SUBARU

FORESTER

2004 Model Year

PDF Service Manual

GENERAL INFORMATION SECTION (Pub.No.G8080GE1)

ENGINE SECTION 1 (Pub.No.G8080GE2)

ENGINE SECTION 2 (Pub.No.G8080GE3)

ENGINE SECTION 3 (Pub.No.G8080GE4)

TRANSMISSION SECTION (Pub.No.G8080GE5)

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GENERAL INFORMATION SECTION

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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.

FUJI HEAVY INDUSTRIES LTD. G8080GE1

FOREWORD

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1. Foreword

A: FOREWORD

These manuals are used when performing maintenance, repair, or diagnosis of the Subaru FORESTER.

Applied model: SG***** from 2004MY

The manuals contain the latest information at the time of publication. Changes in specifications, methods, etc. may be made without notice.

HOW TO USE THIS MANUAL

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1. How to Use This Manual

A: HOW TO USE THIS MANUAL

1. STRUCTURE

Each section consists of SCT that are broken down into SC that are divided into sections for each component. The specification, maintenance and other information for the components are included, and diagnosis information has also been added where necessary.

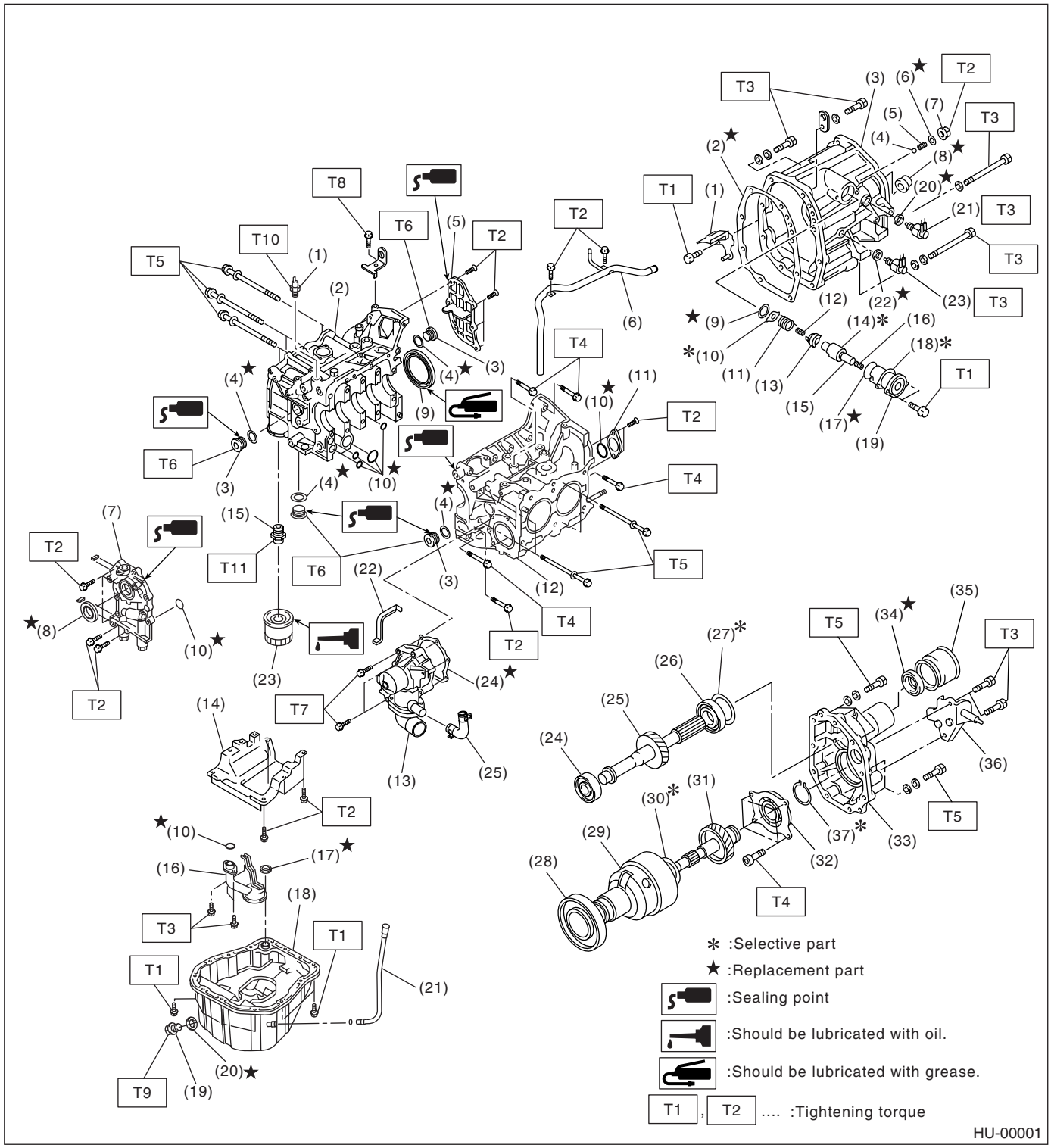
2. INDEX

The first page has an index with tabs.

3. COMPONENTS

Illustrations are listed for each component. The information necessary for repair work (tightening torque, grease up points, etc.) is described on these illustrations. Information is described using symbol. To order the parts, refer to parts catalogue.

Example:



4. SPECIFICATION

If necessary, specifications are also included.

5. INSPECTION

Inspections are included to be carried out before and after maintenance.

6. MAINTENANCE

• Maintenance instructions for serviceable parts describes work area and detailed steps with illustration. It also describes the use of special tool, tightening torque, cautions for each procedure.
• If many serviceable parts are included in one service procedure, appropriate reference are provided for each part.

Example:

15.Main Shaft Assembly for Single-Range (A)

A: REMOVAL (B)

1) Remove the manual transmission assembly from vehicie. <Ref. to MT-33, REMOVAL, Manual Transmission Assembly.> (C)

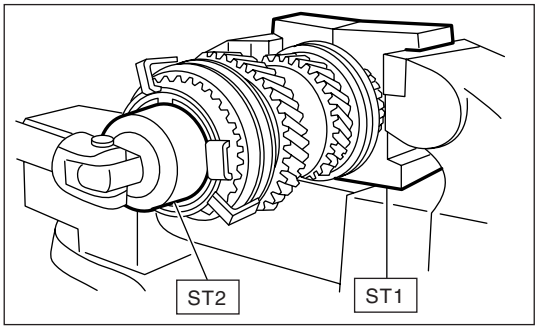
---

11) Tighten the lock nuts to the specified torque using ST1 and ST2.

NOTE: (D)
Secure the lock nuts in two Places affer tightening.

ST2 499987003 SOCKET WRENCH
ST1 498937000 (E) TRANSMISSION HOLDER (F)

Tightening torque:
118 N·m (12.0 kgf-m, 86.8 ft-lb) (G)



(H)

HU-00002

(A) Component
(B) Process
(C) Reference
(D) Caution
(E) Tool number of special tool
(F) Name of special tool
(G) Tightening torque
(H) Illustration

7. DIAGNOSIS

Tables showing a step-by-step process make it easy to conduct diagnosis.

8. SI UNITS

Measurements in these manuals are according to the SI units. Metric and yard/pound measurements are also included.

Example:

Tightening torque:
44 N·m (4.5 kgf-m, 33 ft-lb)

SPECIFICATION

SPC

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1. Forester

A: DIMENSIONS

Model			2.0 L Non-turbo	2.0 L Turbo	2.5 L Non-turbo	2.5 L Turbo
Overall length		mm (in)	4,450 (175.2)			
Overall width		mm (in)	1,735 (68.3)			
Overall height (at C.W.)		mm (in)	1,590 (62.6)	1,585 (62.4)	1,590 (62.6)	
Compartment	Length	mm (in)	1,795 (70.7)			
	Width	mm (in)	1,455 (57.3)			
	Height	mm (in)	1,245 (49.0), 1,210 (47.6)★			
Wheelbase		mm (in)	2,525 (99.4)			
Tread	Front	mm (in)	1,495 (58.9)			
	Rear	mm (in)	1,485 (58.5)			
Minimum road clearance		mm (in)	190 (7.5)	195 (7.7)	200 (7.9)	

★: With sunroof

B: ENGINE

Model		2.0 L Non-turbo	2.0 L Turbo	2.5 L Non-turbo	2.5 L Turbo
Engine type		Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine			
Valve arrangement		Overhead camshaft type			
Bore×Stroke	mm (in)	92×75 (3.62×2.95)		99.5×79 (3.92×3.11)	
Displacement	cm^3 (cu in)	1,994 (121.67)		2,457 (149.94)	
Compression ratio		10.0±0.2	8.0±0.2	10.0±0.2	8.2±0.2
Firing order		1 — 3 — 2 — 4			
Idle speed at Park or Neutral position	rpm	650±100	700±100	650±100	700±100
Maximum output	kW (PS)/rpm	92 (125)/5,600	130 (177)/5,600	115 (156)/5,600	155 (211)/5,600
Maximum torque	N·m (kgf-m, ft-lb)/rpm	184 (18.8, 41.4)/3,600	245 (25.0, 55.1)/3,200	223 (22.7, 50.1)/3,600	320 (32.6, 71.8)/3,600

C: ELECTRICAL

Model		2.0 L Non-turbo	2.0 L Turbo	2.5 L Non-turbo	2.5 L Turbo
Ignition timing at idling speed BTDC/rpm		10°±10°/650	12°±10°/700	MT: 10°±10°/650 AT: 15°±10°/650	17°±10°/700
Spark plug	Type and manufacturer	CHAMPION: RC10YC4 **Alternate** NGK: BKR5E-11	NGK: PFR6G	CHAMPION: RC10YC4 **Alternate** NGK: BKR5E-11	NGK: ILFR6B
Generator		12 V — 90 A			
Battery	Type and capacity (5HR)	MT: 12 V — 48 AH (55D23L) AT: 12 V — 52 AH (65D23L)		12 V — 27 AH (34B19L) 12 V — 48 AH (55D23L)★	MT: 12 V — 48 AH (55D23L) AT: 12 V — 52 AH (65D23L)

★: For Australia model

D: TRANSMISSION

Model			2.0 L Non-turbo		2.0 L Turbo		2.5 L Non-turbo		2.5 L Turbo	
Transmission type			5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Clutch type			DSPD	TCC	DSPD	TCC	DSPD	TCC	DSPD	TCC
Gear ratio		1st	3.454	2.785	3.454	2.785	3.454	2.785	3.454	2.785
		2nd	2.062	1.545	1.947	1.545	2.062	1.545	1.947	1.545
		3rd	1.448	1.000	1.366	1.000	1.448	1.000	1.366	1.000
		4th	1.088	0.694	0.972	0.694	1.088	0.694	0.972	0.694
		5th	0.871	—	0.738	—	0.780	—	0.738	—
		Reverse	3.333	2.272	3.333	2.272	3.333	2.272	3.333	2.272
		Dual range	1.447	—	—	—	1.196	—	—	—
Reduction gear (Front)	1st reduction	Type of gear	—	Helical	—	Helical	—	Helical	—	Helical
		Gear ratio	—	1.000	—	1.000	—	1.000	—	1.000
	Final reduction	Type of gear	Hypoid							
		Gear ratio	4.111	4.444	4.444	4.111	4.111	4.444	4.111	4.444
Reduction gear (Rear)	Transfer reduction	Type of gear	Helical	—	Helical	—	Helical	—	Helical	—
		Gear ratio	1.000	—	1.081★, 1.000	—	1.000	—	1.000	—
	Final reduction	Type of gear	Hypoid							
		Gear ratio	4.111	4.444	4.111★, 4.444	4.111	4.111	4.444	4.111	4.444

5MT: 5 forward speeds with synchromesh and 1-reverse
4AT: Electronically controlled fully-automatic, 4-forward speeds and 1-reverse
DSPD: Dry Single Plate Diaphragm
TCC: Torque Converter Clutch
★: For Europe model

E: STEERING

Type		Rack and Pinion, Integral
Turns, lock to lock		3.0
Minimum turning circle m (ft)	Curb to curb	10.6 (34.8)
	Wall to wall	11.4 (37.4)

F: SUSPENSION

Front	Macpherson strut type, Independent, Coil spring
Rear	Dual-link type, Independent, Coil spring

G: BRAKE

Model	2.0 L Non-turbo, 2.5 L Non-turbo	2.0 L Turbo, 2.5 L Non-turbo★, 2.5 L Non-turbo
Service brake system	Dual circuit hydraulic with vacuum suspended power unit	
Front	Ventilated disc brake	
Rear	Drum brake	Disc brake
Parking brake	Mechanical on rear brakes	

★: RHD model

H: TIRE

Rim size	15×6J	16×6 1/2J
Tire size	205/70 R15 95H	215/60 R16 95V, P215/60 R16 94H
Type	Steel belted radial, Tubeless	

I: CAPACITY

Model		2.0 L Non-turbo		2.0 L Turbo		2.5 L Non-turbo		2.5 L Turbo	
Transmission		5MT	4AT	5MT	4AT	5MT	4AT	5MT	4AT
Fuel tank	ℓ (US gal, Imp gal)	60 (15.9, 13.2)							
Engine oil (When replacing)	ℓ (US qt, Imp qt)	Approx. 4.0 (4.2, 3.5)							
Transmission gear oil	ℓ (US qt, Imp qt)	4.0 (4.2, 3.5)	—	3.5 (3.7, 3.1), 3.9 (4.1, 3.4) ★1	—	4.0 (4.2, 3.5)	—	3.5 (3.7, 3.1)	—
ATF	ℓ (US qt, Imp qt)	—	8.4 (8.9, 7.4)	—	9.3 (9.8, 8.2)	—	9.3 (9.8, 8.2)	—	9.3 (9.8, 8.2)
Front differential gear oil	ℓ (US qt, Imp qt)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)	—	1.2 (1.3, 1.1)
Rear differential gear oil	ℓ (US qt, Imp qt)	0.8 (0.8, 0.6)							
Power steering fluid	ℓ (US qt, Imp qt)	0.7 (0.7, 0.6)							
Engine coolant	ℓ (US qt, Imp qt)	6.6 (7.0, 5.8)	6.5 (6.9, 5.7), 6.9 (7.3, 6.1) ★3	7.4 (7.8, 6.5)	7.3 (7.7, 6.4) ★2	6.9 (7.3, 6.1)	6.8 (7.2, 6.0)	7.4 (7.8, 6.5)	7.3 (7.7, 6.4)

★1: With oil pump
★2: MT model with oil cooler Included
★3: Model with ATF warmer

J: WEIGHT

1. LHD MODEL

Option code★		EC		K4		KS	
Model		2.0 L Non-turbo				2.5 L Non-turbo	
Grade		2.0 X				2.5 X	
Transmission		5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front kgf (lb)	760 (1,675)	775 (1,710)	775 (1,710)	790 (1,740)	780 (1,720)	800 (1,765)
	Rear kgf (lb)	600 (1,325)	600 (1,325)	595 (1,310)	595 (1,310)	620 (1,365)	620 (1,365)
	Total kgf (lb)	1,360 (3,000)	1,375 (3,035)	1,370 (3,020)	1,385 (3,050)	1,400 (3,085)	1,420 (3,130)
Maximum permissible axle weight (M.P.A.W.)	Front kgf (lb)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)
	Rear kgf (lb)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)
Maximum permissible weight (M.P.W.)	Total kgf (lb)	1,880 (4,140)	1,880 (4,140)	1,880 (4,140)	1,880 (4,140)	1,880 (4,140)	1,880 (4,140)
Option	Sport package base	—	—	—	—	—	—
	Aluminum wheel	❍	❍	❍	❍	❍	❍
	Front fog light	—	—	—	—	❍	❍
	Cruise control	—	—	—	—	❍	❍
	High-grade audio	—	—	—	—	—	—
	Sport steering	—	—	—	—	—	—
	Leather package base	—	—	—	—	—	—
	Leather seat, Leather door trim	—	—	—	—	—	—
	Navigation system	—	—	—	—	—	—
	Air conditioner	—	—	❍	❍	❍	❍
	Side airbag	—	—	—	—	—	—
	Sunroof	—	—	—	—	—	—
	Self-leveling function Rr	❍	❍	—	—	—	—
	Cold area pack A	—	—	—	—	—	—
	Cold area pack B	—	—	—	—	—	—
	Cold area pack C	—	—	—	—	—	—
	Cold area pack D	❍	❍	—	—	—	—
	Heated mirrors	❍	❍	—	—	—	—
	Security system	—	—	—	—	—	—

★: For the option codes, refer to ID section. <Ref. to ID-5, MODEL NUMBER PLATE, Identification.>

Option code★			EC		K4	
Model			2.0 L Turbo			
Grade			2.0 XT			
Transmission			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	810 (1,785)	830 (1,830)	815 (1,795)	835 (1,840)
	Rear	kgf (lb)	620 (1,365)	620 (1,365)	630 (1,390)	630 (1,390)
	Total	kgf (lb)	1,430 (3,150)	1,450 (3,195)	1,445 (3,185)	1,465 (3,230)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)
	Rear	kgf (lb)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,950 (4,295)	1,950 (4,295)	1,950 (4,295)	1,950 (4,295)
Option	Sport package base		—	—	—	—
	Aluminum wheel		—	—	—	—
	Front fog light		❍	❍	❍	❍
	Cruise control		❍	❍	—	❍
	High-grade audio		—	—	—	—
	Sport steering		—	—	—	—
	Leather package base		❍	❍	❍	❍
	Leather seat, Leather door trim		—	—	—	❍
	Navigation system		—	—	—	—
	Air conditioner		❍	❍	❍	❍
	Side airbag		❍	❍	❍	❍
	Sunroof		—	—	❍	❍
	Self-leveling function Rr		❍	❍	—	—
	Cold area pack A		—	—	—	—
	Cold area pack B		❍	❍	—	—
	Cold area pack C		—	—	—	—
	Cold area pack D		—	—	—	—
	Heated mirrors		❍	❍	—	—
	Security system		—	—	—	—

★: For the option codes, refer to ID section. <Ref. to ID-5, MODEL NUMBER PLATE, Identification.>

2. RHD MODEL

Option code★			EK		EK	
Model			2.0 L Non-turbo		2.0 L Turbo	
Grade			2.0 X		2.0 XT	
Transmission			5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	775 (1,710)	790 (1,740)	815 (1,795)	835 (1,840)
	Rear	kgf (lb)	600 (1,325)	600 (1,325)	635 (1,400)	635 (1,400)
	Total	kgf (lb)	1,375 (3,035)	1,390 (3,065)	1,450 (3,195)	1,470 (3,240)
Maximum permissible axle weight (M.P.A.W.)	Front	kgf (lb)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)
	Rear	kgf (lb)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)
Maximum permissible weight (M.P.W.)	Total	kgf (lb)	1,880 (4,145)	1,880 (4,145)	1,950 (4,300)	1,950 (4,300)
Option	Sport package base		—	—	—	—
	Aluminum wheel		❍	❍	—	—
	Front fog light		—	—	❍	❍
	Cruise control		—	—	❍	❍
	High-grade audio		—	—	—	—
	Sport steering		—	—	—	—
	Leather package base		—	—	❍	❍
	Leather seat, Leather door trim		—	—	❍	❍
	Navigation system		—	—	—	—
	Air conditioner		❍	❍	❍	❍
	Side airbag		—	—	❍	❍
	Sunroof		—	—	❍	❍
	Self-leveling function Rr		❍	❍	❍	❍
	Cold area pack A		❍	❍	—	—
	Cold area pack B		—	—	—	—
	Cold area pack C		—	—	❍	❍
	Cold area pack D		—	—	—	—
	Heated mirrors		❍	❍	❍	❍
	Security system		—	—	❍	❍

★: For the option codes, refer to ID section. <Ref. to ID-5, MODEL NUMBER PLATE, Identification.>

Option code★			KA					
Model			2.5 L Non-turbo				2.5 L Turbo	
Grade			2.5 X		2.5 XS		2.5 XT	
Transmission			5MT	4AT	5MT	4AT	5MT	4AT
Curb weight (C.W.)	Front	kgf (lb)	765 (1,685)	785 (1,730)	760 (1,675)	780 (1,720)	815 (1,795)	835 (1,840)
	Rear	kgf (lb)	610 (1,345)	610 (1,345)	605 (1,335)	605 (1,335)	610 (1,345)	610 (1,345)
	Total	kgf (lb)	1,375 (3,030)	1,395 (3,075)	1,365 (3,010)	1,385 (3,055)	1,425 (3,140)	1,445 (3,185)
Maximum permissible axle weight (G.A.L.R.)	Front	kgf (lb)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)	1,010 (2,225)
	Rear	kgf (lb)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)	1,035 (2,280)
Maximum permissible weight (G.V.M.)	Total	kgf (lb)	1,950 (4,300)	1,950 (4,300)	1,950 (4,300)	1,950 (4,300)	1,950 (4,300)	1,950 (4,300)
Option	Sport package base		—	—	—	—	—	—
	Aluminum wheel		—	—	—	—	—	—
	Front fog light		—	—	❍	❍	❍	❍
	Cruise control		❍	❍	❍	❍	❍	❍
	High-grade audio		—	—	—	—	—	—
	Sport steering		—	—	—	—	❍	❍
	Leather package base		—	—	—	—	❍	❍
	Leather seat, Leather door trim		—	—	—	—	—	—
	Navigation system		—	—	—	—	—	—
	Air conditioner		❍	❍	❍	❍	❍	❍
	Side airbag		—	—	—	—	—	—
	Sunroof		—	—	—	—	—	—
	Self-leveling function Rr		—	—	❍	❍	❍	❍
	Cold area pack A		—	—	—	—	—	—
	Cold area pack B		—	—	—	—	—	—
	Cold area pack C		—	—	—	—	—	—
	Cold area pack D		—	—	—	—	—	—
	Heated mirrors		—	—	—	—	—	—
	Security system		—	—	—	—	—	—

★: For the option codes, refer to ID section. <Ref. to ID-5, MODEL NUMBER PLATE, Identification.>

3. OPTION

Option		Front kgf (lb)	Rear kgf (lb)	Total kgf (lb)
Sport package base		0.1 (0.2)	0.4 (0.9)	0.5 (1.1)
Aluminum wheel	15 IN	–6.5 (–14.3)	–6.5 (–14.3)	–13.0 (–28.6)
	16 IN	–7.3 (–16.1)	–7.3 (–16.1)	–14.6 (–32.2)
Front fog light		0.7 (1.5)	–0.1 (–0.2)	0.6 (1.3)
Cruise control		1.5 (3.3)	0.2 (0.5)	1.7 (3.8)
High-grade audio		0.8 (1.8)	0.4 (0.9)	1.2 (2.7)
Sport steering		0.2 (0.5)	0.1 (0.2)	0.3 (0.7)
Leather package base		0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Leather seat, Leather door trim		1.2 (2.6)	3.0 (6.6)	4.2 (9.2)
Navigation system		–1.7 (–3.7)	–0.8 (–1.8)	–2.5 (–5.5)
Air conditioner		16.9 (37.3)	–1.4 (–3.1)	15.5 (34.2)
Side airbag		2.0 (4.4)	2.4 (5.3)	4.4 (9.7)
Sunroof		3.5 (7.7)	13.2 (29.1)	16.7 (36.8)
Self-leveling function Rr	Non-turbo	0.1 (0.2)	3.0 (6.6)	3.1 (6.8)
	Turbo	0.1 (0.2)	3.1 (6.8)	3.2 (7.0)
Cold area pack A		0.1 (0.2)	0.2 (0.5)	0.3 (0.7)
Cold area pack B		0.1 (0.2)	0.3 (0.7)	0.4 (0.9)
Cold area pack C		0.1 (0.2)	0.3 (0.7)	0.4 (0.9)
Cold area pack D		0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Heated mirrors		0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Security system		0.3 (0.7)	0.3 (0.7)	0.6 (1.4)

PRECAUTION

PC

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1. Precaution 2

1. Precaution

A: PRECAUTION

Please clearly understand and adhere to the following general precautions. They must be strictly followed to avoid minor or serious injury to the person doing the work or people in the area.

1. ABS

Handle the ABS as a total system. Do not disassemble or attempt to repair individual parts. Doing so could prevent the ABS system from operating when needed or cause it to operate incorrectly and result in injury.

2. BRAKE FLUID

If brake fluid gets in your eyes or on your skin, do the following:

- Wash out your eyes and seek immediate medical attention.
- Wash your skin with soap and then rinse thoroughly with water.

3. RADIATOR FAN

The radiator fan may rotate without warning, even when the engine is not on. Do not place your hand, cloth, tools, or other items near the fan at any time.

4. ROAD TESTS

Always conduct road tests in accordance with traffic rules and regulations to avoid bodily injury and interrupting traffic.

5. AIRBAG

To prevent bodily injury from unexpected deployment of airbags and unnecessary maintenance, follow the instructions in this manual when performing maintenance on airbag components or nearby, and airbag wiring harnesses or nearby.
To prevent unexpected deployment, perform the steps below and then wait at least 20 seconds to discharge electricity before beginning work.

- Step 1: Turn the ignition switch OFF.
- Step 2: Disconnect the ground cable from battery.

6. AIRBAG DISPOSAL

To prevent bodily injury from unexpected airbag deployment, do not dispose airbag modules in the same way as other refuse. Follow all government regulations concerning disposal of refuse.

7. AIRBAG MODULE

Adhere to the following when handling and storing the airbag module to prevent bodily injury from unexpected deployment:

- Do not hold the harnesses or connectors to carry module.
- Do not face the bag in the direction that it opens towards yourself or other people.
- Do not face the bag in the direction that it opens towards the floor or walls.

8. AIRBAG SPECIAL TOOLS

To prevent unexpected deployment, only use special tools.

9. WINDOW

Always wear safety glasses when working around any glass to prevent glass fragments from damaging your eyes.

10.WINDOW ADHESIVE

Always use the recommended or alternative adhesive when attaching glass to prevent it from coming loose and falling, resulting in accidents and injury.

NOTE

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1. Note

A: NOTE

This is information that can improve efficiency of maintenance and assure sound work.

1. FASTENER NOTICE

Fasteners are used to prevent parts from damage and dislocation due to looseness. Fasteners must be tightened to the specified torque.
Do not apply paint, lubricant, rust retardant, or other substances to the surface around bolts, fasteners, etc. Doing so will make it difficult to obtain the correct torque and result in looseness and other problems.

2. STATIC ELECTRICITY DAMAGE

Do not touch the control unit, connectors, logic boards, and other such parts when there is a risk of static electricity. Always use a static electricity prevention cord or touch grounded metal before conducting work.

3. BATTERY

When removing the battery cables, always be sure to turn the ignition switch off to prevent electrical damage to the control unit from rush current.

4. SERVICE PARTS

Use authentic service parts for maximum performance and maintenance, when conducting repairs. Subaru/FHI will not be responsible for poor performance resulting from the use of parts not specified by a genuine dealer.

5. PROTECTING VEHICLE UNDER MAINTENANCE

Make sure to attach the fender cover, seat covers, etc. before work.

