



TURBO

SERVICE MANUAL

NISSAN

Model N12 Series

FOREWORD

This supplement contains information concerning necessary service procedures and relevant data for the model N12 series face-lift.

All information, illustrations and specifications contained in this supplement are based on the latest product information available at the time of publication. If your NISSAN model differs from the specifications contained in this supplement, consult your NISSAN/DATSUN dealer for information.

The right is reserved to make changes in specifications and methods at any time without notice.

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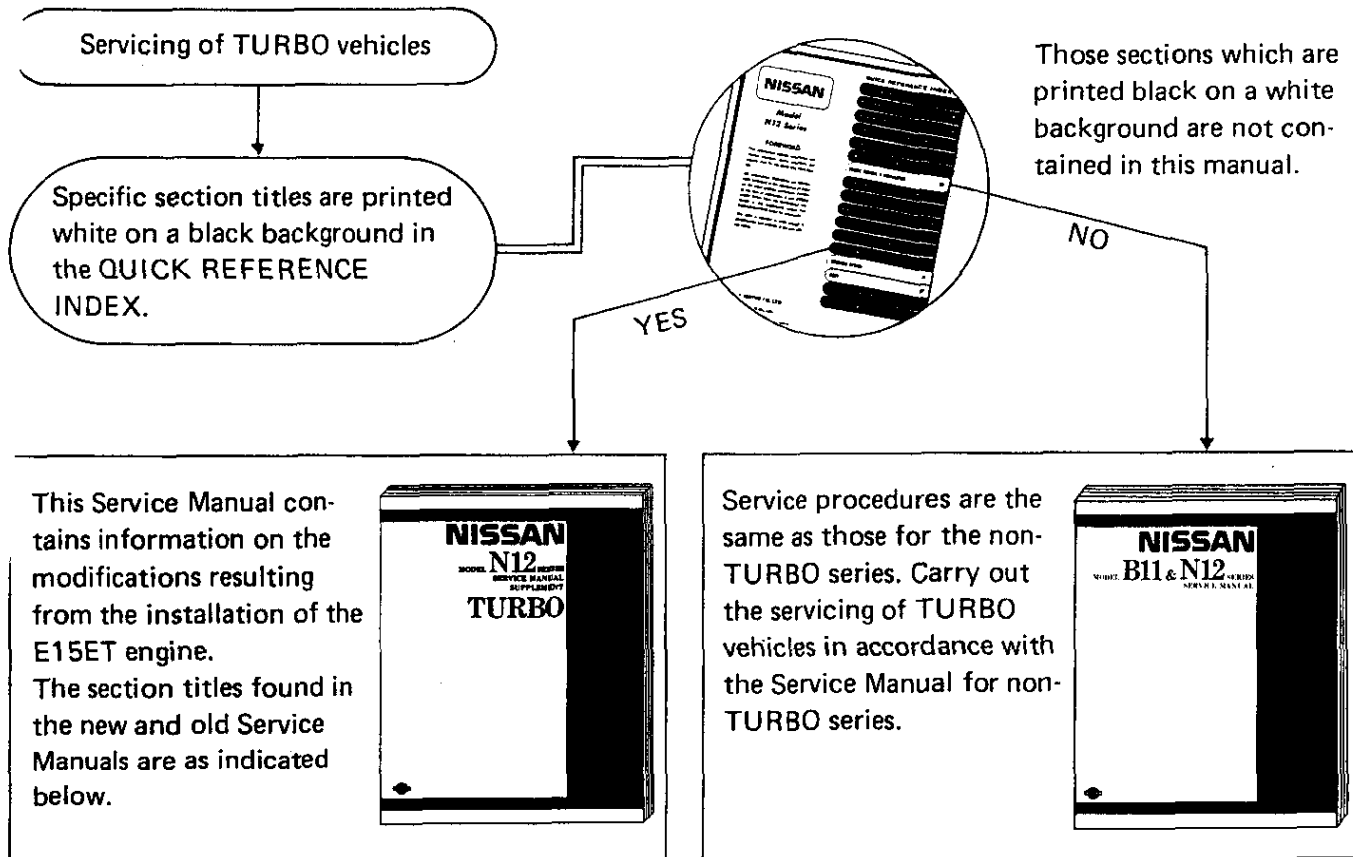
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HOW TO USE THIS MANUAL

- This Service Manual is designed as a guide for servicing models equipped with the E15ET engine.
- This manual includes service procedures specified for models equipped with the E15ET engine. This manual does not contain procedures which are the same as those for vehicles without the E15ET engine. Please use this manual in conjunction with the NISSAN model B11 & N12 series Service Manual (Pub. No. SM2E-N1B1G0).



IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the mechanic and the efficient functioning of the vehicle.

The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.

Special service tools have been designed to permit safe and proper performance of service. Be sure to use them.

Service varies with the procedures used, the skills of the mechanic and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first completely satisfy himself that neither his safety nor the vehicle's safety will be jeopardized by the service method selected.

GENERAL INFORMATION

GI

DIMENSIONS

| | | | Model | Europe | Australia | Except Europe and Australia |
|-----------------------|-------|---------|--------------|------------------|---------------|-----------------------------|
| | | | | 3-door Hatchback | Coupe | |
| Overall length | | | mm (in) | 3,960 (155.9) | 4,125 (162.4) | |
| Overall width | | | mm (in) | 1,620 (63.8) | | |
| Overall height | | | mm (in) | 1,385 (54.5) | 1,355 (53.3) | |
| Wheelbase | | | mm (in) | 2,415 (95.1) | | |
| Tread | Front | mm (in) | 1,395 (54.9) | | | |
| | Rear | mm (in) | 1,385 (54.5) | | | |
| Min. ground clearance | | | mm (in) | 165 (6.5) | | |
| Overhang | Front | mm (in) | 770 (30.3) | 880 (34.6) | | |
| | Rear | mm (in) | 775 (30.5) | 830 (32.7) | | |

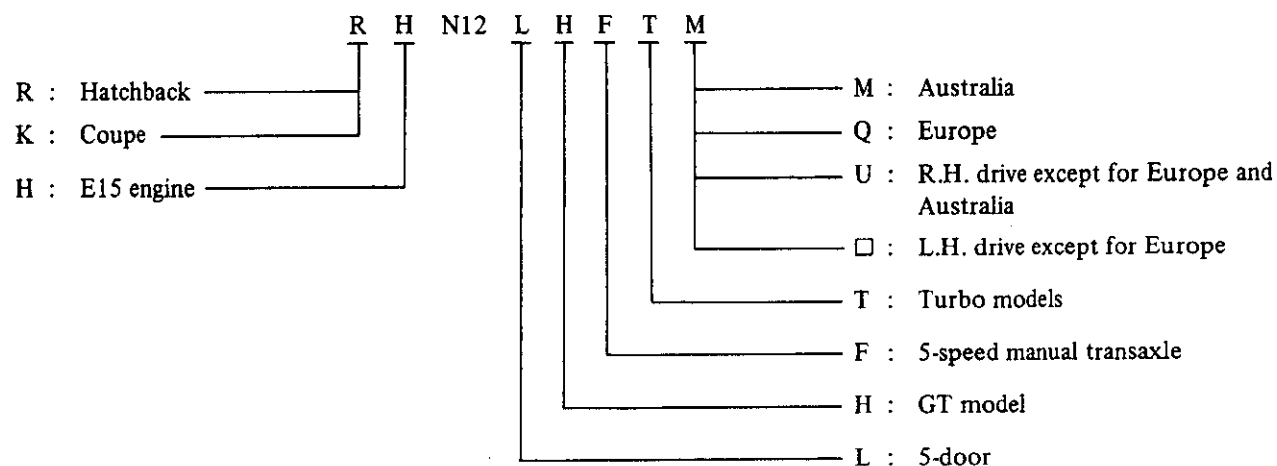
MODEL VARIATION

MODEL VARIATION

| Destination | Body | Model | | Engine | Transaxle | Road wheel size ... offset mm (in) | Tire size |
|-----------------------------|------------------|------------|------------|--------|-----------|--|------------|
| | | L.H. drive | R.H. drive | | | | |
| Except Europe and Australia | Coupe | KHLN12HFT | KHN12HFTU | E15ET | RS5F31A | 4-1/2J-13 (Steel) ... 42 (1.65) 5J-13 (Aluminum) ... 40 (1.57)* | 175/70SR13 |
| Europe | 3-door Hatchback | RHLN12HFTQ | RHN12HFTQ | | | 5J-13 (Steel) ... 40 (1.57) 5J-13 (Aluminum) ... 40 (1.57)* | 175/70HR13 |
| Australia | Coupe | — | KHN12HFTM | | | 4-1/2J-13 (Steel) ... 42 (1.65) 5J-13 (Aluminum) ... 40 (1.57)* | |

*: Option

Prefix and suffix designations



□: means no indication.

MAINTENANCE

MA

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★ : Refer to Service Manual "DATSUN NISSAN MODEL
B11 & N12 SERIES".

MAINTENANCE SCHEDULE (Except for Australia and Sweden)

The following tables list the periodic maintenance servicing required to ensure quality engine performance and good mechanical condition in NISSAN.
The first 1,000 km (600 miles) of service is one of the most important service periods and is vital to ensure the optimum condition. Periodic maintenance beyond the last period shown in the tables requires similar maintenance.

| MAINTENANCE OPERATION | | MAINTENANCE INTERVAL | | | | | | | | | | | | Reference page |
|---|---|----------------------|--|------------|------------|------------|------------|------------|------------|------------|---|---|---------------------|----------------|
| | | | | | | | | | | | | | | |
| | | 1 (0.6) | 10 (6) | 20 (12) | 30 (18) | 40 (24) | 50 (30) | 60 (36) | 70 (42) | 80 (48) | | | | |
| Number of kilometers in thousands (Number of miles in thousands) | | — | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | | | | |
| Number of months | | | | | | | | | | | | | | |
| UNDERHOOD MAINTENANCE | | | | | | | | | | | | | | |
| Torque check cylinder head bolts, manifolds & exhaust tube nuts & carburetor attaching nuts | | X | | | | | | | | | | | ★ | |
| Adjust intake & exhaust valve clearance | | X | | X | | X | | X | | X | | X | ★ | |
| Check drive belts for cracks, fraying, wear & tension | | X | | X | | X | | X | | X | | X | ★ | |
| Change engine anti-freeze coolant (Ethylene glycol base) | | | | | | X | | | | | | X | MA-6, 7 | |
| Change engine coolant (Soft water) | | | X | X | X | X | X | X | X | X | | X | MA-6, 7 | |
| Check cooling system hoses & connections | | | | X | | X | | X | | X | | X | ★ | |
| Check fuel lines (Hoses, piping, connections, etc.) | | | | X | | X | | X | | X | | X | ★ | |
| Replace air cleaner filter (Viscous paper type) | | | | | | X | | | | | | X | MA-5, 6 | |
| (1) | Change engine oil (Use API SE oil) | | | | | | | X | | | | X | MA-5 | |
| (2) | Change engine oil filter | | Every 5,000 km (3,000 miles) or 6 months | | | | | | | | | | MA-7 | |
| (2) | Check & adjust idle rpm & mixture ratio (Check mixture ratio only on models bound for areas affected by emission regulations) | X | X | X | X | X | X | X | X | X | X | X | MA-7 | |
| | Replace fuel filter | | | | | X | | | | | | X | MA-8, 9, 10, 11, 12 | |
| | Adjust ignition timing | | X | X | X | X | X | X | X | X | X | X | MA-8 | |
| | Check & replace spark plugs | | X | | X | | X | | X | | X | | MA-8, 9, 10, 11, 12 | |
| | Check | | | X | | X | | | | | | | MA-7 | |
| | Replace | | | | | | | X | | | X | | | |
| | Check ignition wiring | | | | | X | | | | | | X | ★ | |
| | Check positive crankcase ventilation (P.C.V.) system | | | X | | X | | X | | X | | X | ★ | |
| (3) | Check brake fluid or oil level & leaks | | X | X | X | X | X | X | X | X | X | X | ★ | |
| | Change brake fluid | | | X | | X | | X | | X | | X | ★ | |
| | Check brake booster vacuum hoses, connections & check valve | | | | | X | | | | | | X | ★ | |
| | Check power steering fluid & lines | | X | X | X | X | X | X | X | X | X | X | ★ | |

★: Refer to the original Service Manual and Service Data and Specifications in this section.

NOTE: (1) Under dusty driving conditions, replace element every 20,000 km (12,000 miles) or 12 months, whichever comes first.
(2) Under severe driving conditions such as driving mainly short distances, city driving and driving under dusty conditions, change engine oil more frequently and change filter every 5,000 km (3,000 miles) or 3 months, whichever comes first.
(3) When towing a trailer, change oil in transaxle every 40,000 km (24,000 miles) or 24 months, whichever comes first.

Check: Check, correct and replace if necessary.

The above charts 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.

MAINTENANCE SCHEDULE (For Australia and Sweden)

The following tables list the periodic maintenance servicing required to ensure good emission control performance, good engine performance and good mechanical condition in NISSAN.

The first 1,000 km (600 miles) service is one of the most important services required to ensure the maximum emission control performance and optimum engine condition. Periodic maintenance beyond the last period shown in the tables requires similar maintenance.

| MAINTENANCE OPERATION | | MAINTENANCE INTERVAL | | | | | | | | | | | | Reference page |
|---|---|----------------------|-----|------|------|------|------|------|------|------|------|------|--|----------------|
| Periodic maintenance should be performed at number of kilometers (miles) or months, whichever comes first | Number of kilometers in thousands (Number of miles in thousands) | 1 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | | |
| | | (0.6) | (6) | (12) | (18) | (24) | (30) | (36) | (42) | (48) | (54) | (60) | | |
| | Number of months | — | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | | |
| EMISSION CONTROL MAINTENANCE | | | | | | | | | | | | | | |
| Adjust intake & exhaust valve clearances | | X | | X | | X | | X | | X | | X | | ★ |
| Check & adjust drive belts for cracks, fraying, wear & tension | Check Adjust | | | X | | X | | X | | X | | X | | ★ |
| Change engine oil filter | (1) | | X | X | X | X | X | X | X | X | X | X | | ★ |
| Change engine oil | (1) | | | | | | | | | | | | | MA-7 |
| Change engine coolant (L.L.C., ethylene glycol base) | | | | | | X | | | | X | | | | MA-6, 7 |
| Check cooling system hoses & connections | | | | X | | X | | X | | X | | X | | ★ |
| Check vacuum fitting hoses & connections | | | | X | | X | | X | | X | | X | | MA-13 |
| Check & adjust (carburetor) idle rpm & mixture ratio | X | | | X | | X | | X | | X | | X | | MA-8, 9, 10 |
| Check air regulator hoses | | | | X | | X | | X | | X | | X | | MA-13 |
| Replace fuel filter | (2) | | | | | X | | | | X | | | | MA-6 |
| Check fuel lines (Hoses, piping, connections, etc.) | | | | | | X | | | | X | | | | MA-5, 6 |
| Replace air cleaner filter (Viscous paper type) | (2) | | | | | X | | | | X | | | | MA-5 |
| Adjust ignition timing | | | | X | | X | | X | | X | | X | | MA-8, 9, 10 |
| Replace spark plugs | | | | X | | X | | X | | X | | X | | MA-7 |
| Check ignition wires | | | | | | X | | | | X | | | | ★ |
| Check ventilation hoses | | | | | | X | | | | X | | | | ★ |
| Check vapor lines (Hoses, connections, etc.) (Only for Australia) | | | | | | X | | | | X | | | | MA-5 |
| Replace carbon canister filter (Only for Australia) | | | | | | X | | | | X | | | | ★ |

★: Refer to the original Service Manual and Service Data and Specifications in this section.

NOTE: (1) If vehicle is operated under severe conditions: short distance driving, extensive idling or driving in dusty conditions, change engine oil more frequently and change filter every 5,000 km or 3 months, whichever comes first.

(2) More frequent maintenance if under dusty driving conditions.

Check: Check, correct and replace if necessary.

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

RECOMMENDED FUEL AND LUBRICANTS

FUEL

Use gasoline with a research octane rating of at least 97.

(Except for Australia and Sweden)

Use gasoline with a research octane rating of at least 88. (For Australia)

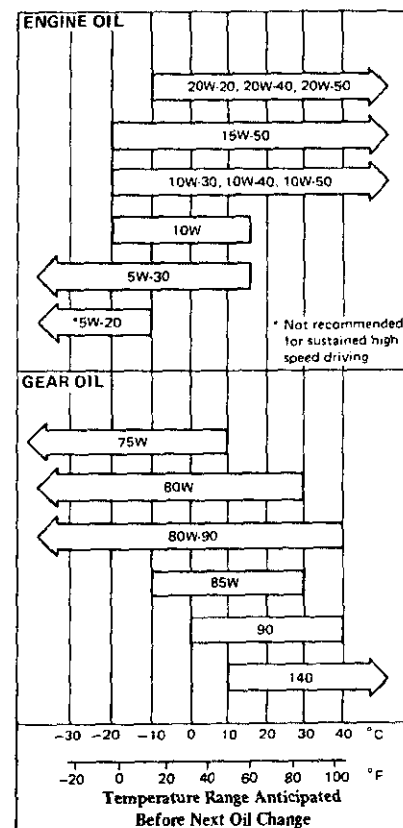
Use gasoline with a research octane rating of at least 90. (For Sweden)

LUBRICANTS

| Lubricant | Specifications | Remarks |
|---------------------------|----------------|--|
| Gasoline engine oil* | API SE | Further details, refer to recommended SAE viscosity chart. |
| Manual transaxle gear oil | API GL-4 | |
| Multi-purpose grease | NLGI No. 2 | Lithium soap base |
| Brake fluid | DOT 3 | US FMVSS No. 116 |
| Anti-freeze | — | Ethylene glycol base |

*: On models equipped with a turbocharger, use 10W-30, 10W-40, 10W-50, 15W-50, 20W-20, 20W-40 or 20W-50 except under extremely cold conditions. Use 5W-30 only under extremely cold conditions.

SAE VISCOSITY NUMBER



APPROXIMATE REFILL CAPACITIES

| | | | Liter | Imp measure |
|-------------------------|------------------------|------------------|--------------|--------------|
| Fuel tank | | | 50 | 11 gal |
| Coolant | Without reservoir tank | With heater | 6.1 | 5-3/8 qt |
| | | Without heater | 5.5 | 4-7/8 qt |
| | Reservoir tank | | 0.7 | 5/8 qt |
| Engine* | With oil filter | | 3.7 | 3-1/4 qt |
| | Without oil filter | | 3.3 | 2-7/8 qt |
| Manual transaxle | | 5-speed | 2.7 | 4-3/4 pt |
| Power steering system | | | 1.0 | 7/8 qt |
| Air conditioning system | Compressor oil | L.H. drive model | 0.15 | 5.3 fl oz |
| | | R.H. drive model | 0.20 | 7.0 fl oz |
| | Refrigerant | | 0.8 - 1.0 kg | 1.8 - 2.2 lb |

*: On models equipped with a turbocharger, add 0.7ℓ (5/8 Imp qt) when the oil cooler and hose are repaired or replaced.

ENGINE MAINTENANCE

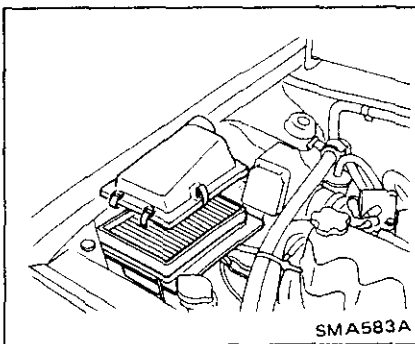
ENGINE MAINTENANCE

BEFORE ENGINE START

REPLACING AIR CLEANER FILTER

Air cleaner filter is a viscous paper type and does not require cleaning.

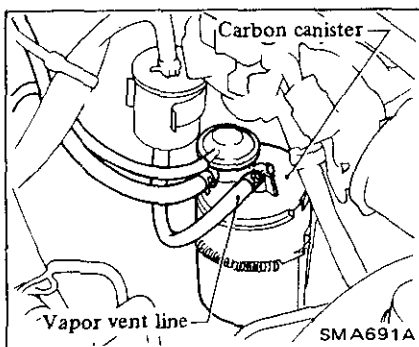
1. Loosen air flow meter attaching screw.
2. Remove air cleaner cover and remove air cleaner filter.



3. Install new air cleaner filter and install air cleaner cover.

CHECKING VAPOR LINES

1. Check all hoses and fuel tank filler cap.
2. Disconnect vapor vent line connecting carbon canister to fuel tank.

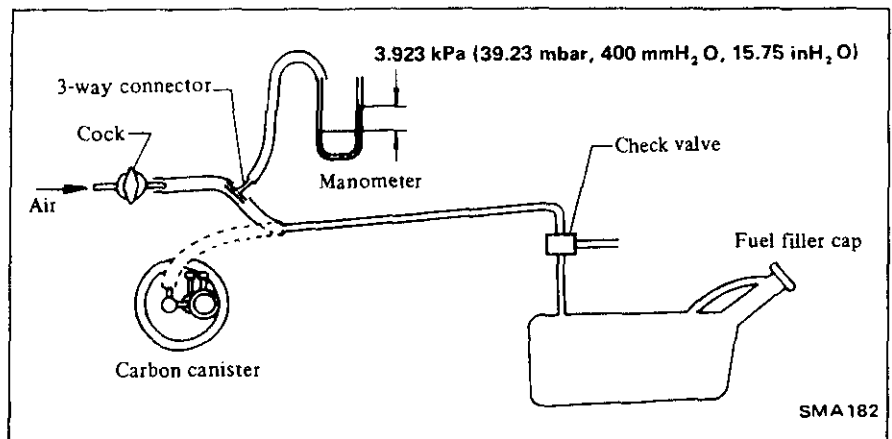


3. Connect 3-way connector, manometer and cock (or equivalent 3-way charge cock) to end of vent line.
4. Slowly supply fresh air into vapor vent line through cock until pressure reaches 3.923 kPa (39.23 mbar, 400 mmH₂O, 15.75 inH₂O).

5. Shut cock completely.
6. After 2-1/2 minutes, measure height of liquid in manometer.
7. Variation in height should remain 0.245 kPa (2.45 mbar, 25 mmH₂O, 0.98 inH₂O).
8. When filler cap does not close completely, height should soon drop to zero.

9. If height does not soon drop to zero when filler cap is removed, the cause is a clogged hose.

If vent line is clogged, breathing in fuel tank is poor, thus causing insufficient delivery of fuel to engine or vapor lock. It must, therefore, be repaired or replaced.

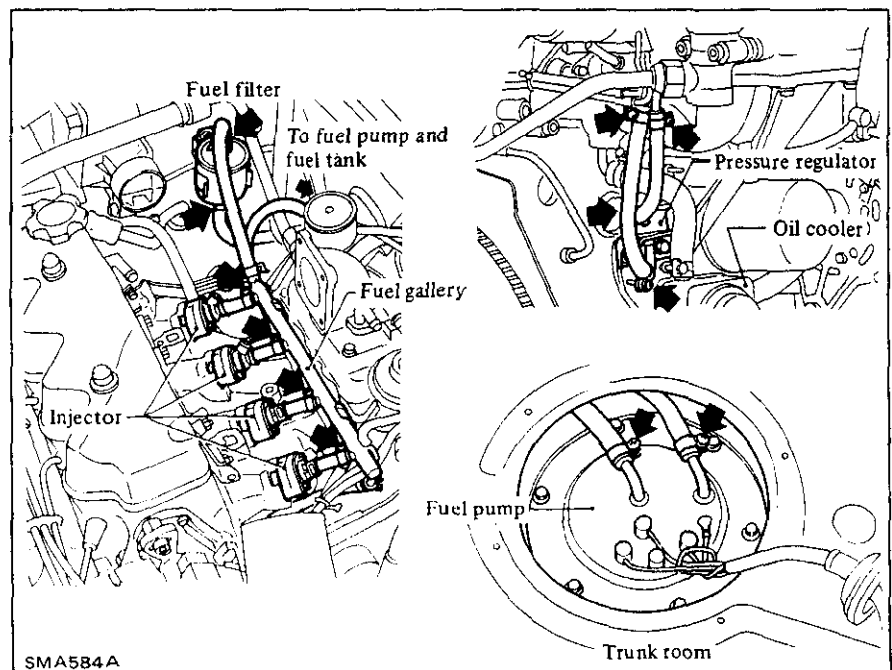


CHECKING FUEL LINES (Hoses, piping, connections, etc.)

1. Check fuel line for leaks, particularly around connection of fuel pipe

and fuel hose.

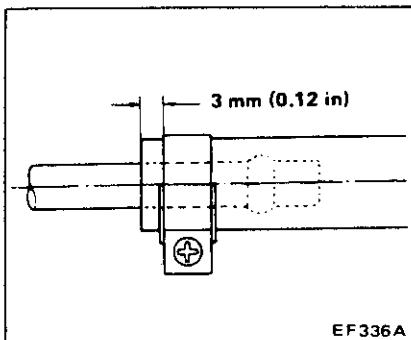
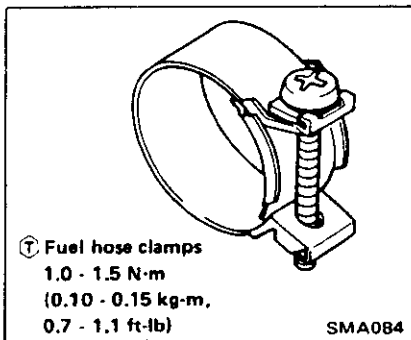
2. Retighten loose connections and replace any damaged or deformed parts.



ENGINE MAINTENANCE

CAUTION:

- Do not reuse fuel hose clamp after loosening.
- Tighten high pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end or screw position (wider than other portions of clamp) is flush with hose end. Tightening torque specifications are the same for all rubber hose clamps. When tightening hose clamp, ensure that screw does not come into contact with adjacent parts.



REPLACING FUEL FILTER

The fuel filter is designed especially for use with the EFI system. It should be replaced as an assembly.

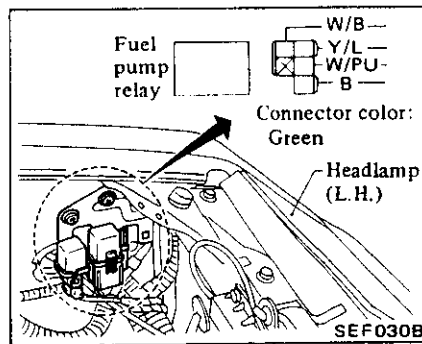
- Follow the procedure below to reduce fuel pressure to zero.

CAUTION:

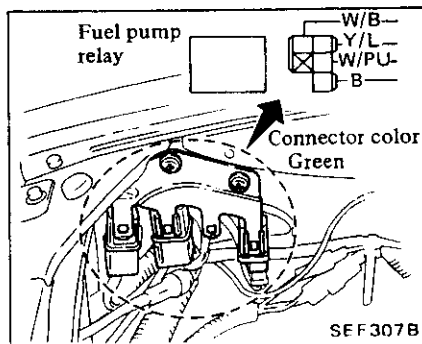
Before disconnecting fuel hose, release fuel pressure from fuel line to eliminate danger.

- Start the engine.
- Disconnect harness connector of fuel pump relay while the engine is running.

L.H. drive models



R.H. drive models

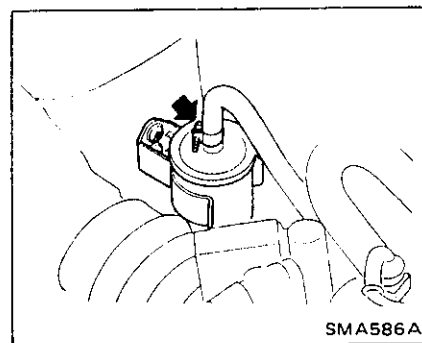


- After engine stalls, crank the engine two or three times.
- Turn ignition switch "OFF".
- Reconnect the harness connector of fuel pump relay.

- Unfasten clamps securing fuel hoses to the outlet and inlet sides of fuel filter, and disconnect fuel hoses.

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

- Remove fuel filter.



- To install fuel filter, reverse the order of removal.

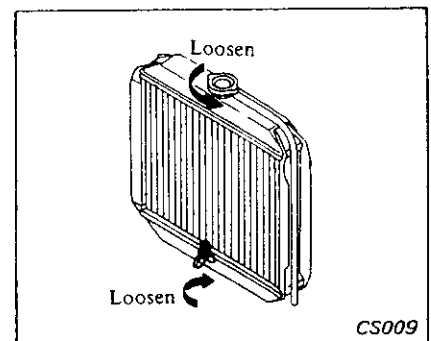
CHANGING ENGINE COOLANT

WARNING:

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

When replacing engine coolant, set heater "TEMP" control lever to fully "HOT" position.

- To flush system, open drain cock at bottom of radiator. Then thoroughly flush until clear water comes out.



- Close drain cock.
- Fill radiator with coolant up to specified level. Follow instructions attached to anti-freeze container for mixing ratio of anti-freeze to water.

Approximate coolant capacity (without reservoir):

Without heater

5.5 liters

(4-7/8 Imp qt)

With heater

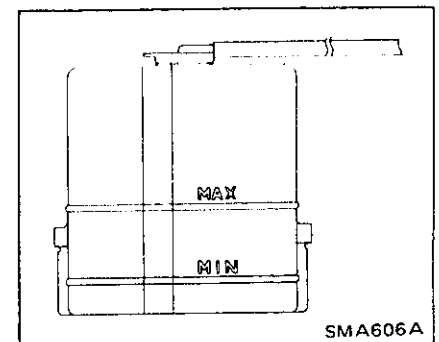
6.1 liters

(5-3/8 Imp qt)

Reservoir tank

0.7 liter

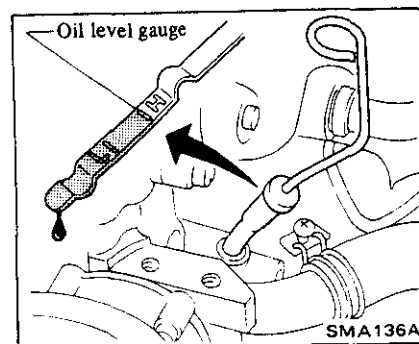
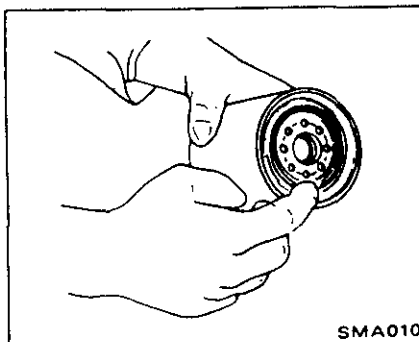
(5/8 Imp qt)



- Install filler cap and fill reservoir tank with coolant up to "MAX" level.

ENGINE MAINTENANCE

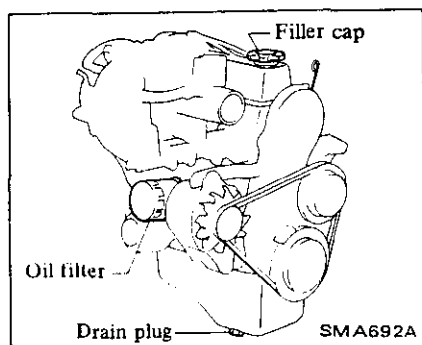
5. Start engine and warm up engine until water temperature indicator points to the middle of gauge.
6. Stop engine and cool engine off completely.
7. Refill radiator with coolant up to filler opening if the coolant level is lower the specified level.
8. Also, refill reservoir tank with coolant up to "MAX" level.



CHANGING ENGINE OIL AND REPLACING OIL FILTER

1. Start engine and warm it up until water temperature indicator points to middle of gauge, then turn off engine.
2. Remove oil filler cap and oil pan drain plug, and allow oil to drain.

WARNING:
Use care as the engine oil is hot.



- A milky oil indicates the presence of cooling water. Isolate the cause and take corrective measure.
- An oil with extremely low viscosity indicates dilution with gasoline.

3. Using oil filter wrench, remove oil filter.
4. After draining engine oil, wipe oil pan drain hole with a clean rag.
5. Clean and install oil pan drain plug with washer.

Ⓙ : Oil pan drain plug
35 - 47 N·m
(3.6 - 4.8 kg-m,
26 - 35 ft-lb)

6. Wipe oil filter mounting surface with a clean rag.
7. Smear a little engine oil on rubber seal of new oil filter.

8. Install new oil filter by hand.

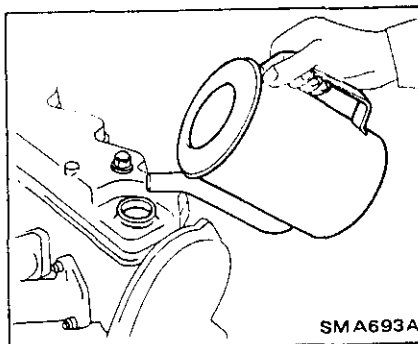
Do not use oil filter wrench to tighten the filter.

9. Refill engine with the appropriate new engine oil by referring to Recommended Lubricants.

Check oil level with dipstick.

Approximate oil capacity:

With oil filter
3.7 liters
(3-1/4 Imp qt)
Without oil filter
3.3 liters
(2-7/8 Imp qt)



10. Install oil filler cap and start engine.

11. Check area around drain plug and oil filter for any sign of oil leakage.

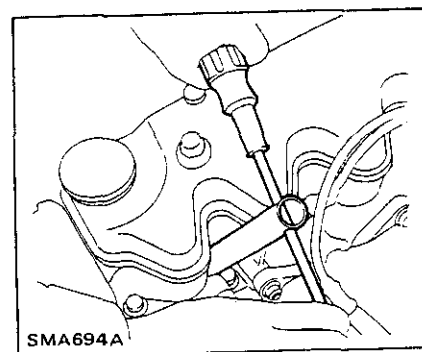
If leakage is evident, retighten or replace.

12. Run engine until water temperature indicator points to middle of gauge. Then turn off engine and wait a few minutes. Check oil level with oil level gauge. If necessary, add engine oil.

When checking oil level, park car on a level surface.

REPLACING SPARK PLUG

1. Disconnect spark plug wire at boot. Do not pull on the wires.
2. Remove spark plugs with spark plug wrench.



3. Check spark plug gap.
4. Install new spark plugs and reconnect high tension cables.

Spark plug type:

| | Europe | Except Europe |
|---------------------|---------------------------|---------------|
| Standard | BPR6ES | BP6ES |
| Hot type | BPR5ES | BP5ES |
| Cold type | BPR7ES | BP7ES |
| Plug gap mm (in) | 0.8 - 0.9 (0.031 - 0.035) | |

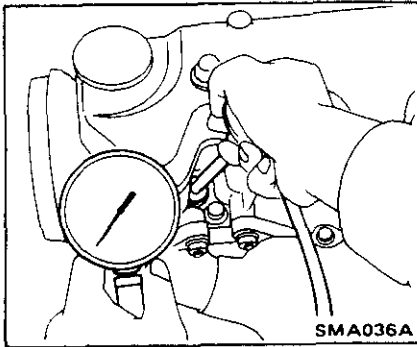
Ⓙ : Spark plug
20 - 29 N·m
(2.0 - 3.0 kg-m,
14 - 22 ft-lb)

CHECKING ENGINE COMPRESSION PRESSURE

1. Warm up engine until water temperature indicator points to middle of gauge.

ENGINE MAINTENANCE

2. Remove air cleaner and all spark plugs.
3. Disconnect cold start valve and all injector connectors.
4. Properly attach a compression tester to spark plug hole in cylinder being tested.



5. Depress accelerator pedal to fully open throttle and choke valve.
6. Crank engine and read gauge indication.

- Run engine at about 350 rpm.
- Engine compression measurement should be made as quickly as possible.

Compression pressure:

kPa (bar, kg/cm², psi)/at rpm

Standard

1,089

(10.89, 11.1, 158)/350

Minimum

892

(8.92, 9.1, 129)/350

Differential limit between cylinders:

98 (0.98, 1.0, 14)/350

7. If cylinder compression in one or more cylinders is low, pour a small amount of engine oil into cylinders through the spark plug holes and retest compression.

- If adding oil helps the compression pressure, chances are that piston rings are worn or damaged.
- If pressure stays low, valve may be sticking or seating improperly.
- If cylinder compression in any two adjacent cylinders is low, and if adding oil does not help the compression, there is leakage past the gasketed surface.

Oil and water in combustion chambers can result from this problem.

AFTER ENGINE WARM-UP CHECKING AND ADJUSTING IDLE-RPM, IGNITION TIMING AND MIXTURE RATIO

CAUTION:

- a. Idle mixture ratio is adjusted at factory and requires no further adjustment. If it becomes necessary to adjust it, proceed with the following steps.
- b. Do not attempt to screw the idle adjusting screw down completely. Doing so could cause damage to tip, which in turn will tend to cause malfunctions.
- c. Before disconnecting and connecting E.C.C.S. component parts harness connectors, ensure that ignition switch is in "OFF" position.

Preparation

1. Make sure that the following parts are in good order.

- Battery
- Fuses
- Ignition system
- Engine oil and coolant levels
- Valve clearance
- E.C.C.S. component parts
- E.C.C.S. harness connectors
- Hoses
- Oil filler cap and oil level gauge

2. Connect engine tachometer and timing light in their proper positions.
3. Apply parking brake and block both front and rear wheels with chocks.

4. Inspection should be carried out while shift lever is in "Neutral" position. Be sure to engage parking brake and to lock both front and rear wheels with wheel chocks.

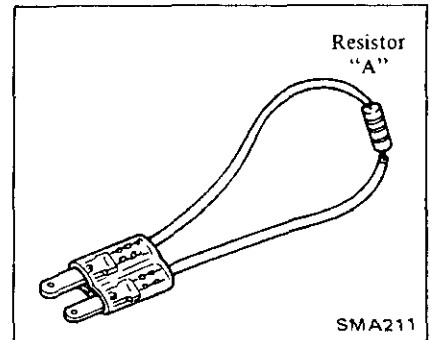
5. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".

6. Use "CO" meter after it is fully warmed up.

7. When measuring "CO"%, insert probe into tail pipe more than 0.4 m (16 in).

8. Measure "CO" % with air cleaner installed.

9. When adjusting idle "CO" %, prepare a resistor.



Make lead wire as follows:

- 1) Use flat plate terminals 3 mm (0.12 in) wide, 0.8 mm (0.031 in) thick as male terminals. Place flat plate terminals parallel with each other and keep distance between inside faces 2 mm (0.08 in).
- 2) Solder lead wire to terminals.
- 3) Solder resistor to side opposite to terminal and wrap insulation tape around soldered portion.

Resistance "A" (with "CO"-meter)

| Altitude m (ft) | Resistance Ω |
|--------------------|------------------------|
| All | 2,500 |

Resistance "A" (without "CO"-meter)

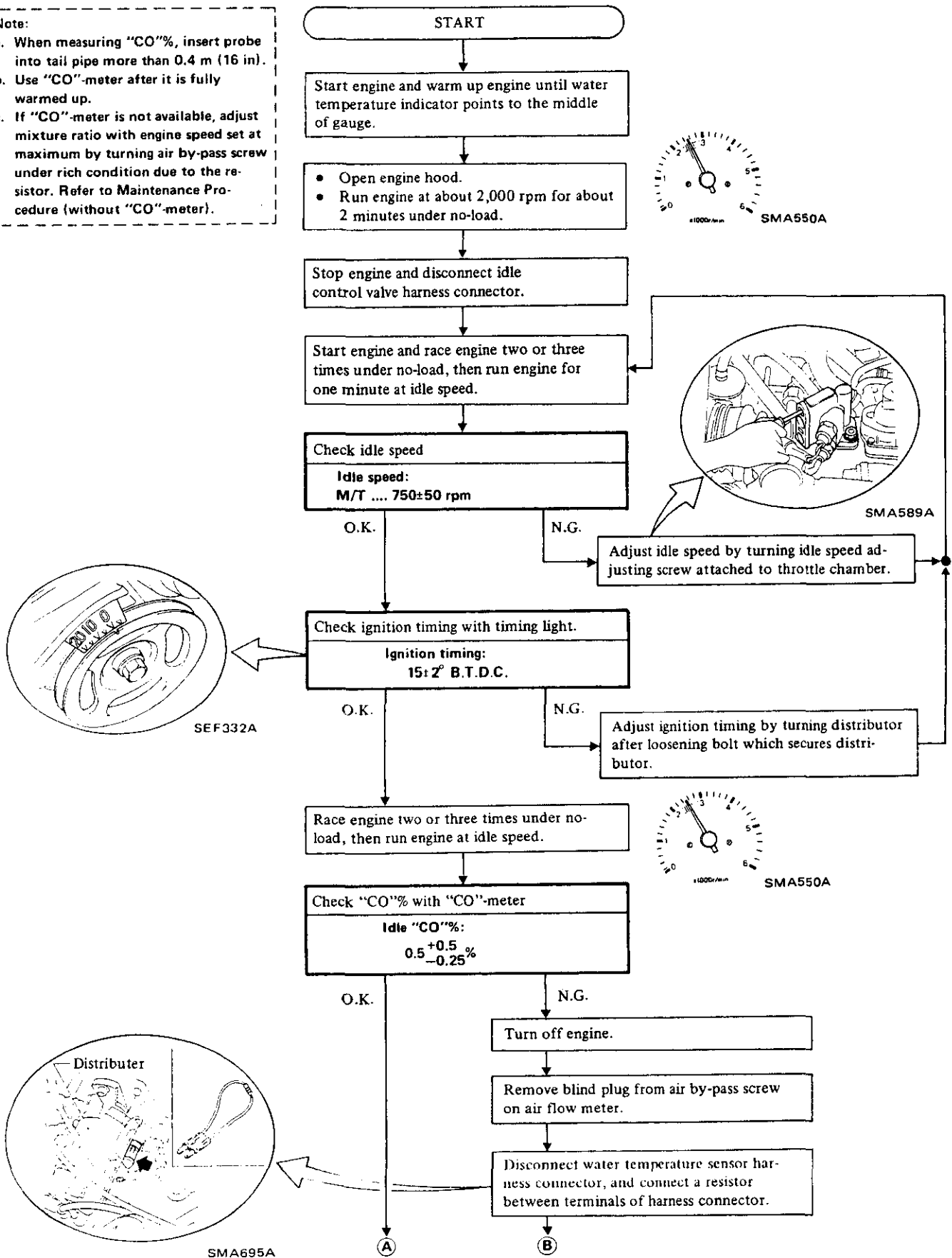
| Altitude m (ft) | Resistance k Ω |
|----------------------------------|--------------------------|
| 0 - 600 (0 - 2,000) | 3.3 |
| 600 - 1,200 (2,000 - 4,000) | 2.8 |
| 1,200 - 1,800 (4,000 - 6,000) | 2.4 |
| Above 1,800 (6,000) | 2.0 |

ENGINE MAINTENANCE

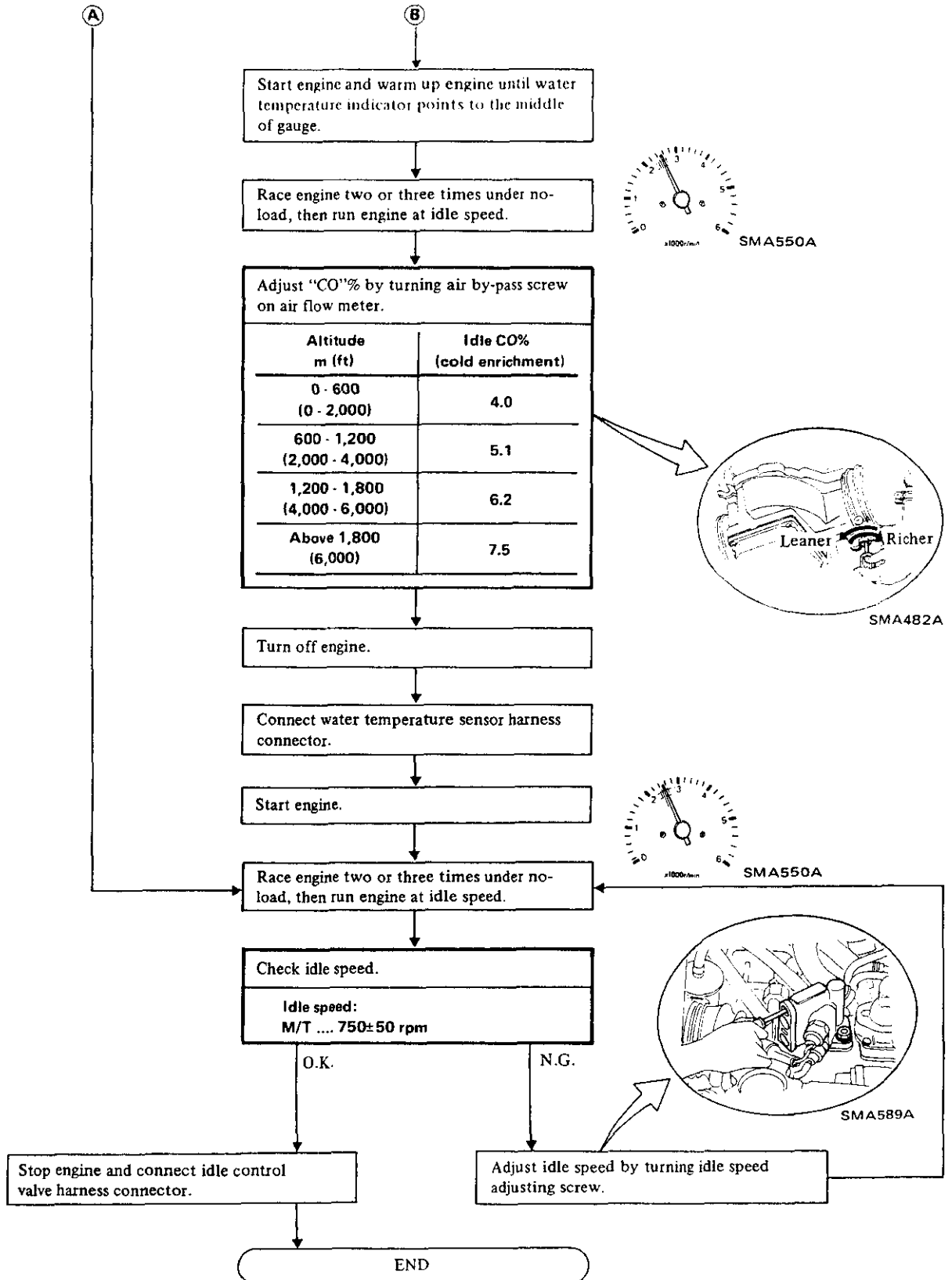
Maintenance procedure (with "CO"-meter)

Note:

- a. When measuring "CO"%, insert probe into tail pipe more than 0.4 m (16 in).
- b. Use "CO"-meter after it is fully warmed up.
- c. If "CO"-meter is not available, adjust mixture ratio with engine speed set at maximum by turning air by-pass screw under rich condition due to the resistor. Refer to Maintenance Procedure (without "CO"-meter).

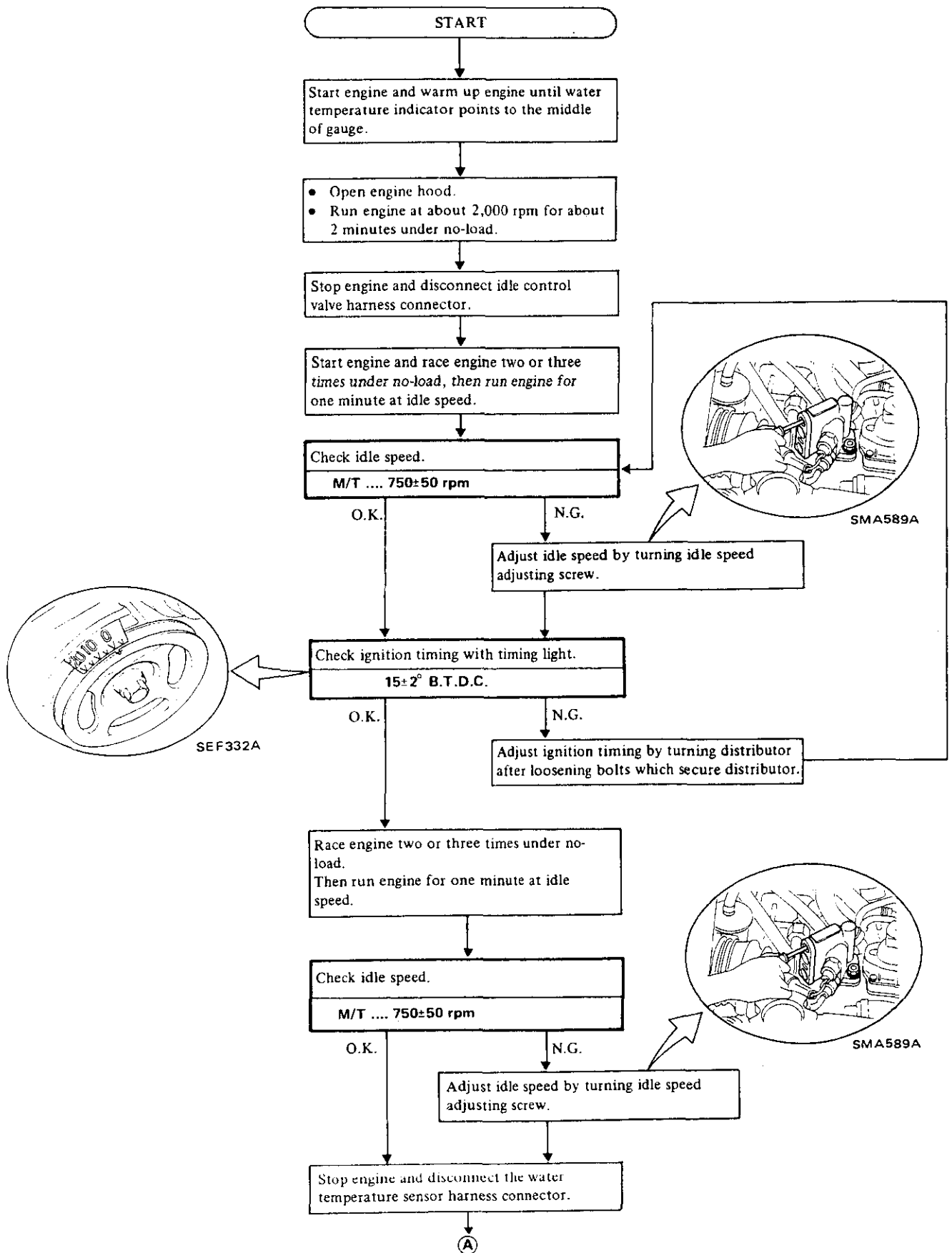


ENGINE MAINTENANCE

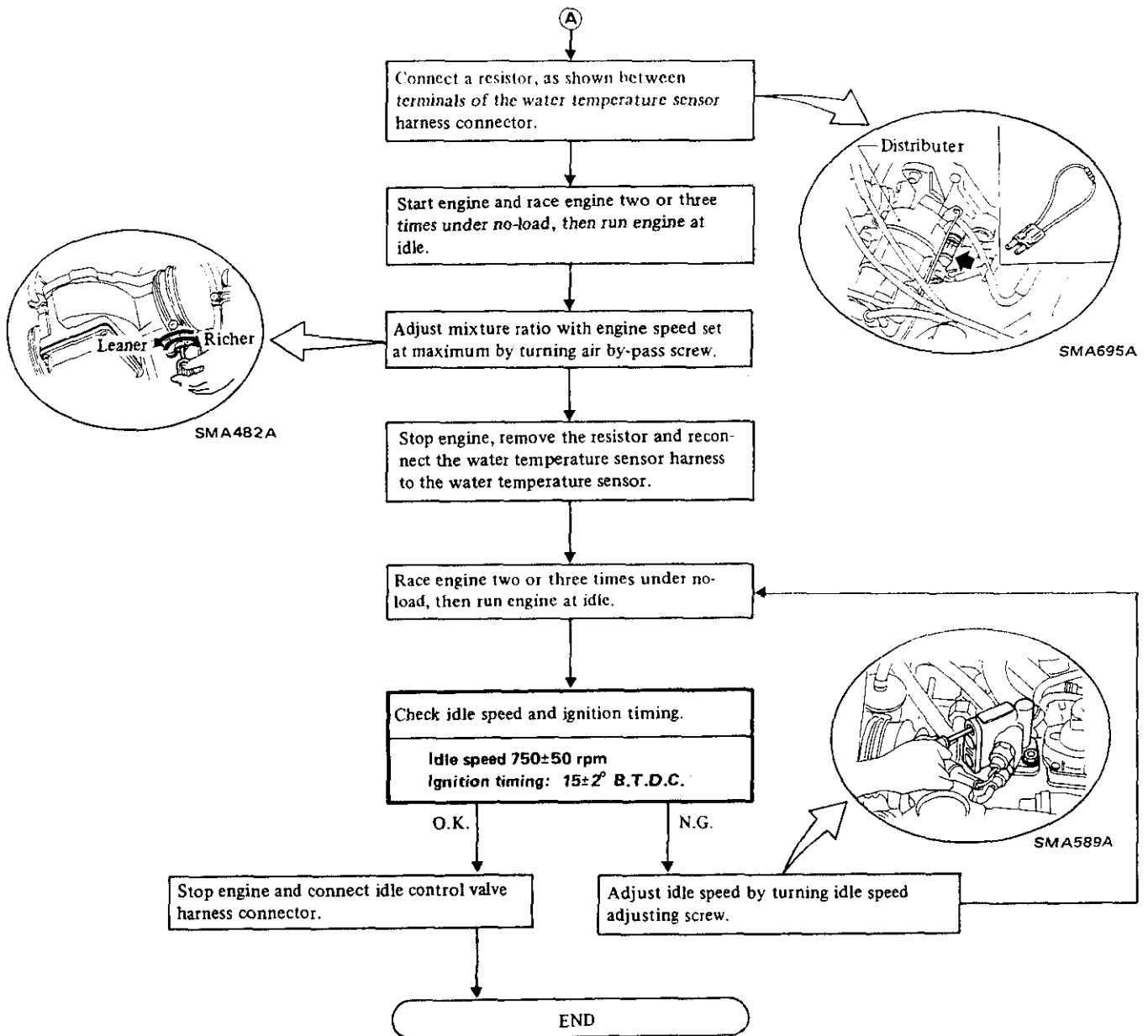


ENGINE MAINTENANCE

Maintenance procedure (without "CO"-meter)



ENGINE MAINTENANCE



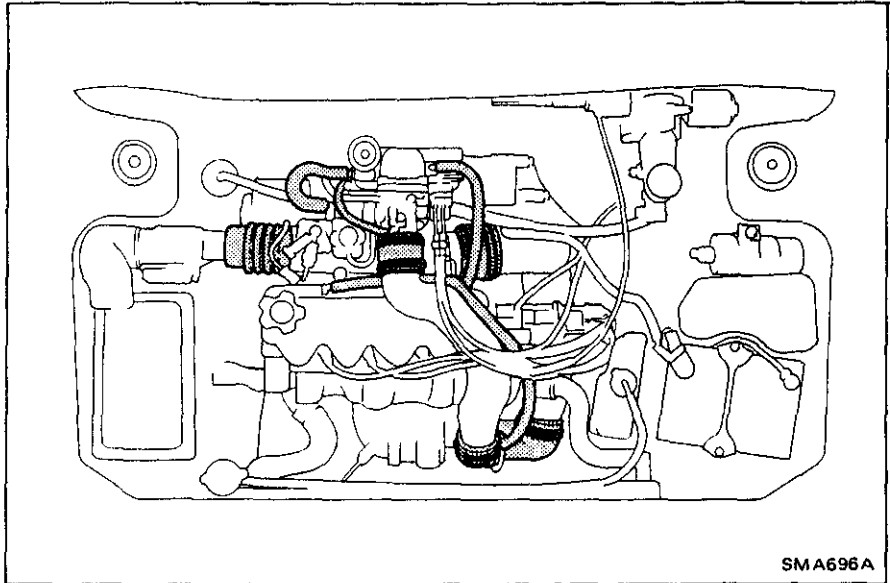
ENGINE MAINTENANCE

CHECKING VACUUM FITTING HOSE AND CONNECTIONS

Check fittings and hoses for loose connections or damage. Retighten loose parts or replace parts that are not suitable for further use.

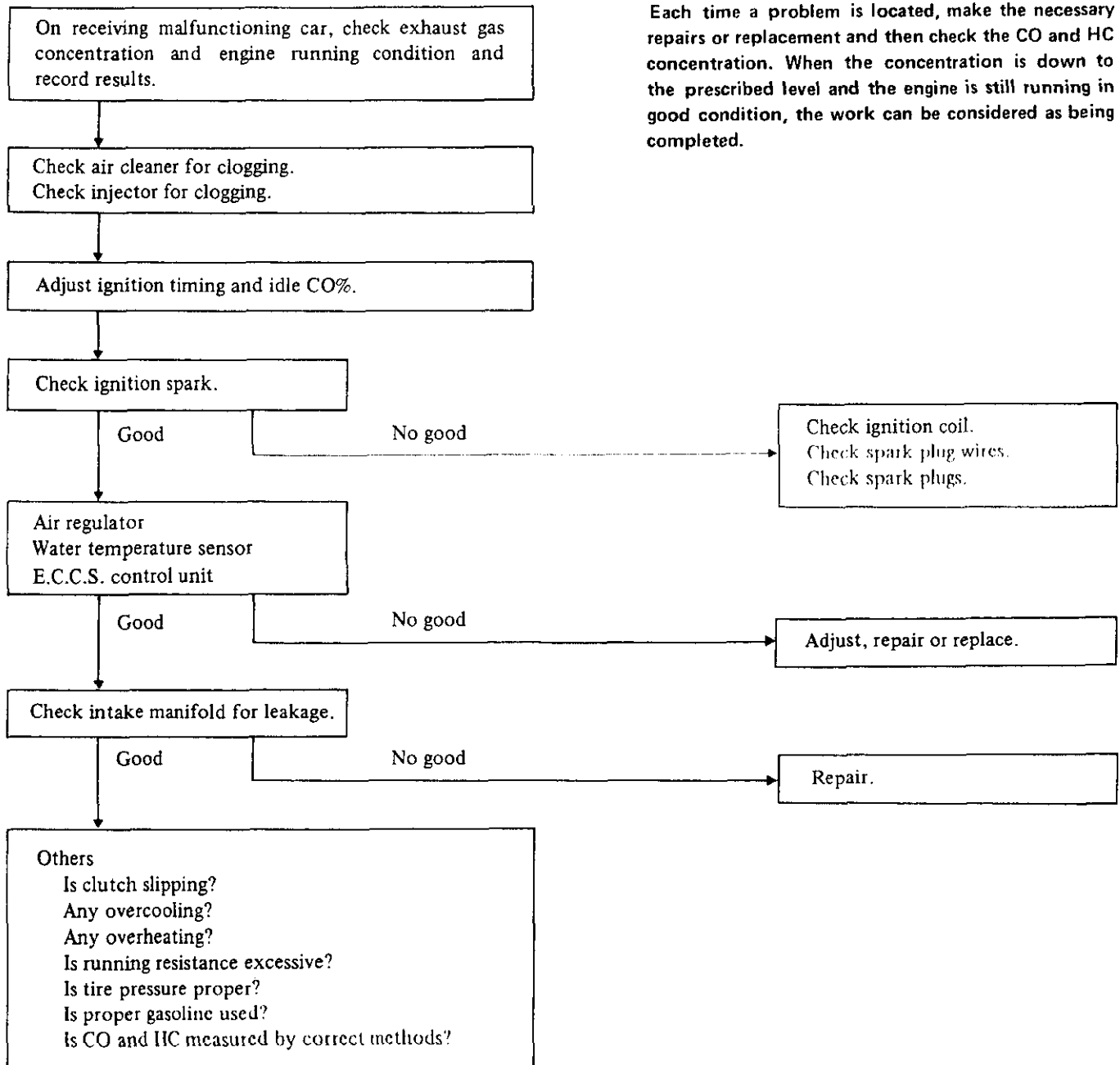
CHECKING AIR REGULATOR HOSES

Check air regulator hoses for leakage, cracks and deterioration. Retighten loose connections and replace any parts if they are damaged or deformed.



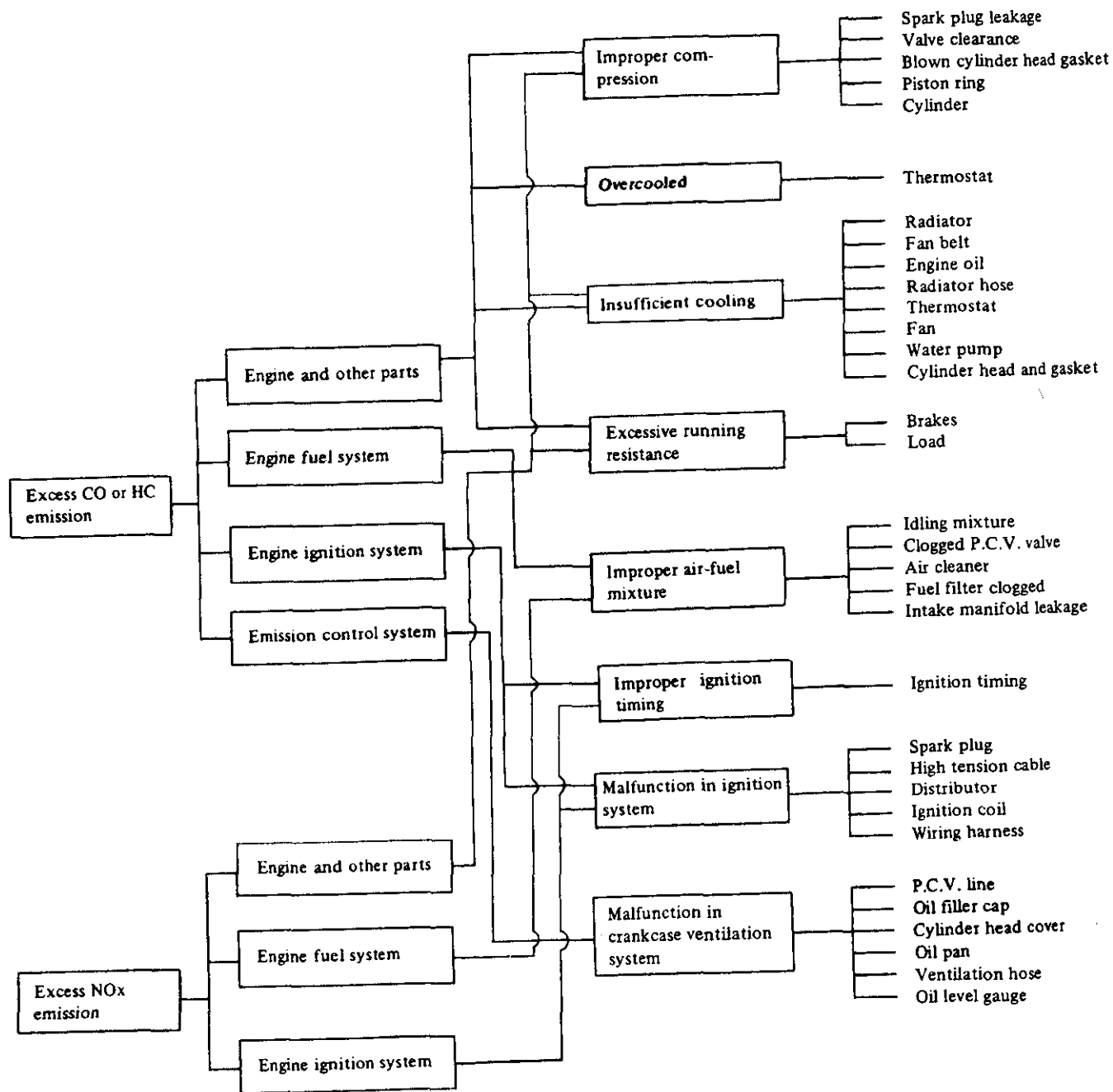
EMISSION TROUBLE-SHOOTING (Sweden and Australia)

EXCESS HC OR CO EMISSION IN EXHAUST GASES



EMISSION TROUBLE-SHOOTING (Sweden and Australia)

MAIN CAUSES FOR EXCESS CO, HC AND NO_x IN EXHAUST GASES



SERVICE DATA AND SPECIFICATIONS

SERVICE DATA AND SPECIFICATIONS

ENGINE MAINTENANCE

INSPECTION AND ADJUSTMENT

Basic mechanical system

| | | | |
|--|--------|-------------------------------|------------------------------|
| Valve clearance mm (in) | Hot | Intake | 0.28 (0.011) |
| | | Exhaust | 0.28 (0.011) |
| | Cold*1 | Intake | 0.22 (0.009) |
| | | Exhaust | 0.22 (0.009) |
| Drive belt deflection (Cold) | | Used*2 | New*3 |
| Alternator mm (in) | | 13 - 17 (0.51 - 0.67) | 10 - 14 (0.39 - 0.55) |
| Air conditioner mm (in) | | 9 - 11 (0.35 - 0.43) | 7 - 9 (0.28 - 0.35) |
| Power steering mm (in) | | 7 - 9 (0.28 - 0.35) | 6.5 - 8.5 (0.256 - 0.335) |
| Pushing force N (kg, lb) | | 98 (10,22) | |
| Engine compression pressure kPa (bar, kg/cm ² , psi) Standard | | 1,089 (10.89, 11.1, 158) | |
| Minimum | | 892 (8.92, 9.1, 129) | |
| Differential limit between cylinders | | 98 (0.98, 1.0, 14) at 350 rpm | |

*1 After checking valve clearance while engine is cold, also check it when engine is hot to see if it remains within the specific range. If it does not readjust it.

