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# **PERIODIC MAINTENANCE SERVICES**

## GENERAL DESCRIPTION

PERIODIC MAINTENANCE SERVICES

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### 1. General Description

#### A: GENERAL

Be sure to perform periodic maintenance in order to maintain vehicle performance and find problems before they become serious.

# SCHEDULE

## PERIODIC MAINTENANCE SERVICES

## 2. Schedule

### A: MAINTENANCE SCHEDULE 1

		MAINTENANCE INTERVAL																	Remarks
		[Number of months or km (miles), whichever occurs first]																	
		3	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120	
Months	4.8	12	24	36	48	60	72	81.4	96	108	120	132	144	156	168	180	192		
× 1,000 km	3	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120		
× 1,000 miles	3	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	82.5	90	97.5	105	112.5	120		
1	Engine oil	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
2	Engine oil filter	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
3	Spark plugs					R				R				R				R	
										R								R	
4	Drive belt(s)					I				I				I			R		
5	Camshaft Drive belt					I				I				I			R		
6	Fuel line					(I)				(I)				(I)				I	
7	Fuel filter					(R)				(R)				(R)				R	
										(R)								R	
8	Air cleaner element					R				R				R				R	
9	Cooling system					I				I				I				I	
10	Coolant					R				R				R				R	
11	Clutch system			I		I		I		I		I		I		I		I	
12	Transmission oil					I				I				I				I	
13	ATF					I				I				I				I	
14	Front & rear differential oil					I				I				I				I	
15	Brake line			I		I		I		I		I		I		I		I	
16	Brake fluid					R				R				R				R	
17	Disc brake pads & discs			I		I		I		I		I		I		I		I	
18	Parking brake			I		I		I		I		I		I		I		I	
19	Suspension			I		I		I		I		I		I		I		I	
20	Wheel bearing									(I)								(I)	
21	Axle boots & joints			I		I		I		I		I		I		I		I	
22	Tire rotation		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	
23	Steering system (Power steering)			I		I		I		I		I		I		I		I	
24	Supplement restraint system	Inspect every 10 years																	

Symbols used:

R: Replace

I: Inspection

(R) or (I): Recommended service for safe vehicle operation.

NOTE:

(1) This inspection is not required to maintain emission warranty eligibility and it does not affect the manufacturer's obligations under EPA's in-use compliance program.

(2) When the vehicle is used in extremely dusty conditions, the air cleaner element should be replaced more often.

(3) ATF filter is maintenance free part. ATF filter needs replacement, when it has physically damaged or ATF leaked.

(4) A tire should be replaced when the tread wear indicator appears as a solid band across the tread. The indicators appear when the remaining tread has been worn to 1.6 mm (0.063 in) or less.

# SCHEDULE

## PERIODIC MAINTENANCE SERVICES

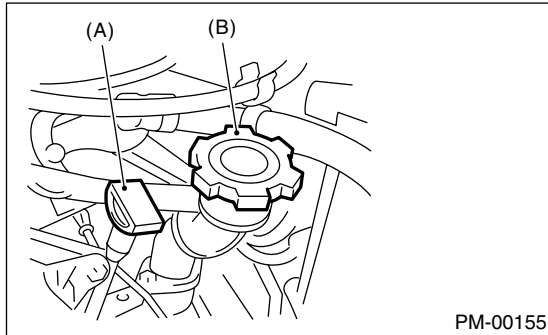
### B: MAINTENANCE SCHEDULE 2

Item	Every	Repeat short distance drive	Repeat rough/muddy road drive	Extremely cold weather area	Salt or other corrosive used or coastal area	High humidity or mountain area	Repeat towing trailer
Engine oil	3.75 months	R		R			R
	6,000 km						
	3,750 miles						
Engine oil filter	3.75 months	R		R			R
	6,000 km						
	3,750 miles						
Fuel filter	7.5 months				I		
	12,000 km						
	7,500 miles						
Fuel line	7.5 months				I		
	12,000 km						
	7,500 miles						
Transmission oil	15 months						R
	24,000 km						
	15,000 miles						
ATF	15 months						R
	24,000 km						
	15,000 miles						
Front & rear differential oil	15 months						R
	24,000 km						
	15,000 miles						
Brake line	7.5 months				I		
	12,000 km						
	7,500 miles						
Brake fluid	15 months					R	
	24,000 km						
	15,000 miles						
Disc brake pads & discs	7.5 months	I	I		I		I
	12,000 km						
	7,500 miles						
Parking brake	7.5 months				I		
	12,000 km						
	7,500 miles						
Suspension	7.5 months		I	I	I		
	12,000 km						
	7,500 miles						
Axle boots & joints	7.5 months	I	I		I		I
	12,000 km						
	7,500 miles						
Steering system (Power steering)	7.5 months		I	I	I		
	12,000 km						
	7,500 miles						

### 3. Engine Oil

#### A: REPLACEMENT

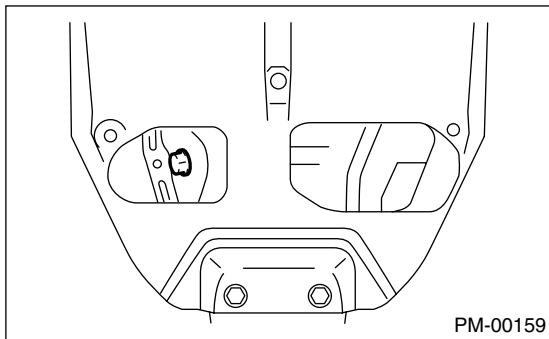
1) Open the engine oil filler cap for quick draining of the engine oil.



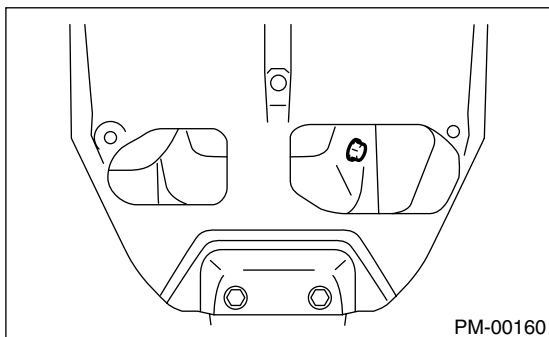
- (A) Oil level gauge
- (B) Oil filler cap

2) Drain the engine oil by loosening engine oil drain plug.

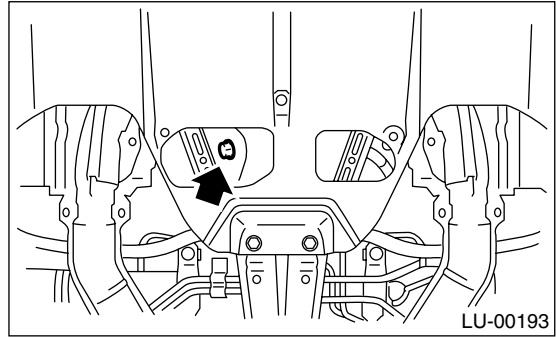
- TURBO MODEL



- STi MODEL



- NON-TURBO MODEL



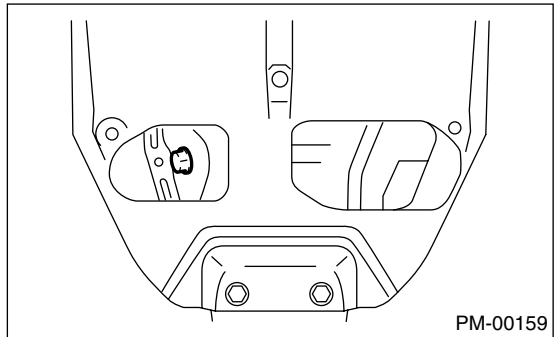
3) Replace the drain plug gasket.

4) Tighten the engine oil drain plug after draining engine oil.

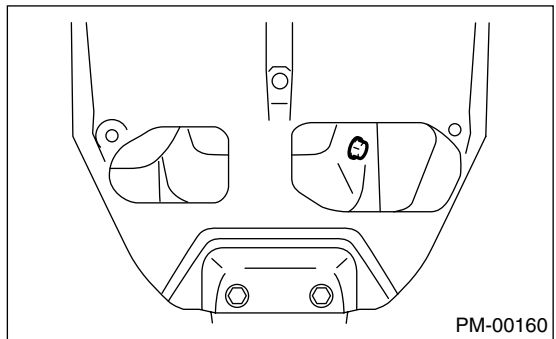
**Tightening torque:**

**44 N·m (4.5 kgf·m, 33 ft·lb)**

- TURBO MODEL



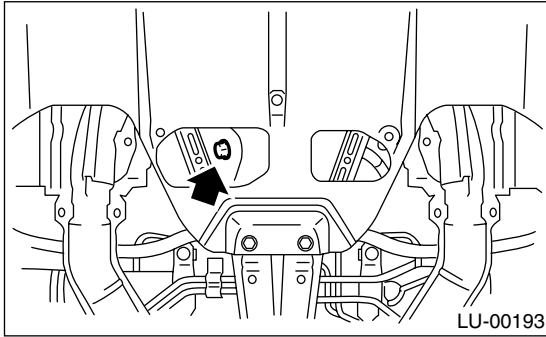
- STi MODEL



# ENGINE OIL

## PERIODIC MAINTENANCE SERVICES

### • NON-TURBO MODEL



5) Fill engine oil through the filler pipe up to center between upper level and lower level. Make sure that the vehicle is placed level when checking oil level. Use engine oil of proper quality and viscosity, selected in accordance with the table in figure.

#### Recommended oil

##### API classification

**SL with the words “Energy Conserving or Energy conserving II” or New API mark displayed on the container (If it is impossible to get SL grade, you may use SJ grade.)**

##### ILSAC classification

**GF-3**

#### Engine oil capacity

##### Non-turbo model (Upper level):

**Approx. 4.0 ℓ (4.2 US qt, 3.5 Imp qt)**

##### Non-turbo model (Lower level):

**Approx. 3.0 ℓ (3.2 US qt, 2.6 Imp qt)**

##### Turbo model (Upper level):

**Approx. 4.5 ℓ (4.8 US qt, 4.0 Imp qt)**

##### Turbo model (Lower level):

**Approx. 3.5 ℓ (3.7 US qt, 3.1 Imp qt)**

SAE (1)	
(°C)	-30 -20 -15 0 15 30 40
(°F)	-22 -4 5 32 59 86 104
	10W-30, 10W-40
	5W-30, 0W-20 (2)

LU-00071

(1) Viscosity No. and applicable temperature

(2) Preferred

The proper viscosity helps vehicle get good cold and hot starting by reducing viscous friction and thus increasing cranking speed.

#### NOTE:

- When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API classification and SAE viscosity No. designated by SUBARU.

- If vehicle is used in desert areas with very high temperatures or for other heavy duty applications, the following viscosity oils may be used:

API classification: SL or SJ.

ILSAC classification: GF-3.

SAE Viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50

6) Close the engine oil filler cap.

7) Start the engine and warm it up for a time.

8) After the engine stops, recheck the oil level. <Ref. to PM-6, INSPECTION, Engine Oil.>

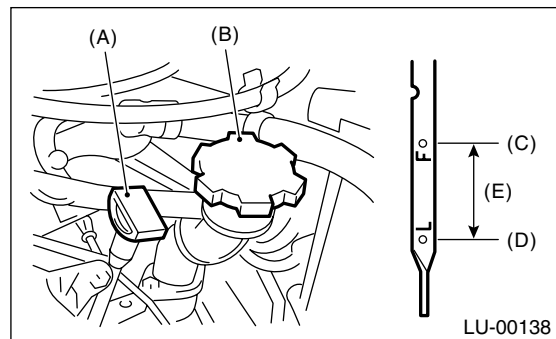
### B: INSPECTION

1) Park the vehicle on a level surface.

2) Remove the oil level gauge and wipe it clean.

3) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.

4) Remove it again and note the reading. If the engine oil level is below the “L” line, add oil to bring the level up to the “F” line.



(A) Oil level gauge

(B) Oil filler cap

(C) Upper level

(D) Lower level

(E) Approx. 1 ℓ (1.1 Us qt, 0.9 Imp qt)

5) After turning off the engine, wait a few minutes for the oil to drain back into oil pan before checking the level.

6) Just after driving or while the engine is warm, engine oil level may show in the range between the “F” line and the notch mark. This is caused by thermal expansion of the engine oil.

7) To prevent overfilling the engine oil, do not add oil above the “F” line when the engine is cold.

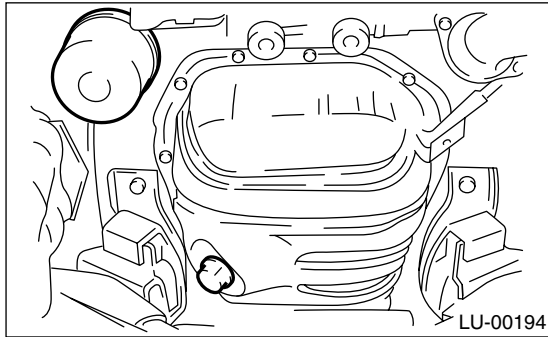
## 4. Engine Oil Filter

### A: REPLACEMENT

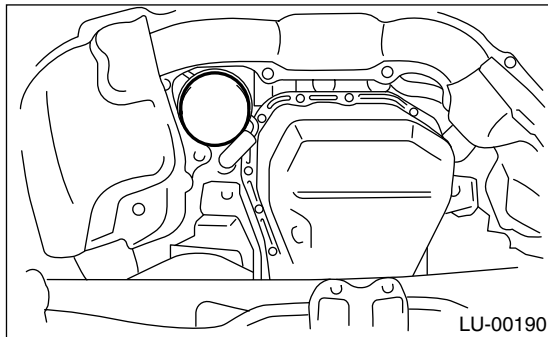
- 1) Remove the under cover.
- 2) Remove the oil filter with ST.

ST 498547000 OIL FILTER WRENCH

- NON-TURBO MODEL



- TURBO MODEL



- 3) Get a new oil filter and apply a thin coat of engine oil to the seal rubber.
- 4) Install the oil filter by turning it by hand, being careful not to damage the seal rubber.
- 5) Tighten more (approx. 2/3 to 3/4 turn) after the seal rubber contacts the cylinder block. Do not tighten excessively, or oil may leak.
- 6) After installing the oil filter, run the engine and make sure that no oil is leaking around seal rubber.

**NOTE:**

The filter element and filter case are permanently joined; therefore, interior cleaning is not necessary.

- 7) Check the engine oil level. <Ref. to PM-6, INSPECTION, Engine Oil.>

# SPARK PLUGS

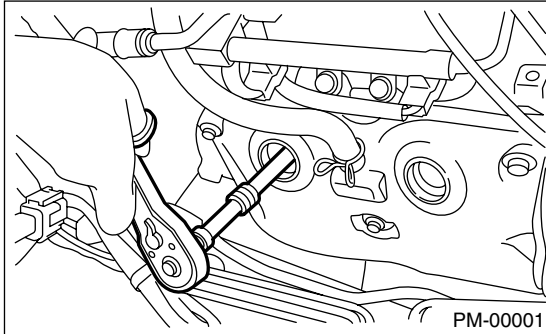
## PERIODIC MAINTENANCE SERVICES

### 5. Spark Plugs

#### A: REPLACEMENT

##### 1. SOHC MODEL

- 1) Remove the intake duct and intake chamber.
- 2) Remove the washer tank and put it aside.
- 3) Disconnect the spark plug cord.
- 4) Remove the spark plug with a plug-wrench.



