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.

2. Schedule

A: MAINTENANCE SCHEDULE 1

1. U.S.

		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		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Turbo model Note (6)
2	Engine oil filter		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	Turbo model Note (6)
3	Spark plug					R				R				R				R	Non-turbo model
										R								R	Turbo 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	Fuel filter									R								R	
8	Air cleaner element					R				R				R				R	Note (2)
9	Cooling system					I				I				I				I	
10	Engine 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	Note (3)
14	Front and 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 pad and disc			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	Note (4)
23	Steering system (Power steering)			I		I		I		I		I		I		I		I	
24	A/C filter	Check every 12 months or every 12,000 km (7,500 miles).																	Note (5)
25	ATF filter	Inspect once a year.																	Note (3)

Symbols used:
R: Replace
I: Inspection
(R) or (I): Recommended service for safe vehicle operation.

PERIODIC MAINTENANCE SERVICES

NOTE:
1. This inspection is not required to maintain emission warranty eligibility and it dose 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. However, ATF filter needs to be replaced when it is physically damaged or 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.
6. For turbo model, replace every 3.75 months or every 6,000 km (3,750 miles).

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	
	× 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 plug					R				R				R				R	Non-turbo model
										R								R	Turbo 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	Fuel filter									R								R	
8	Air cleaner element					R				R				R				R	Note (2)
9	Cooling system					I				I				I				I	
10	Engine 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	Note (3)
14	Front and 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 pad and disc			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	Note (4)
23	Steering system (Power steering)			I		I		I		I		I		I		I		I	
24	A/C filter	Check every 12 months or every 12,000 km (7,500 miles).																	Note (5)
25	ATF filter	Check once a year.																	Note (3)

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 dose 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. However, ATF filter needs to be replaced when it is physically damaged or 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.

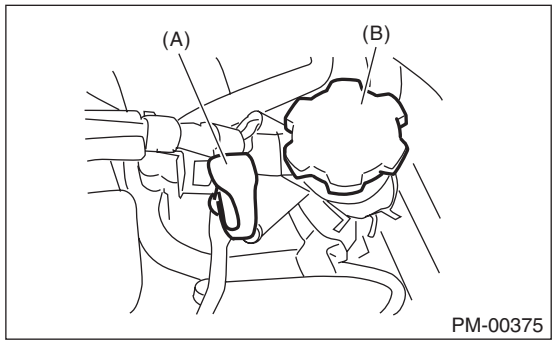
B: MAINTENANCE SCHEDULE 2

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 6,000 km 3,750 miles	R		R			R
Engine oil filter	3.75 months 6,000 km 3,750 miles	R		R			R
Fuel line	7.5 months 12,000 km 7,500 miles				I		
Transmission oil	15 months 24,000 km 15,000 miles						R
ATF	15 months 24,000 km 15,000 miles						R
Front and rear differential oil	15 months 24,000 km 15,000 miles						R
Brake line	7.5 months 12,000 km 7,500 miles				I		
Brake fluid	15 months 24,000 km 15,000 miles					R	
Disc brake pad and disc	7.5 months 12,000 km 7,500 miles	I	I		I		I
Parking brake	7.5 months 12,000 km 7,500 miles				I		
Suspension	7.5 months 12,000 km 7,500 miles		I	I	I		
Axle Boots & Joints	7.5 months 12,000 km 7,500 miles	I	I		I		I
Steering system (Power steering)	7.5 months 12,000 km 7,500 miles		I	I	I		

3. Engine Oil

A: REPLACEMENT

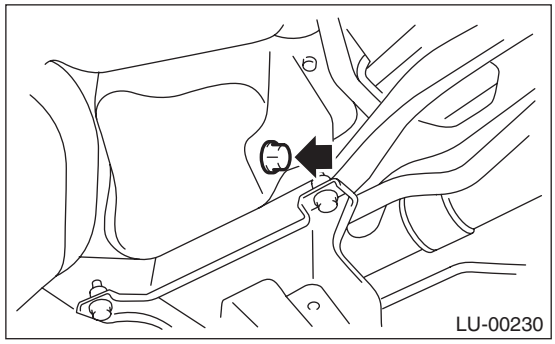
1) Set the vehicle on a lift.
2) Open the engine oil filter cap for quick draining of engine oil.



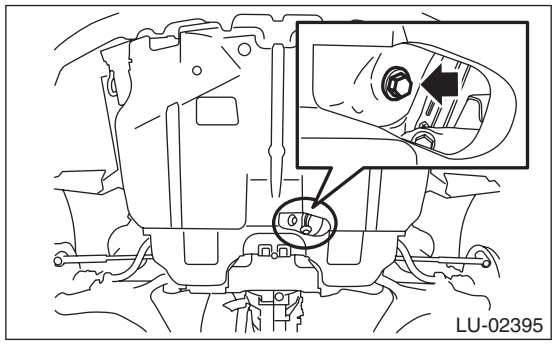
(A) Oil level gauge
(B) Oil filler cap

3) Lift up the vehicle.
4) Drain engine oil by loosening the engine oil drain plug.

- Non-turbo model



- Turbo model



NOTE:
Prepare the container for draining of engine oil.

CAUTION:
If the engine oil is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

5) Replace the drain plug gasket.

NOTE:
Use a new drain plug gasket.
6) Tighten the engine oil drain plug after draining engine oil.

Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb)
7) Using engine oil of proper quality and viscosity, fill engine oil through the oil filler duct to the “F” line on oil level gauge. Place the vehicle on a level surface when checking oil level.

Recommended oil:
Refer to “RM” section for the engine oil viscosity. <Ref. to RM-2, LUBRICANTS, RECOMMENDED MATERIALS, Recommended Materials.>

Engine oil capacity
Refer to “SPC” section for the engine oil capacity. <Ref. to SPC-4, CAPACITY, Impreza.>

NOTE:
- The proper viscosity helps vehicle get good cold and hot starting by reducing viscous friction and thus increasing cranking speed.
- 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 standard 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 standard: SM or SL
ILSAC standard: GF-4
SAE Viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50
8) Close the engine oil filler cap.
9) Start the engine and warm it up for a time.
10) Stop the engine to inspect the oil level again. <Ref. to PM-8, INSPECTION, Engine Oil.>

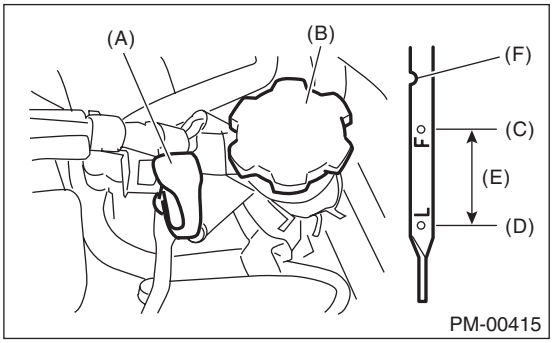
B: INSPECTION

CAUTION:
If the engine oil is spilt over exhaust pipe, wipe it off with cloth to avoid emitting smoke or causing a fire.

1) Park the vehicle on a level surface.
2) Remove the oil level gauge and wipe it clean.
3) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted and properly orientated.
4) Remove the level gauge again and record the oil level. If the engine oil level is below “L” line, add oil to bring the level up to “F” line.
5) Start the engine and warm it up for a time.
6) After turning off the engine, wait a few minutes for the oil to return to the oil pan before checking the level.

NOTE:
• Just after driving or while the engine is warm, engine oil level shows in the range between “F” line and the notch mark. This is caused by thermal expansion of engine oil.
• To prevent overfilling of engine oil, do not add oil above “F” line when the engine is cold.
• As the oil level gauge is used for daily maintenance, the “F” and “L” lines are set assuming that the engine is cold.

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



(A) Oil level gauge
(B) Oil filler cap
(C) “F” line
(D) “L” line
(E) Approx. 1 ℓ (1.1 US qt, 0.9 Imp qt)
(F) Notch mark

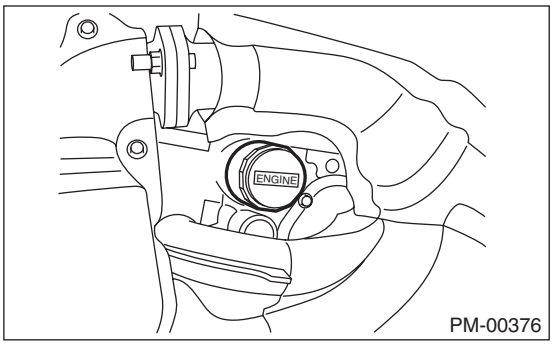
4. Engine Oil Filter

A: REPLACEMENT

1) Remove the under cover. (Turbo model)
2) Remove the oil filter using the ST.

ST	18332AA000	OIL FILTER WRENCH (Outer diameter: 68 mm (2.68 in) for oil filter)
ST	18332AA010	OIL FILTER WRENCH (Outer diameter: 65 mm (2.56 in) for oil filter)

CAUTION:
If engine oil adheres to the exhaust pipe, wipe it off completely.



3) Clean the oil filter installation surface on cylinder block or oil cooler.
4) Obtain a new engine oil filter and apply a thin coat of engine oil to the seal rubber.
5) Install the oil filter by turning it by hand, being careful not to damage seal rubber.
• Tighten the oil filter 68 mm (2.68 in) in diameter (approx. 1 rotation) after the seal rubber of the oil filter comes in contact with cylinder block or oil cooler. When using a torque wrench, tighten to 14 N·m (1.4 kgf-m, 10.3 ft-lb).
• Tighten the oil filter with 65 mm (2.56 in) in diameter further (approx. 2/3 — 3/4 rotations) after the seal rubber of the oil filter comes in contact with cylinder block or oil cooler. When using a torque wrench, tighten to 12 N·m (1.2 kgf-m, 8.7 ft-lb).

CAUTION:
Do not overtighten. Doing so may cause an oil leak.
6) Run the engine and make sure that no oil is leaking around seal rubber.

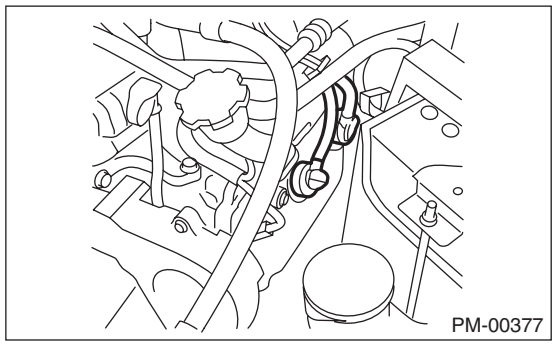
NOTE:
The filter element and filter case are permanently jointed; therefore, interior cleaning is not necessary.
7) Check the engine oil level. <Ref. to PM-8, INSPECTION, Engine Oil.>

5. Spark Plug

A: REPLACEMENT

1. SOHC MODEL

1) Disconnect the battery cables, and then remove the battery and battery carrier.
2) Remove the air cleaner lower case.
3) Disconnect the spark plug cord.



4) Remove the spark plug with a plug-wrench.
5) Install a new spark plug.

Recommended spark plug:
NGK: FR5AP-11

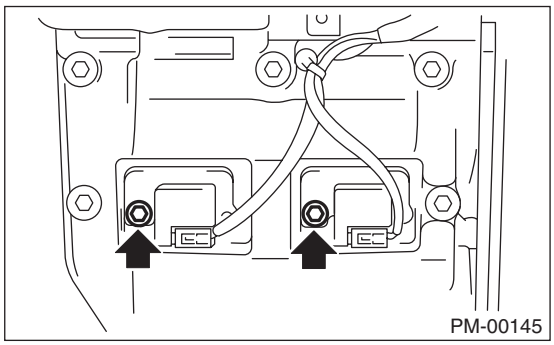
6) Tighten the spark plug lightly with hand, and then secure with a plug-wrench to the specified torque.

