Recommended fuel	
Models without a catalytic converter (non-catalyst models)	95 RON unleaded or 97 RON leaded
Models with a catalytic converter (catalyst models)	95 RON unleaded. Leaded fuel must not be used

Torque wrench settings	**Nm**	**lbf ft**
Exhaust manifold retaining nuts and bolts	19	14
Exhaust system fasteners:		
Catalytic converter-to-tailpipe bolts	49	36
Front pipe mounting bolt	23	17
Front pipe-to-intermediate pipe/catalytic converter nuts	49	36
Front pipe-to-manifold nut	31	23
Intermediate pipe-to-tailpipe bolts	49	36
Fuel pump retaining bolts	19	14
Fuel tank retaining bolts	34	25
Inlet manifold retaining nuts and bolts	19	14

1 General information and precautions

The fuel system consists of a fuel tank mounted under the rear of the car, a mechanical fuel pump, and a carburettor. The fuel pump is operated by an eccentric on the inlet camshaft, and is mounted on the rear of the cylinder head. The air cleaner contains a disposable paper filter element, and incorporates a flap valve air temperature control system which allows cold air from the outside of the car and warm air from the exhaust manifold to enter the air cleaner in the correct proportions.

The fuel pump lifts fuel from the fuel tank via a filter, which is mounted onto the engine compartment bulkhead, and supplies it to the carburettor. Excess fuel is returned from the pump to the fuel tank. Further details on the carburettor and exhaust system can be found in Sections 10 and 16.

2.1a Release the air cleaner housing lid from the inlet duct . . .

Warning: Many of the procedures in this Chapter require the removal of fuel lines and connections, which may result in some fuel spillage. Before carrying out any operation on the fuel system, refer to the precautions given in Safety first! at the beginning of this manual, and follow them implicitly. Petrol is a highly-dangerous and volatile liquid, and the precautions necessary when handling it cannot be overstressed.

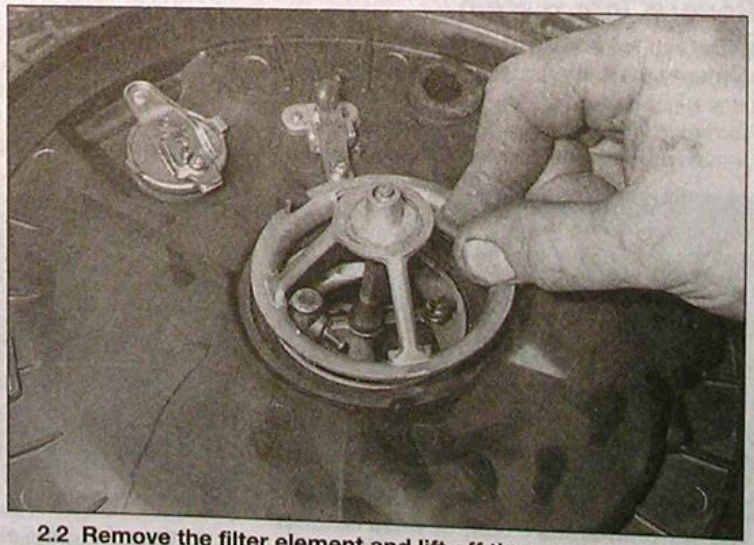
2 Air cleaner assembly - removal and refitting

Removal

1 Release the retaining clips, then slacken and remove the air cleaner housing lid retaining nut and screw. Free the lid from the inlet duct, then slacken the retaining clip and disconnect the hot-air inlet hose from the base of the lid. Position the lid clear of the base **(see illustrations)**.

2 Lift out the filter element and remove the mounting frame **(see illustration)**.

2.1b . . . then disconnect the hot-air inlet hose



2.2 Remove the filter element and lift off the mounting frame

and hold a wad of rag over the pump outlet while an assistant spins the engine on the starter. *Keep the hands away from the electric cooling fan.* Regular spurts of fuel should be ejected as the engine turns.

2 The pump can also be tested after it has been removed. With the pump outlet pipe disconnected but the inlet pipe still connected, hold a wad of rag by the outlet. Operate the pump lever by hand, moving it in and out; if the pump is in a satisfactory condition, the lever should move and return smoothly, and a strong jet of fuel should be ejected.

Removal

3 Identify the pump inlet, outlet and return hoses, and slacken the retaining clips. Place wads of rag beneath the hose unions to catch any spilled fuel, then disconnect both hoses from the pump, and plug the hose ends to minimise fuel loss. If necessary, remove the air cleaner housing to improve access to the pump.

4 Slacken and remove the bolts securing the pump to the rear of the cylinder head. Remove the pump along with its insulating spacer; discard the spacer, a new one must be used on refitting.

Refitting

5 Ensure that the pump and cylinder head mating surfaces are clean and dry, then offer up the new insulating spacer. Refit the pump to the cylinder head, and tighten the pump retaining bolts to the specified torque setting.

6 Reconnect the inlet, outlet and return hoses to their relevant pump unions, and securely tighten their retaining clips.

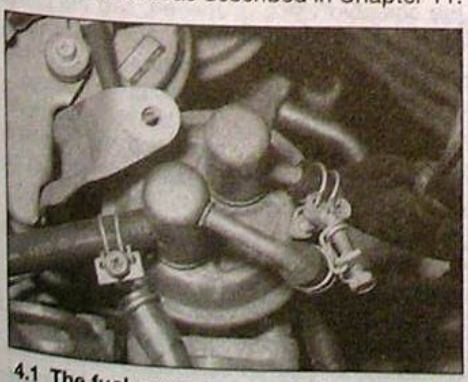
5 Fuel gauge sender unit - removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding.*

Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

2 To gain access to the sender unit, remove the rear seat back as described in Chapter 11.



4.1 The fuel pump is mounted on the left-hand end of the cylinder head

3 Undo the retaining screws, and lift up the access cover to expose the sender unit.

4 Disconnect the wiring connector from the sender unit, and tape the connector to the vehicle body to prevent it disappearing behind the tank.

5 Mark the hoses for identification purposes, then slacken the feed and return hose retaining clips. Disconnect both hoses from the top of the sender unit, and plug the hose ends. Tape the hoses to the vehicle body to prevent them disappearing behind the tank.

6 Note the alignment marks on the sender unit and tank - if no marks exist, make some.

7 On models where the sender unit is retained by a large ring, unscrew the locking ring and remove it from the tank. This is best accomplished by using a screwdriver on the raised ribs of the locking ring. Carefully tap the screwdriver to turn the ring anti-clockwise until it can be unscrewed by hand.

8 On models where the sender unit is bolted to the tank, slacken and remove all the retaining bolts and washers.

9 On all models, carefully lift the sender unit from the top of the fuel tank, taking great care not to bend the sender unit float arm, or to spill fuel onto the interior of the vehicle. As the sender unit is being removed, unclip the fuel filter from the base of the tank, and remove the sender unit and filter as an assembly.

10 Recover the rubber sealing ring and discard it; a new one must be used on refitting.

11 Wash the filter assembly in a high flash-point solvent. Examine the filter for signs of clogging or splitting, and renew if necessary.

Refitting

12 Refitting is a reversal of the removal procedure, noting the following points:

a) Fit a new rubber sealing ring to the fuel tank.

b) Ensure that the filter is clipped securely in position before seating the sender unit in the tank.

c) Where the unit is retained by a locking ring, align the sender unit arrow with the mark on the tank, and securely tighten the locking ring.

d) Where the unit is retained by bolts, align the marks made on removal, and securely tighten all the bolts.

e) Ensure that the feed and return hoses are correctly reconnected, and are securely retained by their clips.

6 Fuel tank -removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding.*

Removal

1 Before removing the fuel tank, all fuel must be drained from the tank. Since a fuel tank drain plug is not provided, it is therefore preferable to carry out the removal operation when the tank is nearly empty. Before proceeding, disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual) and syphon or hand-pump the remaining fuel from the tank.

2 Remove the exhaust system as described in Section 16.

3 Free both handbrake cables from their retaining clips on the base of the fuel tank.

4 Disconnect the wiring connector and fuel hoses from the fuel gauge sender unit, as described in paragraphs 1 to 5 of Section 5.

5 Working at the left-hand side of the rear of the fuel tank, release the retaining clips, then disconnect the filler neck vent pipe and main filler neck hose from the fuel tank.

6 Place a trolley jack with an interposed block of wood beneath the tank, then raise the jack until it is supporting the weight of the tank.

7 Slacken and remove the three bolts securing the rear of the fuel tank retaining straps to the vehicle body, then pivot each strap away from the tank.

8 Slowly lower the fuel tank out of position, disconnecting any other relevant vent pipes as they become accessible (where necessary). Remove the tank from underneath the vehicle, and recover the tank mounting rubbers, noting their correct fitted positions.

9 If the tank is contaminated with sediment or water, remove the sender unit (Section 5) and swill the tank out with clean fuel. The tank is injection-moulded from a synthetic material, and if damaged, it should be renewed. However, in certain cases, it may be possible to have small leaks or minor damage repaired. Seek the advice of a suitable specialist before attempting to repair the fuel tank.

