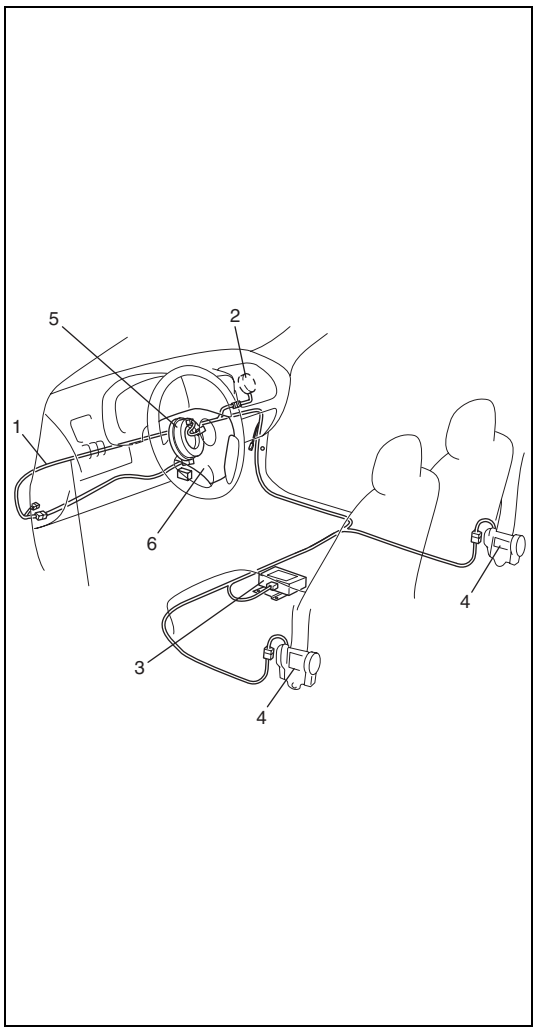
PRECAUTIONS

PRECAUTION FOR VEHICLES EQUIPPED WITH A SUPPLEMENTAL RESTRAINT (AIR BAG) SYSTEM



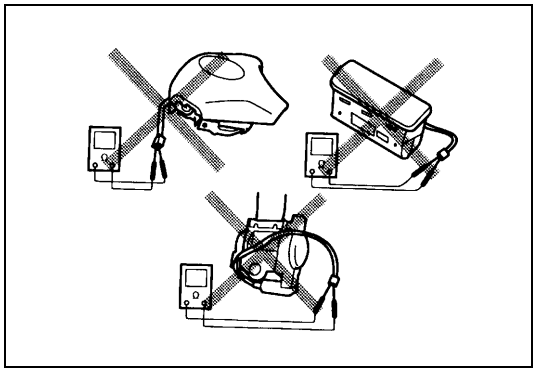
WARNING:

- **The configuration of air bag system parts are as shown in the figure. When it is necessary to service (remove, reinstall and inspect) these parts, be sure to follow procedures described in SECTION 10B. Failure to follow proper procedures could result in possible air bag system activation, personal injury, damage to parts or air bag system being unable to activate when necessary.**
- **If the air bag system and another vehicle system both need repair, SUZUKI recommends that the air bag system be repaired first, to help avoid unintended air bag system activation.**
- **Do not modify the steering wheel, dashboard, or any other air bag system components. Modifications can adversely affect air bag system performance and lead to injury.**
- **If the vehicle will be exposed to temperatures over 93°C (200°F) (for example, during a paint baking process), remove the air bag system components beforehand to avoid component damage or unintended air bag system activation.**

1. Air bag wire harness	4. Seat belt pretensioner
2. Passenger air bag (inflator) module	5. Contact coil
3. SDM	6. Driver air bag (inflator) module

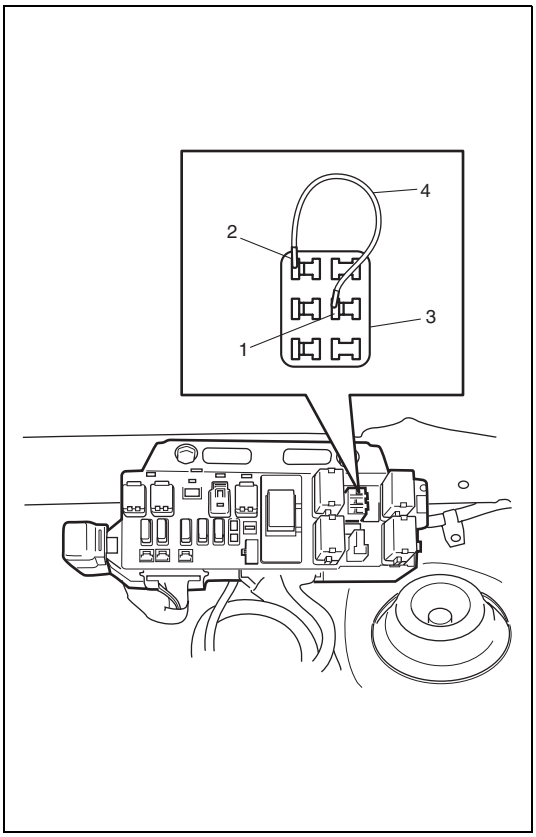
DIAGNOSIS

- When troubleshooting air bag system, be sure to follow “DIAGNOSIS” in SECTION 10B. Bypassing these procedures may result in extended diagnostic time, incorrect diagnosis, and incorrect parts replacement.
- Never use electrical test equipment other than that specified in this manual.



WARNING:

Never attempt to measure the resistance of the air bag (inflator) modules (driver and passenger) and seat belt pretensioners (driver and passenger). It is very dangerous as the electric current from the tester may deploy the air bag or activate the pretensioner.