Tightening torque:
21 N·m (2.1 kgf-m, 15.5 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. DOHC MODEL

1) Disconnect the battery cables, and then remove the battery and battery carrier.
2) Remove the air cleaner lower case.
3) Disconnect the connector from ignition coil and ignitor assembly.
4) Remove the ignition coil and ignitor assembly.



5) Remove the spark plug with a spark plug socket.
6) Install a new spark plug.

Recommended spark plug:
NGK: SILFR6A

7) 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, 15.5 ft-lb)

8) Tighten the ignition coil and ignitor assembly.

Tightening torque:
16 N·m (1.6 kgf-m, 11.8 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

NOTE:
Since the rear belt is a stretch type belt, it does not require tension adjustment.

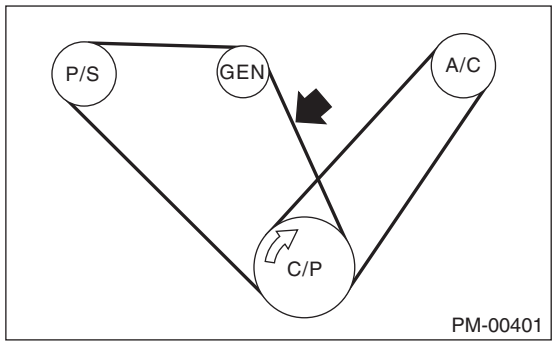
1. PROCEDURE (WITHOUT BELT TENSION GAUGE)

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-12, REPLACEMENT, V-belt.>

Belt tension

(A)
When replacing: 7 — 9 mm (0.276 — 0.354 in)
When reusing: 9 — 11 mm (0.354 — 0.433 in)

(B)
When replacing: 7.5 — 8.5 mm (0.295 — 0.335 in)
When reusing: 9.0 — 10.0 mm (0.354 — 0.394 in)



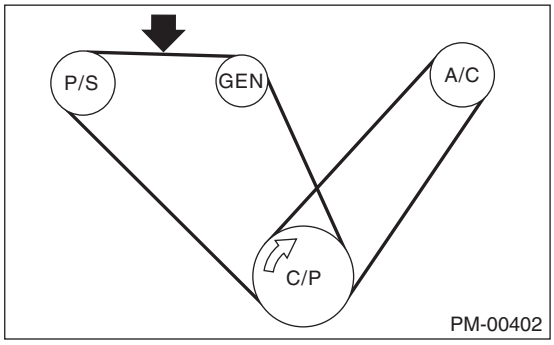
C/P Crank pulley
GEN Generator
P/S Power steering oil pump pulley
A/C A/C compressor pulley

2. PROCEDURE (WITH BELT TENSION GAUGE)

1) Replace the belts if cracks, fraying or wear are found.
2) Remove the V-belt covers and radiator reservoir tank.
3) Check the belt tension, using the belt tension gauge. Adjust the tension, if necessary by changing the generator installing position or idler pulley installing position.

Belt tension (Non-turbo model)
When installing new parts:
640 — 780 N (65 — 80 kgf, 144 — 175 lbf)
At inspection:
490 — 640 N (50 — 65 kgf, 110 — 144 lbf)

Belt tension (Turbo model)
When installing new parts:
640 — 780 N (65 — 80 kgf, 144 — 175 lbf)
At inspection:
490 — 640 N (50 — 65 kgf, 110 — 144 lbf)

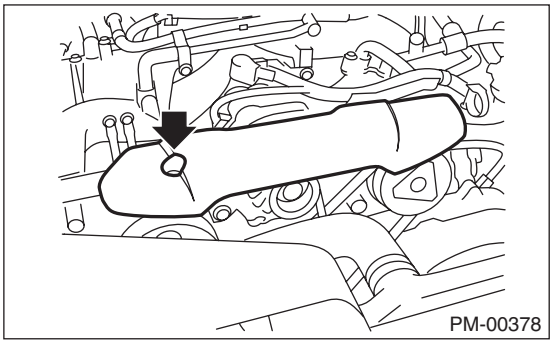


C/P Crank pulley
GEN Generator
P/S Power steering oil pump pulley
A/C A/C compressor pulley

B: REPLACEMENT

1. V-BELT COVER

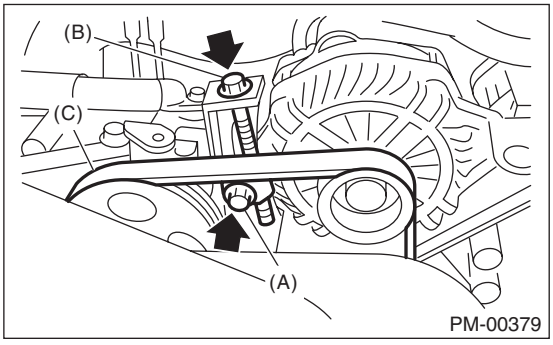
Remove the V-belt covers.



2. FRONT SIDE BELT (FOR 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, 18.4 ft-lb)
Slider bolt
8 N·m (0.8 kgf-m, 5.9 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 (FOR A/C)

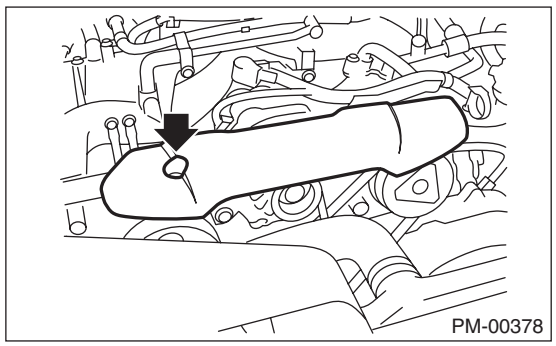
CAUTION:
Always use new rear side belt.
1) Remove the front side belts.
2) Cut the rear side belt.
3) Install a new belt using an installation jig. <Ref. to ME(H4SO)-40, REAR SIDE BELT, INSTALLATION, V-belt.> <Ref. to ME(H4DOTC)-42, REAR SIDE BELT, INSTALLATION, V-belt.>
4) Install the front side belt.
<Ref. to ME(H4SO)-39, FRONT SIDE BELT, INSTALLATION, V-belt.>

7. Timing Belt

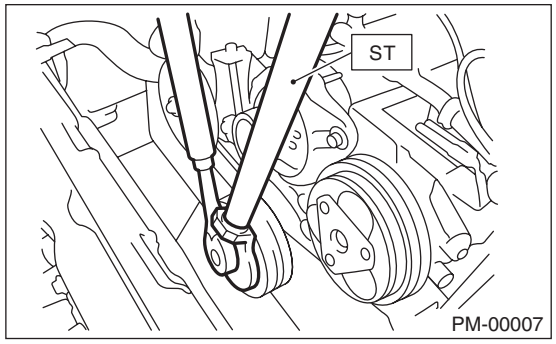
A: REPLACEMENT

1. NON-TURBO MODEL

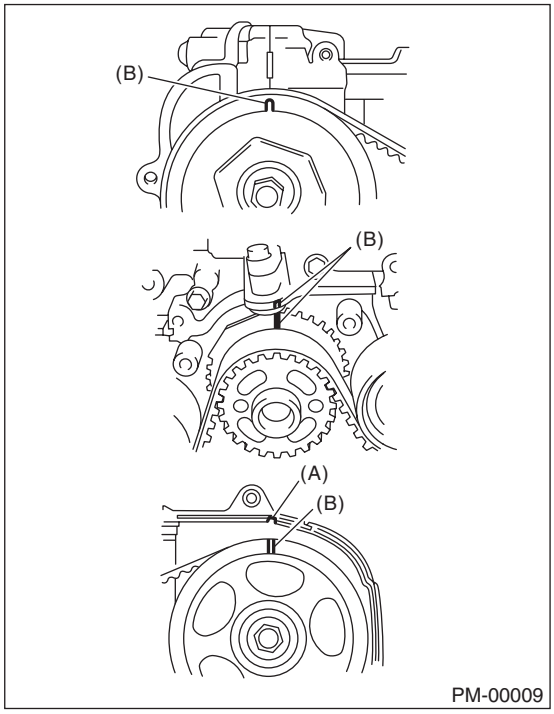
1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4SO)-23, REMOVAL, Radiator Main Fan and Fan Motor.>, <Ref. to CO(H4SO)-25, REMOVAL, Radiator Sub Fan and Fan Motor.>
2) Protect the radiator with cardboard and blanket.
3) Remove the V-belt covers.



4) Remove the V-belts. <Ref. to ME(H4SO)-39, REMOVAL, V-belt.>
5) Remove the A/C compressor V-belt tensioner.
6) Use the ST to lock the crankshaft, and remove the pulley bolt.
ST 499977100 CRANK PULLEY WRENCH

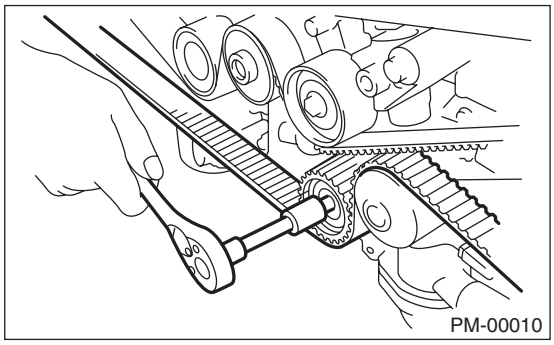


7) Remove the crank pulley.
8) Remove the belt cover LH.
9) Remove the front timing belt cover.
10) Turn the crankshaft and align the alignment marks on crankshaft, and left and right cam sprockets with notches of belt cover and cylinder block.
ST 499987500 CRANKSHAFT SOCKET

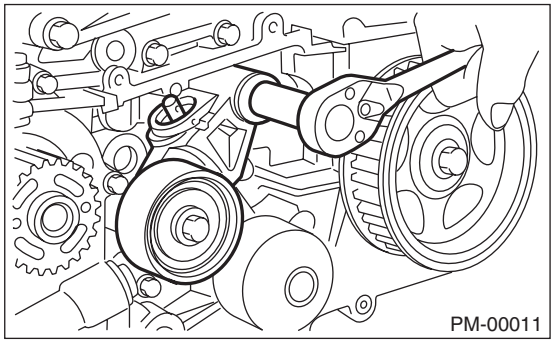


(A) Notch
(B) Alignment mark

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



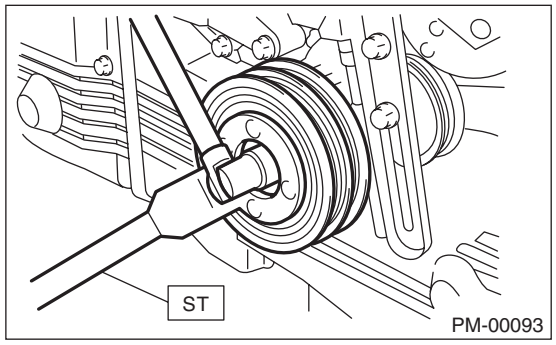
13) Remove the timing belt.
14) Remove the automatic belt tension adjuster assembly.