Refitting

10 Refitting is the reverse of the removal procedure, noting the following points:

a) When lifting the tank back into position, reconnect all the relevant breather hoses, and take great care to ensure that none of the hoses become trapped between the tank and vehicle body. Tighten the fuel tank mounting bolts to the specified torque setting.

b) Ensure that all pipes and hoses are correctly routed,. and securely held in position with their retaining clips.

c) On completion, refill the tank with fuel, and check for signs of leakage prior to taking the vehicle out on the road.

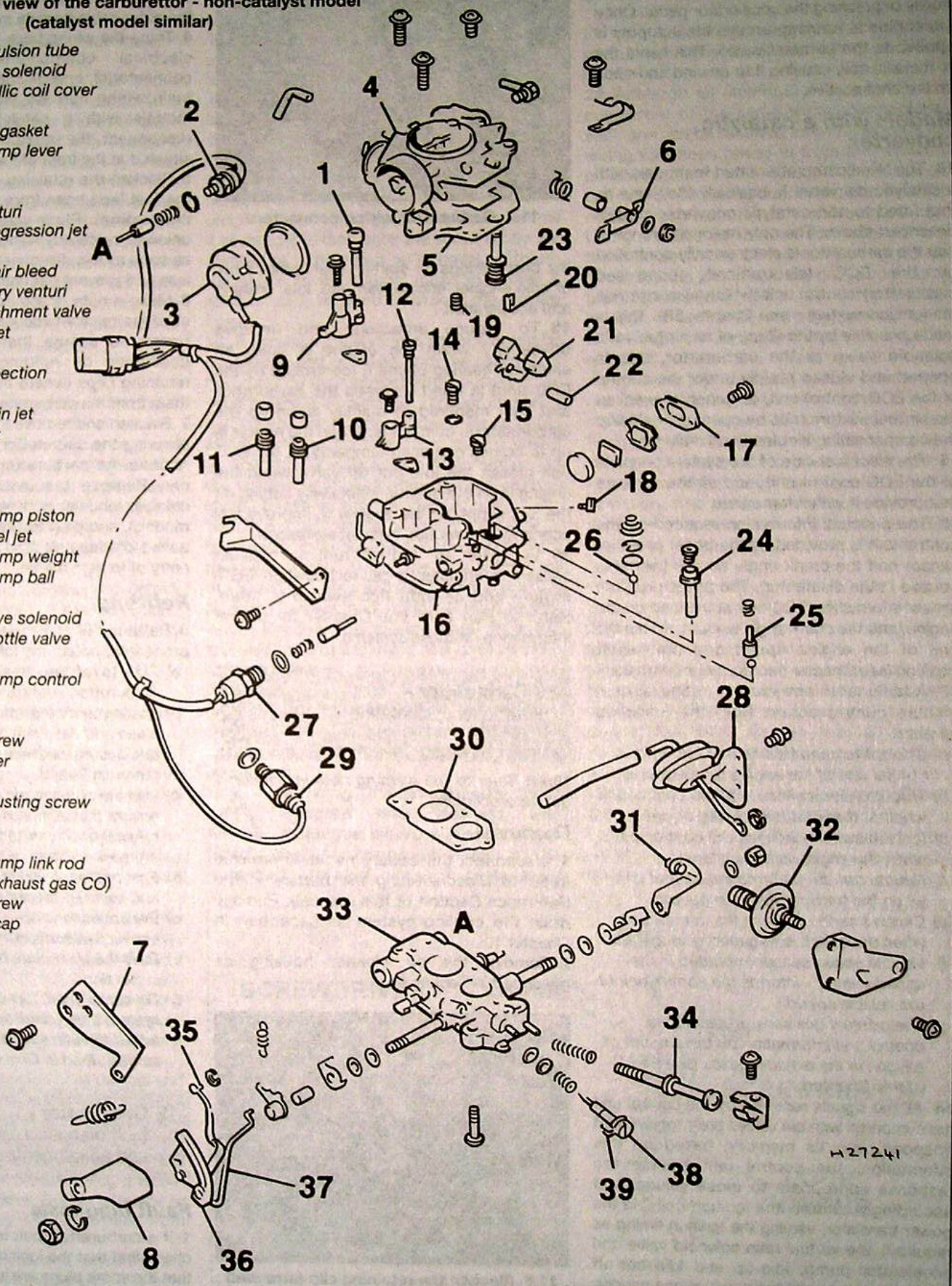
7 Accelerator cable - removal, refitting and adjustment

Removal

1 Free the accelerator inner cable from the carburettor throttle cam.

10.1 Exploded view of the carburettor - non-catalyst model (catalyst model similar)

1 Secondary emulsion tube
2 Idle-up control solenoid
3 Choke bi-metallic coil cover
4 Upper body
5 Float chamber gasket
6 Accelerator pump lever
7 Bracket
8 Bracket
9 Secondary venturi
10 Secondary progression jet
11 Idle-up jet
12 Primary main air bleed
13 Primary auxiliary venturi
14 Part-load enrichment valve
15 Primary main jet
16 Main body
17 Float level inspection window
18 Secondary main jet
19 Primary idle jet
20 Needle valve
21 Float
22 Float pivot pin
23 Accelerator pump piston
24 Primary idle fuel jet
25 Accelerator pump weight
26 Accelerator pump ball valve
27 Idle cut-off valve solenoid
28 Secondary throttle valve diaphragm
29 Accelerator pump control solenoid
30 Gasket
31 Adjustment screw
32 Throttle damper
33 Throttle body
34 Idle speed adjusting screw
35 Choke link rod
36 Throttle lever
37 Accelerator pump link rod
38 Idle mixture (exhaust gas CO) adjustment screw
39 Tamperproof cap



the air cleaner filter element is clean; see the relevant Sections of Chapter 1 or of this Chapter. If the engine is running very roughly, first check the valve clearances and the compression pressures as described in Chapter 2A.

2 If careful checking of all of the above produces no improvement, the carburettor must be removed for cleaning and overhaul.

3 Note that in the rare event of a complete carburettor overhaul being necessary, it may prove more economical to renew the carburettor as a complete unit. Check the price and availability of a replacement carburettor and of its component parts before starting work; note that most sealing washers, screws and gaskets are available in kits, as are some of the major sub-assemblies. In most cases, it will be sufficient to dismantle the carburettor and to clean the jets and passages.

Overhaul

Note: *Refer to the warning note in Section 1 before proceeding.*

4 Disconnect the throttle return spring, and inspect the accelerator pump operating lever for wear. Remove the accelerator pump lever retaining spring, circlip and clip, and disconnect the pump lever and spring assembly.

5 Remove the clip, and disconnect the choke connecting rod.

6 Remove the retaining screws, and detach the carburettor upper body. If the top is tight, a gentle tap with a plastic hammer is usually sufficient to free it. Do not lever the assemblies apart, as there is a risk of damaging the mating surfaces.

7 Inspect the float chamber for corrosion and calcium build-up.

8 Remove the accelerator pump inlet spring, retaining clip, strainer and ball; invert the carburettor over a cupped hand to catch these parts.

9 Unscrew the brass plug, and remove the accelerator pump outlet spring, weight and ball; invert the carburettor over a cupped hand to catch these parts.

10 Remove the accelerator pump bellows and piston assembly from the upper body, and check the assembly for fatigue and damage.

11 Tap out the float pin, and remove the float, needle valve and float chamber gasket. **Note:** *In some instances, the needle valve seat is not removable.*

12 Note the correct location of all the jets and air bleeds prior to removal; these notes can then be used to ensure that the jets are correctly positioned on refitting.

13 Where necessary, remove all primary and secondary jets and air bleeds, using a close-fitting screwdriver. **Note:** *Do not attempt to remove the secondary slow air bleeds from the carburettor.*

14 Remove each plug, and unscrew the primary idle-up and secondary slow jets from the main body. Unscrew the primary idle air bleed.

15 Remove the two screws, and detach the auxiliary venturis. Unscrew the primary and secondary combined air corrector and emulsion tubes from the auxiliary venturis.

16 Remove the float chamber plug, and unscrew the primary main jet from its place in the side of the float chamber. Unscrew the secondary main jet, and remove it from the bottom of the float chamber.

17 Remove the idle mixture adjustment screw tamperproof cap. Turn the screw in until it seats lightly, counting the **exact** number of turns required to do this, then unscrew it. On refitting, turn the screw in until it seats lightly, then back the screw off by the number of turns noted on removal, to return the screw to its original location. **Note:** A *special tool is required to remove the mixture screw.*

18 If necessary, the various solenoids can be unscrewed and removed from the carburettor body, noting their correct fitted positions. As each solenoid is removed, recover its spring and plunger and, where fitted, the solenoid sealing washer. Each solenoid can be tested by applying 12 volts across its terminals - as the voltage is applied, the solenoid plunger should be drawn into the solenoid body.

19 On models with a catalytic converter, if the fuel/air ratio solenoid is to be removed, free its wiring from the connector as described in paragraph 22. Remove the two retaining screws, and withdraw the solenoid valve. Recover the sealing rings from the solenoid and discard them; new ones must be used on refitting.

