

# SQRD4T20 LUBRICATION SYSTEM

<b>GENERAL INFORMATION</b>	<b>11-3</b>	Inspection	11-12
Components	11-3	Installation	11-13
Operation	11-4	<b>Oil Filter Seat</b>	<b>11-14</b>
Specifications	11-4	Removal	11-14
Tools	11-4	Installation	11-15
<b>DIAGNOSIS &amp; TESTING</b>	<b>11-6</b>	<b>Oil Pan</b>	<b>11-16</b>
Problem Symptoms Table	11-6	Removal	11-16
Engine Oil Level Inspection	11-7	Installation	11-17
Oil Pressure Inspection	11-8	<b>Oil Strainer</b>	<b>11-18</b>
<b>ON-VEHICLE SERVICE</b>	<b>11-9</b>	Removal	11-18
Engine Oil Replacement	11-9	Installation	11-18
Engine Oil Draining	11-9	<b>Oil Pump Assembly</b>	<b>11-19</b>
Engine Oil Adding	11-10	Removal	11-19
<b>Oil Filter</b>	<b>11-11</b>	Installation	11-19
Removal	11-11	<b>Oil Dipstick Tube Assembly</b>	<b>11-21</b>
Installation	11-11	Removal	11-21
<b>Oil Pressure Switch</b>	<b>11-12</b>	Installation	11-22
Removal	11-12		

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



11

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

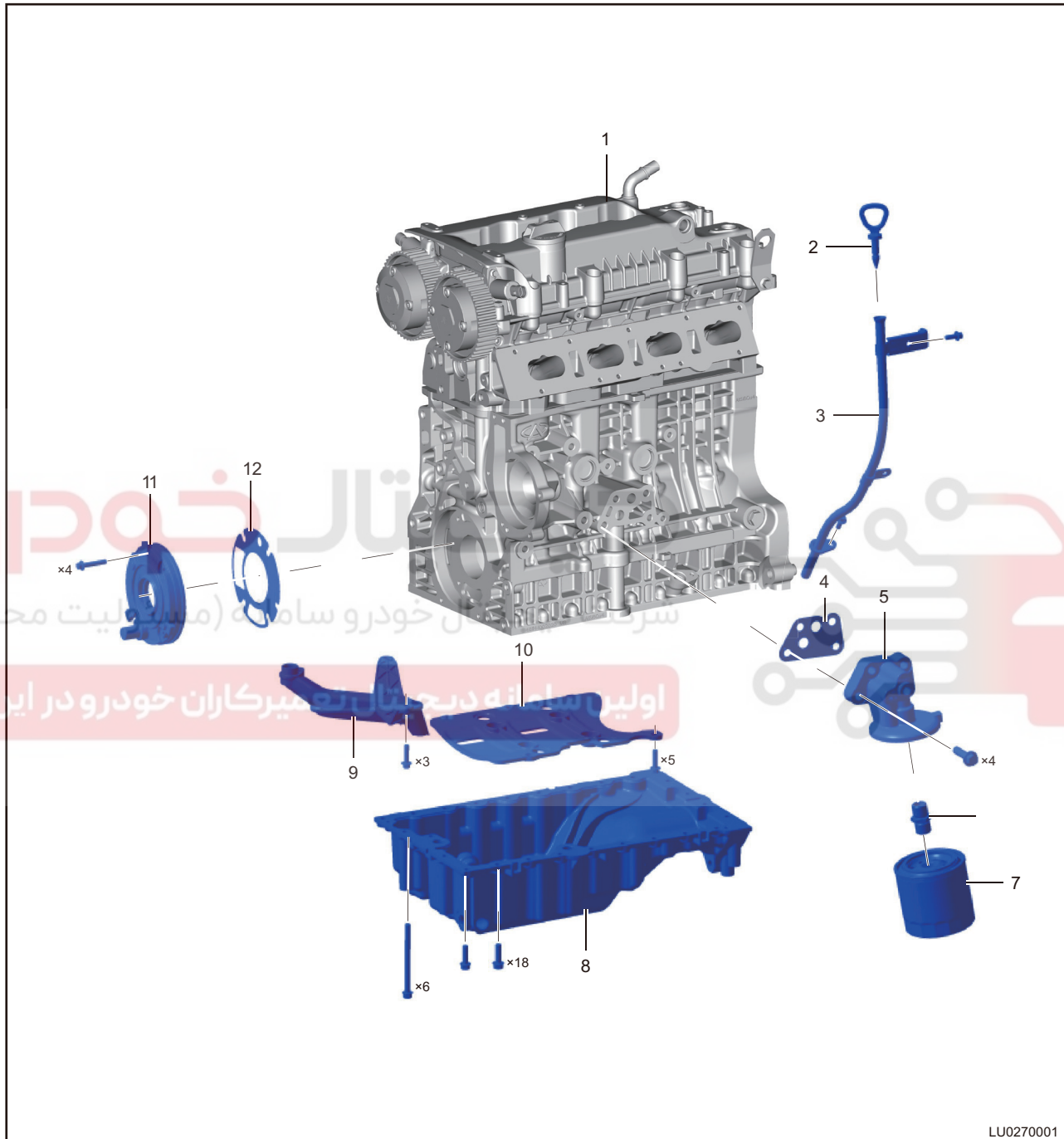
اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## GENERAL INFORMATION