- 5) Set the new spark plugs.

##### **Recommended spark plug:**

**CHAMPION: RC10YC4 (Standard)**

**NGK: BKR5E-11 (Alternate)**

**NGK: BKR6E-11 (Alternate)**

- 6) Tighten the spark plug lightly with hand, and then secure with a plug-wrench to the specified torque.

##### **Tightening torque:**

**21 N-m (2.1 kgf-m, 15.2 ft-lb)**

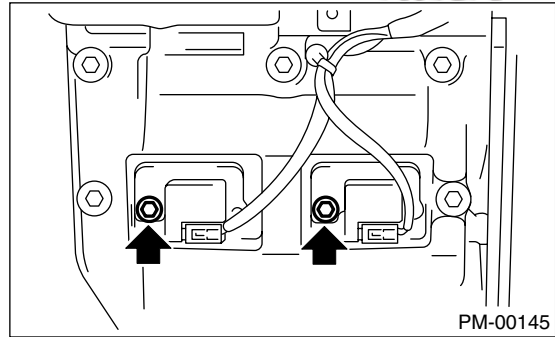
##### NOTE:

- Be sure to place the gasket between the cylinder head and spark plug.
- If a torque wrench is not available, tighten the spark plug until gasket contacts cylinder head; then tighten further 1/4 to 1/2 turns.

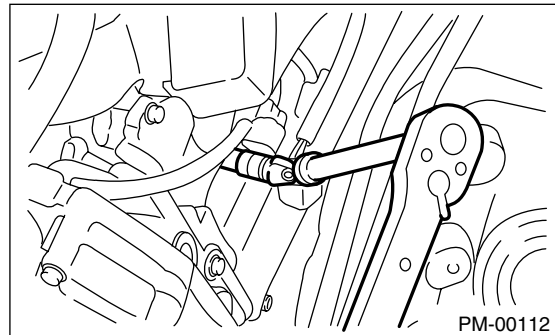
##### 2. DOHC MODEL

- 1) Disconnect the battery cables, and then remove the battery and battery carrier.
- 2) Remove the washer tank and put it aside.
- 3) Remove the air cleaner lower case.
- 4) Disconnect the connector from ignition coil.

- 5) Remove the ignition coil.



- 6) Remove the spark plug with a spark plug socket.



- 7) Set new spark plugs.

##### **Recommended spark plug:**

**2.0 L Turbo model**

**NGK: PFR6G**

**STi model**

**NGK: ILFR6B**

- 8) Tighten the spark plug lightly with hand, and then secure with a plug-wrench to the specified torque.

##### **Tightening torque:**

**21 N-m (2.1 kgf-m, 15.2 ft-lb)**

- 9) Tighten the ignition coil.

##### **Tightening torque:**

**16 N-m (1.6 kgf-m, 11.7 ft-lb)**

##### NOTE:

- Be sure to place the gasket between the cylinder head and spark plug.
- If a torque wrench is not available, tighten the spark plug until gasket contacts cylinder head: then tighten further 1/4 to 1/2 turns.



## 6. V-belt

### A: INSPECTION

#### 1. WITHOUT USING BELT TENSION GAUGE

- 1) Replace the belts, if cracks, fraying or wear is found.
- 2) Check the V-belt tension and adjust it if necessary by changing the generator installing position and/or idler pulley installing position. <Ref. to PM-9, REPLACEMENT, V-belt.>

#### Belt tension

(A)

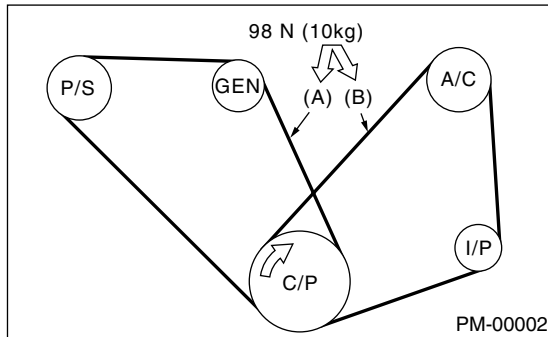
**Replaced: 7 — 9 mm (0.276 — 0.354 in)**

**Reused: 9 — 11 mm (0.354 — 0.433 in)**

(B)

**Replaced: 7.5 — 8.5 mm (0.295 — 0.335 in)**

**Reused: 9.0 — 10.0 mm (0.354 — 0.394 in)**



- (A) Front side belt
- (B) Rear side belt
- C/P Crankshaft pulley
- GEN Generator
- P/S Power steering oil pump pulley
- A/C Air conditioning compressor pulley
- I/P Idler pulley

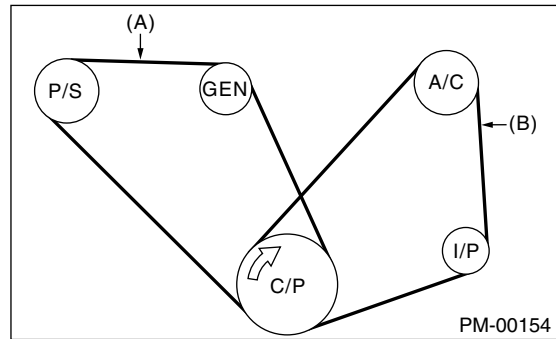
#### 2. WITH USING BELT TENSION GAUGE

- 1) Replace the belts, if cracks, fraying or wear is found.
- 2) Remove the V-belt cover and radiator reservoir tank.
- 3) Check the belt tension using belt tension gauge. And adjust it if necessary by changing the generator installing position and/or idler pulley installing position.

#### Belt tension

(A) 490 — 640 N (50 — 65 kgf, 110 — 144 lb)

(B) 350 — 450 N (36 — 46 kgf, 79 — 101 lb)



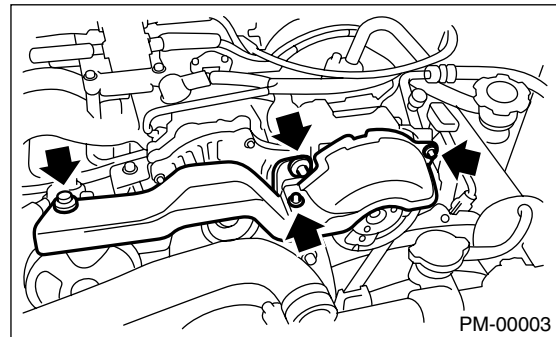
- (A) Front side belt
- (B) Rear side belt
- C/P Crank pulley
- GEN Generator
- P/S Power steering oil pump pulley
- A/C A/C compressor pulley
- I/P Idler pulley

### B: REPLACEMENT

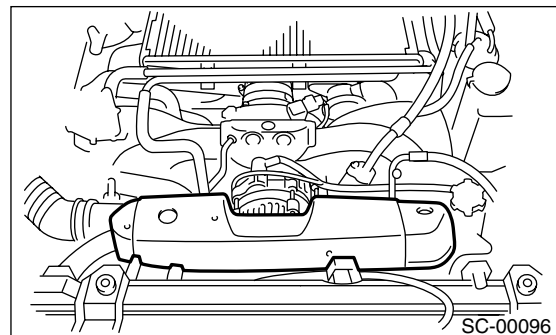
#### 1. V-BELT COVER

Remove the V-belt cover.

NON-TURBO MODEL



TURBO MODEL



## V-BELT

### PERIODIC MAINTENANCE SERVICES

#### 2. FRONT SIDE BELT (DRIVING POWER STEERING OIL PUMP AND GENERATOR)

##### NOTE:

Wipe off any oil or water on the belt and pulley.

- 1) Loosen the lock bolt (A).
- 2) Loosen the slider bolt (B).
- 3) Remove the front side belt (C).
- 4) Install a new belt, and tighten the slider bolt so as to obtain the specified belt tension.
- 5) Tighten the lock bolt (A).
- 6) Tighten the slider bolt (B).

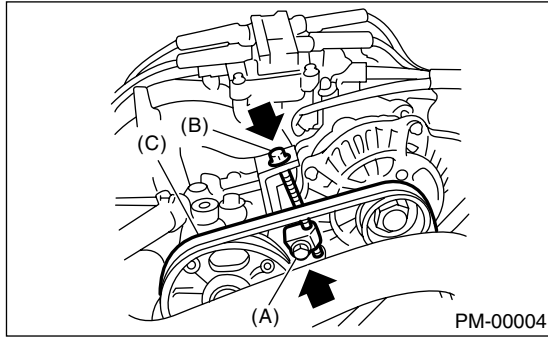
##### Tightening torque:

###### Lock bolt:

**25 N·m (2.5 kgf-m, 18 ft-lb)**

###### Slider bolt:

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**



- 7) Idle the engine for approx. 5 min. to normalize the V-belt. (With using tension gauge)
- 8) Stop the engine, and then check the belt tension and adjust it. (With using tension gauge)
- 9) Idle the engine for approx. 1 min. to normalize the V-belt. (With using tension gauge)
- 10) Stop the engine, and then check the belt tension is within specified value. (With using tension gauge)
- 11) Adjust the belt tension until the value within specification. (With using tension gauge)

#### 3. REAR SIDE BELT (DRIVING AIR CONDITIONER)

##### NOTE:

Wipe off any oil or water on the belt and pulley.

- 1) Remove the front side belt.
- 2) Loosen the lock nut (A).
- 3) Loosen the slider bolt (B).
- 4) Remove the rear side belt.
- 5) Install a new belt, and tighten the slider bolt so as to obtain the specified belt tension.
- 6) Tighten the lock nut (A).

- 7) Install the front side belt.

Non-turbo model

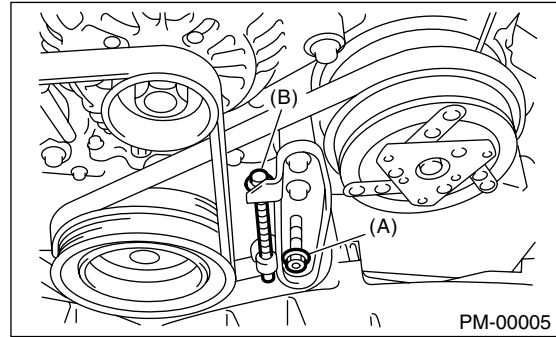
<Ref. to ME(H4SO)-40, FRONT SIDE BELT, INSTALLATION, V-belt.>

Turbo model

<Ref. to ME(H4DOTC)-41, FRONT SIDE BELT, INSTALLATION, V-belt.>

##### Tightening torque:

**23 N·m (2.3 kgf-m, 17.0 ft-lb)**



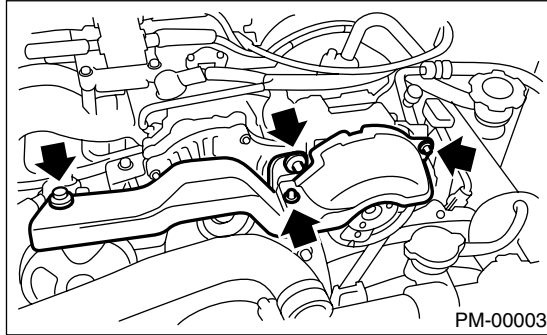
- 8) Idle the engine for approx. 5 min. to normalize the V-belt. (With using tension gauge)
- 9) Stop the engine, and then check the belt tension and adjust it. (With using tension gauge)
- 10) Idle the engine for approx. 1 min. to normalize the V-belt. (With using tension gauge)
- 11) Stop the engine, and then check the belt tension is within specified value. (With using tension gauge)
- 12) Adjust the belt tension until the value within specification. (With using tension gauge)

## 7. Timing Belt

### A: REPLACEMENT

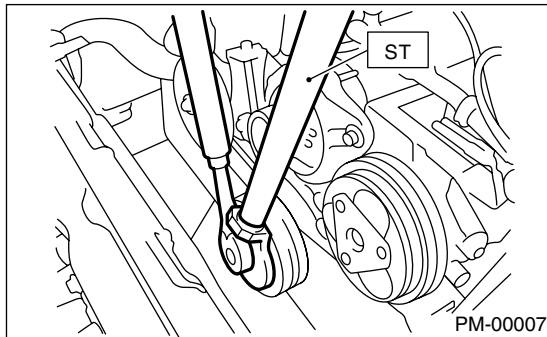
#### 1. SOHC MODEL

- 1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4SO)-22, Radiator Main Fan and Fan Motor.>, <Ref. to CO(H4SO)-23, Radiator Sub Fan and Fan Motor.>
- 2) Shield the radiator from any damage using cardboard and blanket.
- 3) Remove the V-belt cover.



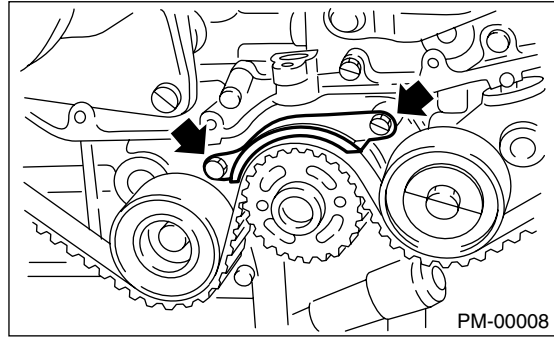
- 4) Remove the V-belts. <Ref. to ME(H4SO)-40, V-belt.>
- 5) Remove the air conditioning compressor drive belt tensioner.
- 6) To lock the crankshaft, use ST. Remove the pulley bolt.

ST 499977100 CRANKSHAFT PULLEY WRENCH

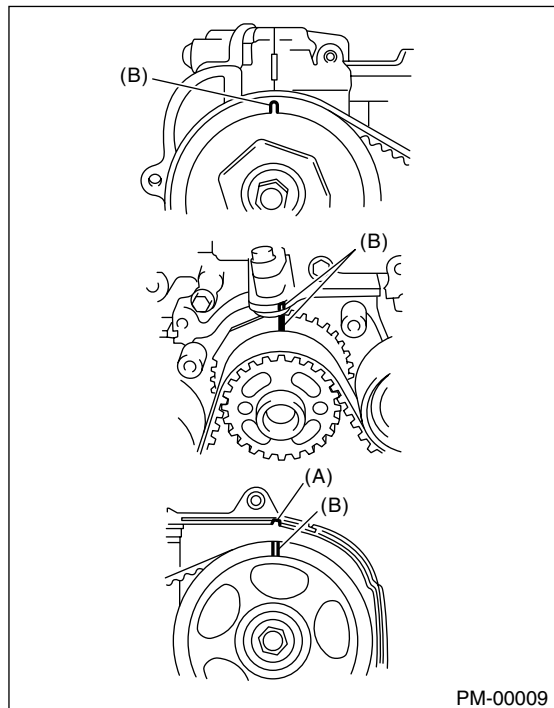


- 7) Remove the crankshaft pulley.
- 8) Remove the left side belt cover.
- 9) Remove the front timing belt cover.