*2 Adjust deflection of used belt

*3 Set deflection of new belt

Ignition and fuel system

Spark plugs

| Desti- nation | Type | | | Gap mm (in) |
|-------------------------------|----------|--------|------------------|---------------------------------|
| | Standard | Hot | Cold | |
| Europe | BPR6ES | BPR5ES | BPR7ES | 0.8 - 0.9 (0.031 - 0.035) |
| Except Europe | BP6ES | BP5ES | BP7ES | |
| High tension cable resistance | | ohm | Less than 30,000 | |

Ignition timing, idle speed and idle "CO"%

| | |
|---|----------------|
| Ignition timing/idle speed (B.T.D.C. degree/rpm) | 15±2° / 750±50 |
|---|----------------|

| | |
|---------------------|--|
| "CO"% at idle speed | 0.5 ^{+0.5} _{-0.25} % |
|---------------------|--|

Emission control system

Unit: kPa (mbar, mmH₂O, inH₂O)

| | |
|--|----------------------------------|
| Vapor line leakage test Supplied pressure | 3.923 (39.23, 400, 15.75) |
| Pressure variation | Less than 0.245 (2.45, 25, 0.98) |

TIGHTENING TORQUE

| Unit | N·m | kg·m | ft·lb |
|----------------------------|---------|-----------|---------|
| Valve rocker adjusting nut | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Oil pan drain plug | 35 - 47 | 3.6 - 4.8 | 26 - 35 |
| Spark plug | 20 - 29 | 2.0 - 3.0 | 14 - 22 |

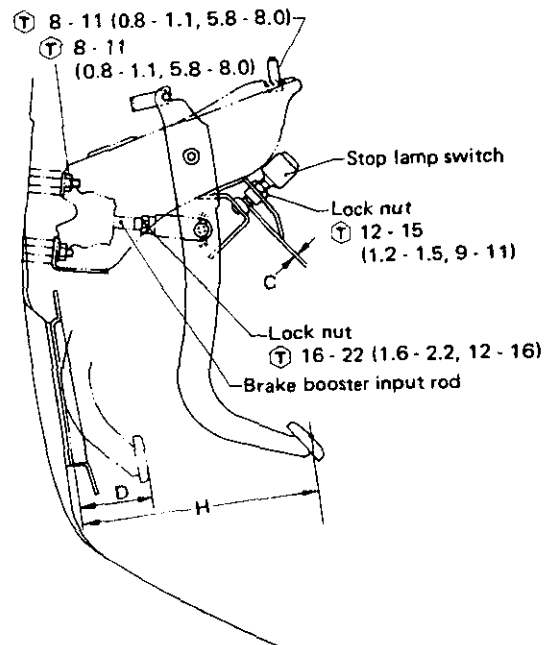
SERVICE DATA AND SPECIFICATIONS

CHASSIS AND BODY MAINTENANCE

BRAKE SYSTEM

Brake pedal

| Item | Destination | Europe | Australia | Except Europe and Australia |
|---|-------------|-------------------------|---------------------|-----------------------------|
| Pedal ratio | | 4.2 | | |
| Maximum stroke | | 140 | | |
| Free height | mm (in) | 194 - 204 (7.64 - 8.03) | | |
| Depressed height [Under force of 490 N (50 kg, 110 lb) with engine running] | L.H. | More than 85 (3.35) | — | More than 80 (3.15) |
| | R.H. | More than 95 (3.74) | More than 95 (3.74) | More than 90 (3.54) |
| Clearance between brake lamp switch and brake pedal | mm (in) | 0 - 1 (0 - 0.04) | | |



Ⓣ : N-m (kg-m, ft-lb)

H : Pedal free height

D : Depressed height

C : Clearance between pedal stopper and threaded end of stop lamp switch

SBR805

ENGINE MECHANICAL

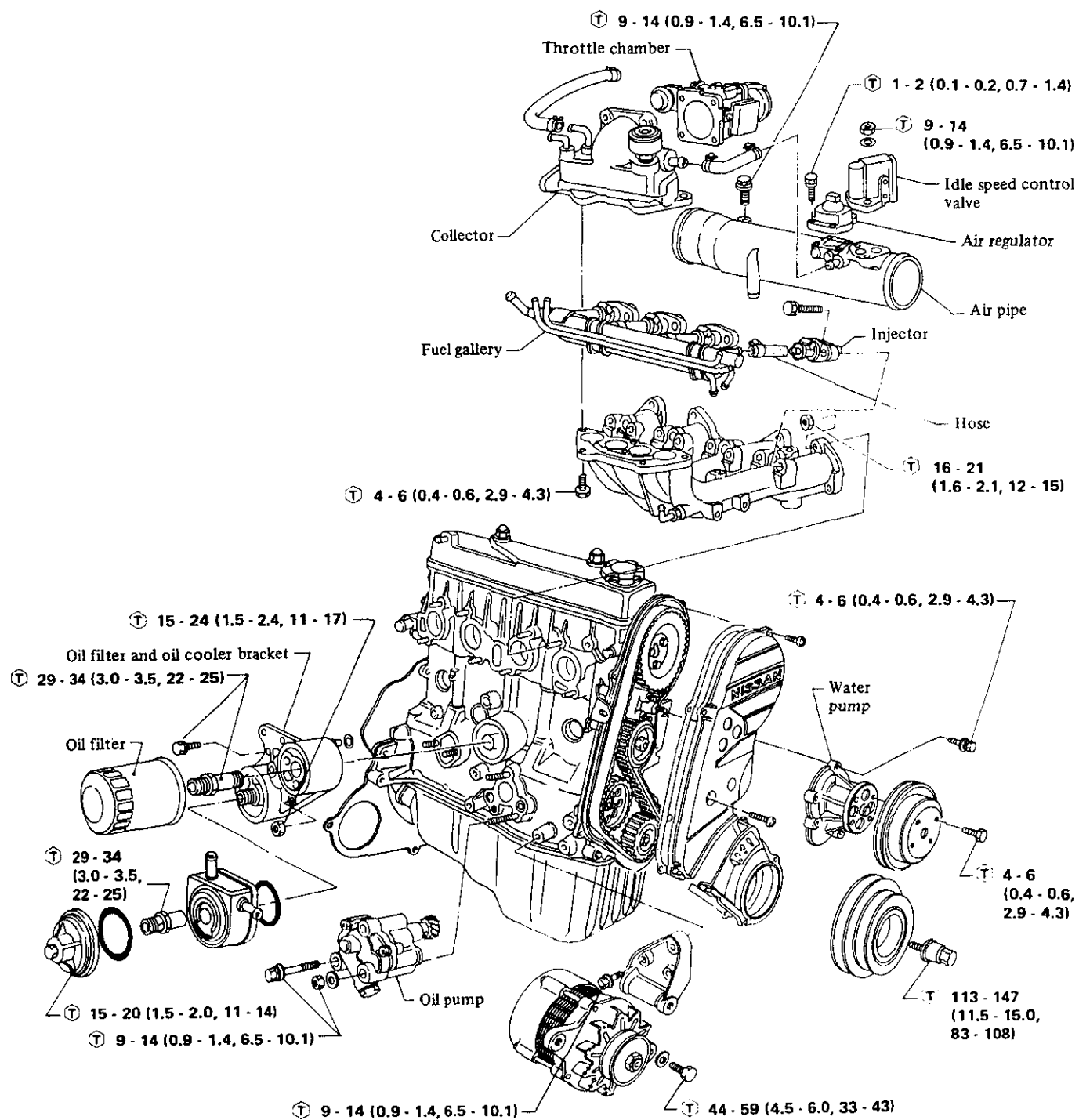
EM

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ENGINE COMPONENTS (Outer parts)

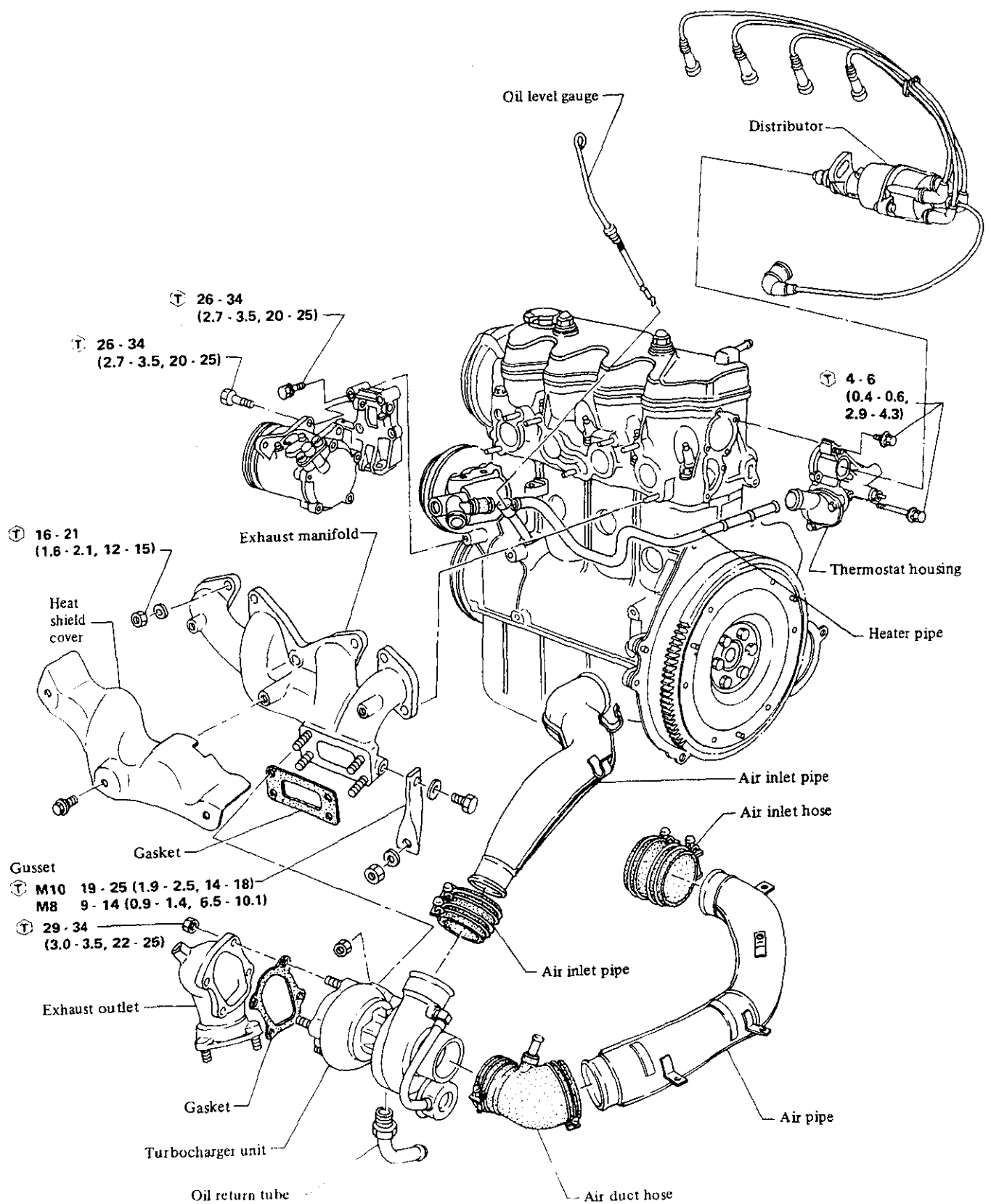
ENGINE COMPONENTS (Outer parts)



T : N·m (kg-m, ft-lb)

SEM182A

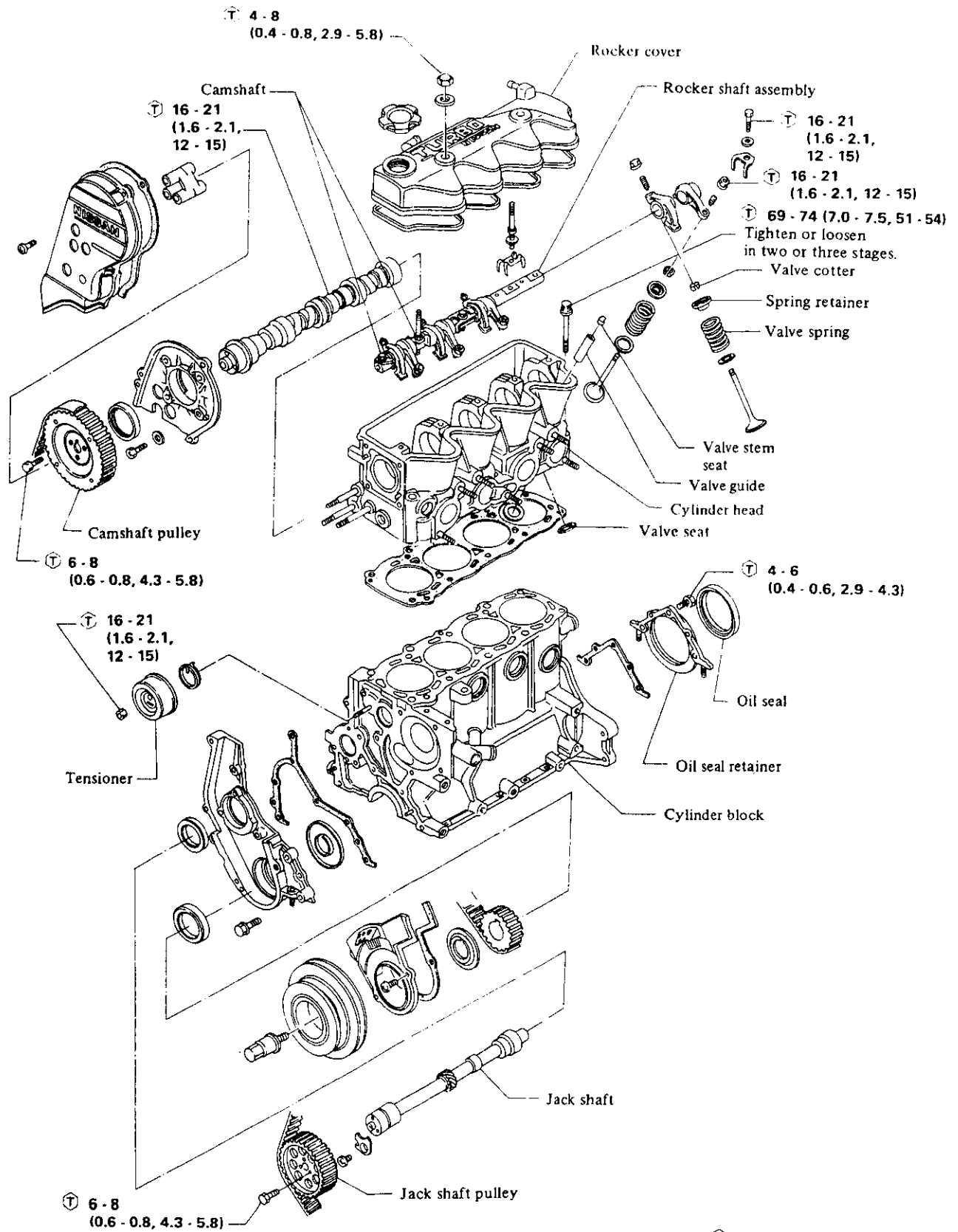
ENGINE COMPONENTS (Outer parts)



Ⓣ : N·m (kg·m, ft·lb)

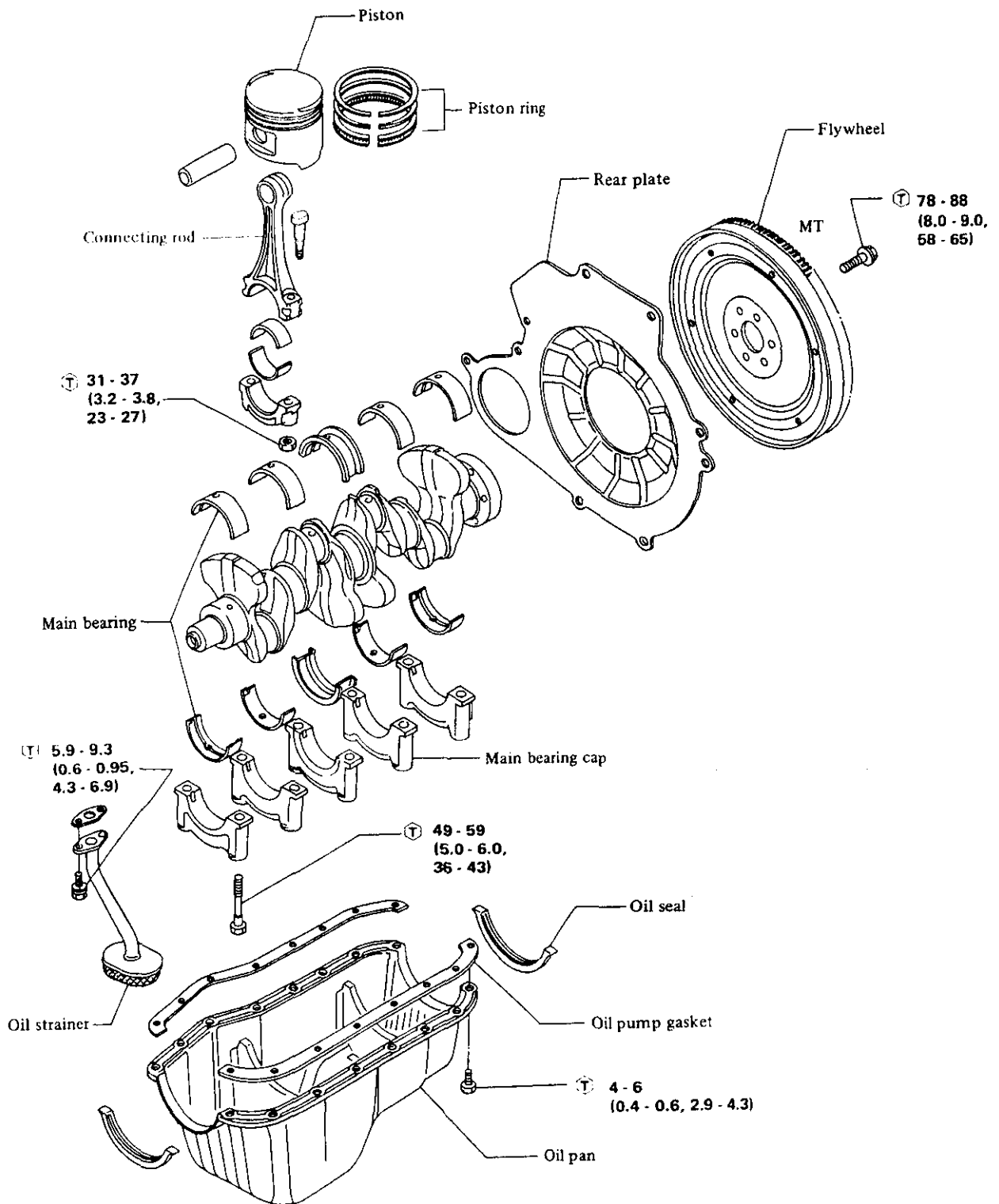
SEM183A

ENGINE COMPONENTS (Internal parts)



SEM076A

ENGINE COMPONENTS (Internal parts)



(T) : N·m (kg·m, ft·lb)

SEM193A

EM-5

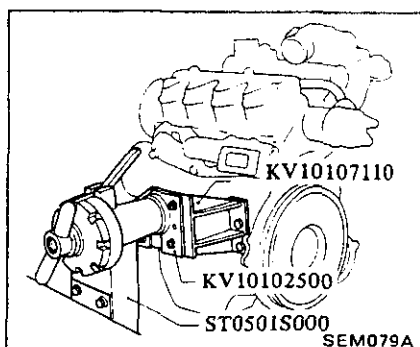
ENGINE DISASSEMBLY

ENGINE DISASSEMBLY

ENGINE OVERALL

MOUNTING ENGINE ON ENGINE STAND

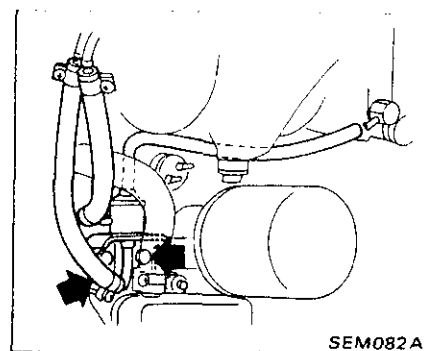
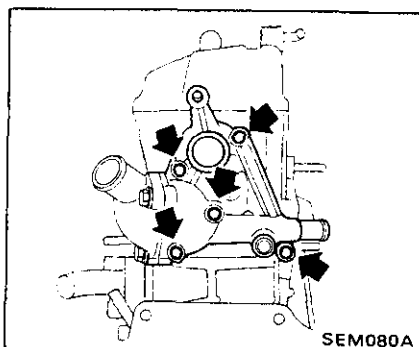
1. Remove transaxle assembly with starter motor.
2. Parts on the left side of the engine
 - (1) Remove turbocharger cover.
 - (2) Disconnect the following parts from turbocharger.
 - Air duct and inlet air hose
 - Oil feed pipe and oil return hose
 - Converter gussets
 - (3) Remove exhaust manifold with turbocharger.
 - (4) Remove cooler compressor bracket and engine mounting bracket.
3. Install engine attachment on the engine.
4. Place engine on work stand.



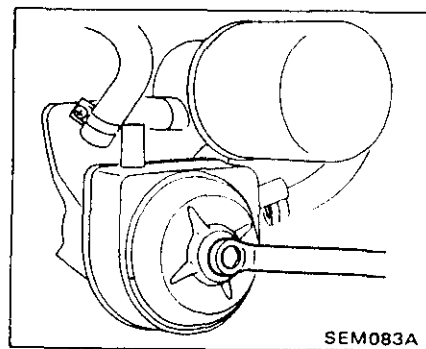
5. Drain engine oil and coolant.

OUTER PARTS

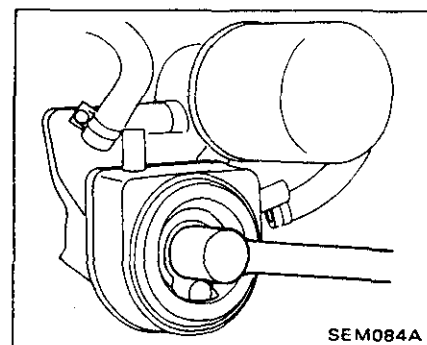
1. Parts at the rear of the engine
 - (1) Remove distributor together with high tension cable.
 - (2) Remove thermostat housing.



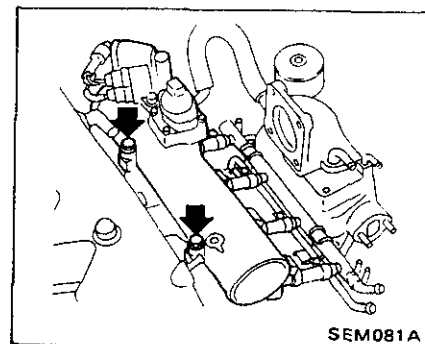
- (9) Remove oil cooler cover.



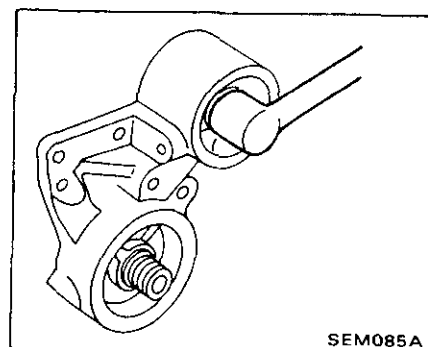
- (10) Remove oil cooler assembly.



- (11) Remove oil filter and oil filter bracket.



- (2) Remove intake manifold gasket, oil cooler hoses and fuel hoses.
- (3) Remove intake manifold.
- (4) Loosen water pump pulley bolts.
- (5) Remove alternator, alternator bracket and drive belt.
- (6) Remove oil filter.
- (7) Remove oil pump assembly.
- (8) Remove pressure regulator.



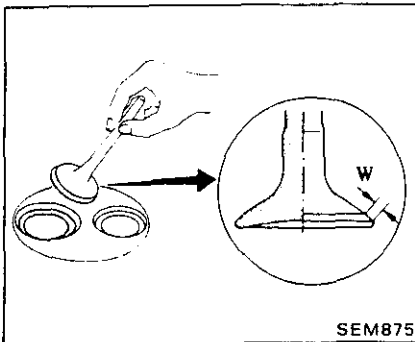
INSPECTION AND REPAIR

CYLINDER HEAD

VALVE SEAT INSERTS

1. Check valve and valve seat inserts for contact.

Coat the valve face with prussian red lead. If contact is wrong, correct valve seat. If the valve red lead appears 360° around face, the valve stem and face are concentric. If not, repair or replace valve.



Valve seat contact W:

Intake

1.4 mm (0.055 in)

Exhaust

1.3 mm (0.051 in)

2. Check valve seat inserts for any evidence of pitting on valve contact surface, and reseat or replace if worn out excessively.

Correct valve seat surface.

When repairing valve seat, check valve and valve guide for wear beforehand. If worn, replace them. Then correct valve seat.

Replacement

1. Old insert can be removed by heating cylinder head 150 to 160°C (302 to 320°F) in oil.

Then tap the valve insert and remove the valve insert.

Do not damage the cylinder head surface.

2. Select a suitable valve seat insert and check its outside diameter.
3. Ream the cylinder head recess at room temperature.
4. Heat cylinder head 150 to 160°C (302 to 320°F) in oil.

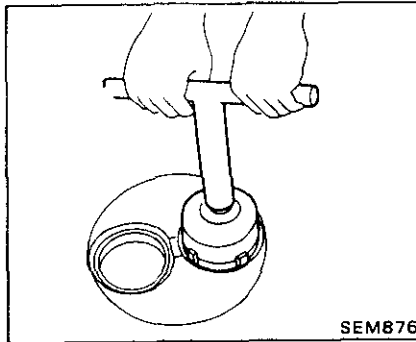
5. Install valve insert.

When replacing valve insert, valve should also be replaced.

Resurfacing

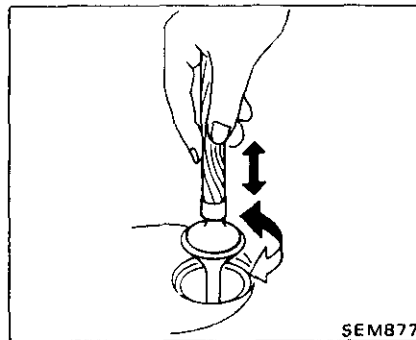
1. Resurface the valve seat. Refer to S.D.S.

The cutting should be done with both hands for uniform cutting.



2. Apply small amount of fine grinding compound to valve contacting face and put valve into guide.

Lap valve against its seat until proper valve seating is obtained. Remove valve and then clean valve and valve seat.

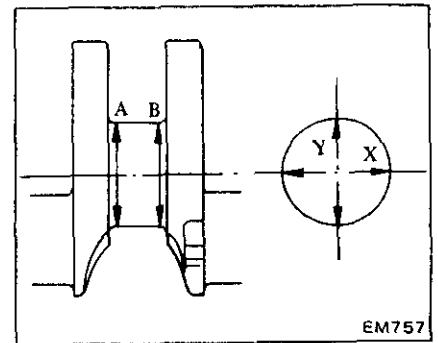


If out-of-round or taper exceeds the specified limit, replace or repair.

Out-of-round (X-Y) and

Taper (A-B):

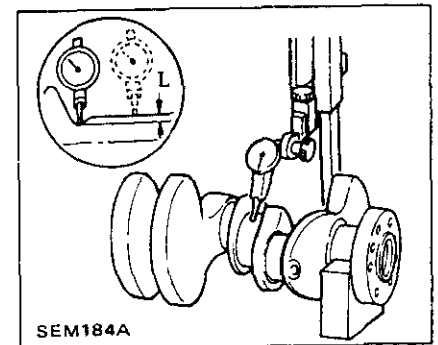
Less than 0.01 mm (0.0004 in)



- a. When regrounding crank pin and crank journal, measure fillet roll. Make sure the measurements exceed the specified limit. If the measurements are lower than the specified limit, do not regrind.

L:

More than 0.13 mm (0.0051 in)



CRANKSHAFT

CRANK JOURNAL AND PIN

1. Repair or replace as required. If faults are minor, correct with fine crocus cloth.

2. Check journals and crank pins with a micrometer for taper and out-of-round. Measurement should be taken along journals for taper and around journals for out-of-round.

- b. Do not grind off fillet roll.

- c. Refer to S.D.S. for regrounding crankshaft and available service parts.

ENGINE ASSEMBLY

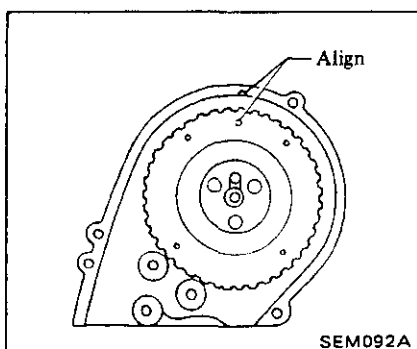
ENGINE ASSEMBLY

ENGINE OVERALL

INTERNAL PARTS

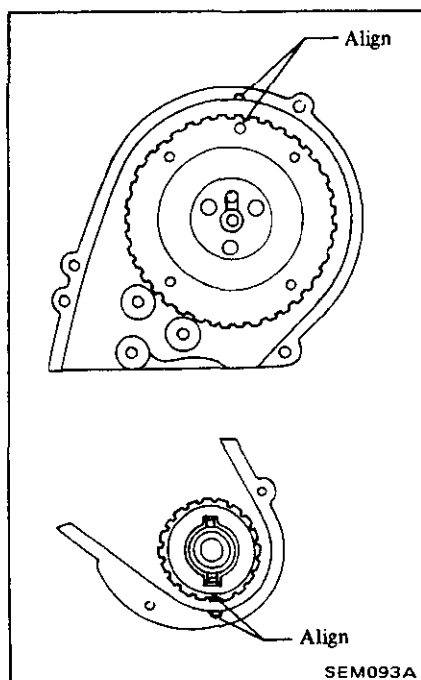
Cylinder head assembly. Install it through gasket by accommodating knock pin of cylinder block as follows:

Align camshaft pulley mark with cylinder head cover mark. This causes valves for No. 1 cylinder to position at top dead center on compression stroke.

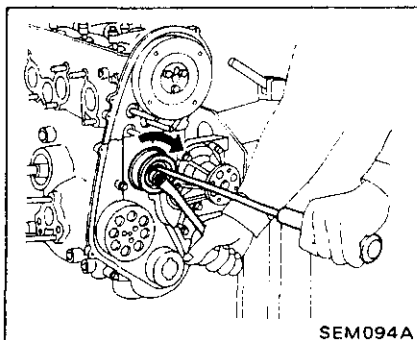


TIMING BELT

1. Ensure that marks on camshaft pulley and cylinder head cover and marks on crankshaft timing pulley and cylinder block cover are properly aligned.



2. Rotate tensioner clockwise about 70 to 80° and temporarily tighten lock nut.



3. Place timing belt on pulleys.

a. When using used belt, be sure to install it with rotating direction mark facing engine rotating direction.

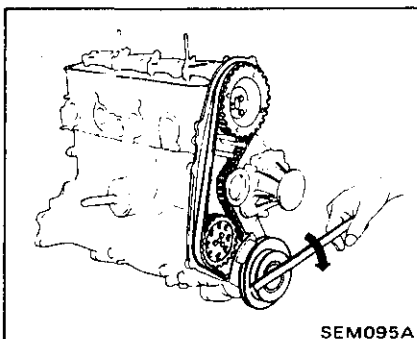
b. Ensure that belt is not loose around jack shaft and camshaft pulleys.

4. Loosen tensioner lock nut so that tensioner pushes on timing belt.

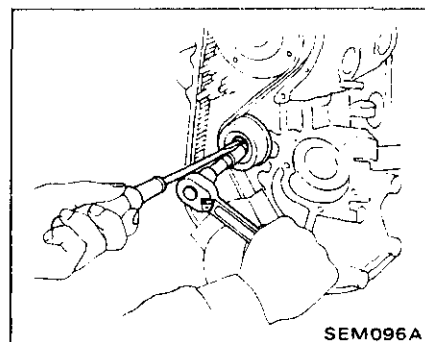
5. Install lower dust cover and crank pulley.

Ⓙ : Crankshaft pulley bolt
113 - 147 N·m
(11.5 - 15.0 kg·m,
83 - 108 ft·lb)

6. Turn crankshaft about a half turn.



7. Tighten nut while preventing tensioner from turning in "free" direction.



Ⓙ : Tensioner lock nut
16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

FRONT SIDE PARTS

1. Install water pump pulley
2. Install spacer and upper dust cover.

LEFT SIDE PARTS

1. Install cooler compressor and engine mounting bracket.
2. Install exhaust manifold with turbocharger.

Ⓙ : Exhaust manifold fixing nut
16 - 21 N·m
(1.6 - 2.1 kg·m,
12 - 15 ft·lb)

3. Install the following parts.

- Air duct and inlet air hose
- Oil feed pipe and oil return hose

Ⓙ : 20 - 29 N·m
(2.0 - 3.0 kg·m,
14 - 22 ft·lb)

- Converter gussets

Ⓙ : M8
9 - 14 N·m
(0.9 - 1.4 kg·m,
6.5 - 10.1 ft·lb)

M10
19 - 25 N·m
(1.9 - 2.5 kg·m,
14 - 18 ft·lb)

SERVICE DATA AND SPECIFICATIONS

RIGHT SIDE PARTS

1. Install oil pump assembly with new gasket.

⊕ : Oil pump bolt & nuts
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

2. Install oil cooler and oil filter bracket.

⊕ : Bracket to cylinder block
Bolt
29 - 34 N·m
(3.0 - 3.5 kg-m,
22 - 25 ft-lb)
Nut
15 - 24 N·m
(1.5 - 2.4 kg-m,
11 - 17 ft-lb)

Always replace gaskets.

3. Install oil filter stud and oil filter.

⊕ : Oil filter stud
29 - 34 N·m
(3.0 - 3.5 kg-m,
22 - 25 ft-lb)

4. Install oil cooler assembly.

⊕ : Oil cooler stud
29 - 34 N·m
(3.0 - 3.5 kg-m,
22 - 25 ft-lb)

5. Install oil cooler cover.

⊕ : Oil cooler cover
15 - 20 N·m
(1.5 - 2.0 kg-m,
11 - 14 ft-lb)

6. Install pressure regulator.

⊕ : 9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

7. Install alternator bracket and alternator.

⊕ : Alternator bracket fixing bolt
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)
Alternator to bracket bolt
44 - 59 N·m
(4.5 - 6.0 kg-m,
33 - 43 ft-lb)

Alternator adjusting bar bolt
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

8. Install intake manifold.

⊕ : Intake manifold fixing nuts
16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

9. Install fuel and water hoses.

10. Install intake manifold gusset.

⊕ : Gusset fixing bolt and nut
Bolt
15 - 24 N·m
(1.5 - 2.4 kg-m,
11 - 17 ft-lb)
Nut
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

REAR SIDE PARTS

Install thermostat housing with distributor.

⊕ : Thermostat housing fixing bolt
4 - 6 N·m
(0.4 - 0.6 kg-m,
2.9 - 4.3 ft-lb)

PREADJUSTMENT

1. Adjust valve clearance using cold specification.
2. Adjusting belt deflection.

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

| | | |
|-------------------------|-------------------------|--------------------------|
| Cylinder arrangement | | 4, in-line |
| Displacement | cm ³ (cu in) | 1,488 (90.80) |
| Bore and Stroke | mm (in) | 76 x 82 (2.99 x 3.23) |
| Valve arrangement | | O.H.C. |
| Firing order | | 1-3-4-2 |
| Number of piston rings | Compression | 2 |
| | Oil | 1 |
| Number of main bearings | | 5 |
| Compression ratio | | 7.4 |

INSPECTION AND ADJUSTMENT CYLINDER HEAD

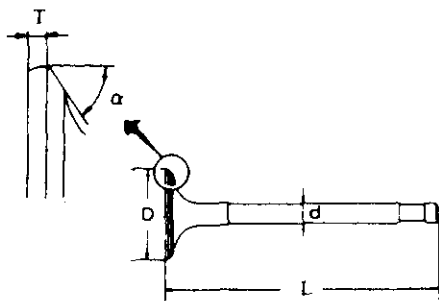
Unit: mm (in)

| | Standard | Limit |
|-----------------------|----------------------------|-------------|
| Head surface flatness | Less than 0.05 (0.0020) | 0.1 (0.004) |

SERVICE DATA AND SPECIFICATIONS

VALVE

Unit: mm (in)



SEM188

| | | |
|---------------------------------------|---------|----------------------------------|
| Valve head diameter "D" | Intake | 37.0 (1.457) |
| | Exhaust | 31.0 (1.220) |
| Valve length "L" | Intake | 119.4 - 119.8 (4.70 - 4.72) |
| | Exhaust | 119.65 - 120.05 (4.71 - 4.73) |
| Valve stem diameter "d" | Intake | 6.970 - 6.985 (0.2744 - 0.2750) |
| | Exhaust | 6.945 - 6.960 (0.2734 - 0.2740) |
| Valve seat angle "α" | Intake | 60°30' |
| | Exhaust | 45°30' |
| Valve margin "T" limit | | 0.5 (0.020) |
| Valve stem end surface grinding limit | | 0.2 (0.008) |
| Valve clearance | Intake | 0.28 (0.011) [*0.22 (0.009)] |
| | Exhaust | 0.28 (0.011) [*0.22 (0.009)] |

*Cold: Used as approximate values during engine assembly, clearances should ultimately be adjusted to the above hot values; refer to section MA for procedures.

Valve spring

| | | |
|---------------------------|---------------------|---|
| Free height | mm (in) | 46.70 (1.8386) |
| Pressure height | mm/N (mm/kg, in/lb) | 30.2/568.61 (30.2/57.98, 1.189/127.85) |
| Assembled height | mm/N (mm/kg, in/lb) | 39.2/229.78 (39.2/23.43, 1.543/51.66) |
| Out of square "S" mm (in) | | 2.0 (0.079) |

Valve guide

Unit: mm (in)

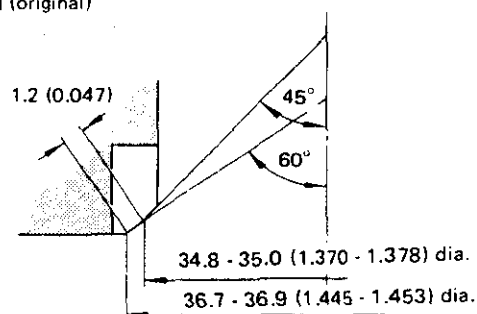
| | | Standard | Service |
|--|---------|--------------------------------------|--------------------------------------|
| Valve guide Outer diameter | | 12.033 - 12.044 (0.4737 - 0.4742) | 12.256 - 12.274 (0.4825 - 0.4832) |
| Valve guide Inner diameter (Finished size) | | 7.005 - 7.020 (0.2758 - 0.2764) | |
| Cylinder head valve guide hole diameter | | 11.970 - 11.988 (0.4713 - 0.4720) | 12.200 - 12.211 (0.4803 - 0.4807) |
| Interference fit of valve guide | | 0.045 - 0.074 (0.0018 - 0.0029) | |
| | | Standard | Max. tolerance |
| Stem to guide clearance | Intake | 0.02 - 0.05 (0.0008 - 0.0020) | 0.1 (0.004) |
| | Exhaust | 0.045 - 0.075 (0.0018 - 0.0030) | |
| Valve deflection limit | | 0.2 (0.008) | |

Valve seat

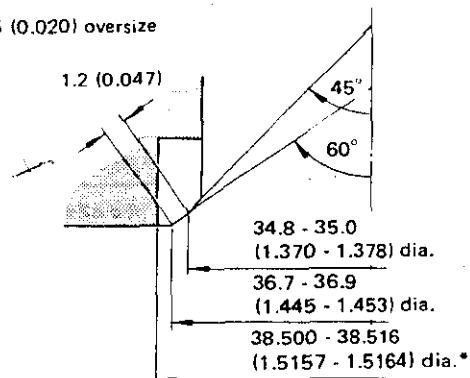
Unit: mm (in)

INTAKE

Standard (original)



0.5 (0.020) oversize



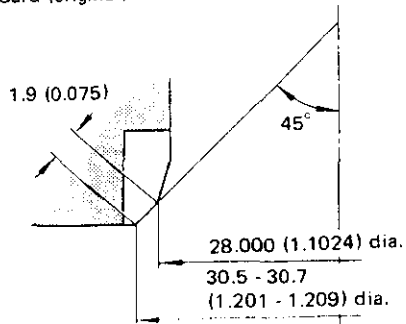
*Cylinder head machining data.

SEM097A

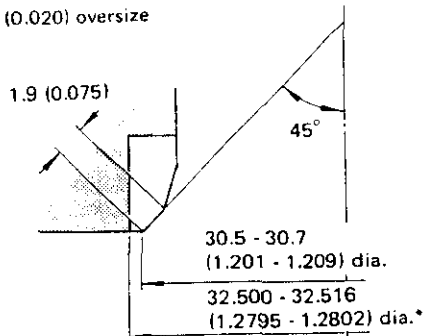
SERVICE DATA AND SPECIFICATIONS

EXHAUST

Standard (original)



0.5 (0.020) oversize



*Cylinder head machining data.

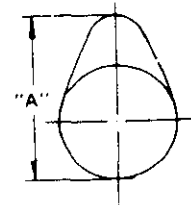
SEM098A

Unit: mm (in)

CAMSHAFT AND CAMSHAFT BEARING

Unit: mm (in)

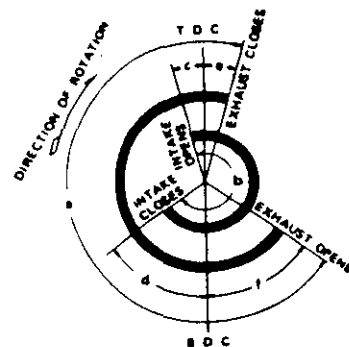
| | Standard | Max. tolerance |
|---------------------------------------|--------------------------------------|----------------|
| Camshaft journal to bearing clearance | | |
| No. 1, 3, 5 | 0.035 - 0.076 (0.0014 - 0.0030) | 0.15 (0.0059) |
| No. 2, 4 | 0.078 - 0.119 (0.0031 - 0.0047) | 0.20 (0.0079) |
| Inner diameter of camshaft bearing | 42.000 - 42.025 (1.6535 - 1.6545) | — |
| Outer diameter of camshaft journal | | |
| No. 1, 3, 5 | 41.949 - 41.965 (1.6515 - 1.6522) | — |
| No. 2, 4 | 41.906 - 41.922 (1.6498 - 1.6505) | — |
| Camshaft bend [T.I.R.*] | Less than 0.02 (0.0008) | 0.1 (0.004) |
| Camshaft end play | 0.15 - 0.29 (0.0059 - 0.0114) | 0.4 (0.016) |



EM671

| | | |
|--------------------------|---------|-----------------------------------|
| Cam height "A" | Intake | 35.884 - 36.134 (1.4128 - 1.4226) |
| | Exhaust | 35.64 - 35.89 (1.4031 - 1.4130) |
| Wear limit of cam height | | 0.20 (0.0079) |

Valve timing



EM120

Unit: degree

| | | | | | |
|-----|-----|---|----|----|----|
| a | b | c | d | e | f |
| 232 | 232 | 5 | 47 | 12 | 40 |

* Total indicator reading

SERVICE DATA AND SPECIFICATIONS

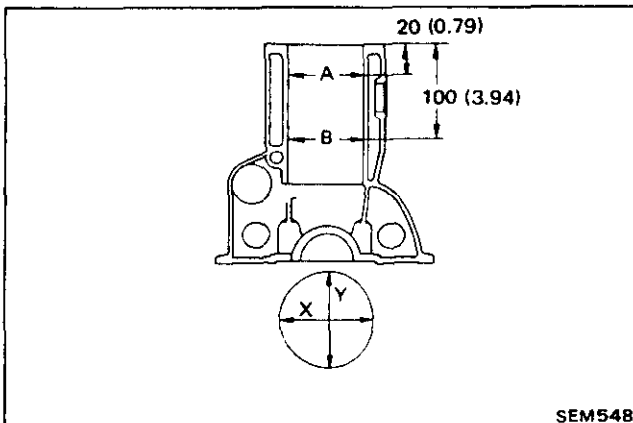
JACK SHAFT AND JACK SHAFT BUSHING

Unit: mm (in)

| | | Standard | Max. tolerance |
|---|----|------------------------------------|-----------------------------------|
| Jack shaft journal to bushing clearance | FR | 0.027 - 0.109 (0.0011 - 0.0043) | 0.15 (0.0059) |
| | RR | 0.028 - 0.110 (0.0011 - 0.0043) | |
| Inner diameter of jack shaft bushing | FR | 32.020 - 32.085 (1.2606 - 1.2632) | 28.620 - 28.685 (1.1268 - 1.1293) |
| | RR | 28.620 - 28.685 (1.1268 - 1.1293) | |
| Outer diameter of jack shaft journal | FR | 31.987 - 32.000 (1.2593 - 1.2598) | 28.587 - 28.600 (1.1255 - 1.1260) |
| | RR | 28.587 - 28.600 (1.1255 - 1.1260) | |
| Jack shaft end play | | 0.045 - 0.105 (0.0018 - 0.0041) | |

CYLINDER BLOCK

Unit: mm (in)



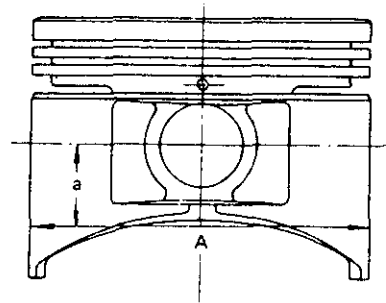
SEM548

| | | Standard | Wear limit |
|--|--------------------|------------------------------------|-------------------|
| Surface flatness | | Less than 0.05 (0.0020) | 0.10 (0.0039) |
| Cylinder bore | Inner diameter | 76.00 - 76.05 (2.9921 - 2.9941) | 76.20 (3.0000) |
| | Out-of-round (X-Y) | Less than 0.015 (0.0006) | — |
| | Taper (A-B) | Less than 0.02 (0.0008) | — |
| Difference in inner diameter between cylinders | | Less than 0.05 (0.0020) | — |

PISTON, PISTON RING AND PISTON PIN

Piston

Unit: mm (in)



SEM646

| | | |
|------------------------------------|------------------------|--------------------------------------|
| Piston skirt diameter "A" | Standard | 75.950 - 76.000 (2.9902 - 2.9921) |
| | Service | 75.970 - 76.020 (2.9909 - 2.9929) |
| | 0.50 (0.0197) oversize | 76.450 - 76.500 (3.0098 - 3.0118) |
| "a" dimension | | About 17.0 (0.669) |
| Piston pin hole diameter | | 19.003 - 19.012 (0.7481 - 0.7485) |
| Piston clearance to cylinder block | | 0.040 - 0.060 (0.0016 - 0.0024) |

Piston ring

Unit: mm (in)

| | | Standard | Limit |
|----------------|-----------------|------------------------------------|-------------|
| Side clearance | Top | 0.040 - 0.073 (0.0016 - 0.0029) | 0.2 (0.008) |
| | 2nd | 0.030 - 0.063 (0.0012 - 0.0025) | |
| | Oil | 0.075 - 0.12 (0.0030 - 0.0047) | — |
| Ring gap | Top | 0.14 - 0.22 (0.0055 - 0.0087) | 1.0 (0.039) |
| | 2nd | 0.15 - 0.25 (0.0059 - 0.0098) | |
| | Oil (rail ring) | 0.20 - 0.6 (0.0079 - 0.0236) | |

Piston pin

Unit: mm (in)

| | |
|--|-----------------------------------|
| Piston pin outer diameter | 18.995 - 19.000 (0.7478 - 0.7480) |
| Piston pin to piston clearance | 0.008 - 0.012 (0.0003 - 0.0005) |
| Interference fit of piston pin to connecting rod | 0.017 - 0.038 (0.0007 - 0.0015) |

SERVICE DATA AND SPECIFICATIONS

CONNECTING ROD

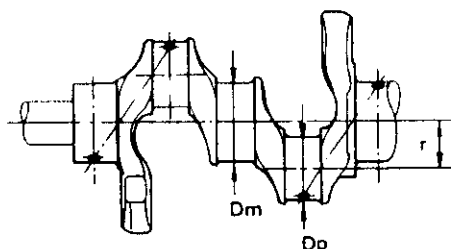
Unit: mm (in)

| | | |
|---|----------|-----------------------------------|
| Center distance | | 137.5 (5.41) |
| Bend, torsion [per 100 mm (3.94 in)] | Limit | 0.05 (0.0020) |
| Piston pin bore dia. | | 18.962 - 18.978 (0.7465 - 0.7472) |
| Big end play | Standard | 0.1 - 0.37 (0.004 - 0.0146) |
| | Limit | 0.5 (0.020) |

CRANKSHAFT

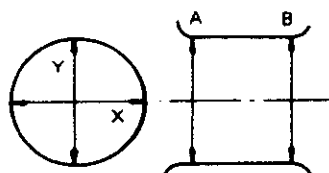
Unit: mm (in)

| | | |
|--|----------|-----------------------------------|
| Main journal dia. "Dm" | | 49.940 - 49.964 (1.9661 - 1.9671) |
| Pin journal dia. "Dp" | | 39.954 - 39.974 (1.5730 - 1.5738) |
| Center distance "r" | | 41 (1.61) |
| Out-of-round (X-Y) and taper (A-B) | Standard | Less than 0.01 (0.0004) |
| | Limit | 0.03 (0.0012) |
| Bend [T.I.R.] | Standard | Less than 0.05 (0.0020) |
| | Limit | 0.10 (0.0039) |
| Free end play | Standard | 0.05 - 0.18 (0.0020 - 0.0071) |
| | Limit | 0.30 (0.0118) |



SEM645

Out-of-round X-Y
Taper A-B



EM715

BEARING

Bearing clearance

Unit: mm (in)

| | Standard | Limit |
|----------------------------------|------------------------------------|---------------|
| Main bearing clearance | | |
| Nos. 1 and 5 | 0.031 - 0.076 (0.0012 - 0.0030) | |
| Nos. 2 and 4 | 0.029 - 0.088 (0.0011 - 0.0035) | 0.10 (0.0039) |
| No. 3 | 0.031 - 0.092 (0.0012 - 0.0036) | |
| Connecting rod bearing clearance | 0.016 - 0.058 (0.0006 - 0.0023) | 0.10 (0.0039) |

Main bearing undersize

Unit: mm (in)

| | Crank main journal diameter "Dm" |
|-------------------------|-------------------------------------|
| Standard | 49.943 - 49.964 (1.9663 - 1.9671) |
| Undersize 0.25 (0.0098) | 49.701 - 49.714 (1.9567 - 1.9572) |

Connecting rod bearing undersize

Unit: mm (in)

| | Crank pin journal diameter "Dp" |
|-------------------------|------------------------------------|
| Standard | 39.954 - 39.974 (1.5730 - 1.5738) |
| Undersize 0.25 (0.0098) | 39.704 - 39.724 (1.5631 - 1.5639) |

MISCELLANEOUS COMPONENTS

Unit: mm (in)

| | |
|------------------------------------|-------------------------|
| Camshaft pulley Runout [T.I.R.] | Less than 0.1 (0.004) |
| Flywheel Runout [T.I.R.] | Less than 0.15 (0.0059) |

SERVICE DATA AND SPECIFICATIONS

TIGHTENING TORQUE

Engine outer parts

| Unit | N·m | kg·m | ft·lb |
|---|-----------|-------------|------------|
| Air pipe to intake manifold | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Air regulator to intake manifold | 1 - 2 | 0.1 - 0.2 | 0.7 - 1.4 |
| Alternator bracket to cylinder block | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Alternator adjust bar bolt | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Alternator to bracket | 44 - 59 | 4.5 - 6.0 | 33 - 43 |
| Collector to intake manifold | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Compressor bracket bolt | 26 - 34 | 2.7 - 3.5 | 20 - 25 |
| Compressor to bracket | 26 - 34 | 2.7 - 3.5 | 20 - 25 |
| Crank pulley bolt | 113 - 147 | 11.5 - 15.0 | 83 - 108 |
| Detonation sensor | 25 - 34 | 2.5 - 3.5 | 18 - 25 |
| Dust cover screw | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Engine mounting bracket to cylinder block | 29 - 39 | 3.0 - 4.0 | 22 - 29 |
| Engine mounting bracket to cylinder head | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Exhaust manifold gusset | | | |
| M8 | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| M10 | 19 - 25 | 1.9 - 2.5 | 14 - 18 |
| Exhaust outlet to exhaust manifold | 29 - 34 | 3.0 - 3.5 | 22 - 25 |
| Idle control unit to intake manifold | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Intake & exhaust manifold nut | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Intake manifold gusset | | | |
| Bolt | 15 - 24 | 1.5 - 2.4 | 11 - 17 |
| Nut | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Oil cooler cover | 15 - 20 | 1.5 - 2.0 | 11 - 14 |
| Oil cooler & oil filter bracket to block | | | |
| Bolt | 29 - 34 | 3.0 - 3.5 | 22 - 25 |
| Nut | 15 - 24 | 1.5 - 2.4 | 11 - 17 |
| Oil cooler stud | 29 - 34 | 3.0 - 3.5 | 22 - 25 |
| Oil filter stud | 29 - 34 | 3.0 - 3.5 | 22 - 25 |
| Oil pump securing bolt | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Oil pump securing nut | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |

| Unit | N·m | kg·m | ft·lb |
|----------------------------------|---------|-----------|------------|
| Pressure regulator | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Spark plug | 20 - 29 | 2.0 - 3.0 | 14 - 22 |
| Thermostat housing bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Throttle chamber bolt | 15 - 20 | 1.5 - 2.0 | 11 - 14 |
| Turbocharger oil feed tube | 20 - 29 | 2.0 - 3.0 | 14 - 22 |
| Turbocharger to exhaust manifold | 29 - 34 | 3.0 - 3.5 | 22 - 25 |
| Water pump bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Water pump pulley bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |

Engine internal parts

| Unit | N·m | kg·m | ft·lb |
|---------------------------|-----------|------------|-----------|
| Camshaft pulley bolt | 6 - 8 | 0.6 - 0.8 | 4.3 - 5.8 |
| Connecting rod nut | 31 - 37 | 3.2 - 3.8 | 23 - 27 |
| Cylinder head bolt | | | |
| 1st | 39 - 44 | 4.0 - 4.5 | 29 - 33 |
| 2nd | 69 - 74 | 7.0 - 7.5 | 51 - 54 |
| Cylinder head front cover | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Flywheel bolt | 78 - 88 | 8.0 - 9.0 | 58 - 65 |
| Front cover bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Jack shaft pulley bolt | 6 - 8 | 0.6 - 0.8 | 4.3 - 5.8 |
| Main bearing cap bolt | 49 - 59 | 5.0 - 6.0 | 36 - 43 |
| Oil pan bolt & nut | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Oil pan drain plug | 35 - 47 | 3.6 - 4.8 | 26 - 35 |
| Oil strainer bolt | 5.9 - 9.3 | 0.6 - 0.95 | 4.3 - 6.9 |
| Rocker arm lock nut | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Rocker cover nut | 4 - 8 | 0.4 - 0.8 | 2.9 - 5.8 |
| Rocker shaft bolt | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Tensioner lock nut | 16 - 21 | 1.6 - 2.1 | 12 - 15 |

ENGINE LUBRICATION & COOLING SYSTEMS

CONTENTS

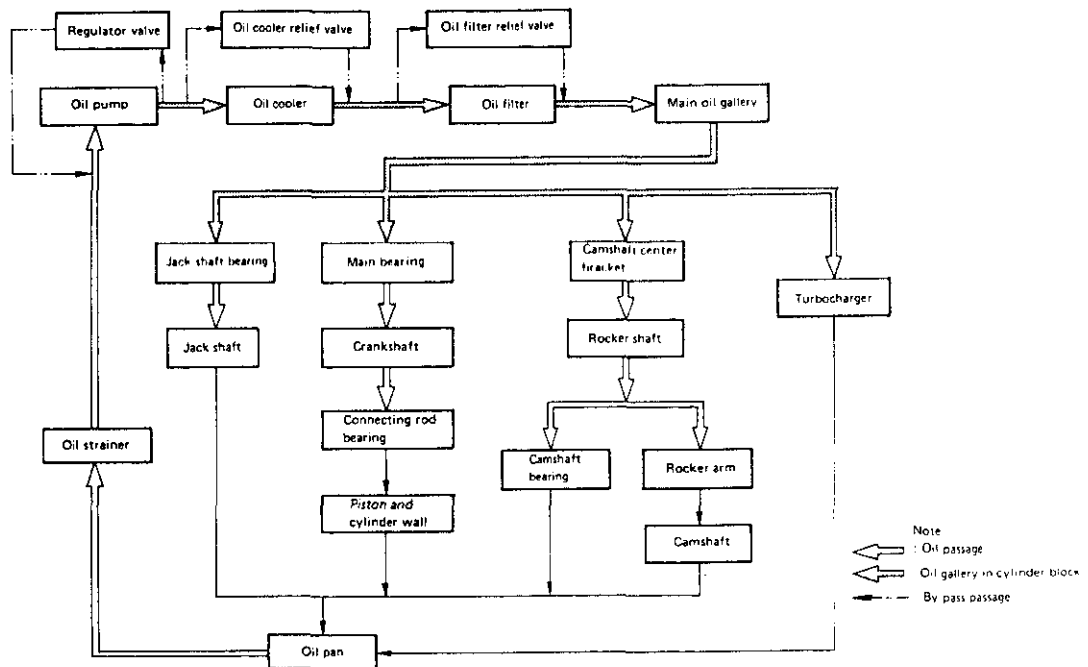
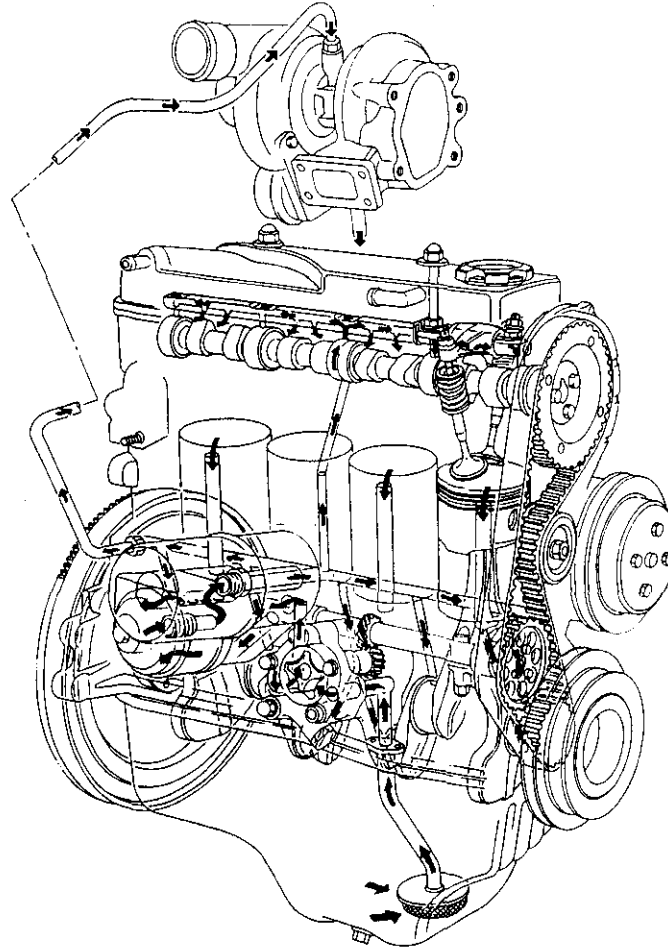


| | | | |
|--|-------|--|-------|
| ENGINE LUBRICATION SYSTEM | LC- 2 | Thermostat | LC- 8 |
| Lubrication circuit | LC- 2 | Radiator and cooling fan | LC- 9 |
| Oil pump | LC- 3 | SERVICE DATA AND | |
| Oil filter and oil cooler | LC- 5 | SPECIFICATIONS | LC-12 |
| COOLING SYSTEM | LC- 6 | Engine lubrication system | LC-12 |
| Cooling circuit | LC- 6 | Engine cooling system | LC-12 |
| Water pump | LC- 7 | SPECIAL SERVICE TOOLS | LC-13 |

ENGINE LUBRICATION SYSTEM

ENGINE LUBRICATION SYSTEM

LUBRICATION CIRCUIT



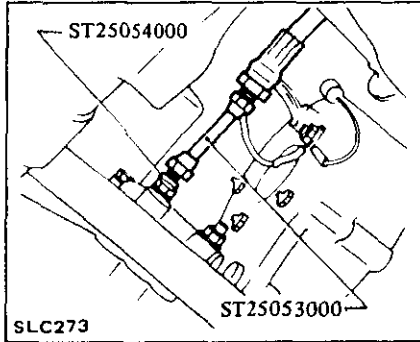
SLC538

ENGINE LUBRICATION SYSTEM

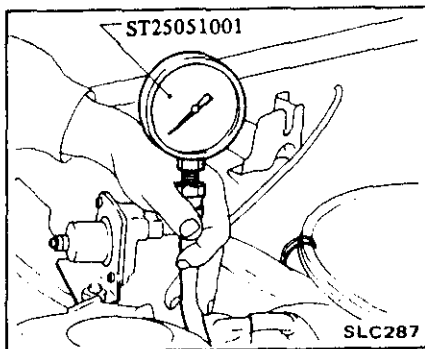
OIL PUMP

OIL PRESSURE CHECK

1. Warm up engine.
2. Remove oil pressure switch.
3. Install pressure gauge and gauge adapter to oil pressure switch hole.



4. Start engine and check oil pressure.



| Engine rpm | Discharge pressure kPa (bar, kg/cm ² , psi) |
|------------|---|
| 1,050 | 196 (2.0, 2, 28) |
| 1,700 | 294 (2.9, 3, 43) |
| 5,150 | 392 (3.9, 4, 57) |

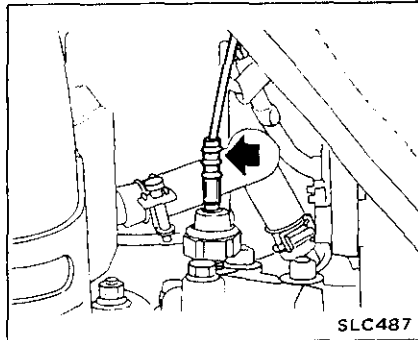
The above table shows data tested when SEA 20W-20 oil is used and oil temperature is between 73 and 83°C (163 and 181°F). Slight difference will be found because of oil grade or oil temperature. If difference is extreme, check oil passage, oil pump, and for oil leaks.

5. Remove pressure gauge and gauge adapter.
6. Install oil pressure switch.

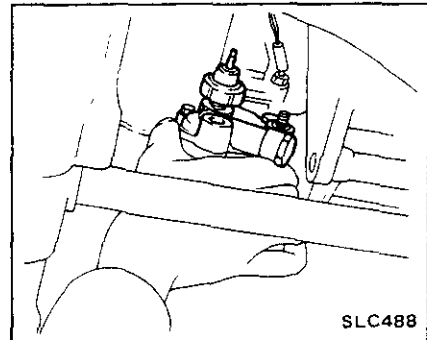
If oil pressure is outside the specifications, check pump for clogged oil passage, leaks, etc.

REMOVAL

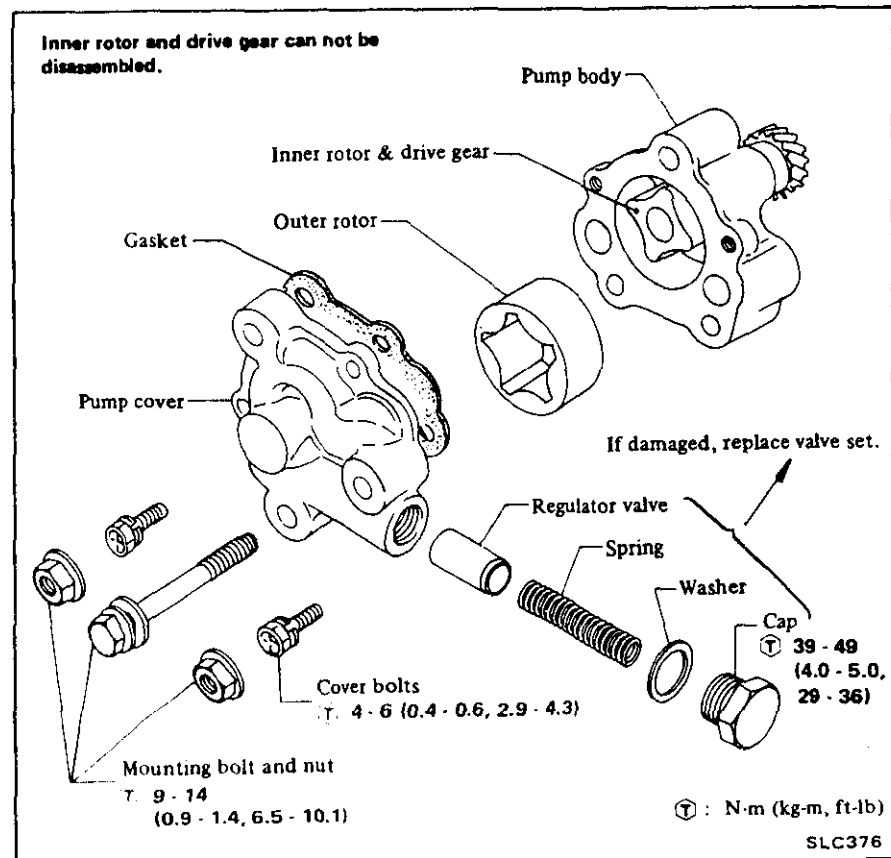
1. Remove alternator lower bolt on oil pump side.
2. Disconnect oil pressure gauge harness.



3. Remove oil pump assembly.

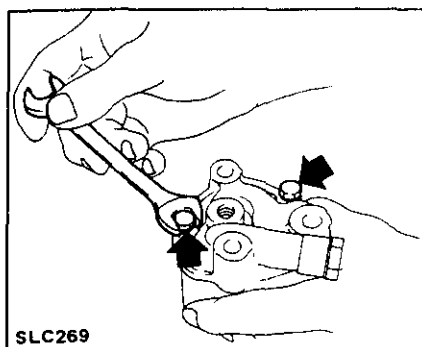


DISASSEMBLY AND ASSEMBLY



ENGINE LUBRICATION SYSTEM

1. Remove pump cover bolts.

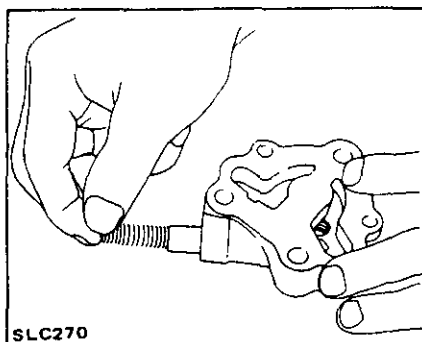


2. Take out outer rotor.

Inner rotor and drive gear cannot be disassembled.

3. Remove regulator valve.

When placing oil pump in a vise, use extreme care not to distort pump body and cover in the jaws.



4. Assemble oil pump in the reverse order of removal.

Use new gasket.

Ⓘ : Regulator valve cap nut

39 - 49 N·m
(4.0 - 5.0 kg-m,
29 - 36 ft-lb)

Oil pump cover bolt

4 - 6 N·m
(0.4 - 0.6 kg-m,
2.9 - 4.3 ft-lb)

INSPECTION

1. Inspect pump body and cover for cracks or excessive wear.
2. Inspect pump rotors for excessive wear.
3. Check inner rotor shaft for looseness in pump body.

If pump rotors or body are damaged or worn, replacement of the entire oil pump assembly is necessary.

4. Check oil pressure regulator valve sliding surface and valve spring.

If damaged, replace valve set.

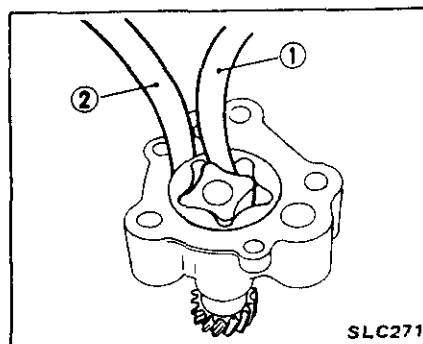
5. Using a feeler gauge, check the following clearances.

Rotor tip clearance ① :

Less than
0.12 mm (0.0047 in)

Outer rotor to body clearance ② :

0.15 - 0.21 mm
(0.0059 - 0.0083 in)

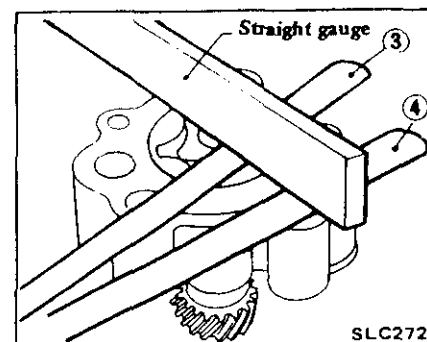


Rotor to straight edge ③ :

Less than
0.05 mm (0.0020 in)

Oil pump body to straight edge ④ :

Less than
0.02 mm (0.0008 in)



INSTALLATION

1. Apply engine oil to pump drive gear and shaft.
2. Charge engine oil into pump and turn pump drive gear several times.
3. Using a new gasket, install oil pump assembly.

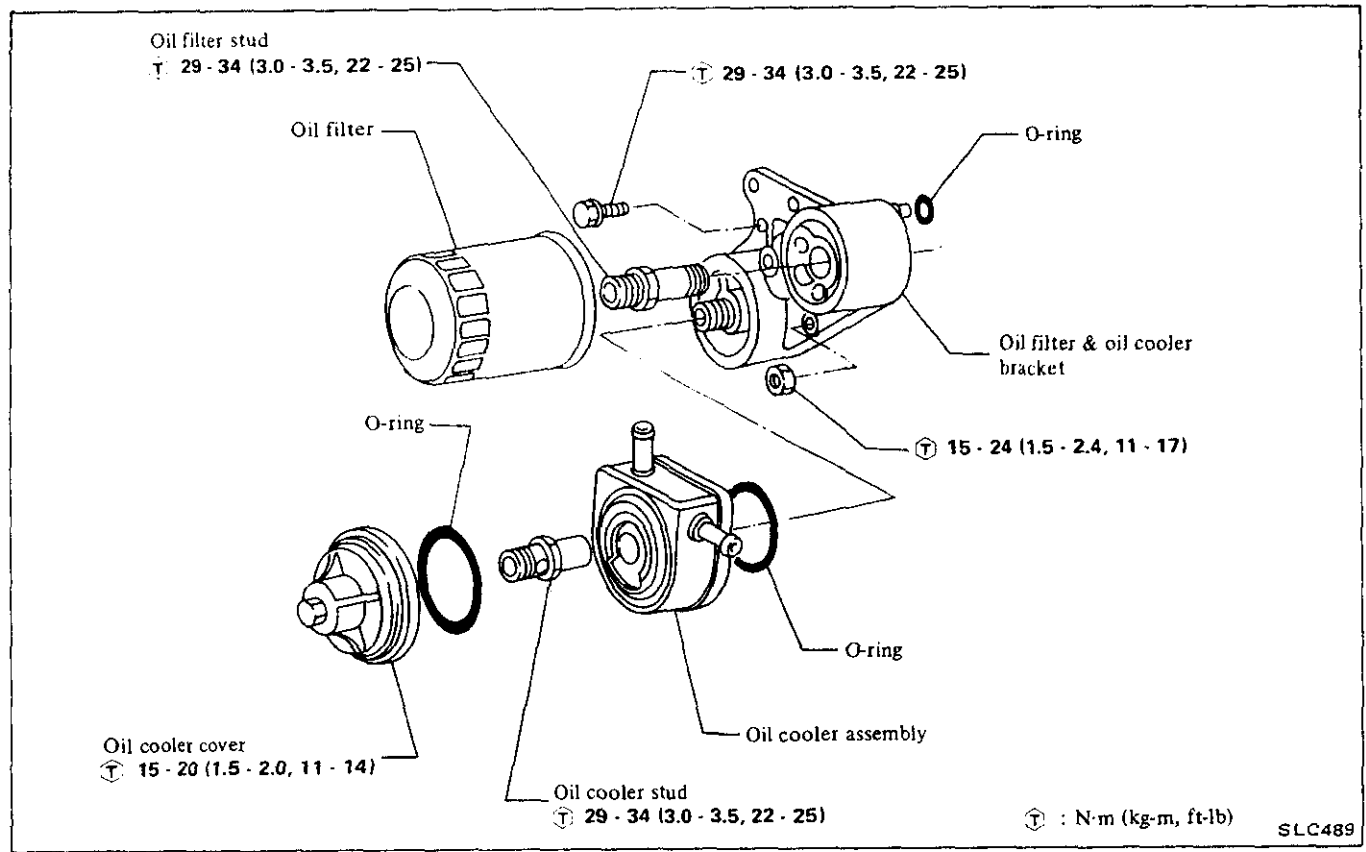
Ⓙ : Oil pump mounting bolt & nuts
9 - 14 N·m
(0.9 - 1.4 kg-m,
6.5 - 10.1 ft-lb)

4. Refill engine with oil.

After installation, run engine for a few minutes, and check for leaks.

ENGINE LUBRICATION SYSTEM

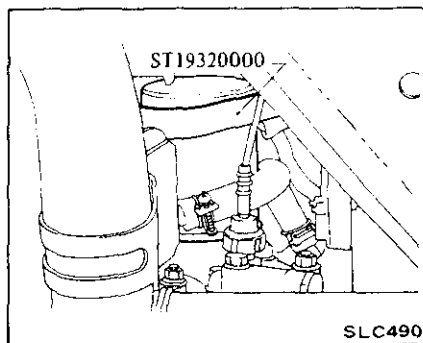
OIL FILTER AND OIL COOLER



OIL FILTER

Replacement

1. Remove oil filter.



2. Install oil filter.

Hand-tighten only.

Do not use a wrench to tighten the filter.

3. Refill with the specified quantity of engine oil.

After installation, run engine for a few minutes, and check for leaks.

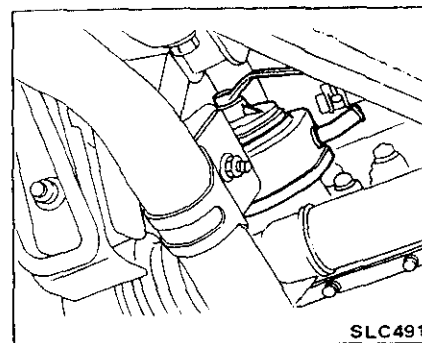
OIL COOLER

Removal

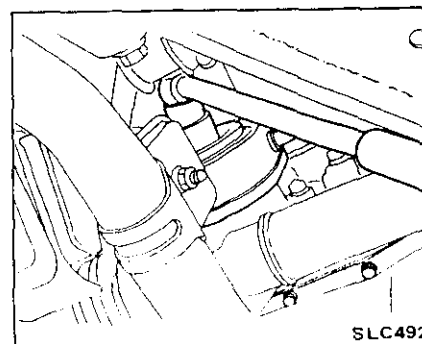
1. Drain about 3 liters (2-5/8 Imp

qt) of engine coolant.

2. Disconnect water hoses on oil cooler side.
3. Remove oil cooler cover.



4. Remove oil cooler stud.



5. Take out oil cooler.

Installation

Replace O-ring used at oil cooler cover.

1. Install oil cooler.

Ⓙ : Oil cooler stud
29 - 34 N·m
(3.0 - 3.5 kg·m,
22 - 25 ft·lb)

2. Install oil cooler cover.

Ⓙ : Oil cooler cover
15 - 20 N·m
(1.5 - 2.0 kg·m,
11 - 14 ft·lb)

3. Install water hoses.

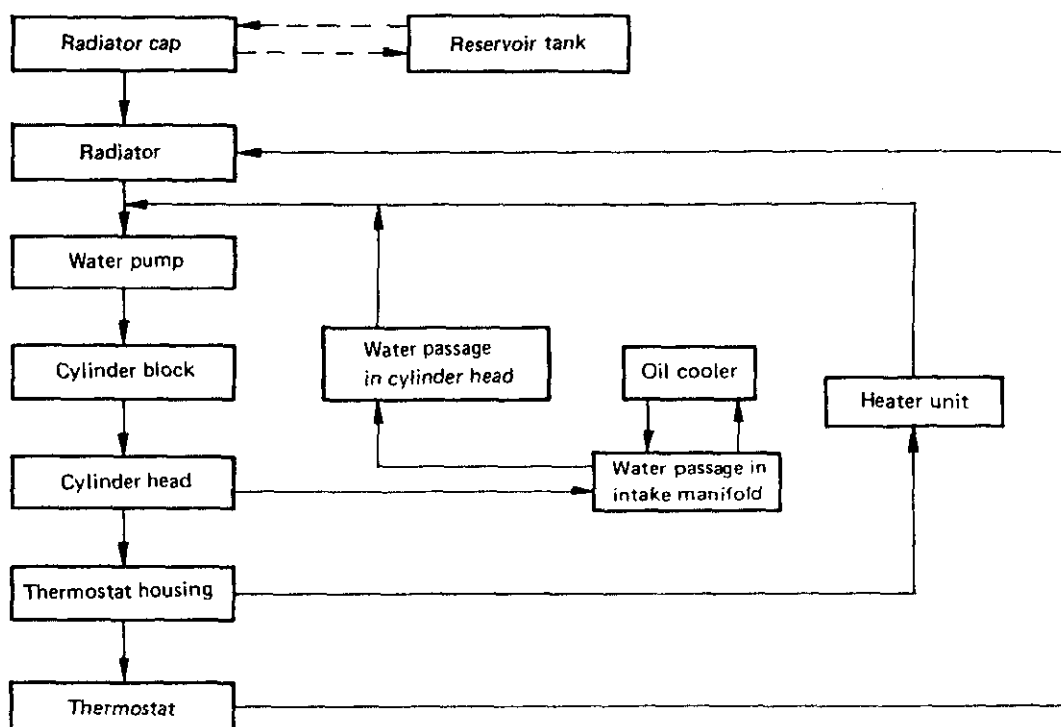
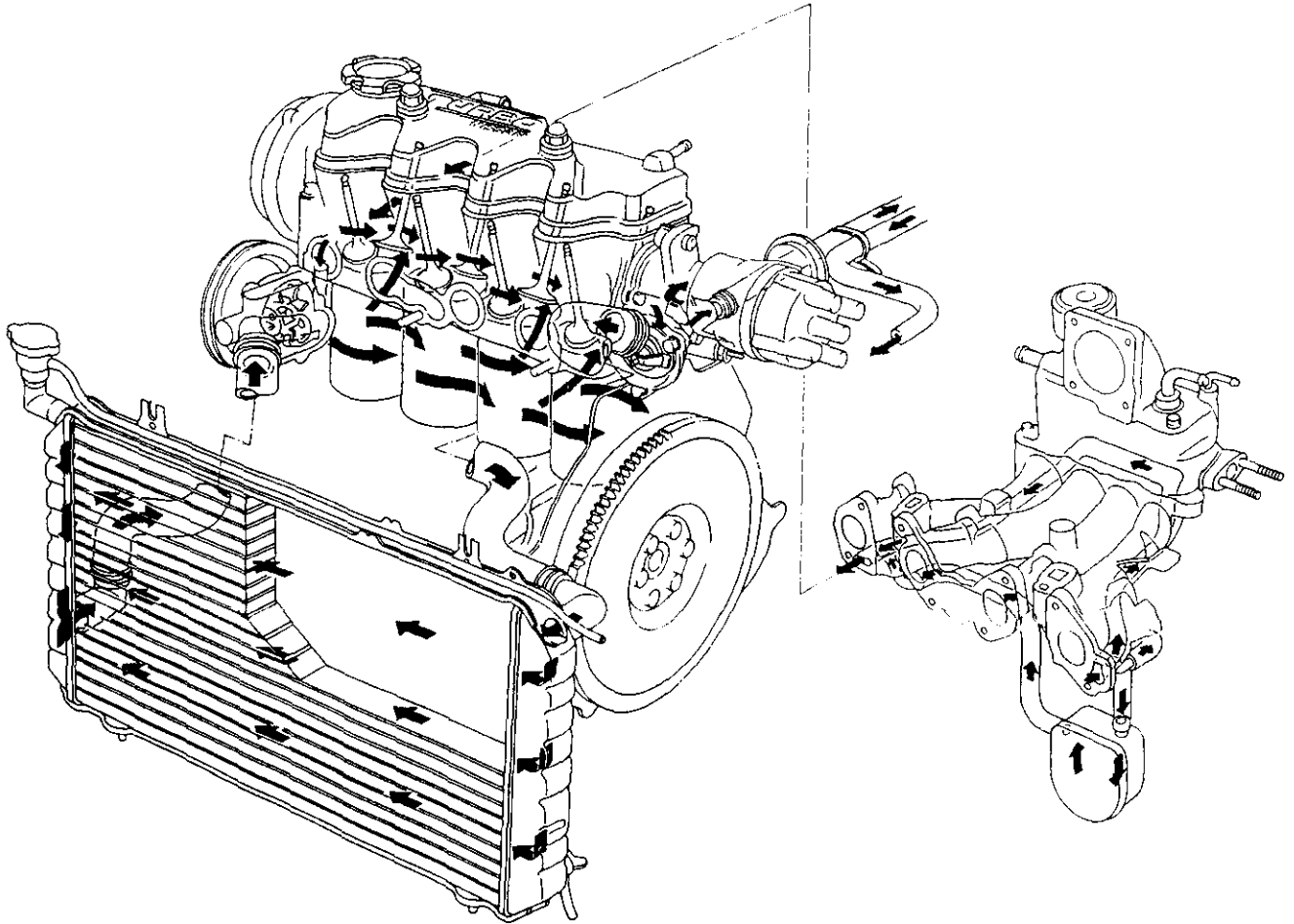
4. Replenish engine oil and cooling water to the specified quantity.

After installation, run engine for a few minutes, and check for leaks.

COOLING SYSTEM

COOLING SYSTEM

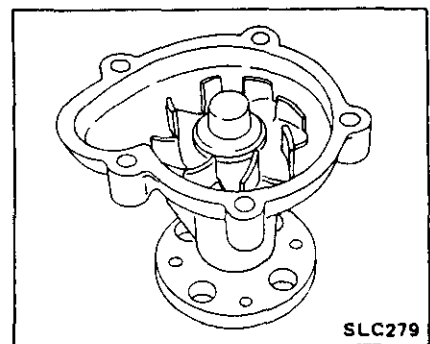
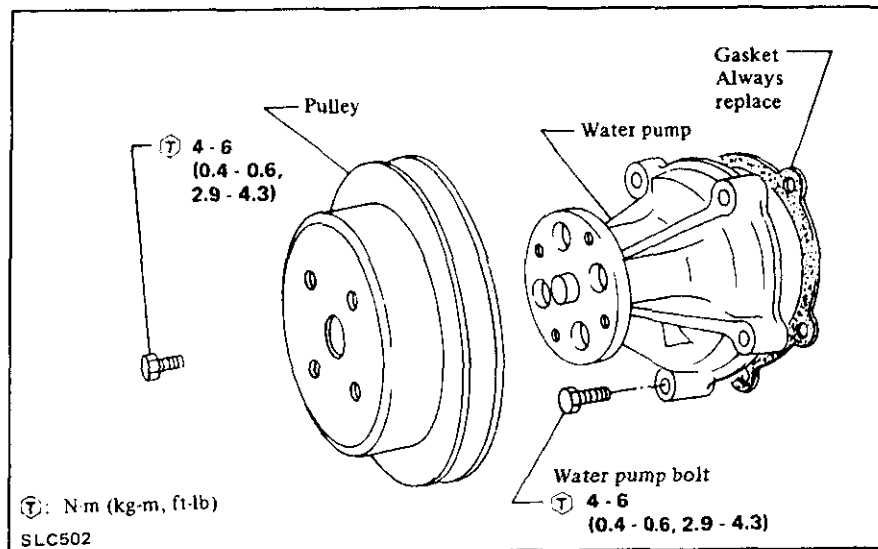
COOLING CIRCUIT



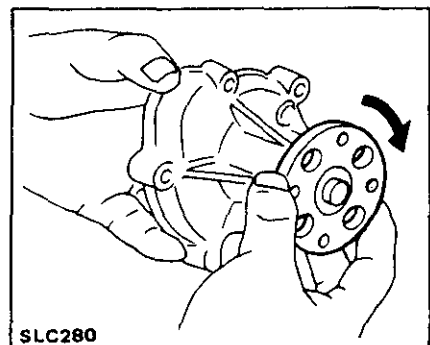
SLC493

COOLING SYSTEM

WATER PUMP



2. Inspect water pump bearing.
Check for excessive end play or rough operation.

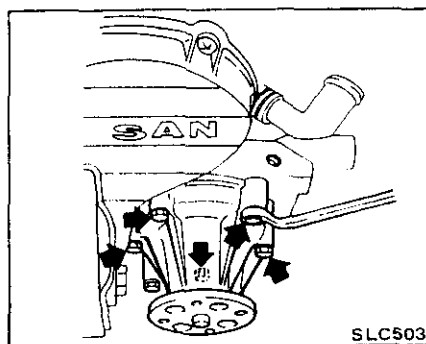


REMOVAL

1. Open radiator drain cock and radiator cap, and drain coolant.

WARNING:

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



INSTALLATION

1. Install water pump, alternator, and drive belts in the reverse order of removal.

Always use new gasket.

- ⑦ : Water pump bolt
4 - 6 N·m
(0.4 - 0.6 kg·m,
2.9 - 4.3 ft·lb)

2. Remove water pump (alternator) drive belt.
 - (1) Loosen alternator securing bolts.
 - (2) Move alternator toward the engine.
 3. Remove water pump pulley.
 4. Remove water pump with gasket.

INSPECTION

The water pump cannot be disassembled and should be replaced as a unit.

