

# MAINTENANCE OPERATIONS

## ENGINE

### Cold Engine Operations

#### 1. (3VZ-E ENGINE)

##### REPLACE TIMING BELT

- (a) Remove the timing belt.  
(See pages EG-32)
- (b) Install the timing belt.  
(See pages EG-41)

#### 2. INSPECT DRIVE BELTS

- (a) Visually check the belt for excessive wear, frayed cords etc.

##### HINT:

Conventional type:

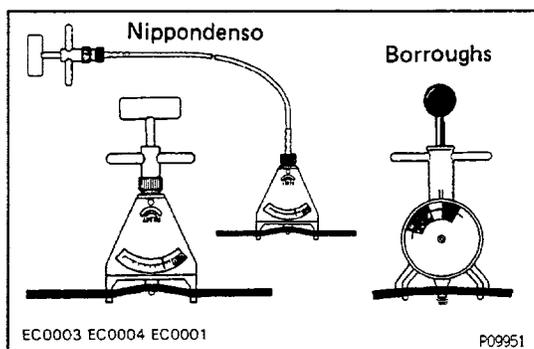
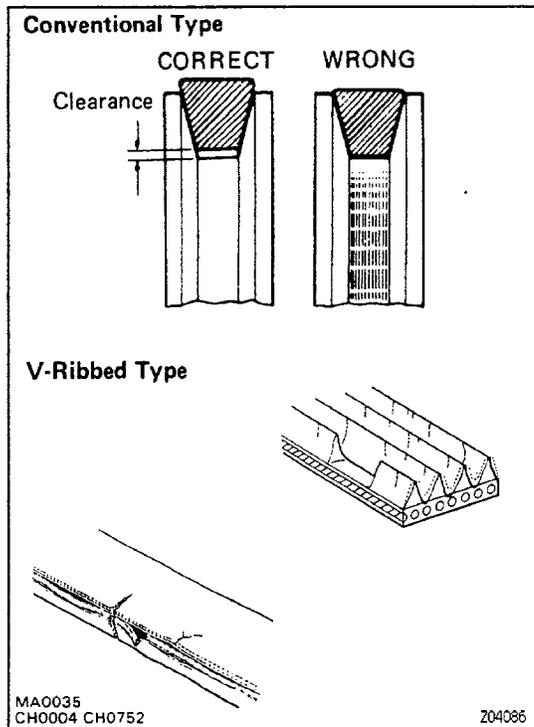
Check that the belt does not touch the bottom of the pulley groove.

If necessary, replace the drive belt.

V-Ribbed type:

Cracks on the ribbed side of the belt are considered acceptable.

If the belt has chunks missing from the ribs, it should be replaced.



- (b) Using a belt tension gauge, check the drive belt tension.

##### Belt tension gauge:

Nippondenso BTG - 20 (95506-00020) or  
Borroughs No. BT-33-73F

##### Drive belt tension:

22R-E Used belt  $80 \pm 20$  lbf

New belt  $125 \pm 25$  lbf

##### 3VZ - E

Generator Used belt  $100 \pm 20$  lbf

New belt  $160 \pm 20$  lbf

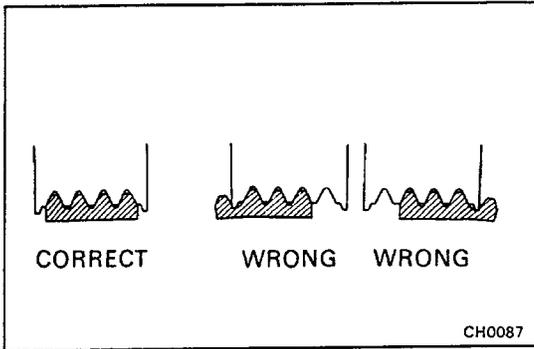
PS Used belt  $80 \pm 20$  lbf

New belt  $125 \pm 25$  lbf

A/C Used belt  $80 \pm 20$  lbf

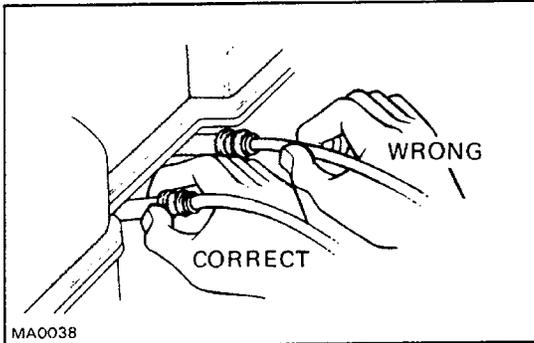
New belt  $125 \pm 25$  lbf

If necessary, adjust the drive belt tension.



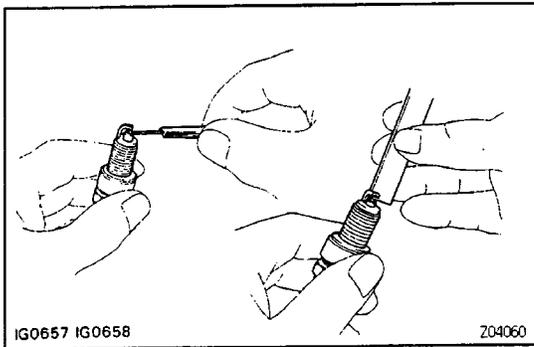
**HINT:**

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for approx. 5 minutes and then recheck the tension.



**3. REPLACE SPARK PLUGS**

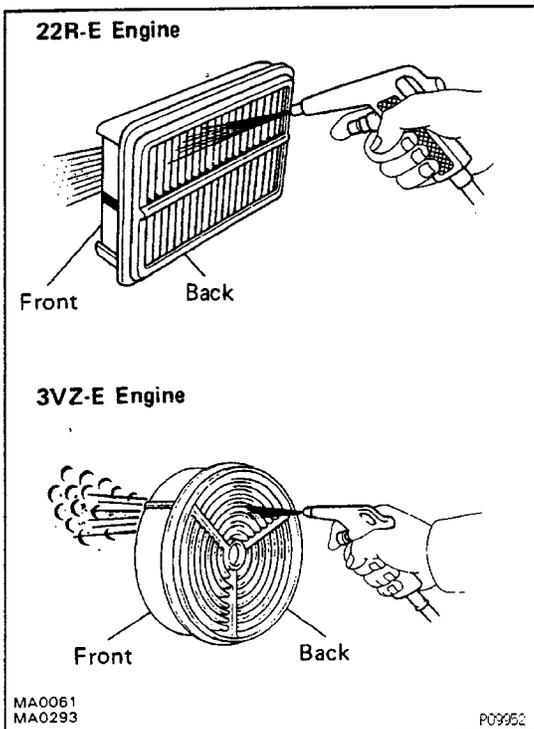
- Disconnect the high-tension cords at the boot.  
Do not pull on the cords.
- (2213 – E)  
Remove the spark plugs.  
(3VZ – E)  
Using plug wrench (16 mm), remove the spark plugs.



- Check the electrode gap of new spark plugs.

**Correct electrode gap:  
0.8 mm (0.031 in.)**

**Recommended spark plugs:  
22R-E ND W16EXR-U  
NGK BPRSEY  
3VZ-E ND K76R-U  
NGK BKR5EYA**



**4. INSPECT AIR FILTER**

- Visually check that the air cleaner element is not excessively dirty, damaged or oily.

**HINT:** Oiliness may indicate a stuck PCV valve.  
If necessary, replace the air cleaner element.

- Clean the element with compressed air.  
First blow from back side thoroughly, then blow off the front side of the element.

**5. REPLACE AIR FILTER**

Replace the used air cleaner element with a new one.