### Components

#### Description



LU0270001

1 - Engine Assembly	2 - Oil Dipstick
3 - Oil Dipstick Tube	4 - Oil Filter Seat Washer
5 - Oil Filter Seat	6 - Oil Filter Union
7 - Oil Filter	8 - Oil Pan
9 - Oil Strainer	10 - Oil Deflector
11 - Oil Pump Assembly	12 - Oil Pump Gasket

## Operation

Function of lubrication system is that when engine is operating, oil pump driven by crankshaft, sucks oil from oil pan and filters it through an oil filter. This filtered oil then flows through oil passages, to friction surfaces of all drive parts and forms oil films between friction surfaces to achieve fluid friction and finally returns to the oil pan, thus reducing friction resistance between drive parts, power consumption, part wear and increasing reliability and durability of engine operation.

### Warning:

Prolonged and repeated contact with engine oil will result in the removal of natural oils from skin, leading to dryness, irritation and dermatitis. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Precautions should be followed when replacing engine oil to minimize the risk of your skin making contact with used engine oil:

- Wear protective clothing and gloves;
- Wash your skin thoroughly with soap and water, or use waterless hand cleaner to remove any used engine oil;
- Never use gasoline, thinners or solvents.

## Specifications

### System Pressures

Condition	Specified Value
Idling speed (650 ± 50 r/min)	60 KPa
High speed (2000 r/min)	160 KPa

11

### Oil

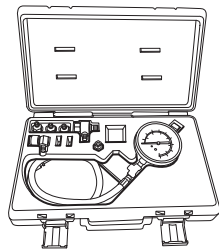
Engine Type	D4T20
Oil Capacity (L)	4.7 ± 0.2 L
Oil	SM SAE-5W-30, SM SAE-5W-40, SM SAE-10W-40

### Torque Specifications

Description	Torque (N·m)
Drain plug	35 ± 3
Oil Filter	22 - 25
Oil Pressure Switch	20 ± 2
Oil Pan Fixing Bolt	15 + 3
Oil Strainer Fixing Bolt	8 + 3
Oil Filter Seat Assembly Fixing Bolt	40 + 5
Oil Filter Union	50 + 5
Oil Pump Fixing Bolt	8 + 3
Oil Dipstick Tube Fixing Bolt	8 + 3

## Tools

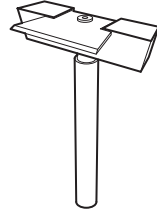
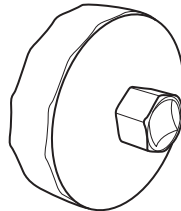
### General Tool

Oil Pressure Tester	
---------------------	---

006



## Special Tool

Oil Pan Remover and Scraper	 056
Oil Filter Remover	 054

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## DIAGNOSIS & TESTING

### Problem Symptoms Table

#### Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Suspected Area
Low pressure in lubrication system	Oil pan (dirty, leaked)
	Oil strainer (mesh dirty, blocked)
	Oil pump
	Line (blocked)
High oil consumption	Engine oil (excessive oil filling capacity)
	Oil filter module (leaked)
	Crankshaft front oil seal (damaged)
	Crankshaft rear oil seal (damaged)
	Oil Pressure Switch
	Oil drain plug (leaked)
	Oil pan (leaked)
	Engine oil leakage (cylinder head gasket damaged)
	Each engine seal surface leakage
Oil pressure warning light comes on	Engine oil (insufficient oil, low oil viscosity)
	Oil filter element (blocked)
	Oil strainer (blocked)
	Crankshaft front oil seal (damaged)
	Crankshaft rear oil seal (damaged)
	Oil pressure switch (damaged)
	Instrument cluster (oil pressure warning light)
	Cylinder block (cracks occur in water jacket, resulting in coolant leaking into oil pan, which will cause oil dilution)
	Line (blocked)
After engine cranked, engine produces clunk sound	Engine oil (high oil viscosity, excessive oil filling capacity)
	Cylinder block (oil passage blocked)

## Engine Oil Level Inspection

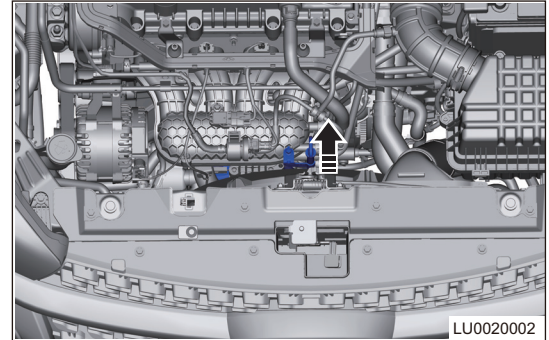
### Hint:

Check oil level indicated by oil dipstick, when engine is stopped under operating temperature.

