

0601 Clutch Device

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دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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1 General Information

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1.1 Important notes

- The clutch device is a control mechanism to transmit and separate power. It transfers the engine power output to the transaxle and realizes smooth power combination and temporary separation between the engine and the transmission, thus facilitating vehicle starting and stopping, gear shifting and other operations.
- The clutch is installed inside the clutch housing between the engine and the transaxle. The clutch assembly is fixed to the rear face of the flywheel with bolts, which is composed of a pressure plate and a friction disc.
- When the vehicle starts moving, the clutch disc gradually engages with the pressure plate. The engine power is transferred to the drive train via the friction between the clutch disc and the pressure plate to make the vehicle start moving smoothly.
- When the vehicle is moving, the driver can depress or release the clutch pedal as required to realize the temporary separation or gradual engagement of the engine and the transaxle, thus to cut off or transfer the power from the engine to the transaxle.
- When shifting gear, the clutch pressure plate may temporarily cut off the power transmission between the drive train and the engine, to reduce the impact and collision between gears and realize a smooth gear shifting.
- The hydraulic clutch system uses brake fluid which is irritating to the skin. If it contacts your skin, please rinse with water thoroughly at once.
- When removing and installing the transaxle assembly, you shall use the hydraulic jack to support the transaxle. In addition, two or more technicians are needed to assist the operation to ensure safety.
- Only use the brake fluid approved by Chery Automobile Co., Ltd..
- All bolts must be tightened with the specified tightening torque.
- The clutch device consists of the following components:
 - a. Clutch pedal
 - b. Clutch master cylinder
 - c. Clutch slave cylinder
 - d. Hydraulic clutch pipeline
 - e. Release bearing and release lever
 - f. Clutch disc
 - g. Clutch pressure plate
 - h. Flywheel

