

General Description

PERIODIC MAINTENANCE SERVICES

1. General Description

A: GENERAL DESCRIPTION

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

Schedule

PERIODIC MAINTENANCE SERVICES

2. Schedule

A: MAINTENANCE SCHEDULE 1

1. U.S.

- Other than U5 model

			Maintenance interval [Number of months or km (miles), whichever occurs first]																	
	Months		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	Remarks
	× 1,000 km		4.8	12	24	36	48	60	72	81.4	96	108	120	132	144	156	168	180	192	
	× 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	3.0 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
		2.5 L		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
2	Engine oil filter	3.0 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
		2.5 L		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
3	Spark plug					R				R					R				R	2.5 L non-turbo model
										R									R	For 2.5 L turbo, 3.0 L model
4	Drive belt(s)					I				I					I		R			
5	Camshaft drive belt					I				I					I		R			
6	Fuel line					(I)				(I)					(I)				I	Note 1.
7	Air cleaner element					R				R					R				R	Note 2.
8	Cooling system					I				I					I				I	
9	Engine coolant					R				R					R				R	
10	Clutch system			I		I		I		I		I		I			I		I	
11	Transmission oil					I				I					I				I	
12	ATF					I				I					I				I	Note 3.
13	Front and rear differential oil					I				I					I				I	
14	Brake line			I		I		I		I		I		I			I		I	
15	Brake fluid					R				R					R				R	
16	Disc brake pad and disc			I		I		I		I		I		I			I		I	
17	Parking brake			I		I		I		I		I		I			I		I	
18	Suspension			I		I		I		I		I		I			I		I	
19	Wheel bearing									(I)									(I)	
20	Axle boots and joints			I		I		I		I		I		I			I		I	
21	Tire rotation		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	Note 4.
22	Steering system (Power steering)			I		I		I		I		I		I			I		I	
23	SRS airbag system	Inspect every 10 years																		
24	A/C filter	Replace every 12 months or 15,000 km (9,300 miles).																		Note 5.

Schedule

PERIODIC MAINTENANCE SERVICES

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 rust, 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.
5. When the A/C filter is installed.

Schedule

PERIODIC MAINTENANCE SERVICES

• U5 model

		Maintenance interval [Number of months or km (miles), whichever occurs first]												Remarks
	Months	3	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75	to the next page	
	× 1,000 km	4.8	12	24	36	48	60	72	81.4	96	108	120		
	× 1,000 miles	3	7.5	15	22.5	30	37.5	45	52.5	60	67.5	75		
1	Engine oil		R	R	R	R	R	R	R	R	R	R		
2	Engine oil filter		R	R	R	R	R	R	R	R	R	R		
3	Spark plug					R				R				
4	Drive belt(s)					I				I				
5	Camshaft drive belt					I				I				
6	Fuel line					(I)				(I)				Note 1.
7	Air cleaner element					R				R				Note 2.
8	Cooling system					I				I				
9	Engine coolant					R				R				
10	Clutch system			I		I		I		I		I		
11	Transmission oil					I				I				
12	ATF					I				I				Note 3.
13	Front and rear differential oil					I				I				
14	Brake line			I		I		I		I		I		
15	Brake fluid					R				R				
16	Disc brake pad and disc			I		I		I		I		I		
17	Parking brake			I		I		I		I		I		
18	Suspension			I		I		I		I		I		
19	Wheel bearing									(I)				
20	Axle boots and joints			I		I		I		I		I		
21	Tire rotation		I	I	I	I	I	I	I	I	I	I		Note 4.
22	Steering system (Power steering)			I		I		I		I		I		
23	SRS airbag system	Inspect every 10 years												
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5. When the A/C filter is installed.

Schedule

PERIODIC MAINTENANCE SERVICES

		Maintenance interval [Number of months or km (miles), whichever occurs first]											
	Months	from the previous page	82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	Remarks
	× 1,000 km		132	144	156	168	180	192	204	216	228	240	
	× 1,000 miles		82.5	90	97.5	105	112.5	120	127.5	135	142.5	150	
1	Engine oil		R	R	R	R	R	R	R	R	R	R	
2	Engine oil filter		R	R	R	R	R	R	R	R	R	R	
3	Spark plug			R				R				R	
4	Drive belt(s)			I		R				I			
5	Camshaft drive belt			I		R				I			
6	Fuel line			(I)				I				(I)	Note 1.
7	Air cleaner element			R				R				R	Note 2.
8	Cooling system			I				I				I	
9	Engine coolant			R				R				R	
10	Clutch system			I		I		I				I	
11	Transmission oil			I				I				I	
12	ATF			I				I				I	Note 3.
13	Front and rear differential oil			I				I				I	
14	Brake line			I		I		I		I		I	
15	Brake fluid			R				R				R	
16	Disc brake pad and disc			I		I		I		I		I	
17	Parking brake			I		I		I		I		I	
18	Suspension			I		I		I		I		I	
19	Wheel bearing							(I)				(I)	
20	Axle boots and joints			I		I		I		I		I	
21	Tire rotation		I	I	I	I	I	I	I	I	I	I	Note 4.
22	Steering system (Power steering)			I		I		I		I		I	
23	SRS airbag system	Inspect every 10 years											
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5. When the A/C filter is installed.

Schedule

PERIODIC MAINTENANCE SERVICES

2. CANADA

			Maintenance interval [Number of months or km (miles), whichever occurs first]																	
	Months		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	Remarks
	× 1,000 km		4.8	12	24	36	48	60	72	81.4	96	108	120	132	144	156	168	180	192	
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1	Engine oil	3.0 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
		2.5 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
2	Engine oil filter	3.0 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
		2.5 L	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	
3	Spark plug					R				R					R				R	2.5 L non-turbo model
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4	Drive belt(s)					I				I					I		R			
5	Camshaft drive belt					I				I					I		R			
6	Fuel line					(I)				(I)					(I)				I	Note 1.
7	Air cleaner element					R				R					R				R	Note 2.
8	Cooling system					I				I					I				I	
9	Engine coolant					R				R					R				R	
10	Clutch system			I		I		I		I		I		I		I		I		
11	Transmission oil					I				I					I				I	
12	ATF					I				I					I				I	Note 3.
13	Front and rear differential oil					I				I					I				I	
14	Brake line			I		I		I		I		I		I		I		I		
15	Brake fluid					R				R					R				R	
16	Disc brake pad and disc			I		I		I		I		I		I		I		I		
17	Parking brake			I		I		I		I		I		I		I		I		
18	Suspension			I		I		I		I		I		I		I		I		
19	Wheel bearing									(I)									(I)	
20	Axle boots and joints			I		I		I		I		I		I		I		I		
21	Tire rotation		I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I	Note 4.
22	Steering system (Power steering)			I		I		I		I		I		I		I		I		
23	SRS airbag system	Inspect every 10 years																		
24	A/C filter	Replace every 12 months or 15,000 km (9,300 miles).																		Note 5.

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5. When the A/C filter is installed.

B: MAINTENANCE SCHEDULE 2

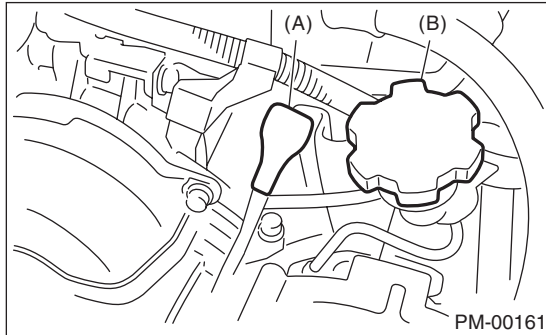
Item	Maintenance interval	Repeat short distance drive	Repeat rough/muddy road drive	Extremely cold weather area	Salt or other corrosive used or coastal area	High humidity or mountain area	Repeat towing trailer
Engine oil	3.75 months	R		R			R
	6,000 km						
	3,750 miles						
Engine oil filter	3.75 months	R		R			R
	6,000 km						
	3,750 miles						
Fuel 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 and 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 pad and disc	7.5 months	I	I		I		I
	12,000 km						
	7,500 miles						
Parking brake	7.5 months	I	I		I		I
	12,000 km						
	7,500 miles						
Suspension	7.5 months		I	I	I		
	12,000 km						
	7,500 miles						
Axle boots and joints	7.5 months	I	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

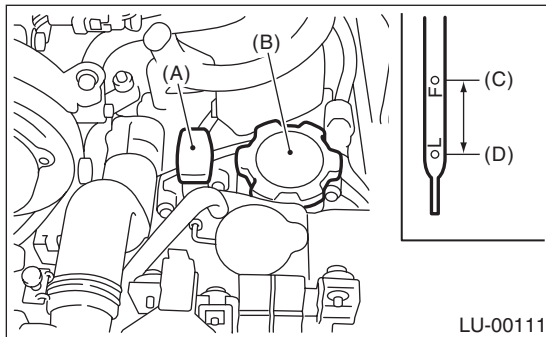
1) Open the engine oil filter cap for quick draining of engine oil.

- 2.5 L model



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

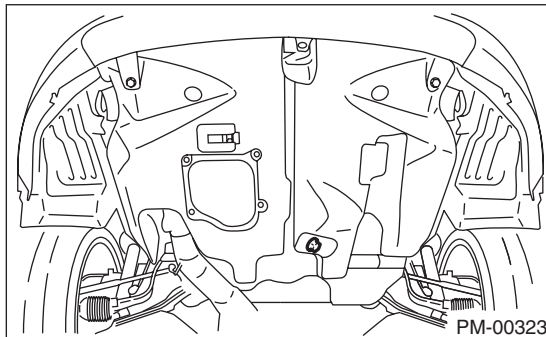
- 3.0 L model



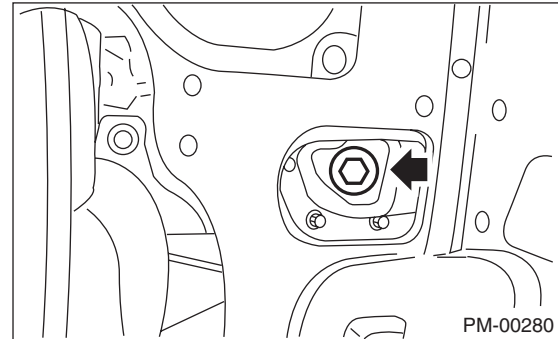
- (A) Oil level gauge
- (B) Oil filler cap
- (C) Upper level
- (D) Lower level

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

- 2.5 L model



- 3.0 L model



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

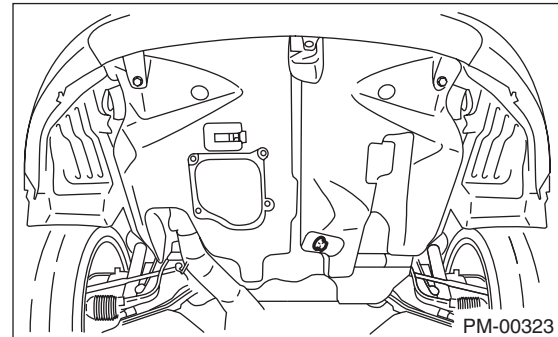
NOTE:

Use a new drain plug gasket.

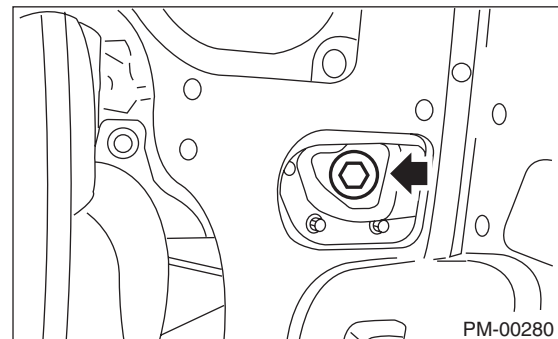
Tightening torque:

44 N·m (4.5 kgf-m, 33 ft-lb)

- 2.5 L model



- 3.0 L model



Engine Oil

PERIODIC MAINTENANCE SERVICES

4) Fill engine oil through the level gauge up to the upper level. Place the vehicle on a level surface when checking oil level. Use engine oil of the proper quality and viscosity, selected in accordance with the following.

Recommended oil:

Refer to “RM” section. <Ref. to RM-2, LUBRICANTS, RECOMMENDED MATERIALS, Recommended Materials.>

Engine oil capacity

2.5 L model

Upper level:

Approx. 4.0 ℓ (4.2 US qt, 3.5 Imp qt)

Lower level:

Approx. 3.0 ℓ (3.2 US qt, 2.6 Imp qt)

3.0 L model

Upper level:

Approx. 5.5 ℓ (5.8 US qt, 4.8 Imp qt)

Lower level:

Approx. 4.5 ℓ (4.8 US qt, 4.0 Imp qt)

The proper viscosity oil helps the engine maintain its ideal temperature, and cranking speed increased by reducing viscosity friction in hot condition.

CAUTION:

When replacing 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 standard and SAE viscosity No. designated by SUBARU.

NOTE:

If the vehicle is used in areas with very high temperatures or for other heavy duty applications, use oil having the following viscosity: API Standard: SM
SAE Viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50

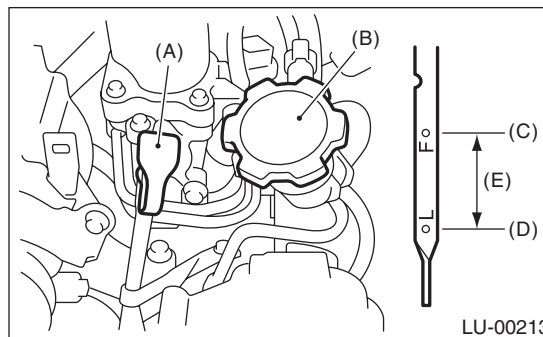
5) Close the engine oil filler cap.

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

7) Stop the engine to inspect the oil level again.
<Ref. to PM-10, INSPECTION, Engine Oil.>

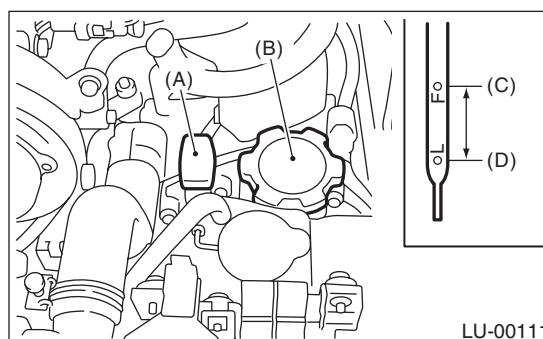
B: INSPECTION

- 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 the level gauge again and record the oil level. If the engine oil level is below the “L” line, add oil to bring the level up to the “F” line.
- 2.5 L model



- (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)

- 3.0 L model



- (A) Oil level gauge
- (B) Oil filler cap
- (C) Upper level
- (D) Lower level

5) After turning off the engine, wait a few minutes for the oil to drain back into the 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 engine oil. (2.5 L model)

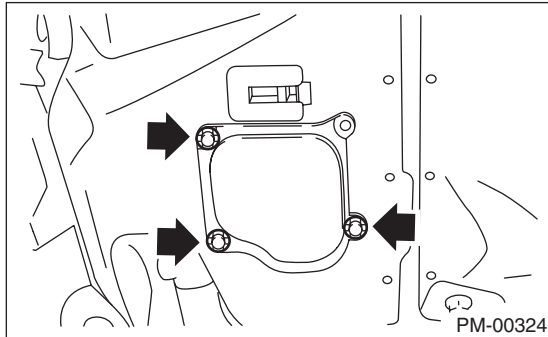
7) To prevent overfilling the engine oil, do not add oil above the “F” line when the engine is cold.

