HOW TO USE THIS MANUAL

IN002-09

INDEX

An INDEX is provided on the first page of each section to guide you to the item to be repaired. To assist you in finding your way through the manual, the Section Title and major heading are given at the top of every page.

GENERAL DESCRIPTION

At the beginning of each section, a General Description is given that pertains to all repair operations contained in that section.
Read these precautions before starting any repair task.

TROUBLESHOOTING

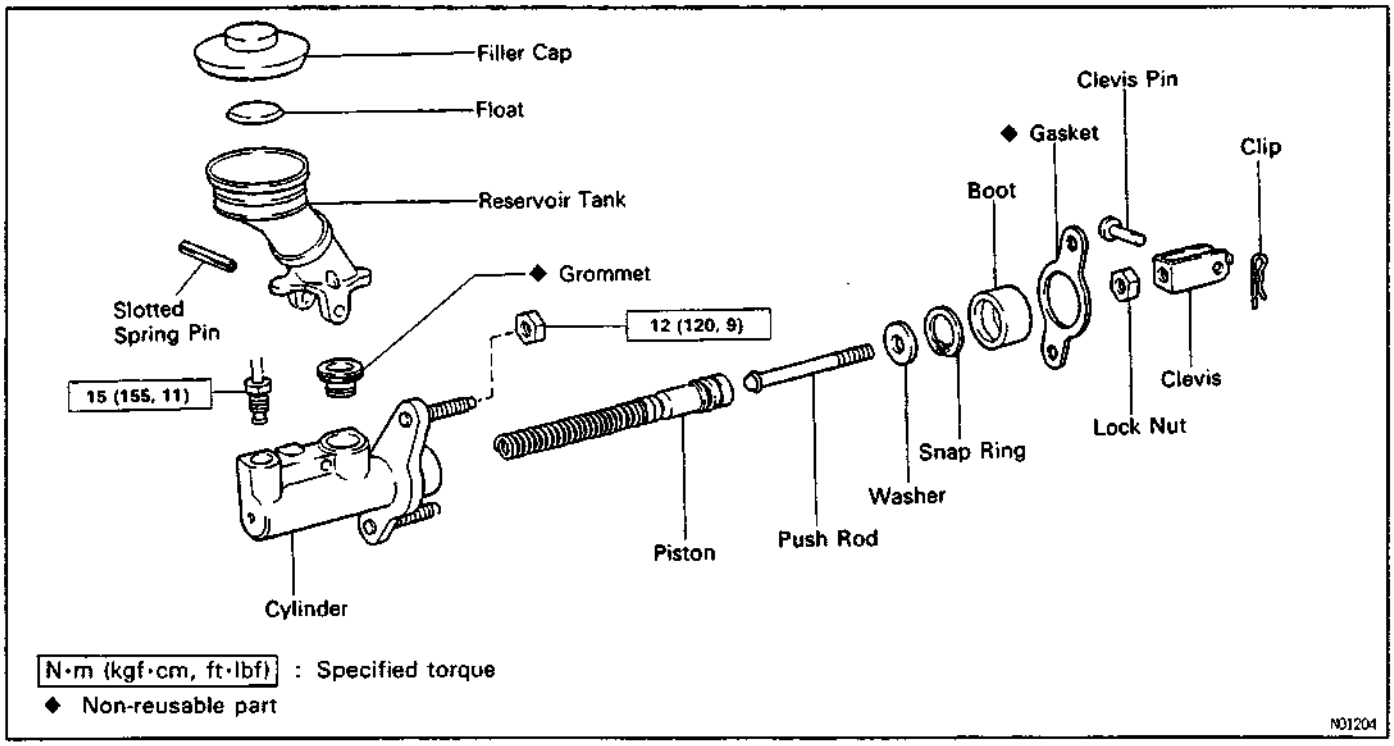
TROUBLESHOOTING tables are included for each system to help you diagnose the problem and find the cause.

PREPARATION

Preparation lists the SST (Special Service Tools), recommended tools, equipment, lubricant and SSM (Special Service Materials) which should be prepared before beginning the operation and explains the purpose of each one.

REPAIR PROCEDURES

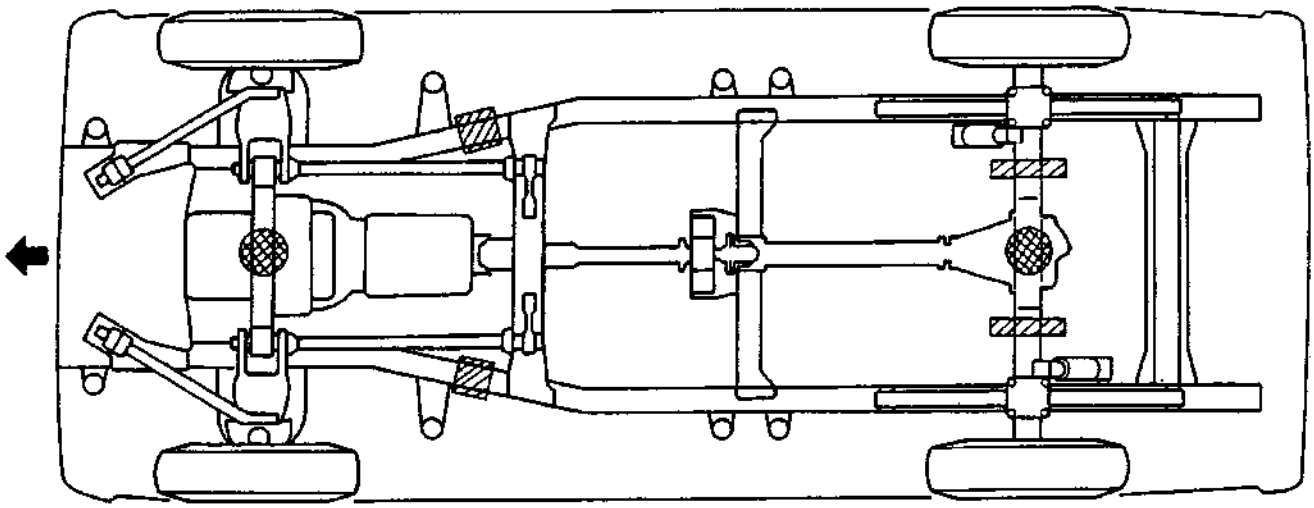
Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.
Example:



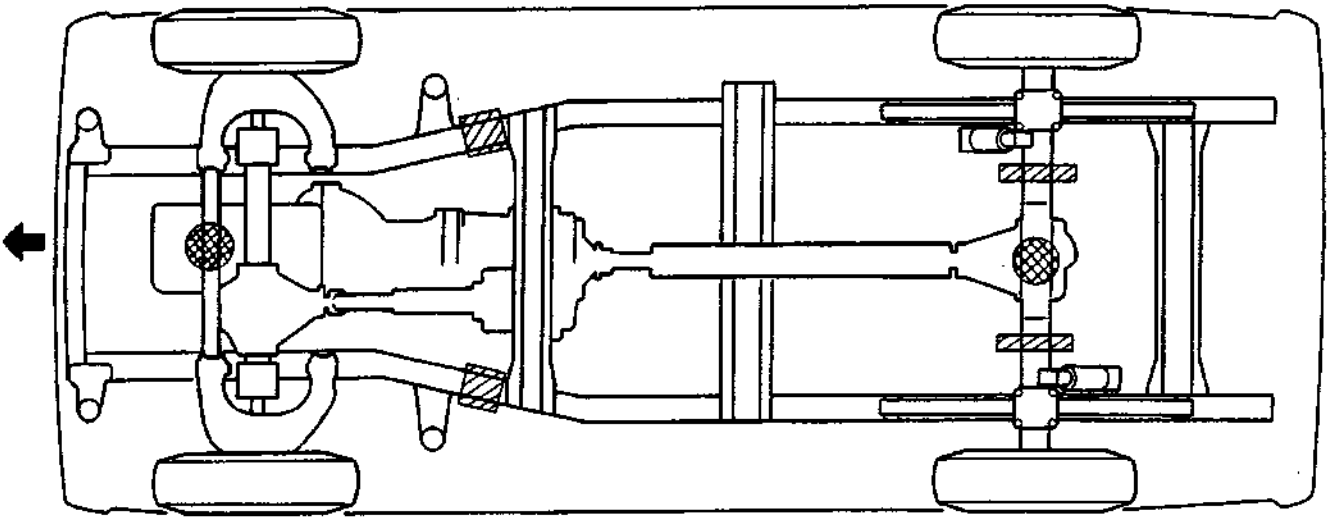
VEHICLE LIFT AND SUPPORT LOCATIONS

IN007–01

[2WD]



[4WD]



JACK POSITION .....