20 Clean the jets, carburettor body assemblies, float chamber and internal drillings. An air line may be used to clear the internal passages once the carburettor is fully dismantled.

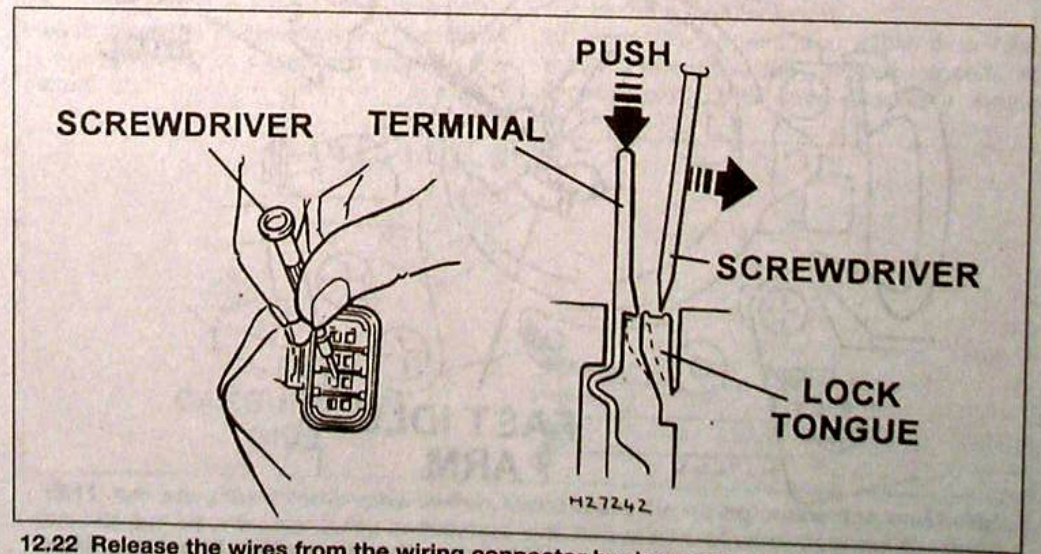
Warning: If high-pressure air is directed into drillings and passages where a diaphragm is fitted, the diaphragm is likely to be damaged. Aerosol cans of carburettor cleaner are widely available, and can prove very useful in helping to clear internal passages of stubborn obstructions.

21 Use a straight edge to check all carburettor body assembly mating surfaces for distortion.

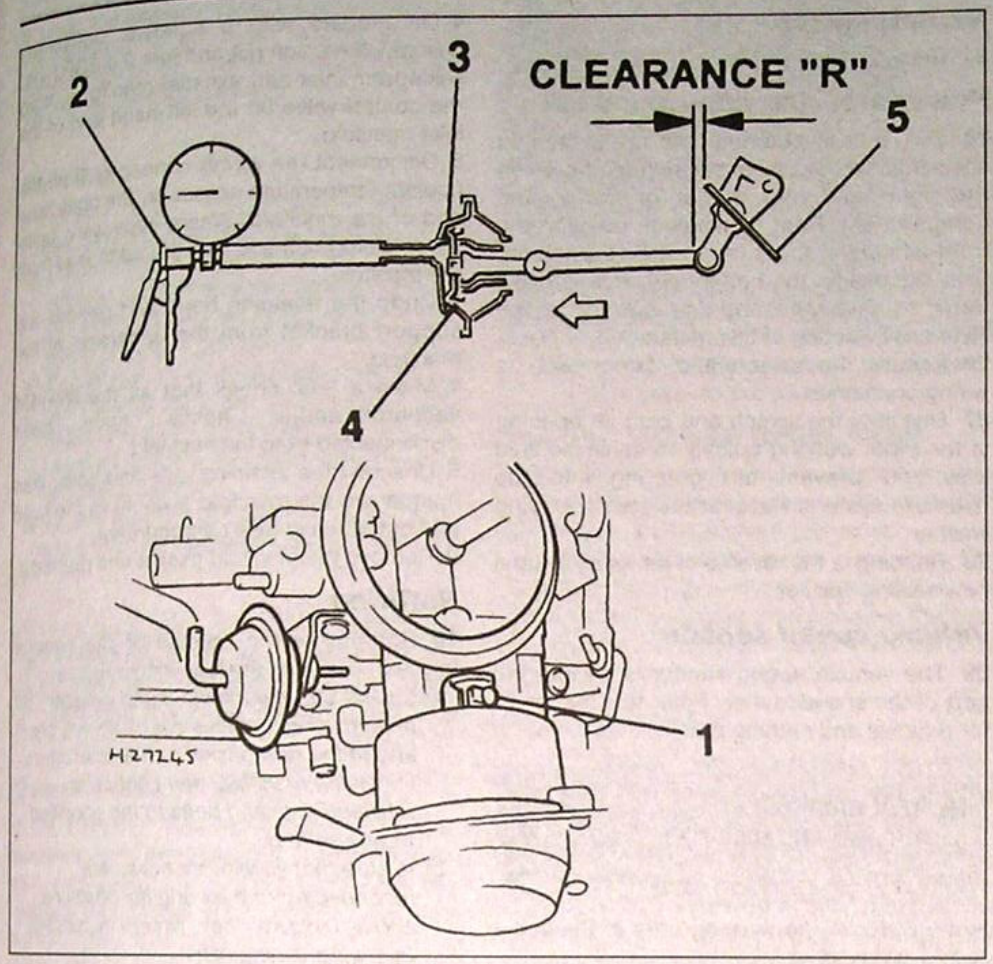
22 Although all electrical components are connected to the same wiring connectors, each one can be renewed individually once its wiring has been released from the relevant connector. To free the wiring, lift the tangs on the side of the wiring connector, and free the retaining clip from the rear of the connector. Using a small, flat-bladed screwdriver, free the relevant wires of the component to be removed, and push them out of the connector **(see illustration)**. Note the correct fitted location of each wire, and take great care not to damage the wiring terminals as they are removed. Slide the wires of the new component into position in the connector, check they are securely retained, then clip the retaining clip into position on the rear of the connector. **Note:** *Ensure that the wires are correctly seated in the connector. If they are not, a poor electrical connection will be made when the two halves of the connector are joined, which could result in the carburettor electrical components not functioning correctly.*

23 On reassembly, renew any worn components, and fit a complete set of new gaskets and seals. A gasket and seal kit is available from your Nissan dealer.

24 Reassembly is a reversal of the dismantling procedure. Ensure that all jets are securely locked in position, but do not overtighten them. Ensure that all mating surfaces are clean and dry, and that all body sections are correctly assembled with their fuel and air passages correctly aligned. Check the float height when reassembling the carburettor. Prior to refitting the carburettor, set the throttle valve fast idle and choke pull-down settings as described below.



12.22 Release the wires from the wiring connector by depressing the lock tongue with a small, flat-bladed screwdriver as shown



12.38 Choke pull-down setting

1 Pull-down adjustment tongue
2 Vacuum pump
3 Pull-down vacuum unit
4 Diaphragm
5 Choke valve-to-bore clearance

13 Electronically-controlled carburettor (ECC) system components

Boost pressure sensor

1 The boost pressure sensor is mounted onto the left-hand front suspension mounting turret, where it is located next to the power transistor.

2 To remove the sensor, first disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

3 Undo the two retaining screws and remove the boost pressure sensor, disconnecting its wiring connector and vacuum hose as they become accessible **(see illustration)**.

4 Refitting is the reverse of removal.

Power transistor

5 See Chapter 5B.

Fuel/air ratio solenoid valve

6 Refer to Section 12.

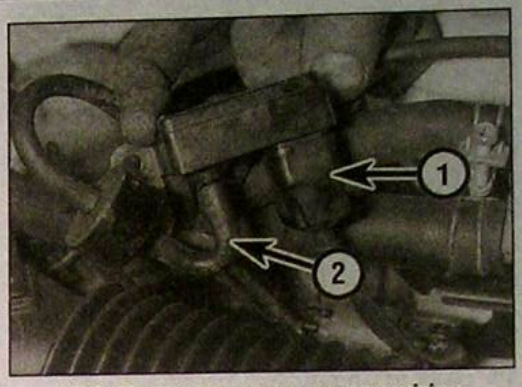
Carburettor solenoid valves

7 Refer to Section 12, paragraphs 18 and 22.

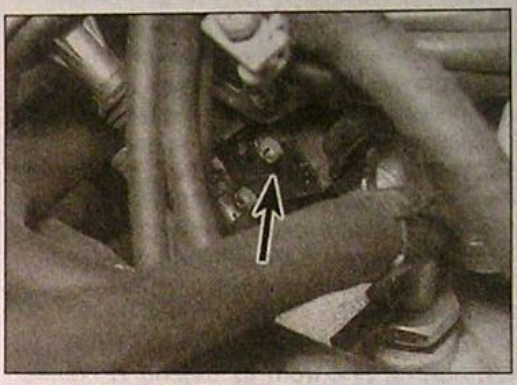
It is not necessary to remove the carburettor from the vehicle, but access can be considerably improved by removing the air cleaner housing as described in Section 2.

