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**GROUP 12****ENGINE  
LUBRICATION****CONTENTS**

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## GENERAL INFORMATION

M1121000100090

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, 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**

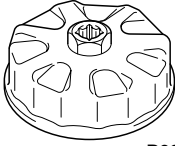
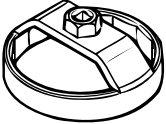
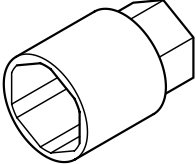
The most effective precaution is to adapt working practices which prevent, as far as practicable, the risk of skin contact with mineral oils. For example; Use enclosed systems for handling used engine oil and decrease components, where practicable, before handling them.

Other precautions:

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Avoid contaminating clothes with oil.
- Do not put oily rags in pockets.
- Do not wear heavily soiled clothing and oil-impregnated foot wear. Work clothing must be cleaned regularly and kept separate from personal clothing.
- Where there is a risk of eye contact, eye protection should be worn. For example; 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, the application of preparations containing lanolin to replace the natural skin oils is advised.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin after work.
- If skin disorders develop, obtain medical advice immediately.

## SPECIAL TOOLS

M1121000600084

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>
 MB991610	MB991610 Oil filter wrench	—	Removal and installation of engine oil filter (when using the oil filter of MD352626) <3.0L Engine>
	MD998054 Oil pressure switch wrench	—	Removal and installation of oil pressure switch

## ON-VEHICLE SERVICE

### ENGINE OIL CHECK

M1121000900063

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 has sufficient viscosity.

### ENGINE OIL REPLACEMENT

M1121001000074

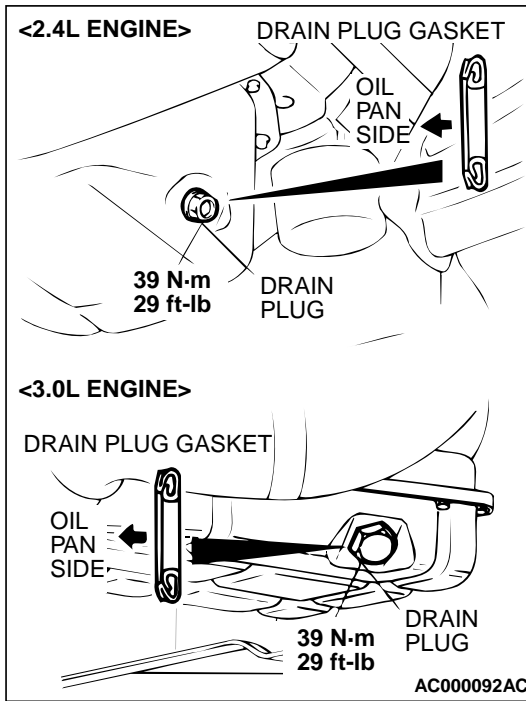
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C (176°F) to 90°C (194°F).

2. Remove the engine oil filler cap.

**⚠ WARNING**

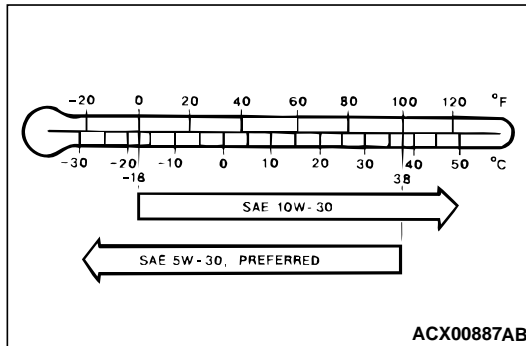
***Use care as oil could be hot.***

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 N·m (29 ft-lb)**



5. Refill the specified quantity of oil.

**Specified Engine Oil (API classification): SJ or higher**  
**Total quantity (Includes volume inside oil filter): 4.3 dm<sup>3</sup> (4.5 quarts)**

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

## ENGINE OIL FILTER REPLACEMENT

M1121001100071

### Required Special Tools:

- MB991396 (When using the oil filter of MD360935, MD325717, MD332687 and MD365876): Oil Filter Wrench
- MB991610 (When using the oil filter of MD135737): Oil Filter Wrench

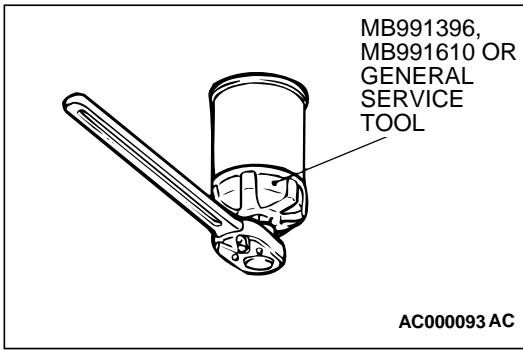
1. Start the engine and allow it to warm up until the temperature of the coolant reaches 80°C (176°F) to 90°C (194°F).