4. Engine Oil Filter

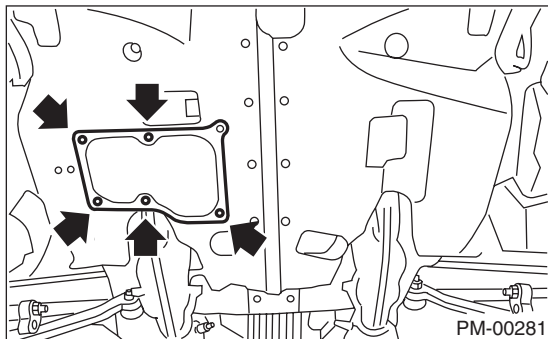
A: REPLACEMENT

1) Remove the service hole cover clip.

- 2.5 L model

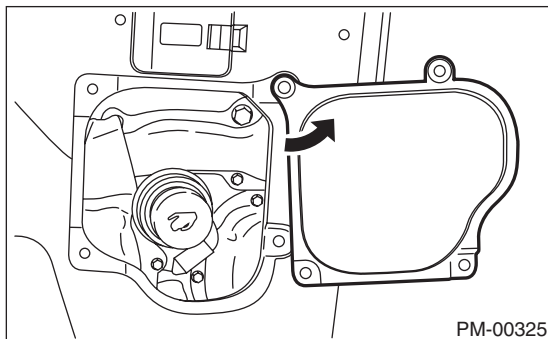


- 3.0 L model

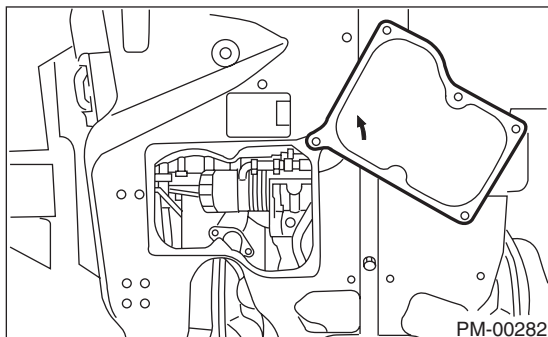


2) Rotate the service hole cover in the direction of the arrow.

- 2.5 L model



- 3.0 L model



3) Remove the oil filter using ST.

- 3.0 L model

ST 49857000

OIL FILTER WRENCH (Outer diameter: 80 mm (3.15 in))

- 2.5 L model

ST 18332AA000

OIL FILTER WRENCH (Outer diameter: 68 mm (2.68 in))

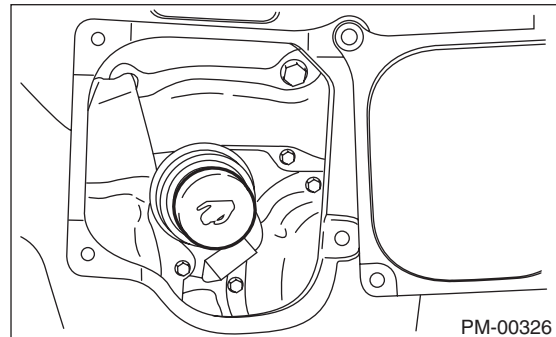
ST 18332AA010

OIL FILTER WRENCH (Outer diameter: 65 mm (2.56 in))

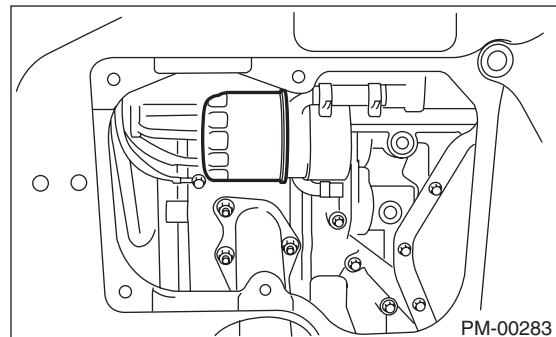
NOTE:

However, in 2.5 model, SUBARU genuine oil filter having outer diameter of 68 mm (2.68 in) or 65 mm (2.6 in) can also be used.

- 2.5 L model



- 3.0 L model



4) Obtain a new oil filter and apply a thin coat of engine oil to the seal rubber.

5) To install the oil filter, turn the filter by hand while being careful not to damage the seal rubber. When the seal rubber just touches the oil cooler, tighten by using a torque wrench or turn the filter by the specified amount.

CAUTION:

Do not tighten excessively, or oil may leak.

- Oil filter 80 mm (3.15 in) in outer diameter
14 N·m (1.4 kgf-m, 10.3 ft-lb) or tighten 3/4 rotation.
- Oil filter 68 mm (2.68 in) in outer diameter
14 N·m (1.4 kgf-m, 10.3 ft-lb) or tighten rotation.
- Oil filter 65 mm (2.56 in) in outer diameter
12 N·m (1.2 kgf-m, 8.7 ft-lb) or tighten 2/3 — 3/4 rotation.

Engine Oil Filter

PERIODIC MAINTENANCE SERVICES

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 jointed; therefore, interior cleaning is not necessary.

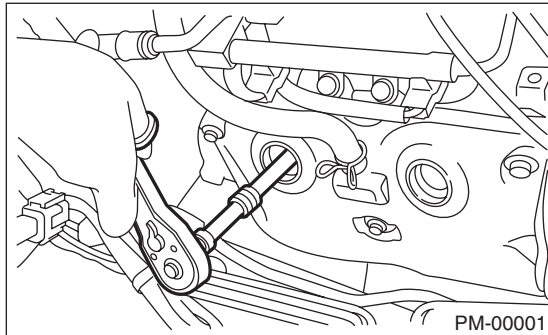
7) Check the engine oil level. <Ref. to PM-10, INSPECTION, Engine Oil.>

5. Spark Plug

A: REPLACEMENT

1. 2.5 L NON-TURBO MODEL

- 1) Remove the intake duct and intake chamber.
- 2) Remove the battery.
- 3) Disconnect the spark plug cord.
- 4) Remove the spark plug with a spark plug socket.



- 5) Tighten the new spark plug lightly with hand, and then secure with a spark plug socket to the specified torque.

Recommended spark plug:
NGK: FR5AP-11

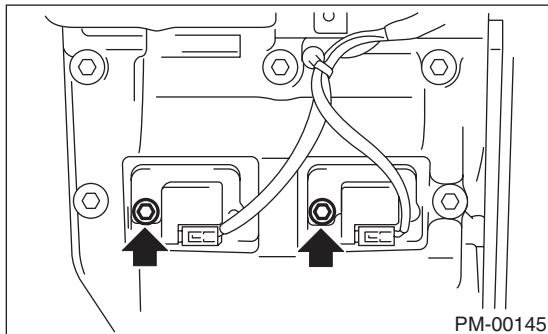
Tightening torque:
21 N·m (2.1 kgf-m, 15.2 ft-lb)

NOTE:

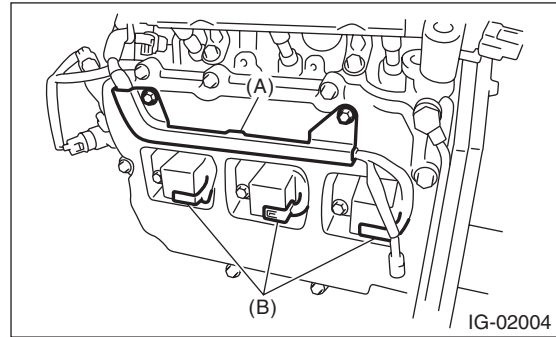
- Be sure to place the gasket between the cylinder head and spark plug.
- If the torque wrench is not available, tighten the spark plug until gasket contacts cylinder head; then tighten further 1/4 to 1/2 turns.

2. 2.5 L TURBO AND 3.0 L MODEL

- 1) Remove the battery and battery carrier.
 - 2) Remove the air cleaner case.
 - 3) Detach the connector from ignition coil.
 - 4) Remove the ignition coil.
- 2.5 L turbo model

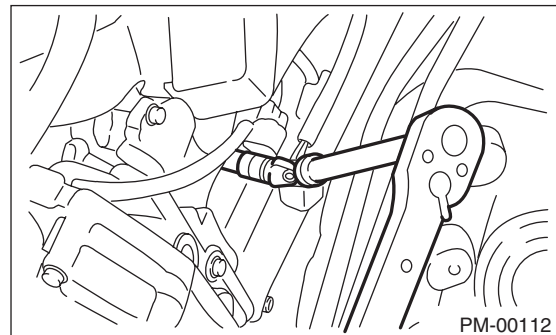


- 3.0 L model



- (A) Bracket
(B) Connector

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



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

Recommended spark plug:
NGK: ILFR6B

Tightening torque:
21 N·m (2.1 kgf-m, 15.2 ft-lb)

- 7) 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 the 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. 2.5 L NON-TURBO AND 2.5 L TURBO MODEL

- 1) Replace the belts if cracks, fraying or wear are found.
- 2) Check the V-belt tension and adjust it if necessary by changing the generator installing position or idler pulley installing position. <Ref. to PM-15, REPLACEMENT, V-belt.>

Belt tension (without belt tension gauge):

(A)

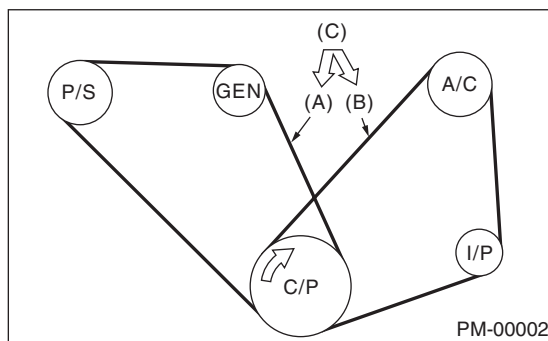
When installing new part: 7 — 9 mm (0.276 — 0.354 in)

At inspection: 9 — 11 mm (0.354 — 0.433 in)

(B)

When installing new part: 7.5 — 8.5 mm (0.295 — 0.335 in)

At inspection: 9.0 — 10.0 mm (0.354 — 0.394 in)



- (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

Belt tension (with belt tension gauge):

(A)

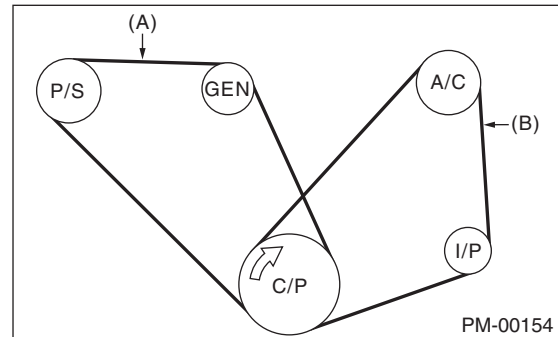
When installing new part: 640 — 785 N (65.3 — 80.0 kgf, 144 — 176 lbf)

At inspection: 490 — 640 N (50 — 65 kgf, 110 — 144 lbf)

(B)

When installing new part: 620 — 760 N (63 — 77 kgf, 140 — 170 lbf)

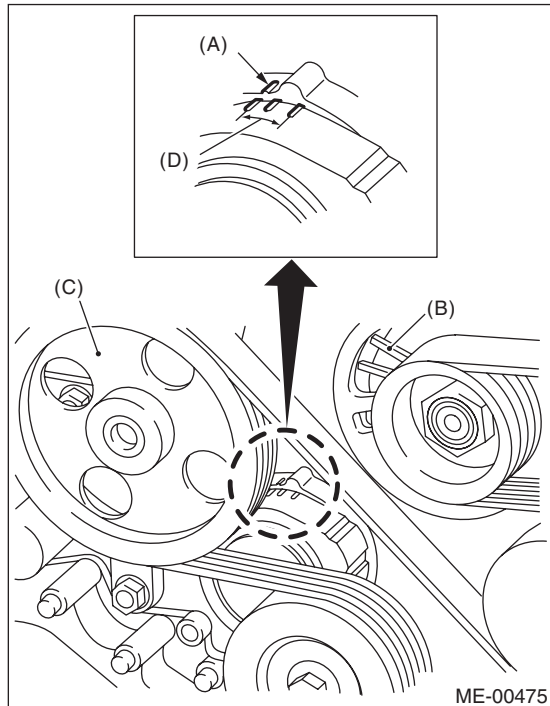
At inspection: 350 — 450 N (36 — 46 kgf, 79 — 101 lbf)



- (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

2. 3.0 L MODEL

- 1) Replace the belts if cracks, fraying or wear are found.
- 2) Check that the V-belt automatic belt tensioner indicator (A) is within the range (D).



