MAINTENANCE

SECTION MA

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SPECIAL SERVICE TOOLS

Tool number Tool name	Description	Engine application		
		SR20DE	GA16DE	LD20-II
EG17650301 Radiator cap tester adapter		X	X	X
KV10115800 Oil filter cap wrench 65 mm (2.56 in) dia.	Removing oil filter 	X	—	—
KV10106250 Oil filter cap wrench	Removing oil filter 	—	X	—
KV10105900 Oil filter cap wrench	Removing oil filter 	—	—	X

Shown below are Pre-delivery Inspection Items required for the new vehicle. It is recommended that necessary items other than those listed here be added, paying due regard to the conditions in each country.

Perform applicable items on each model. Consult text of this section for specifications.

UNDER HOOD (front) — engine off

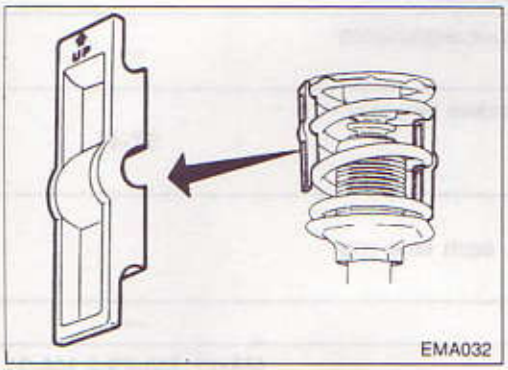
- ☐ Radiator coolant level and coolant hose connections for leaks
- ☐ Battery fluid level, specific gravity and conditions of battery terminals
- ☐ Brake and clutch reservoirs fluid level and fluid lines for leaks
- ☐ Windshield and rear window washer and headlamp cleaner reservoir fluid level

UNDER HOOD (Interior) — engine off

- ☐ Drive belts tension
- ☐ Fuel filter for water or dust, and fuel lines and connections for leaks
- ☐ Power steering reservoir fluid level and hose connections for leaks
- ☐ Engine oil level and oil leaks

INSIDE AND OUTSIDE

- ☐ Remove front spring/strut spacers. Lift up front of vehicle to remove them easily.



WARNING:
Do not drive at speeds higher than 8 km/h (5 miles/h) before spacers have been removed. The handling of the car can be affected seriously.

- ☐ Operation of all instruments, gauges, lights and accessories
- ☐ Operation of horn(s), wiper and washer
- ☐ Steering lock for operation
- ☐ Air conditioner for gas leaks
- ☐ Front and rear seats, and seat belts for operation
- ☐ All moldings, trims and fittings for fit and alignment
- ☐ All windows for operation and alignment
- ☐ Hood, tailgate, door panels for fit and alignment
- ☐ Latches, keys and locks for operation
- ☐ Weatherstrips for adhesion and fit
- ☐ Headlamp aiming
- ☐ Tighten wheel nuts
- ☐ Tire pressure (Inc. spare tire)
- ☐ Check front wheels for toe-in
- ☐ Check rear wheels for toe-in (I.R.S. models only)
- ☐ Install clock/room lamp fuse.
- ☐ Remove wiper blade protectors (If necessary)

UNDER BODY

- ☐ Manual transmission/transaxle and differential gear oil level
- ☐ Brake and fuel lines and oil/fluid reservoirs for leaks
- ☐ Tighten bolts and nuts of steering linkage and gear box, suspension, propeller shafts and drive shafts

ROAD TEST

- ☐ Clutch operation
- ☐ Parking brake operation
- ☐ Service brake operation
- ☐ Steering control and returnability
- ☐ Engine performance
- ☐ Squeaks and rattles

ENGINE OPERATING AND HOT

- ☐ Adjust idle mixture and speed (and ignition timing)
- ☐ Engine idling and stop knob operation (Diesel only)

FINAL INSPECTION

- ☐ Install necessary parts (outside mirror, wheel covers, seat belts, mat, carpet or mud flaps)
- ☐ Inspect for interior and exterior metal and paint damage
- ☐ Check for spare tire, jack, tools and literature
- ☐ Wash, clean interior and exterior

General maintenance includes those items which should be checked during the normal day-to-day operation of the vehicle. They are essential if the vehicle is to continue operating properly. The owners can perform the checks and inspections themselves or they can have their NISSAN dealers do them at a nominal charge.

Item	Reference pages
OUTSIDE THE VEHICLE The maintenance items listed here should be performed from time to time, unless otherwise specified.	
Tires Check the pressure with a gauge periodically when at a service station, including the spare, and adjust to the specified pressure if necessary. Check carefully for damage, cuts or excessive wear.	—
Windshield wiper blades Check for cracks or wear if they do not wipe properly.	—
Doors and engine hood Check that all doors, the engine hood, the trunk lid and back door operate properly. Also ensure that all latches lock securely. Lubricate if necessary. Make sure that the secondary latch keeps the hood from opening when the primary latch is released. When driving in areas using road salt or other corrosive materials, check for lubrication frequently.	MA-47
Tire rotation Tires should be rotated every 10,000 km (6,000 miles).	MA-46
INSIDE THE VEHICLE The maintenance items listed here should be checked on a regular basis, such as when performing periodic maintenance, cleaning the vehicle, etc.	
Lights Make sure that the headlights, stop lights, tail lights, turn signal lights, and other lights are all operating properly and installed securely. Also check headlight aim.	—
Warning lights and buzzers/chimes Make sure that all warning lights and buzzers/chimes are operating properly.	—
Steering wheel Check for change in the steering conditions, such as excessive free play, hard steering or strange noises. **Free play: Less than 35 mm (1.38 in)**	ST-4
UNDER THE HOOD AND VEHICLE The maintenance items listed here should be checked periodically e.g. each time you check the engine oil or refuel.	
Windshield washer fluid Check that there is adequate fluid in the tank.	—
Engine coolant level Check the coolant level when the engine is cold.	MA-11, MA-23 & MA-31
Engine oil level Check the level after parking the vehicle on a level spot and turning off the engine.	MA-17, MA-25 & MA-36
Brake and clutch fluid level Make sure that the brake fluid level is between the "MAX" and "MIN" lines on the reservoir.	MA-41, MA-43
Battery Check the fluid level in each cell. It should be between the "MAX" and "MIN" lines.	EL-11

The following tables show the normal maintenance schedule. Depending upon weather and atmospheric conditions, varying road surfaces, individual driving habits and vehicle usage, additional or more frequent maintenance may be required.

Periodic maintenance beyond the last period shown on the tables requires similar maintenance.

Engine Oil & Minor Service (Gasoline engine)

Abbreviations: R = Replace I = Inspect. Correct or replace if necessary.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page	
Perform on a mileage basis, but on an anual basis when driving less than 9,000 miles (15,000 km) in a year.	Miles x 1,000	9	18	27	36	45	54	63	72	SR series	GA series
	(km x 1,000)	(15)	(30)	(45)	(60)	(75)	(90)	(105)	(120)		
	Months	12	24	36	48	60	72	84	96		
(Engine oil service)		**Engine compartment and under vehicle**									
Engine oil (Use API SG oil only)★		R	R	R	R	R	R	R	R	MA-17	MA-25
Engine oil filter (Use Nissan PREMIUM type or equivalent)★		R	R	R	R	R	R	R	R	MA-17	MA-26
(Minor service)		**Engine compartment**									
Intake & exhaust valve clearance (Except hydraulic lash adjuster type)		See NOTE (1)								—	EM-87
Spark plugs See NOTE (3)		R	R	R	R	R	R	R	R	—	MA-26

NOTE: (1) For GA series engines periodic adjustment is not necessary. However, inspect valve clearances if the valve noise increases.
(2) Maintenance items with "★" should be performed more frequently according to "Maintenance under severe driving conditions".
(3) Non-catalizer models only.

Engine Oil & Minor Service (Diesel engine)

Abbreviations: R = Replace I = Inspect. A = Adjust. Correct or replace if necessary.

MAINTENANCE OPERATION		MAINTENANCE INTERVAL								Reference page
Perform on a mileage basis, but on a semi-annual basis when driving less than 5,000 miles (7,500 km) in half a year.	Miles x 1,000	4.5	9	13.5	18	37.5	45	52.5	60	LD series
	(km x 1,000)	(7.5)	(15)	(22.5)	(30)	(37.5)	(45)	(52.5)	(60)	
	Months	6	12	18	24	30	36	42	48	
(Engine oil service)		**Engine compartment and under vehicle**								
Engine oil (Use API CE oil only)★		R	R	R	R	R	R	R	R	MA-36
Engine oil filter★	See NOTE (1)	R	R	R	R	R	R	R	R	MA-37
Drive belts (For tension)		I	(At the first oil change only)							MA-30
(Minor service)		**Engine compartment**								
Idle rpm			I		I		I		I	MA-39
Drive belts			I		I		I		I	MA-30
Intake and exhaust valve clearance			A		A		A		A	MA-39

NOTE: (1) Use dual element type (Part No. 15208-40L00) for engines with E.G.R. system.
(2) Maintenance items with "★" should be performed more frequently according to "Maintenance under severe driving conditions".

Major Service

Abbreviations: R = Replace I = Inspect. Correct or replace if necessary ( ): At the specified mileage only.

MAINTENANCE OPERATION			MAINTENANCE INTERVAL				Reference pages		
Perform on an annual basis, but on a mileage basis when driving more than 18,000 miles (30,000 km) in a year.		Months	12	24	36	48	SR series	GA series	LD series
		Miles x 1,000	18	36	54	72			
		(km x 1,000)	(30)	(60)	(90)	(120)			
ENGINE		**Underbonnet and under vehicle**							
Drive belts		See NOTE (1)		I	I	I	MA-10	MA-22	MA-30
Engine anti-freeze coolant (Ethylene glycol base)		See NOTE (2)					MA-11	MA-23	MA-31
Cooling system			I	I	I	I	MA-15	MA-23	MA-35
Fuel lines				I		I	MA-15	MA-24	MA-35
Air cleaner filter (Viscous paper type)★				R		R	MA-16	MA-25	MA-36
PETROL ENGINE	Fuel filter★				R		MA-16	MA-24	—
	Spark plugs	Except below	R	R	R	R	MA-18	MA-26	—
		PLATINUM-TIPPED type for catalyzer models			(R)		MA-18	MA-26	—
	Ignition leads (Except for Sweden)				I		MA-19	MA-27	—
	Positive crankcase ventilation (P.C.V.) system *1		I	I	I	I	MA-19	MA-28	—
	Vacuum hoses and connections *1		I	I	I	I	MA-20	MA-28	—
	Exhaust gas sensor (Except for Sweden) *2			I		I	MA-21	MA-29	—
	Vapor lines *2	See NOTE (4)		I		I	MA-20	MA-28	—
DIESEL ENGINE	Fuel filter★			R		R	—	—	MA-36
	Injection nozzles	See NOTE (5)					—	—	MA-38
	Timing belt for camshaft and injection pump				(R)		—	—	EM-114
CHASSIS AND BODY		**Underbonnet and under vehicle**							
Brake & clutch fluid			I	I	I	I	MA-41, 43		
Brake fluid★				R		R	MA-43		
Brake booster vacuum hoses, connections & check valve				I		I	MA-44		
Power steering fluid & lines			I	I	I	I	MA-46		
Brake & clutch system			I	I	I	I	MA-41, 43		
Manual transmission/transaxle & standard differential gear oil★			I	I	I	I	MA-41, 42		
Limited-slip differential (L.S.D.) gear oil (except viscous type)★			I	R	I	R	MA-42, 43		
Steering gear & linkage, axle & suspension parts, propeller shaft & exhaust system★				I		I	MA-41, 46, FA-4, RA-4		
Drive shafts★			I	I	I	I	RA-12, 24		
		Outside and inside							
Wheel alignment (if necessary, rotate & balance wheels)			I	I	I	I	MA-446, FA-5, RA-5		
Brake pads, discs & other brake components★			I	I	I	I	MA-44		
Brake linings, drums & other brake components★			I	I	I	I	MA-45		
Headlamp aiming			I	I	I	I	EL-49		
Foot brake, parking brake & clutch (For free play, stroke & operation)			I	I	I	I	BR-13, 28		CL-4
Body corrosion					Annually		MA-48		

NOTE: (1) After 24 months or 36,000 miles (60,000 km), check every 12 months or 18,000 miles (30,000 km)
(2) Change at 60 month or 54,000 miles (90,000 km), then every 24 months or 36,000 miles (60,000 km).
(3) For Sweden perform at mileage interval only.
(4) For Sweden perform at the first 90,000 km (54,000 miles), and then every 60,000 km (36,000 miles) or 24 months, whichever comes first.
(5) If engine power decreases, black exhaust smoke is emitted or engine noise increases, check and, if necessary, adjust the fuel injection nozzle's starting pressure and the fuel spray pattern.
(6) Maintenance items with "★" should be performerd more frequently according to "Maintenance under severe driving conditions".
***1: Non-catalyzer models only *2: Catalyzer models**

Maintenance Under Severe Driving Conditions

The maintenance intervals shown on the preceding pages are for normal operating conditions. If the vehicle is mainly operated under severe driving conditions as shown below, more frequent maintenance must be performed on the following items as shown in the table.

SEVERE DRIVING CONDITIONS

A — Driving under dusty conditions
B — Driving repeatedly short distances
C — Towing a trailer
D — Extensive idling
E — Driving in extremely adverse weather conditions or in areas where ambient temperatures are either extremely low or extremely high
F — Driving in high humidity areas or in mountainous areas
G — Driving in areas using salt or other corrosive materials
H — Driving on rough and/or muddy roads or in the desert
I — Driving with frequent use of braking or in mountainous areas

Driving condition	Maintenance item	Maintenance operation	Maintenance interval	Reference page		
				SR series	GA series	LD series
	Engine oil service					
A B C D	Engine oil & oil filter Gasoline engine	Replace	Every 6 months or 4,500 miles (7,500 km)	MA-17	MA-25, MA-26	—
	Diesel engine	Replace	Every 3 months or 3,000 miles (5,000 km)	—	—	MA-36, MA-37
	Major service					
A	Air cleaner filter	Replace		MA-16	MA-25	MA-36
A E	Fuel filter	Replace		MA-16	MA-24	MA-36
F	Brake fluid	Replace		MA-43		
G H	Steering gear & linkage, axle & suspension parts, propeller shaft & exhaust system	Check	Every 12 months or 18,000 miles (30,000 km)	MA-41, 46, FA-4, RA-4		
C H	Limited-slip differential (L.S.D.) gear oil (except viscous type)	Replace		MA-42, MA-43		
C H	Manual transmission/transaxle & standard differential gear oil	Replace	Every 24 months or 36,000 miles (60,000 km)	MA-41, 42		
A C G H I	Brake pads, discs & other brake components	Check		MA-44		
A C G H I	Brake linings, drums & other brake components	Check	Every 6 months or 9,000 miles (15,000 km)	MA-45		
C H	Drive shafts	Check		RA-12, RA-24		

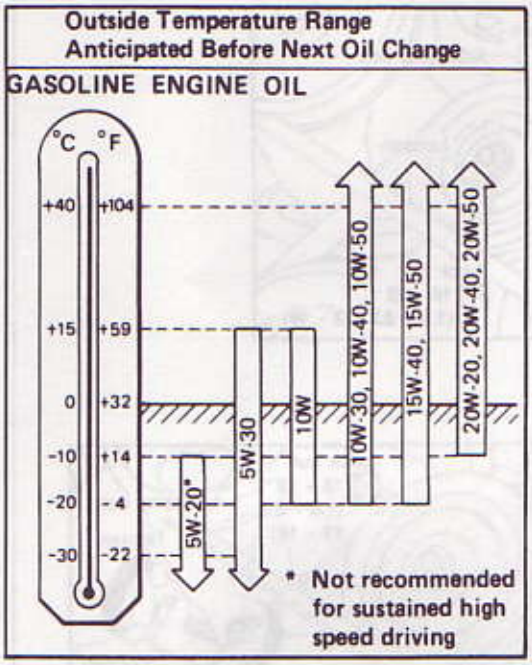
Maintenance operation: Check = Check. Correct or replace if necessary.

Fluids and Lubricants

		Capacity (Approximate)		Recommended fluids and lubricants
		Liter	Imp measure	
Engine oil (Refill)				
With oil filter	SR20DE	3.9	6-7/8 pts	Gasoline engines: API SG, CCMC G4(*1) Diesel engines: API CE, CCMC PD2 and D4(*1)
	GA16DE	3.5	6-1/8 pts	
	LD20-II	5.7	10 pts	
Without oil filter	SR20DE	3.7	6-1/2 pts	
	GA16DE	3.1	5-1/2 pts	
	LD20-II	5.2	9-1/8 pts	
Cooling system				
Total capacity (With reservoir tank)	SR20DE	10.0	17-5/8 pts	Anti-freeze coolant (Ethylene glycol base)
	GA16DE	9.0	15-7/8 pts	
	LD20-II	13.0	22-7/8 pts	
With rear heater	SR20DE	9.3	16-3/8 pts	
	GA16DE	8.3	14-5/8 pts	
	LD20-II	12.3	21-5/8 pts	
Without rear heater	SR20DE	8.6	15-1/8 pts	
	GA16DE	7.5	13-1/8 pts	
	LD20-II	11.3	19-7/8 pts	
Manual transaxle gear oil	RS5W71C	2.1	3-3/4 pts	API GL-4*1
Rear differential oil	H190A, H190A (LSD)	1.5	2-6/8 pts	Standard differential gear: API GL-5*1 Limited-slip differential (L.S.D.) gear: Use only LSD gear oil API GL-5 and SAE 80W-90 *2 approved for Nissan LSD.
	R200V	1.3	2-1/4 pts	API GL-5*1
Power steering fluid		1.0	1-3/4 pts	Type DEXRON™
Brake and clutch fluid		—	—	DOT 4 (US FMVSS No. 116)
Multi-purpose grease		—	—	NLGI No. 2 (Lithium soap base)

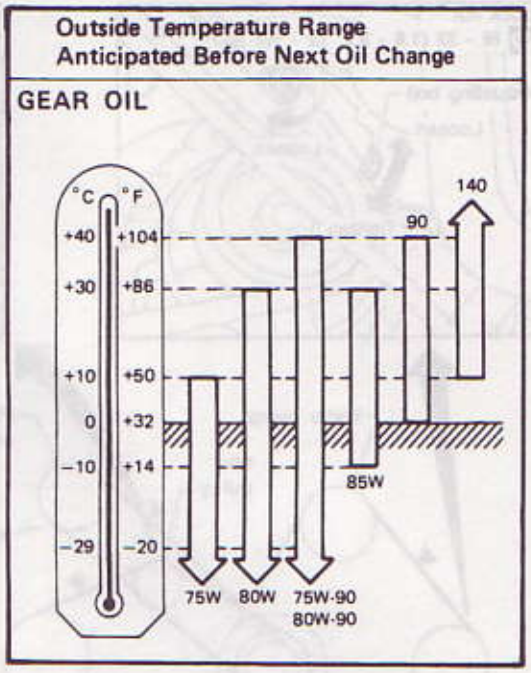
*1: For further details, see "SAE Viscosity Number".
*2: SAE 90 is acceptable in ambient temperatures above -18° (0°F)

SAE Viscosity Number



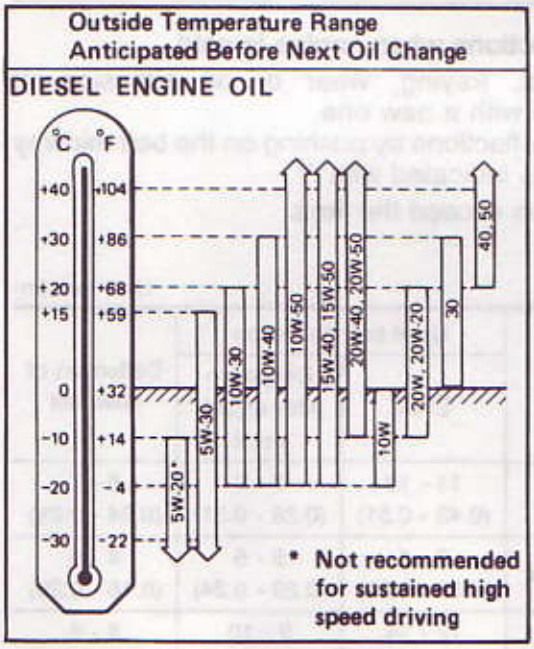
TI0005

- For warm and cold areas: 10W-30 is preferable for ambient temperatures above –20°C (–4°F).
- For hot areas: 20W-40 and 20W-50 are suitable.