- 10) Remove the timing belt guide. (MT model)

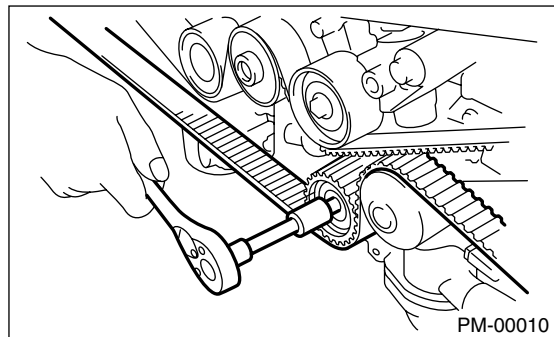


- 11) Turn the crankshaft and align alignment marks on crankshaft, and right and left camshaft sprockets with notches of belt cover and cylinder block. ST 499987500 CRANKSHAFT SOCKET



- (A) Notch  
(B) Alignment mark

- 12) Remove the belt idler.
- 13) Remove the belt idler (No. 2).

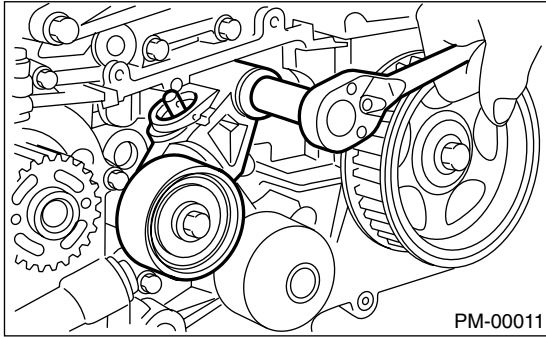


- 14) Remove the timing belt.

# TIMING BELT

## PERIODIC MAINTENANCE SERVICES

15) Remove the automatic belt tension adjuster assembly.



16) Install in the reverse order of removal. <Ref. to ME(H4SO)-46, INSTALLATION, Timing Belt Assembly.>

## 2. DOHC MODEL

1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4DOTC)-27, Radiator Main Fan and Fan Motor.>, <Ref. to CO(H4DOTC)-29, Radiator Sub Fan and Fan Motor.>

2) Protect the radiator with cardboard and blanket.  
3) Remove the V-belts. <Ref. to ME(H4DOTC)-41, V-belt.>

4) Remove the air conditioning compressor drive belt tensioner.

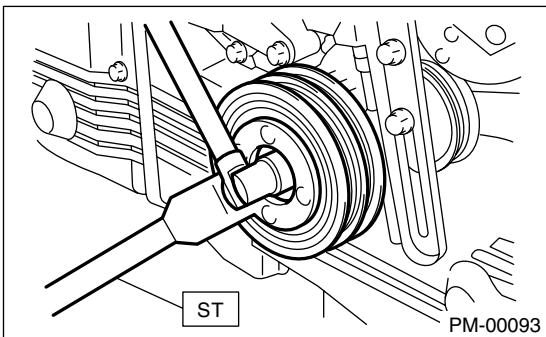
5) Remove the pulley bolt. To lock the crankshaft use ST.

Except for STi model:

ST 499977400 CRANKSHAFT PULLEY WRENCH

STi model:

ST 499977100 CRANKSHAFT PULLEY WRENCH



6) Remove the crankshaft pulley.

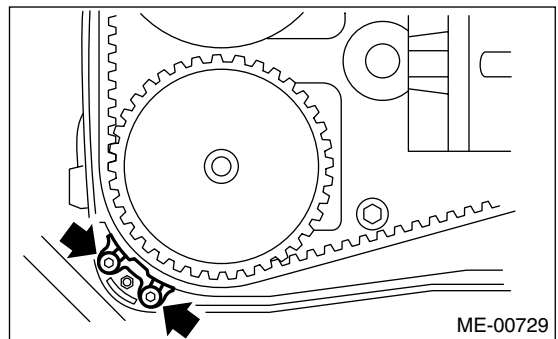
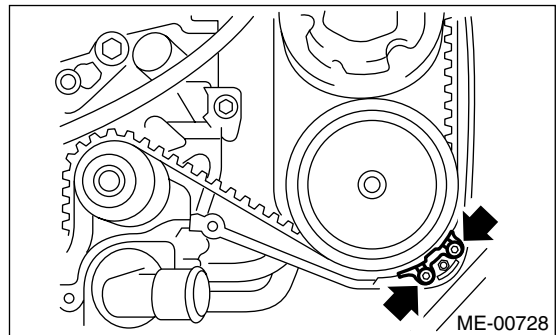
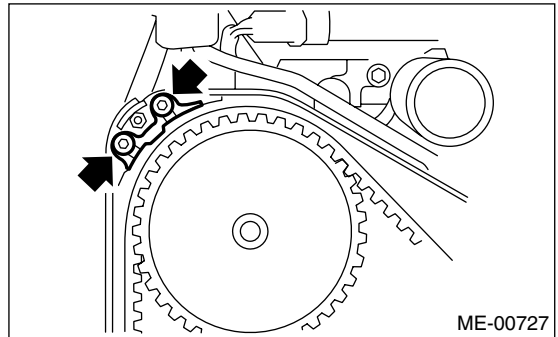
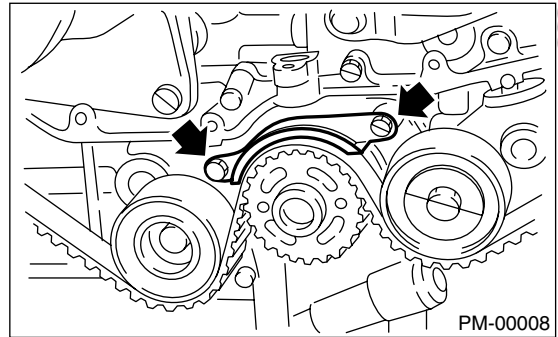
7) Remove the air conditioning compressor drive belt tensioner.

8) Remove the belt cover (LH).

9) Remove the belt cover (RH).

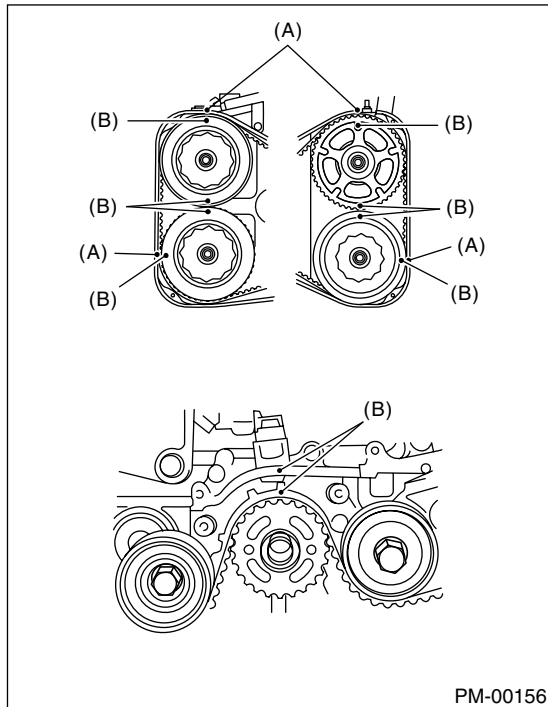
10) Remove the front belt cover.

11) Remove the timing belt guide. (MT model)



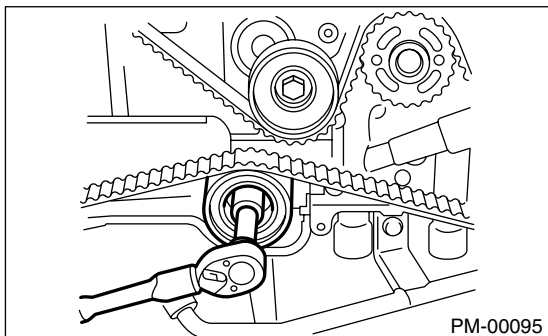
12) Turn the crankshaft and align alignment marks on crankshaft, and right and left camshaft sprockets with notches of belt cover and cylinder block. To turn the crankshaft, use ST.

ST 499987500 CRANKSHAFT SOCKET



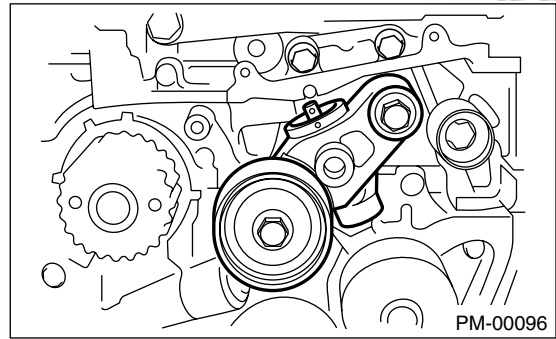
- (A) Notch
- (B) Alignment mark

13) Remove the belt idler.



14) Remove the timing belt.

15) Remove the automatic belt tension adjuster assembly.



16) Install in the reverse order of removal. <Ref. to ME(H4DOTC)-46, Timing Belt Assembly.>

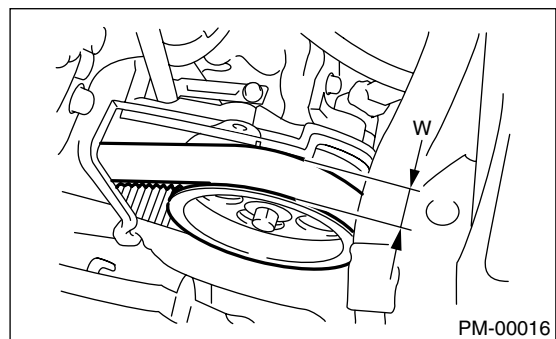
**CAUTION:**

**When installing the timing belt, be sure to align all alignment marks on the belt with corresponding marks on the sprockets. If incorrectly installed, interference between pistons and valves may occur.**

**B: INSPECTION**

**1. SOHC MODEL**

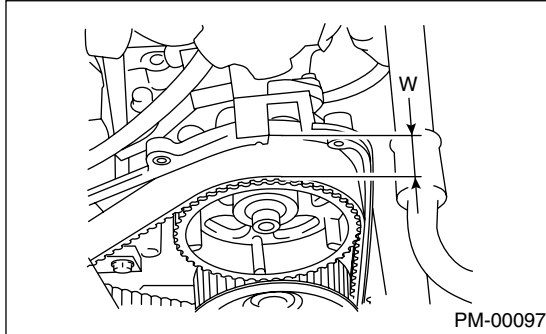
- 1) Remove the front timing belt cover and timing belt cover (LH).
- 2) While cranking the engine at least four rotations, check the timing belt back surface for cracks or damage. Replace the faulty timing belt as needed.
- 3) Measure the timing belt width W. If it is less than 27 mm (1.06 in), check idlers, tensioner, water pump pulley and cam sprocket to determine idler alignment (squareness). Replace the worn timing belt.



4) Install the front timing belt cover and timing belt cover (LH).

### 2. DOHC MODEL

- 1) Remove the timing belt cover (LH).
- 2) While cranking the engine at least four rotations, check the timing belt back surface for cracks or damage. Replace the faulty timing belt as needed.
- 3) Measure the timing belt width  $W$ . If it is less than 30 mm (1.18 in), check idlers, tensioner, water pump pulley and cam sprocket to determine idler alignment (squareness). Replace the worn timing belt.
- 4) Install the timing belt cover (LH).



## **8. Fuel Line**

### **A: INSPECTION**

The fuel line is located mostly internally, so check pipes, areas near pipes, and engine compartment piping for rust, hose damage, loose bands, etc. If faulty parts are found, repair or replace them.

Non-turbo model

<Ref. to FU(H4SO)-64, Fuel Delivery, Return and Evaporation lines.>

Turbo model

<Ref. to FU(H4DOTC)-68, Fuel Delivery, Return and Evaporation Lines.>

**9. Fuel Filter****A: REPLACEMENT**

For fuel filter replacement procedures, refer to “FU” section.

Non-turbo model

<Ref. to FU(H4SO)-61, Fuel Filter.>

Turbo model

<Ref. to FU(H4DOTC)-65, Fuel Filter.>

STi model

<Ref. to FU(STi)-60, Fuel Filter.>

**B: INSPECTION**

- 1) If it is clogged, or if replacement interval has been reached, replace it.
- 2) If water is found in it, shake and expel the water from inlet port.

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NOT FOR RESALE

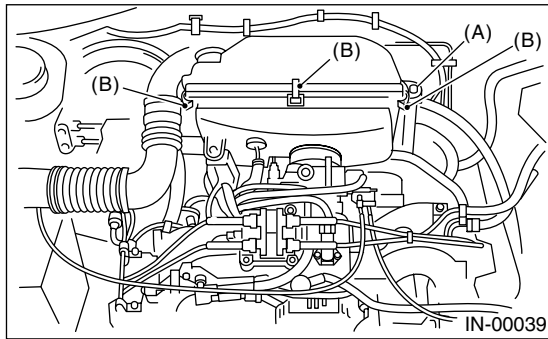


## 10. Air Cleaner Element

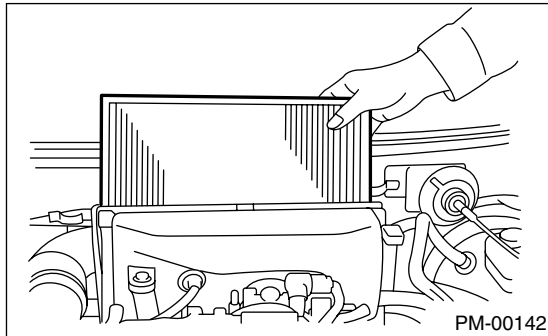
### A: REPLACEMENT

#### 1. NON-TURBO MODEL

- 1) Remove the air intake duct from air cleaner case.
- 2) Remove the bolt (A) which installs air cleaner case to stays.
- 3) Remove the clip (B) above the air cleaner case.



- 4) Remove the air cleaner.



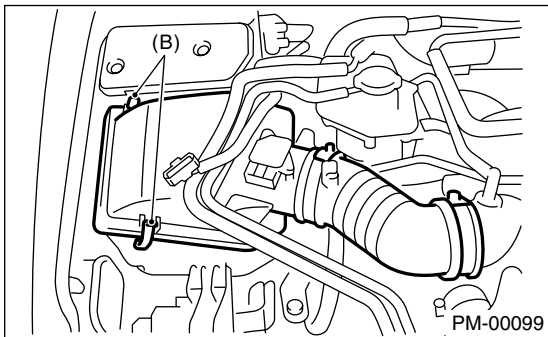
- 5) Install in the reverse order of removal.

**NOTE:**

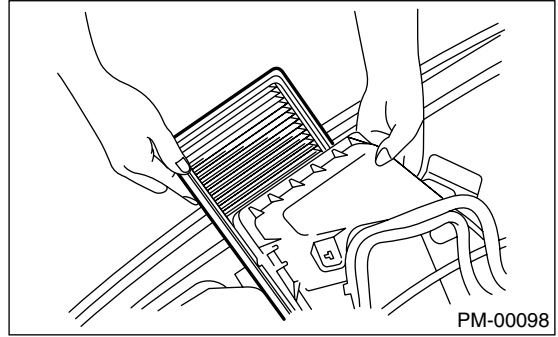
Fasten with a clip after inserting the lower tab of the case.

#### 2. TURBO MODEL

- 1) Remove the clip (B) above the air cleaner case.