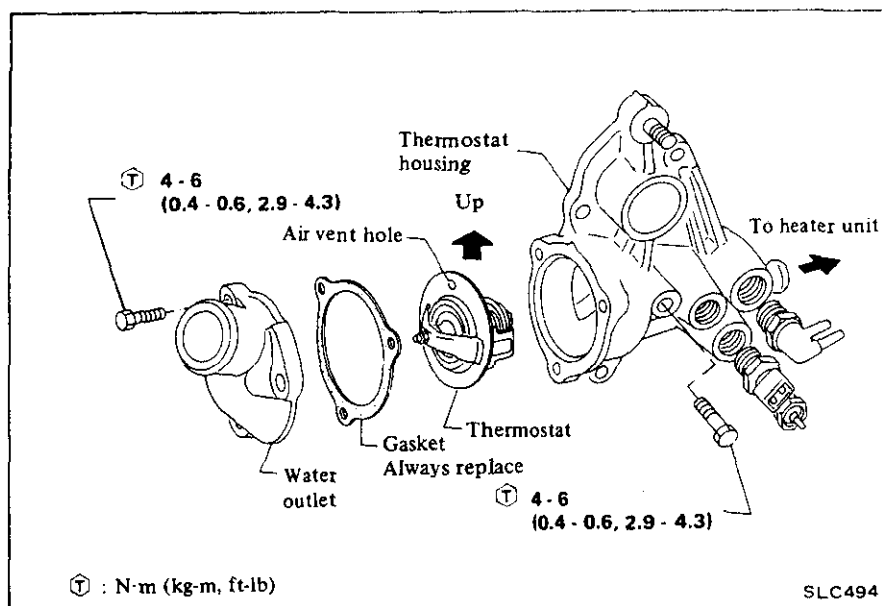
1. Inspect water pump body and vane for rust or corrosion.

2. Adjust drive belt deflection.
Refer to Section MA for drive belt deflection.
3. Fill radiator with coolant.

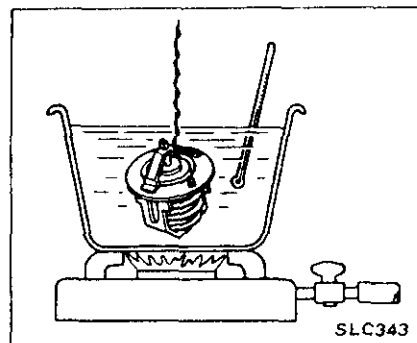
After installation, run engine for a few minutes, and check for leaks.

COOLING SYSTEM

THERMOSTAT



2. Valve opening temperature and maximum valve lift. (Refer to S.D.S.)

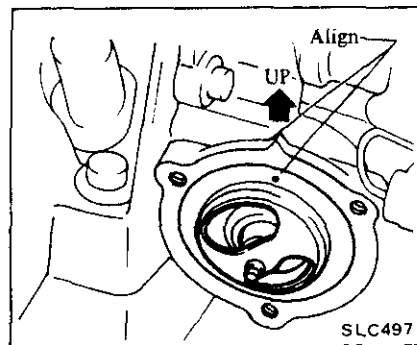


3. Then check if valve closes at 5°C (9°F) below valve opening temperature.

It is necessary to check the new thermostat before installing it.

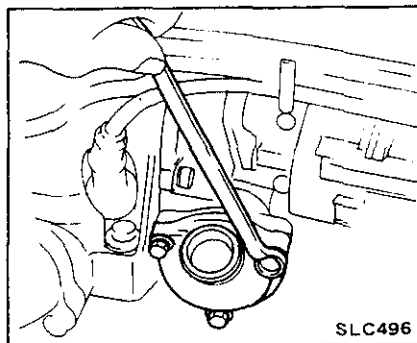
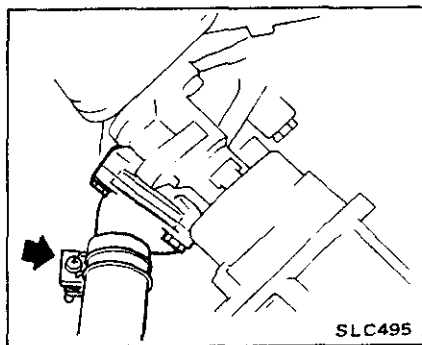
INSTALLATION

1. Install thermostat to thermostat housing with jiggle valve or air vent facing upward.



REMOVAL

1. Drain coolant so that its level is below the thermostat housing.
2. Disconnect radiator upper hose on water outlet side.



INSPECTION

Inspect thermostat for the following and replace if necessary.

1. Valve seating condition at ordinary temperature. It should seat tightly.

2. Install water outlet together with new gasket.

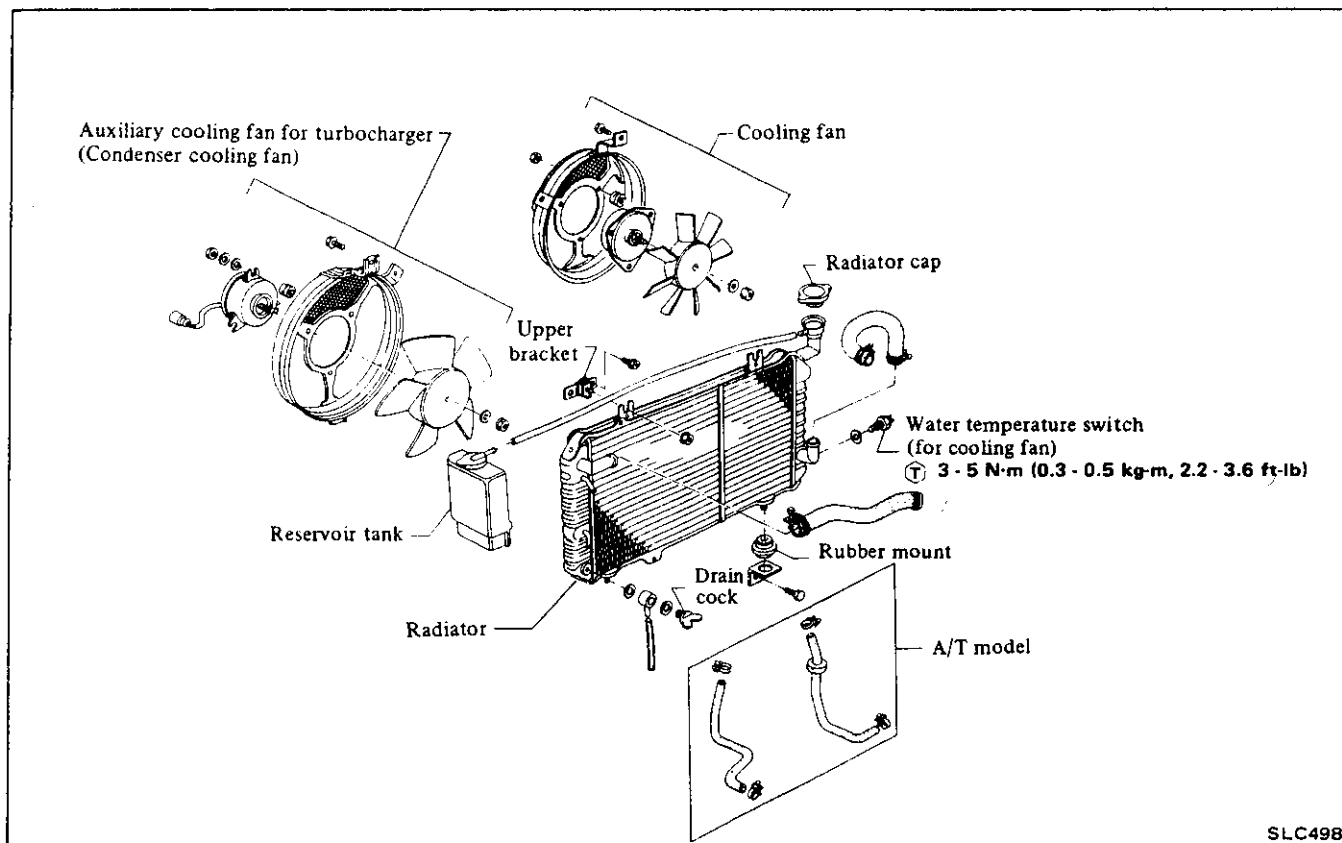
(T) : Attaching bolt
4 - 6 N·m
(0.4 - 0.6 kg-m,
2.9 - 4.3 ft-lb)

3. Connect radiator upper hose.
4. Fill radiator with coolant.

After installation, run engine for a few minutes, and check for leaks.

COOLING SYSTEM

RADIATOR AND COOLING FAN



WARNING:

Never remove the radiator cap when engine is hot; serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap and carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape and then turn the cap all the way off.

REMOVAL AND INSTALLATION

1. Open radiator drain cock and allow to drain coolant into a suitable container.

WARNING:

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

2. Disconnect radiator upper hose and lower hose.
3. On a car with automatic transaxle, disconnect cooler inlet and outlet hoses from radiator.
4. Remove turbocharger cover.
5. Remove radiator fixing nuts (upper side) and upper mounting brackets.
6. Disconnect water temperature switch wire and remove radiator.
7. Install radiator in the reverse order of removal.
8. Fill radiator with the specified quantity of coolant.

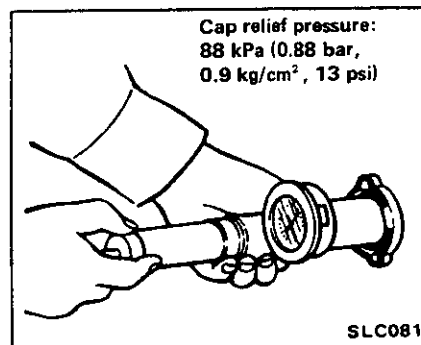
After installation, run engine for a few minutes, and check for leaks.

INSPECTION

Checking radiator cap

Using cap tester, check the radiator cap relief pressure.

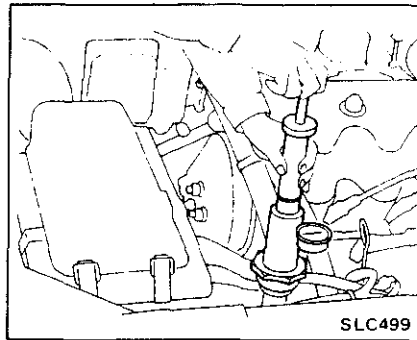
If the pressure gauge drops rapidly and excessively, replace the radiator cap.



COOLING SYSTEM

Checking cooling system for leaks

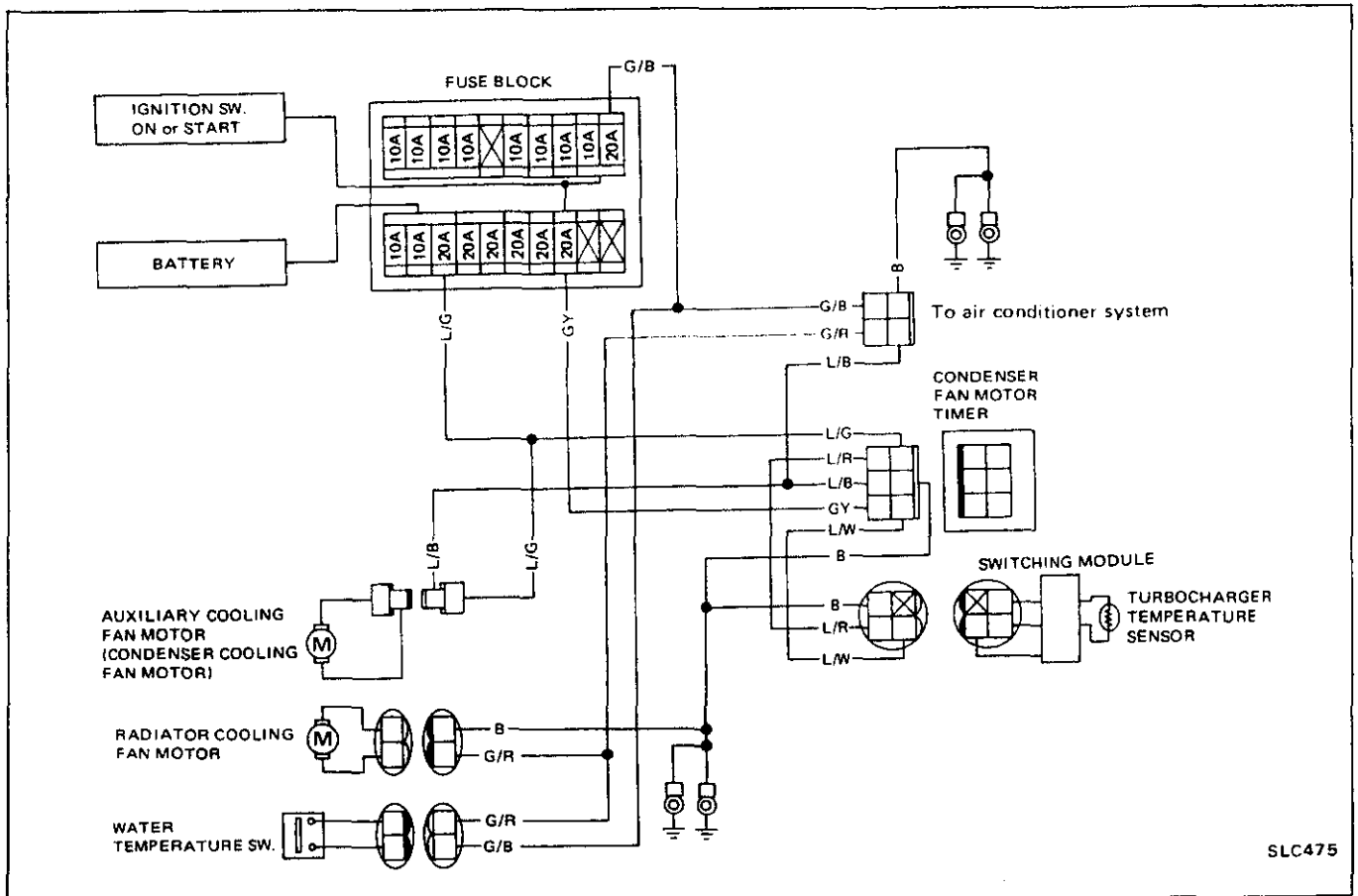
Attach pressure tester. Then pump the tester to the specified pressure.
Check for drop in pressure.



If the pressure drops, check for leaks from hoses, radiator, or water pump.

If no external leaks are found, check heater core, block and head.

ELECTRIC CIRCUIT



Operation

| Water temperature °C (°F) | Air conditioner compressor | Radiator cooling fan motor |
|------------------------------|-------------------------------|-------------------------------|
| Below 90 (194) | Does not operate | Does not operate |
| | Operates | |
| Above 90 (194) | Does not operate | Operates |
| | Operates | |

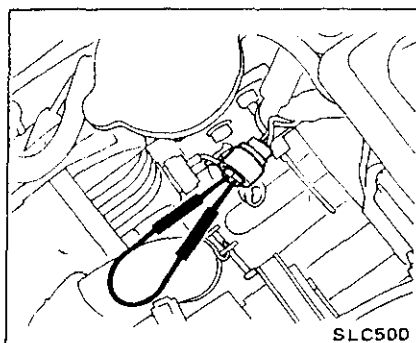
On models not equipped with air conditioner, a fan motor does not operate below a water temperature of 90°C (194°F).

COOLING SYSTEM

RADIATOR COOLING FAN

Inspection

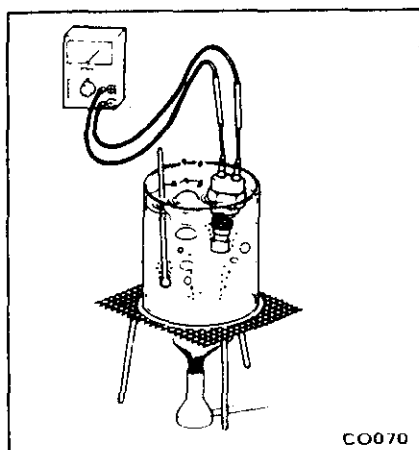
1. Remove battery ground cable and disconnect water temperature switch harness.
2. Connect suitable wire to main harness connection.



3. Connect battery ground cable and turn key switch to "ON" position.
4. Make sure cooling fan is operating. If not, check the following points.

- | | |
|--|---|
| <ul style="list-style-type: none"> • High and low pressure switch • Air conditioner switch • Fan switch • Motor relay • Air conditioner relay | <p>Refer to HA section.</p> <p>Refer to EL section.</p> |
|--|---|

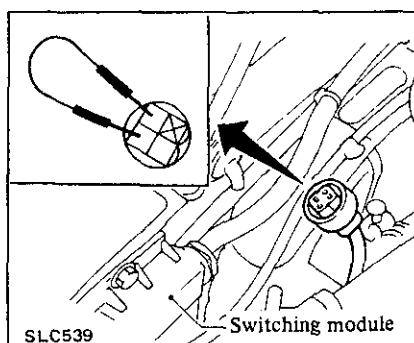
5. If radiator fan fails to operate for cooling system, check water temperature switch to ensure that it is operating properly.



AUXILIARY COOLING FAN (For turbo cooling and condenser cooling)

Inspection

1. Remove battery ground cable and disconnect switching module connector.
2. Connect suitable wire to main harness connection.

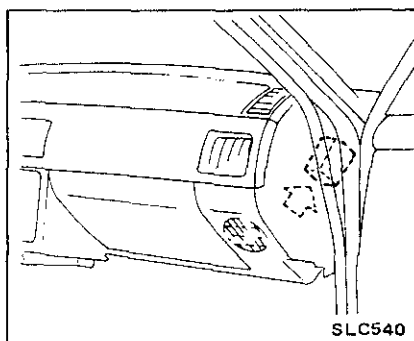


3. Connect battery ground cable and turn ignition switch "ON". Auxiliary cooling fan should not operate.
4. Turn ignition switch "OFF". Auxiliary cooling fan should operate for more than 2 minutes.

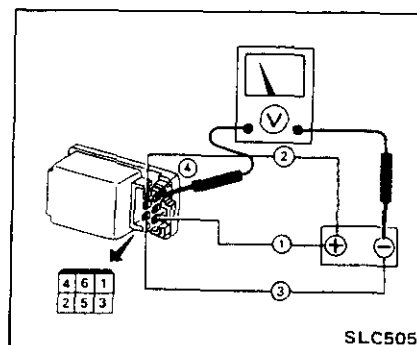
FAN MOTOR TIMER

Inspection

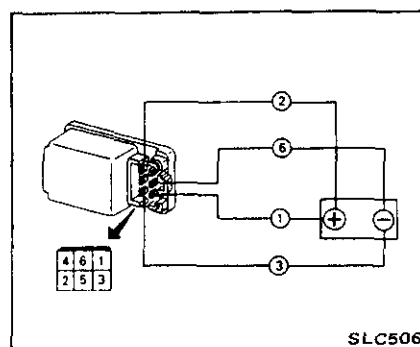
1. Remove battery ground cable and remove fan motor timer.



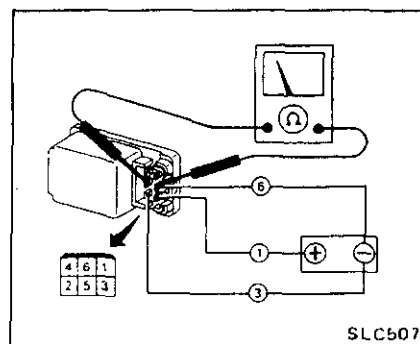
2. Connect positive (+) cables of battery to terminals ① and ② and negative (-) cable to terminal ③. Check to make sure terminal ④ produces a signal of approximately 11 volts.



3. Connect positive (+) cables of battery to terminals ① and ② and negative (-) cables to terminals ③ and ⑥.



Then disconnect positive (+) cable from terminal ②. Continuity should exist between terminals ⑤ and ⑥ corresponding to the length of timer operation.



SERVICE DATA AND SPECIFICATIONS

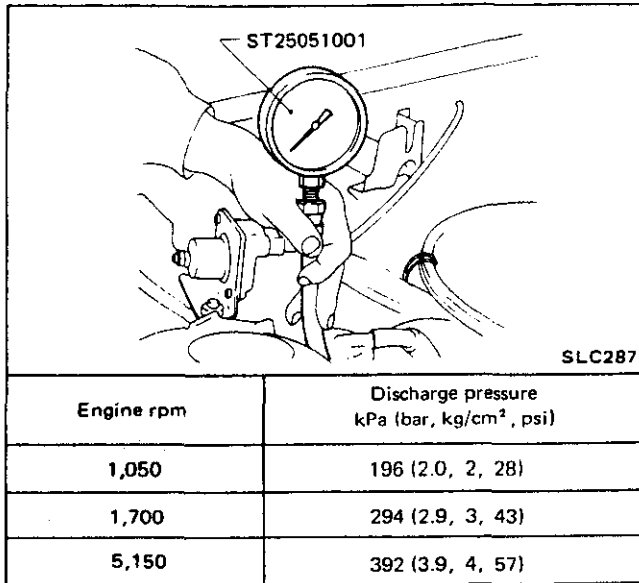
SERVICE DATA AND SPECIFICATIONS

ENGINE LUBRICATION SYSTEM

INSPECTION AND ADJUSTMENT

Oil pump

Oil pressure



Pump unit

Unit: mm (in)

| | |
|---|----------------------------------|
| Outer rotor to body clearance ① | Less than 0.12 (0.0047) |
| Rotor tip clearance ② | 0.15 - 0.21 (0.0059 - 0.0083) |
| Gap between outer rotor and inner rotor ③ | Less than 0.05 (0.0020) |
| Gap between rotor and body ④ | Less than 0.02 (0.0008) |

TIGHTENING TORQUE

| Unit | N·m | kg·m | ft·lb |
|-------------------------------|---------|-----------|------------|
| Oil pump securing bolt & nuts | 9 - 14 | 0.9 - 1.4 | 6.5 - 10.1 |
| Oil pump cover bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Regulator valve cap nut | 39 - 49 | 4.0 - 5.0 | 29 - 36 |

ENGINE COOLING SYSTEM

INSPECTION AND ADJUSTMENT

Thermostat

| | Frigid type | Standard type | Tropical type |
|--------------------------------------|---------------------|--------------------|--------------------|
| Valve opening temperature °C (°F) | 88 (190) | 82 (180) | 76.5 (170) |
| Max. valve lift mm/°C (in/°F) | 8/100 (0.31/212) | 8/95 (0.31/203) | 8/90 (0.31/194) |

Radiator

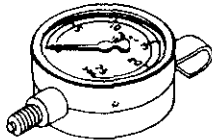
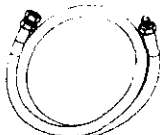
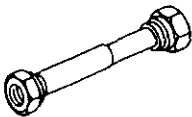

| | |
|--|---------------------|
| Cap relief pressure kPa (bar, kg/cm ² , psi) | 88 (0.88, 0.9, 13) |
| Leakage test pressure kPa (bar, kg/cm ² , psi) | 157 (1.57, 1.6, 23) |

TIGHTENING TORQUE

| Unit | N·m | kg·m | ft·lb |
|----------------------------|-------|-----------|-----------|
| Water pump securing bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |
| Water outlet securing bolt | 4 - 6 | 0.4 - 0.6 | 2.9 - 4.3 |

SPECIAL SERVICE TOOLS

SPECIAL SERVICE TOOLS

| Tool number | Tool name |
|------------------------------|---|
| ST25051001 | Oil pressure gauge  |
| ST25052000 | Hose  |
| ST25053000 | Joint pipe  |
| ST25054000 or 11025-61501 | Adapter  |

ENGINE FUEL

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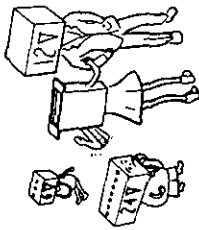
EF

PRECAUTIONS FOR E.C.C.S. ENGINE

PRECAUTIONS FOR E.C.C.S. ENGINE

Pay close attention to the following points when inspecting or servicing an E.C.C.S. vehicle.

- Always use 12-volt batteries as power source.
- Do not attempt to disconnect battery cables while engine is operating.
- If a receiver-transmitter is installed, route antenna feeder cable along opposite side from E.C.C.S. harness and control unit. Make sure that there is no interference while engine is idling.

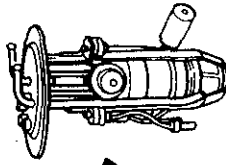


- Do not apply battery power directly to injectors.

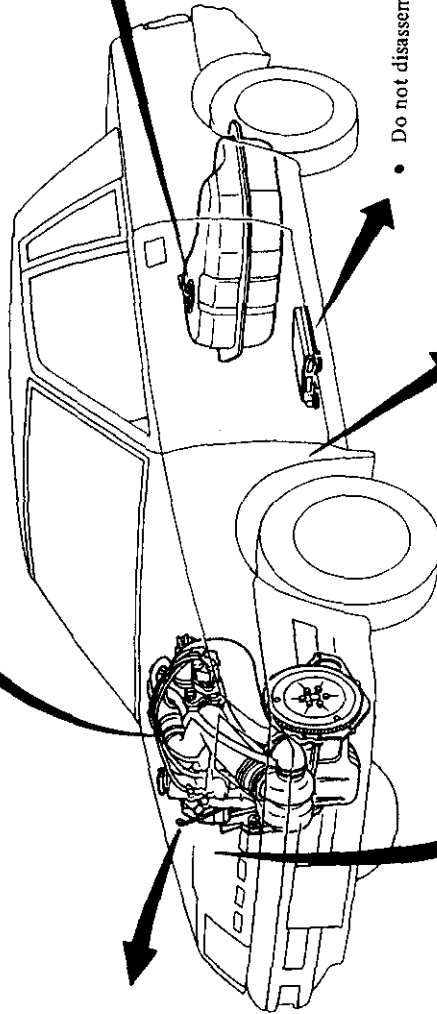
- Securely connect E.C.C.S. harness connector.

A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to IC circuit.

- Keep E.C.C.S. harness at least 10 cm (3.9 in) away from adjacent harnesses, to prevent an E.C.C.S. system malfunction due to reception of external noise, degraded operation of IC circuit, etc.
- Keep E.C.C.S. parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.



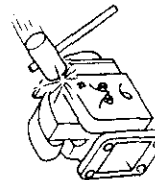
- Do not operate fuel pump when there is no fuel in lines.
- Do not use anti-freeze agents in fuel.
- Do not reuse fuel hose clamps.
- Tighten fuel hose clamps sufficiently.



- Do not disassemble control unit.

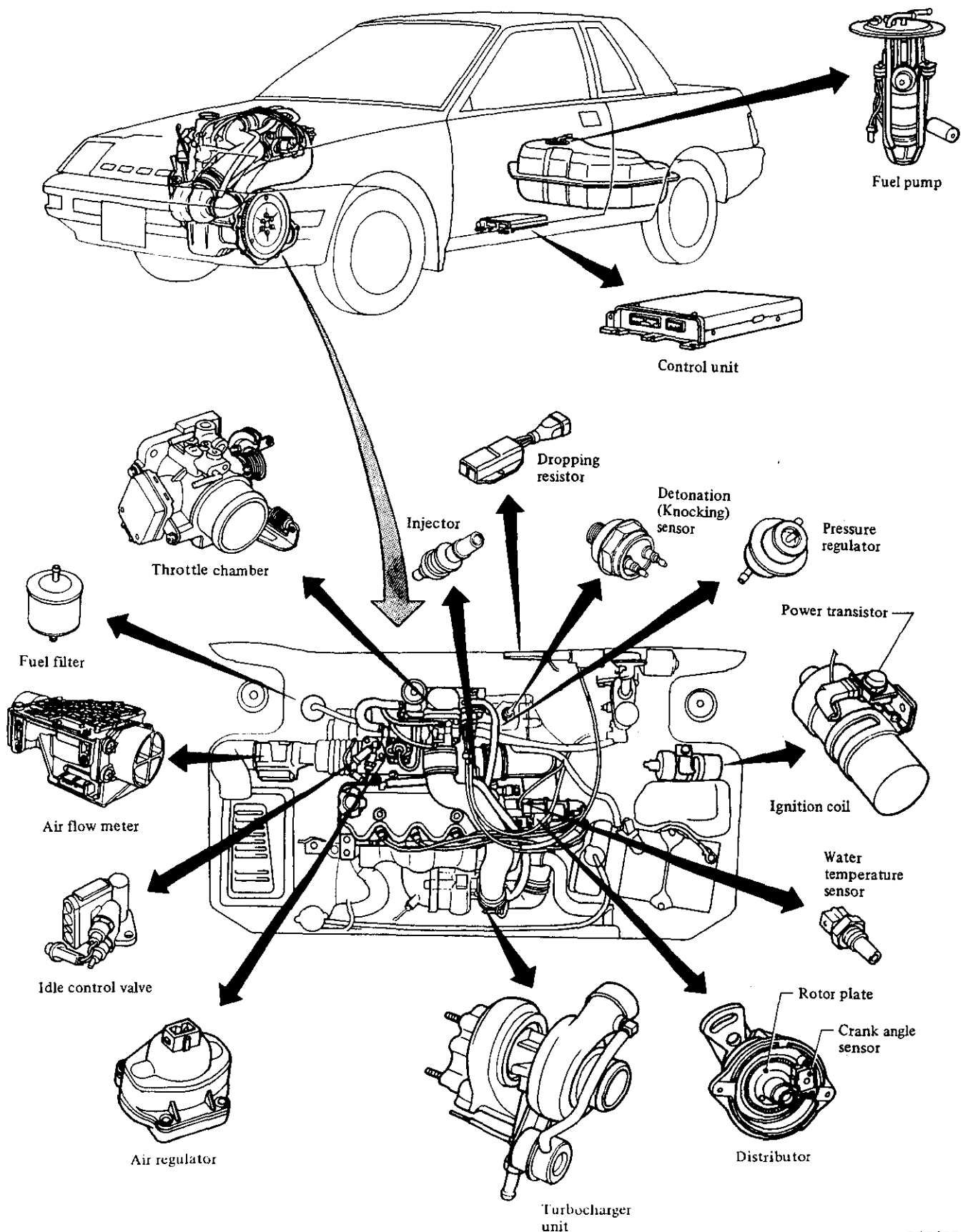


- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.



- Handle air flow meter carefully to avoid damage.
- There should not occur even a slight leak in air intake system.

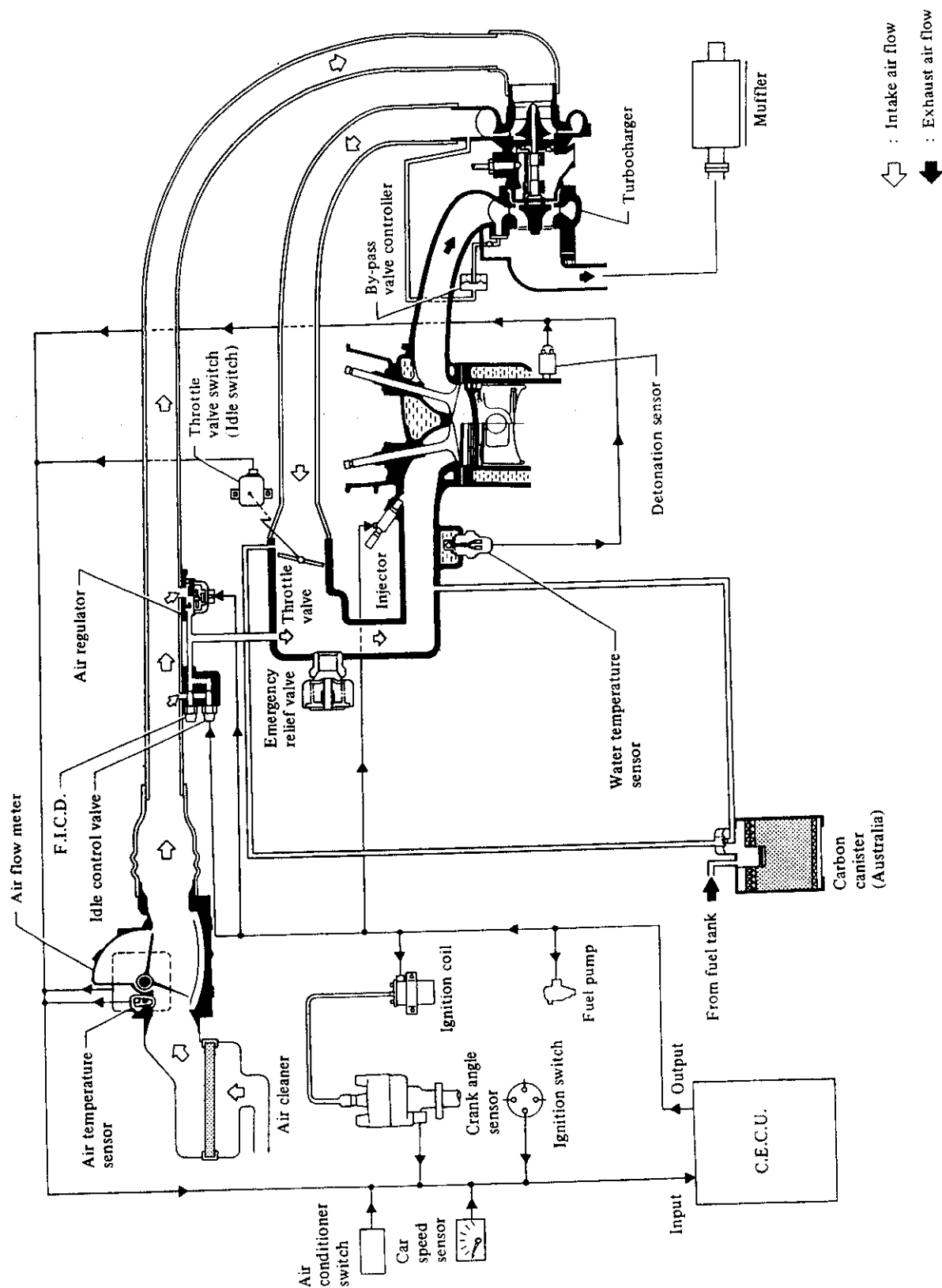
COMPONENT PARTS LOCATION FOR E.C.C.S. ENGINE



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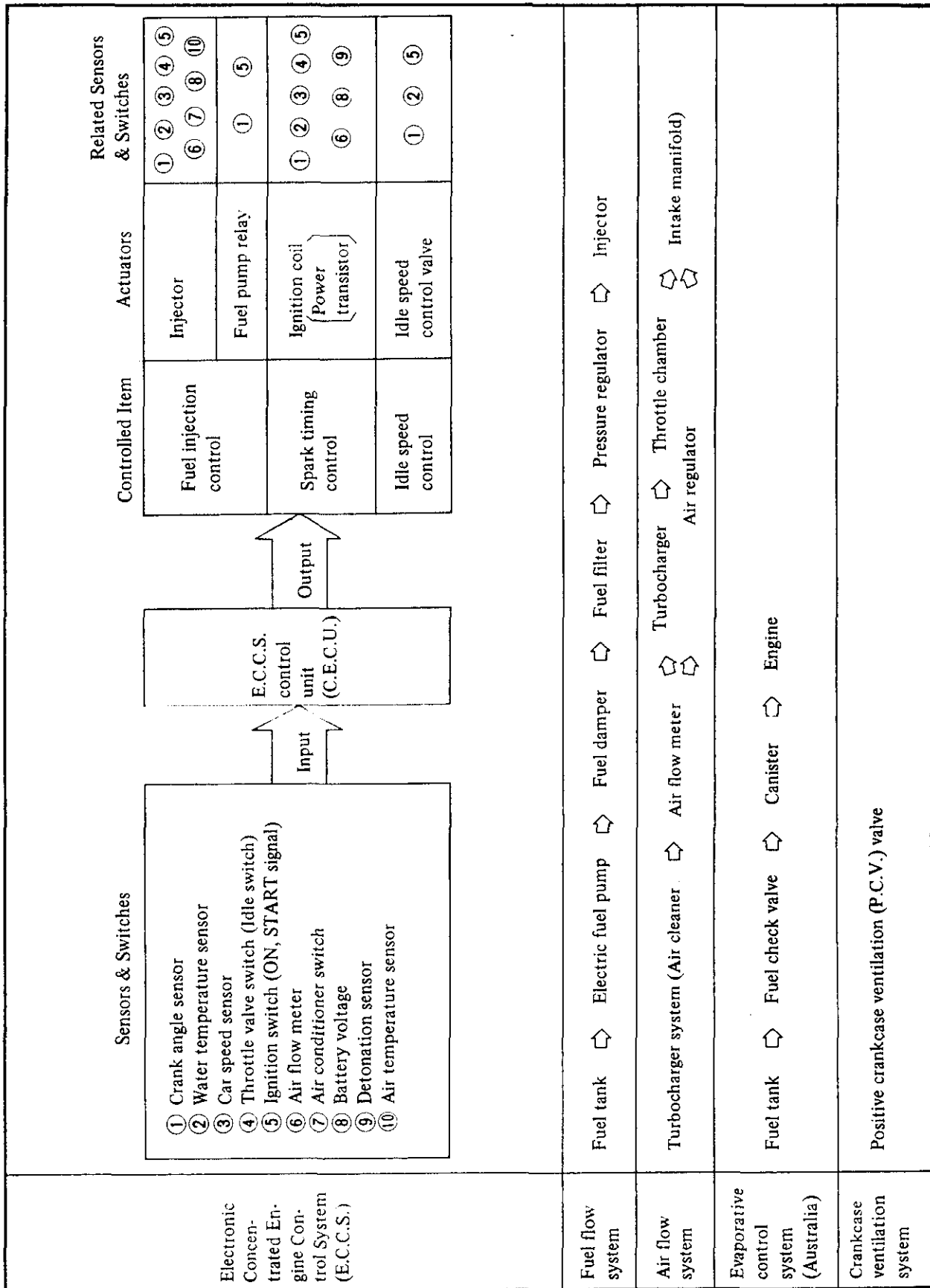
ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM FOR E.C.C.S. ENGINE

ENGINE AND EMISSION CONTROL SYSTEM DIAGRAM FOR E.C.C.S. ENGINE



SEF301B

ENGINE AND EMISSION CONTROL SYSTEM CHART FOR E.C.C.S. ENGINE



DIAGNOSTIC PROCEDURE FOR PROBLEMS

DIAGNOSTIC PROCEDURE FOR PROBLEMS

DIAGNOSIS

INTERMITTENT PROBLEM

DIAGNOSTIC CHARTS CANNOT BE USED TO DIAGNOSE INTERMITTENT FAILURES. This is because many intermittent problems are caused at electrical connections, and if intermittent problems are not corrected, unnecessary component re-

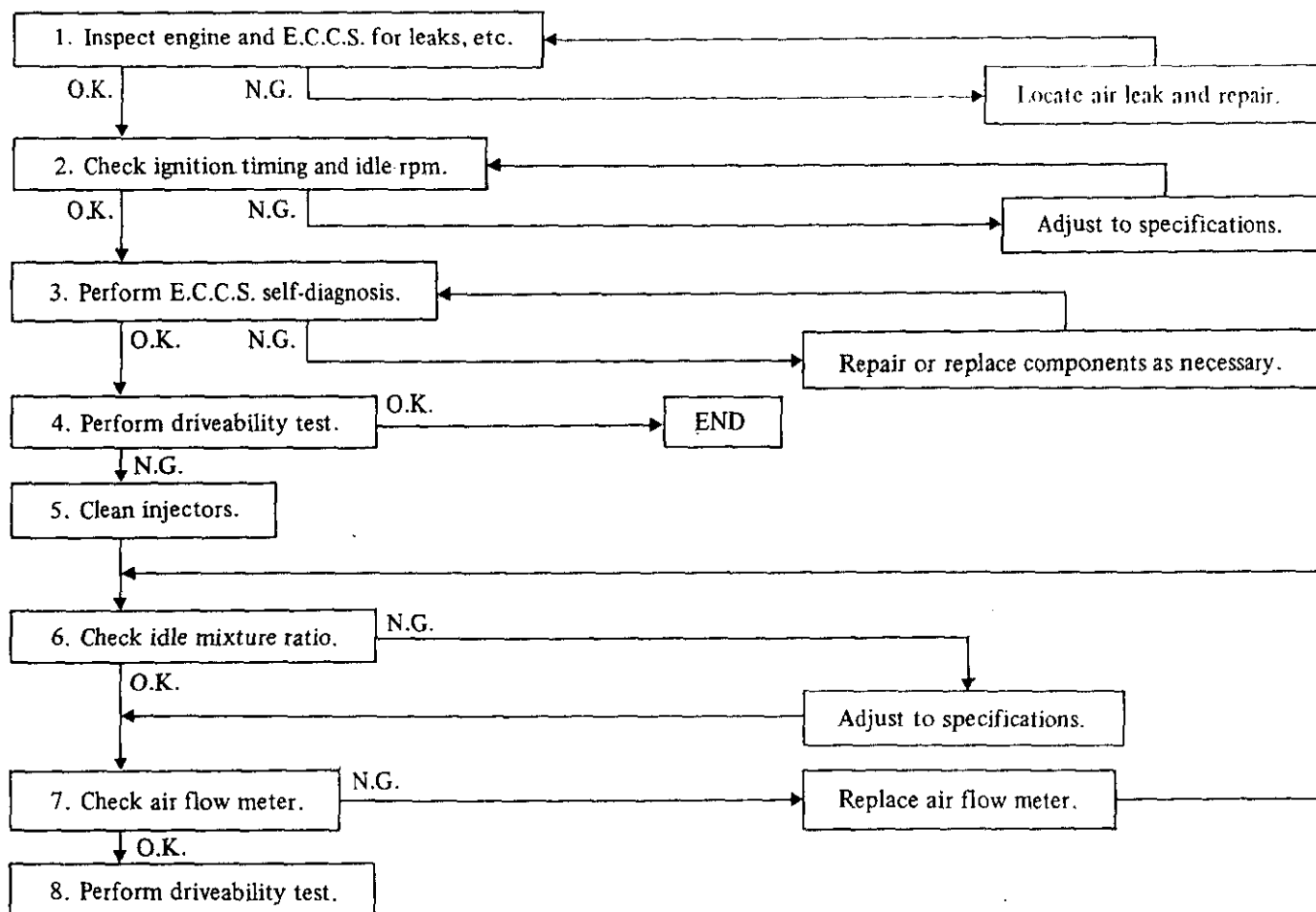
placement will be indicated and the problems may remain. Therefore, DIAGNOSIS OF INTERMITTENT PROBLEMS SHOULD START WITH A VISUAL AND PHYSICAL INSPECTION OF THE CONNECTORS involved in the circuit, especially control unit, air flow meter and water temperature sensor connectors.

CAUTION:

When connecting or disconnecting E.C.C.S. harness connector to or from any E.C.C.S. unit, ensure that the ignition switch is in the "OFF" position and that the negative battery terminal is disconnected. Removing and installing these connectors with the ignition switch left in the "ON" position will damage control unit.

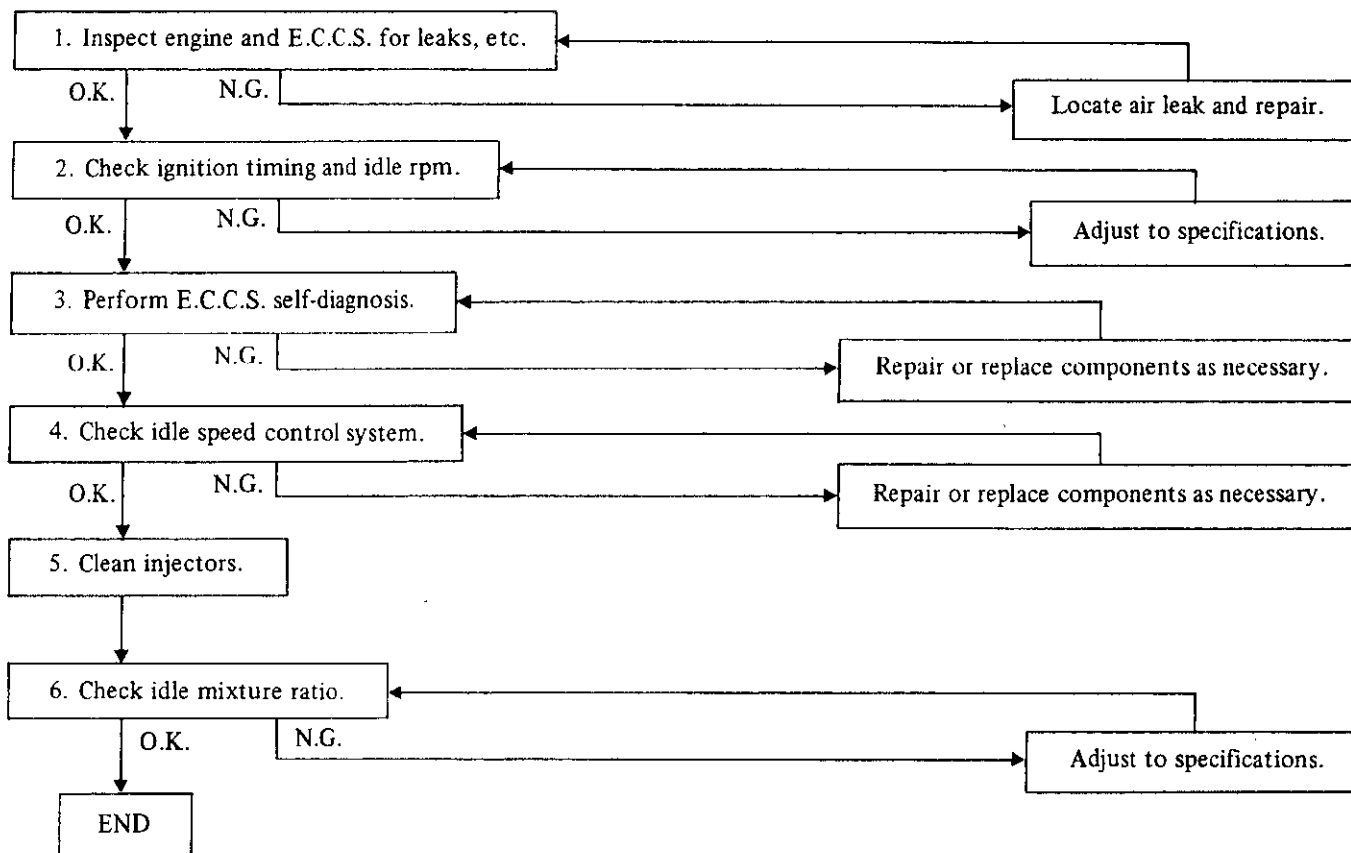
DIAGNOSTIC PROCEDURE FOR E.C.C.S. ENGINE

DRIVEABILITY



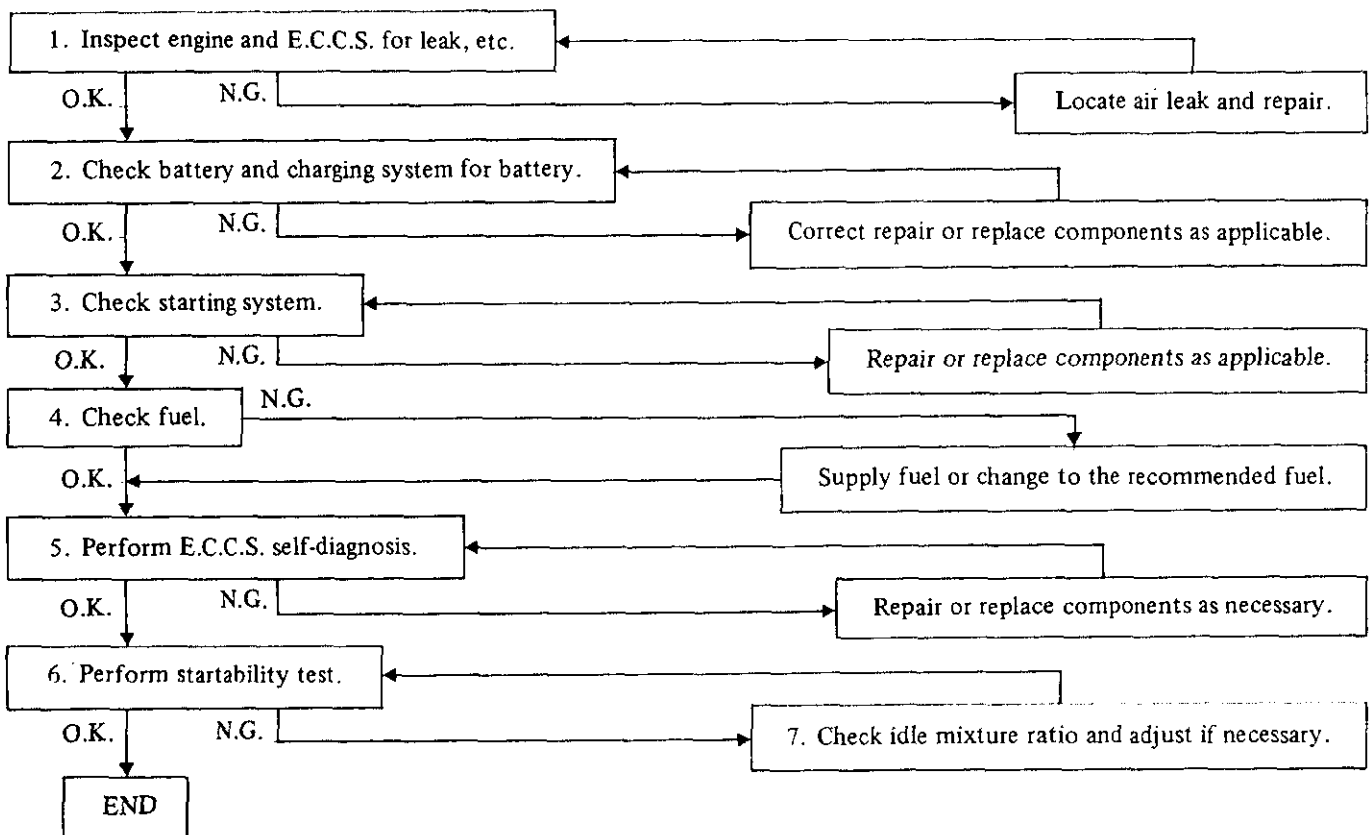
DIAGNOSTIC PROCEDURE FOR PROBLEMS

IMPROPER IDLING



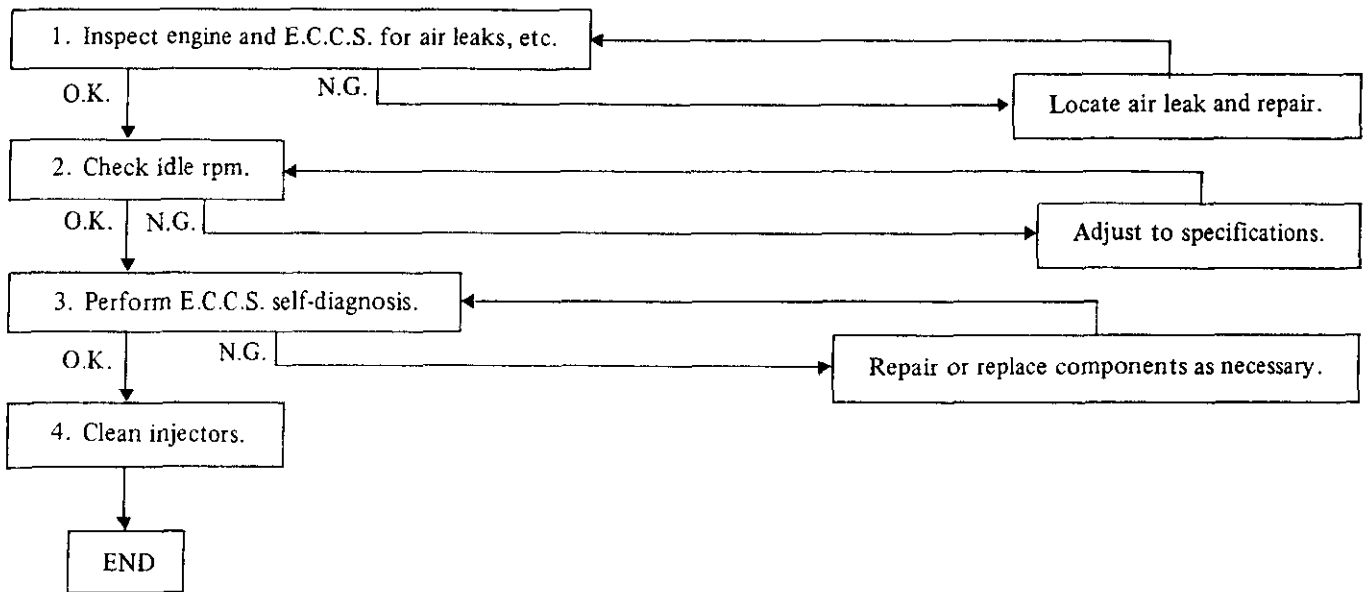
DIAGNOSTIC PROCEDURE FOR PROBLEMS

ENGINE STARTABILITY



DIAGNOSTIC PROCEDURE FOR PROBLEMS

ENGINE STALL



DIAGNOSTIC PROCEDURE FOR PROBLEMS

DIAGNOSTIC STEPS FOR DRIVEABILITY

1. Inspect engine and E.C.C.S. for leaks.

- (1) Check clamps at all air intake components.
- (2) Check vacuum hoses for leakage.
- (3) Check air cleaner filter for clogging.
- (4) Visually inspect for leaks at the following:

- Dipstick
- Intake manifold gasket
- Valve rocker cover
- Oil filter cap
- Air intake hoses and duct
- Air regulator gasket
- I.C.V. gasket
- Emergency relief valve

(5) Check air regulator operation.

2. Check ignition timing and idle rpm.

a. This check or adjustment should be performed under the following conditions:

- Headlamp switch: OFF
- Heater blower: OFF
- Air conditioning switch: OFF (if equipped)

b. Make the check after the radiator cooling fan has stopped. If it is operating, wait until it stops.

(1) Warm engine to operating temperature.

(2) Turn off engine and disconnect idle control valve harness connector.

(3) Start engine and run engine at idle speed.

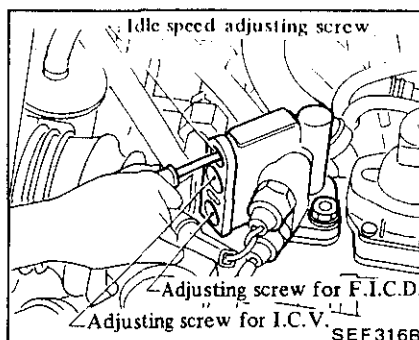
(4) Race engine two or three times under no-load, then run engine at idle speed.

(5) Check idle speed.

M/T: 750±50 rpm

If necessary, adjust to the specified rpm by turning the idle speed adjusting screw.

Do not use adjusting screw for I.C.V. and adjusting screw for F.I.C.D., which are sealed with rubber caps.



(6) Stop engine and connect idle control valve harness to idle control valve.

(7) Check ignition timing with a timing light.

15°±2° B.T.D.C.

Adjust as necessary.

3. Perform E.C.C.S. self-diagnosis. Follow the procedure in E.C.C.S. SELF-DIAGNOSTIC SYSTEM.

4. Perform driveability test.

(1) Evaluate effectiveness of adjustments by driving vehicle.

(2) If unsatisfactory, proceed to step 5.

5. Clean injectors.

6. Check idle mixture ratio.

A) With "CO"-meter

It is essential that the meter be fully warmed up and calibrated before any adjustment is made.

(1) Verify that the engine is at operating temperature.

(2) With the hood open, run the engine at 2,000 rpm for 2 minutes at no-load, to stabilize its condition.

(3) Rev the engine to 4,000 rpm 2 or 3 times under no-load, finally, allow it to run at idle speed for one minute.

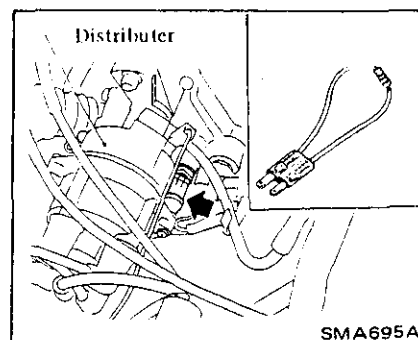
(4) Reset idle speed to the specified speed.

(5) Check CO%.

Idle CO%: 0.5±0.25%

If out of specification, adjust as follows:

a) Disconnect water temperature sensor harness connector, and connect a resistor (2.5 kΩ) between terminals of water temperature sensor.

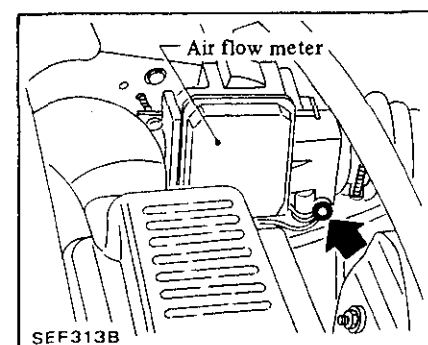


b) Start engine and run engine two or three times under no-load, then run engine at idle speed.

c) Adjust CO% by turning air by-pass screw on air flow meter.

When adjusting mixture ratio, remove blind plug from air flow meter. After adjustment, install the plug on air flow meter.

| Altitude m (ft) | Idle CO% (Cold enrichment) |
|----------------------------------|-------------------------------|
| 0 - 600 (0 - 2,000) | 4.0 |
| 600 - 1,200 (2,000 - 4,000) | 5.1 |
| 1,200 - 1,800 (4,000 - 6,000) | 6.2 |
| Above 1,800 (6,000) | 7.5 |



d) Stop engine and reconnect water temperature sensor harness connector to water temperature sensor.

e) Adjust idle speed as necessary.

B) Without "CO"-meter

(1) Verify that engine is at operating temperature.

DIAGNOSTIC PROCEDURE FOR PROBLEMS

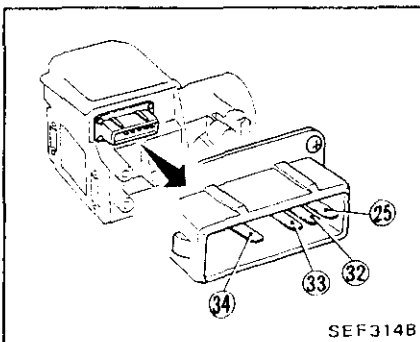
- (2) With the hood open, run engine at 2,000 rpm for 2 minutes at no-load, to stabilize its condition.
- (3) Reset idle speed to the specified speed.
- (4) Turn the ignition switch to the "OFF" position.
- (5) Disconnect water temperature sensor harness connector, and connect an applicable resistor between terminals of water temperature sensor.

| Altitude m (ft) | Resistance k Ω |
|----------------------------------|--------------------------|
| 0 - 600 (0 - 2,000) | 3.3 |
| 600 - 1,200 (2,000 - 4,000) | 2.8 |
| 1,200 - 1,800 (4,000 - 6,000) | 2.4 |
| Above 1,800 (6,000) | 2.0 |

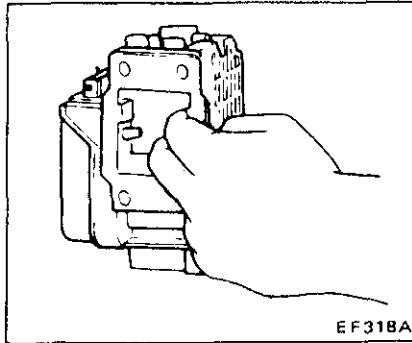
- (6) Rev the engine to 4,000 rpm 2 or 3 times under no-load, finally, allow it to run at idle speed for one minute.
- (7) Adjust mixture ratio with engine speed set at maximum by turning air by-pass screw.

When adjusting mixture ratio, remove blind plug from air flow meter. After adjustment, install the plug on air flow meter.

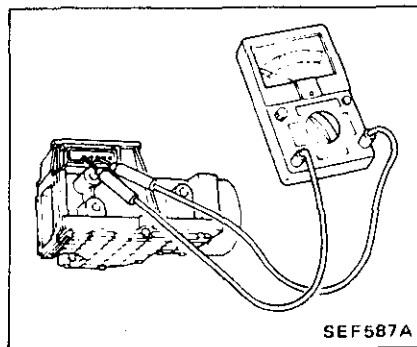
- (8) Stop engine and reconnect water temperature sensor harness connector to water temperature sensor.
- (9) Adjust idle speed as necessary.
7. Check air flow meter.



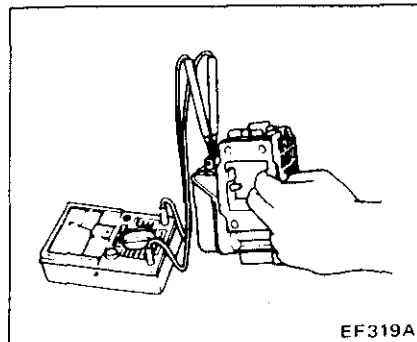
- (1) Fully open the flap by hand to check that it opens smoothly without binding. If it doesn't, it is out of order.



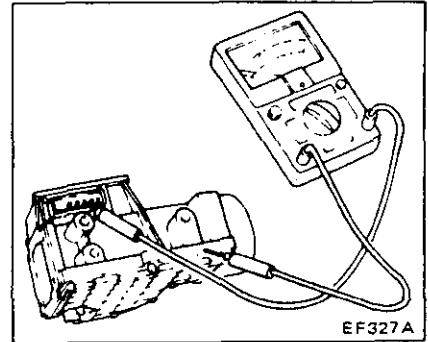
- (2) Measure the resistance between terminals 33 and 34. The standard resistance is 100 to 400 ohms.



- (3) While sliding flap, measure resistance between terminals 32 and 34. If resistance is at any value other than 0 and ∞ ohm, air flow meter is normal.



- (4) Check insulation resistance between the air flow meter body and any one of the terminals 32, 33 and 34. If continuity exists, the air flow meter is out of order.

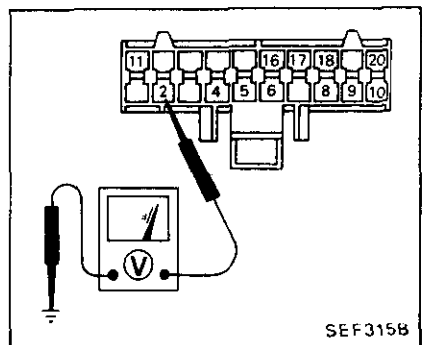


8. Perform driveability test. Re-evaluate vehicle performance.

DIAGNOSTIC STEPS FOR IMPROPER IDLING

1. Inspect engine and E.C.C.S. for leaks. Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
2. Check ignition timing and idle rpm. Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.
3. Perform E.C.C.S. self-diagnosis. Follow the procedure in E.C.C.S. SELF-DIAGNOSTIC SYSTEM.
4. Check idle speed control system.
 - (1) Disconnect 20-pin connector from C.E.C.U.
 - (2) Turn ignition switch "ON" and measure voltage between ② and body ground.

Voltage: Battery voltage



DIAGNOSTIC PROCEDURE FOR PROBLEMS

(3) If N.G., repair or replace idle control valve and harness.

5. Clean injectors.

6. Check idle mixture ratio.

Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.

DIAGNOSTIC STEPS FOR ENGINE STARTABILITY

1. Inspect engine and E.C.C.S. for leaks.

Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.

2. Check battery and charging system for battery.

(1) Check battery voltage.

(2) If poor battery voltage, check charging system for battery.

- Alternator
- Voltage regulator
- Others

Refer to EL section.

3. Check starting system.

(1) Check starter operation.

(2) If it does not operate, check the following:

- Starter
- Ignition relay
- Ignition switch
- Others

Refer to EL section.

4. Check fuel.

(1) Check fuel level.

If low or empty, add fuel.

(2) Check fuel octane rating.

If not proper, change to the recommended gasoline.

5. Perform E.C.C.S. self-diagnosis.

Follow the procedure in E.C.C.S. SELF-DIAGNOSTIC SYSTEM.

6. Perform startability test.

Start engine with the recommended starting procedure.

7. Check and adjust idle mixture ratio. Follow the procedure in step 6 in DIAGNOSTIC STEPS FOR DRIVEABILITY.

DIAGNOSTIC STEPS FOR ENGINE STALL

1. Inspect engine and E.C.C.S. for leaks.

Refer to DIAGNOSTIC STEPS FOR DRIVEABILITY.

2. Check idle rpm.

Follow the procedure from step 2, operations (1) through (6) in DIAGNOSTIC STEPS FOR DRIVEABILITY.

3. Perform E.C.C.S. self-diagnosis.

Follow the procedure in E.C.C.S. SELF-DIAGNOSTIC SYSTEM.

4. Clean injectors.

E.C.C.S. SELF-DIAGNOSTIC SYSTEM

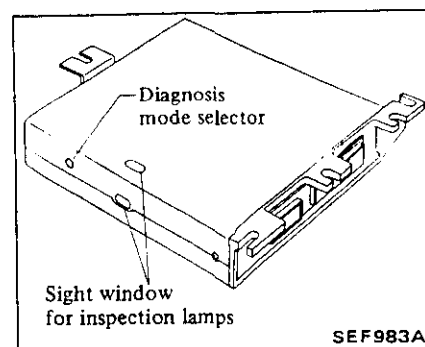
Electronic Concentrated engine Control System (E.C.C.S.) controls the engine operating conditions (Fuel injection, Idle rpm, Ignition timing) with the Central Electronic Control Unit (C.E.C.U.), sensors, switches and so forth.

Therefore, when engine malfunctions occur, the causes cannot be found by a visual inspection, etc.

The E.C.C.S. self-diagnostic system monitors several input and output signals that are emitted in response to various engine operating conditions and when the engine stops. Input signals are compared to computerized signal values stored in the C.E.C.U. (Central Electronic Control Unit) while output signals are monitored to ensure they are properly attuned before they are emitted from the C.E.C.U. unit to actuators. In other words, this system analyzes major electrical signals that are transmitted to and emitted from the C.E.C.U. unit.

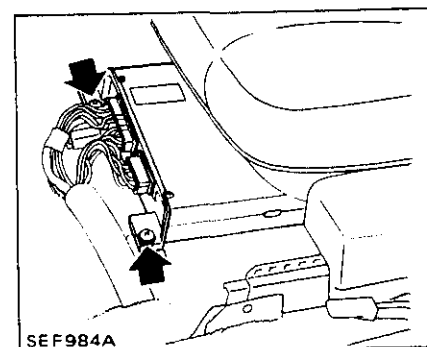
For this reason, if system or unit abnormalities which are not related to these signals are discovered, reference to the "Troubleshooting" chart must be made for remedial action.

A malfunctioning area is determined by the number of blinks of both the red and green light emitting diodes (L.E.D.s). First, the red L.E.D. blinks and the green follows. The red L.E.D. refers to the tenth digit while the green one refers to the unit digit. For example, when the red L.E.D. blinks three times and the green L.E.D. blinks twice, this implies number "32". In this way, all problems are classified by code numbers.



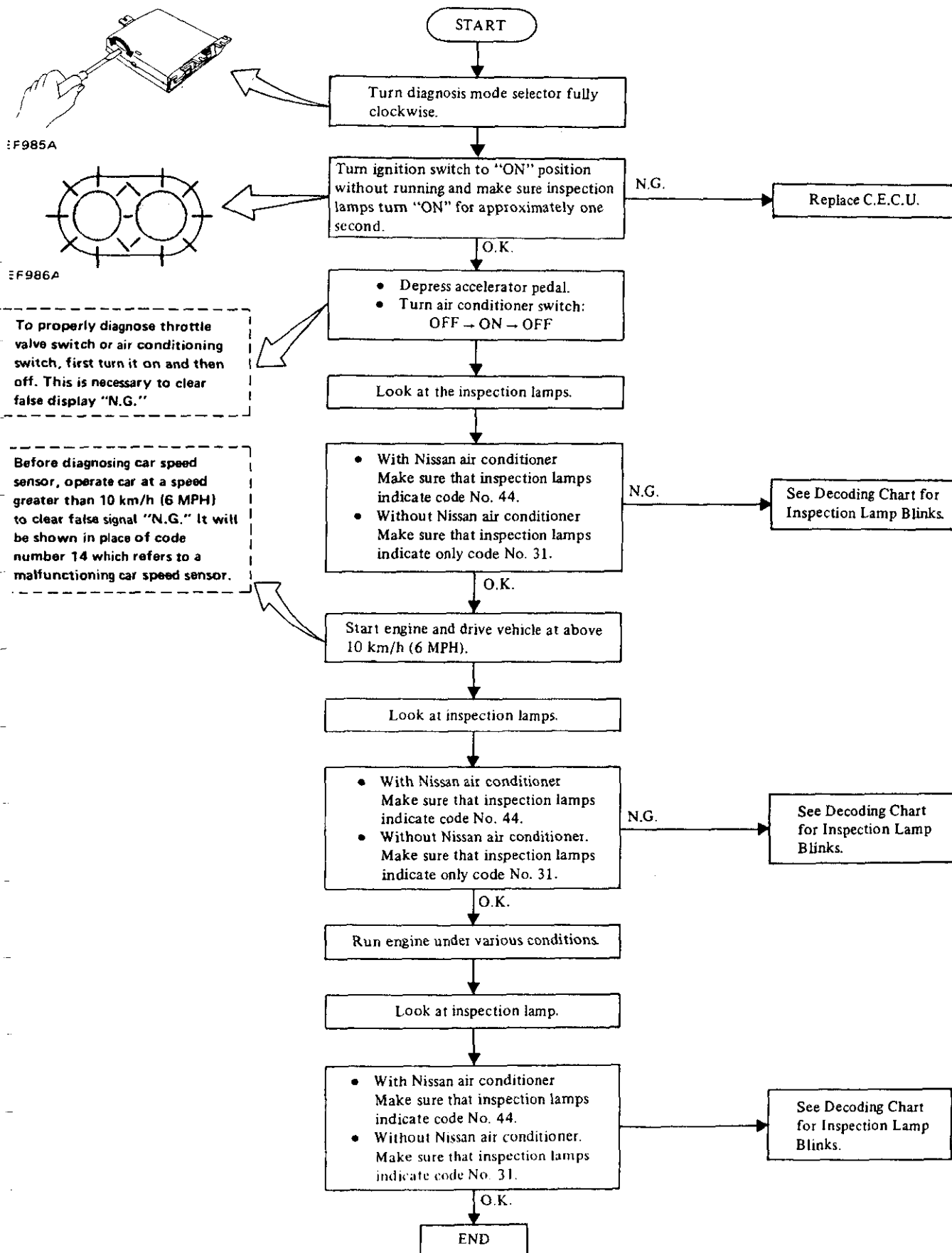
PREPARATIONS

Locate C.E.C.U. in a place so that driver can easily see red and green L.E.D.s (inspection lamps) at a glance.



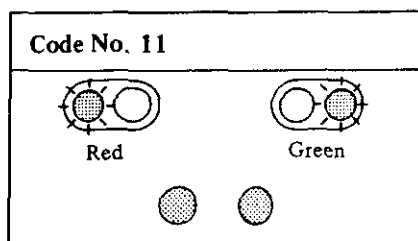
DIAGNOSTIC PROCEDURE FOR PROBLEMS

INSPECTION PROCEDURE

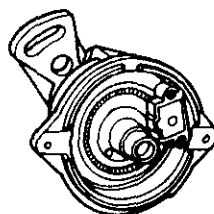


DIAGNOSTIC PROCEDURE FOR PROBLEMS

DECODING CHART FOR INSPECTION LAMP BLINKS



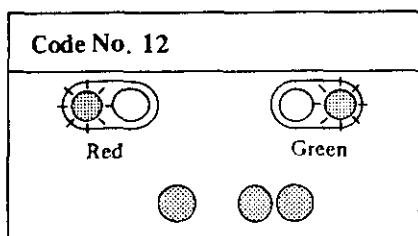
Crank angle sensor circuit is malfunctioning.



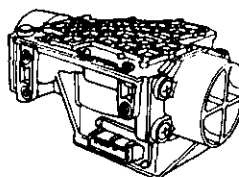
(A)

See page
EF-18.

SEF987A



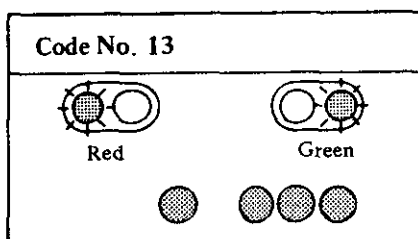
Air flow meter circuit is malfunctioning.



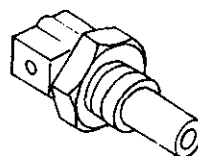
(B)

See page
EF-18.

SEF988A



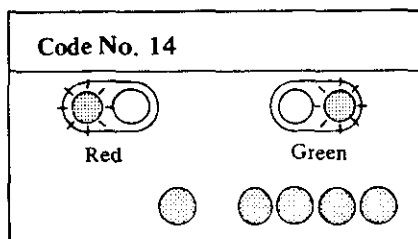
Water temperature sensor circuit is malfunctioning.



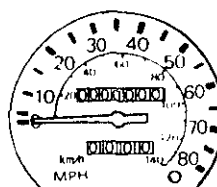
(C)

See page
EF-19.

SEF989A



Car speed sensor circuit is malfunctioning.

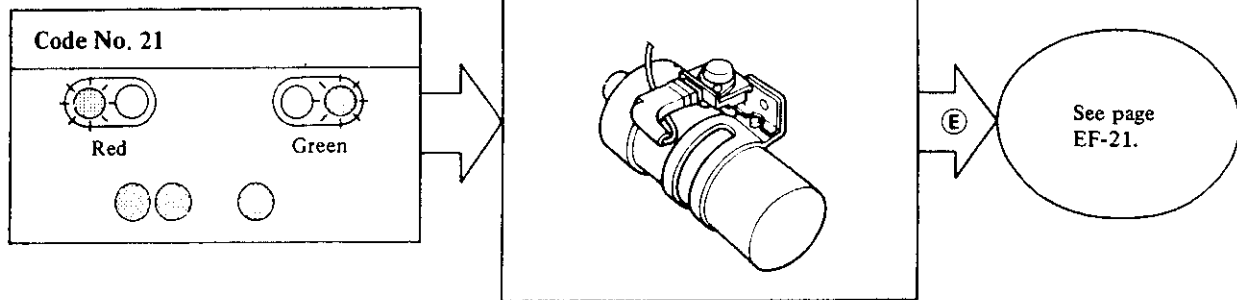


(D)

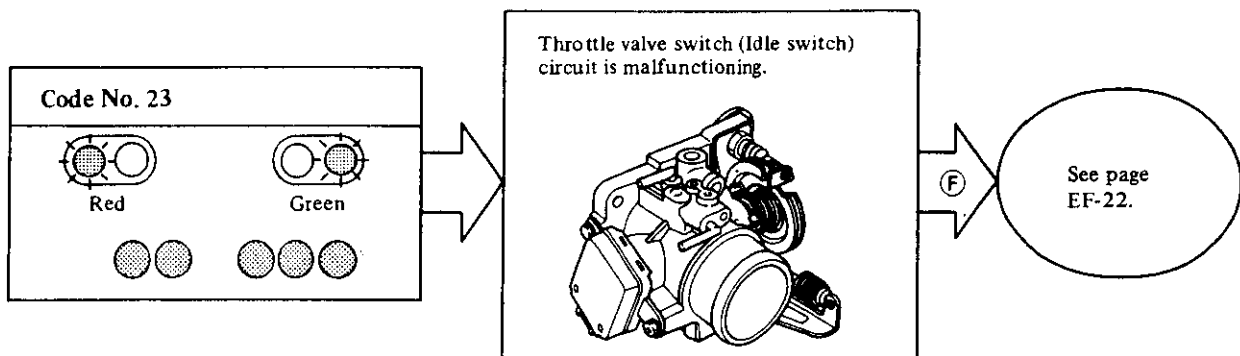
See page
EF-20.