TI0003

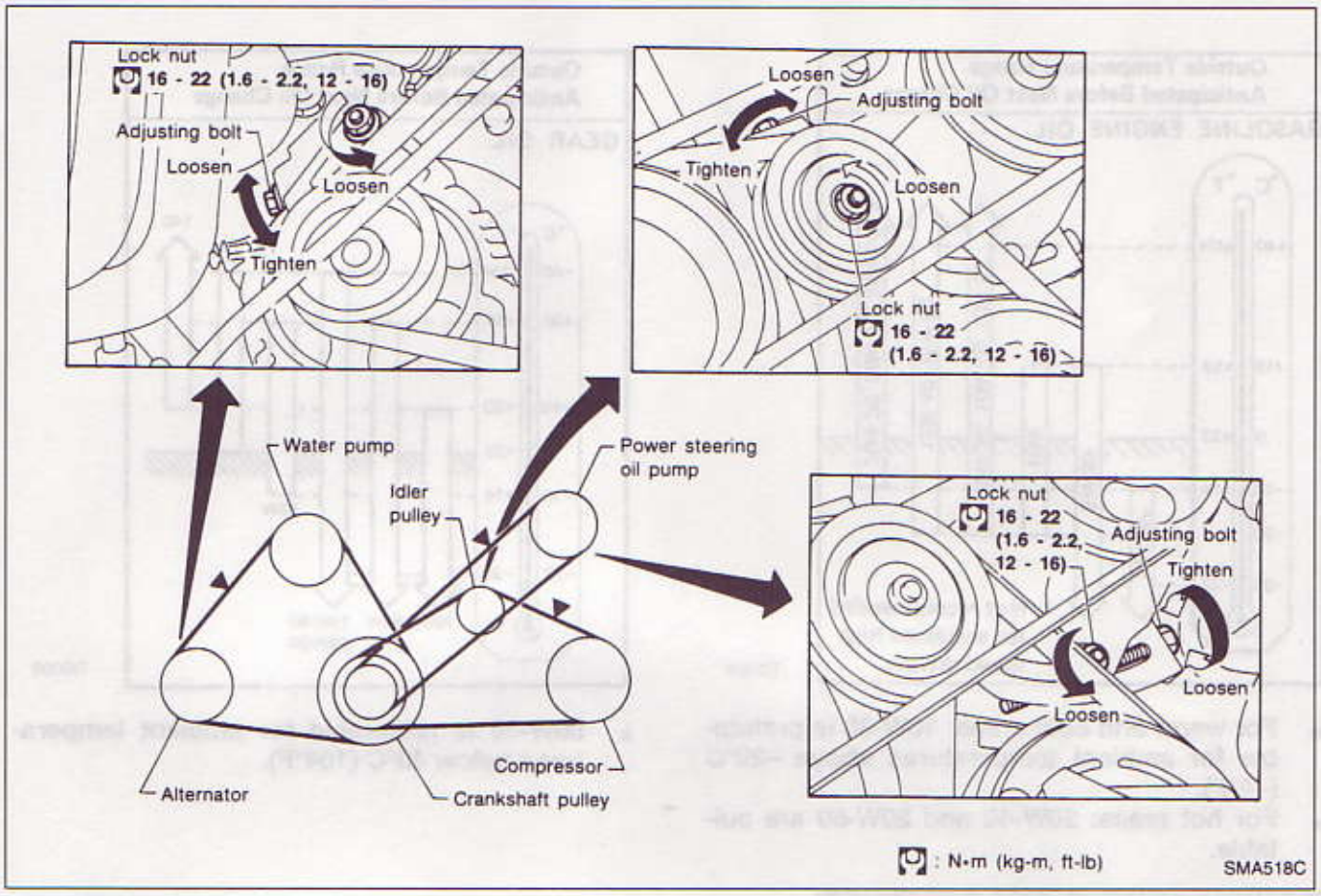
- 80W-90 is preferable for ambient temperatures below 40°C (104°F).



TI0006

- For cold areas: 10W-30 is preferable.
- For hot and warm areas: 20W-40 and 20W-50 are suitable.

Checking Drive Belts



Inspect drive belt deflections when engine is cold.

1. Inspect for cracks, fraying, wear or oil adhesion. If necessary, replace with a new one.
2. Inspect drive belt deflections by pushing on the belt midway between pulleys, as indicated with ▼.

Adjust if belt deflections exceed the limit.

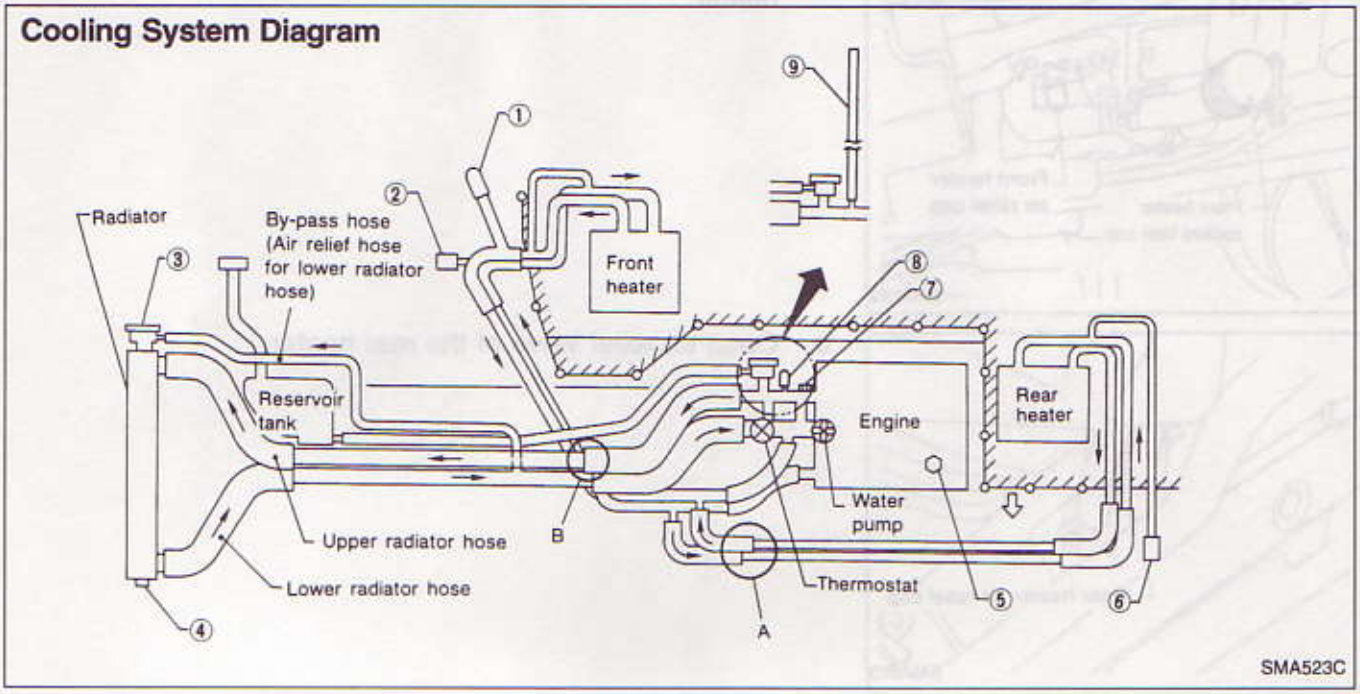
Belt deflection:

Unit: mm (in)

	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	11 - 13 (0.43 - 0.51)	7 - 8 (0.28 - 0.31)	6 - 7 (0.24 - 0.28)
Air conditioner compressor	7 - 8 (0.28 - 0.31)	5 - 6 (0.20 - 0.24)	4 - 5 (0.16 - 0.20)
Power steering oil pump	12 - 14 (0.47 - 0.55)	9 - 10 (0.35 - 0.39)	8 - 9 (0.31 - 0.35)
Applied pushing force	98 N (10 kg, 22 lb)		

Changing Engine Coolant

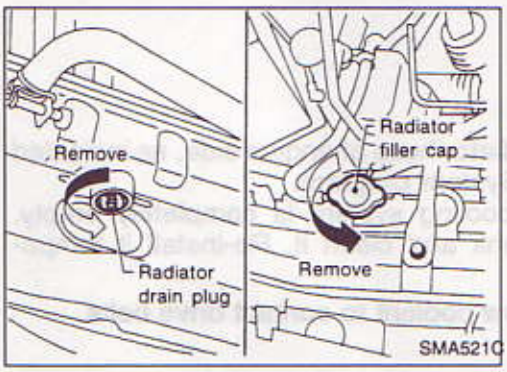
Cooling System Diagram



① Front heater coolant filler cap
② Front heater air relief cap
③ Radiator filler cap
④ Radiator drain plug
⑤ Cylinder block drain plug
⑥ Rear heater air relief cap
⑦ Engine air relief plug
⑧ Engine air relief cap
⑨ Transparent hose
Inner diameter:
7.5 mm (0.295 in)
Length:
1,200 mm (47.24 in)

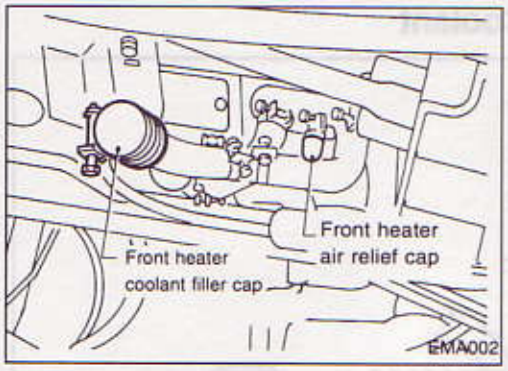
WARNING:
To avoid being scalded, never change the coolant when the engine is hot.

1. Move temperature control lever of the heater to the "HOT" position (from front and rear heater, if so equipped).
2. Remove engine under cover.

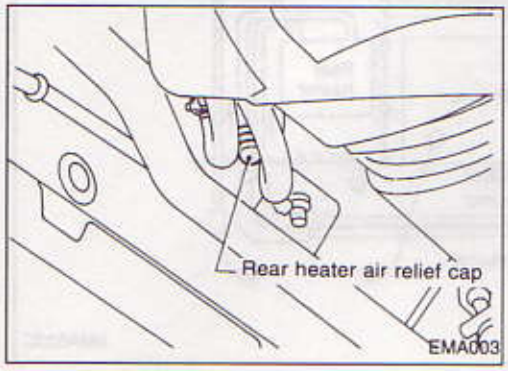


3. Remove radiator drain plug.
4. Remove radiator cap.

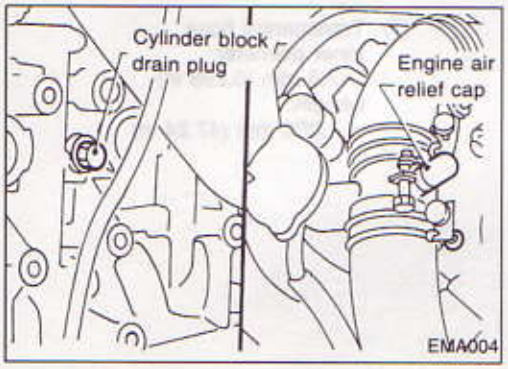
Changing Engine Coolant (Cont'd)



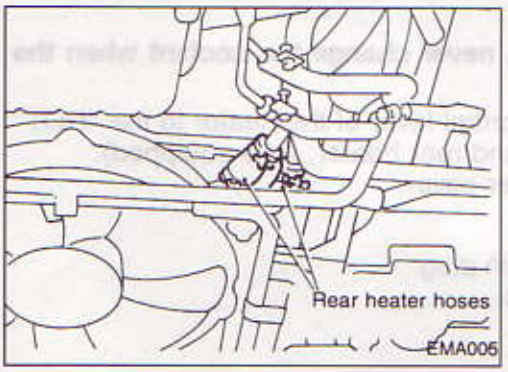
5. Open both the air relief valve and filler apperture of the front heater.



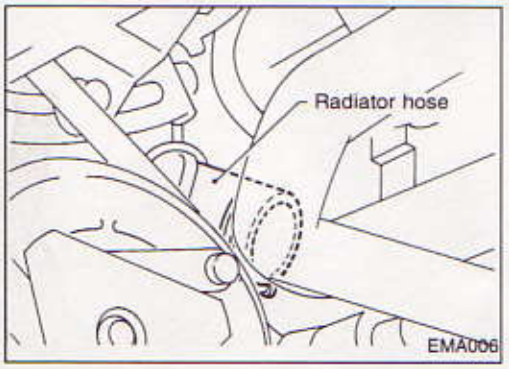
6. Open air relief valve of the rear heater.



7. Remove engine air relief cap and cylinder block drain plug.



8. Disconnect lower heater hoses (both inlet and outlet), as indicated with "A" in Cooling System Diagram.

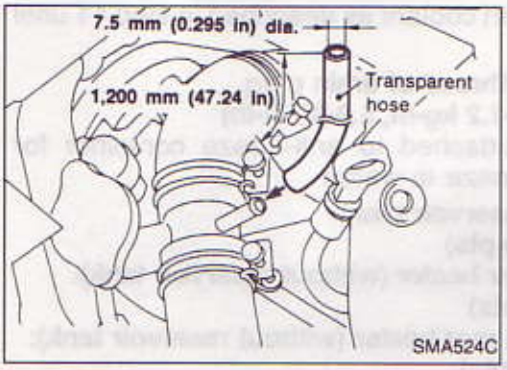


9. Disconnect upper radiator hose at engine side, as indicated with "B" in Cooling System Diagram.
10. Drain coolant until cooling system is completely empty. Remove reservoir tank and clean it. Re-install it temporarily.

- **Be careful not to allow coolant to contact drive belts.**

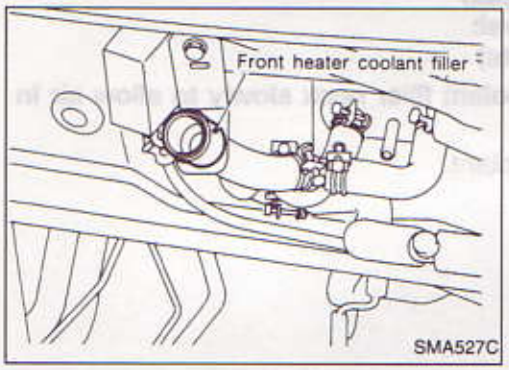
Changing Engine Coolant (Cont'd)

11. Re-install radiator drain plug and cylinder block drain plug.
12. Re-connect lower heater hoses of rear heater and upper radiator hose.

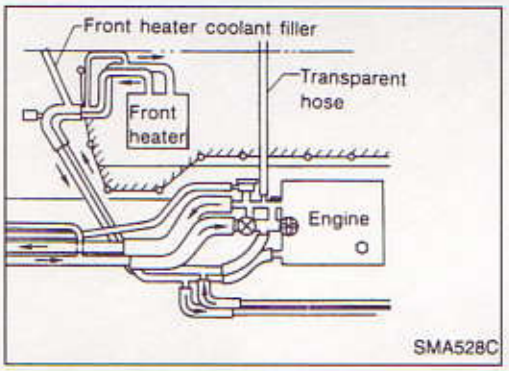


13. Connect a transparent tube to the engine air relief valve, in order to monitor the level of coolant.
- **Dimensions of the tube:**
  - **inner diameter: 7.5 mm (0.295 in)**
  - **length: 1,200 mm (47.24 in)**

14. Put a tray under the air relief valve of the rear heater, in order not to spill any coolant.



15. Fill the radiator with water and install radiator cap.
16. Fill the rest of cooling system by pouring water into filler apperture of the front heater until water spills from the air relief valve of the rear heater.
    If no more air escapes from this air relief valve, close it.
- **Tighten clamp securely.**



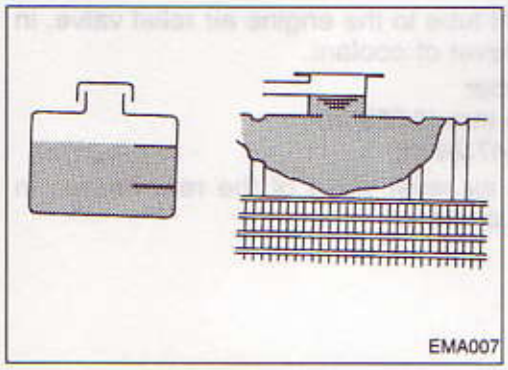
17. Continue with filling the cooling system and monitor fluid level in the transparent tube.
18. When the level mentioned above is at nearly the same hight as the filler apperture of the front heater, stop pouring water.
19. Close the filler apperture and the air relief valve of the front heater.
20 Remove the transparent tube from the engine air relief valve, and close it.
- **Tighten clamps securely.**

21. Fill coolant reservoir tank up to maximum level.
22. Warm up engine until radiator fans operate, then race engine 2 or 3 times under no-load.
- **Make sure that air conditioner switch is "OFF".**
- **Monitor water temperature gauge, to check that engine does not overheat.**

23. Stop the engine and wait until it has cooled down.
24. Repeat steps 3 through step 23 until clear water begins to drain from cooling system.

Changing Engine Coolant (Cont'd)

25.Drain water completely.
26. Re-install reservoir tank



27. Fill cooling system with coolant as described in step 11 until step 22.

- **Apply sealant to the thread of drain plug.**

: 8-12 N·m (0.8-1.2 kg-m, 5.8-8.7 ft-lb)

Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

Coolant capacity (with reservoir tank):
10.0 ℓ (17-5/8 Imp pts)
Coolant capacity with rear heater (without reservoir tank):
9.3ℓ (16-3/8 Imp pts)
Coolant capacity without rear heater (without reservoir tank):
8.6 ℓ (15-1/8 Imp pts)
Reservoir tank for "H"level:
0.7 ℓ (1-1/4 Imp pts)

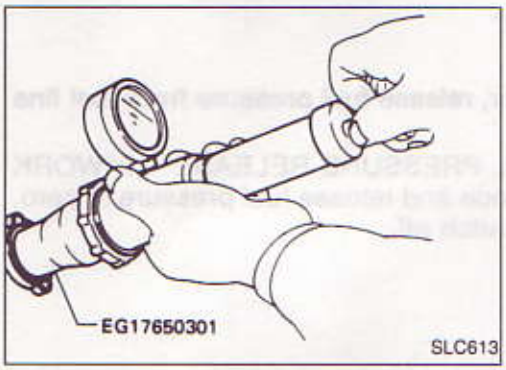
Pour coolant through coolant filler neck slowly to allow air in system to escape.

28. If necessary, add coolant.

Checking Cooling System

CHECKING HOSES

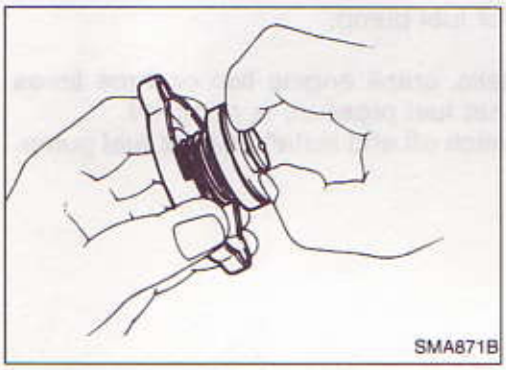
Check hoses for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.



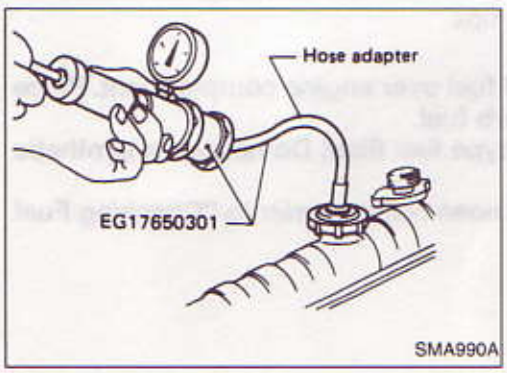
CHECKING RADIATOR CAP

Apply pressure to radiator cap with cap tester to see if it is satisfactory.

Radiator cap relief pressure:
78 - 98 kPa
(0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2, 11 - 14 psi)



Pull the negative-pressure valve to open it. Check that it closes completely when released.

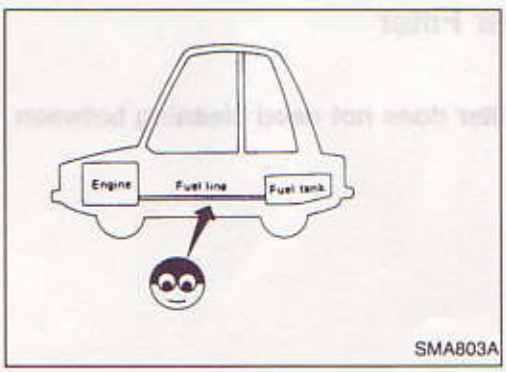


CHECKING COOLING SYSTEM FOR LEAKS

Apply pressure to the cooling system with cap tester to check for leakage.