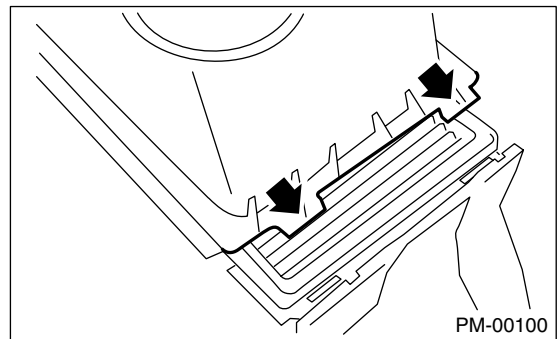
- 2) Remove the air cleaner.



- 3) Install in the reverse order of removal.

**NOTE:**

Align the protruding portion of air cleaner upper cover with holes of air cleaner lower case, then secure upper cover to case.



## 11. Cooling System

### A: INSPECTION

1) Check the radiator for leakage, filling it with coolant and attach the radiator cap tester (A) to filler neck. Then apply a pressure. Check the following points:

**Non-turbo model**

**157 kPa (1.6 kg/cm<sup>2</sup>, 23 psi)**

**Turbo model**

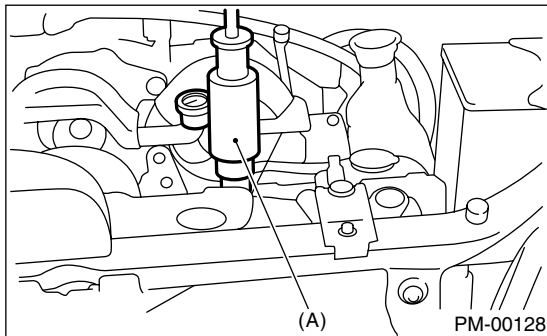
**122 kPa (1.2 kg/cm<sup>2</sup>, 18 psi)**

- Each portion of radiator for leakage
- Hose joints and other connections for leakage

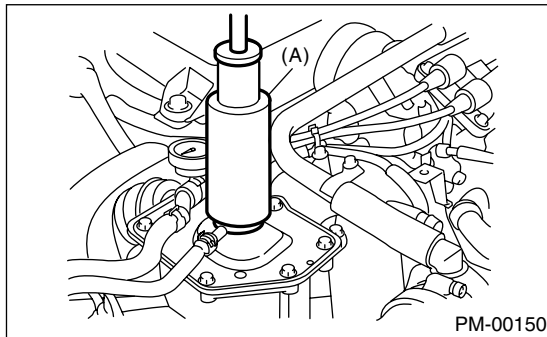
**NOTE:**

- For turbo model, be sure to install the tester to filler tank side.
- When attaching or detaching tester and when operating tester, use special care not to deform radiator filler neck.

**NON-TURBO MODEL**



**TURBO MODEL**



- When performing this check, be sure to keep the engine stationary and fill the radiator with coolant.
- Wipe off check points before applying pressure.
- Use care not to spill coolant when detaching the tester from radiator.
- Do not remove the radiator side cap. (Turbo model)

2) Check the radiator cap valve open pressure using radiator cap tester.

**NOTE:**

Rust or dirt on the cap may prevent the valve from functioning normally: be sure to clean the cap before testing.

Raise the pressure until the needle of gauge stops and see if the pressure can be retained for 5 to 6 seconds. The radiator cap is normal if a pressure above the service limit value has been maintained for this period.

**Radiator cap valve open pressure**

**Non-turbo model**

**Standard value:**

**93 — 123 kPa (0.95 — 1.25 kg/cm<sup>2</sup>, 14 — 18 psi)**

**Service limit:**

**83 kPa (0.85 kg/cm<sup>2</sup>, 12 psi)**

**Turbo model**

**Filler tank side:**

**Standard value:**

**93 — 123 kPa (0.95 — 1.25 kg/cm<sup>2</sup>, 14 — 18 psi)**

**Service limit:**

**83 kPa (0.85 kg/cm<sup>2</sup>, 12 psi)**

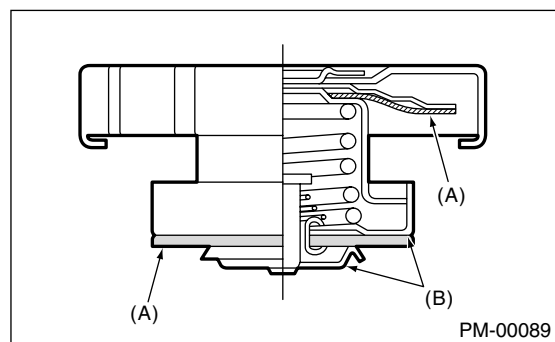
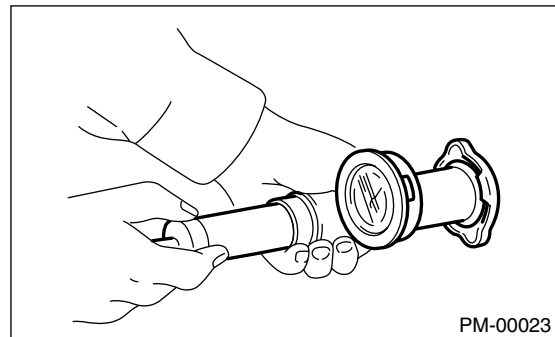
**Radiator side:**

**Standard value:**

**122 — 152 kPa (1.24 — 1.55 kg/cm<sup>2</sup>, 18 — 22 psi)**

**Service limit:**

**112 kPa (1.14 kg/cm<sup>2</sup>, 16 psi)**



(A) Deformation

(B) Deformation, damage, rust

3) Start the engine, and then check it does not overheat or it is cooled excessively. If it overheats or it is cooled excessively, check the cooling system.

Non-turbo model

<Ref. to CO(H4SO)-14, Water Pump.>

<Ref. to CO(H4SO)-17, Thermostat.>

<Ref. to CO(H4SO)-18, Radiator.>

<Ref. to CO(H4SO)-21, Radiator Cap.>

Turbo model

<Ref. to CO(H4DOTC)-19, Water Pump.>

<Ref. to CO(H4DOTC)-21, Thermostat.>

<Ref. to CO(H4DOTC)-22, Radiator.>

<Ref. to CO(H4DOTC)-26, Radiator Cap.>

4) Check the electric fan operates using Subaru Select Monitor, when the coolant temperature exceeds 95°C (203°F). If not operate, check the electric fan system.

Non-turbo model

<Ref. to CO(H4SO)-6, Radiator Main Fan System.>

<Ref. to CO(H4SO)-9, Radiator Sub Fan System.>

Turbo model

<Ref. to CO(H4DOTC)-7, Radiator Main Fan System.>

<Ref. to CO(H4DOTC)-12, Radiator Sub Fan System.>

## 12. Coolant

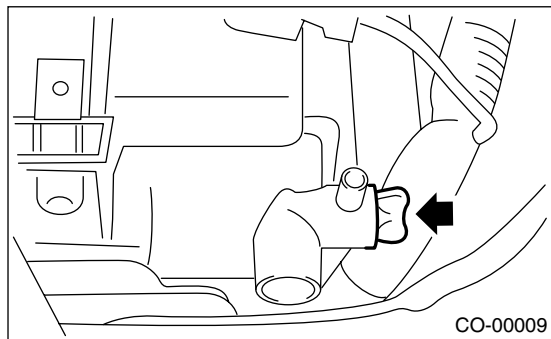
### A: REPLACEMENT

#### 1. REPLACEMENT OF COOLANT

**WARNING:**

The radiator is of the pressurized type. Do not attempt to open the radiator cap immediately after the engine has been stopped.

- 1) Lift-up the vehicle.
- 2) Remove the under cover.
- 3) Place a container under drain pipe.
- 4) Loosen and remove the drain cock to drain engine coolant into container.



- 5) For quick draining, open the radiator cap.

**NOTE:**

- In the case of turbo model, be sure to open the radiator cap of filler tank side.
- Be careful not to spill coolant on the floor.

- 6) Drain the coolant from reservoir tank.
- 7) Tighten the radiator drain cock securely after draining coolant.
- 8) Slowly pour the coolant into radiator. Pour the coolant up to air bleeder hole, and then install the cap. (Turbo model)
- 9) Pour the coolant from radiator filler port to neck of filler, then pour into reservoir tank up to "FULL" level.

**Coolant capacity (fill up to "FULL" level)**

**2.0 L Turbo AT model:**

Approx. 7.6 ℓ (8.0 US qt, 6.7 Imp qt)

**2.0 L Turbo MT model:**

Approx. 7.7 ℓ (8.1 US qt, 6.8 Imp qt)

**2.5 L AT model:**

Approx. 6.9 ℓ (7.3 US qt, 6.1 Imp qt)

**2.5 L MT model:**

Approx. 7.0 ℓ (7.4 US qt, 6.2 Imp qt)

**STi model:**

Approx. 7.7 ℓ (8.1 US qt, 6.8 Imp qt)

**NOTE:**

The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crank-

case. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.

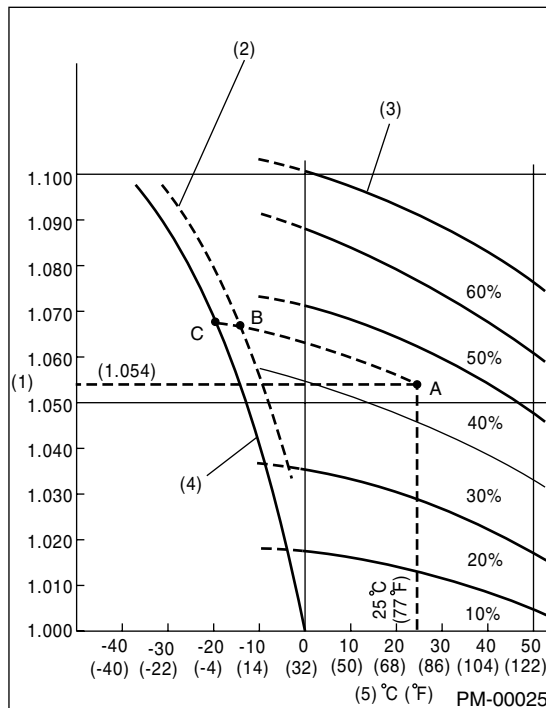
- 10) Securely install the radiator cap.
- 11) Run the engine for more than 5 minutes at 2,000 to 3,000 rpm. (Run the engine until radiator becomes hot in order to purge the air trapped in cooling system.)
- 12) Stop the engine and wait until coolant temperature lowers. Then open the radiator cap to check coolant level and add coolant up to radiator filler neck. Next, add coolant into reservoir tank up to "FULL" level.
- 13) After adding coolant, securely install the radiator and reservoir tank caps.

#### 2. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

The concentration and safe operating temperature of the SUBARU coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.

**[Example]**

If the coolant temperature is 25°C (77°F) and its specific gravity is 1.054, the concentration is 35% (point A), the safe operating temperature is -14°C (7°F) (point B), and the freezing temperature is -20°C (-4°F) (point C).



- (1) Coolant gravity
- (2) Safe operating temperature
- (3) Concentration of coolant
- (4) Freezing temperature
- (5) Coolant temperature

## 3. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

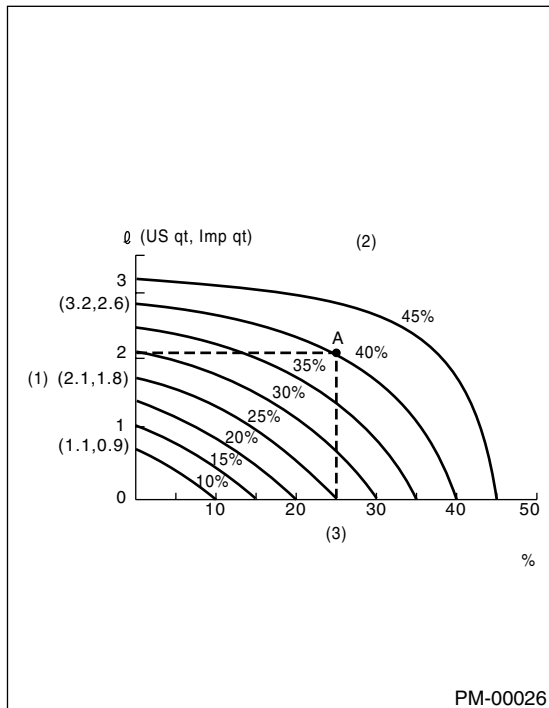
To adjust the concentration of the coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU genuine coolant (concentration 50%).

The amount of coolant that should be replaced can be determined using the diagram.

[Example]

Assume that the coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of coolant concentration intersects with the 40% curve of the necessary coolant concentration, and read the scale on the vertical axis of the graph at height A. The quantity of coolant to be drained is 2.1 ℓ (2.2 US qt, 1.8 Imp qt). Drain 2.1 ℓ (2.2 US qt, 1.8 Imp qt) of coolant from the cooling system and add 2.1 ℓ (2.2 US qt, 1.8 Imp qt) of the undiluted solution of SUBARU coolant.

If a coolant concentration of 50% is needed, drain all the coolant and refill with the undiluted solution only.



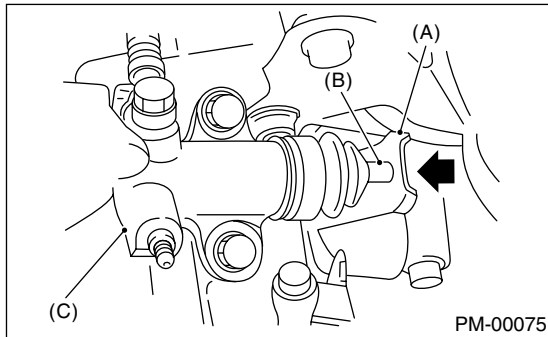
- (1) Quantity of coolant to be drained
- (2) Necessary concentration of coolant
- (3) Concentration of coolant in vehicle cooling system

## 13. Clutch System

### A: INSPECTION AND ADJUSTMENT

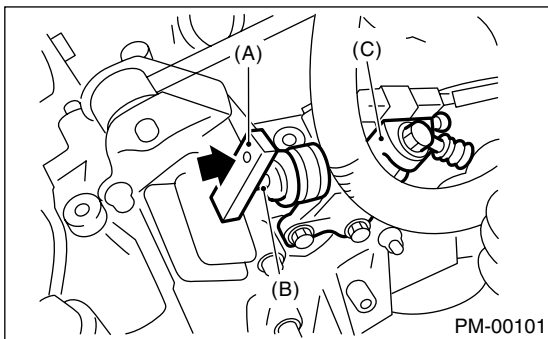
1) Push the release lever to retract the push rod of the operating cylinder and check if the fluid level in the clutch reservoir tank rises or not.

NON-TURBO MODEL



- (A) Release lever
- (B) Push rod
- (C) Operating cylinder

TURBO MODEL



- (A) Release lever
- (B) Push rod
- (C) Operating cylinder

2) If the fluid level rises, pedal free play is correct.  
 3) If the fluid level does not rise, or the push rod cannot be retracted, adjust the clutch pedal. <Ref. to CL-26, Clutch Pedal.>

4) Check the fluid level using the scale on the outside of the clutch master cylinder tank (A). If the level is below "MIN" (B), inspect the clutch master cylinder, operating cylinder and hydraulic line for fluid leaks. If fluid leaks are found, repair or replace. If fluid leaks are not found, add clutch fluid to bring it up to "MAX" (C) of clutch reservoir tank.

