

Models covered

■ 220 GTi 16V	1991-95
■ 220 Turbo	1992-95
■ 420i 16V	1992-95
■ 420i Turbo	1992-95

Engine code

20M4, T16

Injection system

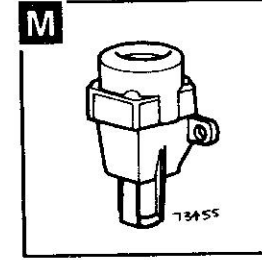
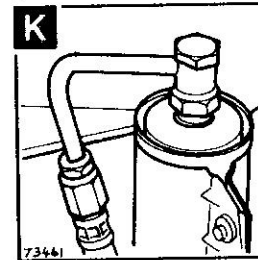
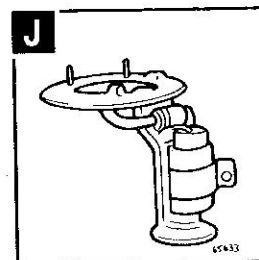
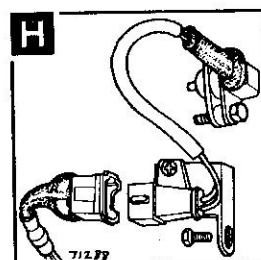
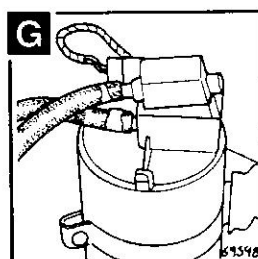
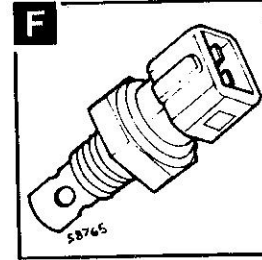
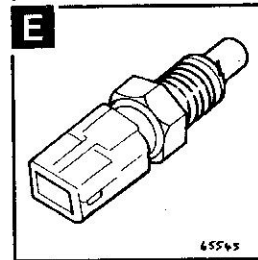
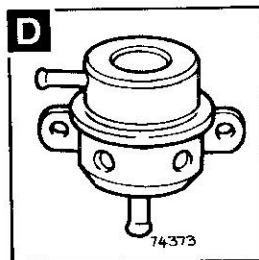
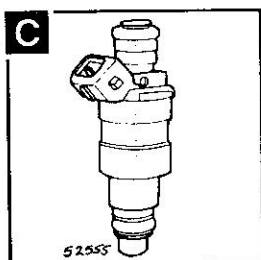
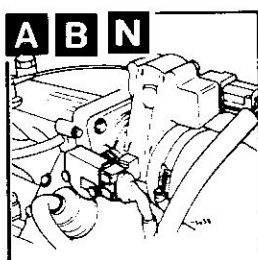
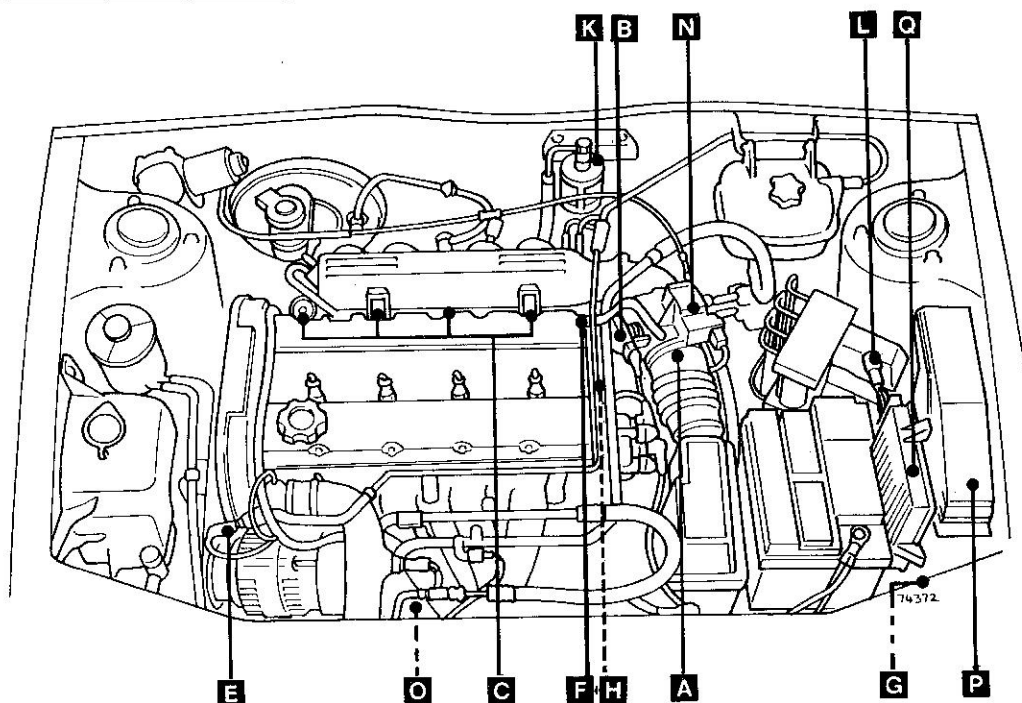
Rover M.E.M.S MPI