- (A) Indicator
- (B) Generator
- (C) Power steering oil pump
- (D) Service limit

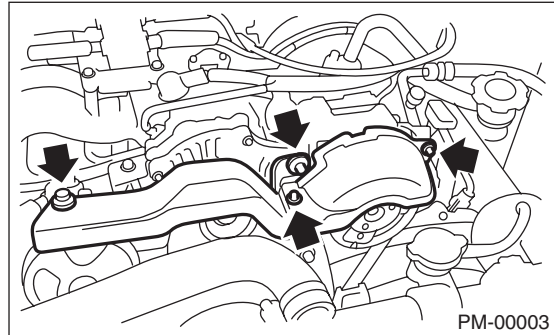
B: REPLACEMENT

1. FRONT SIDE BELT (FOR POWER STEERING OIL PUMP AND GENERATOR)

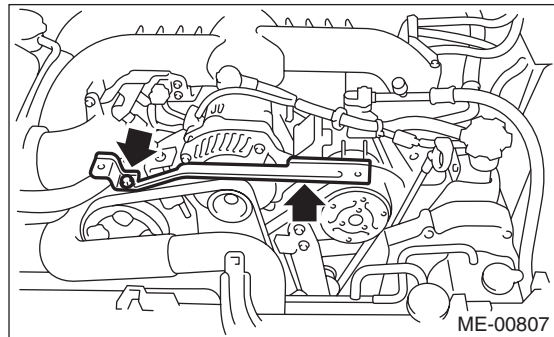
NOTE:

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

- 1) Remove the collector cover. (If equipped)
 - 2) Remove the V-belt covers.
- 2.5 L non-turbo model



- 2.5 L turbo model



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

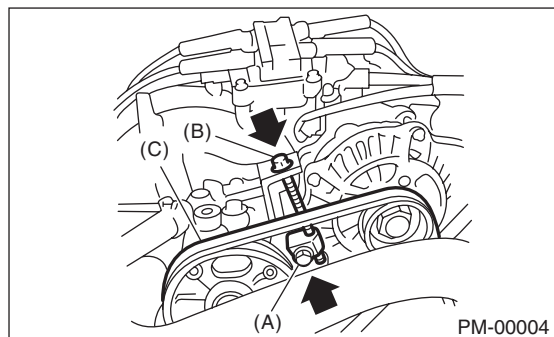
Tightening torque:

Lock bolt

25 N·m (2.5 kgf-m, 18.1 ft-lb)

Slider bolt

8 N·m (0.8 kgf-m, 5.8 ft-lb)



2. REAR SIDE BELT (FOR A/C)

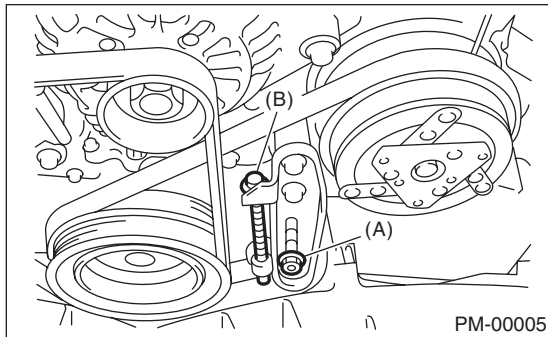
NOTE:

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

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

Tightening torque:

23 N·m (2.3 kgf-m, 17.0 ft-lb)

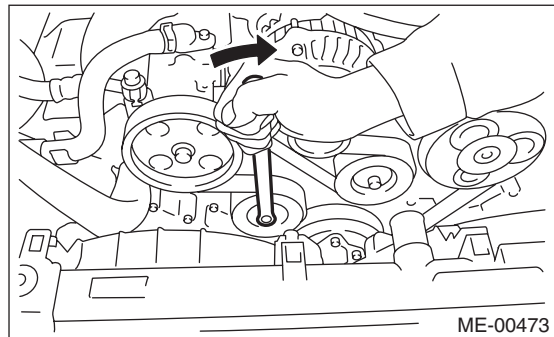


- 7) Install the front side belt.

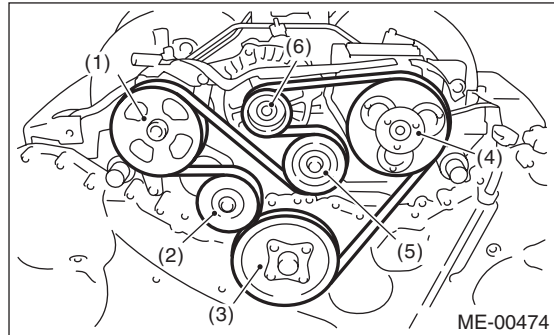
- 2.5 L non-turbo model <Ref. to ME(H4SO)-36, FRONT SIDE BELT, INSTALLATION, V-belt.>
- 2.5 L turbo model <Ref. to ME(H4DOTC)-37, FRONT SIDE BELT, INSTALLATION, V-belt.>

3. 3.0 L MODEL

- 1) Fit the tool to the belt tensioner mounting bolt.
- 2) Turn the tool clockwise, and loosen the V-belt to remove.



- 3) Remove the V-belt cover.
- 4) Install in the reverse order of removal.



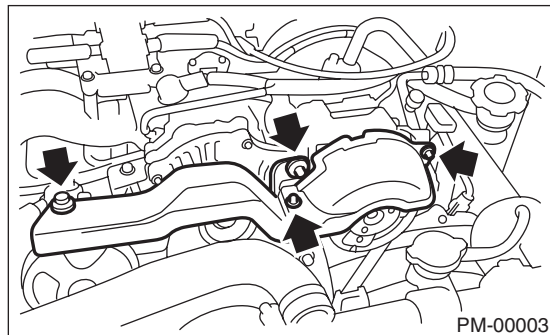
- (1) Power steering oil pump
- (2) Belt tension adjuster
- (3) Crank pulley
- (4) A/C compressor
- (5) Belt idler
- (6) Generator

7. Timing Belt

A: REPLACEMENT

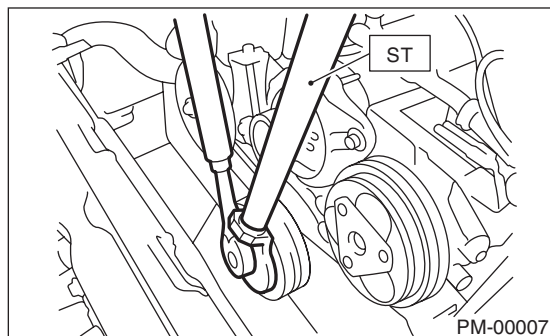
1. 2.5 L NON-TURBO MODEL

- 1) Protect the radiator with cardboard and blanket.
- 2) Remove the V-belt covers.



- 3) Remove the V-belts. <Ref. to ME(H4SO)-36, V-belt.>
- 4) Remove the A/C compressor V-belt tensioner.
- 5) Use the ST to lock the crankshaft, and remove the pulley bolt.

ST 499977100 CRANK PULLEY WRENCH

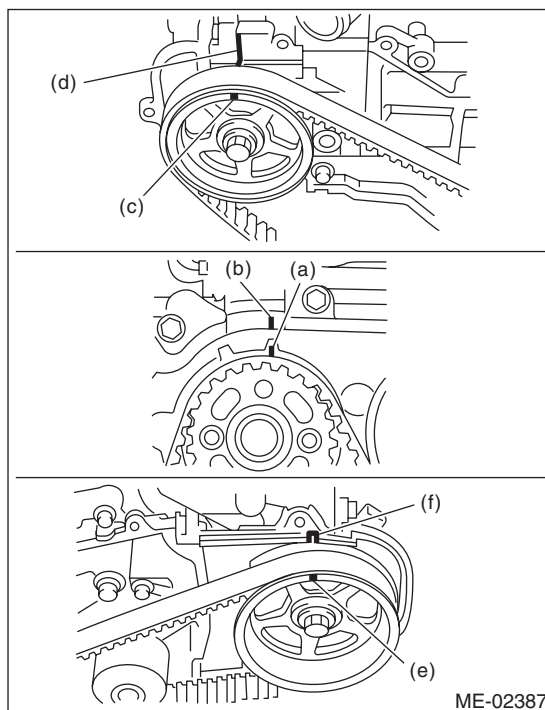
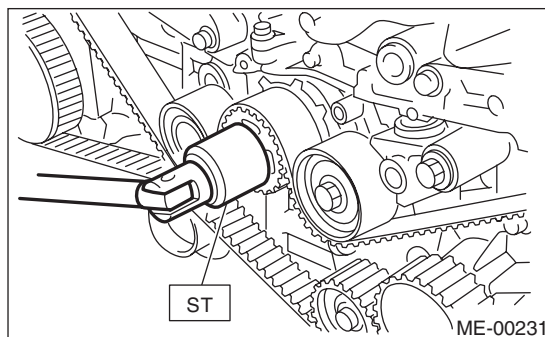


- 6) Remove the crank pulley.
- 7) Remove the belt cover (LH).
- 8) Remove the front timing belt cover.
- 9) Remove the timing belt guide. (MT model)

10) If the alignment mark (a) or arrow mark (which indicates rotation direction) on the timing belt has faded away, put new marks on the belt before removing as shown in procedures below.

- (1) Use the ST to turn crankshaft. Align the mark (a) of sprocket to the cylinder block notch (b), and then ensure the right side cam sprocket mark (c), cam cap and cylinder head matching surface (d) or left side cam sprocket mark (e), timing belt cover notch (f) are properly adjusted.

ST 499987500 CRANKSHAFT SOCKET

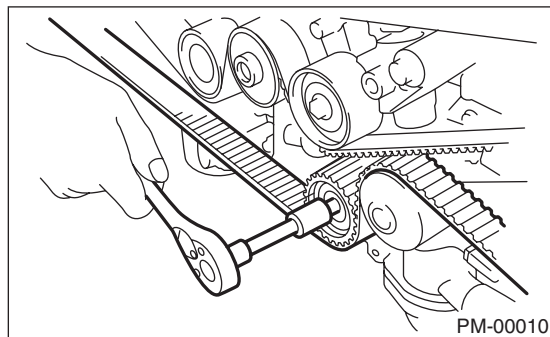


- 11) Remove the belt idler.

Timing Belt

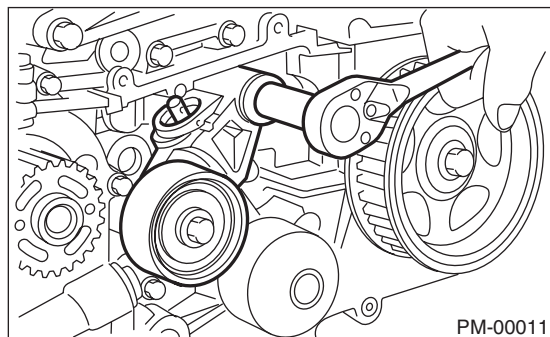
PERIODIC MAINTENANCE SERVICES

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



13) Remove the timing belt.

14) Remove the automatic belt tension adjuster assembly.



15) Install in the reverse order of removal. <Ref. to ME(H4SO)-41, INSTALLATION, Timing Belt.>

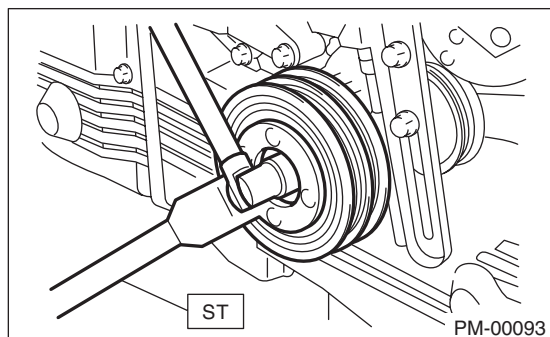
2. 2.5 L TURBO MODEL

1) Protect the radiator with cardboard and blanket.
2) Remove the V-belts. <Ref. to ME(H4DOTC)-36, V-belt.>

3) Remove the A/C compressor V-belt tensioner.

4) Remove the pulley bolt. Using the ST, lock the crankshaft.

ST 499977100 CRANK PULLEY WRENCH



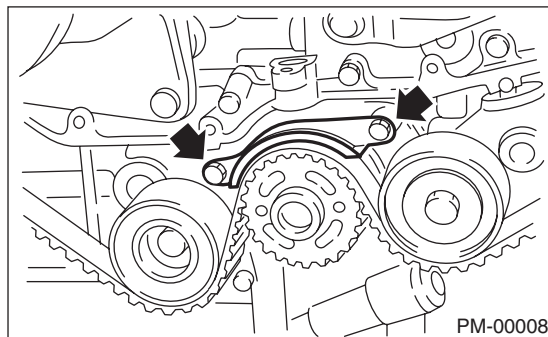
5) Remove the crank pulley.

6) Remove the belt cover (LH).

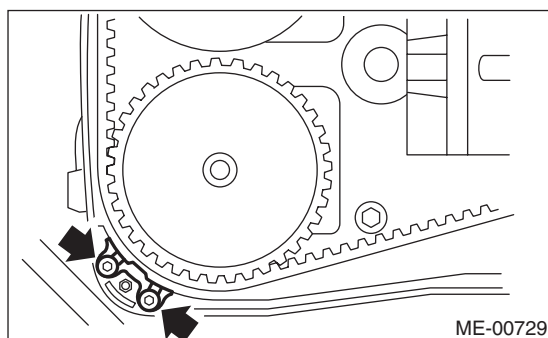
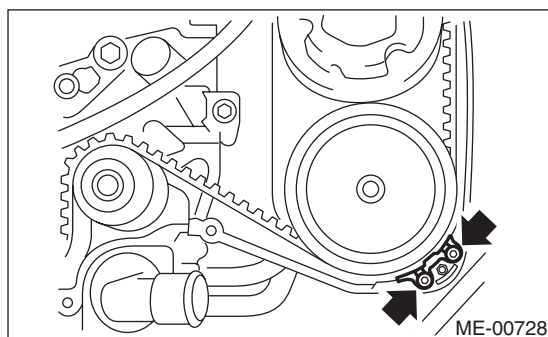
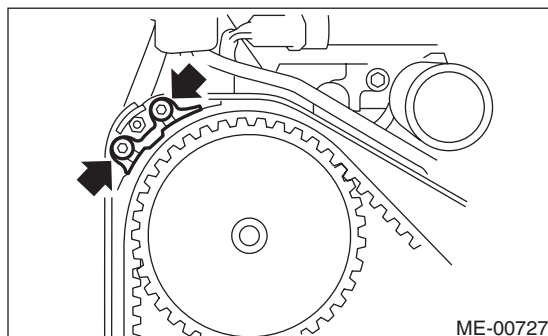
7) Remove the belt cover (RH).

8) Remove the front belt cover.

9) Remove the timing belt guide.

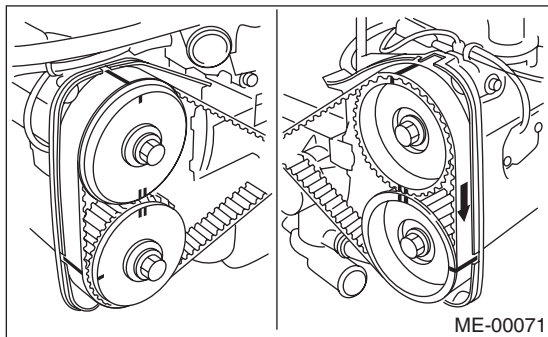
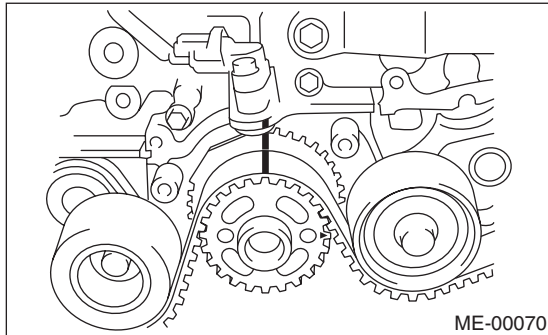


MT model

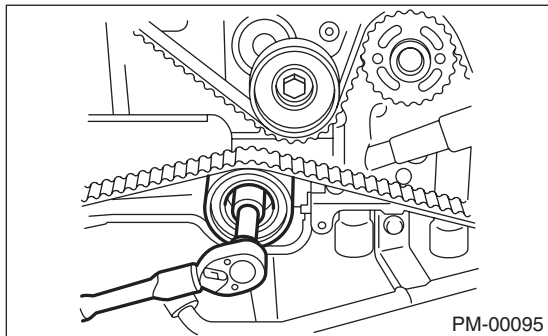


10) Turn the crankshaft and align the alignment marks on crankshaft, and left and right cam sprockets with notches of belt cover and cylinder block. Use the ST to turn crankshaft.