**6. REPLACE ENGINE OIL AND OIL FILTER**

**22R – E (See page EG-236)**

**3VZ- E (See page EG-278)**

**Oil grade:**

**API grade SG Energy – Conserving II multigrade  
and recommended viscosity oil**

**Engine oil capacity:**

**Drain and refill**

**22 R – E****w/o Oil filter change**

3.8 liters (4.0 US qts, 3.3 Imp. qts)

**w/ Oil filter change**

4.3 liters (4.5 US qts, 3.8 Imp. qts)

**3VZ-E****w/o Oil filter change**

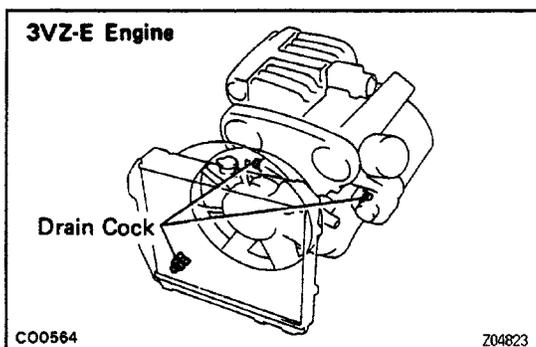
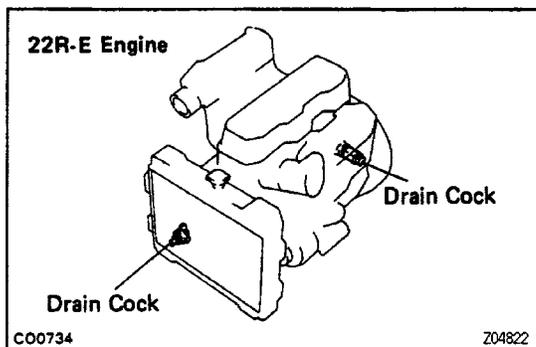
2WD 4.0 liters (4.2 US qts, 3.5 Imp. qts)

4WD 4.2 liters (4.4 US qts, 3.7 Imp. qts)

**w/ Oil filter change**

2WD 4.3 liters (4.5 US qts, 3.8 Imp. qts)

4WD 4.5 liters (4.8 US qts, 4.0 Imp. qts)

**7. REPLACE ENGINE COOLANT**

- Drain the coolant from the radiator and engine drain cocks.
- Close the drain cocks.
- Fill system with coolant.

**Coolant capacity (w/ Heater or air conditioner):****22R-E**

Ex. 4WD A/T 8.4 liters (8.8 US qts, 7.4 Imp. qts)

4WD A/T 9.1 liters 0.6 US qts, 8.0 Imp. qts)

**3VZ-E**

2WD M/T 10.4 liters (11.0 US qts, 9.2 Imp. qts)

A/T 10.2 liters (10.8 US qts, 9.5 Imp. qts)

4WD M/T 10.5 liters (11.1 US qts, 9.2 Imp. qts)

A/T 10.3 liters (10.9 US qts, 9.1 Imp. qts)

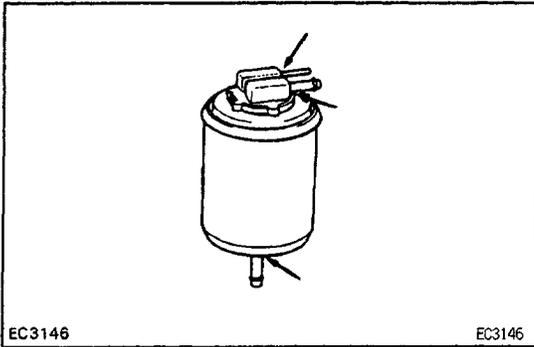
**HINT:**

Use a good brand of ethylene-glycol base coolant, mixed according to the manufacturer's instructions.

Using coolant which has more than 50% ethylene-glycol (but not more than 70%) is recommended.

**NOTICE:**

- Do not use an alcohol type coolant.
- The coolant should be mixed with demineralized water or distilled water.

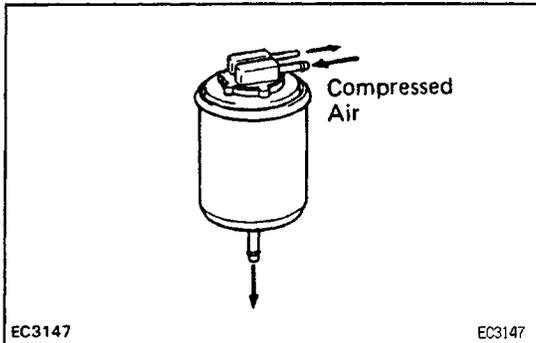


## 8. INSPECT CHARCOAL CANISTER

(a) Remove charcoal canister.

HINT: Label hoses for correct installation.

(b) Visually inspect canister case.

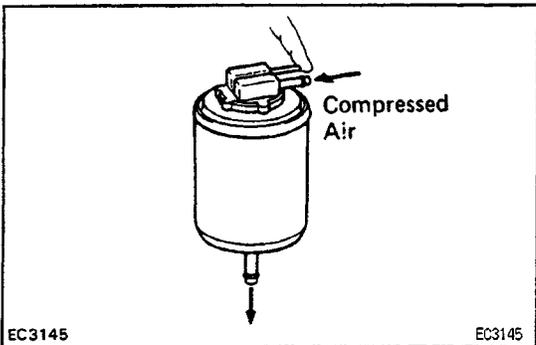


(c) Check for clogged filter and stuck check valve.

(1) Using low compressed air (4.71 kPa (48 gf/cm<sup>2</sup>, 0.68 psi), blow into the tank pipe and check that air flows without resistance from the other pipes.

(2) Blow air (4.71 kPa (48 gf/cm<sup>2</sup>, 0.68 psi) into the purge pipe and check that air does not flow from the other pipes.

If a problem is found, replace the charcoal canister.



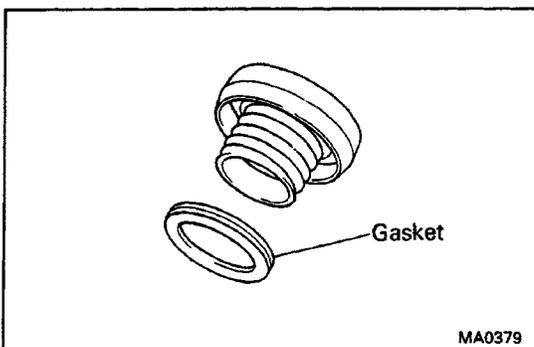
(d) Clean filter in canister.

(1) Clean the filter by blowing 294kPa (3 kgf/cm<sup>2</sup>, 43 psi) of compressed air into the tank pipe while holding the purge pipe closed.

### NOTICE:

- Do not attempt to wash the canister.
- No activated carbon should come out.

(e) Install charcoal canister.



## 9. REPLACE GASKET IN FUEL TANK CAP

(a) Remove the old gasket (O-ring) from the tank cap.

Do not damage the cap.

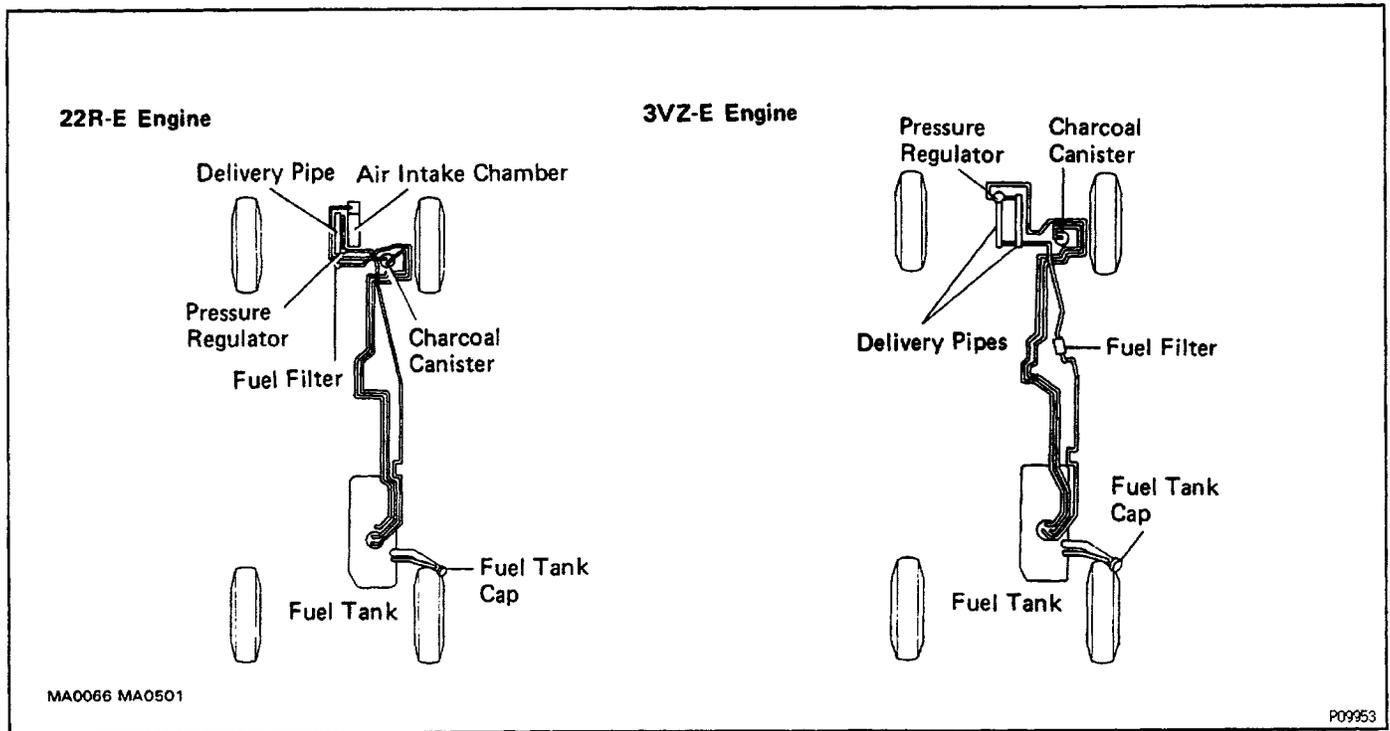
(b) Install a new gasket by hand.