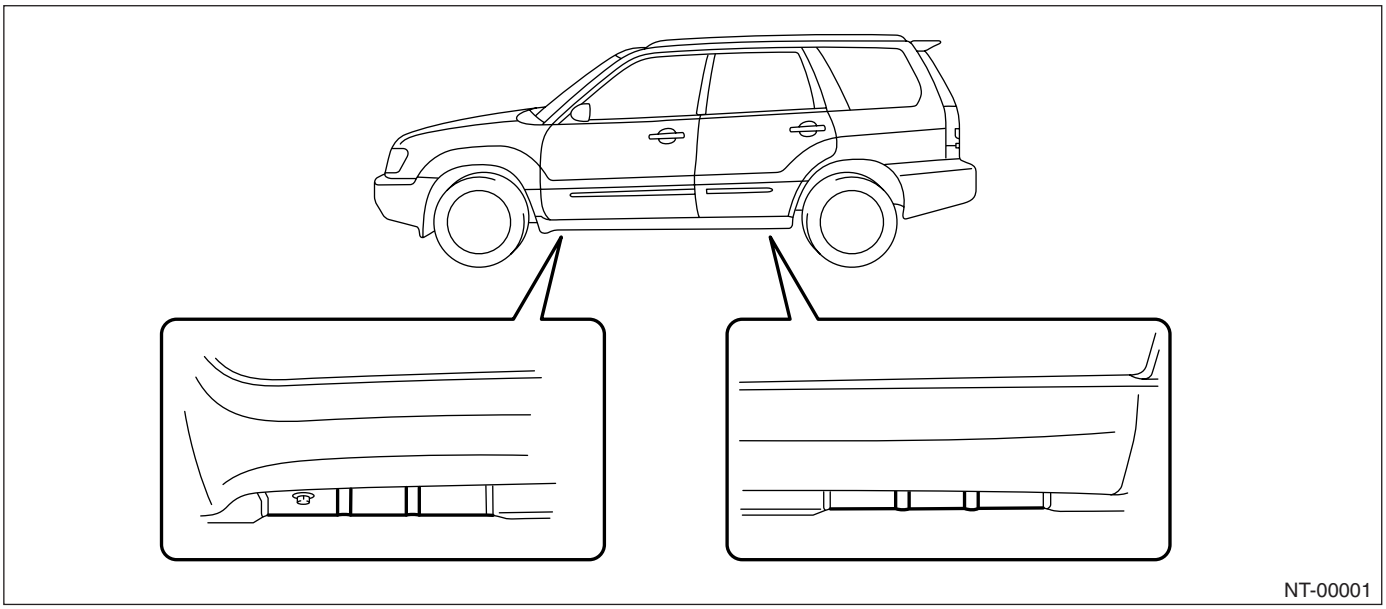
6. ENSURING SAFETY DURING WORK

When working in a group of two or more, perform the work with calling each other to ensure mutual safety.

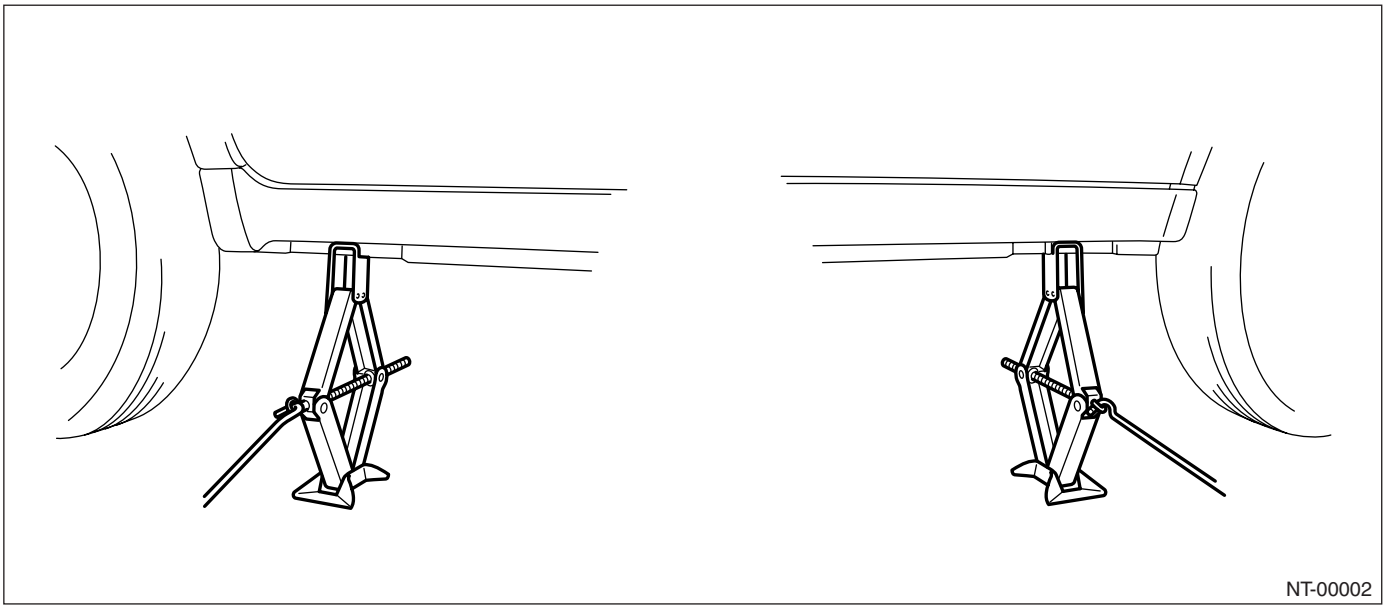
7. LIFTS AND JACKS

When using a lift or jack to raise a vehicle, always follow instructions concerning jack-up points and weight limits to prevent the vehicle from falling, which could result in injury. Be especially careful to make sure the vehicle is balanced before raising it.
Be sure to set the wheel stoppers when jacking-up only the front or rear of the vehicle.

• Support Locations

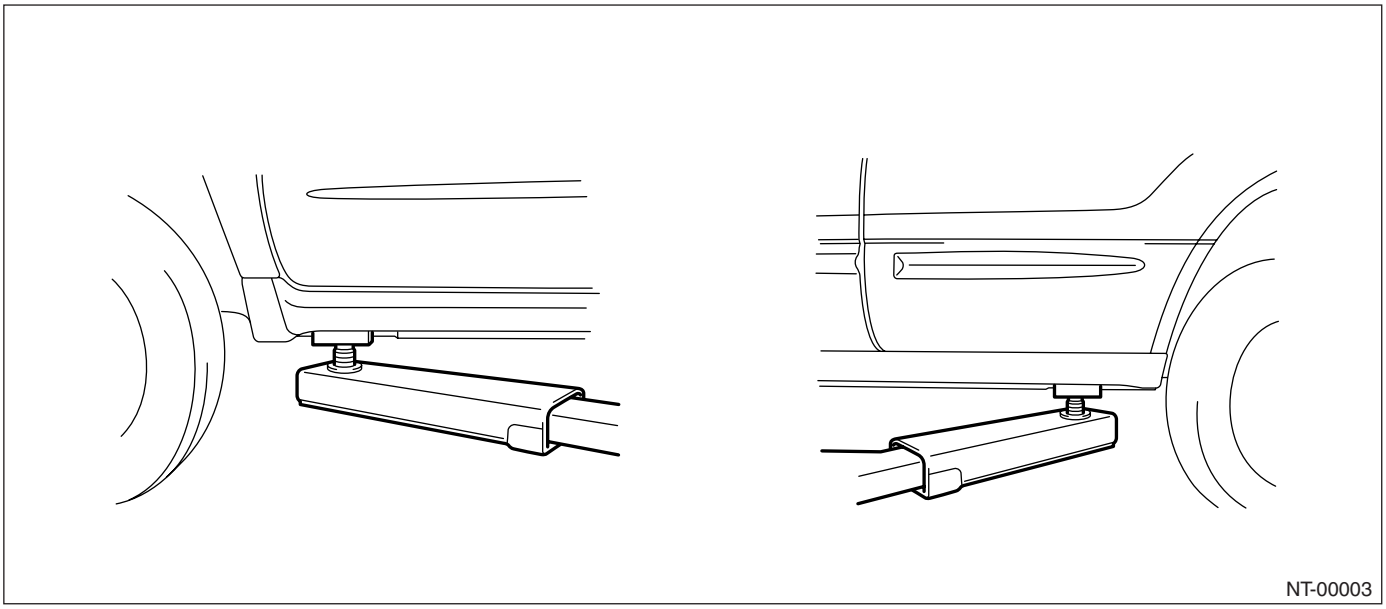


• Pantograph jack

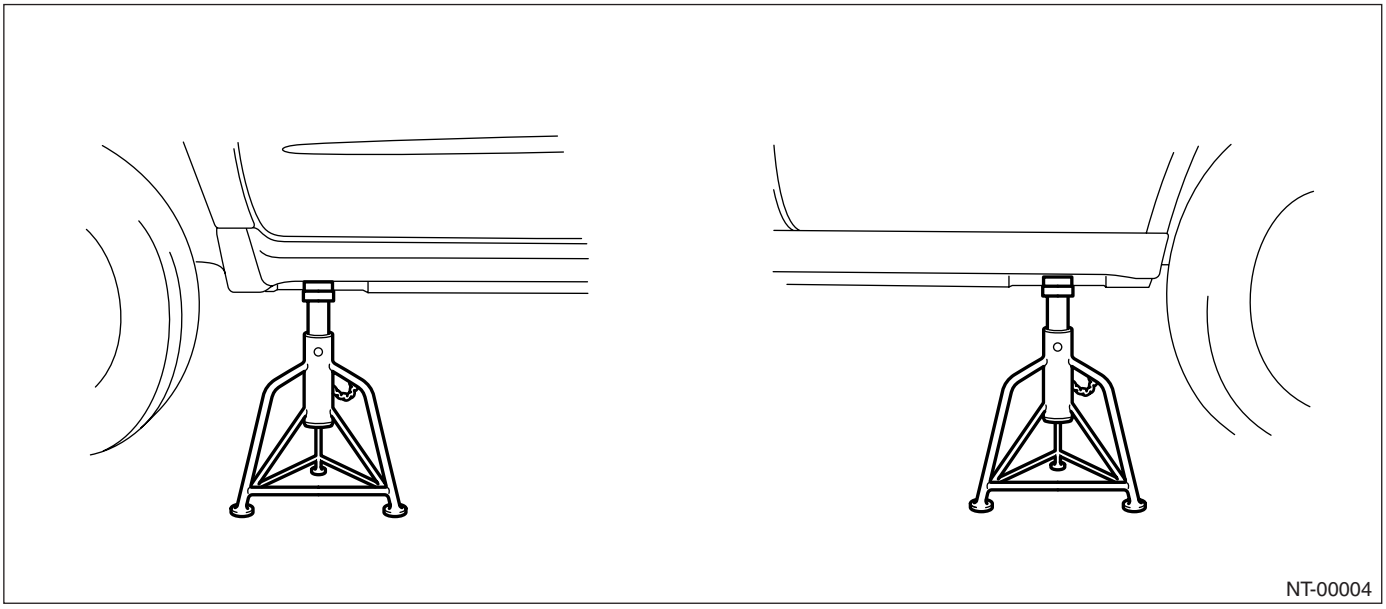


NOTE

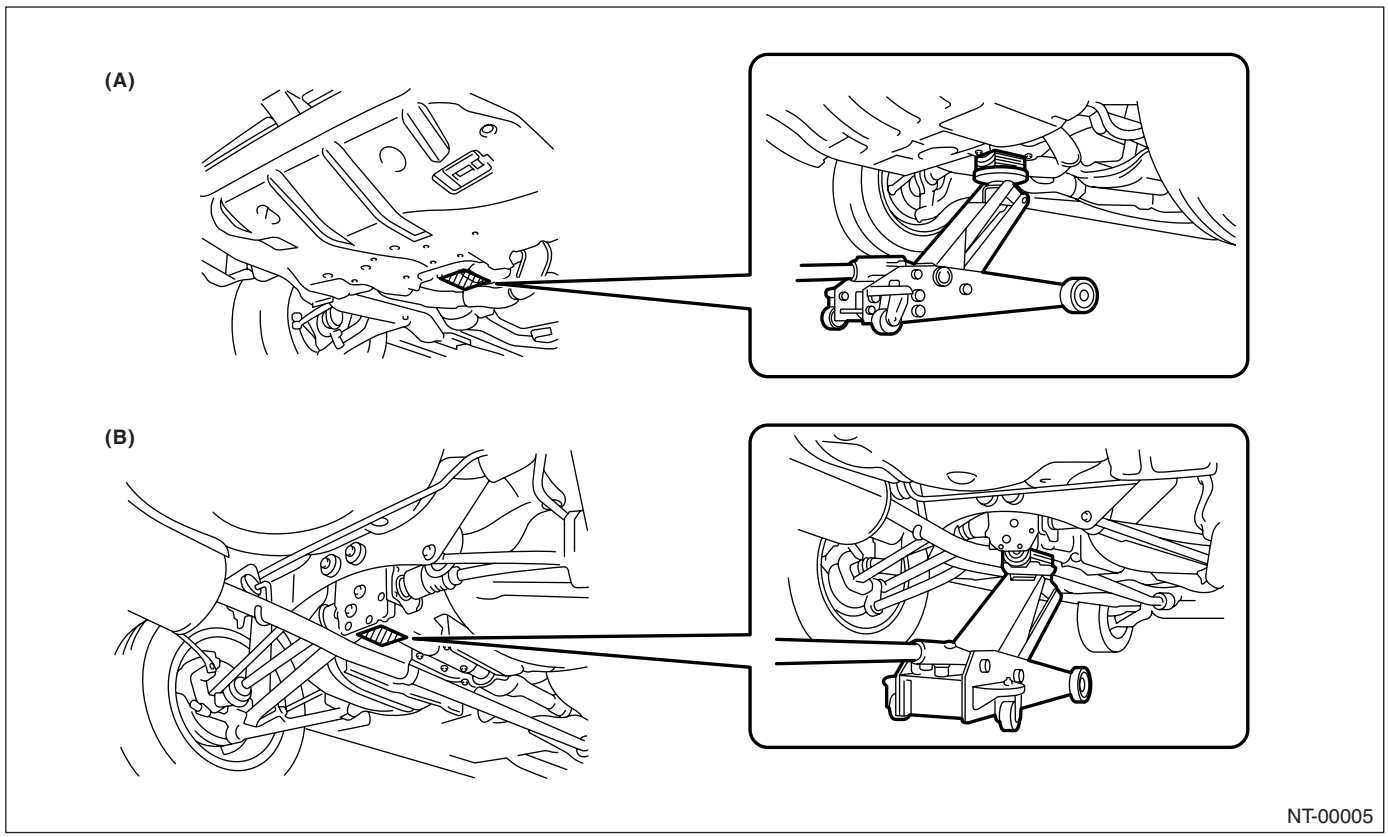
• Lift



• Rigid rack



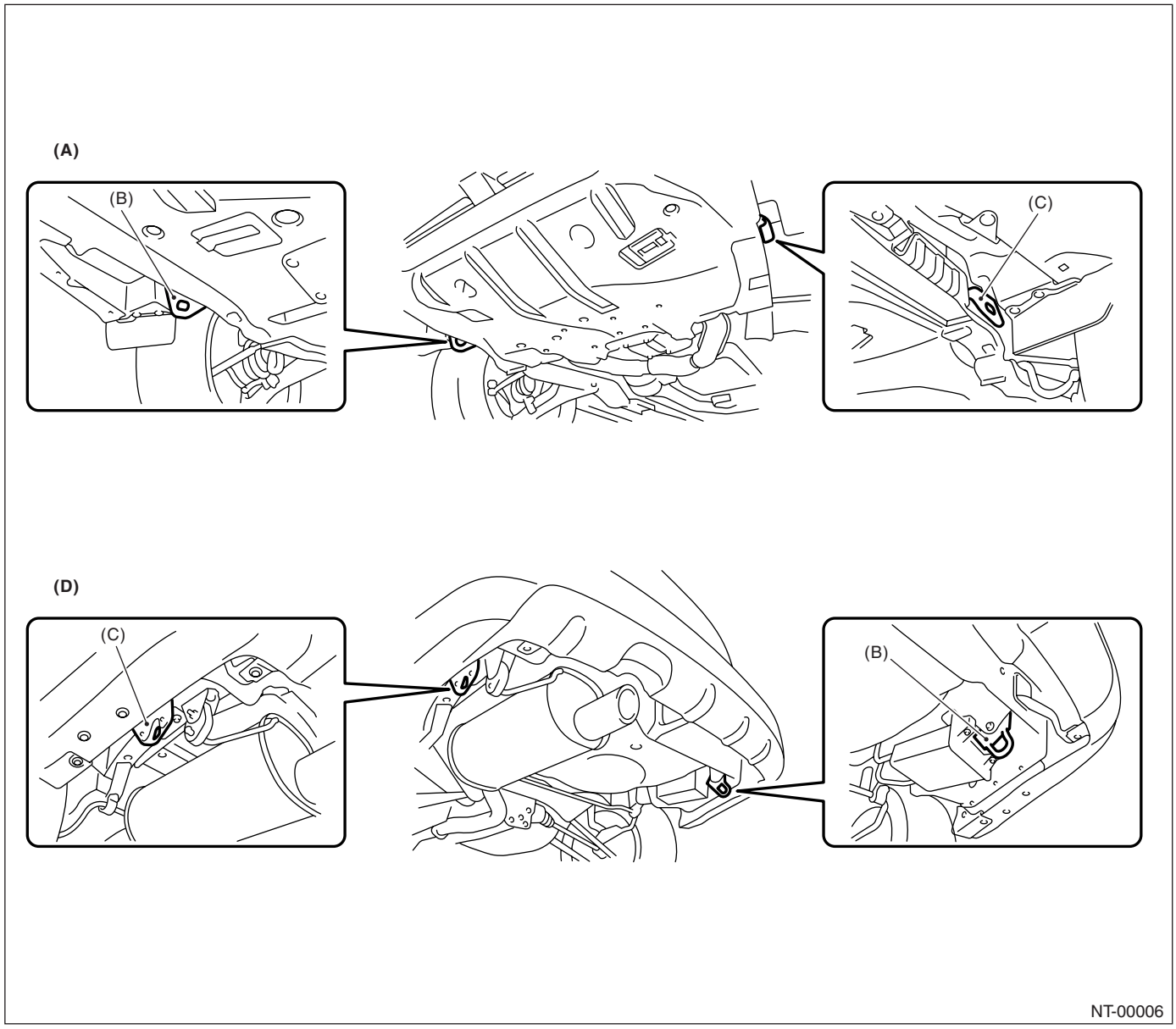
• Jack-up point



(A) Front (B) Rear

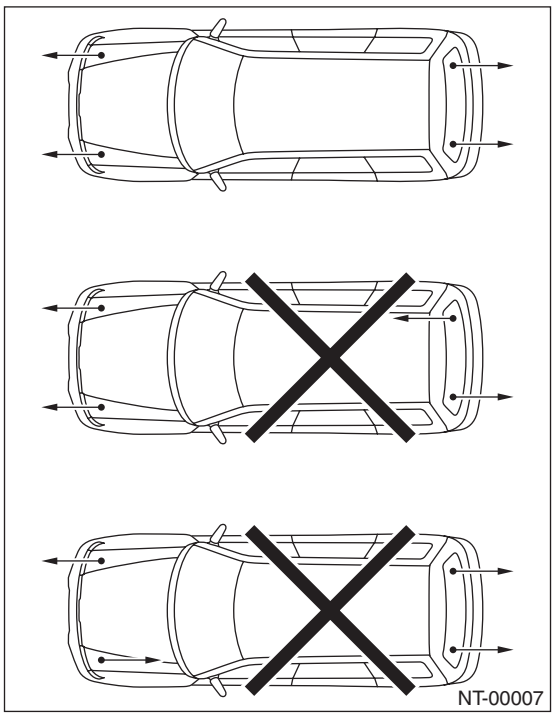
8. TIE-DOWNS

Tie-downs are used when transporting vehicles and when using the chassis dynamo. Attach tie-downs only to the specified points on the vehicle.

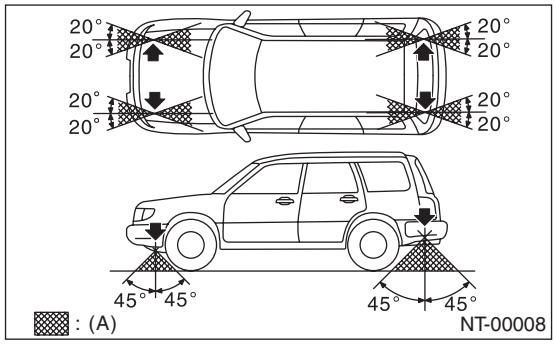


(A) Front
(B) Hook for towing and tie-down
(C) Hook for tie-down
(D) Rear

• Chain direction at tie-down condition



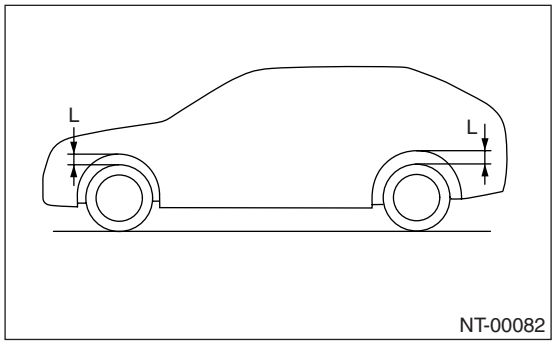
• Chain pulling range at tie-down condition



(A) Chain pulling range at tie-down condition

• Vehicle sinking volume at tie-down condition

Measure the distance L between tire highest point to arch highest point before tie-down and after tie-down. Difference of measurement value (drop height) shall be within 50 mm (1.97 in). Make sure to fix the vehicle securely.



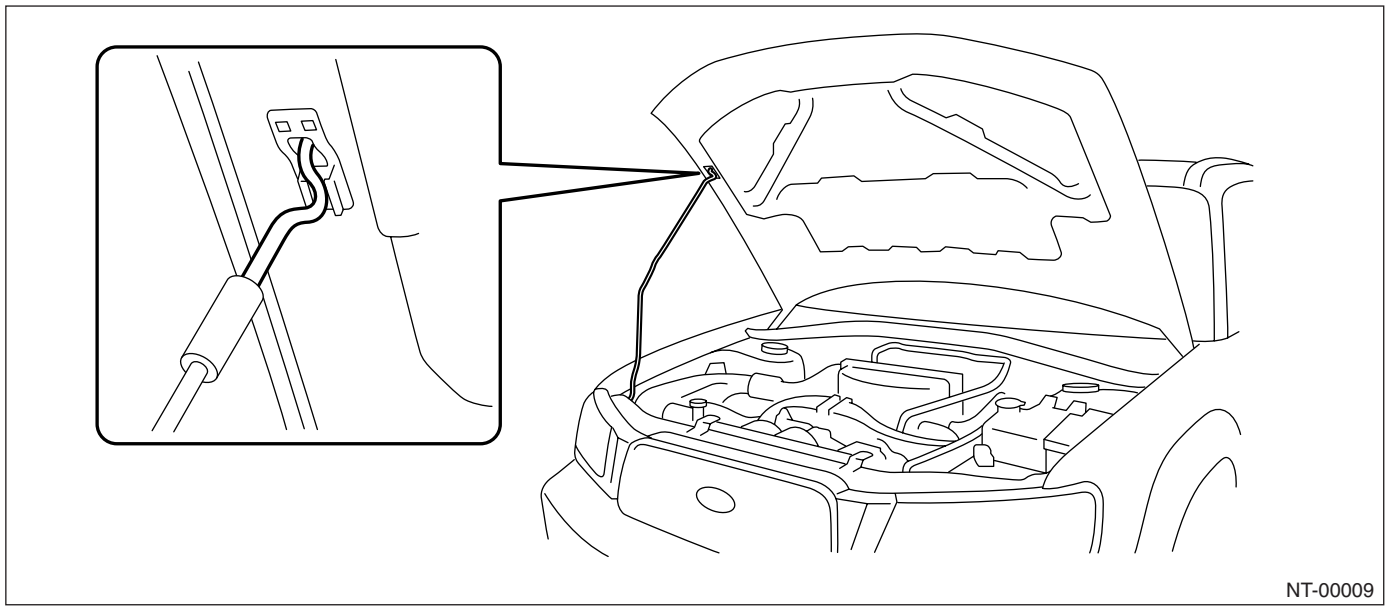
9. TOWING

Avoid towing vehicles except when the vehicle cannot be driven. For models with AWD or AT use a loader instead of towing. When towing other vehicles, to prevent excessive weight from damaging the hook or vehicle:

- Do not tow other vehicles with a front hook for tie-down.
- Make sure the vehicle towing is heavier that the vehicle being towed.

10.FRONT HOOD STAY INSTALLATION

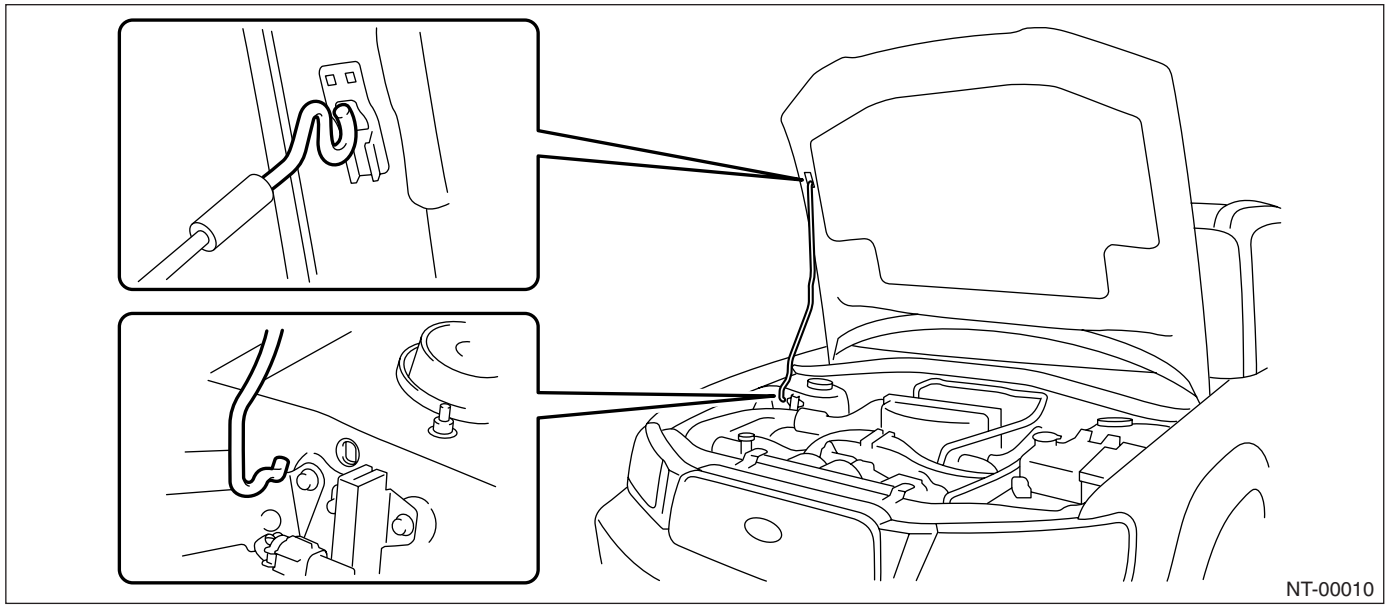
• At the check and general maintenance



• When wider hood opening is necessary

Set stay into the hole of hood inner as shown in the figure below.

NOTE:
Before setting the front hood in this position, remove the windshield washer hose attaching clip from the front hood.



11.TRAINING

For information about training, contact a dealer or agent.

12.GENERAL SCAN TOOL

Using general scan tools will greatly improve efficiency of repairing engine electronic controls. The Subaru Select Monitor can be used to diagnose the engine and also the ABS, the air conditioner, and other parts.