[Without Using SUZUKI Scan Tool] (Vehicle without Immobilizer Indicator Lamp)

1) Check malfunction indicator lamp referring to “Malfunction Indicator Lamp Check” in this section.
2) With the ignition switch OFF position, disconnect SUZUKI scan tool if connected and using service wire (4), connect diagnosis switch terminal (1) to ground terminal (2) in monitor coupler (3).
3) With the ignition switch ON position and leaving engine OFF, read DTC from flashing pattern of malfunction indicator lamp. Refer to “Diagnostic Trouble Code Table”.
   If lamp remains ON, go to “Diagnostic Flow Table A-4”.

NOTE:

- **If abnormality or malfunction lies in two or more areas, malfunction indicator lamp indicates applicable codes three times each.**
  And flashing of these codes is repeated as long as diagnosis terminal is grounded and ignition switch is held at ON position.
- **Take a note of diagnostic trouble code indicated first.**

4) After completing the check, turn the ignition switch OFF position and disconnect service wire from monitor coupler.

DIAGNOSTIC TROUBLE CODE (DTC) CLEARANCE

Using Scan Tool

1) Connect SUZUKI scan tool (Tech-1) or generic scan tool (Vehicle with immobilizer indicator lamp) to data link connector in the same manner as when making this connection for DTC check.
2) Turn ignition switch ON.
3) Erase DTC and pending DTC according to instructions displayed on scan tool. Refer to scan tool operator’s manual for further details.
4) After completing the clearance, turn ignition switch off and disconnect scan tool from data link connector.

NOTE:

DTC and freeze frame data stored in ECM memory are also cleared in following cases. Be careful not to clear them before keeping their record.

- **When power to ECM is cut off (by disconnecting battery cable, removing fuse or disconnecting ECM connectors)**
- **When the same malfunction (DTC) is not detected again during 40 engine warm-up cycles. (Vehicle with immobilizer indicator lamp)**

DTC NO.	DETECTING ITEM	DETECTING CONDITION (DTC will set when detecting :)	MIL
P1620 (No.84)	ECU code not registered	Refer to Section 8G	
P1621 (No.83)	No ECU code transmitted from Immobilizer Control Module		
P1622 (No.82)	Fault in ECM		
P1623 (No.81)	ECU code not matched		

NOTE:

- **For ( ) marked No. in DTC column, it is used for vehicle without immobilizer indication lamp.**
- **DTC No.12 appears when none of the other codes is identified.**
- **For vehicle with immobilizer indication lamp, star (∗) marked DTCs can be read with SUZUKI scan tool ECM application.**

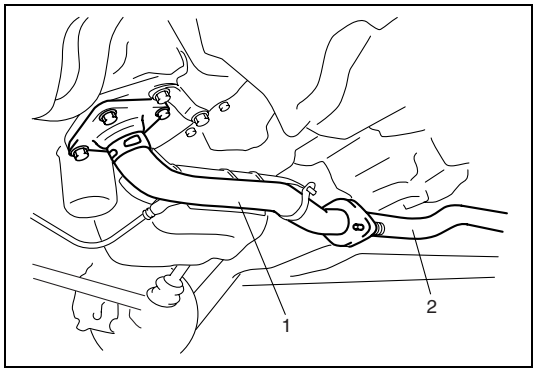
FAIL-SAFE TABLE

When any of the following DTCs is detected, ECM enters fail-safe mode as long as malfunction continues to exist but that mode is canceled when ECM detects normal condition after that.

DTC NO.	TROUBLE AREA	FAIL-SAFE OPERATION	SYMPTOM
P0105 (No.11)	MAP SENSOR	ECM uses value determined by throttle opening and engine speed. ECM stops EGR, EVAP purge and idle air control.	Hard starting/ rough or incorrect idle/ excessive fuel consumption/ hesitation/ poor acceleration/ surge/ detonation or spark knock
P0110 (No.18)	IAT SENSOR	ECM controls actuators assuming that intake air temperature is 20°C.	Hard starting/ rough or incorrect idle/ excessive fuel consumption/ hesitation poor acceleration/ detonation or spark knock
P0115 (No.19)	ECT SENSOR	ECM controls actuators assuming that engine coolant temperature is 80°C. Radiator fan motor ON.	Hard starting/ rough or incorrect idle/ excessive fuel consumption/ hesitation poor acceleration/ detonation or spark knock
P0120 (No.13)	TP SENSOR	ECM controls actuators assuming that throttle opening is 20°.	Rough or incorrect idle/ excessive fuel consumption/ hesitation/ poor acceleration
P0130, P0134 (No.14)	HEATED OXYGEN SENOR-1	–	Hard starting/rough or incorrect idle/ excessive fuel consumption/ hesitation/ poor acceleration
P0325 (No.17)	KNOCK SENSOR	–	Detonation/ spark knock
P0335 (No.23)	CKP SENSOR	• Fix ignition timing. • ECM changes injection control system from sequential injection to simultaneous one.	Hard staring/ engine stall

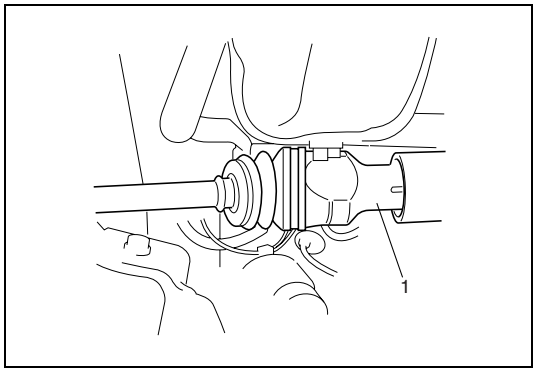
UNIT DISMOUNTING

1) Disconnect negative cable at battery.
2) Hoist vehicle and remove wheels.
3) Drain transmission oil.