(c) Inspect the cap for damage or cracks.

(d) Install the cap and check the torque limiter.

## 10. INSPECT FUEL LINES AND CONNECTIONS

Visually inspect the fuel lines for cracks, leakage loose connections, deformation or tank band looseness.



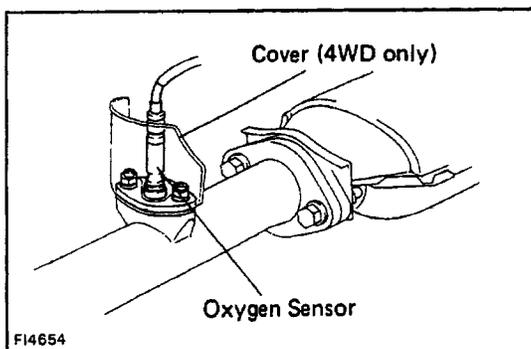
### 11. INSPECT EXHAUST PIPES AND MOUNTINGS

Visually inspect the pipes, hangers and connections for severe corrosion, leaks or damage.

### 12. (3VZ-E ENGINE)

#### ADJUST VALVE CLEARANCE

(See page [EG-18](#))



### 13. (FEDERAL AND CANADA)

#### REPLACE OXYGEN SENSOR

- Disconnect the oxygen sensor wiring connector.
- Remove the cover (4WD), oxygen sensor and gasket from the exhaust pipe.
- Install a new gasket, oxygen sensor and cover (4WD) to the exhaust pipe.

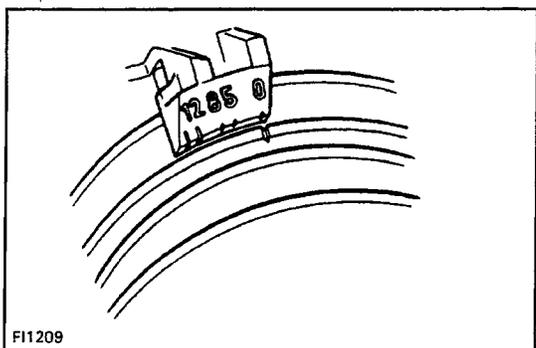
**Torque: 20 N-m (200 kgf-cm, 14 ft-lbf)**

- Inspect oxygen sensor operation.

Inspect feedback control.

22R-E (See page [EG-212](#))

3VZ-E (See page [EG-252](#))



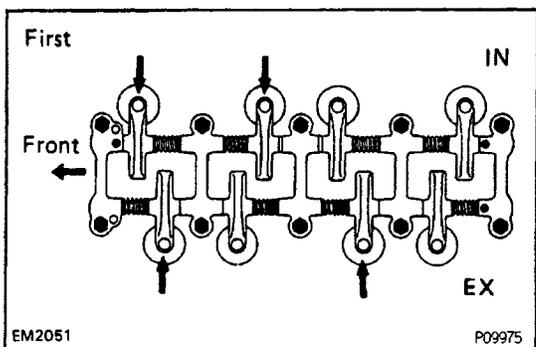
## Hot Engine Operations

### 14. (22R-E ENGINE)

#### ADJUST VALVE CLEARANCE

- (a) Warm up the engine to normal operating temperature.
- (b) Stop the engine and remove the cylinder head cover.
- (c) Set No.1 cylinder to TDC/compression.
  - Turn the crankshaft with a wrench to align the timing marks at TDC. Set the groove on the pulley to the "O" position.
  - Check that the rocker arms on No.1 cylinder are loose and rocker arms on No.4 cylinder are tight.

If not, turn the crankshaft one complete revolution and align marks as above.



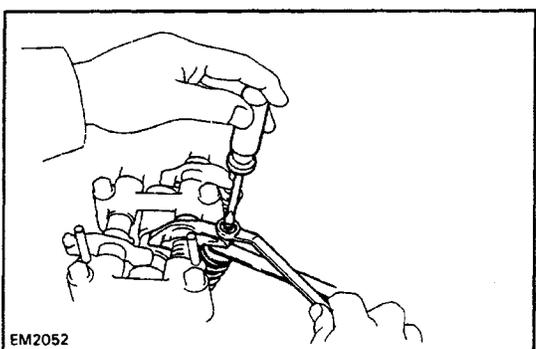
(d) Adjust the clearance of half of the valves.

- Adjust only the valves indicated by arrows.

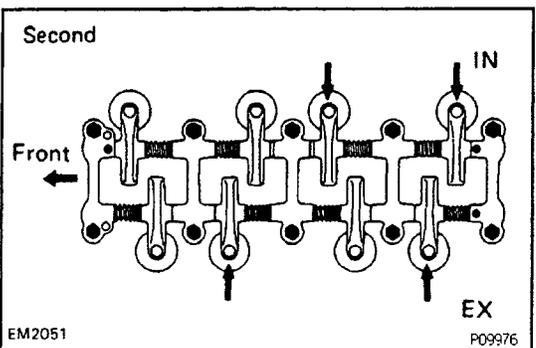
#### Valve clearance:

**Intake 0.20 mm (0.008 in.)**

**Exhaust 0.30 mm (0.012 in.)**



- Use a thickness gauge to measure between the valve stem and rocker arm. Loosen the lock nut and turn the adjusting screw to set the proper clearance. Hold the adjusting screw in position, and tighten the lock nut.
- Recheck the clearance. The thickness-gauge should move with a very slight drag.



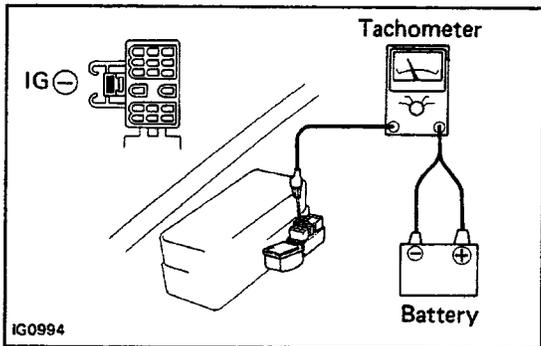
- (e) Turn the crankshaft one complete revolution (360 °) and align timing marks in the manner mentioned above. Adjust only the valves indicated by arrows.

(f) Reinstall the cylinder head cover.