SEF990A

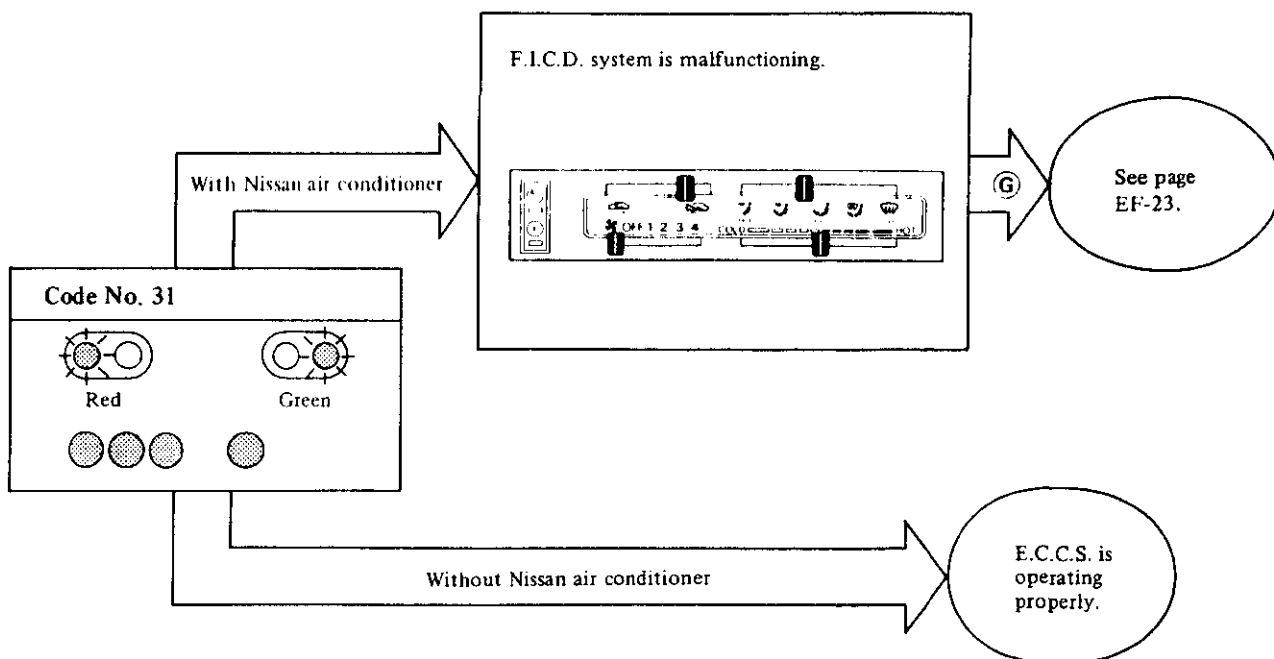
DIAGNOSTIC PROCEDURE FOR PROBLEMS



SEF991A

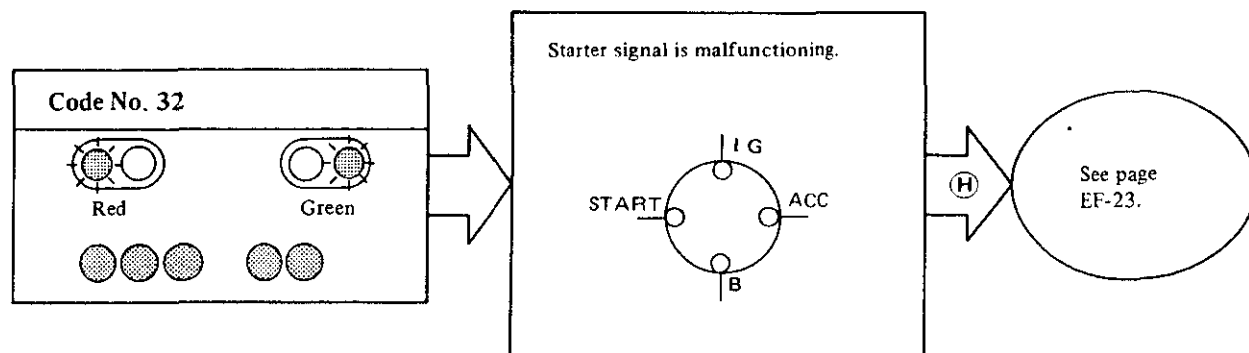


SEF992A

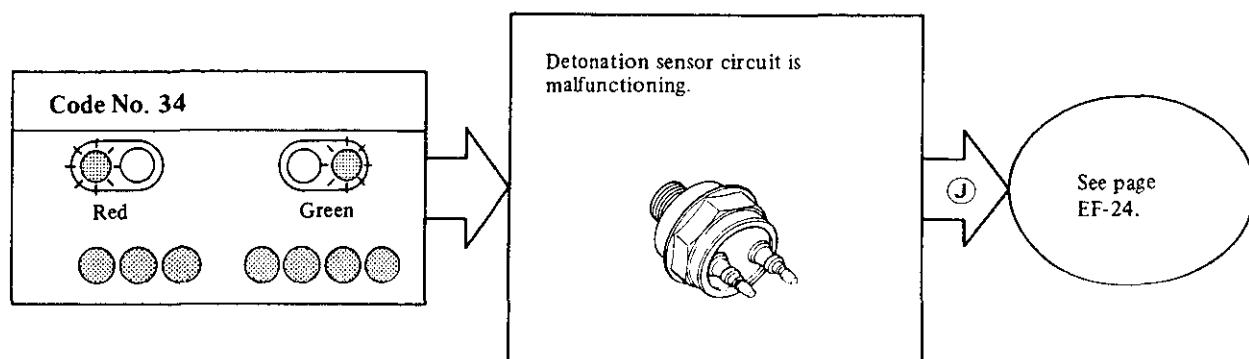


SEF993A

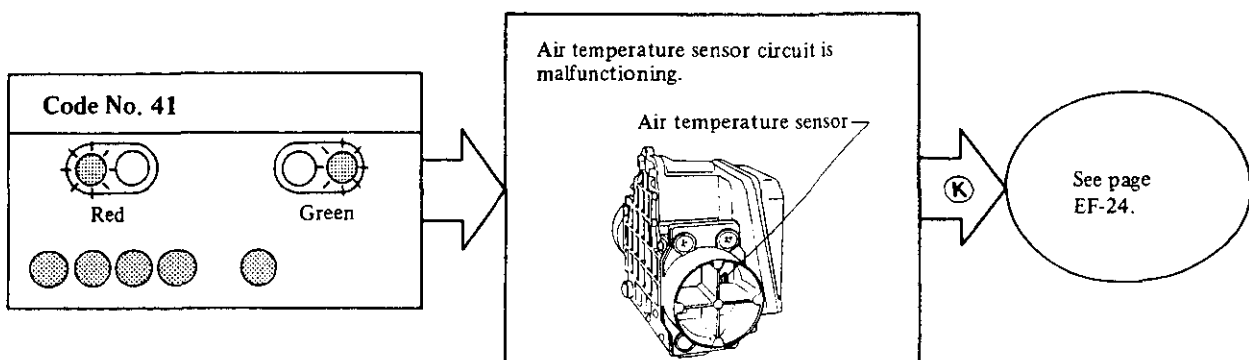
DIAGNOSTIC PROCEDURE FOR PROBLEMS



SEF994A

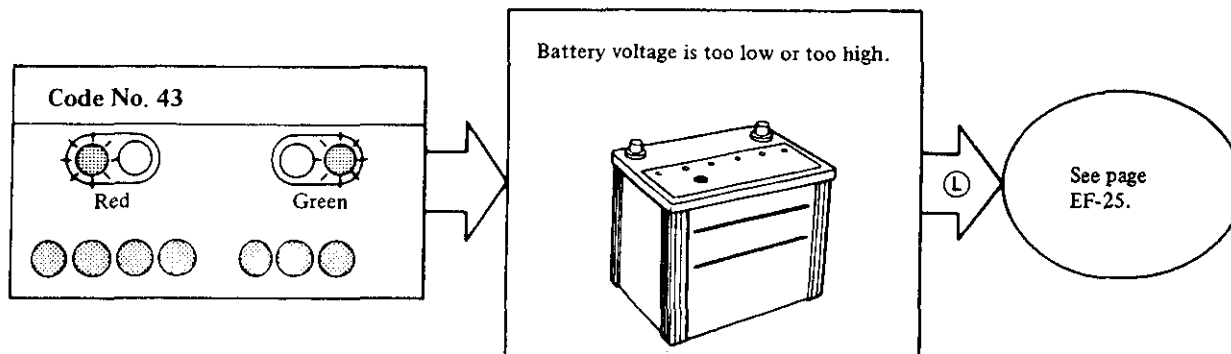


SEF996A

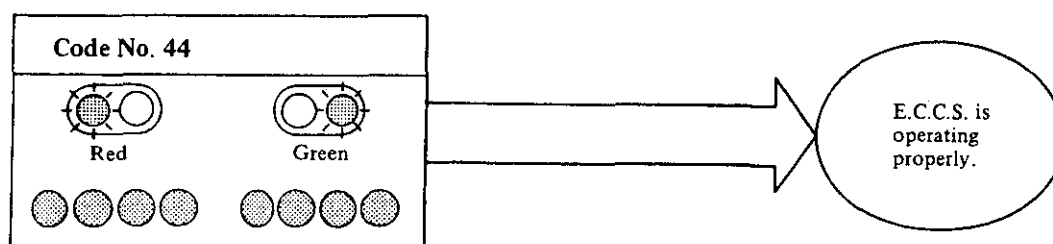


SEF997A

DIAGNOSTIC PROCEDURE FOR PROBLEMS



SEF999A



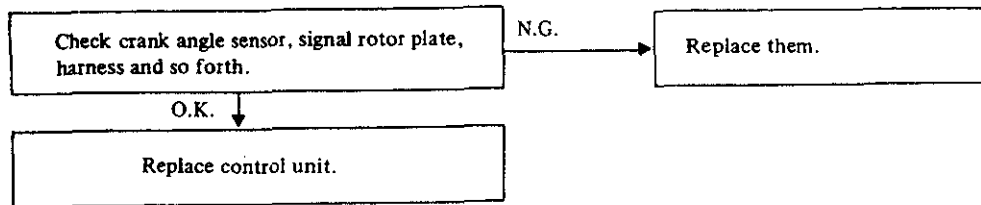
SEF001B

DIAGNOSTIC PROCEDURE FOR PROBLEMS

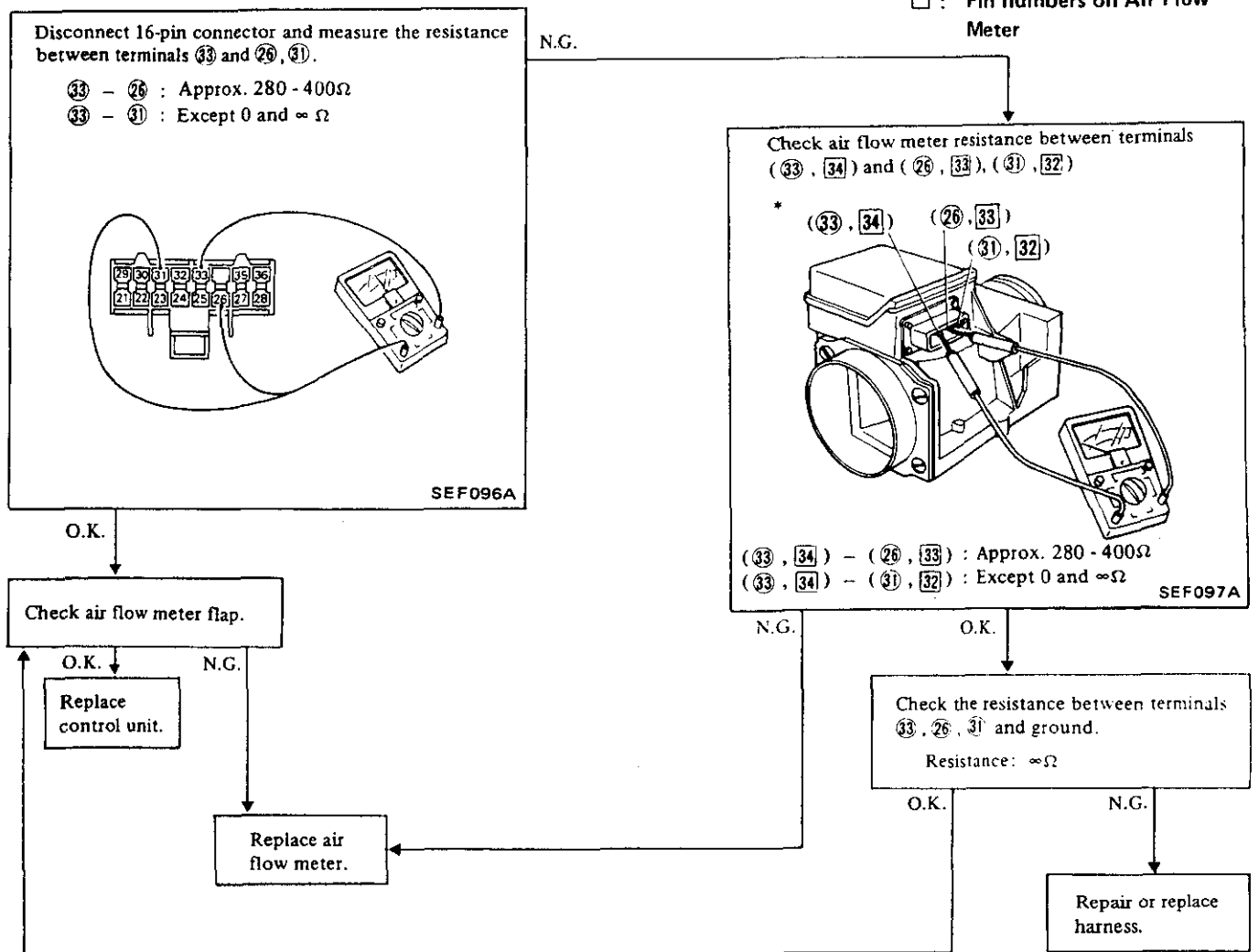
TROUBLE-SHOOTING DIAGNOSIS

Electronic control system inspection

① C.A.S. (Crank angle sensor)



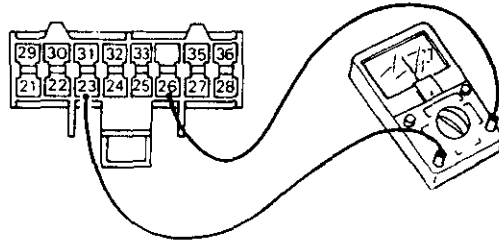
② Air flow meter



DIAGNOSTIC PROCEDURE FOR PROBLEMS

Water temperature sensor

Disconnect 16-pin connector and measure the resistance between terminal ②③ and ②⑤.



SEF716A

| Cylinder head temperature | Resistance |
|---------------------------|--------------|
| Above 20°C (68°F) | Below 2.9 kΩ |
| Below 20°C (68°F) | Above 2.1 kΩ |

N.G.

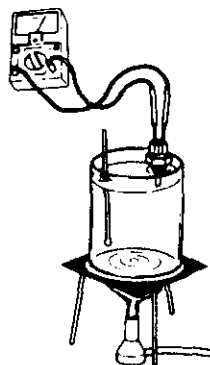
Check harness.

O.K.

O.K.

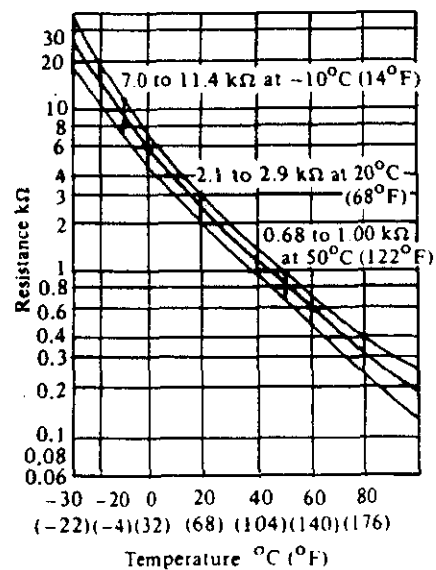
Replace control unit.

Dip the sensor into water maintained at a temperature of 20°C (68°F), 80°C (176°F), etc., and read its resistance.



EF329A

CHARACTERISTIC CURVE



EF334A

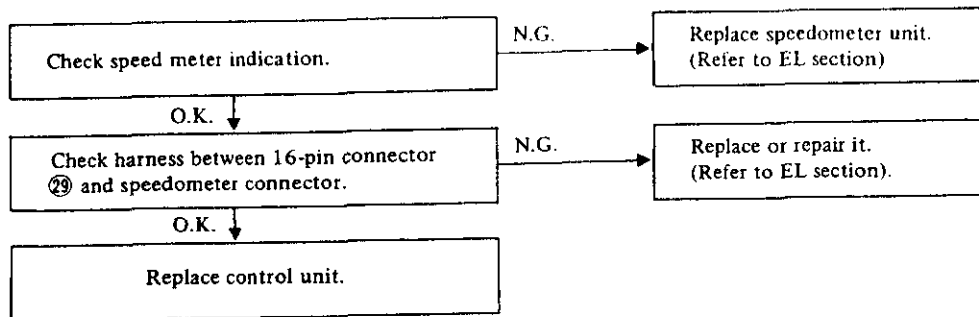
O.K.

N.G.

Replace water temperature sensor.

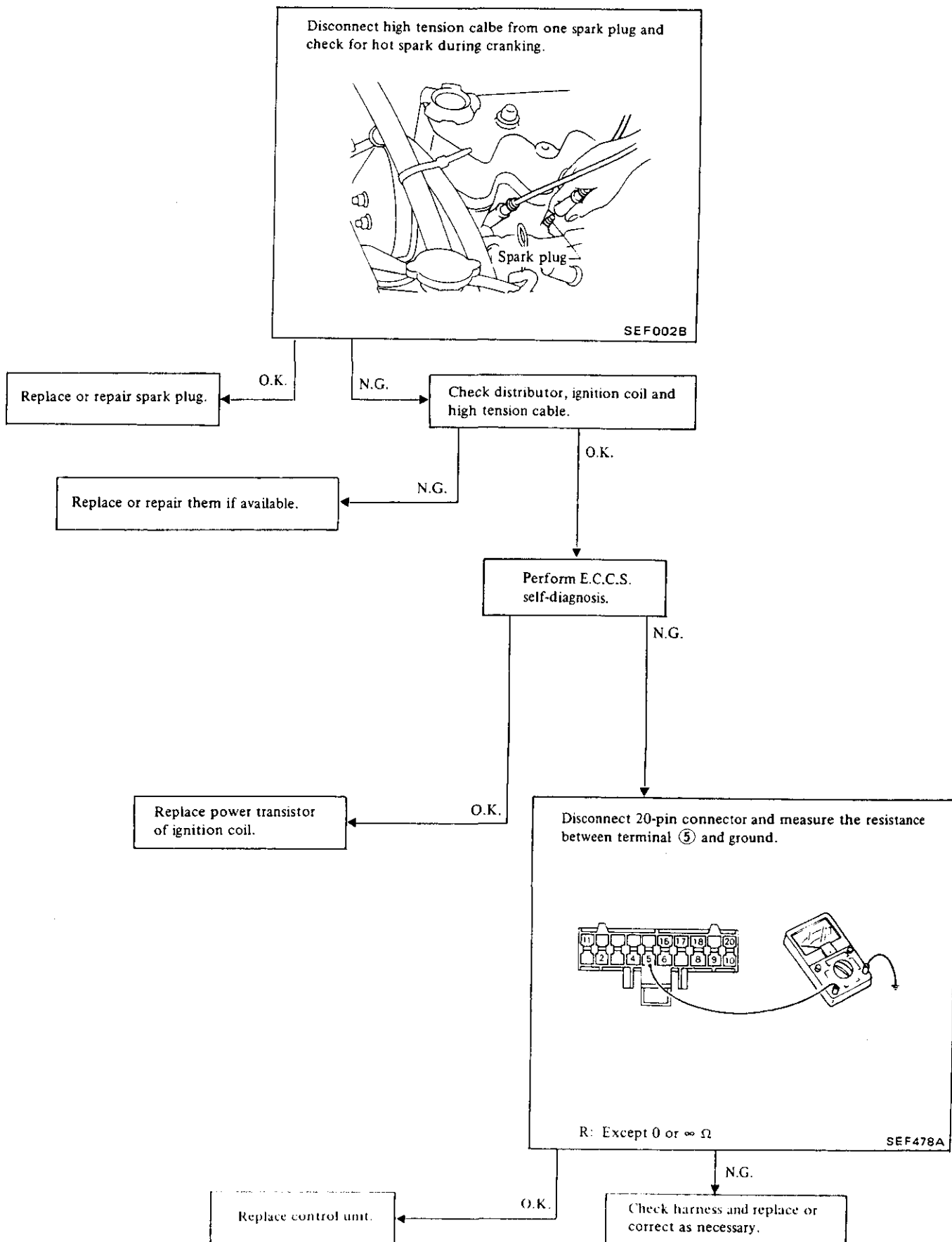
DIAGNOSTIC PROCEDURE FOR PROBLEMS

⑤ Car speed sensor



DIAGNOSTIC PROCEDURE FOR PROBLEMS

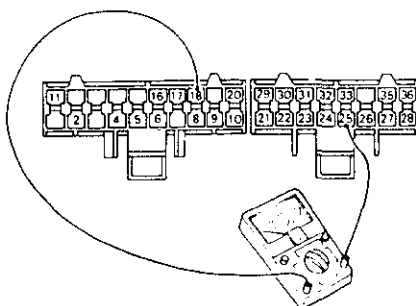
⑤ IGN. (Ignition system)



DIAGNOSTIC PROCEDURE FOR PROBLEMS

Ⓕ Idle switch (Throttle valve switch)

Disconnect 20-pin and 16-pin connectors and measure the resistance between ⑮ and ⑳.

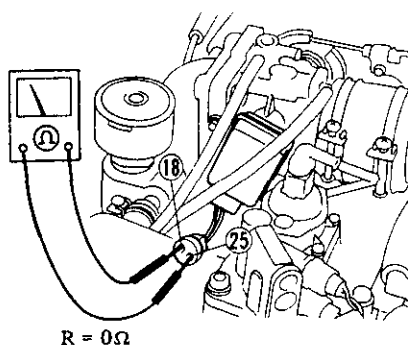


| Throttle | Resistance |
|-----------|----------------|
| released | 0Ω |
| depressed | $\infty\Omega$ |

SEF473A

N.G.

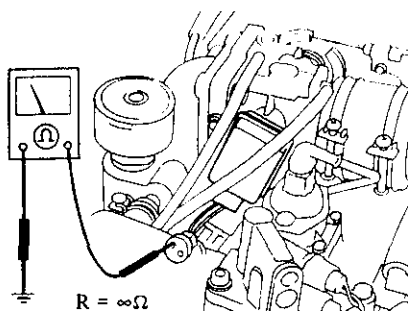
Measure the throttle valve switch resistance between ⑮ and ⑳.



SEF003B

O.K.

Measure the resistance between ⑮, ⑳ and body ground.



SEF004B

N.G.

Check harness and correct or repair it as necessary.

O.K.

Replace idle switch.

N.G.

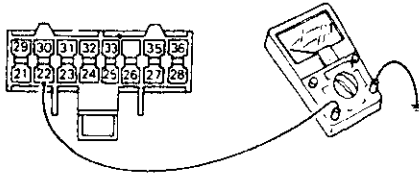
Adjust idle switch.

N.G.

DIAGNOSTIC PROCEDURE FOR PROBLEMS

⑥ Air conditioner switch

Disconnect 16-pin connector and measure the voltage between ② and body ground.



| Air conditioner switch | Voltage |
|------------------------|---------|
| ON | 12V |
| OFF | 0V |

SEF089A

N.G.

Inspect harness.

N.G.

Correct or replace it.

O.K.

Check air conditioner switch.
(Refer to HA section.)

O.K.

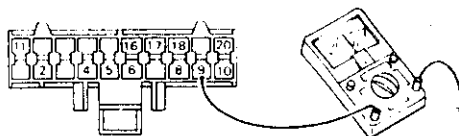
Replace control unit.

N.G.

Replace air conditioner switch.

⑦ Starter switch

Disconnect 20-pin connector and measure voltage between terminal ⑨ and body ground while cranking engine.



Voltage: Battery voltage

SEF475A

Replace control unit.

O.K.

N.G.

Check starting circuit.
(Refer to EL section.)

N.G.

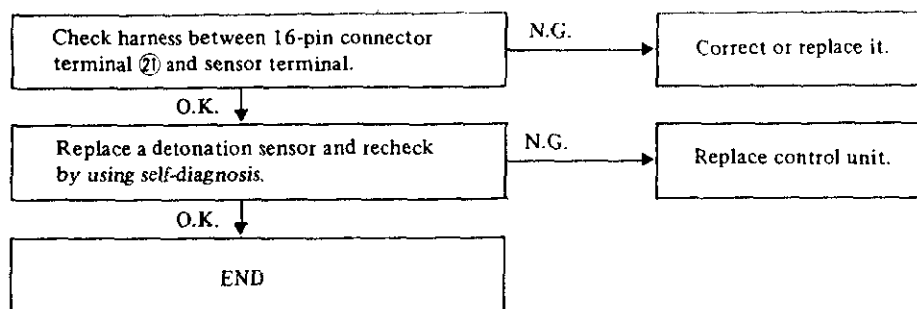
Replace or repair malfunctioning parts or harness.

O.K.

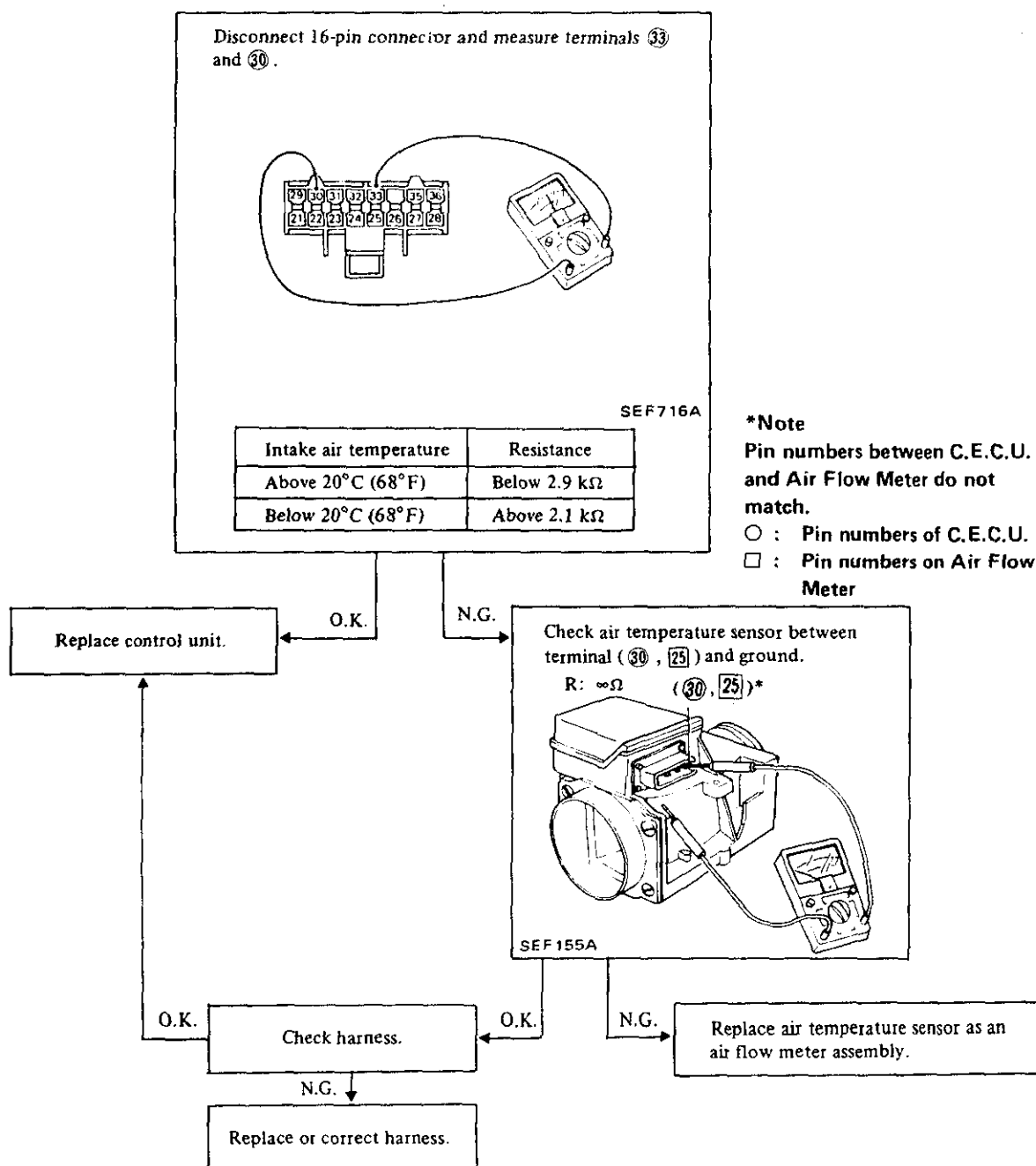
Replace or repair battery.

DIAGNOSTIC PROCEDURE FOR PROBLEMS

① Detonation sensor



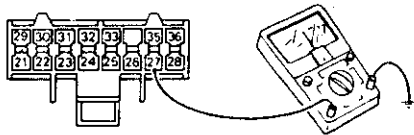
⑧ Air temperature



DIAGNOSTIC PROCEDURE FOR PROBLEMS

① Battery

Disconnect 16-pin connector and measure the voltage between terminal 27 and body ground.



V: Battery voltage

SEF095A

O.K.

Replace control unit.

O.K.

Check harness and battery.

N.G.

Replace or correct them as necessary.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

OUTLINE

In the Electronic Concentrated Engine Control System (E.C.C.S.), the control unit employs a micro-computer. This micro-computer controls fuel injection, spark timing, idle speed and fuel pump operation.

Electrical signals from each sensor are fed into the micro-computer and each actuator is controlled by an electrical pulse with a duration that is computed in the micro-computer.

WARNING:

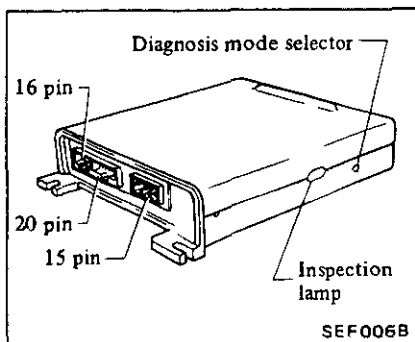
If your car is equipped with electronic controls, use of a transmitter, such as a radio transmitter (but not a receiver, such as a radio) may interfere with unshielded electronic controls and cause them to malfunction. Car manufacturers do not necessarily use electronic controls in the same ways or for the same operations. Examples of vehicle functions which may involve electronic controls include fuel de-

livery systems, engine timing, brakes, emission control and cruise control. Definite information regarding the type of electronic controls in your car can only be obtained from the manufacturer. Consult your NISSAN/DATSUN dealer regarding the need for modifications to your car's electronic controls before installation or use of a transmitter.

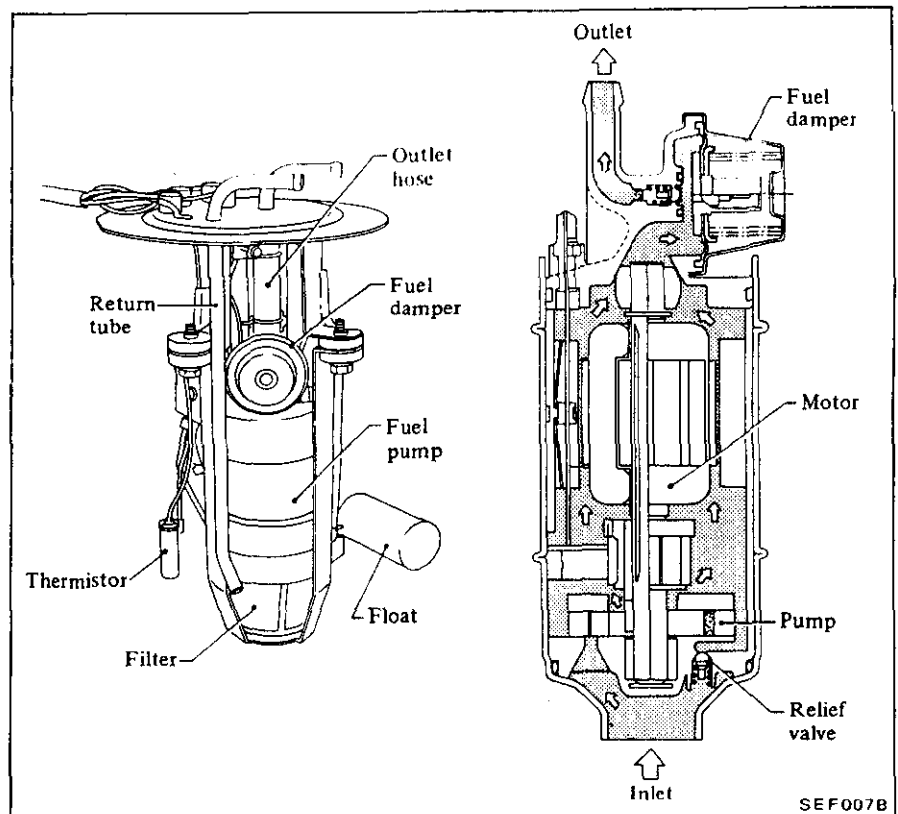
E.C.C.S. COMPONENTS

E.C.C.S. CONTROL UNIT

The E.C.C.S. control unit consists of a micro-computer, connectors for signal input and output and power supply, and inspection lamps and diagnosis mode selector. The control unit controls the quantity of fuel that is injected, ignition timing, idle speed and fuel pump operation.

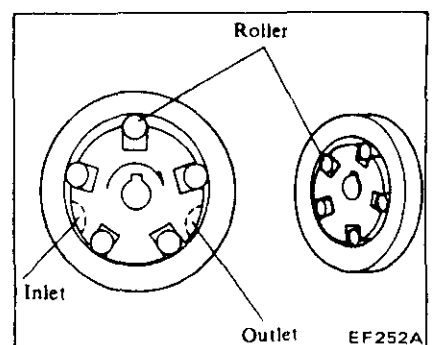


FUEL PUMP



The fuel pump is located in the fuel tank and combined with the fuel tank gauge unit.

The fuel pump is a wet type pump where the vane rollers are directly coupled to a motor which is filled with fuel.



ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

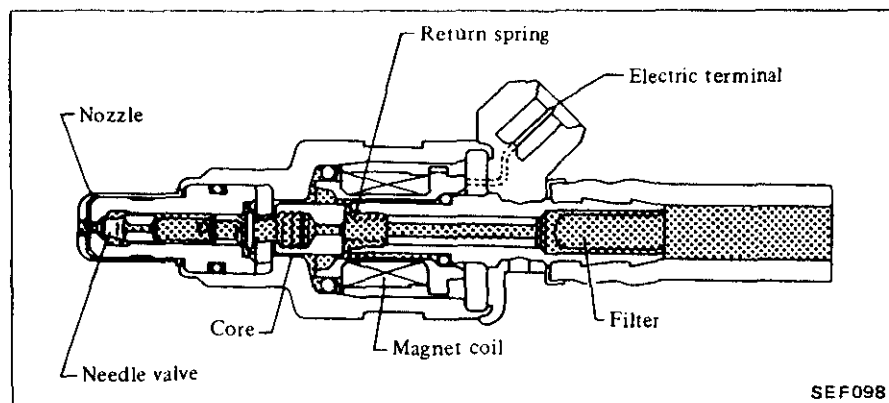
A relief valve in the pump is designed to open when the pressure in the fuel line rises over 422 to 490 kPa (4.22 to 4.90 bar, 4.3 to 5.0 kg/cm², 61 to 71 psi) due to malfunction in the pressure system.

The check valve prevents abrupt drop of pressure in the fuel pipe when stopping the engine.

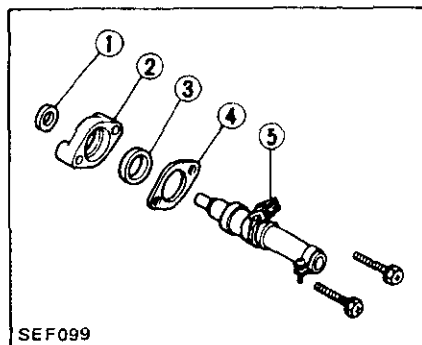
The fuel damper acts like a shock absorber in fuel flow discharged from the fuel pump. There are not adjustments on this damper.

Change in the pump discharge pressure is monitored by the diaphragm and spring, which vary the volume of the fuel chamber.

INJECTOR



The injector operates on the solenoid valve principle. When an electric signal is applied to the coil built into the injector, the plunger is pulled into the solenoid, thereby opening the needle valve for fuel injection. The quantity of injected fuel is in proportion to the duration of the pulse applied from the control unit.

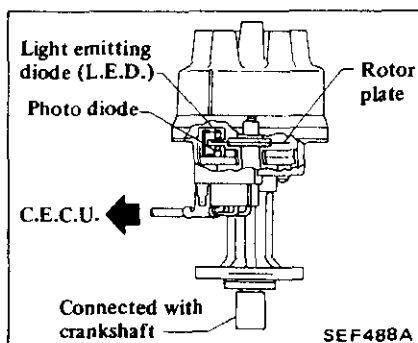


- 1 Injector lower rubber insulator
- 2 Injector lower holder
- 3 Injector upper rubber insulator
- 4 Injector upper holder
- 5 Injector

CRANK ANGLE SENSOR

The crank angle sensor detects engine rpms and the crank angle (piston position). It also sends a signal to the control unit to control various opera-

tions. This sensor is built into the distributor.

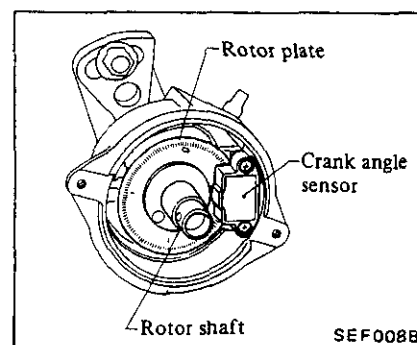


Use care when installing, the crank sensor built in to the distributor as the position of matching mark is different from former model. (Refer to Section EM.)

Signal rotor plate

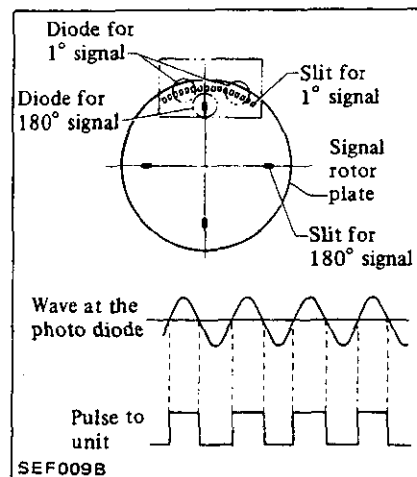
The signal rotor plate has 360 slits at 1° intervals on its outer periphery. It also has four slits at 90° intervals.

These four slits are used to detect the crank angle, that is, the position of each piston. The teeth are used to provide the 1° signal that is necessary to control engine rpms and ignition timing.



Crank angle sensor operation

The crank angle sensor has two diodes and a wave forming circuit. When a signal rotor plate passes the space between the Light Emitting Diode (L.E.D.) and Photo Diode, the slit of the signal rotor plate alternately cuts the light which is sent to the photo diode from the L.E.D. This causes an alternative voltage and it is then converted into an on-off pulse by the wave forming circuit, which is sent to the control unit.

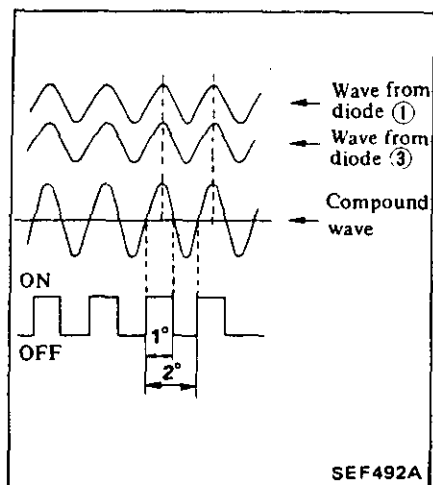
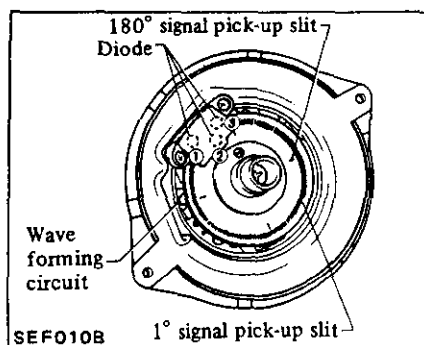


Detection of 1° signal (For detecting of engine rpms and ignition timing control)

Diodes ① and ③ are used to detect the 1° signal which is created by 360 slits on the rotor plate. When a slit reaches the space between the L.E.D. and photo diode, the photo diode receives the light from the L.E.D. and this causes an alternative voltage.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

Thus, each wave from each diode is *compounded*. Then, the compound wave is converted into an on-off pulse. This 1° on-off signal is sent to the control unit.



Detection of 180° signal (For detecting piston T.D.C.)

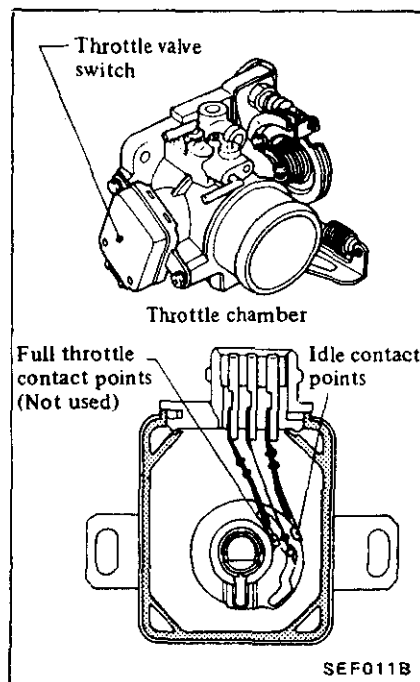
Diode ② is used to detect the 180° signal which is created by 90° slits on the rotor plate. When a slit reaches the space between the L.E.D. and photo

diode, the photo diode catches the light from the L.E. D. and this causes an alternative voltage. At this time, a signal on-off pulse is generated. Since engine rpm is twice that of the distributor, the rotor plate has four dits at 90° intervals.

THROTTLE VALVE SWITCH

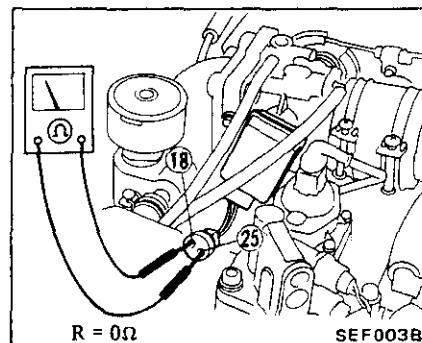
The throttle valve switch is attached to the throttle chamber and actuates in response to accelerator pedal movement.

This switch has the idle contact. The idle contact closes when the throttle valve is positioned at idle and opens when it is at any other position.

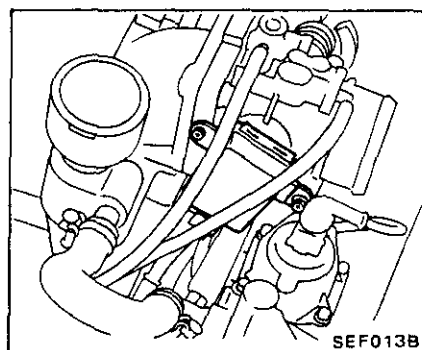


ADJUSTMENT

1. Disconnect throttle valve switch connector.
2. Connect ohmmeter between terminals ⑱ and ⑳, and make sure continuity exists.



3. Adjust throttle valve switch position, with retaining screw, so that idle switch may be changed from "ON" to "OFF" when engine speed is about 1,100 rpm under no load.



ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

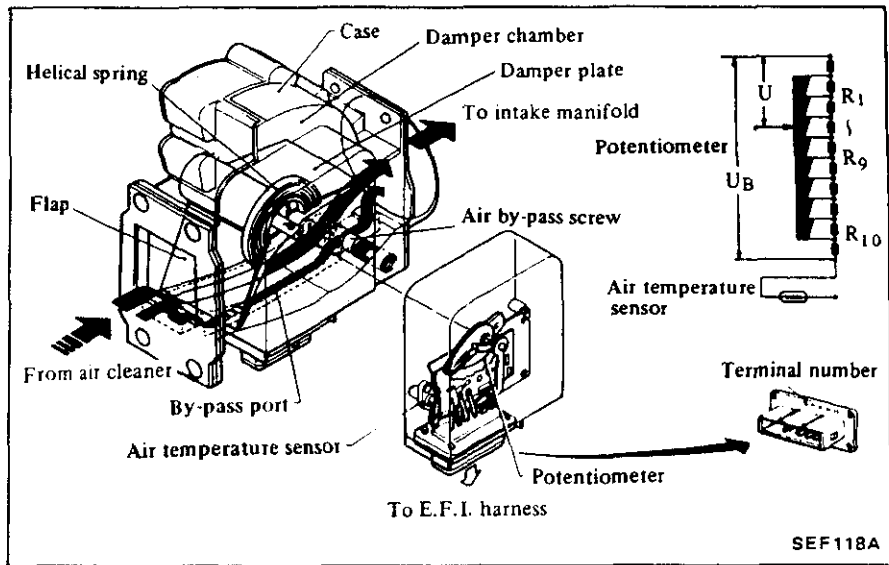
AIR FLOW METER

The air flow meter measures the quantity of intake air, and sends a signal to the control unit so that the base pulse width can be determined for correct fuel injection by the injector. The air flow meter is provided with a flap in the air passage. As the air flows through the passage, the flap rotates and its angle of rotation electronically signals the control unit.

During idling operation when the amount of intake air is extremely small, the air flows parallel with the flap through the by-pass port so that the specified intake air flow can be provided correctly.

An air temperature sensor is installed in the air passage.

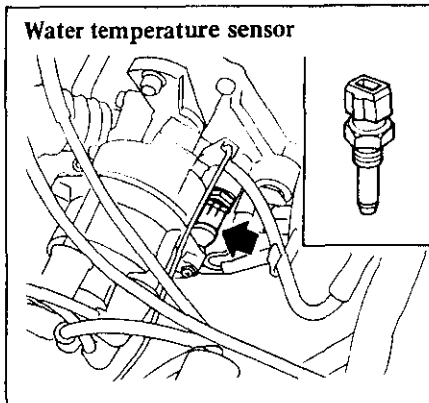
The by-pass port has the air by-pass screw which regulates the idle mixture ratio. The air by-pass screw is preset and sealed at the factory.



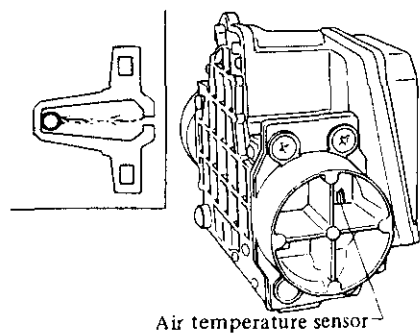
WATER TEMPERATURE SENSOR

The water temperature sensor, built into the thermostat housing, monitors change in water temperature and transmits a signal to increase the pulse duration during the warm-up period. The temperature sensing unit employs a thermistor which is very sensitive in the low temperature range.

The electrical resistance of the thermistor decreases in response to the temperature rise.



Air temperature sensor

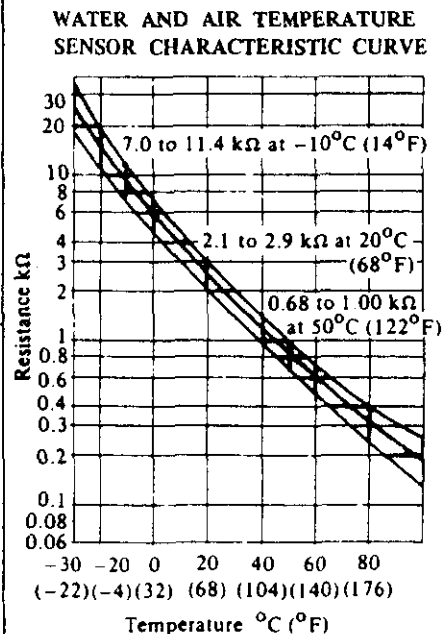


AIR TEMPERATURE SENSOR

The air temperature sensor, built into the air flow meter, monitors change in the intake air temperature and transmits a signal for the fuel enrichment to change the pulse duration.

The temperature sensing unit employs a thermistor which is very sensitive in the temperature range.

The electrical resistance of the thermistor decreases in response to air temperature rise.



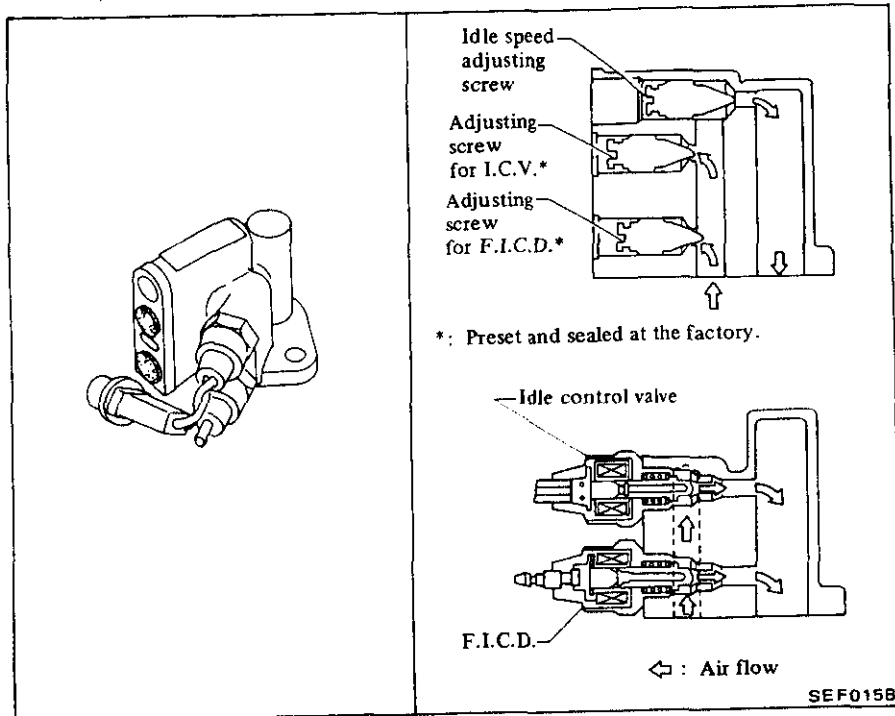
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ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

IDLE CONTROL VALVE

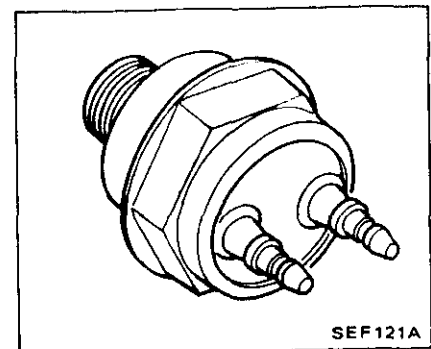
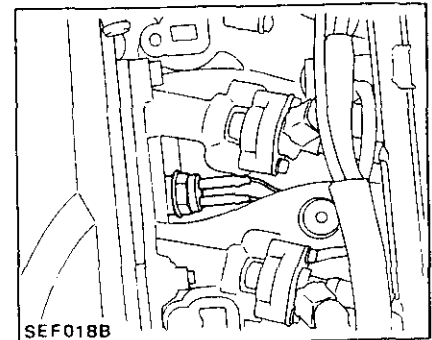
When the idle speed decreases because of an increase in electrical load (e.g. the headlamps are turned on), etc., the idle control valve (I.C.V.) is activated to stabilize the idle rpm within the lower and upper limits already stored in the control unit's memory section. However, when the air conditioning is

“ON”, the idle speed is controlled by the fast idle control device (F.I.C.D.). The idle speed is usually adjusted with the idle speed adjusting screw after disconnecting the I.C.V. harness connector. Adjusting screw for I.C.V. and adjusting screw for F.I.C.D. are preset at the factory and sealed with rubber plugs.



DETONATION SENSOR

The detonation sensor is attached to the cylinder block and senses engine knocking conditions. The sensor monitors the knocking from each combustion chamber and sends an electric signal to the control unit where it is changed to a knocking signal.



CAR SPEED SENSOR

The car speed sensor provides a car speed signal to the control unit. The speed sensor consists of a reed switch, which is installed in the speed meter unit and transforms car speed into a pulse signal.

BATTERY VOLTAGE

Battery voltage is sent to the control unit, which then function to compensate the variability in it.

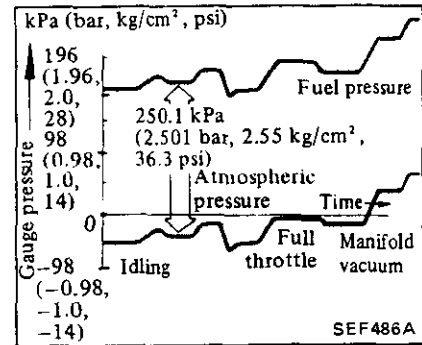
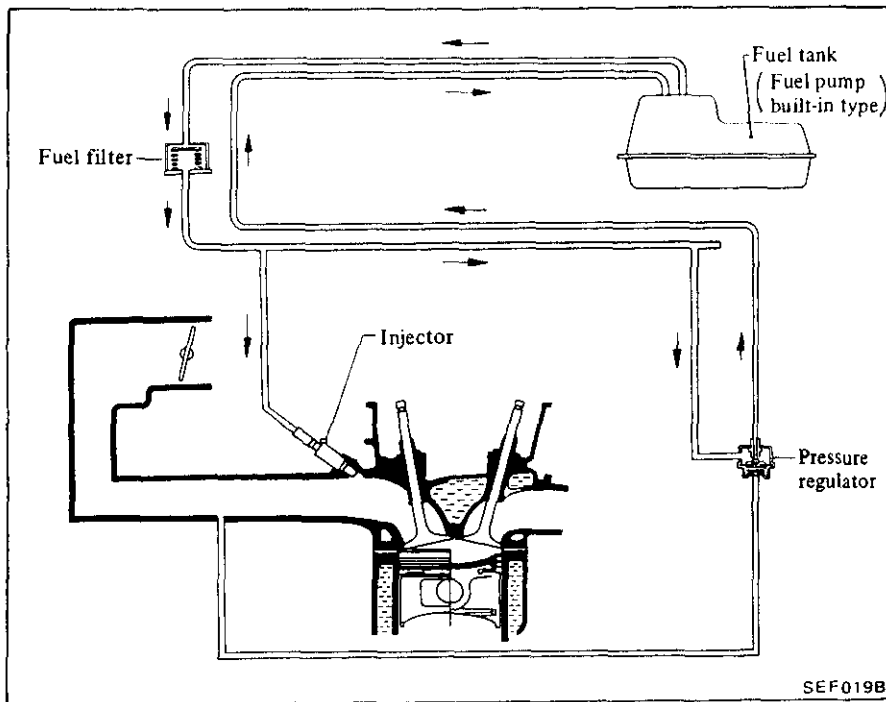
ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

FUEL FLOW SYSTEM

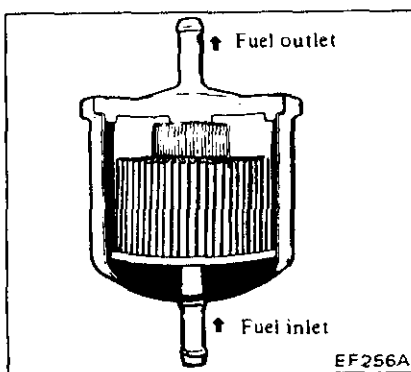
Fuel is drawn from the fuel pump in the fuel tank, from which it is discharged under pressure. As it flows through the mechanical fuel damper, pulsation in the fuel flow is damped. Then, the fuel is filtered in the fuel filter, goes through the fuel line, and is injected into the intake port.

Surplus fuel is led through the pressure regulator and is returned to the fuel tank. The pressure regulator controls the injection pressure in such a manner that the pressure difference between the fuel pressure and the intake manifold vacuum is always 250.1 kPa (2.501 bar, 2.55 kg/cm², 36.3 psi).

introduced into the air chamber, thereby keeping differential pressure constant causing excessive fuel to return to the fuel tank through the return side port. This constant differential pressure provides optimum fuel injection in every mode of engine operation.

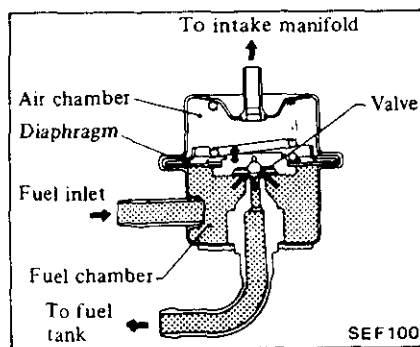


FUEL FILTER



The fuel filter is placed between the fuel damper and the injector, and is used to remove foreign matter in the fuel. Water in the fuel is collected at the bottom of the filter casing.

PRESSURE REGULATOR



The pressure regulator controls the pressure of fuel so that a pressure difference of 250.1 kPa (2.501 bar, 2.55 kg/cm², 36.3 psi) can be maintained between the fuel pressure and intake manifold vacuum. The pressure regulator is divided into the air chamber and fuel chamber by the diaphragm. Intake manifold vacuum is

Inspection

If the fuel pressure is other than that specified, first check the fuel pump and then check the following items:

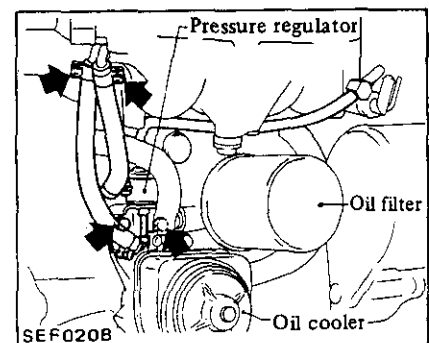
If fuel pressure is too high:

Vacuum hose connected to pressure regulator poorly, clogged fuel return piping, or faulty pressure regulator.

If fuel pressure is too low:

Clogged fuel pump, fuel filter, or fuel tank; leak in the fuel system, or faulty pressure regulator.

Replacement



1. Reduce fuel line pressure to zero.
2. Disengage vacuum tube connecting regulator to intake manifold from pressure regulator.
3. Remove screws securing pressure regulator.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

4. Unfasten hose clamps, and disconnect pressure regulator from fuel hose.

Place a rag under pressure regulator to prevent splashing of fuel.

5. To install pressure regulator, reverse the order of removal.

6. For installation of fuel hose, refer to Fuel Hose.

FUEL HOSE

Make sure that all low pressure fuel hoses are fully inserted and are free from undue strain before clamping.

When removing or installing high pressure fuel hose, observe the following.

Insert high pressure fuel hoses into their proper positions as instructed below.

Type (A): Insert rubber hose until its end contacts unit.

Type (B): Push end of rubber hose onto fuel pipe until it contacts inner bulge.

Type (C): Push end of rubber hose onto fuel pipe until it is 33 mm (1.30 in) from end of pipe.

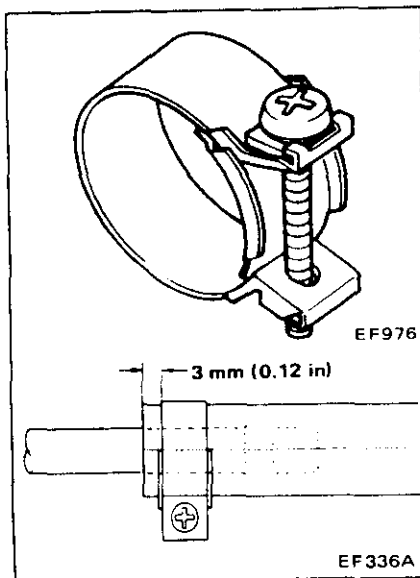
Type (D): Push end of rubber hose with hose socket onto unit by hand as far as they will go. Clamp is not necessary at this connection.

Type (E): Push end of injector rubber hose onto fuel pipe until it is 28 mm (1.10 in) from end of pipe.

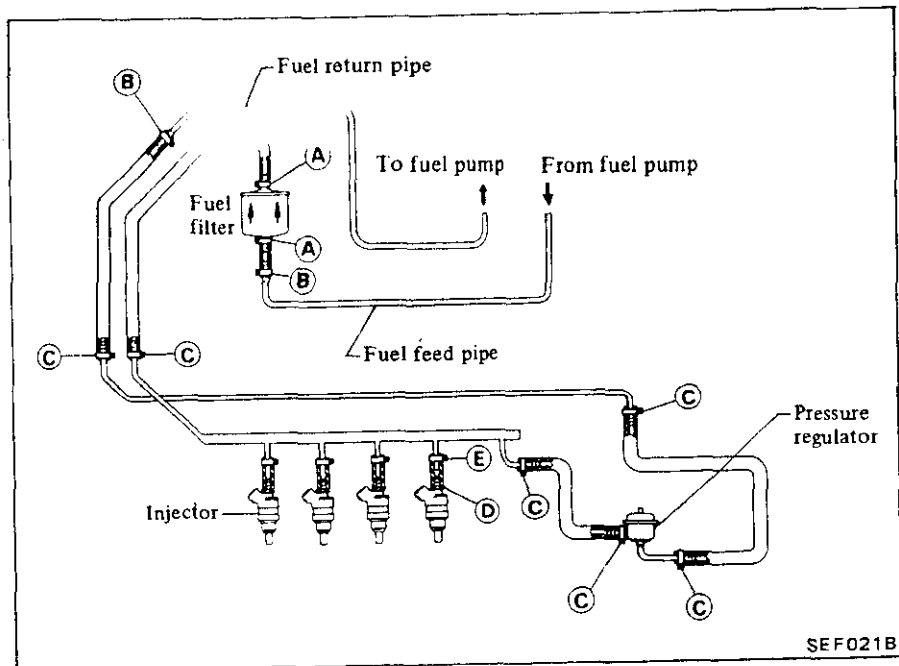
CAUTION:

- Do not reuse fuel hose clamps after loosening.
- Clean dust and dirt from parts with compressed air when assembling.
- Tighten high pressure rubber hose clamp so that clamp end is 3 mm (0.12 in) from hose end or screw position (wider than other portions of clamp) is flush with hose end.

Ⓙ Fuel hose clamps
1.0 - 1.5 N·m
(0.10 - 0.15 kg·m,
0.7 - 1.1 ft·lb)

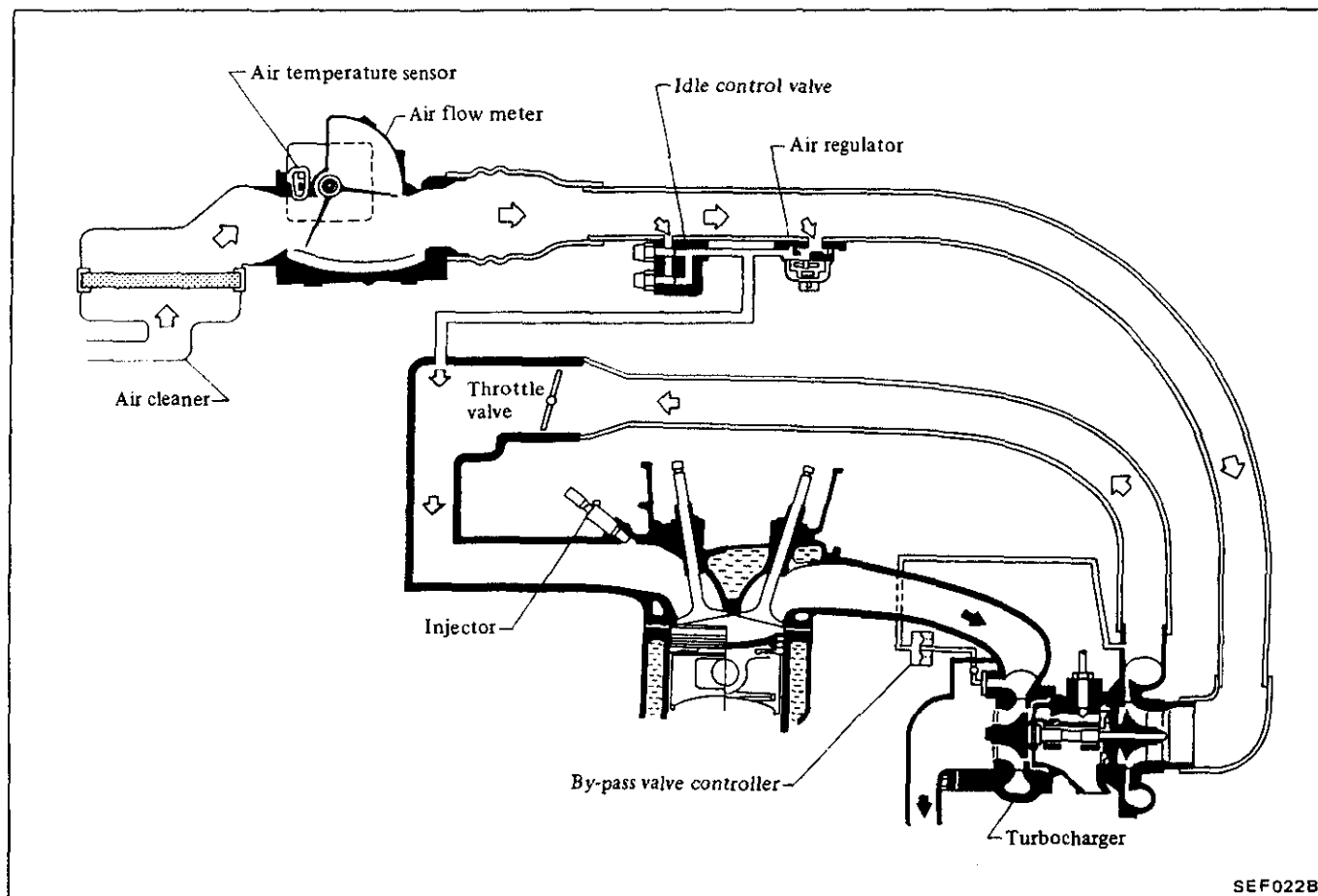


- When tightening hose clamp, ensure that screw does not come into contact with adjacent parts.

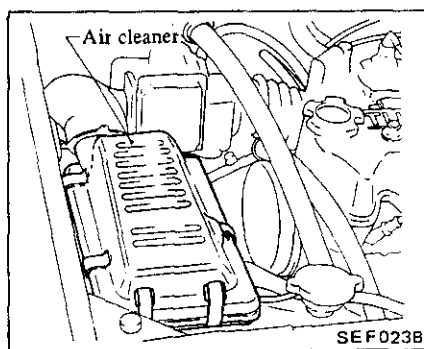


ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

AIR FLOW SYSTEM



AIR CLEANER



Inspection

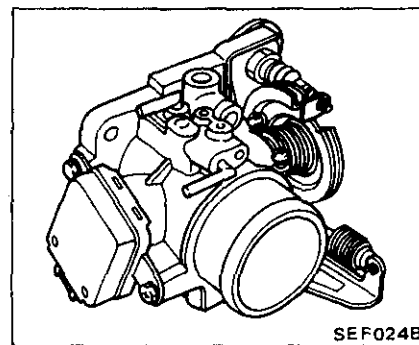
Replace filter more frequently under dusty driving conditions.

AIR FLOW METER

Refer to E.C.C.S. COMPONENTS.

THROTTLE CHAMBER

The throttle chamber, located between the turbocharger and the intake manifold, is equipped with a valve. This valve controls the intake air flow in response to accelerator pedal movement. The rotary shaft of this valve is connected to the throttle valve switch.

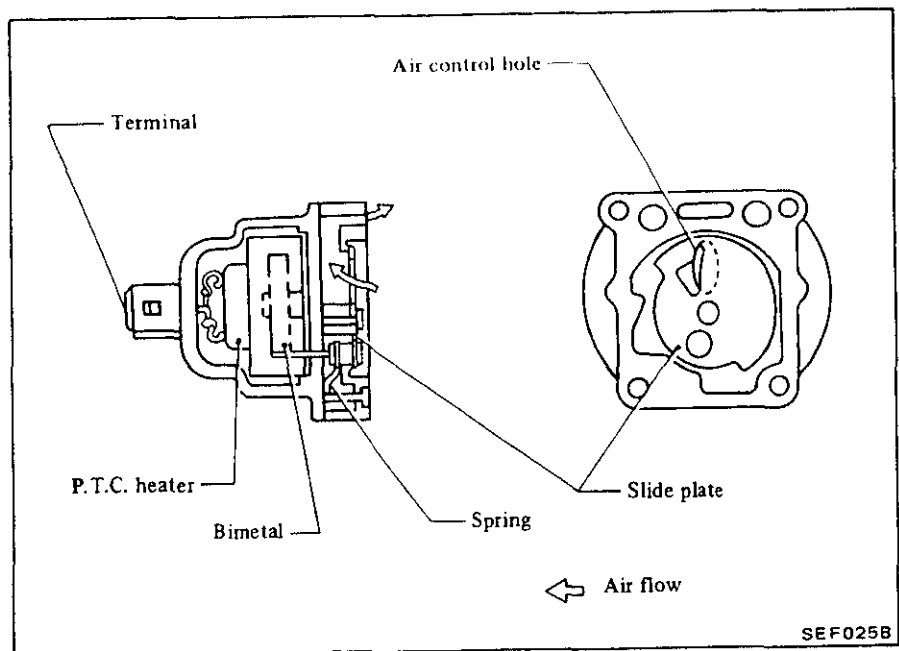


ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

AIR REGULATOR

The air regulator by-passes the throttle valve to control the quantity of air for increasing the engine idling speed when starting the engine at a bimetal temperature of below the specified value.

A bimetal (coil type) and a P.T.C. heater are built into the air regulator. When the ignition switch is turned to the "START" position or engine running, electric current flows through the P.T.C. heater, and the bimetal, as it is heated by the heater, begins to move and closes the air passage in a few minutes. The air passage remains closed until the engine is stopped and the bimetal temperature drops to below the specified value.

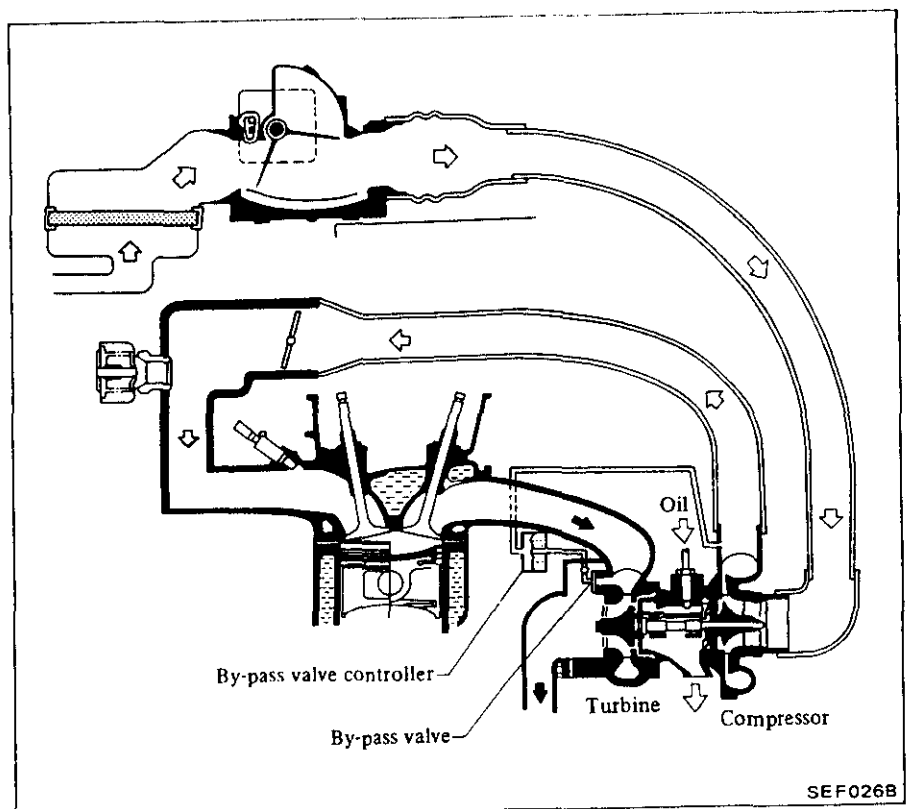


TURBOCHARGER

The turbocharger is installed on the exhaust manifold. This system utilizes exhaust gas energy to rotate the turbine wheel which drives the compressor turbine installed on the other end of the turbine wheel shaft. The compressor supplies compressed air to the engine to increase the charging efficiency so as to improve engine output and torque.

To prevent an excessive rise in the supercharging pressure, a system is adopted which maintains the turbine speed within a certain range by controlling the quantity of exhaust gas that passes through the turbine. This system consists of a by-pass valve controller which detects the supercharged pressure and activates a by-pass valve that allows a part of exhaust gas to be discharged without passing through the turbine.

To prevent an abnormal rise in supercharging pressure and possible engine damage in case of a malfunction, an emergency relief valve is provided as a safety device in the intake manifold.



ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

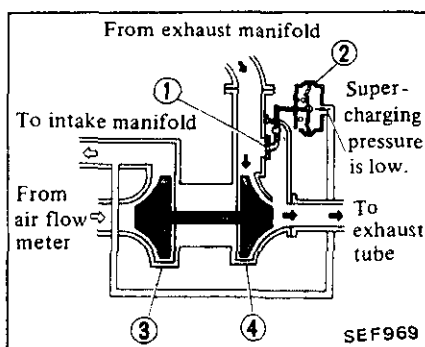
Operation

The by-pass valve controller normally detects the supercharging pressure at the outlet of the compressor housing. All exhaust gas flows through the turbine when the supercharging pressure is below the specified pressure P_0 .

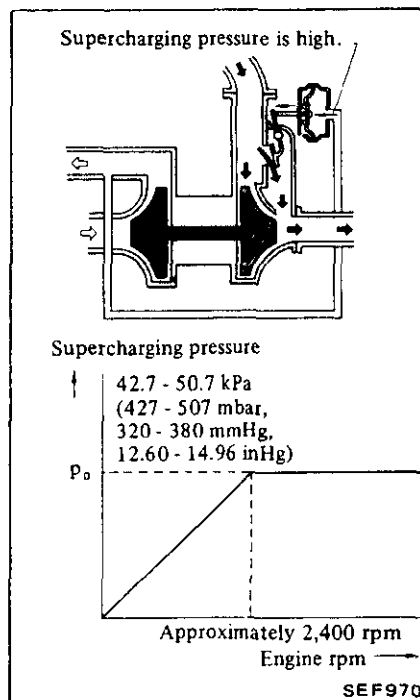
Specified supercharging pressure

P_0 :

42.7 - 50.7 kPa
(427 - 507 mbar,
320 - 380 mmHg,
12.60 - 14.96 inHg)



- 1 By-pass valve
- 2 By-pass valve controller
- 3 Turbine
- 4 Compressor



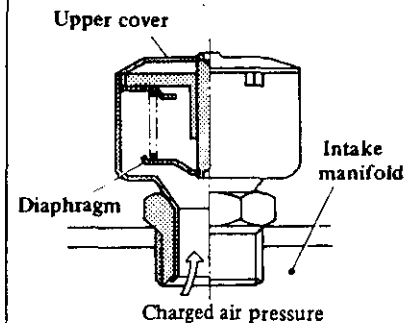
The emergency relief valve operates as follows:

When the pressure in the intake manifold exceeds P_{max} , it exerts a force on diaphragm. Then the upper cover, connected to the diaphragm by a shaft, is pushed open, and the excess pressure in the intake manifold is released into the atmosphere.