Fault finding

Trouble shooter 14

Fuel injection system layout and components

- A Throttle body
- B Throttle valve potentiometer
- C Injector valves
- D Pressure regulator
- E Coolant temperature sensor
- F Air temperature sensor
- G Carbon filter solenoid valve
- H Flywheel sensor
- J Fuel pump - in tank
- K Fuel filter
- L Diagnostic socket
- M Inertia switch - centre console
- N Stepper motor
- O Lambda sensor
- P Fuel pump relay
- Q Electronic control unit (ECU)



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Service adjustments

Preparatory conditions

- ☐ Engine at normal operating temperature.
- ☐ Plug gaps and ignition timing correct.
- ☐ Air filter installed and in good condition.
- ☐ All auxiliary electrical equipment switched OFF.

1.1 Idle speed

Technical Data

All models	875±50 rpm
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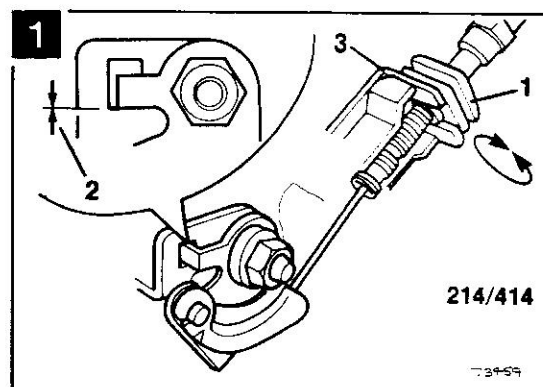
Adjustment

- Idle speed controlled by ECU and idle speed stepper motor.
- No manual adjustment possible.

Cable adjustment - 1

- Ensure throttle cable correctly located.
- Switch ignition ON and wait 5 seconds.
- Switch ignition OFF and check stepper motor in setting position.
- Release throttle cable from abutment bracket [3].
- Unscrew adjusting nut [1] until clear of bracket.
- Ensure throttle screw in contact with stepper motor pushrod.
- Turn adjusting nut [1] until free play taken out of inner cable.
- Ensure no gap in linkage [2] without opening throttle.
- Relocate slot in cable adjusting nut in abutment bracket.
- Open throttle and ensure full throttle is obtained.

NOTE: If specified idle speed not attained, tuning procedure with Microcheck or Cobest connected to diagnostic socket, will be required. Stepper motor and throttle setting screws must only be adjusted when indicated by Microcheck.



1.2 CO level

Technical Data

All models	0,5% maximum
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Adjustment

- CO level controlled by ECU and Lambda sensor.
- No manual adjustment possible.
- If CO level is not within specified limits, check for air leaks and carry out component and electrical tests.