IDENTIFICATION

ID

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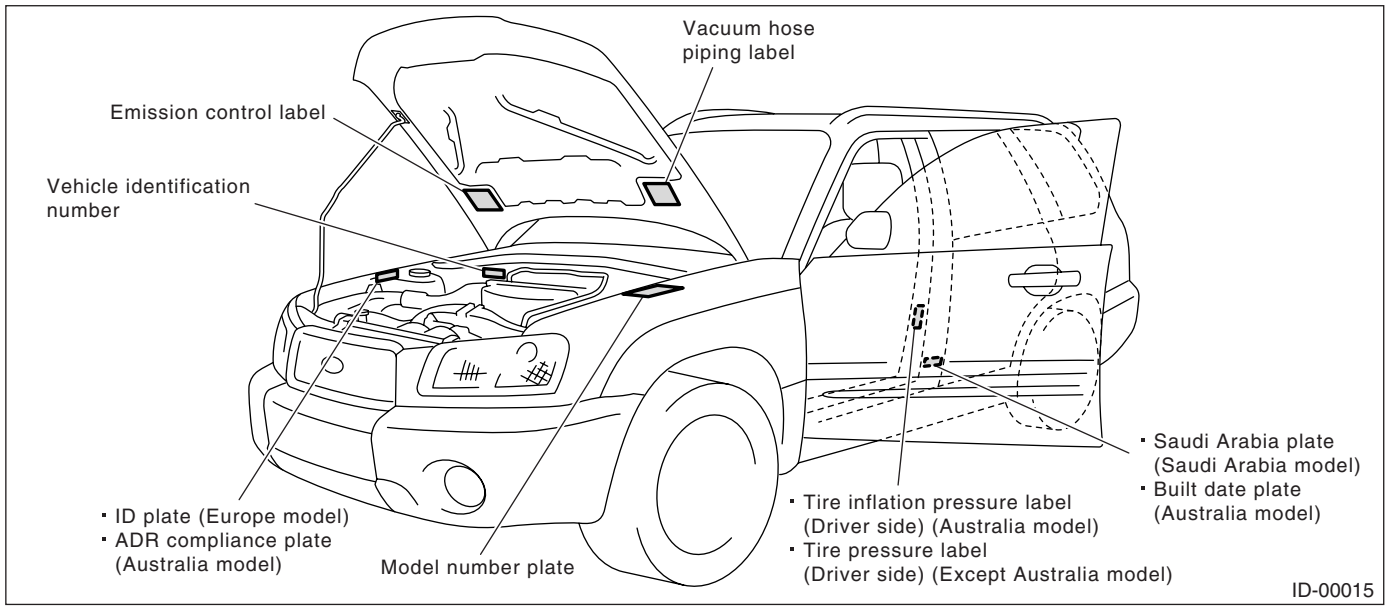
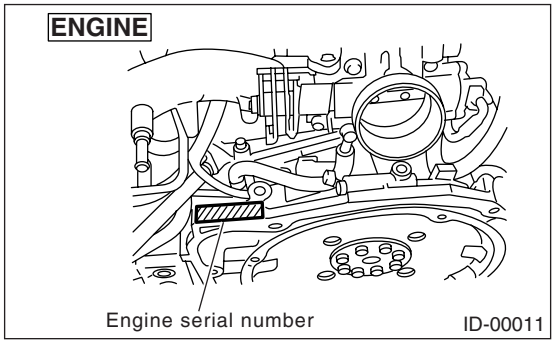
1. Identification

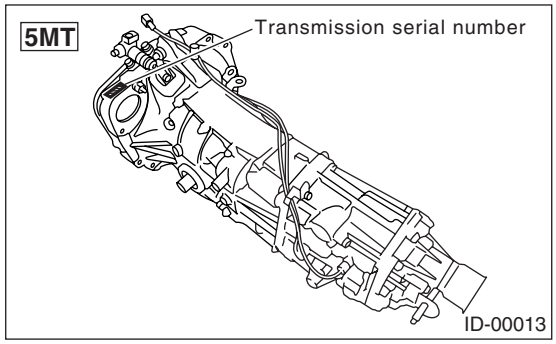
A: IDENTIFICATION

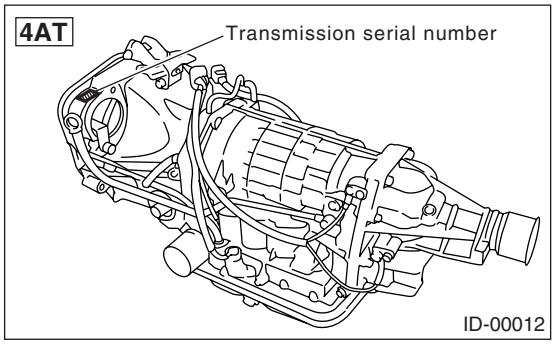
1. IDENTIFICATION NUMBER AND LABEL LOCATIONS

The VIN (Vehicle Identification Numbers) is used to classify the vehicle.
Positioning of the plate label for identification

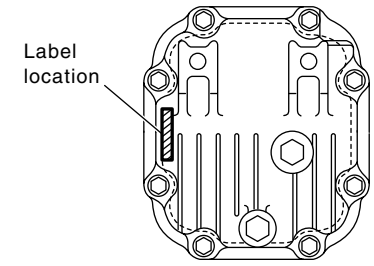




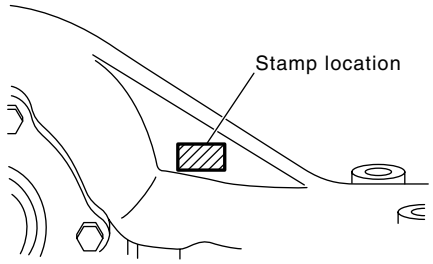




VA-type

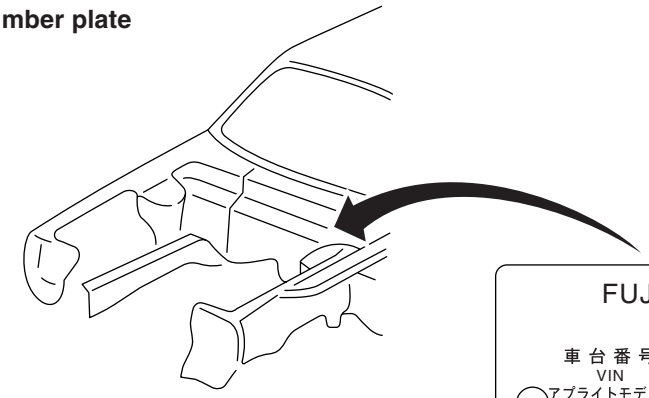


T-type



ID-00016

Model number plate



FUJI HEAVY INDUSTRIES LTD.

型　式

車台番号 VIN: JF1SG5LK43G002001

アプライトモデル applied model: SG5AL1K　オプションコード option code: ECAJ

トリムコード trim code: 410　エンジン型式 engine type: EJ201NWUAA

外装飾コード Color code: 230　ミッション型式 transmission type: TY755XF3AA

富士重工業株式会社

ID-00017

2. MEANING OF V.I.N.

The meaning of the VIN is as follows:

• Europe, Australia and General (Except GCC)

]JF1SG5LK44G002001[

The starting and ending brackets ( ][ ) are stop marks.

Digits	Code	Meaning	Details
1 to 3	JF1	Manufacturer body area	JF1: Passengercar, FHI made JF2: MPV, FHI made
4	S	Car line	S: FORESTER
5	G	Body type	G: Wagon
6	5	Displacement	5: 2.0L AWD 9: 2.5L AWD
7	L	Steering position	K: RHD (Right-hand drive) L: LHD (Left-hand drive)
8	K	Engine & transmission	R: SOHC MPI 4-speed AT K: SOHC MPI Full-time AWD 5-speed MT Dual range D: DOHC Turbo Full-time AWD 5-speed MT T: DOHC Turbo 4-speed D-AT
9	4	Drive type	3: Full-time AWD Single range 4: Full-time AWD Dual range 5: AWD AT
10	4	Model year	3: 2003MY 4: 2004MY 5: 2005MY
11	G	Factory location	G: FHI (Gunma)
12 to 17	002001	Serial number	—

• GCC countries (Saudi Arabia, etc.)

]JF1SG93MX4J002001[

The starting and ending brackets ( ][ ) are stop marks.

Digits	Code	Meaning	Details
1 to 3	JF1	Manufacturer body area	JF1: Passenger car, FHI made
4	S	Car line	S: FORESTER
5	G	Body type	G: Wagon
6	9	Displacement	9: 2.5L AWD
7	3	Grade	3: 2.5X
8	M	Restraint	M: Manual belts, dual airbag
9	X	Check digit	0 — 9 & X
10	4	Model year	3: 2003MY 4: 2004MY 5: 2005MY
11	J	Transmission type	H: Full-time AWD 4-speed AT J: Full-time AWD 5-speed MT dual range
12 to 17	002001	Serial number	—

3. MODEL NUMBER PLATE

The model number plate indicates: the applied model, the option code, the trim code, the engine type, the transmission type, and the exterior color code. This information is helpful when placing orders for parts.

SG5BL1K

Digits	Code	Meaning	Details
1	S	Series	S: FORESTER
2	G	Body type	G: Wagon
3	5	Engine displacement Drive system Suspension system	5: 2.0 L AWD 9: 2.5 L AWD
4	B	Minor change	B: 2004MY
5	L	Destination	K: RHD (Right-hand drive) L: LHD (Left-hand drive)
6	1	Grade	1: 2.0X 3: HUNTER Ver 5: 2.0XT 7: 2.5X B: 2.5XT
7	K	Transmission, fuel feed system	R: SOHC MPI 4-speed AT K: SOHC MPI Full-time AWD 5-speed MT Dual range D: DOHC Turbo Full-time AWD 5-speed MT P: DOHC Turbo 4-speed AT T: DOHC Turbo 4-speed D-AT

The engine and transmission type are as follows:

- **Engine**

EJ201NWTAA

Digits	Code	Meaning	Details
1 and 2	EJ	Engine type	EJ: 4 cylinders
3 and 4	20	Displacement	20: 2.0L 25: 2.5L
5	1	Fuel feed system	1: D-MPI SOHC-A 5: L-MPI Turbo
6	N	Emission control	M: Unleaded non-STEP-III N: Unleaded STEP-III
7	W	Transmission	W: MT Y: MT (Response to CO_2 emission control) X: AT V: AT (Response to CO_2 emission control)
8	T	Minor change	T: 2004MY
9 to 10	AA	Detailed specifications	Used when ordering parts. See the parts catalog for details.

• Transmission

TY755XF3AA

Digits	Code	Meaning	Details
1	T	Transmission	T: Transmission
2	Y	Transmission type	Y: Full-time AWD MT center differential Z: Full-time AWD AT MPT
3 and 4	75	Classification	75: MT 1A: AT 1B: AT
5	5	Series	3: AT 5: MT
6	X	Transmission specifications	V: Full-time AWD 5-speed MT with viscous coupling center differential single range X: Full-time AWD 5-speed MT Dual range with viscous coupling center differential Z: Full-time AWD 4-speed AT with MPT L: Full-time AWD 4-speed AT with MPT Turbo
7	F	Mounted body	F: 2.5L SOHC R: 2.0L SOHC N: 2.0L DOHC Turbo H: 2.5L DOHC Turbo
8	3	Minor change	3: Initial
9 to 10	AA	Detailed specifications	Used when ordering parts. See the parts catalog for details.

• Rear differential 1

VA1REK

Digits	Code	Meaning	Details
1	V	For AWD	V: AWD
2	A	Type	A: A type
3	1	Hypoid gear diameter mm (in)	1: 152 (6.0) dia.
4	R	Installation position	R: Rear
5	E	Reduction gear ratio	E: 4.111 F: 4.444
6	K	Specification differences	—

• Rear differential 2

HP

Code	Reduction gear ratio	LSD
HP	4.111	Viscous
JP	4.111	Viscous
CF	4.444	Viscous

• Option code

ECAJ

Digits	Code	Meaning	Details
1 to 2	EC	Destination	EC: EC K4: K4 KS: KS EK: EK KA: KA
3 to 4	AJ	Main option of vehicle	—

RECOMMENDED MATERIAL

RM

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1. Recommended Materials

A: RECOMMENDED MATERIALS

1. GENERAL

To insure the best performance, always use the specified oil, gasoline, adhesive, sealant, etc. or a substitute of equivalent quality.

2. FUEL

Always use a gasoline of the same or higher octane value than specified in the owner's manual. Ignoring the specifications below will result in damage or poor operation of the engine and fuel injection system. Use the specified gasoline to correct performance.

• Unleaded gasoline

Use unleaded gasoline and not leaded gasoline on vehicles with catalytic converter installed to reduce air pollution. Using leaded gasoline will damage the catalytic converter.

Model	Petrol	RON
Non-turbo	Unleaded	More than 95 RON More than 90 RON*
Turbo	Unleaded	More than 98 RON

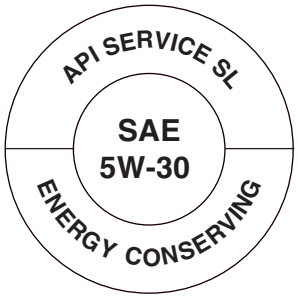
*For Australia model.

• Leaded gasoline

On vehicles without catalytic converter, use leaded gasoline with an octane value of 90 RON or higher.

3. LUBRICANTS

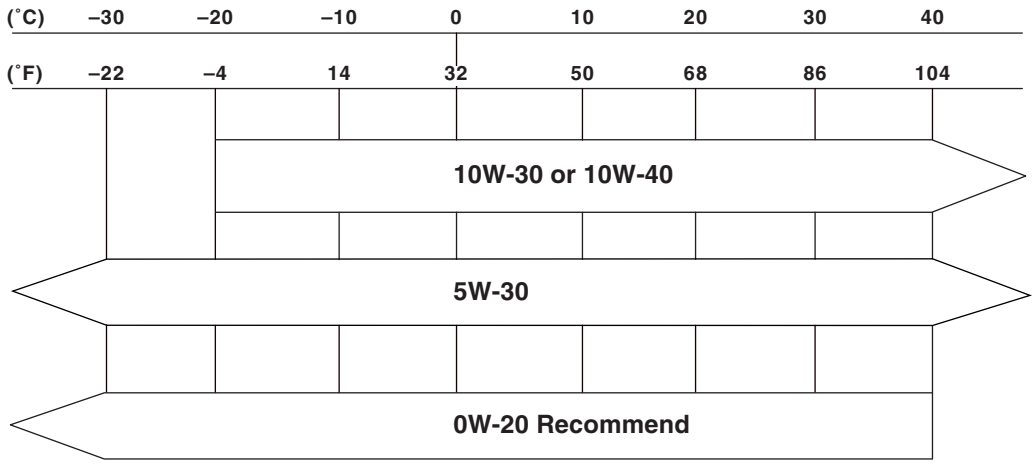
Use either the lubricants in the table below or equivalent lubricants. See the table below to choose the correct SAE viscosity.

Lubricant	Recommended			Alternative
	API Spec.	CCMC Spec.	ACEA Spec.	
Engine oil	SL or SJ Grade “Energy conserving”  RM-00006  RM-00001  RM-00002	G4 or G5	A1, A2 or A3	SH or SG
Manual transmission oil	GL-5	—	—	—
Front differential oil	GL-5	—	—	—
Rear differential oil	GL-5	—	—	—

SAE viscosity No. and applicable temperature

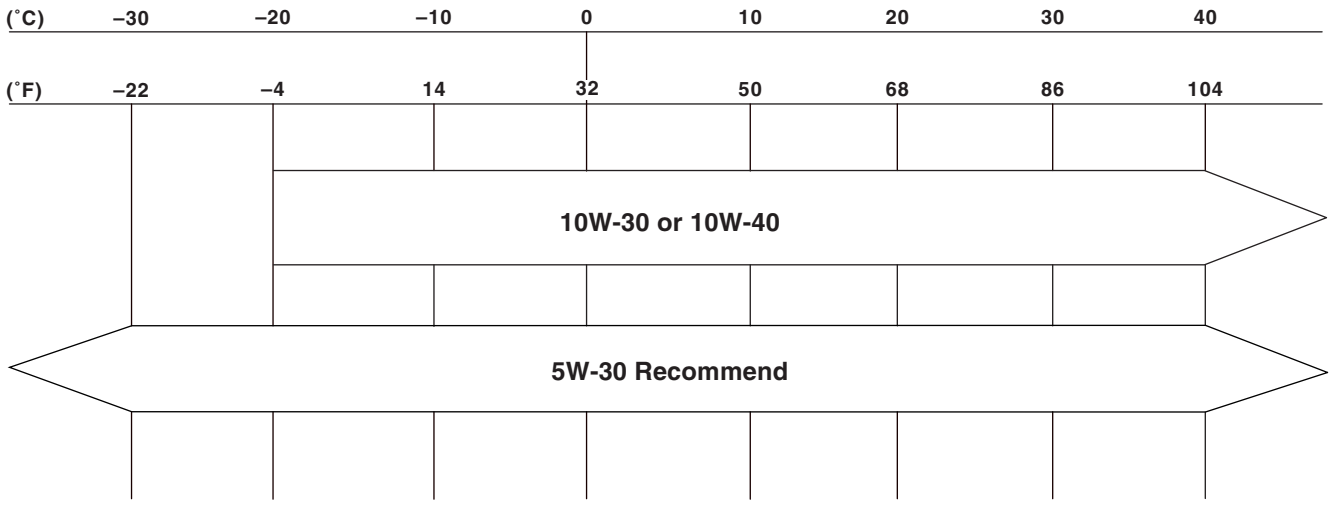
Engine oil

Non-turbo model



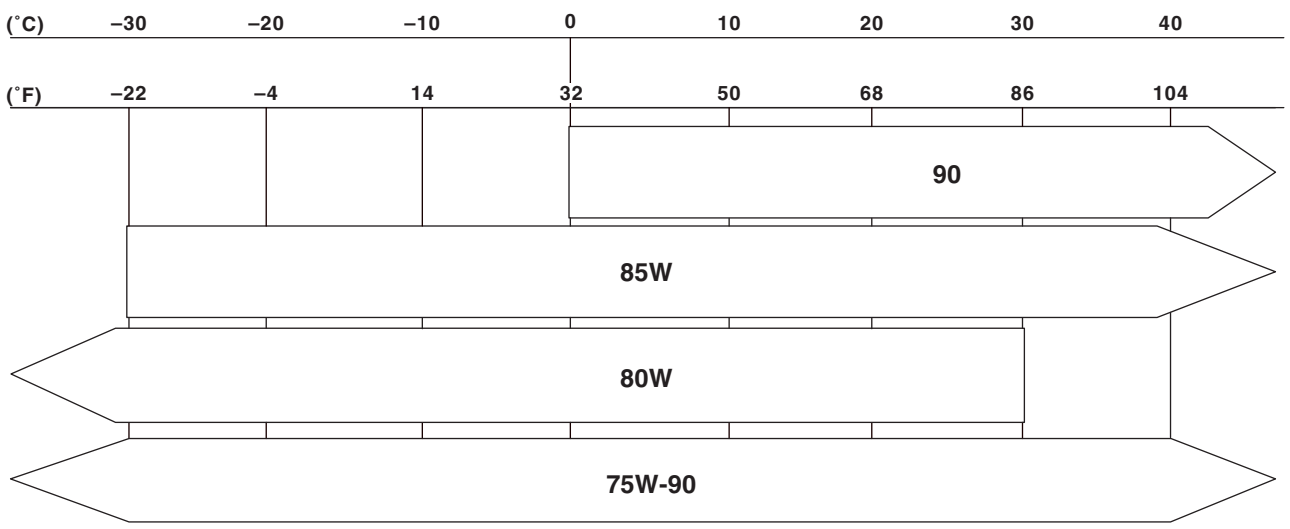
RM-00032

Turbo model



RM-00033

SAE viscosity No. and applicable temperature SAE J300
Manual transmission oil, front differential oil and rear differential oil



RM-00004

4. FLUID

Use the fluids specified in the table below. Do not mix two different kinds or makes of fluid.

Fluid	Recommended	Alternative	Remarks
Automatic transmission fluid	DEXRON III	—	—
Power steering fluid	DEXRON III	—	—
Brake fluid	FMVSS No. 116 DOT3	FMVSS No. 116 DOT4	—
Clutch fluid	FMVSS No. 116 DOT3	FMVSS No. 116 DOT4	—

5. COOLANT

Use genuine coolant to protect the engine.

Coolant	Recommended	Item number	Alternative
Coolant	SUBARU coolant	000016218	None
Water for dilution	Distilled water	—	Tap water (Soft water)

6. REFRIGERANT

Standard air conditioners on Subaru vehicles use HFC134a refrigerant. Do not mix it with other refrigerants. Also, do not use any air compressor oil except for ZXL200PG.

Air conditioner	Recommended	Item number	Alternative
Refrigerant	HFC134a	—	None
Compressor oil	ZXL200PG	—	None

7. GREASE

Use the grease and supplementary lubricants shown in the table below.

Grease	Application point	Recommended	Item number	Alternative
Supplementary lubricants	• Oxygen sensor • Bolts, etc.	SUBARU CRC	004301003	—

Grease	Application point	Recommended	Item number	Alternative
Grease	MT main shaft	FX 2200 clutch grease	000040901	—
	Clutch master cylinder push rod	Slicolube G-40M	004404003	—
	• Gear shift lever • Select lever • Clutch operating cylinder • Accelerator pedal • Clutch pedal • Brake pedal • Hill holder • Clutch bearing • Clutch release lever • Steering shaft bearing	SUNLIGHT2	003602010	—
	Steering gearbox	Valiant grease M-2	003608001	—
	Disc brake	Niglube RX-2	K0779GA102	—
	• Drum brake • Drum brake wheel cylinder	Molykote No. 7439	003602001	—
	• Brake pad • Brake shoe	Molykote AS-880N	K0777YA010	—
	Front axle AARi	One luber C	—	—
	Front axle AC	HTBJ	—	—
	Rear axle BJ	Molylex No. 2	003601001	—
	Rear axle EBJ	NTG2218	—	—
	Rear axle DOJ	VU-3A702	23223GA050	—
	• Water pump • Door latch • Door striker	Slicolube G-30M	004404002	—

8. ADHESIVES

Use the adhesives shown in the table below, or equivalent.

Adhesive	Application point	Recommended	Item number	Alternative
Adhesive	Windshield and body	Dow Automotive's Adhesive: Gurit-ESSEX Betaseal 1502 or equivalent Glass primer: Betawipe VP 04604 or Betawipe 5001 Paint surface primer: Betaprime 5402	—	—
	Soft vinyl	Cemedine 540	—	3M's EC-776 EC-847 or EC-1022 (Spray type)
	Momentary sealant	Cemedine 3000	—	Armstrong's Eastman 910
	Inner rearview mirror base	REPAIR KIT IN MR	65029FC000	—

9. SEAL MATERIAL

Use seal material shown in the table below, or equivalent.

Seal material	Application point	Recommended	Item number	Alternative
Seal material	• Engine case • Torque converter clutch case • Transmission case (5MT)	Three Bond 1215B	004403007	Dow Corning's No. 7038
	Transmission	Three Bond 1217B	K0877YA020	—
	Rear differential	Three Bond 1324	004403042	—
	Rear differential	Three Bond 1105	004403010	Dow Corning's No. 7038
	Weather strip	Starcalking B-33A	000018901	Butyl Rubber sealant
	Steering adjusting screw	Three Bond 1102	004403006	—
	SOHC camshaft cap	Three Bond 1280B	K0877YA018	—

PRE-DELIVERY INSPECTION

PI

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1. Pre-delivery Inspection

A: GENERAL

The purposes of the pre-delivery inspection (PDI) are as follows.

- Remove the additional parts used for ensuring the vehicle quality during transportation and restore the vehicle to its normal state.
- Check if the vehicle before delivery is in a normal state.
- Check for any damage or missing parts that may have taken place during transportation or storage.
- Make sure to deliver a complete vehicle to the customer.

Because of the above reasons, all SUBARU distributor service must always carry out the PDIs before delivering a vehicle.

In addition, all SUBARU distributor service and PDI centers must check the status of every vehicle received to identify who is responsible for any possible defects.

B: PDI PROCEDURE

Follow the procedures shown in the table below.

Static Checks Just After Vehicle Receipt

Step	Check point
1. Appearance check	(1) If the vehicle is covered with protective coating, visually check the vehicle body for damage and dents. If the protective coating has been removed, visually check the body paints for small areas of damage or stains. (2) Visually check the glass and light lenses for any damage and cracks or excessive gaps to the body sheet metal. (3) Visually check the plated parts for any damage.
2. Tire check	(1) Check the tires for damage, abnormal conditions, and dents on the wheels. (2) Check the tire air pressure.
3. Fuse installation	If the vehicle is about to be delivered to the customer, attach a room light fuse.
4. Connection of air conditioner harness	If the vehicle is about to be delivered to the customer, connect the air conditioner harness.
5. Check the doors for lock/unlock and open/close operations.	(1) Using the key, check if the door can be locked and unlocked normally. (2) Open and close all doors to see that there are no abnormal conditions.
6. Operation check of double lock	Check that the double lock operates normally.
7. Operation check of the child safety lock system.	Check the child safety lock system operates normally.
8. Check the rear gate for lock/unlock and open/close operations.	(1) Check if the rear gate can be unlocked normally from the emergency door. (2) Open and close the rear gate to see that there are no abnormal conditions. (3) Operate the power door locking switch to check that the rear gate is locked and unlocked normally.
9. Operation check of fuel lid opener lock release lever	Operate the fuel lid opener to check that the fuel lid is unlocked normally.
10. Accessory check	Check that the following accessories are provided: • Owner's manual • Warranty booklet • Service booklet • Spare key • Jack • Tool set • Spare tire
11. Operation check of hood lock release system	Operate the hood lock release lever to check that the hood opens normally.
12. Battery	Check the battery for any abnormal conditions such as rust and trace of battery fluid leaks.
13. Brake fluid	Check the fluid amount.
14. Engine oil	Check the oil amount.
15. Transmission fluid	(1) Check the fluid amount. (2) For AT, check the front differential oil.
16. AT front differential oil	Check the AT front differential oil amount.
17. Coolant	Check the coolant amount.
18. Clutch fluid	Check the clutch fluid amount.
19. Window washer fluid	Check the window washer fluid amount.
20. Hood latch check	Check that the hood is closed and latched securely.
21. Keyless entry system	Check that the keyless entry system operates normally.
22. Security system	Check that the security system operates normally.
23. Seat	(1) Check the seat surfaces for smears or dirt. (2) Check the seat installation conditions and functionality.
24. Seat belt	Check the seat belt installation conditions and functionality.
25. Wheel alignment	Check that the wheel alignments are properly adjusted.

Checks with the Engine Running

Step	Check point
26. Test mode connectors	Test mode connectors
27. Starting condition	Start the engine and check that the engine starts smoothly.
28. Exhaust system	Check that the exhaust noise is normal and no leaks are found.
29. Indicator light	Check that all the indicator lights operate normally.
30. Clock	Check that the clock operates normally.
31. Radio	Check that the radio system operates normally.
32. Front accessory power supply socket	Check that the front accessory power supply socket operates normally.
33. Lighting system	Check that the lighting systems operate normally.
34. Window washer	Check that the window washer system operates normally.
35. Wiper	Check that the wiper system operates normally.
36. Power window operation check	Check the power window for correct operations.