1.2 Product specifications

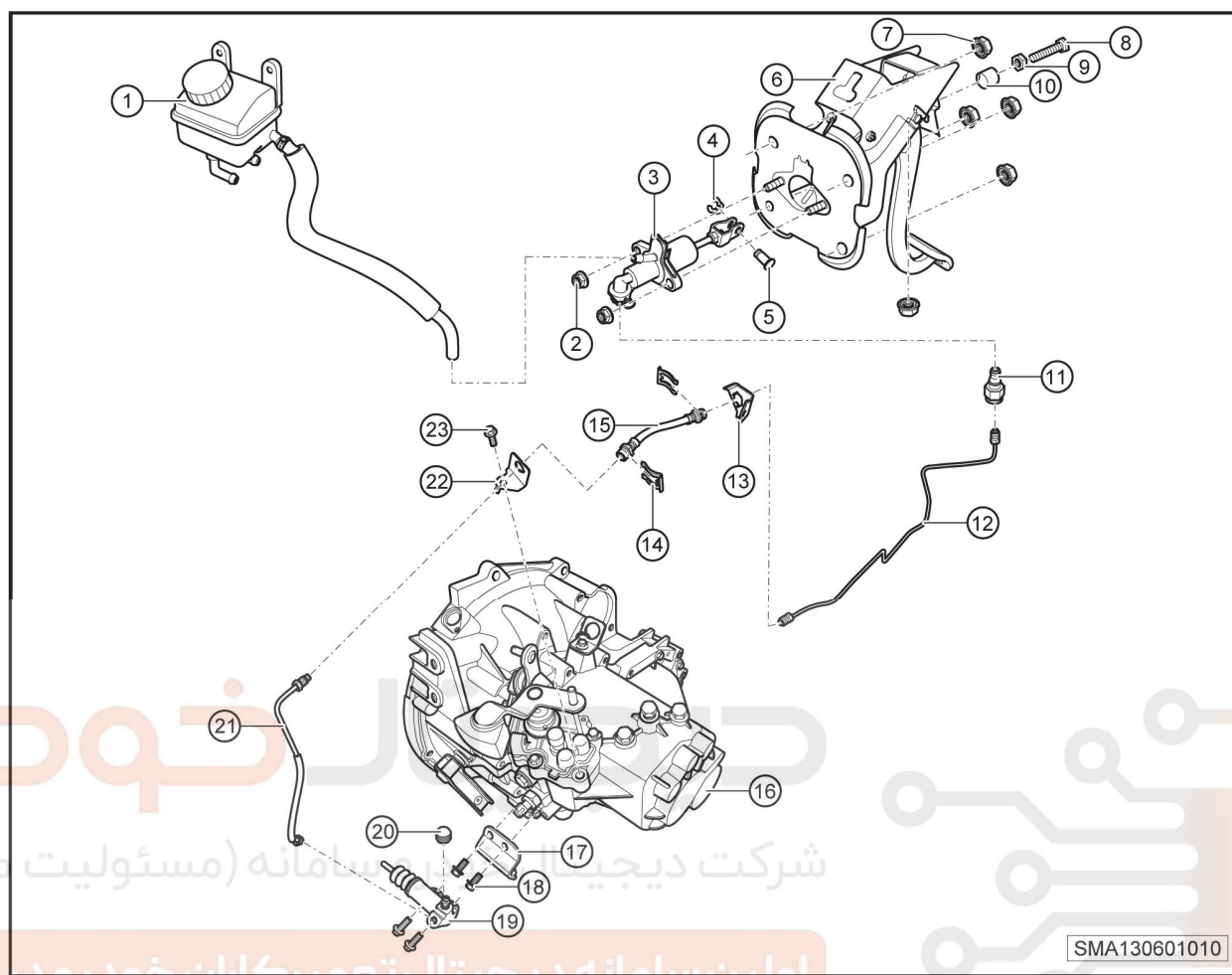
Torque specifications

Component	Torque (N•m)
Fixing bolt of the clutch pedal	25±3
Fixing bolt of the clutch master cylinder	10±1
Fixing bolt of the clutch slave cylinder	25±3
Fixing bolt of the clutch slave cylinder bracket	25±3
Fixing bolt of the clutch pressure plate	23±2
Fixing bolt of the flywheel	110±5
Pipe connector of the clutch system	16.5±2.5

Standard parameters of clutch components

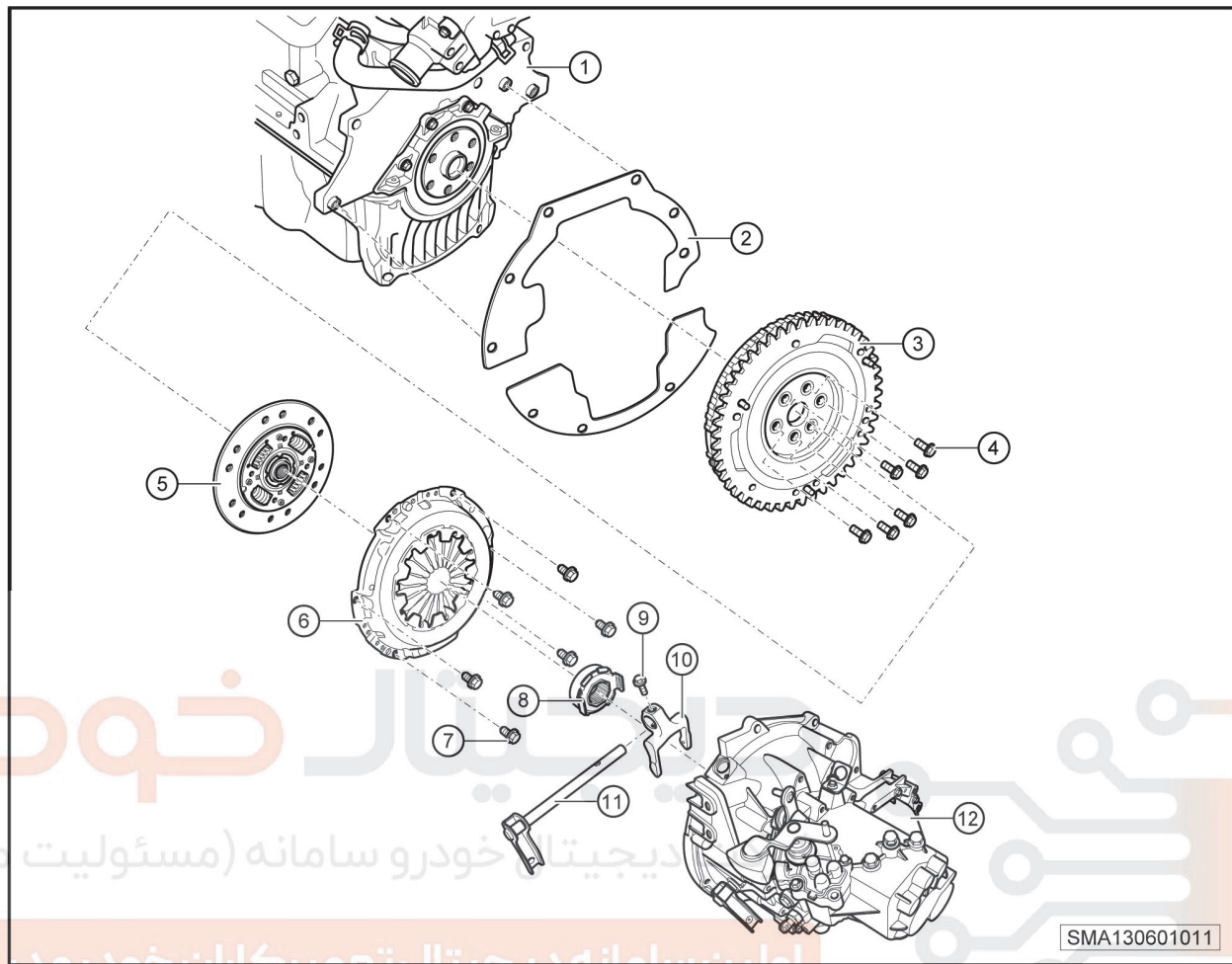
Component	Inspection item	Specification
Clutch pedal	Clutch pedal height	203.6±3 mm
	Standard clutch pedal travel	118±12 mm
	Free clearance	10±2 mm
	Pedal effort	138 N
Clutch disc	Outer diameter	228 mm
	Inner diameter	155 mm
Clutch pressure plate	Pressing force	>4500 N
	Separation force	<1480 N