2. Remove the engine oil filler cap.

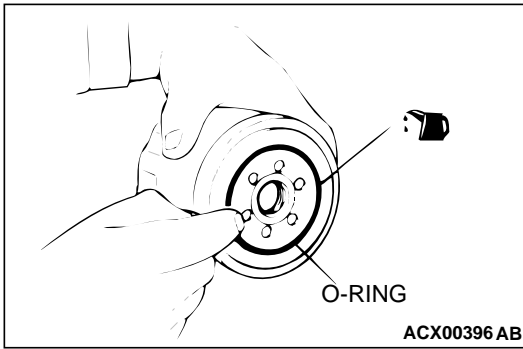
**⚠ WARNING**

**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.



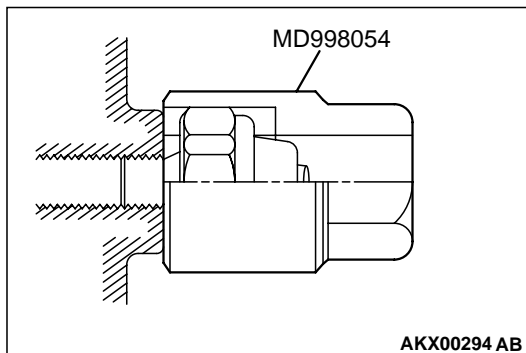
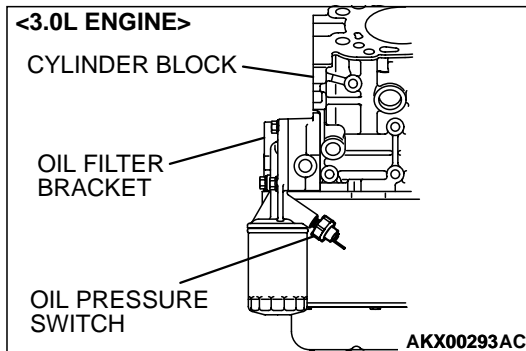
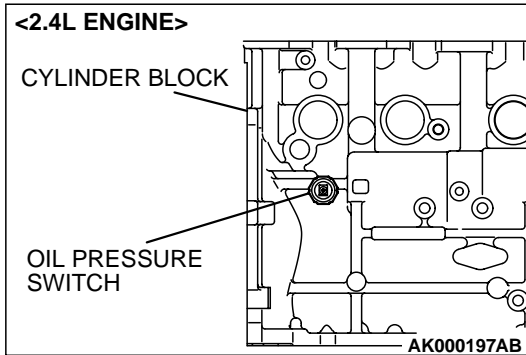
6. Apply a small amount of engine oil to the O-ring of the new oil filter.
7. Once the O-ring of the oil filter is touching the flange, use the respective tool in the following table to tighten to the specified torque.
8. Install the drain plug and refill engine oil. (Refer to Engine Oil Replacement 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 N·m (124 in-lb)]
MD325714, MD332687, MD365876		MB991396 or equivalent	Approximately 3/4 turn [16 N·m (11.6 ft-lb)]
MD136466, MD322508		General service tool	Approximately 3/4 turn [17 N·m (12.5 ft-lb)]
MD352626	3.0L	MB991610 or equivalent	Approximately 3/4 turn [14 N·m (124 in-lb)]

**OIL PRESSURE CHECK****Required Special Tool:**

MD998054:Oil Pressure Switch Wrench

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

**CAUTION**

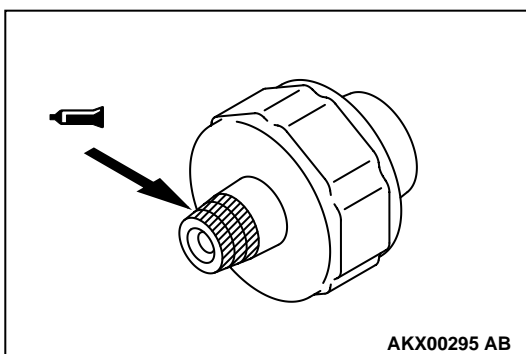
Since sealant is applied to the thread of the oil pressure switch, take care not to damage the oil pressure switch when removing it.

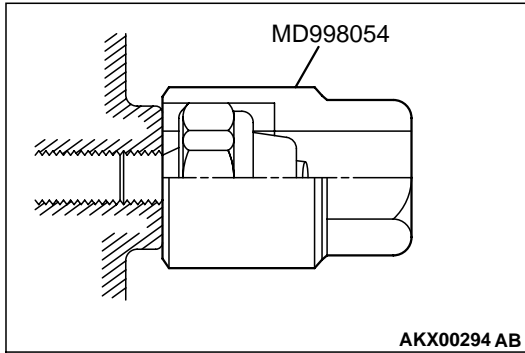
3. Use special tool MD998054 to remove the oil pressure switch.
4. Install the oil pressure gauge.
 

*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.
8. 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.

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

**Tightening torque:**

**19 N·m (14 ft-lb) <2.4L ENGINE>**

**9.8 N·m (87 in-lb) <3.0L ENGINE>**

10. Install the oil pressure switch terminal.

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

M1121002200060

ITEMS		SPECIFICATIONS
Engine oil filter	MD360935, MD352626	14 N·m (124 in-lb)
	MD325714, MD332687, MD365876	16 N·m (11.6 ft-lb)
	MD136466, MD322508	17 N·m (12.5 ft-lb)
Engine oil pan drain plug		39 N·m (29 ft-lb)
Oil pressure switch	2.4L Engine	19 N·m (14 ft-lb)
	3.0L Engine	9.8 N·m (87 in-lb)

### SERVICE SPECIFICATION

M1121000300027

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

### SEALANT

M1121000500021

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

### LUBRICANTS

M1121000400080

ITEMS	ENGINE OIL (API CLASSIFICATION)	QUANTITY dm <sup>3</sup> (qt)
Oil filter	SJ or higher	0.3 (0.32)
Total quantity		4.3 (4.5)

## ENGINE OIL

 CAUTION

Never use nondetergent or straight mineral oil.  
**Oil Identification Symbol**

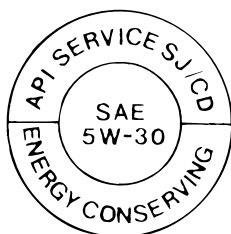
Use only engine oils displaying the ILSAC certification mark ("Starburst" symbol) on the container.

ILSAC CERTIFICATION MARK  
("STARBURST" SYMBOL)



ACX00394AI

API SERVICE SYMBOL



ACX00886AB

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