

MAINTENANCE

SECTION **MA**


MA

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PREPARATION

SPECIAL SERVICE TOOL

Tool number Tool name	Description
EG17650301 Radiator cap tester adapter	 Checking cooling system

ENGINE MAINTENANCE

Retightening Manifold Bolts and Nuts MANIFOLD BOLTS AND NUTS

Intake:

☞ : 15 - 20 N·m (1.5 - 2.0 kg-m, 11 - 14 ft-lb)

Exhaust:

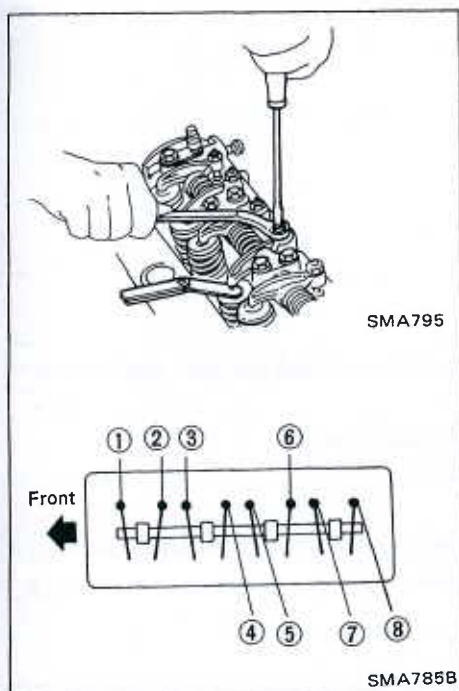
Without turbocharged engine

☞ : 25 - 29 N·m (2.5 - 3.0 kg-m, 18 - 22 ft-lb)

With turbocharged engine

☞ : 29 - 34 N·m (3.0 - 3.5 kg-m, 22 - 25 ft-lb)

Retightening should be performed while engine is cold [approximately 20°C (68°F)].



Adjusting Intake and Exhaust Valve Clearance

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

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

Valve clearance:

Intake ①, ③, ⑤ and ⑦

0.35 mm (0.014 in)

Exhaust ②, ④, ⑥ and ⑧

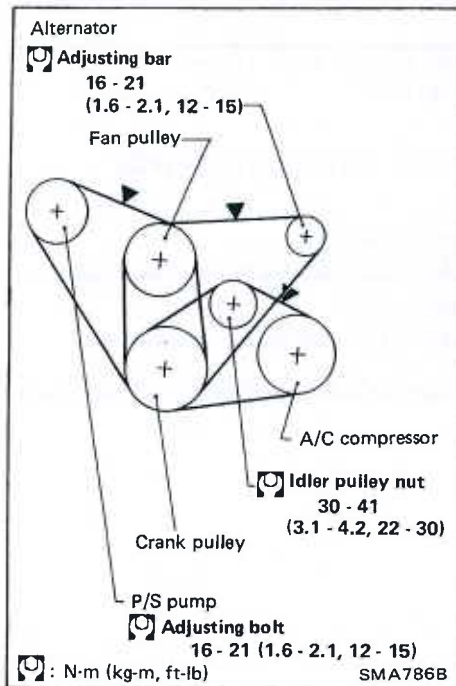
0.35 mm (0.014 in)

Adjusting screw lock nuts:

☞ : 14 - 18 N·m

(1.4 - 1.8 kg-m, 10 - 13 ft-lb)

ENGINE MAINTENANCE



Drive Belt Inspection

1. Inspect for cracks, fraying, wear or oil adhesion. Replace if necessary.

The belts should not touch the bottom of the pulley groove.

2. Check drive belt deflection by pushing on the belt midway between pulleys.

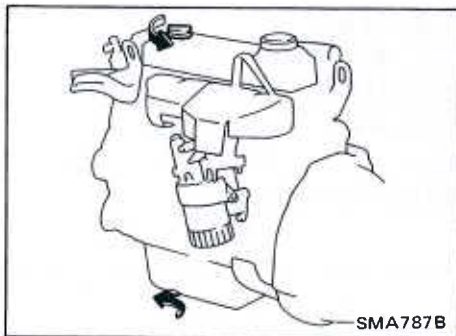
Adjust if belt deflections exceed the limit.