Throttle valve switch

8 Undo the two screws, and free the switch from the right-hand side of the carburettor **(see illustration)**. If necessary, remove the air cleaner housing to improve access to the switch.



13.3 Boost pressure sensor wiring connector (1) and vacuum hose (2)



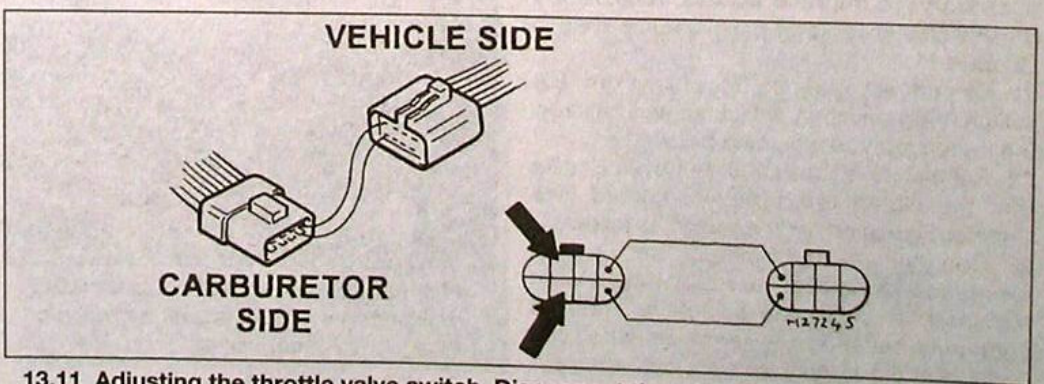
13.8 Throttle valve switch (arrowed) is mounted on the right-hand side of the carburettor

9 Free the switch wiring from the connector as described in paragraph 22 of Section 12, and remove the switch.

10 Refitting is the reverse of removal. On completion, adjust the switch as follows.

11 Warm the engine up to normal operating temperature, then stop it and disconnect the carburettor wiring connector containing the throttle switch wiring connectors. Referring to the accompanying illustration, use two pieces of wire to connect the terminals of the idle cut-off valve solenoid; this is necessary to allow the engine to start **(see illustration)**. Connect a multi-meter set to its resistance across the switch terminals.

12 Start the engine, and allow it to idle. Slowly increase the engine speed to approximately 2000 rpm; continuity should



13.11 Adjusting the throttle valve switch. Disconnect the wiring connector, and bridge the idle cut-off solenoid wiring connectors with two pieces of wire. Connect the multi-meter to the arrowed terminals of the carburettor side of the connector, and adjust the switch as described in text

6 Undo the retaining nuts and bolts securing the manifold to the head. Manoeuvre the manifold out of the engine compartment, and discard the manifold gaskets.

Refitting

7 Refitting is the reverse of the removal procedure, noting the following points:

a) Examine all the exhaust manifold studs for signs of damage and corrosion; remove all traces of corrosion, and repair or renew any damaged studs.

b) Ensure that the manifold and cylinder head sealing faces are clean and flat, and fit the new manifold gaskets. Tighten the manifold retaining nuts and bolts to the specified torque.

c) Reconnect the front pipe to the manifold using the information given in Section 16

16 Exhaust system - general information and component removal

General information

1 On models without a catalytic converter, the exhaust system consists of three sections; the front pipe, the intermediate pipe and silencer box, and the tailpipe and main silencer box.

2 On models with a catalytic converter, the exhaust system consists of four sections, the front pipe, the catalytic converter, the intermediate pipe and silencer box, and the tailpipe and main silencer box.

3 The system is suspended throughout its entire length by rubber mountings, and all exhaust sections are joined by flanged joints which are secured together by nuts and/or bolts.

Removal

4 Each exhaust section can be removed individually, or the complete system can be removed as a unit.

5 To remove the system or part of the system, first jack up the front or rear of the car, and support it on axle stands. Alternatively, position the car over an inspection pit or on car ramps.

Front pipe

6 Undo the nuts securing the front pipe to the manifold, and the bolt securing the front pipe to its mounting bracket **(see illustrations)**. Separate the front pipe from the manifold and collect the gasket.

7 Slacken and remove the two nuts/bolts and springs securing the front pipe flange joint to the intermediate pipe/catalytic converter (as applicable) **(see illustration)**. Withdraw the front pipe from underneath the vehicle, and recover the gasket from the joint.

16.6a Undo the three nuts securing the front pipe to the manifold . . .

16.6b . . . and the bolt securing the front pipe to its mounting bracket

Catalytic converter (where fitted)

8 Slacken and remove the two nuts/bolts and springs (as applicable) securing the front pipe flange joint to the catalytic converter.

9 Unscrew the two bolts securing the intermediate pipe to the catalytic converter, and recover the gasket from between the two.

10 Free the catalytic converter from the front pipe, and recover the gasket.

Intermediate pipe

11 On models with a catalytic converter, unscrew the two bolts securing the intermediate pipe to the catalytic converter, and recover the gasket from between the two.

12 On models without a catalytic converter, undo the two nuts/bolts and springs (as applicable) securing the front pipe flange joint to the intermediate pipe, then separate the joint and recover the gasket.

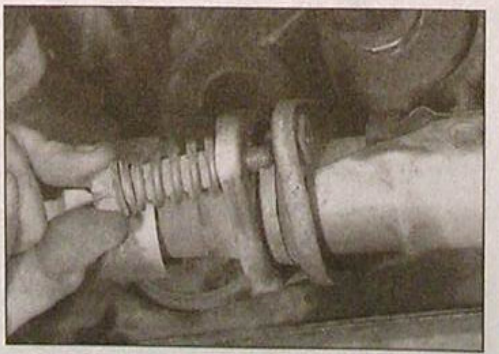
13 On all models, slacken and remove the bolt securing the mounting rubber to the rear of the intermediate pipe.

14 Undo the two bolts securing the tailpipe to the intermediate pipe, then manoeuvre the intermediate pipe out from underneath the vehicle. Recover the gasket from the tailpipe joint.

Tailpipe

15 Slacken and remove the two bolts securing the tailpipe to the intermediate pipe.

16 Unhook the tailpipe from its mounting rubbers, then remove it from the vehicle and recover the gasket.



16.7 Slacken and remove the bolts and springs securing the front pipe to the intermediate pipe/catalytic converter

Complete system

17 Undo the nuts securing the front pipe to the manifold, and the bolt securing the front pipe to its mounting bracket. Separate the front pipe from the manifold, and collect the gasket.

18 With the aid of an assistant, free the system from all its mounting rubbers, and manoeuvre it out from underneath the vehicle.

Heat shield(s)

19 The heat shields (where fitted) are secured in position by a mixture of nuts, bolts and clamps. When an exhaust section is renewed, transfer any relevant heat shields from the original over to the new section before installing the exhaust section on the vehicle.

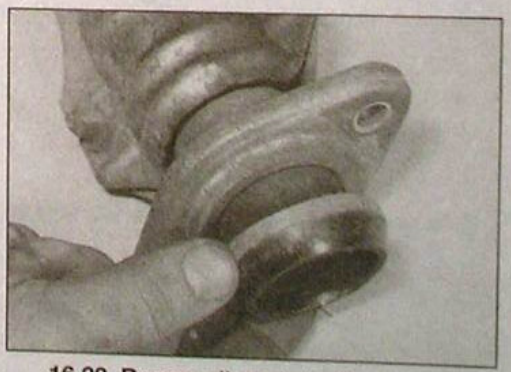
Refitting

20 Each section is refitted by a reverse of the removal sequence, noting the following points:

a) Ensure that all traces of corrosion have been removed from the flanges, and renew all necessary gaskets ***(see illustration)****.*

b) Inspect the rubber mountings for signs of damage or deterioration, and renew as necessary.

c) Prior to tightening the exhaust system fasteners to the specified torque, ensure that all rubber mountings are correctly located, and that there is adequate clearance between the exhaust system and vehicle underbody.



16.20 Renew all gaskets (front pipe shown)

exist between the switch terminals. Slowly decrease the engine speed whilst observing the meter; at 1200 rpm the switch should operate, and an open-circuit will be present between the switch terminals. If adjustment is necessary, carefully bend the tang until the switch operates as described.

13 Once the switch is correctly adjusted, stop the engine and reconnect the wiring connector.

Coolant temperature sensor

14 Refer to Chapter 3.

ECC control unit

15 The ECC control unit is situated just in front of the centre console, mounted onto the transmission tunnel floor. Prior to removal, disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

16 To gain access to the control unit, undo the retaining screws and release the retaining clips, then remove the small trim panel from each side of the front of the centre console (see Chapter 11).

17 Undo the retaining screws, and release the control unit from its mounting bracket. Disconnect the wiring connector(s) and remove the unit from the vehicle.

18 Refitting is the reverse of removal, ensuring that the wiring connector is securely reconnected.

Crank angle sensor

19 The crank angle sensor is an integral part of the distributor, and cannot be renewed separately. If the sensor is faulty, the complete distributor body assembly must be renewed. Refer to Chapter 5B for further information.