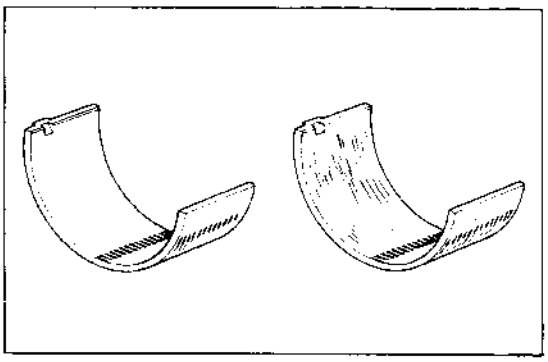
Front ..... Center of crossmember
Rear ..... Under the rear differential

SUPPORT POSITION

Safety stand .....

IN0012
IN0108

Z04590



7. REMOVE MAIN BEARING CAPS AND MEASURE OIL CLEARANCE

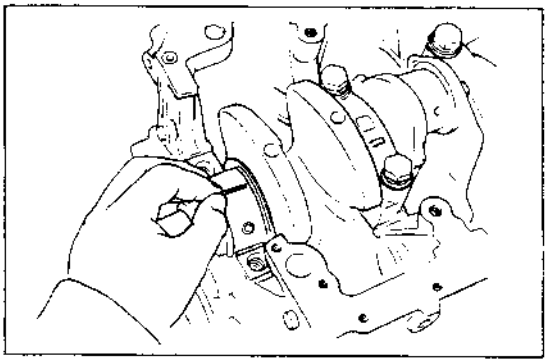
(a) Remove the main bearing caps by removing two bc

(b) Lift out the crankshaft and remove the upper main bearings from the cylinder block.

(c) Clean the bearing and main journals.

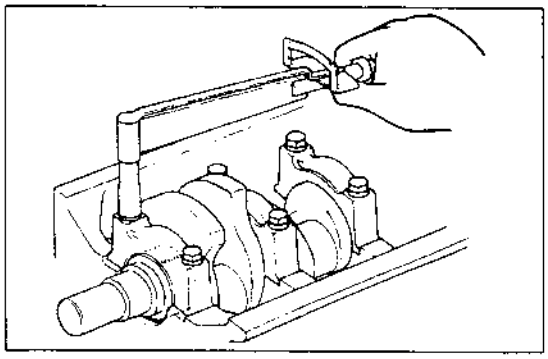
Inspect each bearing for pitting and radial scratches.

If bearings are damaged, replace them.



(d) Install the upper main bearings on the cylinder block and crankshaft.

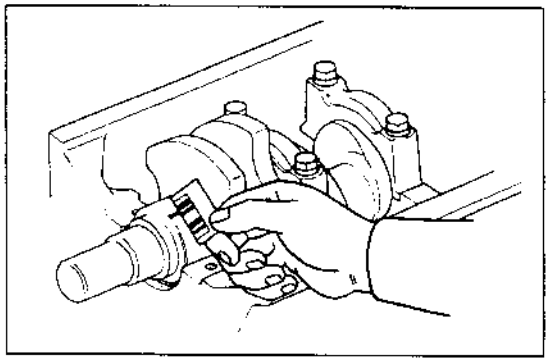
(e) Lay a strip of plastigage across the main journals.



(f) Install the main bearing caps. Torque the cap bolts.

Torque: 1,050 kg-cm (76 ft-lb, 103 N·m)

NOTE: Do not turn the crankshaft.



(g) Remove the main bearing caps.

(h) Measure the plastigage at its widest point.

If the clearance is greater than the maximum, replace the bearings and/or grind the main journals.

Maximum clearance: 0.08 mm (0.0031 in.)
Standard clearance: 0.025 – 0.055 mm (0.0010 – 0.0022 in.)

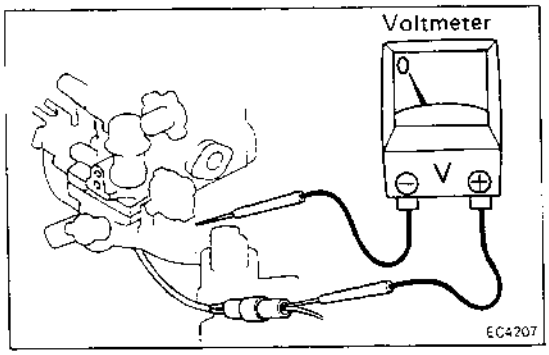
(i) Clean out the pieces of plastigage from the bearings and journals.

8. REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the upper main bearings from the cylinder block.

(c) Arrange the caps and bearings in order.



3. CHECK CMH WITH WARM ENGINE

(a) Warm up the engine to above 55°C (131°F).

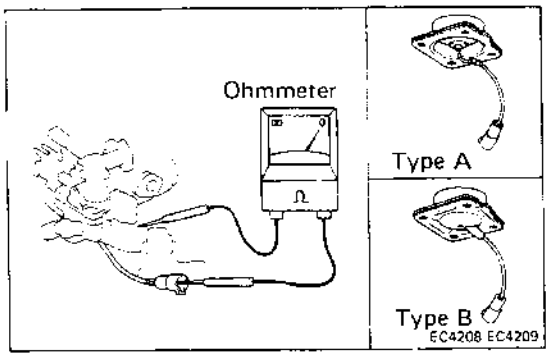
(b) Check that there is no voltage.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

A03087

INSPECTION OF THERMO SWITCH (1)

(See page EC-23)



INSPECTION OF CMH

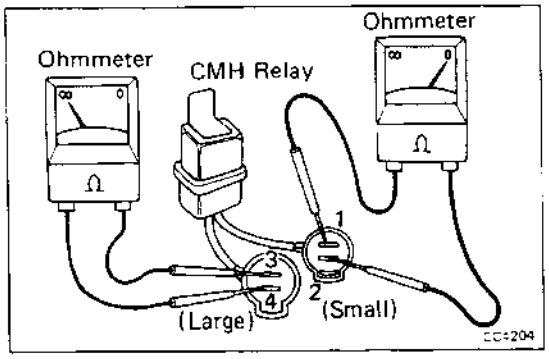
MEASURE RESISTANCE

(a) Unplug the wiring connector.

(b) Using an ohmmeter, measure the resistance between the positive (+) terminal and intake manifold.

Resistance at 20°C (68°F):
Type A (ND) 0.35 — 1.0 Ω
Type B (TDK) 0.5 — 2.0 Ω

(c) Plug in the wiring connector.

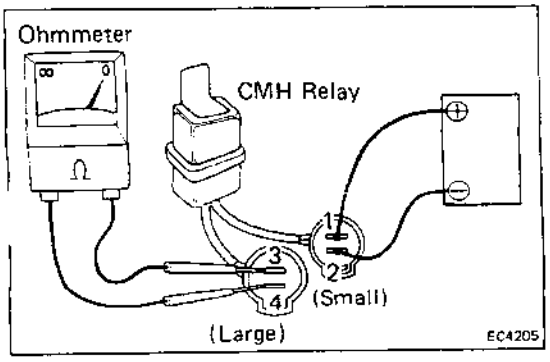


INSPECTION OF CMH RELAY

1. INSPECT RELAY CONTINUITY

Check that there is continuity between terminals 1 and 2. Check that there is no continuity between terminals 3 and 4.