### 16. ADJUST IDLE SPEED

(a) Preparation

- Install air cleaner
- Connect all pipes and hoses of air intake system



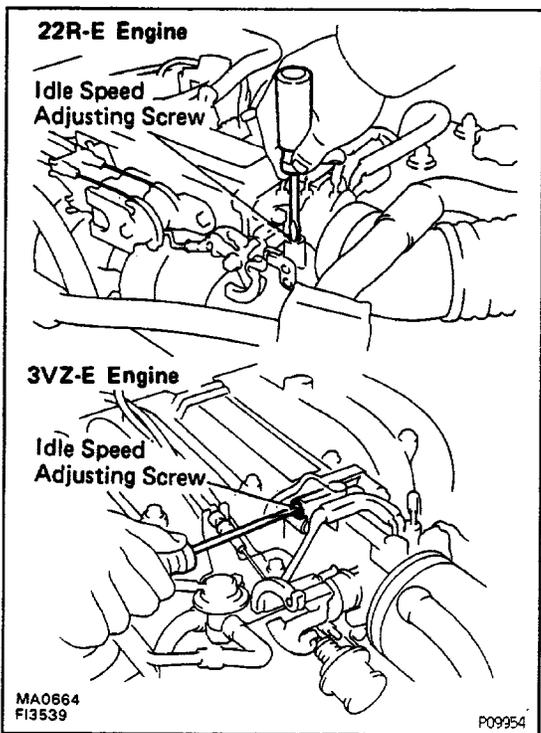
- Connect all vacuum lines (i.e., EVAP, EGR system, etc.)
- Make sure all MFI system wiring connectors are fully connected
- Engine should be at normal operating temperature
- Switch off accessories
- Set transmission in neutral

(b) Connect a tachometer– to the engine

Connect the tachometer– test probe to the iG E) terminal of the DLC1.

**NOTICE:**

- **NEVER** allow the tachometer terminal to touch ground as it could result in damage to the igniter and/or ignition coil.
- As some tachometers are not compatible with this ignition system, we recommend that you confirm the compatibility of your unit before use.



(c) Race the engine at 2,500 rpm for approx. 2 minutes.

(d) Set the idle speed by turning the idle speed adjusting screws.

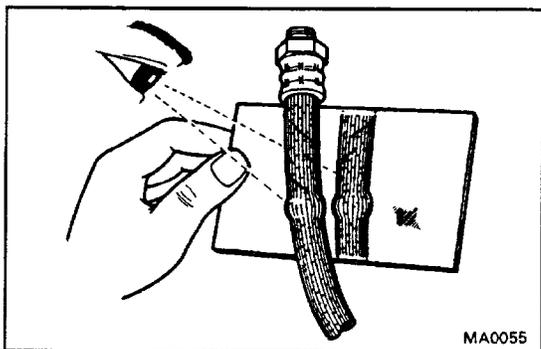
**Idle speed:**

**22R–E 4WD A/T 850 rpm**

**Ex. 4WD A/T 750 rpm**

**3VZ–E 800 rpm**

(e) Remove the tachometer.



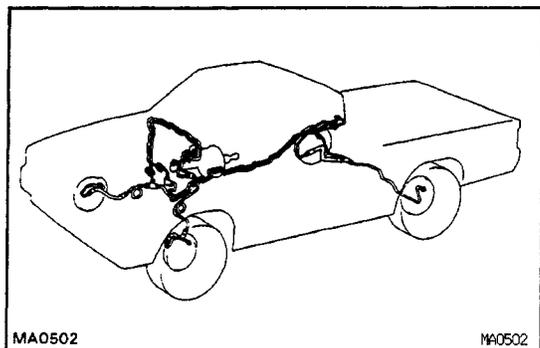
## BRAKES

### 16. INSPECT BRAKE LINE PIPES AND HOSES

**HINT:** Inspect in a well – lighted area. Inspect the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before inspecting the front brake.

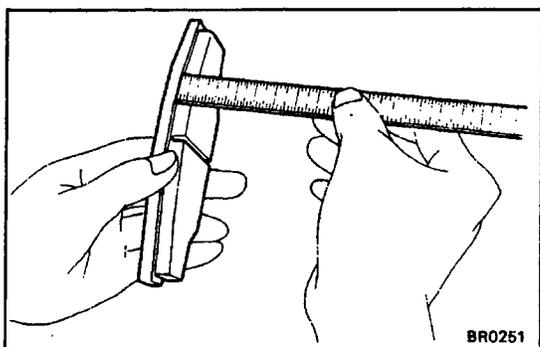
(a) Check all brake lines and hoses for:

- Damage



- Wear
- Deformation
- Cracks
- Corrosion
- Leaks
- Bends
- Twists

- (b) Check all clamps for tightness and connections for leakage. .
- (c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.
- (d) Check that the lines installed in grommets pass through the center of the grommets.



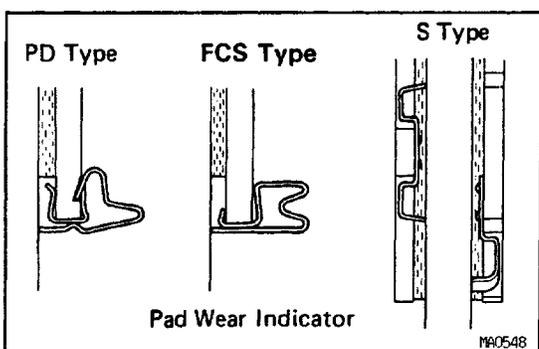
## 17. INSPECT FRONT BRAKE PADS AND DISCS

(See BR section)

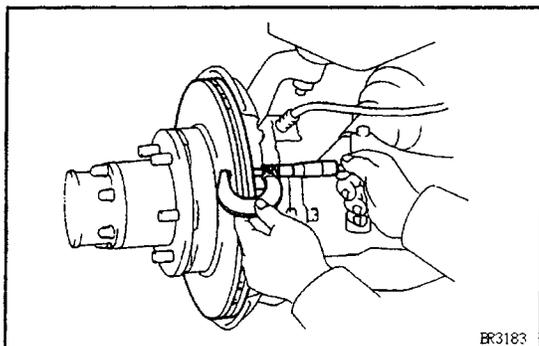
- (a) Check the thickness of the disc brake pad and check for irregular wear.

**Minimum lining thickness:**

**1.0 mm (0.039 in.)**



HINT: If a squealing or scraping noise occurs from the brake during driving, check the pad wear indicator. If there are traces of the indicator contacting the disc rotor, the disc pad should be replaced.



- (b) Check the disc for wear.

**Minimum disc thickness:**

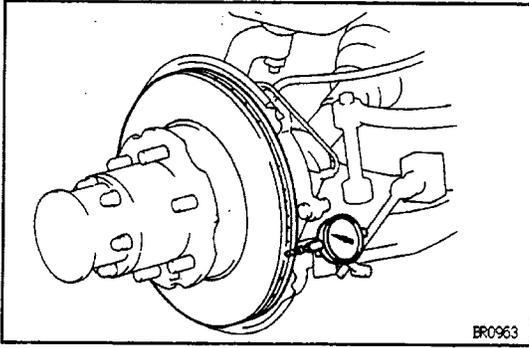
**2WD FS17 type 21.0 mm (0.827 in.)**

**FS18 type 20.0 mm (0.787 in.)**

**PD60 type 23.0 mm (0.906 in.)**

**PD66 type 28.0 mm (1.102 in.)**

**4WD S 12 + 12 Type 18.0 mm (0.790 in.)**

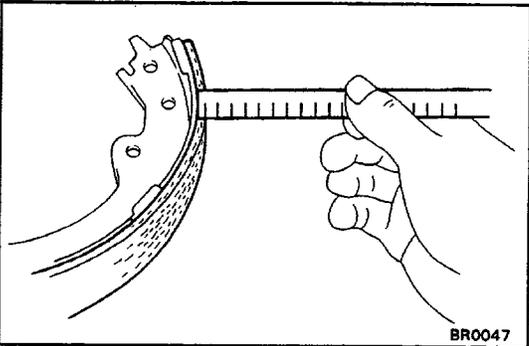


(c) Check the disc for runout.