1. Park vehicle on level ground, stop the engine after warming up and wait for 5 minutes.
2. Open the hood and pull out the oil dipstick in the direction of arrow as shown in the illustration, and wipe it clean with a piece of cloth.

### Caution:

- Please put a piece of cloth under the oil dipstick end to prevent oil from splashing onto engine or body.

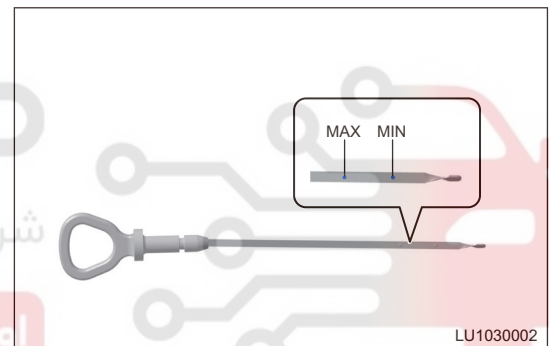


3. Reinsert the oil dipstick to place and leave it for 3 s to 5 s.
4. Pull out the oil dipstick again and check if oil level is proper.

### Hint:

If engine oil level is too low, check for leakage and add oil up to the full level mark.

- (a) If oil level is at or above the "MAX" mark, drain the excessive engine oil.
- (b) If oil level is between "MIN" mark and "MAX" mark, it shows that oil level is proper.
- (c) If oil level is below the "MIN" mark, it is necessary to add engine oil.



### Caution:

- When adding engine oil, oil level should not be above the "MAX" mark.
- Do not start the engine while measurement.

## Oil Pressure Inspection

### Preconditions

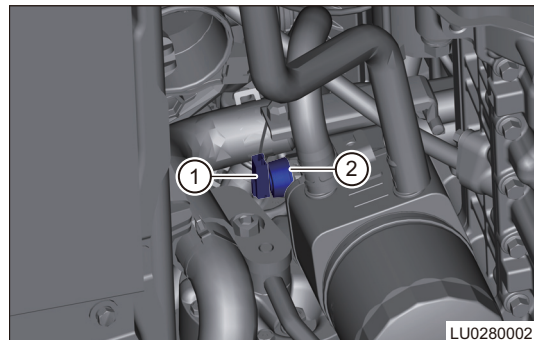
1. Engine oil level is normal.
2. Oil filter is used within 5000 km.
3. Engine reaches the normal operating temperature.

### Inspection

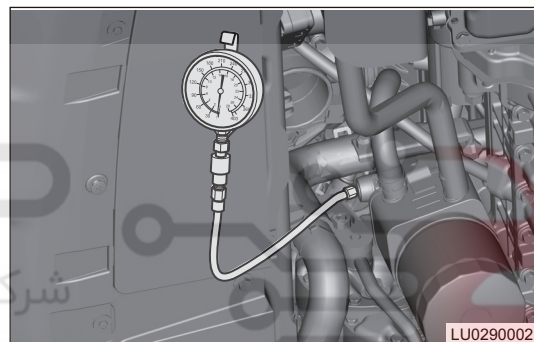
1. Disconnect the oil pressure switch connector (1) and remove the oil pressure switch (2).

#### Tightening Torque

$20 \pm 2 \text{ N}\cdot\text{m}$



2. Screw the oil pressure tester into threaded hole of oil pressure switch as shown in the illustration.



3. Start engine. When the engine inspection conditions are met, read the oil pressure values at idling speed and high speed respectively.

If lubrication system pressure is low, clean the oil pan and oil strainer mesh, and then test again. If lubrication system pressure is still low, it shows there is a malfunction in the oil pump and the oil pump must be replaced.

Oil pressure at idling speed ( $650 \pm 50 \text{ r/min}$ ): 60 KPa

Oil pressure at high speed ( $2000 \pm 50 \text{ r/min}$ ): 160 KPa

4. Install the oil pressure switch.

#### Hint:

Apply a small amount of seal gum to threads when installing the oil pressure switch.

5. Connect the oil pressure switch connector and check engine oil for leakage.

## ON-VEHICLE SERVICE

### Engine Oil Replacement

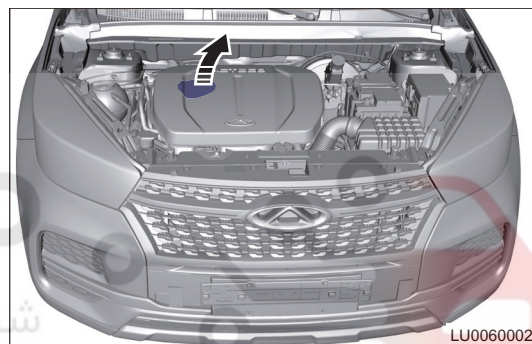
#### Engine Oil Draining

##### Warning/Caution/Hint

###### Warning:

- DO NOT drain engine oil until engine cools down.
- Prolonged and repeated contact with engine oil will result in the removal of natural oils from skin, leading to dryness, irritation and dermatitis. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Open the oil filler cap.
  - (a) Rotate oil filler cap counterclockwise to open it.