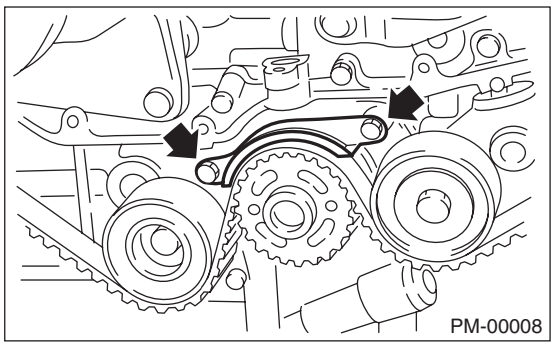
15) Install in the reverse order of removal. <Ref. to ME(H4SO)-51, INSTALLATION, Timing Belt.>

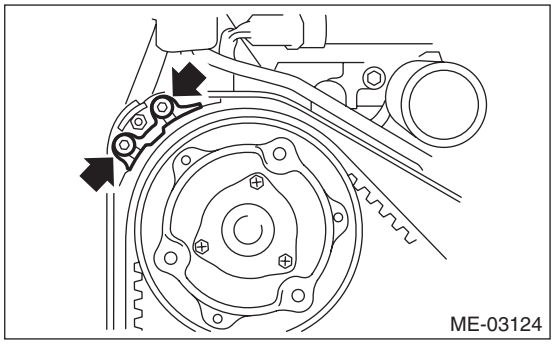
2. TURBO MODEL

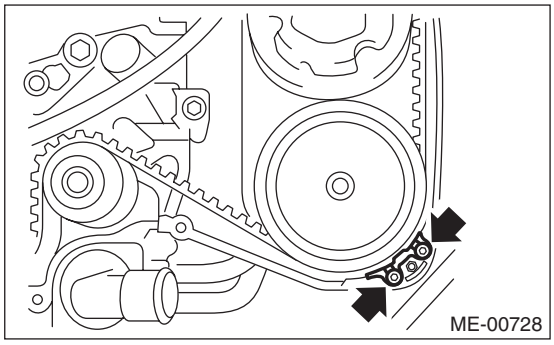
1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4DOTC)-24, REMOVAL, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4DOTC)-26, REMOVAL, Radiator Sub Fan and Fan Motor.>
2) Protect the radiator with cardboard and blanket.
3) Remove the V-belts. <Ref. to ME(H4DOTC)-41, REMOVAL, V-belt.>
4) Remove the A/C compressor V-belt tensioner.
5) Remove the pulley bolt. Using the ST, lock the crankshaft.
ST 499977100 CRANK PULLEY WRENCH

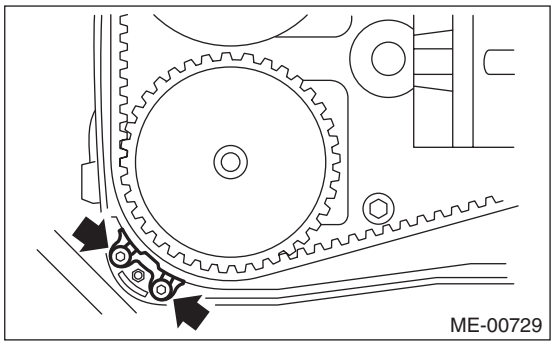


6) Remove the crank pulley.
7) Remove the A/C compressor V-belt tensioner.
8) Remove the belt cover (LH).
9) Remove the belt cover (RH).
10) Remove the front belt cover.
11) Remove the timing belt guide. (MT model)

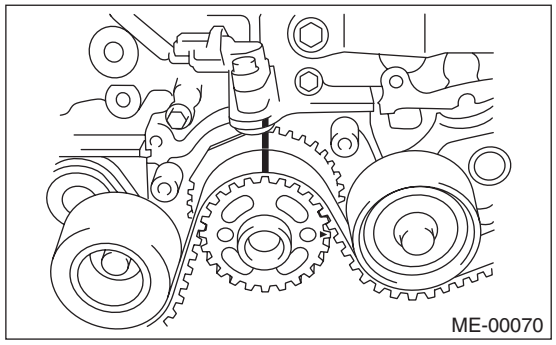


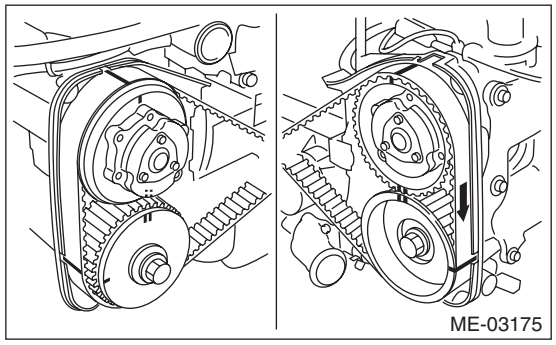




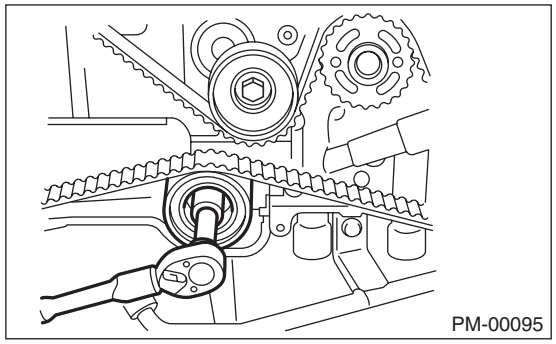


12) Turn the crankshaft and align the alignment marks on crankshaft, and left and right cam sprockets with notches of belt cover and cylinder block. Use the ST to turn crankshaft.
ST 499987500 CRANKSHAFT SOCKET

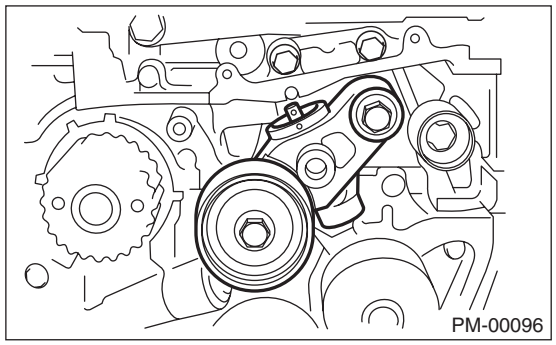

ME-00070


ME-03175

13) Remove the belt idler.


PM-00095

14) Remove the timing belt.
15) Remove the automatic belt tension adjuster assembly.


PM-00096

16) Install in the reverse order of removal. <Ref. to ME(H4DOTC)-53, INSTALLATION, 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. NON-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) When the side part of timing belt (arrow direction shown in the figure) is abnormally worn (fluff or jumping out of core) or damaged, check the idlers, tensioner, water pump pulley and cam sprocket to determine idler alignment (squareness). Replace the worn or damaged timing belt.
4) Install the timing belt cover (LH).

2. 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) When the side part of timing belt (arrow direction shown in the figure) is abnormally worn (fluff or jumping out of core) or damaged, check the idlers, tensioner, water pump pulley and cam sprocket to determine idler alignment (squareness). Replace the worn or damaged 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.

- Non-turbo model

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

- Turbo model

<Ref. to FU(H4DOTC)-71, Fuel Delivery, Return and Evaporation Lines.>

9. Fuel Filter

A: REPLACEMENT

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

- Non-turbo model

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

- Turbo model

<Ref. to FU(H4DOTC)-68, Fuel Filter.>

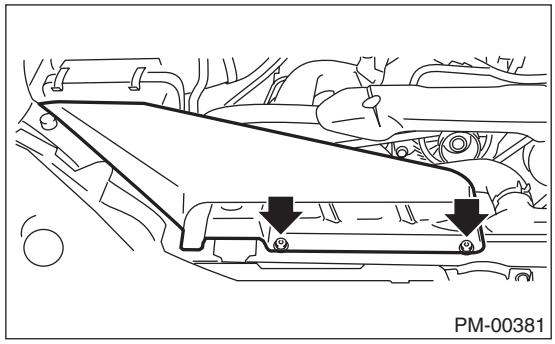
B: INSPECTION

If the filter is clogged, or if the replacement interval has been reached, replace it.

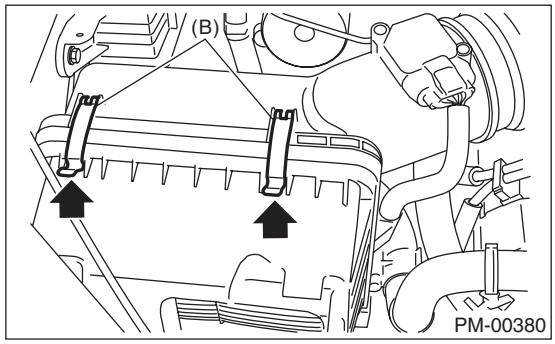
10.Air Cleaner Element

A: REPLACEMENT

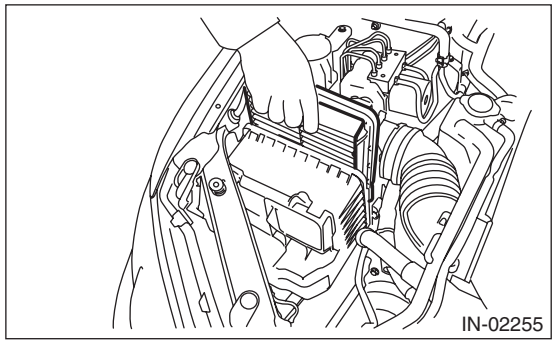
1) Disconnect the ground cable from the battery.
2) Remove the air intake duct.



3) Disconnect the connector from mass air flow and intake air temperature sensor.
4) Loosen the boot clamp.
5) Remove the clips on air cleaner case.



6) Pull the air cleaner case (rear) backward of the vehicle, and remove the element.



7) Check that there are no foreign objects at the cleaner side, and then install in the reverse order of removal.

CAUTION:
Be sure to use SUBARU genuine air cleaner element depending on the engine type when replacing the air cleaner elements. Using other air cleaner element may affect engine.

11.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:

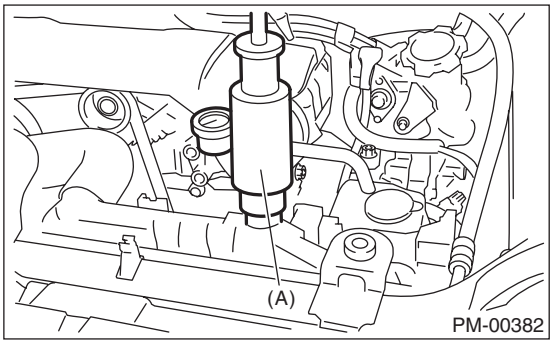
Non-turbo model:
157 kPa (1.6 kgf/cm^2, 23 psi)
Turbo model:
122 kPa (1.2 kgf/cm^2, 18 psi)

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

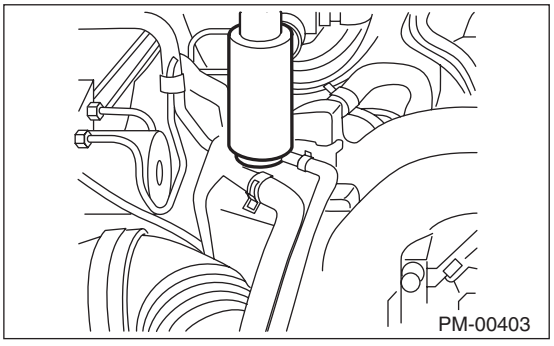
CAUTION:
If the engine coolant adheres to the exhaust pipe, wipe it off completely.