1.3 The hydraulic control mechanism drawing



1. Reservoir	2. Fixing nut of the clutch master cylinder
3. Clutch master cylinder	4. Clamp spring
5. Dowel pin	6. Clutch pedal assembly
7. Fixing nut of the clutch pedal	8. Pedal height adjustment bolt
9. Pedal height adjustment nut	10. Adjustment bolt rubber sleeve
11. Quick connector	12. Pipe A
13. Mounting bracket A	14. Pipe fixing clamp spring
15. Hose	16. Transaxle assembly
17. Mounting bracket of the clutch slave cylinder	18. Fixing bolt of the slave cylinder bracket
19. Clutch slave cylinder	20. Sealing cap
21. Pipe B	22. Mounting bracket of the pipe B
23. Fixing bolt of the bracket B	

1.4 The clutch device drawing



1. Engine assembly	2. Clapboard
3. Flywheel	4. Fixing bolt of the flywheel
5. Friction disc	6. Clutch pressure plate
7. Fixing bolt of the pressure plate	8. Release bearing
9. Bracket fixing bolt	10. Release bearing bracket
11. Release lever	12. Transaxle assembly

2 Diagnosis and Inspection

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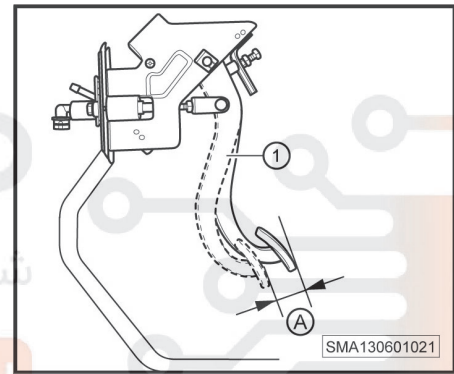
2.1 Checking the clutch pedal free clearance and travel

Caution

- If the clutch pedal travel does not meet the technical standard, it may lead to incomplete clutch separation, clutch slipping and other failures.
- If the inspection data of the following items do not meet the technical standard, you shall adjust the clutch pedal.

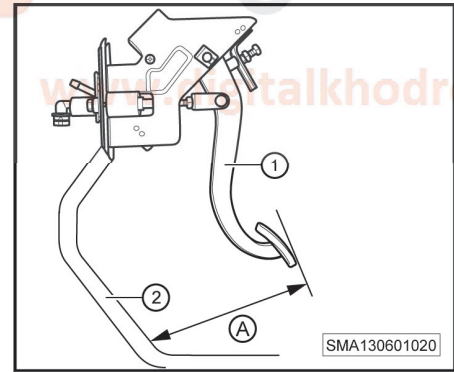
Checking the clutch pedal free clearance

1. Gently press the clutch pedal (-1-) by hand, and stop pressing when feeling the resistance; then test the distance (-A-) as the free clearance.
 - The free clearance: 10 ± 2 mm

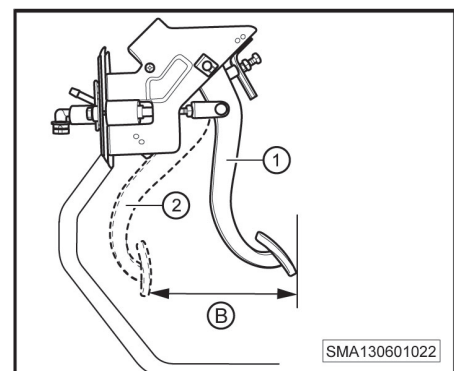


Checking the clutch pedal travel

1. The distance (-A-) between the clutch pedal (-1-) and the vehicle body (-2-) is the clutch pedal height.
 - The clutch pedal height: 203.6 ± 3 mm



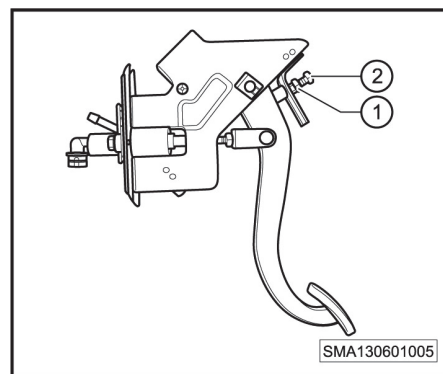
2. Record the original position of the clutch pedal (-1-) as a benchmark.
3. Press the clutch pedal to its limit position (-2-).
4. The distance (-B-) between the two positions is the clutch pedal travel.
 - The standard clutch pedal travel: 118 ± 12 mm