Clutch switch

20 The clutch switch is located on the pedal bracket behind the facia. To remove the switch, first disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual). If necessary, to improve access, remove the driver's side lower facia panel as described in Chapter 11.

21 Disconnect the wiring plug from the switch, then slacken the locknut and unscrew the switch from its mounting bracket.

22 Refitting is a reversal of removal. Ensure that the clutch is correctly adjusted (see Chapter 6) then adjust the switch as follows.

23 Connect a multi-meter, set to its resistance function, across the switch terminals. Position the switch so there is continuity between the terminals when the pedal is in the at-rest position, and an open-circuit when the pedal is lightly depressed. Once the switch is correctly adjusted, securely tighten the locknut and reconnect the wiring.

Neutral switch

24 Refer to Chapter 7A.

Power steering idle-up switch

25 The power steering idle-up switch is screwed into the power steering feed pipe, in the right-hand rear corner of the engine compartment. Prior to removal, position the front wheels in the straight-ahead position, then disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual).

26 Locate the switch and disconnect its wiring connector.

27 Unscrew the switch and plug its opening in the pipe, working quickly to minimise fluid loss and prevent dirt entering into the hydraulic system. Recover the switch sealing washer.

28 Refitting is the reverse of removal, using a new sealing washer.

Vehicle speed sensor

29 The vehicle speed sensor is an integral part of the speedometer. Refer to Chapter 12 for removal and refitting details.

14 Inlet manifold - removal and refitting

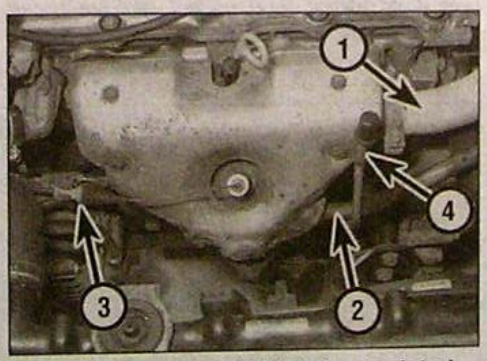
Note: *Refer to the warning note in Section 1 before proceeding.*

Removal

1 Remove the carburettor as described in Section 11.

2 Drain the cooling system as described in Chapter 1.

3 Make a note of the correct fitted locations of all the relevant inlet manifold vacuum and coolant hose connections. Disconnect them from the manifold and, where necessary, from the associated vacuum valves. To avoid confusion on refitting, it may be wise to label each hose as it is disconnected.



15.1 Exhaust manifold and associated components - models with a catalytic converter

1 *Hot-air inlet hose*
2 *EGR pipe*
3 *Exhaust gas sensor wiring connector*
4 *Exhaust gas sampling pipe*

4 On models with a catalytic converter, unscrew the union nut and free the EGR pipe, linking the inlet and exhaust manifolds, from the control valve on the left-hand end of the inlet manifold.

5 Disconnect the wiring connector from the coolant temperature sensor on the right-hand end of the manifold. Where necessary, undo the retaining bolt and free the earth lead from the manifold.

6 Undo the retaining bolts and remove the support bracket from the underside of the manifold.

7 Make a final check that all the relevant vacuum/breather hoses have been disconnected from the manifold.

8 Unscrew the retaining nuts and bolts, then manoeuvre the manifold away from the head and out of the engine compartment.

9 Remove the manifold gasket and discard it.

Refitting

10 Refitting is the reverse of the removal procedure, noting the following points:

a) Ensure that the manifold and cylinder head mating surfaces are clean and dry, and fit the new gasket to the head studs. Install the manifold, and tighten its retaining nuts and bolts to the specified torque setting.

b) Ensure that all relevant hoses are reconnected to their original positions, and are securely held (where necessary) by their retaining clips.

c) Refit the carburettor as described in Section 11.

d) On completion, refill the cooling system as described in Chapter 1.

15 Exhaust manifold - removal and refitting

Removal

1 Disconnect the hot-air inlet hose from the manifold shroud, and remove it from the vehicle **(see illustration)**.

2 On models with a catalytic converter, trace the wiring back from the exhaust gas sensor to its wiring connector, and disconnect it from the main wiring harness. Also unscrew the union nuts and free the EGR pipe, air induction pipe and the exhaust gas sampling pipe from the side of the manifold.

3 On all models, slacken and remove the retaining screws, and remove the shroud from the top of the exhaust manifold.

4 Firmly apply the handbrake, then jack up the front of the vehicle and support it on axle stands.

5 Undo the nuts securing the exhaust front pipe to the manifold, and the bolt securing the front pipe to its mounting bracket. Free the front pipe from the manifold, and recover the gasket.

12.25 Float height setting can be checked as described in text using the inspection window (arrowed)

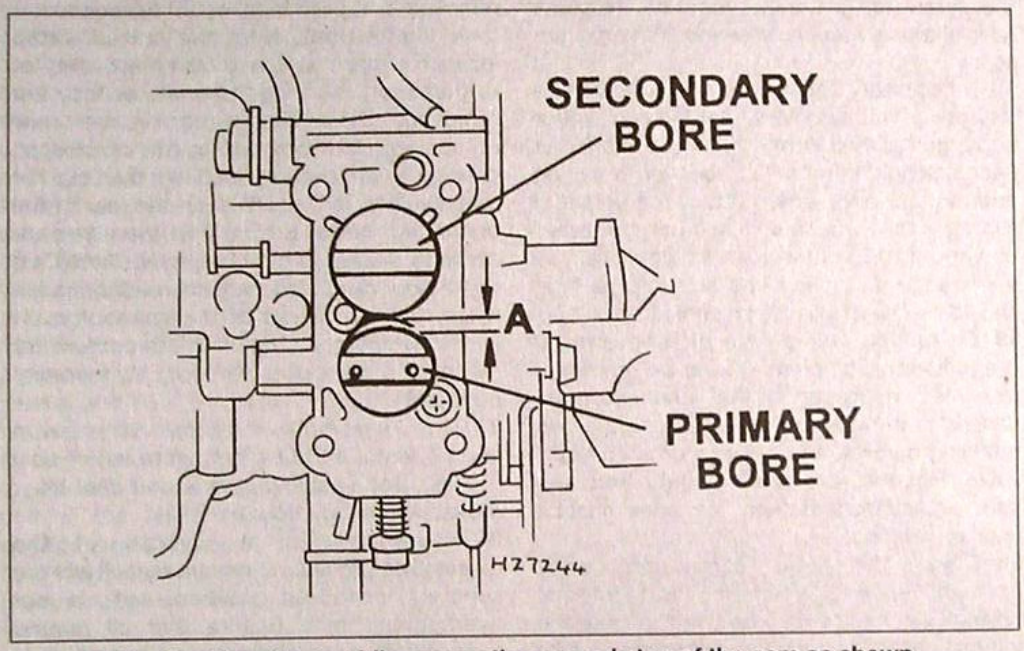
Adjustments

Idle speed and mixture settings

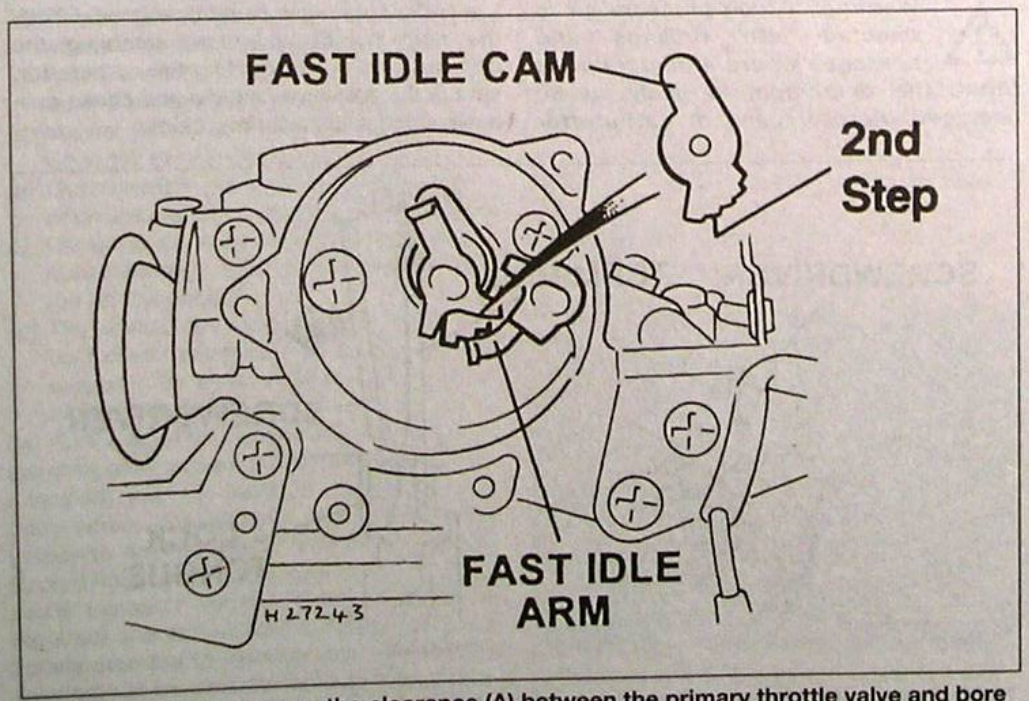
25 Refer to Chapter 1.

