

GROUP 12

**ENGINE
LUBRICATION**

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GENERAL DESCRIPTION

M1121000100205

The lubrication method is a fully force-fed, full-flow filtration type.

ITEMS	2.4L ENGINE	3.0L ENGINE
Oil pump type	Involute gear type	Trochoid type
Drive method	Timing belt	Crankshaft

ENGINE OILS

⚠ WARNING

Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer. Adequate means of skin protection and washing facilities must be provided.

Recommended Precautions:

The most effective precaution is to adapt working practices which prevent, as far as practical, the risk of skin contact with mineral oils i.e. use enclosed systems for handling used engine oil and decrease components, where practical, before handling them.

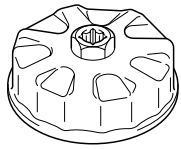
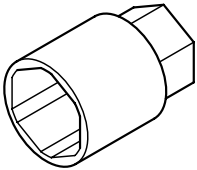
Other Precautions:

- Avoid prolonged and repeated contact with oil, particularly used engine oil.
- Wear protective clothing, including impervious gloves where practical.
- Avoid contaminating clothes, particularly under wear, with oil.
- Do not put oily rags in pockets.
- Do not wear heavily soiled clothing and oil-soaked foot-wear. Overalls must be cleaned regularly and kept separate from personal clothing.

- Where there is a risk of eye contact, eye protection should be worn i.e. chemical goggles or face shields. In addition, an eye wash facility should be provided.
- Obtain First Aid treatment immediately for open cuts and wounds.
- Wash regularly with soap and water to ensure all oil is removed, especially before meals (skin cleansers and nail brushes will help). After cleaning, apply lotion, etc., containing lanolin to replace natural skin oils is advised.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Apply barrier creams before each work period to help clean the skin after work.
- If skin disorders develop, obtain medical advice immediately.

SPECIAL TOOLS

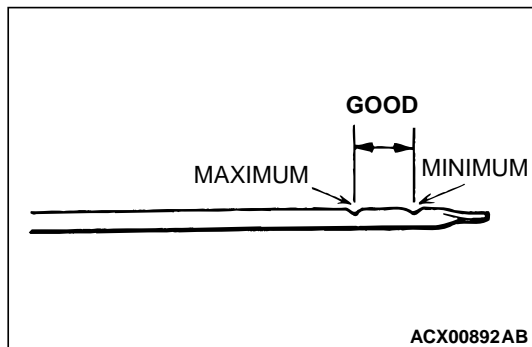
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TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 B991396	MB991396 Oil filter wrench	–	Removal and installation of engine oil filter (when using the oil filter of MD360935, MD325714, MD332687 and MD365876) <2.4L Engine>
	MD998054 Oil pressure switch wrench	–	Removal and installation of oil pressure switch

ON-VEHICLE SERVICE

ENGINE OIL CHECK

M1121000900193



1. Pull out the oil dipstick slowly and check that the oil level is within the marks on the oil dipstick.
2. Check that the oil is not excessively dirty, that there is no coolant or gasoline mixed in, and that it is sufficiently thick and slippery.

ENGINE OIL REPLACEMENT

M1121001000201

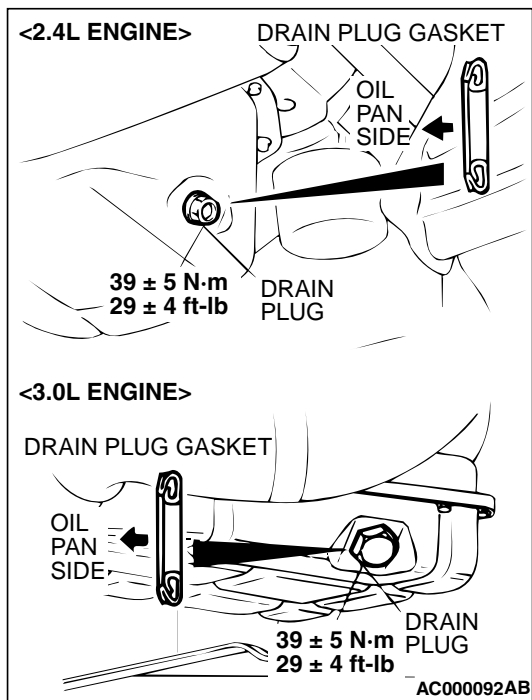
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C (176°F) to 90°C (194°F).
2. Remove the engine oil filler cap.