2.2 Adjusting the clutch pedal free clearance and travel

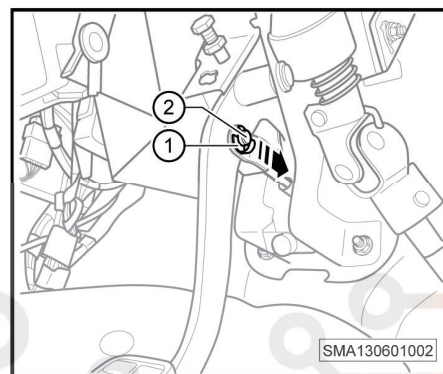
Adjusting the clutch pedal free clearance

1. Loosen the fixing nut (-1-), adjust the height of the bolt (-2-).
 - Tightening torque of the fixing nut: $10 \pm 2 \text{ N}\cdot\text{m}$
2. Check whether the clutch free clearance meets the standard; if not, please readjust.

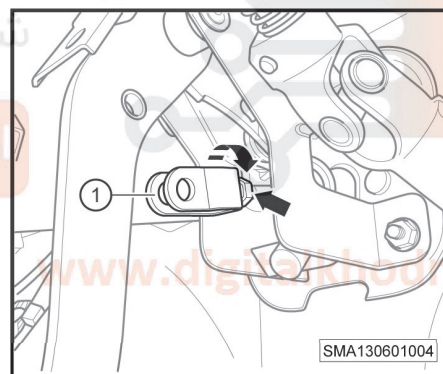


Adjusting the clutch pedal travel

1. Release the clamp spring (-1-) in the (-arrow-) direction.
2. Remove the dowel pin (-2-).

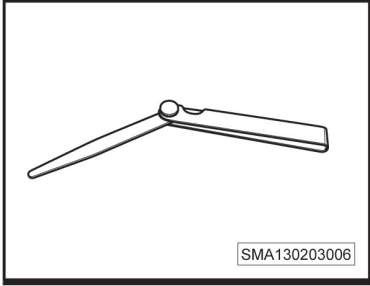
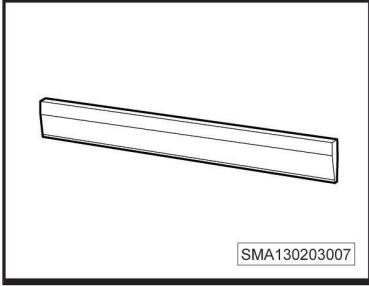


3. Loosen the fixing nut (-arrow-).
 - Tightening torque of the fixing nut: $12 \pm 2 \text{ N}\cdot\text{m}$
4. Loosen the clutch pedal mounting bracket (-1-) in the (-arrow-) direction and adjust the bracket distance.
5. After the adjustment, tighten the fixing nut and install the clutch pedal.
6. Check whether the pedal travel meets the standard; if not, please readjust.



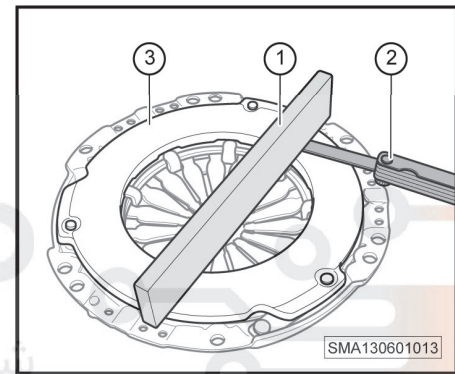
2.3 Checking the clutch pressure plate

Maintenance tools and common equipment

 SMA130203006	 SMA130203007
Clearance gauge	Ruler

Methods

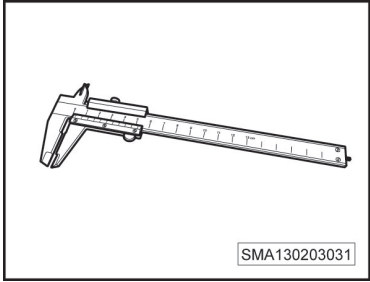
1. Place the ruler (-1-) on the contact surface (-3-) of the pressure plate and test the planeness of the pressure plate with the clearance gauge (-2-).
 - Standard planeness: $\leq 0.3 \text{ mm}$