Dynamic Test with the Vehicle Running

Step	Check point
37. Brake test	Check that the foot brake operates normally.
38. Parking brake	Check that the parking brake operates normally.
39. AT shift control	Check the AT shift patterns are correct.
40. Heater & ventilation	Check that the heater & ventilation system operates normally.
41. Air conditioner	Check that the air conditioner operates normally.
42. Speed control	Check that the speed control operates normally.

Checks after Dynamic Test

Step	Check point
43. ATF level	Check that the ATF level is normal.
44. Power steering fluid level	Check that the power steering fluid level is normal.
45. Fluid leak check	Check for fluid/oil leaks.
46. Water leak check	Spray the vehicle with water and check for water leaks.
47. Appearance check 2	(1) Remove the protective coating (wrap guard).(if any) (2) Check the body paints for damage and smears. (3) Check the plated parts for damage and rust.

1. APPEARANCE CHECK

1) If the vehicle is covered with protective coating, visually check the vehicle body for damage and dents.
2) If there is no protective coating, check the body paints for small areas of damage or stains and repair as necessary.
3) Check the window glass, door glass, and lights for any cracks or damage and repair or replace the parts as necessary.
4) Check the plated parts, such as the grilles and door knobs, for damage or loss of gloss and repair or replace the parts as necessary.

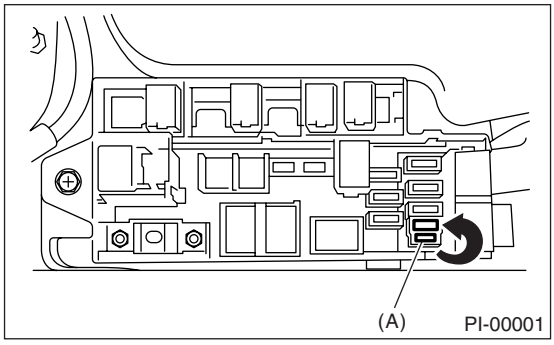
2. TIRE CHECK

- Check the tire outer faces for any damage.
- Check the tire air pressure by referring to the following table.

Tire size	Tire inflation pressure kPa (kg/cm^2, psi)	
	Front	Rear
205/70R15	200 (2.0, 29)	190 (1.9, 28)
215/60R16		
P215/60R16		

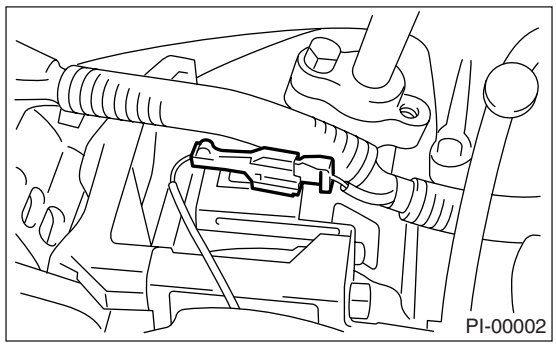
3. FUSE INSTALLATION

A vehicle just delivered has no fuse for the room lamp circuit to prevent battery discharge. Attach a 15 A fuse (A) as shown in the figure.



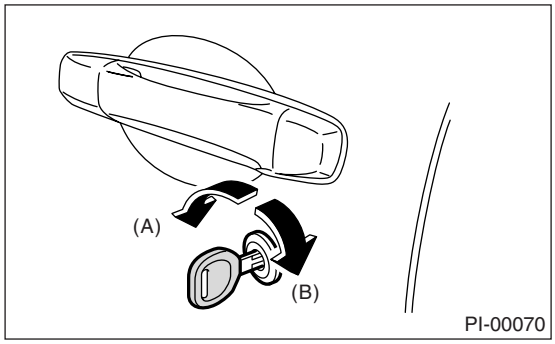
4. CONNECTION OF AIR CONDITIONER HARNESS

A vehicle just delivered has its air conditioner harness disconnected to protect the air conditioner compressor. Connect the harness as shown in the figure.



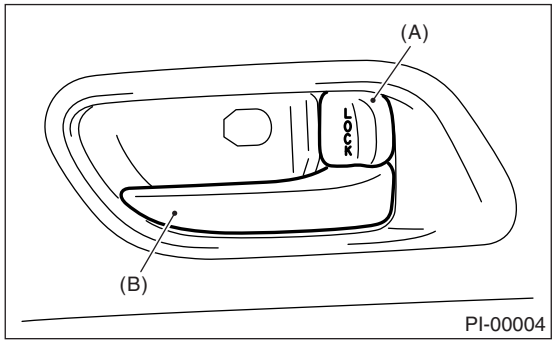
5. CHECK THE DOORS FOR LOCK/UNLOCK AND OPEN/CLOSE OPERATIONS.

1) Using the key, lock and unlock the door several times to check for normal operation. Open and close the door several times for smooth movement.



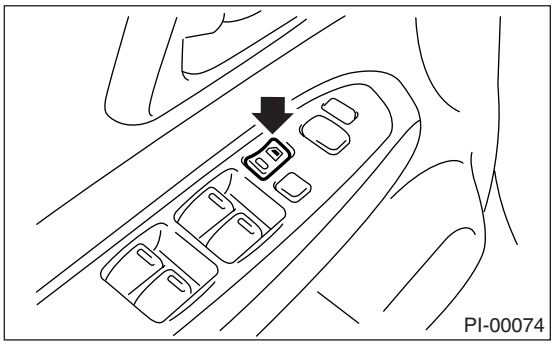
(A) Unlock
(B) Lock

2) Close the driver's door completely, and place the door lock knob (A) to the lock position. Then pull inside door handles (B) to ensure that doors will not open.
For other doors, place the door lock knob (A) to the lock positions and then pull the inside door handles to ensure that the doors will not open.

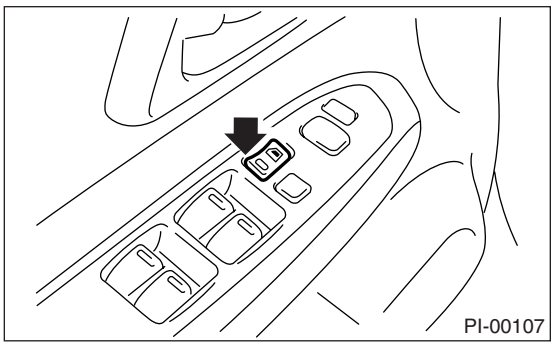


(A) Door lock knob
(B) Inside door handle

3) Press the driver's side power door lock switch to lock side. Check that all doors including rear gate are locked.



4) Press the driver's side power door lock switch to unlock side. Check that all doors including rear gate are unlocked.

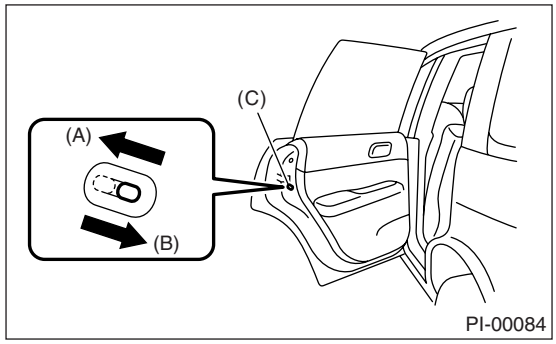


6. CHECK DOUBLE LOCK OPERATION.

1) Fully open all the windows.
2) Remove the key.
3) Lock all the doors using the key or keyless transmitter.
4) Verify that all the doors including rear gate are not unlocked when pressing power door lock switch to unlock side.
5) Verify that the door is not opened when operating door lock knob to unlock position and pulling inner remote. Perform the same check for other doors.
6) When the ignition key is turned to ON position in double lock condition, confirm all doors are released from double lock and then all doors and rear gate is unlocked.

7. CHECK THE OPERATION OF CHILD SAFETY LOCKS

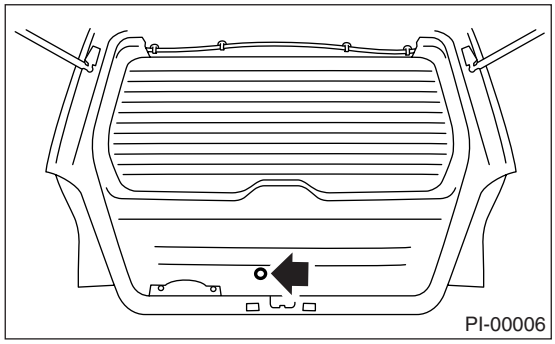
1) Set the child safety lock on both rear doors to the lock positions.
2) Close the rear doors completely.
3) Check that the lock levers of the rear doors are in the unlock positions. Then, pull the inside door handles of the rear doors to ensure that the doors will not open.
4) Next, pull the outside door handles of the rear doors to ensure that the doors will open.



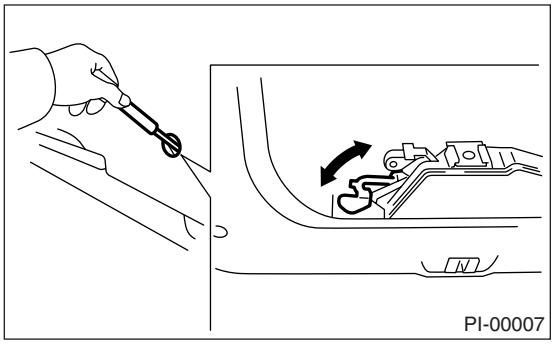
(A) Unlock
(B) Lock
(C) Child safety lock

8. CHECK THE REAR GATE FOR LOCK/ UNLOCK AND OPEN/CLOSE OPERATIONS.

1) Open and close the rear gate several times for smooth movement.
2) Operate the rear gate lever to check that the rear gate is locked and unlocked normally.
(1) Remove the blind cover inside the rear gate.



(2) Using a screwdriver, check the rear gate is lock/unlock.



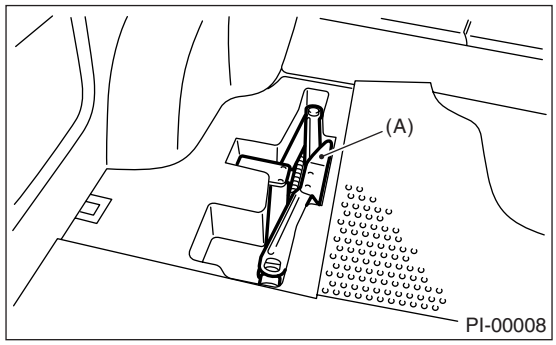
9. OPERATION CHECK OF FUEL LID OPENER LOCK RELEASE LEVER

Operate the fuel lid opener and verify that the fuel lid opens normally. Check that the filler cap is securely closed.

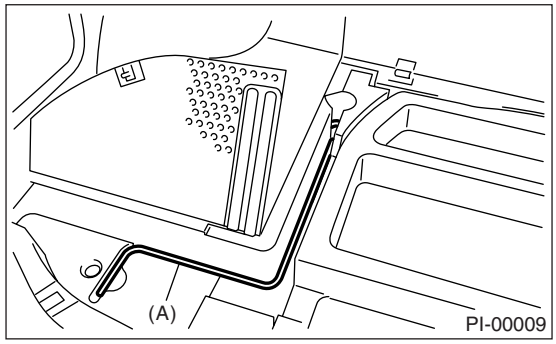
10.ACCESSORY CHECK

Check that the following accessories are provided in the luggage compartment or cargo area.

- Owner's manual
- Warranty booklet
- Service booklet
- Spare key
- Jack
- Tool set
- Spare tire



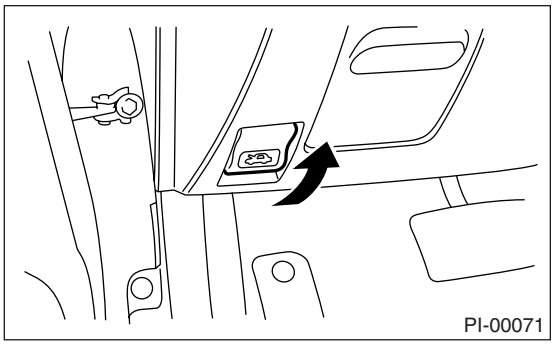
(A) Jack



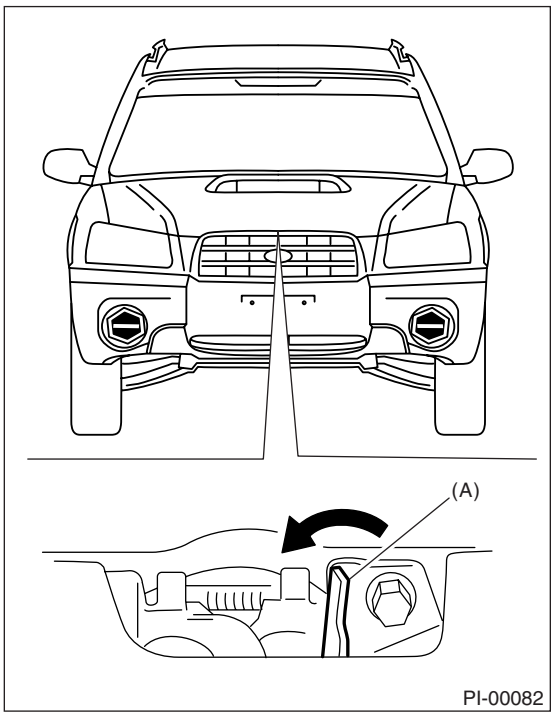
(A) Jack handle

11.OPERATION CHECK OF HOOD LOCK RELEASE SYSTEM

Operate the hood release knob and check that the hood is unlocked normally.

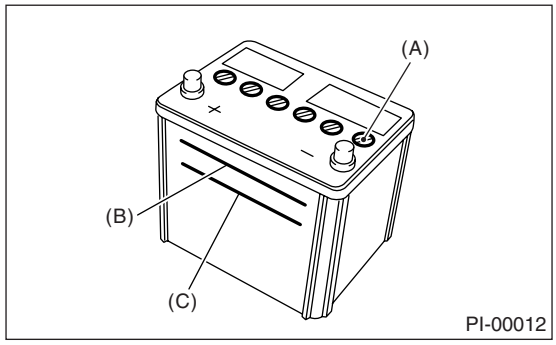


Operate the lever (A) and check that the hood is opened normally. Then support the hood with hood stay.



12.BATTERY

Check the battery terminals to make sure that no rust or corrosions due to fluid leaks are found. Check that the battery caps are securely tightened.



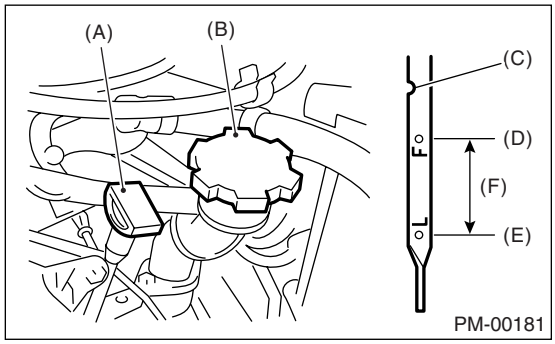
(A) Cap
(B) Upper level
(C) Lower level

13.BRAKE FLUID

Check the brake fluid amount. If the amount is insufficient, carry out a brake line test to identify brake fluid leaks and check the brake operation. After that, refill the brake fluid tank with the specified type of fluid.

14.ENGINE OIL

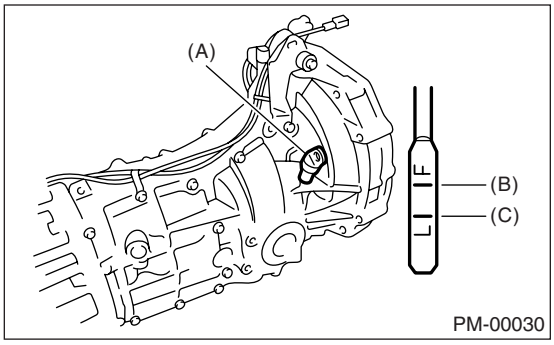
Check the engine oil amount. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of the specified engine oil.



(A) Engine oil level gauge
(B) Engine oil filler cap
(C) Notch mark
(D) Upper level
(E) Lower level
(F) Approx. 1 ℓ (1.1 US qt, 0.9 Imp qt)

15.TRANSMISSION FLUID

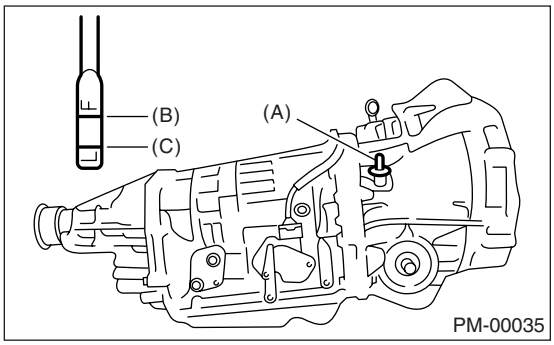
Check the transmission fluid amount. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of the specified fluid.



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

16.AT FRONT DIFFERENTIAL OIL

Check the AT front differential oil amount. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of the specified AT front differential oil.



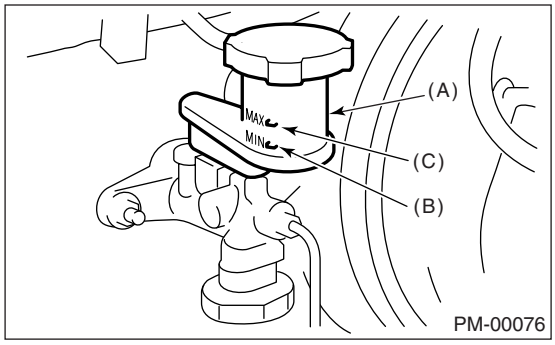
(A) Oil level gauge
(B) Upper level
(C) Lower level

17.COOLANT

Check the coolant amount on the reservoir. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of coolant with the specified concentration.

18.CLUTCH FLUID

Check the clutch fluid amount. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of the specified fluid.



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

19.WINDOW WASHER FLUID

Check the window washer fluid amount. If the amount is insufficient, check that no leaks are found. Then, add the necessary amount of washer fluid commercially available.

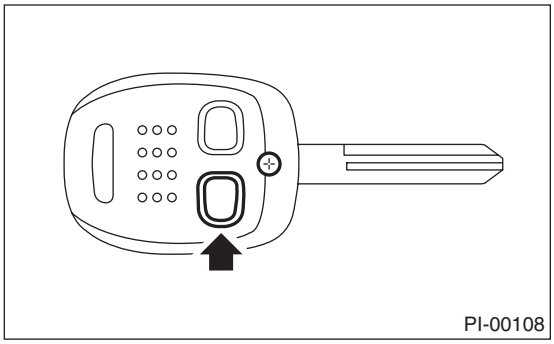
20.HOOD LATCH CHECK

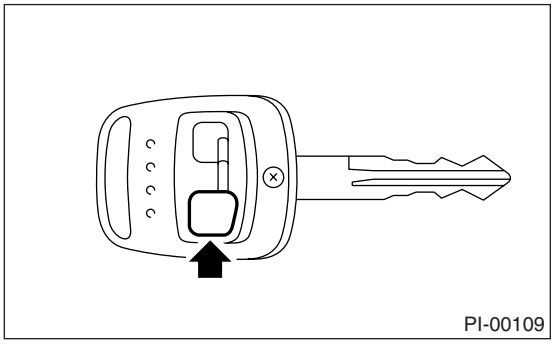
Retract the hood stay and close the hood. Check that the hood is securely latched.

21.KEYLESS ENTRY SYSTEM

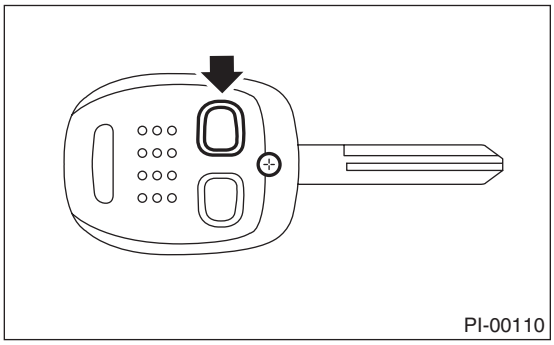
Check the keyless entry system operations as follows:

- Fully open all the door windows.
- Remove the key from the ignition switch and close all the doors including rear gate.
- Press the “LOCK” button on the keyless transmitter once and check if all the doors are locked, and the hazard light flashes once.


PI-00108


PI-00109

- Press the “UNLOCK” button on the keyless transmitter once and check if the all doors are unlocked, and the hazard light flashes twice.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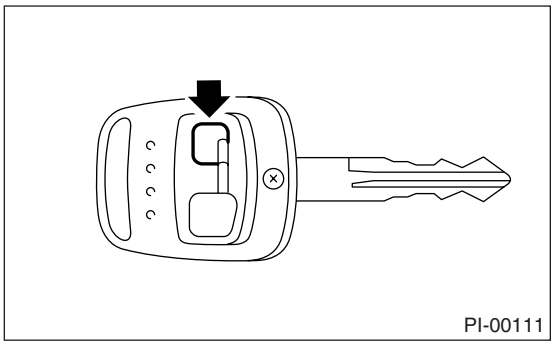

PI-00111

- Close all doors and rear gate, press the “LOCK” button of the keyless transmitter. Press the “UNLOCK” button of the keyless transmitter and wait for 30 seconds. Check that all doors and the rear gate are automatically locked again.

22.SEAT

Check that each seat provides full functionality in sliding and reclining. Check all available functions of the rear seat.

23.SEAT BELT

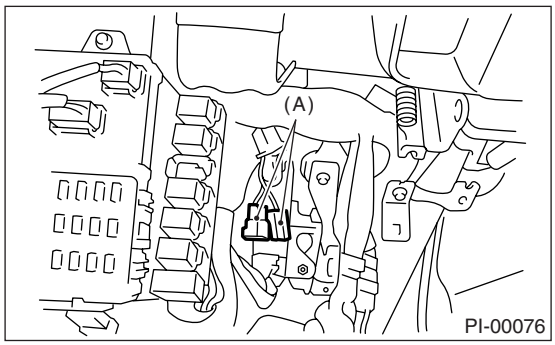
Pull out the seat belt and then release it. Check that the belt webbing retracts smoothly.

24.WHEEL ALIGNMENT

Check the wheel alignments. <Ref. to FS-6, Wheel Alignment.> <Ref. to RS-8, Wheel Alignment.>

25.TEST MODE CONNECTORS

Turn the ignition switch to ON and check that the malfunction indicator light starts blinking. If the light blinks, return the ignition key to LOCK and disconnect the test mode connector. Then, turn the ignition key to ON again. If the malfunction indicator light blinks at that time in spite of the disconnected test mode connector, carry out an engine diagnosis.



PI-00076

(A) Test mode connector (Green)

26.STARTING CONDITION

Start the engine and check that the engine starts smoothly. If any battery voltage problems are found, recharge or replace the battery. If any noises are observed, immediately stop the engine and check and repair the necessary components.

27.EXHAUST SYSTEM

Listen to the exhaust noise to see if no unusual noises are heard.

28.INDICATOR LIGHT

Check that all the indicator lights are off.

29.CLOCK

Check the clock for normal operations and enough accuracy.

30.RADIO

Check the radio for full functionality and normal noise level. Also check the CD unit operations.

31.FRONT ACCESSORY POWER SUPPLY SOCKET

Check the front accessory power supply socket operations.

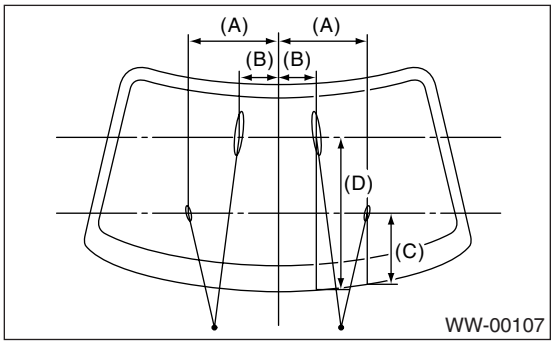
32.LIGHTING SYSTEM

- Check the headlight operations.
- Check the brake light operations.
- Check the other lights for normal operations.

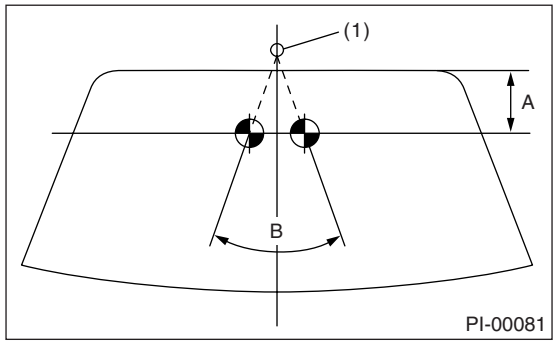
33.WINDOW WASHER

Check that the window washer system injects washer fluid to the specified area of windshield shown in the figure.

Front injection position:
A: 350 mm (13.78 in)
B: 150 mm (5.91 in)
C: 275 mm (10.83 in)
D: 600 mm (23.62 in)



Rear injection position:
A: 35 mm (1.38 in)
B: 72°



(1) Nozzle

34.WIPER

Check the front and rear wipers for normal operations.

35.POWER WINDOW OPERATION CHECK

Manipulate the power window switches one by one to check that each of the power windows goes up and down with no noises.

36.BRAKE TEST

Check the foot brake for normal operations.

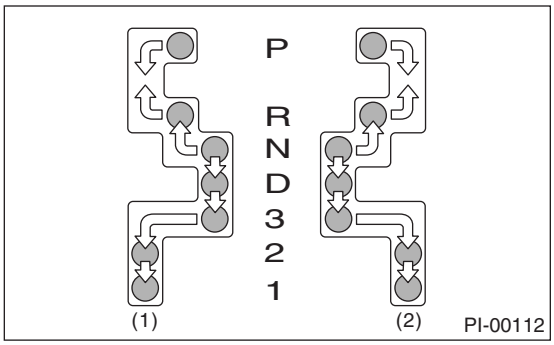
37.PARKING BRAKE

Check the parking brake for normal operations.

38.AT SHIFT CONTROL

1) Turn the ignition switch to ON.
2) Check that the select lever can not be moved from “P” range when brake pedal is not depressed.
3) Check that the select lever can be moved from “P” range when brake pedal is depressed.
4) Select the select lever to except “P” range.
5) Check that the ignition key can not be removed from ignition switch when ignition switch is turned to OFF.

6) Set the AT select lever to each gear position while checking that the demanded gear position is correctly attained.



(1) RHD model
(2) LHD model

Selector Position	Gear Position			
	1st	2nd	3rd	4th
D	OK	OK	OK	OK
3	OK	OK	OK	—
2	OK	OK	—	—
1	OK	—	—	—

39.HEATER & VENTILATION

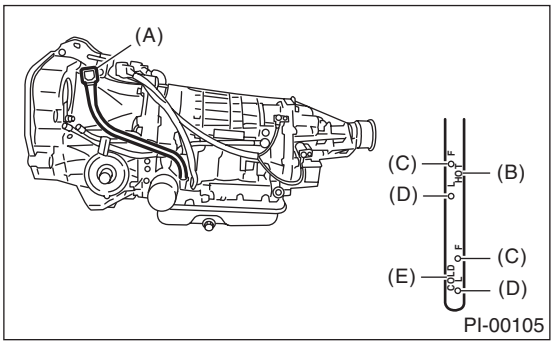
Operate the heater and ventilation system to check for normal airflow outlet control, air inlet control, airflow capacity, and heating performance.

40.AIR CONDITIONER

Operate the air conditioner. Check that the A/C compressor operates normally and enough cooling is provided.