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 the pressure keeps to be the same as or above the limit. Replace the radiator cap if the pressure is below the limit.

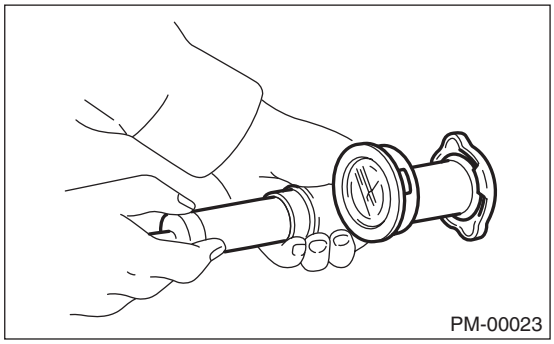
Radiator cap valve open pressure

Non-turbo model
Standard:
93 — 123 kPa
(0.95 — 1.25 kgf/cm^2, 14 — 18 psi)
Service limit:
83 kPa (0.85 kgf/cm^2, 12 psi)

Turbo model

Filler tank side
Standard:
93 — 123 kPa
(0.95 — 1.25 kgf/cm^2, 14 — 18 psi)
Service limit:
83 kPa (0.85 kgf/cm^2, 12 psi)

Radiator side
Standard:
122 — 152 kPa
(1.24 — 1.55 kgf/cm^2, 18 — 22 psi)
Service limit:
112 kPa (1.14 kgf/cm^2, 16 psi)



3) Start the engine, and then inspect that 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)-15, Water Pump.>, <Ref. to CO(H4SO)-17, Thermostat.> <Ref. to CO(H4SO)-19, Radiator.>, <Ref. to CO(H4SO)-22, Radiator Cap.>
- 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.>

4) Check the radiator fan operates using Subaru Select Monitor, when the coolant temperature rise to 95°C (203°F) or more. If it does not operate, check the radiator fan system.
- Non-turbo model

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

<Ref. to CO(H4DOTC)-8, Radiator Fan System.>

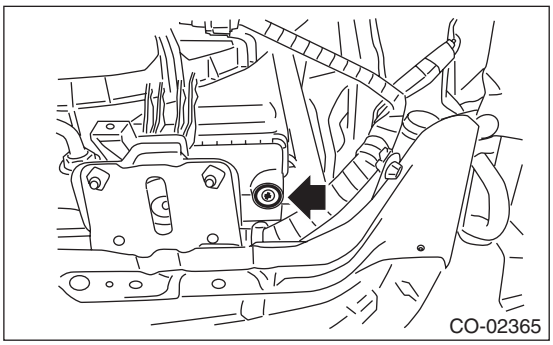
12.Engine Coolant

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) Loosen and remove the drain plug to drain engine coolant into container.



5) For quick draining, open the radiator cap.

CAUTION:
If the engine coolant adheres to the exhaust pipe, wipe it off completely.

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 plug securely after draining coolant.
8) Pour cooling system conditioner through the filler neck.

Cooling system protective agent:
Cooling system conditioner (SOA345001)

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):
Refer to "SPC" section. <Ref. to SPC-4, CAPACITY, Impreza.>

NOTE:
The SUBARU Genuine Coolant containing anti-freeze and anti-rust agents is especially made for SUBARU engine, which has an aluminum crankcase. Always use SUBARU Genuine Coolant, since other coolant may cause corrosion.

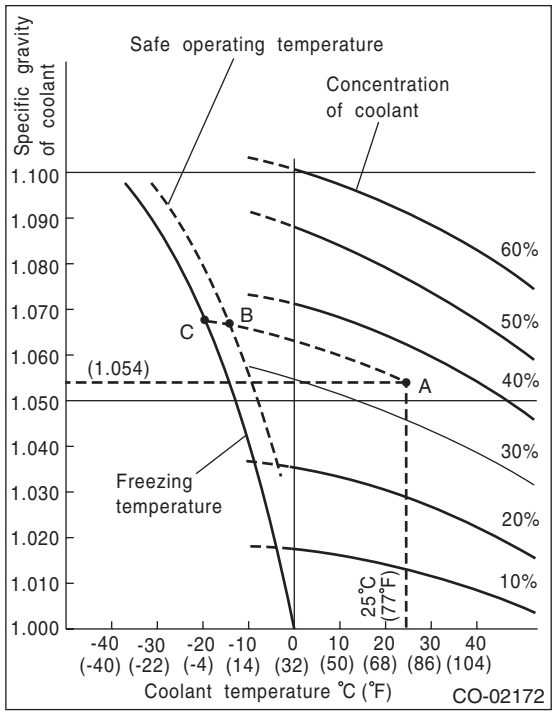
11) Close the radiator cap (or the coolant filler tank cap on turbo models), and start the engine. Race 5 to 6 times at 3,000 rpm or less, then stop the engine. (Complete this operation within 40 seconds.)
12) Wait for one minute after the engine stops, then open the radiator cap (or the coolant filler 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 hard resulting from the engine coolant pressure at this time, air purge is considered to be mostly completed.

17) Stop the engine and wait until the engine coolant temperature drops to 30°C (86°F) or less.
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 3,000 rpm or less. If the flowing sound is heard from heater core, repeat the procedures from step 16) again.

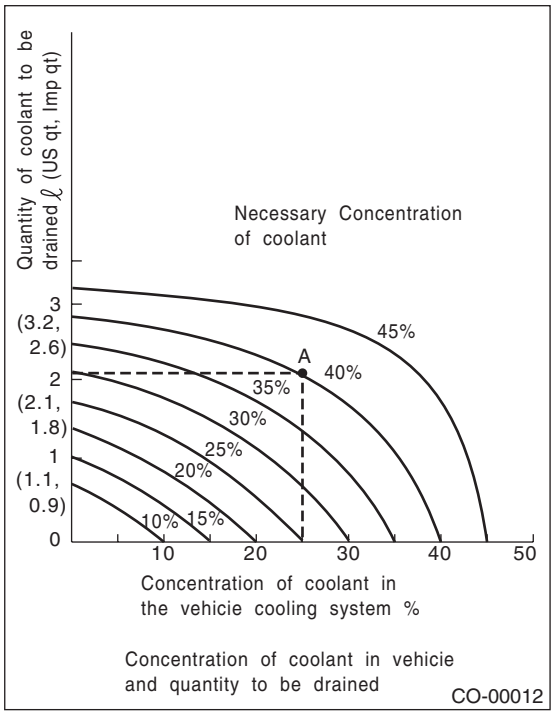
2. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

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

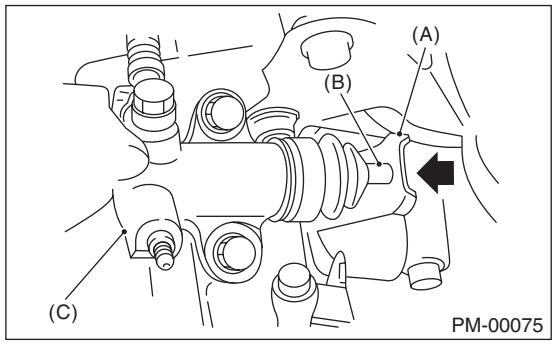
To adjust the concentration of coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU Genuine Coolant (concentration 50%).
The amount of engine coolant that should be replaced can be determined 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.



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.



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

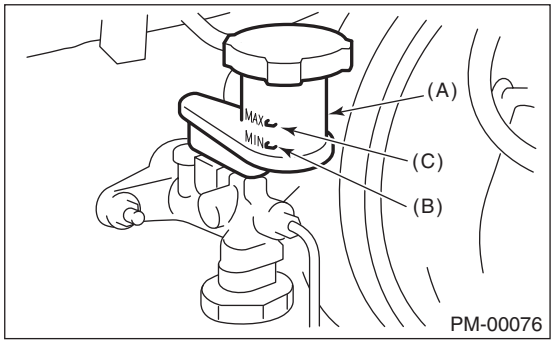
2) If the fluid level rises, pedal free play is correct.
3) If the fluid level does not rise, or the push rod cannot be retracted, adjust the clutch pedal. <Ref. to CL-22, Clutch Pedal.>

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-4, 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.
• If clutch fluid adheres to the exhaust pipe, wipe it off completely.

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

14.Transmission Gear Oil

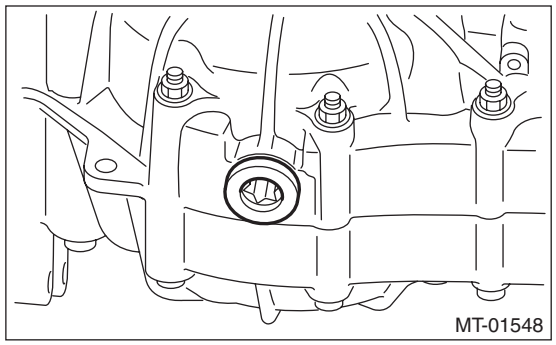
A: REPLACEMENT

1. MANUAL TRANSMISSION

1) Drain the gear oil by removing drain plug.

CAUTION:
If transmission gear oil adheres to the exhaust pipe, wipe it off with cloth completely.

NOTE:
• Before starting work, cool off the transmission gear oil well.
• Drain the gear oil by removing drain plug using TORX® bit T70.



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

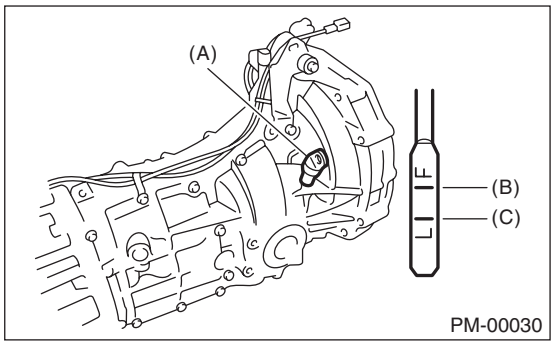
Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

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:
Refer to "SPC" section. <Ref. to SPC-4, CAPACITY, Impreza.>



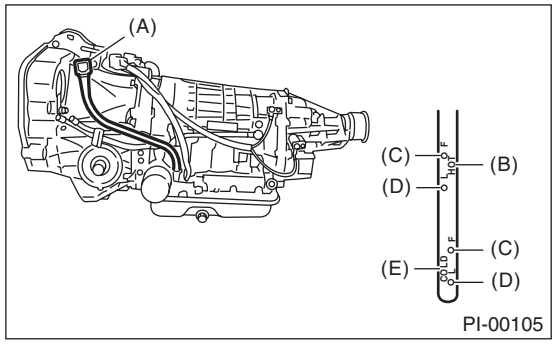
(A) Oil level gauge
(B) Upper level
(C) Lower level

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(diag)-16, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
2) Make sure the vehicle is level.
3) After selecting all positions (P, R, N, D), set the select lever in "P" range. Idle the engine for 1 — 2 minutes, and measure the ATF level.



(A) Level gauge
(B) Inspection position when HOT [70 — 80°C (158 — 176°F)]
(C) Upper level
(D) Lower level
(E) Inspection position when COLD [20 — 30°C (68 — 86°F)]

4) Make sure that ATF level is the center of upper and lower level at "HOT" side.
5) If the ATF level is below the center between upper and lower level, add the recommended ATF until the fluid level is found above the center between upper and lower level.