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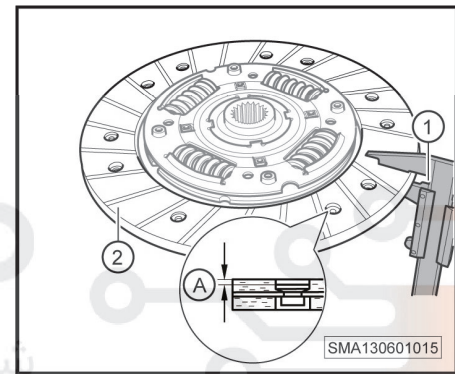
2.4 Checking the friction disc

Maintenance tools and common equipment

 SMA130203031	
Vernier	

Methods

1. Check the thickness of the friction disc (-2-) with the vernier (-1-).
 - Standard thickness: 7.3 ± 0.3 mm
2. Check the rivet's wear limit (-A-).
 - Wear limit: 0.8 mm



2.5 Clutch fault list

Condition	Cause	Troubleshooting
Incomplete clutch separation	Excessive free clearance, and inadequate separation travel	Check and adjust the clutch pedal travel
	Release bearing wear	Replace the release bearing
	Excessive wear of the clutch pressure plate and the diaphragm spring	Replace the pressure plate assembly
	Inadequate fluid or unwanted air in the hydraulic clutch system	Add fluid and discharge the air from the system
	Damage to the driven plate spline hole or the input shaft spline	Replace the driven plate or the input shaft
	Damage to the release bearing location bracket	Replace the location bracket
Clutch slipping	Too short clutch pedal free travel, and incorrect installation/adjustment of the release mechanism	Check and adjust the clutch pedal travel
	Exceeding the wear limit of clutch disc	Replace the clutch disc
	Fault of the pressure plate assembly, and fatigue of the diaphragm spring	Replace the pressure plate assembly
	Oil stain on the friction disc surface	Remove the oil stain, and check the input shaft oil seal for leakage
	Friction loss due to flywheel surface wear	Replace the flywheel
Heavy clutch operation	Blockage of the clutch pedal or incorrect installation	Check and reinstall the clutch pedal
	Air or impurities in the hydraulic clutch system	Replace the fluid and discharge the air from the system
Abnormal noise and vibration of the clutch	Inadequate oil or ablation noise in the release bearing	Replace the release bearing
	Damage to the internal gears of the transaxle	Check and replace the damaged gear
	Severe wear of the driven plate spline hole or the input shaft spline	Replace the driven plate or the input shaft
	Rugged pressure plate diaphragm, or damage of the diaphragm spring	Replace the pressure plate assembly
	Skewed installation of the pressure plate, deviating from the flywheel center	Reinstall the pressure plate

3 Clutch

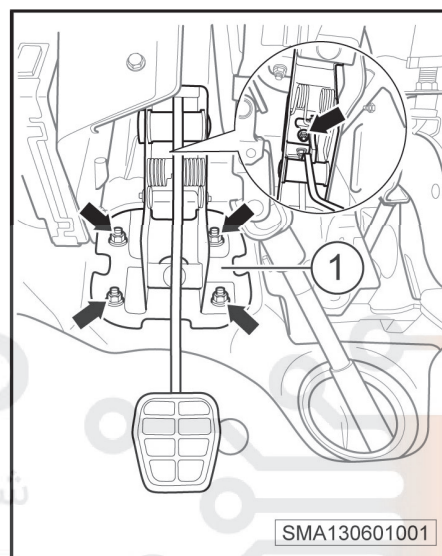
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3.1 Clutch release mechanism

3.1.1 Removing and installing the clutch pedal assembly

Removal

1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Remove the clutch master cylinder => refer to page 894.
3. Unscrew the fixing nuts of the clutch pedal (-arrow-).
 - Tightening torque of the nut: $25 \pm 3 \text{ N}\cdot\text{m}$
4. Remove the clutch pedal assembly (-1-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Checking the clutch pedal travel is required => refer to page 889.

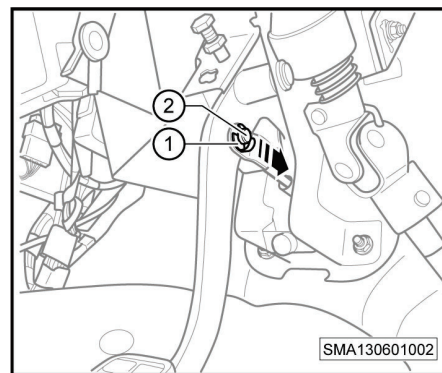
3.1.2 Removing and installing the clutch master cylinder

Caution

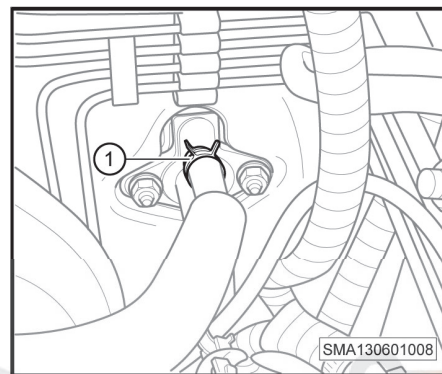
- The master cylinder contains brake fluid which is harmful to the skin; thus, please wear protective gloves during repair.
- If it contacts your skin, please rinse with water immediately.
- Recycle the leaking brake fluid in repair with a vessel.
- Prevent the brake fluid from splashing on the vehicle; otherwise, it may damage the vehicle paintwork. If the brake fluid splashes on the paintwork, please rinse it with water immediately.