Testing pressure:
98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi)

CAUTION:
Higher pressure than the specified value may cause damage to radiator.

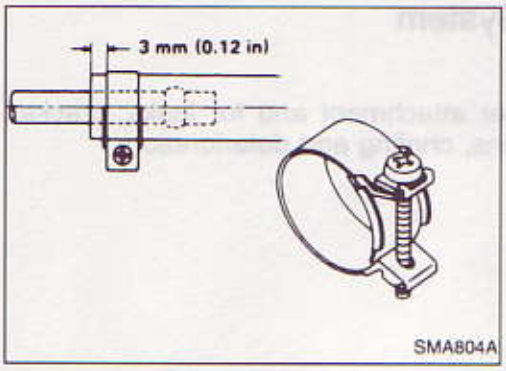


Checking Fuel Lines

Inspect fuel lines and tank for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

If necessary, repair or replace faulty parts.

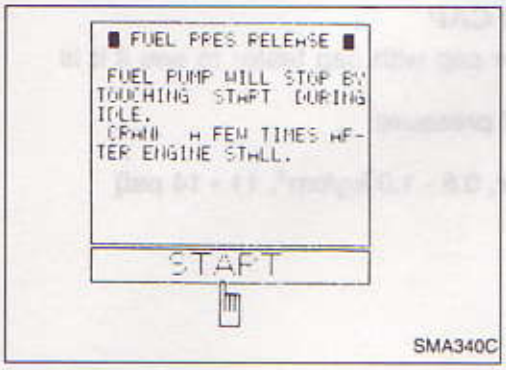
Checking Fuel Lines (Cont'd)



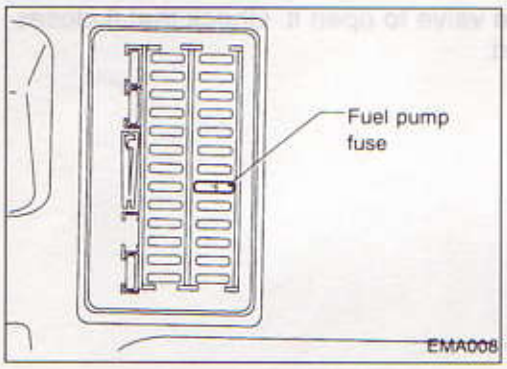
CAUTION:
Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.
Tightening torque specifications are the same for all rubber hose clamps.
Ensure that screw does not contact adjacent parts.

Changing Fuel Filter

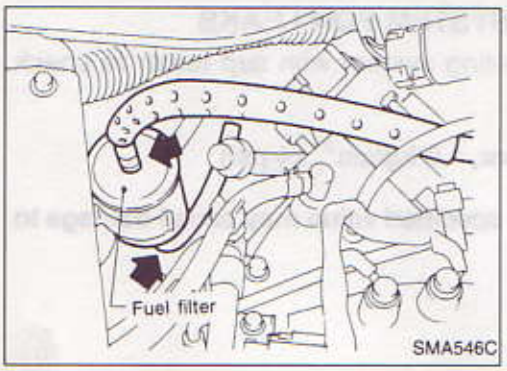
WARNING:
Before removing fuel filter, release fuel pressure from fuel line to eliminate danger.



1. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode and release fuel pressure to zero.
2. Turn ignition switch off.

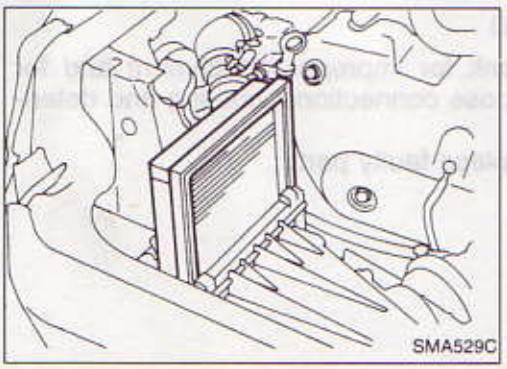


1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank engine two or three times to make sure that fuel pressure is released.
4. Turn ignition switch off and install fuse for fuel pump.



5. Loosen fuel hose clamps.
6. Replace fuel filter.

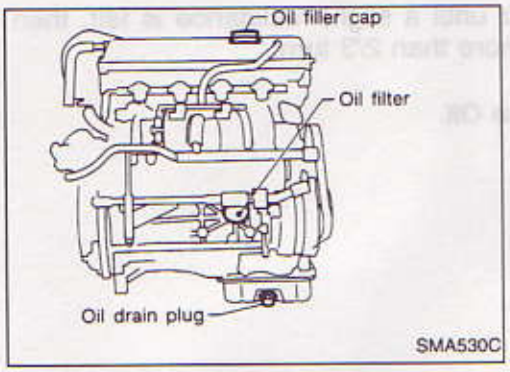
- **Be careful not to spill fuel over engine compartment. Place a shop towel to absorb fuel.**
- **Use a high-pressure type fuel filter. Do not use a synthetic resinous fuel filter.**
- **When tightening fuel hose clamps, refer to "Checking Fuel Lines".**



Changing Air Cleaner Filter

Viscous paper type

The viscous paper type filter does not need cleaning between renewals.



Changing Engine Oil

WARNING:
Be careful not to burn yourself, as the engine oil is hot.

1. Warm up engine, and check for oil leakage from engine components.
2. Remove drain plug and oil filler cap.
3. Drain oil and refill with new engine oil.

Refill oil capacity (Approximate):

Unit: ℓ (Imp pts)

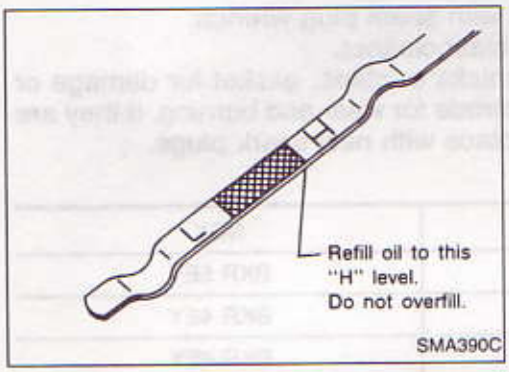
With oil filter change	3.9 (6-7/8)
Without oil filter change	3.7 (6-1/2)

The refill capacity changes depending on the oil temperature and drain time, use these values as a reference and be certain to check with the dipstick when changing the oil.

CAUTION:
Be sure to clean drain plug and install with new washer.

Drain plug:
: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)

- **Use recommended engine oil.**
  Consult "RECOMMEND FLUIDS AND LUBRICANTS".

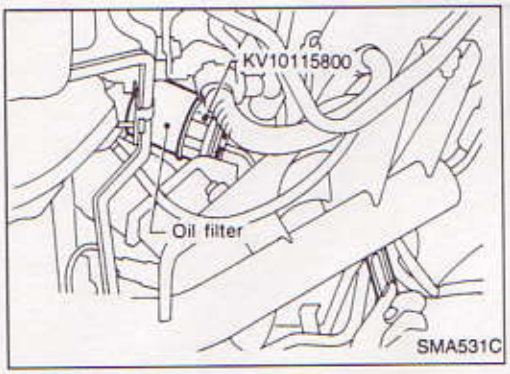


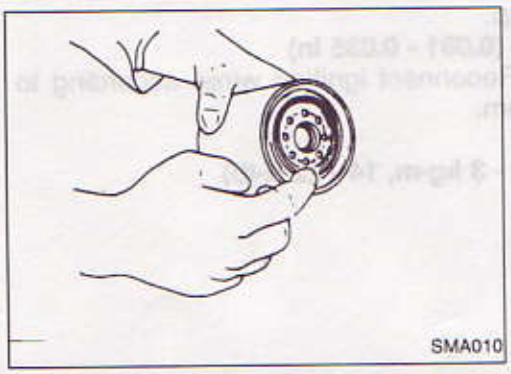
4. Check oil level.
5. Start engine and check area around drain plug and oil filter for oil leakage.
6. Run engine for a few minutes, then turn it off. After several minutes, check oil level.

Changing Oil Filter

1. Remove oil filter with Tool.

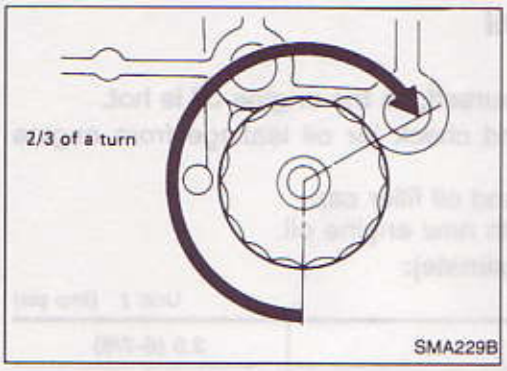
WARNING:
Be careful not to burn yourself, as the engine and the engine oil are hot.





2. Before installing new oil filter, clean the oil filter mounting surface on cylinder block, and coat the rubber seal of oil filter with a little engine oil.

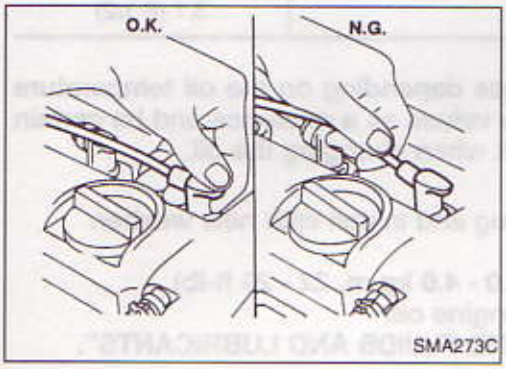
Changing Oil Filter (Cont'd)



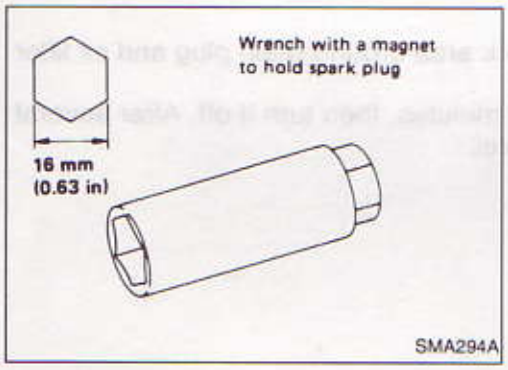
3. Screw in the oil filter until a slight resistance is felt, then tighten additionally more than 2/3 turn.
4. Add engine oil.

Refer to Changing Engine Oil.

Checking and Changing Spark Plugs



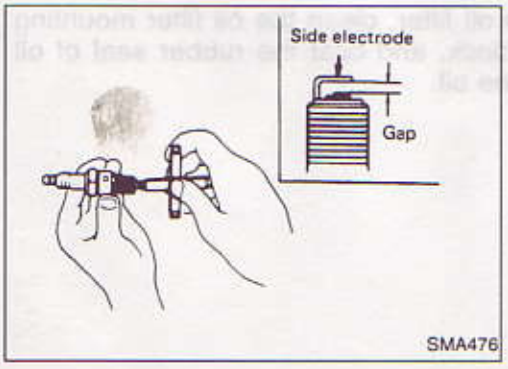
1. Disconnect ignition wires from spark plugs by pulling at the boot. Do not pull at the wire.



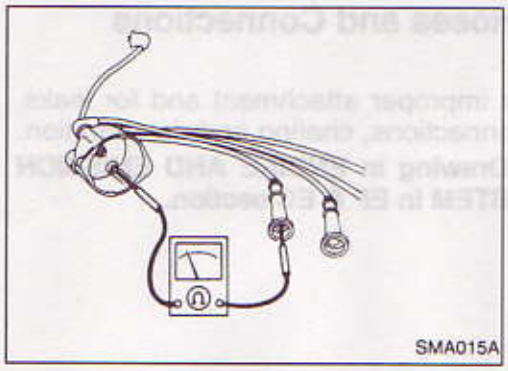
2. Remove spark plugs with spark plug wrench.
3. Clean plugs in sand blast cleaner.
4. Check insulator for cracks or chips, gasket for damage or deterioration and electrode for wear and burning. If they are excessively worn, replace with new spark plugs.

Spark plug

Make	NGK
Standard type	BKR 5EY
Hot type	BKR 4EY
Cold type	BKR 6EY



5. Check spark plug gap.
   Gap: 0.8 - 0.9 mm (0.031 - 0.035 in)
6. Install spark plugs. Reconnect ignition wires according to nos. indicated on them.
   Spark plug:
   : 20 - 29 N·m (2 - 3 kg-m, 14 - 22 ft-lb)


SMA015A

Checking Ignition Wires

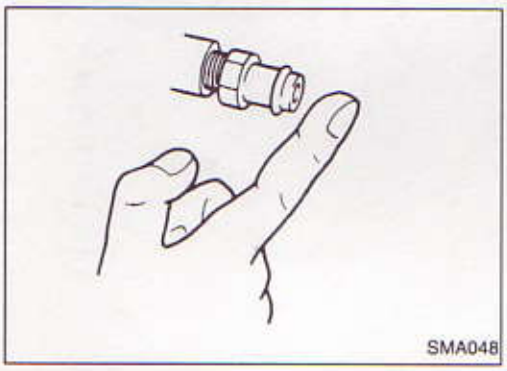
1. Inspect wires for cracks, damage, burned terminals and for improper fit.
2. Measure the resistance of wires and check for intermittent breaks.

Resistance:

Unit: kΩ/m (kΩ/ft)

Marking	Resistance
BOUGICORD 403 CLASS E1	4.48 - 6.72 (1.365 - 2.048)

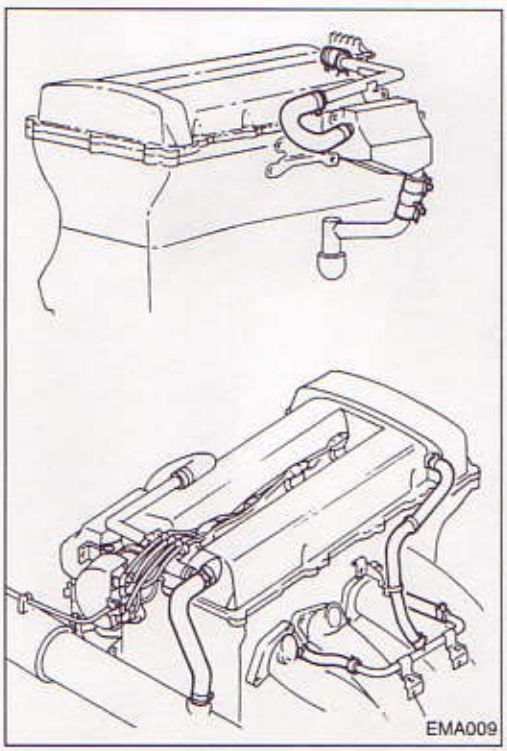
If the resistance exceeds the above specification, replace the ignition wire with a new one.


SMA048

Checking Positive Crankcase Ventilation (P.C.V.) System

CHECKING P.C.V. VALVE

With engine running at idle, remove ventilation hose from P.C.V. valve; if valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.


EMA009

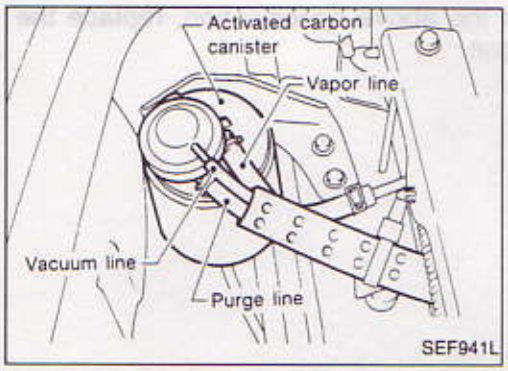
CHECKING VENTILATION HOSES

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed from obstructions, replace.

Checking Vacuum Hoses and Connections

Check vacuum hoses for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

Refer to Vacuum Hose Drawing in ENGINE AND EMISSION CONTROL OVERALL SYSTEM in EF & EC section.



Checking Vapor Lines

1. Visually inspect vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect vacuum relief valve of fuel tank filler cap for clogging, sticking, etc.

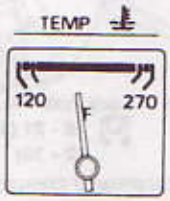
Refer to EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION in EF & EC section.

Checking Exhaust Gas Sensor

Checking procedure

INSPECTION START

Start engine and warm it up until water temperature indicator points to the middle of gauge.



SEF246F

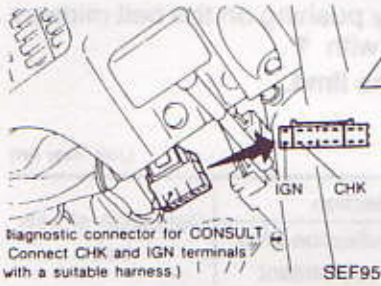
1. See "M/R F/C MNT" in "Data monitor" mode.
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH → LEAN → RICH →
1 time 2 times
LEAN → RICH .....

SEF320

OR

1. Set "Exhaust gas sensor monitor" in the self- diagnostic Mode II.
(Refer to section EF & EC.)
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED L.E.D. on the E.C.U. or the check engine light on the instrument panel goes ON and OFF more than 5 times during 10 seconds.



SEF950L

SEF621K

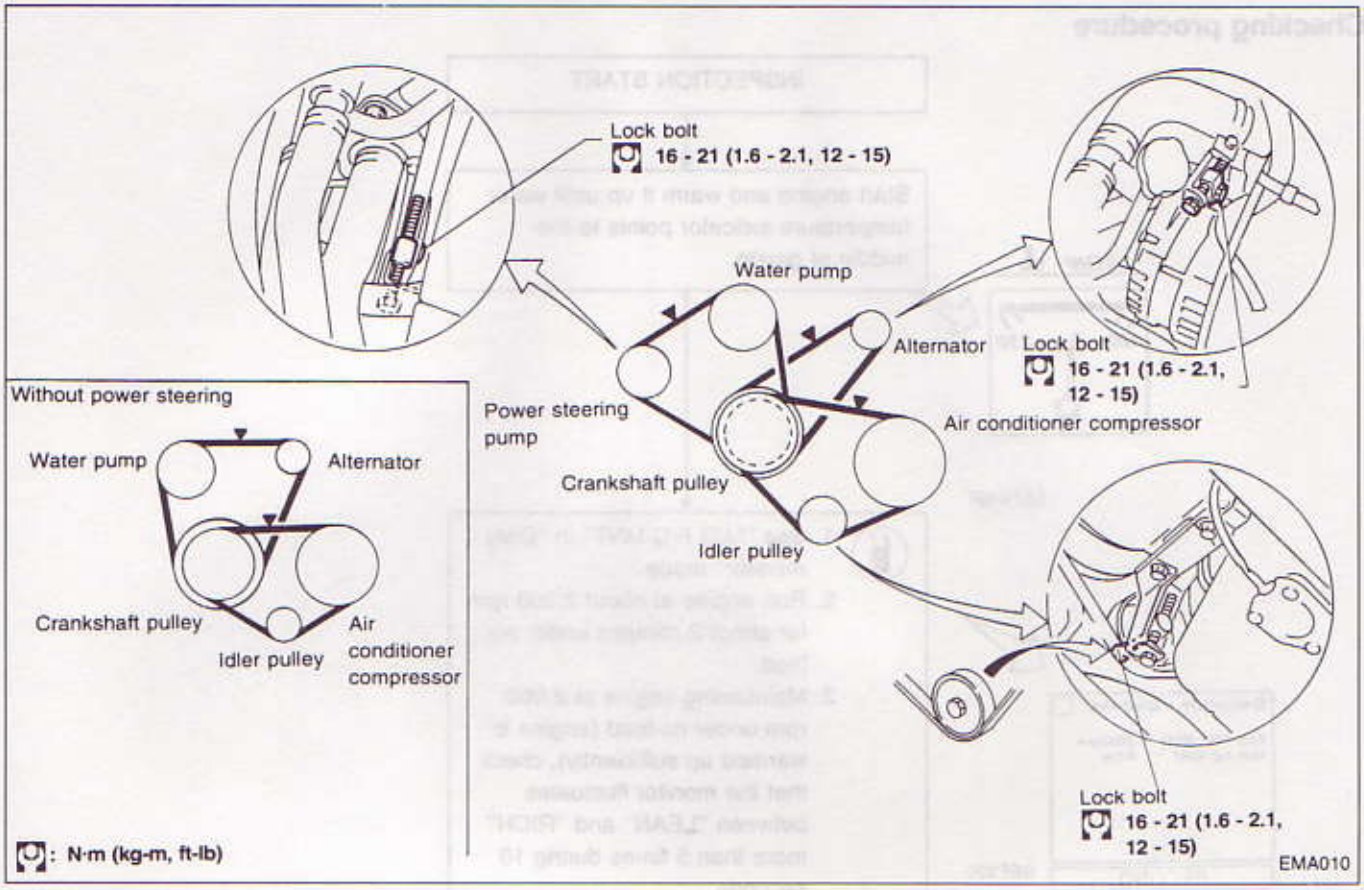
O.K.