**Recommended clutch fluid:**

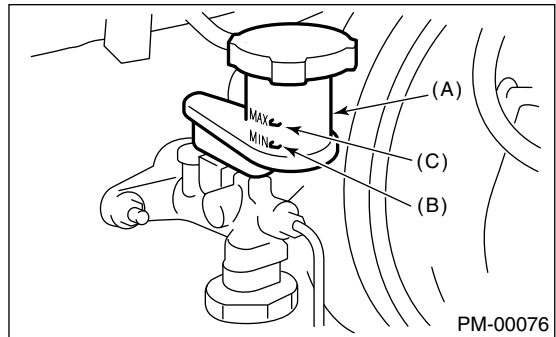
**FMVSS No. 116, fresh DOT3 or DOT4 brake fluid**

**CAUTION:**

Prevent the clutch fluid from being splashed over vehicle body. If the clutch fluid is splashed over vehicle body, flush it, and then wipe it up.

**NOTE:**

- Avoid mixing different grades of brake fluid to prevent degradation of the fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.



- (A) Reservoir tank
- (B) MIN level
- (C) MAX level

## 14. Transmission Gear Oil

### A: REPLACEMENT

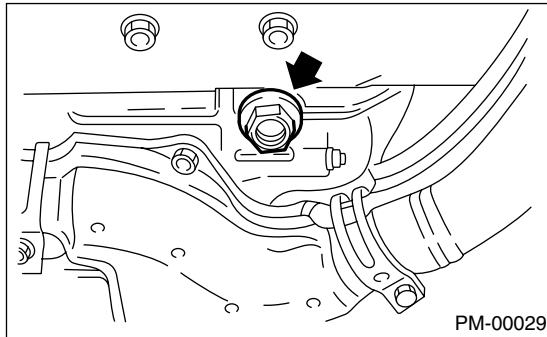
#### 1. MANUAL TRANSMISSION

1) Drain the gear oil by removing drain plug.

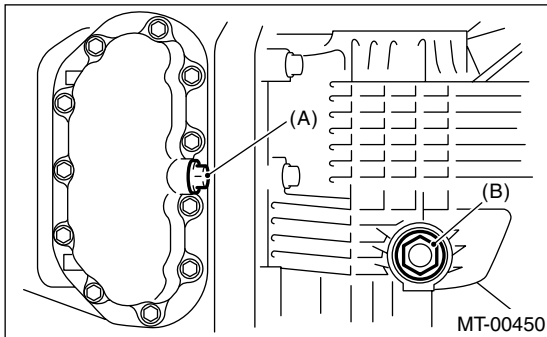
**NOTE:**

- Before starting work, cool off the transmission gear oil well.
- If transmission gear oil adheres to the exhaust pipe, wipe it off completely.

5MT



6MT



- (A) Drain plug (Oil pan side)
- (B) Drain plug (Clutch housing side)

2) Replace the gasket with new one, and then tighten it to the specified torque.

**Tightening torque:**

5MT

**70 N·m (7.1 kgf-m, 51.6 ft-lb)**

6MT (Oil pan side):

**44 N·m (4.5 kgf-m, 32.5ft-lb)**

6MT (Clutch housing side):

**70 N·m (7.1 kgf-m, 51.6 ft-lb)**

3) Fill transmission gear oil through the oil level gauge hole up to the upper point of level gauge.

**NOTE:**

Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.

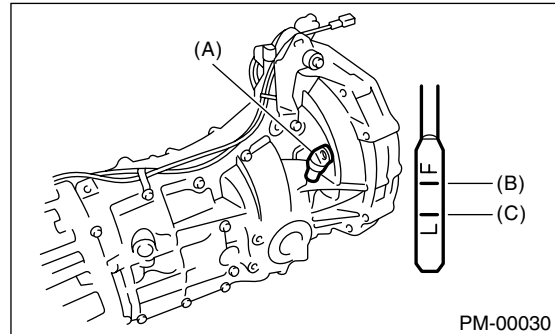
**Gear oil capacity:**

5MT model

**3.5 L (3.7 US qt, 3.1 Imp qt)**

6MT model

**4.1 L (4.3 US qt, 3.6 Imp qt)**



- (A) Oil level gauge
- (B) Upper level
- (C) Lower level

## 15. ATF

### A: INSPECTION

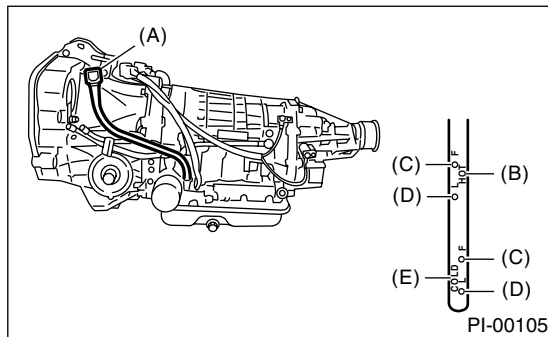
#### CAUTION:

The level of ATF varies with fluid temperature. Pay attention to the fluid temperature when checking ATF level.

1) Raise the ATF temperature by driving a distance of 5 to 10 km (3 to 6 miles). Otherwise, idle the engine to raise ATF temperature to 70 — 80°C (158 — 176°F) on Subaru Select Monitor. <Ref. to 4AT-21, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

2) Make sure the vehicle is level.

3) After selecting all positions (P, R, N, D, 3, 2, 1), set the select lever in “P” range. Measure the ATF level with the engine idling for one or two minutes.



- (A) Level gauge
- (B) Hot side
- (C) Upper level
- (D) Lower level
- (E) Cold side

4) Make sure that ATF level is above the center of upper and lower marks.

#### NOTE:

When the transmission is hot, the level should be above the center of upper and lower marks, and when it is cold, the level should be found below the center of these two marks.

5) If the ATF level is below the center between upper and lower marks, add the recommended ATF until the ATF level is found above the center between upper and lower marks.

#### CAUTION:

- Use care not to exceed the upper limit level.
- Remember that the addition of ATF to the upper limit mark when the transmission is cold will result in overfilling of ATF, causing a transmission failure.

6) Check ATF level after raising ATF temperature to 70 — 80°C (158 — 176°F) by running the vehicle or by idling the engine again.

7) Check the ATF for leaks.

Check for leaks in the transmission. If there are leaks, it is necessary to repair or replace gasket, oil seals, plugs or other parts.

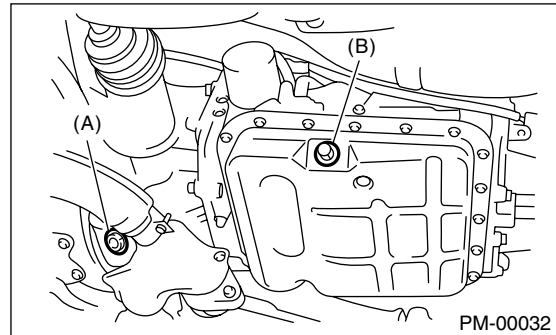
### B: REPLACEMENT

#### 1. AUTOMATIC TRANSMISSION FLUID

1) Drain the ATF (Automatic Transmission Fluid) by removing drain plug.

#### NOTE:

Before starting work, cool off the ATF well.



- (A) Front differential drain plug
- (B) ATF drain plug

2) Replace the gasket with a new one, and then tighten the specified torque.

#### Tightening torque:

**25 N·m (2.55 kgf-m, 18.4 ft-lb)**

3) Fill ATF up to the middle of the “COLD” side on level gauge by using the gauge hole.

#### Recommended fluid:

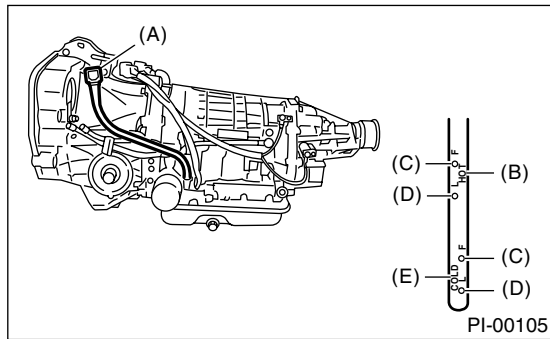
**Dexron III type automatic transmission fluid**

#### Fluid capacity:

**Fill the same amount drained from ATF drain plug hole.**



4) Check the ATF level. <Ref. to PM-24, INSPECTION, ATF.>



- (A) Level gauge
- (B) Hot side
- (C) Upper level
- (D) Lower level
- (E) Cold side

## 2. ATF FILTER

### NOTE:

ATF filter is a maintenance free part. ATF filter needs replacement, when it has physically damaged or ATF leaked.

For the replacement procedures of the ATF filter:  
<Ref. to 4AT-66, ATF Filter.>

# FRONT & REAR DIFFERENTIAL GEAR OIL

## PERIODIC MAINTENANCE SERVICES

### 16. Front & Rear Differential Gear Oil

#### A: REPLACEMENT

##### 1. FRONT DIFFERENTIAL (MT MODEL)

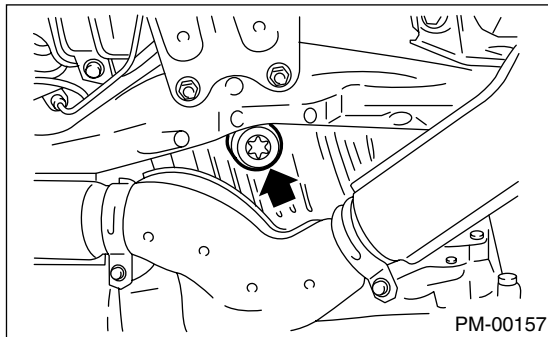
For MT vehicle, differential oil works as manual transmission oil to lubricate differential. Refer to "Transmission Oil". <Ref. to PM-23, Transmission Gear Oil.>

##### 2. FRONT DIFFERENTIAL (AT MODEL)

1) Drain the differential gear oil by removing drain plug using TORX®.

#### NOTE:

- Before starting work, cool off the differential gear oil well.
- If front differential gear oil adheres to the exhaust pipe, wipe it off completely.



2) Replace the gasket with a new one, and then tighten the drain plug to specified torque.

#### Tightening torque:

**44 N·m (4.5 kgf·m, 32.5 ft·lb)**

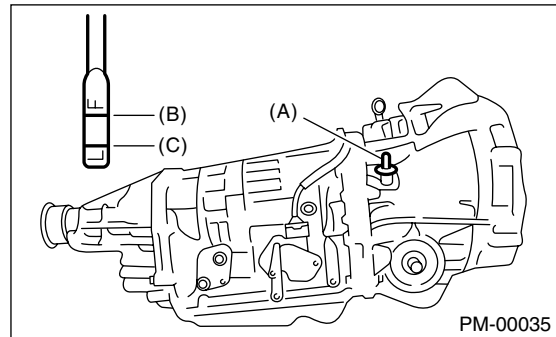
3) Fill differential gear oil through the oil level gauge hole up to the upper point of level gauge.

#### NOTE:

Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.

#### Differential gear oil capacity:

**1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)**



- (A) Oil level gauge
- (B) Upper level
- (C) Lower level

##### 3. REAR DIFFERENTIAL

- 1) Drain the oil by removing drain plug.
- 2) Remove the filler plug or rear differential oil temperature switch for quick draining oil.
- 3) Install the drain plug after draining oil.

#### NOTE:

Apply fluid packing to the drain plug threads.

#### Fluid packing:

**Three Bond 1105 (Part No. 004403010)**

#### Tightening torque:

**49.0 N·m (5.0 kgf·m, 36.2 ft·lb)**

## FRONT & REAR DIFFERENTIAL GEAR OIL

PERIODIC MAINTENANCE SERVICES

4) After installing the drain plug onto rear differential gear case firmly, fill oil up fully to the mouth of filler plug.

### CAUTION:

**Mechanical LSD oil must be used for STi model.**

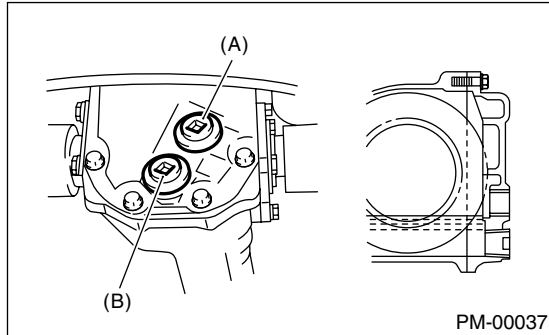
### Recommended gear oil:

**Except STi model**

**GL-5 (75W-90) or equivalent**

**STi model**

**Gear oil LSD (Part No. K0904AA080) or equivalent**



(A) Filler plug

(B) Drain plug

### Oil capacity:

**Except for STi model:**

**0.8 ℓ (0.8 US qt, 0.7 Imp qt)**

**STi model:**

**0.9 — 1.1 ℓ**

**(1.0 — 1.2 US qt, 0.8 — 1.0 Imp qt)**

### NOTE:

Each oil manufacturer has its base oil and additives. Thus, do not mix two or more brands.

5) Install the filler plug or rear differential oil temperature switch onto rear differential gear case firmly.

### NOTE:

Apply fluid packing to the filler plug or rear differential oil temperature switch threads.

### Fluid packing:

**Three Bond 1105 (Part No. 004403010)**

### Tightening torque:

**49.0 N·m (5.0 kgf-m, 36.2 ft-lb)**

## 17. Brake Line

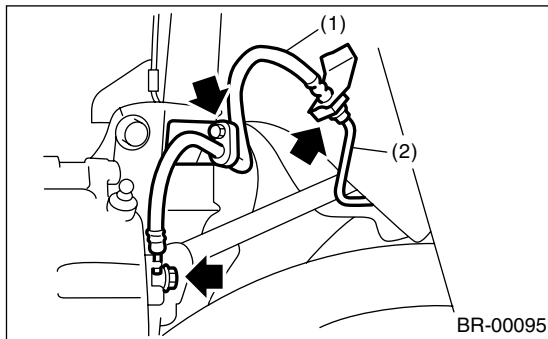
### A: INSPECTION

#### 1. BRAKE LINE

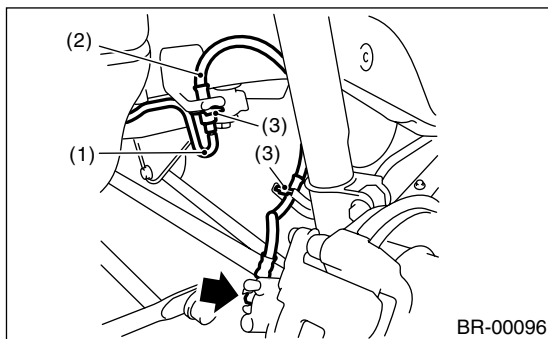
- 1) Check scratches, swelling, corrosion, traces of fluid leakage on the brake hoses or pipe joints.
- 2) Check the possibility of adjacent parts interfering with brake pipes/hoses during driving, and loose connections/clamps.
- 3) Check any trace of fluid leakage, scratches, etc. on the master cylinder, wheel cylinder and pressure control valve.