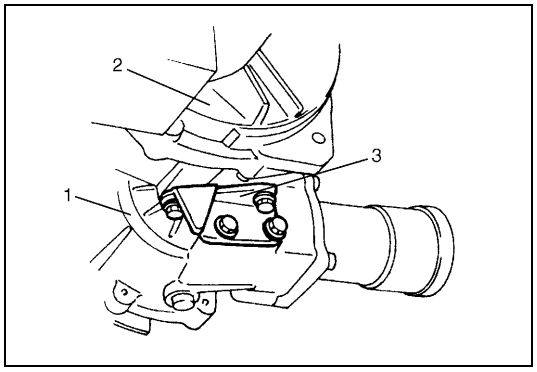


4) Remove exhaust No.1 pipe (1).
5) Remove propeller shaft.

2. Exhaust No.2 pipe

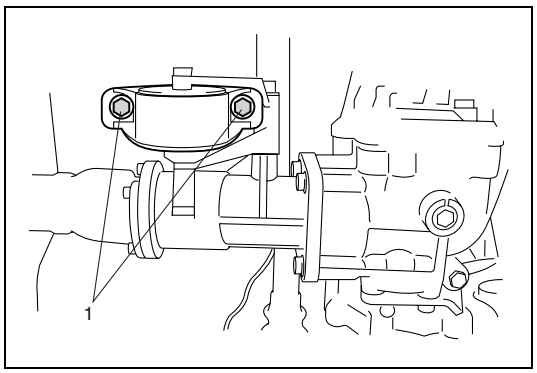


6) Remove right side drive shaft (1) refer to Section 4A.



7) Remove Stiffener (3).

1. Transfer
2. Transmission



8) With transmission assembly held on jack, remove rear mounting bolts (1).

9) Remove transfer mounting bolts and draw out transfer assembly from transmission assembly.

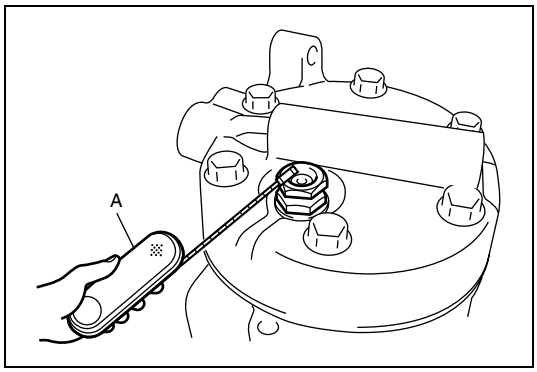
For M15 Engine Model

NOTE:

For M15 engine model, refer to the same section of the Service Manual mentioned in the "Foreword" of this service manual.

Relief Valve Inspection

For Z13DT Engine Model



By using special tool, check if there is refrigerant leakage.
If there is refrigerant leakage, replace the compressor assembly.

Special tool
(A): 09990–86011

For M15 Engine Model

NOTE:

For M15 engine model, refer to the same section of the Service Manual mentioned in the "Foreword" of this service manual.

Specifications

Tightening Torque Specifications

For M15 Engine Model

NOTE:

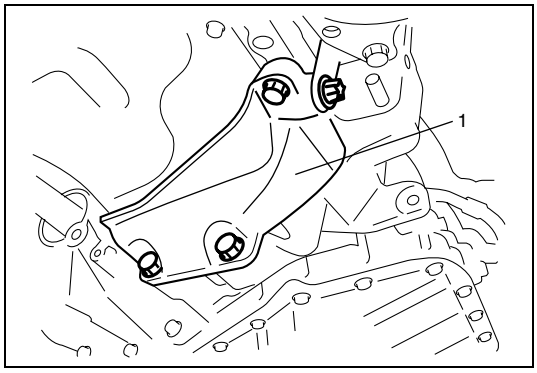
For M15 engine model, refer to the same section of the Service Manual mentioned in the "Foreword" of this service manual.

For Z13DT Engine Model

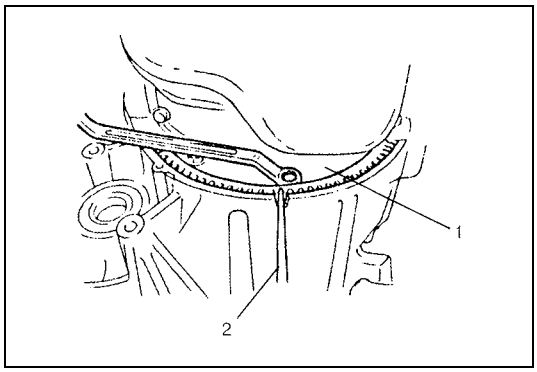
Fastening part		Tightening torque		
		N•m	kg-m	lb-ft
Refrigerant line	8 mm pipe	13	1.3	9.5
	12 mm pipe	23	2.3	17.0
	14.5 mm pipe	33	3.3	24.0
Pressure sensor		11	1.1	8.0

Dismounting

1) Take down transaxle with engine. For its procedure, refer to "Engine Assembly Removal and Installation" in Section 6A1.

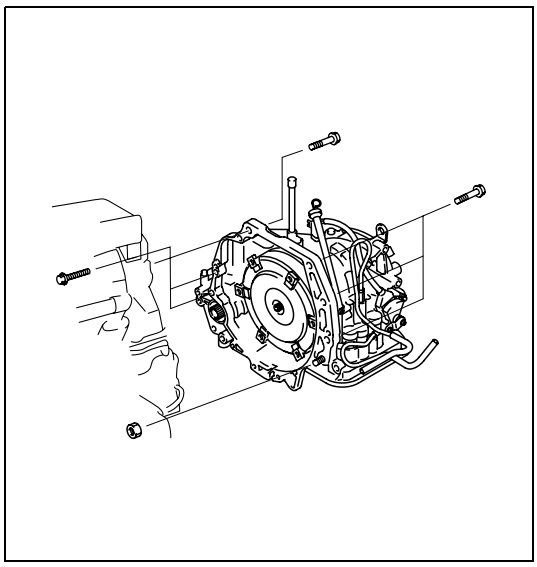


2) Remove lower stiffener (1).