**Minimum disc runout:**

**Ex. C & C 0.09 mm (0.0035 in.)**

**C & C 0.12 mm (0.0047 in.)**



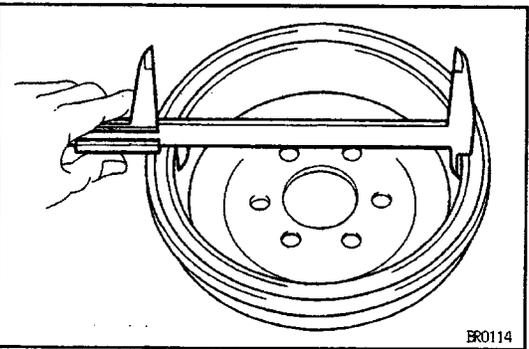
## 18. INSPECT REAR BRAKE LININGS AND DRUMS

(See BR section)

(a) Check the lining – to – drum contact condition and lining wear.

**Minimum lining thickness:**

**1.0 mm (0.0039 in.)**



(b) Check the brake drum for scoring or wear.

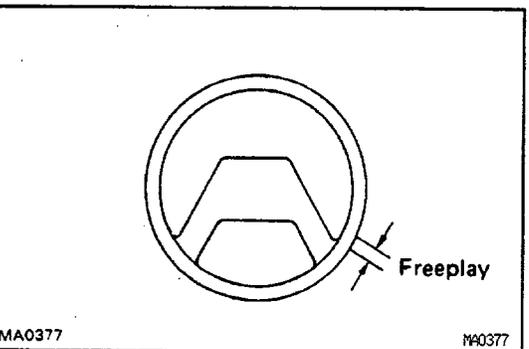
**Maximum drum inside diameter:**

**2WD 256.0 mm (10.079 in.)**

**4WD 297.0 mm (11.693 in.)**

(c) Clean the brake parts with a damp cloth.

**NOTICE: Do not use compressed air to clean the brake parts.**



## CHASSIS

### 19. INSPECT STEERING LINKAGE

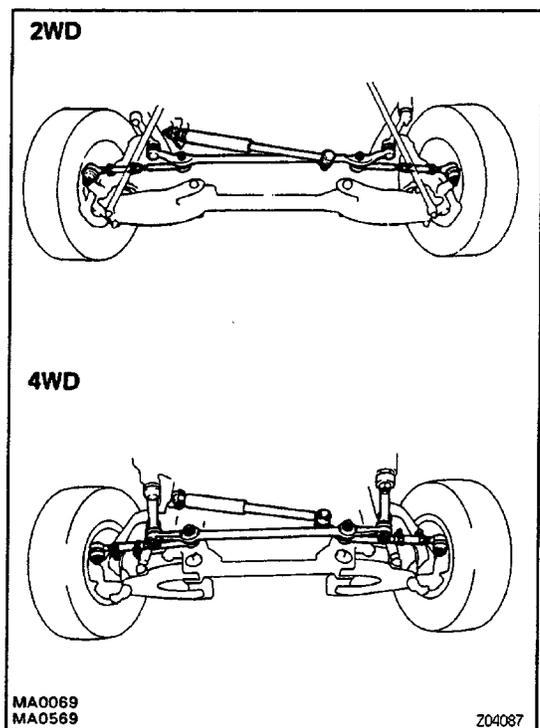
(a) Check the steering wheel freeplay.

**Maximum:**

**30 mm (1.18 in.)**

With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure.

If incorrect, adjust or repair.



**(b) Check the steering linkage for looseness or damage.**

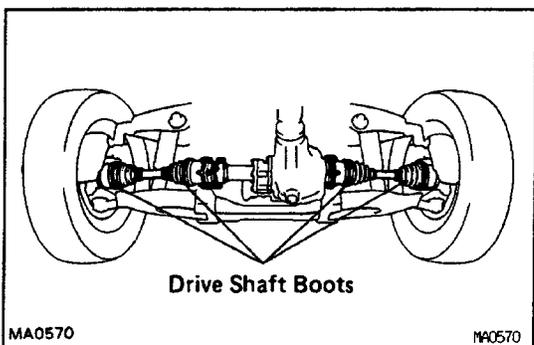
**Check that:**

- Tie rod ends and relay rod ends do not have excessive play.
- Dust seals are not damaged.

## 20. INSPECT STEERING GEAR HOUSING

Check the steering gear housing for oil leaks.

If leakage is found, check for cause and repair.



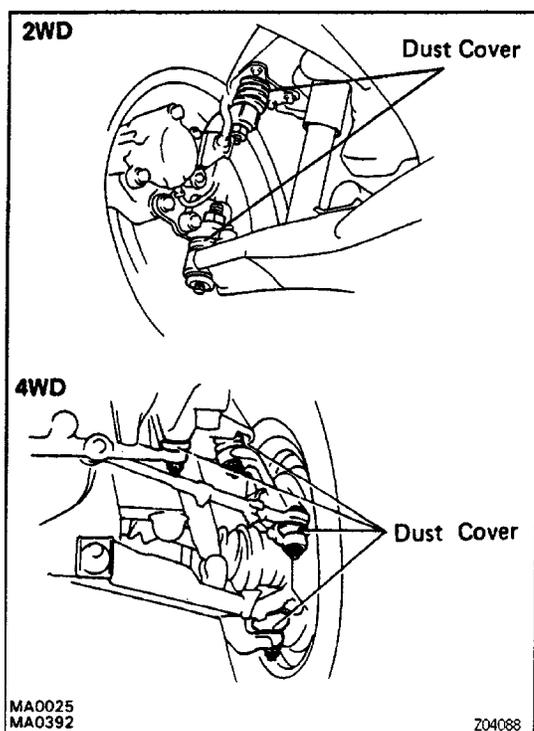
## 21. (4WD)

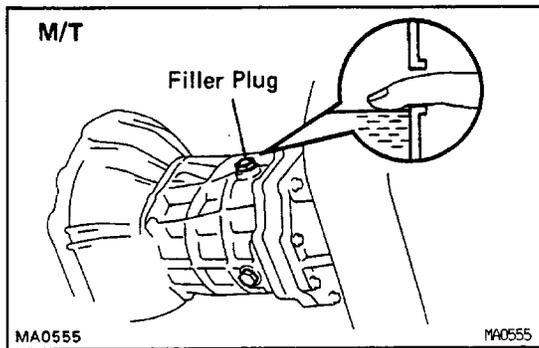
### INSPECT DRIVE SHAFT BOOTS

Inspect the drive shaft boots for clamp looseness, grease leakage or damage.

## 22. INSPECT BALL JOINTS AND DUST COVERS

- Inspect the ball joints for excessive looseness.  
(See SA section)
- Inspect the dust cover for damage.



**23. (2WD)****CHECK OIL LEVEL IN MANUAL TRANSMISSION, AUTOMATIC TRANSMISSION AND DIFFERENTIAL**

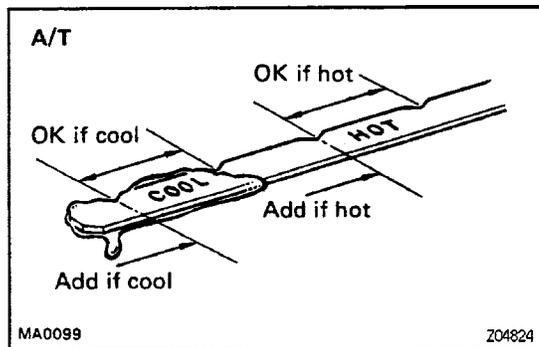
Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

**Transmission oil (M/T) –****Oil grade:**

**API GL-4 or GL-5**

**Viscosity:**

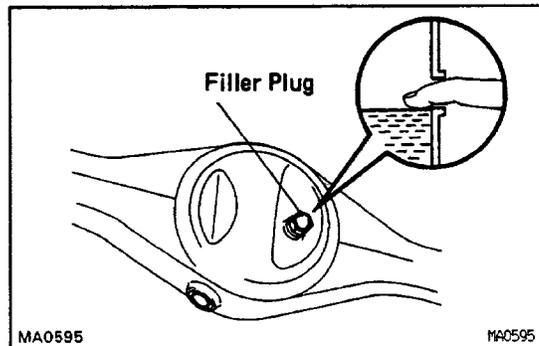
**SAE 75W-90**



Check the automatic transmission for oil leakage. If leakage is found, check for cause and repair.