4. Raise vehicle to a proper position.
  - (a) Unscrew the drain plug (arrow), and drain the oil into a container.

###### Caution:

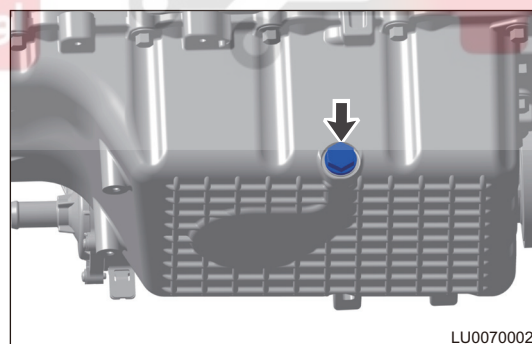
- Apply a certain pushing force to drain plug while loosening the plug by hand, and have the drain plug attached to thread tightly to prevent oil from overflowing in advance. Move away your hand quickly to prevent burn by oil with a certain temperature.
  - Wasted engine oil should be handled by specialized department according to local laws and regulations. Never discard it at will.
- (b) Wipe off the drain plug and tighten it.

###### Tightening torque

$35 \pm 3 \text{ N}\cdot\text{m}$

###### Caution:

- Drain bolt gasket must be replaced each time removing drain bolt.



## Engine Oil Adding

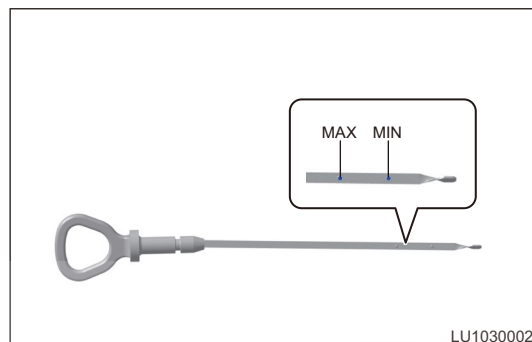
1. Only use engine oil that meets Chery specifications.

Engine Type	D4T20
Oil Capacity (L)	4.5 + 0.3
Oil	Summer: SAE 10W - 40 (SM grade or higher) Winter: SAE 5W - 40 (SM grade or higher)

### Caution:

- DO NOT use inferior engine oil.
- DO NOT mix different types of engine oil.
- Be careful not to spill oil on any part of the engine when adding engine oil.

- (a) Add a proper amount of oil, and check that oil level is between "MIN" mark and "MAX" mark with oil dipstick.



- (b) Turn off the engine after running for 1 to 2 minutes, park vehicle on a level surface and wait for approximately 5 minutes. Check if oil level is between "MIN" mark and "MAX" mark. Refill oil if necessary.
- (c) Check the vehicle for leakage after replacing oil.



## Oil Filter Removal

### Warning/Caution/Hint

#### Warning:

- DO NOT remove oil filter element until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

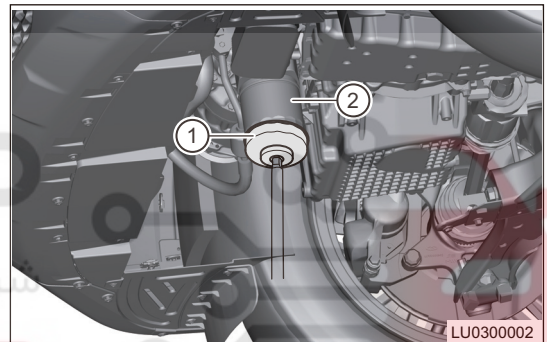
#### Caution:

- Use oil filter installer when replacing oil filter to avoid deformation.
1. Turn off all electrical equipment and the ignition switch.
  2. Disconnect the negative battery cable.
  3. Remove the engine chassis protector.
  4. Drain the engine oil ([See page 11-9](#)).
  5. Remove the oil filter element.

- (a) Use oil filter remover (1) to remove oil filter (2).

#### Tightening Torque

22 - 25 N·m



- (b) Remove the oil filter assembly.

#### Caution:

- The removed oil filter should be handled by specialized department according to local laws and regulations. Never discard it at will.

- (c) Retighten oil filter union.

#### Tightening Torque

50 + 5 N·m

## Installation

### Warning/Caution/Hint

#### Caution:

- Apply a coat of clean engine oil to oil filter grommet.
- Rotate oil filter by hand gently, and tighten oil filter washer until it fully contacts the oil filter seat.
- Use special tool to tighten oil filter.

#### Tightening torque

22 - 25 N·m

- It is necessary to clean oil left on component after installing oil filter.
1. Installation is in the reverse order of removal.