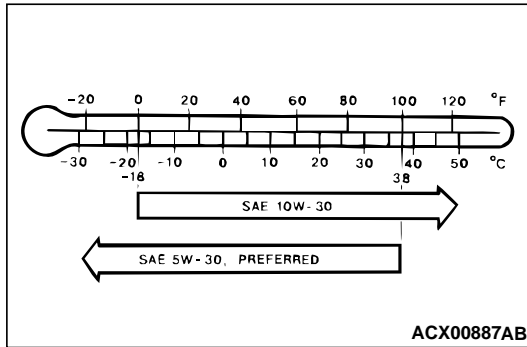
⚠ WARNING

Use care as oil could be hot.

3. Remove the drain plug to drain oil.
4. Install a new drain plug gasket so that it faces in the direction shown in the illustration, and then tighten the drain plug to the specified torque.

Tightening torque: 39 ± 5 N·m (29 ± 4 ft-lb)





5. Refill the specified quantity of oil.

Specified Engine Oil: Engine oil displaying ILSAC certification mark ("Starburst" symbol) conforming the API classification SJ EC or SJ/CD EC

Total quantity (Includes volume inside oil filter): 4.3 dm³ (4.5 quarts)

6. Install the engine oil filler cap.
7. Check oil level.

ENGINE OIL FILTER REPLACEMENT

M1121001100220

Required Special Tool:

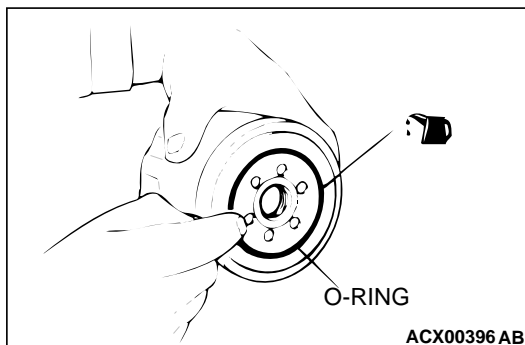
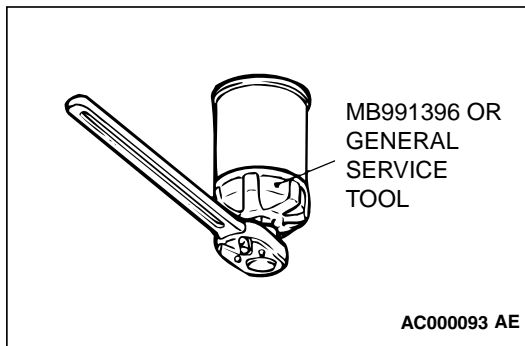
- MB991396 (When using the oil filter of MD360935, MD325717, MD332687 and MD365876): Oil Filter Wrench

1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C (176°F) to 90°C (194°F).
2. Remove the engine oil filler cap.