3) Remove drive plate to torque converter bolts.
   To lock drive plate (1), engage flat head rod or the like (2) with drive plate ring gear.

4) Remove starting motor.



WARNING:

Be sure to keep transaxle with torque converter horizontal or facing up throughout the work. Should it be tilted with torque converter down, converter may fall off and cause personal injury.

NOTE:

When detaching transaxle from engine, move it in parallel with crankshaft and use care so as not to apply excessive force to drive plate and torque converter.

5) Remove bolts and nut fastening engine and transaxle, then detach transaxle from engine.

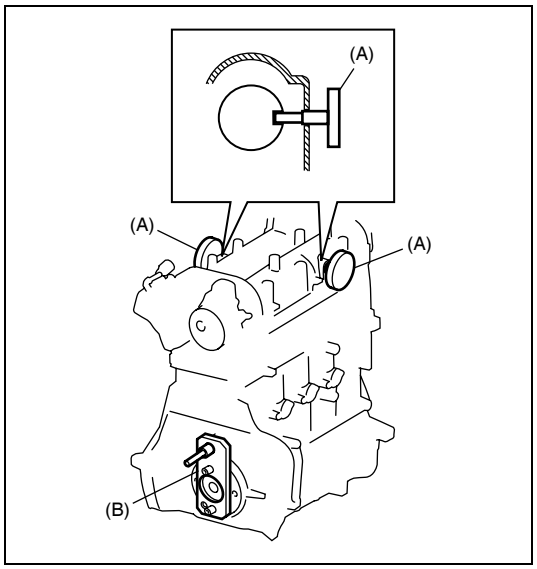
Test	Work Order Description	Nominal Value
T12	Check: Short to Ground/Interruption of Voltage Supply Circuit	
	• Remove electrical component from socket: Circuit Main Fuse • Check the following component for proper operation: Circuit Main Fuse	Test okay?
	Yes: T12	No: T14
T13	Check: Interruption of Voltage Supply Circuit	
	• Measure voltage between the following terminals: Circuit Main Fuse – Input contact & Ground	greater than 11 V
	Yes: E11	No: T13
T14	Check: Short to Ground/Interruption of Voltage Supply Circuit	
	• Remove electrical component from socket: System Main Fuse • Check the following component for proper operation: System Main Fuse	Test okay?
	Yes: E12	No: E13
T15	Check: Short to Ground of Voltage Supply Circuit	
	• Connect fused jumper wire to: Circuit Main Fuse – Output contact & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?
	Yes: T15	No: T17
T16	Check: Short to Ground of Voltage Supply Circuit	
	• Remove fused jumper wire • Connect fused jumper wire to: Main Relay – Socket Terminal E58-3 & Battery voltage • Check the following component for proper operation: Fuse of the fused jumper wire	Test okay?
	Yes: E02	No: T16
T17	Check: Short to Ground of Voltage Supply Circuit	
	• Disconnect wiring harness connector from: ECM • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation.	Test okay?
	Yes: E01	No: E14
T18	Check: Short to Ground of Voltage Supply Circuit	
	• Remove electrical component from socket: Fuel pump relay • Insert new fuse into the socket of the fused jumper wire and then check this fuse for proper operation.	Test okay?
	Yes: E15	No: E16

Result	Cause of Fault
E17	• Circuit interruption between Circuit Main Fuse – Output contact & Radiator Fan Relay No.1 – Socket terminal E53-4 or • Short circuit to ground between Circuit Main Fuse – Output contact & Radiator Fan Relay No.1 – Socket terminal E53-4 & Radiator Fan Relay No.2 – Socket terminal E69-4 • Defective component: Circuit Main Fuse
E18	• Circuit interruption between Radiator Fan Relay No.1 – Socket terminal E53-1 & ECM – Wiring harness connector (wiring harness side) terminal G88-7 • Defective component: Radiator Fan Relay No.1
E19	• Circuit interruption between Radiator Fan Relay No.1 – Socket terminal E53-3 Radiator Fan Motor – Wiring harness connector (wiring harness side) terminal E44-2
E20	• Circuit interruption between Radiator Fan Motor – Wiring harness connector (wiring harness side) terminal E44-1 & Ground

B-02, Data List

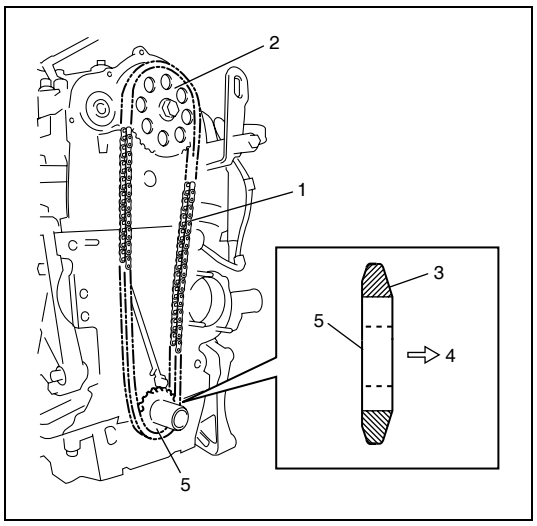
As the data values given below are standard values estimated on the basis of values obtained from the normally operating vehicles by using a scan tool, use them as reference values. Even when the vehicle is in good condition, there may be cases where the checked value does not tall within each specified data range. Therefore, judgment as abnormal should not be made by checking with these data alone.
Also, conditions in the table below that can be checked by the scan tool are those detected by ECM and output from ECM as commands and there may be cases where the engine or actuator is not operating (in the condition) as indicated by the scan tool.