Unit: mm (in)

	Used belt deflection		Set deflection of new belt
	Limit	Adjusted deflection	
Alternator	20 (0.79)	11 - 13 (0.43 - 0.51)	9 - 11 (0.35 - 0.43)
Air conditioner compressor	12 (0.47)	6 - 7.5 (0.236 - 0.295)	5 - 6.5 (0.197 - 0.256)
Power steering oil pump	15 (0.59)	8 - 9.5 (0.315 - 0.374)	7 - 8.5 (0.276 - 0.335)
Applied pushing force	98 N (10 kg, 22 lb)		

Check drive belt deflections when engine is cold.

If engine is hot, check deflections after 30 minutes or more.



Changing Engine Oil

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

Oil capacity:

Refer to the GI section of applicable Service Manuals because oil capacity differs between models.

WARNING:

- Be careful not to burn yourself, as the engine oil may be hot.
- Be sure to clean and install oil pan drain plug with washer.

Drain plug:

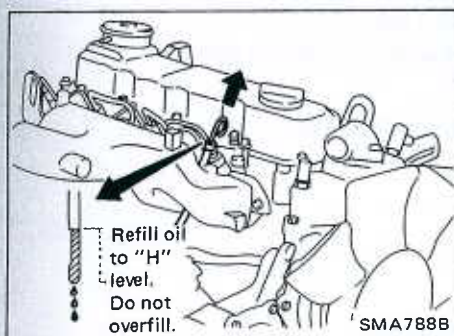
: 54 - 59 N·m (5.5 - 6.0 kg·m, 40 - 43 ft·lb)

- Use recommended engine oil. Refer to GI section.

ENGINE MAINTENANCE

Changing Engine Oil (Cont'd)

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

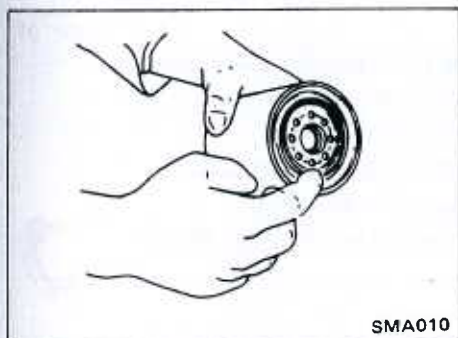


Changing Oil Filter

1. Remove oil filter with a suitable wrench.

WARNING:

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

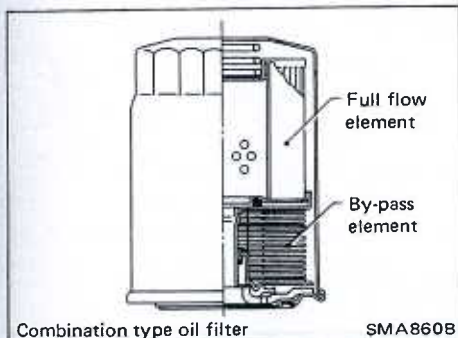


2. Before installing new oil filter, smear a little engine oil on rubber seal of oil filter and mounting surface on cylinder block.

3. Install oil filter.

Except D21 4WD model;

When installing oil filter, screw it in until a slight resistance is felt, then tighten an additional 2/3 turn or more.

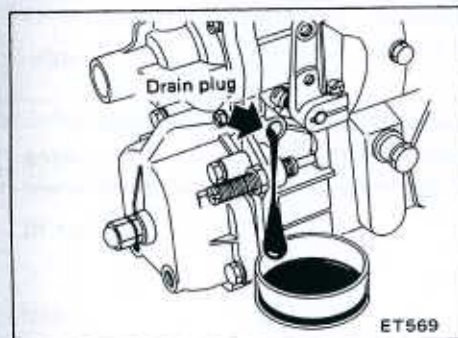


D21 4WD model;

When installing oil filter, screw it in until a slight resistance is felt, then tighten an additional 1/2 turn or more.

4. Add engine oil.

Refer to Changing Engine Oil.