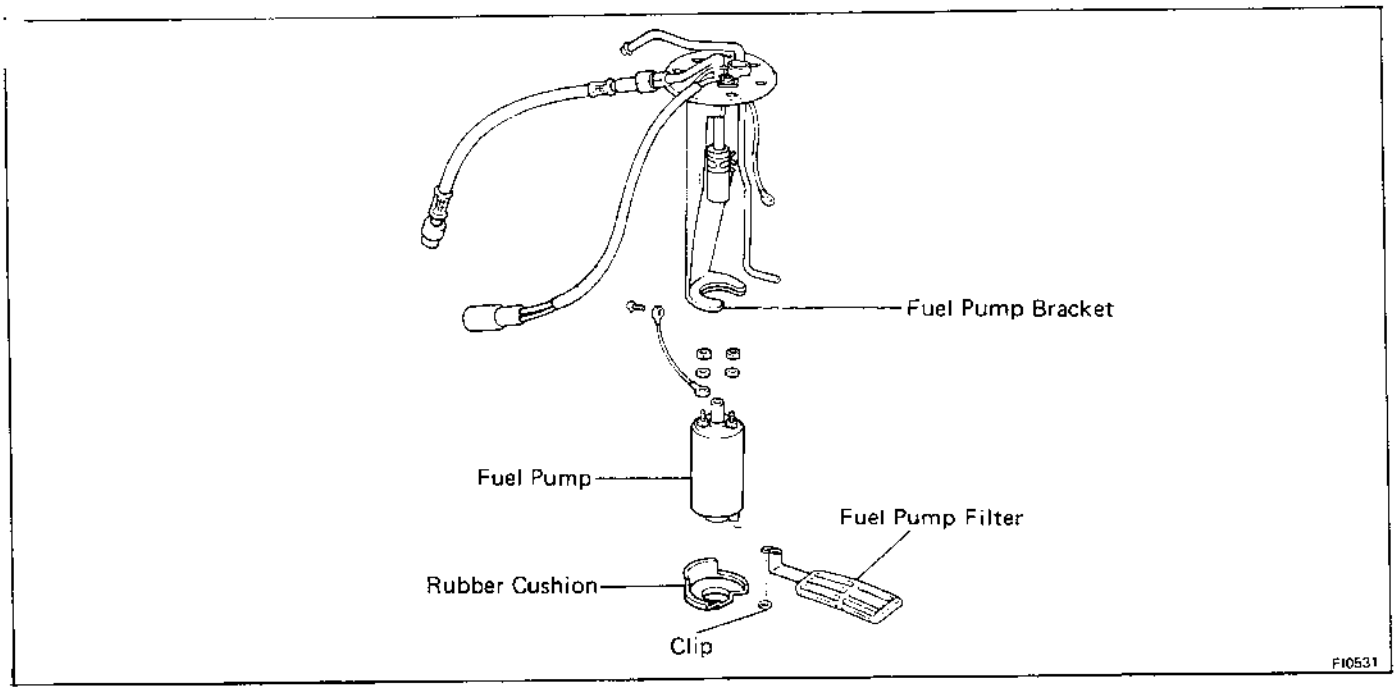
Relay location: Right fender apron



2. INSPECT RELAY OPERATION

Check the continuity between terminals 3 and 4 with battery voltage applied between terminals 1 and 2.

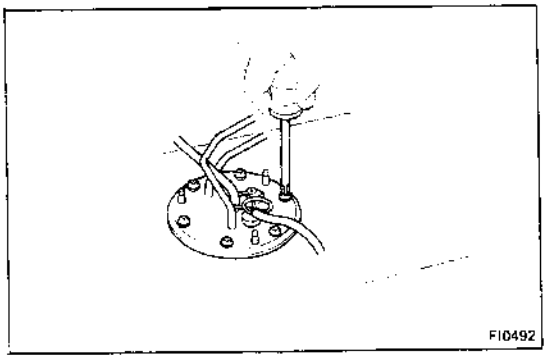
REMOVAL OF FUEL PUMP



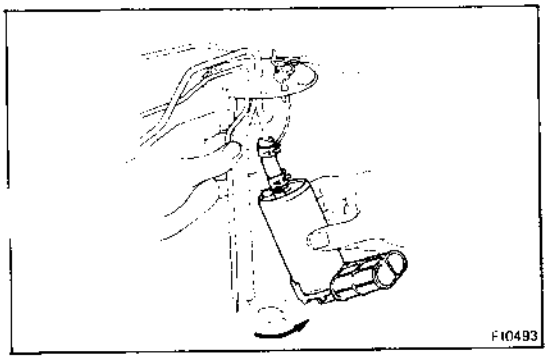
1. DRAIN FUEL FROM FUEL TANK

   WARNING: Avoid smoking and open flame when working on the fuel pump.

2. REMOVE FUEL TANK



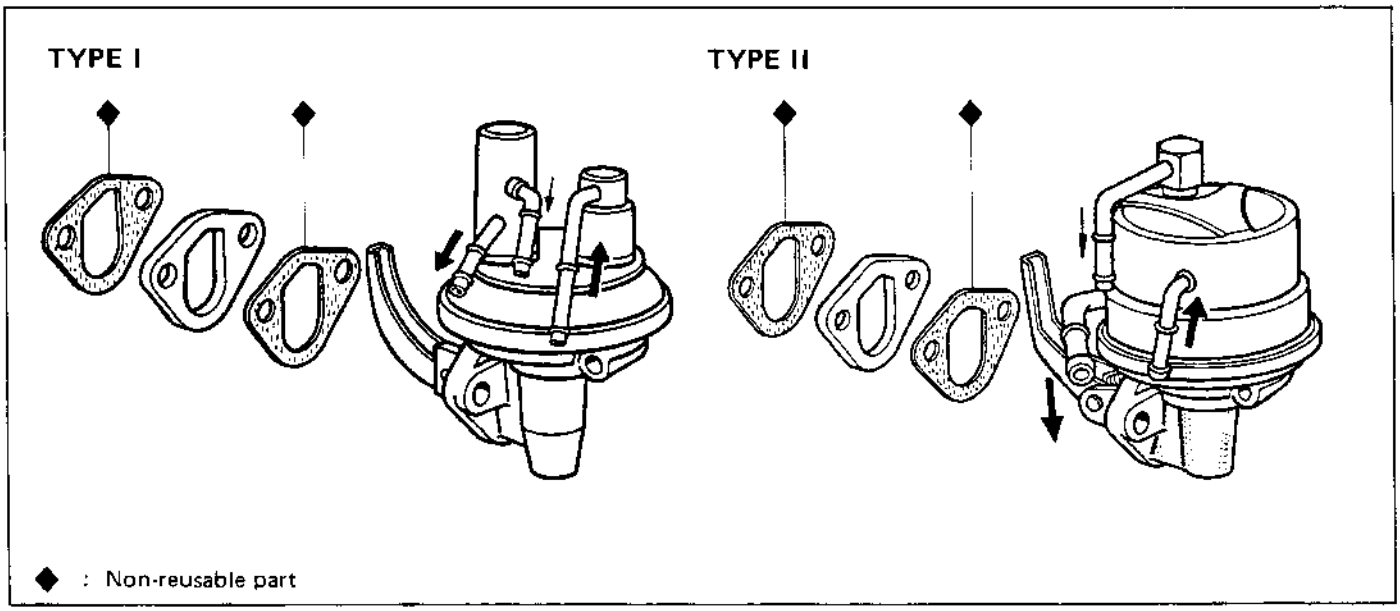
3. REMOVE FUEL PUMP BRACKET FROM FUEL TANK
   (a) Remove the seven bolts.
   (b) Pull out the fuel pump bracket.



4. REMOVE FUEL PUMP FROM FUEL PUMP BRACKET
   (a) Remove the two nuts and disconnect the wires from the fuel pump.
   (b) Pull off the bracket from the lower side of the fuel pump.
   (c) Remove the fuel pump from the fuel hose.

FUEL PUMP

COMPONENTS



REMOVAL OF FUEL PUMP

1. **DRAIN COOLANT**

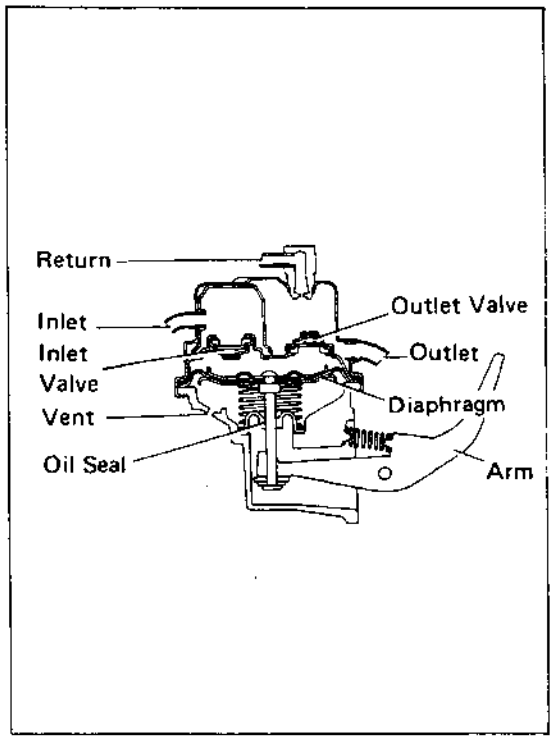
   Open the radiator drain cock and allow the coolant to dr[illegible] into a suitable container.