**Transmission fluid (A/T):**

**ATF DEXRON® II**



Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

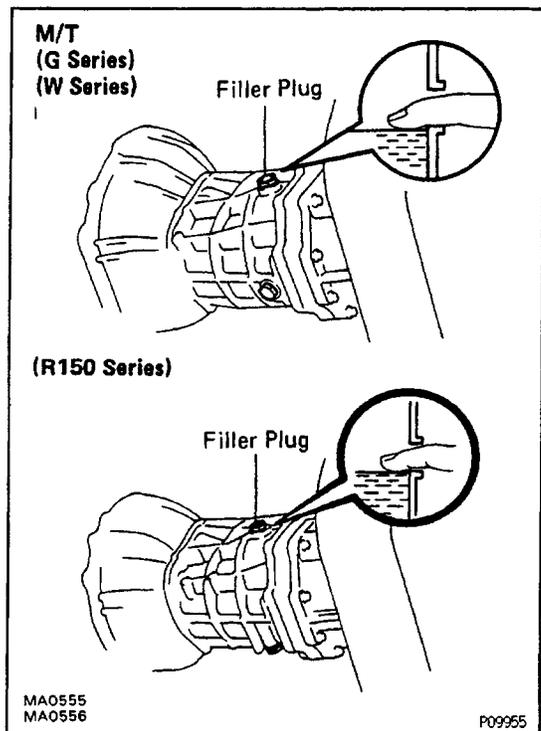
**Differential oil – –****Oil grade:**

**AN GL-5 hypoid gear oil**

**Viscosity:**

**Above -18 ° C (0 ° F) SAE 90**

**Below -18 ° C (0 ° F) SAE 80W-90 or 80W**



24. (4WD)

**CHECK OIL LEVEL IN MANUAL TRANSMISSION, AUTOMATIC TRANSMISSION, TRANSFER AND DIFFERENTIAL**

Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

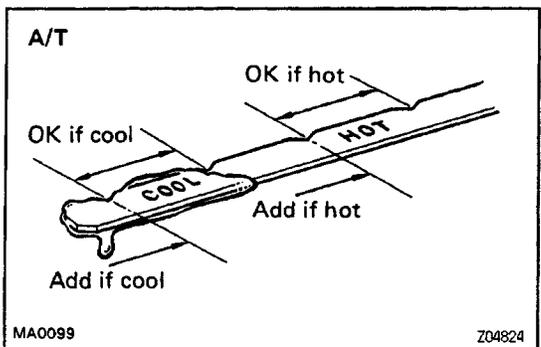
**Transmission oil (M/T) -**

**Oil grade:**

**API GL-4 or GL-5**

**Viscosity:**

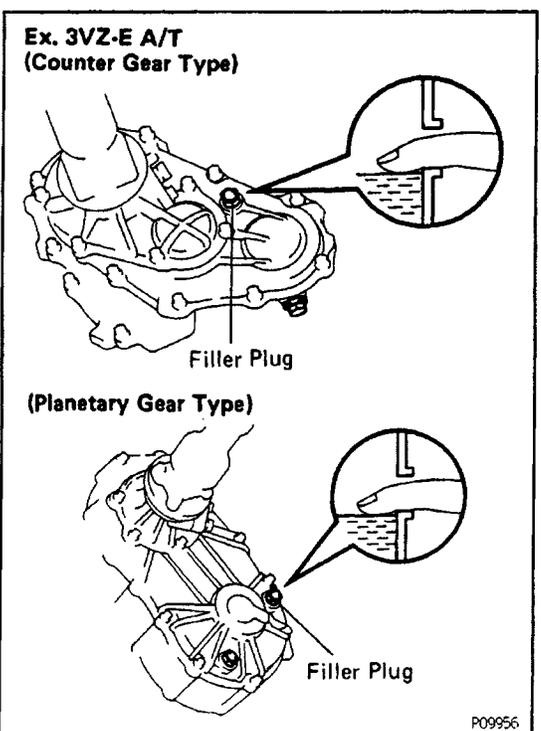
**SAE 75W-90**



Check the automatic transmission for oil leakage. If leakage is found, check for cause and repair.

**Transmission fluid (A/T):**

**ATF DEXRON® II**



Remove the filler- plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

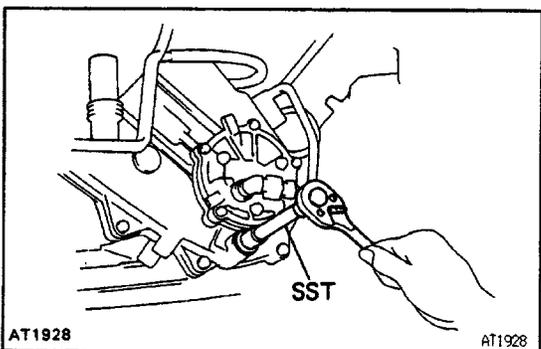
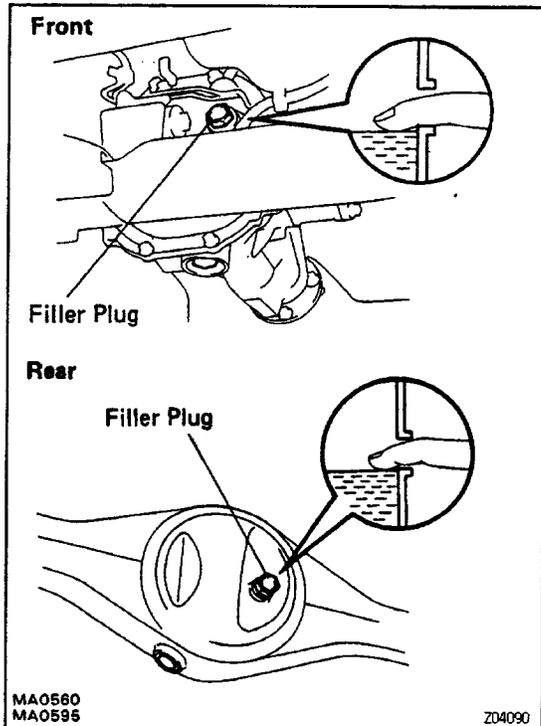
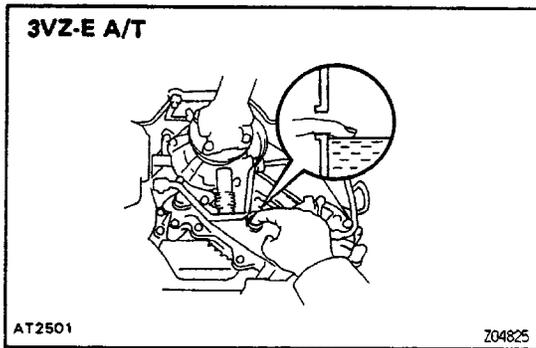
**Transfer oil (Ex. 3vZ - E A/T) -**

**Oil grade: AN GL-4 or GL-5**

**Viscosity: SAE 75W-90**

**Transfer fluid (3VZ- E A/T):**

**ATF DEXRON® II**



Remove the filler plug and feel inside the hole with your finger. Check that the oil comes to within 5 mm (0.20 in.) of the bottom edge of the hole. If the level is low, add oil until it begins to run out of the filler hole.

**Differential oil -**

**Standard differential**

**Oil grade:**

API GL-5 hypoid gear oil

**Viscosity:**

Above  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) SAE 90

Below  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) SAE 80W - 90 or 80W

**A.D.D.**

**Oil grade:**

Toyota 'GEAR OIL SUPER' oil or hypoid gear oil API GL-5

**Viscosity:**

SAE 75W-90

**25. REPLACE MANUAL TRANSMISSION. TRANSFER (4 WD) AND DIFFERENTIAL OIL**

(a) (Transfer)

Remove the transfer cover.

(b) Using SST (A340H Transfer), remove the drain plug and drain the oil.