## Oil Pressure Switch

### Removal

#### Warning/Caution/Hint

##### Caution:

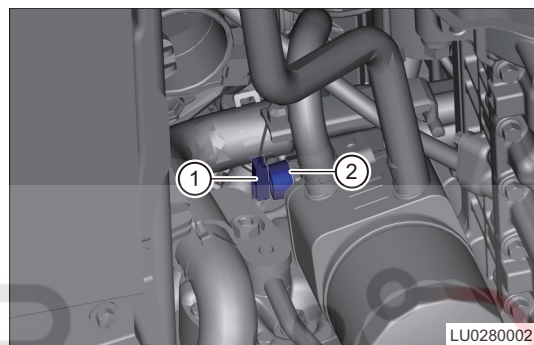
- DO NOT remove oil pressure switch until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the oil pressure switch.

- (a) Disconnect the oil pressure switch connector (1) and remove the oil pressure switch (2).

##### Tightening Torque

$20 \pm 2 \text{ N}\cdot\text{m}$



11

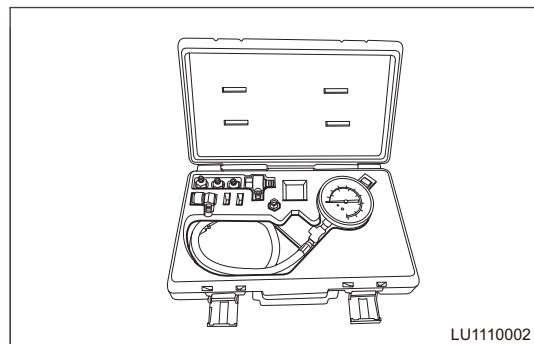
### Inspection

#### Warning/Caution/Hint

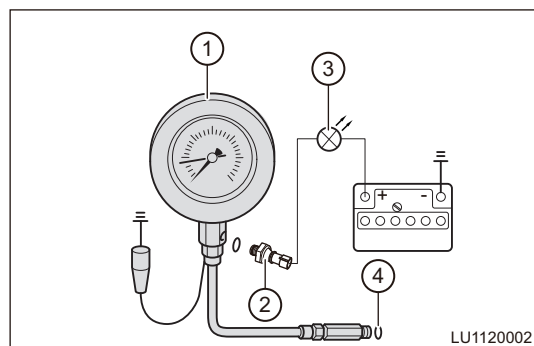
##### Caution:

- Before inspecting oil pressure switch, please make sure that oil level is proper and coolant temperature is above 90°C, and oil filter is used within 5000 Km.

1. Inspect the oil pressure switch.
  - (a) Use an oil pressure tester as shown in the illustration.



- (b) Install the oil pressure tester into the threaded hole (4) of oil pressure switch as shown in the illustration.
- (c) Install the oil pressure switch (2) onto the tester (1) and connect the LED lamp (3).
- (d) LED (3) does not turn on when engine is not started. If it turns on, replace the oil pressure switch.
- (e) After starting engine, observe the pressure reading on tester. LED (3) turns on when oil pressure reaches 94 Kpa, if it does not turn on, replace the oil pressure switch.



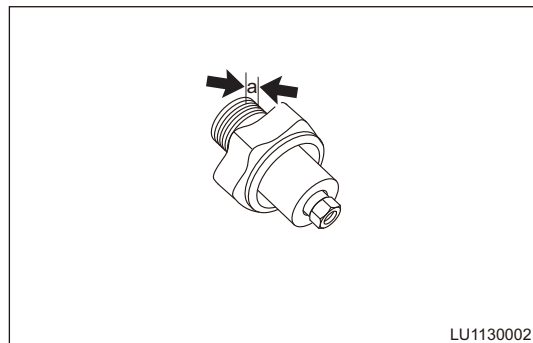


## Installation

1. Remove the oil and impurities on the oil pressure switch and its threaded hole.
2. Apply a small amount of seal gum to threads when installing the oil pressure switch.
  - (a) Use a torque wrench to tighten it to specified torque, as shown in illustration, there is a gap (a) about 2 to 5 mm between oil pressure switch flange surface and oil filter module housing.

### Tightening Torque

$20 \pm 2 \text{ N}\cdot\text{m}$



3. Other installation procedures are in the reverse order of removal.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## Oil Filter Seat Removal

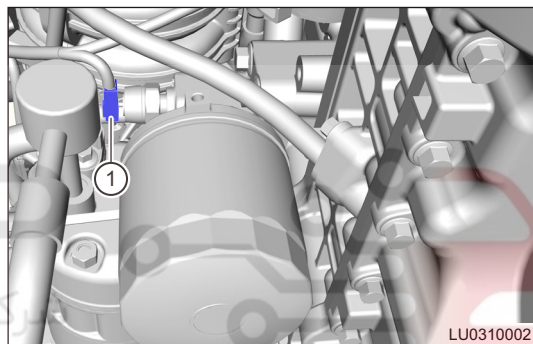
### Warning/Caution/Hint

#### Warning:

- DO NOT remove oil filter module assembly until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Drain the oil ([See page 11-9](#)).
5. Remove the oil filter assembly ([See page 11-11](#)).
6. Remove the oil pressure switch assembly.