Lubricating Injection Pump Governor Diaphragm (In-line type)

1. Drain fuel from governor chamber.

ENGINE MAINTENANCE

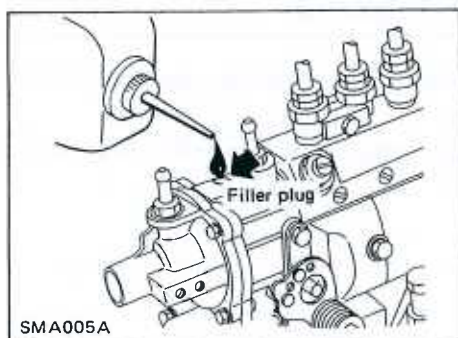
Lubricating Injection Pump Governor Diaphragm (In-line type) (Cont'd)

2. Lubricate governor diaphragm.

Fill with three to four droplets of diaphragm oil.

Diaphragm oil:

OL36V1 or cod liver oil

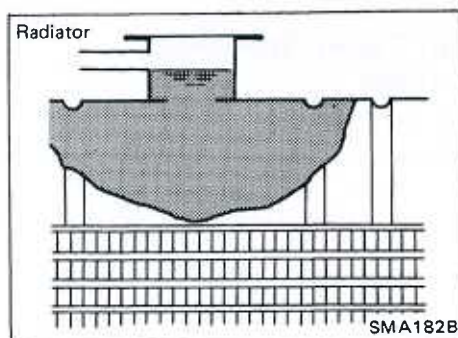
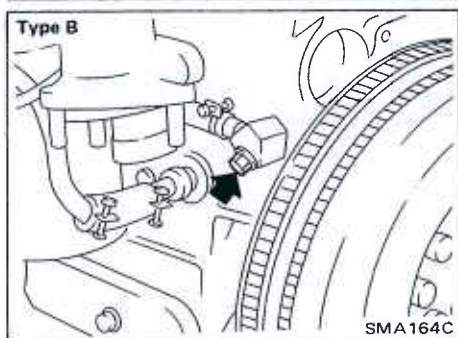
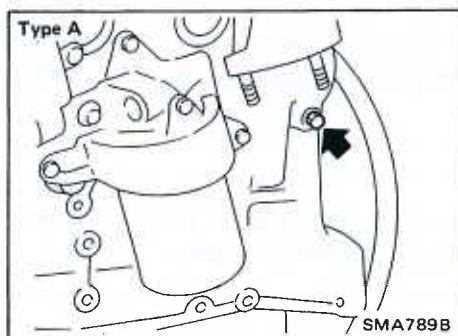
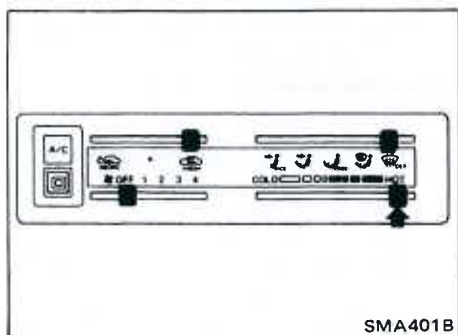


Changing Engine Coolant

WARNING:

To avoid the danger of being scalded, never attempt to change the coolant when the engine is hot.

1. Set heater "TEMP" control lever all the way to "HOT" position.
2. Open drain cock at the bottom of radiator, and remove radiator cap.
3. Remove cylinder block drain plug located at left rear of cylinder block.
4. Drain coolant and then tighten drain plug securely.
Type A: Without turbocharged engine
Type B: With turbocharged engine
5. Fill radiator with water and warm up engine.
6. Stop engine and wait until it cools down.
7. Repeat step 2 through step 5 two or three times.
8. Drain water.



9. Fill radiator with coolant up to filler opening.

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

Coolant capacity:

Refer to the GI section of applicable Service Manuals because coolant capacity differs between models.

Slowly pour coolant through coolant filler neck to allow air in system to escape.

ENGINE MAINTENANCE

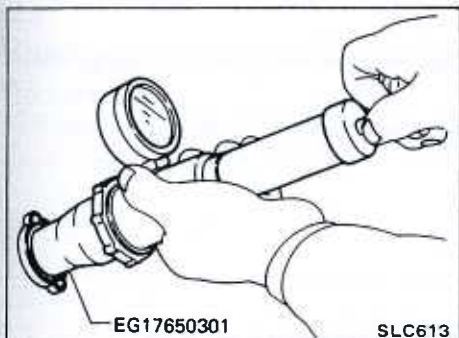
Changing Engine Coolant (Cont'd)

10. Fill reservoir tank up to "MAX" level.
11. Run the engine at approximately 2,000 rpm for about one minute.
12. Stop engine and cool it down, then refill the radiator and the reservoir tank.