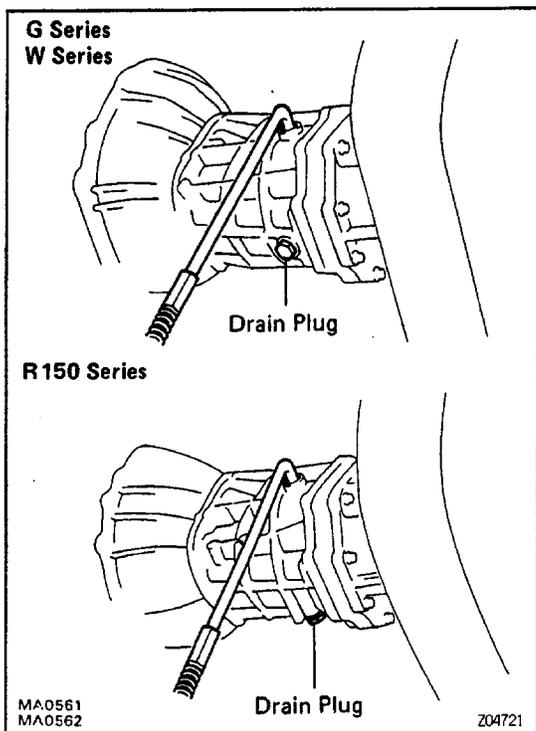
SST 09043-38100

(c) Reinstall drain plug securely.

(d) Add new oil until it begins to run out of the filler hole.

**Oil grade and viscosity:**

See pages MA -16 to 18



**Oil capacity:**

**Transmission -**

**2WD**

W55 2.6 liters (2.7 US qts, 2.3 Imp. qts)

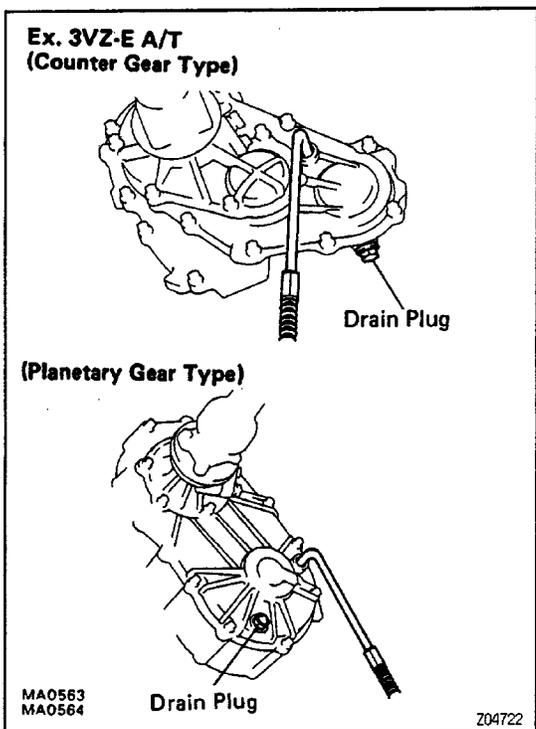
R150 3.0 liters (3.2 US qts, 2.6 Imp. qts)

**4WD**

G58 3.9 liters (4.1 US qts, 3.4 Imp. qts)

W56 2.9 liters (3.1 US qts, 2.5 Imp. qts)

RI 50F 3.0 liters (3.2 US qts, 2.6 Imp. qts)



**Transfer -**

**Counter Gear Type**

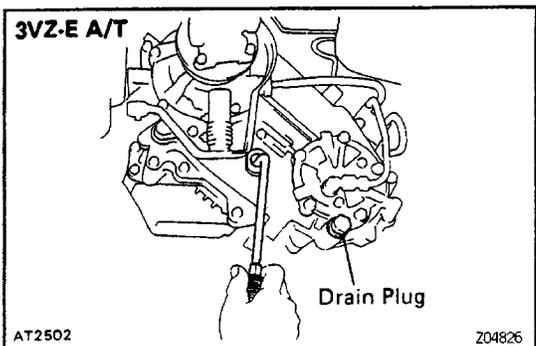
1.6 liters (1.7 US qts, 1.4 Imp. qts)

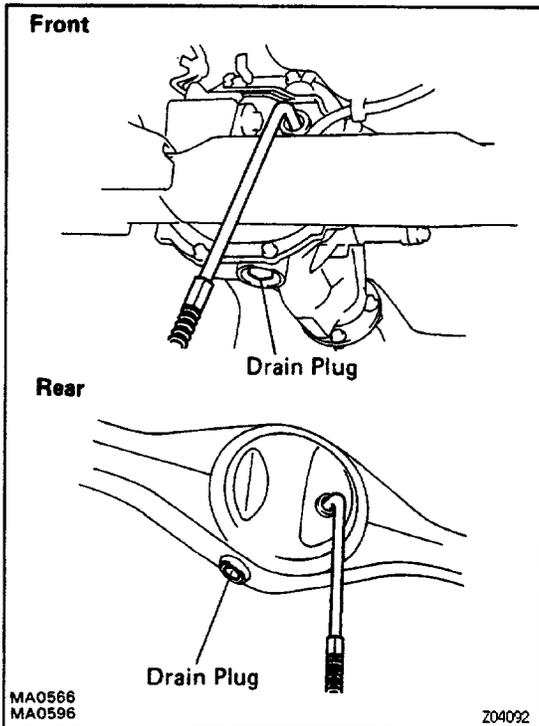
**Planetary Gear Type**

1.1 liters (1.2 US qts, 1.0 Imp. qts)

**A340H**

0.8 liters (0.8 US qts, 0.7 Imp. qts)





**Differential -**

**2WD**

7.5 in. 1.35 liters (1.4 US qts, 1.2 Imp. qts)

8.0 in. 1.8 liters (1.9 US qts, 1.6 Imp. qts)

**4WD**

**Front Standard differential**

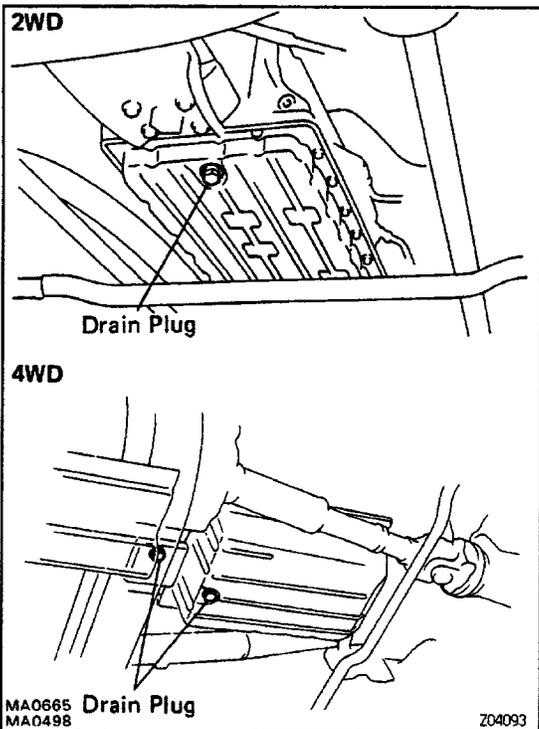
1.6 liters (1.7 US qts, 1.4 Imp. qts)

**A.D.D.**

1.86 liters (2.0 US qts, 1.6 Imp. qts)

**Rear**

2.2 liters 2.3 US qts, 1.9 Imp. qts)



**26. REPLACE AUTOMATIC TRANSMISSION FLUID**

- (a) Remove the drain plug(s) and drain the fluid.
- (b) Reinstall the drain plug(s) securely.
- (c) With the engine OFF, add new fluid through the dipstick tube.

**Fluid:**

**ATP DEXRON® II**

**Drain and refill capacity:**

**2WD**

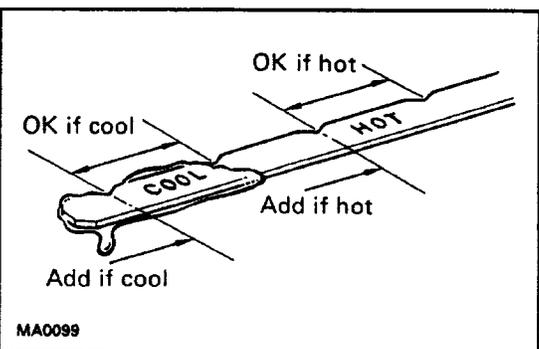
**A43D 2.4 liters (2.5 US qts, 2.1 Imp. qts)**

**A340E 1.6 liters (1.7 US qts, 1.4 Imp. qts)**

**4WD**

**A340H 4.5 liters (4.8 US qts, 4.0 Imp. qts)**

**A340F 2.0 liters (2.1 US qts, 1.8 Imp. qts)**



- (d) Start the engine and shift the selector into all positions from "P" through "L" and then shift into "P".
- (e) (A340H)  
Shift the transfer lever position: H2→H4→L4 and L4→H4→H2.
- (f) With the engine idling, check the fluid level.  
Add fluid up to the cool level on the dipstick.