<input type="checkbox"/> 220 GTi 16V	1991-95
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Checks & adjustments

2.1 Fuel pressure

Technical Data

System pressure (vacuum disconnected)	2,8-3,2 bar
Regulated pressure (vacuum connected)	2,3-2,7 bar

Checking pressure - 2

- Connect pressure gauge between fuel filter and injector rail.
- Start engine and allow to idle.
- Compare regulated pressure indicated with that specified.
- Disconnect vacuum hose from pressure regulator.
- Compare system pressure indicated with that specified.

2.2 Throttle valve potentiometer

Technical Data

Terminals	Voltage
1 & 2, throttle closed	0-1
1 & 2, throttle fully open	4-5

Checking - 3

- With ignition switched OFF and potentiometer multi-plug connected.
- Peel back multi-plug rubber cover.
- Connect voltmeter between terminals 2 (yellow/green wire) and 1 (pink/black wire).
- Switch ignition ON.
- With throttle closed, compare voltage indicated with that specified.
- Open throttle fully, compare voltage indicated with that specified.
- Voltage change should be smoothly progressive.

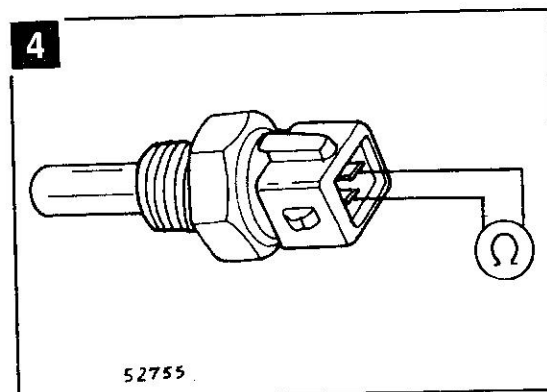
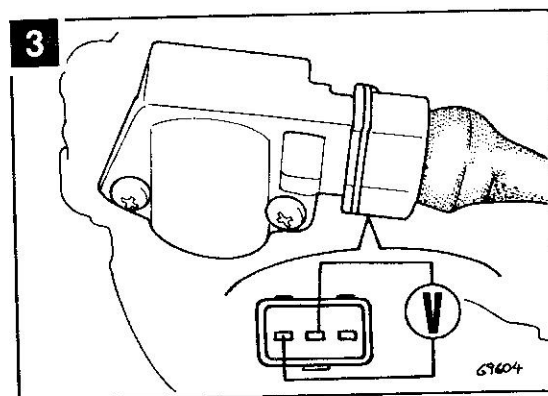
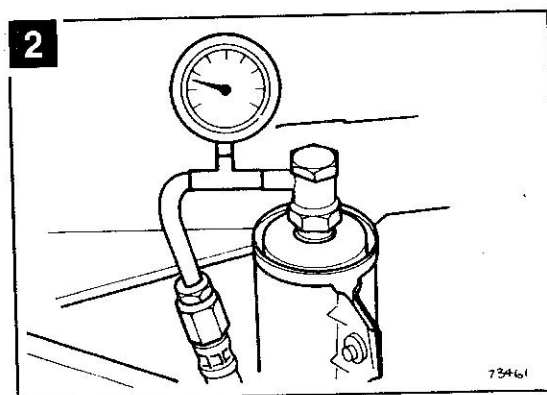
2.3 Coolant temperature sensor

Technical Data

Temperature - °C	Resistance - ohms
20	2500
40	1180
60	600
80	330

Checking - 4

- Ensure ignition switched OFF.
- Relieve residual pressure from cooling system.
- Remove sensor from coolant elbow.
- Immerse sensor probe in coolant of specified temperature.
- Connect ohmmeter between sensor terminals.
- Compare resistance indicated with that specified.
- Sensor may be checked in situ if engine temperature and resistance readings are compared with those specified.