N.G.

Check and adjustment should be made by referring to IDLE SPEED/ IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION in section EF & EC.

INSPECTION END

Checking Drive Belts



Inspect drive belt deflections when engine is cold.

1. Inspect for cracks, fraying, wear or oil adhesion. If necessary, replace with a new one.
2. Inspect drive belt deflections by pushing on the belt midway between pulleys, as indicated with ▼.

Adjust if belt deflections exceed the limit.

Belt deflection:

With power steering

Unit: mm (in)

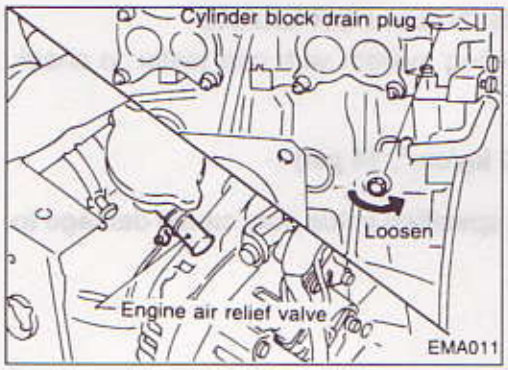
	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	11 (0.43)	7-9 (0.28 - 0.35)	6-8 (0.24 - 0.32)
Air conditioner	9.5 (0.374)	6-8 (0.24 - 0.32)	5-7 (0.20 - 0.28)
Power steering oil pump	7.5 (0.295)	4-6 (0.16 - 0.24)	3-5 (0.12 - 0.20)
Applied pushing force	98 N (10 kg, 22 lb)		

Without power steering

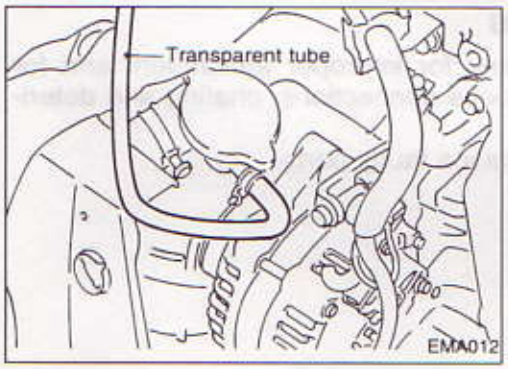
	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	10 (0.39)	7-9 (0.28 - 0.35)	6-8 (0.24 - 0.32)
Air conditioner	9.5 (0.374)	6-8 (0.24 - 0.32)	5-7 (0.20 - 0.28)
Applied pushing force	98 N (10 kg, 22 lb)		

Changing Engine Coolant

The procedure for changing engine coolant is the same as the procedure already described for SR-engine. Refer to page MA-11.
Different locations and/or components are shown below.



Location of engine air relief valve and cylinder block drain plug.



How to fit the transparent tube to the engine air relief valve.

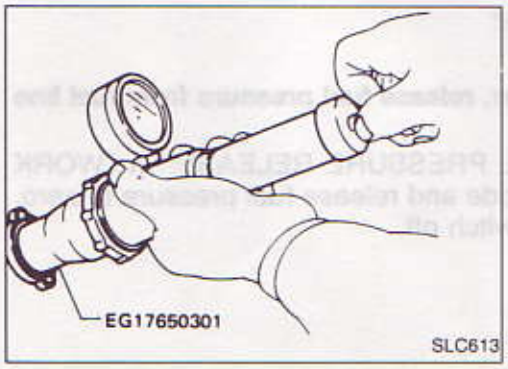
- **Tightening torque of cylinder block drain plug:**
  : 34-44 N·m (3.5 - 4.5 kg-m, 25-33 ft-lb)
- **Coolant capacity (with reservoir tank):**
  9.0ℓ (15-7/8 Imp pts)
- **Coolant capacity with rear heater (without reservoir tank):**
  8.3ℓ (14-5/8 Imp pts)
- **Coolant capacity without rear heater (without reservoir tank):**
  7.5ℓ (13-1/4 Imp pts)

[Reservoir tank capacity for "H" level is 0.7 ℓ (1-1/4 Imp pts).]

Checking Cooling System

CHECKING HOSES

Check hoses for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

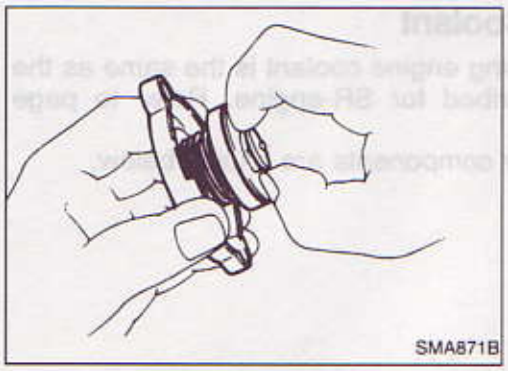


CHECKING RADIATOR CAP

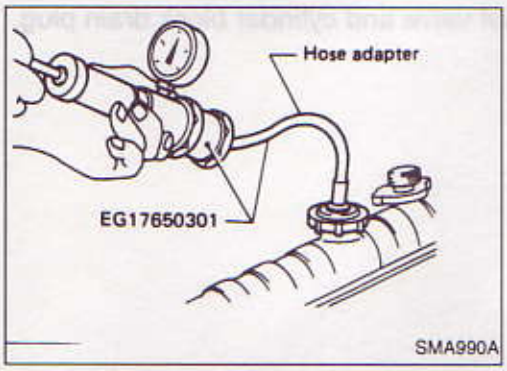
Apply pressure to radiator cap with cap tester to see if it is satisfactory.

Radiator cap relief pressure:
78 - 98 kPa
(0.78 - 0.98 bar, 0.8 - 1.0 kg/cm², 11 - 14 psi)

Checking Cooling System (Cont'd)


SMA871B

Pull the negative-pressure valve to open it. Check that it closes completely when released.



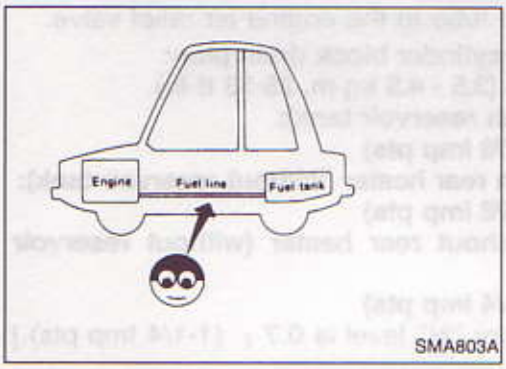
SMA990A

CHECKING COOLING SYSTEM FOR LEAKS

Apply pressure to the cooling system with cap tester to check for leakage.

Testing pressure:
98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi)

CAUTION:
Higher pressure than the specified value may cause damage to radiator.

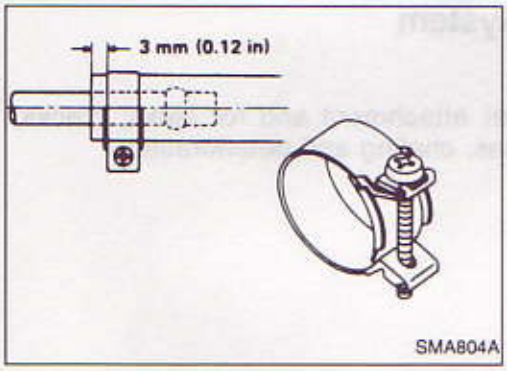


SMA803A

Checking Fuel Lines

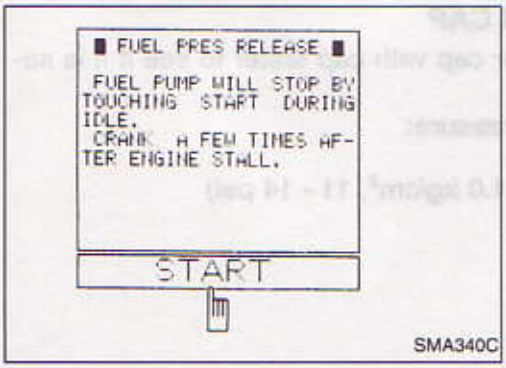
Inspect fuel lines and tank for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

If necessary, repair or replace faulty parts.



SMA804A

CAUTION:
Tighten high-pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end.
Tightening torque specifications are the same for all rubber hose clamps.
Ensure that screw does not contact adjacent parts.



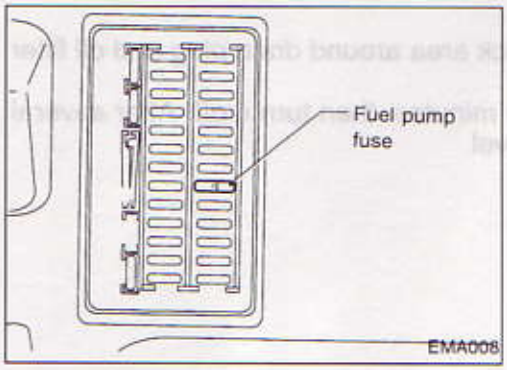
SMA340C

Changing Fuel Filter

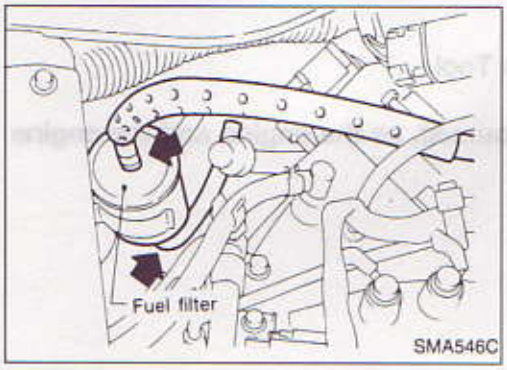
WARNING:
Before removing fuel filter, release fuel pressure from fuel line to eliminate danger.

1. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode and release fuel pressure to zero.
2. Turn ignition switch off.

Changing Fuel Filter (Cont'd)

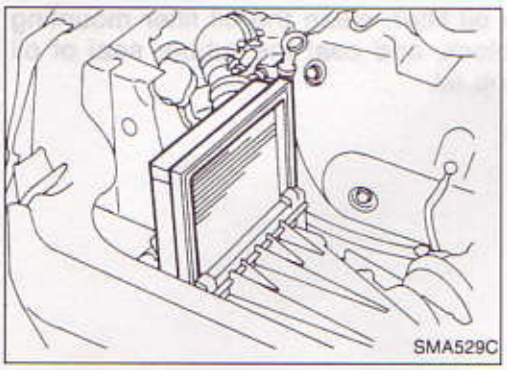


1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank engine two or three times to make sure that fuel pressure is released.
4. Turn ignition switch off and install fuse for fuel pump.



5. Loosen fuel hose clamps.
6. Replace fuel filter.

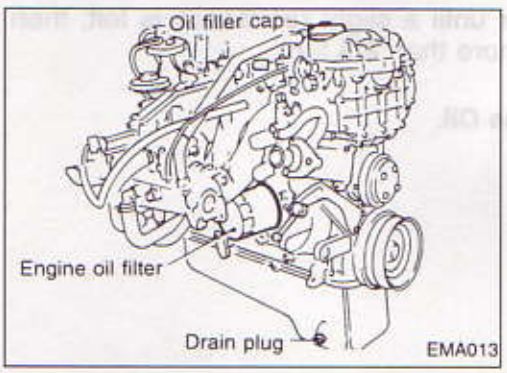
- **Be careful not to spill fuel over engine compartment. Place a shop towel to absorb fuel.**
- **Use a high-pressure type fuel filter. Do not use a synthetic resinous fuel filter.**
- **When tightening fuel hose clamps, refer to "Checking Fuel Lines".**



Changing Air Cleaner Filter

Viscous paper type

The viscous paper type filter does not need cleaning between renewals.



Changing Engine Oil

WARNING:

Be careful not to burn yourself, as the engine oil is hot.

1. Warm up engine, and check for oil leakage from engine components.
2. Remove drain plug and oil filler cap.
3. Drain oil and refill with new engine oil.

Refill oil capacity (Approximate):

Unit: ℓ (Imp pts)

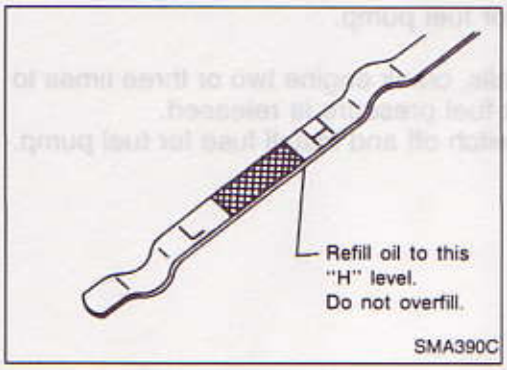
With oil filter change	3.5 (6-1/8)
Without oil filter change	3.1 (5-1/2)

- **Refill oil capacity changes depending on the oil temperature and drain time. Use these values as a reference and be certain to check with the dipstick when changing the oil.**

CAUTION:

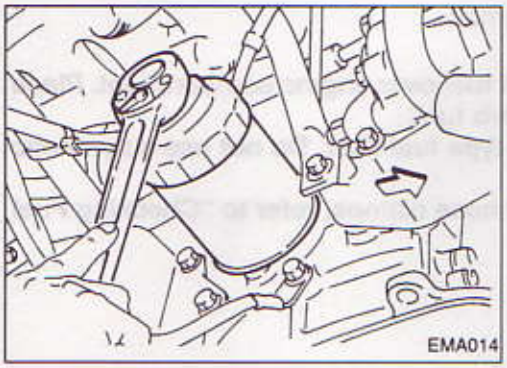
- **Be sure to clean drain plug and install with new washer.**
  Drain plug:
  : 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)
- **Use recommended engine oil.**
  Consult "RECOMMENDED FLUIDS AND LUBRICANTS."

Changing Engine Oil (Cont'd)



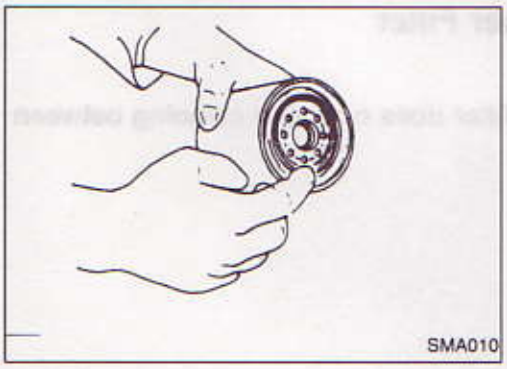
4. Check oil level.
5. Start engine and check area around drain plug and oil filter for oil leakage.
6. Run engine for a few minutes, then turn it off. After several minutes, check oil level.

Changing Oil Filter

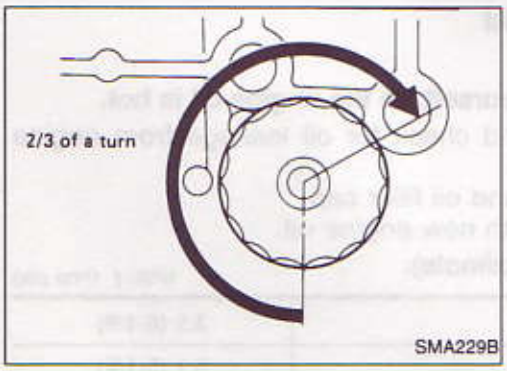


1. Remove oil filter with Tool.

WARNING:
Be careful not to burn yourself, as the engine and the engine oil are hot.



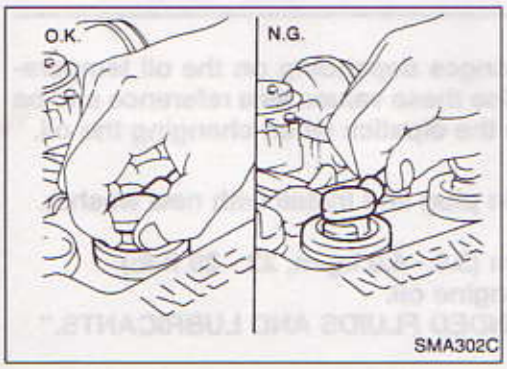
2. Before installing new oil filter, clean the oil filter mounting surface on cylinder block, and coat the rubber seal of oil filter with a little engine oil.



3. Screw in the oil filter until a slight resistance is felt, then tighten additionally more than 2/3 turn.
4. Add engine oil.

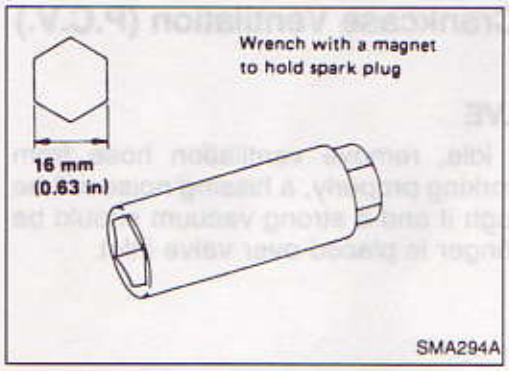
Refer to Changing Engine Oil.

Checking and Changing Spark Plugs



1. Disconnect ignition wires from spark plugs by pulling at the boot. Do not pull at the wire.

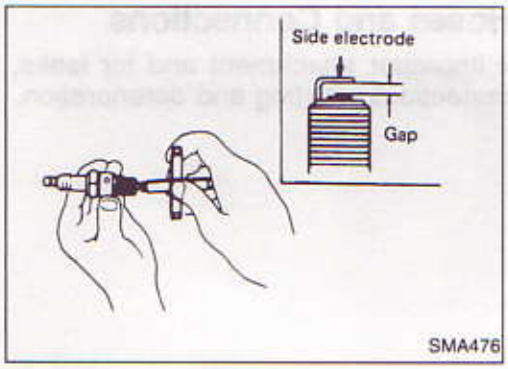
Checking and Changing Spark Plugs (Cont'd)



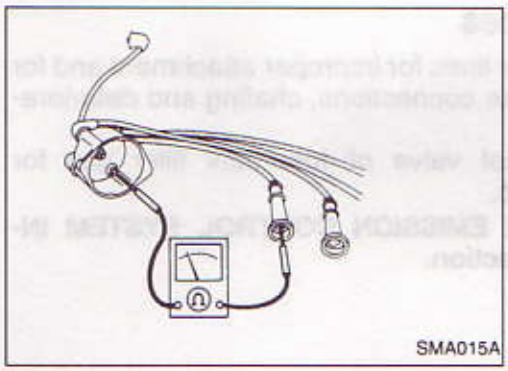
2. Remove spark plugs with spark plug wrench.
3. Clean plugs in sand blast cleaner.
4. Check insulator for cracks or chips, gasket for damage or deterioration and electrode for wear and burning. If they are excessively worn, replace with new spark plugs.

Spark plug:

Make	NGK
Standard type	BKR5E
Hot type	BKR4E
Cold type	BKR6E



5. Check spark plug gap.
   Gap: 0.8 - 0.9 mm (0.031 - 0.035 in)
6. Install spark plugs. Reconnect ignition wires according to nos. indicated on them.
   Spark plug:
   : 20 - 29 N·m (2.0 - 3.0 kg-m, 14 - 22 ft-lb)



Checking Ignition Wires

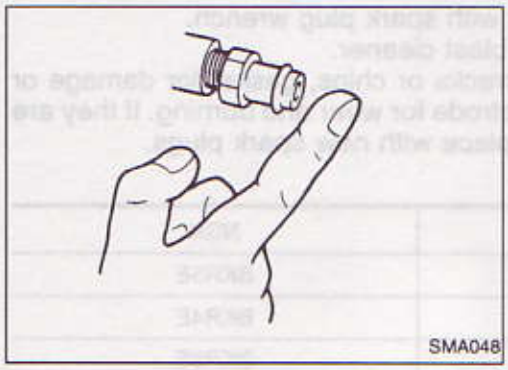
1. Inspect wires for cracks, damage, burned terminals and for improper fit.
2. Measure the resistance of wires and check for intermittent breaks.