Removal

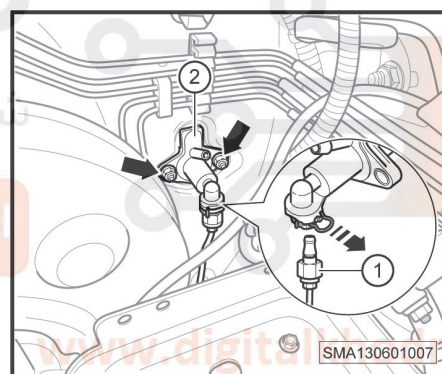
1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Remove the battery => refer to page 975.
3. Release the clamp spring (-1-) in the (-arrow-) direction.
4. Remove the dowel pin (-2-).



5. Release the hydraulic pipeline clamp (-1-) and disconnect the pipeline.



6. Release the oil pipe clamp spring in the (-arrow-) direction and disconnect the oil pipe connector (-1-).
7. Unscrew the fixing nuts of the clutch master cylinder (-arrow-) and remove the clutch master cylinder (-2-).
- Tightening torque of the nut: $10 \pm 1 \text{ N}\cdot\text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Discharging the air from the hydraulic clutch system is required => refer to page 898.
- Checking the clutch pedal travel is required => refer to page 889.

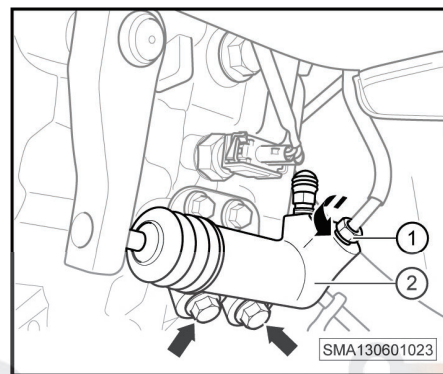
3.1.3 Removing and installing the clutch slave cylinder

Caution

- The slave cylinder contains brake fluid which is harmful to the skin; thus, please wear protective gloves during repair.
- If it contacts your skin, please rinse with water immediately.
- Recycle the leaking brake fluid in repair with a vessel.
- Prevent the brake fluid from splashing on the vehicle; otherwise, it may damage the vehicle paintwork. If the brake fluid splashes on the paintwork, please rinse it with water immediately.

Removal

1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Unscrew the oil pipe connector (-1-) in the (-arrow-) direction.
3. Unscrew the fixing bolts (-arrow-) and remove the slave cylinder (-2-).
 - Tightening torque of the bolt: $25 \pm 3 \text{ N} \cdot \text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Apply grease on the joint between the slave cylinder pushrod and the release lever.
- Discharging the air from the hydraulic clutch system is required => refer to page 898.
- Checking the clutch pedal travel is required => refer to page 889.

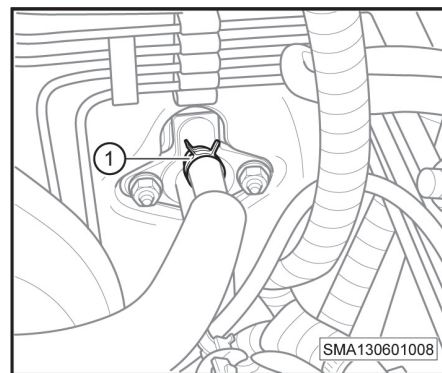
3.1.4 Removing and installing the hydraulic clutch pipeline

Caution

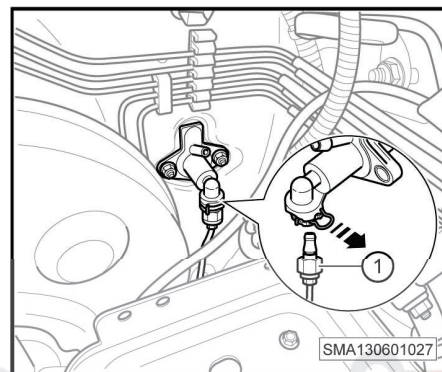
- The slave cylinder contains brake fluid which is harmful to the skin; thus, please wear protective gloves during repair.
- If it contacts your skin, please rinse with water immediately.
- Recycle the leaking brake fluid in repair with a vessel.
- Prevent the brake fluid from splashing on the vehicle; otherwise, it may damage the vehicle paintwork. If the brake fluid splashes on the paintwork, please rinse it with water immediately.