Float height (fuel level) setting

Note: *The float height setting can be checked without removing the carburettor, by checking the fuel level in the inspection window on the carburettor body. With the car parked on level ground, and the engine idling at the specified speed, the fuel level should be between the marks on each side of the inspection window* **(see illustration)**. *If not, the float height must be adjusted as described below.*



12.31a Position the fast idle arm on the second step of the cam as shown . . .



12.31b . . . then measure the clearance (A) between the primary throttle valve and bore

26 Invert the carburettor body so that the float is at the top.

27 Raise the float fully, then lower it slowly until it contacts the needle valve tip. Hold the float in this position, and measure the distance between the upper edge of the float and the sealing face of the upper body. This should be as given in the Specifications at the start of this Chapter. To adjust the setting, **carefully** bend the pivot arm.

28 Turn the carburettor body the correct way up, then measure the distance between the lower edge of the float and the sealing face of the upper body. This should be as given in the Specifications at the start of this Chapter. To adjust the setting, **carefully** bend the float stopper arm.

Throttle valve fast idle setting

29 Remove the three screws, and detach the bi-metallic cover assembly and fixing ring.

30 Invert the carburettor, then open the throttle slightly and place the fast idle arm against the second step of the fast idle cam. The adjustment screw will force open the throttle plate, to leave a small clearance.

31 Ensure that the choke flap is fully closed, then use the shank of a twist drill to measure the clearance A between the wall of the throttle bore and the throttle valve **(see illustration)**. Refer to the Specifications at the start of this Chapter for the required drill size.

32 Adjust as necessary by turning the fast idle adjustment screw in the appropriate direction.

33 Refit the fixing ring and bi-metallic coil housing, ensuring that the spring locates in the slot of the choke lever. Secure loosely with the three screws.

34 Align the cut mark on the bi-metallic cover with the correct mark on the choke assembly housing, and tighten the three screws.

Choke pull-down setting

35 Operate the carburettor choke linkage to fully close the choke valve, and hold the linkage in this position.

36 Attach a hand-held vacuum pump to the choke pull-down diaphragm, and apply a vacuum to the diaphragm so that the diaphragm rod is pulled fully into the diaphragm body. In the absence of a vacuum pump, the rod can be pushed into the diaphragm using a small screwdriver.

37 With the rod fully retracted, use the shank of a suitable twist drill to measure the clearance between the edge of the choke valve and bore, and compare this to the clearance given in the Specifications.

Note: *If the carburettor temperature is below 5° C (41°F), use the stage 1 clearance; above 16.5°C (62°F), refer to the stage 2 clearance.*

38 If necessary, adjust the clearance by **carefully** bending the pull-down tongue in the appropriate direction **(see illustration opposite)**.

9 The choke is controlled by an electrically-heated bi-metallic coil spring which is linked to the choke valve. The choke is operated by slowly depressing the accelerator pedal. Once the engine is running, an electrical supply is applied to the bi-metallic coil. This heats the bi-metallic coil, causing it to unwind and open up the choke valve.

Models with a catalytic converter

10 The Nikki carburettor fitted to models with a catalytic converter is basically the same as that fitted to non-catalytic converter models described above. The only major difference is that the carburettor is electronically controlled by the ECC (electronically controlled carburettor) control unit (which also controls the ignition system - see Chapter 5B). This is made possible by the fitting of an air/fuel ratio solenoid valve to the carburettor, this is opened and closed rapidly under the control of the ECC control unit, to richen or weaken the air/fuel mixture ratio by opening or closing the compensating air bleed and main jet.

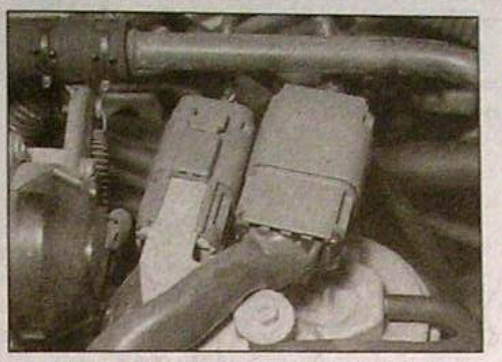
11 The electrical side of the system consists of the ECC control unit, and all the sensors that provide it with information.

12 The principal information required by the control unit is provided by the boost pressure sensor and the crank angle sensor (which is housed in the distributor). The boost pressure sensor informs the ECC unit of the load on the engine, and the crank angle sensor informs the unit of the engine speed and crankshaft position (see Chapter 5 for further information).

13 Additional information to refine air/fuel mixture control comes from the following sensors:

a) Coolant temperature sensor - informs control unit of the engine temperature.
b) Throttle valve switch - informs control unit whether the throttle is closed or open.
c) Ignition switch - informs the control unit when the engine is being started.
d) Neutral switch - informs the control unit when the transmission is in neutral.
e) Clutch switch - informs the control unit when the clutch is engaged/disengaged.
f) Vehicle speed sensor (mounted in the speedometer) - informs the control unit of the vehicle speed.
g) The exhaust gas sensor - sends the control unit information on the amount of oxygen in the exhaust gases (see Part D of this Chapter).

14 All the signals received by the control unit are compared with set values pre-programmed (mapped) into its memory; based on this information, the control unit selects the response appropriate to those values, and accordingly controls the ignition coil (via the power transistor, varying the ignition timing as required), the air/fuel ratio solenoid valve, the accelerator pump, idle-up and idle cut-off solenoid valves, and the exhaust gas sensor. The mixture, idle speed and ignition timing are constantly varied by the control unit, to provide



11.4 Carburettor wiring connectors

the best settings for starting (with either a hot or cold engine), engine warm-up, idle, cruising and acceleration.

15 To reduce emissions and improve driveability when the engine is cold, an electrical heating element (controlled by the ECC unit) is fitted between the carburettor and inlet manifold to quickly warm-up the carburettor on cold starts. When the engine is up to normal operating temperature, the ECC unit closes the idle cut-off valve when the engine is on the overrun (effectively cutting off the fuel supply to the engine) to improve fuel economy and reduce exhaust emissions.

16 In order to further reduce exhaust emissions, an exhaust gas recirculation (EGR) system and air induction system is fitted. Refer to Part D of this Chapter for further information on these systems.

11 Carburettor - removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding.*

Removal

1 Disconnect the battery negative terminal (refer to *Disconnecting the battery* in the Reference Section of this manual). Partially drain the cooling system as described in Chapter 1.

2 Remove the air cleaner housing as described in Section 2.

11.5 Slacken the retaining clip (arrowed) and disconnect the fuel hose from the carburettor

3 Free the accelerator inner cable from the carburettor throttle cam, then slacken the outer cable locknut and adjuster nut, and free the outer cable from its mounting bracket.

4 Trace the wiring back from the carburettor electrical components to its wiring connector(s), and disconnect them from the main wiring harness **(see illustration)**. On models with a catalytic converter, also disconnect the mixture heater connector situated at the front of the manifold.

5 Slacken the retaining clip, and disconnect the fuel feed hose from the carburettor **(see illustration)**. Place wads of rag around the union to catch any spilled fuel. Plug the hose as soon as it is disconnected, to minimise fuel loss and prevent dirt entry into the system.

6 Make a note of the correct fitted positions of all the relevant vacuum pipes and breather hoses, to ensure that they are correctly positioned on refitting, then release the retaining clips (where fitted) and disconnect them from the carburettor.

7 Slacken and remove the four retaining bolts securing the carburettor to the manifold, and remove the carburettor assembly from the car. Remove the insulating spacer (non-catalyst models) or heating element (catalyst models), and plug the inlet manifold port with a wad of clean cloth to prevent the possible entry of foreign matter.

Refitting

8 Refitting is the reverse of the removal procedure, noting the following points:

a) Prior to refitting, ensure that the carburettor, inlet manifold and insulating spacer/heating element sealing faces are clean and flat. Refit them to the manifold, and securely tighten the carburettor retaining bolts.
b) Use the notes made on dismantling to ensure that all hoses are refitted to their original positions and, where necessary, are securely held by their retaining clips.
c) Ensure that all wiring is correctly routed and securely reconnected.
d) Reconnect and adjust the accelerator cable as described in Section 7.
e) Refit the air cleaner housing as described in Section 2.
f) On completion, top-up the cooling system then check and, if necessary, adjust the idle speed and mixture settings as described in Chapter 1.

12 Carburettor - fault diagnosis, overhaul and adjustments

Fault diagnosis

1 If a carburettor fault is suspected, always check first that the ignition timing is accurate, that the spark plugs are in good condition and correctly gapped, that the accelerator and choke cables are correctly adjusted, and that

2 Slacken the outer cable locknut and adjuster nut, then free the outer cable from its mounting bracket **(see illustration)**.
3 Working back along the length of the cable, free it from any relevant retaining clips or ties, whilst noting its correct routing.
4 Working inside the vehicle, remove the lower facia panel from the driver's side of the facia, as described in Chapter 11.
5 Reach up behind the facia, and detach the inner cable from the top of the accelerator pedal.
6 Undo the bolts securing the outer cable end fitting to the bulkhead, then withdraw the cable through the bulkhead and into the passenger compartment.

