

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove relay protective cover.
3. Pull appropriate relay off its base.

Refit

4. Reverse removal procedure.

Mounted on steering column support bracket

Remove and refit

Remove

1. Remove lower fascia panel. ***See CHASSIS AND BODY, Repair, lower dash panel***
2. Locate appropriate relay on mounting bracket, remove relay from base.

Refit

3. Reverse removal procedure.

Floor mounted beneath front seats

Remove and refit

Remove

1. Position seat to gain access to relay.
2. Disconnect the battery negative lead.
3. Remove relay from base.

Refit

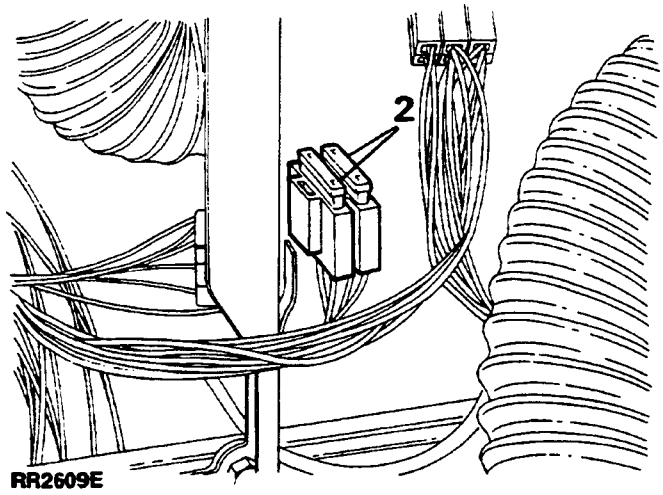
4. Reverse removal procedure.
5. Heated front screen

HEATED FRONT SCREEN

Heated front screen will operate when switch is operated, with engine running. Timer unit will provide a preset time cycle of 7 1/2 minutes ± 20%.

To identify timer unit. ***See Relays, delay units, timer units, diode pack - 1990 / 91 - identification See Relays, delay units, timer units, diode pack - USA and Canada 1990 / 91 - identification.***
Switching OFF ignition, or further operation of heated front screen switch during cycle will switch off screen and cancel, reset and switch off timer unit.

Fuses



RR2609E

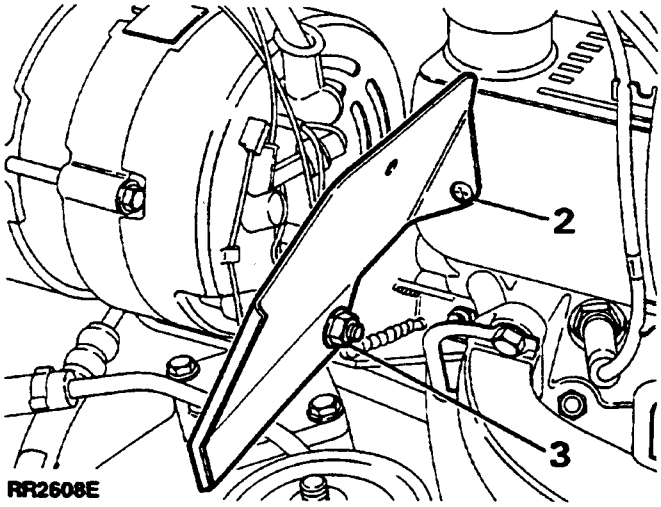
Heated front screen (2) has two 25 amp white, blade type fuses mounted adjacent to the bank of steering column mounted relays.

ALTERNATOR HEAT SHIELD

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove fixing screw to rocker cover.
3. Remove nut from alternator rear mounting bolt. Remove heat shield.



RR2608E

Refit

4. Reverse removal procedure. Check and adjust drive belt tension if required. ***See Alternator drive belts***

HIGH LEVEL STOP LAMP

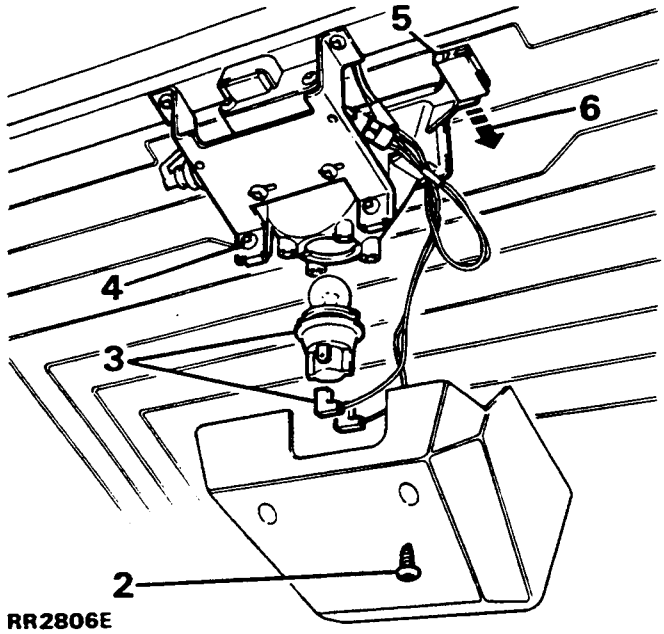
Service repair no - 86.41.35

Includes bulb renewal
Service repair no - 86.41.34

Remove and refit

Remove

1. Disconnect the battery negative lead.



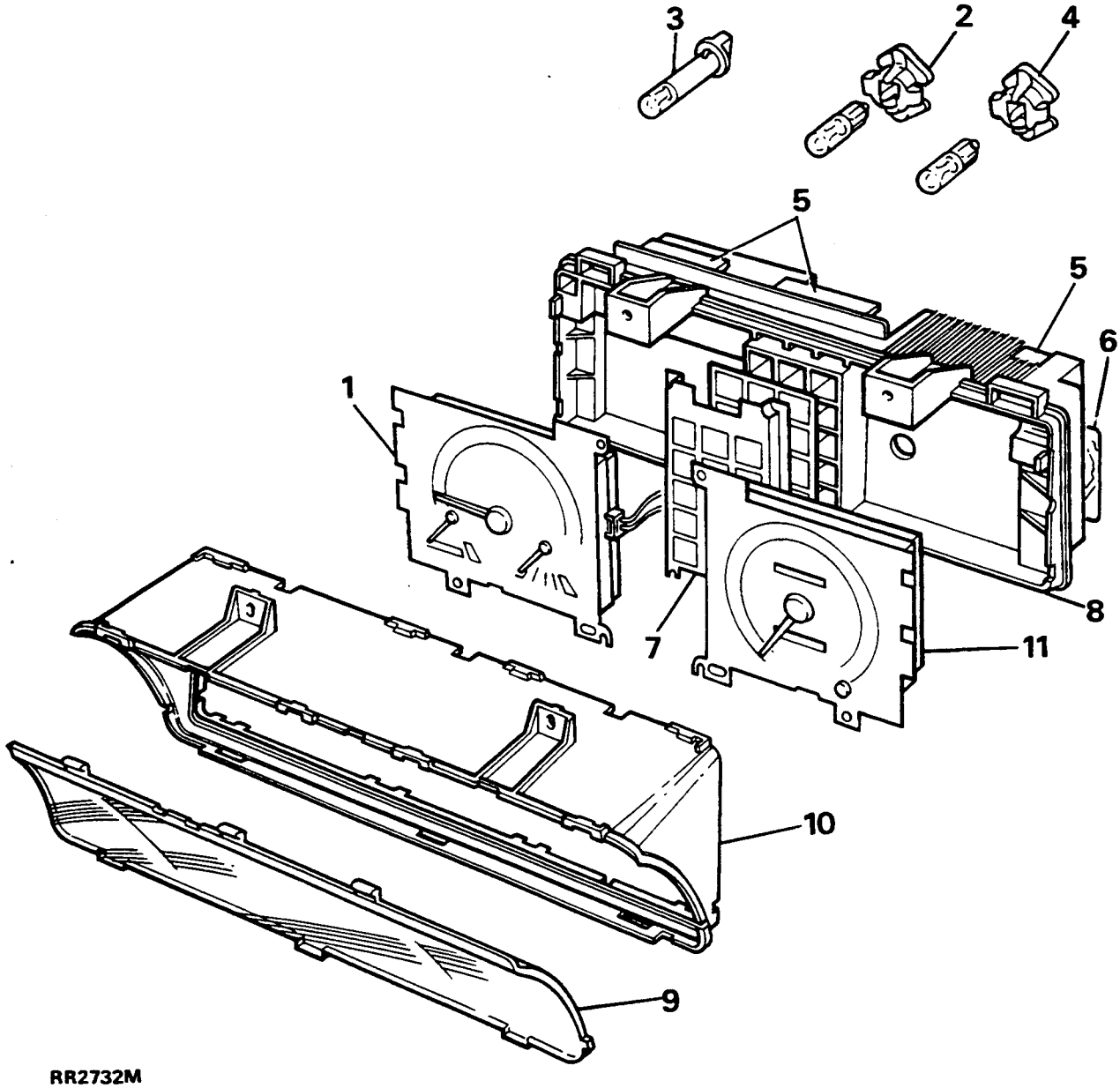
RR2806E

2. Remove two cover retaining screws. Remove cover.
3. Disconnect electrical leads to bulb holder. Remove bulbholder and bulb by twisting anti-clockwise.
4. Remove two screws, mounting plate to stop lamp.
5. Observe position of stop lamp on rear screen. Carefully release tabs on stop lamp from rear screen mountings.
6. Remove stop lamp.

Refit

7. Renew bulb if necessary, correct bulb is a 12V, 21 watt, bayonet type.
8. Reverse removal procedure.

INSTRUMENT BINNACLE

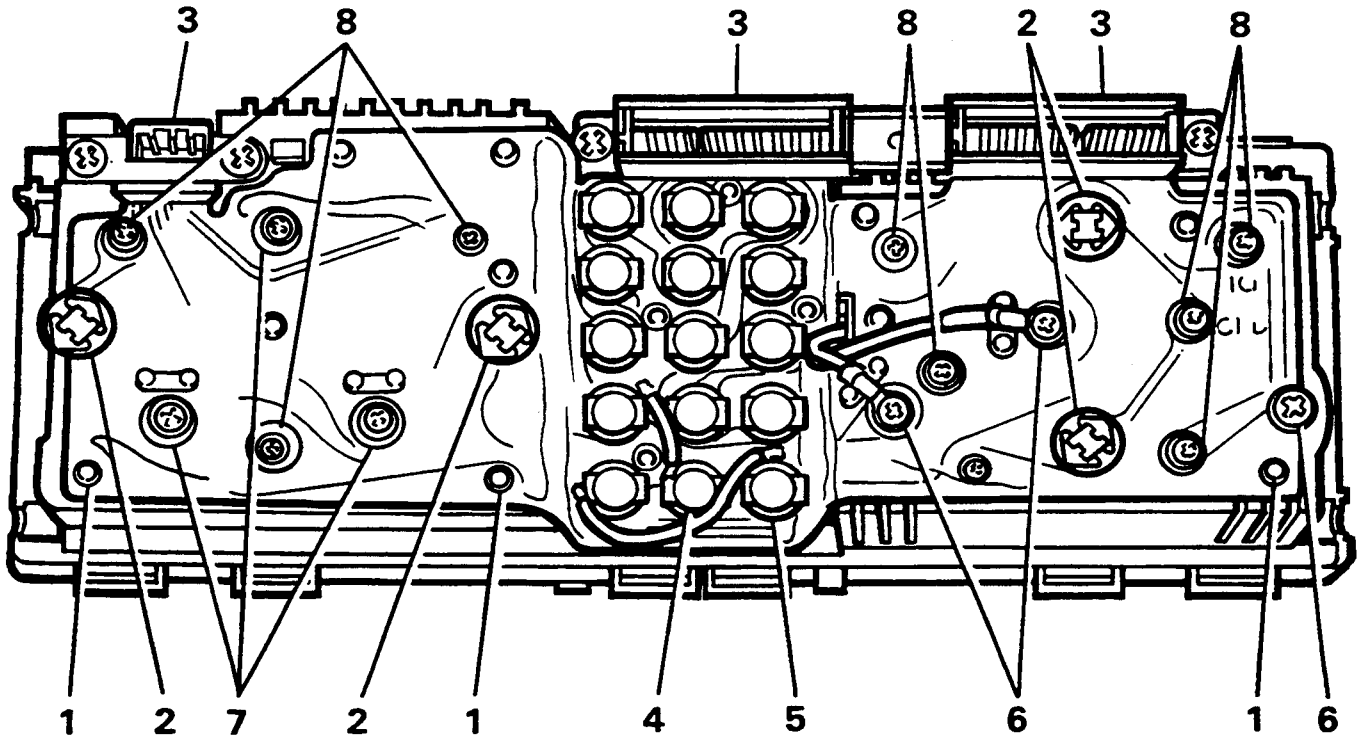


RR2732M

A revised instrument pack was fitted to 1990 model year vehicles. An electronic speedometer is fitted, deleting the requirement for a speedometer cable between speed transducer and speedometer. The instruments are restyled to improve the clarity of graphics.

Instrument pack - RR2732M

1. Tachometer, fuel and temperature gauge.
2. Ignition warning bulb (with separate blue holder unit)
3. Panel illumination bulb and holder.
4. Warning lights bulb and holder.
5. Printed circuit input tags (for harness connection).
6. Printed circuit.
7. Warning light panel.
8. Instrument case (front).
9. Curved lens.
10. Binnacle housing.
11. Speedometer.