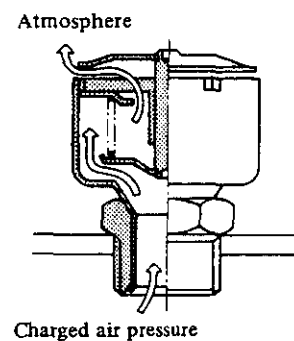
P_{max} :

50.7 - 53.3 kPa
(507 - 533 mbar,
380 - 400 mmHg,
14.96 - 15.75 inHg)

When the pressure in the intake manifold is below P_{max} .



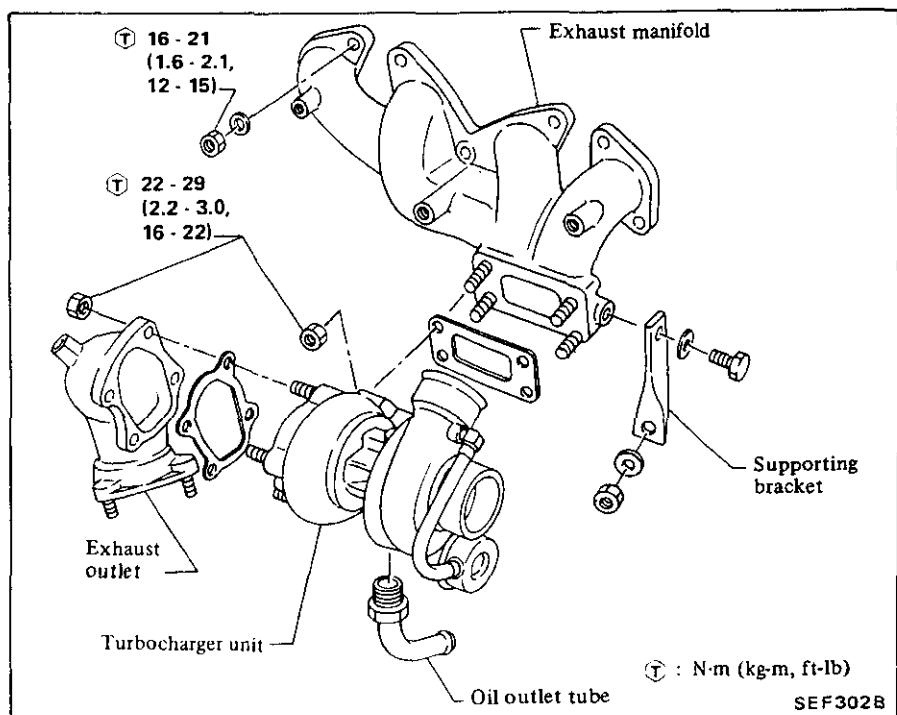
When the pressure in the intake manifold is above P_{max} .



As the engine speed increases and the supercharging pressure approaches the specified pressure value P_0 , it exerts a force on the diaphragm of the by-pass valve controller, thereby opening the by-pass valve.

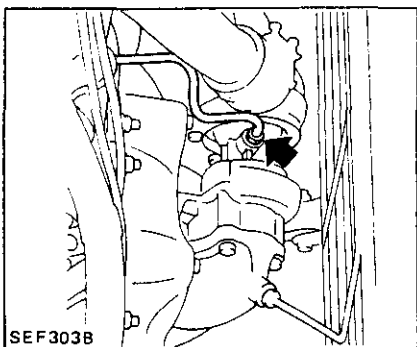
As the valve opens, part of the exhaust gas by-passes the turbine and goes directly to the exhaust tube. As a result, the turbine speed is kept constant and the supercharging pressure maintained at the specified pressure level.

Removal and installation

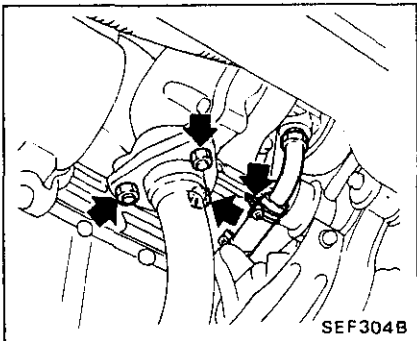


ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

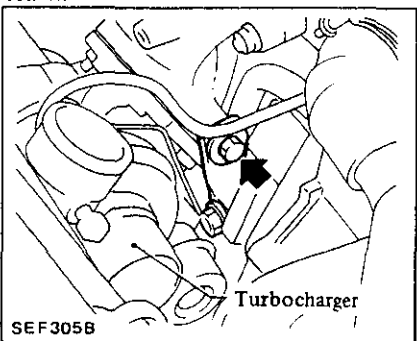
1. Remove blow-by hose, air inlet pipe, air pipe and air duct hose.
2. Remove heat insulator and turbocharger temperature sensor.
3. Disconnect oil delivery tube.



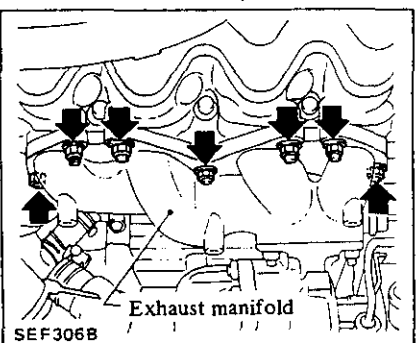
4. Disconnect oil drain hose and exhaust front tube.



5. Remove turbocharger support bracket.



6. Remove turbocharger and exhaust manifold as an assembly.



7. Install in the reverse order of removal.

Disassembly and assembly

Turbocharger should not be disassembled.

Inspection

1. Inspect turbine and compressor wheels for cracks, clogging, deformity or other damage.
2. Revolve wheels to make sure that they turn freely without any abnormal noise.
3. Measure play in axial direction.

Play (Axial direction):

0.013 - 0.091 mm
(0.0005 - 0.0036 in)

Do not allow wheels to turn when axial play is being measured.

4. Check operation of by-pass valve controller.

Do not apply more than 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg) pressure to controller diaphragm.

By-pass valve controller stroke/pressure:

0.38 mm (0.0150 in)/

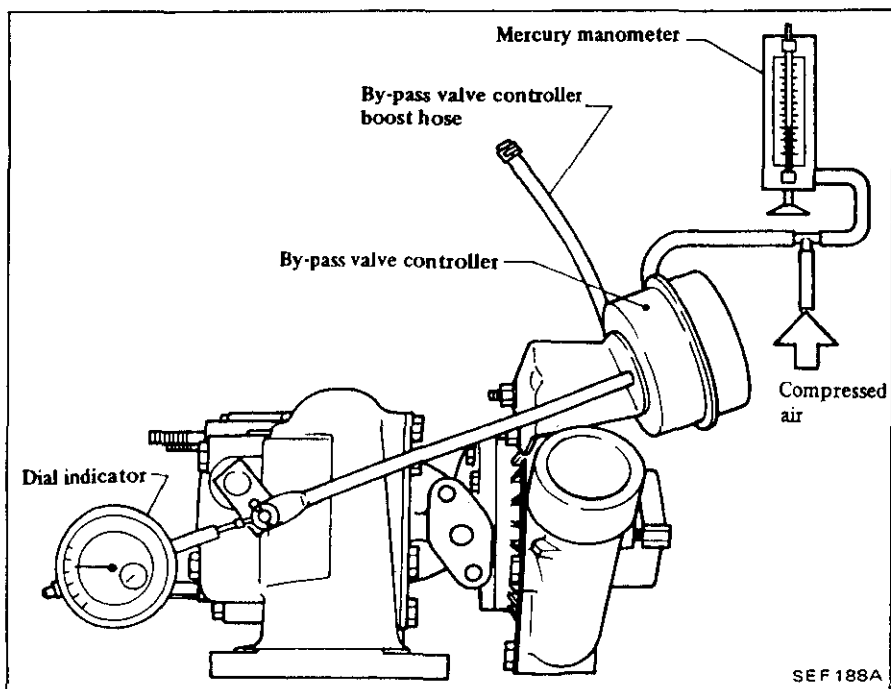
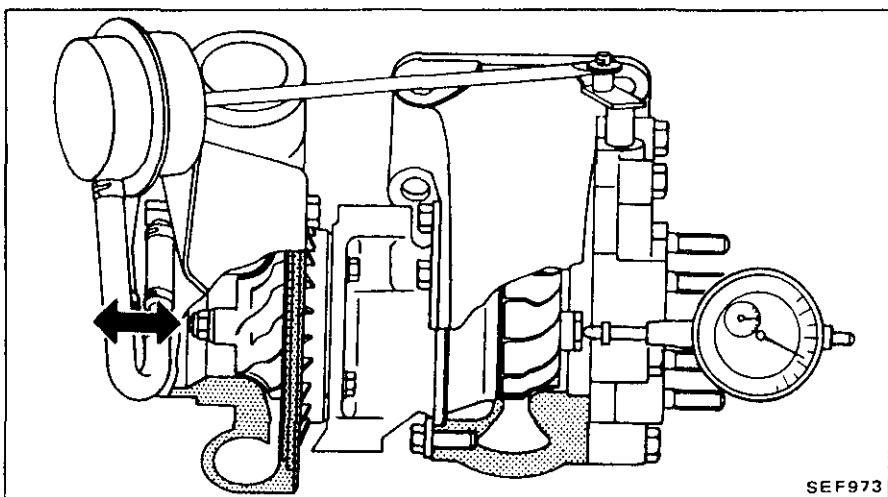
41.9 - 47.2 kPa (419 - 472 mbar,

314 - 354 mmHg,

12.36 - 13.94 inHg)

5. Move by-pass valve to make sure that it is not stuck or scratched.

6. Always replace turbocharger as an assembly if any of the above items shows abnormalities.



ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

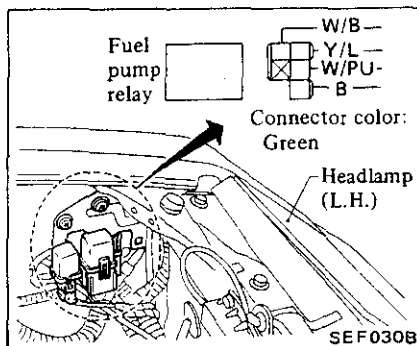
FUEL SYSTEM PRESSURE CHECK

Before disconnecting fuel hose, release fuel pressure from fuel line for safety reasons.

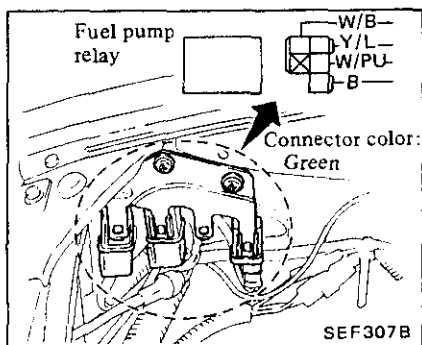
RELEASING FUEL PRESSURE

1. Start the engine.
2. Disconnect harness connector of fuel pump relay while the engine is running.

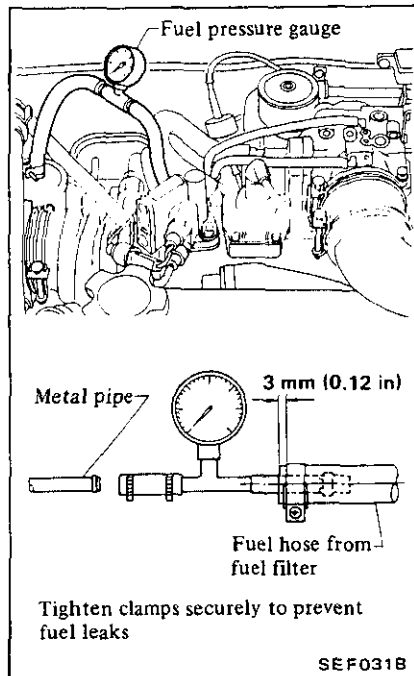
L.H. drive models



R.H. drive models



1. Install Pressure Gauge (J 25400-34) between fuel filter hose and metal pipe at point shown. For convenience in later tests, position gauge so that it can be read from driver's seat.



2. Start engine and read fuel pressure gauge.

At idling:

Approximately 206 kPa
(2.06 bar, 2.1 kg/cm², 30 psi)

The moment accelerator pedal is fully depressed:

Approximately 255 kPa
(2.55 bar, 2.6 kg/cm², 37 psi)

3. If fuel pressure is not as specified, replace pressure regulator, and repeat fuel pressure check.

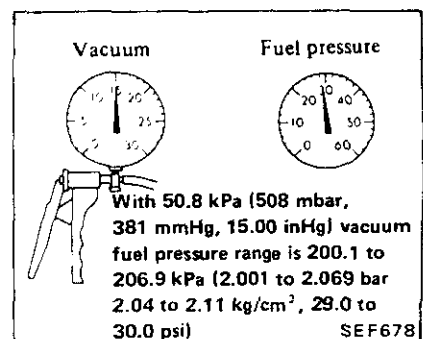
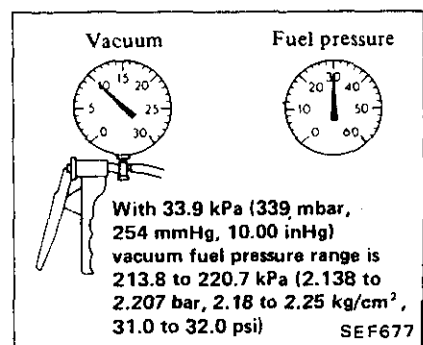
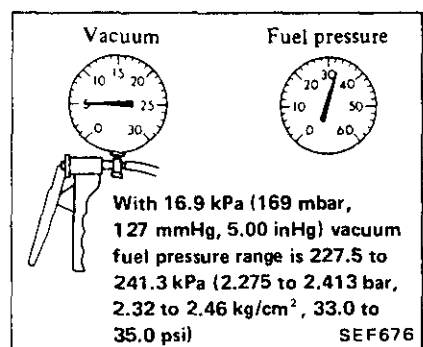
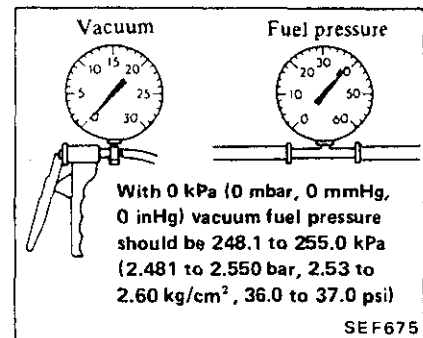
If below the specified value, check for clogged or deformed fuel lines, and if necessary, replace fuel pump as an assembly or check valve.

4. Connect variable vacuum source, J 23738 or equivalent to fuel regulator. Disconnect fuel pressure regulator vacuum hose from intake manifold and attach hose to variable vacuum source.

5. Jump fuel pump relay harness connector, W/B and W/PU.

6. Turn key to "ON".

7. Observe fuel pressure readings as vacuum is changed.



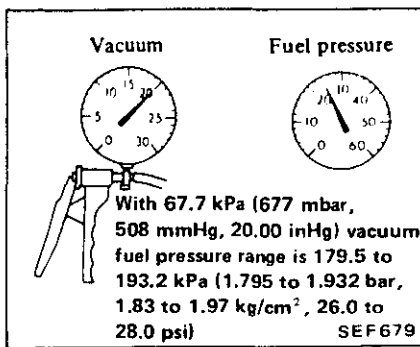
3. After engine stalls, crank the engine two or three times.
 4. Turn ignition switch "OFF".
 5. Reconnect the harness connector of fuel pump relay.
- If engine does not start, remove fuel pump connector and crank the engine for about 5 seconds.

FUEL PRESSURE CHECK

When reconnecting the lines, always use new clamps and be sure to position them correctly.

Use a torque driver to tighten clamps.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

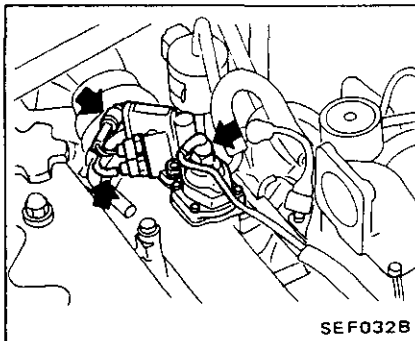


Fuel pressure must decrease as vacuum increases. If results are unsatisfactory, replace pressure regulator.

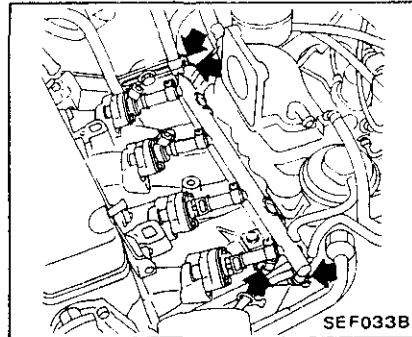
8. Turn key to "OFF".
9. Disconnect variable vacuum source and connect fuel pressure regulator vacuum hose to intake manifold.
10. Reconnect any wires which was disconnected.

REPLACEMENT

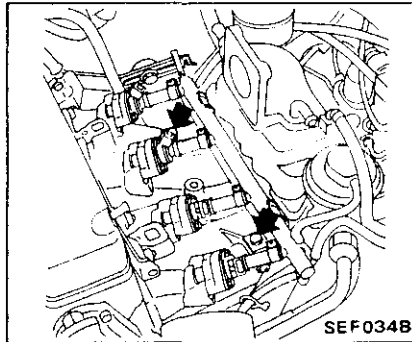
1. Lower fuel pressure.
Refer to FUEL PRESSURE CHECK.
2. Remove air inlet pipe and hose.
3. Disconnect accelerator wire.
4. Disconnect throttle valve switch harness connector and remove throttle chamber.
5. Remove P.C.V. valve and hose.
6. Loosen clamps at both ends of air pipe.
7. Disconnect I.C.V. and air regulator harness connectors.



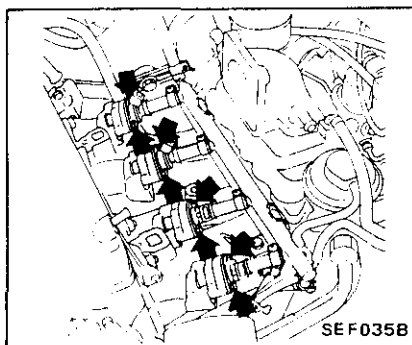
8. Remove air pipe.
9. Disconnect harness connectors from injectors.
10. Remove fuel hoses.



11. Remove bolts securing fuel pipe.



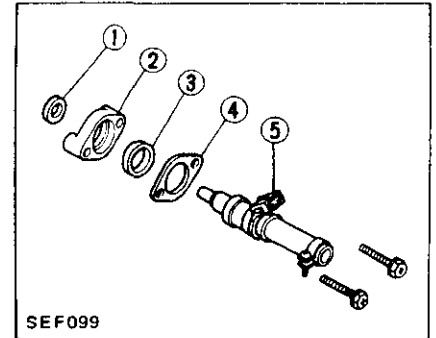
12. Remove screws securing fuel injector.



13. Remove fuel pipe assembly by pulling out fuel pipe and injectors.

14. Unfasten hose clamp on fuel injector and remove fuel injector from fuel pipe.

Place a rag under injector when disconnecting fuel pipe to prevent splashing of fuel.



- 1 Injector lower rubber insulator
- 2 Injector lower holder
- 3 Injector upper rubber insulator
- 4 Injector upper holder
- 5 Injector

15. To install injector and fuel pipe, reverse the order of removal.

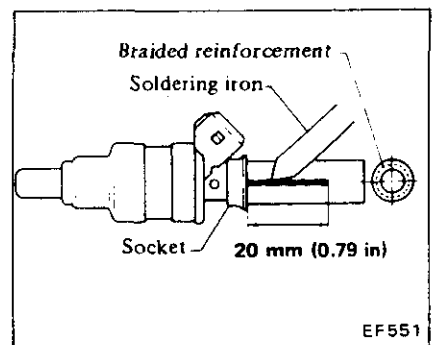
When installing injector, check that there are no scratches or abrasion at lower rubber insulator, and securely install it, making sure it is air-tight.

16. For installation of fuel hose, refer to Fuel Hose.

INJECTOR RUBBER HOSE

If necessary, replace injector rubber hose. Proceed as follows:

Removal



ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

1. On injector rubber hose, measure off a point approx. 20 mm (0.79 in) from socket end.
2. Heat soldering iron (150 watt) for 15 minutes. Cut hose into braided reinforcement from mark to socket end.

Do not feed soldering iron until it touches injector tail piece.

CAUTION:

- a. Be careful not to damage socket, plastic connector, etc. with soldering iron.
- b. Never place injector in a vise when disconnecting rubber hose.

3. Then pull rubber hose out with hand.

Installation

1. Clean exterior of injector tail piece.

2. Wet inside of new rubber hose with fuel.

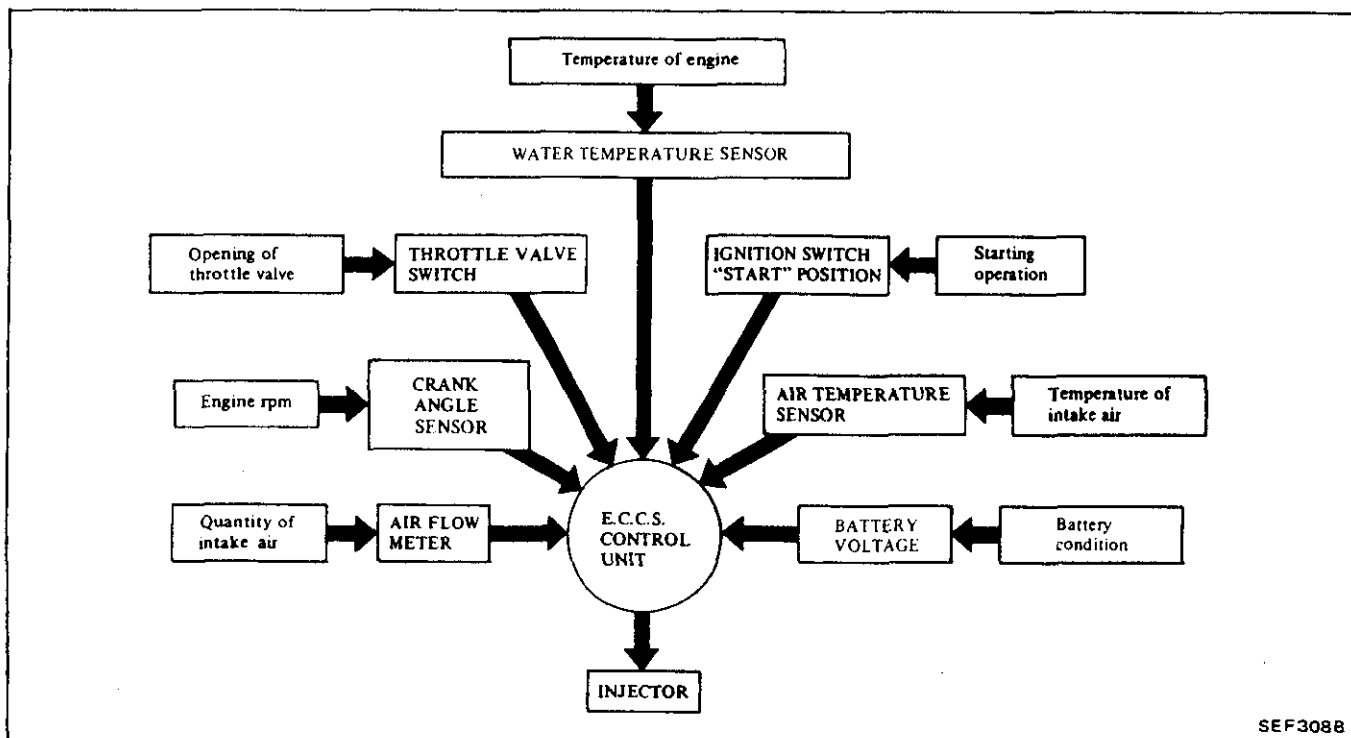
3. Push end of rubber hose with hose socket onto injector tail piece by hand as far as they will go.

Clamp is not necessary at this connection.

CAUTION:

After properly connecting fuel hose to injector, check connection for fuel leakage.

FUEL INJECTION CONTROL



The control unit determines the proper quantity of fuel to be injected from each signal input and then operates the injector. Normally, injection pulse duration is computed in the E.C.C.S. control unit adjusting to the engine operating conditions. Engine operating conditions are detected by switch and sensors. Signals from each sensor/switch are fed into the C.E.C.U. For improved driveability, fuel injection is controlled by pre-determined data in the C.E.C.U. when the engine

is cold, when driving at high speeds or under heavy load and when the fuel shut-off system is in operation. In this case, the mixture ratio is determined by the Central Electronic Control Unit (C.E.C.U.) to correspond to the engine rpm, engine load and engine warm-up conditions.

In the following instances, the control unit emits a signal that will return mixture ratio to the best point which will keep a good driving condition.

Starting engine

When starting engine.

Cold engine

When water temperature is low.

Driving condition

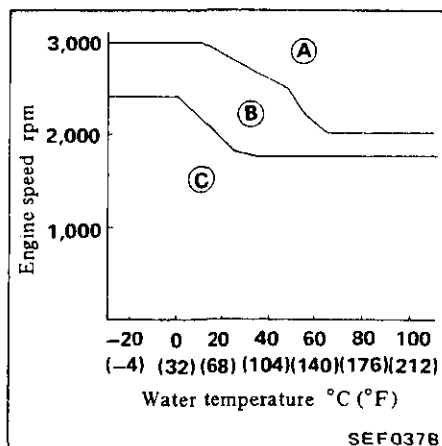
When driving at high speeds (about 7,200 rpm) or under heavy load.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

Fuel shut-off operation

Fuel shut-off is accomplished during deceleration when the engine does not require fuel.

The graph on the right shows the fuel shut off range.



When a transmission gear is in "N" position, or a clutch is depressed, this system does not operate.

| | |
|---|---|
| Deceleration from zone "A" | Fuel is shut off; and fuel is injected again in zone "C". |
| Deceleration from zone "B" | Fuel is not shut off. |
| Deceleration from zone "C" | Fuel is not shut off. |
| Engine rpm increased in order of "C", "B", and "A". (Idle switch ON, downhill driving, etc.) | Fuel is not shut off in zones "C" and "B"; in zone "A", fuel is shut off. |

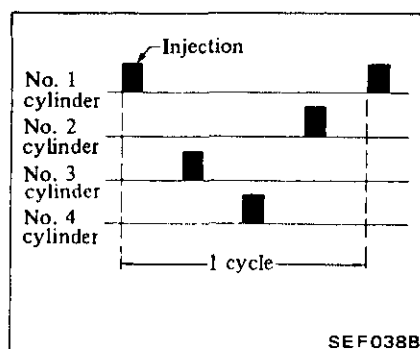
Sequential fuel injection takes the place of simultaneous fuel injection when all of the conditions or requirements described below are met. In other cases, fuel is injected in the simultaneous fuel injection mode.

- When the C.E.C.U. is monitoring a crank angle by a signal transmitted from the crank angle sensor, after the "START" signal turns "OFF" when it has been "ON",
- When the water temperature is more than 10°C (50°F) or when eleven seconds have passed after the engine has started, and
- When the crankshaft's angle of rotation is less than 80 degrees while an injection pulse is being emitted in the sequential mode or when it is less than 70 degrees in the simultaneous fuel injection mode.

SEQUENTIAL FUEL INJECTION

Two types of fuel injection systems are used — simultaneous fuel injection and sequential fuel injection. In the former, fuel is injected into all four cylinders simultaneously. In other words, pulse signals of the same width are simultaneously transmitted from the control unit to the four injectors for each cycle of engine operation. In the sequential fuel injection system, fuel is injected into cylinders according to the firing order. In this case,

four pulse signals are separately transmitted to the injectors. In this type of fuel injection, pulse width can be altered in one cycle of operation and thus improve driving performance.



ELECTRONIC IGNITION TIMING CONTROL

The ignition timing is controlled by the central electronic control unit adjusting to the engine operating conditions: that is, as the best ignition timing in each driving condition has been memorized in the unit, the ignition timing is determined by the electric signal calculated in the unit.

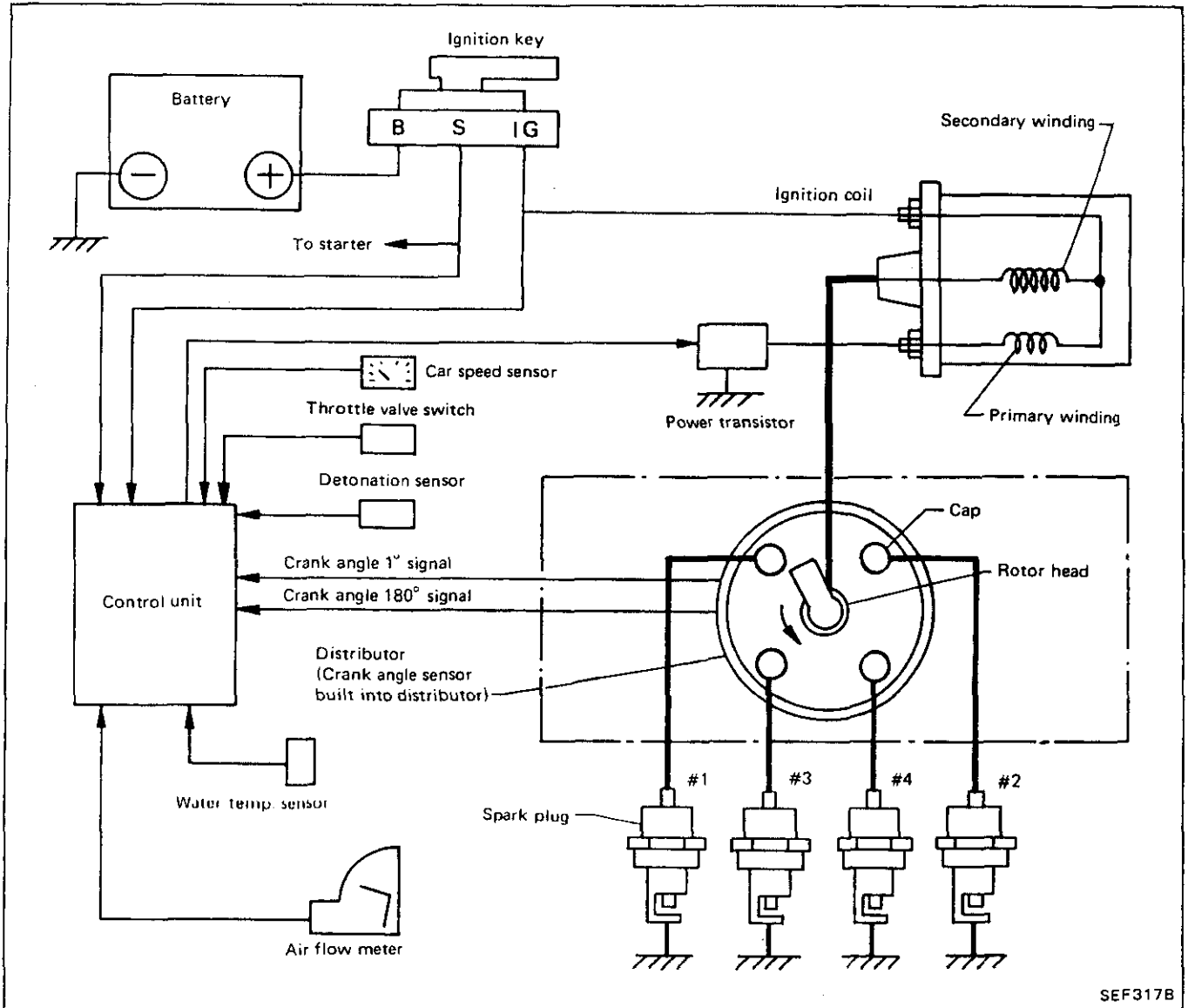
The signals used for the determination of ignition timing are cylinder head temperature, engine rpm, engine load, engine crank angle, detonation sensor and so forth.

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

Then, the signal from the central electronic control unit is transmitted to the power transistor of the ignition coil, and controls the ignition timing.

If there is engine knocking, a detonation sensor monitors its condition and the signal is transmitted to the central electronic control unit. After receiving

it, the control unit controls the ignition timing to avoid the knocking condition.



SEF317B

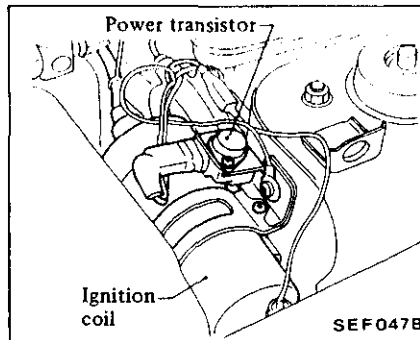
ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

ADJUSTMENT

Ignition timing is automatically controlled by the control unit, and it is usually unnecessary to adjust it.

IGNITION COIL

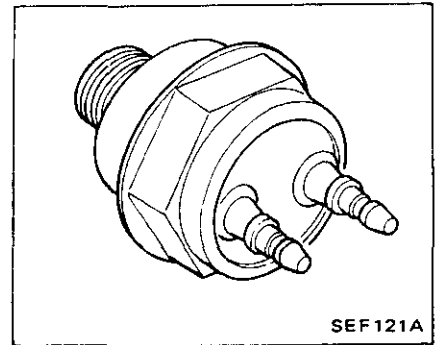
The ignition coil has a built-in power transistor. The signal from the control unit is amplified by the power transistor. This amplified signal is used to connect and disconnect the ignition coil's primary current to generate high voltage across the secondary coil, and thereby create a spark in the spark plug.



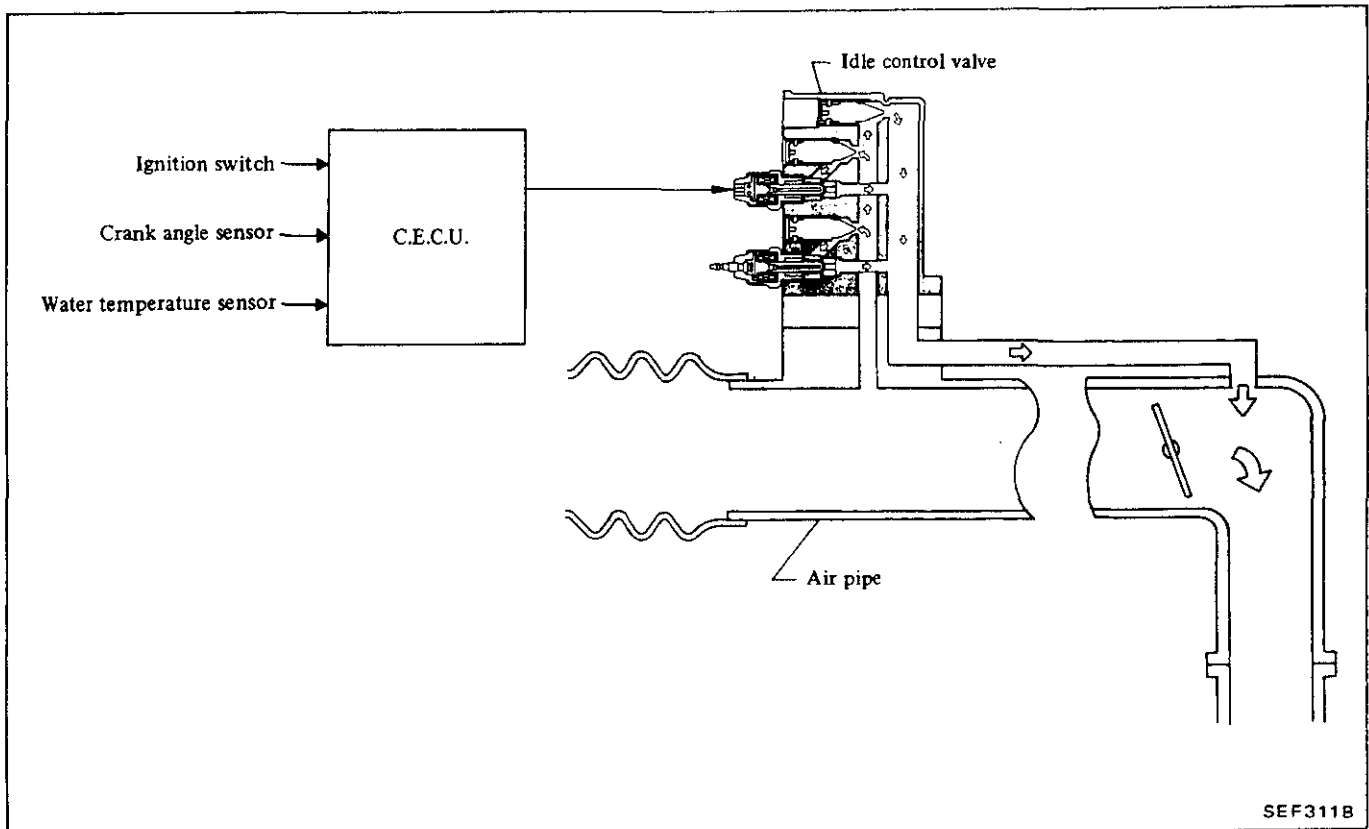
pressure in the combustion chamber into electrical signals. If the engine knocks while operating, the abnormal vibration will be detected by the detonation sensor. This signal is then sent to the control unit to retard the ignition timing to prevent further knocking.

DETONATION SENSOR

The detonation sensor is installed in the side face of the cylinder block. It converts the vibrations caused by



IDLE SPEED CONTROL



The lower limit of the idle speed is compensated by the control unit adjusting to the engine operating conditions. Water temperature and en-

gine rpm are used for the determination of idle speed. The control unit senses the idle conditions, and determines the appropriate

idle speed at each water temperature, and sends the electronic signal to the Idle speed Control Valve (I.C.V.).

ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

When the idle speed decreases lower than the specified rpm, the idle control valve is activated to maintain the idle speed within the speed range. This is indicated by hatches in the figure

below.

When the idle speed increases above the specified rpm, the idle control valve is stopped.

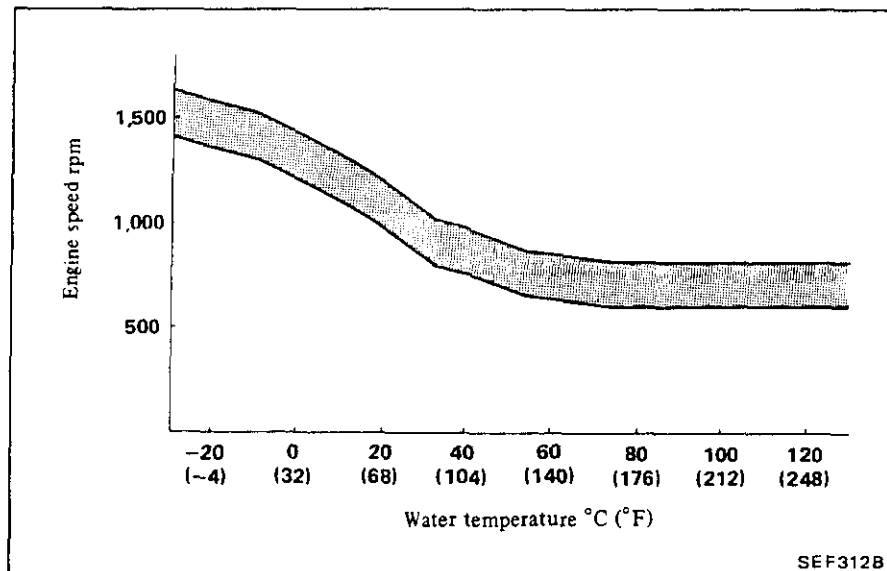
I.C.V. adjustment

CAUTION:

Do not turn adjusting screw A because this screw is preset and sealed at the optimum condition at the factory. Turning adjusting screw A might cause rough idle, body vibration etc.

If adjusting screw A is turned by mistake, readjust as follows:

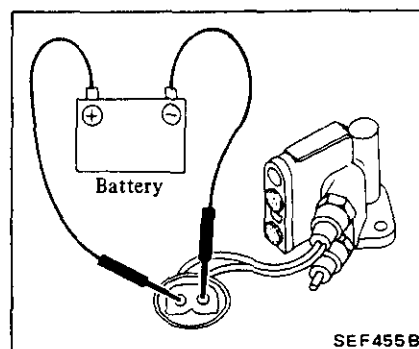
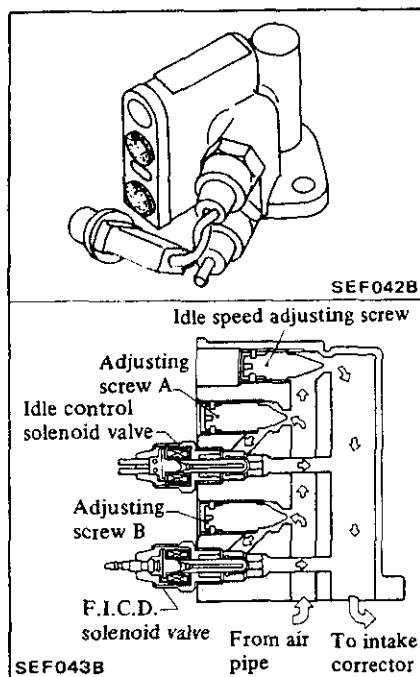
1. Warm up engine.
2. Disconnect harness connector for I.C.V.
3. Make sure that idle speed is in the specified range.
4. Apply battery voltage to the terminals of I.C.V.



SEF312B

IDLE CONTROL VALVE (I.C.V.)

The I.C.V. is attached to the air pipe and sends auxiliary air into the intake collector to increase the idle speed.



5. Remove rubber plug and turn adjusting screw A so that idle speed increases by 90 to 120 rpm.

At this time, verify that engine runs smoothly at idle.

6. Stop engine. Install rubber plug to adjusting screw A hole and connect I.C.V. harness connector.

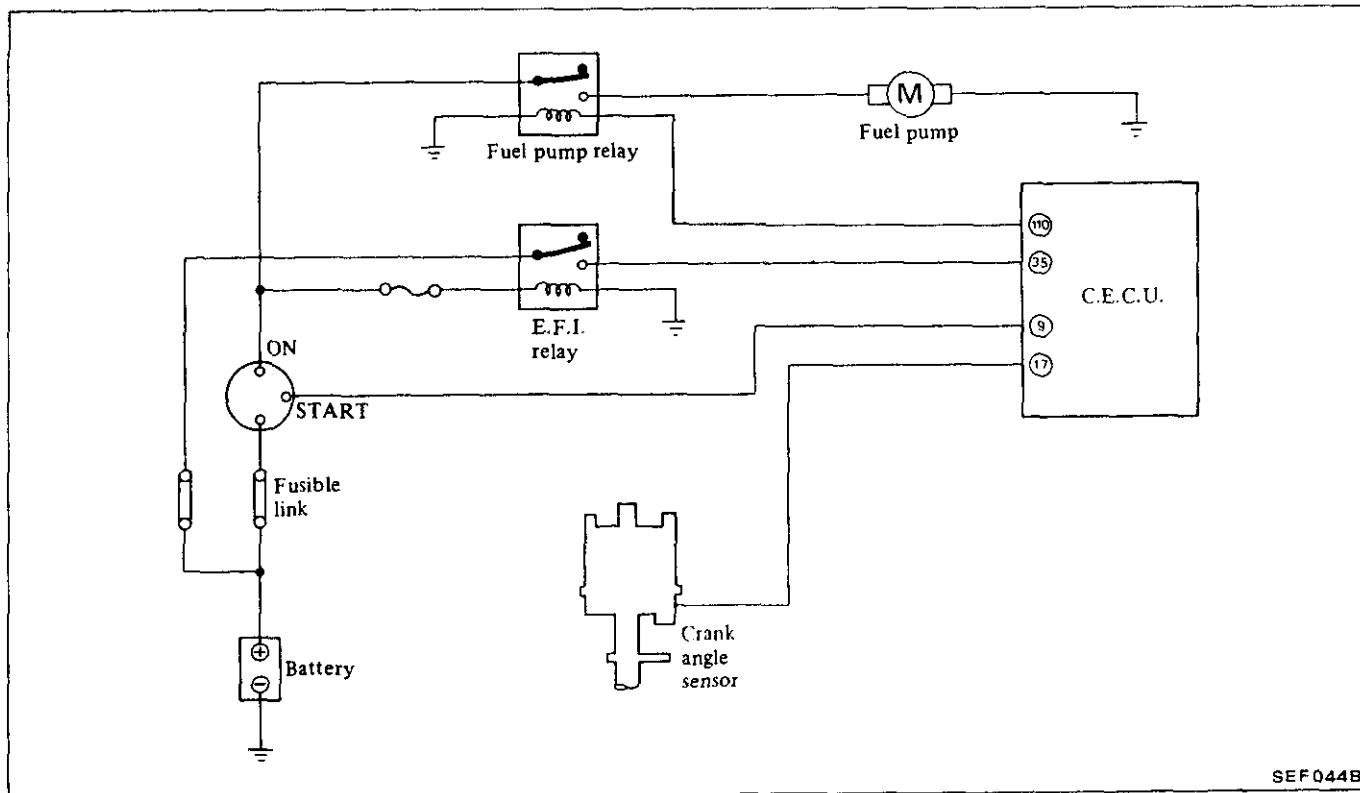
ELECTRONIC CONCENTRATED ENGINE CONTROL SYSTEM (E.C.C.S.)

FUEL PUMP CONTROL

The fuel pump is controlled by the central electronic control unit adjust-

ing to the engine conditions. The signals from engine crank angle and

ignition switch are used for the fuel pump operation.



SEF044B

FUEL PUMP

A relief valve in the pump is designed to open when the pressure in the fuel line rises over 422 to 490 kPa (4.22 to 4.90 bar, 4.3 to 5.0 kg/cm², 61 to 71 psi) due to malfunction in the pressure system.

The check valve prevents abrupt drop of pressure in the fuel pipe when stopping the engine.

Fuel pump operation

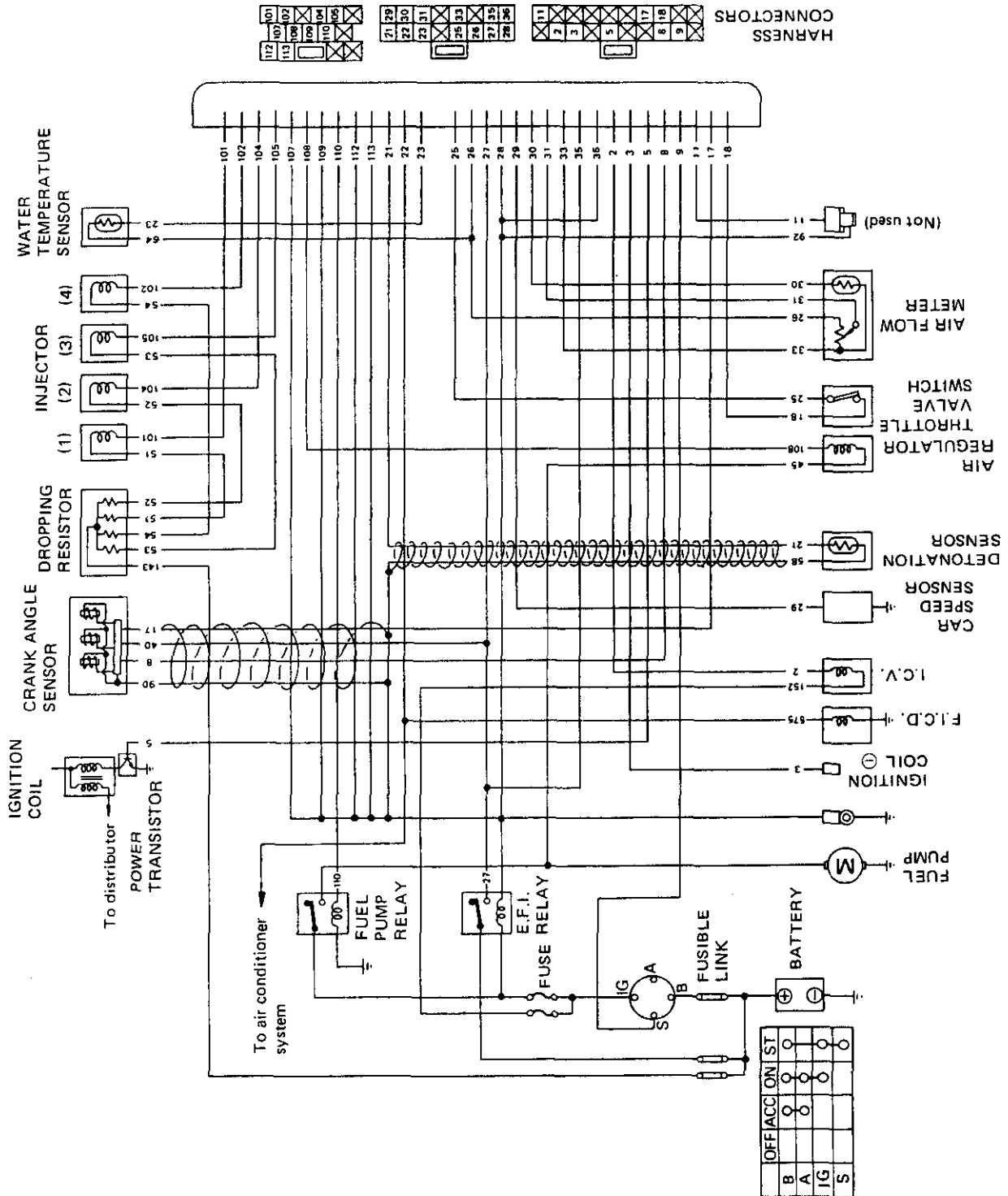
The control unit controls the operation of the fuel pump as follows:

- When a "START" signal is not received by the control unit after the ignition switch has been turned "ON", the fuel pump operates for a period of five seconds.

- While the engine is in operation (or when the control unit receives a 180° signal), the fuel pump continues to operate.
- When the engine stops, the fuel pump automatically stops within 1.0 second.

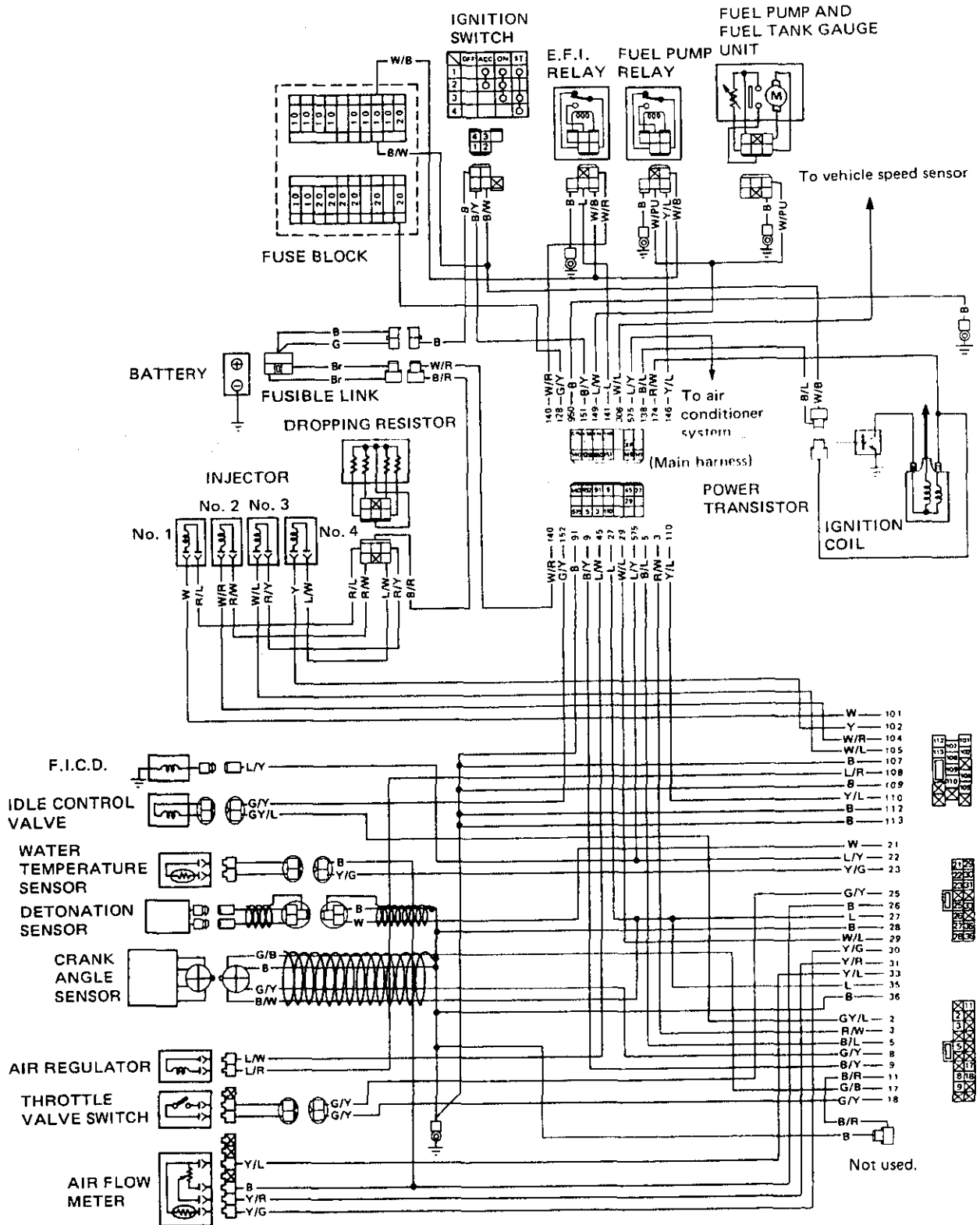
ELECTRICAL SYSTEM INSPECTION

E.C.C.S. CIRCUIT DIAGRAM



ELECTRICAL SYSTEM INSPECTION

E.C.C.S. WIRING DIAGRAM



ELECTRICAL SYSTEM INSPECTION

PREPARATIONS FOR INSPECTION

VEHICLE PREPARATIONS

1. Turn ignition switch to "OFF" position.

CAUTION:

Before disconnecting and connecting electrical connectors, ensure that ignition switch is in the "OFF" position.

2. Disconnect battery ground cable.
3. Disconnect lead wire from "S" terminal of starter motor.
4. Arrange so that air flow meter flap can be pushed manually from air cleaner side.
5. Disconnect 15-pin, 20-pin and 16-pin E.C.C.S. harness connectors from control unit.

CAUTION:

- a. Before disconnecting ECCS harness at 15-pin, 20-pin and 16-pin connectors, ensure that ignition switch is in the "OFF" position.
- b. Be extremely careful not to break or bend 15-pin, 20-pin and 16-pin when disconnecting terminal. Do not touch the circuit tester probe to any unnecessary pin on the 15-pin, 20-pin and 16-pin connectors. Doing so could cause damage to the circuit tester.
- c. After inspection or replacement, connect E.C.C.S. harness connectors with control unit securely and make sure that connectors are secured properly. (At this time, a click may be heard.)

THROTTLE VALVE SWITCH TESTS

| Test No. 1 Idle contacts | | | | |
|--------------------------|---------------|-----|--------------------|---------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | Throttle depressed | No continuity |
| | 18 | 25 | Throttle released | Continuity |

SEF502A

If test is O.K., go to Test No. 2.
If test is not O.K., go to Throttle Valve Switch Adjustment.

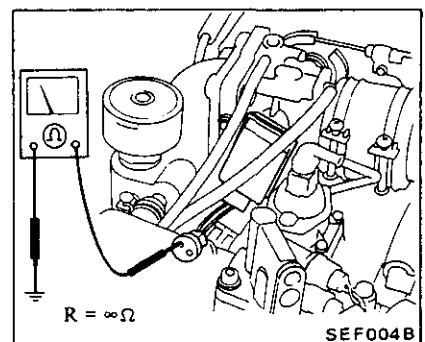
| Test No. 2 Insulation test | | | | |
|----------------------------|---------------|-------------|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | | |
| | 18 | Body ground | | $\infty \Omega$ |

SEF502A

If test is O.K., go to Throttle Valve Switch Adjustment.

If test is not O.K., go to Component Check.

Component check



Connect ohmmeter between engine and terminals 18 and 25. Ohmmeter reading should be infinite.

If test is O.K., check harness.
If test is not O.K., replace component and retest.

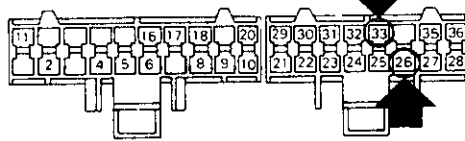
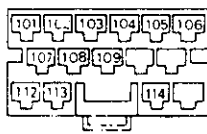
ELECTRICAL SYSTEM INSPECTION

ADJUSTMENT

Refer to THROTTLE VALVE SWITCH.

AIR FLOW METER TESTS

| Test No. 1 Air flow meter resistance | | | | |
|--------------------------------------|---------------|-----|-------|------------------------|
| Tester | Leads to Pins | | Notes | Should Read |
| | (+) | (-) | | |
| Ohmmeter | 33 | 26 | | Approx. 280 to 400Ω |



SEF504A

If test is O.K., go to Test No. 2.

If test is not O.K., perform component check.

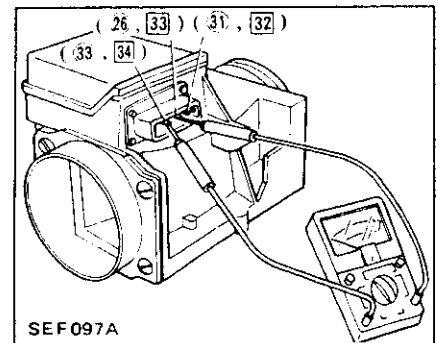
*Note

Pin numbers between C.E.C.U. and Air Flow Meter do not match.

○ : Pin numbers of C.E.C.U.

□ : Pin numbers on Air Flow Meter

Component check

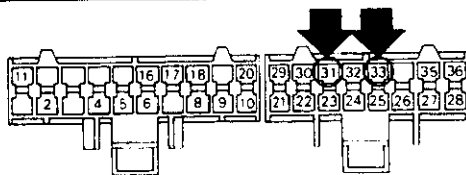
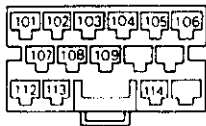


Measure the resistance between terminals (26, 33) and (33, 34). The standard resistance is approximately 280 to 400 ohm.

If test is O.K., check harness.

If test is not O.K., replace component.

| Test No. 2 Air flow meter resistance | | | | |
|--------------------------------------|---------------|-----|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| | (+) | (-) | | |
| Ohmmeter | 33 | 31 | | Except 0 and ∞Ω |



SEF505A

If test is O.K., go to Test No. 3.

If test is not O.K., perform component check.

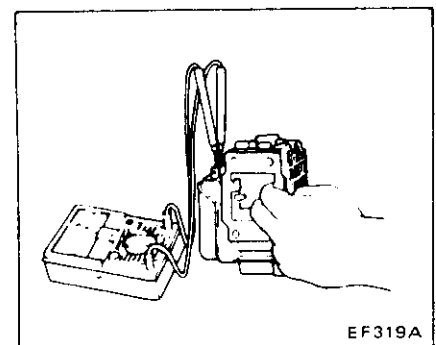
*Note

Pin numbers between C.E.C.U. and Air Flow Meter do not match.

○ : Pin numbers of C.E.C.U.

□ : Pin numbers on Air Flow Meter

Component check



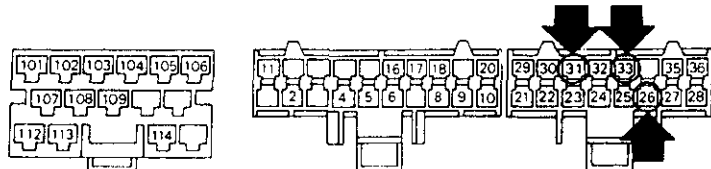
While sliding flap, measure resistance between terminals (33, 34) and (31, 32). If resistance is at any value other than 0 and ∞ ohm, air flow meter is normal.

If test is O.K., check harness.

If test is not O.K., replace component.

ELECTRICAL SYSTEM INSPECTION

| Test No. 3 Insulation resistance | | | |
|----------------------------------|----------------|-------------|-----------------|
| Tester | Leads to Pins | | Notes |
| Ohmmeter | (+) | (-) | |
| | 26 31 33 | Body ground | |
| | | | $\infty \Omega$ |



If test is O.K., go to Test No. 4.

If test is not O.K., perform component check.

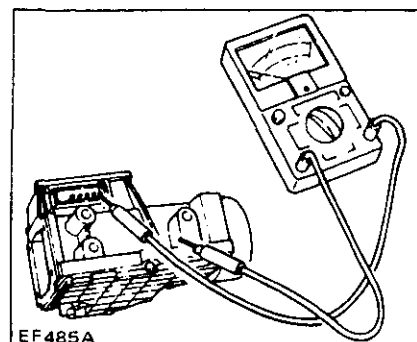
*Note

Pin numbers between C.E.C.U. and Air Flow Meter do not match.

○ : Pin numbers of C.E.C.U.

□ : Pin numbers on Air Flow Meter

Component check

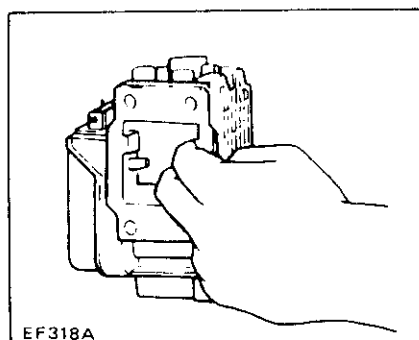


Check insulation resistance between the air flow meter body and any one of the terminals (26 , 33), (31 , 32) and (33 , 34). If continuity exists, the air flow meter is out of order.

If test is O.K., check harness.

If test is not O.K., replace component.

Test No. 4 air flow meter flap



Fully open the flap by hand to check that it opens smoothly without binding. If it doesn't, it is out of order.

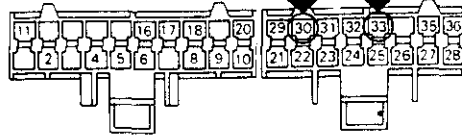
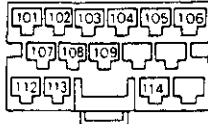
If test is O.K., air flow meter is O.K.

If test is not O.K., replace air flow meter.

ELECTRICAL SYSTEM INSPECTION

AIR TEMPERATURE SENSOR TESTS

| Test No. 1 Air Temperature Sensor | | | | |
|-----------------------------------|---------------|-----|------------------------|-------------------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | Intake air temperature | Below 2.9 k Ω |
| | 33 | 30 | 20°C (68°F) or above | |
| | | | Below 20°C (68°F) | 2.1 k Ω or above |



SEF507A

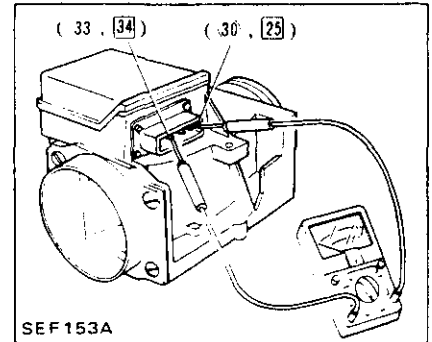
***Note**

Pin numbers between C.E.C.U. and Air Flow Meter do not match.

○ : Pin numbers of C.E.C.U.

□ : Pin numbers on Air Flow Meter

Component check



SEF153A

If test is O.K., go to Test No. 2.

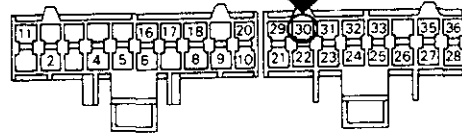
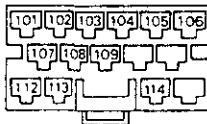
If test is not O.K., perform component check.

1. Measure the outside air temperature.
2. Measure resistance between terminals (33, 34) and (30, 25) of the air flow meter connector.

If test is O.K., check harness.

If test is not O.K., replace component.

| Test No. 2 Insulation Resistance | | | | |
|----------------------------------|---------------|-------------|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | | $\infty \Omega$ |
| | 30 | Body ground | | |



SEF508A

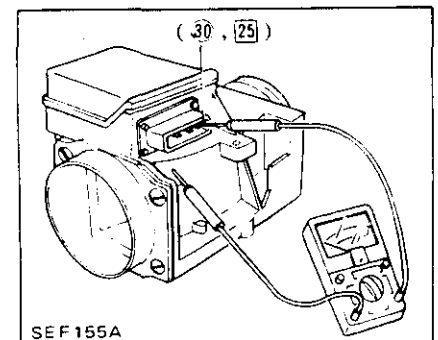
***Note**

Pin numbers between C.E.C.U. and Air Flow Meter do not match.

○ : Pin numbers of C.E.C.U.

□ : Pin numbers on Air Flow Meter

Component check



SEF155A

If test is O.K., air temperature sensor is O.K.

If test is not O.K., perform component check.

Check insulation resistance between terminal (30, 25) and air flow meter body.

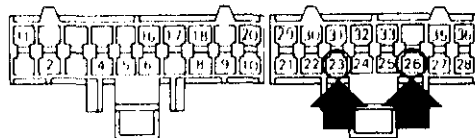
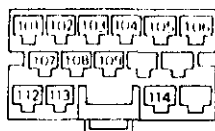
If test is O.K., check harness.

If test is not O.K., replace component.

ELECTRICAL SYSTEM INSPECTION

WATER TEMPERATURE SENSOR TESTS

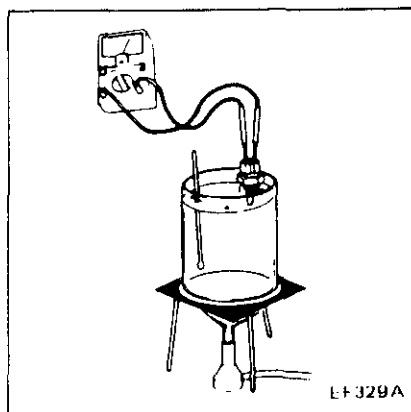
| Water temperature sensor test | | | | |
|-------------------------------|---------------|-----|----------------------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | 20°C (68°F) or above | Below 2.9 kΩ |
| | 23 | 26 | Below 20°C (68°F) | 2.1 kΩ or above |



SEF509A

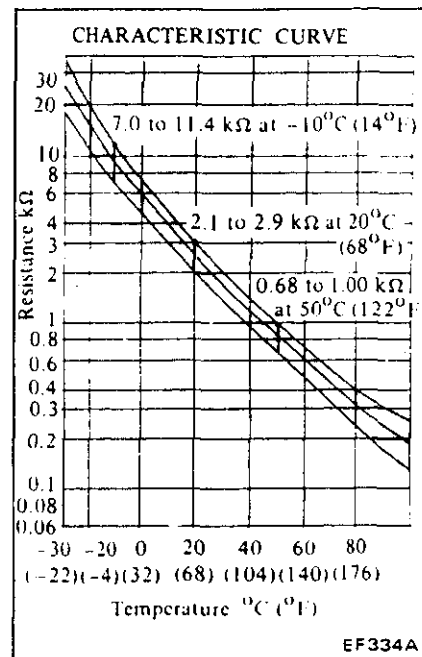
If test is O.K., test is complete.
If test is not O.K., perform component check.

Component check



EF329A

Dip the sensor into water maintained at a temperature of 20°C (68°F), 80°C (176°F), etc., and read its resistance.



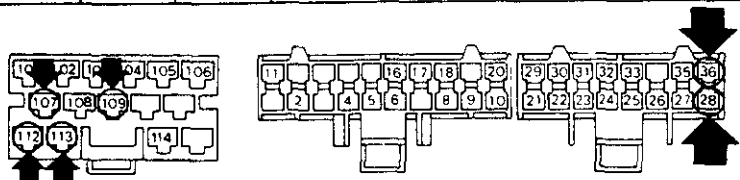
If test matches curve, sensor is O.K.
Check harness.

If test does not match curve, replace sensor.

ELECTRICAL SYSTEM INSPECTION

CONTROL UNIT GROUND CIRCUIT TESTS

| Control unit ground circuit tests | | | | |
|-----------------------------------|-------------------|-------------|-------|-------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | | 0Ω |
| | 28 109 | Body ground | | |
| | 36 112 107 113 | | | |



The diagram shows two views of the control unit. The left view is a top-down perspective of the front of the unit, showing pins 10, 102, 104, 105, 106, 107, 108, 109, 112, 113, and 114. Arrows point to pins 112 and 113. The right view is a side-on perspective of the unit, showing pins 11, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, and 36. Arrows point to pins 35 and 36.

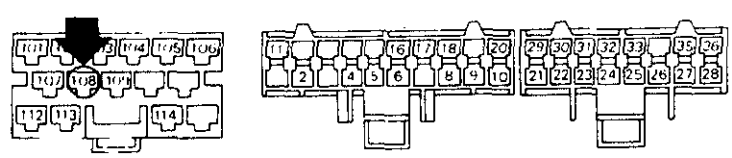
SEF511A

If tests are O.K., ground circuits are O.K.

If tests are not O.K., check wiring diagram and harness.

AIR REGULATOR AND FUEL PUMP RELAY TESTS

| Test No. 1 Air regulator resistance | | | | |
|-------------------------------------|---------------|-------------|-------|-------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Ohmmeter | (+) | (-) | | 25 to 90Ω |
| | 108 | Body ground | | |



The diagram shows two electrical components. On the left is a 24-pin connector with pins numbered 1 through 14. Pin 108 is indicated by a black arrow pointing to the top of pin 8. On the right is a 36-pin connector with pins numbered 1 through 36. Pins 1, 2, 4, 5, 6, 8, 9, 10, 16, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 36 are shown with their respective pin headers.

SEF512A

If test is O.K., go to Test No. 2.

If test is not O.K., check air regulator or fuel pump.

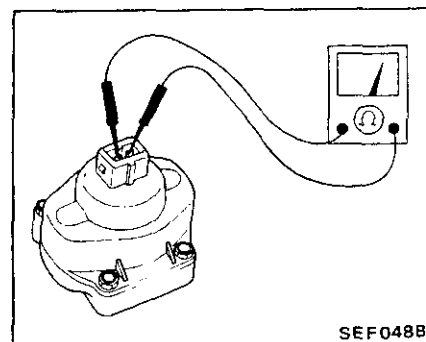
Test No. 2 Air regulator and fuel pump circuit

1. Connect E.C.C.S. harness connectors to C.E.C.U.
2. Turn ignition switch to "ON".
3. Listen for fuel pump operating sounds for about 5 seconds.
4. If no sound is heard, check fuel pump relay.

If fuel pump operates, check air regulator.

CHECKING AIR REGULATOR

1. Disconnect electric connector of air regulator, and check continuity. Continuity should exist. If not, air regulator is faulty.



SEF048B

2. Remove air regulator and visually check slide plate opening.
 - When engine is cold... Open
 - After warm-up Closed
3. Rotate slide plate with a finger. If slide plate opens and closes smoothly, it is operating properly.

If test is O.K., check harness.

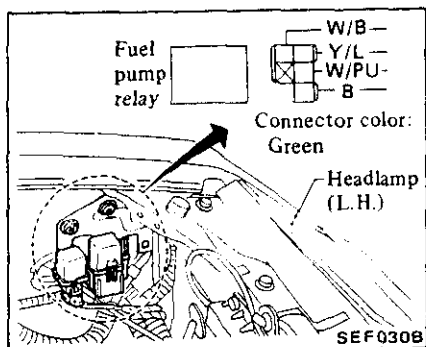
If test is not O.K., replace component and retest.

ELECTRICAL SYSTEM INSPECTION

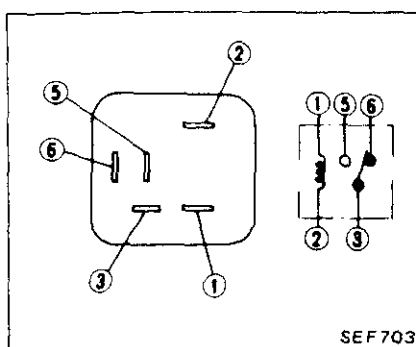
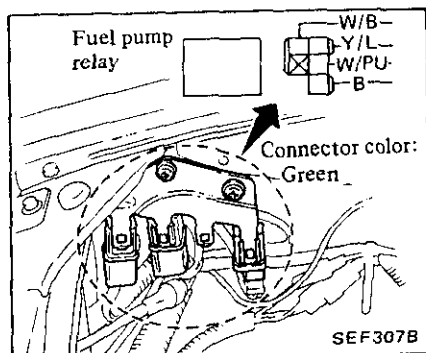
CHECKING FUEL PUMP RELAY

The fuel pump relay is installed on the relay bracket.

L.H. drive models



R.H. drive models



| Check terminals | Normal condition | 12V direct current is applied between terminals ① and ② |
|-----------------|------------------|---|
| ① - ② | Continuity | — |
| ③ - ⑤ | No continuity | Continuity |
| ③ - ⑥ | Continuity | No continuity |

If test is O.K., check harness.

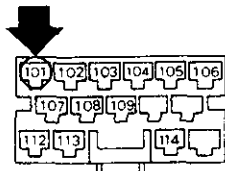
If test is not O.K., replace relay and retest.

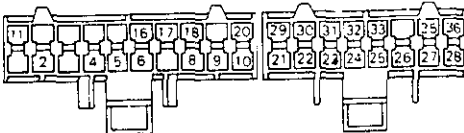
ELECTRICAL SYSTEM INSPECTION

INJECTOR CIRCUIT TESTS

CAUTION: Never turn the selecting switch of the tester to the "Ohmmeter" or "Ammeter" position during these tests as it may burn out the injectors and circuit.

| Test No. 1 Cylinder No. 1 | | | | |
|---------------------------|---------------|-------------|-------------------------------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Voltmeter | (+) | (-) | Connect battery ground cable. | Battery voltage |
| | 101 | Body ground | | |





SEF515A

If test is O.K., go to Test No. 2.

If test is not O.K., go to Component Check.

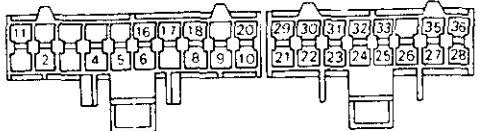
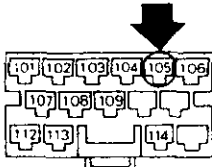
| Test No. 2 Cylinder No. 2 | | | | |
|---------------------------|---------------|-------------|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Voltmeter | (+) | (-) | | Battery voltage |
| | 104 | Body ground | | |

SEF518A

If test is O.K., go to Test No. 3.

If test is not O.K., go to Component Check.

| Test No. 3 Cylinder No. 3 | | | | |
|---------------------------|---------------|-------------|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Voltmeter | (+) | (-) | | Battery voltage |
| | 105 | Body ground | | |

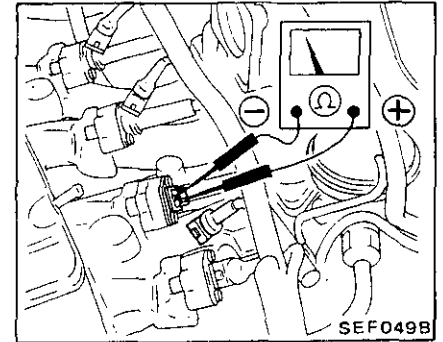


SEF519A

If test is O.K., go to Test No. 4.

If test is not O.K., go to Component Check.

Component check



SEF049B

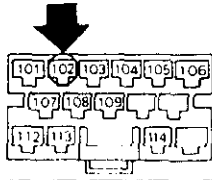

1. Disconnect ground cable from battery.
2. Disconnect electric connectors from injectors.
3. Check continuity between the two terminals. Continuity should exist. If not, injector(s) are faulty.

If test is O.K., go to E.C.C.S. harness Check.

If test is not O.K., replace injector.