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 less than 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 driving the vehicle for 5-10 km (3-6 miles) or by idling the engine.
7) Check the ATF for leaks.
If there are leaks, it is necessary to repair or replace gasket, oil seals, plugs or other parts.

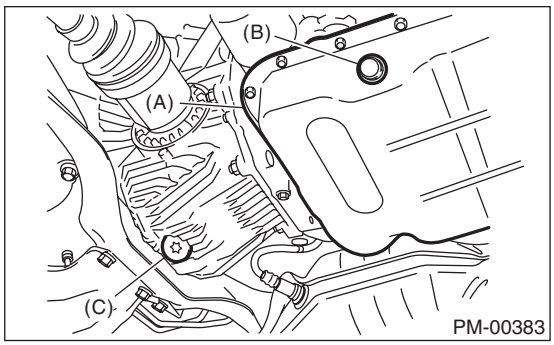
B: REPLACEMENT

1. AUTOMATIC TRANSMISSION FLUID

1) Lift up the vehicle.
2) Drain the ATF (Automatic Transmission Fluid) by removing drain plug.

CAUTION:
If ATF adheres to the exhaust pipe, wipe it off completely.

NOTE:
Before starting work, cool off the ATF well.
3) Check the condition of ATF drained. <Ref. to 4AT-27, CONDITION CHECK, Automatic Transmission Fluid.>



(A) Oil pan
(B) Drain plug (ATF)
(C) Differential gear oil drain plug

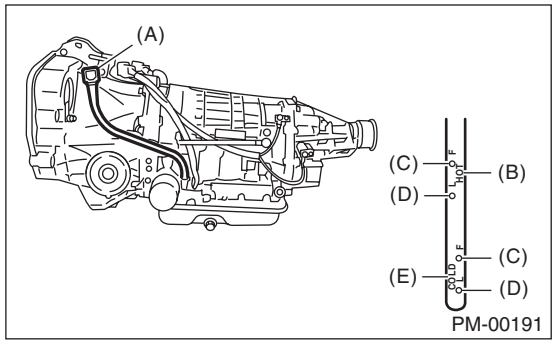
4) Replace the gasket with new part, and then tighten the drain plug to specified torque.

Tightening torque:
25 N·m (2.5 kgf-m, 18.4 ft-lb)
5) Lower the vehicle.
6) Pour ATF from the oil charge pipe.

Recommended fluid:
<Ref. to RM-4, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

Fluid capacity:
Fill the same amount of ATF drained from ATF drain plug hole.

7) Check the level and leaks of the ATF. <Ref. to PM-25, INSPECTION, ATF.>



(A) Level gauge
(B) Inspection position when HOT [70 — 80°C (158 — 176°F)]
(C) Upper level
(D) Lower level
(E) Inspection position when COLD [20 — 30°C (68 — 86°F)]

2. ATF FILTER

NOTE:
ATF filter is maintenance free part. However, ATF filter needs to be replaced when it is physically damaged or leaked.
For the replacement procedure of ATF filter, refer to “ATF Filter”. <Ref. to 4AT-62, ATF Filter.>

16. Front & Rear Differential Gear Oil

A: REPLACEMENT

1. FRONT DIFFERENTIAL (MT MODEL)

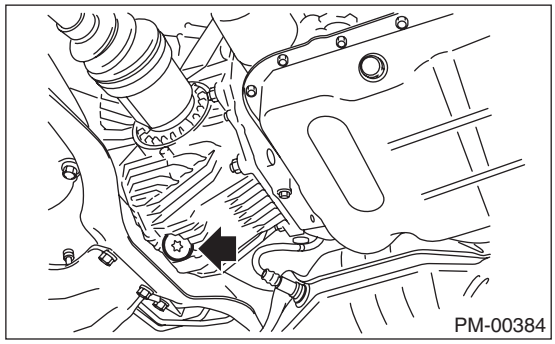
For MT model, differential oil is used as manual transmission oil for lubricating the differential. Refer to “Transmission Oil”. <Ref. to PM-24, Transmission Gear Oil.>

2. FRONT DIFFERENTIAL (AT MODEL)

1) Lift up the vehicle.
2) Drain the differential gear oil by removing drain plug using TORX® bit T70.

CAUTION:
If differential gear oil adheres to the exhaust pipe, wipe it off with cloth completely.

NOTE:
Before starting work, cool off the differential gear oil well.



3) Replace the gasket with a new part and tighten the differential oil drain plug to the specified torque using the TORX® bit T70.

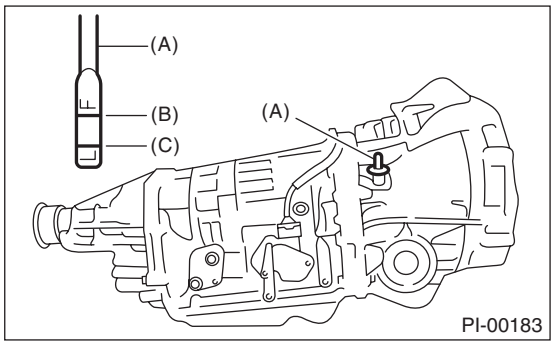
Tightening torque:
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

4) Lower the vehicle.
5) Fill differential gear oil through the oil level gauge hole.

Recommended fluid:
<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:
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

6) Check the level of differential gear oil.
<Ref. to 4AT-28, INSPECTION, Differential Gear Oil.>

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.

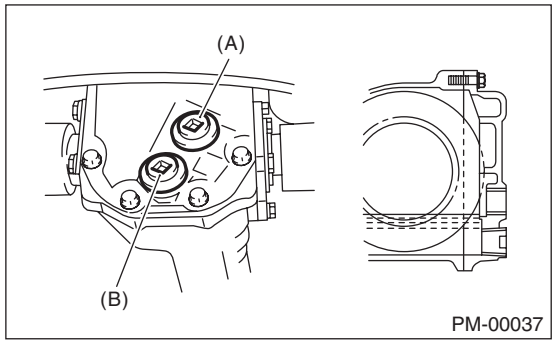
NOTE:
Apply liquid gasket to the drain plug threads.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010)

Tightening torque:
49 N·m (5.0 kgf-m, 36.2 ft-lb)

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

Recommended gear oil:
GL-5 (75W-90) or equivalent



(A) Filler plug
(B) Drain plug

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 to the rear differential gear case securely.

NOTE:
Apply liquid gasket to the filler plug threads.

Liquid gasket:
THREE BOND 1105 (Part No. 004403010)

Tightening torque:
49 N·m (5.0 kgf-m, 36.2 ft-lb)

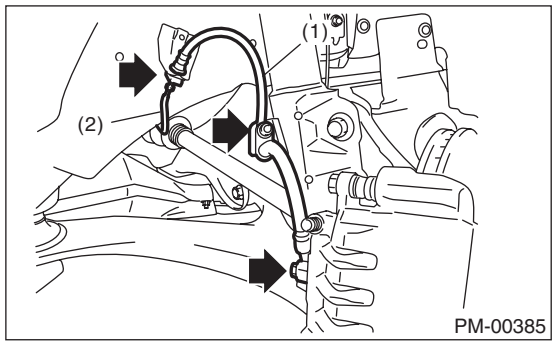
17.Brake Line

A: INSPECTION

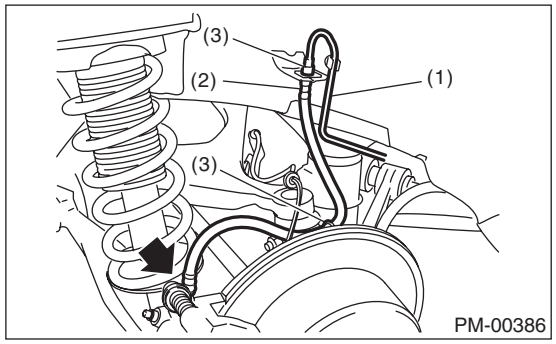
1. BRAKE LINE

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 and wheel cylinder.

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



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

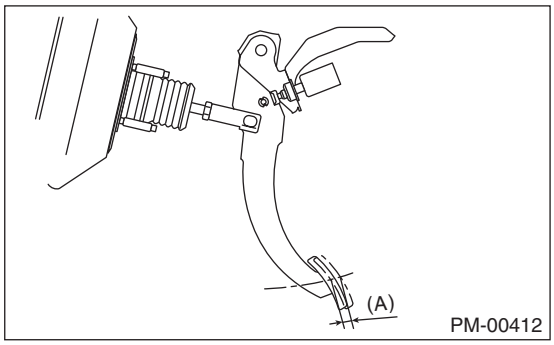


(1) Rear brake pipe
(2) Rear brake hose
(3) Clamp

2. SERVICE BRAKE

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

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



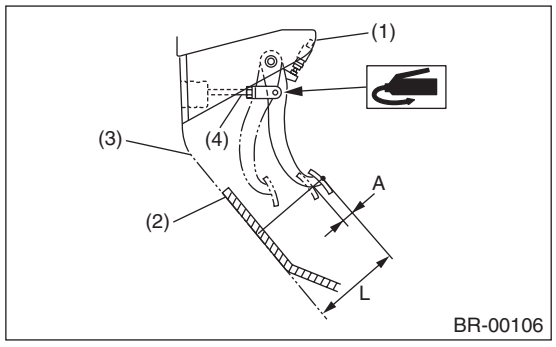
(A) Pedal free play

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. [Depress brake pedal pad with a force of 10 N (1 kgf, 2 lbf) or less to a stroke of 0.5 to 2.0 mm (0.02 to 0.08 in).]
(3) Pull the brake pad by hand.
(4) If there is no play between clevis pin and clevis, turn the brake switch to the left to loosen.
(5) Loosen the operating rod lock nut to turn the operating rod, and then tighten the lock nut after adjusting the pedal to the specified height.

Lock nut tightening torque:
22 N·m (2.2 kgf-m, 16 ft-lb)

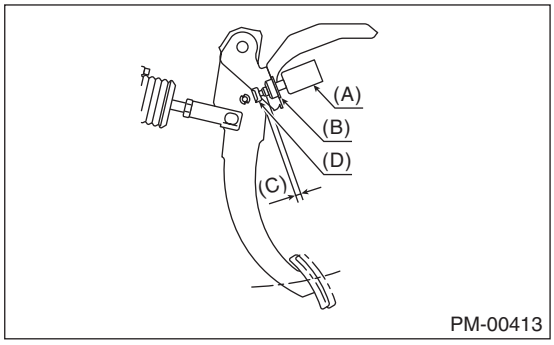
Pedal height L:
150 — 160 mm (5.91 — 6.30 in)

Brake pedal free play A:
0.5 — 2 mm (0.020 — 0.079 in) [When pulling the brake pedal upward with a force of less than 10 N (1 kgf, 2 lbf)]



(1) Stop light switch
(2) Mat
(3) Toe board
(4) Brake booster operating rod

(6) Push the brake switch until the thread end of the brake switch contacts the stopper while pulling the brake pedal.
(7) Turn the switch to the right to secure it while pushing the brake switch thread end against the stopper.
(8) Check that the clearance (C) between stopper and brake switch thread end is within the specification.

