

**GROUP 12**

**ENGINE  
LUBRICATION**

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**GENERAL DESCRIPTION**

M1121000100595

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

ITEM		SPECIFICATION
Oil pump type	2.4L Engine	Involute gear type
	3.8L Engine	Trochoid type
Drive method		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**

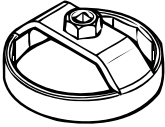
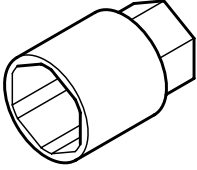
The most effective precaution is to prevent, as far as practical, the risk of skin contact with mineral oils i.e. use enclosed systems for handling used engine oil and degrease components, where practical, before handling them.

**OTHER PRECAUTIONS:**

- Avoid prolonged and repeated contact with oil, particularly used engine oil.
- Wear protective clothing, including impervious gloves where practical.
- Avoid contaminating clothes 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 (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.
- If skin disorders develop, obtain medical advice immediately.

## SPECIAL TOOLS

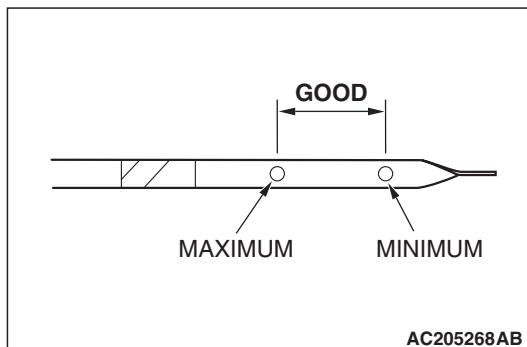
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TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 <p>MB991610</p>	MB991610 Oil filter wrench	General service tool	Removal and installation of engine oil filter (when using oil filter MD356000)
	MD998012 Engine oil pressure switch wrench	General service tool	Removal and installation of engine oil pressure switch

## ON-VEHICLE SERVICE

### ENGINE OIL CHECK

M1121000900557



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

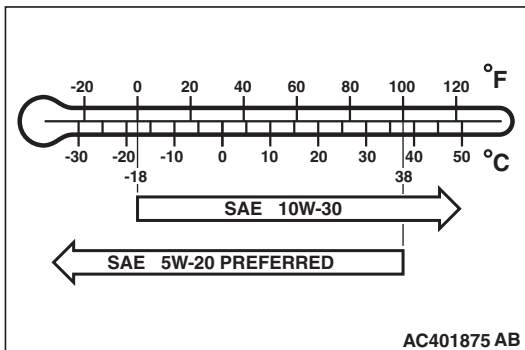
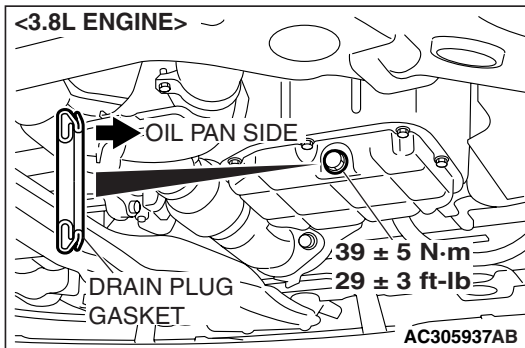
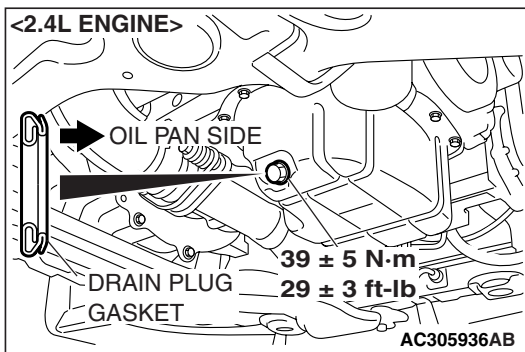
M1121001000803

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

**⚠ WARNING**

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

2. Remove the engine oil filler cap.
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 ± 3 ft-lb)**

5. Refill the specified quantity of oil.

**Specified Engine Oil: Engine oils displaying ILSAC certification symbol ("Starburst" symbol) or conforming to the API classification SL, SL/CF**