ELECTRICAL SYSTEM INSPECTION

| Test No. 4 Cylinder No. 4 | | | | |
|---------------------------|---------------|-------------|-------|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Voltmeter | (+) | (-) | | Battery voltage |
| | 102 | Body ground | | |

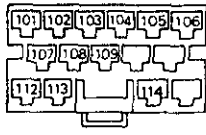
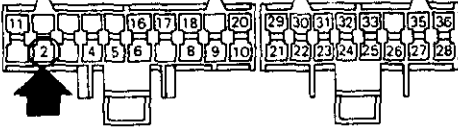
SEF516A

If test is O.K., all injectors are O.K.

If test is not O.K., perform E.C.C.S. harness check.

IDLE CONTROL VALVE (I.C.V.) TEST

| Test No. 1 Solenoid valve for I.S.C. | | | | |
|--------------------------------------|---------------|-------------|---|-----------------|
| Tester | Leads to Pins | | Notes | Should Read |
| Voltmeter | (+) | (-) | 1. Connect battery ground cable. 2. Ignition "ON". | Battery voltage |
| | 2 | Body ground | | |

SEF524A

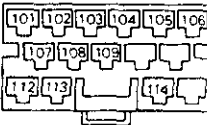
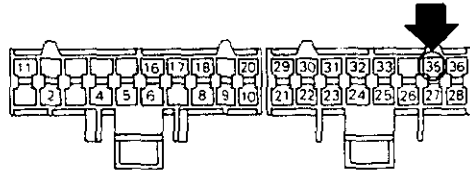
If test is O.K., solenoid valve and circuit of I.C.V. are O.K.

If test is not O.K., check solenoid valve and circuit.

ELECTRICAL SYSTEM INSPECTION

E.F.I. RELAY

| E.F.I. relay test (Control unit power input circuit test) | | | |
|---|---------------|-------------|---|
| Tester | Leads to Pins | | Notes |
| Voltmeter | (+) | (-) | 1. Connect battery ground cable. 2. Ignition "ON". |
| | 35 | Body ground | |

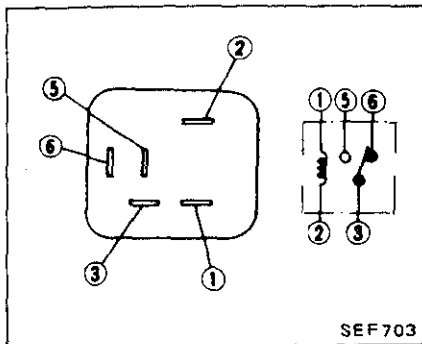
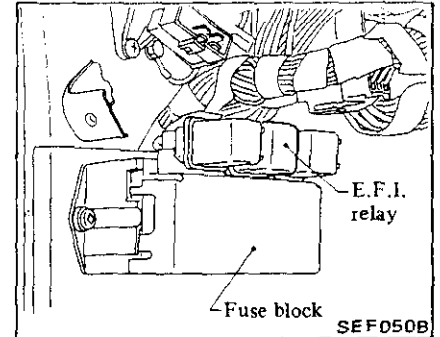



SEF521A

If test is O.K., E.F.I. relay is O.K.

If test is not O.K., perform component check.

Component check



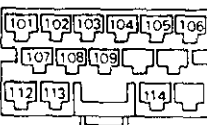
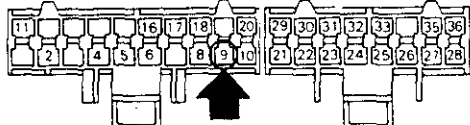
SEF703

| Check terminals | Normal condition | 12V direct current is applied between terminals ① and ② |
|-----------------|------------------|---|
| ① - ② | Continuity | - |
| ③ - ⑤ | No continuity | Continuity |
| ③ - ⑥ | Continuity | No continuity |

If test is O.K., check harness.
If test is not O.K., replace relay and retest.

IGNITION START SIGNAL TEST

| Ignition start signal test | | | |
|----------------------------|---------------|-------------|---|
| Tester | Leads to Pins | | Notes |
| Voltmeter | (+) | (-) | 1. Disconnect starter motor "S" terminal. 2. Connect battery ground cable. 3. Ignition "START". |
| | 9 | Body ground | |

SEF523A

If test is O.K., ignition start signal is O.K.

If test is not O.K., inspect ignition coil and harness.

SERVICE DATA AND SPECIFICATIONS

SERVICE DATA AND SPECIFICATIONS

INSPECTION AND ADJUSTMENT

FUEL PUMP

| | |
|---|--|
| Cut-off discharge pressure kPa (bar, kg/cm ² , psi) | 422 - 490 (4.22 - 4.90, 4.3 - 5.0, 61 - 71) |
|---|--|

PRESSURE REGULATOR

| | |
|---|---------------------------|
| Regulated pressure kPa (bar, kg/cm ² , psi) | 250.1 (2.501, 2.55, 36.3) |
|---|---------------------------|

FUEL PRESSURE

Unit: kPa (bar, kg/cm², psi)

Measuring point:
between fuel filter and fuel pipe

| | |
|-----------|--------------------------------------|
| At idling | Approximately 206 (2.06, 2.1, 30) |
|-----------|--------------------------------------|

| | |
|--|--------------------------------------|
| The moment accelerator pedal is fully depressed | Approximately 255 (2.55, 2.6, 37) |
|--|--------------------------------------|

FUEL INJECTOR

| | | |
|-----------------|----------|------|
| Coil resistance | Ω | 2.35 |
|-----------------|----------|------|

AIR FLOW METER

Unit: Ω

| | |
|--|-------------------|
| Potentiometer resistance between terminals (33, 34) and (26, 33) | Approx. 280 - 400 |
|--|-------------------|

| | |
|--|-----------------------|
| between terminals (33, 34) and (31, 32) | Except 0 and ∞ |
|--|-----------------------|

Pin numbers between C.E.C.U. and Air Flow Meter do not
match.

- : Pin numbers of C.E.C.U.
- : Pin numbers on Air Flow Meter

THROTTLE VALVE SWITCH

| | | |
|--|-----|---------------------|
| Engine speed when idle switch is changed from "ON" to "OFF" | rpm | Approximately 1,100 |
|--|-----|---------------------|

WATER TEMPERATURE SENSOR

Unit: k Ω

| | |
|--|------------|
| Thermistor resistance at -10°C (14°F) | 7.0 - 11.4 |
| at 20°C (68°F) | 2.1 - 2.9 |
| at 50°C (122°F) | 0.68 - 1.0 |

AIR TEMPERATURE SENSOR

Unit: k Ω

| | |
|--|-------------|
| Thermistor resistance at -10°C (14°F) | 7.0 - 11.4 |
| at 20°C (68°F) | 2.1 - 2.9 |
| at 50°C (122°F) | 0.68 - 1.00 |

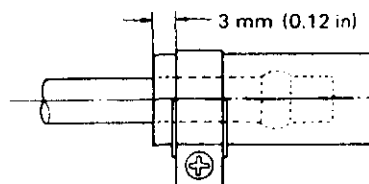
AIR REGULATOR

| | |
|--|---------|
| Air flow quantity [at 20°C (68°F)] m ³ (cu ft)/hr | 9 (318) |
|--|---------|

TIGHTENING TORQUE

| Unit | N-m | kg-m | ft-lb |
|------------------------------------|-----------|-------------|-----------|
| Throttle chamber securing screw | 15 - 20 | 1.5 - 2.0 | 11 - 14 |
| Fuel hose clamp | 1.0 - 1.5 | 0.10 - 0.15 | 0.7 - 1.1 |

Fuel hose clamping position



EF336A

EMISSION CONTROL SYSTEM

GENERAL DESCRIPTION

| System | Destination | Europe and general areas | Sweden | Australia | Major unit |
|-------------------------------------|-------------|-----------------------------|--------|-----------|--|
| Crankcase emission control system | | X | X | X | P.C.V. valve |
| Evaporative emission control system | | — | — | X | <ul style="list-style-type: none">• Carbon canister• Fuel check valve |

X: Available —: Not available

EC

CRANKCASE EMISSION CONTROL SYSTEM

DESCRIPTION

MODEL EQUIPPED WITH TURBOCHARGER

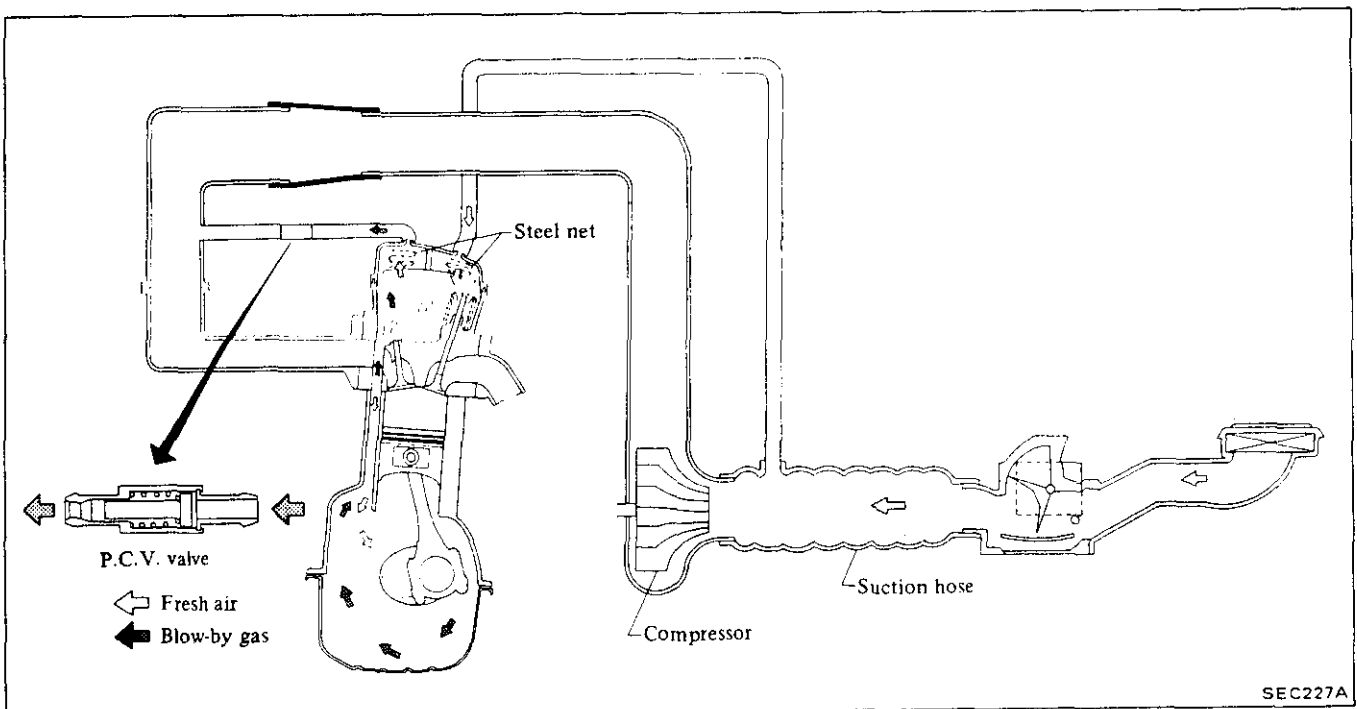
This system returns blow-by gas to both the suction hose and the intake manifold.

Since a vacuum is normally kept in the portion between the air cleaner suction hose, blow-by gas in the rocker

cover is sucked into the turbocharger from the suction hose, and is then sent into the intake manifold through the throttle chamber where it is burnt in the engine.

Blow-by gas located in the crankcase flows into the intake manifold through the positive crankcase venti-

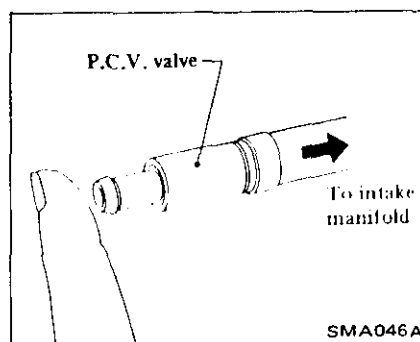
lation (P.C.V.) valve in the blow-by hose when vacuum is maintained in the intake manifold. If positive pressure exists in the intake manifold, any blow-by gas in the crankcase is led to the blow-by upper hose, which prevents an abnormal rise in crankcase pressure.



INSPECTION

P.C.V. VALVE

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



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 of obstructions, replace.

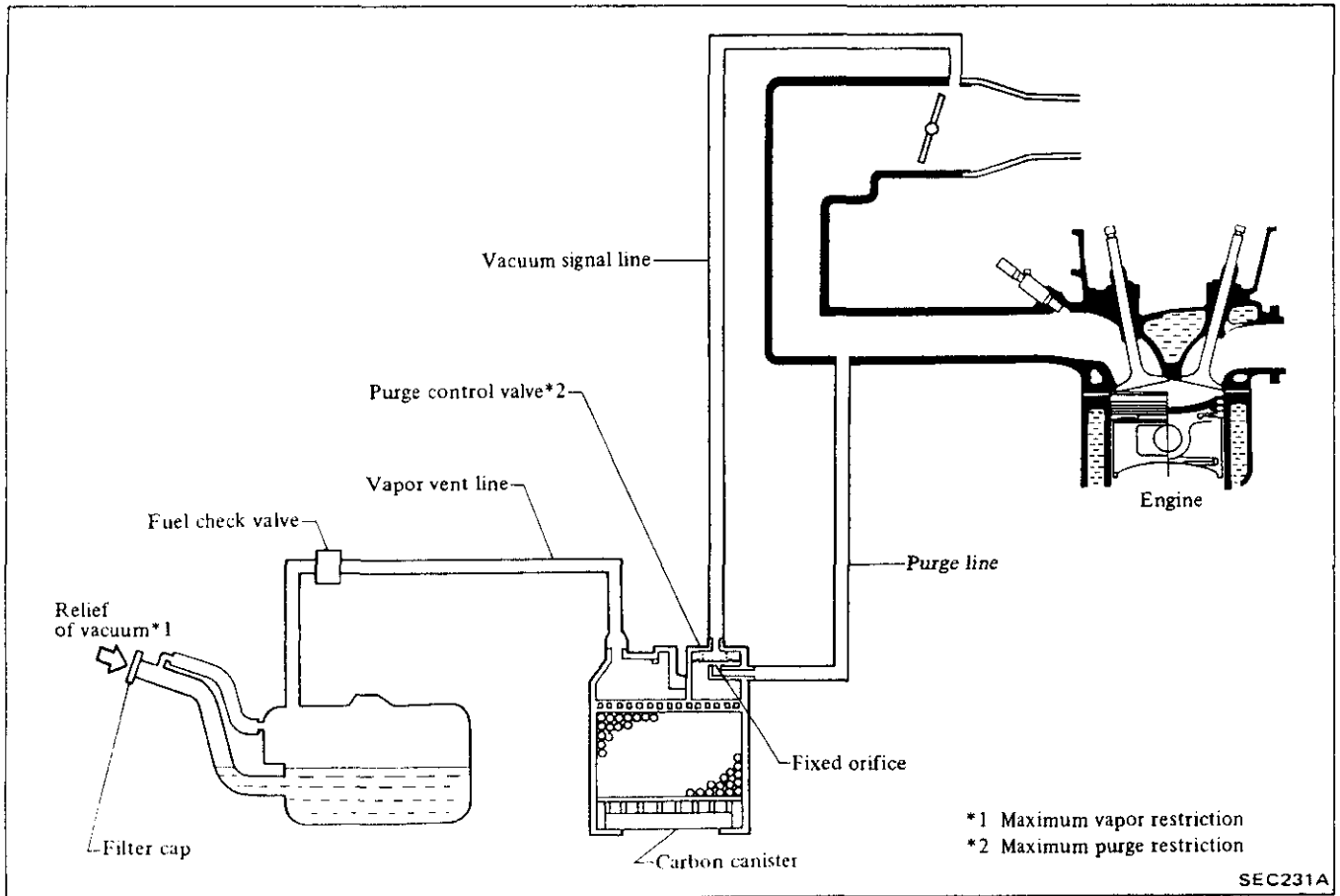
EVAPORATIVE EMISSION CONTROL SYSTEM

DESCRIPTION

The evaporative emission control system is used to reduce hydrocarbons

emitted to the atmosphere from the fuel system. This reduction of hydro-

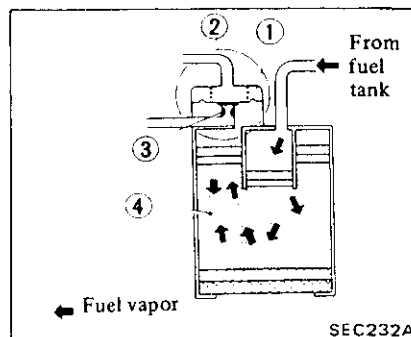
carbons is accomplished by activated charcoals in the carbon canister.



OPERATION

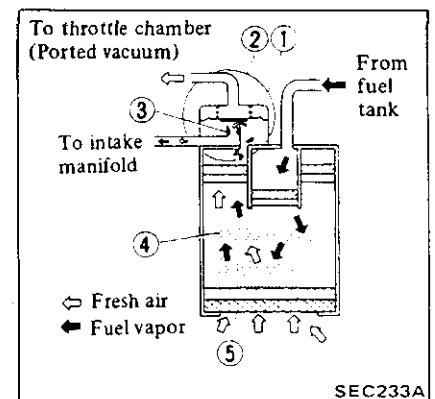
The canister retains the vapor until the canister is purged by the air drawn through the purge line to the intake manifold when the engine is operated. When the engine runs at idle, the purge control valve is closed. As the engine speed increases, and the ported vacuum rises higher, the purge control valve opens and the vapor is sucked into the intake manifold through the fixed orifice. When the engine stops and intake manifold pressure become atmospheric pressure, the purge control valve is closed, and the vapor is retaining again.

(1) Engine does not operate or operates at idle.



- 1 Diaphragm
- 2 Purge control valve
- 3 Fixed orifice
- 4 Activated carbon

(2) Engine speed increases.



- 1 Diaphragm
- 2 Purge control valve
- 3 Fixed orifice
- 4 Activated carbon
- 5 Filter

EVAPORATIVE EMISSION CONTROL SYSTEM

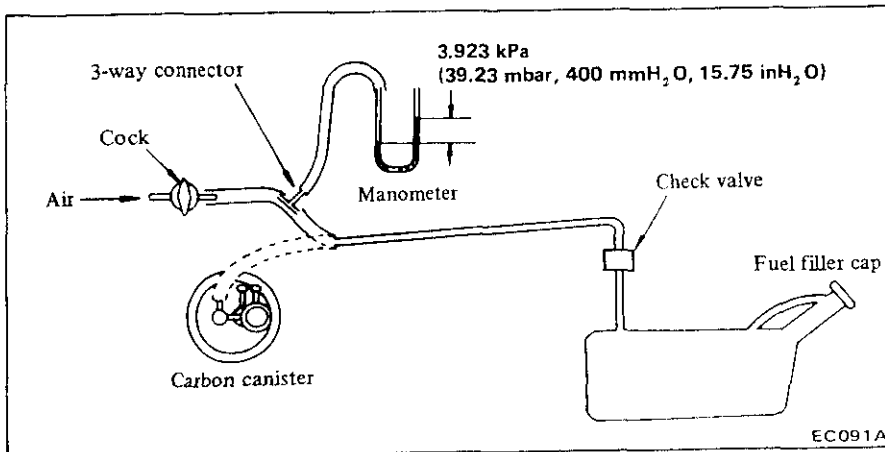
INSPECTION

FUEL TANK AND VAPOR VENT LINE

1. Check all hoses and fuel tank filler cap.
2. Disconnect the vapor vent line connecting carbon canister to fuel tank.

3. Connect a 3-way connector, a manometer and a cock (or an equivalent 3-way charge cock) to the end of the vent line.

4. Supply fresh air into the vapor vent line through the cock little by little until pressure becomes 3.923 kPa (39.23 mbar, 400 mmH₂O, 15.75 inH₂O).



5. Shut the cock completely and leave it unattended.
6. After 2.5 minutes, measure the height of the liquid in the manometer.
7. Variation in height should remain at 0.245 kPa (2.45 mbar, 25 mmH₂O, 0.98 inH₂O).
8. When filler cap does not close completely, the height should drop to zero in a short time.
9. If the height does not drop to zero in a short time when filler cap is removed, the cause is a stuffy hose.

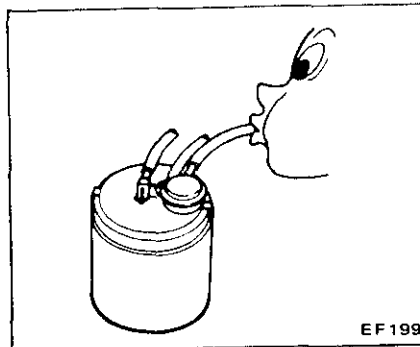
In case the vent line is stuffy the breathing in fuel tank is not thoroughly made thus causing insufficient deliver of fuel to engine or vapor lock. It must, therefore, be repaired or replaced.

CARBON CANISTER PURGE CONTROL VALVE

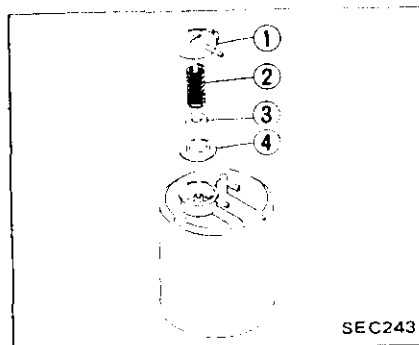
Check for fuel vapor leakage, in the vacuum line, at diaphragm of carbon canister purge control valve.

To check for leakage, proceed as follows:

1. Inhale air into the opening of rubber hose running to vacuum hole in carbon canister and ensure that there is no leak.



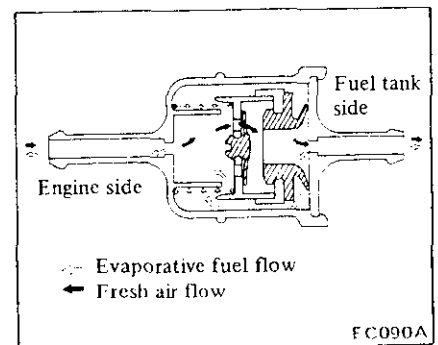
2. If there is a leak, remove top cover from purge control valve and check for dislocated or cracked diaphragm. If necessary, replace diaphragm kit (which is made up of a retainer, diaphragm and spring).



- 1 Cover
- 2 Diaphragm spring
- 3 Retainer
- 4 Diaphragm

FUEL CHECK VALVE

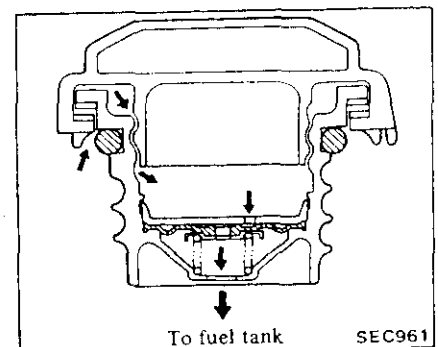
1. Blow air through connector on fuel tank side. A considerable resistance should be felt at the mouth and a portion of air flow be directed toward the engine.
2. Blow air through connector on engine side. Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not being properly functioning in steps 1 and 2 above, replace.



FUEL TANK VACUUM RELIEF VALVE

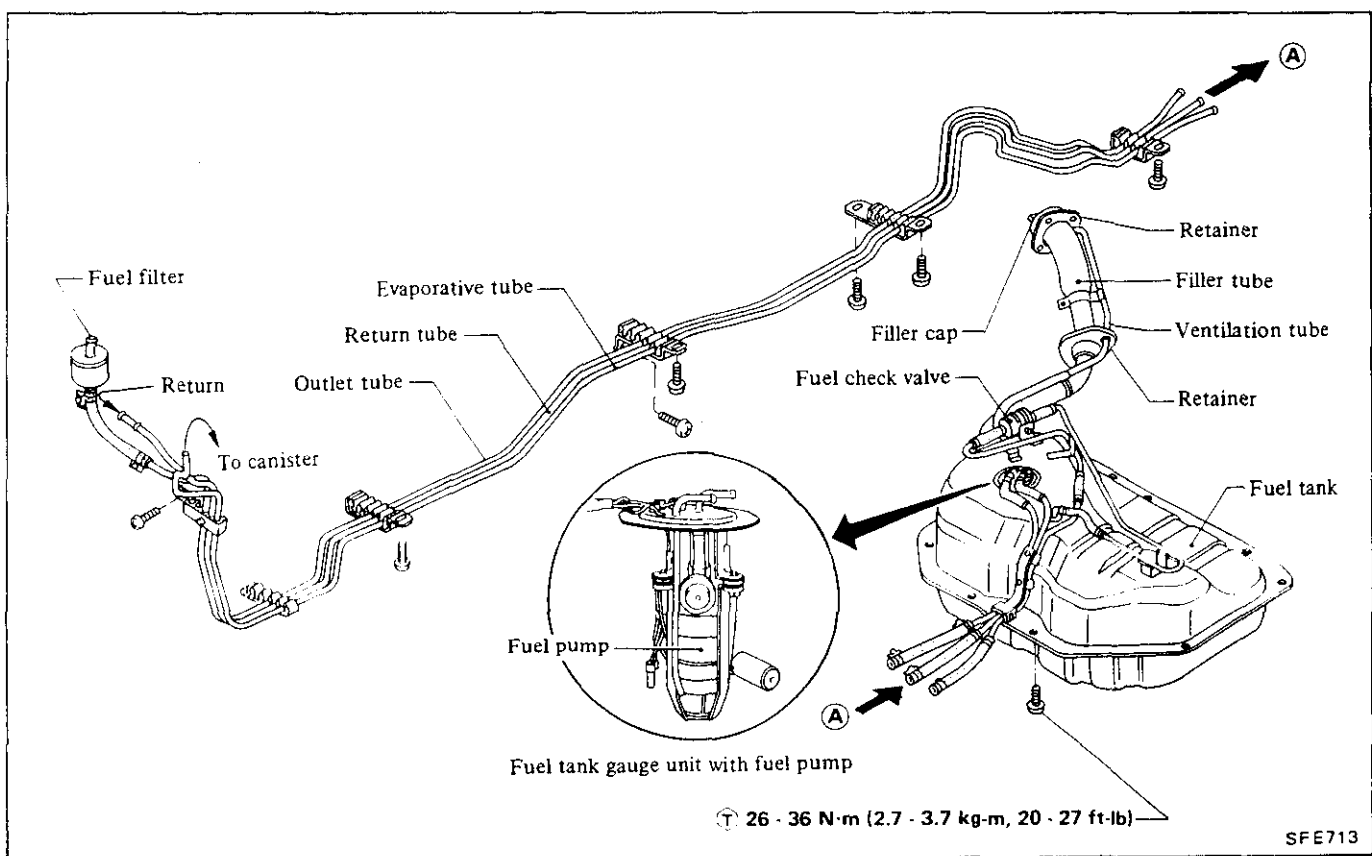
Remove fuel filler cap and see it functions properly.

1. Wipe clean valve housing and have it in your mouth.
2. Inhale air. A slight resistance accompanied by valve indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should be disappeared with valve clicks.
3. If valve is clogged, or if no resistance is felt, replace cap as an assembled unit.



ENGINE CONTROL, FUEL & EXHAUST SYSTEMS

FUEL SYSTEM



PRECAUTIONS

WARNING:

When replacing fuel line parts, be sure to observe the following:

- Put a "CAUTION INFLAMMABLE" sign in the workshop.
- Be sure to furnish the workshop with a CO_2 fire extinguisher.
- Be sure to disconnect battery cable before starting work.
- Put drained fuel in an explosion-proof container and put on lid securely.

FUEL SYSTEM PARTS

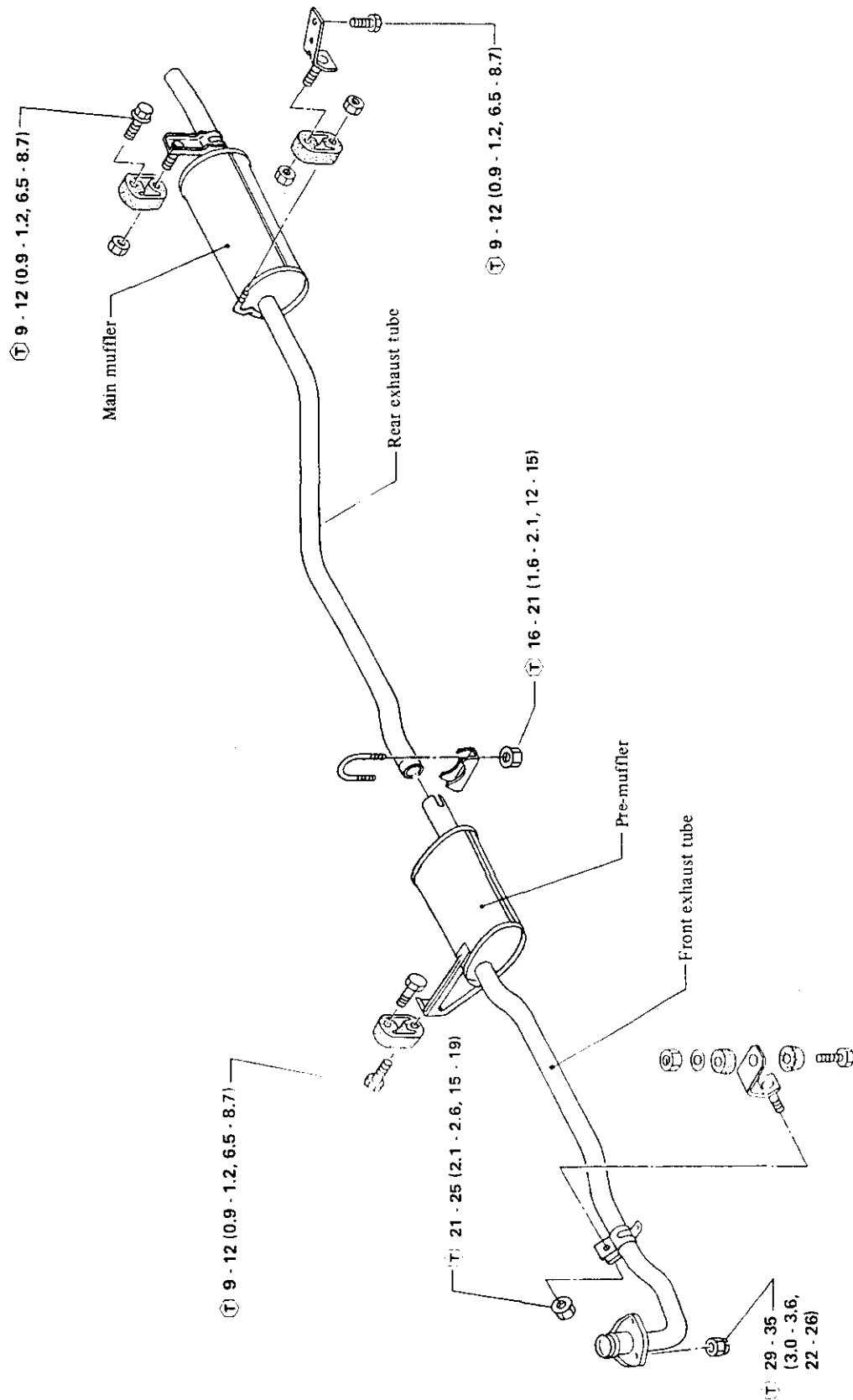
Removal and installation

CAUTION:

Before disconnecting fuel hose, fuel tank gauge unit, fuel filler hose and tube, fuel check valve and fuel tube, release fuel pressure from fuel line to eliminate danger. Refer to **REPLACE-
MENT FUEL FILTER** (Section MA).

EXHAUST SYSTEM

EXHAUST SYSTEM



(T) : N·m (kg·m, ft·lb)

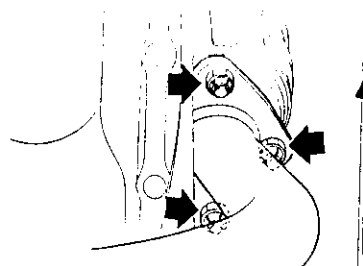
EXHAUST SYSTEM

EXHAUST TUBE AND MUFFLER ASSEMBLY REMOVAL AND INSTALLATION

- Remove exhaust tube and muffler assembly in the order of 1 to 5.
- Install in the reverse order of removal.

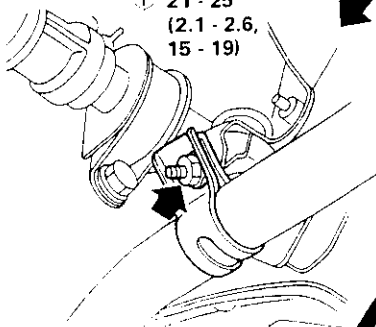
1. Remove manifold fixing bolts.

Ⓙ 29 - 35
(3.0 - 3.6, 22 - 26)



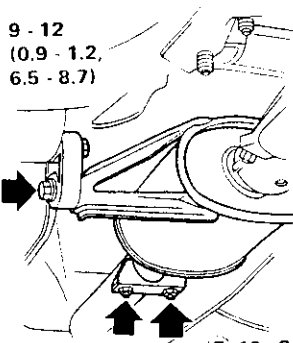
2. Remove front tube mounting nut.

Ⓙ 21 - 25
(2.1 - 2.6, 15 - 19)



3. Remove pre-muffler mounting insulator and bracket bolt and U-bolt nuts.

Ⓙ 9 - 12
(0.9 - 1.2, 6.5 - 8.7)



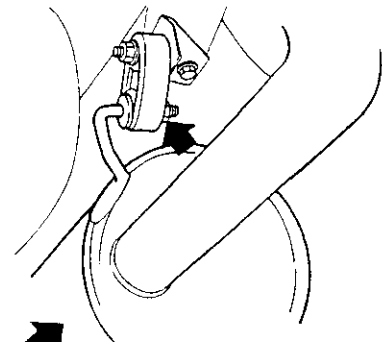
Ⓙ 16 - 21 (1.6 - 2.1, 12 - 15)

- a. Be careful not to deform mounting rubbers.
b. Install new converter gasket.

- c. Keep sufficient clearance between exhaust system parts and adjacent parts.

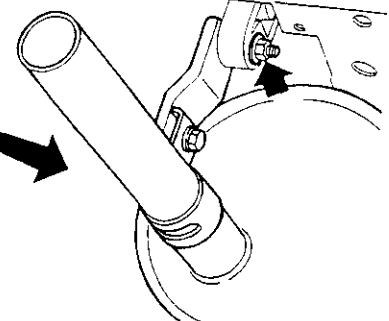
4. Remove main muffler mounting (front) nut.

Ⓙ 9 - 12
(0.9 - 1.2, 6.5 - 8.7)



5. Remove main muffler mounting (rear) nut.

Ⓙ 9 - 12
(0.9 - 1.2, 6.5 - 8.7)



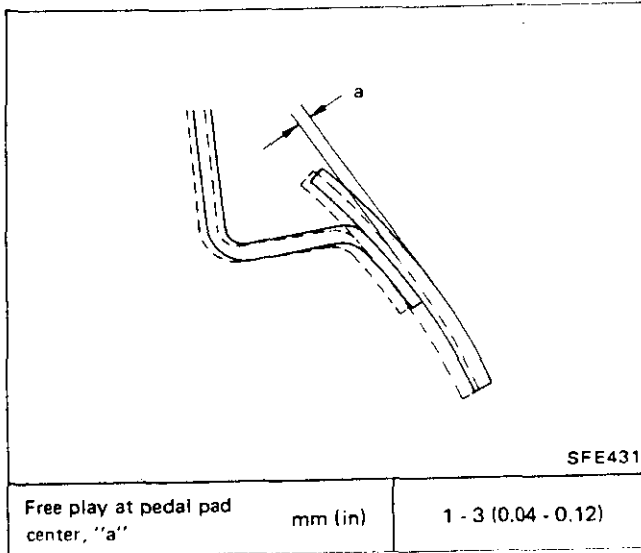
Ⓙ : N·m (kg·m, ft·lb)

SFE744

SERVICE DATA AND SPECIFICATIONS

SERVICE DATA AND SPECIFICATIONS

INSPECTION AND ADJUSTMENT ACCELERATOR SYSTEM



TIGHTENING TORQUE

FUEL SYSTEM

| Unit | N-m | kg-m | ft-lb |
|-------------------------|---------|-----------|---------|
| Fuel tank mounting bolt | 26 - 36 | 2.7 - 3.7 | 20 - 27 |
| Fuel drain plug | 16 - 21 | 1.6 - 2.1 | 12 - 15 |

EXHAUST SYSTEM

| Unit | N-m | kg-m | ft-lb |
|---|---------|-----------|-----------|
| Manifold fixing bolt (To catalytic converter) | 29 - 35 | 3.0 - 3.6 | 22 - 26 |
| Front exhaust tube fixing nut | 21 - 25 | 2.1 - 2.6 | 15 - 19 |
| Pre-muffler mounting insulator and bracket bolt (nut) | 9 - 12 | 0.9 - 1.2 | 6.5 - 8.7 |
| U-bolt nut | 16 - 21 | 1.6 - 2.1 | 12 - 15 |
| Main muffler mounting nut | 9 - 12 | 0.9 - 1.2 | 6.5 - 8.7 |

CLUTCH

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

CLUTCH CONTROL SYSTEM

| | |
|------------------------|------------|
| Type of clutch control | Mechanical |
|------------------------|------------|

CLUTCH DISC

| | |
|---|--|
| Type | 200CBL |
| Facing size Outer dia. x Inner dia. x Thickness mm (in) | 200 x 130 x 3.5 (7.87 x 5.12 x 0.138) |
| Thickness of disc assembly Free mm (in) | 8.90 - 9.60 (0.3504 - 0.3780) |
| At load 3,923 N mm (in) (400 kg, 882 lb) | 8.0 - 8.4 (0.315 - 0.331) |
| Number of torsion springs | 6 |

CLUTCH COVER

| | |
|----------------------|------------------|
| Model | C200S |
| Full load N (kg, lb) | 4,413 (450, 992) |

INSPECTION AND ADJUSTMENT

CLUTCH DISC

Unit: mm (in)

| | |
|---|-------------|
| Model | 200CBL |
| Wear limit of facing surface to rivet head | 0.3 (0.012) |
| Runout limit | 0.7 (0.028) |
| Distance of runout checking point (from the hub center) | 95 (3.74) |
| Maximum backlash of spline (at outer edge of disc) | 0.4 (0.016) |

CLUTCH COVER

Unit: mm (in)

| | |
|---|-----------------------------|
| Model | C200S |
| Diaphragm spring height | 31.0 - 33.0 (1.220 - 1.299) |
| Unevenness of diaphragm spring toe height | Less than 0.5 (0.020) |

MANUAL TRANSAXLE

CONTENTS

| | |
|--|------|
| REMOVAL AND INSTALLATION | ★ |
| MANUAL TRANSAXLE | |
| [Model: RS5F31A (5-speed)] | MT-2 |
| Transmission case | ★ |
| Clutch housing | MT-4 |
| Shift control mechanism | |
| (Inside transaxle) | ★ |
| Gears and shafts (Except final drive) | MT-6 |
| Final drive | ★ |
| Replacement of oil seals | ★ |

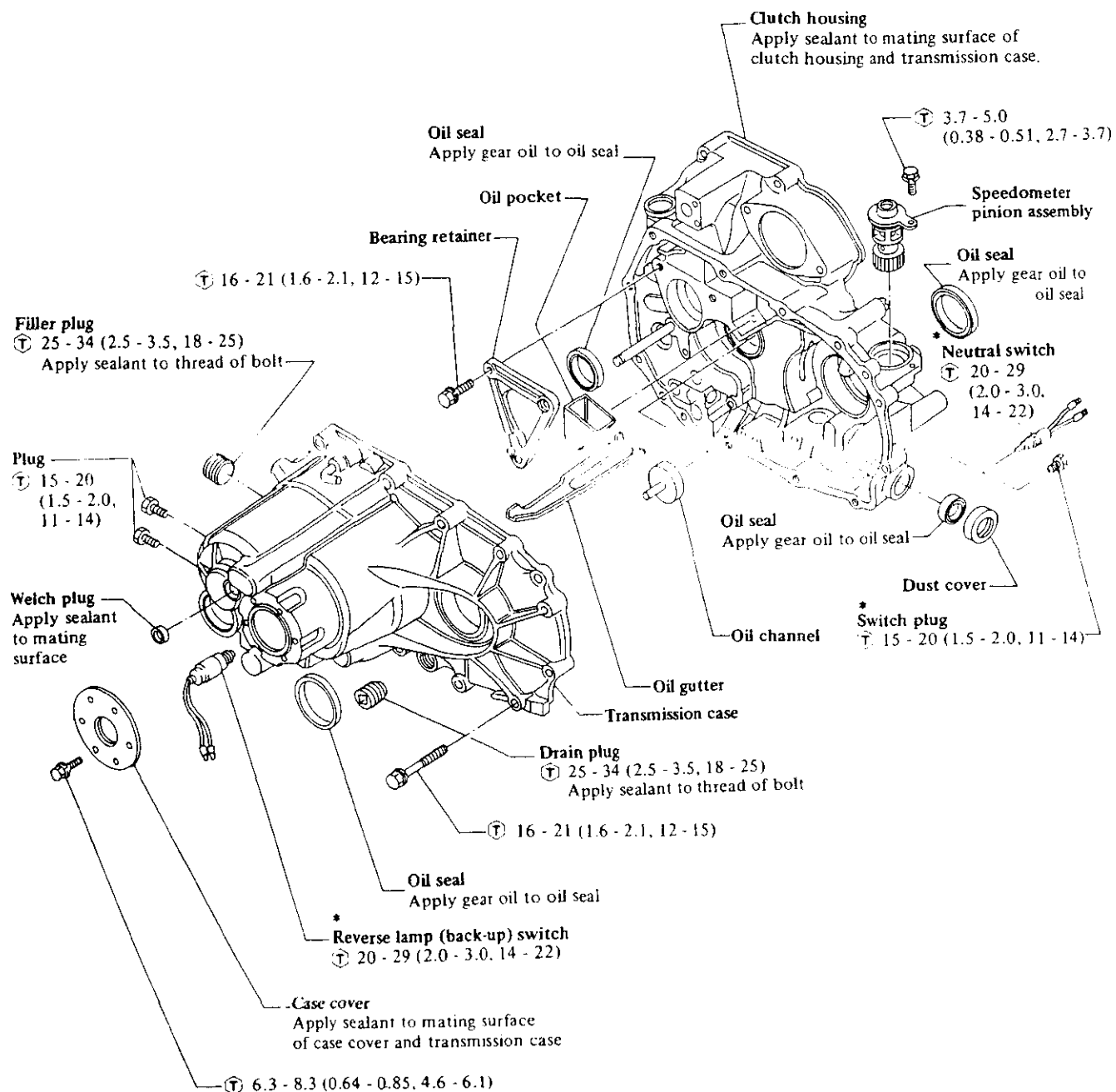
| | |
|--|------|
| Replacement of bearings | ★ |
| TRANSMISSION GEAR CONTROL | ★ |
| SERVICE DATA AND | |
| SPECIFICATIONS | MT-8 |
| General specifications | MT-8 |
| Inspection and adjustment | ★ |
| Tightening torque | ★ |
| TROUBLE DIAGNOSES AND | |
| CORRECTIONS | ★ |
| SPECIAL SERVICE TOOLS | ★ |

★ : Refer to Service Manual "DATSUN NISSAN MODEL
B11 & N12 SERIES"

MT

MANUAL TRANSAXLE [Model : RS5F31A (5-speed)]

Case component



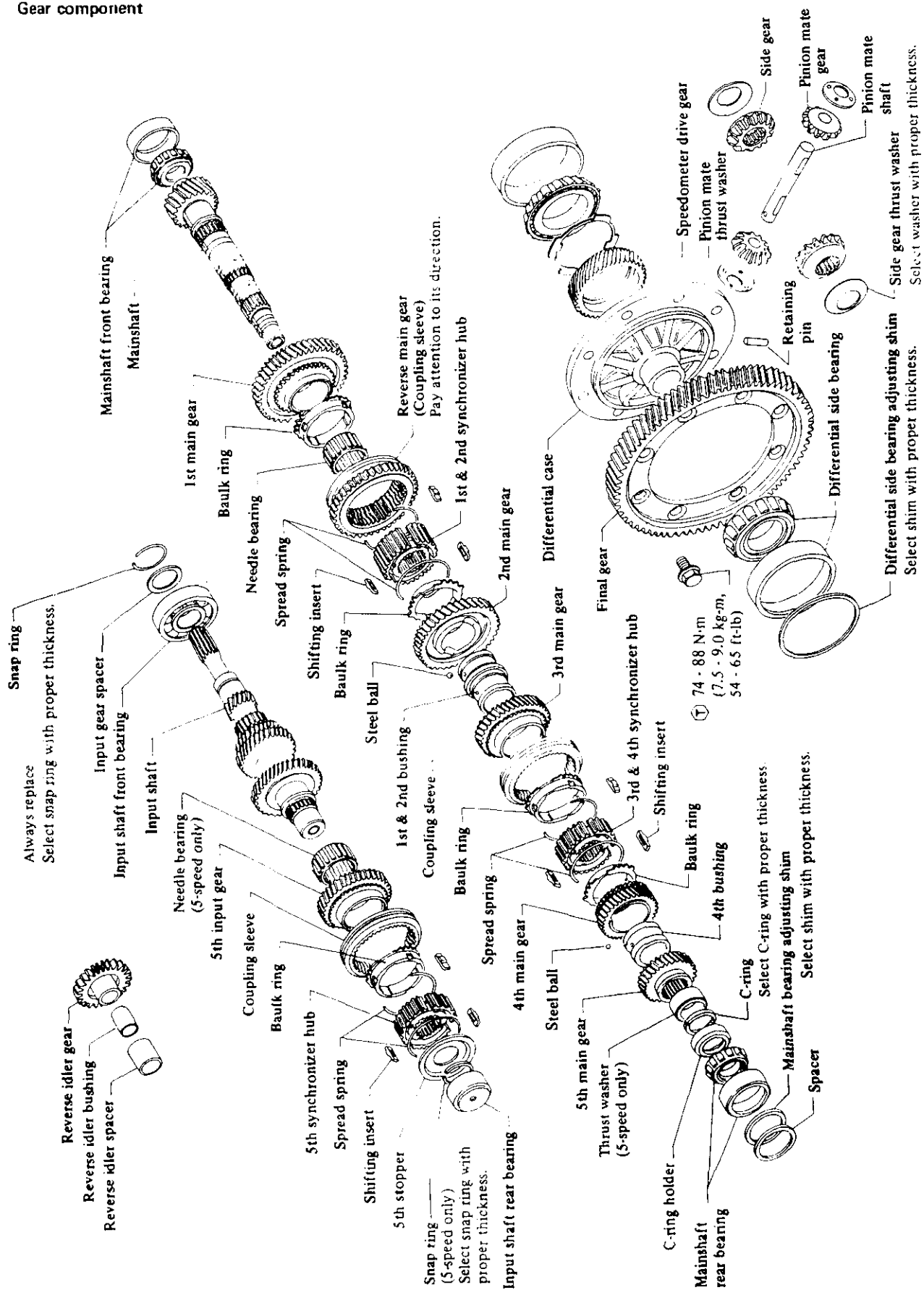
* Apply locking sealer to threads of switches.

Ⓙ : N·m (kg-m, ft-lb)

SMT735

MANUAL TRANSAXLE [Model: RS5F31A (5-speed)]

Gear component

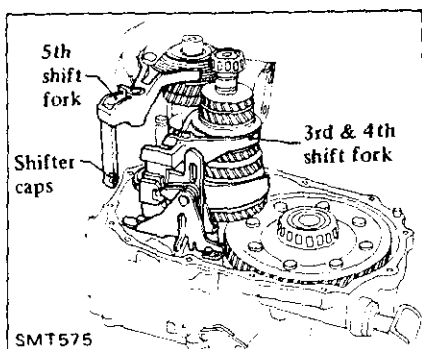


MANUAL TRANSAXLE [Model: RS5F31A (5-speed)]

CLUTCH HOUSING

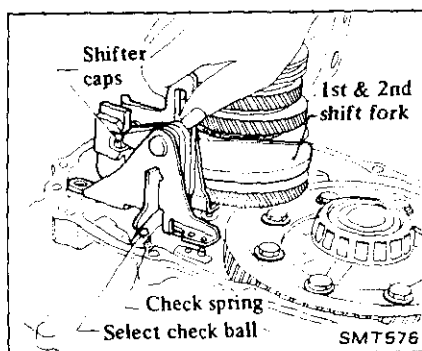
DISASSEMBLY

1. Wipe off dirt and grease.
2. Drain oil.
3. Remove transmission case.
4. Draw out reverse idler spacer and fork shaft, then remove 5th, 3rd & 4th shift fork. **Be careful not to lose shifter caps.**



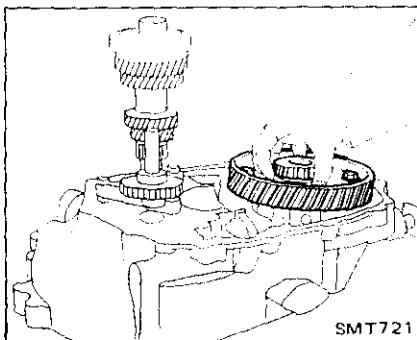
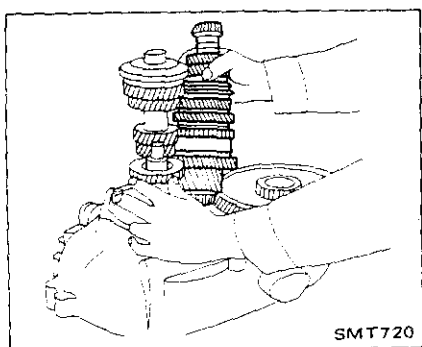
5. Remove control bracket with 1st & 2nd shift fork.

Be careful not to lose select check ball, check spring and shifter caps.

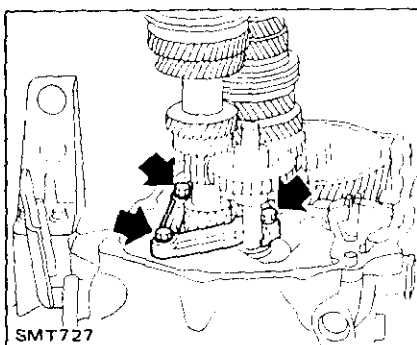


6. Remove mainshaft and final drive assembly.

Always withdraw mainshaft straight out. Failure to do so can damage resin oil channel on clutch housing side.



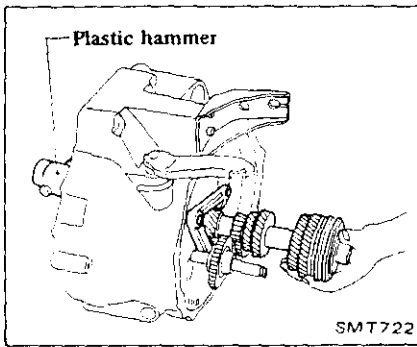
7. Remove bearing retainer securing bolts.



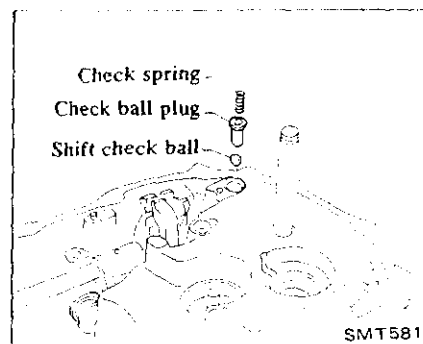
8. Turn clutch housing so its side faces down. Lightly tap input shaft end (on engine side) with a plastic hammer, then remove input shaft together with bearing retainer and reverse idler gear.

Do not draw out reverse idler shaft from clutch housing because these fittings will be loose.

When removing input shaft, be careful not to scratch oil seal lip with shaft spline.

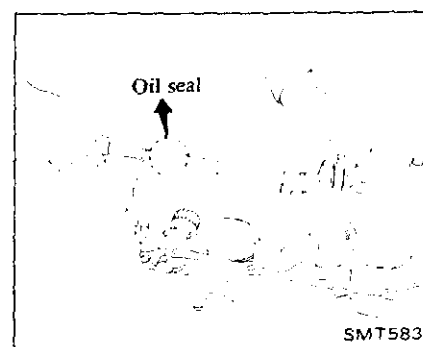
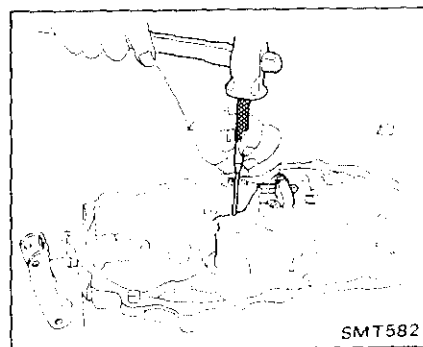


9. Remove oil pocket, shift check ball, check spring and check ball plug.



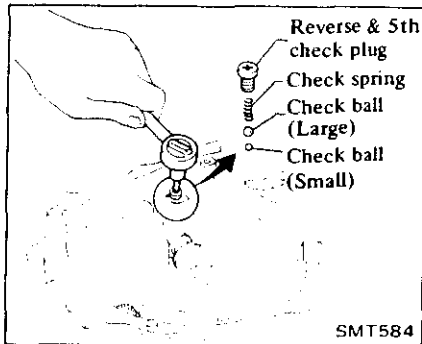
10. Drive retaining pin out of striking lever, then remove striking rod, striking lever and striking interlock.

- a. Select a position where retaining pin does not interfere with clutch housing when removing the former.
- b. When removing striking rod, use care not to damage oil seal's lip. If necessary, tape edges of striking rod when removing the rod.

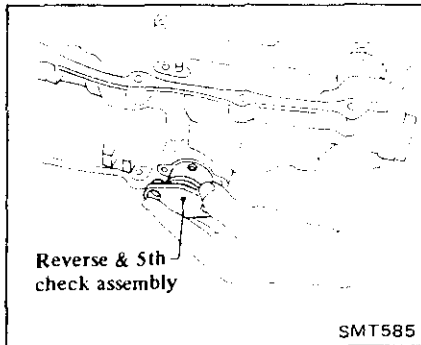


MANUAL TRANSAXLE [Model: RS5F31A (5-speed)]

11. Remove reverse & 5th check plug, then detach check spring and check balls.



12. Remove reverse & 5th check assembly.



13. Remove clutch control shaft, clutch release bearing and clutch lever.
14. Remove mainshaft bearing outer race and differential side bearing outer race.
15. Remove oil channel.

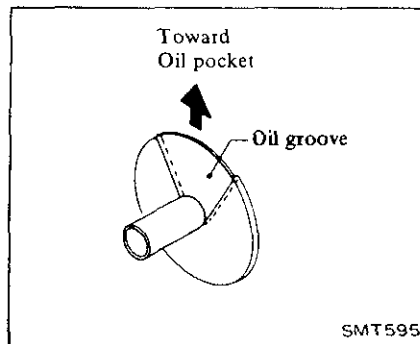
INSPECTION

1. Clean with solvent and check for cracks or cavities by means of dyeing test.
2. Check mating surface of clutch housing for small nicks, projections or sealant.

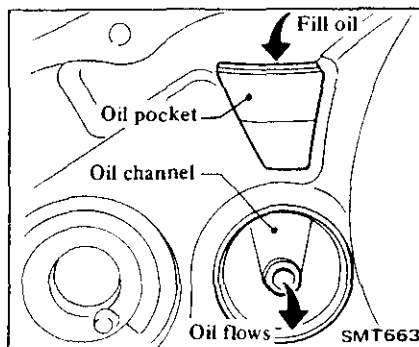
ASSEMBLY

1. Install a new oil channel.

Ensure that oil groove in oil channel always faces toward oil pocket when installing it on clutch housing.



2. Install mainshaft bearing outer race and differential side bearing outer race.
3. Install clutch control shaft, clutch release bearing and clutch lever.
4. Install oil pocket, then make sure oil flows from oil pocket to oil channel.



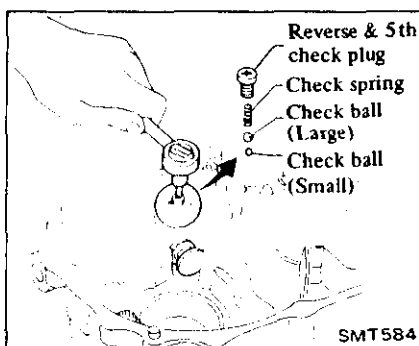
5. Install following parts in reverse order of disassembly.

- Reverse & 5th check assembly
- Reverse & 5th check plug (check spring, check balls)

a. Install smaller check ball first, then larger one.

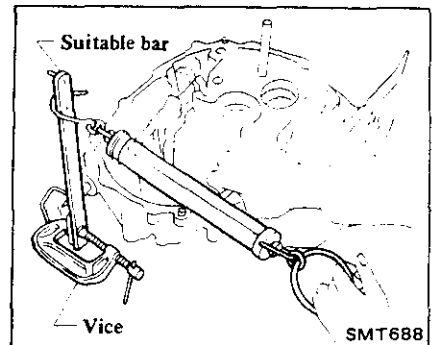
b. When replacing clutch housing, reverse & 5th check assembly, check spring and check plug, it is necessary to adjust reverse check force.

1) First, install used check plug or standard check plug and tighten it to the specified torque.



①: Reverse & 5th check plug
19 - 25 N·m
(1.9 - 2.5 kg-m,
14 - 18 ft-lb)

2) Check reverse check force.



Reverse check force:
22.1 - 27.0 N·m
(225 - 275 kg-cm,
195 - 239 in-lb)

3) If reverse check force is not within the above range, select another check plug having a different length and reinstall it.

Reverse check plug:

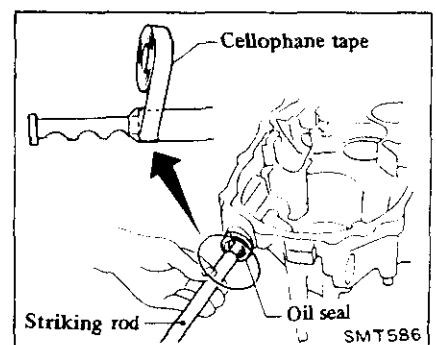
Refer to S.D.S.

c. Apply locking sealer to thread of check plug.

- Striking lever
- Striking interlock
- Boot (for shift control oil seal)
- Striking rod

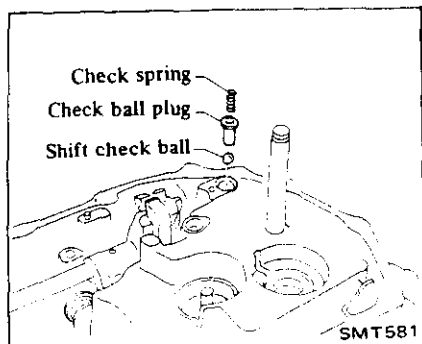
CAUTION:

When inserting striking rod into clutch housing, tape edges of striking rod to avoid damaging oil seal's lip if it hits against oil seal.



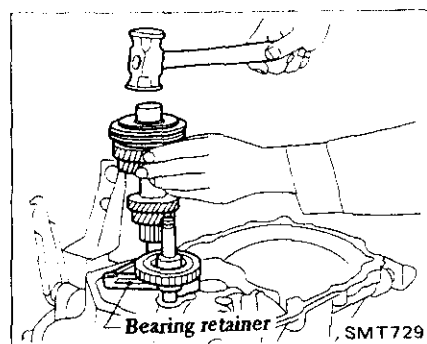
MANUAL TRANSAXLE [Model: RS5F31A (5-speed)]

- Shift check related parts (check ball plug, shift check ball, check spring)



- Oil pocket
- Input shaft and reverse idler gear

Use care not to damage oil seal's lip by splines of input shaft while shaft is being inserted into clutch housing.



- Bearing retainer

Ⓙ : 16 - 21 N·m
(1.6 - 2.1 kg-m,
12 - 15 ft-lb)

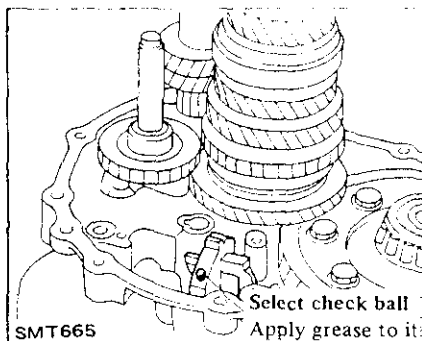
- Mainshaft

A resin oil channel is used at end of mainshaft on clutch housing side. Use care not to damage oil channel when inserting mainshaft into clutch housing.

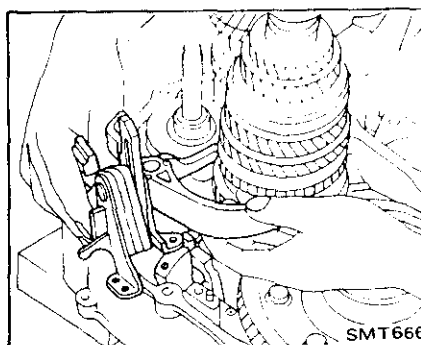
- Final drive assembly

If clutch housing is replaced with a new one, adjust differential side bearing rotary frictional force by selecting shim. Refer to Transmission Case for assembly and adjustment.

- Apply grease to select check ball, then install it and check spring into striking interlock hole.



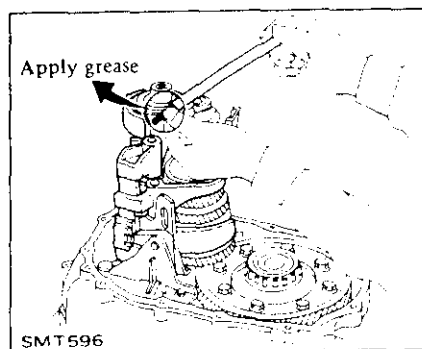
- Apply grease to shifter caps, then install it to control bracket. Install control bracket with 1st & 2nd shift fork.



Ⓙ : Control bracket bolt
6.3 - 8.3 N·m
(0.64 - 0.85 kg-m,
4.6 - 6.1 ft-lb)

- Install 3rd & 4th and 5th shift fork.
- Insert fork shaft.

Apply grease to support spring before installing, in order to prevent spring from falling into hole for fork shaft on clutch housing.



- Install reverse idler spacer.

- Install transmission case.

- Measure gear rotary frictional force and ensure that gear moves smoothly without binding. Refer to "Transmission Case" for assembly.

- Apply sealant to thread of drain plug, then install it to transmission case.

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

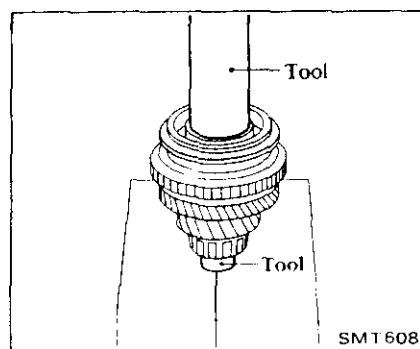
GEARS AND SHAFTS (Except final drive)

Refer to Service Manual "DATSUN NISSAN model B11 & N12 series" for other than main gears and mainshaft.

ASSEMBLY

Main gears and mainshaft

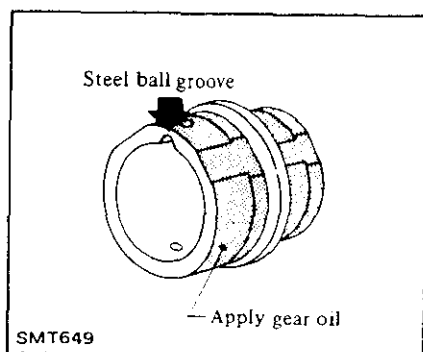
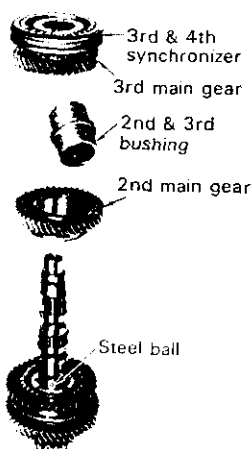
- Apply gear oil to 1st needle bearing, then assemble needle bearing, 1st gear, 1st gear baulk ring, 1st & 2nd synchronizer assembly and 2nd gear baulk ring.



- Apply gear oil to 2nd & 3rd bushing outer surface, then install steel ball, 2nd gear, 2nd & 3rd bushing, 3rd gear, and 3rd & 4th synchronizer assembly. 2nd & 3rd bushing has a groove in which steel ball fits. Slowly turn bushing to properly fit steel ball in its groove.

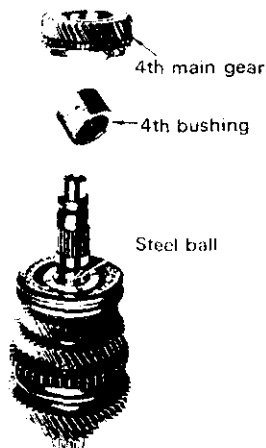
MANUAL TRANSAXLE [Model: RS5F31A (5-speed)]

Before installing steel ball, apply grease to it.

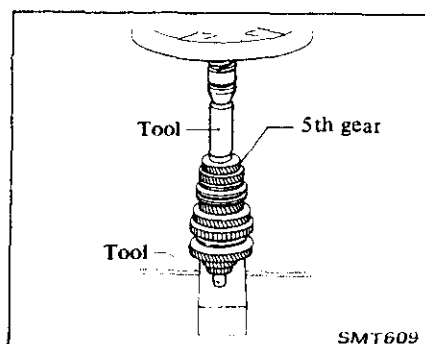


3. Apply grease to steel ball, then install it to mainshaft. Apply gear oil to 4th bushing outer surface. 4th

bushing also has a groove in which steel ball fits. Ensure that steel ball fits properly in its groove when installing 4th bushing.



4. Install 5th gear.



5. Install thrust washer. Select C-ring that will minimize clearance of groove in mainshaft, then install C-ring and C-ring holder.

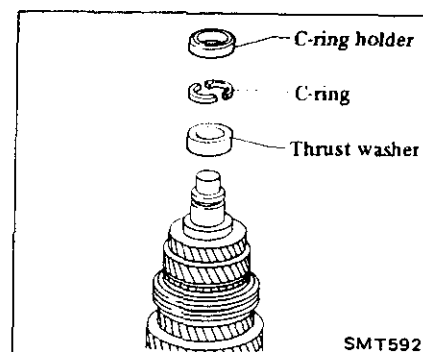
Allowable clearance of groove:

0 - 0.1 mm

(0 - 0.004 in)

C-ring:

Refer to S.D.S.



6. Install mainshaft front and rear bearing inner race.

7. Measure gear end play.

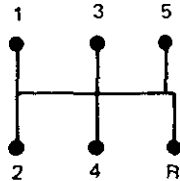
8. Install mainshaft assembly, input shaft assembly, bearing retainer, control bracket, shift forks, fork rod and transmission case.

SERVICE DATA AND SPECIFICATIONS

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

TRANSAXLE

| | |
|--------------------|---|
| Transaxle model | RS5F31A |
| No. of speeds | 5 |
| Synchromesh type | Warner |
| Shift pattern |  |
| Gear ratio | |
| 1st | 3.333 |
| 2nd | 1.955 |
| 3rd | 1.286 |
| 4th | 0.902 |
| 5th | 0.733 |
| Rev. | 3.417 |
| Number of teeth | |
| Input gear | |
| 1st | 15 |
| 2nd | 22 |
| 3rd | 28 |
| 4th | 41 |
| 5th | 45 |
| Rev. | 12 |
| Main gear | |
| 1st | 50 |
| 2nd | 43 |
| 3rd | 36 |
| 4th | 37 |
| 5th | 33 |
| Rev. | 41 |
| Reverse idler gear | 30 |
| Oil capacity | liter (Imp pt) |
| | 2.7 (4-3/4) |

FINAL GEAR

| | |
|----------------------------|---------|
| Transaxle model | RS5F31A |
| Final gear ratio | 3.550 |
| Number of teeth | |
| Final gear/Pinion gear | 71/20 |
| Side gear/Pinion mate gear | 14/10 |

FRONT AXLE & FRONT SUSPENSION

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

COIL SPRING

| Vehicle model | Dimension | |
|--|---------------------|--------------|
| | Hatchback | Coupe |
| Wire diameter mm (in) | 11.0 (0.433) | 11.2 (0.441) |
| Coil diameter (Inside) mm (in) | 110 (4.33) | |
| Free length mm (in) | 330 (12.99) | 338 (13.31) |
| Spring constant N/mm (kg/mm, lb/in) | 19.61 (2.00, 112.0) | |

STRUT ASSEMBLY

| Destination | Europe and Australia | |
|---|--|--------------------------------------|
| | Europe and Australia | Except Europe and Australia |
| Shock absorber type | Double acting hydraulic | |
| Piston rod diameter mm (in) | 20 (0.79) | 18 (0.71) |
| Piston diameter mm (in) | 30 (1.18) | 25 (0.98) |
| Stroke mm (in) | 162 (6.38) | |
| Damping force [at 0.3 m (1.0 ft)/sec.] | | |
| Expansion N (kg, lb) | 1,049 - 1,402 (107 - 143, 236 - 315) | 539 - 736 (55 - 75, 121 - 165) |
| Compression N (kg, lb) | 235 - 353 (24 - 36, 53 - 79) | 235 - 353 (24 - 36, 53 - 79) |

STABILIZER BAR

| | |
|------------------|-----------|
| Diameter mm (in) | 22 (0.87) |
|------------------|-----------|

INSPECTION AND ADJUSTMENT

| | | |
|--|-----------------|--|
| Wheel alignment (Unladen*) | | |
| Camber | degree | -35' - 1°05' |
| Caster | degree | 45' - 2°15' |
| Kingpin inclination | degree | 12°10' - 13°40' |
| Toe-in | mm (in) | 0 - 2 (0 - 0.08) |
| Side slip (Reference data) | mm/m (in/ft) | Out 3 - In 3 (Out 0.036 - In 0.036) |
| Standard side rod length | mm (in) | 175.9 (6.93) |
| Front wheel turning angle Toe-out turns (Inside/Outside) | degree | 20/17°30' |
| Full turn (Inside/Outside) | degree | 37°30' - 40°30'/29°30' - 32°30' |

*: Tankful of fuel, radiator coolant and engine oil full.
Spare tire, jack, hand tools, mats in designed position.

FA

REAR AXLE & REAR SUSPENSION

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

COIL SPRING

| Vehicle model | | Hatchback | Coupe |
|----------------------|---------------------|---------------|----------------------------------|
| Wire diameter | mm (in) | 10.8 (0.425) | 11.0 (0.433) |
| Coil diameter | mm (in) | 100 (3.94) | 100 (3.94) |
| Free length | mm (in) | 304 (11.97) | 308 (12.13) |
| Spring constant | | 23.05 | 23.05 |
| | N/mm (kg/mm, lb/in) | (2.35, 131.6) | (2.35, 131.6) |
| Identification color | | Red 1, Blue 1 | White 1, Yellowish green 2 |

SHOCK ABSORBER

| Destination | | Europe and Australia | Except Europe and Australia |
|--|------------|--------------------------------------|--------------------------------------|
| Maximum length "L" | mm (in) | 552 (21.73) | 552 (21.73) |
| Stroke | mm (in) | 227 (8.94) | 227 (8.94) |
| Damping force {0.3 m (1.0 ft)/sec.} | | | |
| Expansion | N (kg, lb) | 510 - 667 (52 - 68, 115 - 150) | 490 - 686 (50 - 70, 110 - 154) |
| Compression | N (kg, lb) | 235 - 353 (24 - 36, 53 - 79) | 235 - 353 (24 - 36, 53 - 79) |

INSPECTION AND ADJUSTMENT

WHEEL BEARING

| | | |
|-------------------------------|--------------------|------------------------------|
| Axial play | mm (in) | 0 (0) |
| Wheel bearing nut | | |
| Tightening torque | N·m (kg·m, ft·lb) | 39 - 44 (4.0 - 4.5, 29 - 33) |
| Return angle | degree | 90° |
| Wheel bearing starting torque | | |
| With new grease seal | N·m (kg·cm, in·lb) | Less than 0.8 (8, 6.9) |
| As measured at hub bolt | N (kg, lb) | Less than 13.7 (1.4, 3.1) |
| With used grease seal | N·m (kg·cm, in·lb) | Less than 0.4 (4, 3.5) |
| As measured at hub bolt | N (kg, lb) | Less than 6.9 (0.7, 1.5) |

WHEEL ALIGNMENT

| | | |
|--------|-------------|-------|
| Camber | degree | -1 |
| Toe-in | mm (degree) | 0 (0) |

RA

BRAKE SYSTEM

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

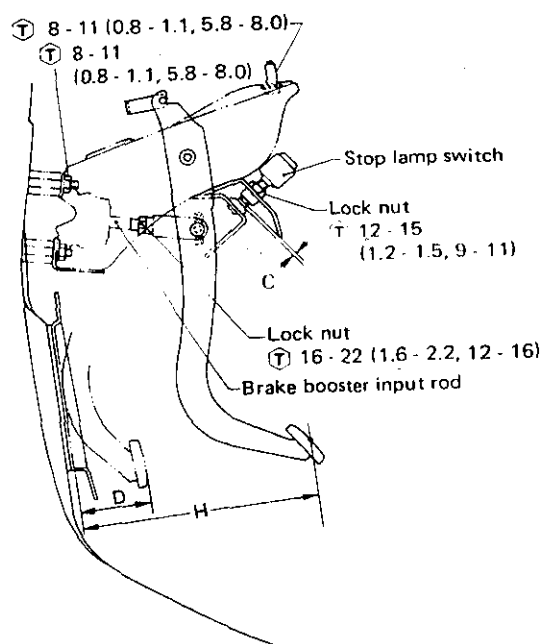
| Item | Destination | Europe | Australia | Except Europe and Australia |
|--|-------------------------------------|--|-----------|-----------------------------|
| Front brake Brake model | | CL18B | | |
| Pad Width x thickness x length | mm (in) | 37.0 x 10.0 x 94.0 (1.457 x 0.394 x 3.701) | | |
| Rotor outer diameter | mm (in) | 240 (9.45) | | |
| Caliper inner diameter | mm (in) | 48.1 (1.894) | | |
| Rear brake Brake model | | LT18A | | |
| Lining Width x thickness x length | mm (in) | 35.0 x 4.0 x 172.8 (1.378 x 0.157 x 6.803) | | |
| Rotor outer diameter/Drum inner diameter | mm (in) | 180 (7.09) | | |
| Caliper/Wheel cylinder inner diameter | mm (in) | 17.46 (11/16) | | 19.05 (3/4) |
| Master cylinder Inner diameter | mm (in) | | | |
| Large | | 25.4 (1) | | |
| Small | | 20.64 (13/16) | | |
| Brake booster Model | | G20 | | |
| Diaphragm diameter | mm (in) | 203 (8) | | |
| Control valve Model | | DP | | |
| Split point | kPa (bar, kg/cm ² , psi) | 3,432 (34.3, 35, 498) | | 2,452 (24.5, 25, 356) |
| Reducing ratio | | 0.4 | | |
| Recommended brake fluid | | DOT 3 | | |

BR

SERVICE DATA AND SPECIFICATIONS

INSPECTION AND ADJUSTMENT BRAKE PEDAL

| Item | Destination | Europe | Australia | Except Europe and Australia |
|---|-------------|-------------------------|---------------------|-----------------------------|
| Pedal ratio | | 4.2 | | |
| Maximum stroke | | 140 | | |
| Free height | mm (in) | 194 - 204 (7.64 - 8.03) | | |
| Depressed height [Under force of 490 N (50 kg, 110 lb) with engine running] | L.H. | More than 85 (3.35) | — | More than 80 (3.15) |
| | R.H. | More than 95 (3.74) | More than 95 (3.74) | More than 90 (3.54) |
| Clearance between brake lamp switch and brake pedal | mm (in) | 0 - 1 (0 - 0.04) | | |



① : N·m (kg-m, ft-lb)

H : Pedal free height
D : Depressed height
C : Clearance between pedal stopper and threaded end of stop lamp switch

SBR805

PARKING BRAKE

| Type | Center lever type |
|--|-------------------|
| Number of notches [At pulling force: 196 N (20 kg, 44 lb)] | 6 - 7 |

CHECK VALVE

| | |
|---|--------------------|
| Maximum vacuum leakage [15 seconds after 66.7 kPa (667 mbar, 500 mmHg, 19.69 inHg) is applied] | 1.3 (13, 10, 0.39) |
| kPa (mbar, mmHg, inHg) | |

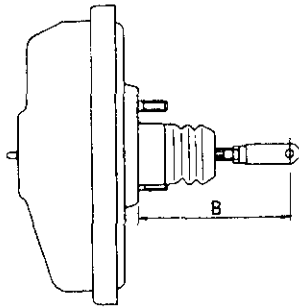
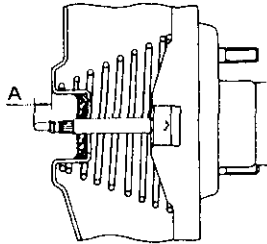
SERVICE DATA AND SPECIFICATIONS

BRAKE BOOSTER

| | |
|--|--------------------|
| Maximum vacuum leakage (15 seconds after engine is stopped) kPa (mbar, mmHg, inHg) | 3.3 (33, 25, 0.98) |
|--|--------------------|

| | | |
|-----------------------|---------|--------------------------------------|
| Output rod length "A" | mm (in) | 10.375 - 10.425 (0.4085 - 0.4104) |
|-----------------------|---------|--------------------------------------|

| | | |
|----------------------|---------|------------|
| Input rod length "B" | mm (in) | 150 (5.91) |
|----------------------|---------|------------|



SBR445

DISC BRAKE

| | | |
|---------------------|---------|-------------------------|
| Brake model | CL18B | |
| Pad repair limit | | |
| Minimum thickness | mm (in) | 2.0 (0.079) |
| Rotor repair limit | | |
| Maximum runout | mm (in) | Less than 0.07 (0.0028) |
| Maximum parallelism | mm (in) | Less than 0.02 (0.0008) |
| Minimum thickness | mm (in) | More than 10.0 (0.394) |

DRUM BRAKE

| | | |
|---|---------|-------------------------|
| Brake model | LT18A | |
| Lining repair limit | | |
| Minimum thickness | mm (in) | 1.5 (0.059) |
| Drum repair limit | | |
| Maximum inner diameter | mm (in) | 181.0 (7.13) |
| Out-of-roundness | mm (in) | Less than 0.03 (0.0012) |
| Radial runout | mm (in) | Less than 0.05 (0.0020) |
| Taper | mm (in) | |
| [Measured at a point 45 mm (1.77 in) from inlet] | | Less than 0.04 (0.0016) |

TIGHTENING TORQUE

| Item | N-m | kg-m | ft-lb |
|----------------------------------|-----------|-------------|-----------|
| Brake pedal | | | |
| Pedal bracket to body | 8 - 11 | 0.8 - 1.1 | 5.8 - 8.0 |
| Stop lamp switch lock nut | 12 - 15 | 1.2 - 1.5 | 9 - 11 |
| Brake booster | | | |
| Brake booster to pedal bracket | 8 - 11 | 0.8 - 1.1 | 5.8 - 8.0 |
| Input rod lock nut | 16 - 22 | 1.6 - 2.2 | 12 - 16 |
| Brake booster to master cylinder | 8 - 11 | 0.8 - 1.1 | 5.8 - 8.0 |
| Master cylinder | | | |
| Secondary piston stopper bolt | | | |
| TOKICO make | 2.0 - 3.4 | 0.2 - 0.35 | 1.4 - 2.5 |
| NABCO make | 1.5 - 2.9 | 0.15 - 0.30 | 1.1 - 2.2 |
| Anti-skid system | | | |
| DP valve mounting bolt | 4 - 5 | 0.4 - 0.5 | 2.9 - 3.6 |
| Brake hose connector | 17 - 20 | 1.7 - 2.0 | 12 - 14 |
| Brake tube flare nut | 15 - 18 | 1.5 - 1.8 | 11 - 13 |
| Wheel cylinder air bleeder | 7 - 9 | 0.7 - 0.9 | 5.1 - 6.5 |
| Wheel nut | 78 - 98 | 8.0 - 10.0 | 58 - 72 |
| Front disc brake | | | |
| Baffle plate | 3.2 - 4.3 | 0.33 - 0.44 | 2.4 - 3.2 |
| Torque member fixing bolt | 54 - 64 | 5.5 - 6.5 | 40 - 47 |
| Torque member to cylinder body | 22 - 31 | 2.2 - 3.2 | 16 - 23 |
| Disc rotor to wheel hub | 25 - 33 | 2.5 - 3.4 | 18 - 25 |
| Rear drum brake | | | |
| Back plate | 25 - 33 | 2.5 - 3.4 | 18 - 25 |
| Wheel cylinder fixing bolt | 6 - 8 | 0.6 - 0.8 | 4.3 - 5.8 |
| Parking brake | | | |
| Center floor type | | | |
| Control lever to body | 8 - 11 | 0.8 - 1.1 | 5.8 - 8.0 |
| Adjuster lock nut | 3.1 - 4.3 | 0.32 - 0.44 | 2.3 - 3.2 |
| Front cable clamp to body | 3.1 - 4.3 | 0.32 - 0.44 | 2.3 - 3.2 |

HEATER & AIR CONDITIONER

HEATER AND AIR CONDITIONER

MODIFICATION NOTICE :

Heater & Air Conditioner system for the turbocharger vehicle is described in this section.