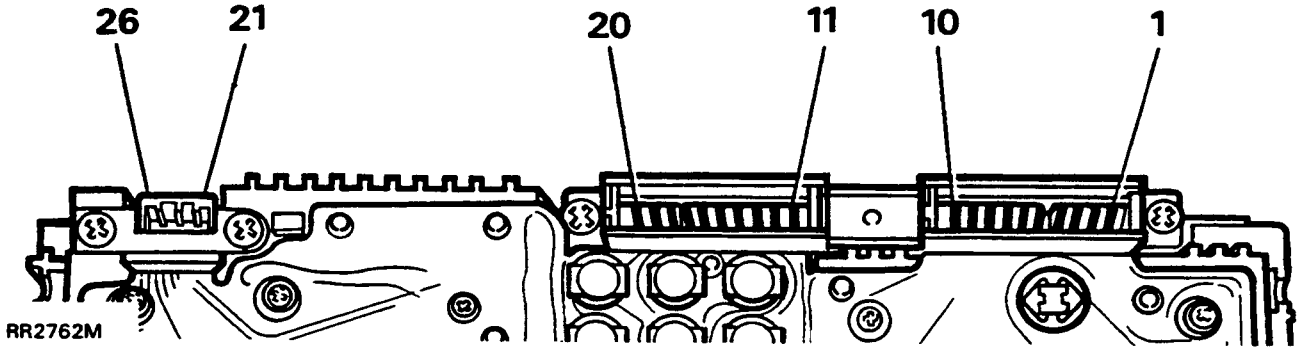


RR2733M

Instrument case back - RR2733M

1. Printed circuit locating pegs.
2. Panel illumination bulbs - 4.
3. Harness connectors.
4. Warning light bulbs.
5. No charge warning light bulb (blue holder).
6. Tachometer/fuel/temperature gauge securing screws - 3.
7. Speedometer securing screws - 3.
8. Printed circuit securing screws 8.

Printed circuit harness connections - RR2762



RR2762M

Connection sequence looking towards BACK of instrument case.

CIRCUIT SERVED

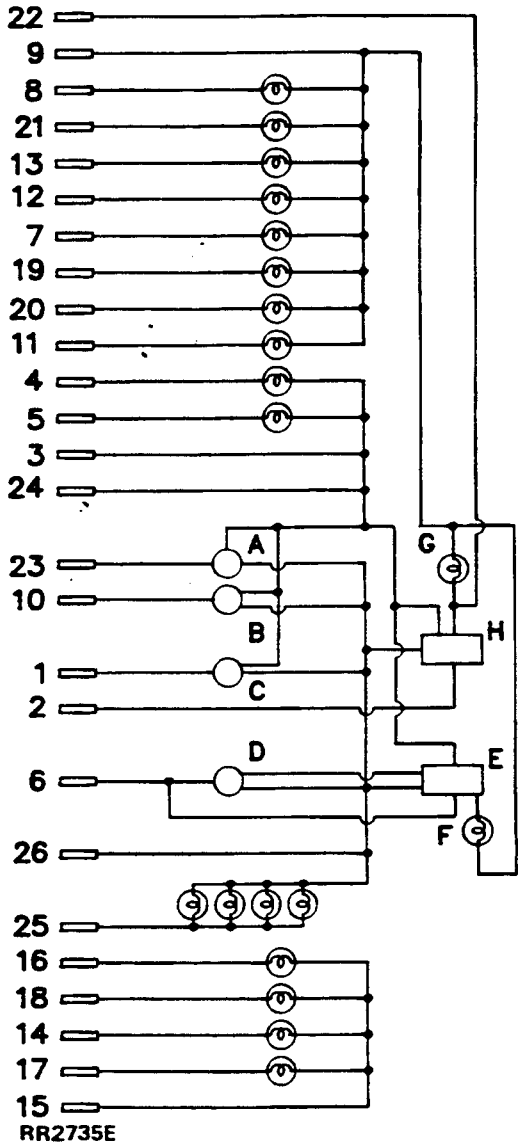
Numbers refer to pin number on instrument pack circuit diagram RR2735M and illustration RR2762M

Coolant temperature 1
Low coolant input 2
Ignition switch 12V+ 3
Ignition warning light 4
Oil pressure warning light 5
Fuel tank unit 6
Transmission oil temperature 7
Cold start warning (diesel) 8
12V+ ignition 9
Tachometer signal 10
Brake fail/handbrake warning light 11
Brake pad wear warning light 12
Low wash fluid 13
Direction indicator - left 14
Zero volts from dimmer 15
Main beam warning light 16
Trailer warning light 17
Direction indicator - right 18
EFI warning light 19
ABS warning light 20
Seat belt warning light 21
Low coolant check 22
Speed signal 23
Photo transistor 24
Panel illumination bulbs (4) 25
Earth -ve 26

Instrument pack

Key

A. Speedometer
B. Tachometer
C. Temperature gauge
D. Fuel gauge
E. Low fuel warning unit
F. Low fuel warning light
G. Low coolant warning light
H. Low coolant warning unit



RR2735E

PANEL AND WARNING LIGHT BULBS

Service repair no - 86.45.31 panel
Service repair no - 86.45.61 warning light

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Unclip cowl from back of instrument binnacle.
3. Rotate appropriate bulb holder anti-clockwise to remove.

△ **NOTE: 'No Charge/Ignition On' warning light, identified by BLUE bulb holder, is a 2 watt capless type.**

4. Fit new bulb. Rotate bulb holder clockwise to lock in position. Correct bulb type is: warning lights, 1.4 watt capless type, panel illumination, 3 watt capless type.
5. Refit cowl.
6. Refit battery negative lead.

△ **NOTE: Difficulty may be experienced in changing bulbs due to limited space. Instrument binnacle fixings may be removed to enable binnacle to be raised as far as connections permit. See 'Instrument Binnacle - remove and refit' below for details of binnacle mounting bracket fixing.**

INSTRUMENT BINNACLE

Service repair no - 88.20.13

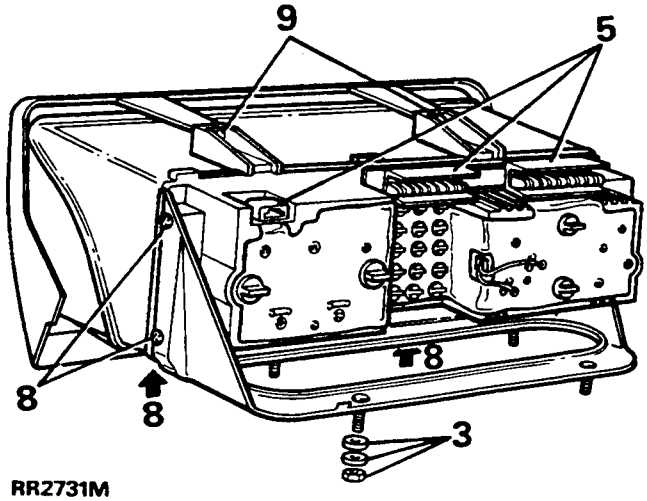
Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove lower fascia by releasing six retaining screws.
3. Remove four nuts, spring and plain washers securiong instrument.
4. Remove binnacle cowl.
5. Disconnect two multi-plugs and single plug.
6. Remove instrument binnacle.

Refit

7. Reverse removal procedure. 1 to 6.



RR2731M

Removing instrument pack

8. Remove binnacle mounting bracket.
9. Remove two screws, remove bezel.
10. Detach curved lens from binnacle housing by depressing four tabs and easing top of lens out, then depressing three tabs and easing lower edge of lens out.
11. Remove instrument case from binnacle housing by releasing upper and lower locating tabs.

Refitting Instrument Pack to Binnacle

12. Reverse removal procedure. 9 to 11.

TACHOMETER, FUEL AND TEMPERATURE GAUGE UNIT
Service repair no - 88.25.17

NOTE: Tachometer, fuel and temperature gauges are replaced as a unit.

13. Remove two panel illumination bulb holders.
14. Remove three larger screws retaining tachometer, fuel and temperature gauges. Note position of black and white leads secured by two screws.
15. Remove unit from instrument case.

Refit

16. Reverse removal procedure. Items 13 to 15.

SPEEDOMETER
Service repair no - 88.30.01

17. Remove two panel illumination bulb holders.
18. Remove three screws securing speedometer.
19. Remove speedometer from instrument case.

Refit

20. Reverse removal procedure. Items 16 to 18.

PRINTED CIRCUIT
Service repair no - 88.20.19

21. Remove Speedometer and Tachometer units as described above. Remove all warning light bulbs. Note position of no charge warning light, blue bulb holder.
22. Remove two harness connectors, retained by four screws release printed circuit tags and input plug.
23. Remove eight screws and plain washers, securing printed circuit.
24. Carefully remove printed circuit from locating pegs.

Refit

25. Reverse removal procedure. Items 21 to 24.

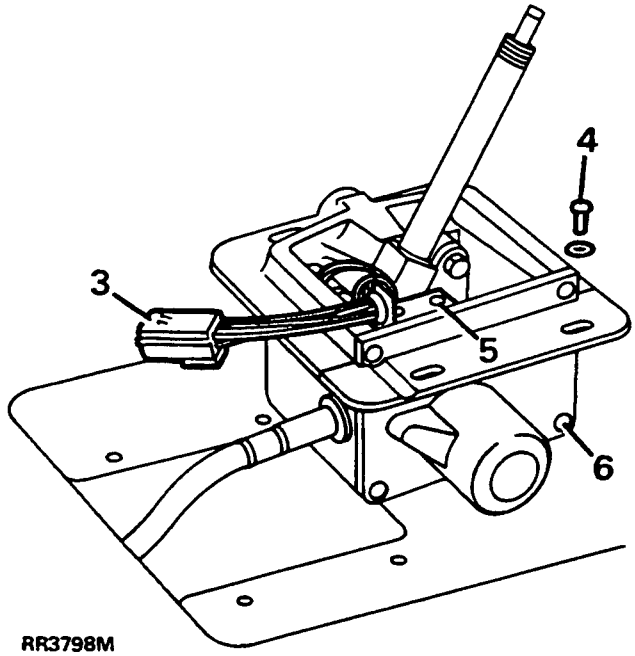
GEAR SELECTOR-INTERLOCK

Interlock solenoid

Remove and refit

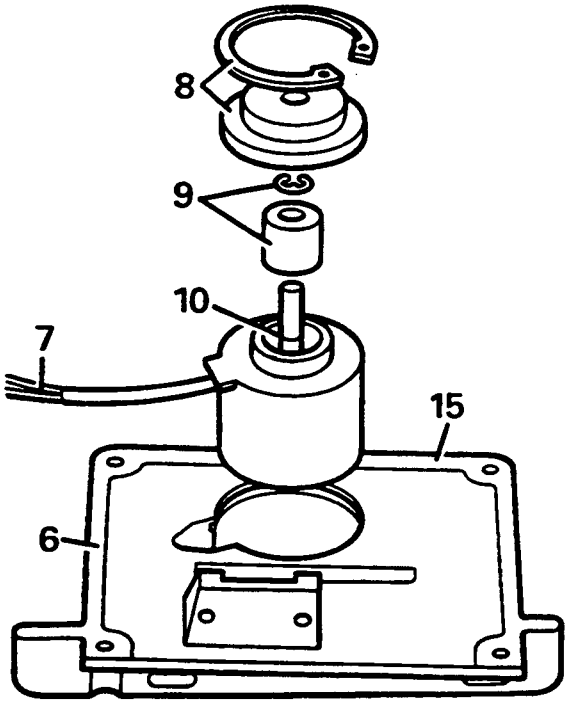
Remove

1. Disconnect the battery negative lead.
2. Remove gear selector head and illumination panel. ***See Automatic gear selector-panel illumination***
3. Disconnect electrical multiplug.



RR3798M

4. Remove screws and lift gear selector mechanism above housing.
5. Remove screws from microswitch support bracket.
6. Remove screws and separate side cover from housing.
7. Disconnect wiring solenoid to multiplug.
8. Remove circlip and retainer plate.
9. Remove clip and centre sleeve.
10. Refit clip into groove on spindle and lever against it to remove solenoid from housing.



RR3800M

Refit

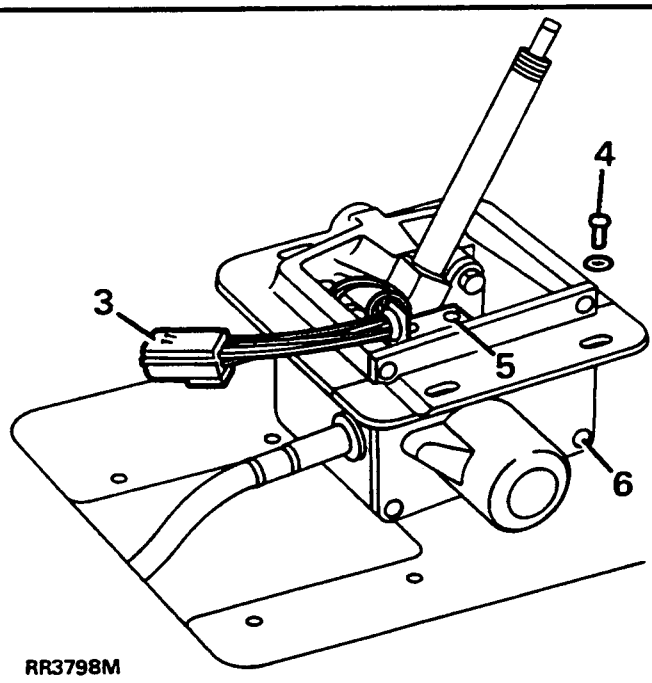
11. Fit solenoid with wiring positioned into side cover recess.
12. Fit sleeve and new clip.
13. Fit retaining plate and circlip.
14. Connect wiring to multiplug.
15. Apply sealant and fit side cover to housing. Use Silcoset 152 sealant or equivalent.
16. Grease all moving parts of gear selector mechanism. Use Rocol E1A or equivalent grease.
17. Reverse instructions 1 to 5.

Interlock microswitch onto castellated plate.