Test	Work Order Description	Nominal Value
T01	Tester Display – Battery Voltage	
	• Ignition ON	11.0 ... 13.5 V
	• Engine OFF	
	• All consumers turned off	
	• Engine starting	greater than 8.0 V
	• Engine running at idle speed, operating temperature	12.0 ... 15.0 V
	Concerned Terminals:	
	E27-1, E27-2, E27-3, E27-50 (For RM413D)	
	G88-1, G88-2, G88-3, G88-50 (For RB413D)	
	Yes: T02	No: C-03
T02	Tester Display – Main Relay	
	• Ignition OFF	OFF
	• Ignition ON	ON
	• Engine OFF	
	• All consumers turned off	
	Concerned Terminals:	
	E27-4, E27-5, E27-6, E27-80 (For RM413D)	
	G88-4, G88-5, G88-6, G88-80 (For RB413D)	
	Yes: T03	No: C-04
T03	Tester Display – Fuel Pump	
	• Ignition ON	OFF
	• Engine OFF	
	• All consumers turned off	
	• Wait at least 20 s	
	• Engine running at idle speed, operating temperature	ON
	Concerned Terminals:	
	E27-75 (For RM413D)	
	G88-75 (For RB413D)	
	Yes: T04	No: C-06
T04	Tester Display – PPS 1 Voltage	
	• Ignition ON	greater than 3.80 V
	• Engine OFF	
	• All consumers turned off	
	• Accelerator pedal actuated to full load stop	
	• Accelerator pedal not actuated	less than 1.00 V
	• Accelerator pedal slightly actuated	greater than 1.00 V
	Concerned Terminals:	
	E27-15, E27-32, E27-35, E27-41, E27-65, E27-83 (For RM413D)	
	G88-15, G88-32, G88-35, G88-41, G88-65, G88-83 (For RB413D)	
	Yes: T05	No: C-10

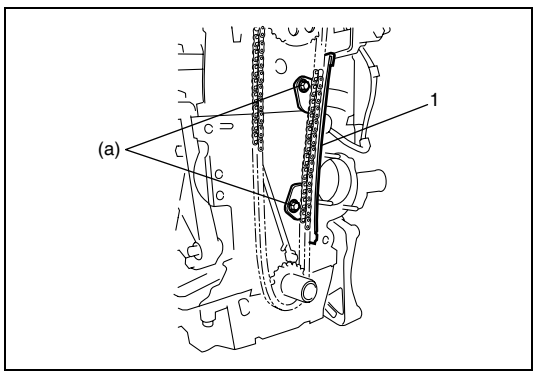


2) Confirm that special tools (A) and (B) are installed.
   If special tool(s) is removed, install special tool(s) referring to "Pistons, Piston Rings, Connecting Rods and Cylinder Removal and Installation" in this section or "Camshaft Housing Assembly Disassembly and Reassembly" in this section.

Special tool
(A): 09917-68610
(B): 09912-38300

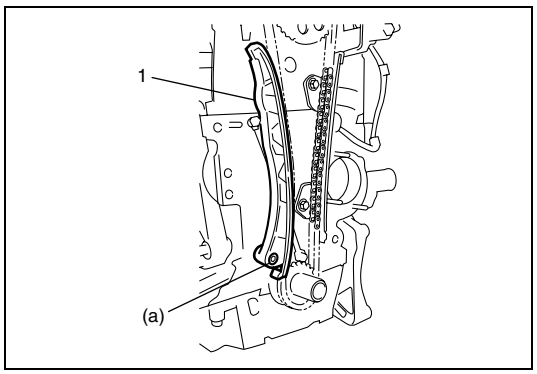


3) Install timing chain (1) to camshaft timing sprocket (2).
4) Install crankshaft timing sprocket (5) to timing chain with its long taper side (3) faced to outside (4) as shown in figure.
5) Insert crankshaft timing sprocket with timing chain to crankshaft.



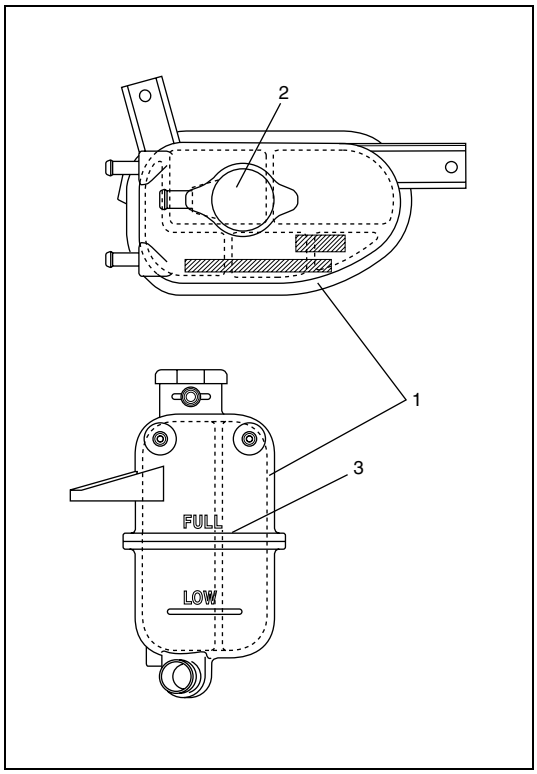
6) Apply engine oil to sliding surface of timing chain guide (1), and install it.

Tightening torque
Chain guide mounting bolt (a): 9 N·m (0.9 kg-m, 6.5 lb-ft)



7) Apply engine oil to sliding surface of timing chain tensioner (1), and install it.