Resistance:

Unit: kΩm (kΩft)

Marking	Resistance
SUMITOMO L-16	9.6 - 22.4 (2.93 - 6.83)

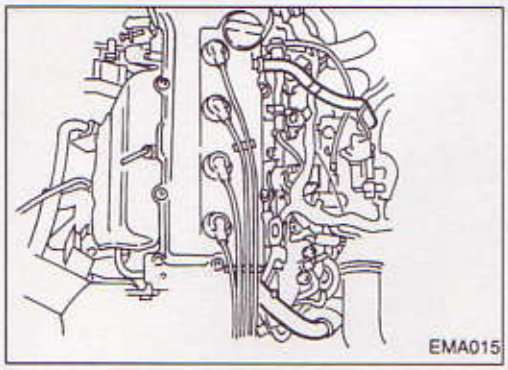
If it exceeds the above specification, replace the ignition wire with a new one.


SMA048

Checking Positive Crankcase Ventilation (P.C.V.) System

CHECKING P.C.V. VALVE

With engine running at idle, remove ventilation hose from P.C.V. valve; if valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.

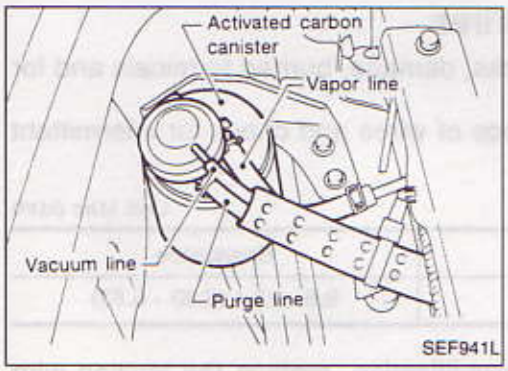

EMA015

CHECKING VENTILATION HOSES

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed from obstructions, replace.

Checking Vacuum Hoses and Connections

Check vacuum hoses for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.



SEF941L

Checking Vapor Lines

1. Visually inspect vapor lines for improper attachment and for cracks, damage, loose connections, chafing and deterioration.
2. Inspect vacuum relief valve of fuel tank filler cap for clogging, sticking, etc.

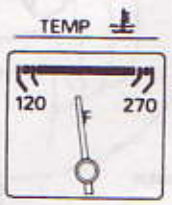
Refer to EVAPORATIVE EMISSION CONTROL SYSTEM INSPECTION in EF & EC section.

Checking Exhaust Gas Sensor

Checking procedure

INSPECTION START

Start engine and warm it up until water temperature indicator points to the middle of gauge.



SEF246F

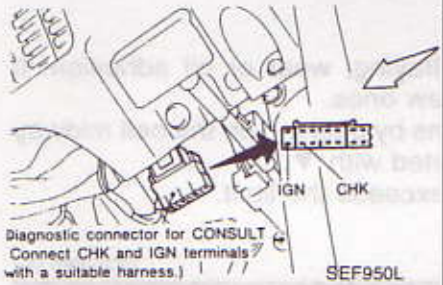
1. See "M/R F/C MNT" in "Data monitor" mode.
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH → LEAN → RICH → (1 time) (2 times) **LEAN → RICH .....**

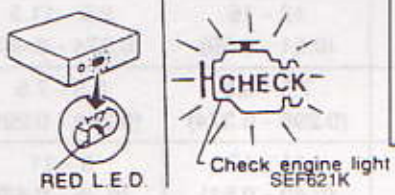
SEF320

OR

1. Set "Exhaust gas sensor monitor" in the self- diagnostic Mode II. (Refer to section EF & EC.)
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED L.E.D. on the E.C.U. or the check engine light on the instrument panel goes ON and OFF more than 5 times during 10 seconds.



SEF950L



SEF621K

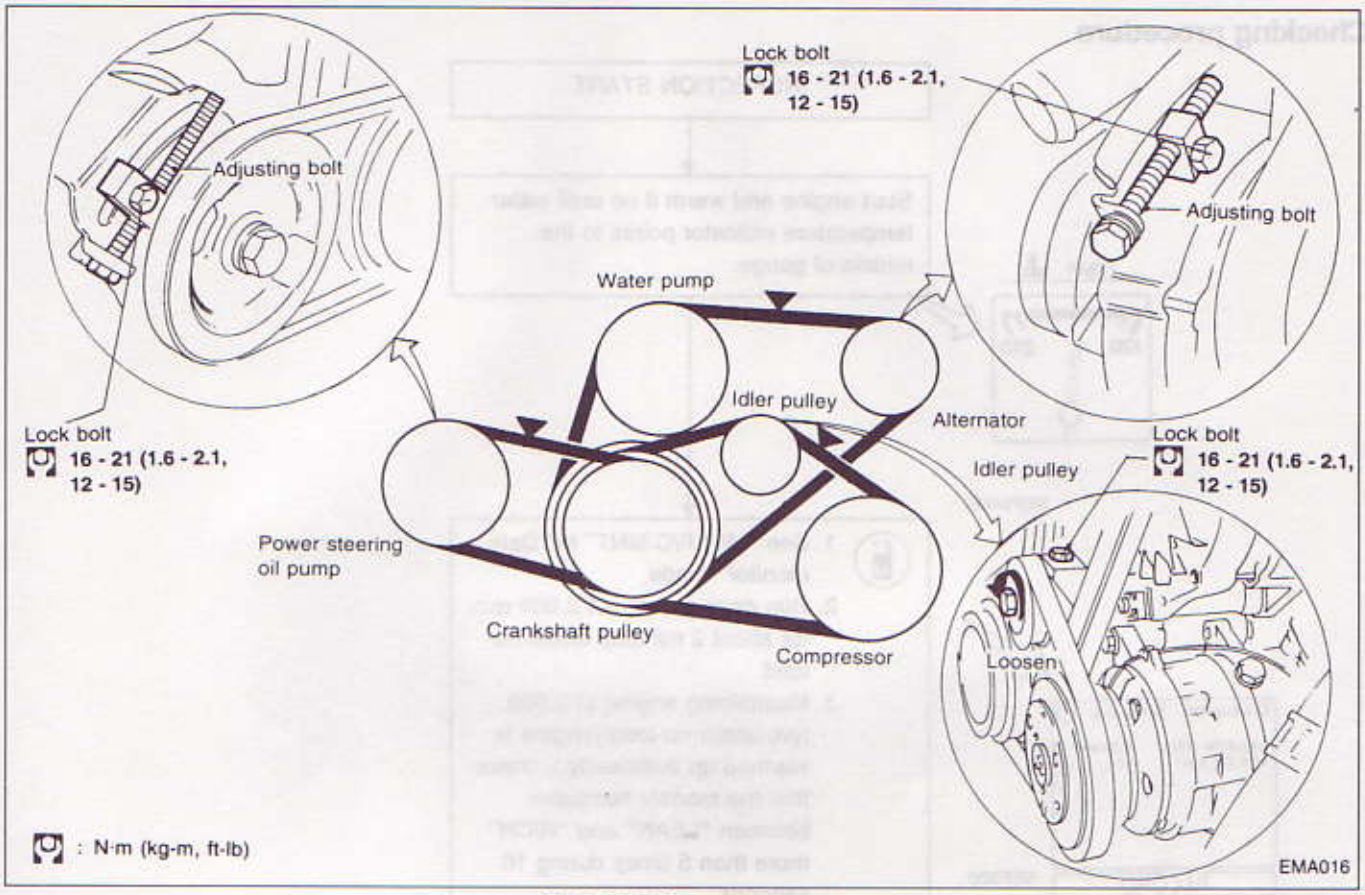
O.K.

N.G.

Check and adjustment should be made by referring to IDLE SPEED/ IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION in section EF & EC.

INSPECTION END

Drive Belt Check



WARNING:
Inspect drive belt deflections when engine is cold. When engine is hot, check deflections at least 30 minutes after engine has been switched off.

1. Inspect belts for cracks, fraying, wear or oil adhesion. If necessary, replace with new ones.
2. Inspect drive belt deflections by pushing on the belt midway between pulleys, as indicated with ▼.
3. Adjust belt deflection if it exceeds the limit.

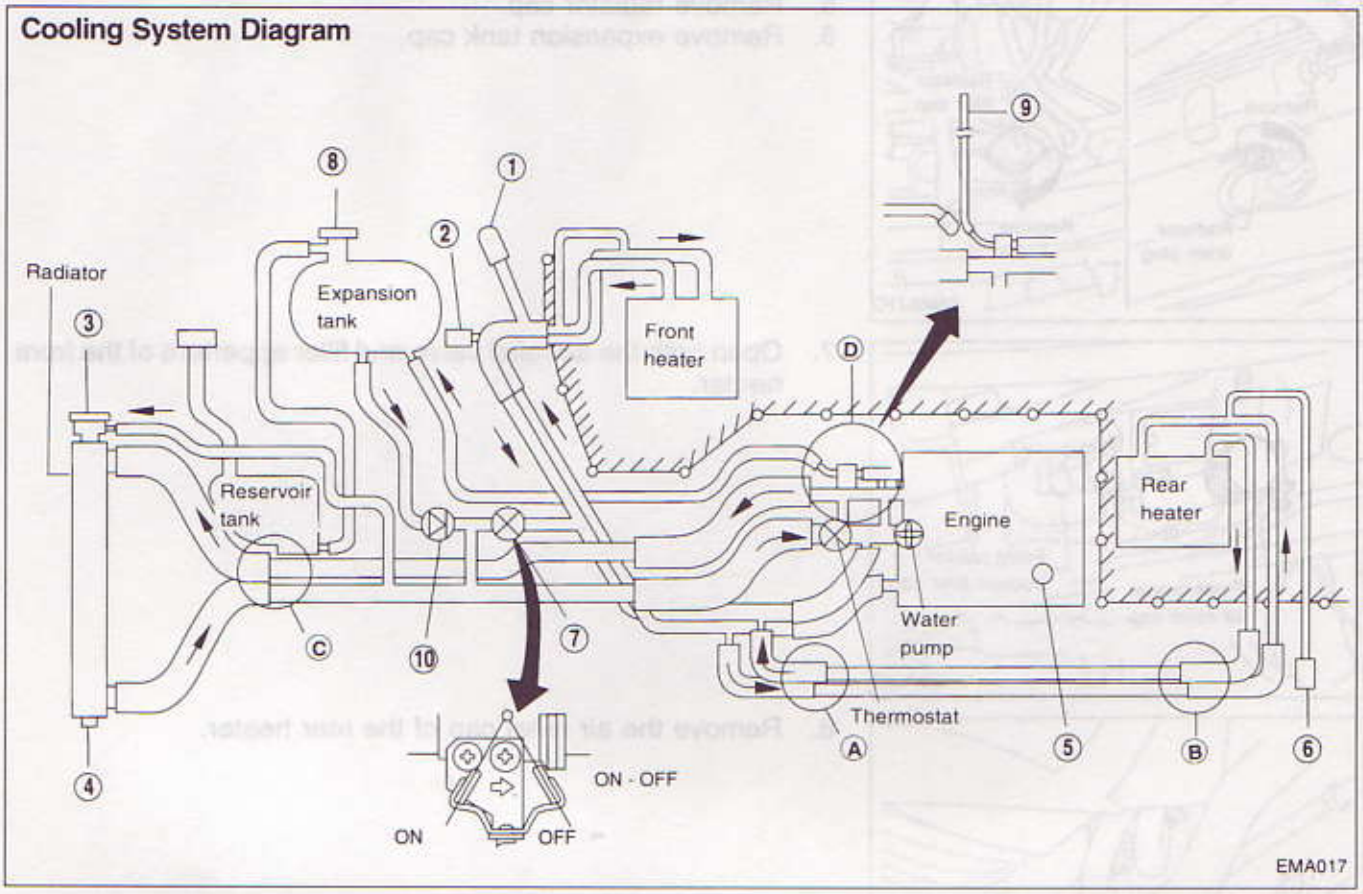
Belt deflection:

Unit: mm (in)

	Used belt deflection		Set Deflection of new belt
	Limit	Adjust deflection	
Alternator	17 (0.67)	13 - 15 (0.51 - 0.59)	9.5 - 11.5 (0.374 - 0.453)
Air conditioner compressor	11 (0.43)	7.5 - 9.5 (0.295 - 0.374)	5.5 - 7.5 (0.216 - 0.295)
Power steering oil pump	15 (0.59)	11 - 13 (0.43 - 0.51)	9 - 11 (0.35 - 0.43)
Applied pushing force:	98 N (10 kg, 22 lb)		

Changing Engine Coolant

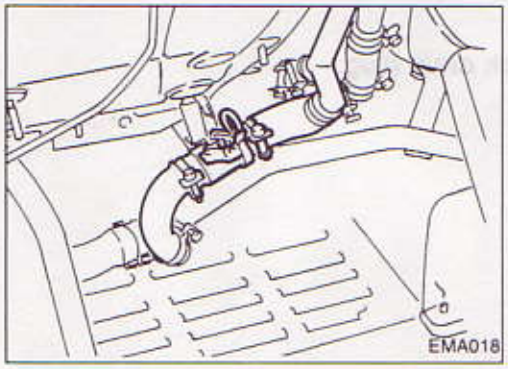
Cooling System Diagram



① Front heater coolant filler cap
② Front heater air relief cap
③ Radiator filler cap
④ Radiator drain plug
⑤ Cylinder block drain plug
⑥ Rear heater air relief cap
⑦ ON/OFF valve
⑧ Expansion tank cap
⑨ Transparent hose
Inner diameter: 7.5 mm (0.295 in)
Length: 1,200 mm (47.24 in)
⑩ One way valve

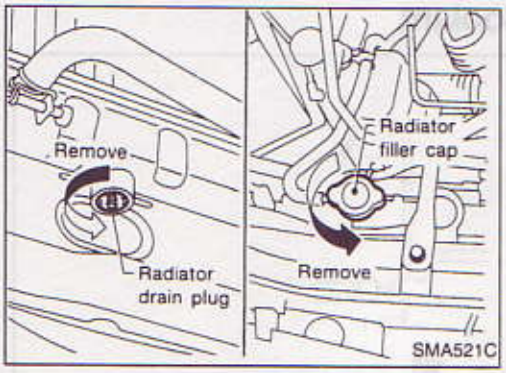
WARNING:
To avoid being scalded, never change the coolant when the engine is hot.

1. Move temperature control lever of the heater to the "HOT" position (from front and rear heater, if so equipped).
2. Remove engine under cover.

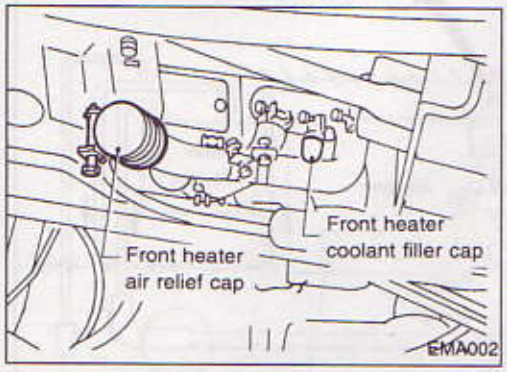


3. Turn the ON/OFF valve, situated in the outlet tube from the expansion tank, to the "ON" position.

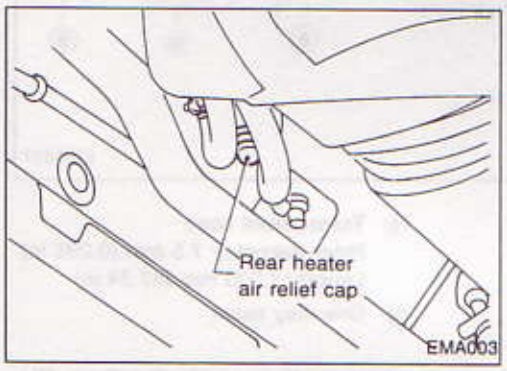
Changing Engine Coolant (Cont'd)



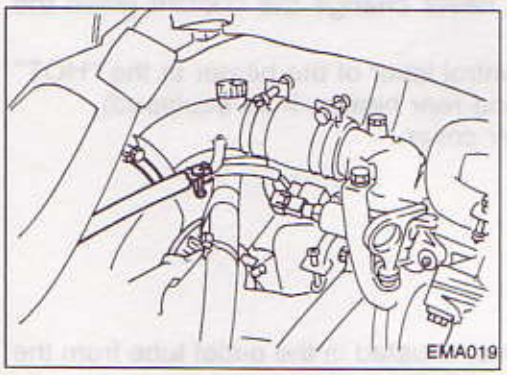
4. Remove radiator drain plug.
5. Remove radiator cap.
6. Remove expansion tank cap.



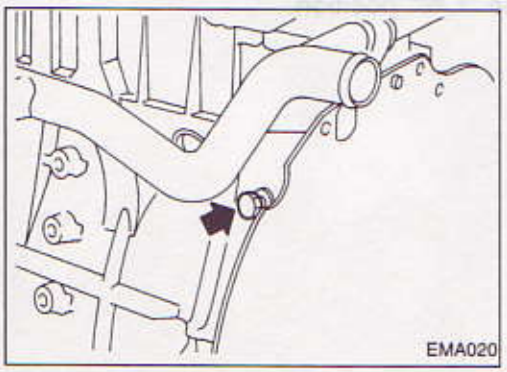
7. Open both the air relief valve and filler apperture of the front heater.



8. Remove the air relief cap of the rear heater.



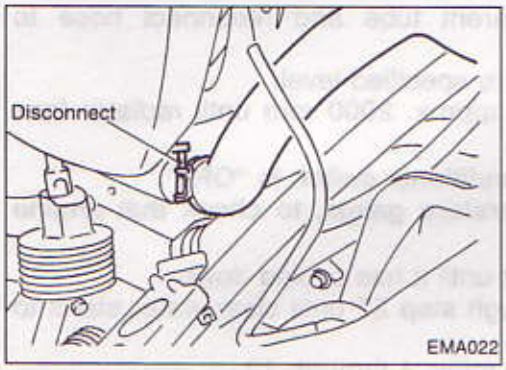
9. Disconnect hose leading from engine to expansion tank at engine side (as indicated with "D" in Cooling System Diagram), and plug hose. See illustration at left.



10. Remove cylinder block drain plug.

Changing Engine Coolant (Cont'd)

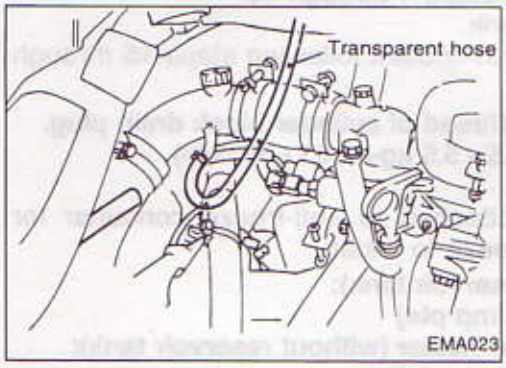
11. Disconnect upper and lower hoses to rear heater, at locations indicated with "A" and "B" in Cooling System Diagram.



12. Disconnect upper radiator hose at location indicated with "C" in Cooling System Diagram.
13. Drain cooling system completely.
14. Remove Reservoir tank and clean it.
    Re-install it temporarily.

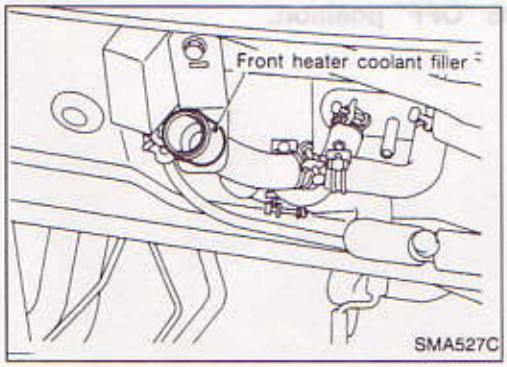
- **Be careful not to allow coolant to contact drive belts.**

15. Re-install radiator- and cylinder block drain plugs and tighten them securely.
16. Re-connect upper radiator- and rear heater hoses.



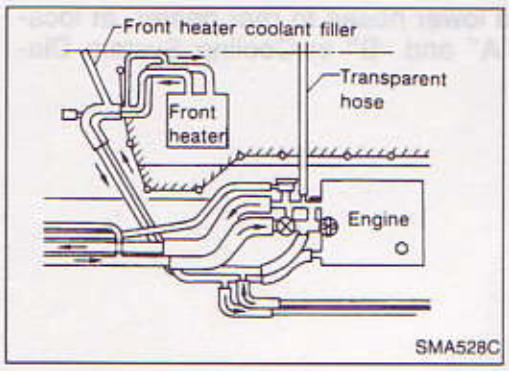
17. Connect a transparent tube to that position, where the hose from the expansion tank has been disconnected (position indicated with "D" in Cooling System Diagram).
    Dimensions transparent tube:
    - **inner diameter: 7.5 mm (0.295 in)**
    - **length: 1,200 mm (49.24 in)**
18. Place a tray under the air relief valve of the rear heater, in order not to spill any coolant.
19. Fill radiator with water and install radiator cap.
20. Fill cooling system further by pouring water into expansion tank, until water spills from air relief valve of rear heater. If no more air escapes from this air relief valve, close it.