Checking Cooling System

CHECKING HOSES

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



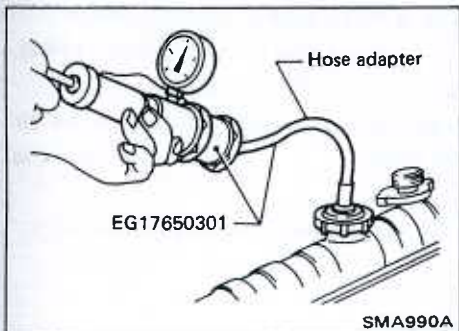
CHECKING RADIATOR CAP

Apply pressure to radiator cap by means of a cap tester to see if it is satisfactory.

Radiator cap relief pressure:

78 - 98 kPa

(0.78 - 1.0 bar, 0.8 - 1.0 kg/cm², 11 - 14 psi)



CHECKING COOLING SYSTEM FOR LEAKS

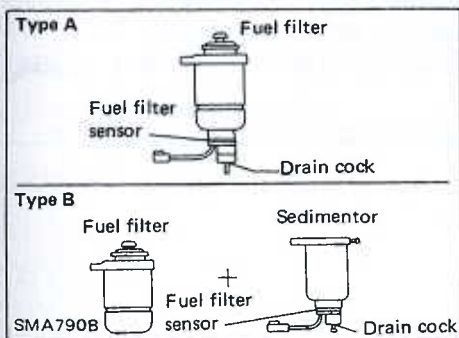
Apply pressure to the cooling system by means of a tester to check for leakage.

Testing pressure:

98 kPa (0.98 bar, 1.0 kg/cm², 14 psi)

CAUTION:

Higher than the specified pressure may cause radiator damage.



Checking and Replacing Fuel Filter and Draining Water

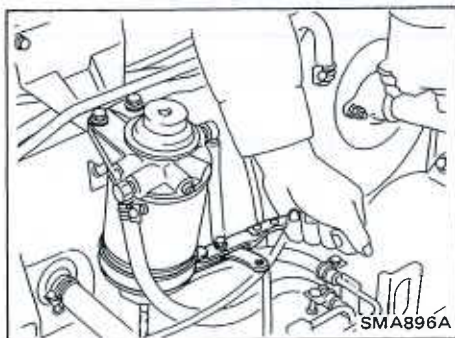
Be careful not to spill fuel in engine compartment. Place a rag to absorb fuel.

REPLACING FUEL FILTER

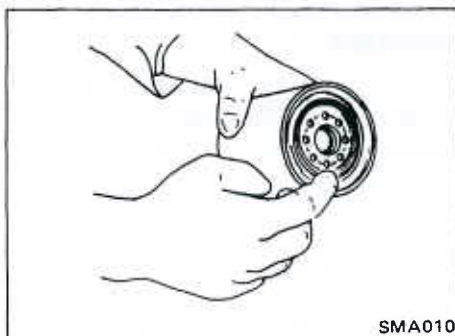
1. Remove fuel filter sensor and drain fuel. (Type A)

ENGINE MAINTENANCE

Checking and Replacing Fuel Filter and Draining Water (Cont'd)