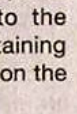
Refitting

7 From inside the vehicle, feed the cable through the hole in the bulkhead.
8 When the end of the cable appears in the engine compartment, pull the cable through the bulkhead, and route it correctly around the engine compartment.
9 Return to the inside of the vehicle, and secure the outer cable end fitting to the bulkhead by securely tightening its retaining bolts. Clip the inner cable into position on the top of the accelerator pedal.
10 Make sure that the cable is securely retained, then refit the lower panel to the facia (see Chapter 11).
11 From within the engine compartment, work along the cable, and ensure that it is secured in position with all the relevant retaining clips and ties, and correctly routed.
12 Locate the outer cable in its mounting bracket, and reconnect the inner cable to the throttle cam. Adjust the cable as described below.

Adjustment

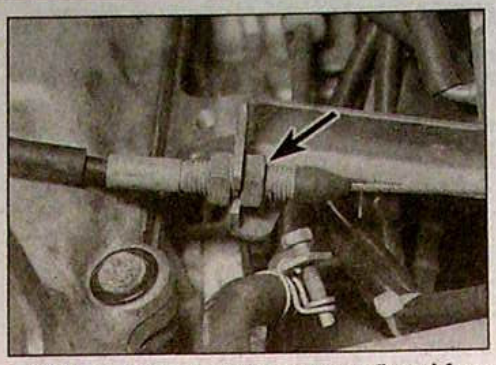
13 With the throttle cam resting against its stop, slacken the accelerator cable locknut, and position the adjuster nut so that only a slight amount of free play is present in the inner cable. Hold the adjuster nut stationary, and securely tighten the locknut.
14 Have an assistant depress the accelerator pedal, and check that the throttle cam opens fully and returns smoothly to its stop. If necessary, readjust the cable as described above.

8 Accelerator pedal - removal and refitting



Removal

1 Remove the lower facia panel from the driver's side of the facia, as described in Chapter 11.
2 Reach up behind the facia, and detach the inner cable from the top of the accelerator pedal.



7.2 Slacken the locknut (arrowed) and free the accelerator cable from its mounting bracket

3 Undo the two mounting bolts securing the pedal mounting bracket to the bulkhead, and remove the pedal assembly from underneath the facia.
4 If necessary, remove the retaining clip from the end of the accelerator pedal pivot shaft, then slide the pedal out of position and recover the return spring from the mounting bracket.
5 Examine the mounting bracket and pedal pivot points for signs of wear, and renew as necessary.

Refitting

6 Refitting is a reversal of the removal procedure, applying a little multi-purpose grease to the pedal pivot shaft. On completion, adjust the accelerator cable as described in Section 7.

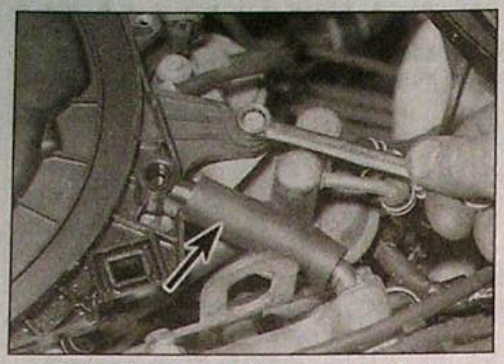
9 Unleaded petrol - general information and usage

Note: *The information given in this Chapter is correct at the time of writing, and applies only to petrols currently available in the UK. If updated information is thought to be required, check with a Nissan dealer. If travelling abroad, consult one of the motoring organisations (or a similar authority) for advice on the petrols available, and their suitability for your vehicle.*
1 The fuel recommended by Nissan is given in the Specifications Section of this Chapter.
2 RON and MON are different testing standards; RON stands for Research Octane Number (also written as RM), while MON stands for Motor Octane Number (also written as MM).
3 All Nissan Primera carburettor models are designed to run on fuel with a minimum octane rating of 95 (RON). All models with a catalytic converter must be run on unleaded fuel **only**. Under no circumstances should leaded fuel be used, as this may damage the catalyst. On models without a catalytic converter, either unleaded or leaded fuel can be used without modification.

10 Carburettor - general information

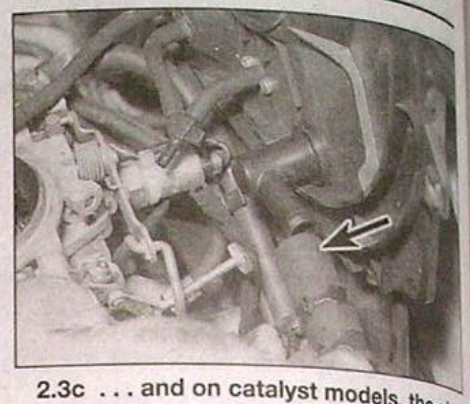
Models without a catalytic converter

1 The Nikki 21 L series carburettor is a down-draught progressive twin venturi instrument, with a vacuum-controlled secondary throttle **(see illustration)**. The choke control is semi-automatic in operation.
2 The carburettor is constructed in three main bodies; these are the upper body, the main body, and the throttle body (which contains the throttle assembly). An insulating block, placed between the main carburettor body and the throttle body, prevents excess heat transference to the main body.
3 During slow running and at idle, fuel sourced from the float chamber passes into the idle channel through a metered idle jet. Here it is mixed with a small amount of air from a calibrated air bleed. The resulting mixture is drawn through a channel, to be discharged from the idle orifice under the throttle valve. A tapered mixture screw is used to vary the outlet, and this ensures fine control of the idle mixture. An idle cut-off valve is used to prevent run-on when the engine is shut down. It utilises a 12-volt solenoid plunger to block the idle channel when the ignition is switched off.
4 A progression slot provides extra enrichment as it is uncovered by the opening of the throttle valve during initial acceleration.
5 Under normal operating conditions, fuel is drawn through a calibrated main jet, into the base of the auxiliary venturi. An emulsion tube is placed in the auxiliary venturi, capped with a main air bleed. The fuel is mixed with air, drawn in through the holes in the emulsion tube. The resulting mixture is discharged into the main airstream via the main nozzle.
6 The carburettor is also equipped with an accelerator pump, to provide an initial spurt of extra fuel during sudden acceleration. The accelerator pump is mechanically operated by a lever which is connected to the throttle linkage. A solenoid valve, controlled by a thermostatic switch, is fitted to the accelerator pump circuit to vary the pump output. With the engine cold, the solenoid valve is opened, and the pump gives maximum output. Once the engine reaches operating temperature, the solenoid valve closes, and the pump output is reduced.
7 The idle speed is set by an adjustable screw. The adjustable mixture screw is sealed during production with a tamperproof plug to prevent unnecessary adjustment.
8 When an electrical load is placed on the alternator (or the power steering is in operation), the idle speed will tend to drop, since both the alternator and the power steering pump are engine-driven. To counteract this stalling tendency, an idle-up solenoid is fitted to the carburettor. The solenoid opens a bypass fuel-and-air channel to increase the idle speed.



2.3a Disconnect the breather hose (arrowed), and undo the mounting bolt . . .

2.3b . . . then lift up the housing base and disconnect the various vacuum hoses . . .



2.3c . . . and on catalyst models, the air induction valve (AIV) hose (arrowed)

3 Undo the retaining bolt, and disconnect the breather hose from the front of the air cleaner housing base. Lift up the base, then disconnect the necessary vacuum hose(s) (noting their correct fitted locations) from the hot idle compensator and air temperature control valve switch, as they become accessible. On models with a catalytic converter, also disconnect the air induction valve (AIV) hose **(see illustrations)**.

4 Remove the housing lid and base as an assembly, and recover the housing seal from the top of the carburettor.

5 To remove the inlet duct, undo the two retaining bolts and free it from the resonator. If necessary, the resonator box can then be unbolted and removed from the vehicle.

Refitting

6 Refitting is a reverse of the removal procedure, ensuring that all ducts and hoses are securely reconnected to their original locations, and do not become trapped as the housing is refitted.

3 Air cleaner air temperature control (ATC) system

General information

1 The system is controlled by a heat-sensitive vacuum switch mounted in the base of the air cleaner housing. When the engine is started from cold, the switch is open, and allows inlet manifold depression to act on the air temperature control valve diaphragm in the air inlet nozzle. This vacuum causes the diaphragm to rise, drawing a flap valve across the cold air inlet, thus allowing only (warmed) air from around the exhaust manifold to enter the air cleaner.

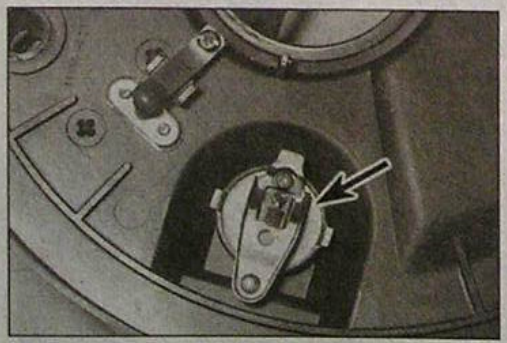
2 As the temperature of the exhaust-warmed air in the air cleaner rises, the bi-metallic strip in the vacuum switch deforms, closing the switch to shut off vacuum supply to the air temperature control valve assembly. As the vacuum supply is cut, the flap is gradually lowered across the hot-air inlet until, when the engine is fully warmed up to normal operating temperature, only cold air from the front of the car is entering the air cleaner.