- (g) Check that the fluid level is in the "HOT" range at the normal operating temperature (70 – 80 ° C or 158 – 176 °F) and add as necessary.

**NOTICE: Do not overfill.**

## **27. REPACK FRONT WHEEL BEARINGS AND THRUST BUSH**

- (a) Change the front wheel bearing grease.  
(See SA section)

**2WD –**

**Grease grade:**

**Lithium base multipurpose grease (NLGI No.2)**

**Wheel bearing friction preload (at starting):**

**5.9–18N(0.6–1.8kgf,1.3–4.0lbf)**

**4WD –**

**Grease grade:**

**Lithium base multipurpose grease (NLGI No.2)**

**Wheel bearing friction preload (at starting):**

**27 – 55 N (2.8 – 5.6 kgf, 6.2 – 12.3 lbf)**

- (b) Repack the drive shaft thrust bush grease.  
(See SA section)

## **28. (4WD)**

### **LUBRICATE PROPELLER SHAFT**

Lubricate propeller shaft, referring to the lubrication chart. Before pumping in grease, wipe off any mud and dust on the grease fitting.

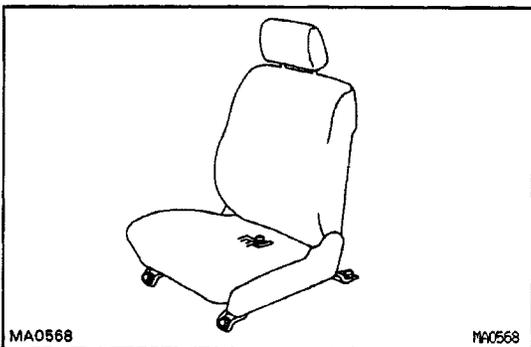
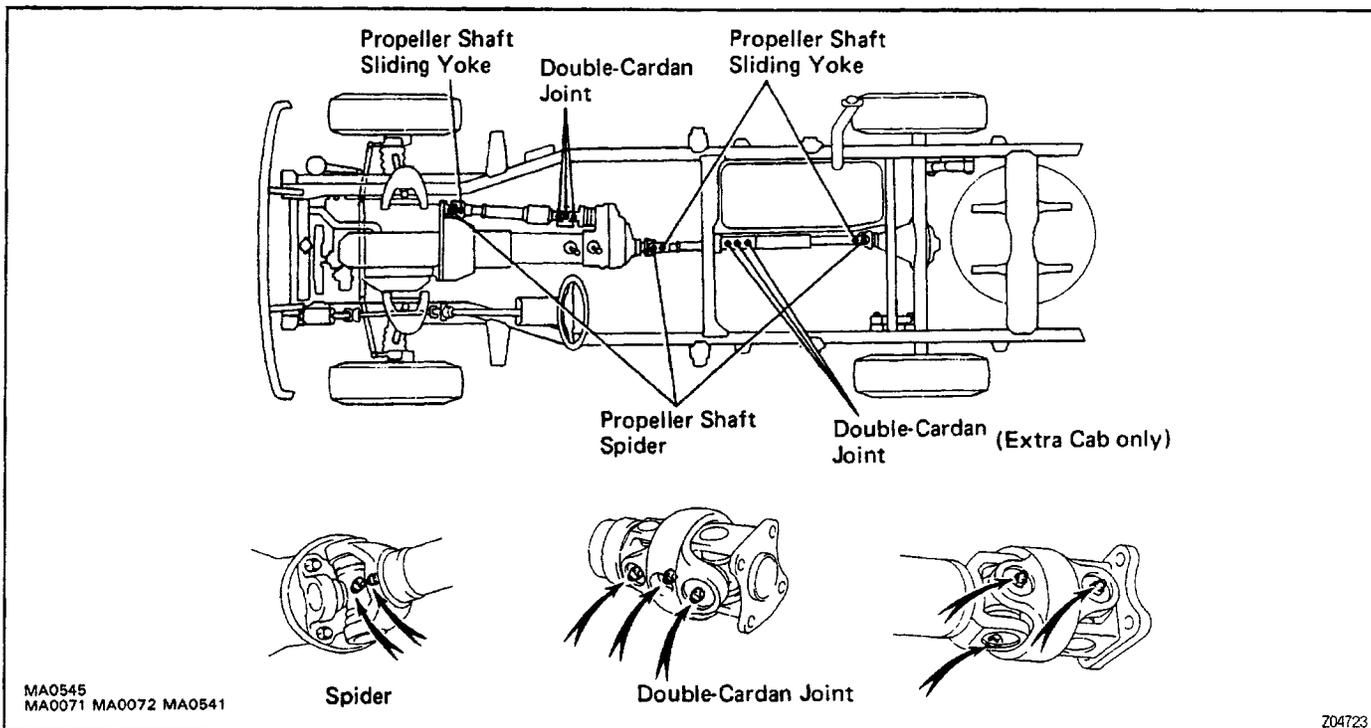
**Grease grade:**

**Propeller shaft (ex. Double-cardan joint) –**

**Lithium base chassis grease (NLGI No.2)**

**Double-cardan joint – Molybdenum disulphide**

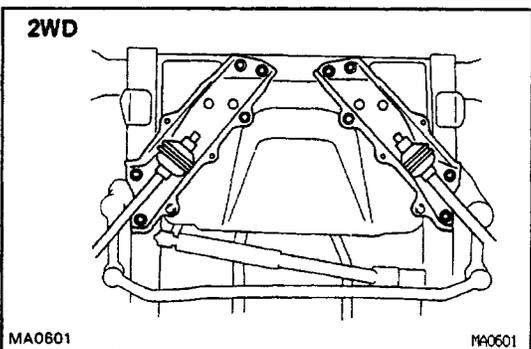
**Lithium base chassis grease (NLGI No.2)**



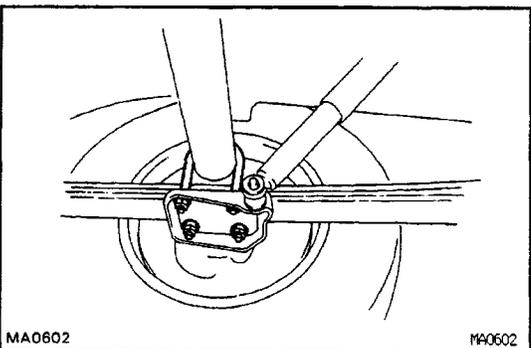
**29. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY**

Tighten the following parts:

- Seat mounting bolts  
Torque: 37 N-m (375 kgf-cm, 27 ft-lbf)



- Strut bar bracket-to-frame mounting bolts (2 WD)  
Torque: 52 N-m (530 kgf-cm, 38 ft-lbf)



- Leaf spring U – bolt mounting nuts  
Torque:  
2WD 0.5 ton 147 N-m (1,500 kgf-cm, 108 ft-lbf)  
Others 123 N-m (1,250 kgf-cm, 90 ft-lbf)

Under Severe Conditions:

In addition to the above maintenance items, check for loose or missing bolts and nuts on the following.

- Steering system
- Drive train

- Suspension system
- Fuel tank mounts
- Engine mounts, etc.

### 30. FINAL INSPECTION

(a) Check operation of body parts:

- Hood  
Auxiliary catch operates properly
- Hood locks securely when closed
- Doors  
Door locks operate properly
- Doors close properly
- Seats
- Seat adjusts easily and locks securely in any positions  
Seat backs lock securely at any angle  
Fold-down seat backs lock securely

(b) Road test

- Engine and chassis parts do not have abnormal noises.
- Vehicle does not wander or pull to one side.
- Brakes work properly and do not drag.

(c) Be sure to deliver a clean vehicle and especially check:

- Steering wheel
- Shift lever knob
- All switch knobs
- Door handles
- Seats