Removal

1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Remove the battery => refer to page 975.
3. Release the hydraulic pipeline clamp (-1-) and disconnect the pipeline.



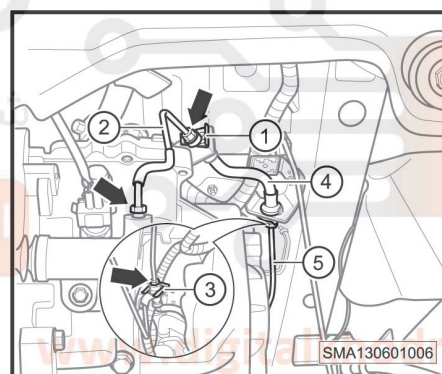
4. Release the oil pipe clamp spring in the (-arrow-) direction and disconnect the oil pipe connector (-1-).



5. Remove the pipeline connectors (-arrow-).

- Tightening torque of the pipeline connector:
 $16.5 \pm 2.5 \text{ N} \cdot \text{m}$

6. Loosen the fixing clamp (-1-) and remove the pipe (-2-).
7. Loosen the fixing clamp spring (-3-) and remove the pipe (-5-).
8. Remove the hose (-4-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Discharging the air from the hydraulic clutch system is required => refer to page 898.

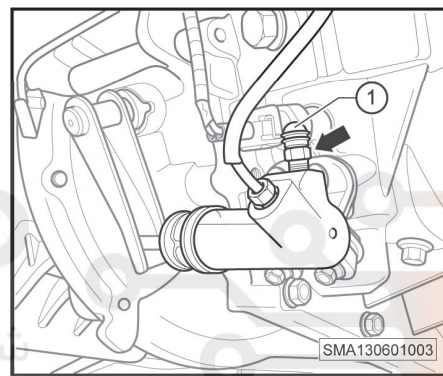
3.1.5 Discharging the air from the clutch hydraulic system

Caution

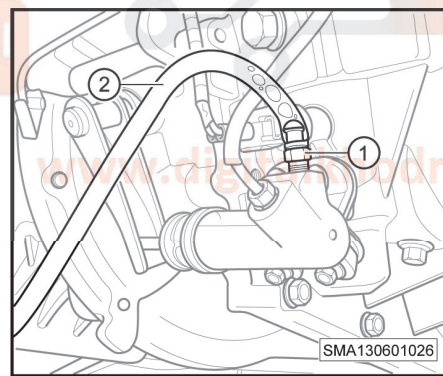
- The brake fluid is harmful to skin, thus please wear protective gloves during repair.
- If it contacts your skin, please rinse with water immediately.
- Recycle the leaking brake fluid in repair with a vessel.
- Prevent the brake fluid from splashing on the vehicle; otherwise, it may damage the vehicle paintwork. If the brake fluid splashes on the paintwork, please rinse it with water immediately.
- Make sure that there is enough brake fluid in the reservoir before air discharge.
- After air discharge, you shall check whether the brake fluid level of the reservoir meets the standard and whether there is a leak in the oil pipe and the connector of the clutch system.
- Only use the brake fluid approved by Chery Automobile Co., Ltd.; otherwise, it may lead to pipeline corrosion.
- Brake fluid type: DOT-4.

Procedures

1. Remove the sealing cap (-1-).
2. Unscrew the exhaust bolt (-arrow-).



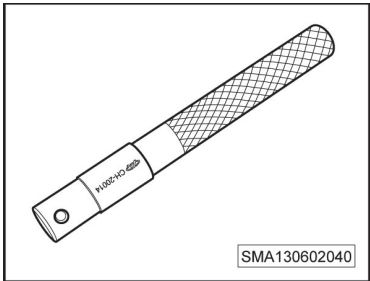
3. Connect the transparent hose (-2-) to the exhaust bolt (-1-).
4. Gently press the clutch pedal until there is no more bubbles appearing in the exhaust hose, then tighten the exhaust bolt.
5. Press the clutch pedal for several times to fix it in the position. Then unscrew the exhaust bolt to discharge air, and quickly tighten the bolt.
6. Repeat the operation of step 5 until the air in the clutch system is all discharged.
7. Tighten the exhaust bolt (-1-), remove the hose, and put on the sealing cap.
8. Check the brake fluid in the reservoir.