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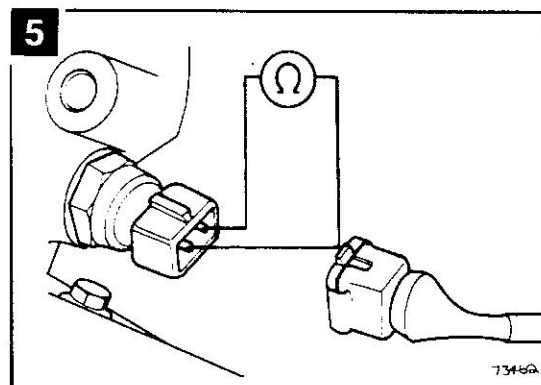
2.4 Air temperature sensor

Technical Data

Temperature - °C	Resistance - ohms
0	5700
20	2400
40	1100
60	500

Checking - 5

- Disconnect sensor multi-plug [1].
- Connect ohmmeter between sensor terminals.
- Using thermometer, measure ambient air temperature.
- Compare resistance indicated with that specified.



2.5 Injector valves

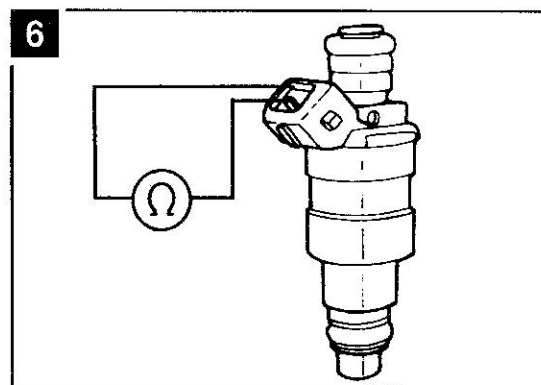
Technical Data

Resistance between terminals	approx. 16 ohms
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Injector spray pattern and leak rate — refer to General Test Procedures.

Checking resistance - 6

- Ensure ignition switched OFF.
- Disconnect injector valve multi-plug.
- Connect ohmmeter between injector terminals.
- Compare resistance indicated with that specified.



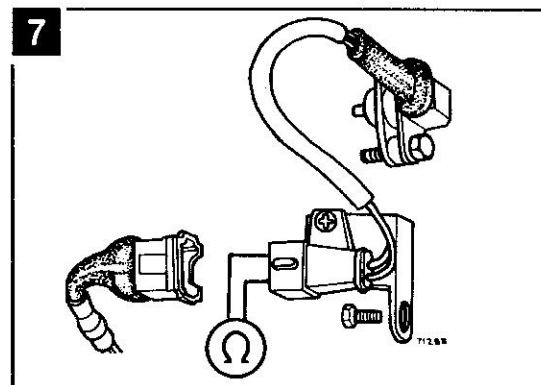
2.6 Flywheel sensor

Technical Data

Resistance between terminals	1100-1700 ohms
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Checking resistance - 7

- Ensure ignition switched OFF.
- Disconnect sensor multi-plug connector.
- Connect ohmmeter between sensor connector terminals.
- Compare resistance indicated with that specified.

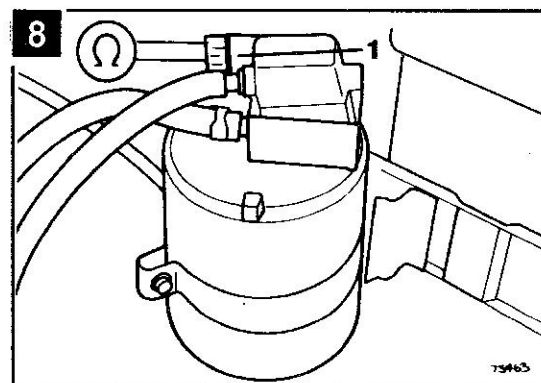


2.7 Carbon filter solenoid valve

Checking - 8

NOTE: Solenoid valve may be remote from filter on some models.

- Disconnect solenoid valve multi-plug [1].
- Connect ohmmeter between solenoid valve terminals.
- Check that there is continuity in solenoid windings.