- **Tighten clamp securely.**



21. Continue filling cooling system by pouring water into filler apperture of front heater, meanwhile monitoring fluid level in the transparent tube.

Changing Engine Coolant (Cont'd)



22. When the level mentioned above is at the same hight as the filler apperture of the front heater, stop pouring water.
23. Close the filler apperture and the air relief valve of the front heater.

- **Tighten clamps securely.**

24. Remove the transparent tube and reconnect hose to expansion tank.
25. Fill reservoir tank up to specified level.
26. Warm up engine at approx. 2000 rpm until radiator fans operate.

- **Make sure that air conditioner switch is "OFF".**
- **Monitor water temperature gauge, to check that engine does not overheat.**

27. Stop engine and wait until it has cooled down.
28. Repeat steps 4 through step 27 until clear water starts to drain from radiator.
29. Drain water following steps 4 through 13.
30. Re-install reservoir tank.
31. Fill cooling system with coolant following steps 15 through 27.

- **Apply sealant to the thread of cylinder block drain plug.**
  : 44 - 54 N·m (4.5 - 5.5 kg-m, 33 - 40 ft-lb)

Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

Coolant capacity (with reservoir tank):
13.0 ℓ (22-7/8 Imp pts)
Coolant capacity with rear heater (without reservoir tank):
12.3 ℓ (21-5/8 Imp pts)
Coolant capacity without rear heater (without reservoir tank):
11.3 ℓ (19-7/8 Imp pts)
Reservoir tank for "H" level:
0.7 ℓ (1-1/4 Imp pts).
Expansion tank:
2.1 ℓ (3-3/4 Imp pts)

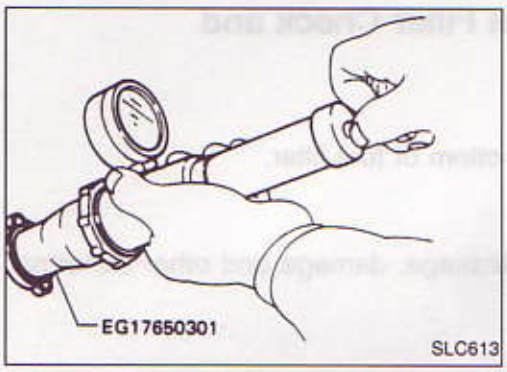
Pour coolant through coolant filler neck slowly to allow air in system to escape.

32. **If necessary add coolant.**
33. **Turn the ON/OFF valve, situated in the outlet tube from the expansion tank, to the "OFF" position.**

Checking Cooling System

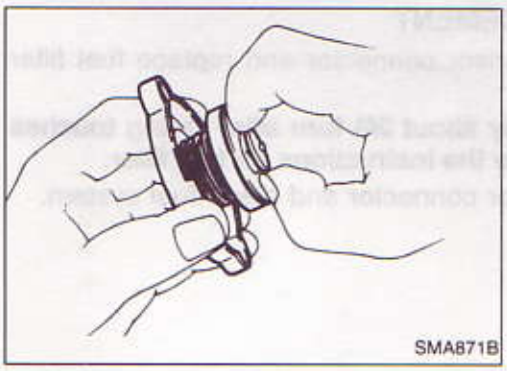
CHECKING HOSES

Check hoses for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.

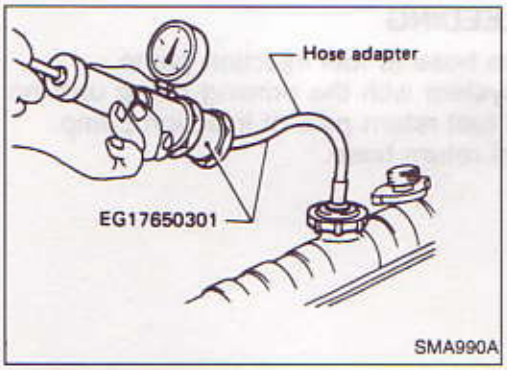


RADIATOR CAP CHECK

1. Check relief pressure with cap tester.
   Radiator cap relief pressure:
   78 - 98 kPa
   (0.78 - 0.98 bar, 0.8 - 1.0 kg/cm^2, 11 - 14 psi)
   Replace radiator cap if pressure is not within the specified values.



2. Pull the negative-pressure valve to open it, and check that it closes completely when released.

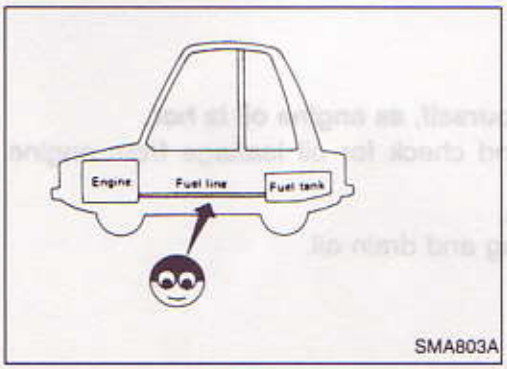


COOLING SYSTEM LEAK CHECK

Apply pressure to the cooling system with cap tester to check for leakage.

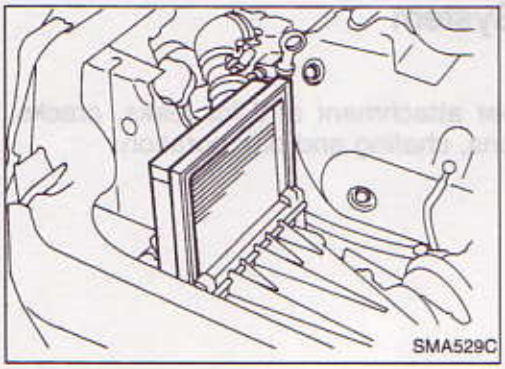
Testing pressure:
98 kPa (0.98 bar, 1.0 kg/cm^2, 14 psi)

CAUTION:
Higher pressure than the specified value may cause damage to radiator.



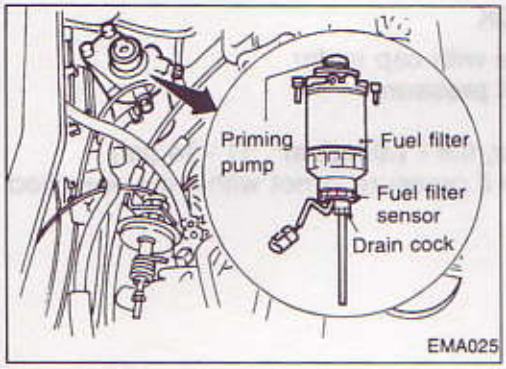
Fuel Line Check

Inspect fuel lines and tank for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration. If necessary, repair or replace malfunctioning parts.



Air Cleaner Filter Replacement

The viscous paper type air cleaner filter does not require any cleaning operation between renewals.



Water Draining, Fuel Filter Check and Replacement

WATER DRAINING

Open drain cock at the bottom of fuel filter.

FUEL FILTER CHECK

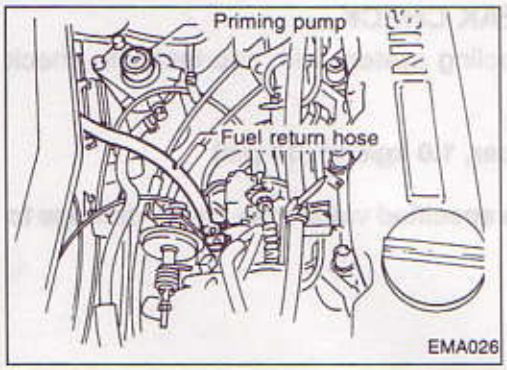
Check fuel filter for fuel leakage, damage and other abnormal signs.

FUEL FILTER REPLACEMENT

1. Disconnect water sensor connector and replace fuel filter with a new one.

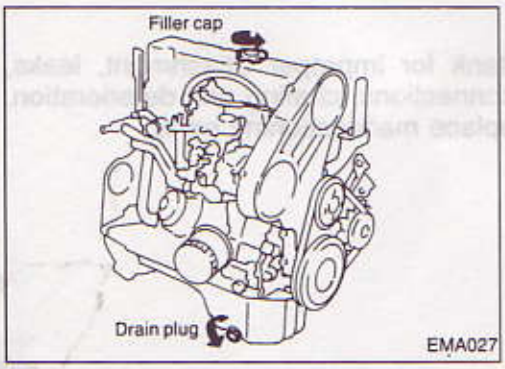
Hand-tighten fuel filter by about 2/3 turn after O-ring touches mounting surface. Follow the instructions on fuel filter.

2. Connect water sensor connector and bleed fuel system.



FUEL SYSTEM AIR BLEEDING

1. Disconnect fuel return hose at fuel injection pump.
2. Bleed air from fuel system with the priming pump until no bubbles come out of fuel return pipe of injection pump.
3. Securely connect fuel return hose.



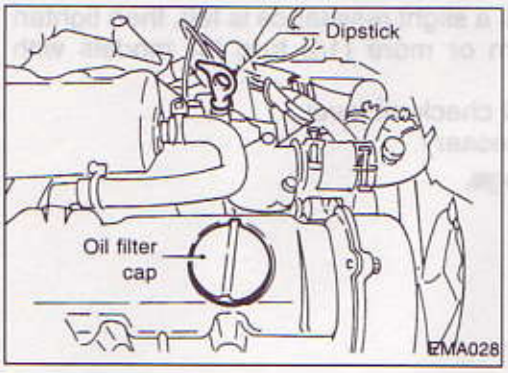
Engine Oil Change

Warning:

Be careful not to burn yourself, as engine oil is hot.

1. Warm up engine, and check for oil leakage from engine components.
2. Remove oil filler cap.
3. Remove oil drain plug and drain oil.

Engine Oil Change (Cont'd)



4. Tighten oil drain plug.
5. Fill with engine oil.

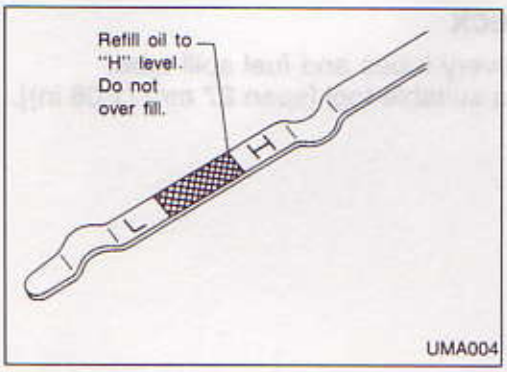
Oil refill capacity:

Unit: ℓ (Imp pts)

Without oil filter	5.2 (9-1/8)
With oil filter	5.7 (10)

CAUTION:

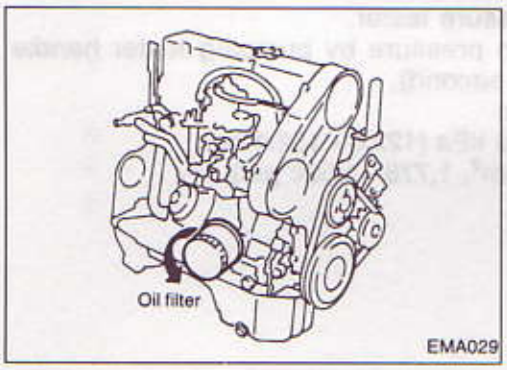
- **Be sure to clean drain plug and install with new washer.**
  Drain plug:
  :29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)



- **Use recommended engine oil. Consult "RECOMMEND FLUIDS AND LUBRICANTS".**

6. Confirm oil level and warm up engine.
7. Recheck oil level and adjust it to "H" level if necessary.

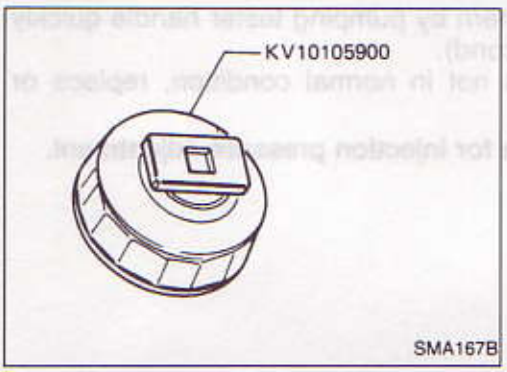
Engine Oil Filter Change

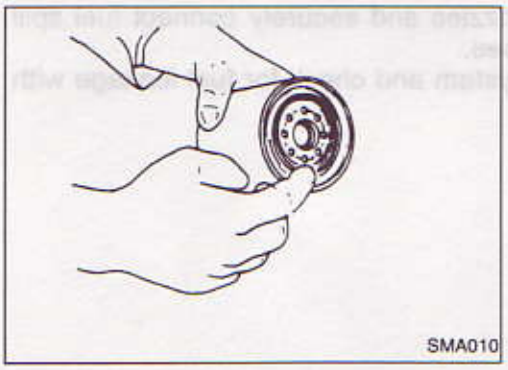


1. Remove oil filter with Tool.

WARNING:

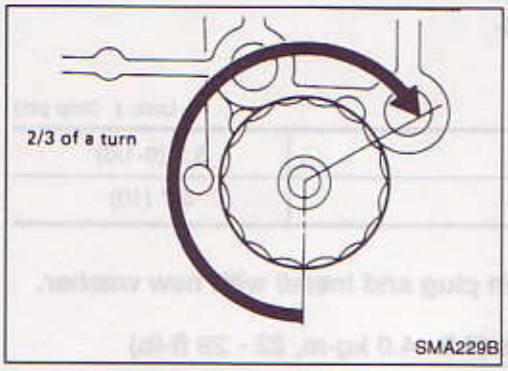
Be careful not to burn yourself, as engine and engine oil are hot.





2. Before installing new oil filter, wipe clean oil filter mounting surface on cylinder block, and apply a little engine oil to rubber seal of oil filter.

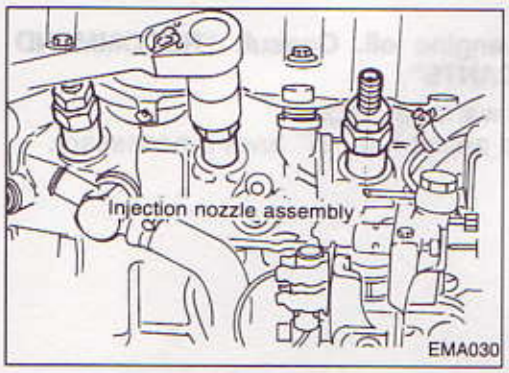
Engine Oil Filter Change (Cont'd)



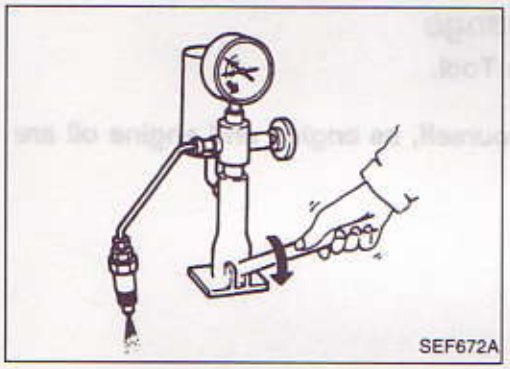
3. Screw oil filter on until a slight resistance is felt, then tighten an additional 2/3 turn or more (1/2 turn for models with E.G.R. system).
4. Warm up engine and check oil level.
5. Adjust oil level if necessary.

Refer to Engine Oil Change.

Injection Nozzle Check

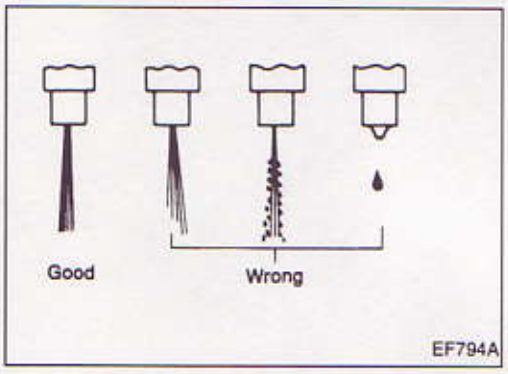


1. Remove injection delivery tubes and fuel spill tube.
2. Remove nozzle with a suitable tool [span 27 mm (1.06 in)].



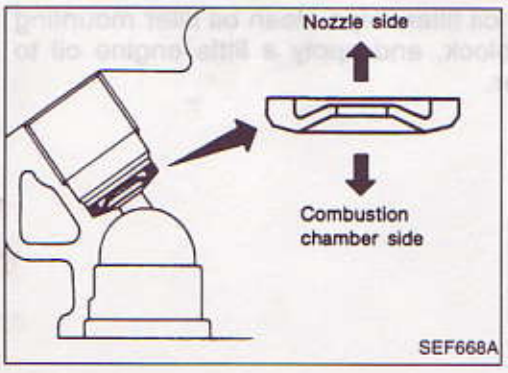
3. Install injector to pressure tester.
4. Check initial injection pressure by pumping tester handle slowly (one time per second).

Injection pressure:
12,259 - 13,239 kPa (122.6 - 132.4 bar, 125 - 135 kg/cm^2, 1,778 - 1,920 psi)



5. Check fuel spray pattern by pumping tester handle quickly (4 or 6 times per second).
6. If injection nozzle is not in normal condition, replace or correct.

Refer to EF & EC section for injection pressure adjustment.

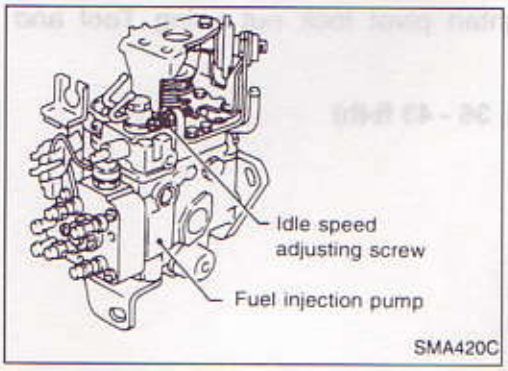


7. Install all injection nozzles and securely connect fuel spill tube and delivery tubes.
8. Bleed air from fuel system and check for fuel leakage with engine running.

Idle Speed Check

Inspection should be carried out with gears in "Neutral" and with air conditioner and other electrical loads off.

1. Warm up engine to normal operating temperature.
2. Attach a diesel tacho tester.
3. Race engine two or three times and check idle speed.



Idle Speed:

Unit: rpm

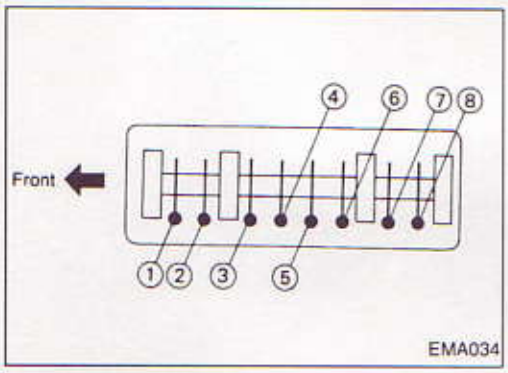
Idle speed	700 +50 −50
Idle speed with air conditioner "ON"	800 +50 −50

4. If it is out of specification, adjust idle speed with idle speed adjusting screw.

Securely lock the adjusting screw with lock nut.

Timing Belt Replacement

Refer to EM section.



Adjusting Intake and Exhaust Valve Clearance

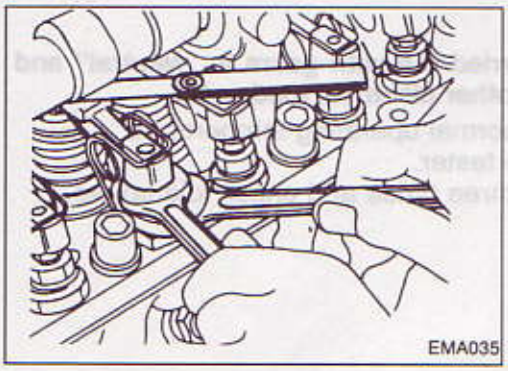
Adjustment should be made while engine is warm but not running.

1. Remove valve rocker cover.
2. Set No. 1 cylinder at top dead center on its compression stroke and adjust valve clearance ①, ②, ③ and ⑤.
3. Set No. 4 cylinder at top dead center on its compression stroke and adjust valve clearance ④, ⑥, ⑦ and ⑧.