Compared to the former model, this model's modified portions include Refrigerant Line (partially), F.I.C.D. and Electrical system.

CONTENTS

| | | | |
|---------------------------------|-------|---|-------|
| DESCRIPTION | HA- 2 | SERVICE PROCEDURES | HA- 9 |
| Refrigerant line | HA- 2 | Fast idle control device (F.I.C.D.) | HA- 9 |
| Electrical unit location | HA- 4 | SERVICE DATA AND | |
| ELECTRICAL DIAGRAM | HA- 5 | SPECIFICATIONS | HA- 9 |
| Schematic | HA- 5 | General specifications | HA- 9 |
| Wiring diagram | HA- 7 | Inspection and adjustment | HA-10 |
| | | Tightening torque | HA-10 |

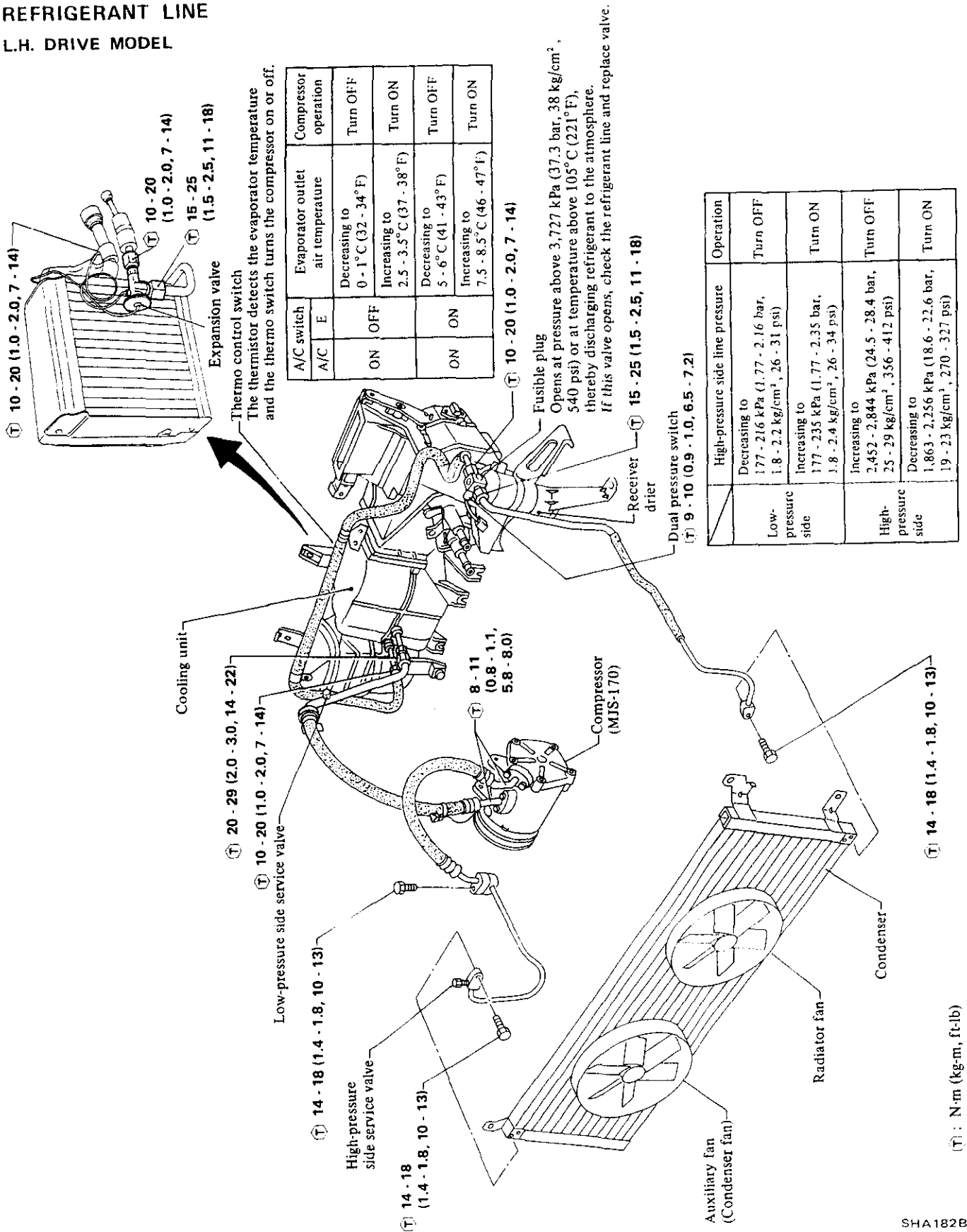


DESCRIPTION

DESCRIPTION

REFRIGERANT LINE

L.H. DRIVE MODEL

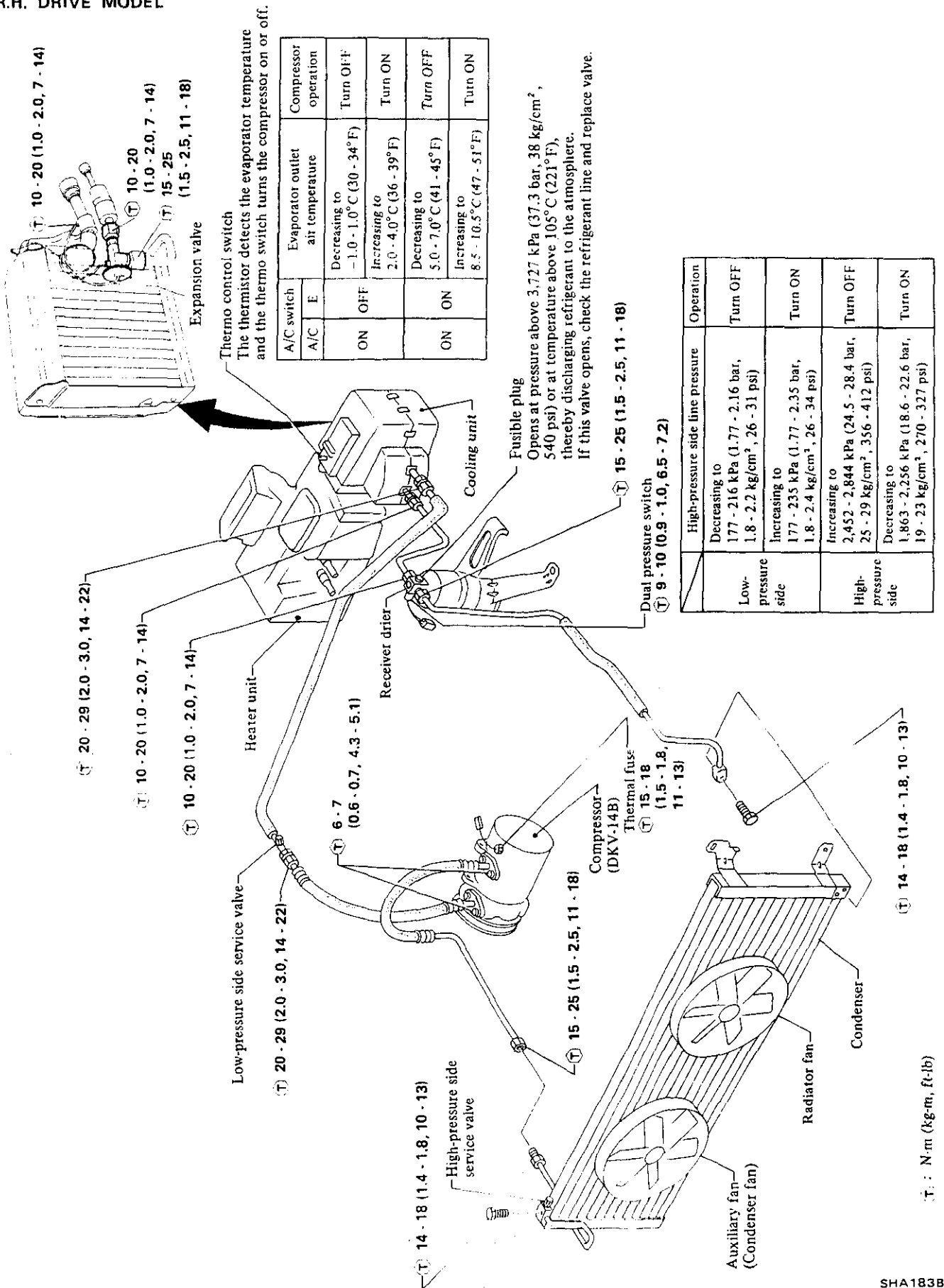


(T) : N·m (kg-m, ft-lb)

SHA182B

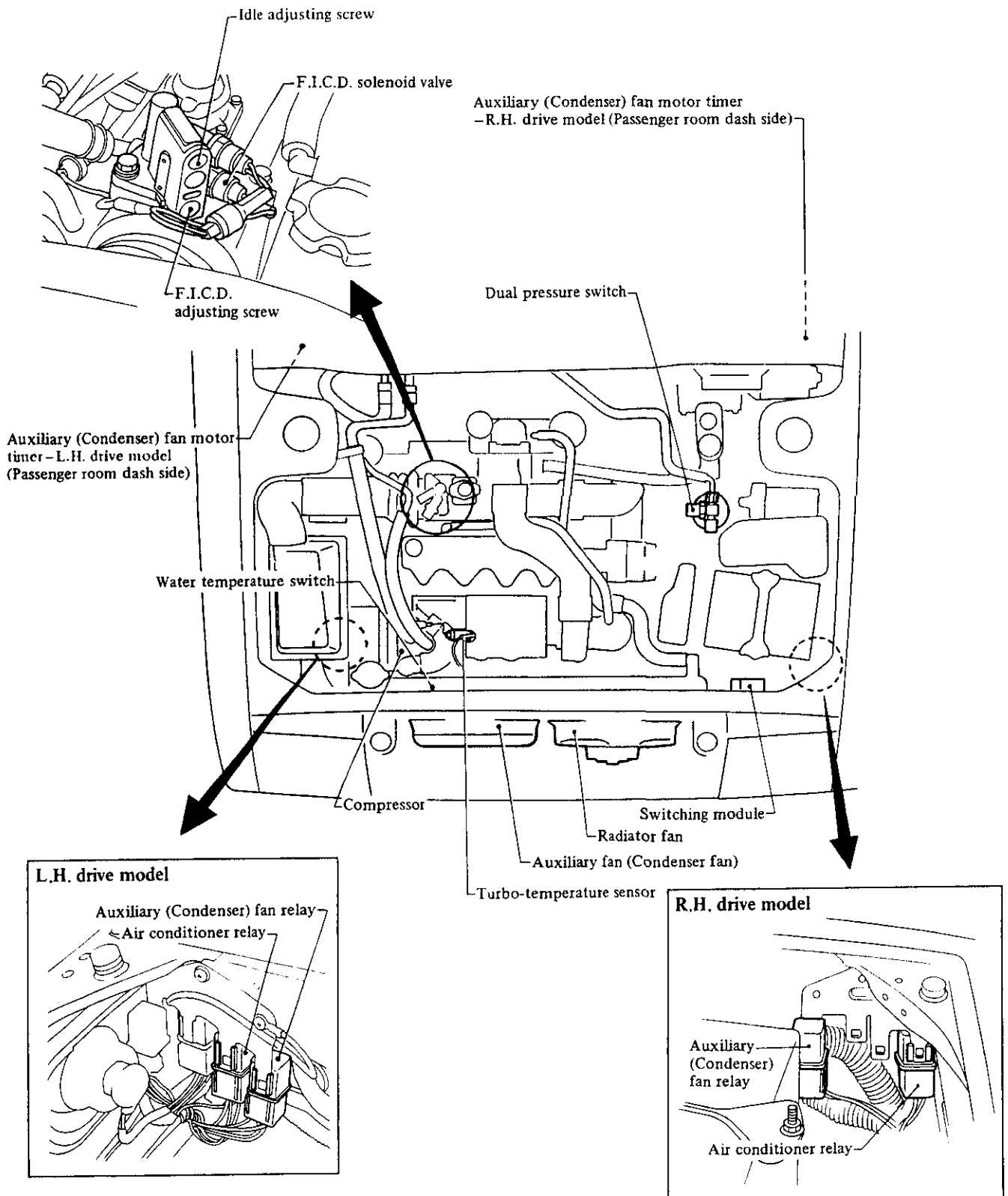
DESCRIPTION

R.H. DRIVE MODEL



DESCRIPTION

ELECTRICAL UNIT LOCATION

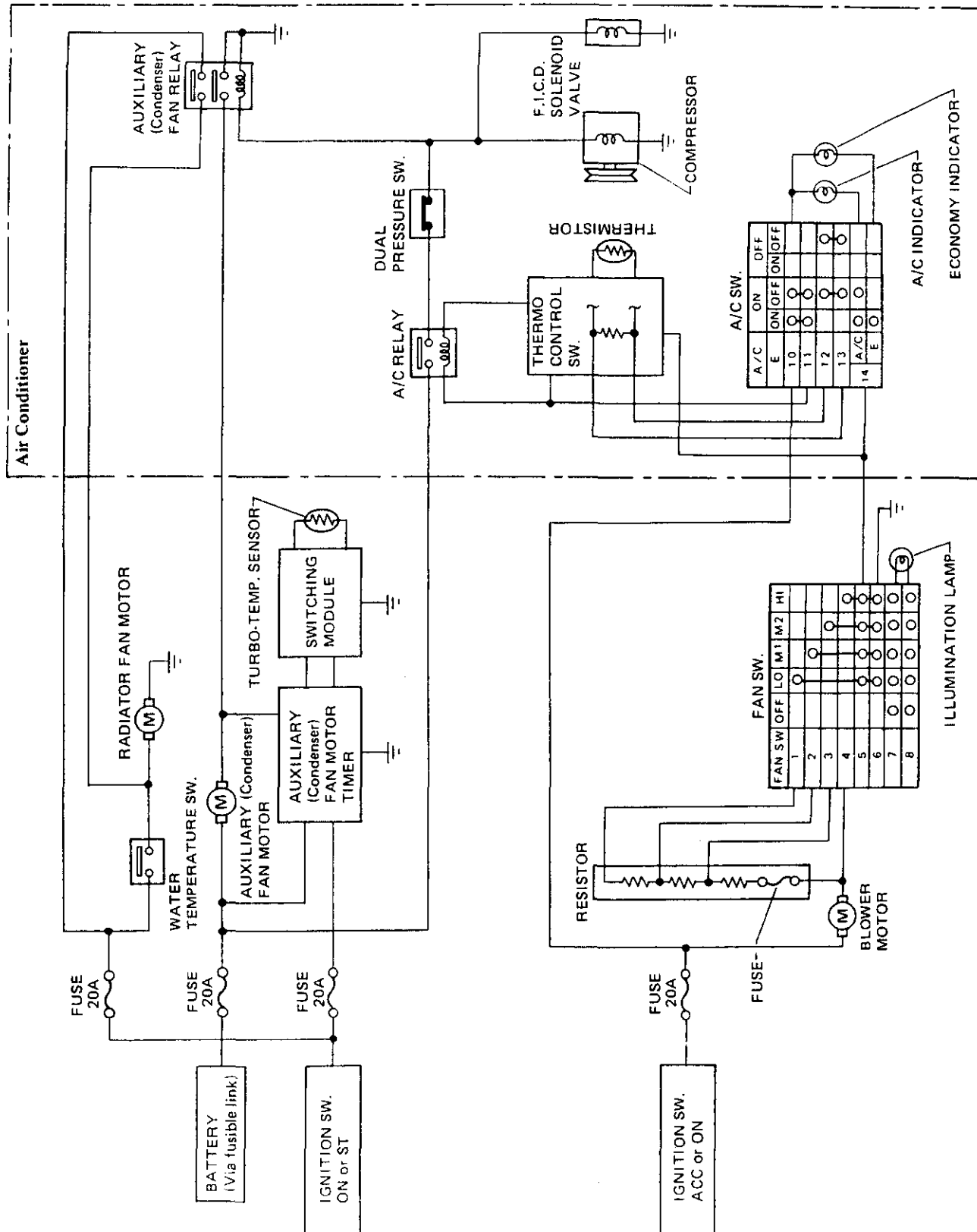


ELECTRICAL DIAGRAM

ELECTRICAL DIAGRAM

SCHEMATIC

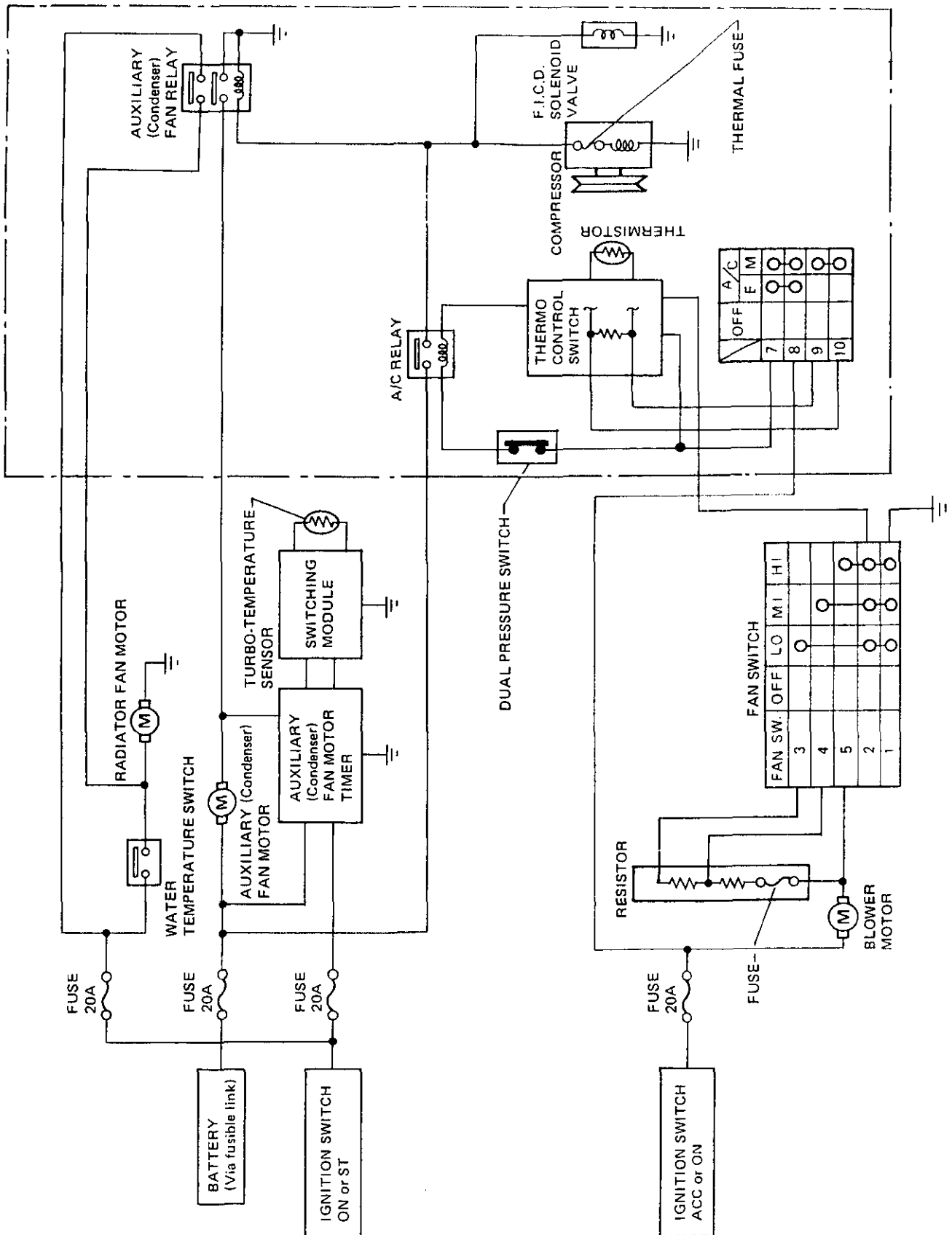
L.H. DRIVE MODEL



SHA998A

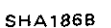
ELECTRICAL DIAGRAM

R.H. DRIVE MODEL



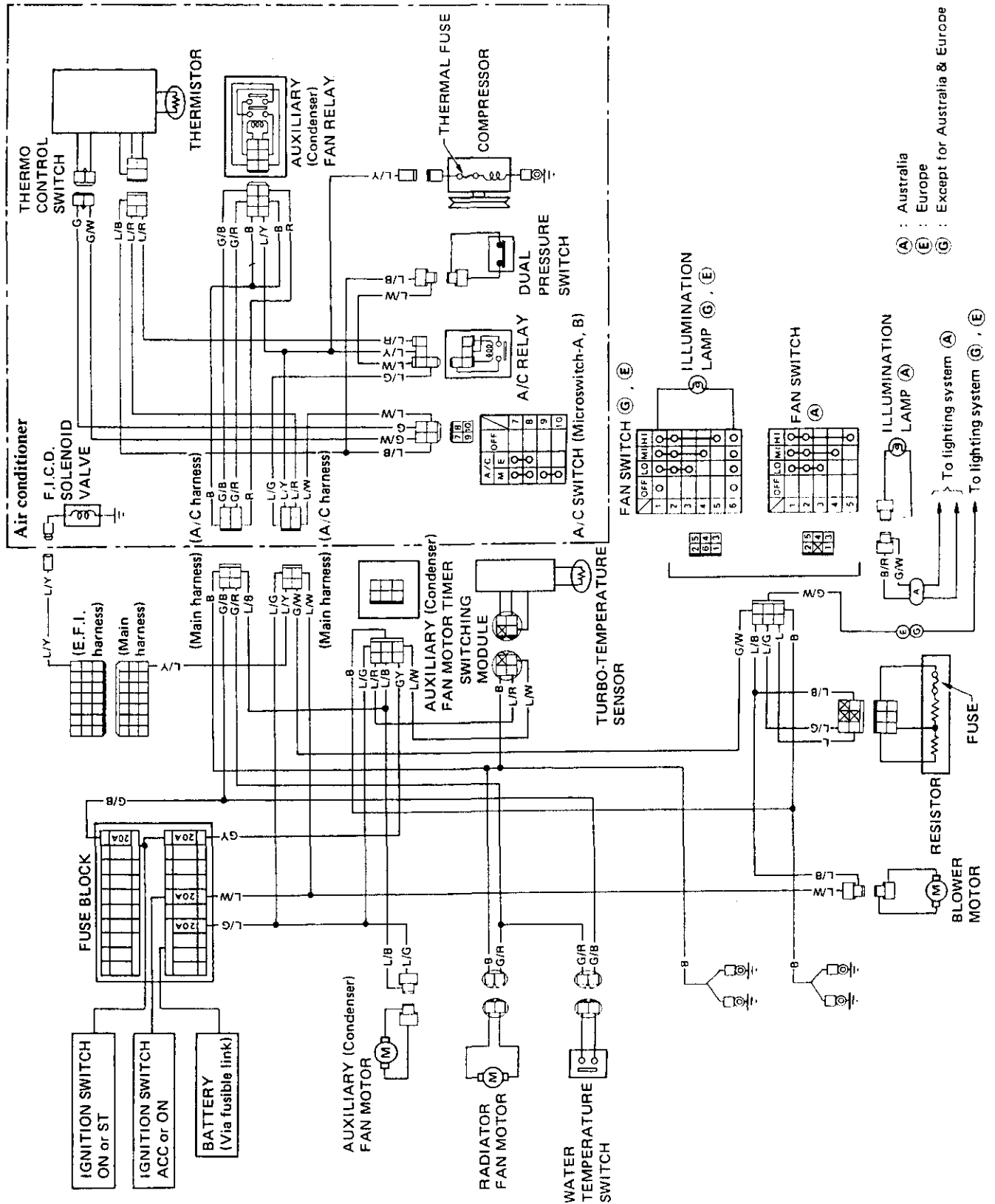
SHA185B

L.H. DRIVE MODEL



ELECTRICAL DIAGRAM

R.H. DRIVE MODEL



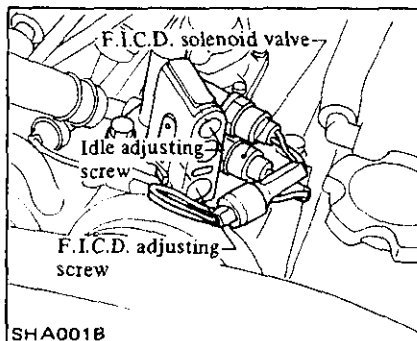
SERVICE PROCEDURES

FAST IDLE CONTROL
DEVICE (F.I.C.D.)

ADJUSTMENT OF IDLE SPEED

1. Run engine until it reaches operating temperature.
2. With air conditioning system OFF (when compressor is not operated), make sure that engine is at correct idle speed.
3. With air conditioning system ON (Air conditioner switch at "A/C" position, fan control lever at "HI" position), make sure that compressor and F.I.C.D. solenoid valve are functioning properly.

4. Set idle speed at the specified value.



| Engine idling speed | M/T model |
|----------------------|------------|
| When F.I.C.D. is OFF | 750±50 rpm |
| When F.I.C.D. is ON | 800±50 rpm |

SERVICE DATA AND SPECIFICATIONS

GENERAL SPECIFICATIONS

COMPRESSOR

| Model | MJS170 | DKV-14B |
|--|-----------------------------------|-------------------------|
| Item | | |
| Applied model | L.H. drive model | R.H. drive model |
| Type | Swash plate | Rotary |
| Displacement cm ³ (cu in)/rev. | 170 (10.37) | 140 (8.54) |
| Cylinder bore x stroke mm (in) | 40.0 x 22.6 (1.575 x 0.890) | — |
| Rotor dia. x stroke mm (in) | — | 72 x 8 (2.83 x 0.31) |
| Direction of rotation | Clockwise (viewed from drive end) | |
| Type of driving belt | A type | |

REFRIGERANT

| | | |
|----------|---------|-----------------------|
| Type | R-12 | |
| Capacity | kg (lb) | 0.8 - 1.0 (1.8 - 2.2) |

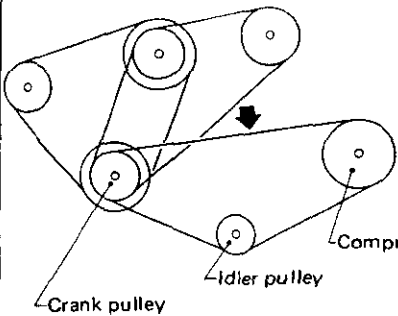
LUBRICATION OIL

| Model | MJS170 | DKV-14B |
|---|---------------------|----------------------|
| Item | | |
| Applied model | L.H. drive model | R.H. drive model |
| Type | SUNISO 5GS | |
| Capacity ml (Imp fl oz) | | |
| Total in system | 150 (5.3) | 200 (7.0) |
| Remaining oil in system after oil return and draining operation | Approx. 30 (1.1) | Approx. 100 (3.5) |
| Amount of oil filled into compressor (Service parts) | 150 (5.3) | 200 (7.0) |

SERVICE DATA AND SPECIFICATIONS

INSPECTION AND ADJUSTMENT

BELT TENSION

| | |
|---|---|
| Measuring point |  <p style="text-align: right;">SHA002B</p> |
| Fan belt/Applied pressure mm (in)/ N (kg, lb) | <p>New: 7 - 9 (0.28 - 0.35)/98 (10, 22)</p> <p>Used: 9 - 11 (0.35 - 0.43)/98 (10, 22)</p> |

ENGINE IDLING SPEED

| | M/1 |
|----------------------|------------|
| When F.I.C.D. is OFF | 750±50 rpm |
| When F.I.C.D. is ON | 800±50 rpm |

COMPRESSOR

| | MJS170 | DKV-14B |
|---|------------------------------|------------------------------|
| Applied model | L.H. drive model | R.H. drive model |
| Clutch hub to pulley clearance mm (in) | 0.5 - 0.8 (0.020 - 0.031) | 0.3 - 0.6 (0.012 - 0.024) |

TIGHTENING TORQUE

COMPRESSOR AND COMPRESSOR INSTALLATION

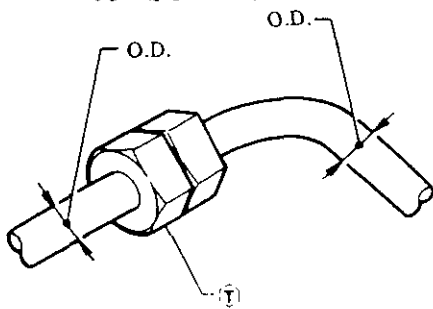
| | MJS170 | | | DKV-14B | | |
|---------------------------|------------------|-----------|---------|------------------|-----------|-----------|
| | L.H. drive model | | | R.H. drive model | | |
| | N·m | kg·m | ft·lb | N·m | kg·m | ft·lb |
| Compressor | | | | | | |
| Shaft nut | 19 - 21 | 1.9 - 2.1 | 14 - 15 | — | — | — |
| Center bolt | — | — | — | 15 - 16 | 1.5 - 1.6 | 11 - 12 |
| Pulley lock nut | — | — | — | 34 - 39 | 3.5 - 4.0 | 25 - 29 |
| Coil mounting screw | — | — | — | 5 - 6 | 0.5 - 0.6 | 3.6 - 4.3 |
| Rear cover fixing bolt | 19 - 21 | 1.9 - 2.1 | 14 - 15 | — | — | — |
| Thermal fuse cap nut | — | — | — | 15 - 18 | 1.5 - 1.8 | 11 - 13 |
| Compressor installation | | | | | | |
| Bracket to cylinder block | 26 - 34 | 2.7 - 3.5 | 20 - 25 | 26 - 34 | 2.7 - 3.5 | 20 - 25 |
| Compressor to bracket | 26 - 34 | 2.7 - 3.5 | 20 - 25 | 26 - 34 | 2.7 - 3.5 | 20 - 25 |

DUAL PRESSURE SWITCH

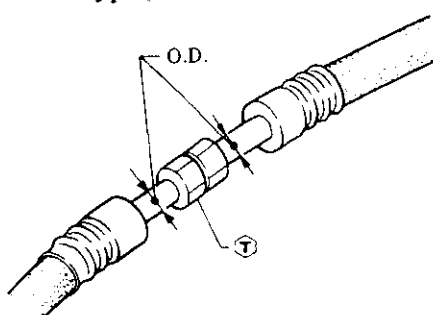
| | N·m | kg·m | ft·lb |
|----------------------|--------|-----------|-----------|
| Dual pressure switch | 9 - 10 | 0.9 - 1.0 | 6.5 - 7.2 |

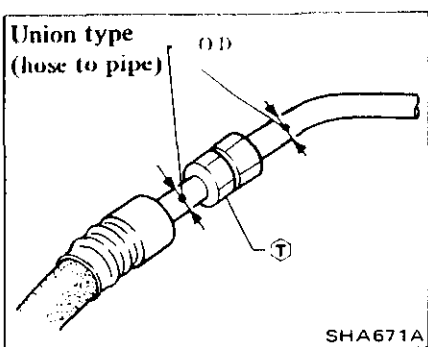
SERVICE DATA AND SPECIFICATIONS

REFRIGERANT LINE

| Union type (pipe to pipe)  | Pipe O.D. mm (in) | Material | | | | | |
|---|----------------------|-----------------|-----------|---------|----------|-----------|---------|
| | | Steel or copper | | | Aluminum | | |
| | | N·m | kg·m | ft-lb | N·m | kg·m | ft-lb |
| SHA669A | 6 (1/4) | 10 - 20 | 1.0 - 2.0 | 7 - 14 | — | — | — |
| | 8 (5/16) | 15 - 25 | 1.5 - 2.5 | 11 - 18 | 10 - 20 | 1.0 - 2.0 | 7 - 14 |
| | 10 (3/8) | 15 - 25 | 1.5 - 2.5 | 11 - 18 | 10 - 20 | 1.0 - 2.0 | 7 - 14 |
| | 12 (1/2) | 20 - 29 | 2.0 - 3.0 | 14 - 22 | 15 - 25 | 1.5 - 2.5 | 11 - 18 |
| | 16 (5/8) | 25 - 34 | 2.5 - 3.5 | 18 - 25 | 20 - 29 | 2.0 - 3.0 | 14 - 22 |
| | 19 (3/4) | 25 - 34 | 2.5 - 3.5 | 18 - 25 | 20 - 29 | 2.0 - 3.0 | 14 - 22 |

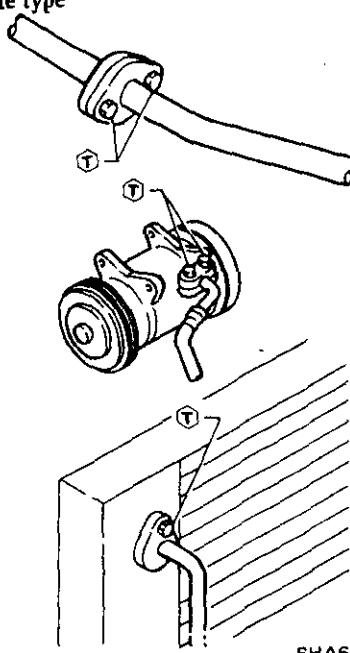
When connecting pipes of different material, use lower tightening torque.

| Union type (hose to hose)  | Pipe O.D. mm (in) | Material | | | | | |
|--|----------------------|-----------------|-----------|---------|----------|-----------|---------|
| | | Steel or copper | | | Aluminum | | |
| | | N·m | kg·m | ft-lb | N·m | kg·m | ft-lb |
| SHA670A | 6 (1/4) | 10 - 20 | 1.0 - 2.0 | 7 - 14 | — | — | — |
| | 8 (5/16) | 15 - 25 | 1.5 - 2.5 | 11 - 18 | 10 - 20 | 1.0 - 2.0 | 7 - 14 |
| | 10 (3/8) | 15 - 25 | 1.5 - 2.5 | 11 - 18 | 10 - 20 | 1.0 - 2.0 | 7 - 14 |
| | 12 (1/2) | 25 - 34 | 2.5 - 3.5 | 18 - 25 | 20 - 29 | 2.0 - 3.0 | 14 - 22 |
| | 16 (5/8) | 25 - 34 | 2.5 - 3.5 | 18 - 25 | 20 - 29 | 2.0 - 3.0 | 14 - 22 |



- Use tightening torque for flexible hose

SERVICE DATA AND SPECIFICATIONS

| Plate type | Bolt type | | | | Tightening torque | | |
|--|-----------|--------------|--------------------------|------------------|-------------------|-----------|-----------|
| | Grade | Nominal size | Bolt diameter mm (in) | Pitch mm (in) | N·m | kg·m | ft·lb |
|  SHA672A | 4T | M6 | 6.0 (0.236) | 1.0 (0.039) | 3 - 4 | 0.3 - 0.4 | 2.2 - 2.9 |
| | | M8 | 8.0 (0.315) | 1.25 (0.0492) | 8 - 11 | 0.8 - 1.1 | 5.8 - 8.0 |
| | | M10 | 10.0 (0.394) | 1.5 (0.059) | 16 - 22 | 1.6 - 2.2 | 12 - 16 |
| | 7T | M6 | 6.0 (0.236) | 1.0 (0.039) | 6 - 7 | 0.6 - 0.7 | 4.3 - 5.1 |
| | | M8 | 8.0 (0.315) | 1.25 (0.0492) | 14 - 18 | 1.4 - 1.8 | 10 - 13 |
| | | M10 | 10.0 (0.394) | 1.5 (0.059) | 25 - 35 | 2.6 - 3.6 | 19 - 26 |

ELECTRICAL SYSTEM

CONTENTS

| | | | |
|---------------------------------------|-------|-------------------------------------|-------|
| POWER SUPPLY ROUTING | EL- 2 | Illumination lamps | EL-19 |
| Schematic/Power supply routing | EL- 2 | METERS, GAUGES AND | |
| BATTERY | EL- 4 | WIRING SYSTEM | EL-20 |
| Service data and specifications | EL- 4 | Combination meter | EL-20 |
| STARTING SYSTEM | EL- 4 | Meter and gauges | EL-22 |
| Wiring diagram | EL- 4 | Warning lamps | EL-24 |
| Starter motor | EL- 5 | WIPER AND WASHER | EL-25 |
| Service data and specifications | EL- 6 | Windshield wiper and washer | EL-25 |
| CHARGING SYSTEM | EL- 6 | Rear window wiper and washer | EL-26 |
| Wiring diagram | EL- 6 | Headlamp wiper and washer | EL-27 |
| Service data and specifications | EL- 7 | ELECTRICAL ACCESSORIES | EL-28 |
| IGNITION SYSTEM | EL- 8 | Clock | EL-28 |
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| Wiring diagram | EL- 8 | Cigarette lighter | EL-29 |
| Distributor | EL- 9 | Audio | EL-29 |
| Service data and specifications | EL-10 | LOCATION OF ELECTRICAL | |
| LIGHTING SYSTEM | EL-11 | UNITS | EL-31 |
| Headlamp | EL-11 | Engine compartment | EL-31 |
| Exterior lamps | EL-17 | Passenger compartment | EL-32 |

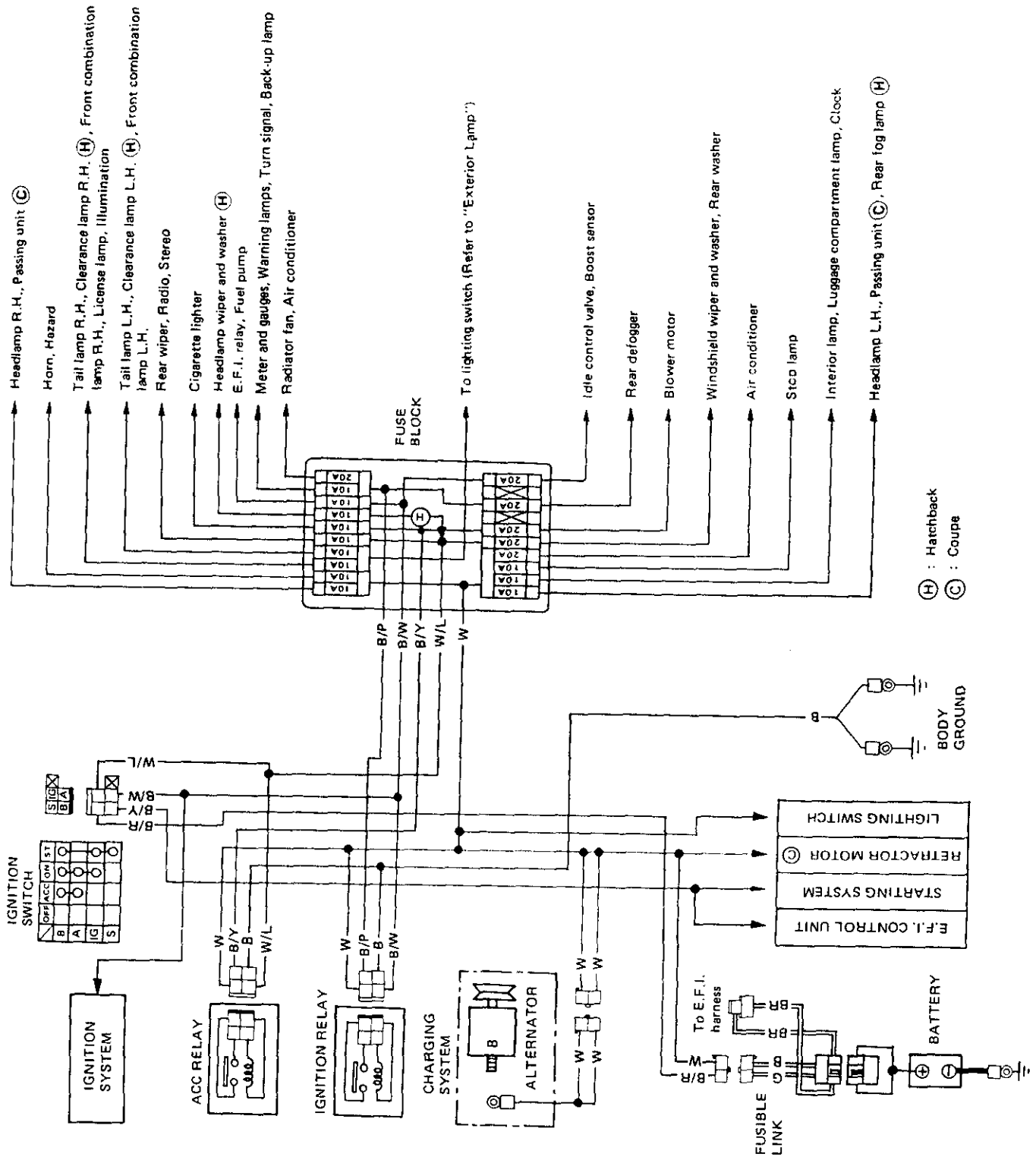
POWER SUPPLY ROUTING

POWER SUPPLY ROUTING

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

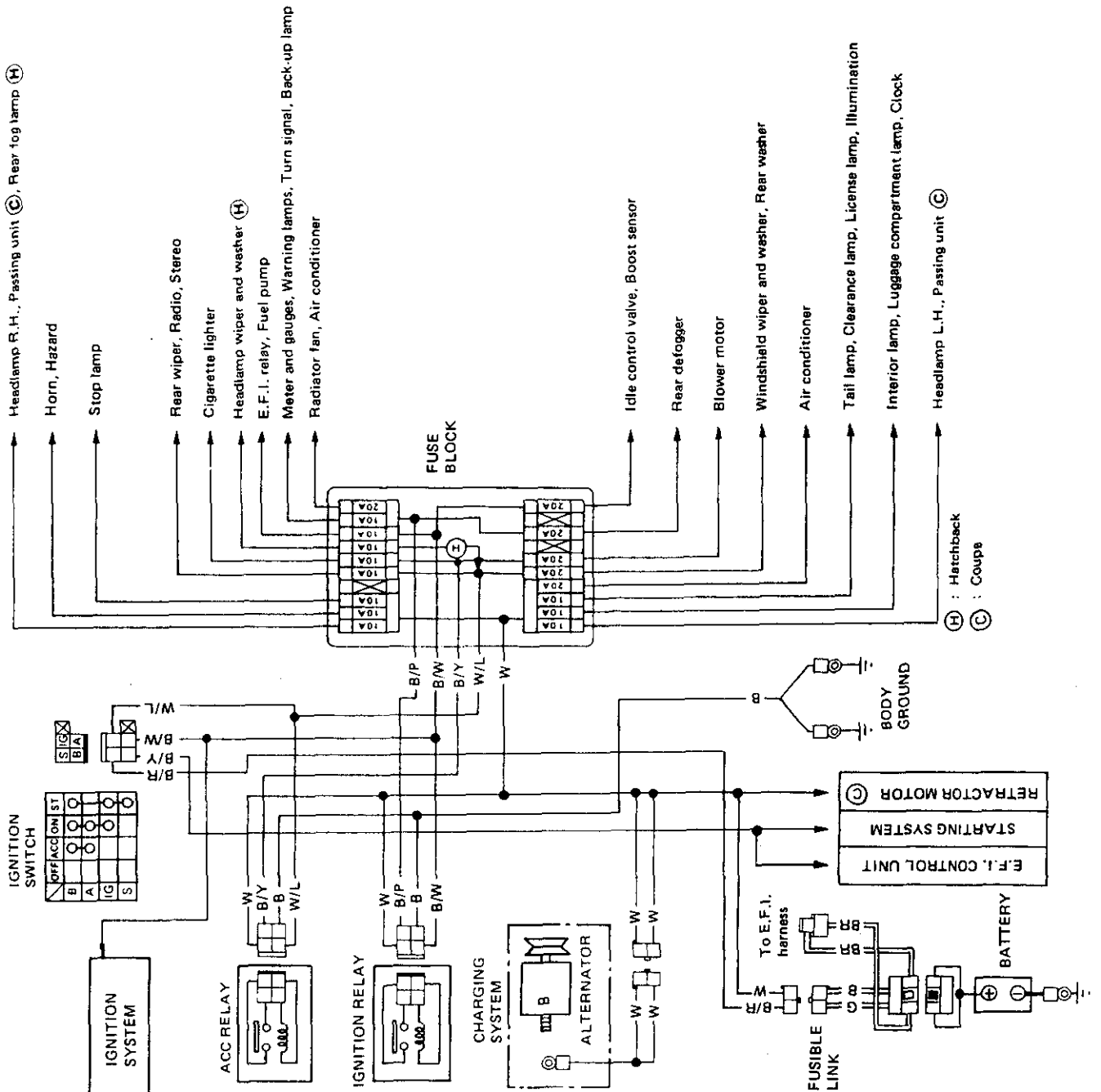
SCHEMATIC/POWER SUPPLY ROUTING

L.H. DRIVE MODEL



POWER SUPPLY ROUTING

R.H. DRIVE MODEL



SEL480D

BATTERY / STARTING SYSTEM

BATTERY

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

SERVICE DATA AND SPECIFICATIONS

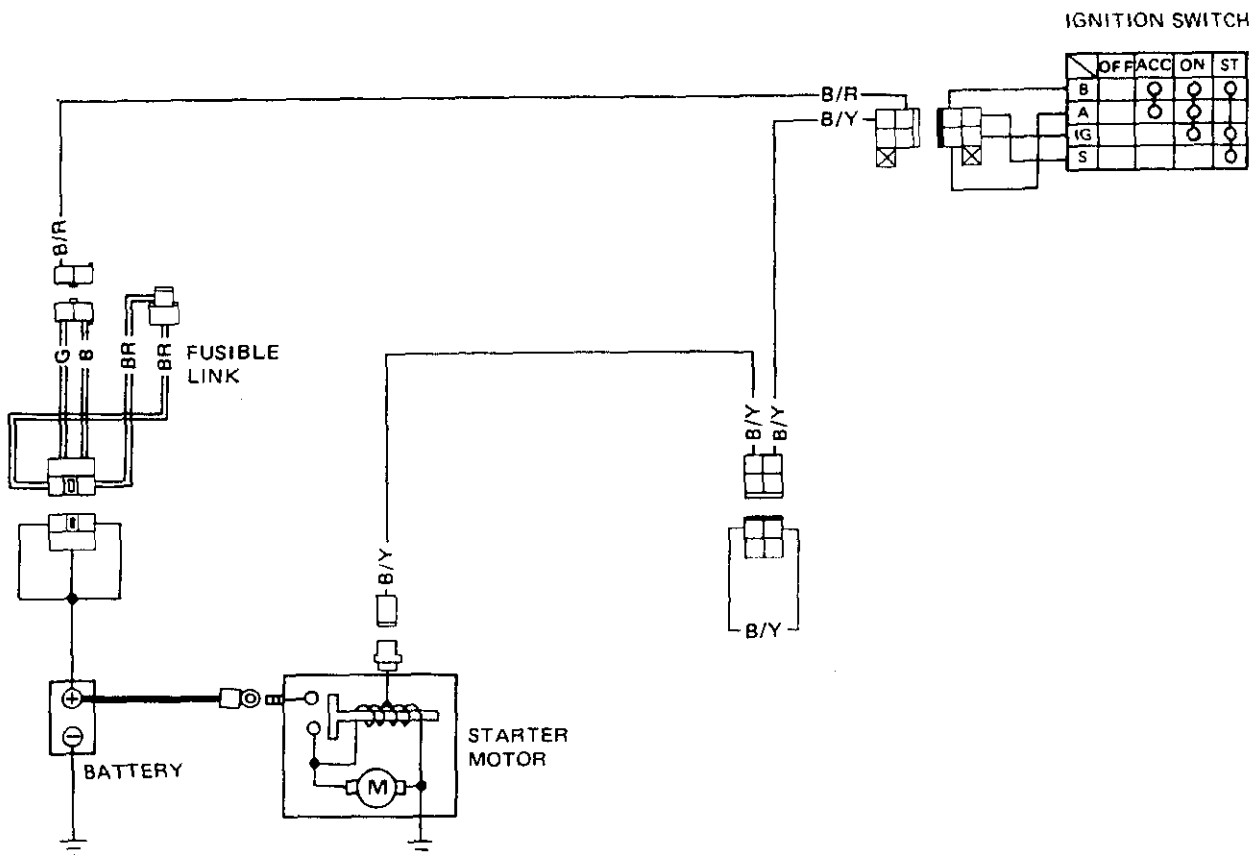
BATTERY

| Applied model | Standard | Option | | | |
|---------------|------------------|-------------------|-------|-------------------------------|------------------|
| | All | Except for Europe | | Except for Europe & Australia | All |
| Type | NS60L-MF | NS60L | N50ZL | N40L | 55D23L-MF |
| | Maintenance-free | Low maintenance | | | Maintenance-free |
| Capacity V-AH | 12-45 | | 12-60 | 12-40 | 12-60 |

STARTING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WIRING DIAGRAM



SEL462D

STARTING SYSTEM

STARTER MOTOR

S114-377

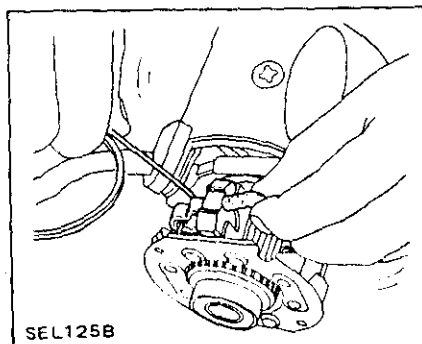
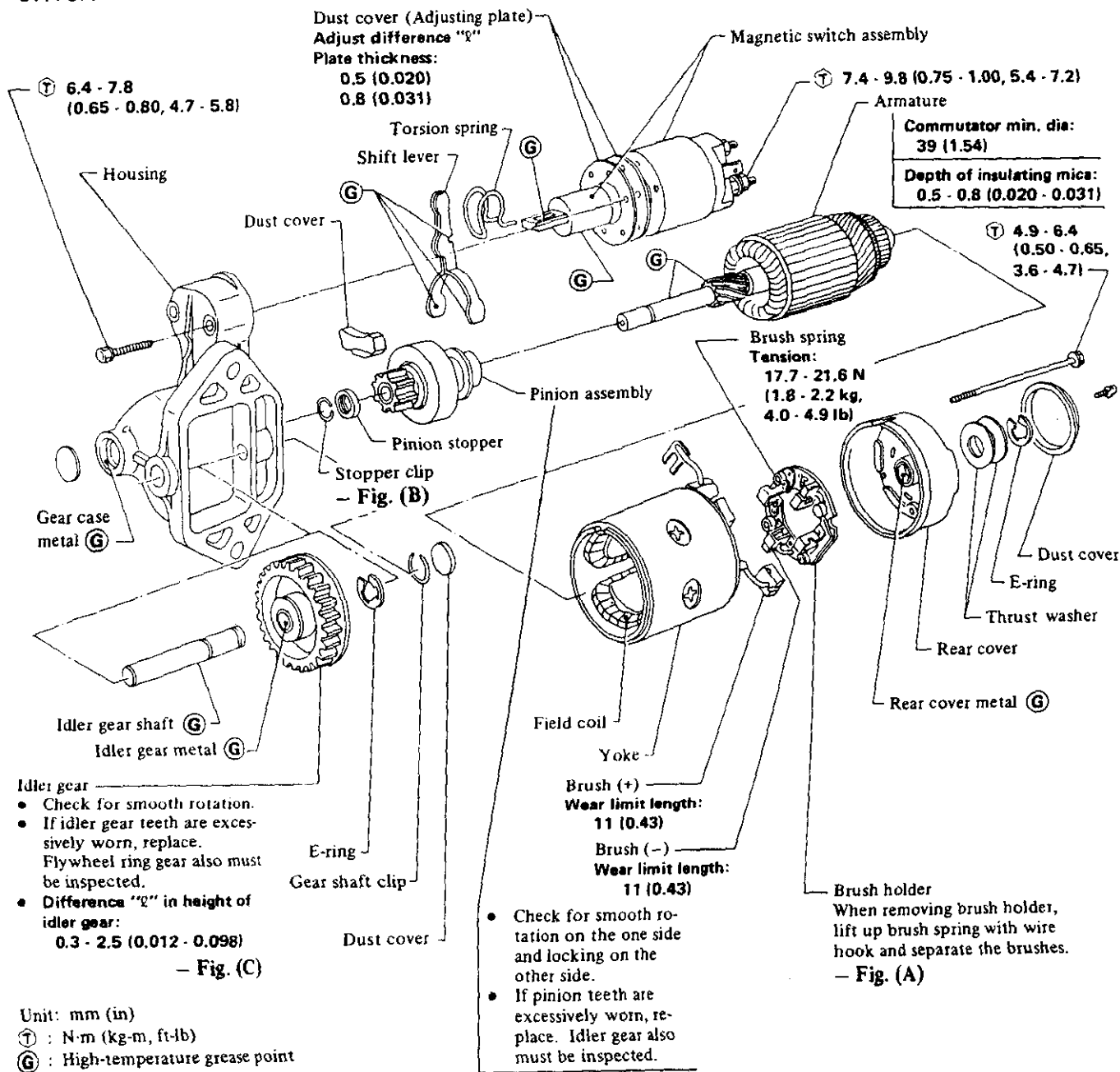


Fig. (A)

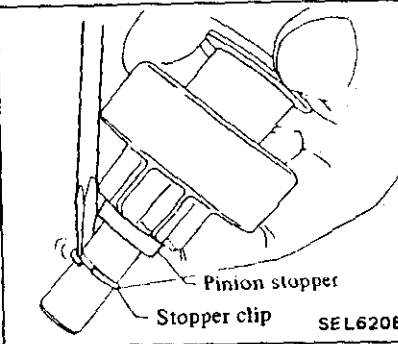


Fig. (B)

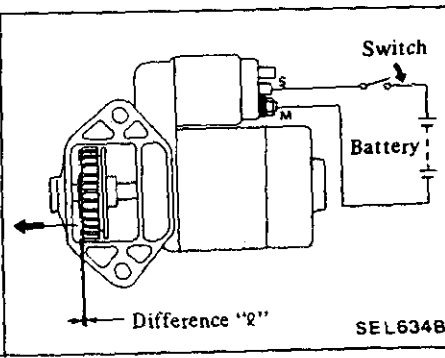


Fig. (C)

SEL246C

CHARGING SYSTEM

SERVICE DATA AND SPECIFICATIONS

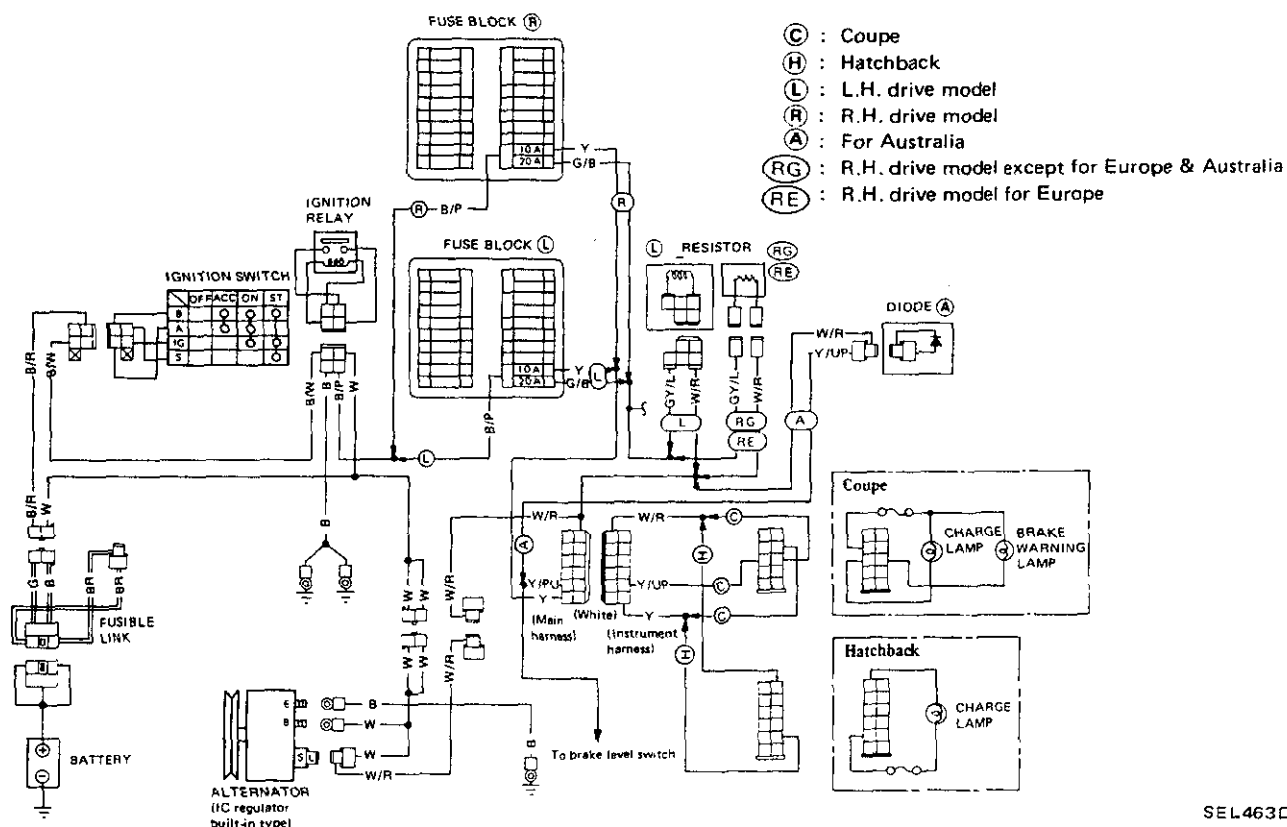
STARTER MOTOR

| | | |
|------------------------------|------------|---------------------------------------|
| Type | | S114-377 |
| | | Reduction type |
| Applied model | | All |
| System voltage | V | 12 |
| No load | | |
| Terminal voltage | V | 11.5 |
| Current | A | Less than 60 |
| Revolution | rpm | More than 2,350 |
| Outer diameter of commutator | mm (in) | More than 39 (1.54) |
| Minimum length of brush | mm (in) | 11 (0.43) |
| Brush spring tension | N (kg, lb) | 17.7 - 21.6 (1.8 - 2.2, 4.0 - 4.9) |
| Difference "g" | mm (in) | 0.3 - 2.5 (0.012 - 0.098) |

CHARGING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WIRING DIAGRAM



SEL463D

CHARGING SYSTEM

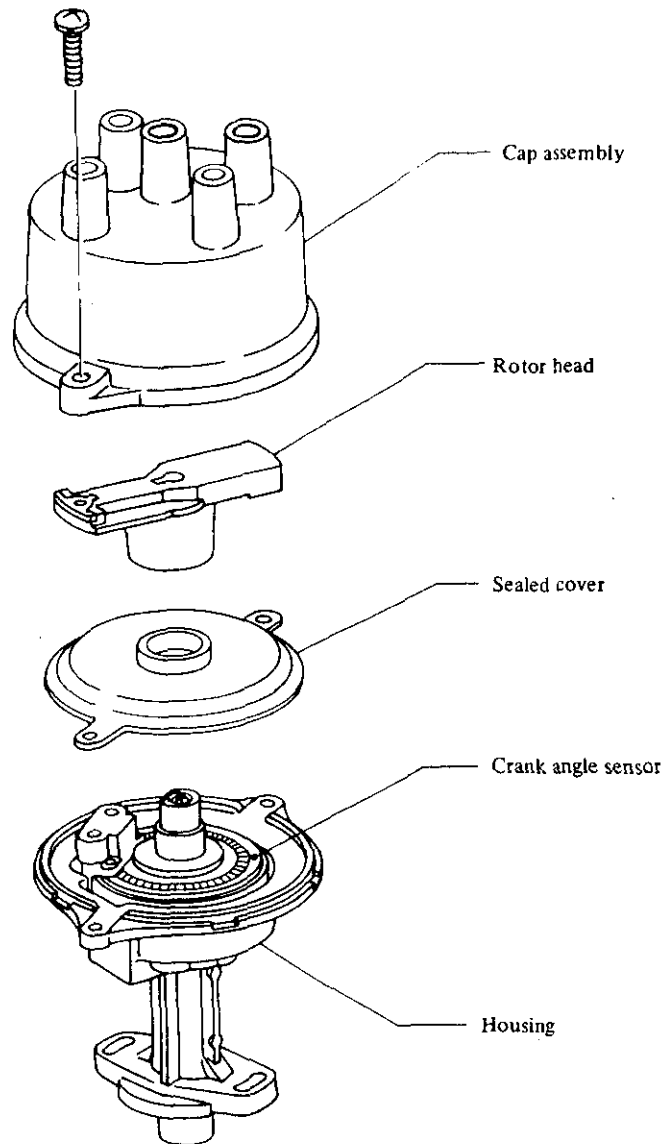
SERVICE DATA AND SPECIFICATIONS

ALTERNATOR

| Type | LR150-125B | LR160-124 |
|--|--|--|
| Applied model | L.H. drive model and R.H. drive Europe model | R.H. drive model except for Europe |
| Nominal rating V-A | 12-50 | 12-60 |
| Ground polarity | Negative | Negative |
| Minimum revolution under no-load (When 14 volts is applied) rpm | Less than 900 | Less than 1,000 |
| Hot output current A/rpm | More than 42/2,500 More than 50/5,000 | More than 50/2,500 More than 60/5,000 |
| Regulated output voltage V | 14.4 - 15.0 | 14.4 - 15.0 |
| Brush wear limit mm (in) | More than 7.0 (0.276) | More than 7.0 (0.276) |
| Brush spring pressure N (g, oz) | 2.501 - 3.383 (255 - 345, 8.99 - 12.17) | 2.501 - 3.383 (255 - 345, 8.99 - 12.17) |
| Slip ring outer diameter mm (in) | More than 30 (1.18) | More than 30 (1.18) |

IGNITION SYSTEM

DISTRIBUTOR



SEL196D

CHECKING

Cap and rotor head

Check cap and rotor head for dust, carbon deposits and cracks.

DISASSEMBLY

Cap, sealed cover, rotor head, housing and harness can be disassembled (but not crank angle sensor).

IGNITION SYSTEM

SERVICE DATA AND SPECIFICATIONS DISTRIBUTOR

| | | |
|--|------------------|-------------------|
| Type | D4P82-06 | D4P82-02 |
| Applied model | Europe | Except for Europe |
| Firing order | 1-3-4-2 | |
| Rotating direction | Counterclockwise | |
| Cap insulation resistance $M\Omega$ | More than 50 | |
| Rotor head insulation resistance $M\Omega$ | More than 50 | |

IGNITION COIL

| | | |
|--|-------------|--|
| Type | E12-59 | |
| Applied model | All | |
| Primary voltage V | 12 | |
| Primary resistance [at 20°C (68°F)] Ω | 0.84 - 1.02 | |
| Secondary resistance [at 20°C (68°F)] $k\Omega$ | 8.2 - 12.4 | |

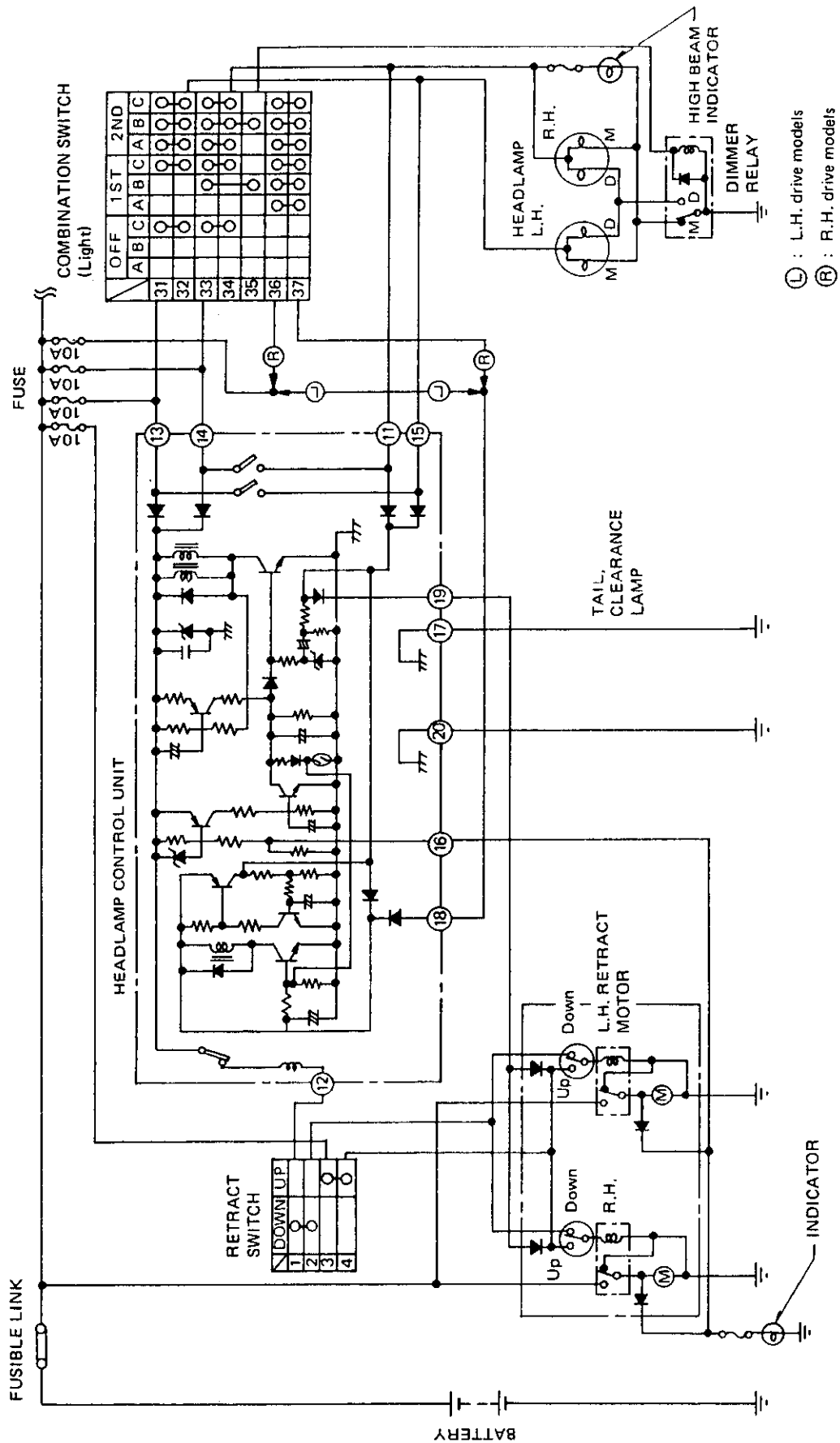
SPARK PLUG

| | | |
|-----------------------------------|---------------------------|-------------------|
| Type | | |
| Standard | BPR6ES | BP6ES L45PW |
| Hot | BPR5ES | BP5ES L46PW |
| Cold | BPR7ES | BP7ES L44PW |
| Applied model | Europe | Except for Europe |
| Size (Screw dia. x reach) mm (in) | 14 x 19 (0.55 x 0.75) | |
| Plug gap mm (in) | 0.8 - 0.9 (0.031 - 0.035) | |

LIGHTING SYSTEM

COUPE

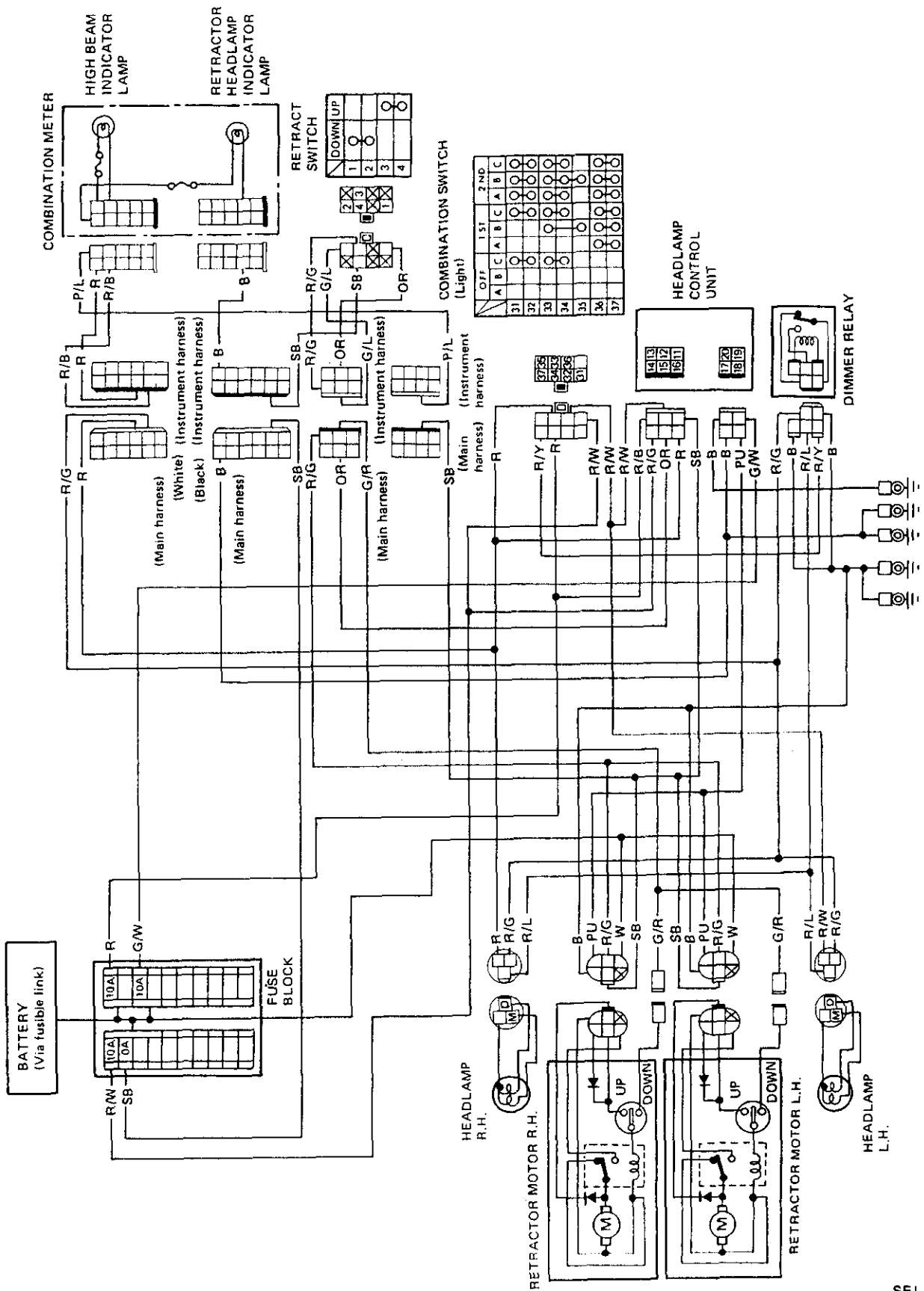
Schematic



LIGHTING SYSTEM

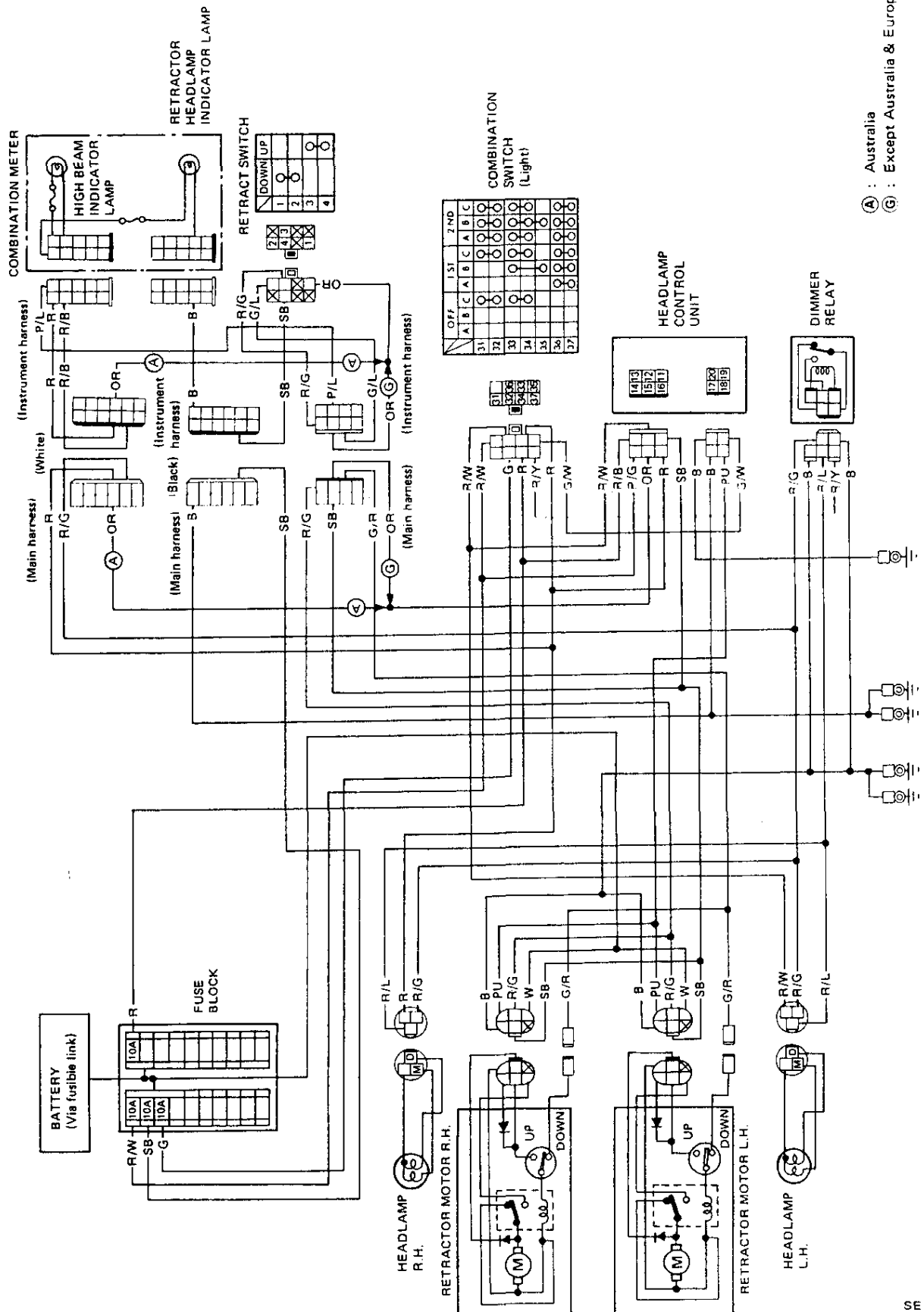
Wiring diagram

L.H. drive model



SEL468D

R.H. drive model



(A) : Australia
(G) : Except A

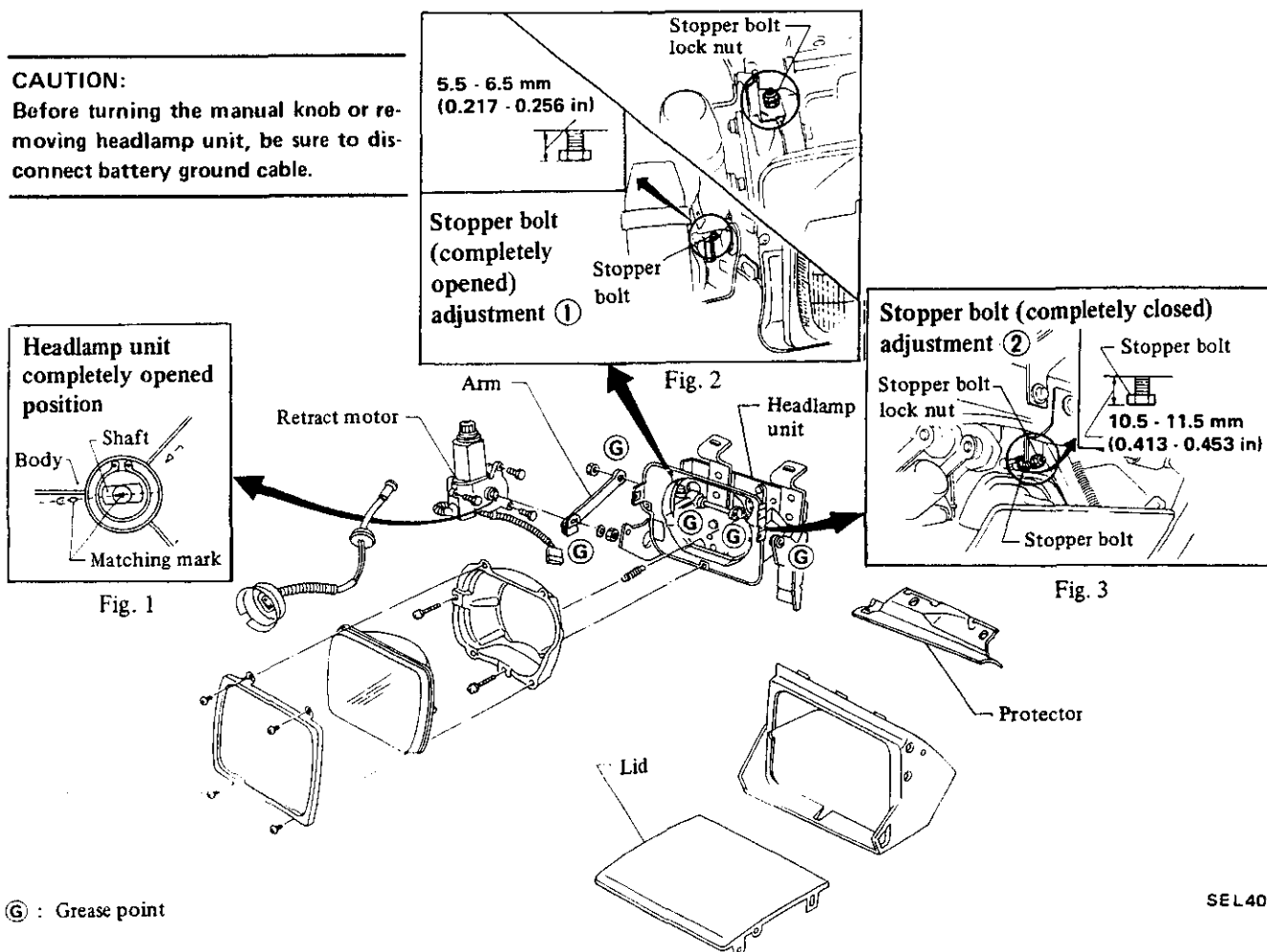
LIGHTING SYSTEM

Retract system

- When removing retract motor, remove motor and headlamp unit as an assembly first. Then remove motor from headlamp unit.
- After working on this unit, be sure to confirm proper operation using manual knob.
- When installing retract motor, align matching mark on motor with that of motor body with headlamp unit in completely opened position (Fig. 1). Then install retract motor and adjust stopper bolt (Fig. 2 and Fig. 3).
- Apply grease to sliding portion and link joint as necessary.
- Pack harness connector with watertight grease as necessary.