Remove and refit

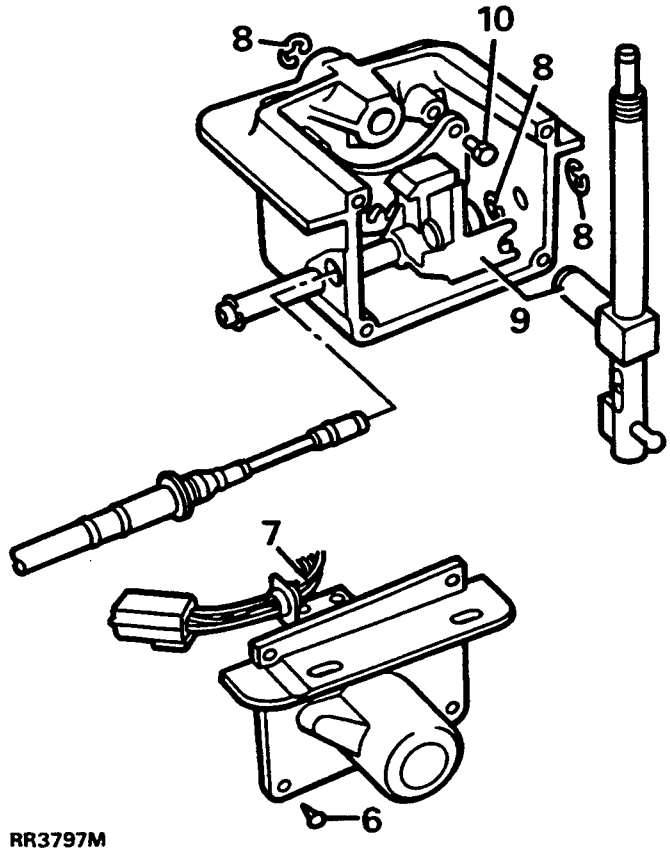
Remove

1. Disconnect the battery negative lead.
2. Remove gear selector head and illumination panel. ***See Automatic gear selector-panel illumination***
3. Disconnect electrical multiplug.



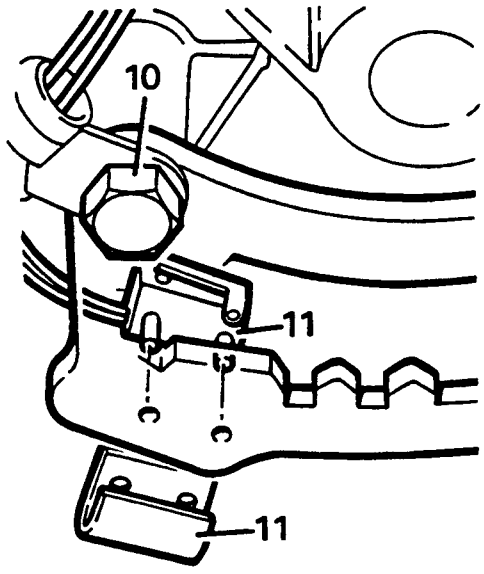
RR3798M

4. Remove screws and lift gear selector mechanism above housing.
5. Remove screws from microswitch support bracket.
6. Remove screws and separate side cover from housing.
7. Disconnect wiring microswitch to multiplug.



RR3797M

8. Remove 3 clips as shown.
9. Slide trunnion forward and remove gear selector arm.



RR3799M

10. Remove bolts securing coxcomb.
11. Remove microswitch retaining clip and microswitch.

Refit

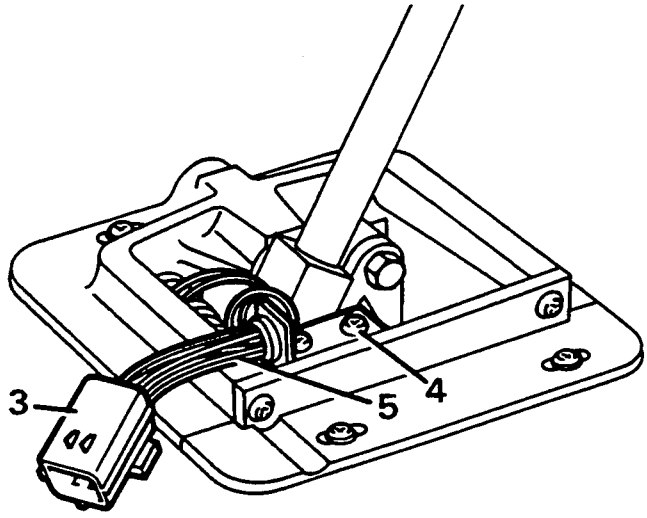
12. Reverse removal procedure. correctly positioning microswitch.
13. Apply Loctite 242E to castellated plate bolts and Tighten to ***9 Nm.***
14. Grease all moving parts of gear selector mechanism. Use Rocol E1A or equivalent grease.
15. Apply Silcoset 152 sealant or equivalent and fit side cover to housing.

Interlock microswitch onto side cover

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove gear selector head and illumination panel. ***See Automatic gear selector-panel illumination***



RR3801M

3. Disconnect electrical multiplug.
4. Remove screws from microswitch support bracket.
5. Disconnect wiring microswitch to multiplug.

Refit

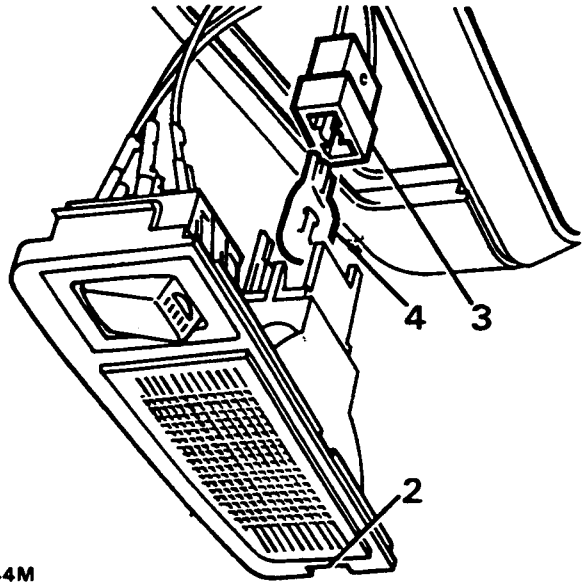
6. Reverse removal procedure. correctly positioning microswitch.
7. Grease all moving parts of gear selector mechanism. Use Rocol E1A or equivalent grease.

MAP LIGHT BULB RENEWAL

Remove and refit

Remove

1. Disconnect the battery negative lead.



RR3644M

2. Pry slot to open cover.
3. Remove bulbholder.
4. Remove bulb from holder.
5. Replace bulb with 12v 5w capless.

Refit

6. Reverse removal procedure.

ELECTRICAL SEAT FAILURE

△ **NOTE: Carry out following procedure if seat failure occurs with seat obscuring fixing bolts.**

1. Check 30A fuses and courtesy lamp fuse B2.
2. Disconnect 9 way connector between seat ECU and motors (memory seat). Power motor from a seperate battery source.
3. If partial failure occurs in forward and reverse travel only, change drive cable as required to move seat to desired position.
4. If 2. and 3 is not possible, move seat by driving cables manually.

DRIVE CABLE - ELECTRIC SEAT

Remove and refit

Remove

1. Remove seat. ***See CHASSIS AND BODY, Repair, Front Seat Electrical***
2. Cut cable tie, remove drive cable securing clips.
3. Remove drive cable from gearbox.
4. Remove drive cable from motor by unscrewing ferrule.
5. Cut cable ties from drive cable. Note position for reassembly.
6. Remove drive cable. If cable has failed, 'twist' may have occurred in seat. To rectify this, use a small screwdriver to turn gearbox of failed cable until twist is removed.

Refit

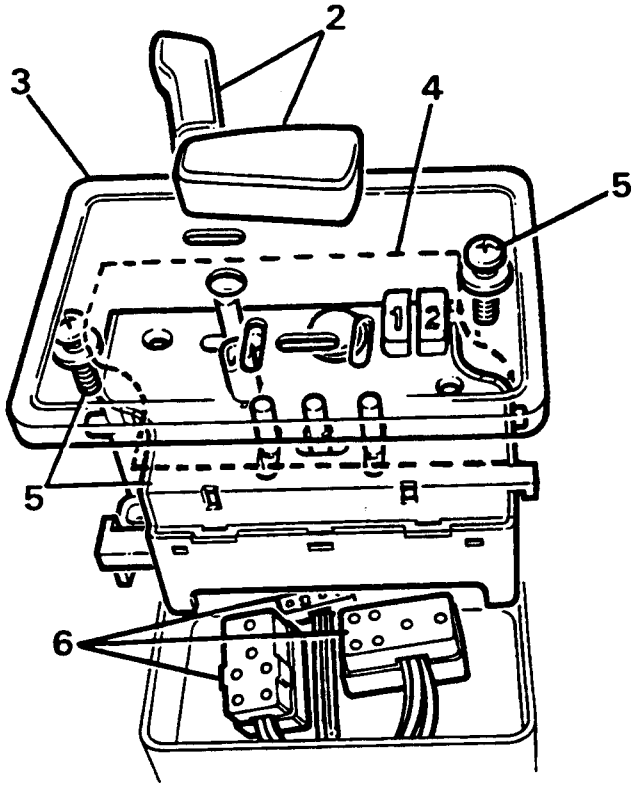
7. Reverse removal procedure. Ensuring new cable ties are fitted in original positions.
8. Operate seats to full extent of travel. To ensure that 'twist' has been removed, check that both gearboxes stop simultaneously.

MEMORY SEAT - SWITCH

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Pry finger tip controls from top of switch housing.



RR3762M

3. Remove switch housing cover by lightly depressing sides of switch housing to disengage clips.
4. Remove sealing diaphragm.
5. Remove switch securing screws, lift switch to gain access to multiplugs.
6. Disconnect multiplugs and remove switch.

Refit

7. Reverse removal procedure. Fitting a new sealing diaphragm.

MEMORY SEAT SWITCH - CLEAN

NOTE: If a seat switch problem is diagnosed, the cause may be liquid spillage or ingress of foreign matter. The switch may be cleaned using the following procedure.

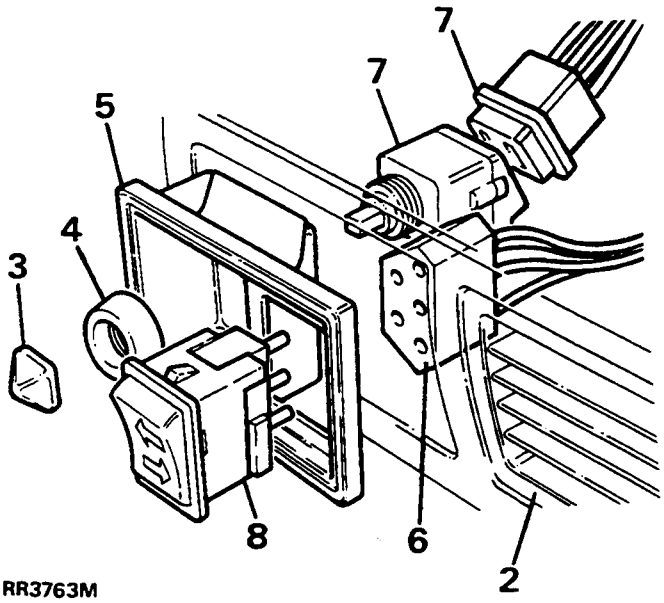
1. Remove seat switch. ***See Memory Seat - Switch***
2. Discard sealing membrane.
3. Clean affected area of switch using a slightly damp clean cloth.
4. If contamination still exists, clean switch using a clean cloth slightly dampened with methylated spirits.
5. Allow switch to dry completely.
6. Refit switch using a new membrane.
7. Check seat switch for satisfactory operation.

EXTERIOR MIRROR SWITCHES - MEMORY TYPE

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove air vent adjacent to switches.
3. Carefully pry button from mirror adjustment switch.



RR3763M

4. Unscrew locking ring from switch.
5. Withdraw switch retaining panel, noting position of adjustment switch in panel retaining clip.
6. Disconnect multiplug at rear of changeover switch, remove panel.
7. Disconnect multiplug to remove mirror adjustment switch.
8. Depress two spring clips and remove change over switch.

Refit

9. Reverse removal procedure. 1 to 8.

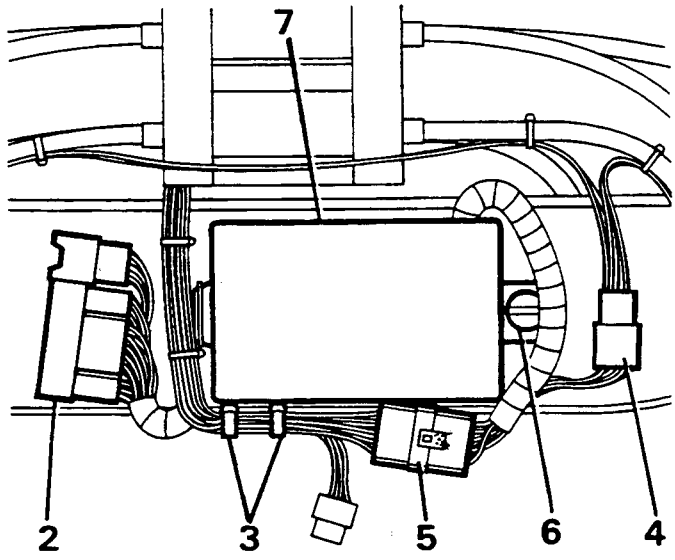
NOTE: The mirror adjustment switch is located on the multiplug connector in the 12 o'clock position. (On non memory mirrors this connector is in the 9 o'clock position).