ST 499987500 CRANKSHAFT SOCKET

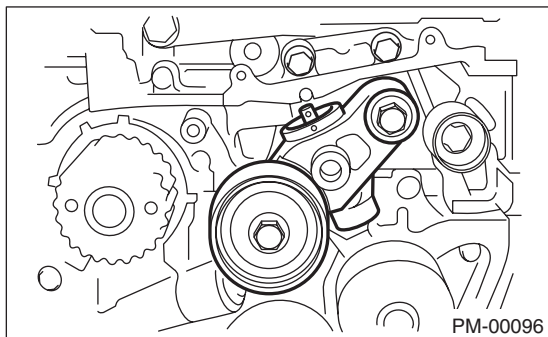


11) Remove the belt idler.



12) Remove the timing belt.

13) Remove the automatic belt tension adjuster assembly.



14) Install in the reverse order of removal. <Ref. to ME(H4DOTC)-42, Timing Belt.>

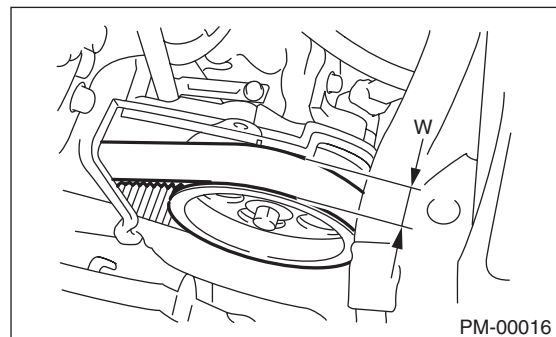
CAUTION:

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. 2.5 L NON-TURBO MODEL

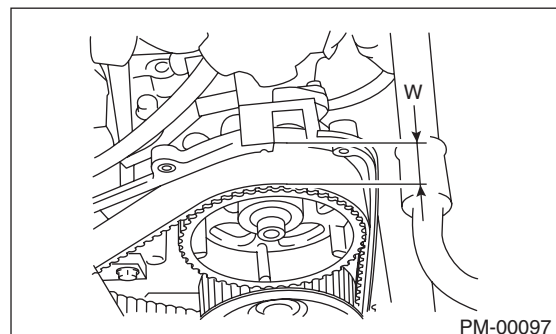
- 1) Remove the front timing belt cover and timing belt cover (LH).
- 2) While cranking engine at least four rotations, check the timing belt back surface for cracks or damage. Replace the faulty timing belt as needed.
- 3) Measure the timing belt width W. If it is less than 27 mm (1.06 in), check the 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. 2.5 L TURBO MODEL

- 1) Remove the timing belt cover (LH).
- 2) While cranking 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 29 mm (1.14 in), check the 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 band, etc. If faulty parts are found, repair or replace them.

- 2.5 L non-turbo model

<Ref. to FU(H4SO)-56, Fuel Delivery and Evaporation Lines.>

- 2.5 L turbo model

<Ref. to FU(H4DOTC)-60, Fuel Delivery, Return and Evaporation Lines.>

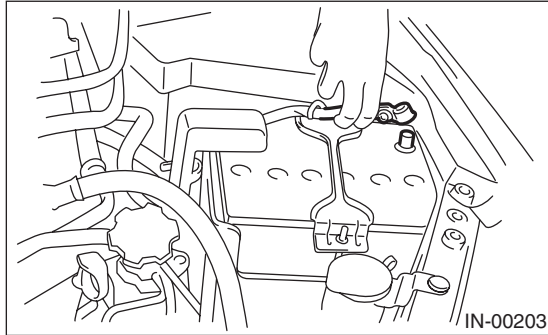
- 3.0 L model

<Ref. to FU(H6DO)-56, Fuel Delivery, Return and Evaporation Lines.>

9. Air Cleaner Element

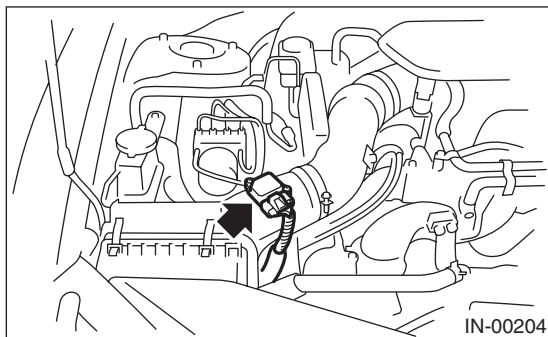
A: REPLACEMENT

1) Disconnect the ground cable from battery.

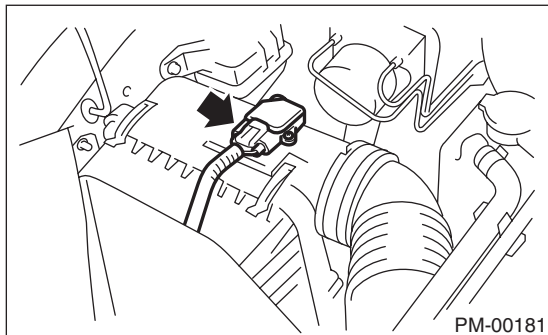


2) Disconnect the connector from mass air flow sensor.

- Non-turbo model



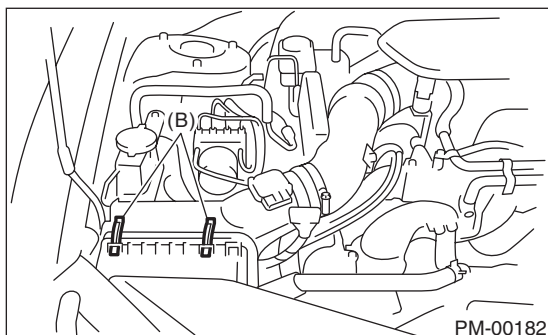
- Turbo model



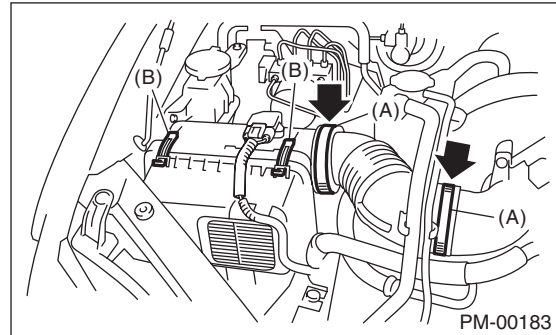
3) Loosen the clamps (A) which connect the air cleaner case to intake duct. (Turbo model)

4) Remove the clips (B) on air cleaner case.

- Non-turbo model

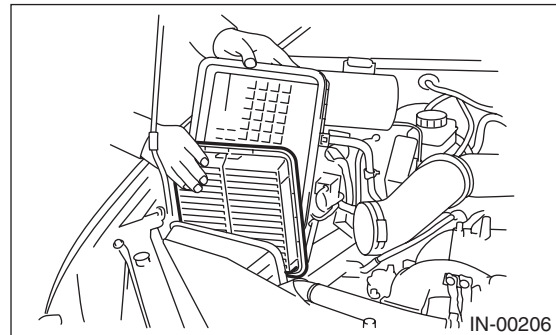


- Turbo model



5) Remove the air cleaner case (rear).

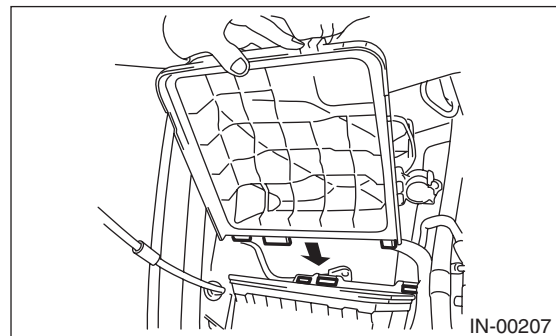
6) Remove the air cleaner element.



7) Install in the reverse order of removal.

NOTE:

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



- Refer to "COMPONENT" for tightening torque.

2.5 L non-turbo model

<Ref. to IN(H4SO)-2, COMPONENT, General Description.>

2.5 L turbo model

<Ref. to IN(H4DOTC)-2, COMPONENT, General Description.>

3.0 L model

<Ref. to IN(H6DO)-2, COMPONENT, General Description.>

10. Cooling System

A: INSPECTION

1) To check the radiator for leakage, fill it with engine coolant, and attach the radiator cap tester (A) to the filler neck, and apply pressure. Check the following points:

Non-turbo model:

157 kPa (1.6 kg/cm², 23 psi)

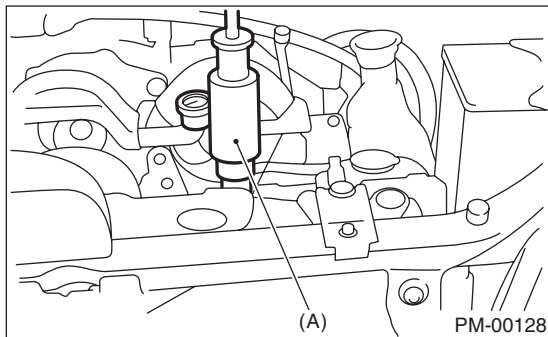
Turbo model:

122 kPa (1.2 kg/cm², 18 psi)

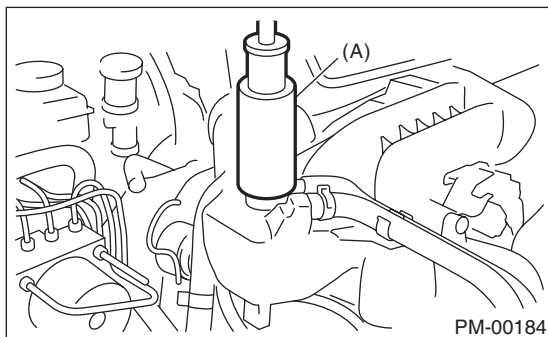
- Each portion of radiator for leakage
- Hose joints and other connections for leakage

NOTE:

- For turbo model, be sure to install the tester to filler tank side.
- Be particularly careful not to deform the filler neck of radiator when installing and removing the tester and after testing.
 - Non-turbo model



- Turbo model



- When performing this check, be sure to keep the engine stationary and fill radiator with coolant.
 - Wipe off check points before applying pressure.
 - Use care not to spill coolant when detaching 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 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 five to six 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:

93 — 123 kPa (0.95 — 1.25 kg/cm², 14 — 18 psi)

Service limit:

83 kPa (0.85 kg/cm², 12 psi)

Turbo model

Filler tank side

Standard:

93 — 123 kPa (0.95 — 1.25 kg/cm², 14 — 18 psi)

Service limit:

83 kPa (0.85 kg/cm², 12 psi)

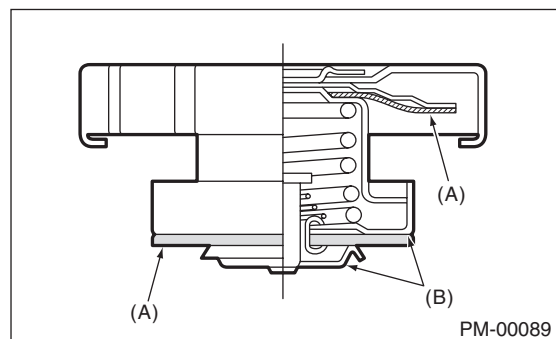
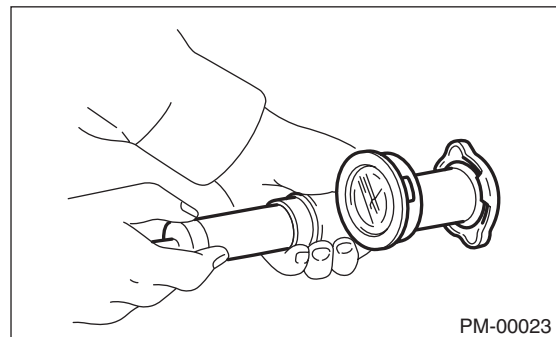
Radiator side

Standard:

122 — 152 kPa (1.24 — 1.55 kg/cm², 18 — 22 psi)

Service limit:

112 kPa (1.14 kg/cm², 16 psi)



- (A) Check points for deformation
- (B) Check points for 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.

- 2.5 L non-turbo model

<Ref. to CO(H4SO)-14, Water Pump.> <Ref. to CO(H4SO)-17, Thermostat.> <Ref. to CO(H4SO)-19, Radiator.> <Ref. to CO(H4SO)-22, Radiator Cap.>

- 2.5 L turbo model

<Ref. to CO(H4DOTC)-15, Water Pump.> <Ref. to CO(H4DOTC)-17, Thermostat.> <Ref. to CO(H4DOTC)-19, Radiator.> <Ref. to CO(H4DOTC)-23, Radiator Cap.>

- 3.0 L model

<Ref. to CO(H6DO)-12, Water Pump.> <Ref. to CO(H6DO)-13, Thermostat.> <Ref. to CO(H6DO)-14, Radiator.> <Ref. to CO(H6DO)-17, Radiator Cap.>

4) Check the radiator fan operates using Subaru Select Monitor, when the coolant temperature exceeds 96°C (205°F). If it does not operate, check the radiator fan system.

- 2.5 L non-turbo model

<Ref. to CO(H4SO)-8, INSPECTION, Radiator Fan System.>

- 2.5 L turbo model

<Ref. to CO(H4DOTC)-9, INSPECTION, Radiator Fan System.>

- 3.0 L model

<Ref. to CO(H6DO)-8, INSPECTION, Radiator Fan System.>

11.Engine Coolant

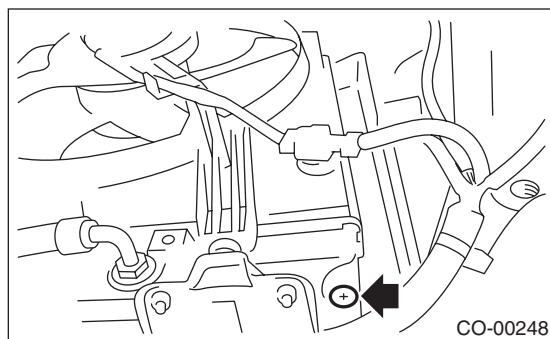
A: REPLACEMENT

1. REPLACEMENT OF ENGINE 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) Remove the drain cock to drain engine coolant into container.



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

NOTE:

- For turbo model, be sure to open the radiator cap on the 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) Pour cooling system conditioner through the filler neck.

Cooling system protective agent:

Cooling system conditioner (part No. SOA635071)

- 9) Pour the engine coolant into the radiator (or the coolant filler tank on turbo models) up to the filler neck position.