2. **DISCONNECT UPPER RADIATOR HOSE**

3. **DISCONNECT THREE FUEL HOSES FROM FUEL PUMP**

4. **REMOVE FUEL PUMP**

   Remove the two bolts, fuel pump and gasket.



INSPECTION OF FUEL PUMP (Airtight Test)

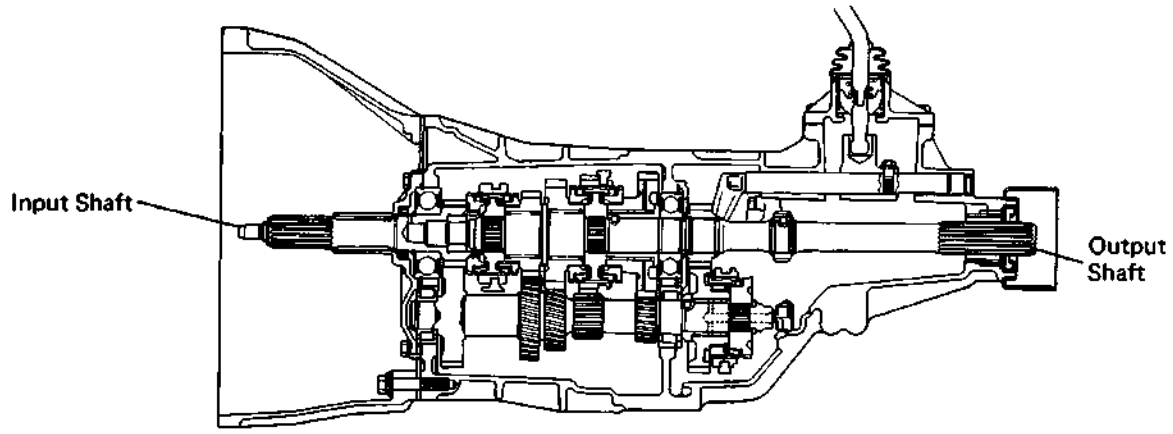
PRECHECKS

Before preforming the following checks on the fuel pump:

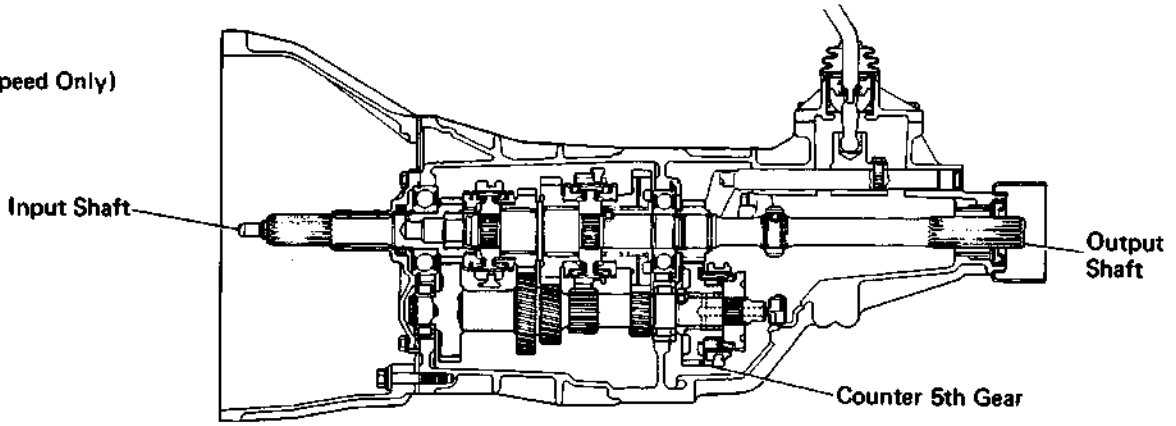
(a) Run some fuel through the pump to insure that the check valves seal tightly (a dry check valve may not seal properly).

(b) Without blocking off any pipe,operate the pump lever and check the amount of force necessary for operation and the amount of arm play.This same amount of force should be used in the checks.

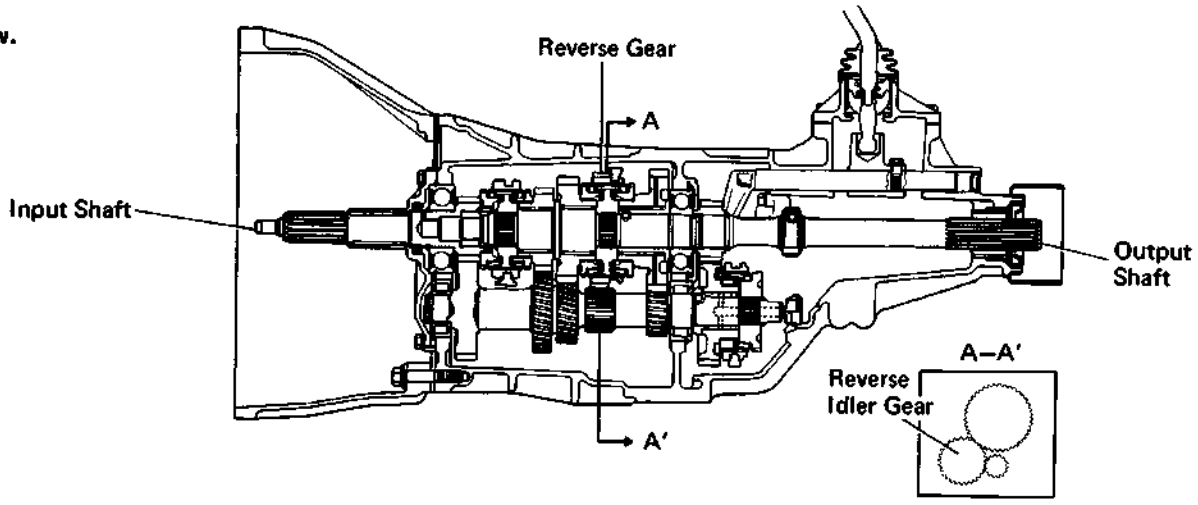
4th



5th
(5-Speed Only)

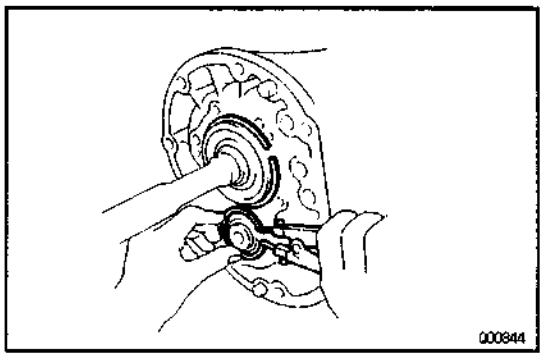


Rev.

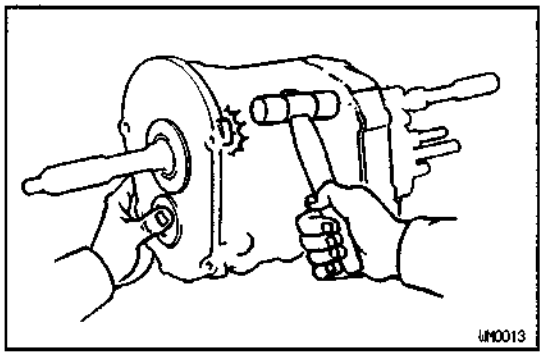


- The above illustrations show the engagements of a 5-speed transmission.
- The above illustration shows a G type transmission. The configuration of each gear is slightly different to W and R type transmissions but the gear engagements are the same.