ECU - MEMORY SEAT

Remove and refit

Remove

1. Remove driver's seat. ***See CHASSIS AND BODY, Repair, Front seat Electrical***
2. Disconnect connector from seat.



RR3761M

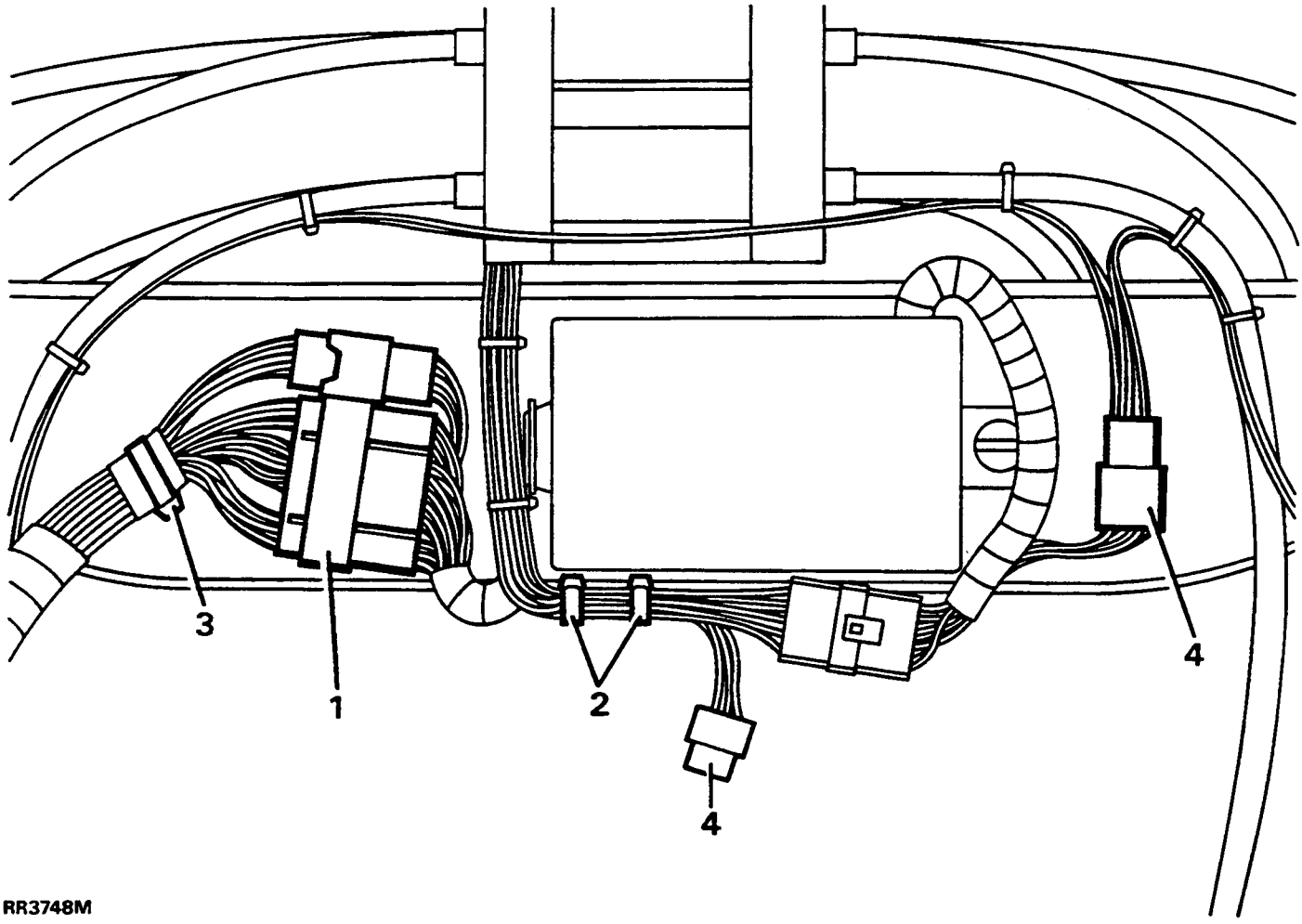
3. Remove cable ties.
4. Disconnect sensor and seat switch multiplug, remove from seat.
5. Disconnect seat motor multiplug.
6. Turn ECU retaining turnbuckle half a turn.
7. Remove ECU.

Refit

8. Reverse removal procedure. Ensuring cable retaining clips are correctly located. ***See Memory Seat - harness layout***
9. Initialise system. ***See Fault diagnosis, Memory Seat / Mirror System Service Check***

MEMORY SEAT - HARNESS LAYOUT

WARNING: To prevent damage to wiring under driver's seat and subsequent failure, the wiring must be installed as shown in RR3748M



RR3748M

1. ECU link harness connector has retaining clip to seat base.
2. Link harness has two cable ties to seat motor harness, one if which is secured to seat base.
3. Main harness has P-clip securing it to seat base.
4. Sensor connector to link harness has retaining clip to seat base.

HANDSET INITIALISATION

NOTE: New handsets are supplied in pairs. If a new handset is required, it will require initialisation to the ECU using the following procuedure:

1. Starting conditions: ignition off, doors unlocked, bonnet switch depressed.
2. Carry out instructions 3. to 9. within 8 seconds.
3. Switch ignition ON.
4. Switch ignition OFF.
5. Lock doors.
6. Unlock doors.
7. Release bonnet switch.
8. Switch ignition ON.
9. Switch ignition OFF.

If alarm is correctly accessed, horn will sound and LED will light. It is now possible to programme two handsets of correct frequency to vehicle alarm ECU. This must be carried out within two minutes.

10. Press and hold down button on first handset until dash LED flashes.
11. Repeat instruction 10. for second handset.
12. The LED will extinguish if both handsets have been initialised correctly.

HANDSET BATTERIES

Replace

1. Gently prise handset apart using a coin or small flat bladed screwdriver.
2. Hold the board in one hand, cup other hand, clap hands together to jar batteries from clip.
3. Leave batteries out, operate handset by pressing button for 10 seconds to allow integrated circuit to reset itself.

CAUTION: Handle new batteries as little as possible. Hands should be clean, dry and free from grease.

4. Fit new batteries in clip, positive side uppermost.
5. Clip handset case together.

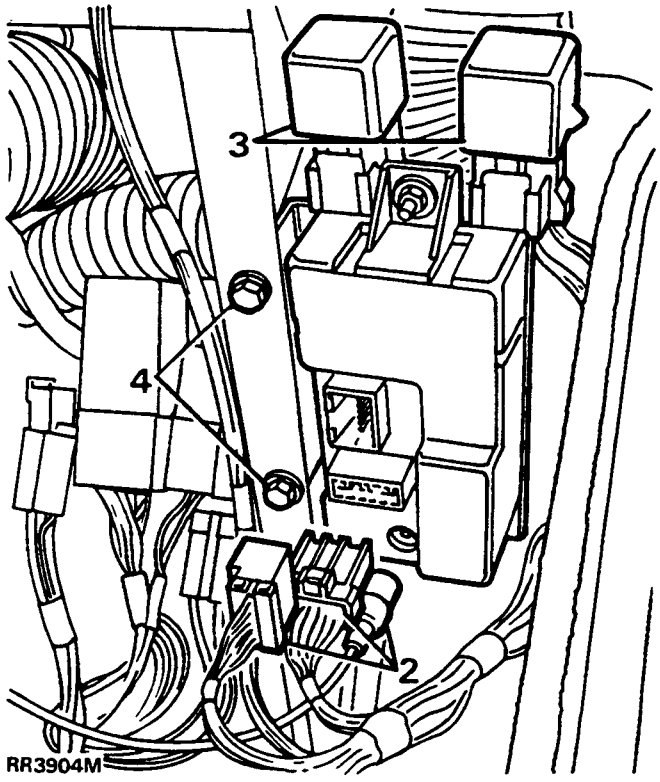
ALARM ECU

Service repair no - 86.77.01

Remove and refit

Remove

1. Remove lower dash panel, ***See CHASSIS AND BODY, Repair, lower dash panel***
2. Remove multiplugs and aerial lead from ECU.



3. Remove relays and bases from bracket.
4. Remove ECU bracket fixings.
5. Remove ECU with bracket.

Refit

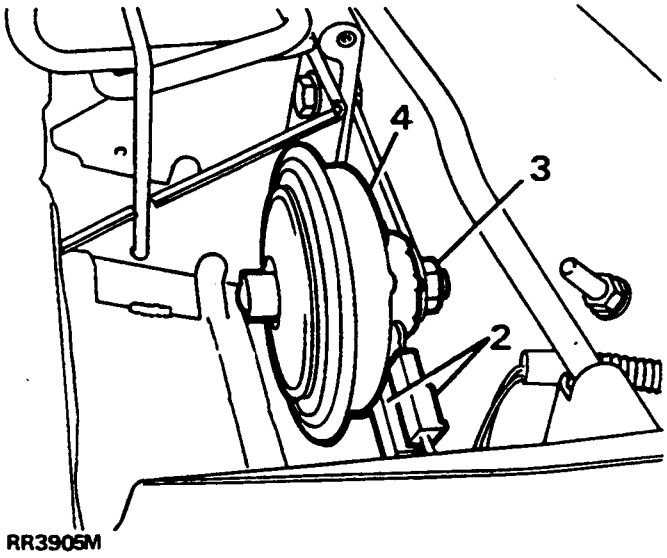
6. Reverse removal procedure. Ensure aerial and multiplugs are fitted securely to ensure alarm functions correctly.

ALARM HORN

Remove and refit

Remove

1. Remove decker panel, ***See CHASSIS AND BODY, Repair, decker panel***



2. Disconnect two Lucar connectors.
3. Remove single nut securing horn.
4. Remove horn.

Refit

5. Reverse removal procedure.

SUBWOOFER BOX

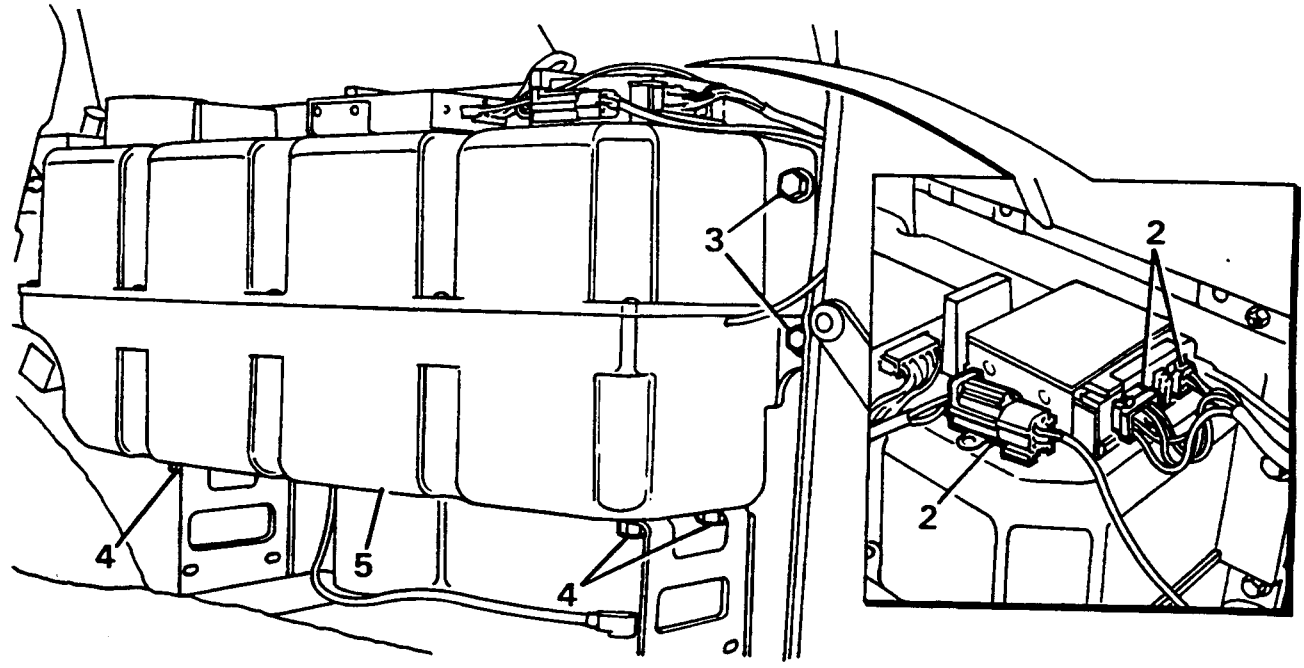
Remove and refit

Remove

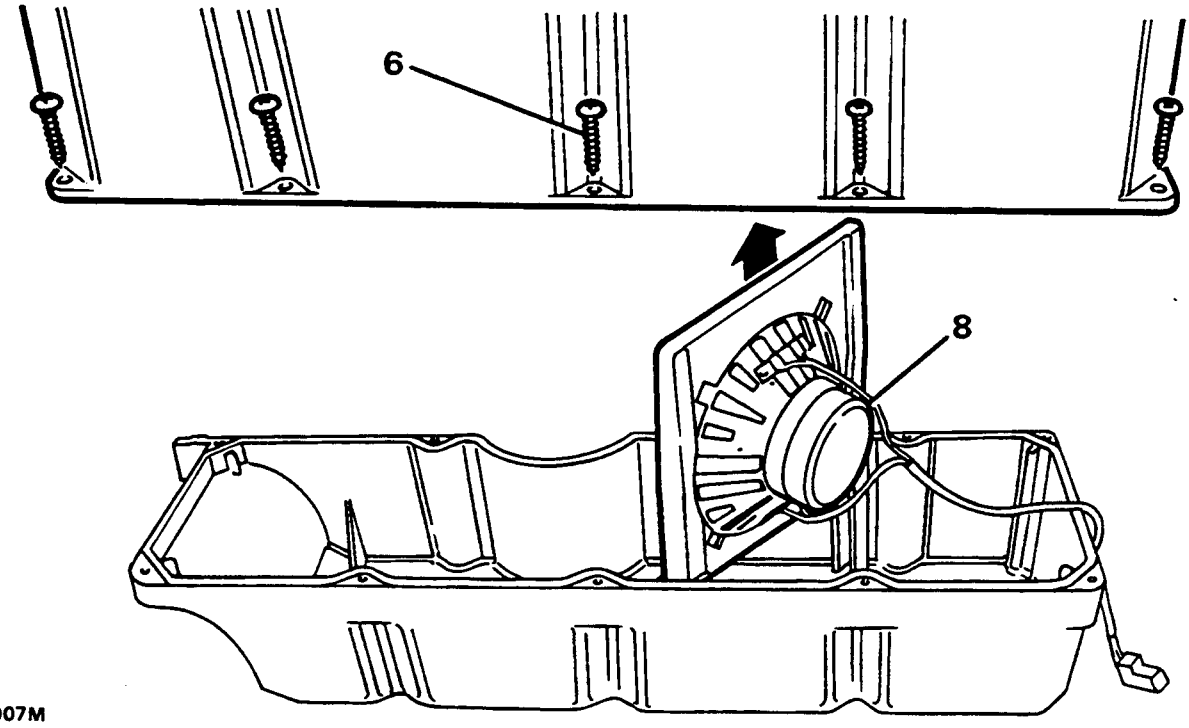
1. Disconnect the battery negative lead.
2. Disconnect electrical leads.
3. Remove four bolts from upper fixing.
4. Remove four bolts from lower fixing.
5. Remove subwoofer box from vehicle.
6. Remove ten screws securing two halves of subwoofer.
7. Remove top half of unit.
8. Remove subwoofer speaker.