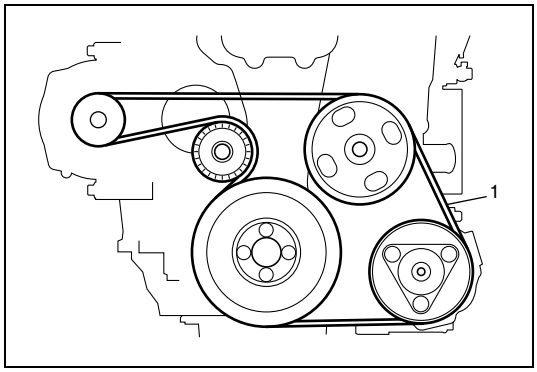
Tightening torque
Chain tensioner mounting bolt
(a): 9 N·m (0.9 kg-m, 6.5 lb-ft)



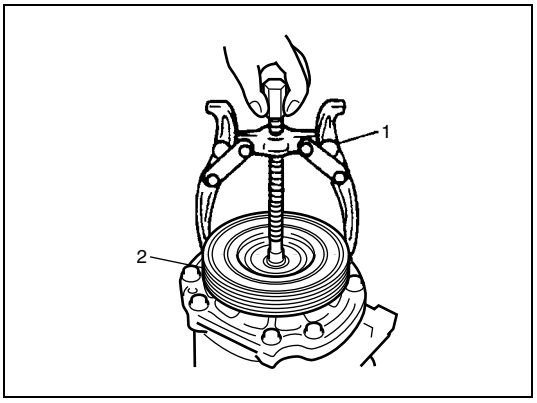
7) Disconnect coolant hose of upper side from thermostat case. If it is hard to disconnect it after removing clip, push to insert hose to pipe a little further in order to unstick hose from pipe and disconnect it.
8) Remove degassing tank cap (2) as follows.
   a) Turn cap 90° counterclockwise slowly.
   b) Wait till any pressure is released, then continue turning it counterclockwise.
9) Pour coolant (50/50 mixture of good quality ethylene glycol antifreeze and water) to degassing tank up to "FULL" mark (3). Put a shop cloth under disconnected hose end so that coolant is not spilled on engine and floor because a small amount of air bubbles and/or coolant may come out of it.
10) Connect hose to thermostat case.
11) Run engine, with degassing tank cap (2) removed, until radiator inlet hose is hot.
12) With engine idling, add coolant to degassing tank (1) until level reaches "FULL" mark (3).
    Install degassing tank cap (2) turning it clockwise up to stop.

Water Pump / Generator Drive Belt Tension Inspection

WARNING:
To help avoid danger of being burned, do not remove degassing tank cap while engine and radiator are still hot. Scalding fluid and steam can be blown out under pressure if cap is taken off too soon.



1) Disconnect negative (–) cable at battery.
2) Inspect drive belt (1) for tension, cracks, cuts, deformation, wear and cleanliness. If any defect exists, replace drive belt referring to "Water Pump / Generator Drive Belt Removal and Installation" in this section.
3) Connect negative (–) cable at battery.



6) Remove magnet clutch pulley (2).

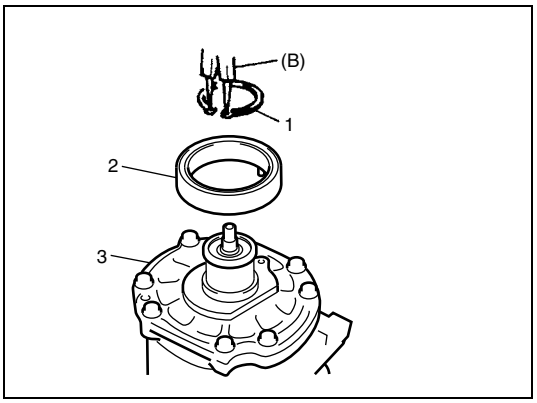
NOTE:

If it is difficult to remove magnet clutch pulley by hand, use puller (1).

CAUTION:

When using puller, turn the center bolt of puller by hand. Otherwise, magnet clutch pulley might be distorted.

7) Disconnect magnet clutch lead wire coupler and removal magnet clutch lead wire clamp.

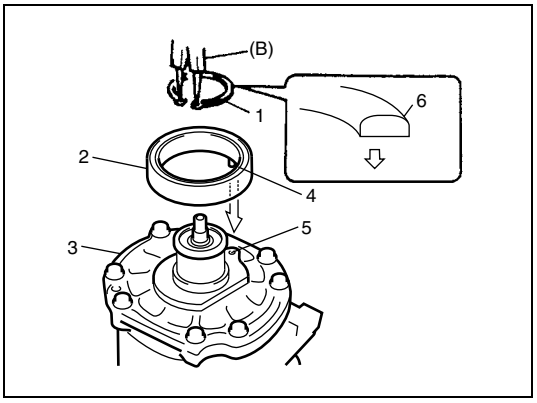


8) Remove circlip (1) by using special tool.

Special tool
(B):09900–06107

9) Remove magnet clutch coil (2) from compressor (3).

INSTALLATION

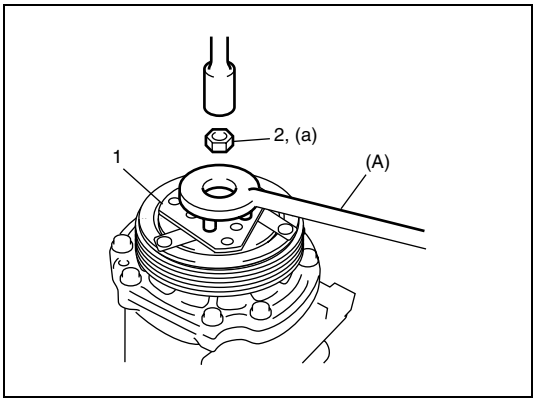


1) Install magnet clutch coil (2) fitting protrusion (4) of magnet clutch coil into hole (5) of compressor case (3).
2) Install circlip (1) directing chamfer side (6) upward.

Special tool
(B):09900–06107

3) Connect magnet clutch lead wire coupler and install magnet clutch lead wire clamp.

4) Install magnet clutch pulley (1) and circlip.