41.ATF LEVEL

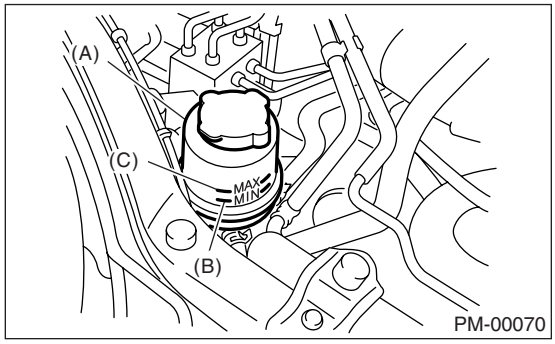
Check that the ATF level is normal. If insufficient, check that no leaks are found. Then add the necessary amount of the specified ATF.



(A) Level gauge
(B) Check position when “HOT”
(C) Upper level
(D) Lower level
(E) Check position when “COLD”

42.POWER STEERING FLUID LEVEL

Check that the power steering fluid level is normal. If insufficient, check that no leaks are found. Then add the necessary amount of the specified power steering fluid.



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

43.FLUID LEAK CHECK

Check the entire areas of the vehicle for any trace of coolant/oil/fluid leaks.

44.WATER LEAK TEST

Spray the vehicle with water and check that no water enters the passenger compartment.

- Before performing the water leakage test, remove anything that may obstruct the operation or which must be kept dry.
- Close all windows completely, and then close all doors tightly. Close the hood before starting the test.
- Connect a hose to a tap, and spray water on the vehicle. The rate of water discharge must be approx. 20 — 25 ℓ (5.3 — 6.6 US gal, 4.4 — 5.5 Imp gal) per minute.

When spraying water on areas adjacent to the floor and wheel house, increase the pressure. When directing water on areas other than the floor portion and wheel house, decrease the pressure. But the force of water must be made strong occasionally by pressing the end of the hose.

NOTE:
Be sure to keep the hose at least 10 cm (3.9 in) from the vehicle.

Check the following areas:

- Front window and body framework mating portion
- Door mating portions
- Glass mating portions
- Rear quarter window mating portions
- Rear window and body framework mating portion
- Around roof drips

If any dampness in the compartment is discovered after the water has been applied, carefully check all areas that may have possibly contributed to the leak.

45.APPEARANCE CHECK 2

1) When vehicle body is covered with protective film (wrap guard), peel it off.

NOTE:
• Use of steam eases peeling off the wrap guard.
• When performing on the vehicles left for a long time, or during low temperature period, sprinkle some water heated to 50 — 60°C (122 — 140°F) over the vehicle to raise its surface temperature before peeling off the wrap guard.
Do not use the water heated to over 60°C (140°F).
• If the adhesive remains on the coated surface, rub the portion with a flannel rag, etc. soaked with a coat of coating wax or a solvent, such as oil benzene and IPA, and then wipe it off.
• Avoid adhesion of the solvent to resin or rubber components. Do not use coating wax or a solvent while the component surface temperature is high due to hot weather, etc.
• If the coated surface is swollen out due to seams or moisture, expose the vehicle to the sun light for a few hours. Otherwise, heat the portion with seams or moisture using a dryer, etc.
• Dispose of the peeled wrap guard as burnable industrial garbage.

2) Check the whole vehicle body for stains, flaking, damage caused by transportation, rust, dirt, cracks, or blistering.

NOTE:
• It is better to determine an inspection pattern in order to avoid missing an area, since the total inspection area is wide.
• It is desirable not to make corrections to the body paint unless absolutely needed. However, if any corrections are required to remove scratches or rust, the area to be corrected must be limited as much as possible. Re-painting and spray painting must be avoided whenever possible.

3) Carefully check each window glass for scratches. Slight damage may be removed by polishing with cerium oxide. (Half-fill a cup with cerium oxide, and add warm water to it. Then agitate the content until it turn to wax. Apply this wax to a soft cloth, and polish the glass.)

4) Check each portion of the vehicle body and underside components for the formation of rust. If rust is discovered, remove it with #80 — #180 emery paper, and treat the surface with rust preventive. After this treatment is completed, flush the portion thoroughly, and prepare the surface for repair painting.

5) Check each portion of the body and all of the chrome parts for deformation or distortion. Also check each lamp lens for cracks.

PERIODIC MAINTENANCE SERVICE

PM

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1. General Description

A: GENERAL

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

2. Schedule

A: MAINTENANCE SCHEDULE 1

1. FOR EUROPE AREA

For periodic maintenance of over 120,000 km (75,000 miles) or 96 months, carry out inspection by referring to the following table. For a maintenance period gone beyond these tables, apply them repeatedly as a set of 120,000 km (75,000 miles) or 96 months.

			Maintenance interval [Number of months or km (miles), whichever occurs first]										
	Month				12	24	36	48	60	72	84	96	Remarks
	×1,000 km		1.6	5	15	30	45	60	75	90	105	120	
	×1,000 miles		1	3	9	19	28	38	47	56	66	75	
1	Engine oil				R	R	R	R	R	R	R	R	
2	Engine oil filter				R	R	R	R	R	R	R	R	
3	Spark plug	For Turbo									R		
		Others				R		R		R		R	
4	Drive belt(s)				I	I	I	I	I	I	I	I	
5	Camshaft drive belt					R		R		R		R	
6	Fuel line					I		I		I		I	
7	Fuel filter						R			R			
8	Air cleaner element				I	R	I	R	I	R	I	R	
9	Cooling system					I		I		I		I	
10	Coolant					R		R		R		R	
11	Clutch system					I		I		I		I	
12	Hill-holder system					I		I		I		I	
13	Transmission oil					I		R		I		R	
14	ATF					I		R		I		R	
15	Front & rear differential					I		R		I		R	
16	Brake line					I		I		I		I	
17	Brake fluid					R		R		R		R	
18	Disk brake pads & discs				I	I	I	I	I	I	I	I	
19	Brake linings & drums					I		I		I		I	
20	Parking brake					I		I		I		I	
21	Suspension					I		I		I		I	
22	Wheel bearing											(I)	
23	Axle boot & joint				I	I	I	I	I	I	I	I	
24	Steering system					I		I		I		I	

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

NOTE:
(1) When the vehicle is used in extremely dusty conditions, the air cleaner element should be replaced more often.
(2) ATF filter is a maintenance free part. ATF filter needs replacement, when it is physically damaged or ATF leaked.

2. EXCEPT FOR EUROPE AREA

For periodic maintenance of over 50,000 km (30,000 miles) or 48 months, carry out inspections by referring to the following tables. For a maintenance period gone beyond these tables, apply them repeatedly as a set of 50,000 km (30,000 miles) or 48 months.

		Maintenance Interval [Number of months or km (miles), whichever occurs first]					
	Months		12	24	36	48	Remarks
	×1,000 km	5	12.5	25	37.5	50	
	×1,000 miles	3	7.5	15	22.5	30	
1	Engine oil		R	R	R	R	
2	Engine oil filter		R	R	R	R	

For periodic maintenance of over 100,000 km (60,000 miles) or 48 months, carry out inspections by referring to the following tables. For a maintenance period gone beyond these tables, apply them repeatedly as a set of 100,000 km (60,000 miles) or 48 months.

			Maintenance Interval [Number of months or km (miles), whichever occurs first]					
	Months			12	24	36	48	Remarks
	×1,000 km		1.6	25	50	75	100	
	×1,000 miles		1	15	30	45	60	
3	Spark plugs	For Turbo					R	
		Others		R	R	R	R	
4	Drive belt(s)			I	I	I	I	
5	Camshaft drive belt						R	
6	Fuel line				I		I	
7	Fuel filter				R		R	
8	Air cleaner element			I	R	I	R	
9	Cooling system				I		I	
10	Coolant				R		R	
11	Clutch system		I	I	I	I	I	
12	Hill-holder system		I	I	I	I	I	
13	Transmission oil				R		R	
14	ATF				R		R	
15	Front & rear differential oil				R		R	
16	Brake line				I		I	
17	Brake fluid				R		R	
18	Disc brake pads & discs			I	I	I	I	
19	Brake linings and drums				I		I	
20	Parking brake			I	I	I	I	
21	Suspension			I	I	I	I	
22	Wheel bearing						(I)	
23	Axle boots & joints			I	I	I	I	
24	Steering system (Power steering)			I	I	I	I	

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

NOTE:
(1) When the vehicle is used in extremely dusty conditions, the air cleaner element should be replaced more often.
(2) ATF filter is a maintenance free part. ATF filter needs replacement, when it is physically damaged or ATF leaked.

B: MAINTENANCE SCHEDULE 2

1. EUROPE AREA

Item	Every	Repeat short distance drive	Repeat rough/muddy road drive	Extremely cold weather area	Salt or other corrosive used or coastal area	High humidity or mountain area	Repeat towing trailer
Engine oil		Replace more frequently		Replace more frequently			Replace more frequently
Engine oil filter		Replace more frequently		Replace more frequently			Replace more frequently
Fuel line	12 months				I		
	15,000 km						
	9,000 miles						
Transmission oil							Replace more frequently
ATF							Replace more frequently
Front & rear differential oil							Replace more frequently
Brake line	12 months				I		
	15,000 km						
	9,000 miles						
Brake fluid	12 months					R	
	15,000 km						
	9,000 miles						
Brake pads	12 months	I	I		I		I
	15,000 km						
	9,000 miles						
Brake linings and drums	12 months	I	I		I		I
	15,000 km						
	9,000 miles						
Parking brake	12 months	I	I		I		I
	15,000 km						
	9,000 miles						
Suspension	12 months		I	I	I		
	15,000 km						
	9,000 miles						
Axle boots & joints	12 months	I	I		I		I
	15,000 km						
	9,000 miles						
Steering system (Power steering)	12 months		I	I	I		
	15,000 km						
	9,000 miles						

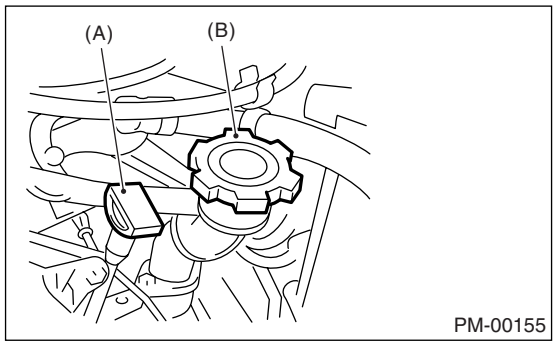
2. EXCEPT FOR EUROPE AREA

Item	Every	Repeat short distance drive	Repeat rough/muddy road drive	Extremely cold weather area	Salt or other corrosive used or coastal area	High humidity or mountain area	Repeat towing trailer
Engine oil		Replace more frequently		Replace more frequently			Replace more frequently
Engine oil filter		Replace more frequently		Replace more frequently			Replace more frequently
Fuel line	6 months				I		
	12,500 km						
	7,500 miles						
Transmission oil							Replace more frequently
ATF							Replace more frequently
Front & rear differential oil							Replace more frequently
Brake line	6 months				I		
	12,500 km						
	7,500 miles						
Brake fluid	12 months					R	
	25,000 km						
	15,000 miles						
Brake pads	6 months	I	I		I		I
	12,500 km						
	7,500 miles						
Brake linings and drums	6 months	I	I		I		I
	12,500 km						
	7,500 miles						
Parking brake	6 months	I	I		I		I
	12,500 km						
	7,500 miles						
Suspension	6 months		I	I	I		
	12,500 km						
	7,500 miles						
Axle boots & joints	6 months	I	I		I		I
	12,500 km						
	7,500 miles						
Steering system (Power steering)	6 months		I	I	I		
	12,500 km						
	7,500 miles						

3. Engine Oil

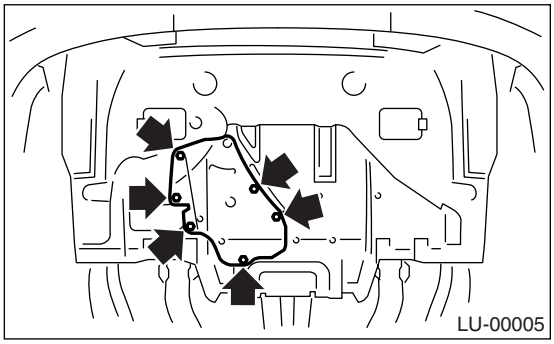
A: REPLACEMENT

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

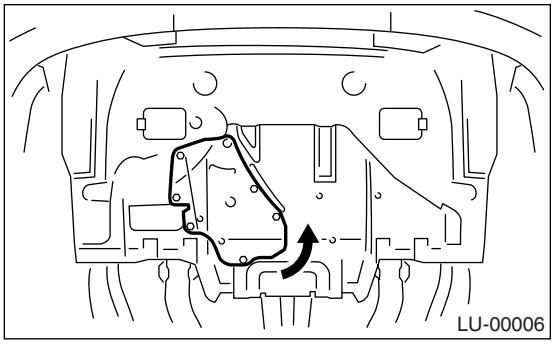


(A) Oil level gauge
(B) Engine oil filler cap

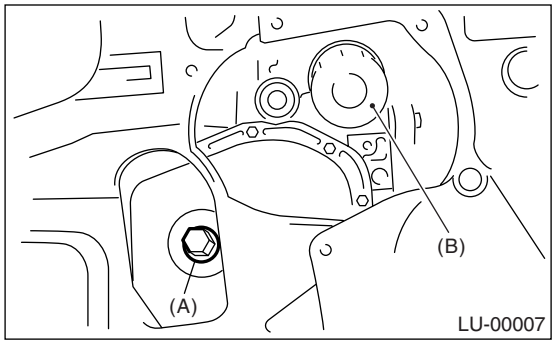
2) Remove six clips securing service hole cover.



3) Turn the service hole cover counterclockwise.



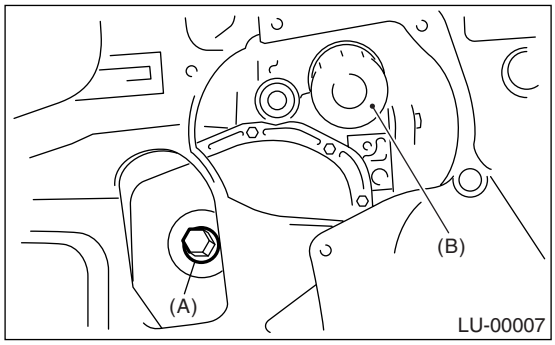
4) Drain the engine oil by loosening engine oil drain plug.



(A) Engine oil drain plug
(B) Engine oil filter

5) Replace the drain plug gasket with a new one.
6) Tighten the engine oil drain plug after draining engine oil.

Tightening torque:
44 N·m (4.5 kgf-m, 33 ft-lb)



(A) Engine oil drain plug
(B) Engine oil filter

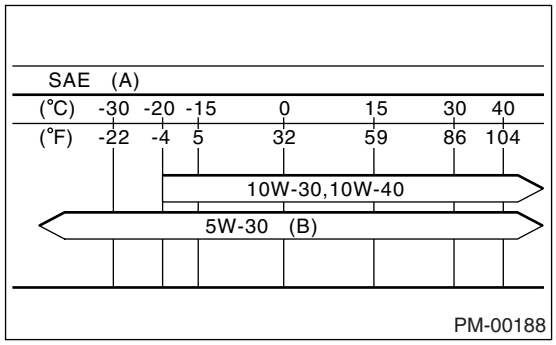
7) Fill engine oil through the filler pipe up to center between upper lever and lower level. Make sure that the vehicle is placed level when checking oil level. Use engine oil of proper quality and viscosity, selected in accordance with the table in figure.

Recommended oil

API classification SL, SJ with the "Energy Conserving" logo is printed, or SH (if you cannot obtain the oil with SL, SJ or SH grades, you may use SG, SF grades "ENERGY CONSERVING" oil.)
ACEA specification, A1, A2 or A3
CCMC specification, G4 or G5
New API certification mark (Star burst mark) label is on the container.

Engine oil capacity

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)



(A) Viscosity No. and applicable temperature
(B) Preferred

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

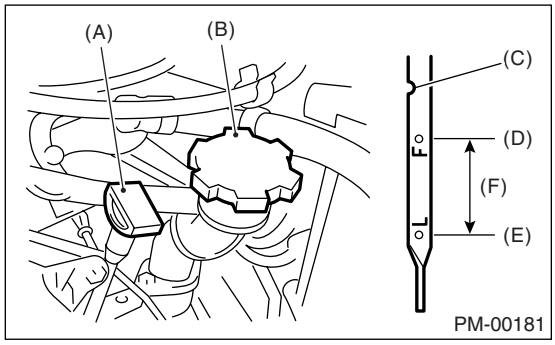
CAUTION:
When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API classification and SAE viscosity No. designated by SUBARU.

NOTE:
If the vehicle is used in areas with very high temperatures or for other heavy duty applications, the following viscosity oils may be used: API classification: SL, SJ or SH
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) After the engine stops, recheck the oil level. <Ref. to PM-8, INSPECTION, Engine Oil.>

B: INSPECTION

1) Park the vehicle on a level surface.
2) Remove the oil level gauge and wipe it clean.
3) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and in the proper orientation.
4) Remove it again and note the reading. If the engine oil level is below the "L" line, add oil to bring the level up to the "F" line.



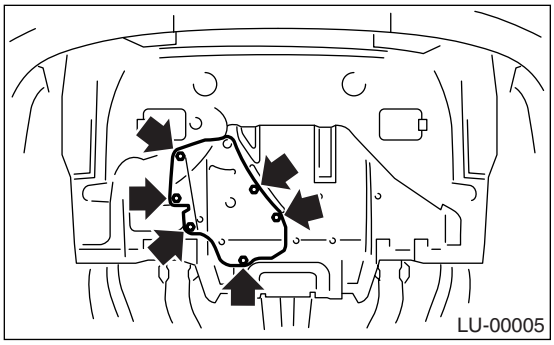
(A) Engine oil level gauge
(B) Engine oil filler cap
(C) Notch mark
(D) Upper level
(E) Lower level
(F) Approx. 1 ℓ (1.1 US qt, 0.9 Imp qt)

5) After turning off the engine, wait a few minutes for the oil to drain back into oil pan before checking the level.
6) Just after driving or while the engine is warm, engine oil level may show in the range between the "F" line and the notch mark. This is caused by thermal expansion of the engine oil.
7) To prevent overfilling the engine oil, do not add oil above the "F" line when the engine is cold.

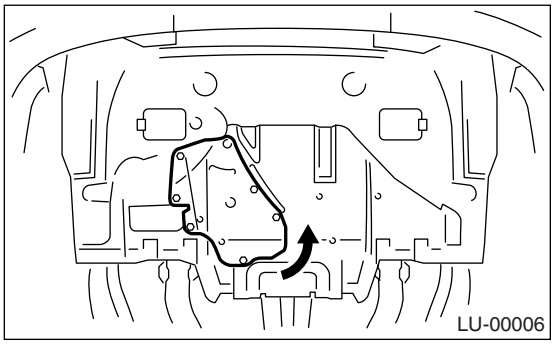
4. Engine Oil Filter

A: REPLACEMENT

1) Remove six clips securing service hole cover.

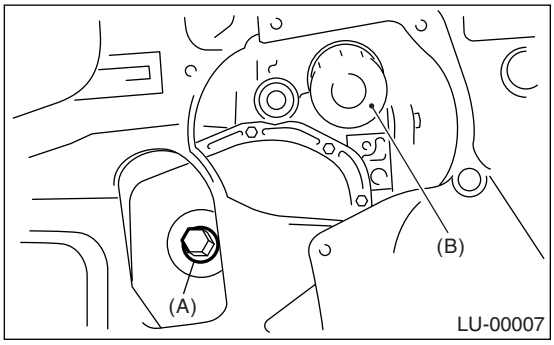


2) Turn the service hole cover counterclockwise.



3) Remove the oil filter with ST.

ST	498547000	OIL FILTER WRENCH (Outer diameter: 80 mm (3.15 in))
ST	18332AA000	OIL FILTER WRENCH (Outer diameter: 68 mm (2.68 in))
ST	18332AA010	OIL FILTER WRENCH (Outer diameter: 65 mm (2.56 in))



(A) Engine oil drain plug
(B) Engine oil filter

4) Wipe clean the oil filter matching surface on cylinder block or oil cooler.
5) Get a new engine oil filter and apply a thin coat of engine oil to the seal rubber.

CAUTION:
Be careful not to use the oil filter 80 mm (3.15 in) in diameter to turbo model.

6) Install the oil filter by turning it by hand, being careful not to damage the seal rubber.
• Tighten the oil filter 80 mm (3.15 in) or 65 mm (2.56 in) in diameter by approx. 2/3 — 3/4 rotation more after the seal rubber of oil filter comes in contact with cylinder block or oil cooler.
• Tighten the oil filter 68 mm (2.68 in) in diameter by approx. 1 rotation more after the seal rubber of oil filter comes in contact with cylinder block or oil cooler.

CAUTION:
Do not tighten excessively, or oil may leak.

7) After installing the oil filter, run the engine and make sure that no oil is leaking around seal rubber.

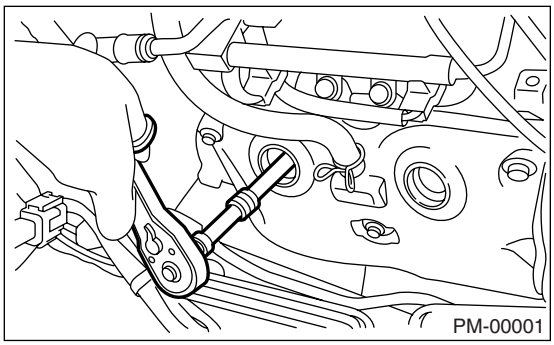
NOTE:
The filter element and filter case are permanently joined; therefore, interior cleaning is not necessary.

8) Check the engine oil level. <Ref. to PI-3, PDI PROCEDURE, Pre-delivery Inspection.>

5. Spark Plugs

A: REPLACEMENT

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



5) Set the new spark plug.

Spark plug:
Non-turbo model
CHAMPION RC10YC4 (Standard)
NGK BKR5E-11 (Alternate)
2.0 L Turbo model
NGK PFR6G
2.5 L Turbo model
NGK ILFR6B

Spark plug gap:
Non-turbo model
1.0 — 1.1 mm (0.039 — 0.043 in)
Turbo model
0.7 — 0.8 mm (0.028 — 0.031 in)

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

Tightening torque:
21±3 N·m (2.14±0.31 kgf-m, 15.49±2.21 ft-lb)

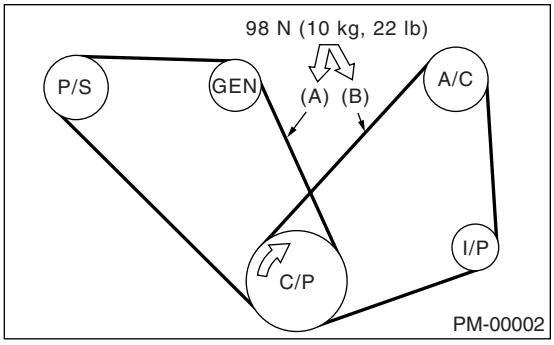
NOTE:
• Be sure to place the gasket between the cylinder head and spark plug.
• If a torque wrench is not available, tighten the spark plug until gasket contacts cylinder head; then tighten further 1/4 to 1/2 turns.

6. V-belt

A: INSPECTION

1) Replace the belts, if cracks, fraying or wear is found.
2) Check the V-belt tension and adjust it if necessary by changing the generator installing position or idler pulley installing position. <Ref. to PM-11, REPLACEMENT, V-belt.>

Belt tension
(A)
replaced: 7.0 — 9.0 mm (0.276 — 0.354 in)
reused: 9.0 — 10.0 mm (0.354 — 0.394 in)
(B)
replaced: 7.5 — 8.5 mm (0.295 — 0.335 in)
reused: 9.0 — 10.0 mm (0.354 — 0.394 in)

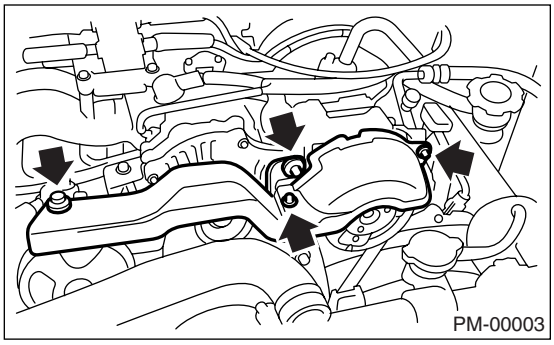


(A)	Front side belt
(B)	Rear side belt
C/P	Crank pulley
GEN	Generator
P/S	Power steering oil pump pulley
A/C	Air conditioning compressor pulley
I/P	Idler pulley

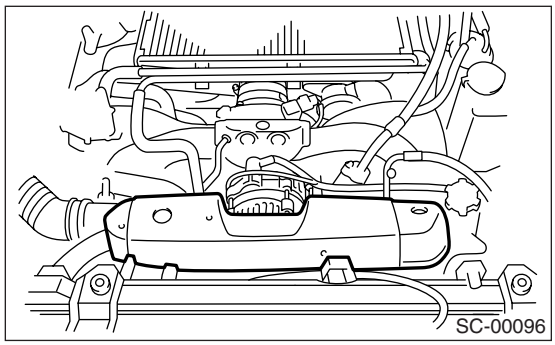
B: REPLACEMENT

1. V-BELT COVER

1) Remove the V-belt cover.
- Non-turbo model



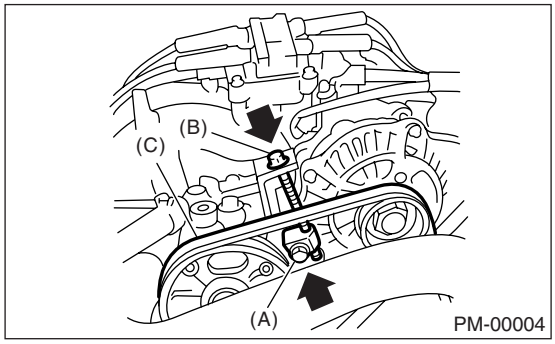
- Turbo model



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

NOTE:
Wipe off any oil or water on the belt and pulley.
1) Loosen the lock bolt (A).
2) Loosen the slider bolt (B).
3) Remove the front side belt (C).
4) Install a new belt, and tighten the slider bolt (B) so as to obtain the specified belt tension.
5) Tighten the lock bolt (A).
6) Tighten the slider bolt (B).