- 10) Fill engine coolant into the reservoir tank up to "FULL" level.

Recommended engine coolant:

Refer to "RM" section. <Ref. to RM-4, COOLANT, RECOMMENDED MATERIALS, Recommended Materials.>

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

2.5 L non-turbo model

MT model

Approx. 6.4 ℓ (6.8 US qt, 5.6 Imp qt)

AT model

Approx. 6.3 ℓ (6.7 US qt, 5.5 Imp qt)

2.5 L turbo model

MT model

Approx. 7.2 ℓ (7.6 US qt, 6.3 Imp qt)

AT model

Approx. 7.3 ℓ (7.7 US qt, 6.4 Imp qt)

3.0 L model

Approx. 7.2 ℓ (7.6 US qt, 6.3 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.

- 11) Close the radiator cap (or the coolant filler tank cap on turbo models), and start the engine. Race 5 to 6 times at 3,000 rpm or less, then stop the engine. (Complete this operation within 40 seconds.)

- 12) Wait for one minute after the engine stops, then open the radiator cap (or the coolant filler tank cap on turbo models). If the engine coolant level drops, add engine coolant into the radiator (or the coolant filler tank on turbo models) up to the filler neck position.

- 13) Perform the procedures 11) and 12) again.

- 14) Install the radiator cap (or the coolant filler tank cap on turbo models) and reservoir tank cap properly.

- 15) Start the engine and operate the heater at maximum hot position and the blower speed setting to "LO".

- 16) Run the engine at 2,000 rpm or less until radiator fan starts and stops.

NOTE:

- Be careful with the engine coolant temperature gauge to prevent overheating.
- If the radiator hose becomes harden by engine coolant pressure at this time, air purge seems to be mostly completed.

- 17) Stop the engine and wait until the engine coolant temperature lowers to 30°C (86°F).

18) Open the radiator cap (or the coolant filler tank cap on turbo models). If the engine coolant level drops, add engine coolant into the coolant filler tank up to the filler neck position and the reservoir tank to "FULL" level.

19) Install the radiator cap (or the coolant filler tank cap on turbo models) and reservoir tank cap properly.

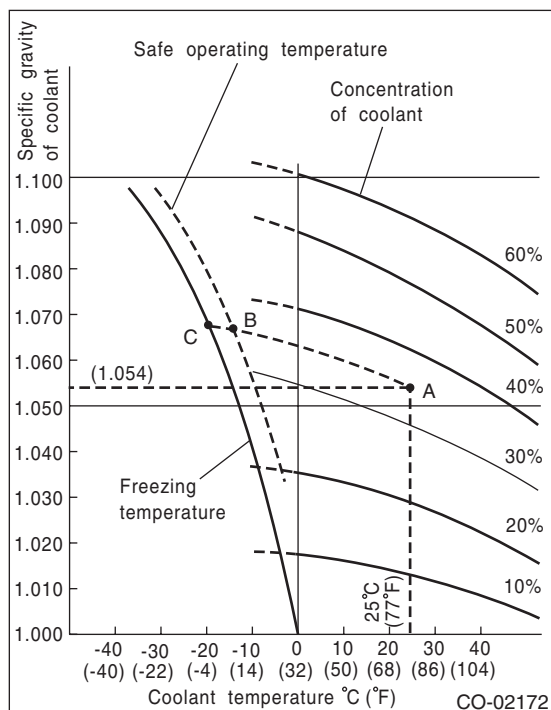
20) Set the heater setting to maximum hot position and the blower speed setting to "LO" and start the engine. Perform racing at less than 3,000 rpm. If the flowing sound is heard from heater core, repeat the procedures from step 16).

2. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

The concentration and safe operating temperature of 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).



3. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

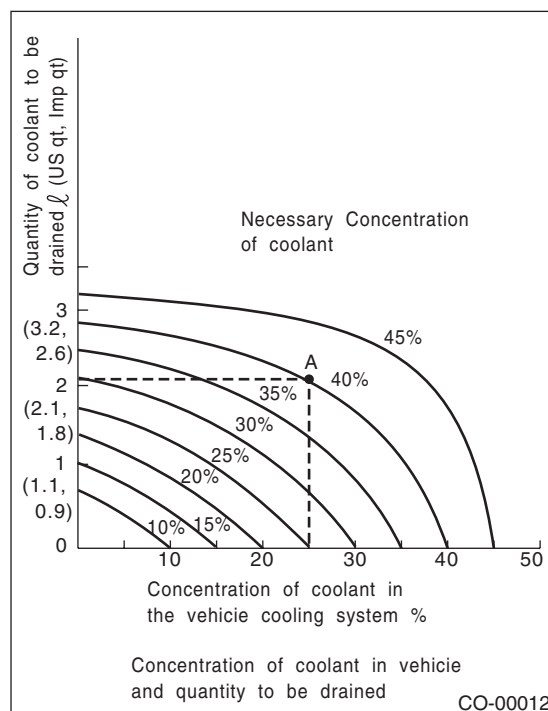
To adjust the concentration of coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU genuine coolant (concentration 50%).

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

[Example]

Assume that the engine coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of engine coolant concentration intersects with the 40% curve of the necessary engine 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.



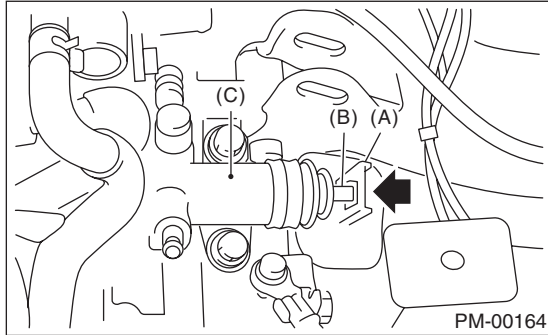
Clutch System

PERIODIC MAINTENANCE SERVICES

12.Clutch System

A: INSPECTION AND ADJUSTMENT

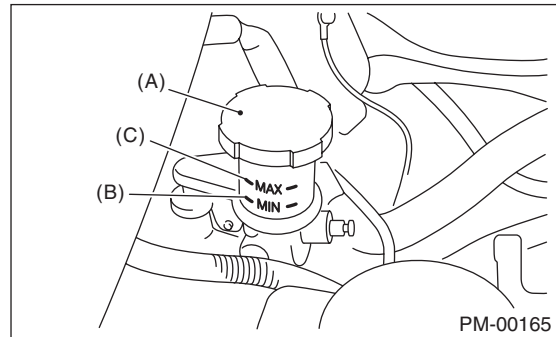
1) Push the release lever to retract the push rod of the operating cylinder and check if the fluid level in the clutch reservoir tank rises or not.



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

NOTE:

- Avoid mixing different brands 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

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-23, Clutch Pedal.>

4) Check the fluid level using the scale on the outside of the clutch reservoir 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:

Refer to "RM" section. <Ref. to RM-3, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

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.

13. Transmission Gear Oil

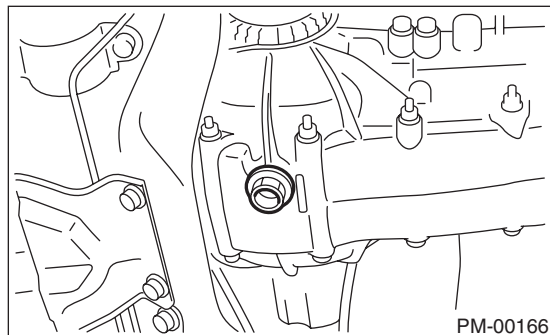
A: REPLACEMENT

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.



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

Tightening torque:

69 N·m (7.0 kgf·m, 50.6 ft·lb)

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

Recommended gear oil:

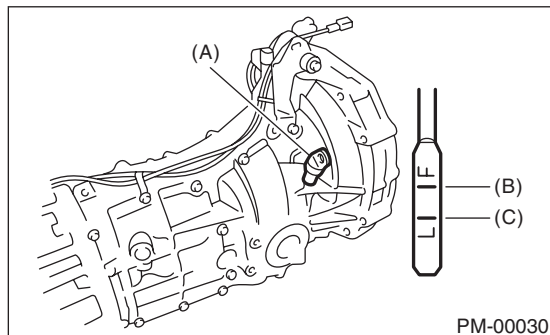
Refer to “RM” section. <Ref. to RM-2, LUBRICANTS, RECOMMENDED MATERIALS, Recommended Materials.>

NOTE:

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

Gear oil capacity:

3.5 ℓ (3.7 US qt, 3.1 Imp qt)



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

14. Automatic Transmission Fluid

A: INSPECTION

CAUTION:

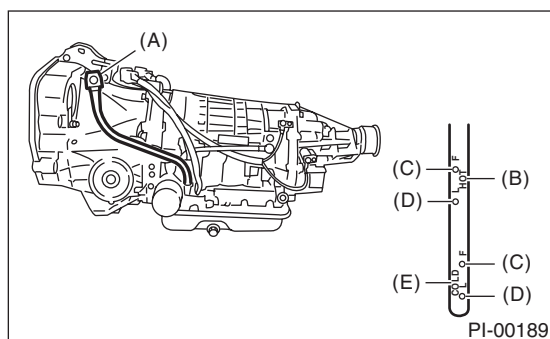
The level of ATF varies with fluid temperature. Pay attention to the fluid temperature when checking ATF level.

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(diag)-15, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>

2) Make sure the vehicle is level.

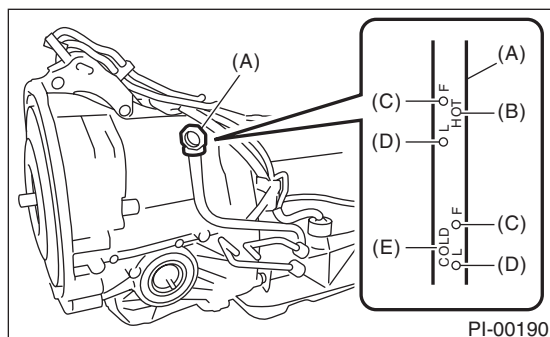
3) After selecting all positions (P, R, N, D), shift the select lever in “P” range. Idle the engine for 1 — 2 minutes, and measure the ATF level.

- 4AT model



- (A) Level gauge
- (B) ATF level range at “HOT” [70 — 80°C (158 — 176°F)]
- (C) Upper level
- (D) Lower level
- (E) ATF level range at “COLD” [20 — 30°C (68 — 86°F)]

- 5AT model



- (A) Level gauge
- (B) ATF level range at “HOT” [70 — 80°C (158 — 176°F)]
- (C) Upper level
- (D) Lower level
- (E) ATF level range at “COLD” [20 — 30°C (68 — 86°F)]

4) Make sure that ATF level is above the center of upper and lower marks at “HOT” side.

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

CAUTION:

- Use care not to exceed the upper limit level.
- Adding ATF to the upper limit mark on “HOT” side when the ATF temperature is below 70°C (158°F) will 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

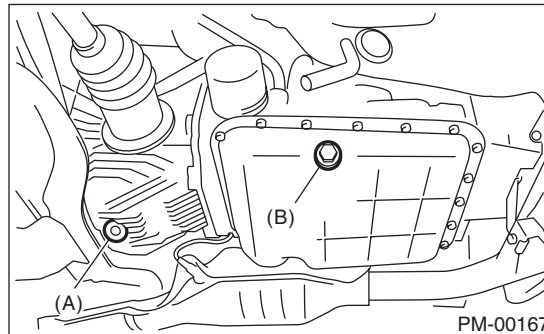
1. AUTOMATIC TRANSMISSION FLUID

1) Drain the ATF by removing drain plug.

NOTE:

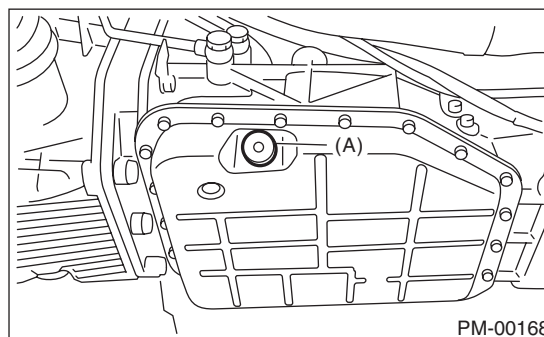
Before starting work, cool off the ATF well.

- 4AT model



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

- 5AT model



- (A) ATF drain plug

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

Tightening torque:

4AT model

25 N·m (2.5 kgf-m, 18.1 ft-lb)

5AT model

20 N·m (2.0 kgf-m, 4.5 ft-lb)

3) Pour in the ATF using the oil charge pipe.

Recommended ATF:

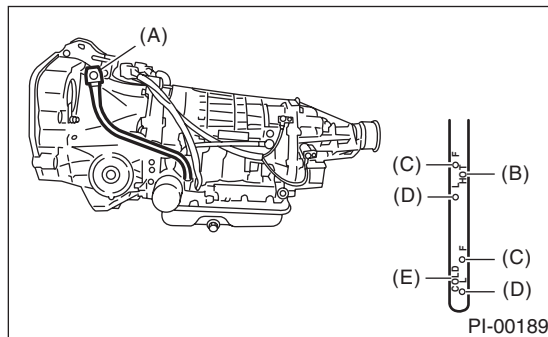
Refer to “RM” section. <Ref. to RM-3, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

Capacity:

Fill the same amount of ATF drained.

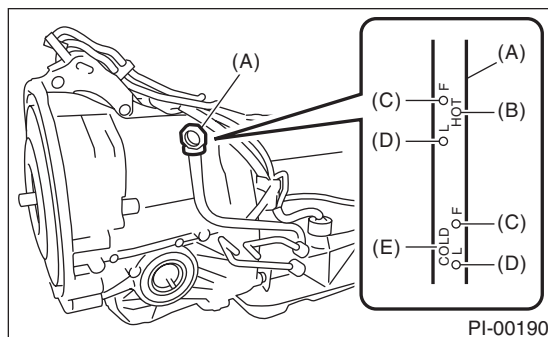
4) Check the ATF level. <Ref. to PM-28, INSPECTION, Automatic Transmission Fluid.>

- 4AT model



- (A) Level gauge
- (B) ATF level range at “HOT” [70 — 80°C (158 — 176°F)]
- (C) Upper level
- (D) Lower level
- (E) ATF level range at “COLD” [20 — 30°C (68 — 86°F)]

- 5AT model



- (A) Level gauge
- (B) ATF level range at “HOT” [70 — 80°C (158 — 176°F)]
- (C) Upper level
- (D) Lower level
- (E) ATF level range at “COLD” [20 — 30°C (68 — 86°F)]

2. ATF FILTER

NOTE:

Basically, the ATF filter is maintenance free, but when it is rusted or physically damaged or leaking, the ATF filter needs to be replaced.

For the replacement procedure of ATF filter, refer to “ATF FILTER”.