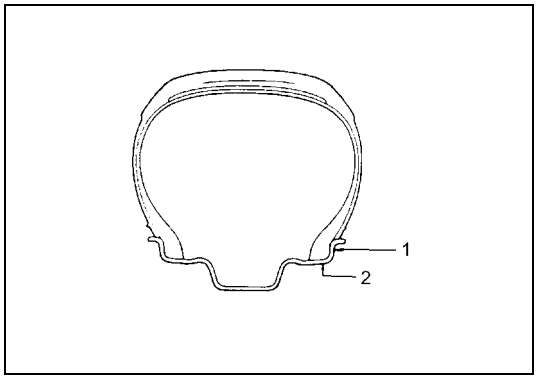


5) Tighten new armature plate nut (2) as specified below.

Tightening t que
Clutch plate nut (a): 16 N·m (1.6 kg-m, 11.5 lb-ft)

Special tool
(A): 09920-55810

How to measure wheel run-out



To measure the wheel run-out, it is necessary to use an accurate dial indicator. The tire may be on or off the wheel. The wheel should be installed to the wheel balancer of the like for proper measurement.
Take measurements of both lateral run-out (1) and radial run-out (2) at both inside and outside of the rim flange. With the dial indicator set in place securely, turn the wheel one full revolution slowly and record every reading of the indicator.

NOTE:

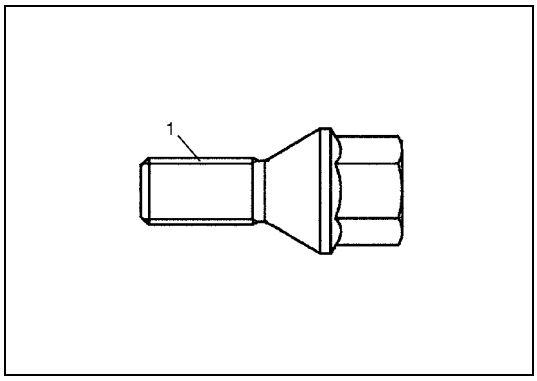
Total indicator reading ignore indicator "JUMP" due to weld seams, paint runs, scratches, etc.

When the measured run-out exceeds the specification and correction by the balancer adjustment is impossible, replace the wheel.If the reading is affected by welding, paint or scratch, it should be ignored.

Run-out limit

Radial run-out limit	Lateral run-out limit
2.0 mm (0.078 in.)	2.0 mm (0.078 in.)

Wheel Bolts

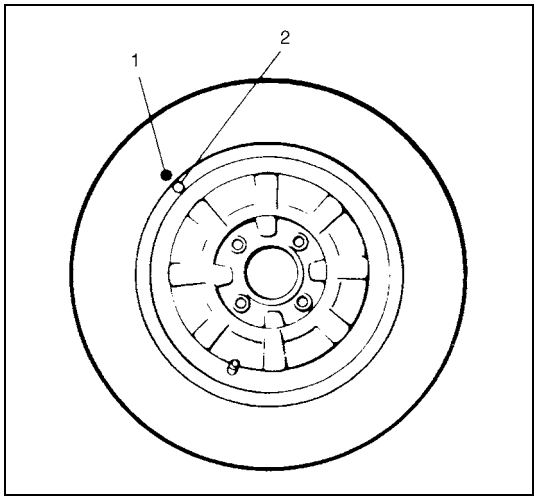


All models use metric lug wheel bolts.

Metric lug bolt size

(1): M12 x 1.5

Matched Tires and Wheels

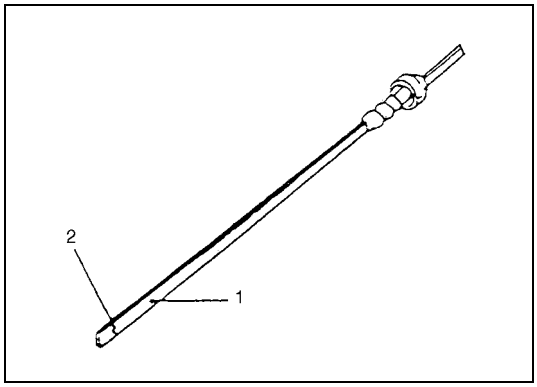


Tires and wheels are match-mounted at the assembly plant.
This means that the radially stiffest part of the tire, or "high spot", is matched to the smallest radius or "low spot" of the wheel.
This is done to provide the smoothest possible ride.
The "high spot" of the tire is originally marked by paint dot (1) on the outboard sidewall. This paint dot will eventually be washed off the tire. The "low spot" of the wheel is originally marked by paint dot (2) on the wheel rim-flange. Properly assembled, the wheel rims' paint dot should be aligned with the tires' paint dot as shown in left figure.
Whenever a tire is dismounted from its wheel, it should be remounted so that the tire and wheel are matched. If the tire's paint dot cannot be located, a line should be scribed on the tire and wheel before dismounting to assure that it is remounted in the same position.

Oil Pressure Check

NOTE:

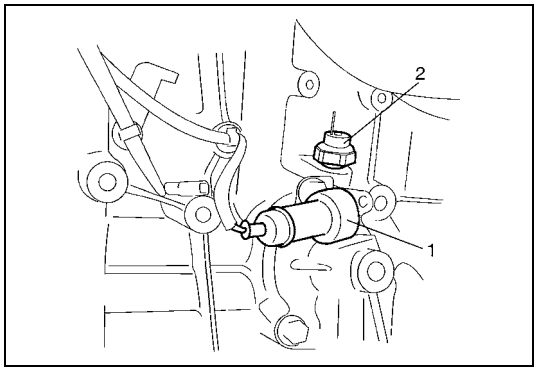
Prior to checking oil pressure, check the following items.