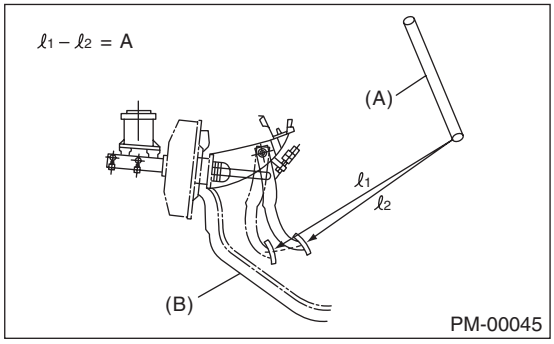


(A) Brake switch
(B) Switch clip
(C) 1.35±0.61 mm (0.05±0.02 in)
(D) Stopper

(9) Pull the pedal pad and check the play. Check that the stop light goes out when the pedal is not depressed.

3) Check the pedal stroke.
While the engine is idling, depress the brake pedal with a 490 N (50 kgf, 110 lbf) 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 pedal stroke is normal if the difference between two measured values is the specified value or less. If the measured value is specification or more, there is possibility of entering air in hydraulic unit.

Brake pedal stroke A:
95 mm (3.74 in)/ 490 N (50 kgf, 110 lbf) or less

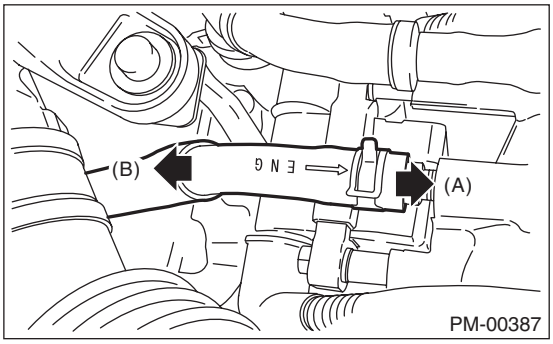


(A) Steering wheel
(B) Toe board

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 built into the vacuum hose. Disconnect the vacuum hose to inspect function of check valve.
Blow compressed air into vacuum hose from the end of brake booster side. Check that the air flows from the air hose on engine side. Next blow air into hose from engine side: Check that the air does not flow from the hose.
Replace the 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

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.

18.Brake Fluid

A: INSPECTION

1) Check that the brake fluid level is between “MIN” and “MAX”. If out of the specified range, refill or drain fluid. If the fluid level is close to “MIN”, check the brake pad for wear and refill the fluid.
2) Check the fluid for discoloration. If the fluid color has changed excessively, drain the fluid and refill with new fluid.

B: REPLACEMENT

CAUTION:
• Do not let brake fluid come into contact with the painted surface of the vehicle body. Wash away with water immediately and wipe off if it is spilled by accident.
• Avoid mixing brake fluid of different brands to prevent fluid performance from degrading.
• Be careful not to allow dirt or dust to enter the reservoir tank.
• If brake fluid adheres to the exhaust pipe, wipe it off completely.

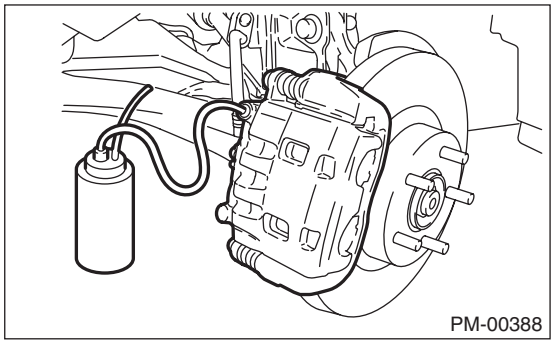
NOTE:
• During the operation, keep the reservoir tank filled with brake fluid to eliminate entry of air.
• The brake pedal operating must be very slow.
• For convenience and safety, two people should work together.
• The required amount of brake fluid is approximately 500 mℓ (16.9 US fl oz, 17.6 Imp fl oz) for the entire brake system.
1) Either jack-up the vehicle and place a rigid rack under it, or have the vehicle lifted.
2) Remove all the wheels.
3) Drain the brake fluid from the reservoir tank.
4) Refill the reservoir tank with recommended brake fluid.

Recommended brake fluid:
Refer to “RM” section. <Ref. to RM-4, FLUID, RECOMMENDED MATERIALS, Recommended Materials.>

Perform the same procedure as for bleeding the brake line, until new brake fluid comes out from vinyl tube. <Ref. to BR-38, PROCEDURE, Air Bleeding.>

NOTE:
Perform brake fluid replacement starting in the order from the farthest wheel cylinder from the master cylinder.

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.



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, 5.9 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 lbf) 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.

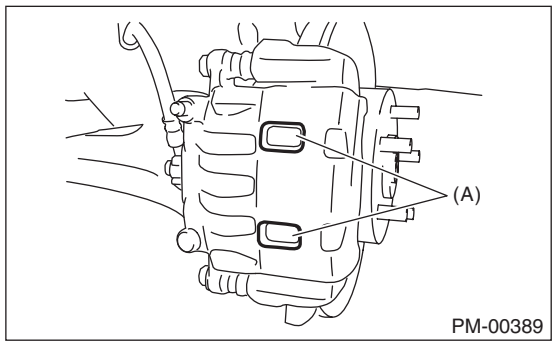
19.Disc Brake Pad and Disc

A: INSPECTION

1. DISC BRAKE PAD AND DISC

1) Jack-up the vehicle and support it with rigid racks. 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.



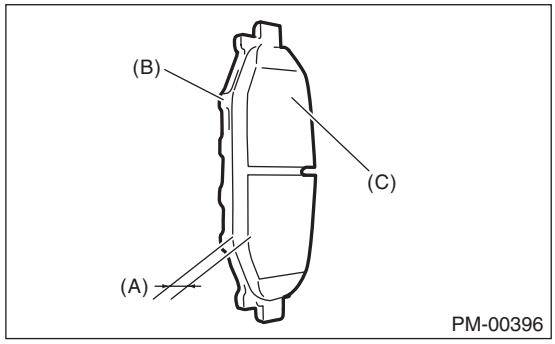
(A) Inspection hole

- Front (back metal not included)

Pad thickness	mm (in)
Standard	11 (0.43)
Wear limit	1.5 (0.059)

- Rear (back metal not included)

Pad thickness	mm (in)
Standard	9.0 (0.354)
Wear limit	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

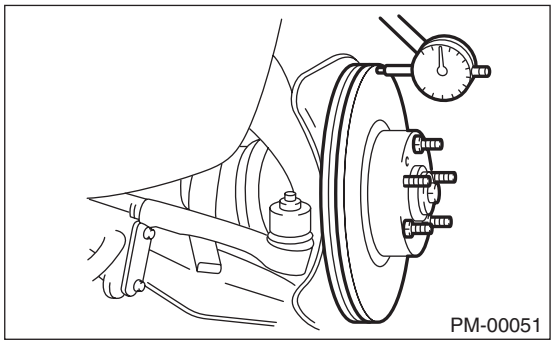
Disc rotor thickness	mm (in)
Standard	24 (0.94)
Wear limit	22 (0.87)

- Rear

Disc rotor thickness	mm (in)
Standard	10 (0.39)
Wear limit	8.5 (0.33)

4) Remove the caliper body. <Ref. to BR-16, Front Disc Brake Assembly.> <Ref. to BR-23, Rear Disc Brake Assembly.>
5) Tighten the wheel nuts to secure disc rotor.
6) Set a dial gauge at a point of 10 mm (0.39 in) or less from outer periphery of the rotor, and then measure the disc rotor runout.

Disc rotor runout limit:
Front: 0.050 mm (0.0020 in)
Rear: 0.050 mm (0.0020 in)



20.Parking Brake

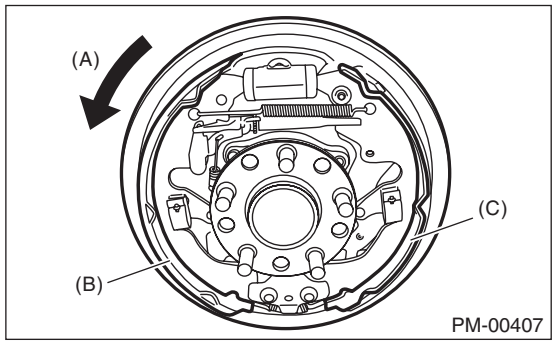
A: INSPECTION

1. REAR DRUM BRAKE

1) Remove the brake drum and check that there is no fluid leakage from the wheel cylinder.
If fluid leaks are found in the wheel cylinder, check the wheel cylinder and replace it.
2) Inspect the brake shoes for damage or deformation and check the brake linings for wear.

NOTE:
• Always replace both leading and trailing brake shoes for the left and right wheels at the same time.
• When replacing either the left or the right brake assembly, always replace the leading shoe and the trailing shoe of one side.

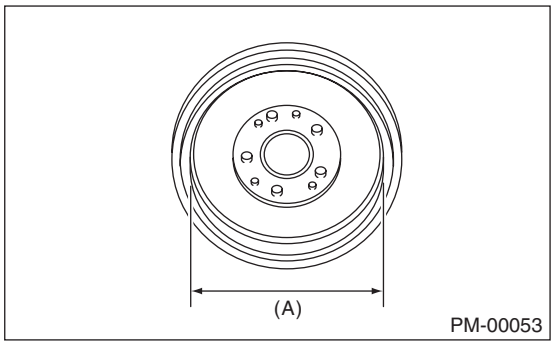
Thickness of brake lining (except for back metal):
Standard: 4.5 mm (0.177 in)
Service limit: 1.5 mm (0.059 in)



(A) Direction of drum rotation (Forward)
(B) Leading shoe
(C) Trailing shoe

3) Check the brake drum for wear, dents or other damage.
If the inside surface of the brake drum is streaked, correct the surface with emery cloth (#200 or more). If it is unevenly worn or tapered, or the outer surface of the brake drum is damaged, repair or replace it.

Brake drum inside diameter:
Standard: 254 mm (10.000 in)
Service limit: 256 mm (10.08 in)
If the deformation or wear of back plate, shoe, etc. is noticeable, replace problem parts.



(A) Inside diameter

2. PARKING BRAKE (REAR DISC BRAKE)

1) Measure the brake disc rotor inside diameter. If the disc is scored or worn, replace the brake disc rotor.

Disc rotor inside diameter:
Standard:
190 mm (7.48 in)
Service limit:
191 mm (7.52 in)
2) Measure the lining thickness. If it exceeds the limit, replace the brake shoe.

Lining thickness:
Standard:
2.8 mm (0.11 in)
Service limit:
1.5 mm (0.059 in)

NOTE:
Replace the right and left brake shoe as a set.

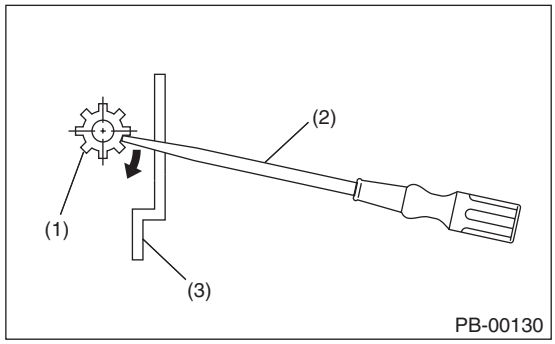
B: ADJUSTMENT

1. REAR DRUM BRAKE

The main brake automatically adjusts itself, so no adjustments are needed.

2. PARKING BRAKE (REAR DISC BRAKE)

For rear disc brake, adjust the parking brake after bleeding air.
1) Remove the rear cover (rubber) installed at rear disc rotor.
2) Turn the adjusting screw toward the arrow mark (downward) until it is locked slightly, by using flat-tip screwdriver as shown in the figure.