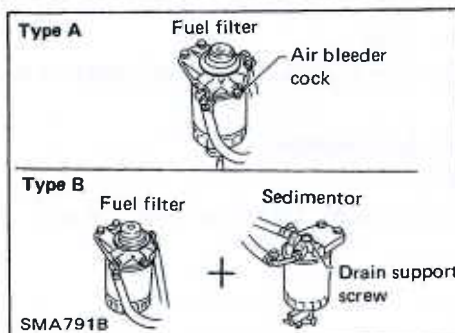


2. Remove fuel filter, using a suitable tool.

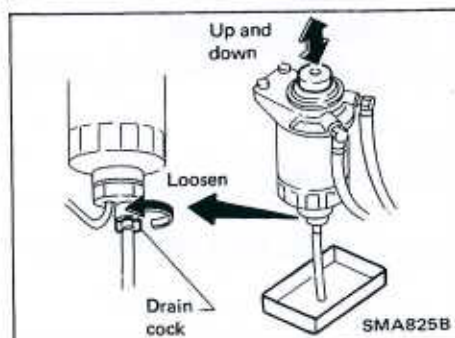


3. Wipe clean fuel filter mounting surface on fuel filter bracket and smear a little fuel on rubber seal of fuel filter.
4. Screw fuel filter on until a slight resistance is felt, then tighten an additional more than 2/3 turn.
5. Install fuel filter sensor to new fuel filter. (Type A)
6. Bleed air from fuel line.
Refer to Bleeding Fuel System in EF section.
7. Start engine and check for leaks.

DRAINING WATER



1. (Type A)
Loosen air bleeder cock of fuel filter cover (If equipped).
(Type B)
Loosen drain support screw from the sedimentor cover.



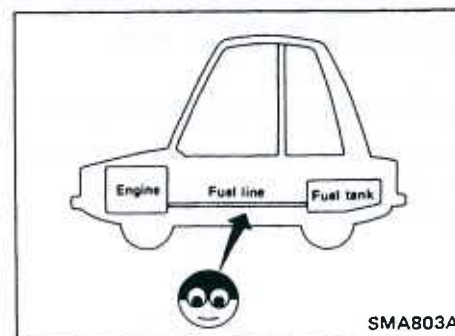
2. Loosen drain cock and drain water.
Loosening drain cock 4 to 5 turns causes water to start draining. Do not remove drain cock by loosening it excessively.
In the case of a fuel filter cover not equipped with an air bleeder cock, if water does not drain properly, move the priming pump up and down.
3. Bleed air.
Refer to section EF for fuel system bleeding instructions.

Checking Fuel System

Check fuel lines and tank for proper attachment, leaks, cracks, damage, loose connections, chafing and deterioration.

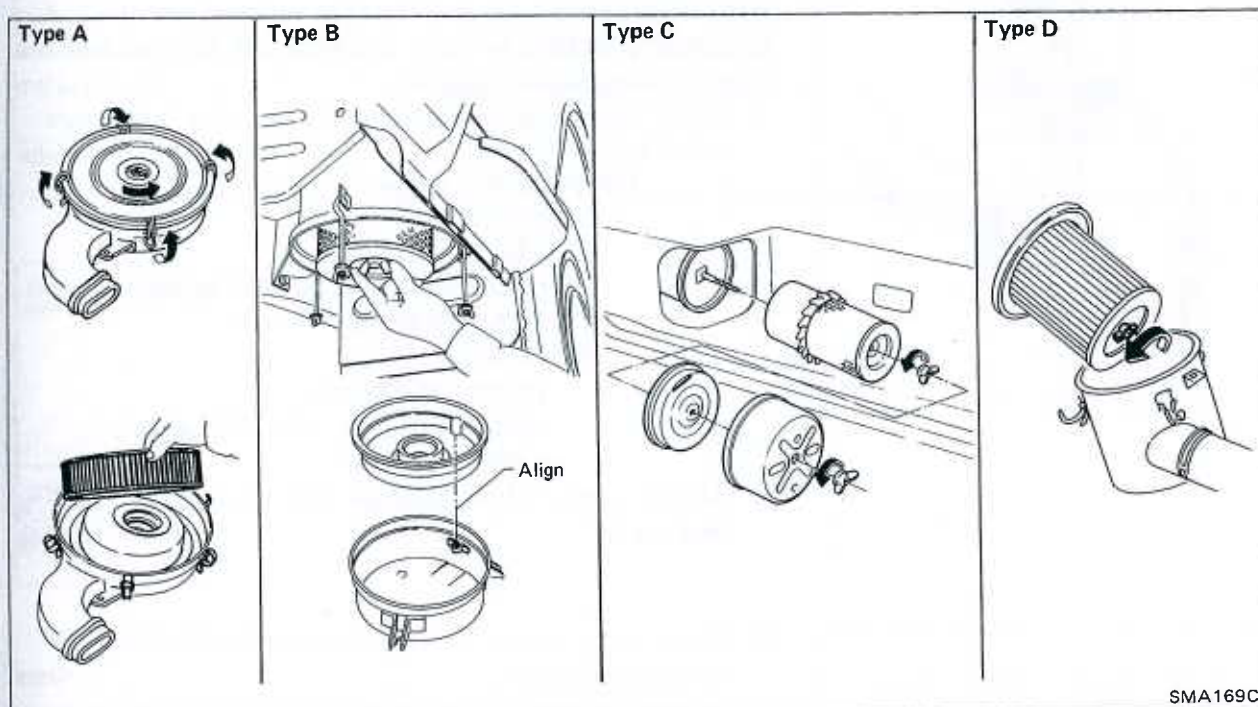
CAUTION:

- Keep clean parts with compressed air when assembling.



ENGINE MAINTENANCE

Cleaning and Replacing Air Cleaner Filter



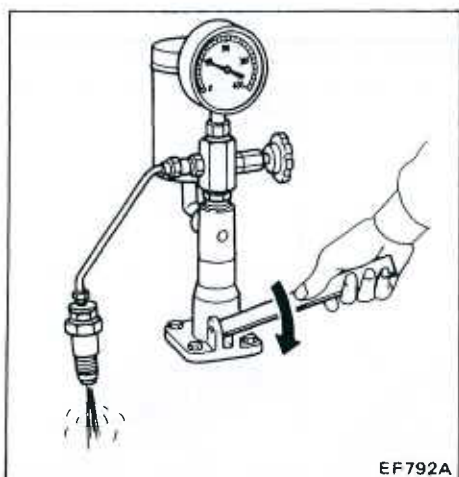
Cleaning and Replacing Air Cleaner Filter (Dry Paper type)

Clean or replace element more often under dusty driving conditions.

Replacing Air Cleaner Filter (Viscous Paper type)

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

ENGINE MAINTENANCE



Checking Injection Nozzle

WARNING:

When using nozzle tester, do not allow fuel sprayed from nozzle to contact your hand or body, and make sure that your eyes are properly protected with goggles.

1. Check initial injection pressure by pumping tester handle one time per second.

Initial injection pressure:

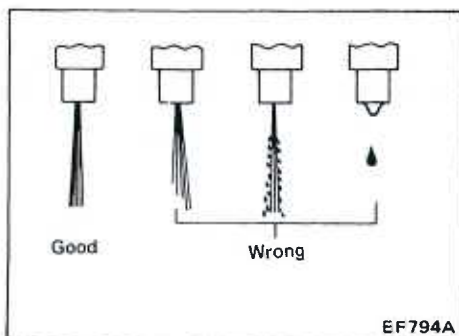
Used Nozzle

9,807 - 10,297 kPa
(98.1 - 103.0 bar, 100 - 105 kg/cm²,
1,422 - 1,493 psi)

New Nozzle

10,297 - 11,278 kPa
(103.0 - 112.8 bar, 105 - 115 kg/cm²,
1,493 - 1,635 psi)

- Always check initial injection pressure before installing new nozzle.



2. Check spray pattern by pumping tester handle 4 to 6 times or more per second.
 3. If spray pattern is not correct, clean injection nozzle tip or replace it.
- For details, refer to INJECTION NOZZLE ASSEMBLY in EF section.

: Injection nozzle to cylinder head

54 - 64 N·m
(5.5 - 6.5 kg-m, 40 - 47 ft-lb)

Spill tube nut

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

Injection tube

20 - 25 N·m
(2.0 - 2.5 kg-m, 14 - 18 ft-lb)