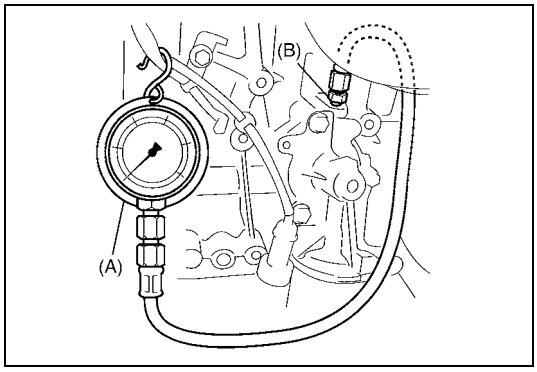
- Oil level in oil pan
  If oil level is low, add oil up to Full level mark (hole) on oil level gauge.
- Oil quality
  If oil is discolored or deteriorated, change it.
  For particular oil to be used, refer to “Engine Oil and Oil Filter Replacement” in Section 0B.

1.	Full level mark (hole)
2.	Low level mark (hole)

- Oil leaks
  If leak is found, repair it.



1) Disconnect oil pressure switch coupler (1).
2) Remove exhaust manifold cover, if necessary.
3) Remove oil pressure switch (2) from cylinder block.



4) Install special tools (Oil pressure gauge) to threaded hole of oil pressure switch.

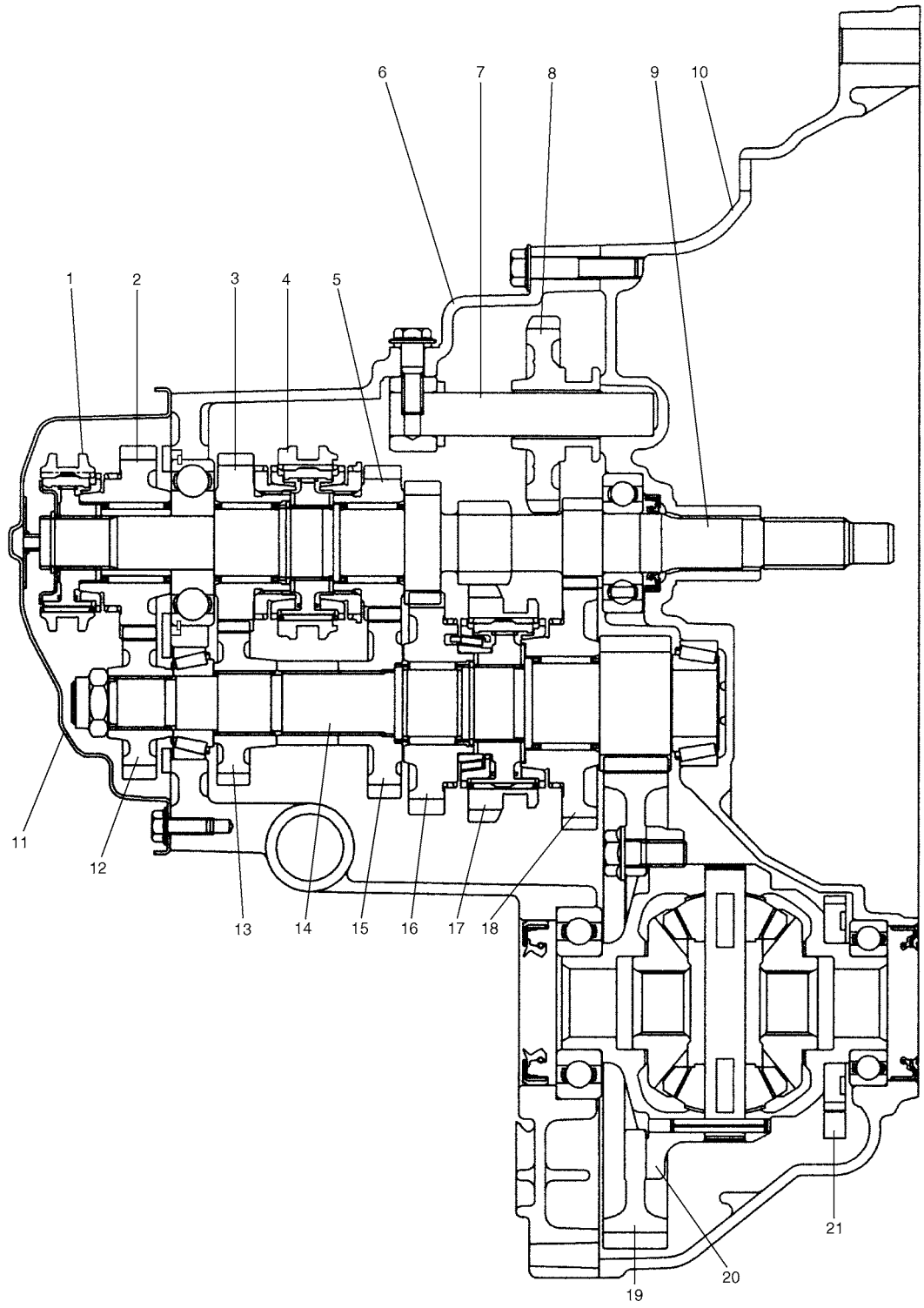
Special tool
(A) : 09915-77310
(B) : 09915-78211

5) Start engine and warm it up to normal operating temperature.

NOTE:

Be sure to place transaxle gear shift lever in “Neutral” (shift selector lever to “P” range for A/T model), and set parking brake and block drive wheels.

Transaxle for 2WD Model



1. 5th speed sleeve & hub	8. Reverse idler gear	15. Countershaft 3rd gear
2. Input shaft 5th gear	9. Input shaft	16. Countershaft 2nd gear
3. Input shaft 4th gear	10. Right case	17. Low speed sleeve & hub
4. High speed sleeve & hub	11. Side cover	18. Countershaft 1st gear
5. Input shaft 3rd gear	12. Countershaft 5th gear	19. Final gear
6. Left case	13. Countershaft 4th gear	20. Differential case
7. Reverse gear shaft	14. Countershaft	21. Vehicle speed sensor