MT0502 GM0358



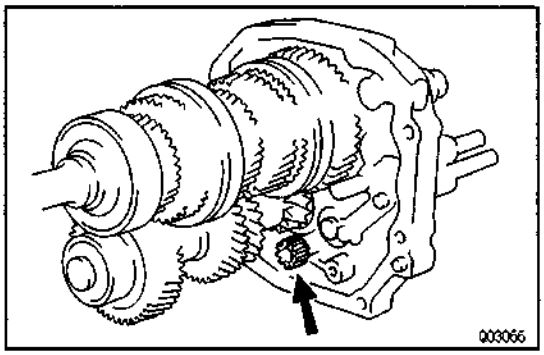
(b) Using a snap ring pliers, remove the two bearing snap rings.



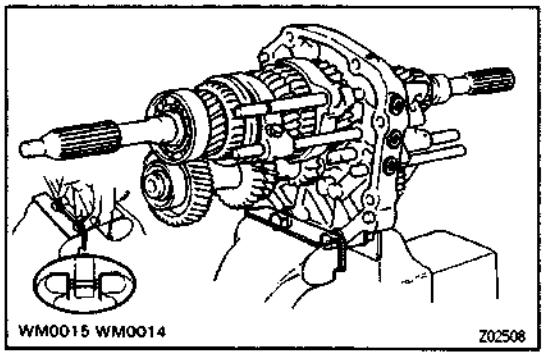
6. SEPARATE INTERMEDIATE PLATE FROM TRANSMISSION CASE

(a) Using a plastic hammer, carefully tap the transmission case.

(b) Pull the transmission case from the intermediate plate.



7. REMOVE FRONT MAGNET

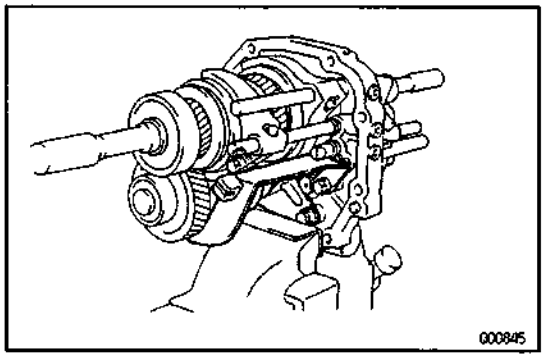


8. MOUNT INTERMEDIATE PLATE IN VISE

(a) Use two long clutch housing bolts, plate washers and suitable nuts as shown.

NOTICE: Install the plate washers in reverse of normal. Increase or decrease plate washers so that the bolt tip and the front tip surface of the nut are aligned.

(b) Mount the intermediate plate in a vise.



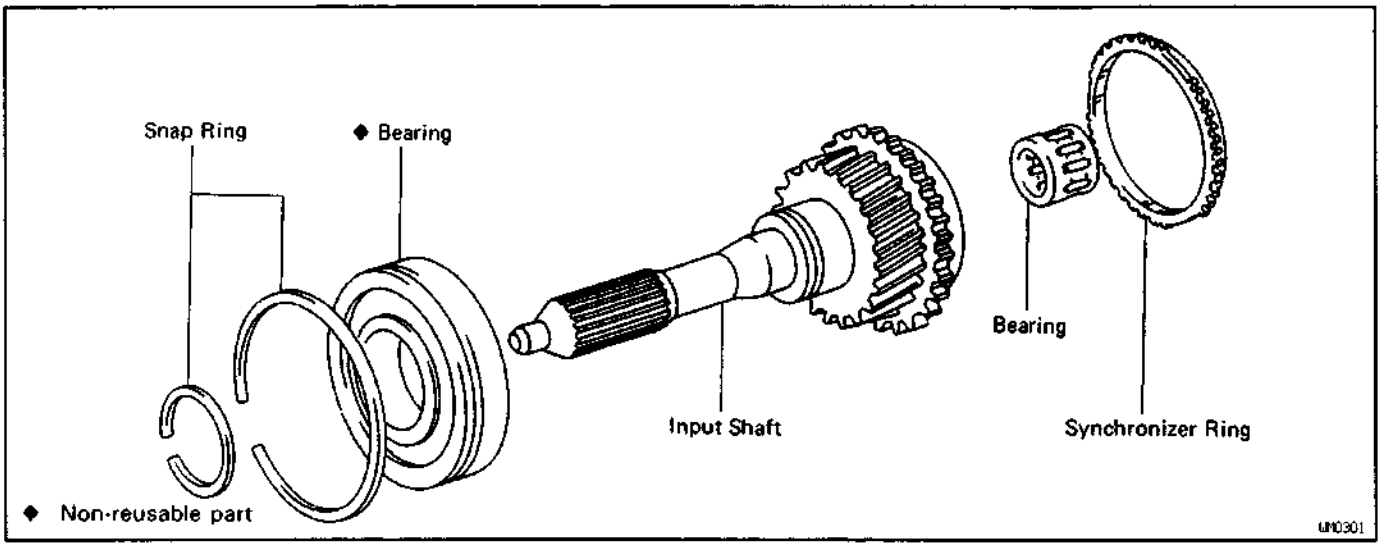
9. REMOVE OIL SEPARATOR

Remove the two bolts and oil receiver.

INPUT SHAFT

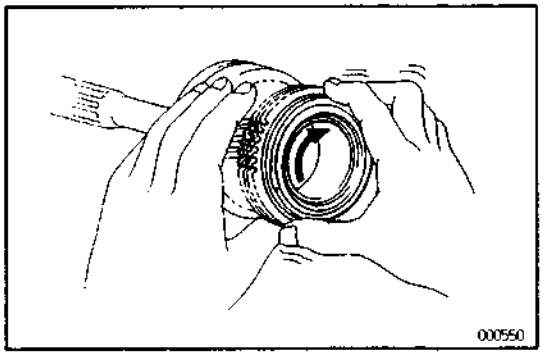
MT00F–02

COMPONENTS



MT00Q–02

INPUT SHAFT INSPECTION



INSPECT SYNCHRONIZER RING

(a) Check for wear or damage.

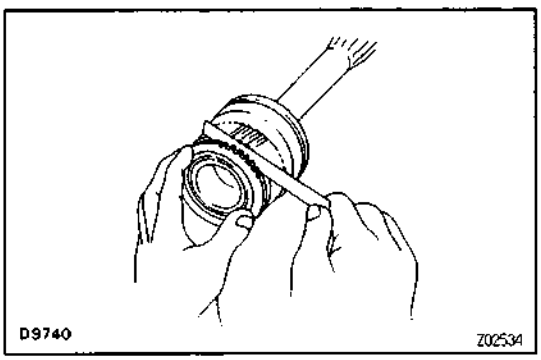
(b) Check the braking effect of the synchronizer ring.

Turn the synchronizer ring in one direction while pushing it to the gear cone and check that the ring is locked.

If the braking effect is insufficient, apply a small amount of fine lapping compound between the synchronizer ring and gear cone.

NOTICE:

- **Wash off completely the fine lapping compound after rubbing.**
- **Check again the braking effect of the synchronizer ring.**



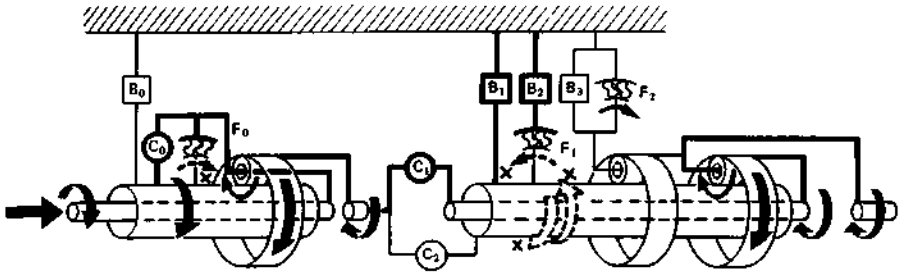
(c) Using a feeler gauge, measure the clearance between the synchronizer ring back and the gear spline end.