CAUTION:

Before turning the manual knob or removing headlamp unit, be sure to disconnect battery ground cable.



Adjusting installed headlamp unit

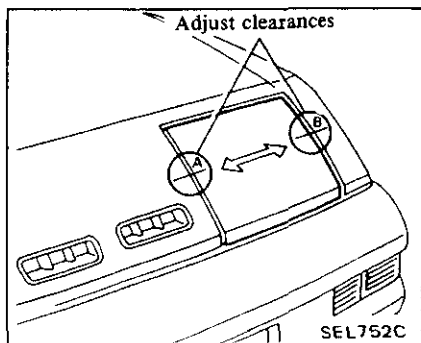


Fig. 4

- A: Approx. 6 mm (0.24 in)
 B: Approx. 7 mm (0.28 in)

Adjusting installation of lid

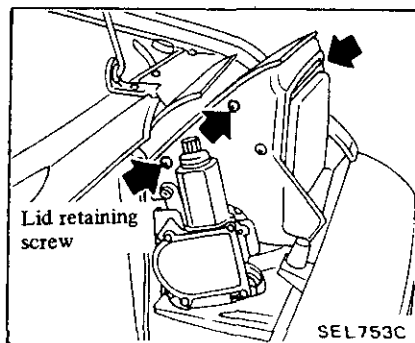


Fig. 5

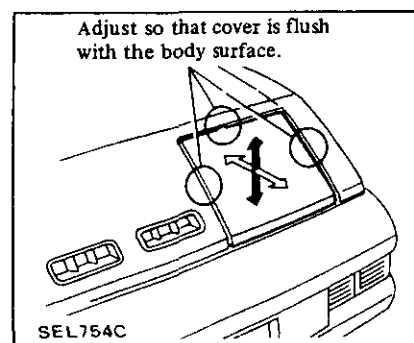
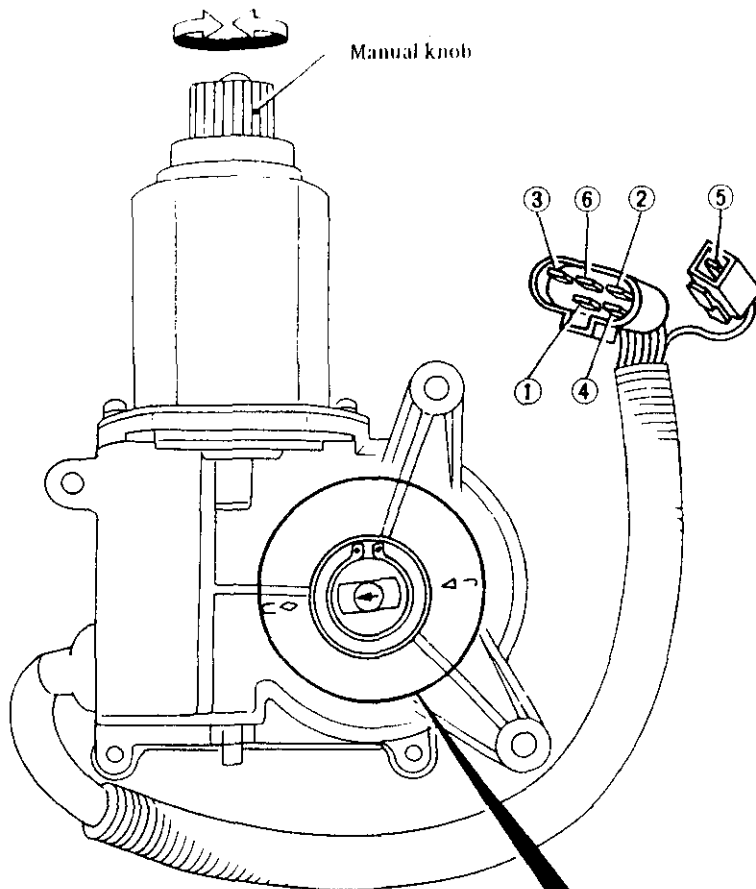


Fig. 6

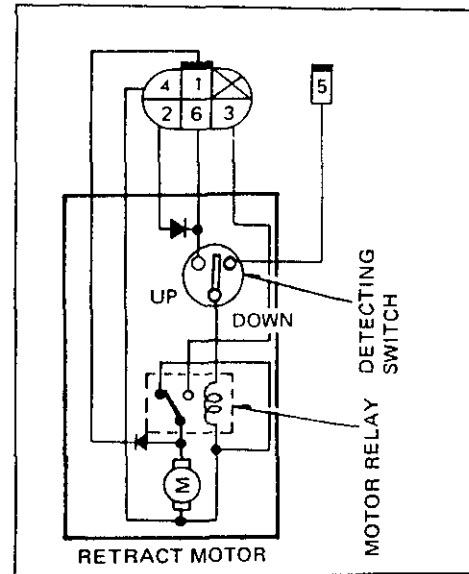
- After adjusting installed headlamp unit or installation of lid, be sure to confirm that the protector and lid do not interfere with each other using manual knob.

LIGHTING SYSTEM

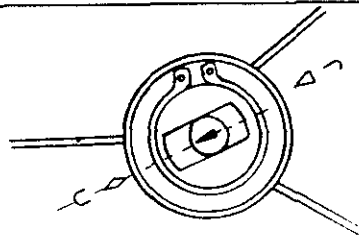
Inspection — retract motor



Electrical circuit



Turn manual knob and align marks as shown in the figure.



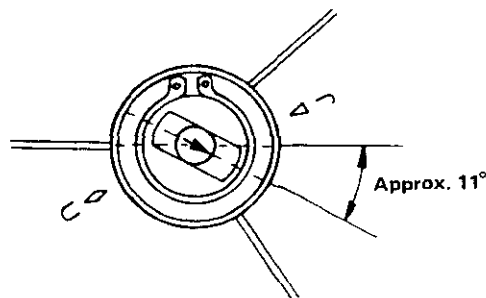
Detecting switch

"Down (Headlamp unit completely opened)" position

Inspection

Check continuity, between ④ and ⑤

If there is no continuity, replace retract motor.



Detecting switch

"Up (Headlamp unit completely closed)" position

Inspection

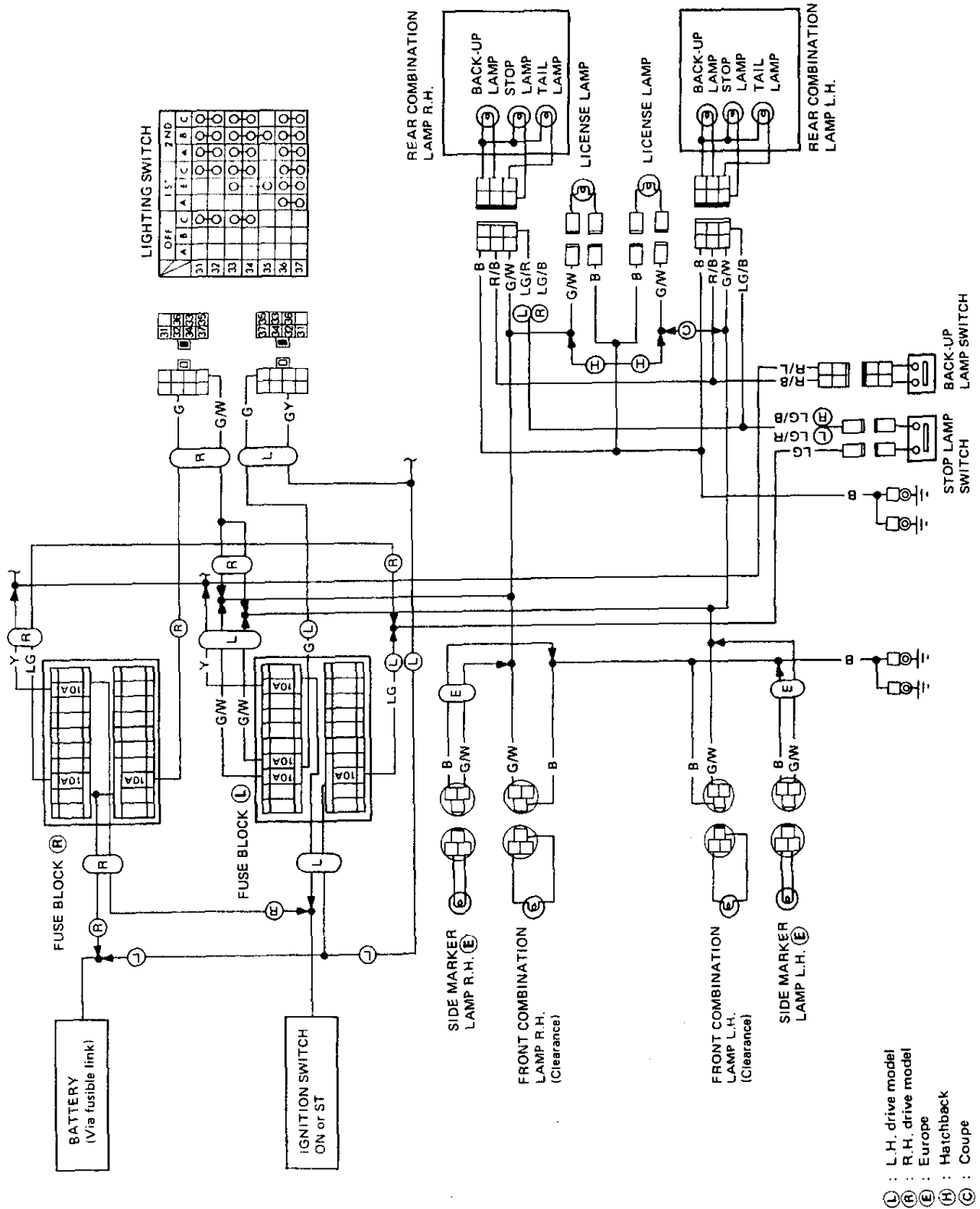
Check continuity between ④ and ⑥

If there is no continuity, replace retract motor.

LIGHTING SYSTEM

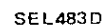
EXTERIOR LAMPS

WIRING DIAGRAM/CLEARANCE, SIDE MARKER, LICENSE, TAIL, STOP AND BACK-UP LAMPS



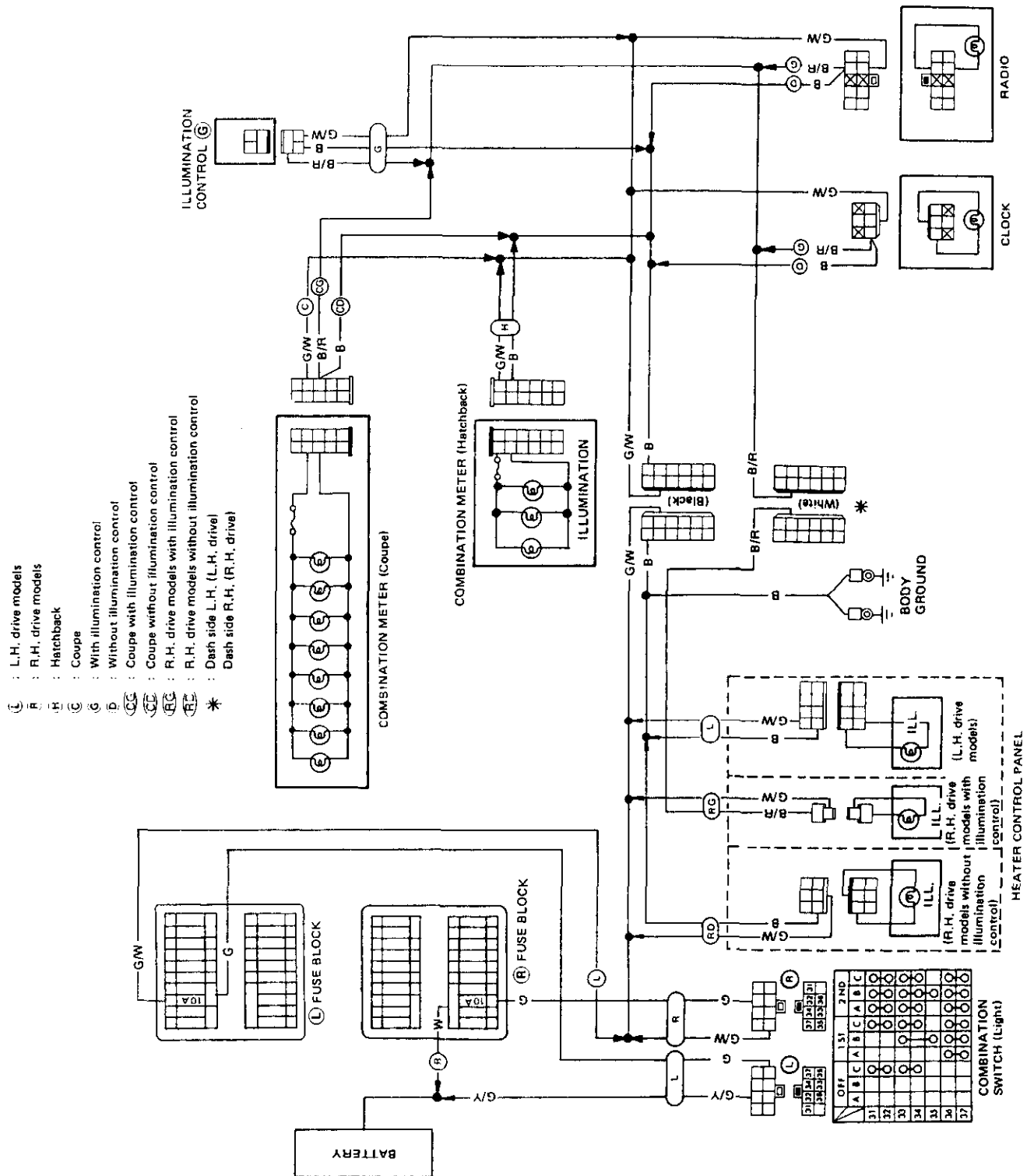
SEL470D

WIRING DIAGRAM/TURN SIGNAL AND HAZARD



LIGHTING SYSTEM

ILLUMINATION LAMPS WIRING DIAGRAM



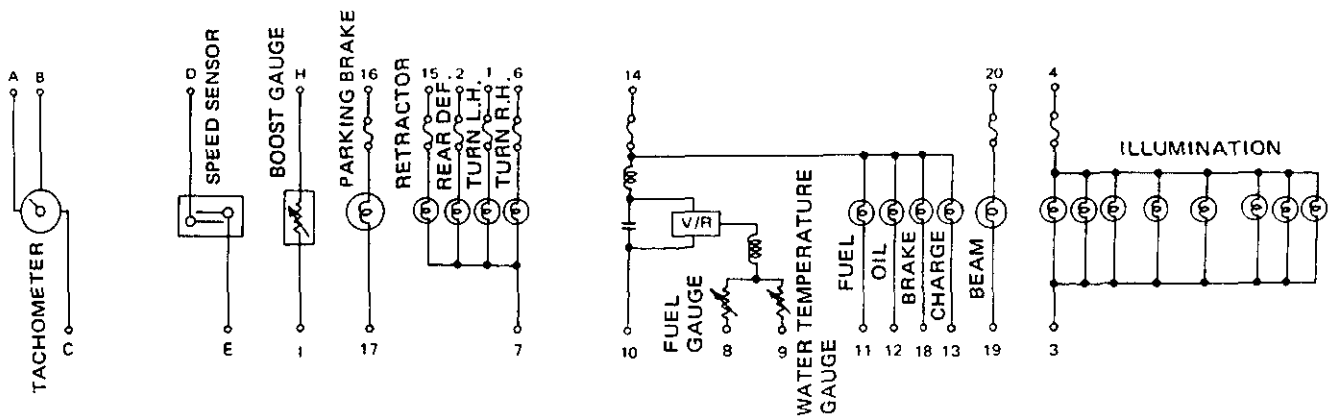
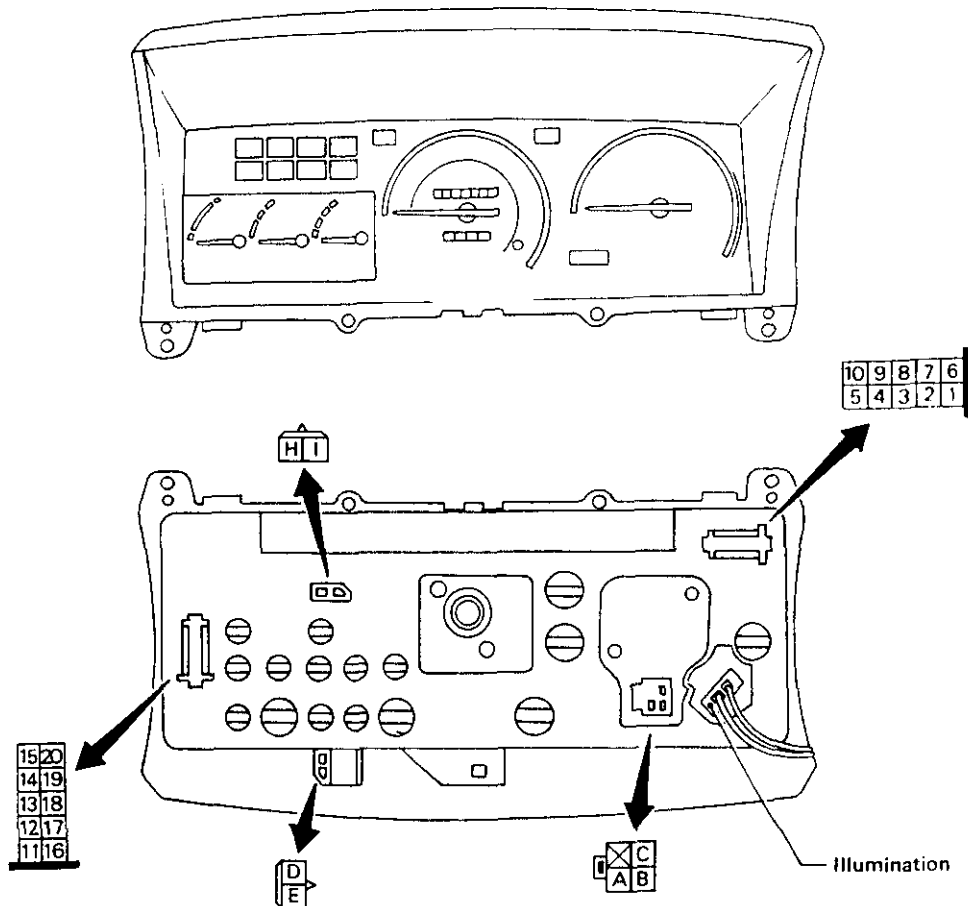
METERS, GAUGES AND WARNING SYSTEM

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

COMBINATION METER

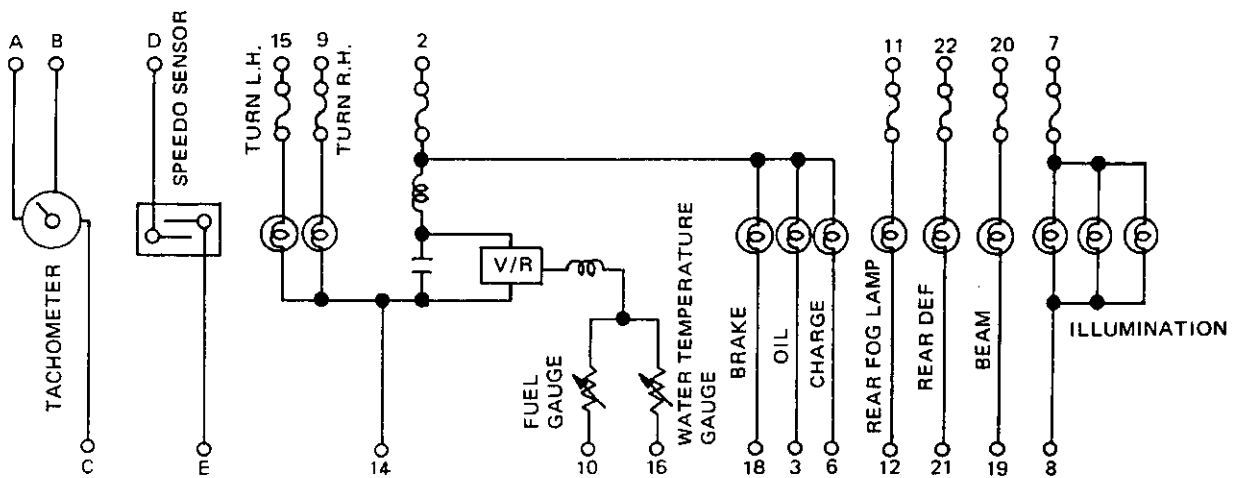
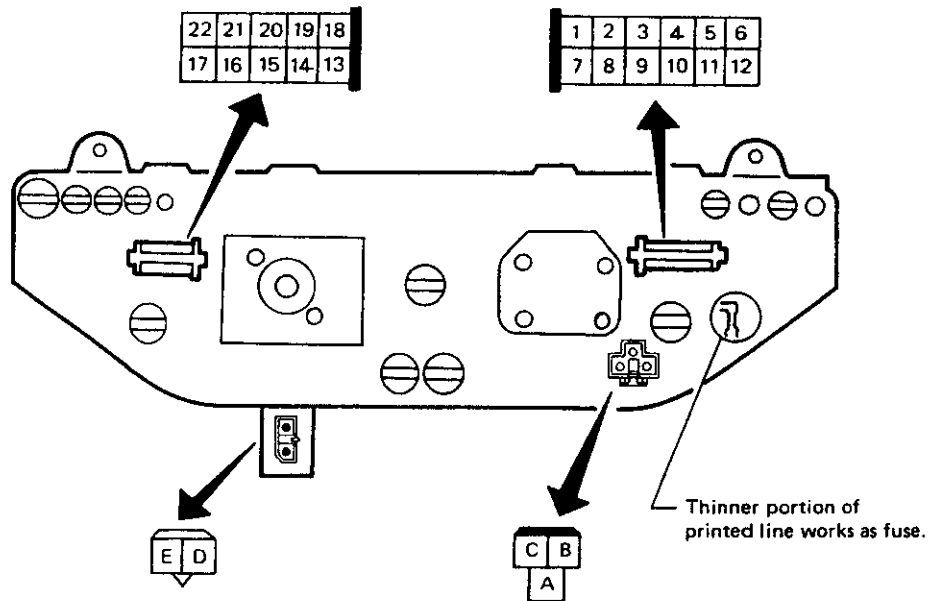
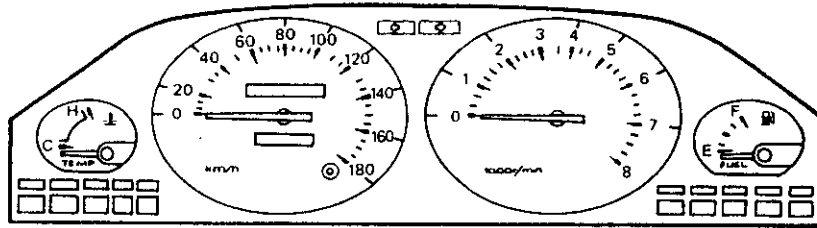
SCHEMATIC/COMBINATION METER

Coupe (Except for Europe)



METERS, GAUGES AND WIRING SYSTEM

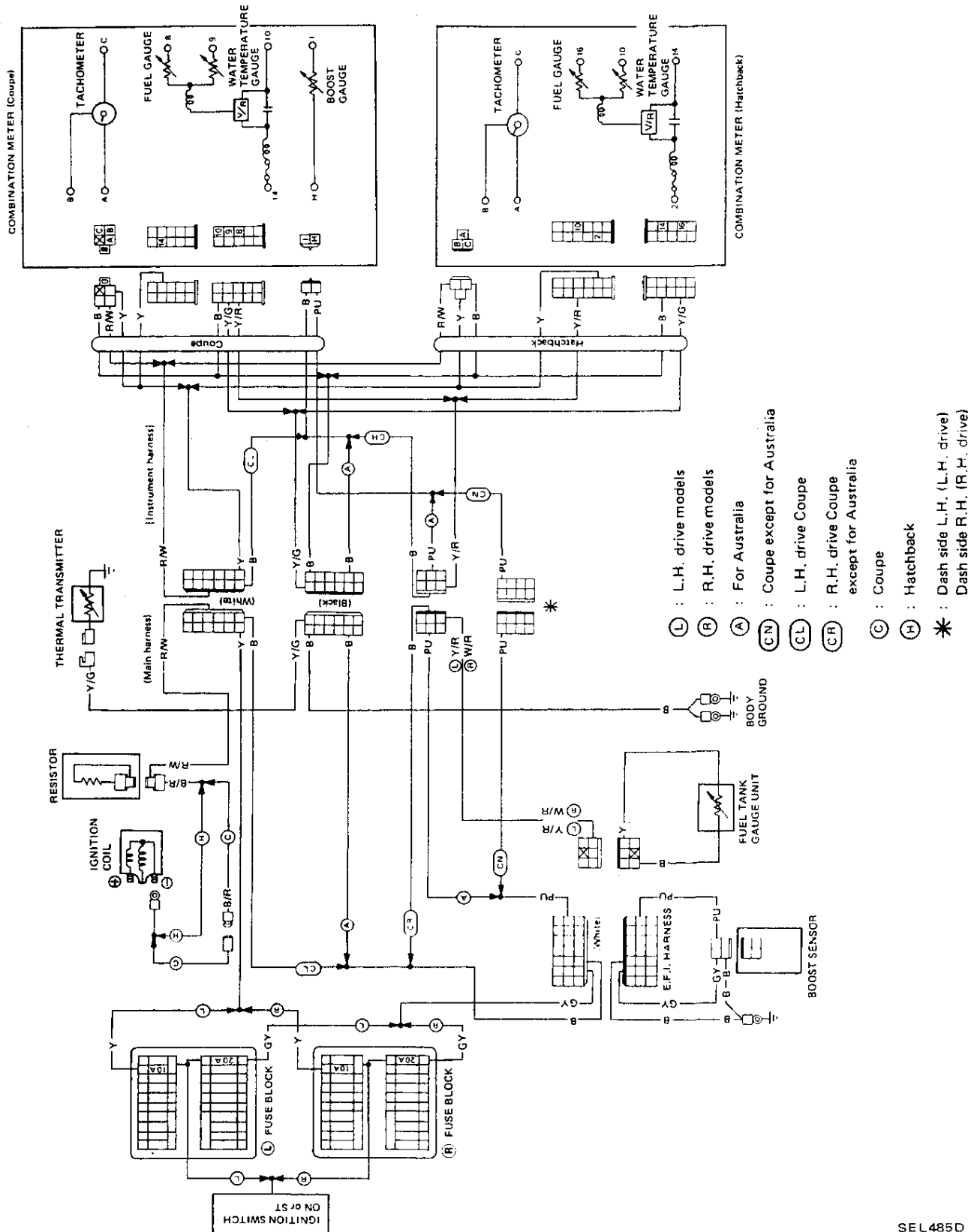
Hatchback (Europe)



SEL472D

METERS, GAUGES AND WIRING SYSTEM

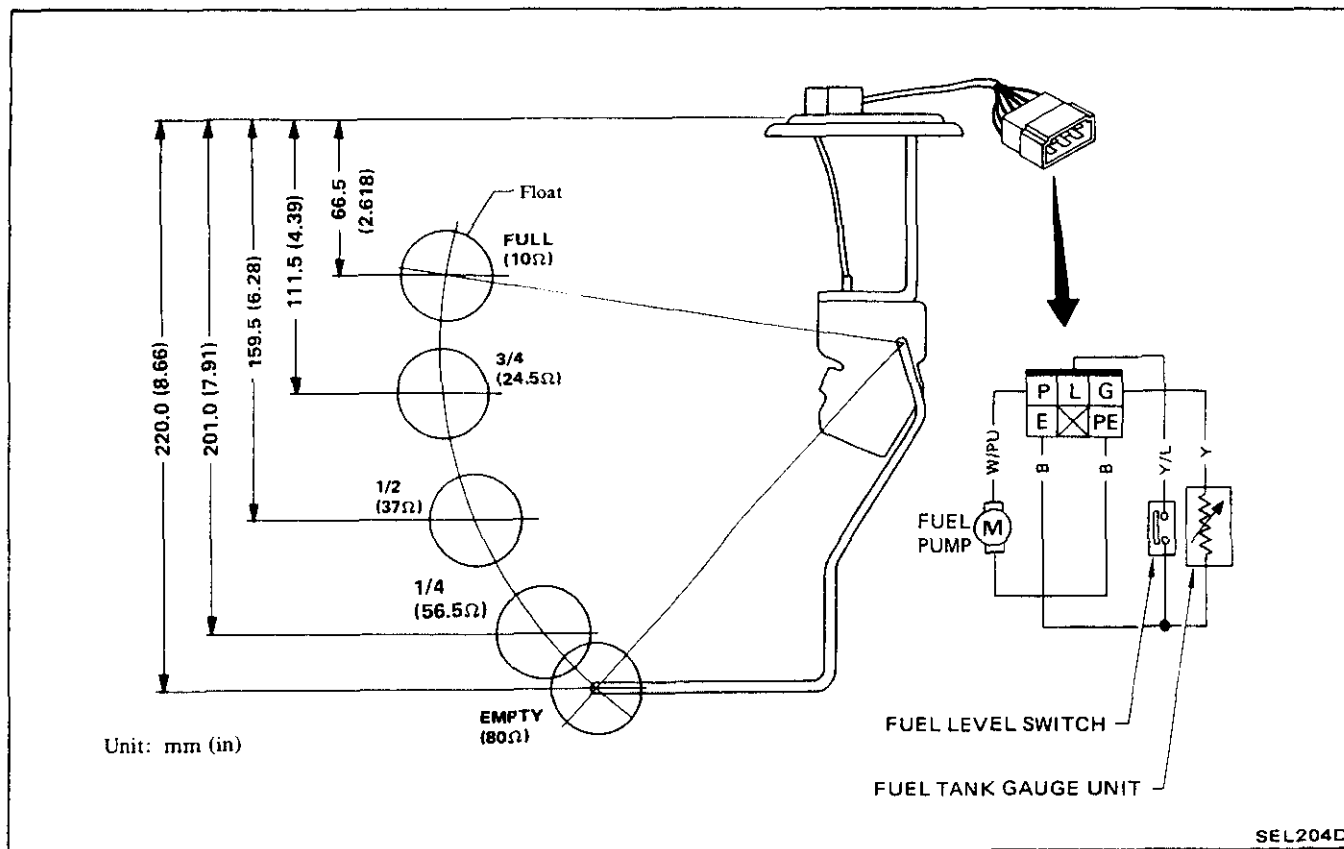
METER AND GAUGES WIRING DIAGRAM



METERS, GAUGES AND WIRING SYSTEM

FUEL TANK GAUGE UNIT

Inspection



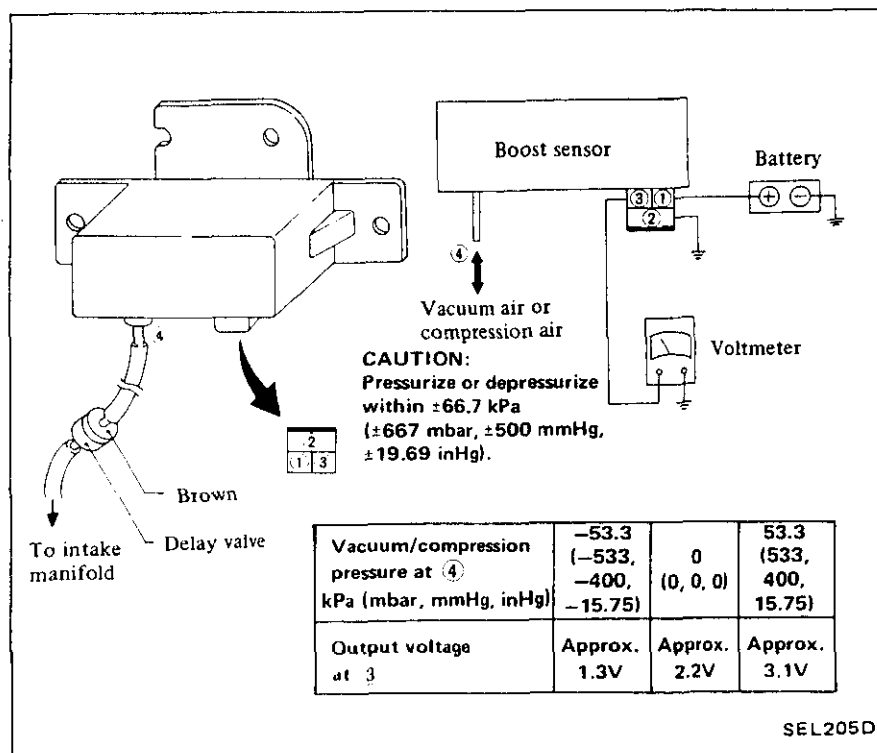
BOOST SENSOR

Location

Boost sensor is attached to the dash upper panel in engine room compartment.

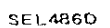
Refer to "LOCATION OF ELECTRICAL UNITS".

Inspection



WARNING LAMPS

WIRING DIAGRAM

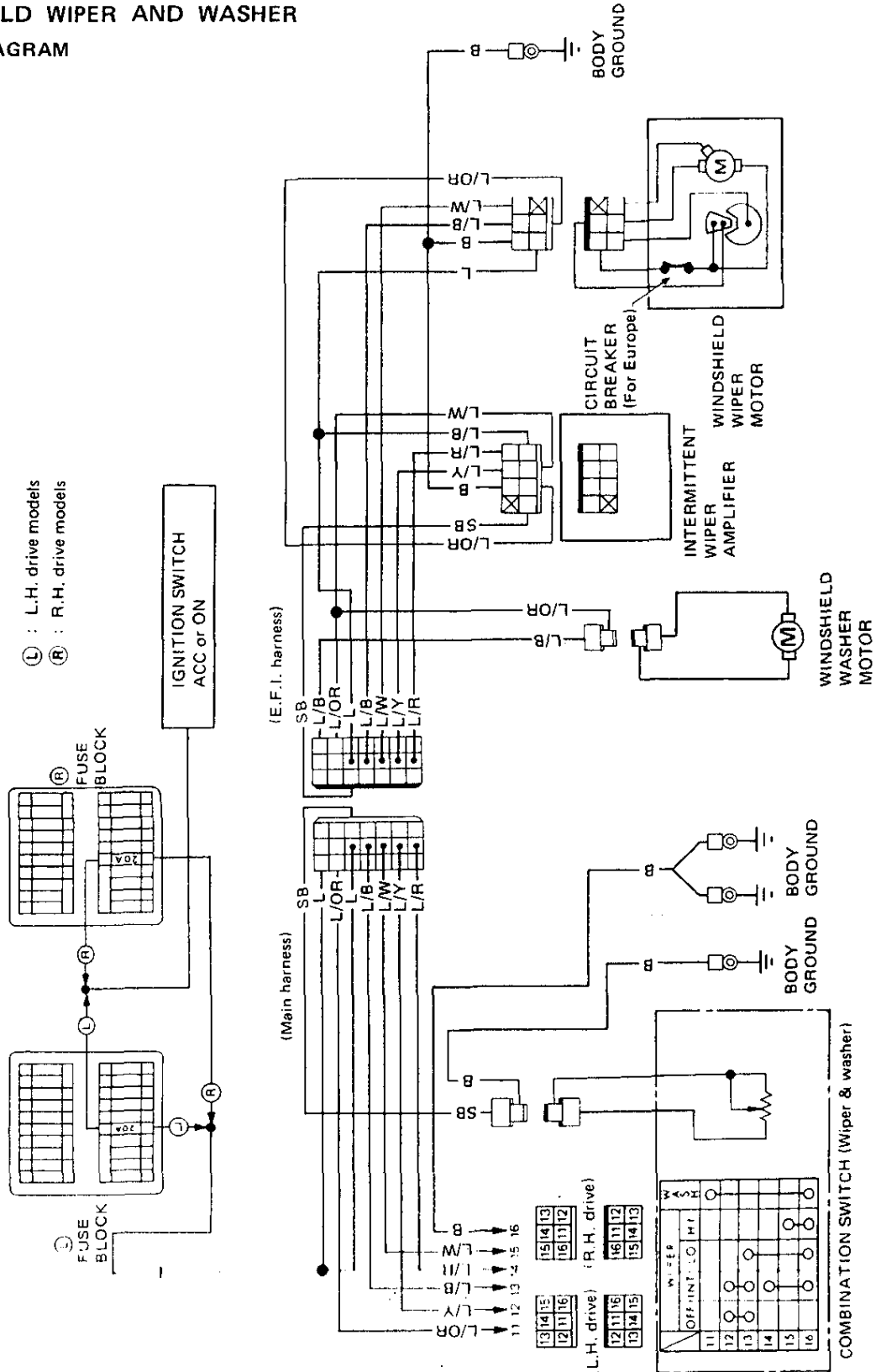


WIPER AND WASHER

WIPER AND WASHER

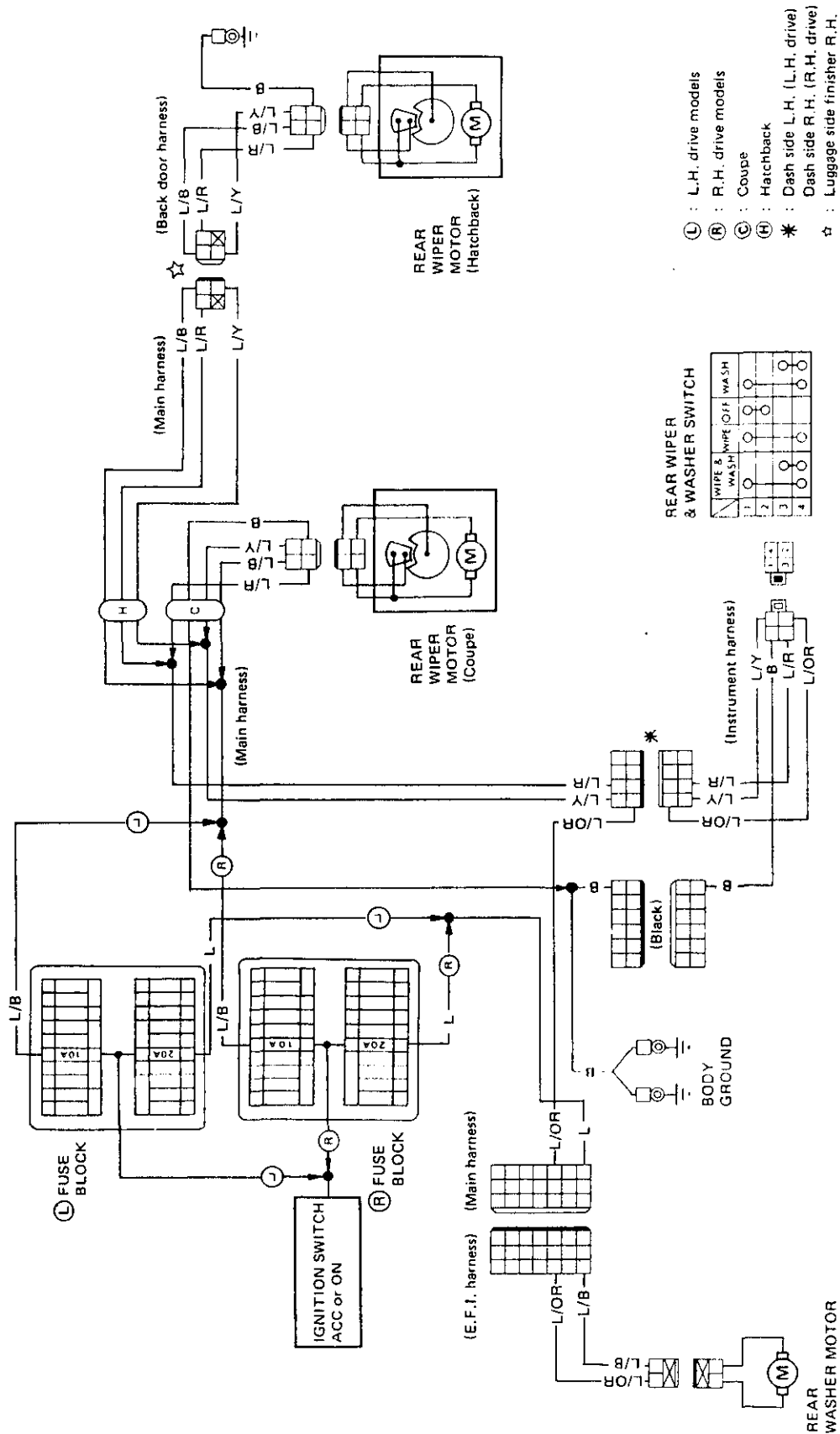
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

WINDSHIELD WIPER AND WASHER WIRING DIAGRAM



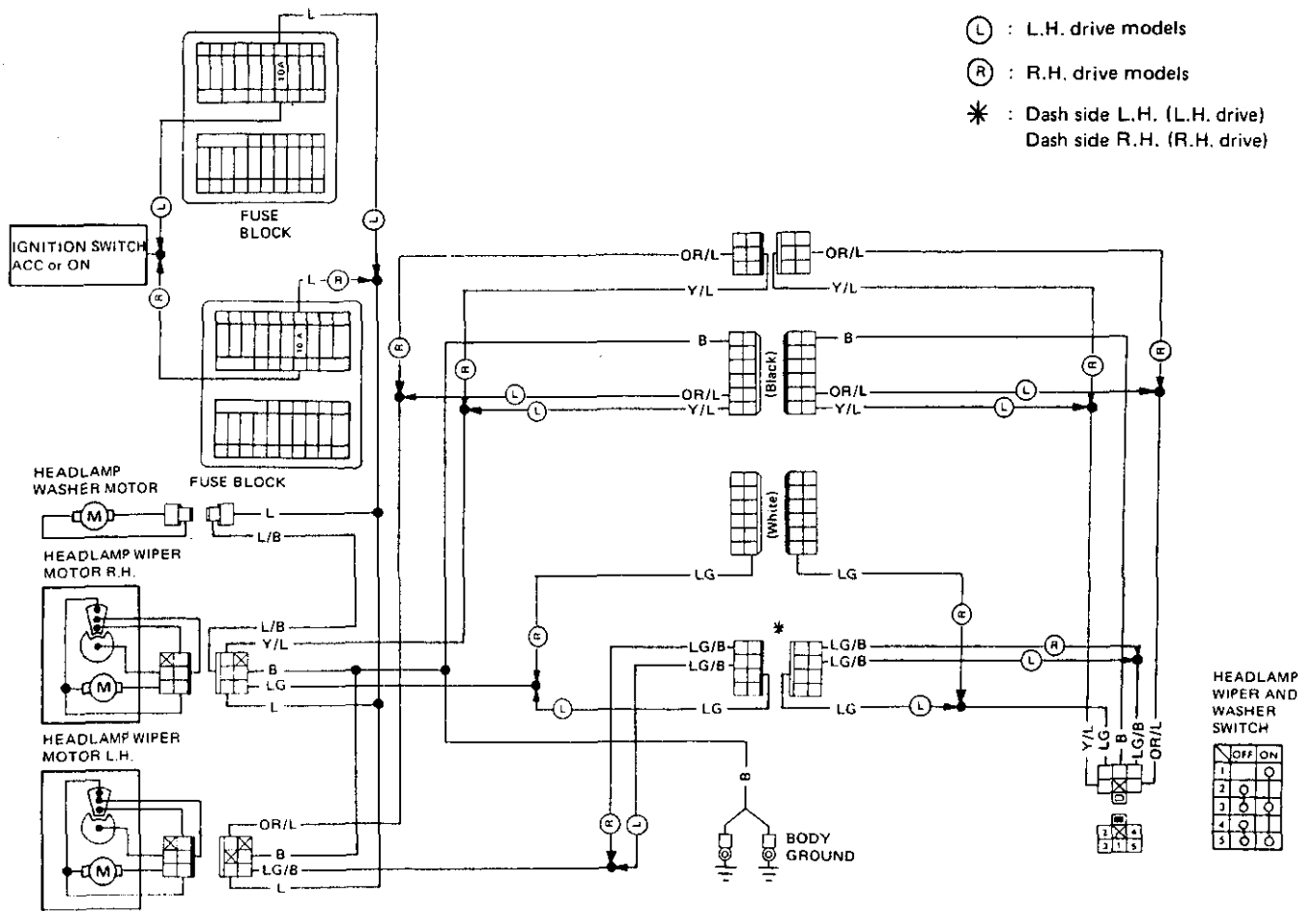
WIPER AND WASHER

REAR WINDOW WIPER AND WASHER WIRING DIAGRAM



WIPER AND WASHER

HEADLAMP WIPER AND WASHER WIRING DIAGRAM



SEL489D

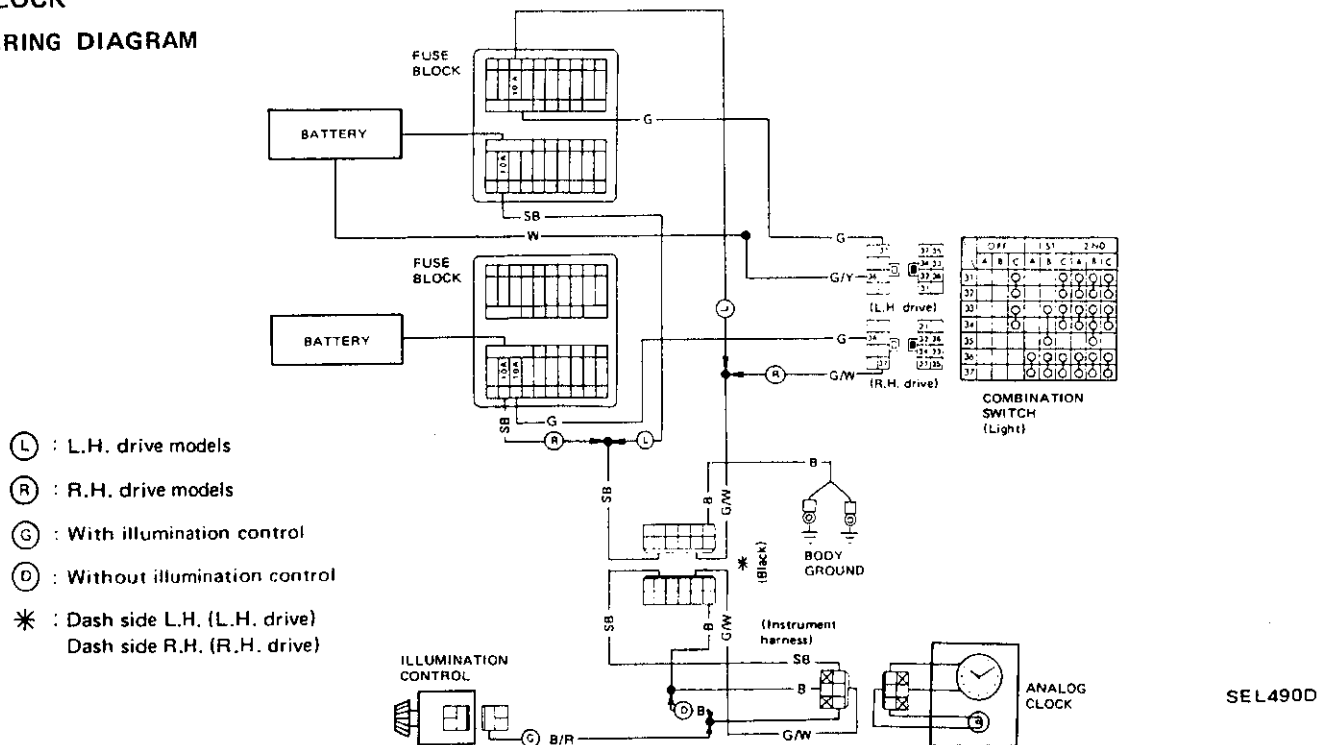
ELECTRICAL ACCESSORIES

ELECTRICAL ACCESSORIES

CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

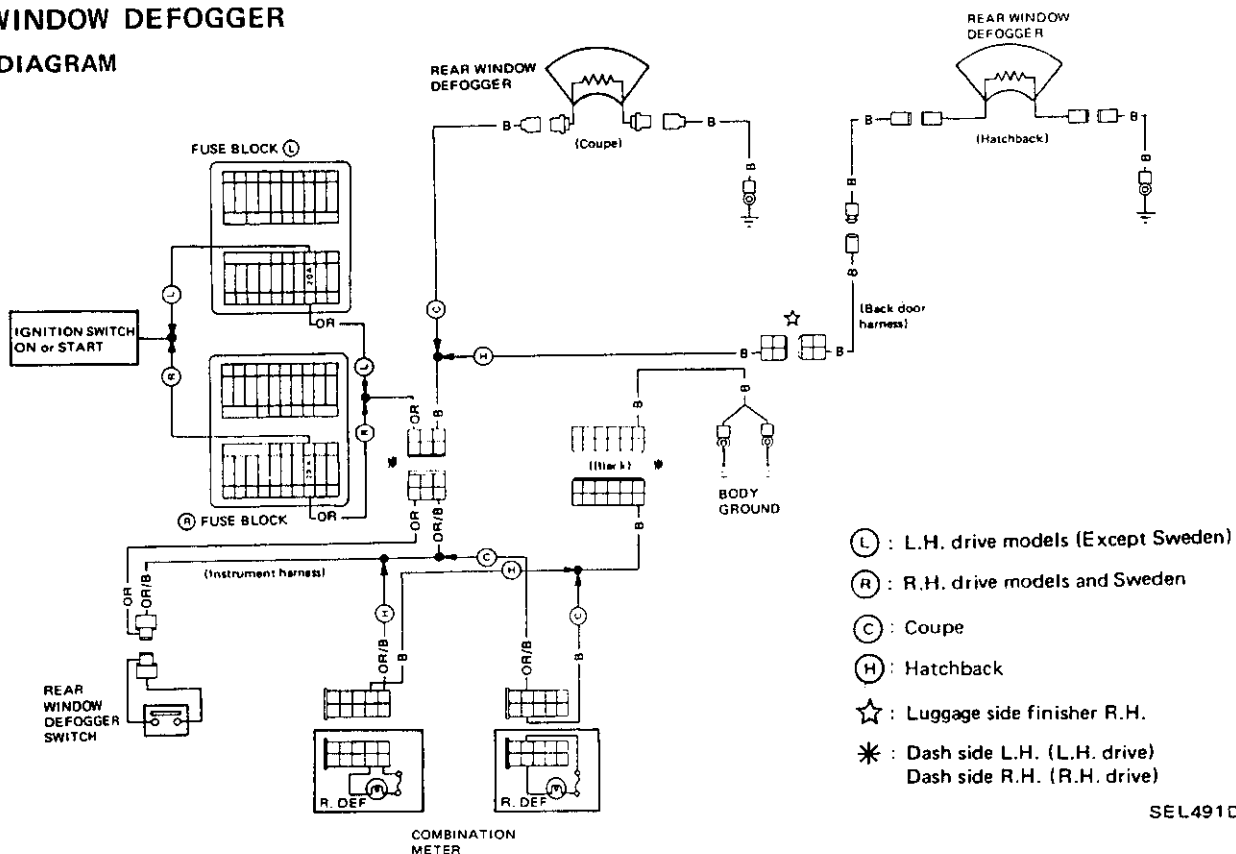
CLOCK

WIRING DIAGRAM

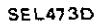


REAR WINDOW DEFOGGER

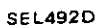
WIRING DIAGRAM



WIRING DIAGRAM

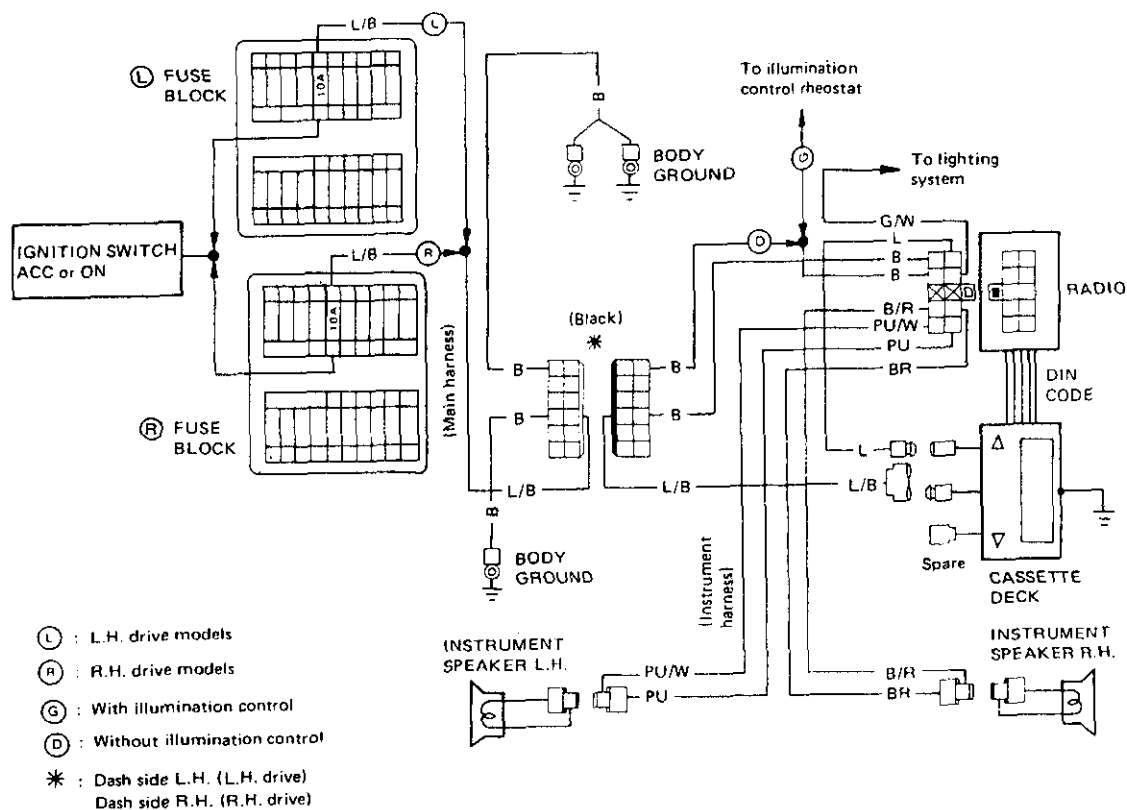


One-speaker type



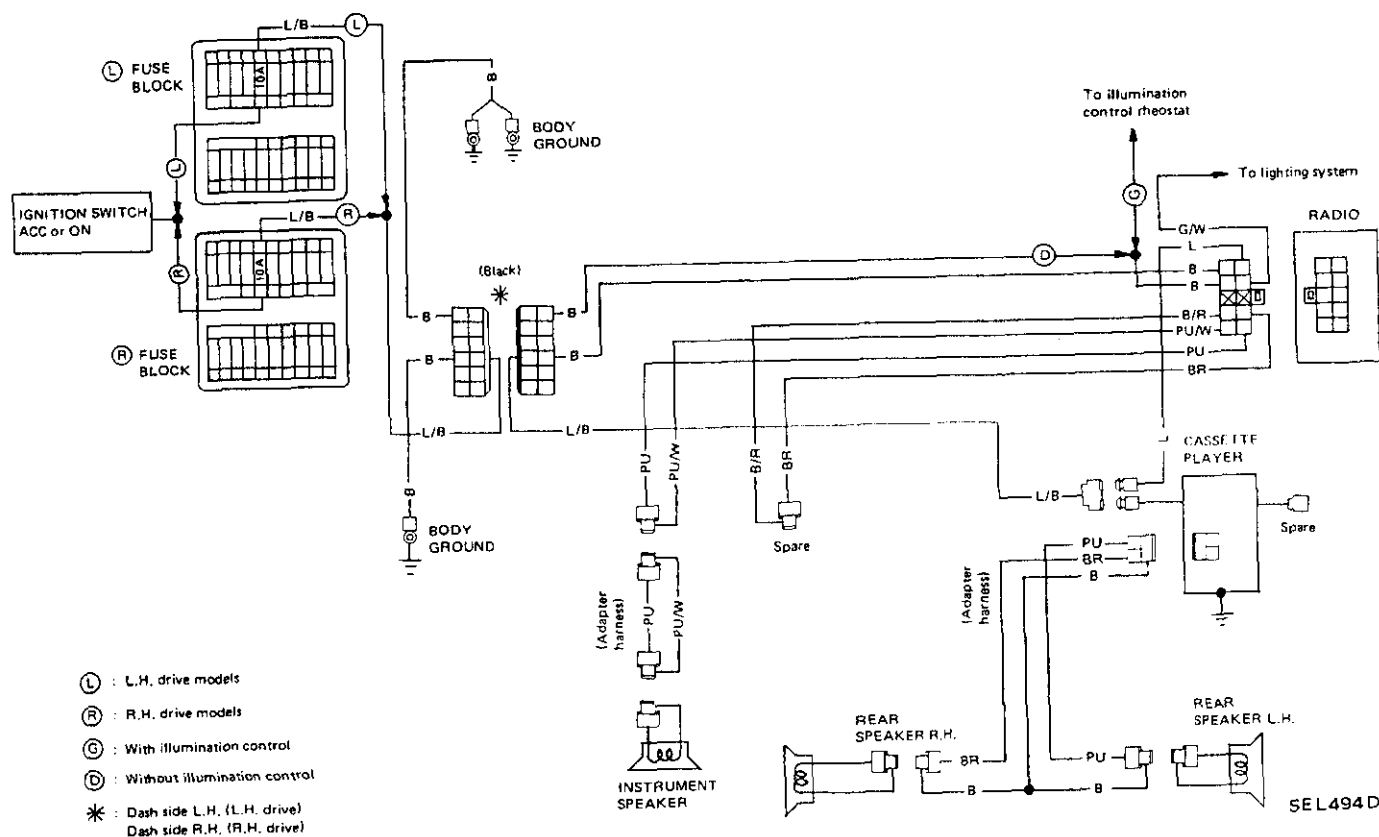
ELECTRICAL ACCESSORIES

Two-speaker type



SEL493D

Three-speaker type



SEL494D

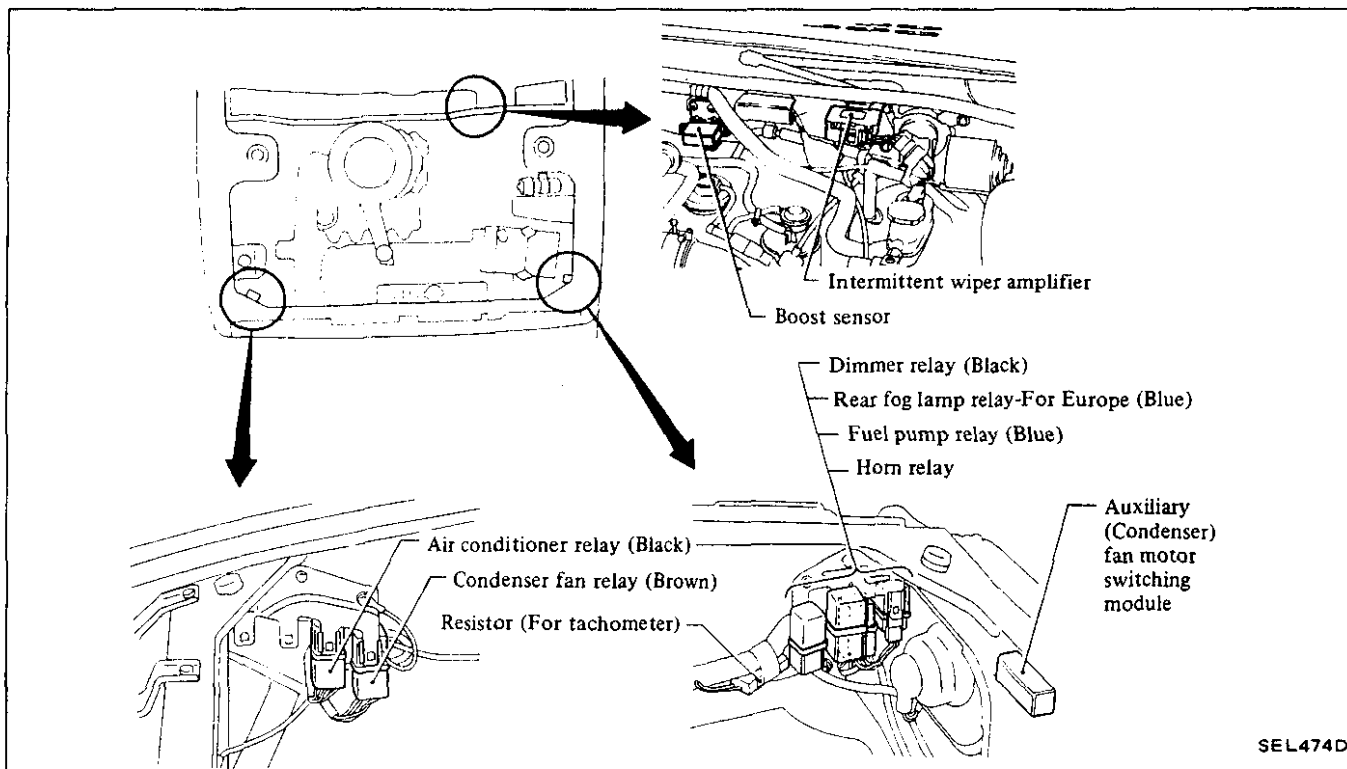
LOCATION OF ELECTRICAL UNITS

LOCATION OF ELECTRICAL UNITS

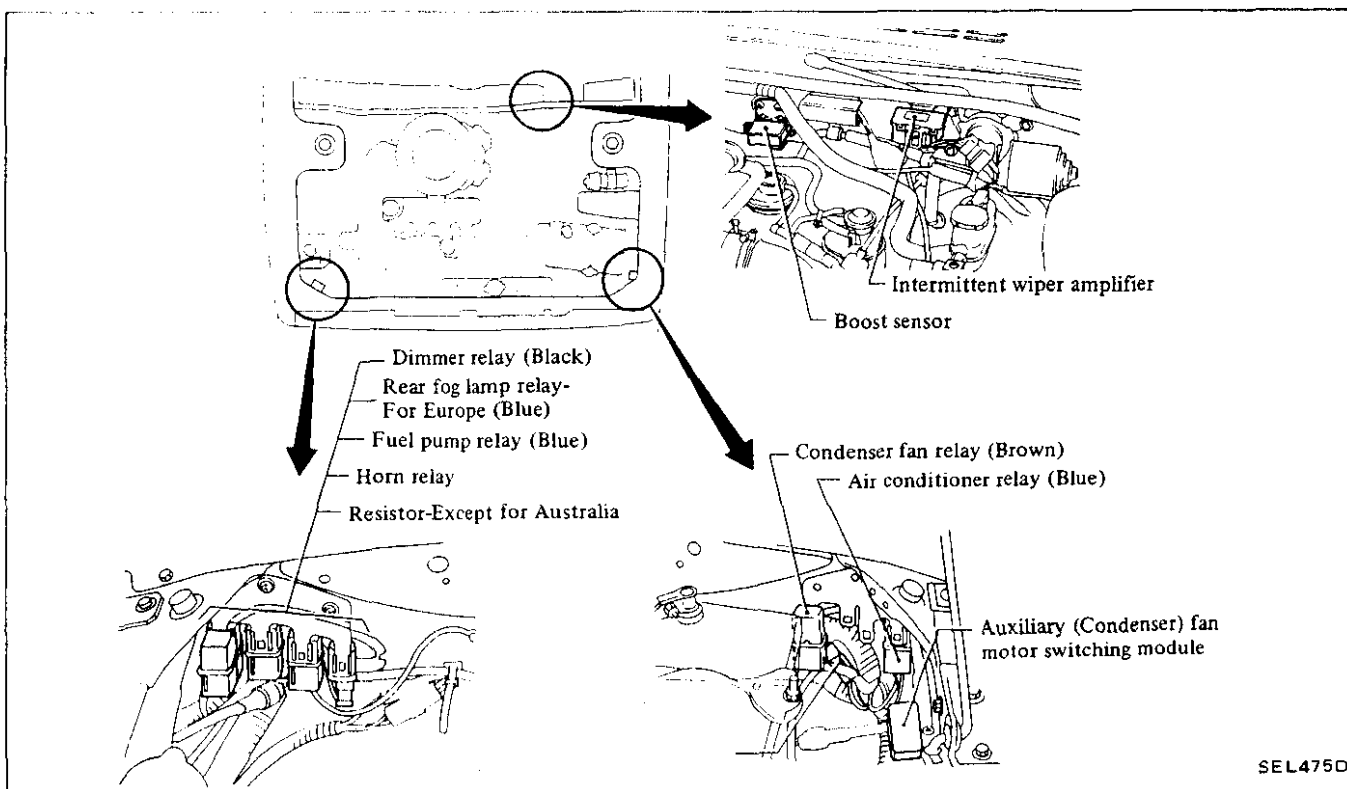
CAUTION: Before starting to work, be sure to turn ignition switch "OFF" and then disconnect battery ground cable.

ENGINE COMPARTMENT

L.H. DRIVE MODEL



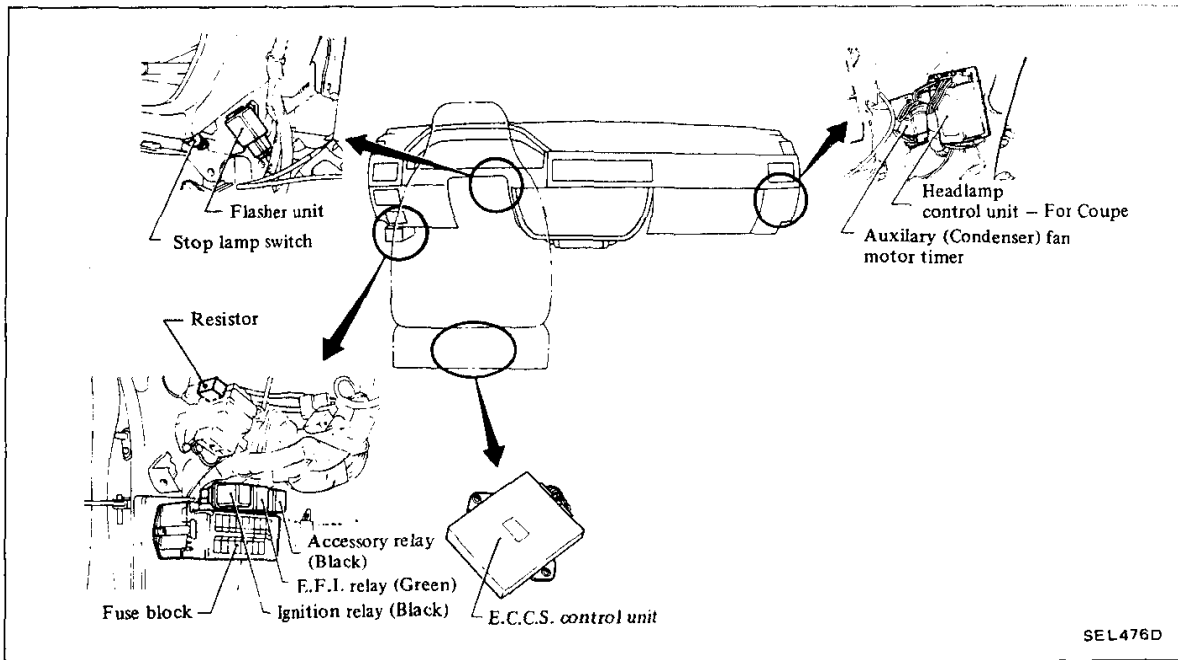
R.H. DRIVE MODEL



LOCATION OF ELECTRICAL UNITS

PASSENGER COMPARTMENT

L.H. DRIVE MODEL



R.H. DRIVE MODEL