Tightening torque:
Lock bolt
25 N·m (2.5 kgf-m, 18 ft-lb)
Slider bolt:
8 N·m (0.8 kgf-m, 5.8 ft-lb)

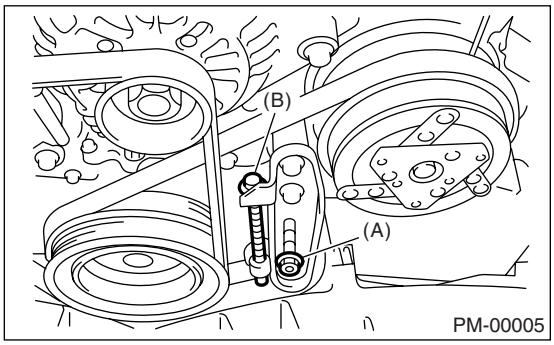


3. REAR SIDE BELT (DRIVING AIR CONDITIONER)

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

1) Remove the front side belt.
2) Loosen the lock nut (A).
3) Loosen the slider bolt (B).
4) Remove the rear side belt.
5) Install a new belt, and tighten the slider bolt (B) so as to obtain the specified belt tension.
6) Tighten the lock nut (A).
7) Install the front side belt. <Ref. to ME(H4SO)-43, REAR SIDE BELT, INSTALLATION, V-belt.>

Tightening torque:
23 N·m (2.3 kgf-m, 17.0 ft-lb)

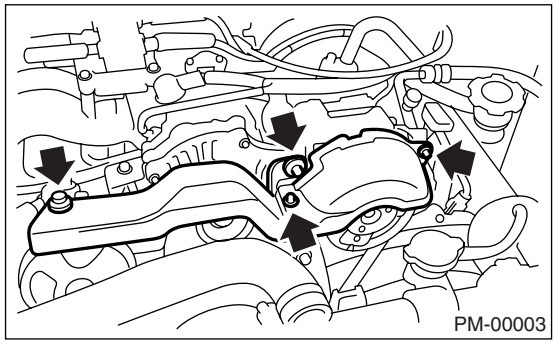


7. Timing Belt

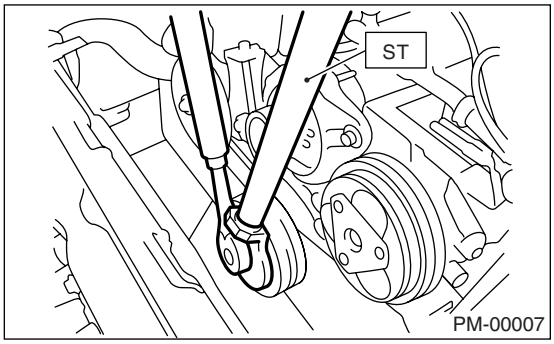
A: REPLACEMENT

1. NON-TURBO MODEL

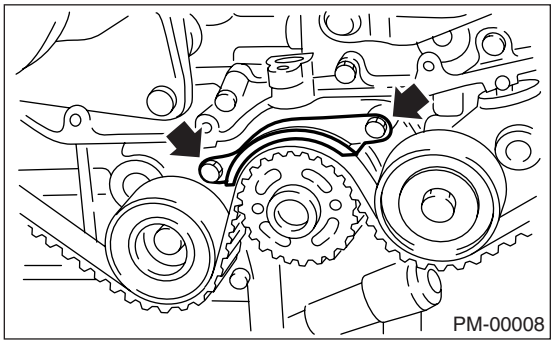
1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4SO)-35, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4SO)-40, Radiator Sub Fan and Fan Motor.>
2) Shield the radiator from any damage using cardboard and blanket.
3) Remove the V-belt cover.



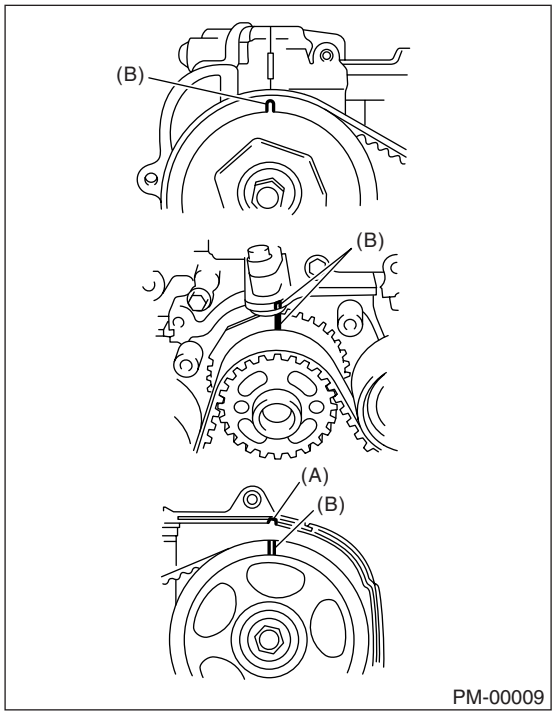
4) Remove the V-belts. <Ref. to ME(H4SO)-43, V-belt.>
5) Remove the air conditioning compressor V-belt tensioner.
6) To lock the crankshaft, use ST. Remove the pulley bolt.
ST 499977100 CRANK PULLEY WRENCH



7) Remove the crank pulley.
8) Remove the left side belt cover.
9) Remove the front timing belt cover.
10) Remove the timing belt guide. (MT model)

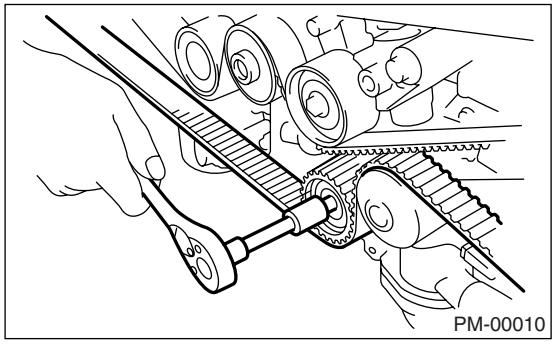


11) Turn the crankshaft and align alignment marks on crankshaft, and right and left cam sprockets with notches of belt cover and cylinder block.
ST 499987500 CRANKSHAFT SOCKET

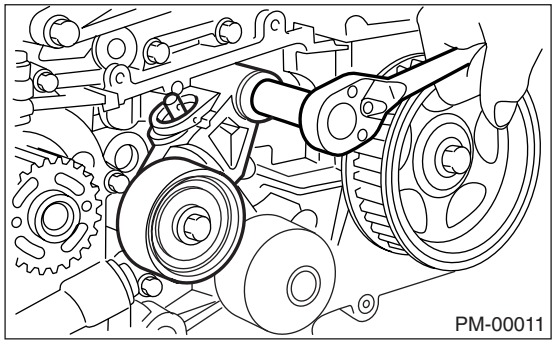


(A) Notch
(B) Alignment mark

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



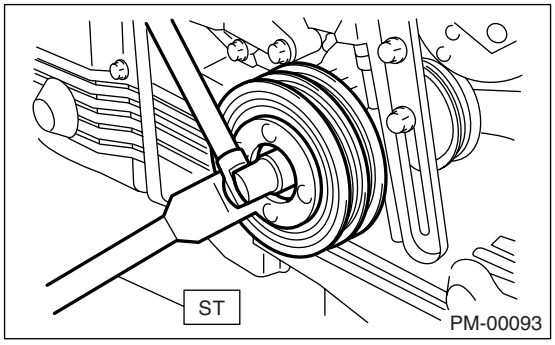
14) Remove the timing belt.
15) Remove the automatic belt tension adjuster assembly.



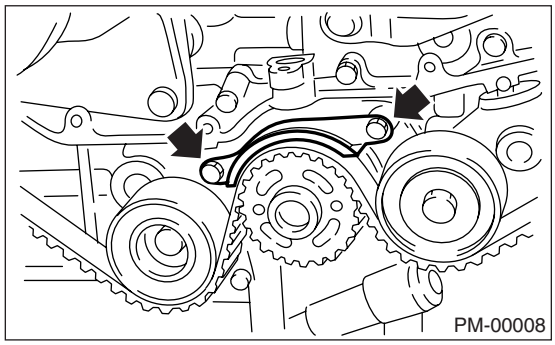
16) Install in the reverse order of removal. <Ref. to ME(H4SO)-49, INSTALLATION, Timing Belt.>

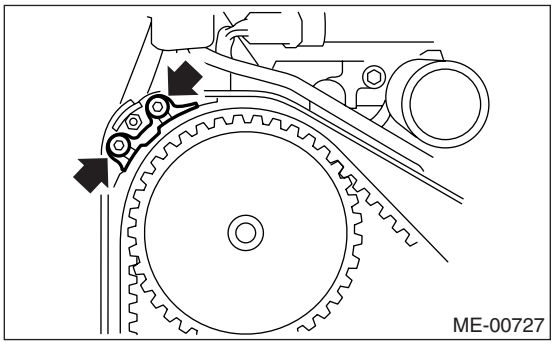
2. TURBO MODEL

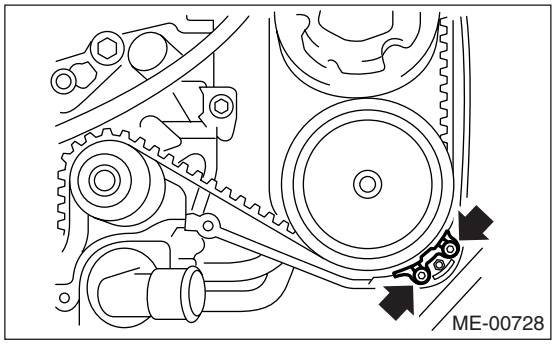
1) Remove the radiator fan and air conditioner fan. <Ref. to CO(H4SO)-35, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4SO)-40, Radiator Sub Fan and Fan Motor.>
2) Protect the radiator with cardboard and blanket.
3) Remove the V-belts. <Ref. to ME(H4SO)-43, V-belt.>
4) Remove the air conditioning compressor drive belt tensioner.
5) To lock the crankshaft use ST. Remove the pulley bolt.
ST 499977300 CRANK PULLEY WRENCH

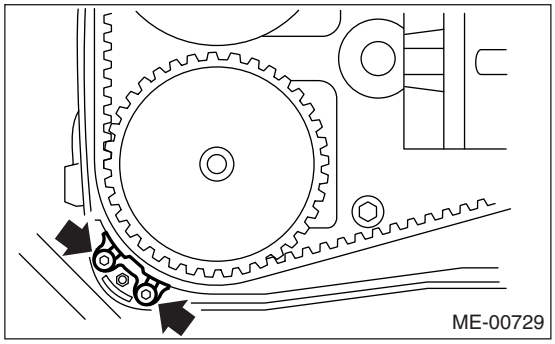


6) Remove the crank pulley.
7) Remove the air conditioning compressor drive belt tensioner.
8) Remove the belt cover (LH).
9) Remove the belt cover (RH).
10) Remove the front belt cover.
11) Remove the timing belt guide. (MT model)



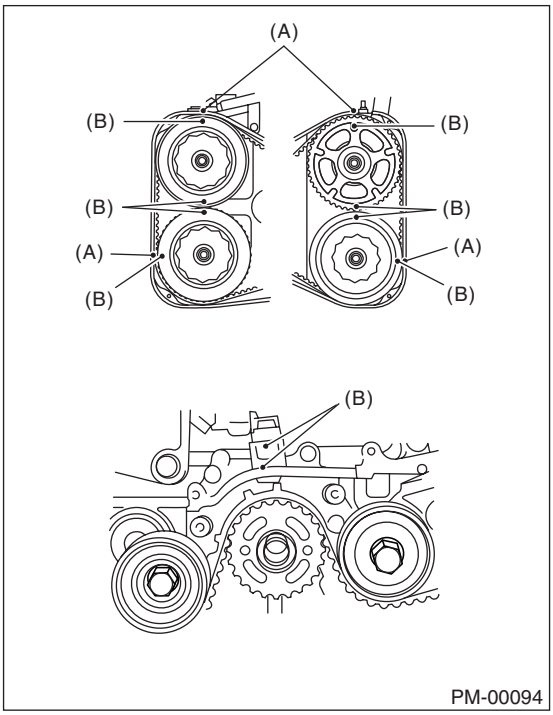






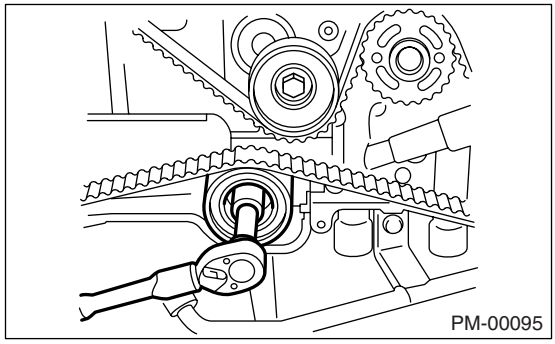
12) Turn the crankshaft and align alignment marks on crankshaft, and right and left cam sprockets with notches of belt cover and cylinder block. To turn the crankshaft, use ST.

ST 499987500 CRANKSHAFT SOCKET

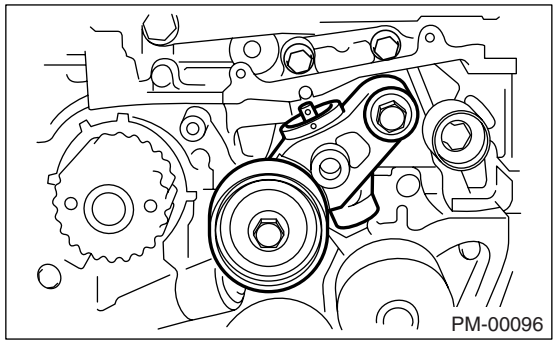


(A) Notch
(B) Alignment mark

13) Remove the belt idler.



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



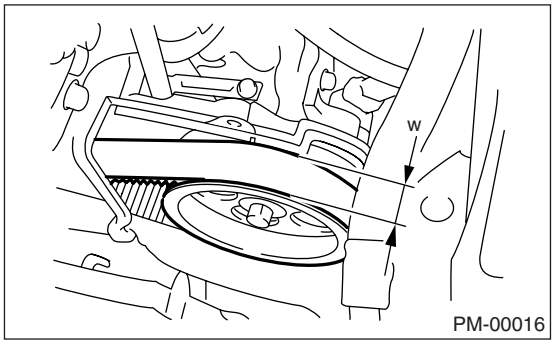
16) Install in the reverse order of removal. <Ref. to ME(H4DOTC)-58, Timing Belt Assembly.>

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

B: INSPECTION

1. SOHC MODEL

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

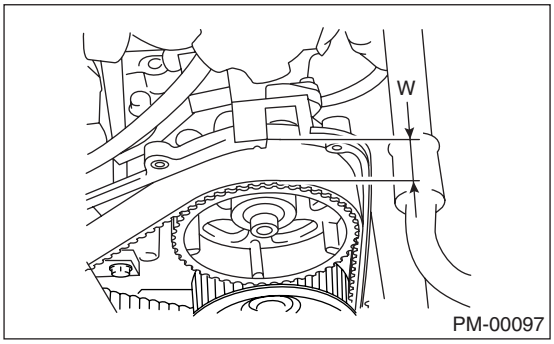


4) Install the front timing belt cover and timing belt cover (LH).

2. DOHC MODEL

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

4) Install the timing belt cover (LH).



8. Fuel Line

A: INSPECTION

Check pipes and areas near pipes for rust, hose damage, loose bands, etc. If faulty parts are found, repair or replace them. <Ref. to FU(H4SO)-63, Fuel Delivery, Return and Evaporation Lines.>

9. Fuel Filter

A: REPLACEMENT

For fuel filter replacement procedures, refer to “FU” section.
<Ref. to FU(H4SO)-60, Fuel Filter.>

B: INSPECTION

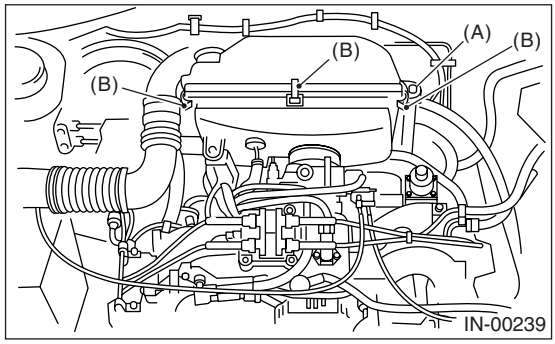
1) If fuel filter is clogged, or if replacement interval has been reached, replace it.
2) If water is found in it, shake and expel the water from inlet port.

10.Air Cleaner Element

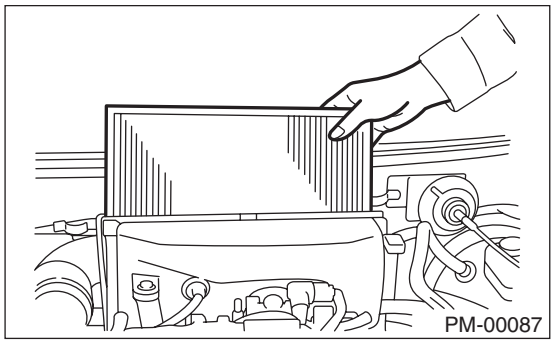
A: REMOVAL

1. NON-TURBO MODEL

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

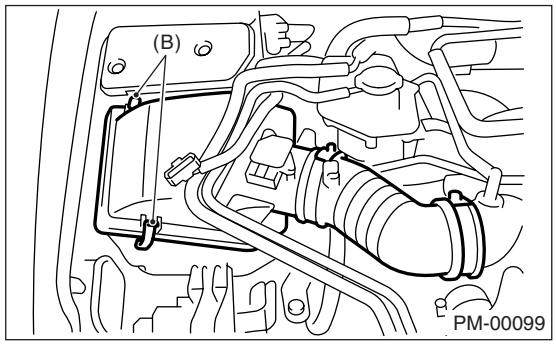


4) Remove the air cleaner.

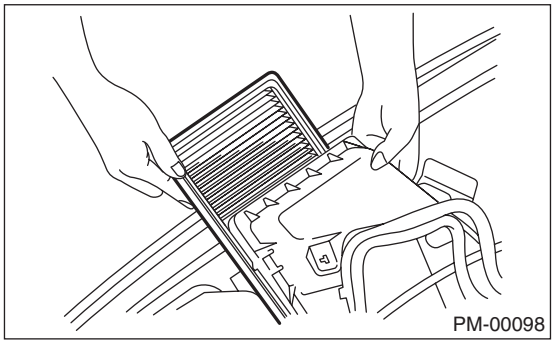


2. TURBO MODEL

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



2) Remove the air cleaner.



B: INSTALLATION

1. NON-TURBO MODEL

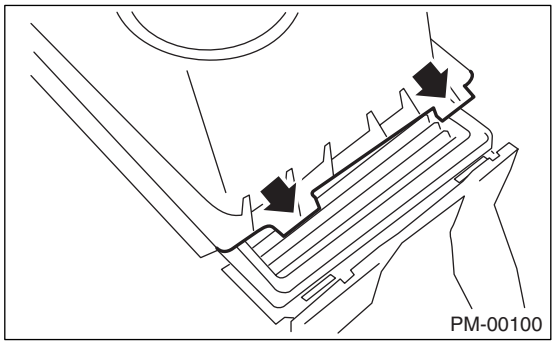
Install in the reverse order of removal.

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

2. TURBO MODEL

Install in the reverse order of removal.

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



11.Cooling System

A: INSPECTION

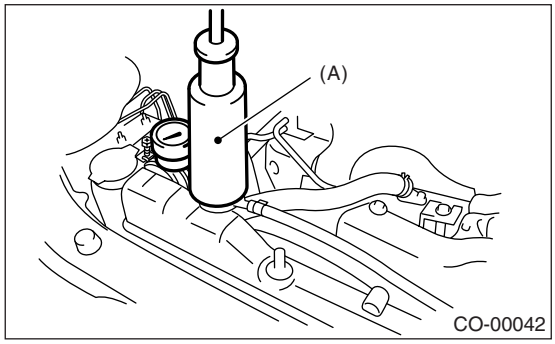
1) Check the radiator for leakage, filling it with coolant and attach the radiator cap tester (A) to filler neck.

PRESSURE:
157 kPa (1.6 kg/cm^2, 23 psi)

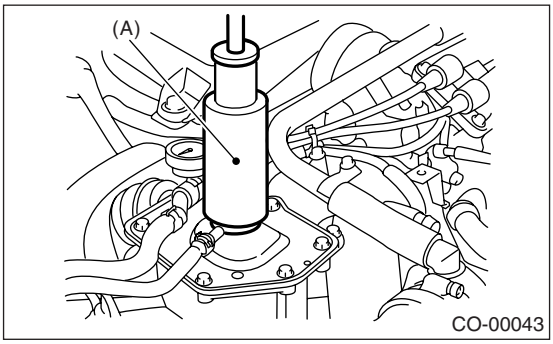
Check the following points.
- Each portion of radiator for leakage
- Hose joints and other connections for leakage

CAUTION:
• For turbo model, be sure to install tester to filler tank side.
• When attaching or detaching tester and when operating tester, use special care not to deform radiator filler neck.
• When performing this check, be sure to keep the engine stationary and fill the radiator with coolant.
• Wipe off check points before applying pressure.
• Use care not to spill coolant when detaching the tester from radiator.

- Non-turbo model



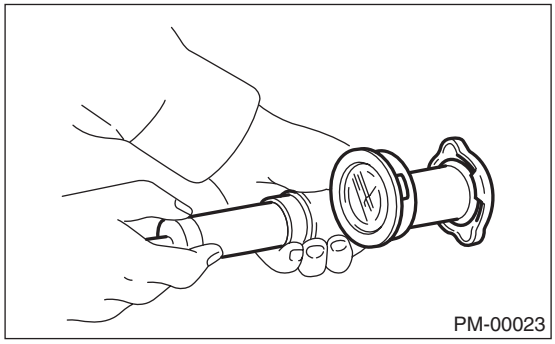
- Turbo model

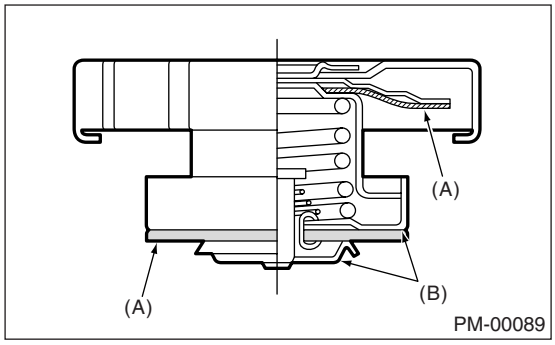


2) Check the radiator cap valve open pressure using radiator cap tester.
Raise the pressure until the needle of gauge stops and see if the pressure can be retained for 5 to 6 seconds. The radiator cap is normal if a pressure above the service limit value has been maintained for this period.

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

Radiator cap valve open pressure
Standard value:
93 — 123 kPa (0.95 — 1.25 kg/cm^2, 14 — 18 psi)
Service limit:
83 kPa (0.85 kg/cm^2, 12 psi)





(A) Deformation
(B) Deformation, damage, rust

3) Start the engine, and then check if it does not over heat or it is cooled excessively. If it overheats or it is cooled excessively, check the cooling system. <Ref. to CO(H4SO)-21, Water Pump.> <Ref. to CO(H4SO)-26, Thermostat.> <Ref. to CO(H4SO)-28, Radiator.> <Ref. to CO(H4SO)-34, Radiator Cap.>
4) Check the radiator fan operates using Subaru Select Monitor, when the coolant temperature exceeds 95°C (203°F). If not operate, check the radiator fan system. <Ref. to CO(H4SO)-13, Radiator Fan System.>

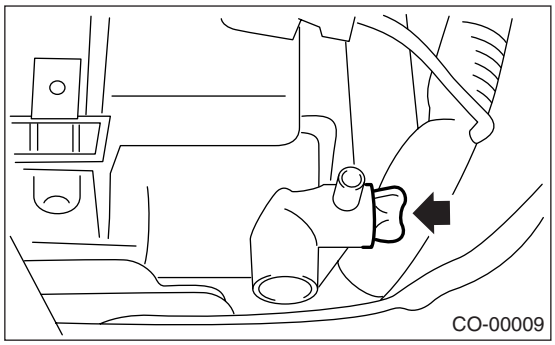
12.Engine Coolant

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 cock to drain engine coolant into container.



5) For quick draining, open the radiator cap.

CAUTION:
Be careful not to spill coolant on the floor.

6) Drain the coolant from reservoir tank.
7) Tighten the radiator drain cock securely after draining coolant.
8) Slowly pour the engine coolant from radiator filler port to neck of filler, then pour into reservoir tank up to “FULL” level.

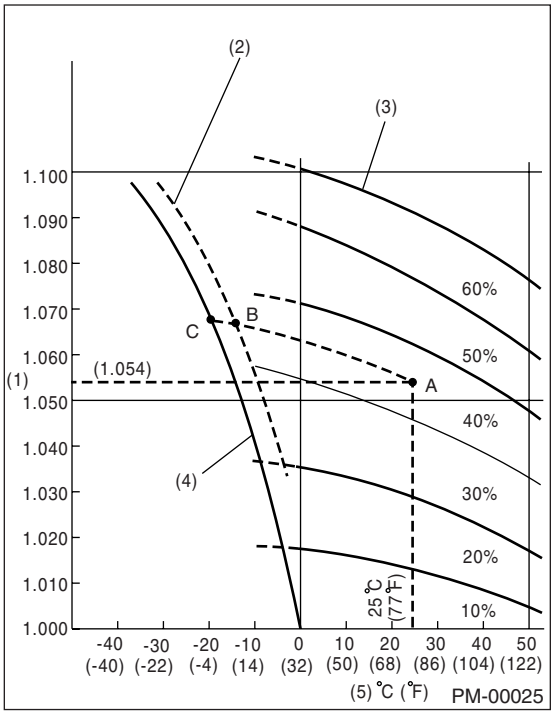
Coolant capacity (fill up to “FULL” level)
2.0 L Non-turbo AT model:
Approx. 6.5 ℓ (6.9 US qt, 5.7 Imp qt)
2.0 L Non-turbo MT model:
Approx. 6.6 ℓ (7.0 US qt, 5.8 Imp qt)
2.0 L Non-turbo model with ATF warmer:
Approx. 6.9 ℓ (7.3 US qt, 6.1 Imp qt)
2.0 L 2.5 L Turbo AT and MT with oil cooler model:
Approx. 7.3 ℓ (7.7 US qt, 6.4 Imp qt)
2.0 L 2.5 L Turbo MT without oil cooler model:
Approx. 7.4 ℓ (7.8 US qt, 6.5 Imp qt)
2.5 L AT model:
Approx. 6.8 ℓ (7.2 US qt, 6.0 Imp qt)
2.5 L MT model:
Approx. 6.9 ℓ (7.3 US qt, 6.1 Imp qt)

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.

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

2. RELATIONSHIP OF SUBARU COOLANT CONCENTRATION AND FREEZING TEMPERATURE

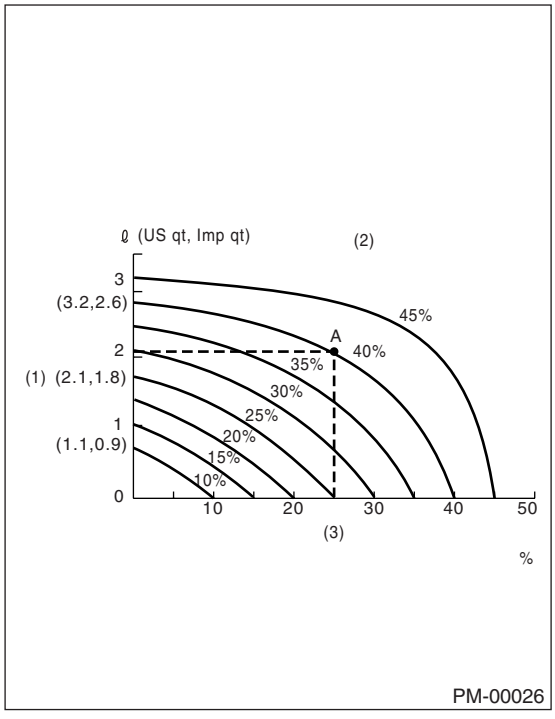
The concentration and safe operating temperature of the SUBARU Genuine Coolant is shown in the diagram. Measuring the temperature and specific gravity of the coolant will provide this information.
[Example]
If the coolant temperature is 25°C (77°F) and its specific gravity is 1.054, the concentration is 35% (point A), the safe operating temperature is −14°C (7°F) (point B), and the freezing temperature is −20°C (−4°F) (point C).