**NOTE:**

- When the brake fluid level in the reservoir tank is lower than the specified limit, the brake fluid warning light on the combination meter will come on.
- Visually check the brake hose (using a mirror where it is difficult to see) for any damage.



- (1) Front brake hose
- (2) Front brake pipe



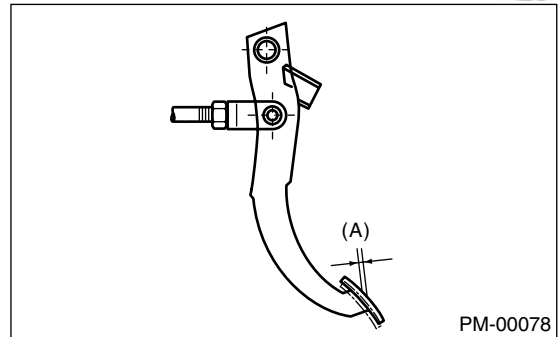
- (1) Rear brake pipe
- (2) Brake hose
- (3) Clamp

### B: CHECKING

#### 1. SERVICE BRAKE

- 1) Check the free play of brake pedal with a force of less than 10 N (1 kgf, 2 lb).

**Brake pedal free play:**  
**0.5 — 2.0 mm (0.02 — 0.08 in)**



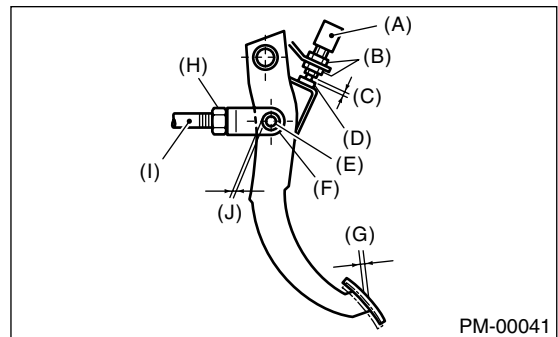
(A) Brake pedal free play

- 2) If the free play is out of specifications above, adjust the brake pedal as follows:

- (1) Be sure the engine is off. (No vacuum is applied to brake booster.)
- (2) There should be play between brake booster clevis and pin at brake pedal installing portion.

[Depress brake pedal pad with a force of less than 10 N (1 kgf, 2 lb) to a stroke of 0.5 to 2.0 mm (0.02 to 0.08 in).]

- (3) Depress the surface of brake pad by hand.
- (4) If there is no free play between clevis pin and clevis, turn the brake switch adjusting nut until the clearance between stopper and screw of brake switch becomes 0.3 mm (0.012 in).



- (A) Brake switch
- (B) Adjusting nut
- (C) 0.3 mm (0.012 in)
- (D) Stopper
- (E) Clevis pin
- (F) Clevis
- (G) Brake pedal free play
- (H) Lock nut
- (I) Brake booster operating rod
- (J) Play at pin

### 3) Check the pedal stroke.

While the engine is idling, depress the brake pedal with a 490 N (50 kgf, 110 lb) load and measure the distance between brake pedal and steering wheel. With the brake pedal released, measure the distance between pedal and steering wheel again. The difference between the two measurements must be less than specified value. If the distance is more than specified, there is possibility of air inside the hydraulic unit.

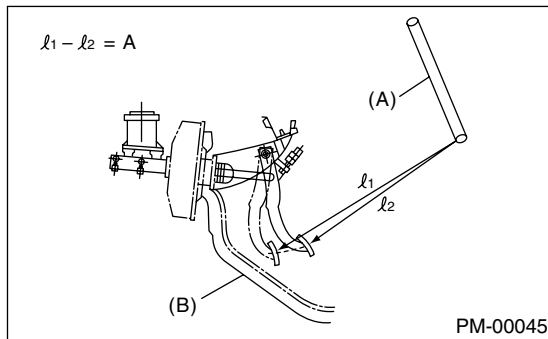
#### **Brake pedal reserve distance: A**

##### **Turbo AT model**

**105 mm (4.13 in)/ 490 N (50 kgf, 110 lb) or less**

##### **Except turbo AT model**

**90 mm (3.54 in)/ 490 N (50 kgf, 110 lb) or less**



- (A) Steering wheel
- (B) Toe board

4) Check to see if air is in the hydraulic brake line by the feel of pedal operation. If air appears to exist in the line, bleed it from the system.

5) Check for even operation of all brakes, using a brake tester or by driving the vehicle for a short distance on a straight road.

## 2. BRAKE SERVO SYSTEM

1) With the engine off, depress the brake pedal several times applying the same pedal force: Make sure the travel distance should not change.

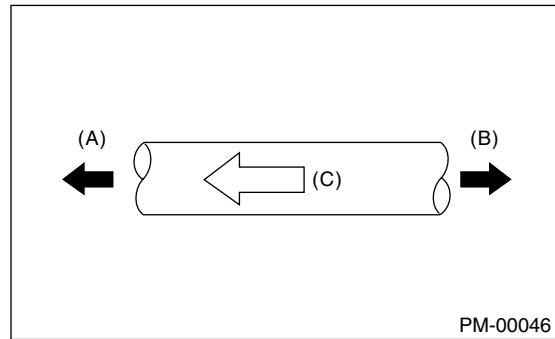
2) With the brake pedal depressed, start the engine: Make sure the pedal should move slightly toward the floor.

3) With the brake pedal depressed, stop the engine and keep the pedal depressed for 30 seconds: Make sure the pedal height should not change.

4) Check valve is built into the vacuum hose. Disconnect the vacuum hose to inspect function of check valve.

Blow air into the vacuum hose from its brake booster side end: Air must flow out of engine side end of hose. Next blow air into the hose from engine side: Air should not flow out of hose.

Replace both check valve and vacuum hose if the check valve is faulty. Engine side of vacuum hose is indicated by marking "ENG" as shown.



- (A) Engine side
- (B) Brake booster side
- (C) ENG

5) Check the vacuum hose for cracks or other damage.

#### NOTE:

When installing the vacuum hose on the engine and brake booster, do not use soapy water or lubricating oil on their connections.

6) Check vacuum hose to make sure it is tight and secure.

## 18. Brake Fluid

### A: REPLACEMENT

- 1) Either jack-up the vehicle and place a safety stand under it, or lift-up the vehicle.
- 2) Remove both front and rear wheels.
- 3) Draw out the brake fluid from master cylinder with syringe.
- 4) Refill the reservoir tank with recommended brake fluid.

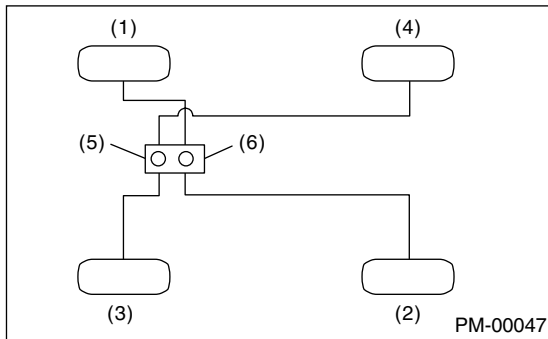
**Recommended brake fluid:**

**FMVSS No. 116, fresh DOT3 brake fluid**

**NOTE:**

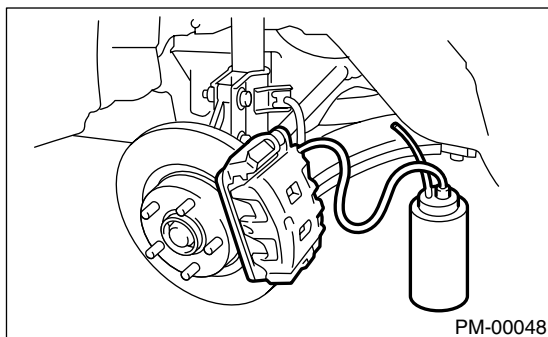
- Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.

Bleeding sequence (1) → (2) → (3) → (4)



- (1) Front right
- (2) Rear left
- (3) Front left
- (4) Rear right
- (5) Secondary
- (6) Primary

- 5) Install one end of a vinyl tube onto the air bleeder and insert the other end of the tube into a container to collect the brake fluid.



**NOTE:**

- Cover the bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
  - During the bleeding operation, keep the brake reservoir tank filled with brake fluid to eliminate entry of air.
  - The brake pedal operating must be very slow.
  - For convenience and safety, two people should do the work.
  - The amount of brake fluid required is approx. 500 m<sup>3</sup> (16.9 US fl oz, 17.6 Imp fl oz) for total brake system.
- 6) Instruct your co-worker to depress the brake pedal slowly two or three times and then hold it depressed.
  - 7) Loosen the bleeder screw approx. 1/4 turn until a small amount of brake fluid drains into container, and then quickly tighten the screw.
  - 8) Repeat steps 6) and 7) above until there are no air bubbles in the drained brake fluid and new fluid flows through vinyl tube.

**NOTE:**

- Add brake fluid as necessary while performing the air bleed operation, in order to prevent the tank from running short of brake fluid.
- 9) After completing the bleeding operation, hold brake pedal depressed and tighten the screw and install bleeder cap.

**Tightening torque:**

**8 N·m (0.8 kgf-m, 5.8 ft-lb)**

- 10) Bleed air from each wheel cylinder by following the previous 5 steps.
- 11) Depress the brake pedal with a force of approx. 294 N (30 kgf, 66 lb) and hold it there for approx. 20 seconds. At this time check the pedal to see if it makes any unusual movement. Visually inspect the bleeder screws and brake pipe joints to make sure that there is no fluid leakage.
- 12) Install the wheels, and drive the vehicle for a short distance between 2 to 3 km (1 to 2 miles) to make sure that brakes are operating properly.

## 19. Disc Brake Pads and Discs

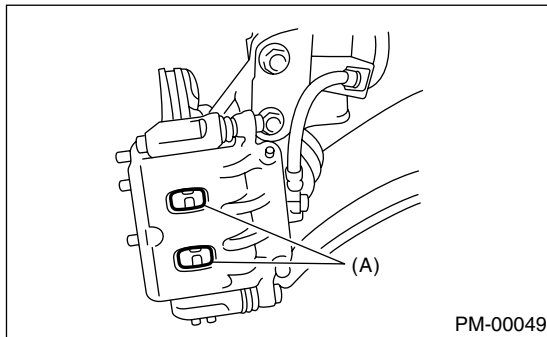
### A: INSPECTION

#### 1. DISC BRAKE PAD AND DISC

- 1) Jack-up the vehicle and support with rigid racks. Then remove the wheels.
- 2) Visually check the pad thickness through inspection hole of disc brake assembly. Replace the pad if necessary.

**NOTE:**

When replacing a pad, always replace the pads for both the right and left wheels at the same time. Also replace the pad clips if they are twisted or worn.



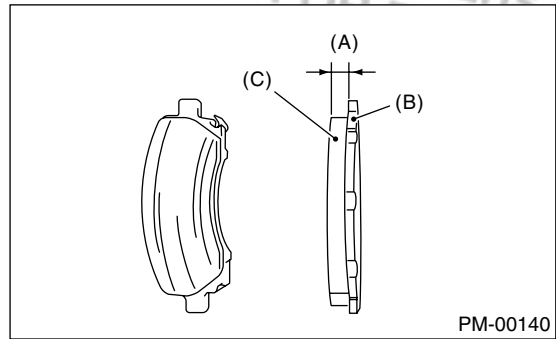
(A) Inspection hole

• Front

	Pad thickness mm (in)	
	inch	mm (in)
Standard	15 inch	11 (0.43)
	16 inch	11 (0.43)
	17 inch	9.2 (0.36)
Service limit	15 inch	1.5 (0.059)
	16 inch	1.5 (0.059)
	17 inch	1.2 (0.047)

• Rear

	Pad thickness mm (in)	
	inch	mm (in)
Standard	14 inch	9 (0.35)
	17 inch	9 (0.35)
Service limit	14 inch	1.5 (0.059)
	17 inch	1.2 (0.047)



- (1) Thickness of pad
- (2) Back metal
- (3) Lining

- 3) Check the disc rotor, and correct or replace if it is damaged or worn.

• Front

	Disc rotor thickness mm (in)	
	inch	mm (in)
Standard	15, 16 inch	24 (0.94)
	17 inch	30 (1.18)
Service limit	15, 16 inch	22 (0.87)
	17 inch	28 (1.10)

• Rear

	Disc rotor thickness mm (in)	
	inch	mm (in)
Standard	14 inch	10 (0.39)
	17 inch	20 (0.79)
Service limit	14 inch	8.5 (0.34)
	17 inch	18 (0.71)

- 4) Remove the caliper body. <Ref. to BR-22, Front Disc Brake Assembly.>, <Ref. to BR-32, Rear Disc Brake Assembly.>

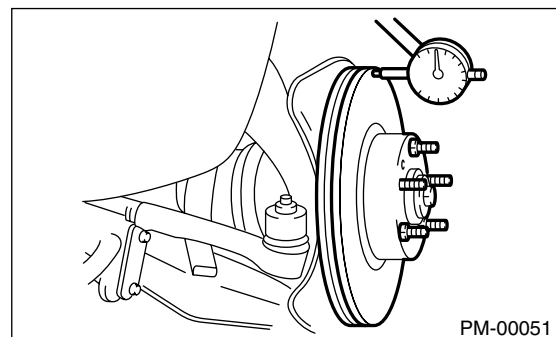
- 5) Tighten the wheel nuts to secure disk rotor.

- 6) Set a dial gauge at a point less than 10 mm (0.39 in) from outer periphery of rotor, and then measure the disk rotor runout.

**Disc rotor runout limit:**

**Front: 0.075 mm (0.0030 in)**

**Rear: 0.070 mm (0.0028 in)**



## 20. Parking Brake

### A: INSPECTION

Inspect the brake linings and drums of both sides of the rear brake at the same time by removing brake drums.

1) Inspect the brake shoes for damage or deformation and check brake linings for wear.

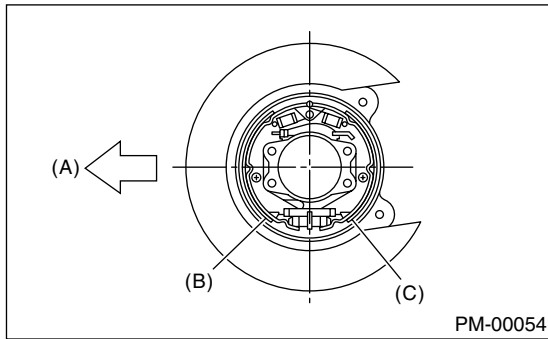
**NOTE:**

Always replace both primary and secondary brake shoes for the right and left wheels at the same time.

**Brake lining thickness (except back metal)**

**Standard value: 3.2 mm (0.126 in)**

**Wear limit: 1.5 mm (0.059 in)**



- (A) Forward
- (B) Brake shoe (Primary side)
- (C) Brake shoe (Secondary side)

2) Check the disk rotor for wear, dents or other damage. If the inside surface of disk rotor is streaked, correct the surface with emery cloth (#200 or more). If it is unevenly worn or tapered, correct or replace it.