Refit

9. Reverse removal procedure.



RR3906M



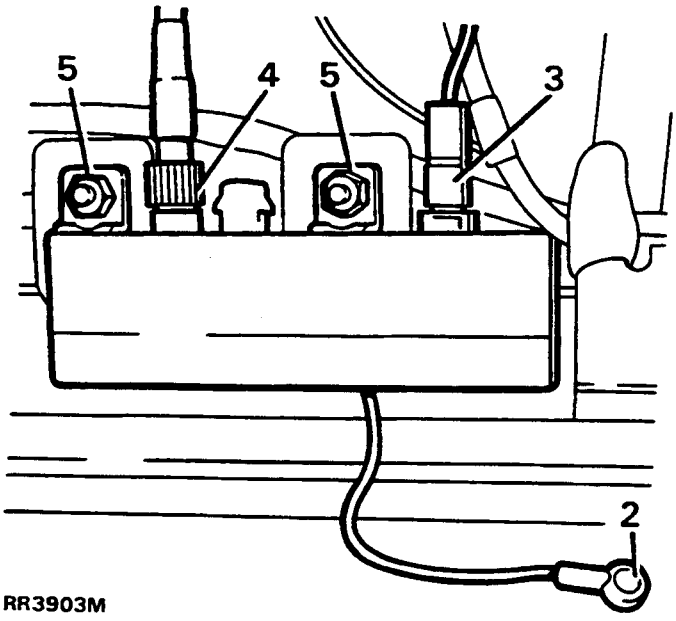
RR3907M

ANTENNA AMPLIFIER

Remove and refit

Remove

1. Remove headlining sufficiently to gain access to signal amplifier. ***See CHASSIS AND BODY, Repair, headlining***
2. Remove 'RF in' lead from antenna.



RR3903M

3. Remove '+ VE' lead from amplifier.
4. Unscrew 'RF out' lead, disconnect.
5. Remove two securing nuts.
6. Remove amplifier.

Refit

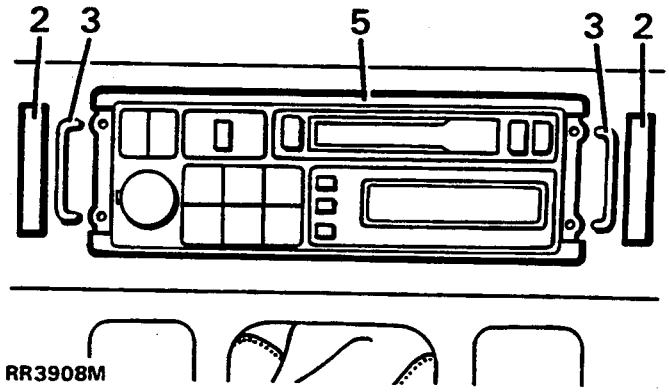
7. Reverse removal procedure. To ensure 'RF out' lead is correctly located, hold centre lead down in position while tightening knurled nut.

RADIO

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove access covers from radio.



RR3908M

3. Insert suitable radio removal tools e.g. SMD 4091 into access holes.
4. Press removal tools to release radio.
5. Remove radio, disconnect aerial and multiplugs from rear of radio.

Refit

6. Reverse radio code.
7. Reactivate radio code.

ALTERNATOR - MAGNETTI MARELLI - TYPE A133/80

Service repair no - 86.10.08

Overhaul

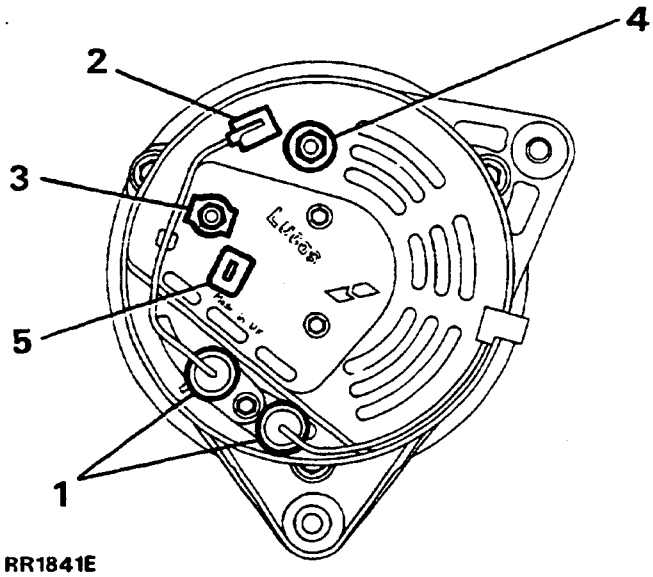
Including Test (Bench)

△ **NOTE: Alternator charging circuit ignition warning light is connected in series with alternator field circuit. Bulb failure would prevent alternator charging, except at very high engine speeds. Therefore, bulb MUST be checked before suspecting alternator failure.**

Precautions

Battery polarity is **NEGATIVE GROUND,** which must be maintained at all times.
No separate control unit is fitted; instead a voltage regulator of micro-circuit construction is incorporated on slip ring end bracket, inside alternator cover.
Battery voltage is applied to alternator output cable even when ignition is switched off, battery must be disconnected before commencing any work on alternator. Disconnect battery when repairing body structure using electric welding equipment.

Sequence of connections



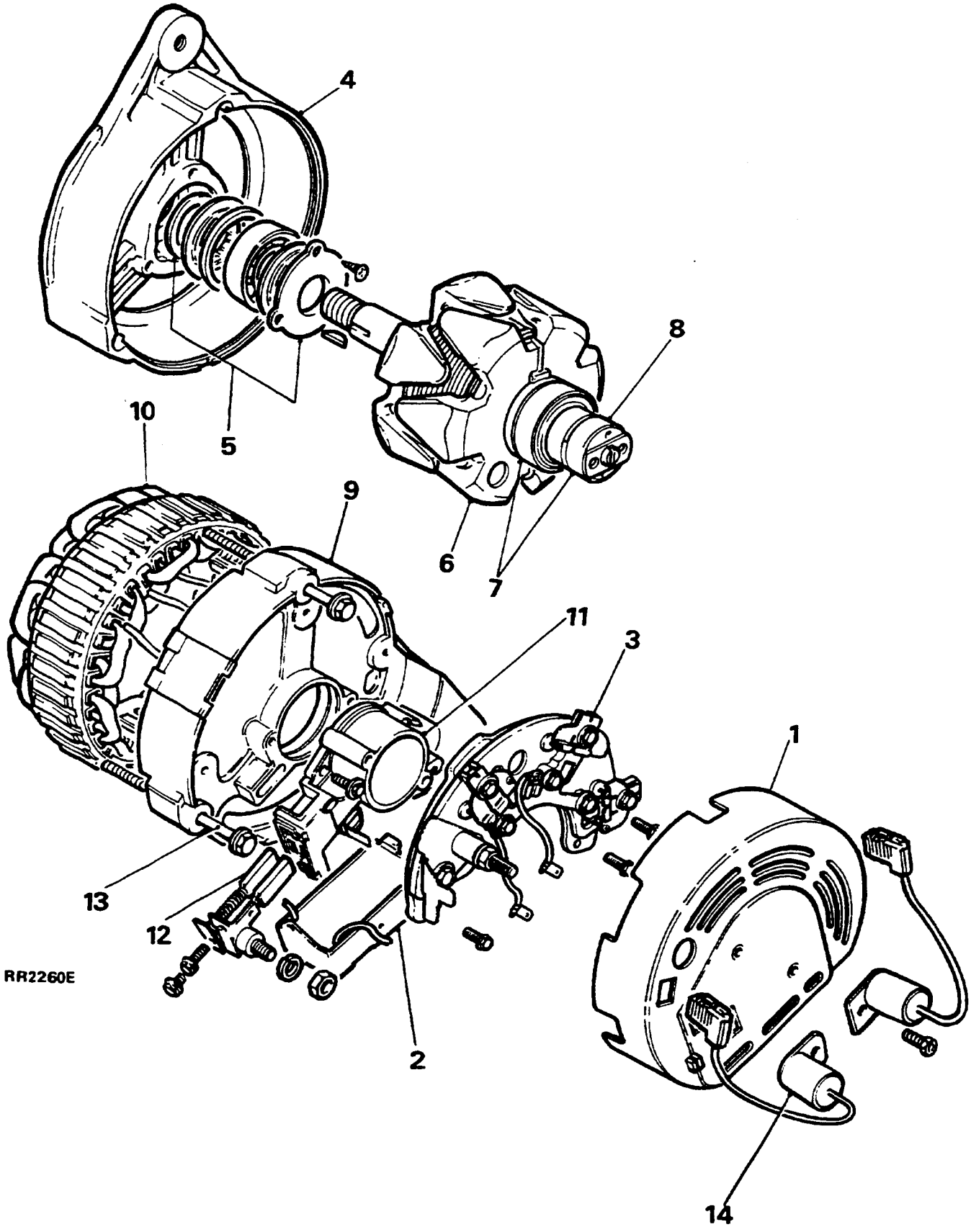
RR1841E

1. Suppression capacitors (two)
2. Positive suppression terminal
3. IND terminal
4. + output terminal
5. Sensing terminal

ALTERNATOR - MAGNETTI MARELLI - TYPE A133/80 - RR2260E

1. Cover
2. Regulator
3. Rectifier
4. Drive end bracket
5. Bearing assembly
6. Rotor
7. Slip ring end bearing
8. Slip rings
9. Slip ring end bracket
10. Stator
11. Brush box
12. Brushes
13. Through bolts (three)
14. Suppressors

ALTERNATOR - A133/80



ALTERNATOR TESTING

Service repair no - 86.10.01

Charging system check

1. Check battery is in good condition, with an open circuit voltage of at least 12.6 V. Recharge or substitute battery to carry out test.
2. Check drive belt adjustment and condition, ***See SECTION 10, Maintenance, Under Bonnet Maintenance***
3. Check battery connections are clean and tight.
4. Check alternator connections are clean and tight.
5. Ensure there is no drain on battery from, for example, interior, under bonnet or door edge lamps.

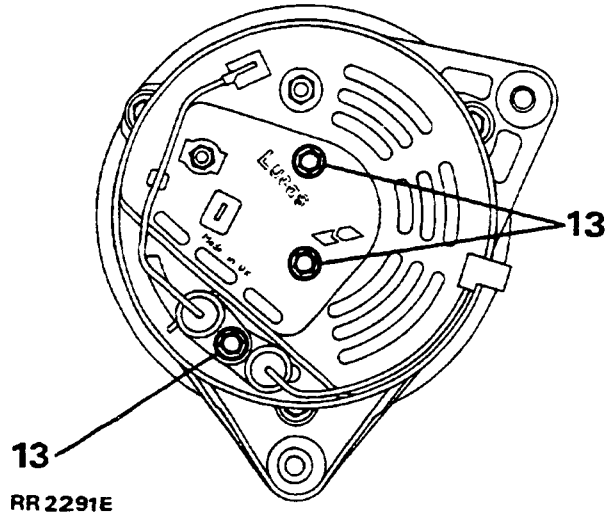
Alternator test

Following instructions refer to use of suitable test equipment using a carbon pile rheostat.

6. Connect test equipment referring to manufacturer's instructions.
7. Start engine and run at 3000 rev/min without accessory load.
8. Rotate carbon pile load control to achieve greatest output (amps) without allowing voltage to fall below 12.0 V. A reading in amps, of alternator output, minus 10% to allow for EFI and Ignition loss, should be obtained.
9. Run engine at 3000 rev/min, switch selector to regulator test, read voltmeter. A reading of 13.6 to 14.4 V should be obtained.
10. Switch selector to diode/stator test, switch on headlamps to load alternator. Raise engine speed to 3000 rev/min, read voltmeter, needle must be within 'OK' range.

TESTING-ALTERNATOR REMOVED

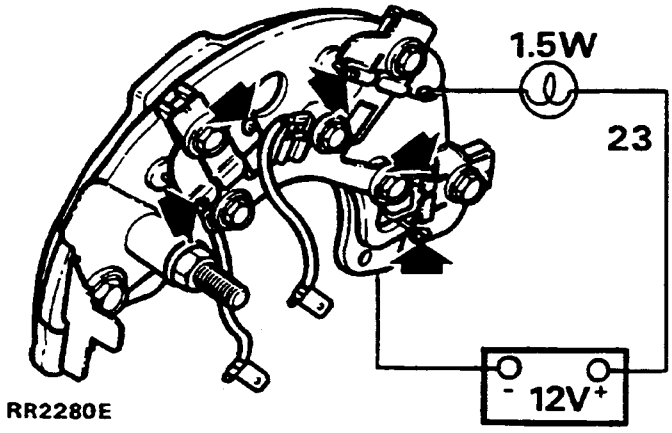
11. Withdraw connectors from alternator.
12. Remove alternator. ***See Repair, alternator***
13. Disconnect suppressor and remove alternator cover.