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

3. PROCEDURE TO ADJUST THE CONCENTRATION OF THE COOLANT

To adjust the concentration of the engine coolant according to temperature, find the proper fluid concentration in the above diagram and replace the necessary amount of coolant with an undiluted solution of SUBARU Genuine Coolant (concentration 50%).
The amount of coolant that should be replaced can be determined using the diagram.
[Example]
Assume that the engine coolant concentration must be increased from 25% to 40%. Find point A, where the 25% line of the engine coolant concentration intersects with the 40% curve of the necessary the engine coolant concentration, and read the scale on the vertical axis of the graph at height A. The quantity of the engine 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 Genuine Coolant.
If the engine coolant concentration of 50% is needed, drain all the coolant and refill with the undiluted solution only.



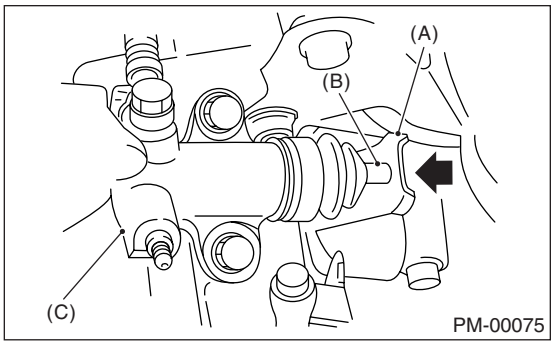
(1) Quantity of the engine coolant to be drained
(2) Necessary concentration of the engine coolant
(3) Concentration of coolant in vehicle the engine cooling system

13.Clutch System

A: INSPECTION AND ADJUSTMENT

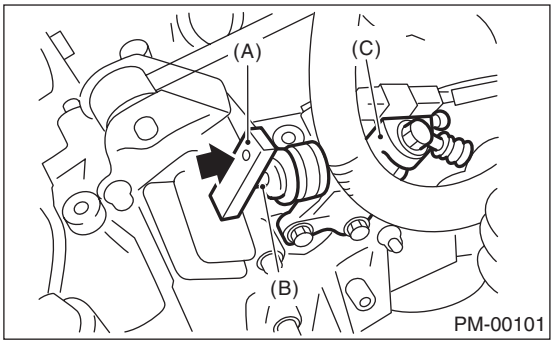
1) Push the release lever to retract the push rod of the operating cylinder and check if the fluid level in the clutch reservoir tank rises or not.

- Non-turbo model



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

- Turbo model

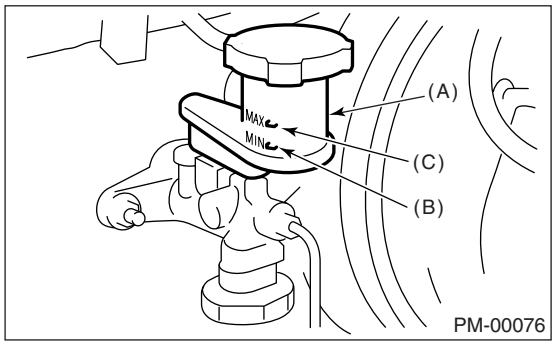


(A) Release lever
(B) Push rod
(C) Operating cylinder

2) If the fluid level rises, pedal free play is correct.
3) If the fluid level does not rise, or the push rod cannot be retracted, adjust the clutch pedal. <Ref. to CL-34, Clutch Pedal.>
4) Check the fluid level using the scale on the outside of the clutch master cylinder tank (A). If the level is below “MIN” (B), inspect the clutch master cylinder, operating cylinder and hydraulic line for fluid leaks. If fluid leaks are found, repair or replace. If fluid leaks are not found, add clutch fluid to bring it up to “MAX” (C) of clutch reservoir tank.

Recommended clutch fluid:
FMVSS No. 116, fresh DOT3 or DOT4 brake fluid

CAUTION:
• Prevent the clutch fluid from being splashed over vehicle body. If the clutch fluid is splashed over vehicle body, flush it, and then wipe it up.
• Avoid mixing different 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

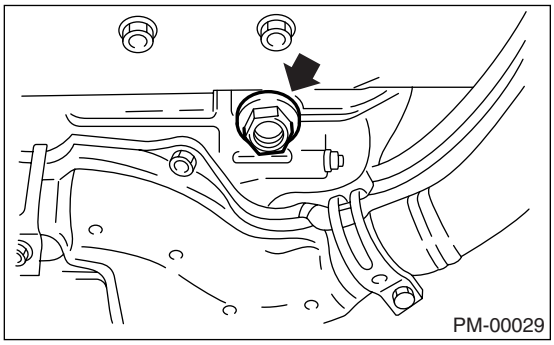
A: REPLACEMENT

1. MANUAL TRANSMISSION

1) Drain the gear oil by removing drain plug.

CAUTION:
• Before starting work, cool off the transmission gear oil well.

• If transmission gear oil adheres to the exhaust pipe, wipe it off completely.



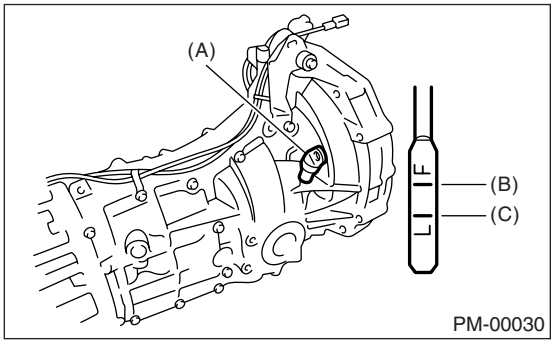
2) Replace the gasket with new one, and then tighten it to the specified torque.

Tightening torque:
70 N·m (7.1 kgf-m, 51.6 ft-lb)

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

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

Gear oil capacity:
Non-turbo model
4.0 ℓ (4.2 US qt, 3.5 Imp qt)
Turbo model
Without oil pump
3.5 ℓ (3.7 US qt, 3.1 Imp qt)
With oil pump
3.9 ℓ (4.1 US qt, 3.4 Imp qt)



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

15.Hill-holder System

A: INSPECTION AND ADJUSTMENT

1) Confirm the stopping and starting performance by activating the hill-holder on an uphill road of 3° or higher inclination.

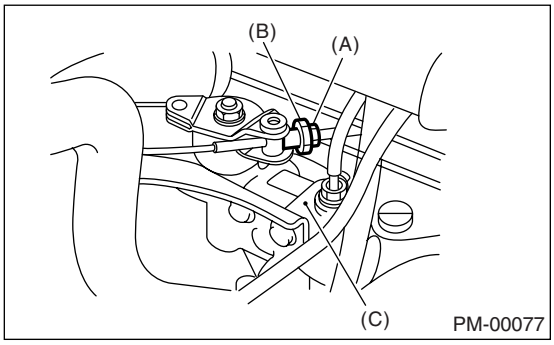
(1) When the vehicle does not stop;
Tighten the adjusting nut of PHV cable.

(2) When the vehicle does not start properly;
A; When the hill-holder is released later than engagement of clutch (engine tends to stall): Loosen the adjusting nut gradually until smooth starting is enabled.
B; When the hill-holder is released earlier than engagement to clutch (vehicle slips down slightly): Tighten the adjusting nut so that hill-holder is released later than engagement of clutch (status in A). Then make adjustment the same as in A.

CAUTION:

• Whenever turning the adjusting nut, hold the inner cable with pliers to prevent it from turning.

• Replace the pressure hold valve (PHV) or PHV cable with a new one, if they are defective and/or damaged.



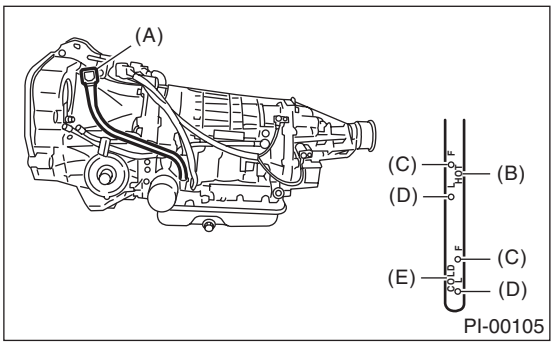
(A) Lock nut
(B) Adjusting nut
(C) Pressure hold valve

16.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(H4SO)-18, READ CURRENT DATA, OPERATION, Subaru Select Monitor.>
2) Make sure the vehicle is level.
3) After selecting all positions (P, R, N, D, 3, 2, 1), set the select lever in "P" range. Measure the ATF level with the engine idling for one or two minutes.



(A) Level gauge
(B) Check position when "HOT"
(C) Upper level
(D) Lower level
(E) Check position when "COLD"

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

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

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

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

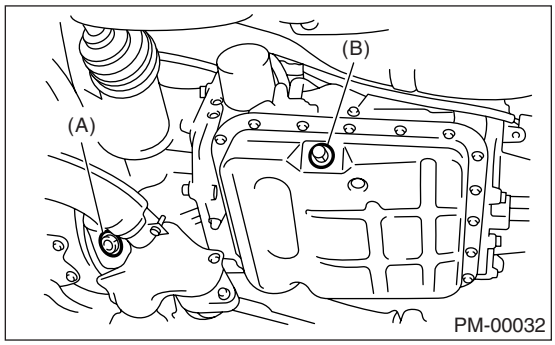
6) Check ATF level after raising ATF temperature to 70 — 80°C (158 — 176°F) by running the vehicle or by idling the engine again.
7) Check the ATF for leaks.
Check for leaks in the transmission. If there are leaks, it is necessary to repair or replace gasket, oil seals, plugs or other parts.

B: REPLACEMENT

1. AUTOMATIC TRANSMISSION FLUID

1) Drain the ATF by removing drain plug.

NOTE:
Before starting work, cool off ATF well.



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

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

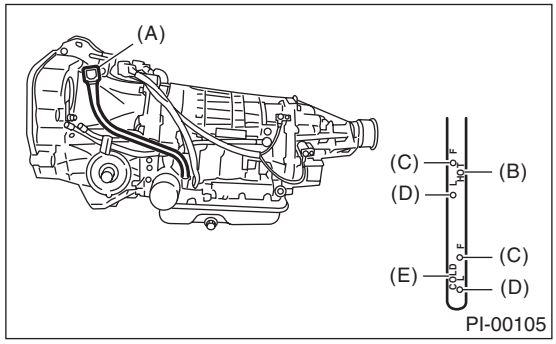
Tightening torque:
25 N·m (2.5 kgf-m, 18.1 ft-lb)

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

Recommended fluid:
Dexron III type automatic transmission fluid

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

4) Check the ATF level. <Ref. to PM-26, INSPECTION, ATF.>



(A) Level gauge
(B) Check position when “HOT”
(C) Upper level
(D) Lower level
(E) Check position when “COLD”

2. ATF FILTER

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

For the ATF filter replacement procedures, refer to “ATF Filter”. <Ref. to 4AT-76, ATF Filter.>

17.Front & Rear Differential Oil

A: REPLACEMENT

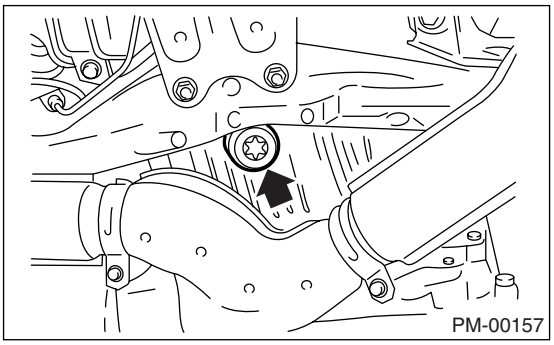
1. FRONT DIFFERENTIAL (MT MODEL)

For MT model, manual transmission oil works as differential oil to lubricate differential. Refer to “Transmission Oil”. <Ref. to PM-24, Transmission Gear Oil.>

2. FRONT DIFFERENTIAL (AT MODEL)

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

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



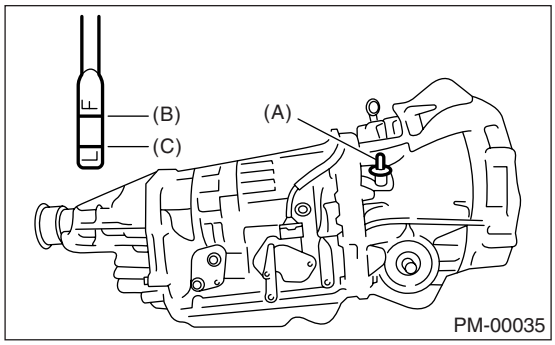
2) Replace the gasket with a new one, and then tighten the drain plug to specified torque.

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

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

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

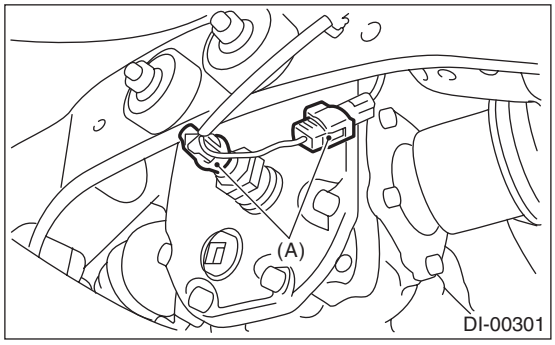
Differential gear oil capacity:
1.1 — 1.3 ℓ (1.2 — 1.4 US qt, 1.0 — 1.1 Imp qt)



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

3. REAR DIFFERENTIAL

1) Disconnect the oil temperature switch connector (For Europe turbo model).



(A) Connector

2) Drain the differential gear oil by removing drain plug.
3) Remove the filler plug or oil temperature switch for quick draining oil.

NOTE:
Remove the oil temperature switch (For Europe turbo model) and filler plug as a unit.

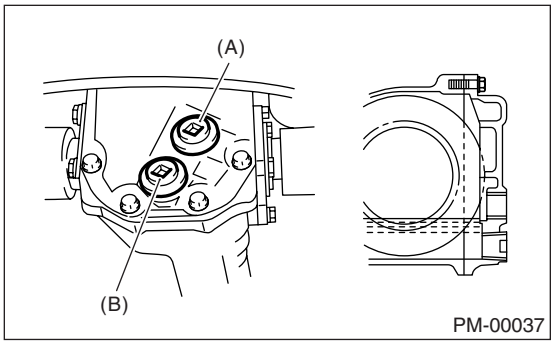
4) Install the drain plug after draining oil.

NOTE:
• Apply liquid gasket to the drain plug threads except for 2.0 L Non-turbo model.
• Use a new aluminum gasket for 2.0 L Non-turbo model.

Liquid gasket:
Three Bond 1105 (Part No. 004403010)

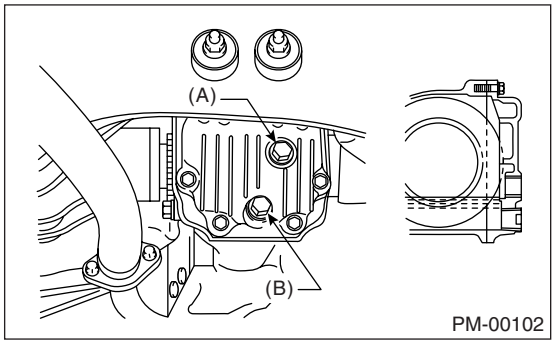
Tightening torque:
Except for 2.0 L Non-turbo model:
49.0 N·m (5.0 kgf-m, 36.2 ft-lb)
2.0 L Non-turbo model:
34 N·m (3.5 kgf-m, 25.3 ft-lb)

5) After installing the drain plug onto rear differential gear case firmly, fill oil up fully to the mouth of filler plug.
EXCEPT FOR 2.0 L Non-turbo model



(A) Filler plug
(B) Drain plug

2.0 L Non-turbo model



(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.

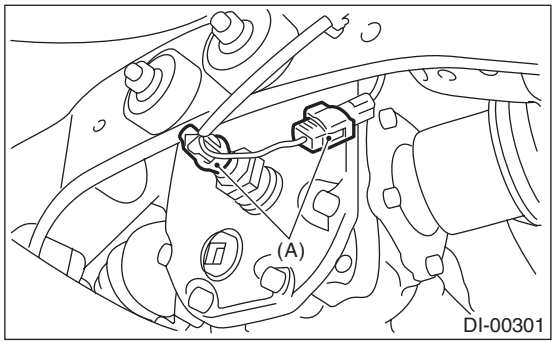
6) Install the filler plug or oil temperature switch onto rear differential gear case firmly.

NOTE:
• Install the oil temperature switch (For Europe turbo model) and filler plug as a unit.
• Apply liquid gasket to the filler plug threads except for 2.0 L Non-turbo model.
• Use a new aluminum gasket for 2.0 L Non-turbo model.

Liquid gasket:
Three Bond 1105 (Part No. 004403010)

Tightening torque:
Except for 2.0 L Non-turbo model:
49.0 N·m (5.0 kgf-m, 36.2 ft-lb)
2.0 L Non-turbo model:
34 N·m (3.5 kgf-m, 25.3 ft-lb)

7) Connect the oil temperature switch connector (For Europe turbo model).



(A) Connector

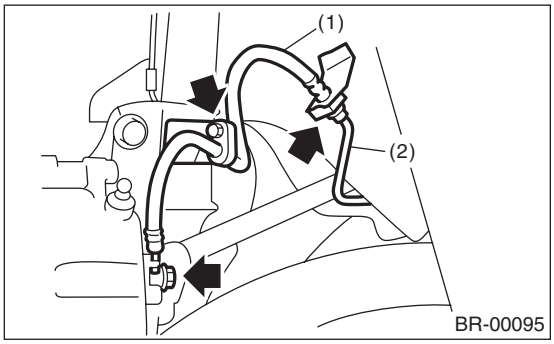
18.Brake Line

A: INSPECTION

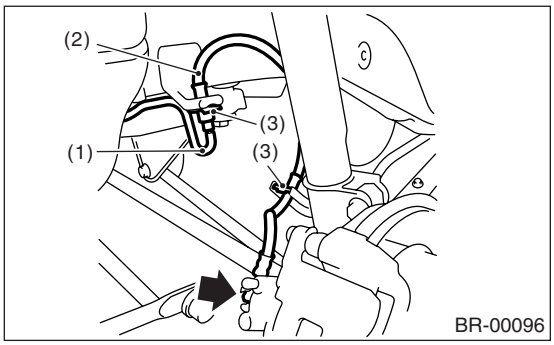
1. BRAKE LINE

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

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



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



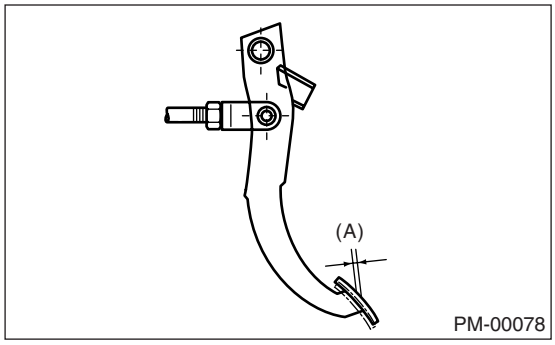
(1) Brake pipe
(2) Rear brake hose
(3) Clamp

B: CHECKING

1. SERVICE BRAKE

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

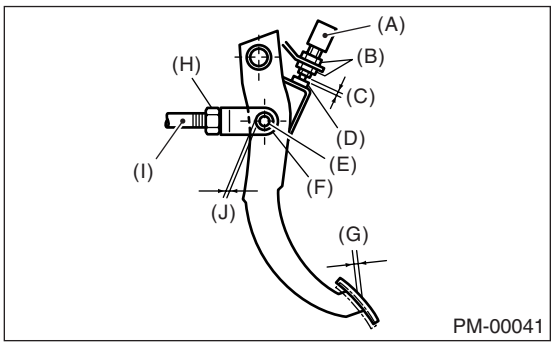
Brake pedal free play:
0.5 — 2.0 mm (0.02 — 0.08 in)



(A) Brake pedal free play

2) If the free play is out of specifications above, adjust the brake pedal as follows.
(1) Be sure the engine is off. (No vacuum is applied to brake booster.)
(2) There should be play between brake booster clevis and pin at brake pedal installing portion.
[Depress brake pedal pad with a force of less than 10 N (1 kgf, 2 lb) to a stroke of 0.5 to 2.0 mm (0.02 to 0.08 in).]
(3) Depress the surface of brake pad by hand.

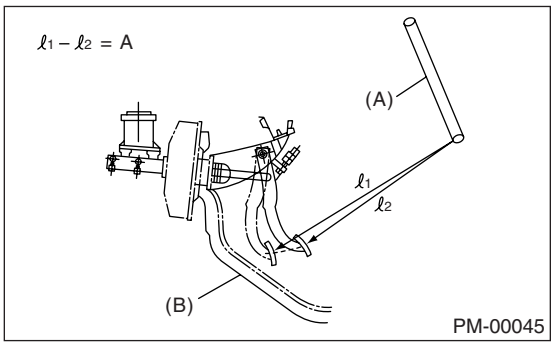
(4) If there is no free play between clevis pin and clevis, turn the brake switch adjusting nut until the clearance between stopper and screw of brake switch becomes 0.3 mm (0.012 in).



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

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

Brake pedal reserve distance: A
For Australia model
105 mm (4.13 in)/ 490 N (50 kgf , 110 lb) or less
Except for Australia model
90 mm (3.54 in)/ 490 N (50 kgf , 110 lb) or less

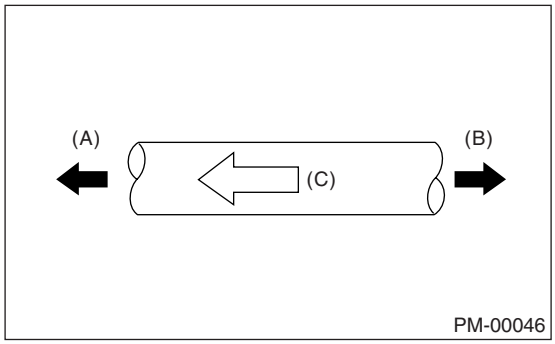


(A) Steering wheel
(B) Toe board

4) Check to see if air is in the hydraulic brake line by the feel of pedal operation. If air appears to exist in the line, bleed it from the system.
5) Check for even operation of all brakes, using a brake tester or by driving the vehicle for a short distance on a straight road.

2. BRAKE SERVO SYSTEM

1) With the engine off, depress the brake pedal several times applying the same pedal force: Make sure the travel distance should not change.
2) With the brake pedal depressed, start the engine: Make sure the pedal should move slightly toward the floor.
3) With the brake pedal depressed, stop the engine and keep the pedal depressed for 30 seconds: Make sure the pedal height should not change.
4) Check valve is built into the vacuum hose. Disconnect the vacuum hose to inspect function of check valve.
Blow air into the vacuum hose from its brake booster side end: Air must flow out of engine side end of hose. Next blow air into the hose from engine side: Air should not to brake booster side.
Replace both check valve and vacuum hose if the check valve is faulty. Engine side of vacuum hose is indicated by marking “ENG” as shown in illustration.



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

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

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

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

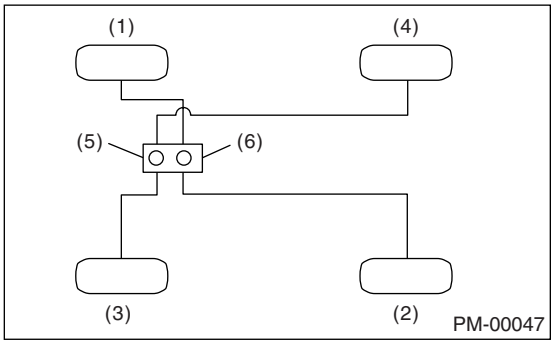
19.Brake Fluid

A: REPLACEMENT

1) Lift-up the vehicle.
2) Remove both front and rear wheels.
3) Draw out the brake fluid from master cylinder with syringe.
4) Refill the reservoir tank with recommended brake fluid.

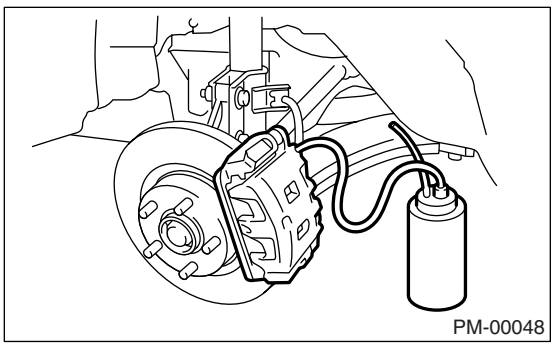
Recommended brake fluid:
FMVSS No. 116, fresh DOT3 or DOT4 brake fluid

CAUTION:
• Avoid mixing different brands of brake fluid to prevent degrading the quality of the fluid.
• Be careful not to allow dirt or dust to get into the reservoir tank.
Bleeding sequence (1) → (2) → (3) → (4)



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

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



CAUTION:
• Cover the bleeder with waste cloth, when loosening it, to prevent brake fluid from being splashed over surrounding parts.
• During the bleeding operation, keep the brake reservoir tank filled with brake fluid to eliminate entry of air.
• The brake pedal operating must be very slow.
• For convenience and safety, two people should do the work.

NOTE:
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 approx. 1/4 turn until a small amount of brake fluid drains into container, and then quickly tighten the screw.
8) Repeat steps 6) and 7) above until there are no air bubbles in the drained brake fluid and new fluid flows through vinyl tube.

NOTE:
Add brake fluid as necessary while performing the air bleed operation, in order to prevent the tank from running short of brake fluid.

9) After completing the bleeding operation, hold brake pedal depressed and tighten the bleeder screw and install bleeder cap.

Tightening torque:
8 N·m (0.8 kgf-m, 5.8 ft-lb)

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

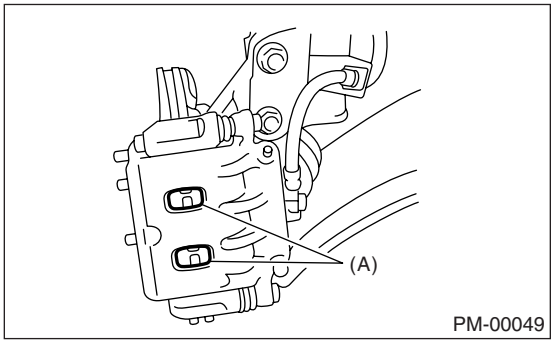
20.Disc Brake Pads and Discs

A: INSPECTION

1. DISC BRAKE PAD AND DISC

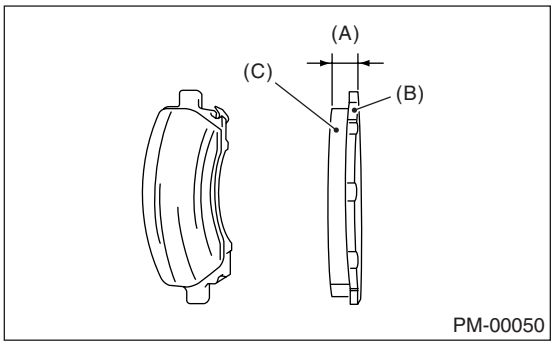
1) Lift-up the vehicle. Then remove the wheels.
2) Visually check the pad thickness through inspection hole of disc brake assembly. Replace the pad if necessary.