Checking Idle Speed

Preparation

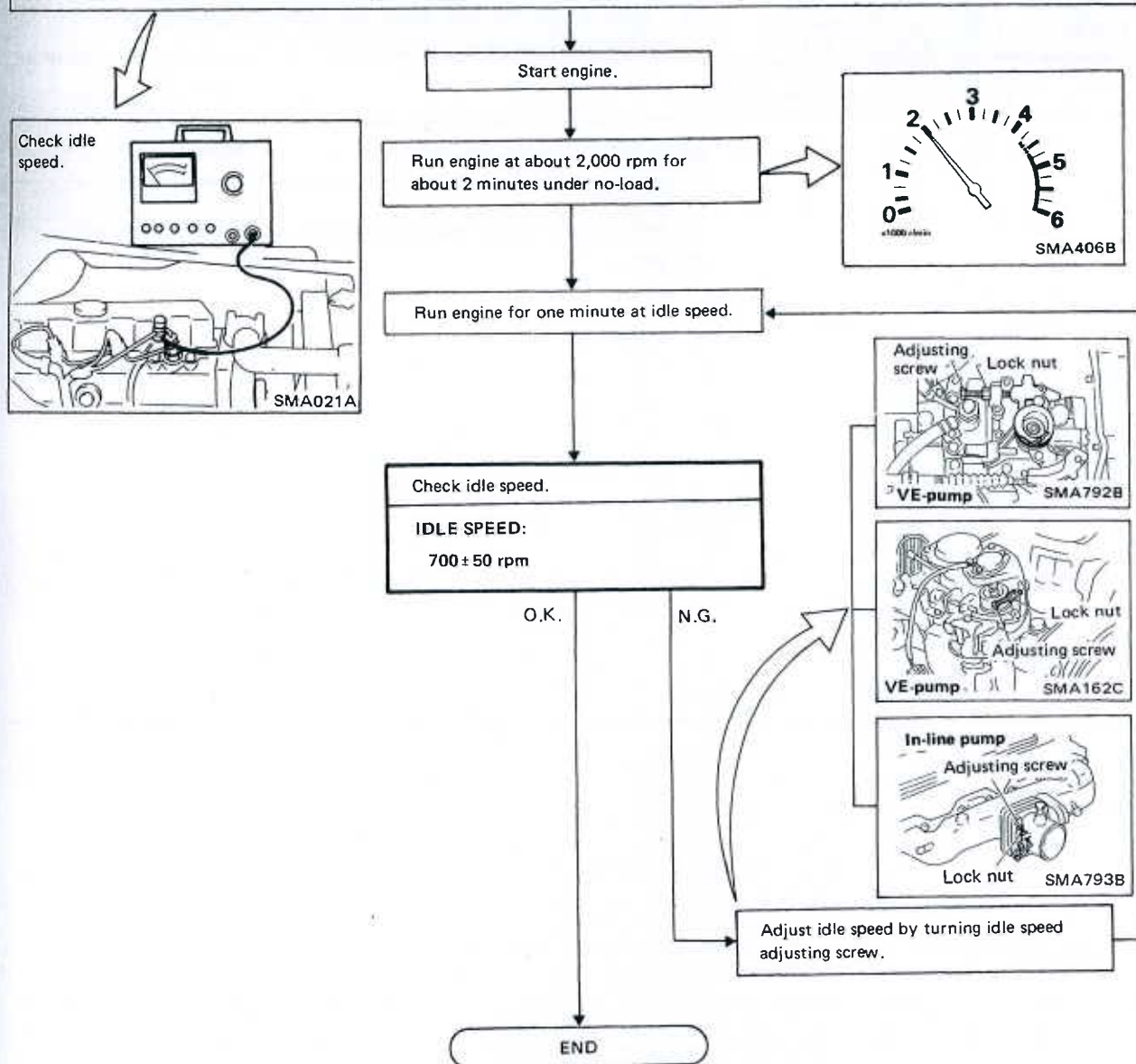
1. Make sure that injection timing is correct.
2. Make sure that injection nozzles are in good condition.
3. Make sure that the following parts are in good condition.
 - Air cleaner clogging
 - Glow system
 - Engine oil and coolant levels
 - Valve clearance
 - Air intake system (Oil filler cap, oil level gauge, etc.)
4. Set shift lever in "Neutral" position. Engage parking brake and lock both front and rear wheels with wheel chocks.
5. Turn off air conditioner, lights and accessories.