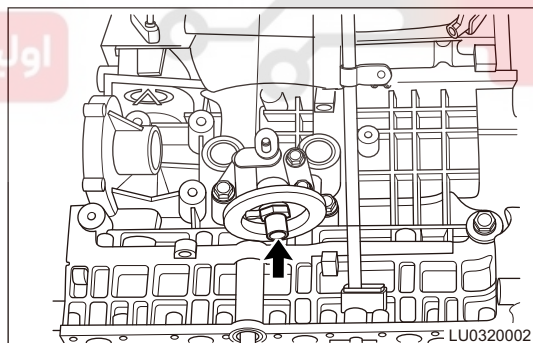
(a) Disconnect the oil pressure switch connector (1).



(b) Remove the oil filter union (arrow).

#### Tightening Torque

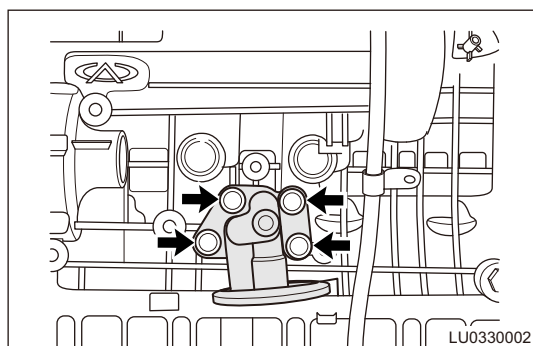
50 + 5 N·m



(c) Remove 4 fixing bolts from oil filter seat.

#### Tightening Torque

40 + 5 N·m



(d) Remove the oil filter seat assembly.

## Installation

### Warning/Caution/Hint

#### Caution:

- Clean installation surface of oil filter seat assembly.
  - Check if oil filter seat assembly washer is installed to correct position.
  - Check if oil filter seat assembly washer is damaged. If so, replace the washer.
  - Add oil to specified level.
1. Installation is in the reverse order of removal.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## Oil Pan Removal

### Warning/Caution/Hint

#### Caution:

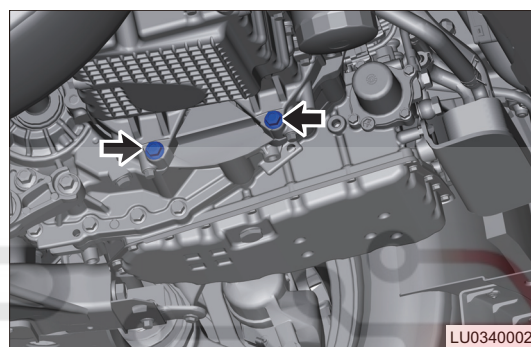
- DO NOT drain oil and remove oil pan until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service. DO NOT remove oil pan until engine cools down.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Drain the engine oil ([See page 11-9](#)).
4. Remove the oil pan assembly.

- (a) Remove 2 coupling bolts (arrow) between oil pan and transmission case, and remove transmission case dust deflector.

#### Tightening Torque

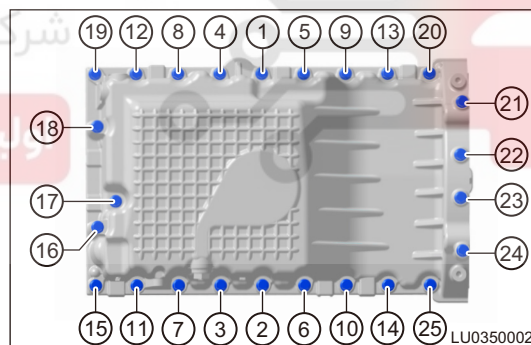
$50 \pm 5 \text{ N}\cdot\text{m}$



- (b) Remove 25 fixing bolts from oil pan in order as shown in illustration.

#### Tightening Torque

$15 + 3 \text{ N}\cdot\text{m}$



- (c) Tap all around oil pan slightly with a rubber hammer, remove oil pan.

#### Caution:

- Because the seal gum is sealed between oil pan and cylinder block frame, never use hard objects, such as a hammer, to tap it during removal, but it can be tapped slowly from left and right with a rubber hammer.
  - A transmission carrier can be used to support the oil pan during removal, to prevent personal injury from sudden dropping of oil pan.
  - DO NOT damage or miss dowel pin when removing oil pan.
- (d) Remove the residual seal gum on oil pan and engine frame with flat scraper.

#### Caution:

- When removing seal gum on installation surface between oil pan and engine frame, threaded hole can be cleaned with detergent properly.

## Installation

### Warning/Caution/Hint

#### Caution:

- When applying seal gum, check the type and expiration date of seal gum.
- Remove impurities, iron chips and residue of seal gum on oil pan.
- Remove oil stain and residue of seal gum on the threaded hole of oil pan and cylinder block.
- Seal gum should not be applied too thick; otherwise it will overflow into oil pan due to squeezing, which will block the oil strainer.
- DO NOT add engine oil until seal gum becomes dry after installing oil pan.