**Total quantity: 4.3 dm<sup>3</sup> (4.5 quarts)**

*NOTE: SAE 5W-20 engine oil is strongly recommended for optimum fuel economy and cold starting. If the ambient temperature is not within the usable temperature range of SAE 5W-20 shown in the above illustration, use SAE 10W-30 engine oil.*

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

## ENGINE OIL FILTER REPLACEMENT

M1121001100617

### Required Special Tool:

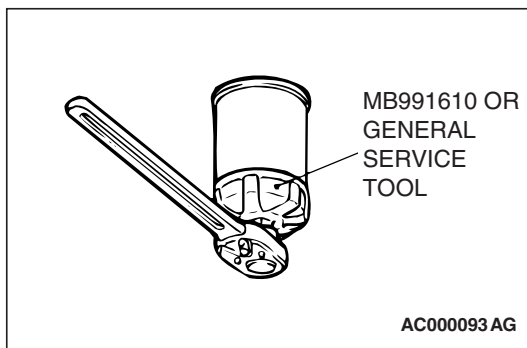
- MB991610: Oil Filter Wrench

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

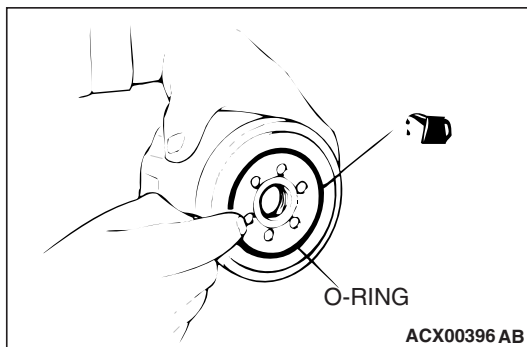
### **⚠ WARNING**

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

2. Remove the engine oil filler cap.
3. Remove the drain plug to drain oil.



4. Use an oil filter wrench 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. Screw on the oil filter by hand until it touches the surface of the flange and then tighten it with an oil filter wrench.

NUMBER	ENGINE	SPECIAL TOOL	TIGHTENING TORQUE
MD136466, MD322508	2.4L	General service tool	Approximately 3/4 turn [17 ± 3 N· m (13 ± 2 ft-lb)]
MD356000		MB991610 or equivalent	Approximately 3/4 turn [14 ± 2 N· m (124 ± 18 in-lb)]
MD321589, MD352627	3.8L	General service tool	Approximately one turn [14 ± 2 N· m (124 ± 18 in-lb)]

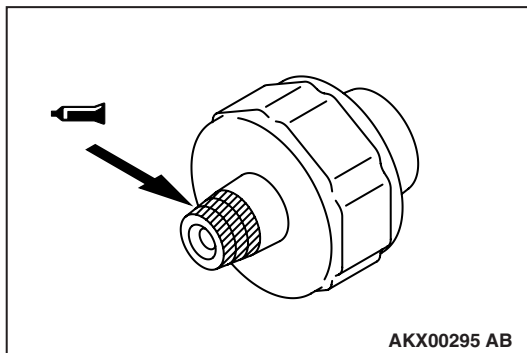
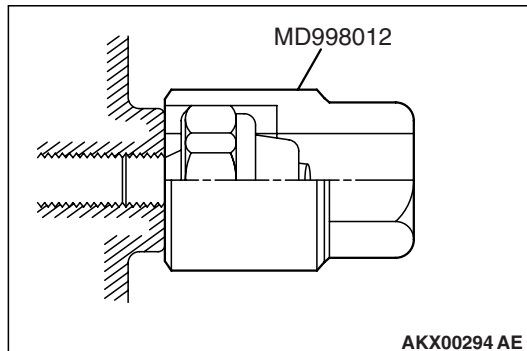
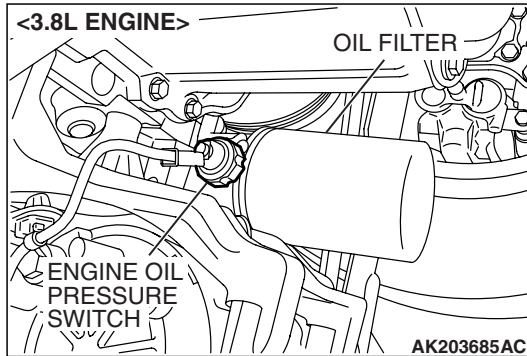
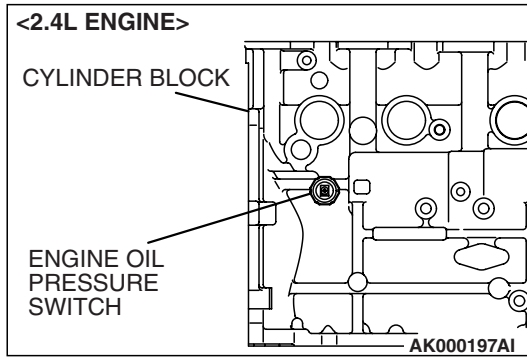
8. Install the drain plug and refill engine oil (Refer to Engine Oil Replacement [P.12-3](#)).
9. Rev the engine a few times, and check to be sure that no engine oil leaks at the oil filter.