- 4AT model
<Ref. to 4AT-61, ATF Filter.>
- 5AT model
<Ref. to 5AT-55, ATF Filter.>

Front & Rear Differential Gear Oil

PERIODIC MAINTENANCE SERVICES

15. Front & Rear Differential Gear Oil

A: REPLACEMENT

1. FRONT DIFFERENTIAL (MT MODEL)

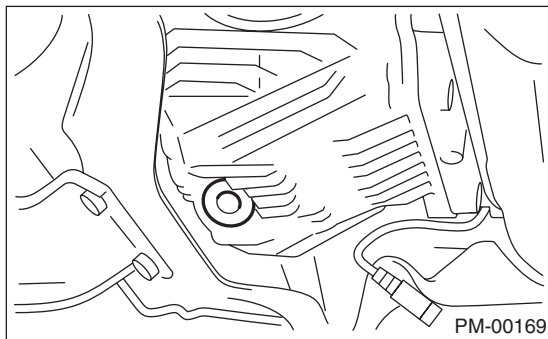
Front differential gear oil for MT model lubricates the transmission and differential together. Refer to "Transmission Oil" for replacement procedure. <Ref. to PM-27, Transmission Gear Oil.>

2. FRONT DIFFERENTIAL (AT MODEL)

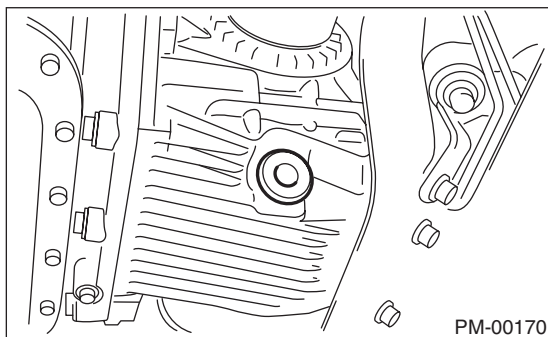
1) Drain the differential gear oil by removing drain plug using TORX® BIT T70.

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.
- 4AT model



- 5AT model



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

Tightening torque:

Copper gasket

70 N·m (7.1 kgf-m, 51.6 ft-lb)

Aluminum gasket

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.

Recommended gear oil:

Refer to "RM" section. <Ref. to RM-2, LUBRICANTS, RECOMMENDED MATERIALS, Recommended Materials.>

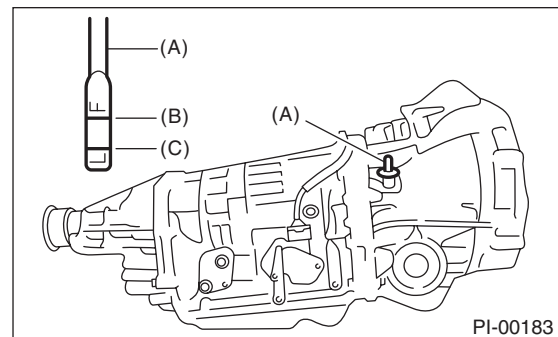
NOTE:

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

Gear oil capacity:

4AT model

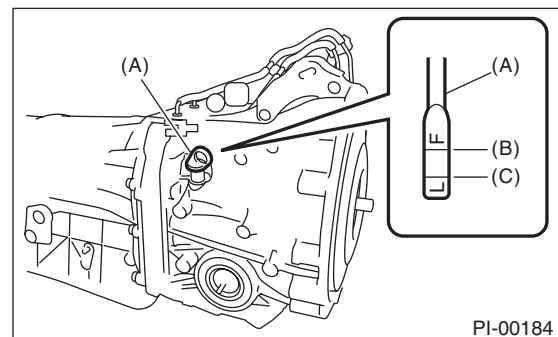
1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)



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

5AT model

1.3 — 1.5 ℓ (1.4 — 1.6 US qt, 1.1 — 1.3 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 for quick draining oil.
- 3) Install the drain plug after draining oil.

NOTE:

- Apply liquid gasket to the drain plug threads for T-type.
- Use a new gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No.004403010)

Tightening torque:

T-TYPE

49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

VA1-type

34 N·m (3.5 kgf-m, 25.3 ft-lb)

VA2-type

29 N·m (3.0 kgf-m, 21.4 ft-lb)

- 4) Pour oil to the bottom end of filler plug hole.

Recommended gear oil:

Refer to "RM" section. <Ref. to RM-2, LUBRICANTS, RECOMMENDED MATERIALS, Recommended Materials.>

- Except for VA2-type

Oil capacity:

0.8 ℓ (0.8 US qt, 0.7 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.

NOTE:

- Apply liquid gasket to the filler plug threads for T-type.
- Use a new gasket for VA-type.

Liquid gasket:

THREE BOND 1105 (Part No.004403010)

Tightening torque:

T-type

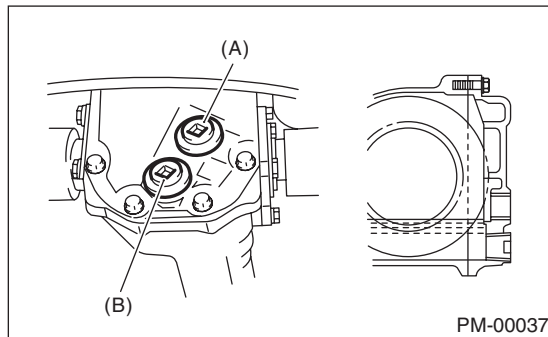
49.0 N·m (5.0 kgf-m, 36.2 ft-lb)

VA1-type

34 N·m (3.5 kgf-m, 25.3 ft-lb)

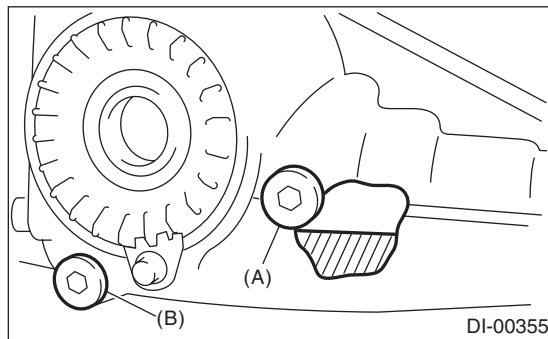
VA2-type

29 N·m (3.0 kgf-m, 21.4 ft-lb)



- (A) Filler plug
- (B) Drain plug

- VA2-type



- (A) Filler plug
- (B) Drain plug

16.Brake Line

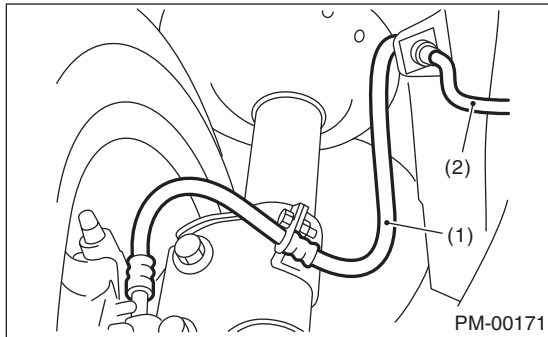
A: INSPECTION

1. BRAKE LINE

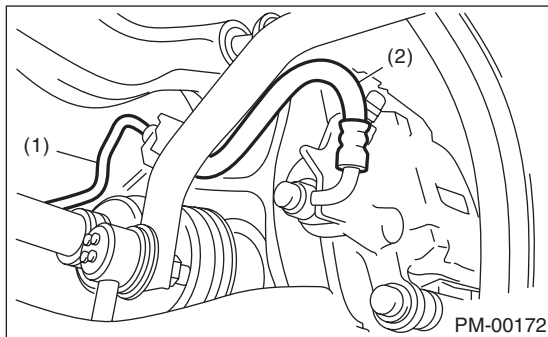
- 1) Check for scratches, swelling, corrosion, traces of fluid leakage on the brake hoses or pipe joints.
- 2) Check the possibility of adjacent parts interfering with brake pipes/hoses during driving, and loose connections/clamps.
- 3) Check any trace of fluid leakage, scratches, etc. on master cylinder,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

NOTE:

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



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



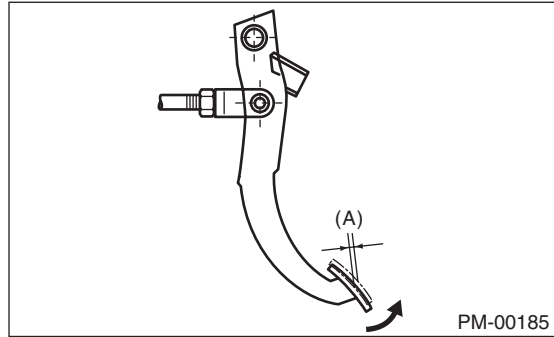
- (1) Rear brake pipe
- (2) Rear brake hose

2. SERVICE BRAKE

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

Brake pedal free play (Pulling up direction of pedal)

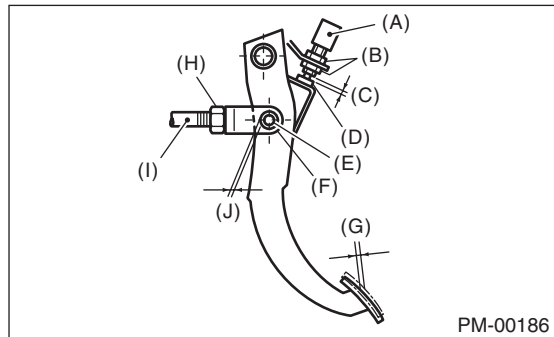
0.5 — 2.0 mm (0.02 — 0.08 in)



(A) Pedal free play

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

- (1) Make 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. [Pulling up the 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) If there is no free play between clevis pin and clevis, turn brake switch adjusting nut until the clearance between stopper and screw of brake switch becomes 0.3 mm (0.012 in).



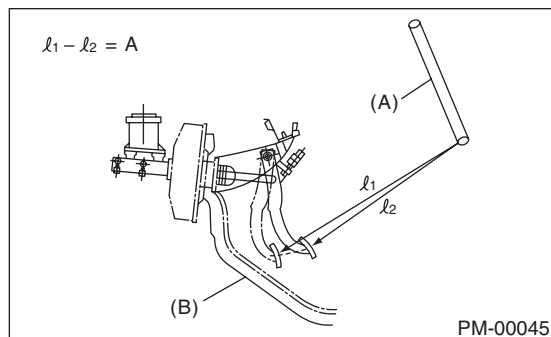
- (A) Brake switch
- (B) Adjusting nut
- (C) 0.3 mm (0.012 in)
- (D) Stopper
- (E) Clevis pin
- (F) Clevis
- (G) Pedal free play
- (H) Lock nut
- (I) Brake booster operating rod
- (J) Play at pin

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 the brake pedal and steering wheel. With the brake pedal released, measure the distance between pedal and steering wheel again. The difference between the two measured values must be less than specified value. If the measured value is more than specification, there is possibility of entering air in hydraulic unit.

Brake pedal stroke A:

95 mm (3.7 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.

3. BRAKE SERVO SYSTEM

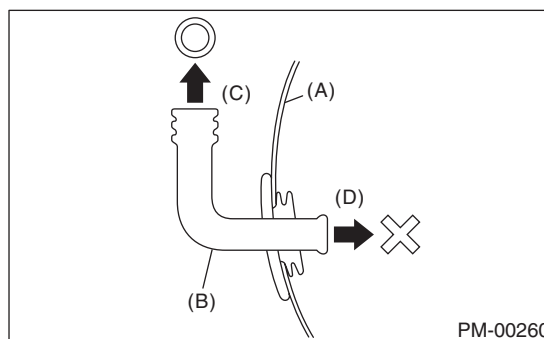
1) With the engine off, depress the brake pedal several times applying the same pedal force. Make sure the travel distance should not change.

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) A check valve is incorporated into the brake booster nipple part. Disconnect the vacuum hose to inspect function of check valve.

Make sure air flows from the booster end to engine end but does not flow in the opposite direction in the check valve.



- (A) Brake booster
- (B) Check valve
- (C) Engine side
- (D) Brake booster side

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 the vacuum hose to make sure it is tightly secured.

17.Brake Fluid

A: REPLACEMENT

- 1) Either jack-up the vehicle and place a rigid rack under it, or lift-up the vehicle.
- 2) Remove all the wheels.
- 3) Drain the brake fluid from master cylinder.
- 4) Refill the reservoir tank with recommended brake fluid.

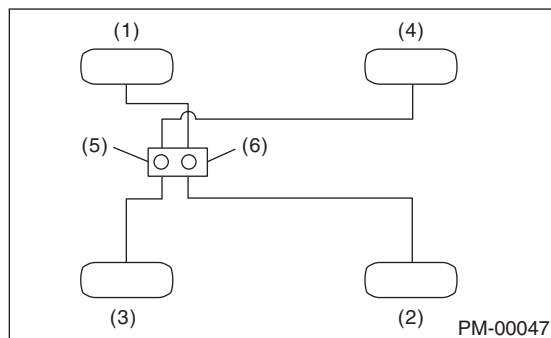
Recommended brake fluid:

Refer to “RM” section. <Ref. to RM-3, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

NOTE:

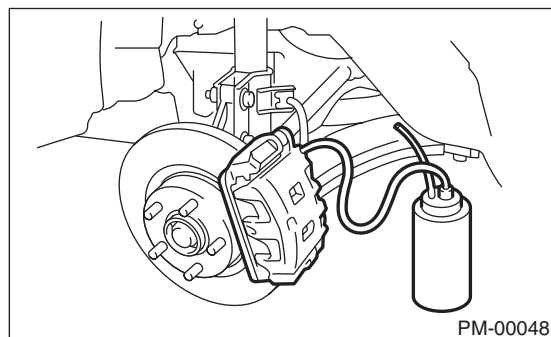
- Avoid mixing different brands of brake fluid to prevent degrading the quality of fluid.
- Be careful not to allow dirt or dust to get into the reservoir tank.

Bleeding sequence (1)→ (2)→ (3)→(4)



- (1) Front RH
- (2) Rear LH
- (3) Front LH
- (4) Rear RH
- (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 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.
 - Operate the brake pedal slowly.
 - For convenience and safety, two people should do the work.
 - The amount of brake fluid required is approx. 500 mℓ (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 approximately 1/4 turn until a small amount of brake fluid drains into the container, and then quickly tighten the screw.
 - 8) Repeat steps 6) and 7) until there are no air bubbles in 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 the 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 steps from 5) to 9).
- 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 confirm 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 confirm brakes are operating properly.

18.Disc Brake Pad and Disc

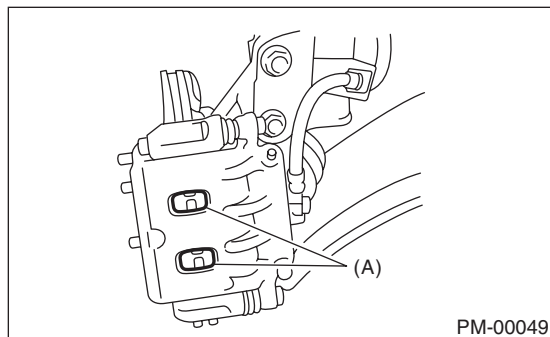
A: INSPECTION

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 left and right wheels at the same time. Also replace the pad clips if they are twisted or worn.