#### 1. Install the oil pan assembly.

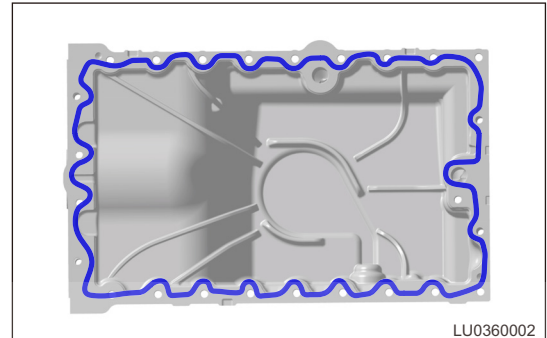
- (a) As shown in illustration, apply seal gum evenly to oil pan installation surface.

#### Recommended seal gum

Loctite 5900H

#### Seal gum line diameter

1.5 - 3 mm

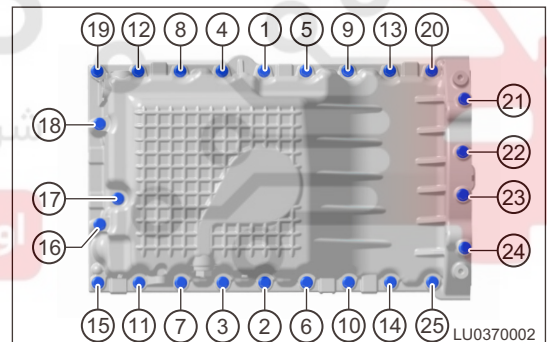


- (b) Align oil pan with frame dowel pin, assemble oil pan and tap it slightly to fit it with frame closely.

- (c) As shown in illustration, pre-tighten oil pan fixing bolts until oil pan is pressed tightly, then tighten bolts in order.

#### Tightening Torque

15 + 3 N·m



#### 2. Other installation procedures are in the reverse order of removal.

## Oil Strainer

### Removal

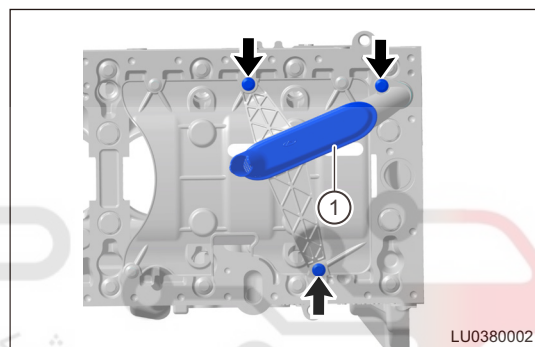
#### Warning/Caution/Hint

##### Caution:

- DO NOT drain engine oil and remove oil pan until engine cools down.
  - Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.
1. Turn off all electrical equipment and the ignition switch.
  2. Disconnect the negative battery cable.
  3. Drain the engine oil (See page 11-9).
  4. Remove the oil pan assembly (See page 11-16).
  5. Remove the oil strainer.
    - (a) Remove 3 oil strainer fixing bolts (arrow).

##### Tightening Torque

8 + 3 N·m



- (b) Remove the oil strainer assembly (1).

### Installation

#### Warning/Caution/Hint

##### Caution:

- Before installing oil strainer, check oil strainer grommet for damage or deterioration. If there is damage or deterioration, replace the grommet.
1. Installation is in the reverse order of removal.



## Oil Pump Assembly Removal

### Warning/Caution/Hint

#### Warning:

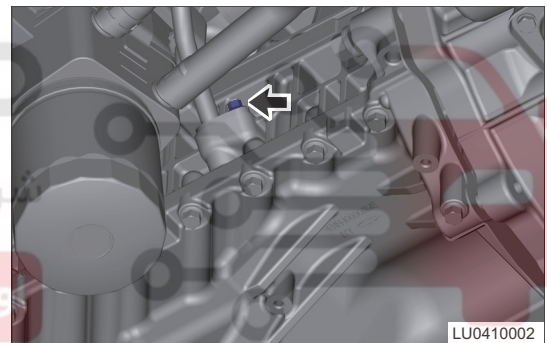
- DO NOT drain engine oil until engine cools down.
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Drain the engine oil (See page 11-9).
4. Remove the accessory drive belt.
5. Remove the front right wheel (See page 20-8).
6. Remove the timing belt assembly (See page 05-30).
7. Remove the crankshaft eccentric gear (See page 05-22).
8. Remove the crankshaft front oil seal (See page 05-22).
9. Remove the oil pump assembly

- (a) Remove 4 oil pump fixing bolts (arrow).

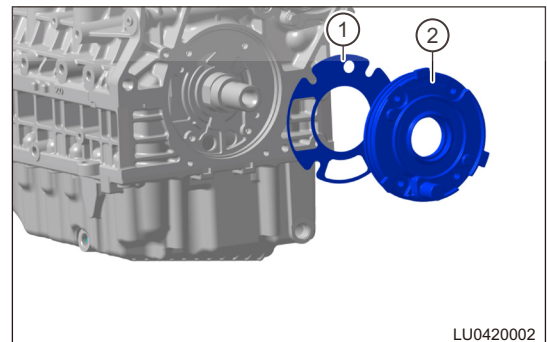
#### Tightening Torque

8 + 3 N·m in diagonal order



11

- (b) Remove oil pump assembly (2) and oil pump assembly gasket (1).