Minimum clearance:

0.5 mm (0.020 in:)

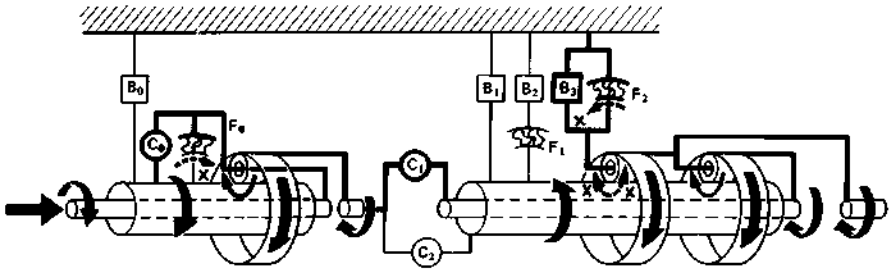
FUNCTION OF COMPONENTS (Cont'd)

2 or L Position 2nd Gear



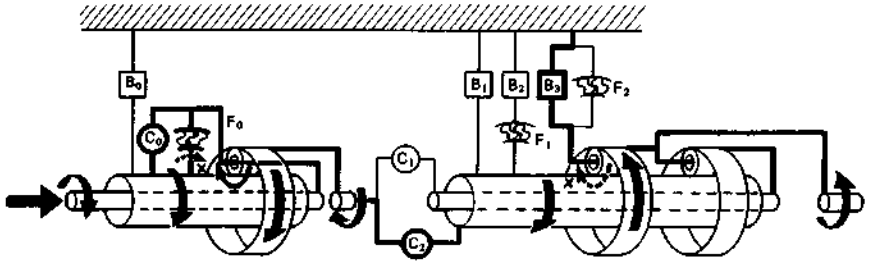
AT7806

L Position 1st Gear



AT7807

R Position Reverse Gear



AT7808

General Troubleshooting

Problem	Possible cause	Remedy	Page
Fluid discolored or smells burnt	Fluid contaminated Torque converter clutch faulty Transmission faulty	Replace fluid Replace torque converter clutch Disassemble and inspect transmission	AT–115 AT–162 •
Vehicle does not move in any forward position or reverse	Manual linkage out of adjustment Valve body or primary regulator faulty Parking lock pawl faulty Torque converter clutch faulty Converter drive plate broken Oil pump intake screen blocked Transmission faulty	Adjust linkage Inspect valve body Inspect parking lock pawl Replace torque converter clutch Replace drive plate Clean screen Disassemble and inspect transmission	AT–116 • AT–158 AT–162 AT–162 • •
Shift lever position incorrect	Manual linkage out of adjustment Manual valve and lever faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission	AT–116 • •
Harsh engagement into any drive position	Throttle cable out of adjustment Valve body or primary regulator faulty Accumulator pistons faulty Transmission faulty	Adjust throttle cable Inspect valve body Inspect accumulator pistons Disassemble and inspect transmission	AT–116 • • •
Delayed 1–2, 2–3 or 3–0/1) up–shift, or down–shifts from O/D–3 or 3–2 and shifts back to O/D or 3	Electronic control faulty Valve body faulty Solenoid valve faulty	Inspect electronic control Inspect valve body Inspect solenoid valve	AT–120 • •
Slips on 1–2, 2–3 or 3–0/D up–shift, or slips or shudders on acceleration	Manual linkage out of adjustment Throttle cable out of adjustment Valve body faulty Solenoid valve faulty Transmission faulty	Adjust linkage Adjust throttle cable Inspect valve body Inspect solenoid valve Disassemble and inspect transmission	AT–116 AT–116 • • •
Drag, binding or tie–up on 1–2, 2–3 or 3–OID up–shift	Manual linkage out of adjustment Valve body faulty Transmission faulty	Adjust linkage Inspect valve body Disassemble and inspect transmission	AT–116 • •

Remark *: Refer to A340H Automatic Transmission Repair Manual. (Pub. No. RM271U)

Automatic Shift Schedule

Throttle valve fully open [ ] Fully closed km/h (mph)

		1→2	2→3	3→O/D	[3→O/D]	[O/D→3]	O/D→3	3→2	2→1
D position	NORM	44–48 (27–30)	93–99 (58–61)	134–141 (83–87)	35–39 (22–24)	21–25 (13–16)	128–135 (79–84)	87–94 (54–58)	40–43 (25–27)
	PW R	47–51 (29–32)	93–99 (58–61)	148–155 (92–96)	50–53 (31–33)	21–25 (13–16)	143–149 (89–92)	87–94 (54–58)	41–45 (25–28)
2 position	NORM PW R	43–46 (27–29)	103–109 (64–68)	–	–	–	–	97–103 (60–64)	38–42 (24–26)
L position	NORM PW R	–	–	–	–	–	–	82–89 (51–55)	47–51 (29–32)

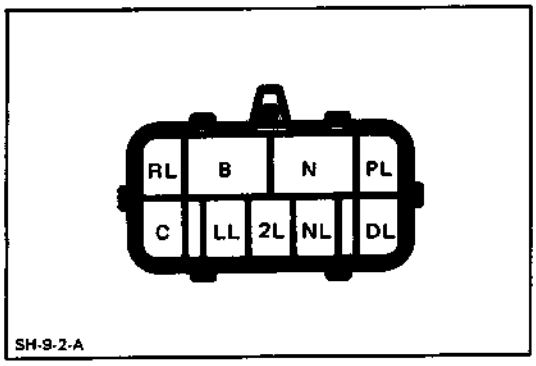
Throttle valve opening 5% km/h (mph)

		Lock–up ON			Lock–up OFF		
		2nd	*3rd	O/D	2nd	*3rd	O/D
D position	NORM	–	41 – 45 (25 – 28)	59 – 63 (37 – 39)	–	38 – 42 (24 – 26)	55 – 59 (34 – 37)
	PWR	–	55 – 59 (34 – 37)	75 – 79 (47 – 49)	–	50 – 53 (31 – 33)	70 – 73 (43 – 45)

* : O/D switch OFF

HINT:

(1) Lock–up will not occur in 2nd gear unless the throttle valve opening is greater than 50%.
(2) There is no lock–up in the 2 and L positions.
(3) In the following cases, the lock–up will be released regardless of the lock–up pattern.
When the throttle is completely closed.
When the brake light switch is ON.

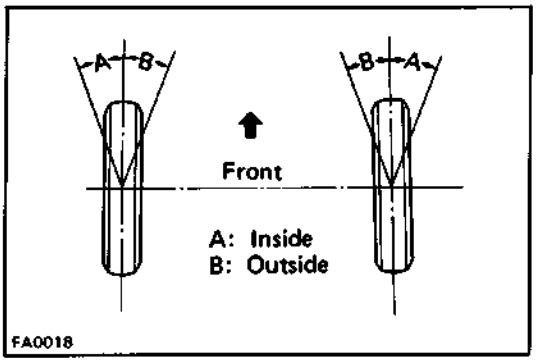


Park/Neutral Position Switch

INSPECTION OF PARK/NEUTRAL POSITION SWITCH

Inspect that there is continuity between each terminals.

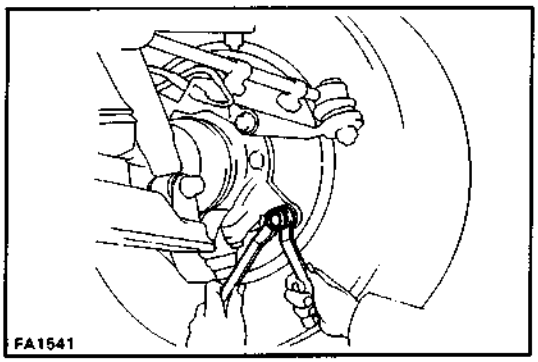
Shift Position \ Terminal	B	N	PL	RL	NL	DL	2L	LL	C
P	○—○		○						○
R				○					○
N	○—○				○				○
D						○			○
2							○		○
L								○	○



5. ADJUST WHEEL ANGLE

Remove the caps of the knuckle stopper bolts and check the steering angles.