**ENGINE OIL PRESSURE CHECK**

M1121002300722

**Required Special Tool:**  
MD998012: Engine Oil Pressure Switch Wrench

1. Check engine oil quantity.



**CAUTION**

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

2. Use special tool MD998012 to remove the engine oil pressure switch.

*NOTE: Remove the terminal of oil pressure switch where special tool MD998012 is not fitted.*

3. Install the engine oil pressure gauge.

*NOTE: Use a 1/8 pipe thread adapter.*

4. Run the engine to warm it.

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

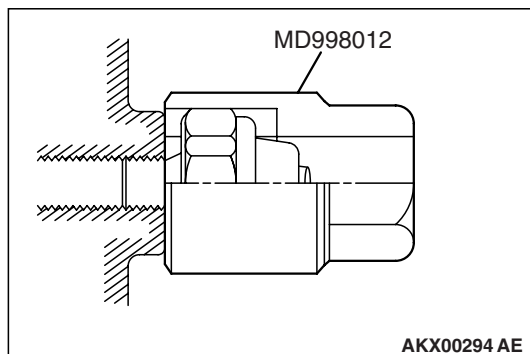
**Standard value:**

**At idle: 29 kPa (4.2 psi) or more**

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

6. Remove the engine oil pressure gauge.

7. Apply the specified sealant 3M™ AAD Part number 8672 or equivalent to the threads of the engine oil pressure switch.



**⚠ CAUTION**

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

8. Use special tool MD998012 to tighten the engine oil pressure switch to the specified torque.

**Tightening torque:**

<2.4L ENGINE>  $19 \pm 3 \text{ N} \cdot \text{m}$  ( $14 \pm 2 \text{ ft-lb}$ )

<3.8L ENGINE>  $10 \pm 2 \text{ N} \cdot \text{m}$  ( $87 \pm 17 \text{ in-lb}$ )

## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

M1121002200394

ITEM		SPECIFICATION
Engine oil filter	MD136466, MD322508	$17 \pm 3 \text{ N} \cdot \text{m}$ ( $13 \pm 2 \text{ ft-lb}$ )
	MD321589, MD352627, MD356000	$14 \pm 2 \text{ N} \cdot \text{m}$ ( $124 \pm 18 \text{ in-lb}$ )
Engine oil pan drain plug		$39 \pm 5 \text{ N} \cdot \text{m}$ ( $29 \pm 3 \text{ ft-lb}$ )
Engine oil pressure switch	2.4L Engine	$19 \pm 3 \text{ N} \cdot \text{m}$ ( $14 \pm 2 \text{ ft-lb}$ )
	3.8L Engine	$10 \pm 2 \text{ N} \cdot \text{m}$ ( $87 \pm 17 \text{ in-lb}$ )

### SERVICE SPECIFICATIONS

M1121000300339

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

### SEALANT

M1121000500344

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

### LUBRICANT

M1121000400808

ITEM	ENGINE OIL	QUANTITY $\text{dm}^3$ (qt)
Oil filter	Engine oils displaying ILSAC certification symbol ("Starburst" symbol) or conforming to the API classification SL, SL/CF	0.3 (0.32)
Total quantity		4.3 (4.5)

## ENGINE OIL

 CAUTION

**Never use nondetergent or straight mineral oil.**

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

ILSAC CERTIFICATION MARK  
("STARBURST" SYMBOL)



ACX00394 AI

API SERVICE SYMBOL



AC401876 AB

If these oils are not available, an API classification SL or SL/CF can be used.