**Brake drum inside diameter**

**Except for STi model**

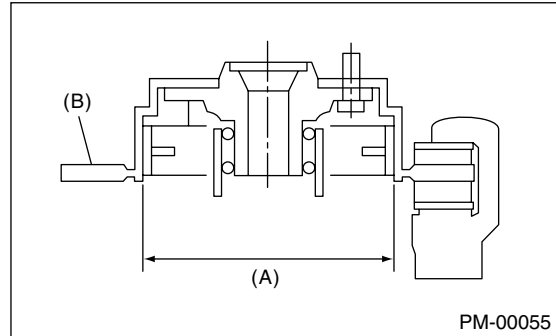
**Standard value: 170 mm (6.69 in)**

**Wear limit: 171 mm (6.73 in)**

**STi model**

**Standard value: 190 mm (7.48 in)**

**Wear limit: 191 mm (7.52 in)**



- (A) Inside diameter
- (B) Disk

3) If the deformation or wear of back plate, shoe, etc. is noticeable, replace them.

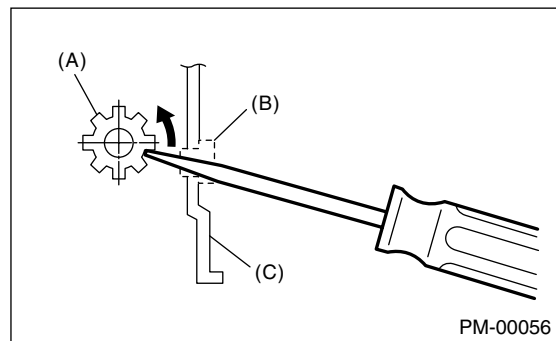
4) When the shoe return spring tension is excessively weakened, replace it.

### B: ADJUSTMENT

For rear disc brake, adjust the parking brake after bleeding air.

1) Remove the rear cover (rubber) installed at back plate.

2) Turn the adjuster toward arrow mark (upward) until it is locked slightly, by using a flat tip screwdriver as shown in illustration.



- (A) Adjuster
- (B) Cover (rubber)
- (C) Back plate

3) Turn back (downward) the adjuster 3 to 4 notches.

4) Install the cover (rubber) at original position correctly.

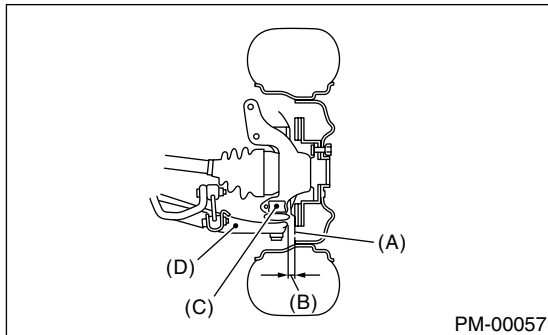


## 21. Suspension

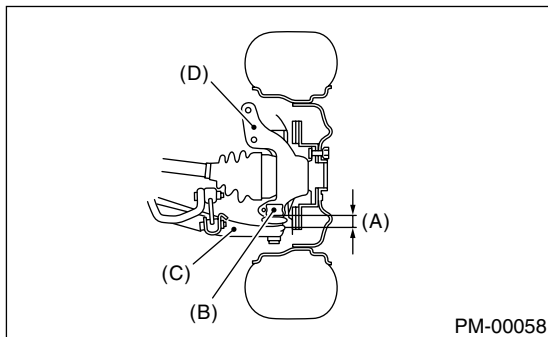
### A: INSPECTION

#### 1. SUSPENSION BALL JOINT

- 1) Jack-up the vehicle until front wheels are off ground.
- 2) Next, grasp the bottom of tire and move it in and out. If relative movement (B) is observed between the brake disc cover (A) and end of transverse link (D), ball joint (C) may be excessively worn.



- 3) Next, grasp the end of transverse link and move it up and down. Relative movement (A) between the housing (D) and transverse link (C) boss indicates ball joint (B) may be excessively worn.



- 4) If relative movement is observed in the immediately preceding two steps, remove and inspect the ball joint. If free play exceeds standard, replace the ball joint. <Ref. to FS-18, Front Ball Joint.>

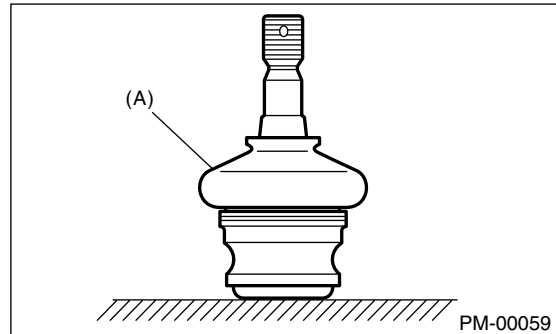
#### 5) Damage of dust seal

Visually inspect the ball joint dust seal. If it is damaged, remove the transverse link. <Ref. to FS-15, Front Transverse Link.> And measure free play of ball joint. <Ref. to FS-18, Front Ball Joint.>

- (1) When looseness exceeds standard value, replace the ball joint.
- (2) If the dust seal is damaged, replace with the new ball joint.

#### NOTE:

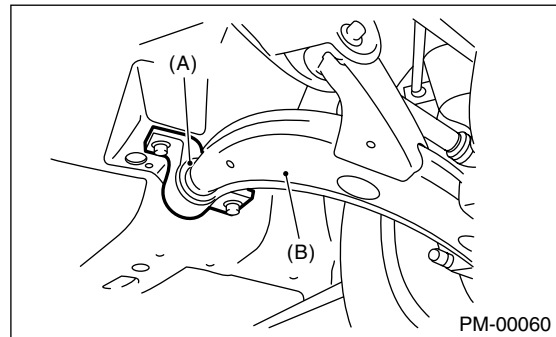
When the transverse link ball joint has been removed or replaced, check the toe-in of front wheel. If the front wheel toe-in is not at specified value, adjust the toe-in. <Ref. to FS-6, Wheel Alignment.>



(A) Dust seal

#### 2. TRANSVERSE LINK'S REAR BUSHING

Check oil leaks at around liquid-filled bushing. If oil leaks, replace the bushing.



(A) Rear bushing  
(B) Transverse link

#### 3. WHEEL ARCH HEIGHT

- 1) Unload cargoes and set the vehicle in curb weight (empty) condition.
- 2) Then, check the wheel arch height of front and rear suspensions to ensure that they are within specified values. <Ref. to FS-6, Wheel Alignment.>
- 3) When the wheel arch height is out of standard, visually inspect the following components and replace deformed parts.
  - Suspension components [Front strut assembly and rear shock absorber assembly]
  - Parts connecting between suspension and body.
- 4) When no components are deformed, adjust the wheel arch height by replacing coil spring in the suspension which wheel arch height is out of standard. <Ref. to FS-6, Wheel Alignment.> <Ref. to RS-8, Wheel Alignment.>

### 4. WHEEL ALIGNMENT OF FRONT SUSPENSION

1) Check the alignment of front suspension to ensure that following items conform to standard values.

- Toe-in
- Camber angle
- Caster angle
- Steering angle

<Ref. to FS-6, Wheel Alignment.>

2) When the caster angle does not conform to reference, visually inspect the following components and replace deformed parts.

- Suspension components [Strut assembly, crossmember, transverse link, etc.]
- Body parts to which suspensions are installed.

3) When the toe-in and camber are out of standard value, adjust them so that they conform to respective service standard.

4) When the right-and-left turning angles of tire are out of standard, adjust to standard value.

### 5. WHEEL ALIGNMENT OF REAR SUSPENSION

1) Check the alignment of rear suspension to ensure that following items are within standard values.

- Toe-in
- Camber angle
- Thrust angle

<Ref. to RS-8, Wheel Alignment.>

2) When the camber angle does not conform to reference, visually inspect parts listed below. If deformation is observed, replace the damaged parts.

- Suspension components [Shock absorber, link F, link R, link UPR, arm R, sub frame, etc.]
- Body parts to which suspensions are installed.

3) When the toe-in and thrust angle are out of standard value, adjust them so that they conform to respective service standard.

### 6. OIL LEAKAGE OF STRUT

Visually inspect the front strut and rear strut for oil leakage as instructed. Replace front strut and rear strut if oil leaks excessively.

### 7. TIGHTNESS OF BOLTS AND NUTS

Check the bolts and nuts shown in the figure for looseness. Retighten the bolts and nuts to specified torque. If the self-lock nuts and bolts are removed, replace them with new ones.

Front suspension: <Ref. to FS-2, General Description.>

Rear suspension: <Ref. to RS-2, General Description.>

### 8. DAMAGE TO SUSPENSION PARTS

Check the following parts and the fastening portion of the vehicle body for deformation or excessive rusting which impairs the suspension. If necessary, replace the damaged parts with new ones. If minor rust formation, pitting, etc. are noted, remove the rust and apply remedial anti-corrosion measures.

- Front suspension
  - Transverse link
  - Crossmember
  - Strut
- Rear suspension
  - Crossmember
  - Lateral links
  - Trailing link
  - Strut

• In the district where salt is sprayed to melt snow on a road in winter, check suspension parts for damage caused by rust every 12 months after lapse of 60 months. Take rust prevention measure as required.

## 22. Wheel Bearing

### A: INSPECTION

#### 1. FRONT WHEEL BEARING

**NOTE:**

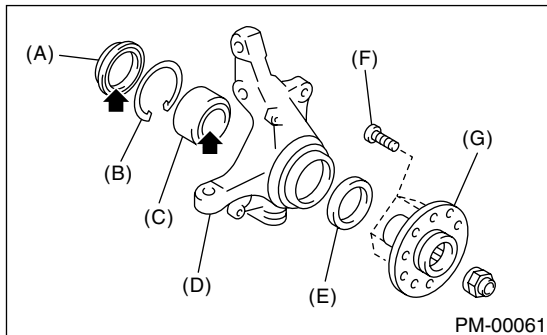
Inspect the condition of front wheel bearing grease.

- 1) Jack-up the front of vehicle.
- 2) While holding the front wheel by hand, swing it in and out to check bearing free play.
- 3) Loosen the wheel nuts and remove front wheel.
- 4) If bearing free play exists in step 2) above, attach a dial gauge to the hub and measure axial displacement in axial direction.

**Service limit:**

***Straight-ahead position within 0.05 mm (0.0020 in)***

- 5) Remove the bolts and self-locking nuts, and extract transverse link from front crossmember.
  - 6) Remove the SFJ of front drive shaft from transmission. <Ref. to DS-17, Front Axle.>
  - 7) While supporting the front drive shaft horizontally with one hand, turn the hub with the other to check for noise or binding.
- If the hub is noisy or binds, disassemble the front axle and check condition of oil seals, bearing, etc.



- (A) Inner oil seal
- (B) Snap ring
- (C) Bearing
- (D) Housing
- (E) Outer oil seal
- (F) Hub bolt
- (G) Hub

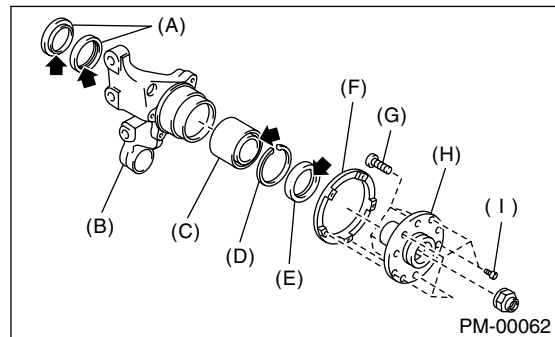
#### 2. REAR WHEEL BEARING

- 1) Jack-up the rear of vehicle.
- 2) While holding the rear wheel by hand, swing it in and out to check bearing free play.
- 3) Loosen the wheel nuts and remove rear wheel.
- 4) If the bearing free play exists in step 2) above, attach a dial gauge to the hub COMPL and measure axial displacement in axial direction.

**Service limit:**

***Straight-ahead position within 0.05 mm (0.0020 in)***

- 5) Remove the DOJ of rear drive shaft from rear differential. <Ref. to DS-34, Rear Drive Shaft.>
  - 6) While supporting the rear drive shaft horizontally with one hand, turn the hub COMPL with the other to check for noise or binding.
- If the hub COMPL is noisy or binds, disassemble the rear axle and check condition of oil seals, bearings, etc.



- (A) Inner oil seal
- (B) Rear housing
- (C) Bearing
- (D) Snap ring
- (E) Outer oil seal
- (F) Tone wheel
- (G) Hub bolt
- (H) Hub
- (I) Socket bolt

## AXLE BOOTS & JOINTS

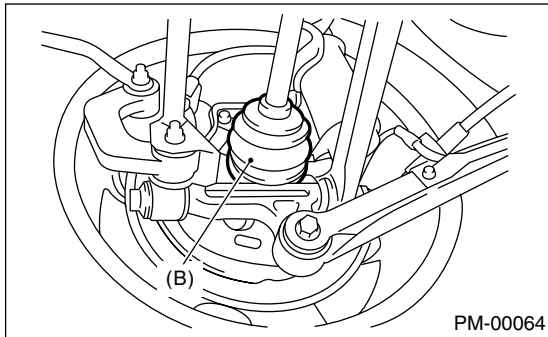
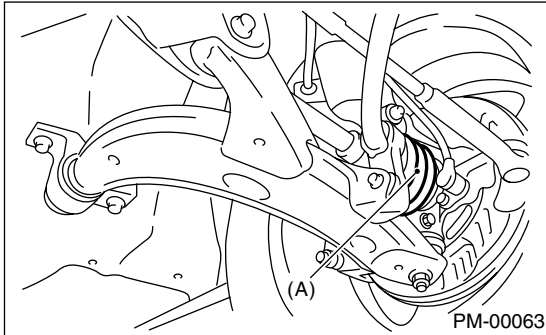
PERIODIC MAINTENANCE SERVICES

### 23. Axle Boots & Joints

#### A: INSPECTION

##### 1. FRONT AND REAR AXLE BOOTS

Inspect the front axle boots (A) and rear axle boots (B) for deformation, damage or failure. If faulty, replace them with new ones. <Ref. to DS-29, Front Drive Shaft.> <Ref. to DS-34, Rear Drive Shaft.>



##### 2. PROPELLER SHAFT

Inspect the propeller shaft for damage or failure. If faulty, replace with a new one. <Ref. to DS-14, Propeller Shaft.>

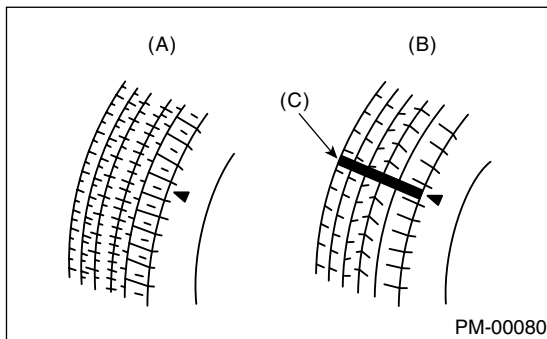
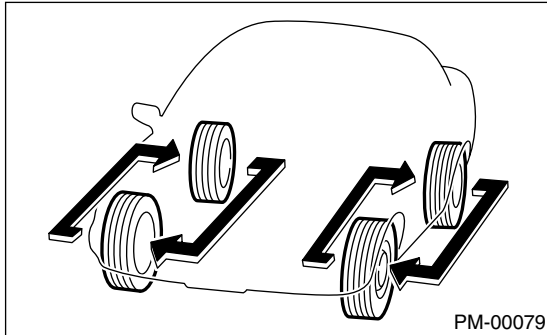
## 24. Tire Rotation

### A: INSPECTION

1) When the tread has worn down to 1.6 mm (2/32 in) or the wear indicator appears across the tread, replace the tire. (It is recommended to replace both left and right tires as a set.)