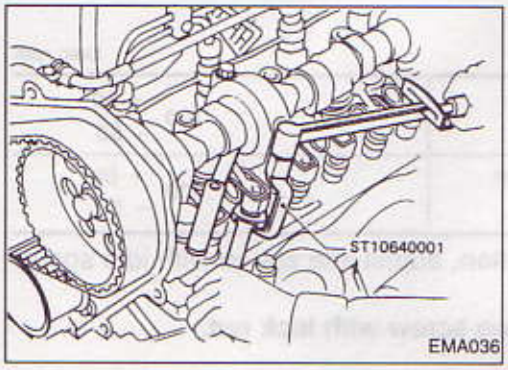
Valve clearance:

(Hot)
Intake
0.25 mm (0.010 in)
Exhaust
0.30 mm (0.012 in)
(Cold)
Intake
0.18 mm (0.007 in)
Exhaust
0.25 mm (0.010 in)

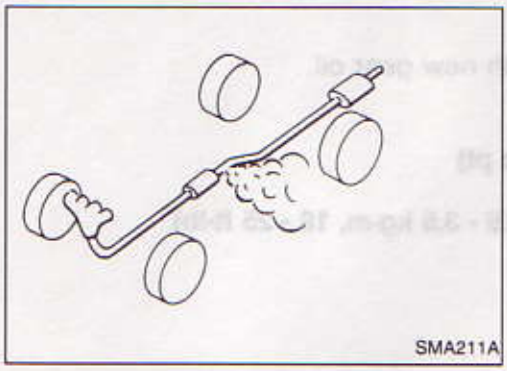
Adjusting Intake and Exhaust Valve Clearance (Cont'd)



1) Loosen pivot lock nut and turn valve rocker pivot until specified clearance is obtained.

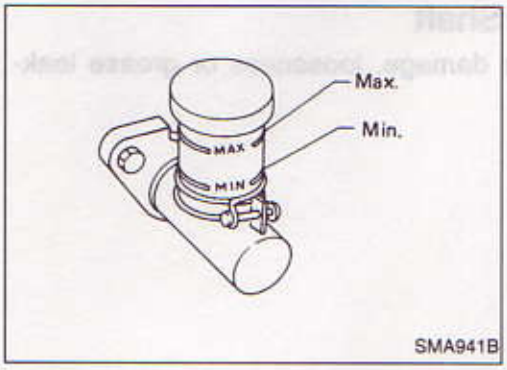


2) After adjustment, tighten pivot lock nut using Tool and recheck clearance.
   : 49 - 59 N·m
   (5.0 - 6.0 kg-m, 36 - 43 ft-lb)


SMA211A

Checking Exhaust System

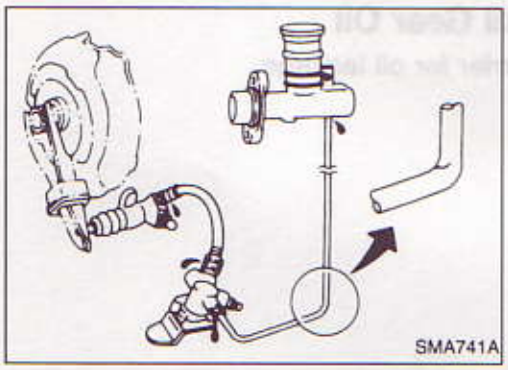
- Check exhaust pipes, muffler and mounting for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.



SMA941B

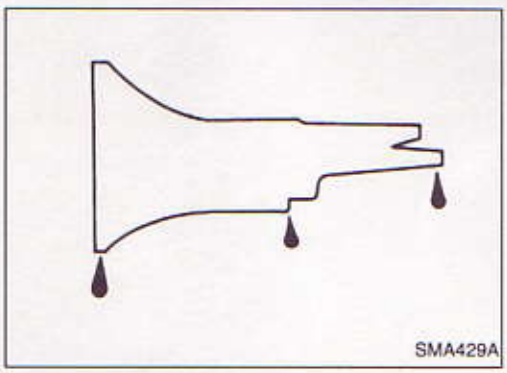
Checking Clutch Fluid Level and Leaks

- If fluid level is extremely low, check clutch system for leaks.


SMA741A

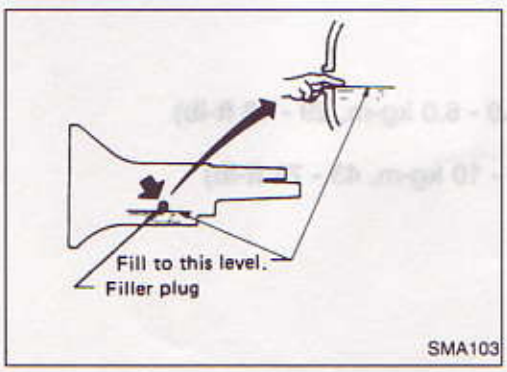
Checking Clutch System

Check fluid lines and operating cylinder for improper attachment, cracks, damage, loose connections, chafing and deterioration.


SMA429A

Checking M/T Oil

1. Check for oil leakage.



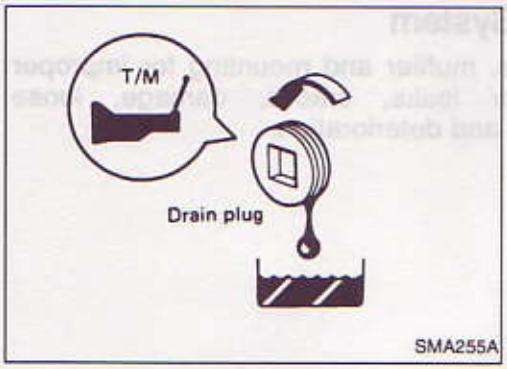
SMA103

2. Check oil level.

Never start engine while checking oil level.

Filler plug:

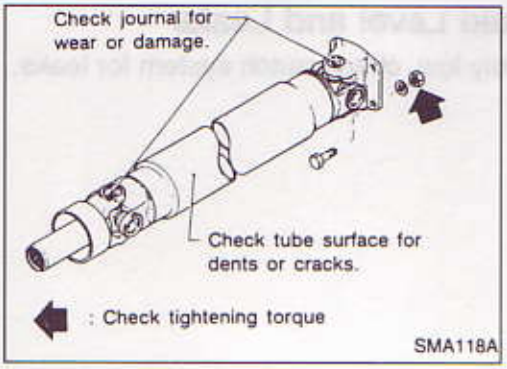
: 25 - 34 N·m(2.5 - 3.5 kg-m, 18-25 ft-lb)



Changing M/T Oil

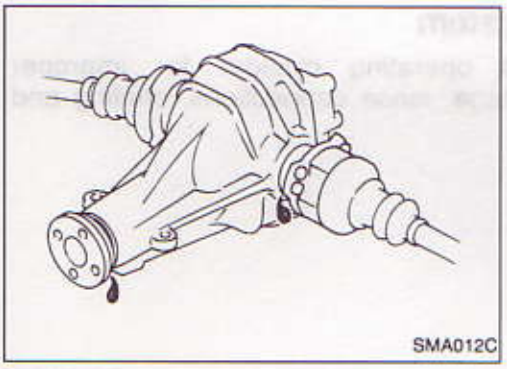
1. Drain oil and refill with new gear oil.
2. Check oil level.

Oil capacity:
2.1 ℓ (3-3/4 Imp pt)
Drain plug:
[O]: 25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)



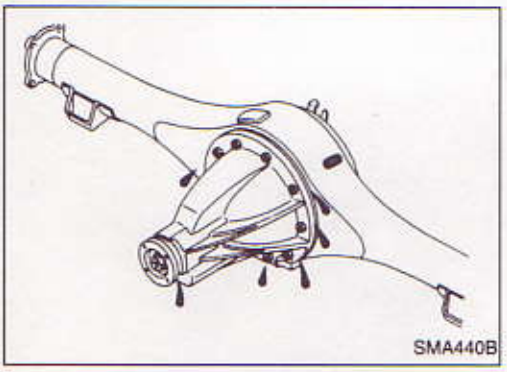
Checking Propeller Shaft

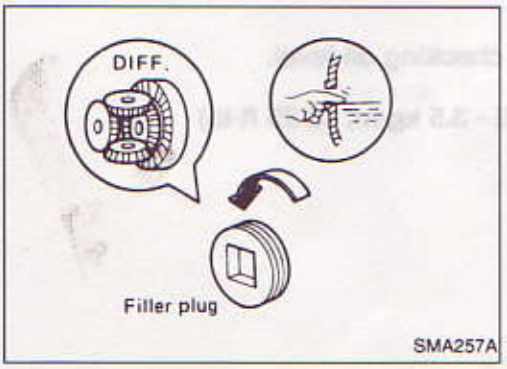
Check propeller shaft for damage, looseness or grease leakage.



Checking Differential Gear Oil

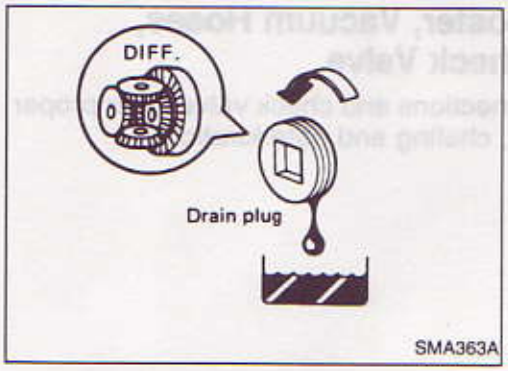
1. Check differential carrier for oil leakage.





2. Check oil level.

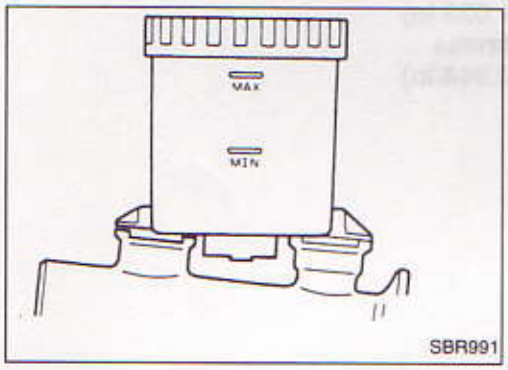
Filler plug:
R200V
[O]: 39 - 59 N·m (4.0 - 6.0 kg-m, 29 - 43 ft-lb)
H190A
[O]: 59 - 98 N·m (6 - 10 kg-m, 43 - 72 ft-lb)



Changing Differential Gear Oil

1. Drain oil and refill with new gear oil.
2. Check oil level.

Oil capacity:
R200V: 1.5 ℓ (2-5/8 Imp pts)
H190A: 1.3 ℓ (2-1/4 Imp pts)
Drain plug:
R200V:
: 39 - 59 N·m (4.0 - 6.0 kg-m, 29 - 43 ft-lb)
H190A:
: 59 - 98 N·m (6 - 10 kg-m, 43 - 72 ft-lb)

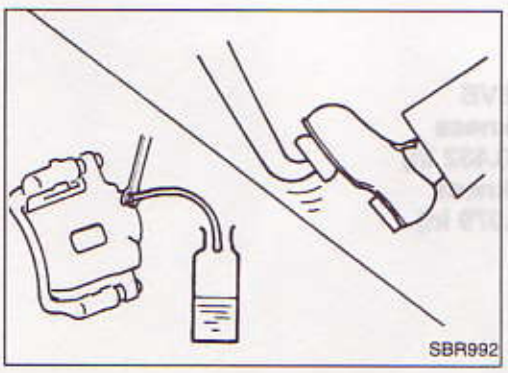


Checking Brake Fluid Level and Leaks

If fluid level is extremely low, check brake system for leaks, and brake pads for wear.

Checking Brake System

Check brake fluid lines and parking brake cables for improper attachment, leaks, chafing, abrasion, deterioration, etc.

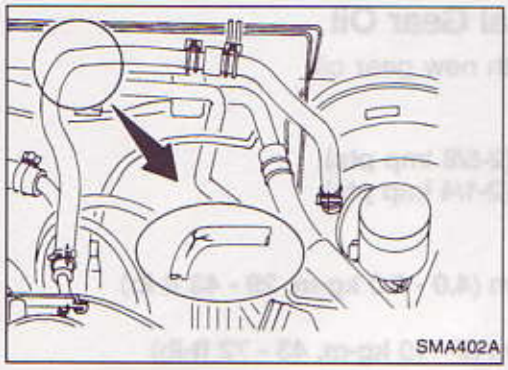


Changing Brake Fluid

1. Drain brake fluid from each air bleeder valve.
2. Refill until new brake fluid comes out from each air bleeder valve. Use same procedure as in bleeding hydraulic system to refill brake fluid.

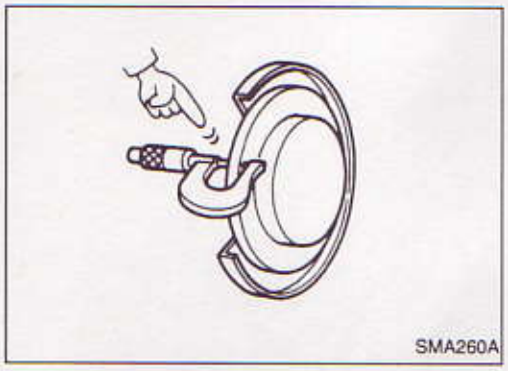
Refer to section BR.

- **Refill with recommended brake fluid "DOT 4".**
- **Never reuse drained brake fluid.**
- **Be careful not to splash brake luid on painted areas.**


SMA402A

Checking Brake Booster, Vacuum Hoses, Connections and Check Valve

Check vacuum lines, connections and check valve for improper attachment, air tightness, chafing and deterioration.


SMA260A

Checking Disc Brake

Check condition of disc brake components.

ROTOR

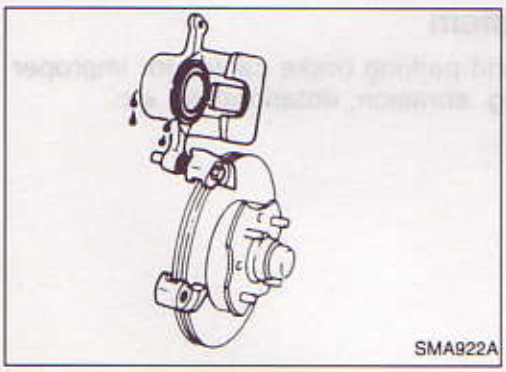
Check condition and thickness.

BD28VA

Standard thickness
22.0 mm (0.886 in)
Minimum thickness
20.0 mm (0.787 in)

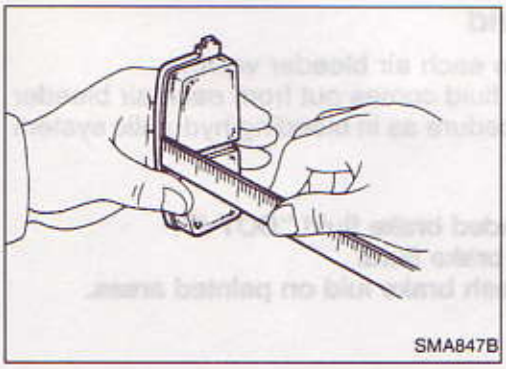
LD28VB

Standard thickness
26.0 mm (1.023 in)
Minimum thickness
24.0 mm (0.944 in)


SMA922A

CALIPER

Check operation and for leakage.

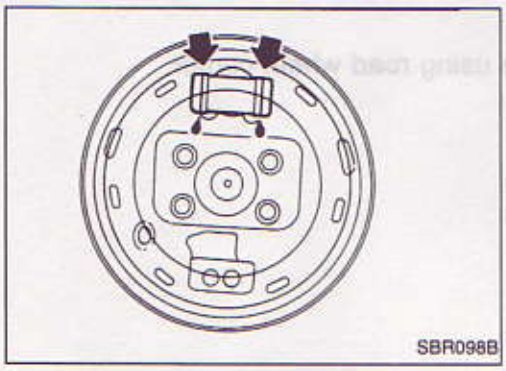

SMA847B

PAD

Check wear or damage.

BD28VA and LD28VB

Standard thickness
11.0 mm (0.432 in)
Minimum thickness
2.0 mm (0.079 in)

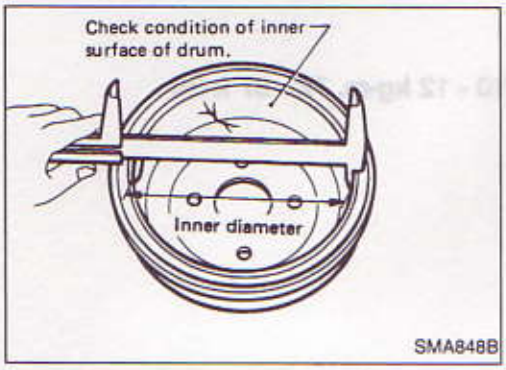

SBR098B

Checking Drum Brake

Check condition of drum brake components.

WHEEL CYLINDER

Check operation and leakage.

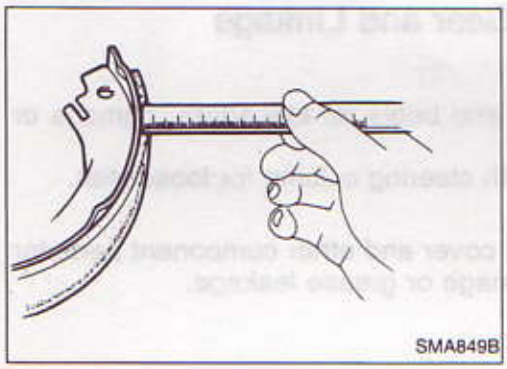


SMA848B

DRUM

Check condition of inner surface.

Standard inner diameter:
254.0 mm (10.00 in)
Maximum diameter:
254.15 mm (10.006 in)

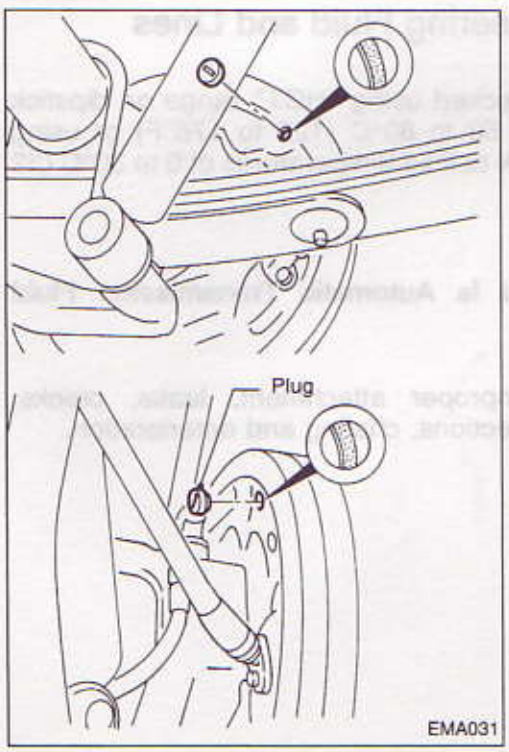

SMA849B

LINING

Check for wear or damage.

Standard thickness:
Trailing 4.5 mm (0.177 in)
Leading 6.0 mm (0.236 in)
Minimum thickness:
1.5 mm (0.059 in)

Refer to section BR for shoe replacement.



EMA031

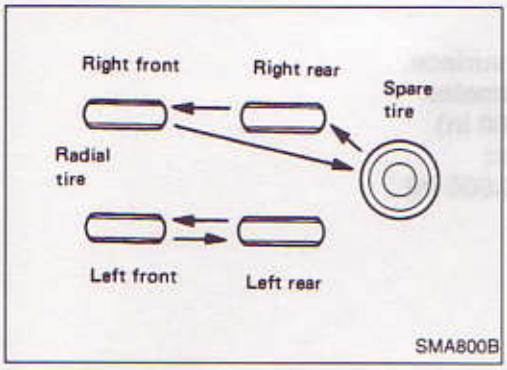
TEMPORARY METHOD FOR CHECKING LINING WEAR

Remove inspection hole plug and check for lining wear.

Balancing Wheels

- Adjust wheel balance using road wheel center.

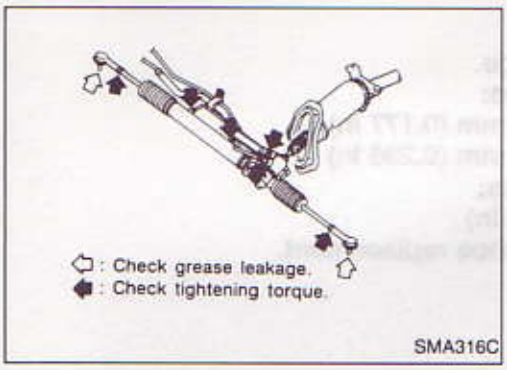
Refer to S.D.S.