RR2291E

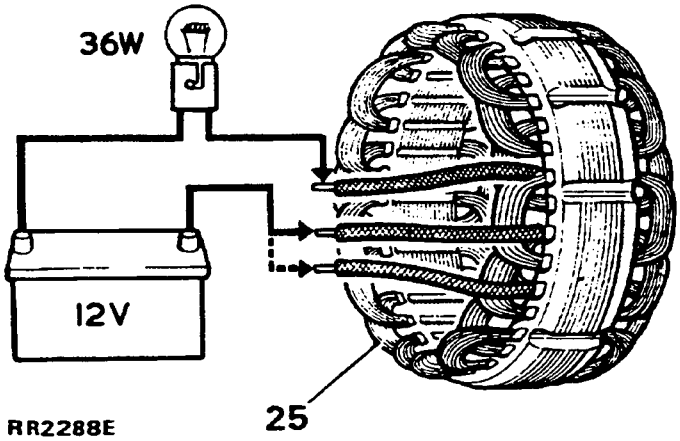
14. Disconnect lead and remove rectifier assembly.
15. Note arrangement of brush box connections. Remove screws securing regulator to brush box and withdraw.
16. Remove screw retaining outer brush box in position and withdraw both brushes.
17. Check brushes for wear by measuring length of brush protruding beyond brush box moulding. Fit new brushes if length is 10mm or less.
18. Check brushes move freely in holders. If sticking, clean with a mineral spirit moistened cloth or polish sides of brush with fine file.
19. Check brush spring pressure using push-type spring gauge. Gauge should register 136 to 279g when brush is pulled back until face is flush with housing. Fit new brush assembly if reading is outside these limits, .
20. Remove two screws securing brush box to slip ring end bracket and lift off brush box assembly.
21. Securely clamp alternator in a vice. Release stator win ding cable ends from rectifier by applying a hot soldering iron to terminal tags of the rectifier. Pry out cable ends when solder melts.

22. Remove two remaining screws securing rectifier assembly to slip ring end bracket and lift off rectifier assembly. Further dismantling of rectifier is not required.
23. Check diodes. Connect test equipment as shown and test each diode in turn, note whether lamp lights, then reverse test lead connections. The lamp should light in one direction only. Renew rectifier assembly if a faulty diode is diagnosed.



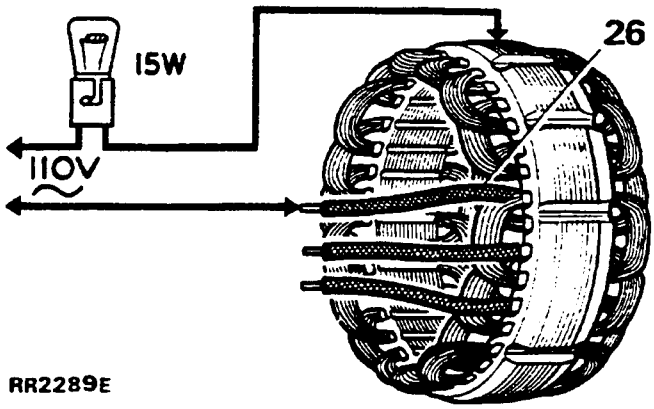
RR2280E

24. Remove slip ring end bracket bolts, remove bracket.
25. Connect a 12 volt battery and a 36 watt test lamp to two stator connections. Repeat test replacing one of two stator connections with the third. If test lamp fails to light in either test, fit a new stator.



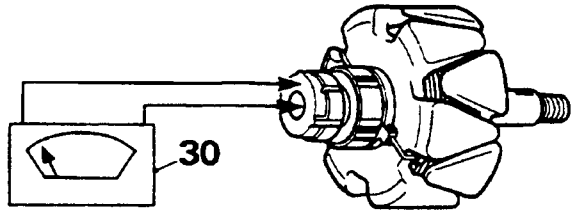
RR2288E

26. Using a 110 volt a.c. supply and a 15 watt test lamp, test for insulation between any one of three stator connections and stator laminations. If test lamp lights, fit a new stator.



RR2289E

27. Clean surfaces of slip rings using a solvent moistened cloth.
28. Inspect slip ring surfaces for signs of burning, remove burn marks using very fine sandpaper. On no account should emery cloth or similar abrasives be used, or any attempt made to machine the slip rings.
29. Note position of stator output leads in relation to alternator fixing lugs, and lift stator from drive end bracket.
30. Connect ohmmeter to slip rings. A reading of 2.6 ohms should be obtained.



RR2290E

31. Using a 110 volt a.c. supply and a 15 watt test lamp, test for insulation between one slip ring and one rotor pole. Fit a new rotor if test lamp lights.

32. To separate drive end bracket and rotor, remove shaft nut, washers, woodruff key and spacers from shaft.
33. Remove bearing retaining plate by removing three screws. Using a press, drive rotor shaft from drive end bearing.
34. If necessary, to remove slip rings or slip ring end bearing on rotor shaft, unsolder outer slip ring connection and gently pry slip ring off shaft, repeat procedure for inner slip ring connection. Using a suitable extraction tool, withdraw slip ring bearing from shaft.

Reassemble

35. Reverse dismantling procedure, noting following points.

    (a) Use Shell Alvania 'RA' to lubricate bearings.
    (b) When refitting slip ring end bearing, ensure it is fitted with open side facing rotor.
    (c) Use Fry's H.T.3 solder on slip ring field connections.
    (d) When refitting rotor to drive end bracket, support inner track of bearing. Do not use drive end bracket to support bearing when fitting rotor.
    (e) Tighten through bolts evenly to ***5 Nm.***
    (f) Fit brushes into housings before fitting brush moulding.
    (g) Tighten shaft nut to ***40 Nm.***
    (h) Refit regulator pack to brush moulding.

36. Reconnect leads between regulator, brush box and rectifier.
37. Refit alternator.

DISTRIBUTOR-LUCAS 35DLM8

Overhaul

DISTRIBUTOR CAP

Service repair no - 86.35.10

1. Unclip and remove cap
2. Fit a new cap if faulty.
3. Clean cap and HT brush with a lint free cloth.

ROTOR ARM

Service repair no - 86.35.16

4. Pull rotor arm from shaft.
5. Fit a new rotor arm if faulty.

INSULATION COVER (FLASH SHIELD)

Service repair no - 86.35.40

6. Remove cover secured by three screws.
7. Fit a new cover if faulty.

VACUUM UNIT

Service repair no - 86.35.21

8. Remove two screws from vacuum unit securing bracket. Disengage vacuum unit connecting rod from pick-up base plate connecting peg. Withdraw vacuum unit from distributor body.

AMPLIFIER MODULE

Service repair no - 86.35.30

9. Remove two screws and withdraw module.
10. Remove gasket.
11. Remove two screws and cast heatsink.

WARNING: Amplifier module is a sealed unit containing Beryllia. This substance is extremely dangerous if handled. DO NOT attempt to open or crush module.

PICK-UP AND BASE PLATE ASSEMBLY

Service repair no - 86.35.42

12. Use circlip pliers to remove circlip retaining reluctor on rotor shaft.
13. Remove flat washer, and 'O' ring recessed in top of reluctor.
14. Gently withdraw reluctor from shaft, taking care not to damage teeth.

NOTE: Coupling ring fitted beneath reluctor.

15. Remove three support pillars and cable grommet. Lift out pick-up and base plate assembly.

NOTE: Do not disturb two barrel nuts securing pick-up module, otherwise air gap will need re-adjustment.

16. Fit a new pick-up and base plate assembly if module is known to be faulty, otherwise check pick-up winding resistance (2k-5k ohm).

Reassemble

17. This is mainly a reversal of dismantling procedure, noting following points:

LUBRICATION

Apply clean engine oil:

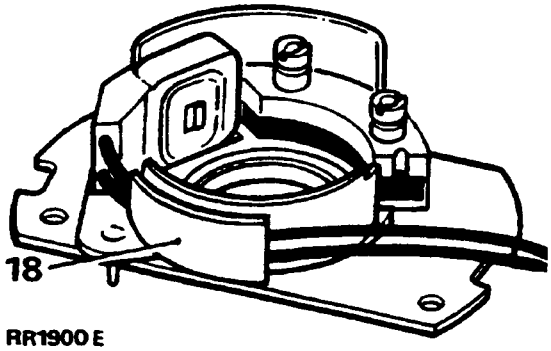
a. A spot into rotor spindle before fitting rotor arm.

Apply Omnilube 2 (or equivalent) grease.

b. Auto advance mechanism.
c. Pick-up plate centre bearing.
d. Pre tilt spring and its rubbing area (pick-up and base plate assembly).
e. Vacuum unit connecting peg (pick-up and base plate assembly).
f. Connecting peg hole in vacuum unit connecting rod.

Fitting pick-up and base plate assembly

18. Pick-up leads must be prevented from fouling rotating reluctor. Both leads should be located in plastic guide as illustrated. Check during re-assembly.



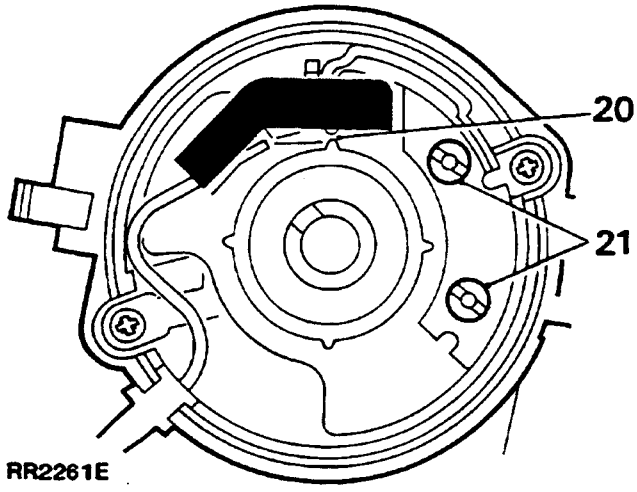
RR1900E

Fitting reluctor

19. Slide reluctor as far as it will go on rotor shaft, rotate reluctor until it engages with coupling ring beneath pick-up base plate. Distributor shaft, coupling ring and reluctor are 'keyed' and rotate together. Fit 'O' ring, flat washer and retaining circlip.

Pick-up air gap adjustment

20. Air gap between pick-up limb and reluctor teeth must be set within specified limits, using a non-ferrous feeler gauge.



RR2261E

21. If adjustment is necessary, slacken two barrel nuts to set the air gap. ***See ENGINE TUNING DATA, Information, Engine Tuning Data***

△ **NOTE: When original pick-up and base plate assembly has been refitted, air gap should be checked, and adjusted if necessary.**

When fitting a new assembly air gap will require adjusting to within specified limits.

Amplifier module

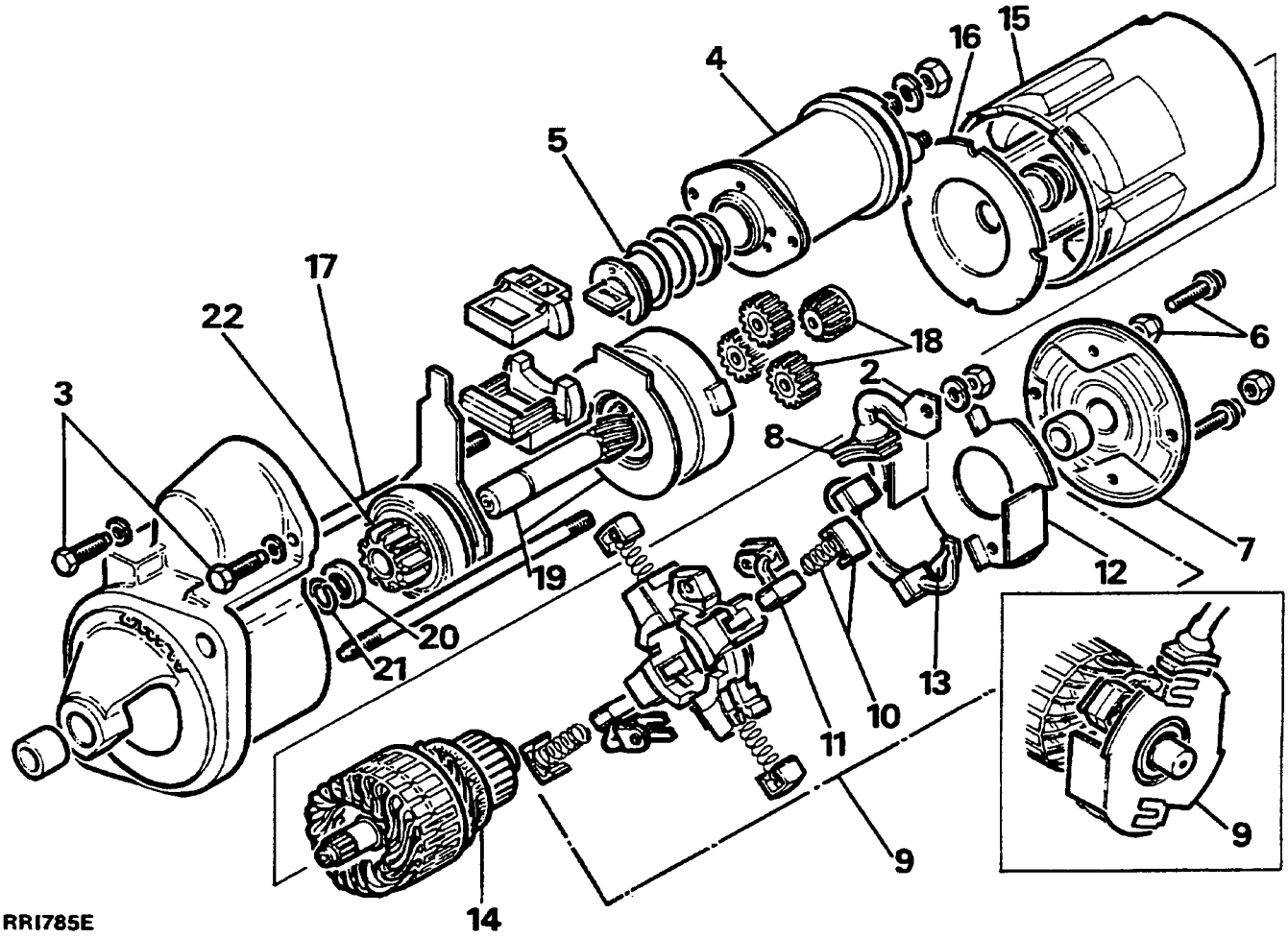
22. Before fitting module, apply MS4 Silicone grease or equivalent heat-conducting compound to amplifier module backplate, seating face on distributor body and both faces of heatsink casting.