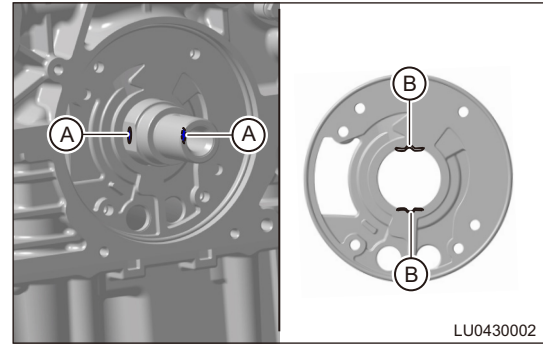
## Installation

### Warning/Caution/Hint

#### Warning:

- Wasted engine oil should be handled by specialized department according to local laws and regulations. Never discard it at will.
1. Replace oil pump washer and seal ring.
  2. Install the oil pump.

- (a) Adjust flat part (B) of rotor hole in oil pump manually to align it with flat part (A) of crankshaft driver.



- (b) Press oil pump into installation hole slowly and smoothly to fit it.  
(c) Apply appropriate seal gum to bottom of bolt flange evenly before installing oil pump assembly fixing bolts.

**Tightening Torque**

8 + 3 N·m in diagonal order

**Caution:**

- Apply a coat of lubricant to grommet outside oil pump for easy assembly and protection before installation.





## Oil Dipstick Tube Assembly Removal

### Warning/Caution/Hint

#### Warning:

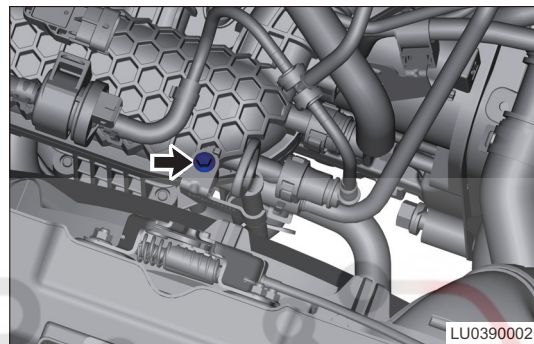
- Prolonged and repeated contact with engine oil will be harmful to your skin. If engine oil spills on your skin, wash it off immediately with water. In addition, the used engine oil contains potentially harmful contaminants, which may cause skin cancer. Therefore, always take proper skin protection measures when performing vehicle service.

1. Turn off all electrical equipment and the ignition switch.
2. Disconnect the negative battery cable.
3. Remove the engine trim cover.
4. Remove the oil tube assembly.

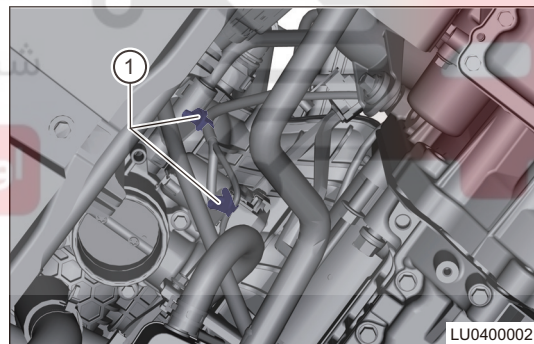
- (a) Remove coupling bolt (arrow) between oil dipstick tube and intake manifold assembly.

#### Tightening Torque

8 + 3 N·m



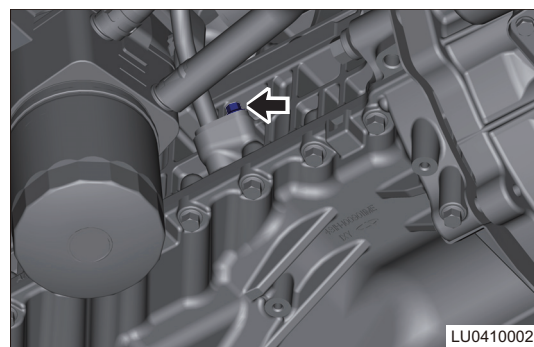
- (b) Disconnect the engine wire harness fixing clip (1).



- (c) Remove coupling bolt (arrow) between oil dipstick tube and engine frame assembly.

#### Tightening Torque

8 + 3 N·m



- (d) Remove the oil dipstick tube assembly.

## Installation

### Warning/Caution/Hint

#### Caution:

- Inspect O-ring before installation to make sure it is not damaged. Or replace it with a new one.
  - Apply small amount of lubricant to O-ring before assembling.
  - When inserting dipstick tube into frame installation hole, insert lower end along shaft line direction as possible. If it tilts, it may be difficult to install O-ring, even damage O-ring.
1. Installation is in the reverse order of removal.