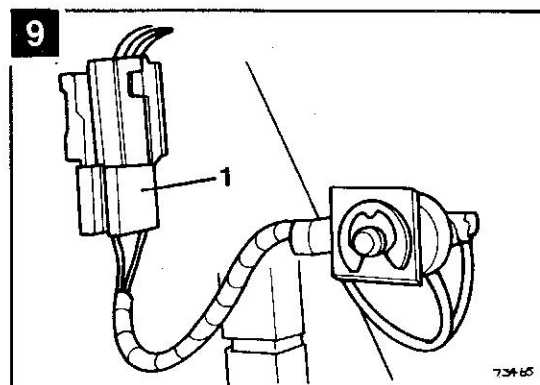


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2.8 Throttle pedal switch

Checking (20M4 engine only) - 9

- Disconnect switch multi-plug [1].
- Connect ohmmeter between switch terminals.
- Meter should indicate zero (continuity).
- Depress throttle pedal.
- Meter should indicate infinity (open circuit).



2.9 Electronic control unit (ECU)

Checking ECU earth connections

- Ensure ignition switched OFF.
- Disconnect ECU multi-plug.
- Connect ohmmeter between multi-plug terminal 14 (black/white wire) and earth.
- Connect ohmmeter between terminal 29 (black wire) and earth.
- In both cases meter should indicate zero (continuity).
- If meter indicates infinity (open circuit), check wiring between multi-plug and engine earth connections.

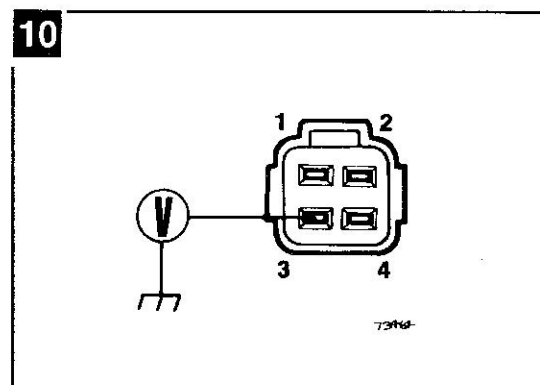
Checking electrical supply

- Ensure ignition switched OFF.
- Disconnect ECU multi-plug.
- Connect voltmeter between multi-plug terminal 28 (brown/pink wire) and earth.
- Switch ignition ON.
- Meter should indicate battery voltage.
- If not, check wiring and connections between main relay and ECU multi-plug.
- If wiring satisfactory, check relay and fusible link.

2.10 Lambda sensor

Checking sensor heater supply - 10

- Disconnect sensor multi-plug connector.
- Connect voltmeter between harness multi-plug terminal 3 (brown/blue wire) and earth.
- Switch ignition ON.
- Meter should indicate battery voltage.
- If not, check sensor relay and wiring.