STARTER MOTOR-LUCAS M78R

Overhaul

Dismantling

1. Remove starter motor.
2. Remove braid between starter and solenoid terminal.
3. Remove two solenoid fixings.
4. Withdraw solenoid body.
5. Lift and remove solenoid plunger.
6. Remove two nuts and two screws from commutator end bracket.
7. Remove commutator end bracket.
8. Remove grommet from yoke.
9. Lift brushbox assembly clear of armature.
10. Remove brush springs.
11. Unclip and remove ground brushes.
12. Remove insulating plate.
13. Withdraw brushes and bus bar.
14. Remove armature from yoke.
15. Remove yoke.
16. Remove intermediate bracket.
17. Loosen and remove through bolts from drive end bracket.
18. Remove sun and planet gears.
19. Push out drive shaft sprocket assembly from drive end bracket.
20. Carefully tap thrust collar from over jump ring back towards drive.
21. Pry snap ring from locating groove.
22. Remove drive assembly from drive shaft.

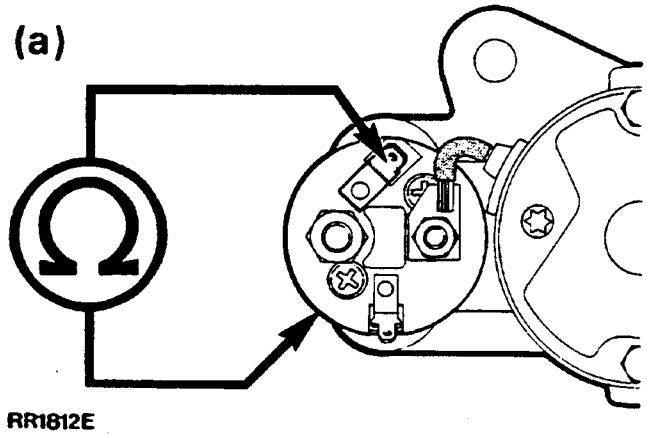


RRI785E

Inspecting

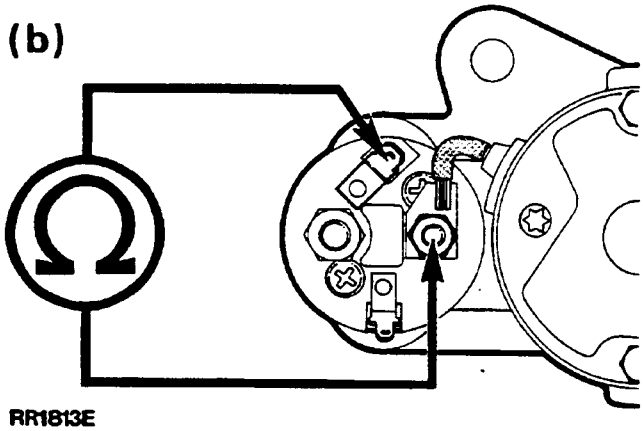
Solenoid

23. Check continuity and resistance value of windings by connecting an ohmmeter as shown.



RR1812E

(a) Resistance value should be: 1.074 ± 0.035 ohms

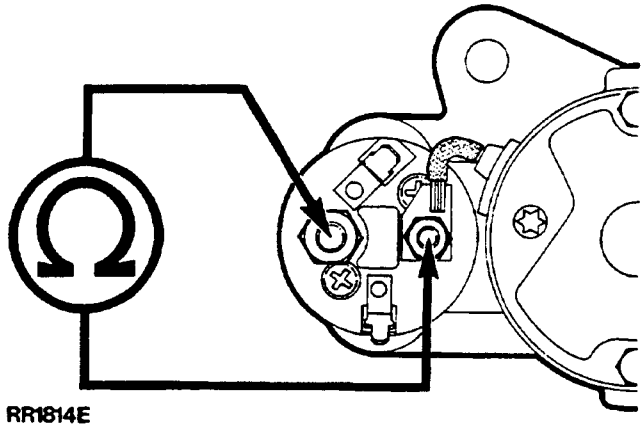


RR1813E

(b) Resistance value should be: 0.298 ± 0.015 ohms

Incorrect results: replace solenoid.
Correct results: proceed to 24.

24. Check contacts by connecting an ohmmeter as shown. Solenoid plunger removed, ohmmeter should read infinity.



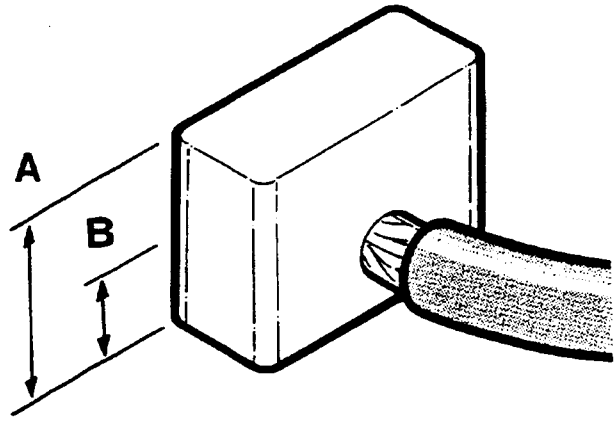
RR1814E

Solenoid plunger operated by hand, ohmmeter should read zero. Incorrect results: replace solenoid. Correct results: proceed to 25.

25. Check operation of spring for freedom of movement.

Brush gear

26. Check brush springs and ensure brushes move freely in holders. Clean brushes with a solvent moistened cloth, if required.

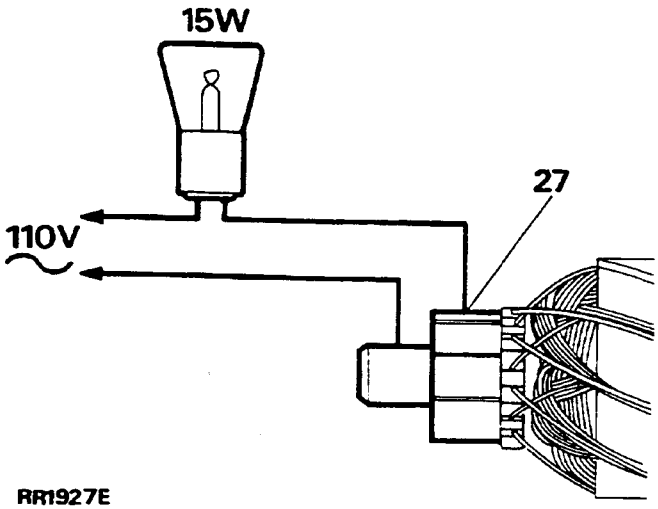


RR1815E

Brush length new, Dimension A is 9 mm.
Minimum brush length, Dimension B is 3.5 mm.

Armature

27. Check armature insulation. The method illustrated uses a 110V, 15W test lamp. Connect tester between any one commutator segment and shaft. If lamp illuminates armature is faulty, and a replacement component is required.



RR1927E

28. If necessary, the commutator may be machined, providing a finished surface can be obtained without reducing diameter below 28.8 mm. Otherwise a new commutator must be fitted. Finish surface with fine emery cloth. Do not undercut insulation slots.

Drive assembly

29. Test roller clutch. Pinion should rotate in one direction only, independent of clutch body. Replace unit if unsatisfactory, or if teeth are damaged or worn.

Bearings

30. Fit new bearing bushes if there is evidence of armature fouling magnets or if there is perceptible side play between shaft and bush.
31. Drive end/intermediate end bracket: press out bush using a suitable press and mandrel.
32. Press new bush in, ensuring that on drive end bracket, bush is flush with casting.
33. Commutator end bracket: thread a 9/16" Whitworth or suitable similar tap firmly into bush. Extract bush with tap using a power press in reverse.

△ **NOTE: Soak new bushes in engine oil for thirty minutes before fitting.**

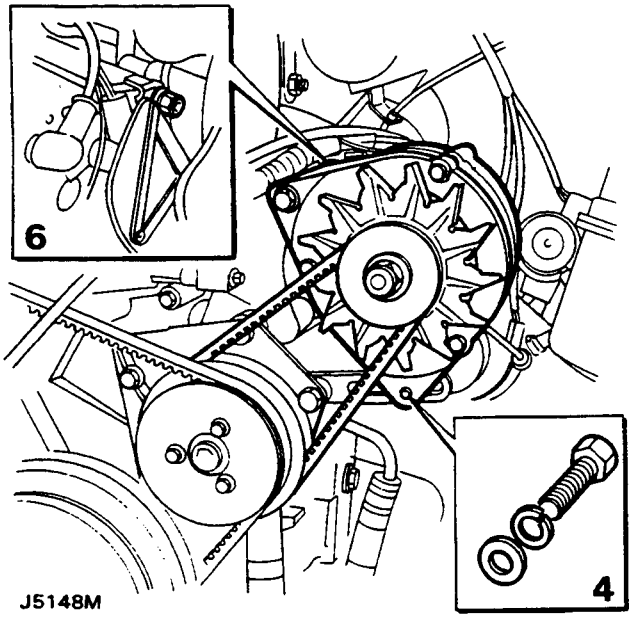
Reassemble

34. Reverse instructions 1 to 22. Smear teeth and operating collar of roller clutch with Shell Retinax 'A' grease. Smear pivot lever of drive assembly with Mobil 22 grease. Smear drive shaft sun and planet gears with Rocol BRB1200 grease.
35. Tighten fixings to correct torque: Starter motor through bolts - ***6.2 Nm.*** *Solenoid screws* - ***6.1 Nm.***

ALTERNATOR - 200 Tdi

Remove

1. Disconnect the battery negative lead.
2. Disconnect the electrical leads from the alternator.
3. Slacken the alternator securing bolts, pivot the alternator inwards and remove the drive belt.
4. Remove the adjustment bolt from under the alternator.
5. Remove the nut from the pivot bolt and detach the heat shield.
6. Support the alternator, withdraw the pivot bolt and detach the alternator from the engine.



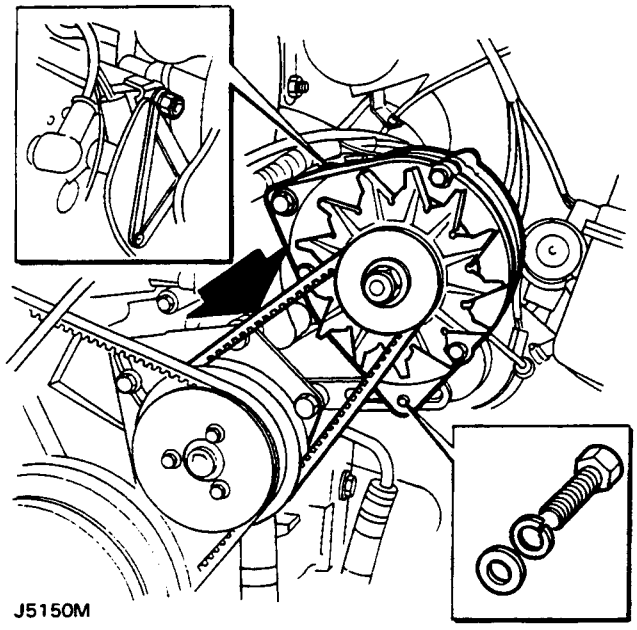
Refit

7. Position the alternator on the engine and insert the pivot bolt.
8. Fit the heat shield and secure with the nut. Do not fully tighten the nut at this stage.
9. Fit the adjustment bolt and the drive belt.
10. Adjust the belt tension and tighten the adjustment and pivot bolts.
11. Connect the electrical leads to the alternator.
12. Reconnect the battery negative lead.

ALTERNATOR DRIVE BELT TENSIONING - Tdi ENGINE

Adjust tension

1. Slacken the alternator pivot and adjustment bolts.
2. Adjust the alternator to give the correct belt tension.



3. Tight the adjustment and pivot bolts.

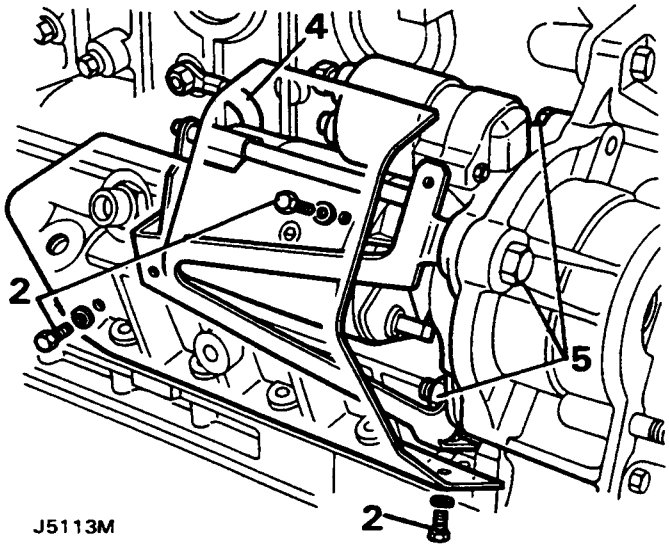
△ **NOTE: If a new drive belt has been fitted, run the engine at fast idle speed for 3 to 5 minutes; then check the tension.**

STARTER MOTOR - Tdi ENGINE

Remove and refit

Remove

1. Disconnect the battery negative lead.
2. Remove the securing bolts and detach the starter motor heat shield.
3. Disconnect electrical leads from the solenoid and detach the plastic tie.
4. Disconnect the earth leads from the starter motor.
5. Remove the securing nuts and bolts and detach the starter motor complete with heat shield mounting bracket.