Tire Rotation

Wheel nuts:

: 98 - 118 N·m (10 - 12 kg-m, 72 - 87 ft-lb)



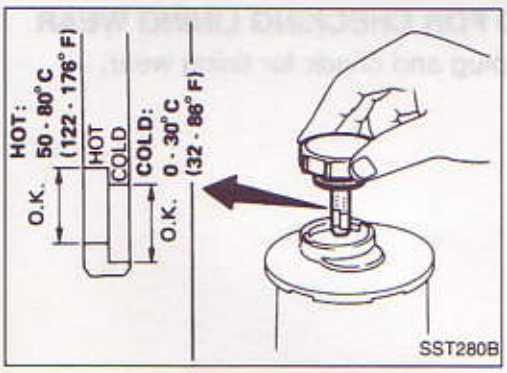
Checking Steering Gear and Linkage

STEERING GEAR

- Check gear housing and boots for looseness, damage or grease leakage.
- Check connection with steering column for looseness.

STEERING LINKAGE

- Check ball joint, dust cover and other component parts for looseness, wear, damage or grease leakage.



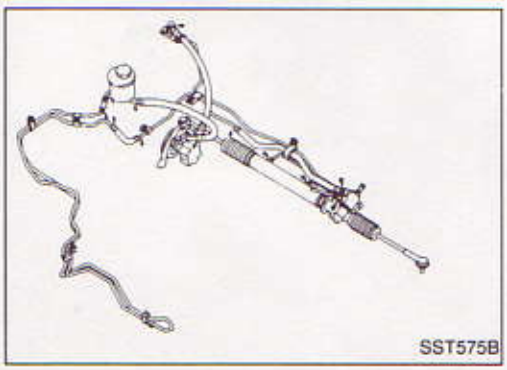
Checking Power Steering Fluid and Lines

Check fluid level.

Fluid level should be checked using "HOT" range on dipstick at fluid temperatures of 50 to 80°C (122 to 176°F) or using "COLD" range on dipstick at fluid temperatures of 0 to 30°C (32 to 86°F).

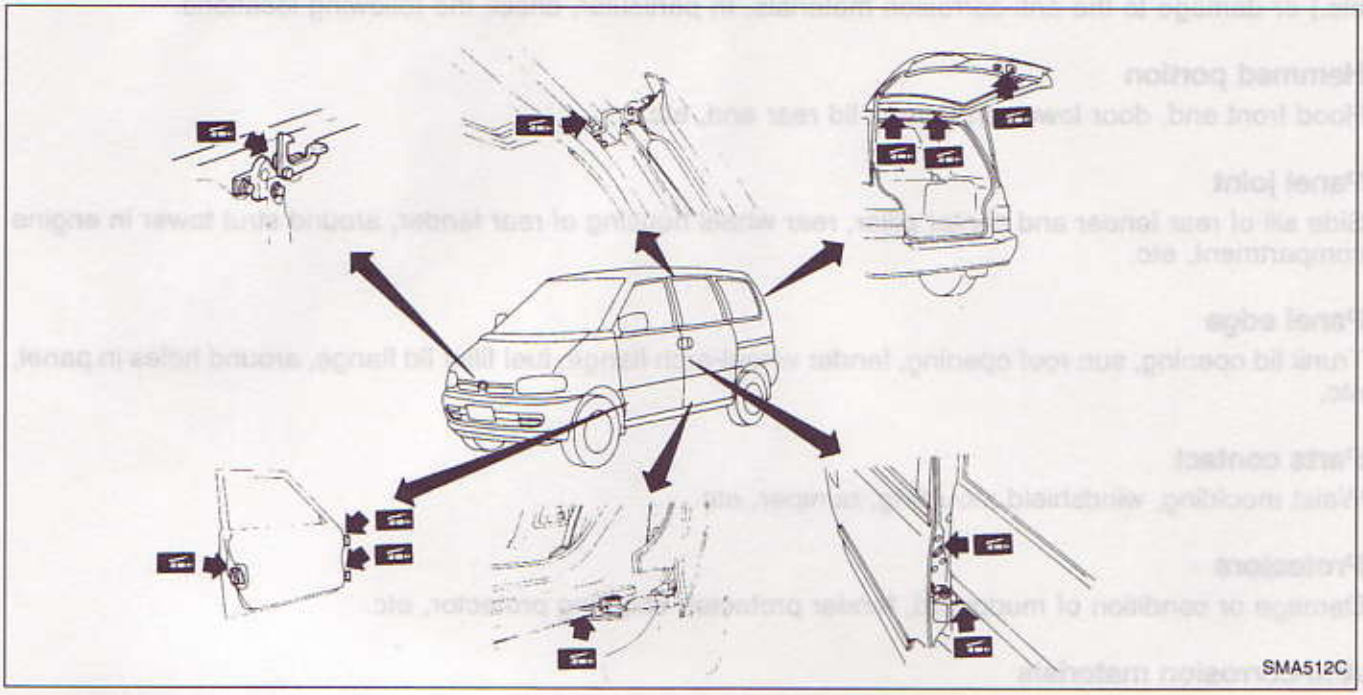
CAUTION:

- **Do not overfill.**
- **Recommended fluid is Automatic Transmission Fluid "DEXRON™" type.**

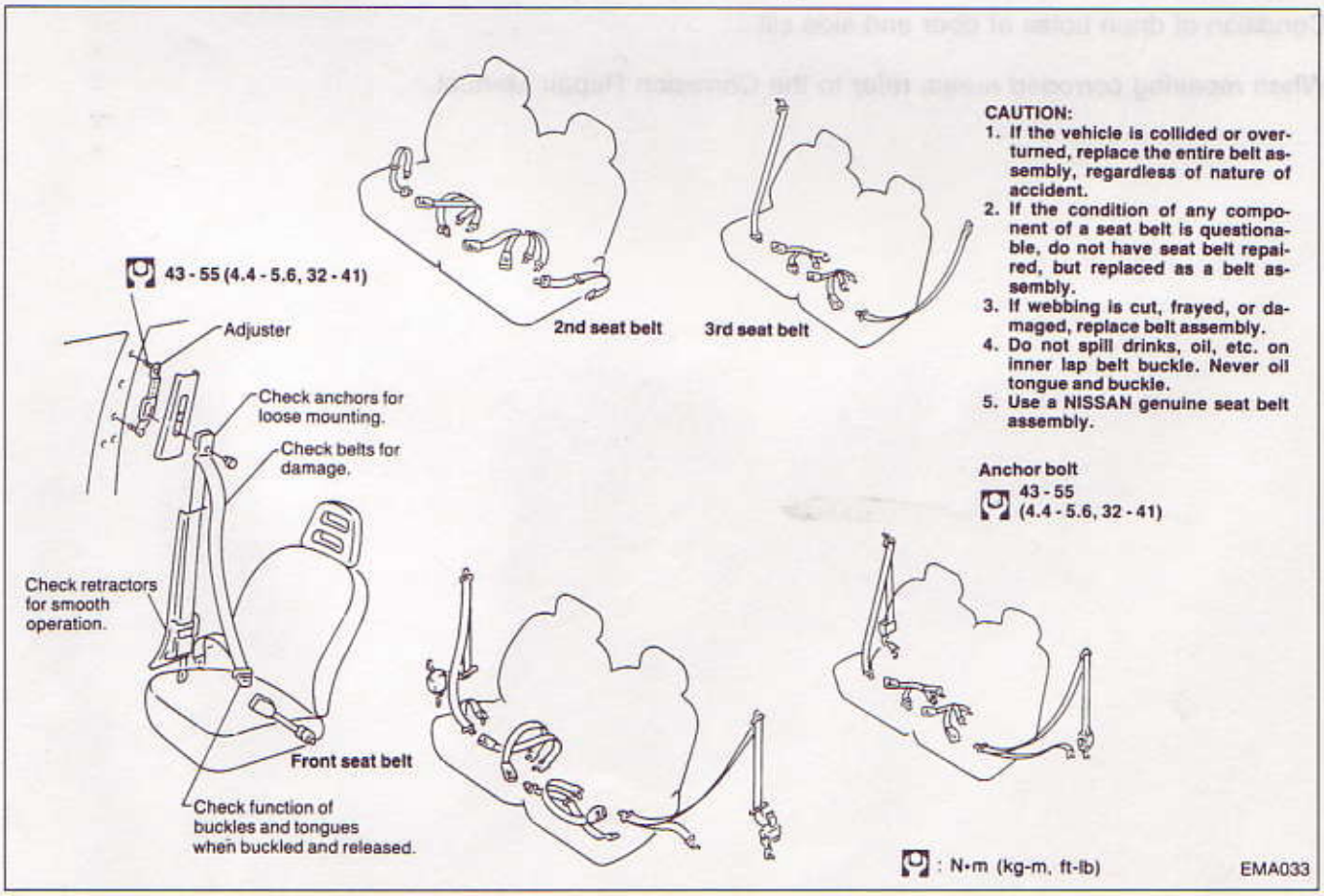


- Check lines for improper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

Lubricating Hood Latches, Locks, Hinges, Slide Door Rollers and Links



Checking Seat Belts, Buckles, Retractors, Anchors and Adjusters



Checking Body Corrosion

Visually check the body sheet metal panel for corrosion, paint damage (scratches, chipping, rubbing, etc.) or damage to the anti-corrosion materials. In particular, check the following locations.

Hemmed portion

Hood front end, door lower end, trunk lid rear end, etc.

Panel joint

Side sill of rear fender and center pillar, rear wheel housing of rear fender, around strut tower in engine compartment, etc.

Panel edge

Trunk lid opening, sun roof opening, fender wheel-arch flange, fuel filler lid flange, around holes in panel, etc.

Parts contact

Waist moulding, windshield moulding, bumper, etc.

Protectors

Damage or condition of mudguard, fender protector, chipping protector, etc.

Anti-corrosion materials

Damage or separation of anti-corrosion materials under the body.

Drain holes

Condition of drain holes at door and side sill.

When repairing corroded areas, refer to the Corrosion Repair Manual.

Engine Maintenance

INSPECTION AND ADJUSTMENT

Drive belt deflection

Unit: mm (in)

	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	11.0 - 13.0 (0.43 - 0.51)	7 - 8 (0.28 - 0.31)	6.0 - 7.0 (0.24 - 0.28)
Air conditioner	7.0 - 8.0 (0.28 - 0.31)	5.0 - 6.0 (0.20 - 0.24)	4.0 - 5.0 (0.16 - 0.20)
Power steering oil pump	12.0 - 14.0 (0.47 - 0.55)	9.0 - 10.0 (0.35 - 0.39)	8.0 - 9.0 (0.31 - 0.35)
Applied pushing force	98 N (10 kg, 22 lb)		

Oil capacity (Refill capacity)

Unit: ℓ (Imp pts)

With oil filter change	3.9 (6-7/8)
Without oil filter change	3.7 (6-1/2)

Coolant capacity (Refill capacity)

Unit: ℓ (Imp pts)

With rear heater*	9.3 (16-3/8)
Without rear heater*	8.6 (15-1/8)
Reservoir tank	0.7 (1-1/4)

* Without reservoir tank

Spark plug

Make	NGK
Type	
Standard	BKR5EY
Hot	BKR4EY
Cold	BKR6EY
Plug gap mm (in)	0.8 - 0.9 (0.031 - 0.035)

Ignition wire

Marking	BOUGICORD 403 CLASS E1
Ignition wire resistance kΩ/m (kΩ/ft)	4.48 - 6.72 (1.365 - 2.048)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Alternator, power steering mounting bolt	45 - 60	4.6 - 6.1	33 - 44
Alternator, power steering adjuster lock bolt	16 - 22	1.6 - 2.2	12 - 16
Engine oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Cylinder block drain plug	8 - 12	0.8 - 1.2	5.8 - 8.7

Engine Maintenance (Cont'd)

INSPECTION AND ADJUSTMENT

Drive belt deflection

With power steering

Unit: mm (in)

	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	11 (0.43)	7 - 9 (0.28 - 0.35)	6 - 8 (0.24 - 0.32)
Air conditioner	9.5 (0.374)	6-8 (0.24 - 0.32)	5 - 7 (0.20 - 0.28)
Power steering oil pump	7.5 (0.295)	4 - 6 (0.16 - 0.24)	3 - 5 (0.12 - 0.20)
Applied pushing force	98 N (10 kg, 22 lb)		

Without power steering

	Used belt deflection		Deflection of new belt
	Limit	Deflection after adjustment	
Alternator	10 (0.39)	7 - 9 (0.28 - 0.35)	6 - 8 (0.24 - 0.32)
Air conditioner	9.5 (0.374)	6 - 8 (0.24 - 0.32)	5 - 7 (0.20 - 0.28)
Applied pushing force	98 N (10 kg, 22 lb)		

Oil capacity (Refill capacity)

Unit: ℓ (Imp pts)

With oil filter change	3.5 (6-1/8)
Without oil filter change	3.1 (5-1/2)

Coolant capacity

Unit: ℓ (Imp pts)

With rear heater*	8.3 (14-5/8)
Without rear heater*	7.5 (13-1/4)
Reservoir tank	0.7 (1-1/4)

* Without reservoir tank

Spark plug

Make	NGK
Type	
Standard	BKR5E
Hot	BKR4E
Cold	BKR6E
Plug gap mm (in)	0.8 - 0.9 (0.031 - 0.035)

Ignition wire

Marking	SUMITOMO L-16
Ignition wire resistance kΩ/m (kΩ/ft)	9.6 - 22.4 (2.93 - 6.83)

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Alternator, power steering mounting bolt	37 - 50	3.8 - 5.1	27 - 37
Alternator, power steering adjuster lock bolt	16 - 21	1.6 - 2.1	12 - 15
Engine oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Cylinder block drain plug	34 - 44	3.5 - 4.5	25 - 33

Engine Maintenance (Cont'd)

INSPECTION AND ADJUSTMENT

Drive belt deflection

Unit: mm (in)

	Used belt deflection		Set deflection of new belt
	Limit	Adjust deflection	
Alternator	17 (0.67)	13 - 15 (0.51 - 0.59)	9.5 - 11.5 (0.374 - 0.453)
Air conditioner compressor	11 (0.43)	7.5 - 9.5 (0.295 - 0.374)	5.5 - 7.5 (0.216 - 0.295)
Power steering oil pump	15 (0.59)	11 - 13 (0.43 - 0.51)	9 - 11 (0.35 - 0.43)
Applied pushing force	98 N (10 kg, 22 lb)		

Coolant capacity (Refill capacity)

Unit: ℓ (Imp pts)

With rear heater*	12.3 (21-5/8)
Without rear heater*	11.3 (19-7/8)
Reservoir tank	0.7 (1-1/4)
Expansion tank	2.1 (3-3/4)

* Without reservoir tank

Cooling system check

Unit: kPa (bar, kg/cm^2, psi)

Radiator cap relief pressure	78 - 98 (0.78 - 0.98, 0.8 - 1.0, 11 - 14)
Radiator testing pressure	98 (0.98, 1.0, 14)

Engine oil capacity (Refill capacity)

Unit: ℓ (Imp pts)

Without oil filter	5.2 (9-1/8)
With oil filter	5.7 (10)

Injection nozzle

Unit: kPa (bar, kg/cm^2, psi)

Initial injection pressure	
New	13,239 - 14,024 (132.4 - 140.2, 135 - 143, 1,920 - 2,035)
Used	12,259 - 13,239 (122.6 - 132.4, 125 - 135, 1,778 - 1,920)

Idle speed

Unit: rpm

Idle speed	700 $^{+50}_{-50}$
Idle speed with Airconditioner "ON"	800 $^{+50}_{-50}$

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Alternator, power steering mounting bolt	37 - 51	3.8 - 5.2	27 - 38
Alternator, power steering adjuster lock bolt	16 - 21	1.6 - 2.1	12 - 15
Cylinder block drain plug	44 - 54	4.5 - 5.5	33 - 40
Engine oil pan drain plug	29 - 39	3.0 - 4.0	22 - 29
Injector (To head)	59 - 69	6.0 - 7.0	43 - 51
Spill tube	39 - 49	4.0 - 5.0	29 - 36
Delivery tube	22 - 25	2.2 - 2.5	16 - 18

Chassis and Body Maintenance

INSPECTION AND ADJUSTMENT

Clutch

Unit: mm (in)

Vehicle model	R.H.D.	L.H.D.
Pedal free height	222 - 232 (8.740 - 9.133)	241.5 - 251.5 (9.507 - 9.901)
Pedal free play	1.0 - 3.0 (0.04 - 0.12)	
Pedal free travel	9.0 - 16.0 (0.35 - 0.63)	

Front axle and front suspension (Unladen)*1

Unit: degree

	Vehicles equipped with I.R.S.		Vehicles equipped with rigid rear axle	
Engine	SR20DE	LD20-II	GA16DE & LD20-II	
Camber	-0°30' to 1°00'			
Caster	2°05' to 3°35'			
Kingpin inclination	12°45' to 14°15'			
Toe-in				
A-B mm (in)	3.1 - 5.1 (0.122 - 0.201)	2.8 - 4.8 (0.110 - 0.189)	3.5 - 5.5 (0.138 - 0.216)	
Angle θ	8' - 14'	7' - 13'	9' - 15'	
Front wheel turning angle			Power steering	Manual steering
(Full turn) *2				
Inside	37°30' to 39°30'		37°30' to 39°30'	40° to 42°
Outside	32° to 34°		32° to 34°	34° to 36°

*1: Fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools and mats in designated positions.
*2: On power steering models, wheel turning force (at circumference of steering wheel) of 98 to 147 N (10 to 15 kg, 22 to 33 lb) with engine idle.

Rear axle and rear suspension (Unladen)*

Rear axle	I.R.S.		Rigid
Engine	SR20DE	LD20-II	GA16DE
Camber degree	-1°15' to 0°15'	-0°57' to 0°33'	—
Toe-in			
A-B mm (in)	-1.8 to 1.8 (-0.071 - 0.071)		—
Angle θ degree	−5' to 5'		—

*: Fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools and mats in designated positions.

Brake

Disc brake mm (in)	
Pad	
Standard thickness	
BD28VA	11.0 (0.433)
LD28VB	11.0 (0.433)
Minimum thickness	
BD28VA	2.0 (0.079)
LD28VB	2.0 (0.079)
Rotor	
Standard thickness	
BD28VA	22.0 (0.866)
LD28VB	26.0 (1.02)
Minimum thickness	
BD28VA	20.0 (0.787)
LD28VB	24.0 (0.945)
Drum brake mm (in)	
Lining	
Standard thickness	
Trailing	4.5 (0.177)
Leading	6.0 (0.236)
Minimum thickness	1.5 (0.059)
Drum	
Standard diameter	254.0 (10.00)
Maximum diameter	255.5 (10.059)
Pedal mm (in)	
Free height	
R.H.D.	208.5 - 218.5 (8.21 - 8.60)
L.H.D.	212.5 - 222.5 (8.37 - 8.76)
Free play	1 - 3 (0.04 - 0.12)
Full stroke mm (in)	145 (5.708)
Parking brake	
Number of notches [at pulling force 196 N (20 kg, 44 lb)]	9 - 10

Wheel balance

Wheel balance (Maximum allowable unbalance at rim flange) g (oz)	10 (0.35)
Tire balance weight g (oz)	5 - 60 (0.18 - 2.12) Spacing 5 (0.18)

Wheel bearing

	Front	Rear	
		IRS	rigid
Wheel bearing axle end play mm (in)	0.05 (0.0020) or less		0 - 0.1
Wheel bearing lock nut Tightening torque N·m (kg-m, ft-lb)	206-284 (21 - 29, 152 - 210)	206 - 275 21 - 28, 152 - 202)	——

TIGHTENING TORQUE

Unit	N·m	kg-m	ft-lb
Clutch			
Pedal stopper lock nut	12 - 15	1.2 - 1.5	9 - 11
Master cylinder push rod lock nut	8 - 11	0.8 - 1.1	5.8 - 8.0
Manual transmission			
Drain and filler plugs			
RS5W71C	25 - 34	2.5 - 3.5	18 - 25
Differential carrier			
Drain and filler plugs			
R 200 V	39 - 59	4 - 6	29 - 43
H 190 B	59 - 98	6 - 10	43 - 72
Front axle and front suspension			
Tie-rod lock nut	78 - 98	8.0 - 10.0	58 - 72
Brake system			
Air bleeder valve	7 - 9	0.7 - 0.9	5.1 - 6.5
Wheel and tire			
Wheel nut	98 - 118	10 - 12	72 - 87