2) If abnormal uneven wear is found on the tire, adjust the wheel alignment.

3) Also, tire rotations should be done by interchanging front and rear tires as shown to ensure even wear of the tires.



- (A) New tread
- (B) Worn tread
- (C) Tread wear indicator

# STEERING SYSTEM (POWER STEERING)

## PERIODIC MAINTENANCE SERVICES

### 25. Steering System (Power Steering)

#### A: INSPECTION

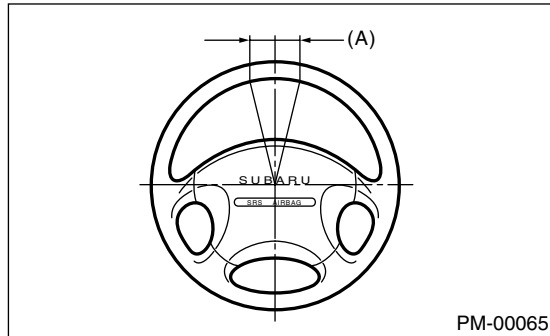
##### 1. STEERING WHEEL

- 1) Set the steering wheel in a straight-ahead position, and check the wheel spokes to make sure they are correctly set in their specified positions.
- 2) Lightly turn the steering wheel to the right and left to determine the point where front wheels start to move.

Measure the distance of the movement of steering wheel at the outer periphery of wheel.

##### **Steering wheel free play:**

**0 — 17 mm (0 — 0.67 in)**



(A) Steering wheel free play

Move the steering wheel vertically toward the shaft to ascertain if there is play in the direction.

##### **Maximum permissible play:**

**0.5 mm (0.020 in)**

- 3) Drive the vehicle and check the following items during operation.

##### (1) Steering force:

The effort required for steering should be smooth and even at all points, and should not vary.

##### (2) Pull to one side:

Steering wheel should not be pulled to either side while driving on a level surface.

##### (3) Wheel runout:

Steering wheel should not be runout.

##### (4) Return factor:

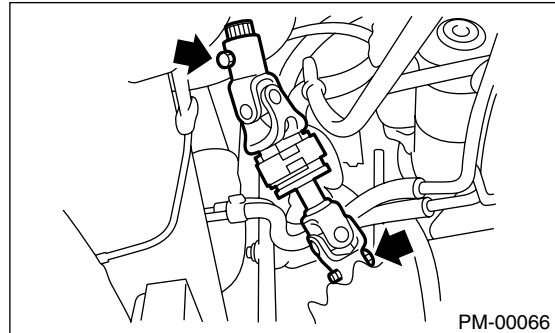
Steering wheel should return to its original position after it has been turned and then released.

##### 2. STEERING SHAFT JOINT

When the steering wheel free play is excessive, disconnect the universal joint of steering shaft and check it for any play and yawing torque (at the point of the crossing direction). Also inspect for any damage to sealing or worn serrations. If the joint is loose, retighten the mounting bolts to the specified torque.

##### **Tightening torque:**

**24 N·m (2.4 kgf·m, 17.4 ft·lb)**



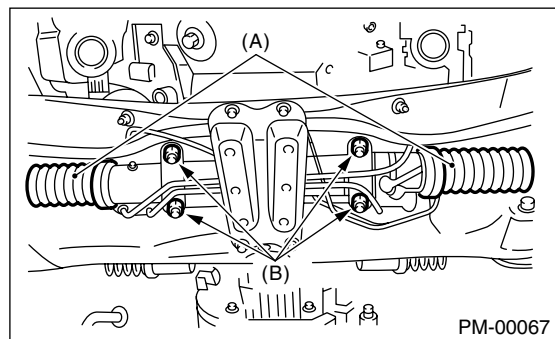
##### 3. GEARBOX

- 1) With vehicle placed on a level surface, turn the steering wheel 90° in both the right and left directions.

While the steering wheel is being rotated, reach under the vehicle and check for looseness in gearbox.

##### **Tightening torque:**

**59 N·m (6.0 kgf·m, 43.4 ft·lb)**



(A) Boot

(B) Gear box mounting bolt

- 2) Check the boot for damage, cracks or deterioration.

# STEERING SYSTEM (POWER STEERING)

PERIODIC MAINTENANCE SERVICES

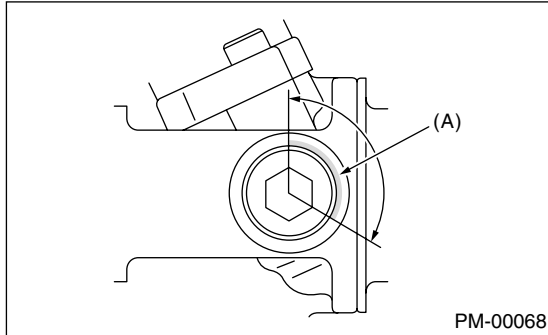
3) With the vehicle on a level surface, quickly turn the steering wheel to the right and left.

While the steering wheel is being rotated, check the gear backlash. If any unusual noise is noticed, adjust the gear backlash in the following manner.

(1) Tighten the adjusting screw to 7.4 N·m (0.75 kgf-m, 5.4 ft-lb) and then loosen. Repeat this operation twice.

(2) Retighten the adjusting screw to 7.4 N·m (0.75 kgf-m, 5.4 ft-lb) and back off 25°.

(3) Apply liquid packing to at least 1/3 of entire perimeter of adjusting screw thread.



(A) Apply liquid packing to at least 1/3 of entire perimeter

(4) Install the lock nut. While holding the adjusting screw with a wrench, tighten the lock nut using ST.

ST 926230000 SPANNER

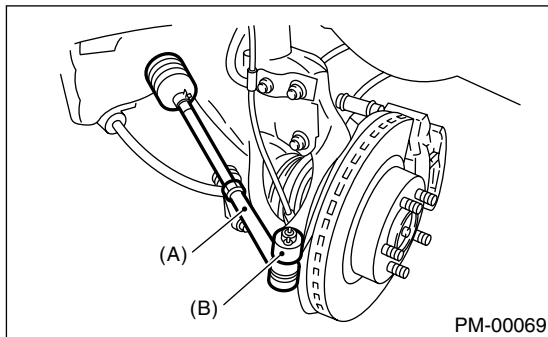
**Tightening torque (Lock nut):**

**39 N·m (4.0 kgf-m, 29 ft-lb)**

Hold the adjusting screw with a wrench to prevent it from turning, while tightening the lock nut.

## 4. TIE-ROD

1) Check the tie-rod and tie-rod ends for bends, scratches or other damage.



(A) Tie-rod end  
(B) Knuckle arm

2) Check the connections of knuckle ball joints for play, inspect for damage on dust seals, and check free play of ball studs. If the castle nut is loose, retighten it to the specified torque, then tighten further up to 60° until the cotter pin hole is aligned.

**Tightening torque:**

**27 N·m (2.75 kgf-m, 19.9 ft-lb)**

3) Check the lock nut on tie-rod end for tightness. If it is loose, retighten it to the specified torque.

**Tightening torque:**

**83 N·m (8.5 kgf-m, 61.5 ft-lb)**

## 5. POWER STEERING FLUID LEVEL

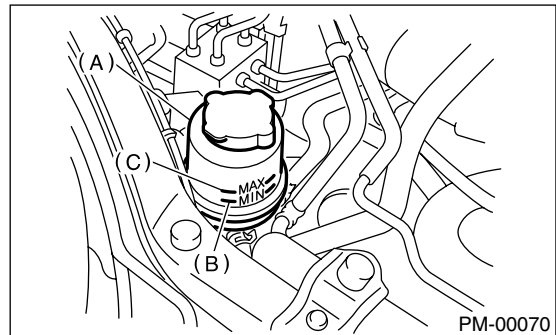
NOTE:

- Check at power steering fluid temperature 20°C (68°F); read the fluid level on the "COLD" side.

- Check at power steering fluid temperature 80°C (176°F); read the fluid level on the "HOT" side.

1) Place the vehicle with engine "OFF" on a flat and level surface.

2) Check the fluid level using the scale on the outside of reservoir tank (A). If the level is below "MIN" (B), add fluid to bring it up to "MAX" (C).



NOTE:

If the fluid level is at MAX level or above, drain fluid to keep the level in specified range of indicator by using a syringe or the like.

**Recommended fluid:**

**Dexron III**

**Fluid capacity:**

**0.7 ℓ (0.7 US qt, 0.6 Imp qt)**

# STEERING SYSTEM (POWER STEERING)

## PERIODIC MAINTENANCE SERVICES

### 6. POWER STEERING FLUID FOR LEAKS

Inspect the underside of oil pump and gearbox for power steering system, hoses, piping and their couplings for fluid leaks.

If fluid leaks are found, correct them by retightening their fitting bolts (or nuts) and/or replacing their parts.

#### NOTE:

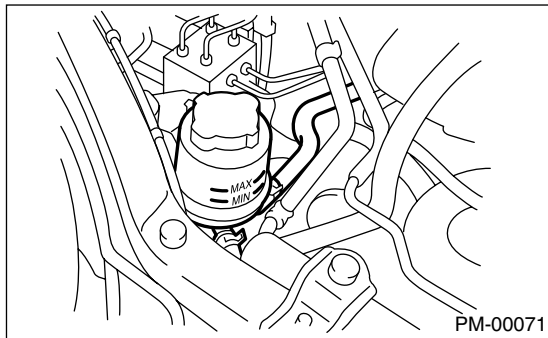
- Wipe the leakage fluid off after correcting fluid leaks, or a wrong diagnosis is taken later.
- Also pay attention to clearances between hoses (or pipings) and other parts when inspecting fluid leaks.

### 7. HOSES OF OIL PUMP FOR DAMAGES

Check the pressure hose and return hose of oil pump for crack, swell or damage. Replace the hose with a new one if necessary.

#### NOTE:

Prevent the hoses from revolving and/or turning when installing hoses.



### 8. POWER STEERING PIPES FOR DAMAGE

Check the power steering pipes for corrosion and damage.

Replace the pipes with a new one if necessary.

### 9. GEARBOX BOOTS

Inspect both sides of gearbox boots as follows, and correct the defects if necessary.

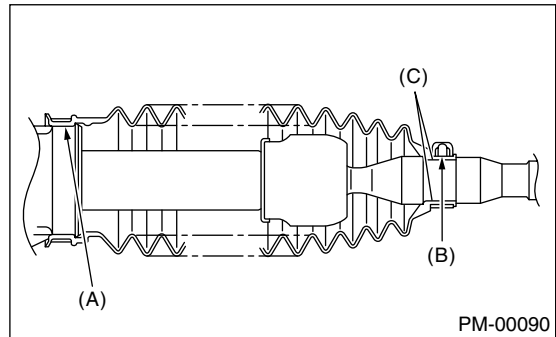
1) (A) and (B) positions of gearbox boot are fitted correspondingly in (A) and (B) grooves of gearbox and the rod (C).

2) Clips are fitted outside of (A) and (B) positions of boot.

3) Boot does not have crack and hole.

#### NOTE:

Rotate (B) the position of gearbox boot against twist of it produced by adjustment of toe-in, etc.



### 10. FITTING BOLTS AND NUTS

Inspect the fitting bolts and nuts of oil pump and bracket for looseness, and retighten them if necessary.

Inspect and/or retighten them when engine is cold.

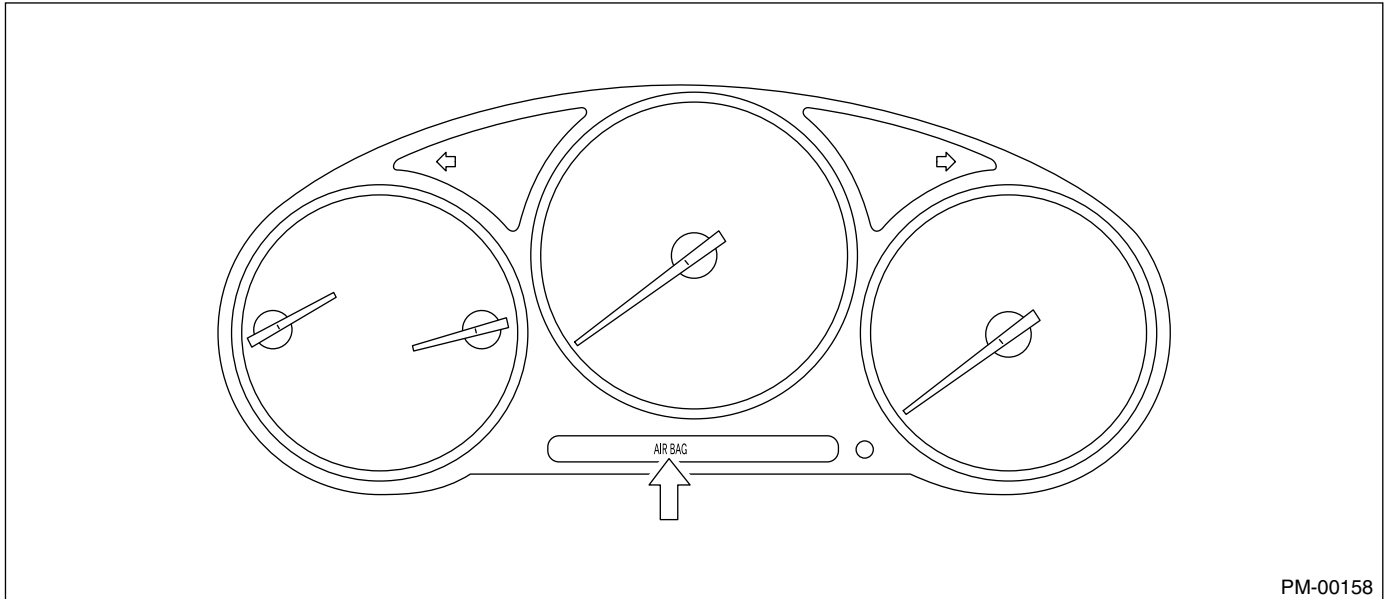


## 26. Supplemental Restraint System

### A: INSPECTION

Check the airbag system in accordance with the result of the self-diagnosis. <Ref. to AB-2, Basic Diagnostic Procedure.>

1) Ensure that airbag connectors are connected. If not, properly connect. When the ignition switch is turned ON with the connector(s) disconnected, the airbag warning light blinks to identify the fault.



PM-00158

2) Turn the ignition switch ON, and connect the airbag diagnosis terminal of the service connector (located below lower cover) to the ground terminal.

3) The warning light blinks to indicate a DTC (a fault is identified). When the airbag system is in good order (no trouble codes are stored in the memory), the warning light blinks on and off at 0.6 second intervals (as long as the diagnosis terminal is connected to the ground terminal).

4) When the warning light indicates a DTC, check the airbag system in accordance with the troubleshooting procedure. <Ref. to AB-2, Basic Diagnostic Procedure.>

# **SUPPLEMENTAL RESTRAINT SYSTEM**

PERIODIC MAINTENANCE SERVICES

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