⚠ WARNING

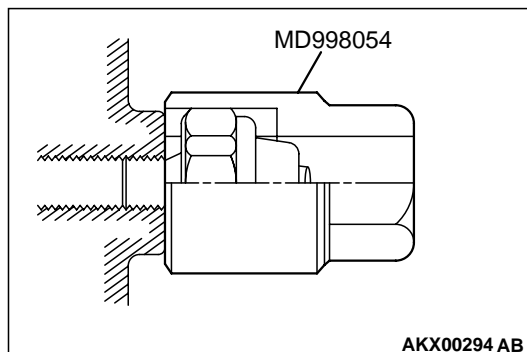
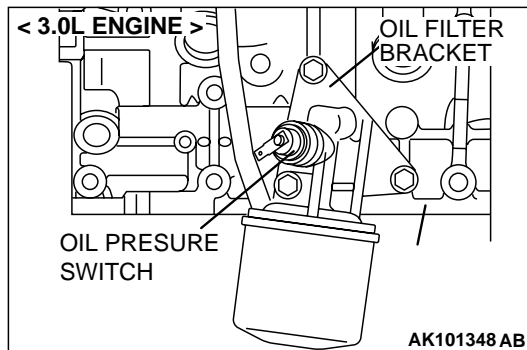
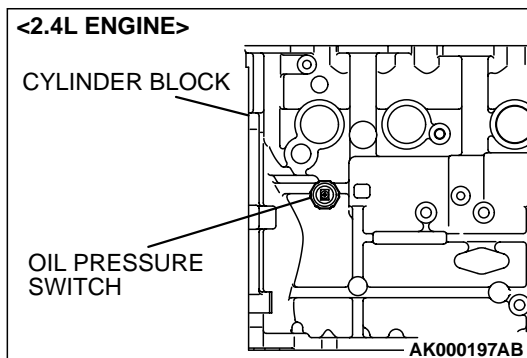
Use care as oil could be hot.

3. Remove the drain plug to drain oil.
4. Use the respective tool in the following table to remove the engine oil filter.
5. Clean the filter bracket side mounting surface and ensure the old O-ring has been removed.



6. Apply a small amount of engine oil to the O-ring of the new oil filter.
7. Once the O-ring of the oil filter is touching the flange, use the respective tool in the following table to tighten to the specified torque.
8. Install the drain plug and refill engine oil. (Refer to Engine Oil Replacement P.12-3.)
9. Race the engine a few times, and check to be sure that no engine oil leaks from the installation section of the oil filter.

NUMBER	ENGINE	SPECIAL TOOL	TIGHTENING TORQUE
MD360935	2.4L	MB991396 or equivalent	Approximately one turn [14 ± 2 N·m (124 ± 18 in-lb)]
MD325714, MD332687, MD365876		MB991396 or equivalent	Approximately 3/4 turn [16 ± 4 N·m (12 ± 3 ft-lb)]
MD136466, MD322508		General service tool	Approximately 3/4 turn [17 ± 3 N·m (13 ± 2 ft-lb)]
MD352626	3.0L	General service tool	Approximately 3/4 turn [14 ± 2 N·m (124 ± 18 in-lb)]



OIL PRESSURE CHECK

M1121002300197

Required Special Tool:

- MD998054: Oil Pressure Switch Wrench

1. Check engine oil quantity.
2. Remove the oil pressure switch terminal.

⚠ CAUTION

Since sealant is applied to the thread of the oil pressure switch, take care not to damage the oil pressure switch when removing it.

3. Use special tool MD998054 to remove the oil pressure switch.

4. Install the oil pressure gauge.

NOTE: Use a 1/8 pipe thread adapter.

5. Run the engine to warm it.

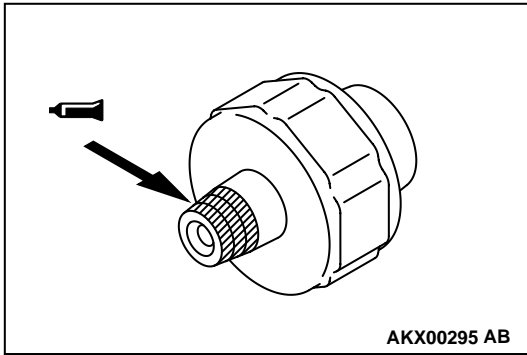
6. After the engine has been warmed up, check that oil pressure is within the standard value.