Self-diagnosis

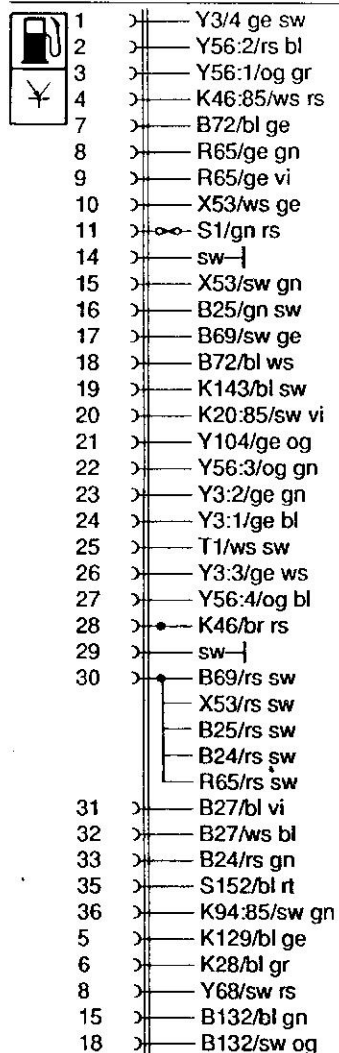
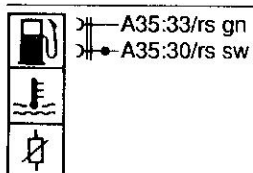
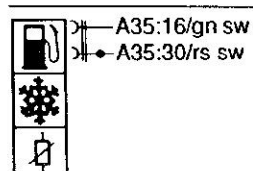
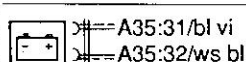
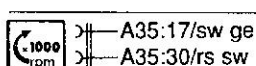
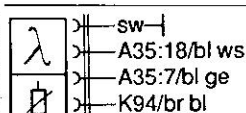
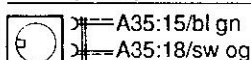
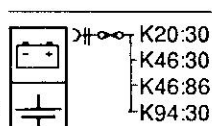
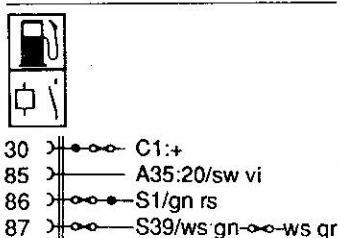
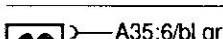
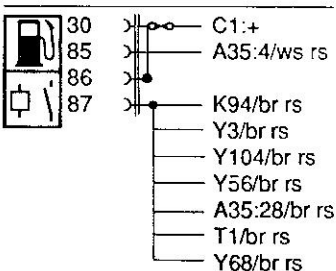
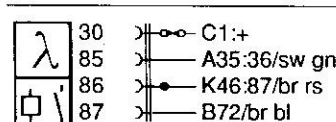
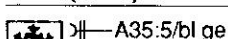
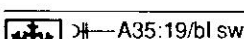
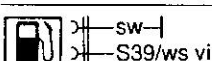
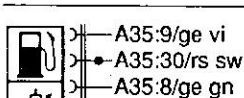
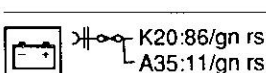
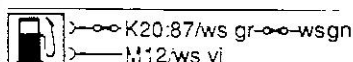
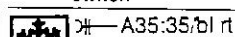
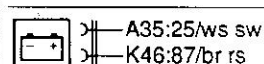
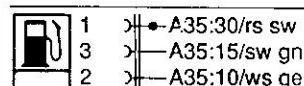
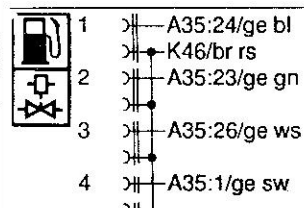
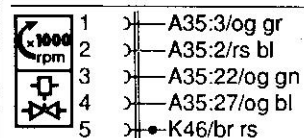
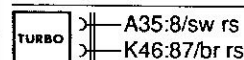
- ECU will operate in emergency mode if sensor fails, to enable car to be driven to workshop.
- Self-diagnosis fault codes can be accessed using Rover (Crypton) Cobest or Microcheck equipment.
- See Self-Diagnosis section.

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ECU Multi-plug



Wiring Diagram

A35 Engine management control unit (ECU)**B24** Coolant temperature sensor**B25** Air temperature sensor**B27** Flywheel sensor**B69** Knock sensor 1**B72** Lambda sensor**B132** Camshaft position sensor (Turbo)**C1** Battery**K20** Fuel pump relay**K28** Blower motor relay (Turbo)**K46** Fuel injection relay**K94** Lambda system relay**K129** AC condensor motor relay (Turbo)**K143** AC magnetic clutch relay**M12** Fuel pump**R65** Throttle valve potentiometer**S1** Ignition switch**S39** Inertia fuel cut-off switch**S152** AC high pressure safety switch**T1** Ignition coil**X53** Diagnostic socket**Y3** Injector valves**Y56** Idle speed stepper motor**Y68** Turbo air pressure solenoid**Y104** Carbon filter solenoid valve