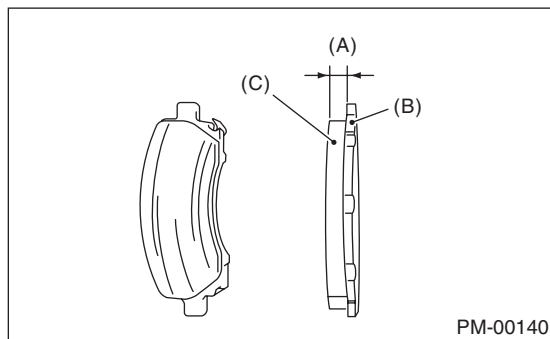
(A) Inspection hole

• Front

Pad thickness			mm (in)
Standard	16-inch	11	(0.43)
	17-inch	11	(0.43)
Wear limit	16-inch	1.5	(0.059)
	17-inch	1.5	(0.059)

• Rear

Pad thickness			mm (in)
Standard	Solid disc type	9	(0.35)
	Ventilated disc type	9	(0.35)
Wear limit	Solid disc type	1.5	(0.059)
	Ventilated disc type	1.5	(0.059)



- (A) Pad thickness
- (B) Back metal
- (C) Lining

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

• Front

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

• Rear

Disc rotor thickness			mm (in)
Standard	Solid disc type	10	(0.39)
	Ventilated disc type	18	(0.71)
Wear limit	Solid disc type	8.5	(0.34)
	Ventilated disc type	16	(0.63)

4) Remove the caliper body. <Ref. to BR-17, Front Disc Brake Assembly.> <Ref. to BR-24, Rear Disc Brake Assembly.>

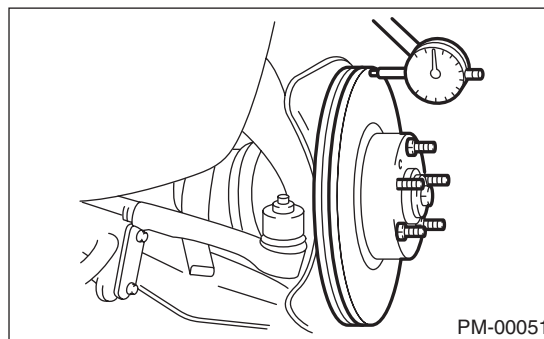
5) Tighten the wheel nuts to secure disk rotor.

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

Disc rotor runout limit:

Front: 0.05 mm (0.002 in)

Rear: 0.05 mm (0.002 in)



19. Parking Brake

A: INSPECTION

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

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

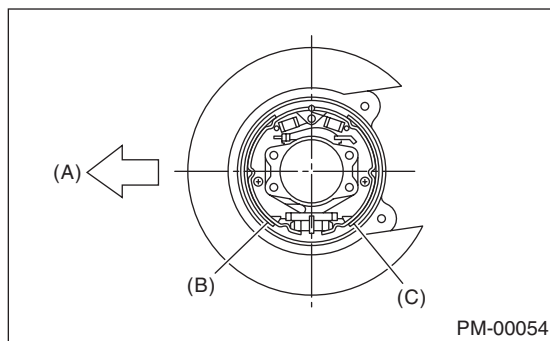
NOTE:

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

Thickness of brake lining (except for back metal):

Standard: 3.2 mm (0.126 in)

Wear limit: 1.5 mm (0.059 in)



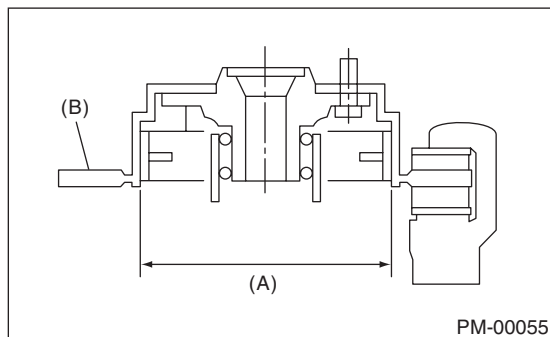
- (A) Forward
- (B) Brake shoe (Primary side)
- (C) Brake shoe (Secondary side)

2) Check the inside of 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:

Standard: 170 mm (6.69 in)

Wear limit: 171 mm (6.73 in)



- (A) Inside diameter
- (B) Disc

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

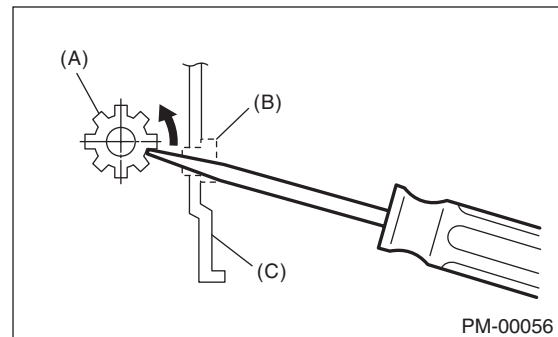
4) When the shoe return spring tension is excessively weakened, replace it.

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 flat-tip screwdriver as shown in the figure.



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

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

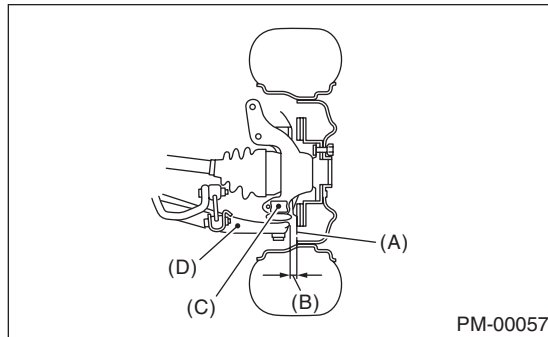
4) Install the cover (rubber) in original position correctly.

20. Suspension

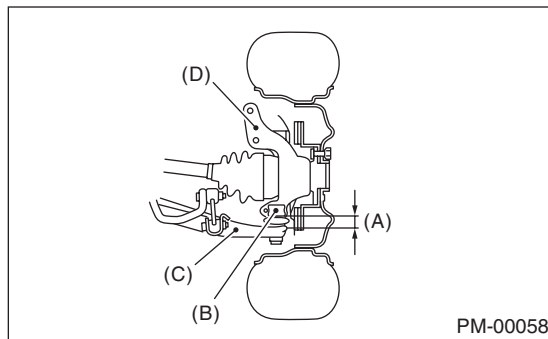
A: INSPECTION

1. SUSPENSION BALL JOINT

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



- 3) Grasp the end of front arm and move it up and down. Relative movement (A) between the housing (D) and front arm (C) boss indicates ball joint (B) may be excessively worn.



- 4) If relative movement is observed in the step 2), 3), remove and inspect the ball joint. If the free play exceeds standard value, replace the ball joint. <Ref. to FS-15, Front Ball Joint.>

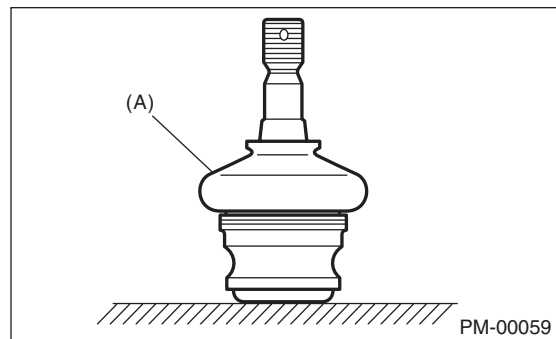
- 5) Damage of dust seal

Visually inspect the ball joint dust seal. If it is damaged, remove the front arm. <Ref. to FS-17, Front Arm.> Also, measure the free play of the ball joint. <Ref. to FS-15, Front Ball Joint.>

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

NOTE:

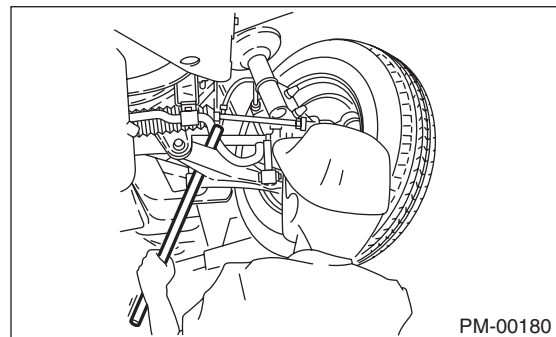
When the front arm ball joint has been removed or replaced, check the toe-in of front wheel. If the front wheel toe-in is not at specified value, adjust the toe-in. <Ref. to FS-6, Wheel Alignment.>



(A) Dust seal

2. FRONT, REAR SUSPENSION BUSHING

Apply pressure with tire lever etc, and inspect the bushing for wear or crack. Replace the bushings if there is wear or crack.



3. WHEEL ARCH HEIGHT

- 1) Unload the cargoes and set the vehicle in curb weight (empty) condition.
- 2) 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 following components and replace deformed parts.
 - Suspension components [Front strut assembly and rear damper assembly]
 - Parts connecting suspension and body
- 4) When no components are deformed, adjust wheel arch height by replacing coil spring in the suspension whose wheel arch height is out of standard. <Ref. to FS-6, Wheel Alignment.> <Ref. to RS-7, 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
 - Caster
 - Steering angle<Ref. to FS-6, Wheel Alignment.>
- 2) When the caster angle does not conform to reference obviously, visually inspect the following components and replace deformed parts.
 - Suspension components [Strut assembly, crossmember, front arm, etc.]
 - Parts connecting suspension and body
- 3) When the toe-in and camber are out of standard value, adjust them so that they conform to standard value.
- 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
 - Thrust angle<Ref. to RS-7, Wheel Alignment.>
- 2) When the camber angle does not conform to standard value, visually inspect the following components. If the deformation is observed, replace the damaged parts.
 - Suspension components [Shock absorber, front link, rear link, upper link, rear arm, sub frame, etc]
 - Parts connecting suspension and body

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

6. OIL LEAKAGE OF STRUT AND SHOCK ABSORBER

Visually inspect the front strut and rear shock absorber for oil leakage. Replace the front strut and rear shock absorber if oil leaks excessively.

7. TIGHTNESS OF BOLTS AND NUTS

Check the bolts and nuts for looseness. Retighten the bolts and nuts to specified torque. If the self-locking nuts and bolts are removed, replace them with new parts.

- 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 parts. If minor rust formation, pitting, etc. are noted, remove the rust and take rust prevention measure.

- Front suspension
 - Front arm
 - Crossmember
 - Strut
- Rear suspension
 - Sub frame
 - Front link
 - Rear link
 - Upper link
 - Rear arm
 - Shock absorber
- In the area 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 measures as required.

21. Wheel Bearing

A: INSPECTION

1. FRONT WHEEL BEARING

NOTE:

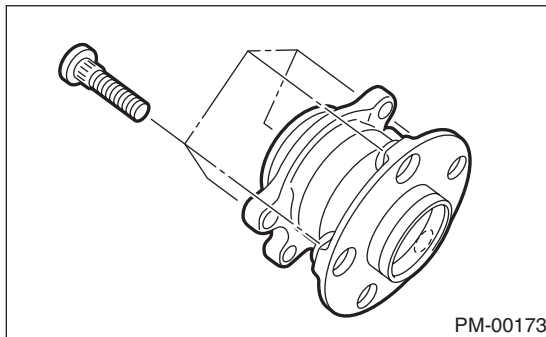
Inspect the condition of front wheel bearing grease.

- 1) Jack-up the front side 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 the front wheel.
- 4) If the bearing free play exists in step 2) above, attach a dial gauge to the hub and measure axial play 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 the front arm from front crossmember.
 - 6) Remove the PTJ of front drive shaft from transmission. <Ref. to DS-13, Front Axle.>
 - 7) While supporting the front drive shaft horizontally with one hand, turn the hub with the other hand to check for noise or binding.
- If the hub is noisy or binds, replace the front axle.



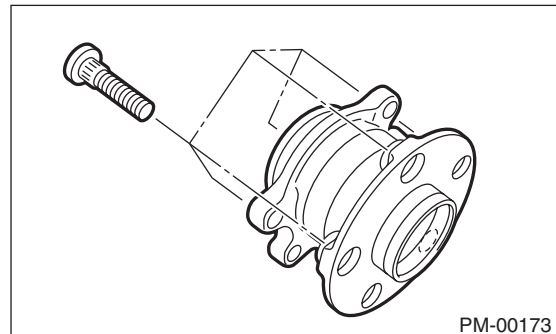
2. REAR WHEEL BEARING

- 1) Jack-up the rear side 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 the rear wheel.
- 4) If the bearing free play exists in step 2) above, attach a dial gauge to the hub and measure axial play 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-26, Rear Drive Shaft.>
 - 6) While supporting rear drive shaft horizontally with one hand, turn the hub with the other hand to check for noise or binding.
- If the hub is noisy or binds, replace the rear axle.



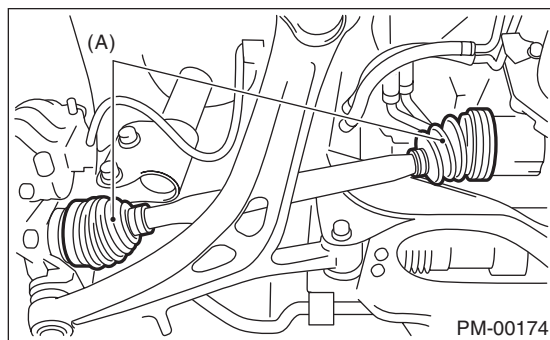
22. Axle Boots & Joints

A: INSPECTION

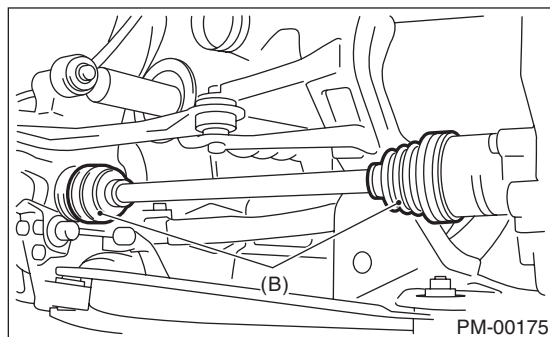
1. FRONT AND REAR AXLE BOOTS

Inspect the front axle boots (A) and rear axle boots (B) for deformation, damage or failure. If faulty, replace with new part. <Ref. to DS-22, Front Drive Shaft.> <Ref. to DS-26, Rear Drive Shaft.>

- Front



- Rear



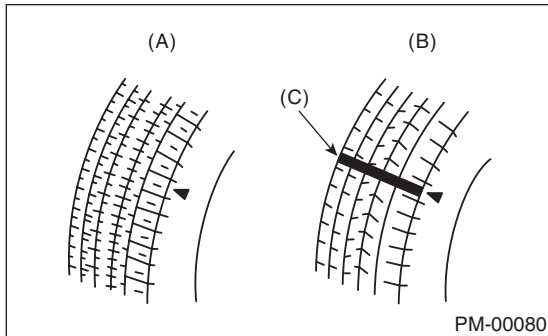
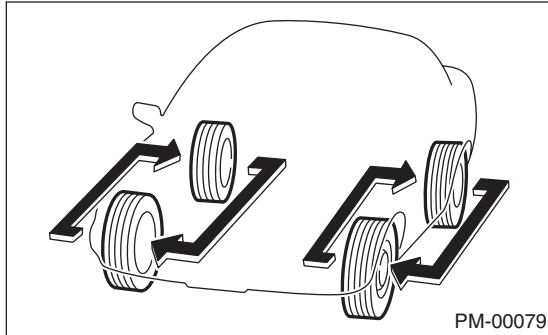
2. PROPELLER SHAFT

Inspect the propeller shaft for damage or failure. If faulty, replace with new part. <Ref. to DS-10, Propeller Shaft.>

23. 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. (Replace the right and left tire as a set.)
- 2) If the tire appears to be worn unevenly, adjust the wheel alignment.
- 3) Next, make a tire rotation between front and rear as shown in the figure, make sure tires are worn evenly.