(1) Adjusting screw
(2) Flat tip screwdriver
(3) Disc rotor

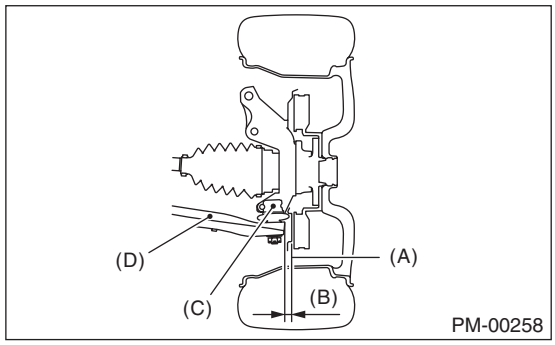
3) Turn back (upward) the adjusting screw 3 to 4 notches.
4) Install the cover (rubber) in original position correctly.

21.Suspension

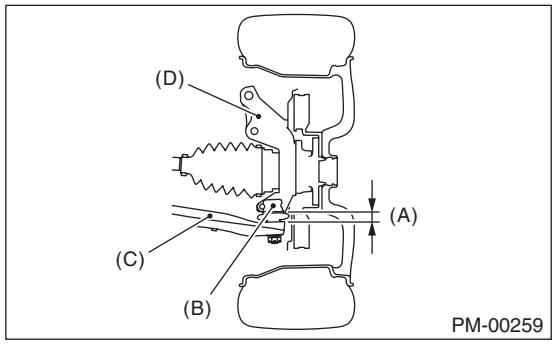
A: INSPECTION

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 in axial direction. If relative movement (B) is observed between the brake disc cover (A) and the end of front arm (D), ball joint (C) may be excessively worn.



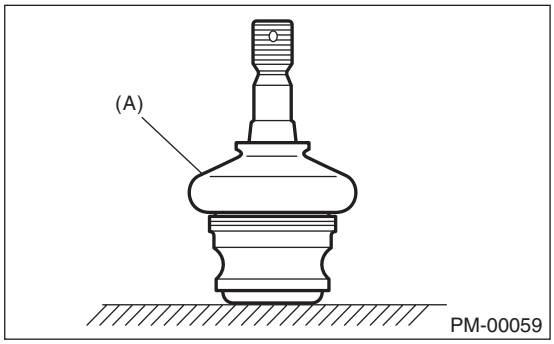
3) Grasp the end of front arm and move it up and down. Relative movement (A) between the housing (D) and front arm (C) boss indicates ball joint (B) may be excessively worn.



4) If the relative movement is observed in the preceding two steps, remove and inspect the ball joint. If the free play exceeds the standard, replace the ball joint. <Ref. to FS-16, 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-18, Front Arm.> Also, measure the free play of the ball joint. <Ref. to FS-16, Front Ball Joint.>
(1) When looseness exceeds the standard, replace the ball joint.
(2) If the dust seal is damaged, replace with a new ball joint.

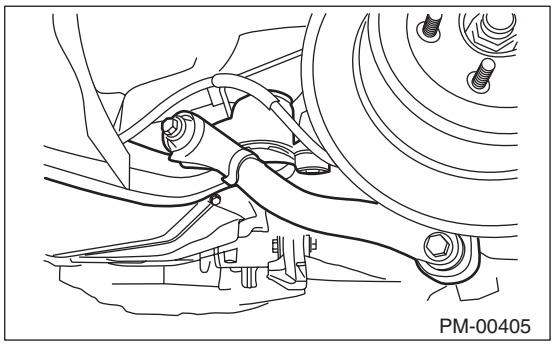
NOTE:
When the front arm ball joint has been removed or replaced, check the toe-in of front wheel. If the front wheel toe-in is not at specified value, adjust the toe-in. <Ref. to FS-6, Wheel Alignment.>



(A) Dust seal

2. FRONT, REAR SUSPENSION BUSHING

Apply pressure with tire lever etc. to inspect the bushing for fatigue or cracks. If defective, replace the bushing.



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 the tolerance value, visually inspect the following components and replace deformed parts.
- Suspension components [Front strut assembly and rear strut 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.>

4. WHEEL ALIGNMENT OF FRONT SUSPENSION

1) Check the alignment of front suspension to make sure the following items are within tolerance.
- Toe-in
- Camber
- Caster
- Steering angle

<Ref. to FS-6, Wheel Alignment.>
2) When the caster angle does not conform to the reference value 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 tolerance 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 make sure the following items are within tolerance.
- Toe-in
- Camber
- Thrust angle

<Ref. to RS-7, Wheel Alignment.>
2) When the camber angle does not conform to tolerance value, visually inspect the following components. If the deformation is observed, replace the damaged parts.
- Suspension components [Shock absorber, front lateral link, rear lateral link, upper arm, trailing link and sub frame]
- Parts connecting suspension and body

3) When the toe-in and thrust angle are out of tolerance value, adjust them so that they conform to tolerance 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 lateral link
  - Rear lateral link
  - Upper arm
  - Trailing link
  - 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.

22.Wheel Bearing

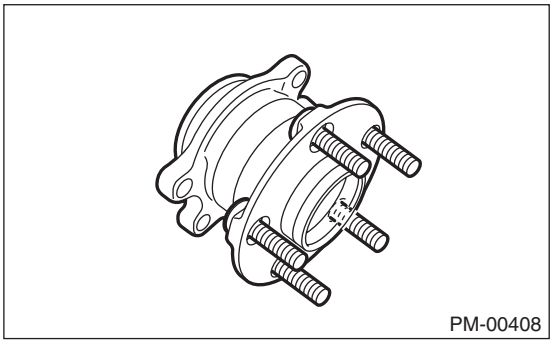
A: INSPECTION

1. FRONT HUB UNIT

1) Jack-up the front side of vehicle.
2) While holding the front wheel by hand, swing it in and out to check that there is no 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 hub and measure the looseness in the 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 the front crossmember.
6) Remove the AAR 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 hub unit.

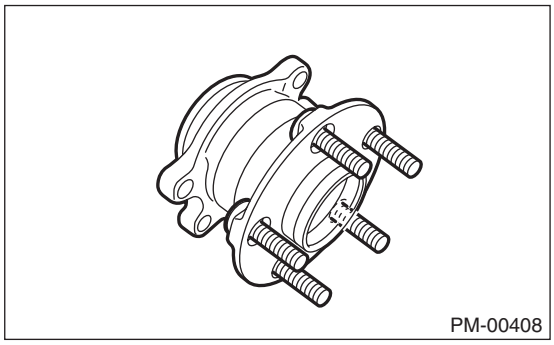

PM-00408

2. REAR HUB UNIT

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 hub and measure the looseness in the 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-29, Rear Drive Shaft.>
6) While supporting rear 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, replace the rear hub unit.

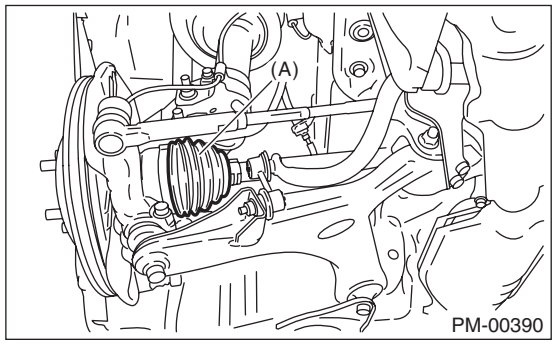

PM-00408

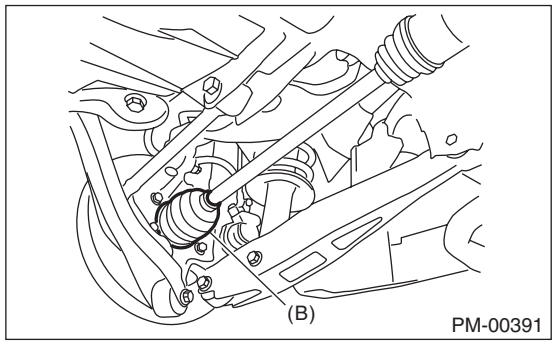
23.Axle Boots & Joints

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 with a new part. <Ref. to DS-25, Front Drive Shaft.> <Ref. to DS-29, Rear Drive Shaft.>





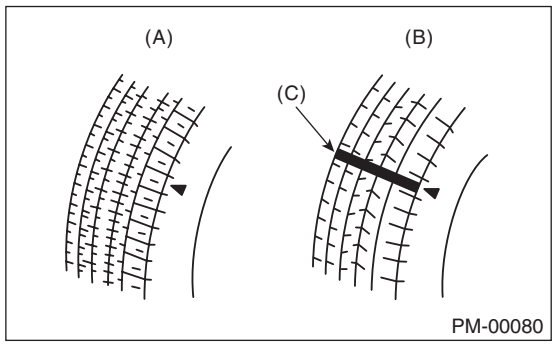
2. PROPELLER SHAFT

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

24.Tire Rotation

A: INSPECTION

1) When the tread has worn down to less than 1.6 mm (0.063 in) or the wear indicator appears across the tire tread, replace the tire. (Replace the right and left tire as a set.)

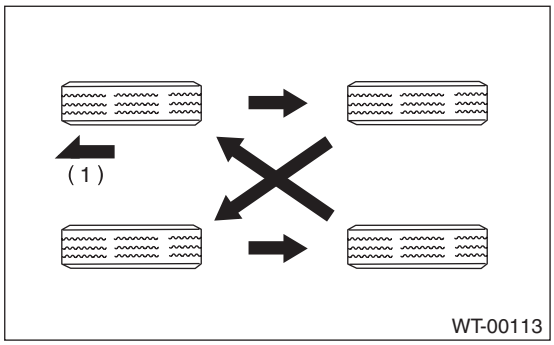


(A) New tread
(B) Damaged tread
(C) Tread wear indicator

2) If the tire appears to be worn unevenly, adjust the wheel alignment.

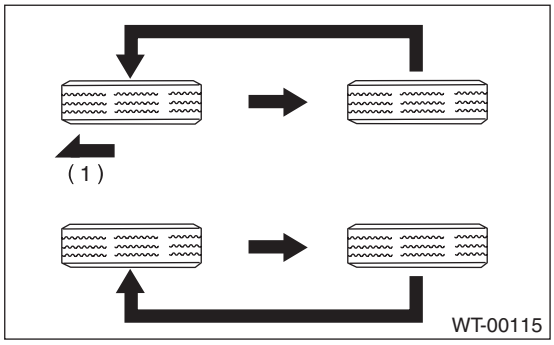
3) Next, make a tire rotation between front and rear as shown in the figure, make sure tires are worn evenly.

- When the direction of tire rotation is not specified

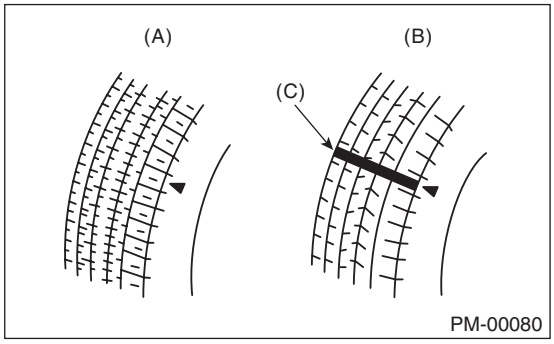


(1) Front

- With instruction for the direction of tire rotation



(1) Front



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

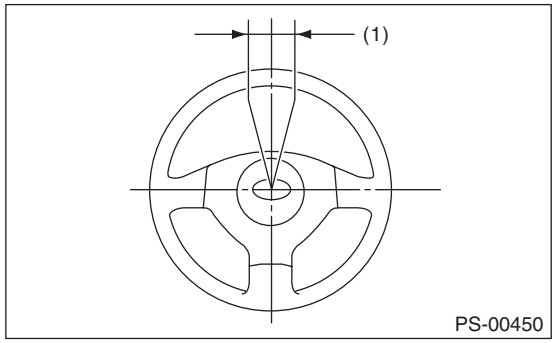
25.Steering System (Power Steering)

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 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.