Wheel angle		
Max.	Inside wheel	32•00' +1• –2•
	Outside wheel	31•
at 200 (outside wheel)	Inside wheel	21 • 10'

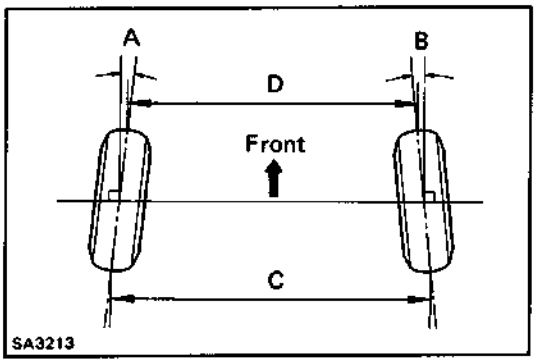


HINT: When the steering wheel is fully turned, make sure that the wheel is not touching the body or brake flexible hose.

If maximum steering angles differ from standard value, adjust the wheel angle with the knuckle stopper bolts.

Torque: 47 N–m (480 kgf–cm, 35 ft–lbf)

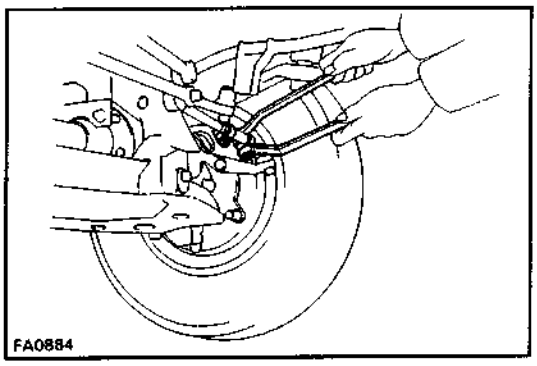
If the wheel angle still cannot be adjusted within limits, inspect and replace damaged or worn steering parts.



6. INSPECT TOE–IN

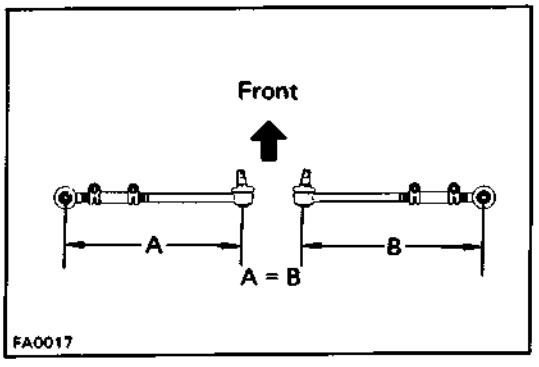
Toe–in: See page A–26

If toe–in is not within specification adjust by the tie rod end.



7. ADJUST TOE–IN

(a) Loosen the clamp bolts and nuts.

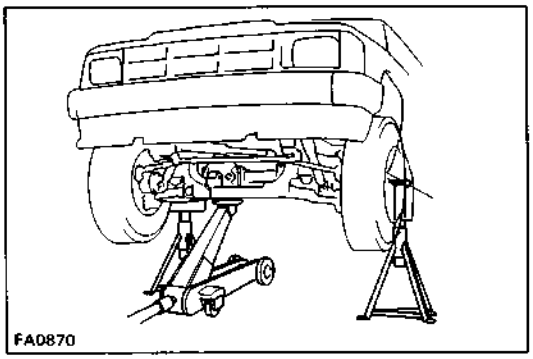


(b) Adjust toe–in by turning the left and right tie rod tubes an equal amount.

Toe–in: See page A–26

(c) Insure that the lengths of the left and right tie rods are equal.

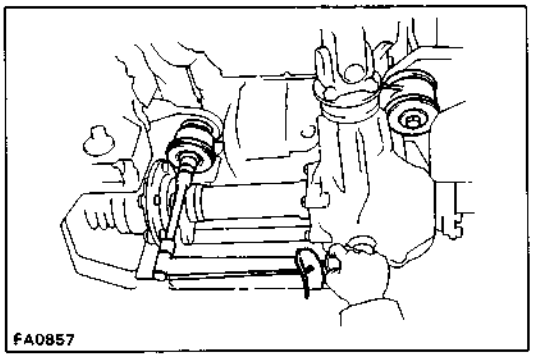
NOTICE: Check that the steering wheel is straightened.



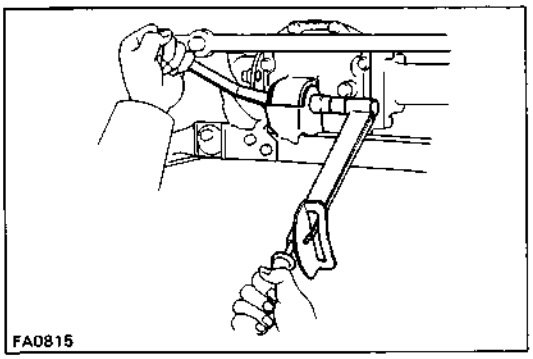
Installation of Front Differential

1. INSTALL FRONT DIFFERENTIAL

(a) Install the front differential to the frame, and support it with a jack.



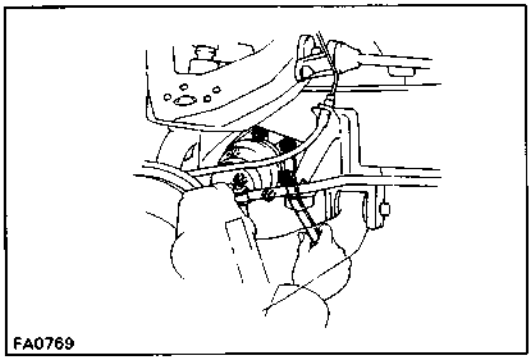
(b) Install and torque the left and right rear mounting bolts.
Torque: 167 N–m (1,700 kgf–cm, 123 ft–lbf)



3. (wl A.D.D.)
CONNECT VACUUM HOSES AND 4WD INDICATOR SWITCH CONNECTOR

4. CONNECT DRIVE SHAFTS TO SIDE GEAR SHAFT

Connect the drive shafts to the side gear shaft, and install and torque the nuts while depressing the brake pedal.
Torque: 83 N–m (845 kgf –cm, 61 ft–lbf)

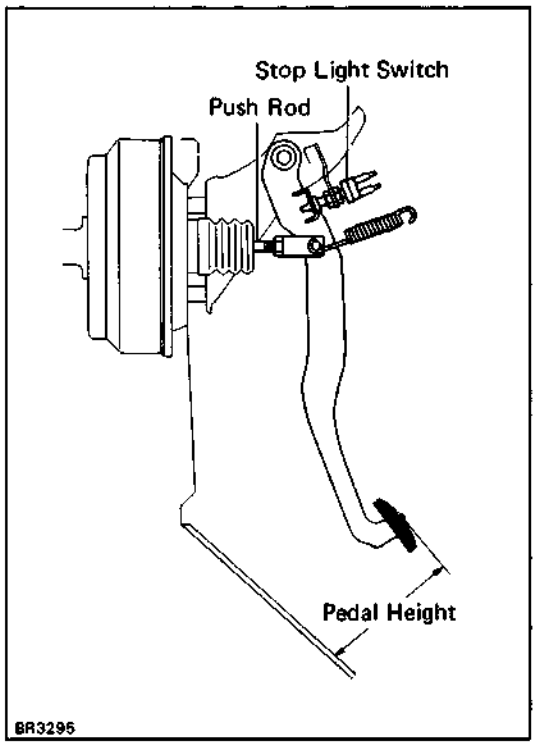


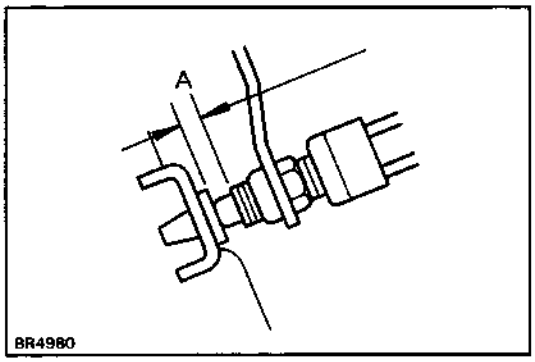
5. CONNECT PROPELLER SHAFT TO COMPANION FLANGE

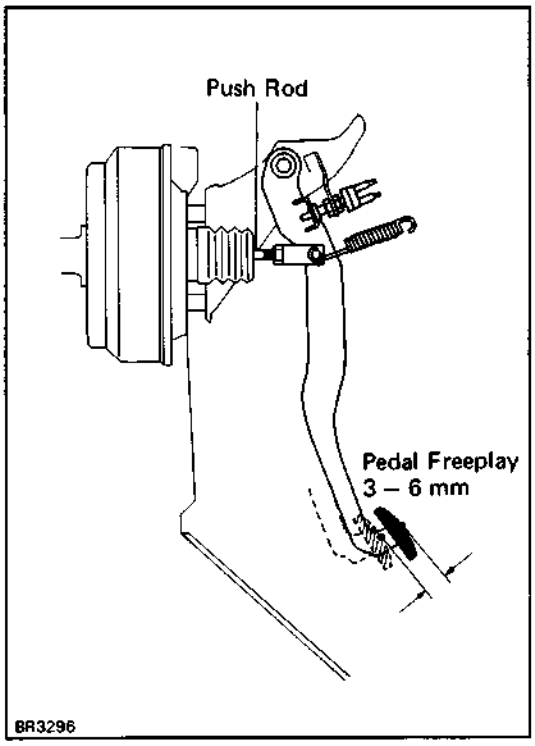
(a) Align the matchmarks on the flanges and connect the flanges with four bolts and nuts.
(b) Torque the nuts.
Torque: 74 N–m (750 kgf–cm, 54 ft–lbf)