3.2 Clutch and pressure plate

3.2.1 Removing and installing the clutch

Maintenance tools and common equipment

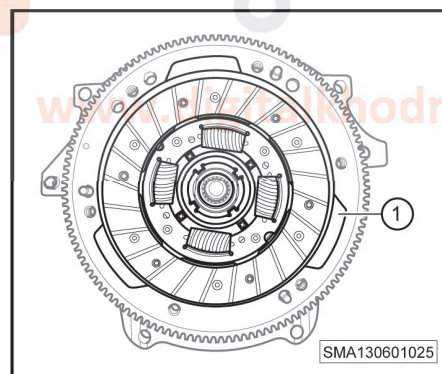
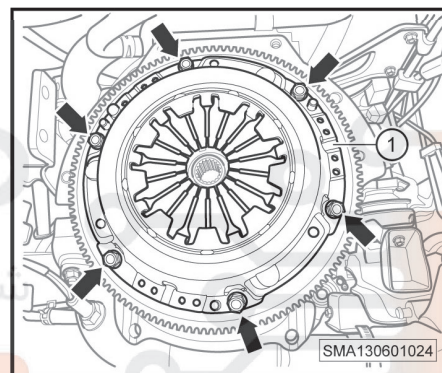
 SMA130602040	
Clutch installation tool	

Removal

1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Remove the transaxle assembly => refer to page 920.
3. Unscrew the fixing bolts (-arrow-) and remove the clutch pressure plate (-1-).

- Tightening torque of the bolt: $23 \pm 2 \text{ N} \cdot \text{m}$

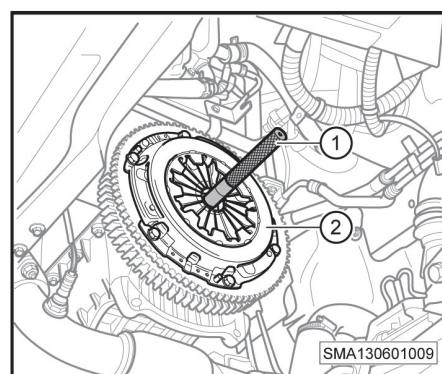
4. Remove the clutch disc (-1-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

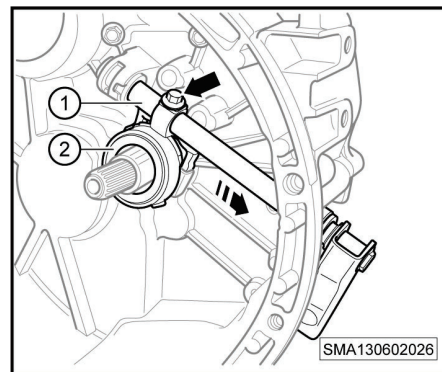
- Apply grease on the clutch disc spline.
- Align the clutch installation tool (-1-) with the center of the clutch (-2-) to install.
- Tighten the fixing bolt of the clutch pressure plate with the specified torque diagonally and evenly.



3.2.2 Removing and installing the release bearing

Removal

1. Switch off all electrical equipment and the ignition switch, and pull out the key.
2. Remove the transaxle assembly => refer to page 920.
3. Unscrew the fixing bolt (-arrow-).
 - Tightening torque of the bolt: $20 \pm 2 \text{ N}\cdot\text{m}$
4. Remove the release shaft (-1-) in the (-arrow-) direction.
5. Remove the release bearing (-2-).



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Apply grease on the joint between the release bearing and the release shaft.

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

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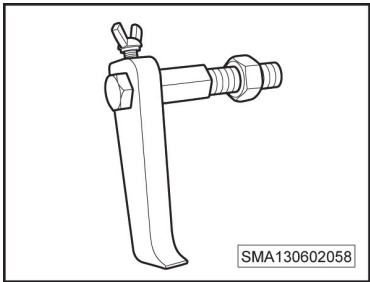
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4 Flywheel

4.1 Removing and installing the flywheel.....901

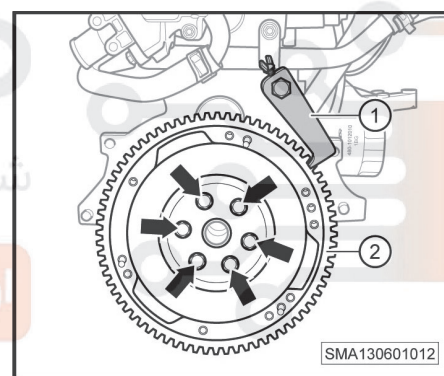
4.1 Removing and installing the flywheel

Maintenance tools and common equipment

	
Flywheel installation tool	

Removal

1. Remove the clutch => refer to page 899.
2. Fix the flywheel ring gear with the flywheel installation tool (-1-).
3. Unscrew the flywheel fixing bolts (-arrow-) and remove the flywheel (-2-).
 - Tightening torque of the bolt: $110 \pm 5 \text{ N}\cdot\text{m}$



Installation

Installation shall follow the reverse sequence of the removal procedure. Please pay attention to the following notes:

- Tighten the flywheel fixing bolts diagonally and evenly.
- First tighten the bolts to the torque of $60 \text{ N}\cdot\text{m}$, then tighten them to the torque of $110 \pm 5 \text{ N}\cdot\text{m}$.
- Replace the flywheel fixing bolts which can only be used once and shall be scrapped after removal.