J5113M

Refit

6. Refit the starter motor to the engine in reverse order to removal.

STARTER MOTOR OVERHAUL - Tdi ENGINE

Dismantling

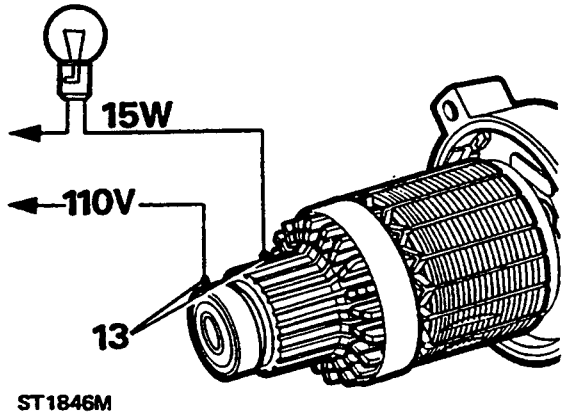
1. Remove the starter motor from the engine.
2. Disconnect the field winding lead from the solenoid.
3. Remove the two securing nuts and washers and withdraw the solenoid and spring, leaving the plunger in place.
4. Remove the two outer nuts from the through studs and withdraw the terminal strap.
5. Remove the inner nuts from the two through studs.
6. Remove the two nuts securing the brush plate assembly to the cover and detach the cover.
7. Withdraw the yoke complete with the brush plate assembly, noting the position of the yoke location plate in the reduction gear housing.
8. Remove the socket head screw and withdraw the armature and the reduction gear housing from the drive end bracket.
9. Remove the clutch drive and pinion assembly and detach the solenoid plunger from the lever.
10. Withdraw the brushes from their boxes.

Inspection and test

11. Clean and examine all parts for condition. Check bearings, bushes and the pinion drive assembly for wear. Examine the reduction drive pinion and drive gear internal teeth. Check that the field coil and armature brushes are satisfactory for continued use.

ARMATURE

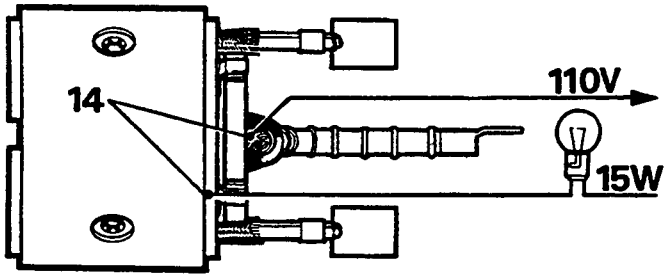
12. Using very fine glass paper, clean the commutator and wipe the surface with a petrol moistened cloth. Do not undercut the insulation slots.
13. Check the armature insulation by connecting a 100V AC 15 watt test lamp between each segment in turn and the armature shaft. The lamp should not light.



ST1846M

FIELD COIL INSULATION

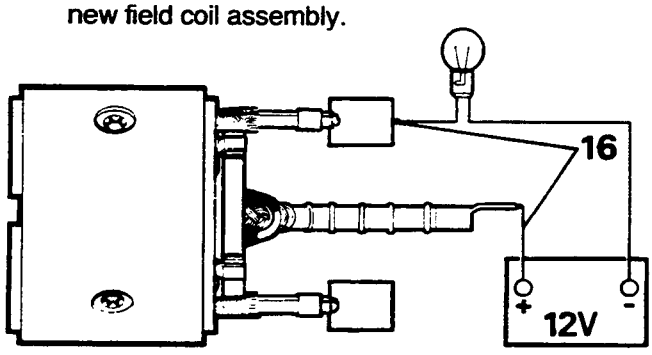
14. Connect a 110V AC 15 watt test lamp between the disconnected end of the winding and a clean unpainted part of the yoke, ensuring that the brushes or leads do not touch the yoke during the test.
15. The lamp should not light; if it does light fit a new field coil assembly.



ST1847M

FIELD COIL CONTINUITY

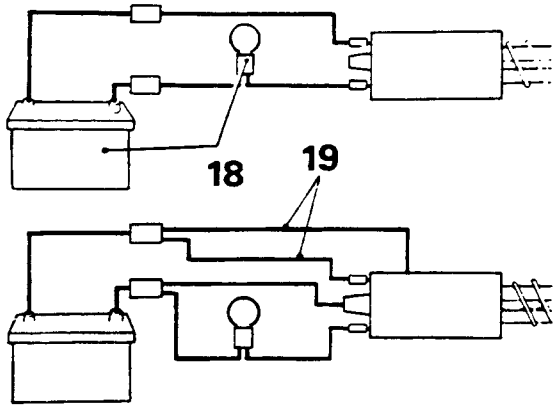
16. Connect a 12V battery operated 60 watt test lamp between each brush in turn and a link lead.
17. The lamp should not light; if it does light, fit a new field coil assembly.



J5203M

SOLENOID

18. Connect a 12 V battery operated 60 watt test lamp across the solenoid main terminals. The lamp should not light: if it does light, fit a new solenoid assembly.
19. Leave the test lamp connected and, using the same 12V battery supply, energise the solenoid by connecting the 12V supply between the small solenoid operating Lucar terminal blade and a good earth point on the solenoid body.

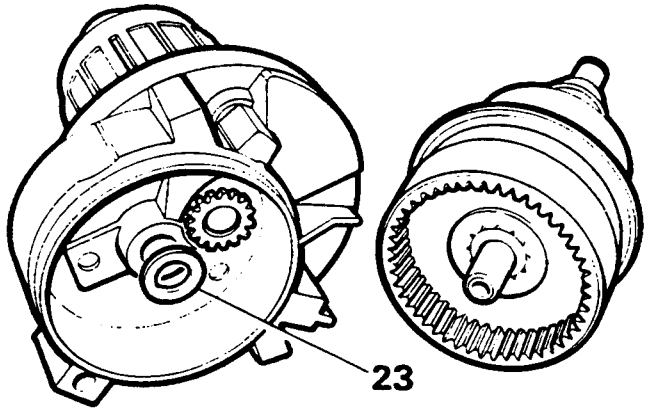


J5204M

20. The solenoid should be heard to operate and the test lamp should light with full brilliance, otherwise fit a new solenoid, assembly.

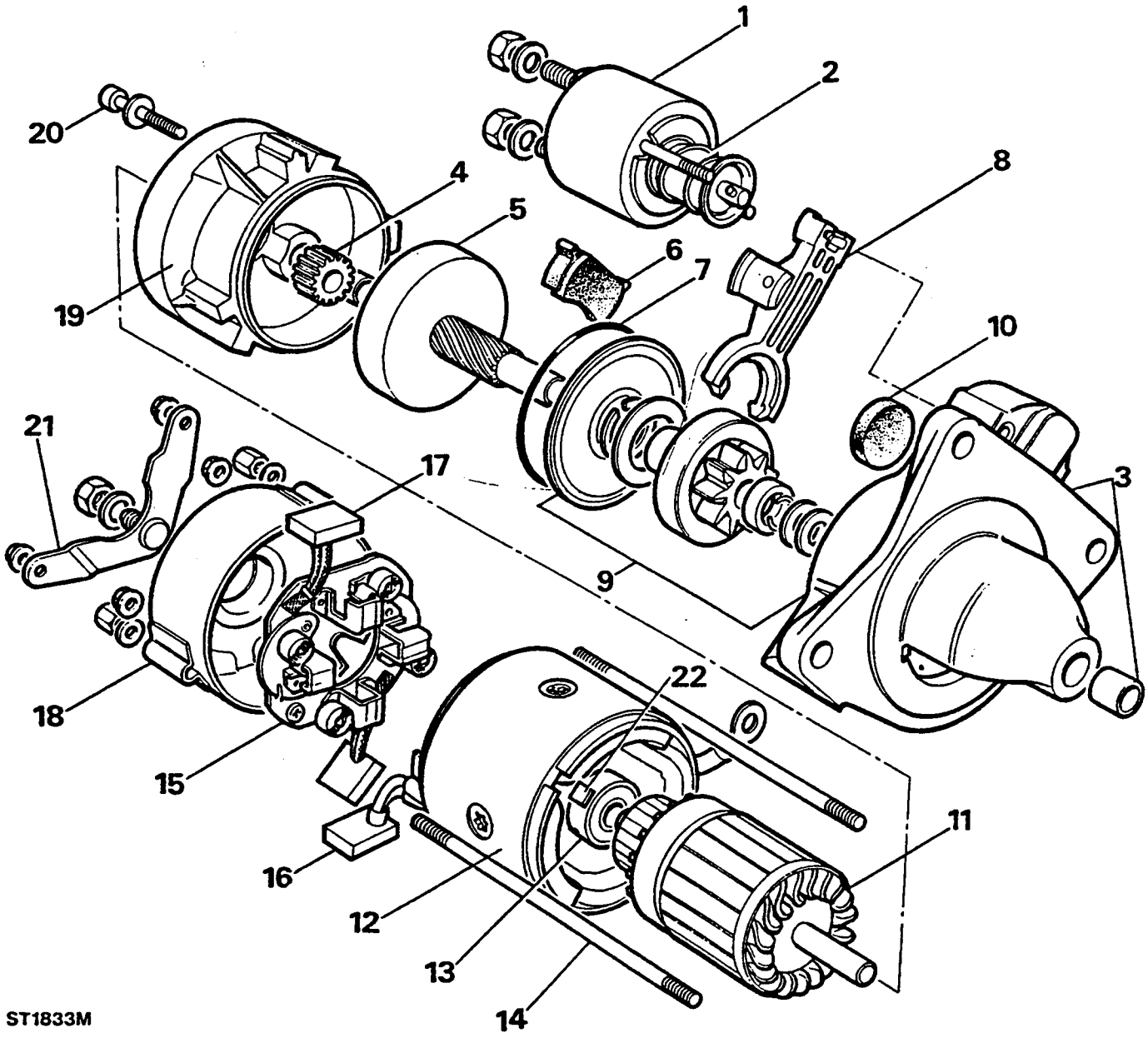
REASSEMBLY

21. If removed fit the round rubber pad to the drive end bracket.
22. Fit the lever to the clutch drive and pinion assembly, locate the solenoid plunger in the end of the lever and fit the assembly to the drive-end bracket, ensuring that the two washers are in position on the shaft.
23. Position the fibre washer on the shaft inside the reduction gear.



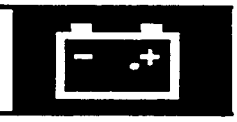
J5205M

24. Position the rubber pad, plain side towards the drive-end bracket, fit the 'O' ring seal and assemble the reduction gear housing to the drive-end bracket and secure with the socket head bolt.
25. Place the yoke location plate in position in the reduction gear housing, ensuring that it is fitted in the slot noted during dismantling, and fit the yoke and brush plate to the armature.



STARTER MOTOR

1. Solenoid
2. Solenoid plunger and spring
3. Drive end bracket and bush
4. Reduction gear pinion
5. Reduction gear
6. Rubber pad
7. 'O'ring seal
8. Lever
9. Clutch drive and pinion assembly
10. Rubber pad
11. Armature
12. Yoke
13. Roller bearing
14. Through-studs
15. Brush plate
16. Field coil brushes
17. Armature brushes
18. Brush plate cover
19. Reduction gear housing
20. Socket headed screw
21. Terminal strap
22. Yoke location key



26. Insert the brushes into their boxes and release the retaining springs, ensuring that the brushes rest correctly on the commutor.
27. If removed refit the through studs to the drive end bracket.
28. Fit the brush plate cover and secure to the brush plate with the two nuts.
29. Secure the assembly with the through studs nuts.
30. Fit the terminal strap to the through studs and secure with the two nuts.
31. Fit the coil spring to the solenid plunger, assemble the solenoid to the drive-end bracket and secure with the two nuts.
32. Check that the starter motor turns freely without tight spots.

TORQUE VALUES

NOTE: Torque wrenches should be regularly checked for accuracy to ensure that all fixings are tightened to the correct torque.

	Nm
Alternator mounting bracket to cylinder head	34
Alternator to mounting bracket	24
Alternator to adjusting link	24
Alternator shaft nut	35
Alternator through bolts	5
Alternator rectifier bolts	3.5
Amplifier module screws	1.2
Amplifier heat sink screws	1.2
Auxiliary driving lamp mounting bolts	15
Distributor clampbolt	20
Distributor pick-up bearing plate support pillars	1.2
Distributor pick-up barrel nuts	1.2
Distributor vacuum unit	2
Spark plug	20
Starter motor to engine bolts	45
Starter motor through bolts	6.2
Solenoid fixing screws	6.1
Solenoid battery terminal nut	4
Solenoid statter terminal nut	3.2
Reverse light switch	25
Wiper motor yoke retaining bolts	1.5

Torque values below cover all screws and bolts used, unless specified otherwise.

METRIC	**Nm**
M5	6
M6	9
M8	25
M10	45
M12	90
M14	105
M16	180

UNC / UNF	
1/4	9
5/16	24
3/8	39
7/16	78
1/2	90
5/8	136

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Land Rover

Lode Lane, Solihull, England B92 8NW.

Telephone: 0121- 722 2424 Fax: 0121- 742 1927 Telex: 338641 Lan Rov G.

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