3 To check the system, allow the engine to cool down completely, then disconnect the inlet duct from the front of the air cleaner inlet nozzle; the flap valve in the nozzle should be securely seated across the hot-air inlet. Start the engine; the flap should immediately rise to close off the cold air inlet, and should then lower steadily as the engine warms up until it is eventually seated across the hot-air inlet again.

4 To check the vacuum switch, disconnect the vacuum pipe from the control valve when the engine is running, and place a finger over the pipe end. When the engine is cold, full inlet manifold vacuum should be present in the pipe; when the engine is at normal operating temperature, there should be no vacuum in the pipe.

5 To check the air temperature control valve assembly, remove the valve assembly from the air cleaner lid (see below). Disconnect the vacuum pipe, and suck hard at the control valve stub; the flap should rise to shut off the cold air inlet.

6 If either component is faulty, it must be renewed.



3.8 Air temperature control valve vacuum switch (arrowed). Hot idle compensator valve is also shown

3.12 Removing the air temperature control valve assembly from the air cleaner lid

Vacuum switch - renewal

7 Remove the air cleaner housing as described in Section 2.

8 Bend up the tangs on the switch retaining clip, and remove the clip **(see illustration)**. Withdraw the switch and seal from the housing. Examine the seal for signs of damage or deterioration, and renew if necessary.

9 Fit the seal to the switch, and install the assembly in the housing. Ensure that the switch is pressed firmly against the housing, and refit the retaining clip, securing it in position by bending down the clip tangs.

10 Refit the air cleaner housing as described in Section 2.

Air temperature control valve - renewal

11 Remove the air cleaner housing as described in Section 2.

12 Undo the three screws, and remove the air temperature control valve from the housing lid **(see illustration)**. Disconnect the vacuum hose and remove the valve assembly.

13 Undo the retaining screw, then free the vacuum diaphragm unit from the flap valve and remove it from the duct.

14 Fit the new diaphragm unit, attach it to the flap valve, and securely tighten its retaining screw.

15 Connect the vacuum hose and refit the valve assembly to the housing lid, tightening its retaining screws securely.

16 Refit the air cleaner as described in Section 2.

4 Fuel pump - testing, removal and refitting

Note: *Refer to the warning note in Section 1 before proceeding.*

Testing

1 To test the fuel pump without removing it from the engine **(see illustration)**, disconnect the outlet pipe which leads to the carburettor.

Carburettor data (continued)

	Primary	Secondary
Models with a catalytic converter:		
Throttle chamber bore	30 mm	34 mm
Venturi diameter	22 mm	30 mm
Main jet	92	135
Main air bleed	70	60
Slow jet	50	80
Slow air bleed	80	80
Float height setting:		
Float upper edge to carburettor body (carburettor inverted)	10 ± 0.5 mm	
Float lower edge to carburettor body (carburettor upright)	43.5 ± 0.5 mm	
Throttle valve fast idle setting	0.63 ± 0.07 mm	
Choke pull-down setting:		
Stage 1	1.49 ± 0.14 mm	
Stage 2	2.26 ± 0.32 mm	

Fuel system component test data - non-catalyst models

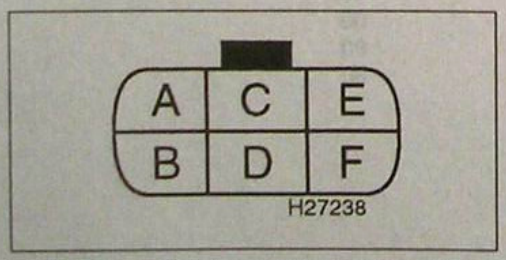
Idle cut-off solenoid **(see illustration SPEC 1)**:	
Apply 12 volts across terminal E (+) and solenoid body(-)	Solenoid should click, indicating correct operation
Accelerator pump solenoid **(see illustration SPEC 1)**:	
Apply 12 volts across terminal A (+ supply) and B (- supply)	Solenoid should click, indicating correct operation
Idle-up solenoid **(see illustration SPEC 1)**:	
Apply 12 volts across terminal C (+ supply) and D (- supply)	Solenoid should click, indicating correct operation
Accelerator pump solenoid coolant temperature switch:	
Meter connected across switch terminals:	
Below 70°C (158°F)	Continuity between terminals
Above 70°C (158°F)	Open-circuit between terminals
Power steering pressure switch:	
Steering wheel being turned	Continuity between switch terminals
Steering wheel stationary	Open-circuit between switch terminals

Note: *All resistance readings given are approximate values, which should be used as a guide only. Before condemning a component as faulty, have your findings confirmed by a Nissan dealer.*

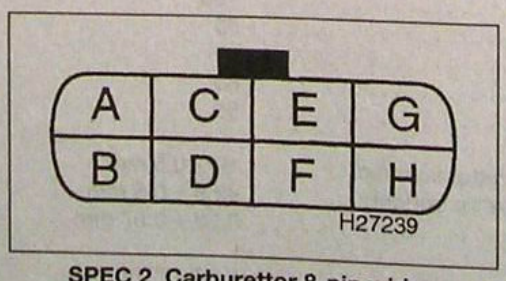
Fuel system (ECC) component test data - catalyst models

Throttle valve switch resistances **(see illustration SPEC 2)**:	
Meter connected between terminals C and D:	
Throttle valve fully closed	Open-circuit between terminals
Throttle valve open	Continuity between terminals
Idle cut-off solenoid **(see illustration SPEC 2)**:	
Apply 12 volts across terminal G (+ supply) and H (- supply)	Solenoid should click, indicating correct operation
Accelerator pump solenoid **(see illustration SPEC 2)**:	
Apply 12 volts across terminal A (+ supply) and B (- supply)	Solenoid should click, indicating correct operation
Idle-up solenoid **(see illustration SPEC 3)**:	
Apply 12 volts across terminal C (+ supply) and D (- supply)	Solenoid should click, indicating correct operation
Air/fuel ratio solenoid valve **(see illustration SPEC 3)**:	
Meter connected between terminals A and B	Continuity should exist
Throttle switch	See Section 13
Mixture heater	Continuity should exist between heater terminals
Clutch switch:	
Clutch pedal released	Continuity between switch terminals
Clutch pedal depressed	Open-circuit between switch terminals
Power steering pressure switch:	
Steering wheel being turned	Continuity between switch terminals
Steering wheel stationary	Open-circuit between switch terminals

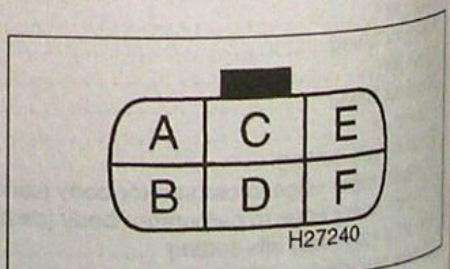
Note: *All resistance readings given are approximate values, which should be used as a guide only. Before condemning a component as faulty, have your findings confirmed by a Nissan dealer.*



SPEC 1 Carburettor wiring connector - non-catalyst models



SPEC 2 Carburettor 8-pin wiring connector - catalyst models

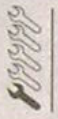


SPEC 3 Carburettor 6-pin wiring connector - catalyst models

Chapter 4 Part A:
Fuel/exhaust systems - carburettor models

Contents

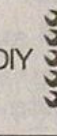
Degrees of difficulty

Easy, suitable for novice with little experience 

Fairly easy, suitable for beginner with some experience 

Fairly difficult, suitable for competent DIY mechanic 

Difficult, suitable for experienced DIY mechanic 

Very difficult, suitable for expert DIY or professional 

Specifications

General

Engine code:	
1.6 litre models	GA16DS
Fuel pump type	Mechanical, driven by eccentric on inlet camshaft
Carburettor:	
Type	Nikki 21L
Designation:	
Models without a catalytic converter	21L304-05
Models with a catalytic converter	21L304-06
Choke type	Automatic

Carburettor data

For idle speed and mixture settings, refer to Chapter 1 Specifications.

	Primary	Secondary
Models without a catalytic converter:		
Throttle chamber bore	30 mm	34 mm
Venturi diameter	22 mm	30 mm
Main jet	100	135
Main air bleed	80	60
Slow jet	40	80
Slow air bleed	80	80
Power jet	55	
Float height setting:		
Float upper edge to carburettor body (carburettor inverted)	10 ± 0.5 mm	
Float lower edge to carburettor body (carburettor upright)	43.5 ± 0.5 mm	
Throttle valve fast idle setting	0.63 ± 0.07 mm	
Choke pull-down setting:		
Stage 1	1.27 ± 0.14 mm	
Stage 2	2.02 ± 0.32 mm	