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

- 4) Re-register the transmitter ID when rotation was performed. (3.0 L U4 model) <Ref. to TPM(diag)-9, REGISTER TRANSMITTER ID, OPERATION, Subaru Select Monitor.>

Steering System (Power Steering)

PERIODIC MAINTENANCE SERVICES

24. Steering System (Power Steering)

A: INSPECTION

1. STEERING WHEEL

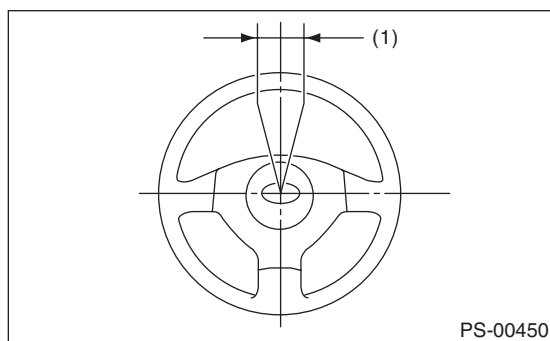
1) Set the steering wheel in a straight-ahead position, and check the wheel spokes to make sure they are correctly set in their specified positions.

2) Lightly turn the steering wheel to the left and right 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)



(1) 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) Pulled 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 show any sign of runout.

(4) Return factor:

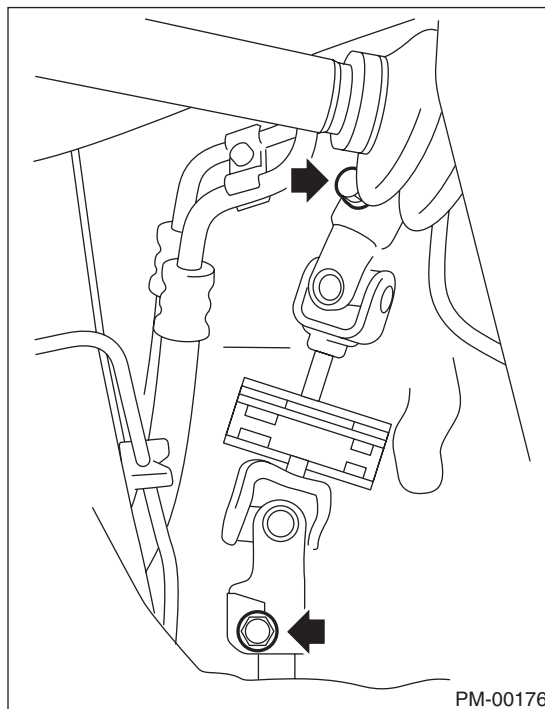
Steering wheel should return to its original position after it has been turned and then released.

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)



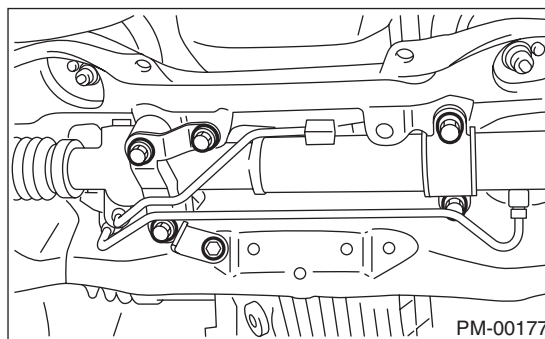
3. GEARBOX

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

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

Tightening torque:

60 N·m (6.1 kgf-m, 44.1 ft-lb)



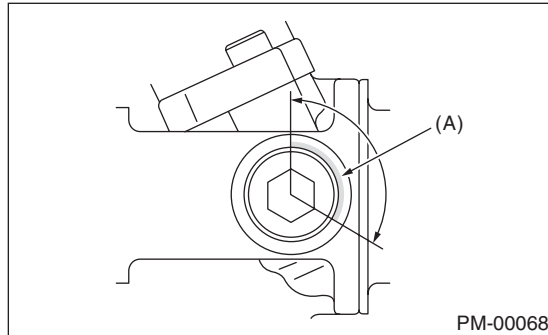
2) Check the boot for damage, cracks or deterioration.

3) With the vehicle placed on a level surface, quickly turn the steering wheel to the left and right. While steering wheel is being rotated, check the gear backlash. If any noise is noticed, adjust the gear backlash.

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

5) Tighten the adjusting screw to 25 N·m (2.5 kgf-m, 18.1 ft-lb) and then loosen.

6) Tighten the adjusting screw to 3.9 N·m (0.40 kgf-m, 2.9 ft-lb) and then loosen 20°.



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

7) Install the lock nut. While holding the adjusting screw with wrench, tighten the lock nut using ST. ST 926230000 SPANNER

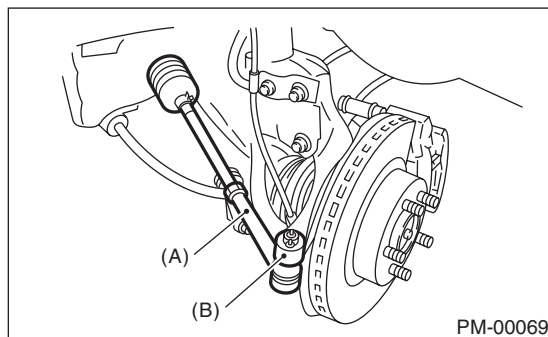
Tightening torque (lock nut):

25 N·m (2.5 kgf-m, 18.1 ft-lb)

Hold the adjusting screw with 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 it 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 the tie-rod for tightness. If it is loose, retighten it to the specified torque.

Tightening torque:

85 N·m (8.7 kgf-m, 63 ft-lb)

5. POWER STEERING FLUID LEVEL

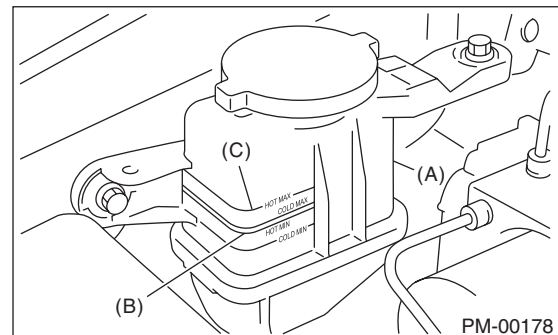
NOTE:

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

- 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 level surface.

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



NOTE:

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

Recommended fluid:

Refer to "RM" section. <Ref. to RM-3, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

Fluid capacity:

0.8 ℓ (0.8 US qt, 0.7 Imp qt)

Steering System (Power Steering)

PERIODIC MAINTENANCE SERVICES

6. POWER STEERING FLUID FOR LEAKS

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

If the fluid leaks are found, retighten their fitting bolts (or nuts) and/or replace their parts.

NOTE:

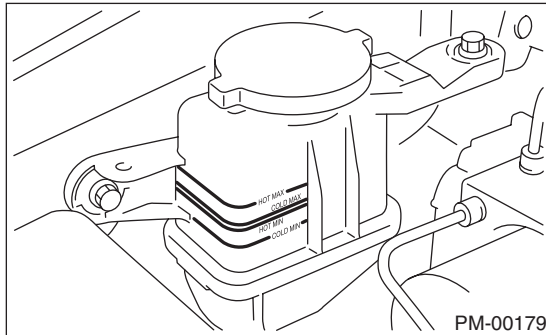
- Wipe the leaked fluid off after correcting fluid leaks.
- Also pay attention to clearances between hoses (or pipes) and other parts when inspecting fluid leaks.

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 part if necessary.

NOTE:

Prevent hoses from turning and/or bending when installing hoses.



8. POWER STEERING PIPES FOR DAMAGES

Check the power steering pipes for corrosion and damage.

Replace the pipes with new parts if necessary.

9. GEARBOX BOOTS

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

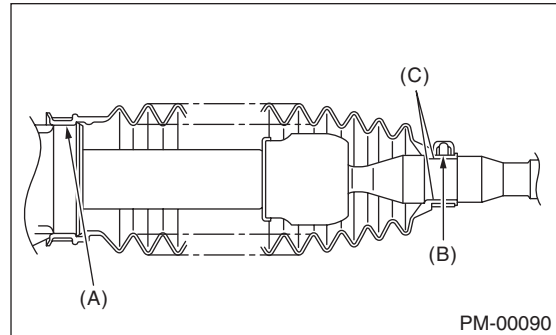
1) Positions (A) and (B) of the gearbox boot are fitted correspondingly in grooves (A) and (B) of the gearbox and rod (C).

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

3) Boot does not have crack or hole.

NOTE:

Rotate (B) position of gearbox boot against the torsion produced by the adjustment of toe-in etc. Apply grease to the groove (C).



10. FITTING BOLTS AND NUTS

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

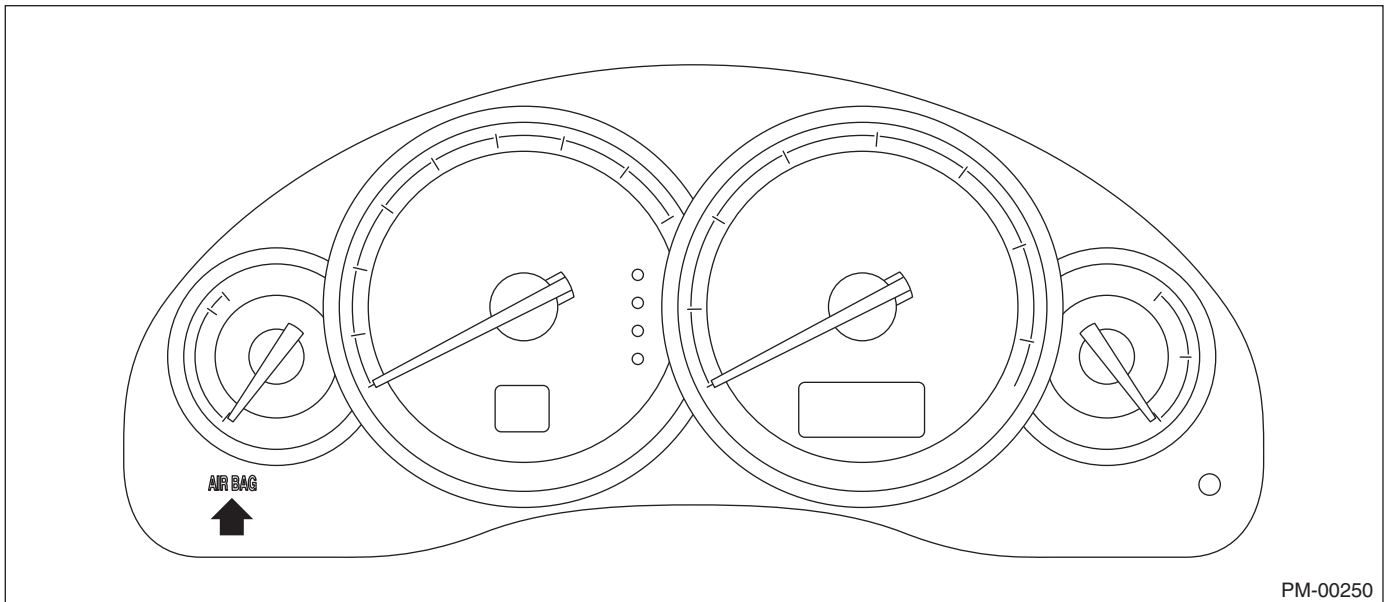
Inspect and/or retighten them when engine is cold.

25. Supplemental Restraint System

A: INSPECTION

Check the airbag system according to the results of the self-diagnosis. <Ref. to AB(diag)-2, Basic Diagnostic Procedure.>

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



2) Connect the Subaru Select Monitor to data link connector. Turn the ignition switch to ON, and Subaru Select Monitor switch to ON.

3) Read the Diagnostic Trouble Code (DTC) using Subaru Select Monitor. <Ref. to ABS(diag)-15, READ DIAGNOSTIC TROUBLE CODE (DTC), OPERATION, Subaru Select Monitor.>

4) Inspect the airbag system according to the Diagnostic Trouble Code (DTC).

Supplemental Restraint System

PERIODIC MAINTENANCE SERVICES

ENGINE SECTION 1

This service manual has been prepared to provide SUBARU service personnel with the necessary information and data for the correct maintenance and repair of SUBARU vehicles.

This manual includes the procedures for maintenance, disassembling, reassembling, inspection and adjustment of components and diagnostics for guidance of experienced mechanics.

Please peruse and utilize this manual fully to ensure complete repair work for satisfying our customers by keeping their vehicle in optimum condition. When replacement of parts during repair work is needed, be sure to use SUBARU genuine parts.

All information, illustration and specifications contained in this manual are based on the latest product information available at the time of publication approval.

FUEL INJECTION (FUEL SYSTEMS)**FU(H4SO)****EMISSION CONTROL
(AUX. EMISSION CONTROL DEVICES)****EC(H4SO)****INTAKE (INDUCTION)****IN(H4SO)****MECHANICAL****ME(H4SO)****EXHAUST****EX(H4SO)****COOLING****CO(H4SO)****LUBRICATION****LU(H4SO)****SPEED CONTROL SYSTEMS****SP(H4SO)****IGNITION****IG(H4SO)****STARTING/CHARGING SYSTEMS****SC(H4SO)****ENGINE (DIAGNOSTICS)****EN(H4SO)(diag)****GENERAL DESCRIPTION****GD(H4SO)**

FUEL INJECTION (FUEL SYSTEMS)

FU(H4SO)

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