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



(A) Inspection hole

Pad thickness including back metal mm (in)		
	Front	Rear
Standard	17 (0.67)	14 (0.55)
Wear limit	7.5 (0.295)	6.5 (0.256)



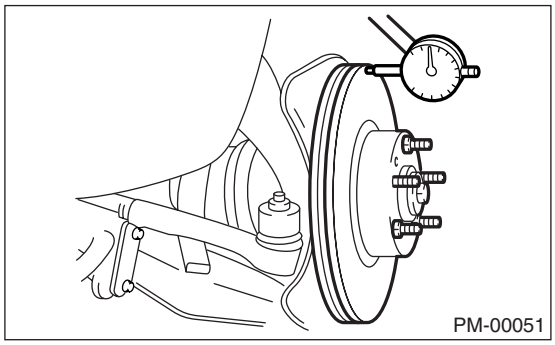
(A) Thickness of pad
(B) Back metal
(C) Lining

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

Brake disc thickness mm (in)		
	Front	Rear
Standard	24 (0.94)	10 (0.39)
Wear limit	22 (0.87)	8.5 (0.335)

4) Remove the caliper body. <Ref. to BR-21, Front Disc Brake Assembly.> <Ref. to BR-27, Rear Disc Brake Assembly.>
5) Tighten the wheel nuts to secure disk rotor.
6) Set a dial gauge at a point less than 10 mm (0.39 in) from outer periphery of rotor, and then measure the disk rotor runout.

Disc rotor runout limit:
Front: 0.075 mm (0.0030 in)
Rear: 0.070 mm (0.0028 in)



21.Brake Linings and Drums

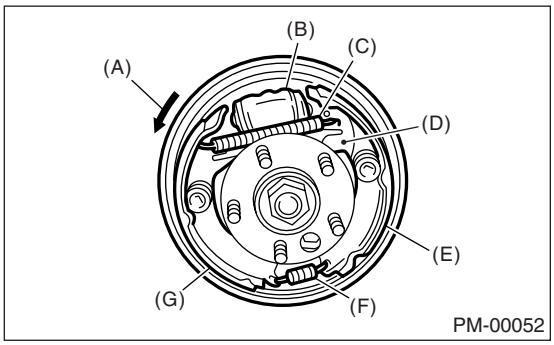
A: INSPECTION

1. REAR DRUM BRAKE

1) Remove the brake drum, and check that there is no fluid leakage from wheel cylinder.
If there is fluid leakage from wheel cylinder, inspect the wheel cylinder, and then repair or replace it.
2) Inspect the brake shoes for damage or deformities and check brake linings for wear.

CAUTION:
• Always replace both leading and trailing brake shoes for the right and left wheels at the same time.
• When either the right and left brake assembly is replaced, always replace the leading shoe and trailing shoe of the other.

Thickness of lining (except back metal)
Standard value: 4.1 mm (0.161 in)
Service limit: 1.5 mm (0.059 in)

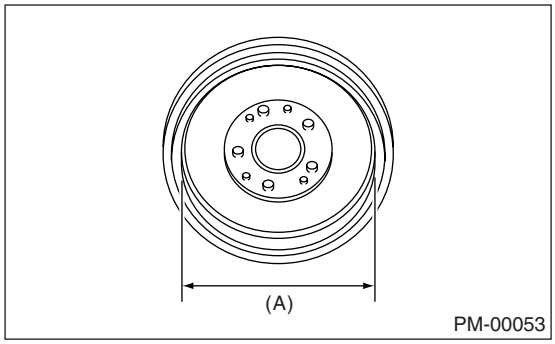


(A) Rotational direction of drum (Forward)
(B) Wheel cylinder
(C) Upper shoe return spring
(D) Adjusting lever
(E) Trailing shoe
(F) Lower shoe return spring
(G) Leading shoe

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

Brake drum inner diameter
Standard value: 228.6 mm (9.000 in)
Service limit: 230.6 mm (9.079 in)

If deformation or wear of back plate, shoe, etc. is noticeable, replace the affected parts.



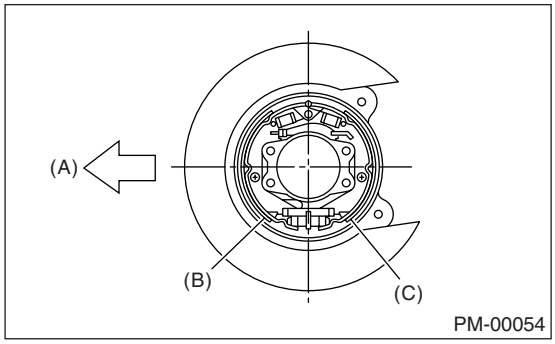
(A) Inside diameter

2. PARKING BRAKE (REAR DISC BRAKE)

Inspect the brake linings and the disk rotor inside of both sides of the rear brake at the same time by removing the disk rotor.
1) Inspect the brake shoes for damage or deformation and check brake linings for wear.

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

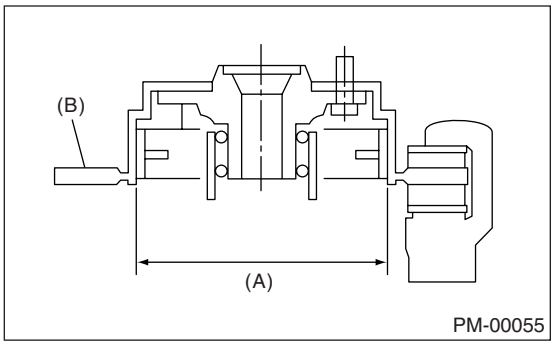
Brake lining thickness (excluding back metal)
Standard value: 3.2 mm (0.126 in)
Wear limit: 1.5 mm (0.059 in)



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

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

Brake drum inside diameter
Standard value: 170 mm (6.69 in)
Wear limit: 171 mm (6.73 in)



(A) Inside diameter
(B) Disk

3) If the deformation or wear of back plate, shoe, etc. is noticeable, replace them.
4) When the shoe return spring tension is excessively weakened, replace it.

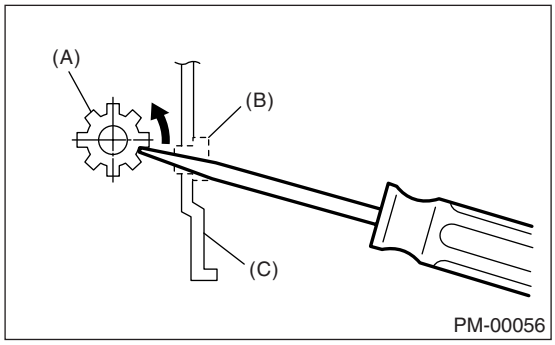
B: ADJUSTMENT

1. REAR DRUM BRAKE

The main brake is adjusted automatically, and so there is no need to adjust it.

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



(A) Adjuster
(B) Rear cover (rubber)
(C) Back plate

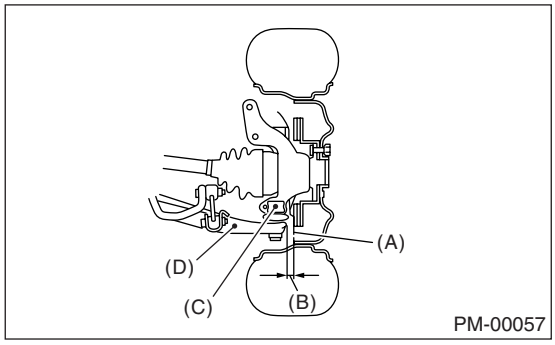
3) Turn back (downward) the adjuster 3 to 4 notches.
4) Install the rear cover (rubber) at original position correctly.

22.Suspension

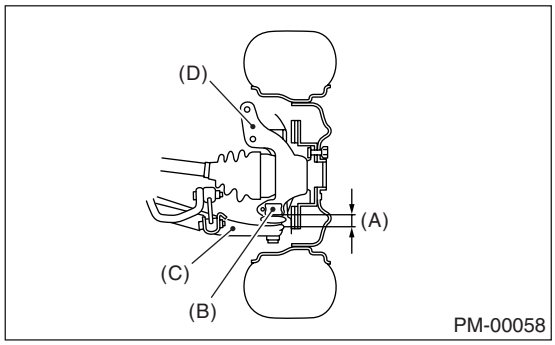
A: INSPECTION

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 (B) is observed between the brake disc cover (A) and end of transverse link (D), ball joint (C) may be excessively worn.



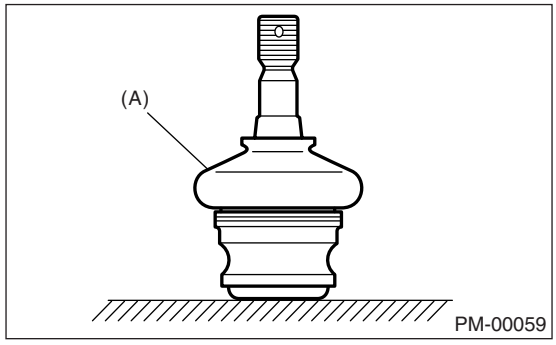
3) Grasp the end of transverse link (C) and move it up and down. Relative movement (A) between the housing (D) and transverse link boss indicates ball joint (B) may be excessively worn.



4) If relative movement is observed in the immediately preceding two steps, remove and inspect the ball joint. If free play exceeds standard, replace the ball joint. <Ref. to FS-17, Front Ball Joint.>
5) Damage of dust seal
Visually inspect the ball joint dust seal. If it is damaged, remove the transverse link. <Ref. to FS-15, Front Transverse Link.> And measure free play of ball joint. <Ref. to FS-17, Front Ball Joint.>

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

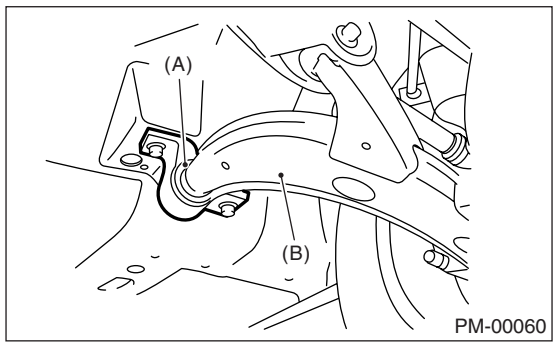
NOTE:
When the transverse link ball joint has been removed or replaced, check the toe-in of front wheel. If the front wheel toe-in is not at specified value, adjust the toe-in. <Ref. to FS-6, Wheel Alignment.>



(A) Dust seal

2. TRANSVERSE LINK'S REAR BUSHING

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



(A) Rear bushing
(B) Transverse link

3. WHEEL ARCH HEIGHT

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

4. WHEEL ALIGNMENT OF FRONT SUSPENSION

1) Check the alignment of front suspension to ensure that following items conform to standard values.
- Toe-in
- Camber angle
- Caster angle
- Steering angle

<Ref. to FS-6, Wheel Alignment.>
2) When the caster angle does not conform to reference, visually inspect the following components and replace deformed parts.
- Suspension components [Strut assembly, crossmember, transverse link, etc.]
- Body parts to which suspensions are installed.

3) When the toe-in and camber are out of standard value, adjust them so that they conform to respective service standard. <Ref. to FS-10, FRONT WHEEL TOE-IN, INSPECTION, Wheel Alignment.> <Ref. to FS-8, CAMBER, INSPECTION, Wheel Alignment.>
4) When the right-and-left turning angles of tire are out of standard, adjust to standard value. <Ref. to FS-10, STEERING ANGLE, INSPECTION, Wheel Alignment.>

5. WHEEL ALIGNMENT OF REAR SUSPENSION

1) Check the alignment of rear suspension to ensure that following items are within standard values.
- Toe-in
- Camber angle
- Thrust angle

<Ref. to RS-8, Wheel Alignment.>
2) When the camber angle does not conform to reference, visually inspect parts listed below. If deformation is observed, replace the damaged parts.
- Suspension components [Shock absorber, front lateral links, rear lateral links, trailing link, etc.]
- Body parts to which suspensions are installed.

3) When the toe-in and thrust angle are out of standard value, adjust them so that they conform to respective service standard. <Ref. to FS-11, REAR WHEEL TOE-IN, INSPECTION, Wheel Alignment.> <Ref. to FS-13, THRUST ANGLE, INSPECTION, Wheel Alignment.>

6. OIL LEAKAGE OF STRUT

Visually inspect the front strut and rear strut for oil leakage as instructed. If oil leakage reaches under spring seat lower portion, replace the front strut and rear strut.

7. TIGHTNESS OF BOLTS AND NUTS

Check the bolts and nuts shown in the figure for looseness. Retighten the bolts and nuts to specified torque. If the self-lock nuts and bolts are removed, replace them with new ones.
Front suspension: <Ref. to FS-2, General Description.>
Rear suspension: <Ref. to RS-2, General Description.>

8. DAMAGE TO SUSPENSION PARTS

Check the following parts and the fastening portion of the vehicle body for deformation or excessive rusting which impairs the suspension. Remove the contaminations on spring seat lower portion with care because dirt, sand, etc. tend to accumulate on it. If necessary, replace the damaged parts with new ones. If minor rust formation, pitting, etc. are noted, remove the rust and apply remedial anti-corrosion measures.
- Front suspension
  - Transverse link
  - Crossmember
  - Strut
- Rear suspension
  - Crossmember
  - Lateral links
  - Trailing link
  - Strut
- In the district where salt is sprayed to melt snow on a road in winter, check suspension parts for damage caused by rust every 12 months after lapse of 60 months. Take rust prevention measure as required.

23.Wheel Bearing

A: INSPECTION

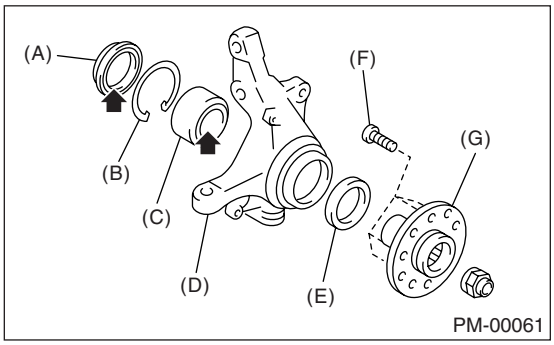
1. FRONT WHEEL BEARING

NOTE:
Inspect the condition of front wheel bearing grease.

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

Service limit:
Straight-ahead position within 0.05 mm (0.0020 in)

5) Remove the bolts and self-locking nuts, and extract transverse link from front crossmember.
6) Remove the AARi of front drive shaft from transmission. <Ref. to DS-19, Front Axle.>
7) While supporting the front drive shaft horizontally with one hand, turn the hub with the other to check for noise or binding.
If the hub is noisy or binds, disassemble the front axle and check condition of oil seals, bearing, etc.



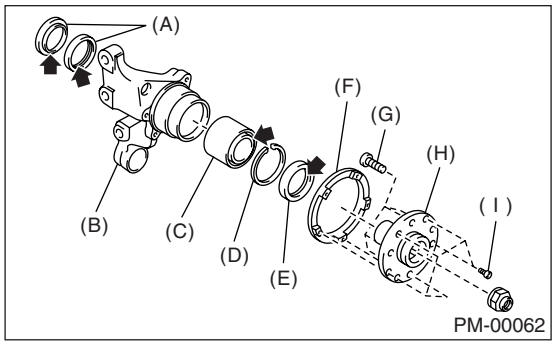
(A) Inner oil seal
(B) Snap ring
(C) Bearing
(D) Housing
(E) Outer oil seal
(F) Hub bolt
(G) Hub

2. REAR WHEEL BEARING

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

Service limit:
Straight-ahead position within 0.05 mm (0.0020 in)

5) Remove the DOJ of rear drive shaft from rear differential. <Ref. to DS-39, Rear Drive Shaft.>
6) While supporting the rear drive shaft horizontally with one hand, turn the hub assembly with the other to check for noise or binding.
If the hub assembly is noisy or binds, disassemble the rear axle and check condition of oil seals, bearings, etc.



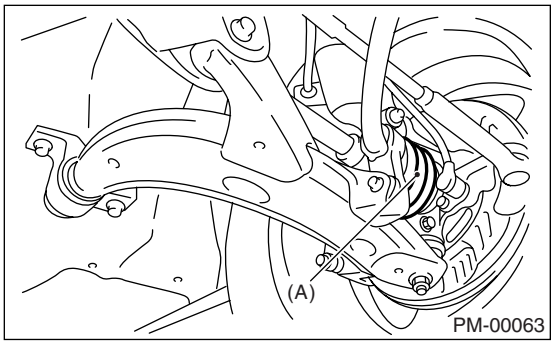
(A) Inner oil seal
(B) Rear housing
(C) Bearing
(D) Snap ring
(E) Outer oil seal
(F) Tone wheel
(G) Hub bolt
(H) Hub
(I) Socket bolt

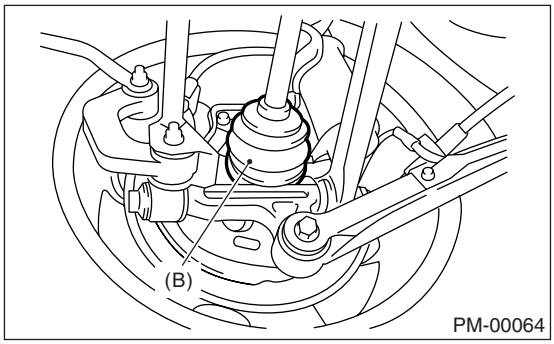
24.Axle Boots & Joints

A: INSPECTION

1. FRONT AND REAR AXLE BOOTS

Inspect the front axle boots (A) and rear axle boots (B) for deformation, damage or failure. If faulty, replace them with new ones. <Ref. to DS-33, Front Drive Shaft.> <Ref. to DS-39, Rear Drive Shaft.>





2. PROPELLER SHAFT

Inspect the propeller shaft for damage or failure. If faulty, replace with a new one. <Ref. to DS-15, Propeller Shaft.>

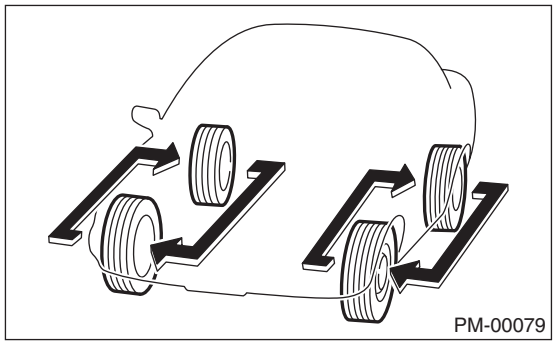
25.Tire Rotation

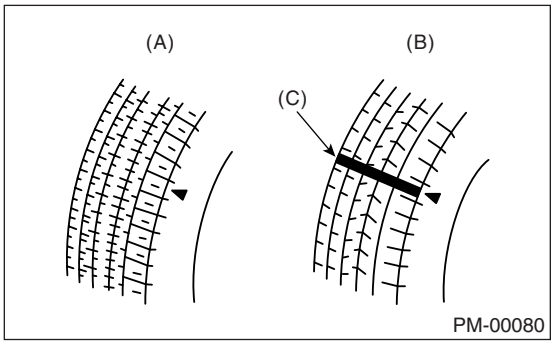
A: INSPECTION

1) Replace the tire if the tread depth is less than 1.6 mm (0.063 in) or if wear indicators appear across the tire tread.

CAUTION:
It is recommended that both right and left tires are replace as a set.

2) Adjust the wheel alignment if abnormally uneven tire wear is found.
3) Also, rotate the tires between the front and rear tires as illustrated every 10,000 km (6,200 miles) running, in order to ensure uniform tire wear.





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

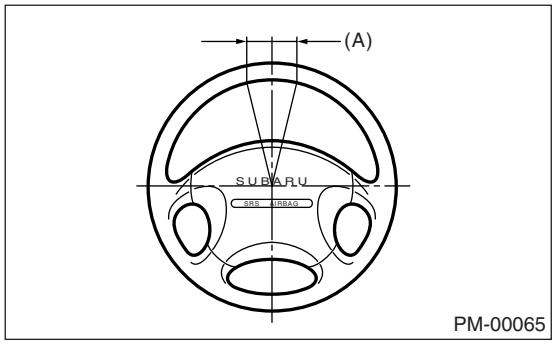
26. Steering System (Power Steering)

A: INSPECTION

1. STEERING WHEEL

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

Steering wheel free play:
0 — 17 mm (0 — 0.67 in)



(A) Steering wheel free play

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

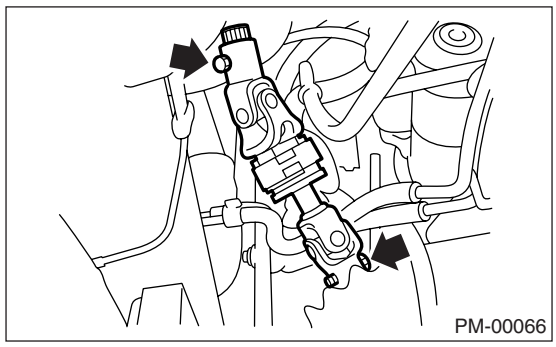
Maximum permissible play:
0.5 mm (0.020 in)

3) Drive the vehicle and check the following items.
(1) Steering force:
The effort required for steering should be smooth and even at all points, and should not vary.
(2) Pull to one side:
Steering wheel should not be pulled to either side while driving on a level surface.
(3) Wheel runout:
Steering wheel should not be runout.
(4) Return factor:
Steering wheel should return to its original position after it has been turned and then released.

2. STEERING SHAFT JOINT

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

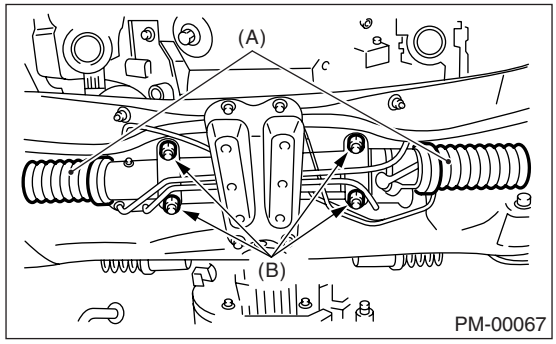
Tightening torque:
24 N·m (2.4 kgf-m, 17.4 ft-lb)



3. GEARBOX

1) With wheels placed in the direction of straight ahead, turn the steering wheel 90° in both the right and left directions.
While the steering wheel is being rotated, check for looseness in gearbox.

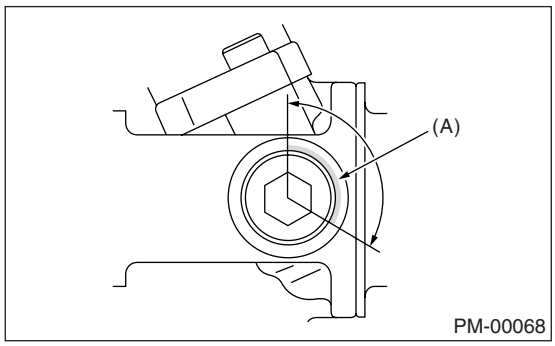
Tightening torque:
59 N·m (6.0 kgf-m, 43.4 ft-lb)



(A) Boot
(B) Gear box mounting bolt

2) Check the boot for damage, cracks or deterioration.
3) With the vehicle on a level surface, quickly turn the steering wheel to the right and left.
While the steering wheel is being rotated, check the gear backlash. If any unusual noise is noticed, adjust the gear backlash in the following manner.
(1) Tighten the adjusting screw to 7.4 N·m (0.75 kgf-m, 5.4 ft-lb) and then loosen. Repeat this operation twice.

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

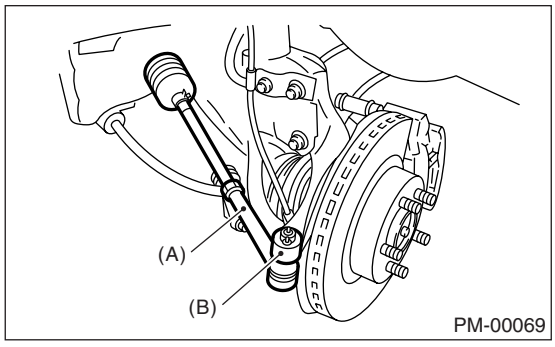
ST 926230000 SPANNER

Tightening torque (Lock nut):
39 N·m (4.0 kgf-m, 29 ft-lb)

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

4. TIE-ROD

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



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

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

Tightening torque:
27 N·m (2.75 kgf-m, 19.9 ft-lb)

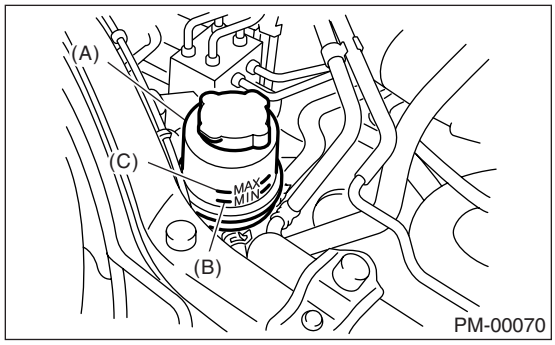
3) Check the lock nut on tie-rod end for tightness. If it is loose, retighten it to the specified torque.

Tightening torque:
83 N·m (8.5 kgf-m, 61.5 ft-lb)

5. POWER STEERING FLUID LEVEL

NOTE:
• Check at power steering fluid temperature 20°C (68°F); read the fluid level on the “COLD” side.
• Check at power steering fluid temperature 80°C (176°F); read the fluid level on the “HOT” side.

1) Place the vehicle with engine stopped on a flat and level surface.
2) Check the fluid level using the scale on the outside of reservoir tank (A). If the level is below “MIN” (B), add fluid to bring it up to “MAX” (C).



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

Recommended fluid:
Dexron III

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

6. POWER STEERING FLUID FOR LEAKS

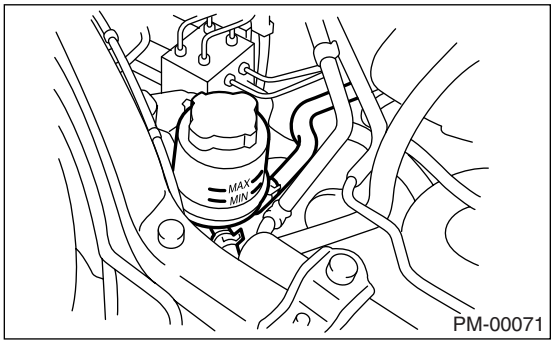
Inspect the underside of oil pump and gearbox for power steering system, hoses, piping and their couplings for fluid leaks.
If fluid leaks are found, correct them by retightening their fitting bolts (or nuts) and/or replacing their parts.

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

7. HOSES OF OIL PUMP FOR DAMAGES

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

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



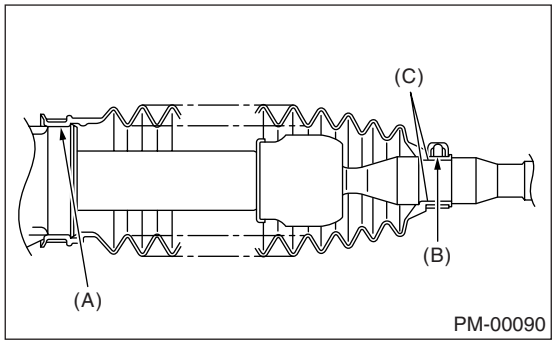
8. POWER STEERING PIPES FOR DAMAGE

Check the power steering pipes for corrosion and damage.
Replace the pipes with a new one if necessary.

9. GEARBOX BOOTS

Inspect both sides of gearbox boots as follows, and correct the defects if necessary.
1) (A) and (B) positions of gearbox boot are fitted correspondingly in (A) and (C) grooves of gearbox and the rod (C).
2) Clips are fitted outside of (A) and (B) positions of boot.
3) Boot does not have crack and hole.

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

NOTE:
Inspect or retighten them when engine is cold.