6. INSTALL DRAIN PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

(wl A.D.D.)
Oil type: Toyota "GEAR OIL SUPER" oil (Part No. 08885 – 02106) or hypoid gear oil API GL–5
Recommended oil viscosity: SAE 75W–90
Capacity: 1.86 liters (1.97 US qts, 1.64 Imp. qts)
(w/o A.D.D.)
Oil type: Hypoid gear oil API GL–5
Recommended oil viscosity:
Above – 18•C (0•F) SAE 90
Below – 18•C (0•F) SAE 80W or 80W–90
Capacity: 1.6 liters (1.7 US qts, 1.4 Imp. qts)







CHECKS AND ADJUSTMENTS

CHECK AND ADJUSTMENT OF BRAKE PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT, AS SHOWN

PEDAL HEIGHT FROM ASPHALT SHEET:
2WD 148 MM (5.83 IN.)
4WD 145 MM (5.71 IN.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Disconnect the connector from the stop light switch.

(b) Loosen the stop light switch lock nut and remove the stop light switch.

(c) Loosen the push rod lock nut.

(d) Adjust the pedal height by turning the pedal push rod.

(e) Tighten the push rod lock nut.

Torque: 25 N–m (260 kgf–cm, 19 ft–lbf)

(f) Install the stop light switch and turn it until it lightly contacts the pedal stopper.

(g) Return the stop light switch one turn.

(f) Check the clearance

(A) between stop light switch and pedal.

Clearance: 0.5 – 2.4mm (0.02 – 0.09 in.)

(i) Tighten the stop light switch lock nut.

(j) Check that the stop light come on when the brake pedal is depressed, and go off when the brake pedal is released.

(k) After adjusting the pedal height, check the pedal free play.

HINT: If clearance

(A) between the stop light switch and the pedal stopper has been adjusted correctly, the pedal freeplay will meet the specifications.

3. CHECK THAT PEDAL FREEPLAY IS CORRECT, AS SHOWN

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

(b) (Single booster)

Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

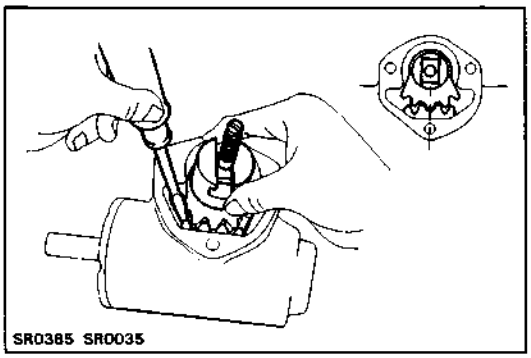
(Tandem booster)

Push in the pedal by hand until the beginning of the second resistance is felt, measure the distance, as shown.

Pedal freeplay: 3 – 6mm (0.12 – 0.24 in.)

(Tandem booster)

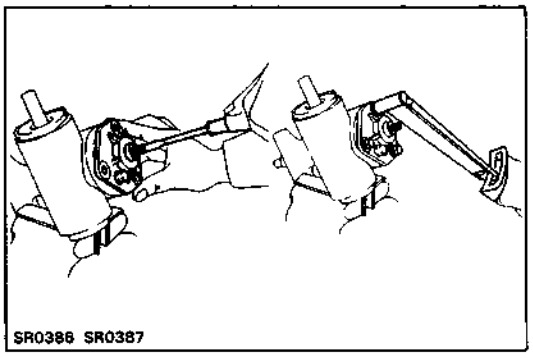
HINT: The freeplay to the first resistance is due to the play between the clevis and pin. And it is 1 – 3mm (0.04 – 0.12 in.) on the pedal.



4. INSTALL SECTOR SHAFT

(a) Install the adjusting screw and thrust washer onto the sector shaft.

(b) Set the ball nut at the center of the worm shaft. Install the sector shaft into the gear housing so that the center teeth mesh together.



5. INSTALL END COVER

(a) Install the end cover over a new gasket.

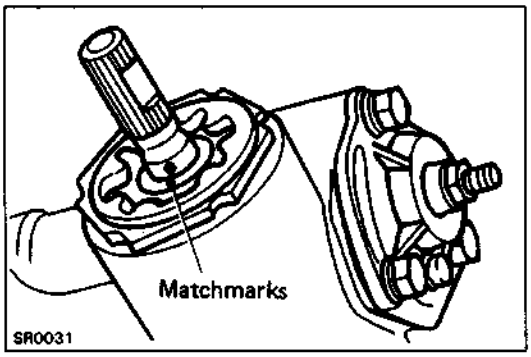
(b) Using a screwdriver, loosen the adjusting screw as far as possible.

(c) Apply sealant to the bleeder plug side cover bolt.

Sealant: Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(d) Torque the three cover bolts.

Torque: 18 N–m (185 kgf–cm, 13 ft–lbf)

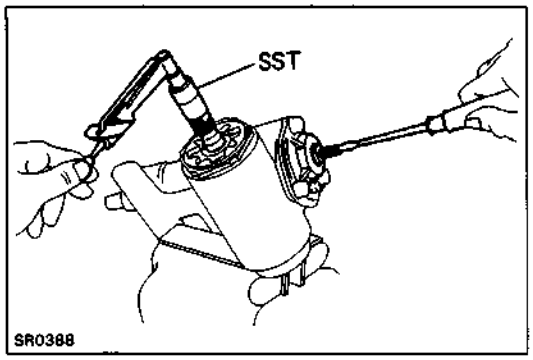


6. PLACE WORM SHAFT IN NEUTRAL POSITION

(a) Count the total shaft rotations and turn the shaft back half of that number.

(b) The worm shaft is now in neutral position.

(c) Place matchmarks on the worm shaft and housing to show neutral position.



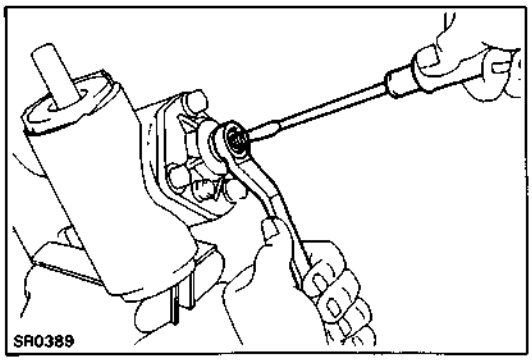
7. ADJUST TOTAL PRELOAD

Using a torque meter and SST, turn the adjusting screw while measuring the preload until it is correct.

HINT: Be sure that the worm shaft is in neutral position.

Preload (Starting): 0.8 – 1.0 N–m (8 – 10.5 kgf–cm, 6.9 – 9.1 in.–lbf)

SST 09616–00010



8. TIGHTEN ADJUSTING SCREW LOCK NUT

(a) Apply sealant to the lock nut.

Sealant: Part No. 08833–00080, THREE BOND 1344, LOCTITE 242 or equivalent

(b) Hold the screw with a screwdriver while tightening the lock nut.

(c) Torque the lock nut.

Torque: 27 N–m (275 kgf–cm, 20 ft–lbf)

HINT: Check that the preload is still correct.