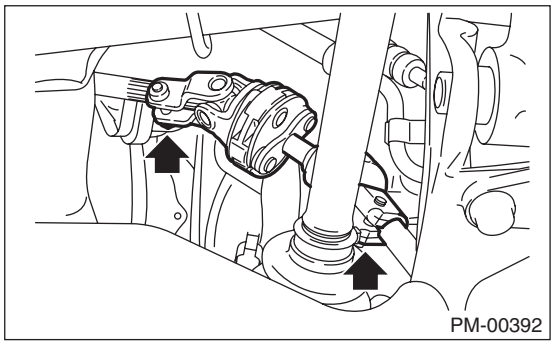
Maximum permissible play:
0.5 mm (0.020 in)

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.

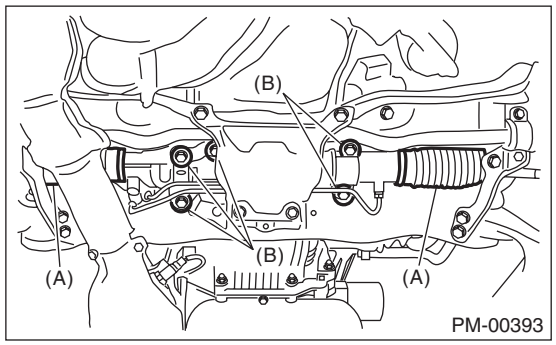
Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)



3. GEARBOX

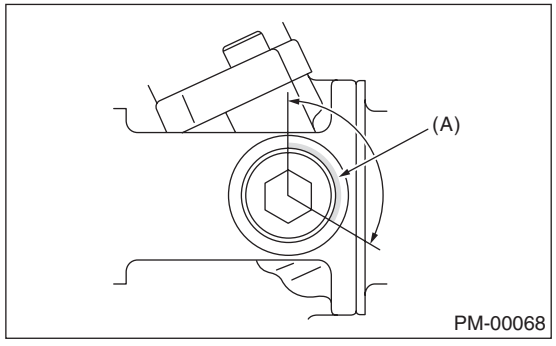
1) With the vehicle placed on a level surface, turn the steering wheel 90° in both the left and right directions.
While the wheel is being rotated, reach under the vehicle and check for looseness in gearbox.

Tightening torque:
60 N·m (6.1 kgf-m, 44.3 ft-lb)



(A) Boot
(B) Gearbox mounting bolt

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 in the following manner.
(1) Tighten the adjusting screw to 25 N·m (2.5 kgf-m, 18 ft-lb) and then loosen.
(2) Tighten the adjusting screw to 3.9 N·m (0.4 kgf-m, 2.9 ft-lb) and then loosen it within 20°.
(3) Apply liquid gasket to at least 1/3 of entire perimeter of adjusting screw thread.



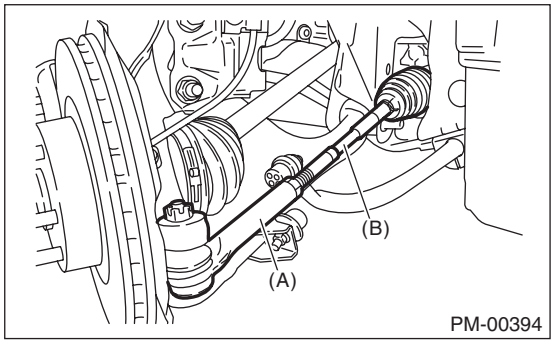
(A) Apply liquid gasket to at least 1/3 of entire perimeter.

(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):
25 N·m (2.5 kgf-m, 18 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

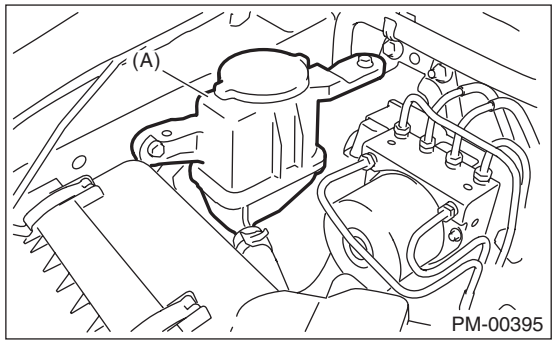
2) Check the connections of knuckle ball joints for play, inspect for damage on dust seals, and check free play of ball studs. If castle nut is loose, retighten it to the specified torque, then further tighten up to 60° until the cotter pin hole is aligned.

Tightening torque:
27 N·m (2.75 kgf-m, 19.9 ft-lb)
3) Check the lock nut on the tie-rod end for tightness. If it is loose, retighten it to the specified torque.

Tightening torque:
85 N·m (8.7 kgf-m, 62.7 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).



CAUTION:
If power steering fluid adheres to the exhaust pipe, wipe it off completely.

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:
SUBARU ATF HP or Dexron III

Fluid capacity:
0.7 ℓ (0.7 US qt, 0.6 Imp qt)

6. POWER STEERING FLUID FOR LEAKS

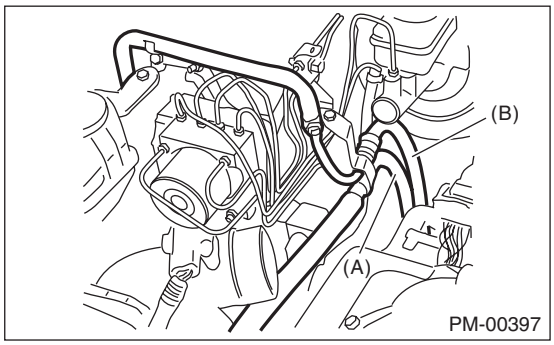
Inspect the underside of oil pump and gearbox of power steering system, hoses, pipes and their couplings for fluid leaks.
If the fluid leaks are found, retighten their fitting bolts (or nuts) and/or replace their parts.

NOTE:
• Wipe the leaked fluid off after correcting fluid leaks.
• Also pay attention to clearances between hoses (or piping) 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.



(A) Pressure hose
(B) Return hose

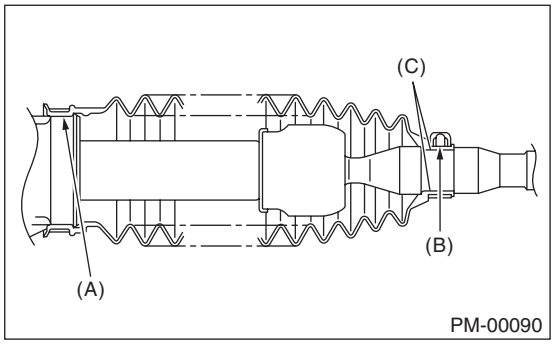
8. POWER STEERING PIPES FOR DAMAGES

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).



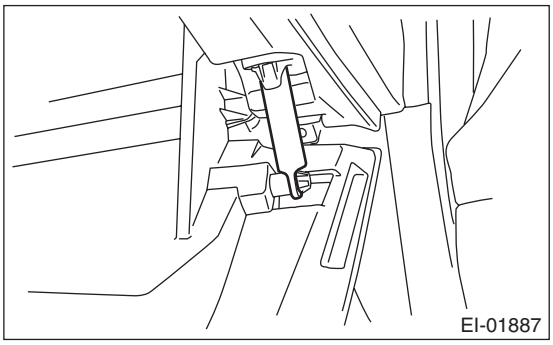
10.FITTING BOLTS AND NUTS

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.

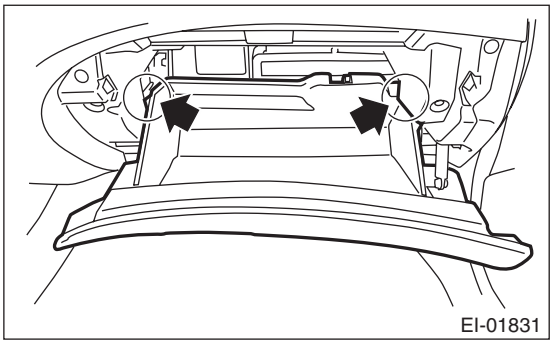
26.A/C Filter

A: REPLACEMENT

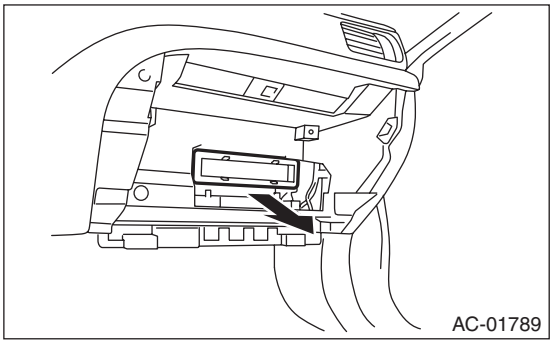
1) Remove the glove box damper.



2) Disengage the stopper section and pull the glove box lid to remove it.



3) Pinch the claw to unlock and remove the A/C filter.

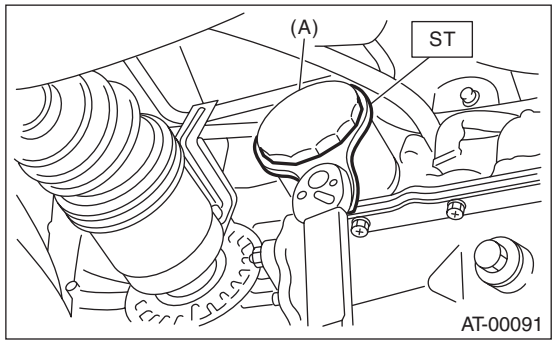


4) Install in the reverse order of removal.

27.ATF Filter

A: REMOVAL

NOTE:
The ATF filter is maintenance free.
1) Lift up the vehicle.
2) Using the ST, remove the ATF filter.
ST 498545400 OIL FILTER WRENCH



(A) ATF filter

B: INSTALLATION

1) Apply a thin coat of ATF to the oil seal part of new ATF filter.
2) Install the ATF filter. Turn it by hand, being careful not to damage oil seal.
3) Tighten the ATF filter using ST.
Calculate the ATF filter tightening torque using following formula.
$T2 = L2/(L1 + L2) \times T1$
T1:14 N·m (1.4 kgf-m, 10.3 ft-lb)
[Required torque setting]
T2: Tightening torque
L1: ST length 78 mm (3.07 in)
L2: Torque wrench length
Example:

Torque wrench length mm (in)	Tightening torque N·m(kgf-m, ft-lb)
100 (3.94)	7.7 (0.79, 5.7)
150 (5.91)	9.0 (0.92, 6.7)
200 (7.87)	10 (1.0, 7.2)

NOTE:
Align the ST with the torque wrench while tightening the ATF filter.
ST 498545400 OIL FILTER WRENCH
4) Fill ATF.
5) Inspect the level of ATF. <Ref. to 4AT-26, Automatic Transmission Fluid.>

C: INSPECTION

Check for rust, hole, ATF leaks or other damage.