Standard value:

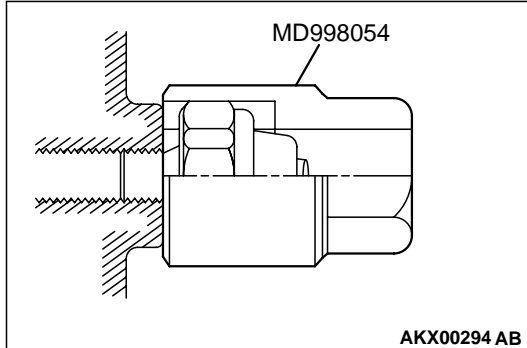
At idle: 29 kPa (4.2 psi) or more

At 3,500 r/min: 294 – 686 kPa (43 – 100 psi)

7. Remove the oil pressure gauge.



AKX00295 AB



AKX00294 AB

- Apply the specified sealant 3M™ AAD Part number 8672 or equivalent to thread of the oil pressure switch.

⚠ CAUTION

Do not start the engine within one hour after the engine oil pressure switch has been installed.

- Use special tool MD998054 to tighten the oil pressure switch to the specified torque.

Tightening torque:

<2.4L Engine> 19 ± 3 N·m (14 ± 2 ft-lb)

<3.0L Engine> 10 ± 2 N·m (87 ± 17 in-lb)

- Install the oil pressure switch terminal.

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

M1121002200178

ITEMS		SPECIFICATIONS
Engine oil filter	MD360935, MD352626	14 ± 2 N·m (124 ± 18 in-lb)
	MD325714, MD332687, MD365876	16 ± 4 N·m (12 ± 3 ft-lb)
	MD136466, MD322508	17 ± 3 N·m (13 ± 2 ft-lb)
Engine oil pan grain plug		39 ± 5 N·m (29 ± 4 ft-lb)
Oil pressure switch	2.4L Engine	19 ± 3 N·m (14 ± 2 ft-lb)
	3.0L Engine	10 ± 2 N·m (87 ± 17 in-lb)

SERVICE SPECIFICATIONS

M1121000300050

ITEM	STANDARD VALUE	
Oil pressure kPa (psi)	at idle	29 (4.2) or more
	at 3,500 r/min	294 – 686 (43 – 100)

SEALANT

M1121000500054

ITEM	SPECIFIED SEALANT
Oil pressure switch	3M™ AAD Part No. 8672 or equivalent

LUBRICANTS

M1121000400239

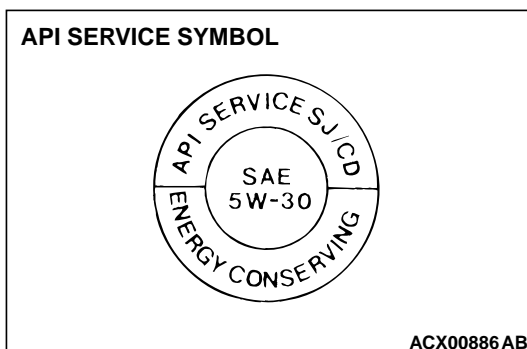
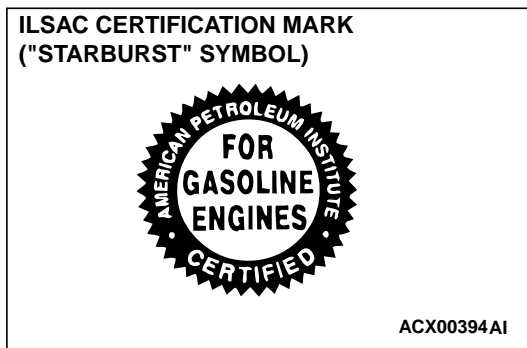
ITEMS	ENGINE OIL	QUANTITY dm ³ (qt)
Oil filter	Engine oil displaying ILSAC certification mark ("Starburst" symbol) conforming the	0.3 (0.32)
Total quantity	API classification SJ EC or SJ/CD EC	4.3 (4.5)

ENGINE OIL

⚠ CAUTION

Never use nondetergent or straight mineral oil. Oil Identification Symbol

Use only engine oils displaying the ILSAC certification mark ("Starburst" symbol) on the container.



If these oils are not available, an API classification SJ EC or SJ/CD EC can be used.

NOTES