ENGINE MAINTENANCE

Checking Idle Speed (Cont'd)

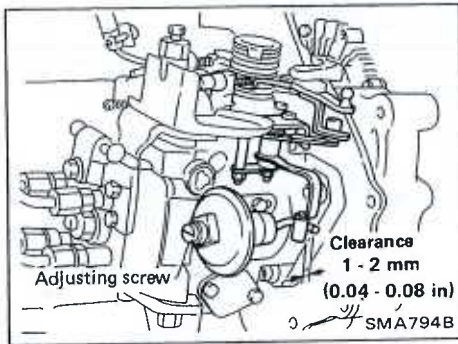
- Warm up engine until water temperature indicator points to middle of gauge.
- Lights, heater fan and all accessories are off.
- Attach tachometer's pick-up to No. 1 fuel injection tube.

In order to take accurate reading of engine rpm, remove clamps that secure No. 1 fuel injection tube.



- Race engine two or three times and allow engine to return to idle speed. If idle speed is not within the specified range, check acceleration linkage for binding and correct it if necessary.

ENGINE MAINTENANCE



Checking Idle Speed (Cont'd)

AIR CONDITIONER EQUIPPED MODEL

1. Make certain that the clearance between the actuator idle control lever pin and the injection pump control lever is within the specified limits.
2. Adjust idle speed to specified rpm without the air conditioner operating.
3. Then check the idle speed when the air conditioner is operating and make sure it is correct.

Unit: rpm

Idle speed (Air conditioner "ON")

850±50

If not, adjust it by turning F.I.C.D. actuator stroke adjusting screw.

INSPE
Drive

Alternat

Air conc
compres

Power s
oil pump

Applied
pushing

Inspect
If engine

Inject

Injection

Used

New

SERVICE DATA AND SPECIFICATIONS (S.D.S.)

Engine Maintenance

INSPECTION AND ADJUSTMENT

Drive belt deflection

Unit: mm (in)

	Used belt deflection		Set deflection of new belt
	Limit	Adjusted deflection	
Alternator	20 (0.79)	11 - 13 (0.43 - 0.51)	9 - 11 (0.35 - 0.43)
Air conditioner compressor	12 (0.47)	6 - 7.5 (0.236 - 0.295)	5 - 6.5 (0.197 - 0.256)
Power steering oil pump	15 (0.59)	8 - 9.5 (0.315 - 0.374)	7 - 8.5 (0.276 - 0.335)
Applied pushing force	98 N (10 kg, 22 lb)		

Inspect drive belt deflections when engine is cold.
If engine is hot, check deflections in 30 minutes or more.

Injection nozzle

Injection pressure kPa (bar, kg/cm ² , psi)	9,807 - 10,297
Used nozzle	(98.1 - 103.0, 100 - 105, 1,422 - 1,493)
New nozzle	10,297 - 11,278 (103.0 - 112.8, 105 - 115, 1,493 - 1,635)

Valve clearance

Intake and exhaust	mm (in)	0.35 (0.014)
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Idle speed

	F.I.C.D. OFF	F.I.C.D. ON
Idle speed rpm	700±50	850±50

COOLING SYSTEM

Radiator cap relief pressure kPa (bar, kg/cm ² , psi)	88 (0.88, 0.9, 13)
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Cooling system leakage testing pressure kPa (bar, kg/cm ² , psi)	98 (0.98, 1.0, 14)
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TIGHTENING TORQUE

Unit	N-m	kg-m	ft-lb
Intake manifold nut/bolt	15 - 20	1.5 - 2.0	11 - 14
Exhaust manifold nut	25 - 29 *29 - 34	2.5 - 3.0 *3.0 - 3.5	18 - 22 *22 - 25
Alternator adjusting bar bolt	16 - 21	1.6 - 2.1	12 - 15
Idler pulley nut (A/C compressor)	30 - 41	3.1 - 4.2	22 - 30
P/S oil pump adjusting lock bolt	30 - 41	3.1 - 4.2	22 - 30
Oil pan drain plug	54 - 59	5.5 - 6.0	40 - 43
Injection nozzle to cylinder head	54 - 64	5.5 - 6.5	40 - 47
Spill tube nut	29 - 39	3.0 - 4.0	22 - 29
Injection tube flare nut	20 - 25	2.0 - 2.5	14 - 18
Valve clearance adjusting screw lock nut	14 - 18	1.4 - 1.8	10 - 13
Rocker cover screw	1 - 2	0.1 - 0.2	0.7 - 1.4
Cylinder block drain plug	29 - 39	3.0 - 4.0	22 - 29

*: With turbocharged engine only

