

## Clutch System

### Precautions

- Recommended clutch hydraulic oil is a brake liquid "DOT4".
- Do not reuse the drained clutch hydraulic oil.
- Pay attention not to spray vehicle hydraulic oil of the clutch onto the paint of vehicle body.
- Please do not use mineral oil such as gasoline or kerosene, to avoid corrosion of rubber part in hydraulic system.
- Please do not decompose master pump, hydraulic release bearing.


### Warnings:

- Please use a dust aspirator to clean clutch friction plate. Do not use compressed air to clean it.

### Preparation work

Special tools to be used are as below:

Special Tool Table

No.	Tools	Overall Diagram	Code	Instructions
1	Flywheel stop dog		JAC-T1F011	Fixing fly wheel

### Common fault diagnostic

The performance diagnosis of clutch assembly and clutch control system should be performed by experienced driver or skillful repair technician.

The following (fault) diagnosis involves common problems and possible causes. After conducting proper diagnosis, adjust or replace parts according to corresponding Countermeasures and proper sections of detailed procedures specified in Manual.

When repairing vehicle, clutch disc and clutch friction plate can't be repaired. If any of them is damaged, it is necessary to replace the complete assembly.

If the rivet of clutch friction plate is worn or clutch friction plate is stained by engine oil or grease, this clutch friction plate can't be reused.

If a part is required to be replaced, use a qualified new part to replace it.

This diagnosis table is helpful to diagnose faults of clutch system caused by the following conditions: clutch can't be released, can't be released completely, can't be engaged completely, skidding, noise, vibration.

The digit on this diagnosis sheet does refer to the order of inspection. There is no precedence relationship among potential causes.

## Clutch System

Diagnosis Table of Clutch System

Items	Potential Cause	Countermeasures
No disengagement	<p>If clutch can't be disengaged, it means the clutch can't operate or cut off the power transmitted from the engine.</p> <p>Check the following conditions</p> <ol style="list-style-type: none"> <li>1. Clutch release rod deformed.</li> <li>2. Diaphragm spring deformation.</li> <li>3. Support ring of diaphragm spring is fractured.</li> <li>4. Clutch pedal control system and clutch cable are adjusted wrongly.</li> <li>5. Clutch friction plate sticks to flywheel or clutch cover.</li> </ol>	<p>Replace the deformed, worn or cracked parts.</p> <p>Adjusted clutch system.</p>
Incomplete separation	<p>Incomplete disengagement of clutch may make it impossible to cut off the power transmitted from the engine and it is difficult to operate the gearshift because clutch friction plate and transmission input shaft continue running.</p> <p>Check the following conditions:</p> <ol style="list-style-type: none"> <li>1. Clutch friction plate is deformed. It may rock when rotated.</li> <li>2. Clutch friction plate is damaged.</li> <li>3. Clutch friction plate spline doesn't match transmission input-shaft spline, or spline tooth face is damaged.</li> <li>4. Clutch friction plate sticks partially to flywheel or bites clutch cover.</li> <li>5. The thickness of flywheel/clutch cover/clutch friction plate exceeds the size as required.</li> <li>6. Clutch pedal control system and clutch cable have mechanical fault or improper adjustment.</li> </ol>	<p>Replace the deformed, worn, cracked or over-size parts. If clutch friction plate can't cooperate with the spline of the input shaft of transmission, replace the plate; if necessary, replace the input shaft.</p> <p>If the friction plate of clutch exceeds the size as specified or is damaged, replace it.</p> <p>Replace does not apply clutch thrust bearing.</p> <p>Adjust clutch system to eliminate unnecessary clearance and mechanical faults.</p> <p>Reinstall the parts that were assembled incorrectly.</p>
Incomplete engagement	<p>Incomplete engagement of clutch may make it impossible to transmit engine power to transmission input shaft. Meanwhile, clutch friction plate may slip.</p> <p>Check the following conditions:</p> <ol style="list-style-type: none"> <li>1. Clutch friction plate is contaminated by engine oil or grease.</li> <li>2. Clutch friction plate is damaged.</li> <li>3. Clutch pedal has no free travel.</li> <li>4. Diaphragm spring/ clutch disc/ clutch release lever/ spline of clutch friction plate is deformed or damaged.</li> <li>5. Clutch pedal control system and clutch cable have mechanical fault or improper adjustment.</li> </ol>	<p>Replace the deformed, worn or cracked parts.</p> <p>Replace clutch friction plate or defective clutch assembly.</p> <p>Adjust the free stroke of clutch pedal correctly.</p> <p>Adjust clutch system to eliminate unnecessary clearance and mechanical faults.</p> <p>Reinstall the parts that were assembled incorrectly.</p>

## Clutch System

Items	Potential Cause	Countermeasures
Slipping	<p>Clutch friction plate slips, may make it impossible to transfer engine power as normal.</p> <p>Check the following conditions:</p> <ol style="list-style-type: none"> <li>1. Clutch friction plate is worn.</li> <li>2. Clutch friction plate is contaminated by engine oil or grease.</li> <li>3. Clutch is engaged incompletely.</li> <li>4. Both thickness of flywheel/clutch cover/clutch friction plate and frictional surface exceed the size as required.</li> <li>5. Over-temperature in clutch housing is caused by improper driving.</li> <li>6. Install unsuitable clutch.</li> </ol>	<p>Replace the deformed, worn or cracked parts, those beyond the size or specification.</p> <p>Countermeasures to "incomplete separation" and "incomplete engagement".</p> <p>Stop engine, lower the temperature in the housing of clutch (if too high), and make further diagnosis.</p> <p>Install the clutch correctly that is designated.</p> <p>Adjust clutch system and clutch cable, to remove unnecessary clearance and eliminate mechanical fault.</p> <p>Reinstall the parts that were assembled incorrectly.</p> <p>Do not leave your foot on the clutch pedal all the time.</p>
Noise	<p>Check the following conditions:</p> <ol style="list-style-type: none"> <li>1. Improper clutch friction plate.</li> <li>2. Poor balance.</li> <li>3. Clutch thrust bearing fault.</li> <li>4. Clutch friction plate is subjected to torsional force vibration attenuation, and the spring is damaged.</li> </ol>	<p>Replace the deformed, worn or cracked parts.</p> <p>Install clutch friction plate as designated.</p> <p>If some part is poorly balanced, replace the clutch assembly.</p> <p>Adjusted clutch wiredrawing.</p> <p>Reinstall the parts that were assembled incorrectly.</p>
Shaking	<p>This situation will occur when clutch friction plate can't engage with flywheel softly.</p> <p>Check the following conditions:</p> <ol style="list-style-type: none"> <li>1. Damper spring of clutch friction plate fails to meet the specification.</li> <li>2. Clutch friction plate fails to meet the specification.</li> <li>3. Clutch friction plate is contaminated by engine oil or grease.</li> </ol>	<p>Replace clutch assembly.</p>

**Hydraulic oil of clutch**

## 1. Overhaul key points

**Caution:**

- Please do not use vacuum pump or any other type of air discharger power device for this system.
- Check the height of clutch hydraulic oil level. Ensure the level is right.
- Do not spray hydraulic oil of the clutch onto the vehicle body paint and other parts. If hydraulic oil of the clutch sprays onto the paint of vehicle body and other parts, immediately wipe it with dry cloth.

## Clutch System

## 2. Discharge the air in the pipeline:

Caution: When dismantling clutch pipeline, clutch master cylinder, hydraulic release bearing, if clutch pedal is soft, it is necessary to discharge air from the system.

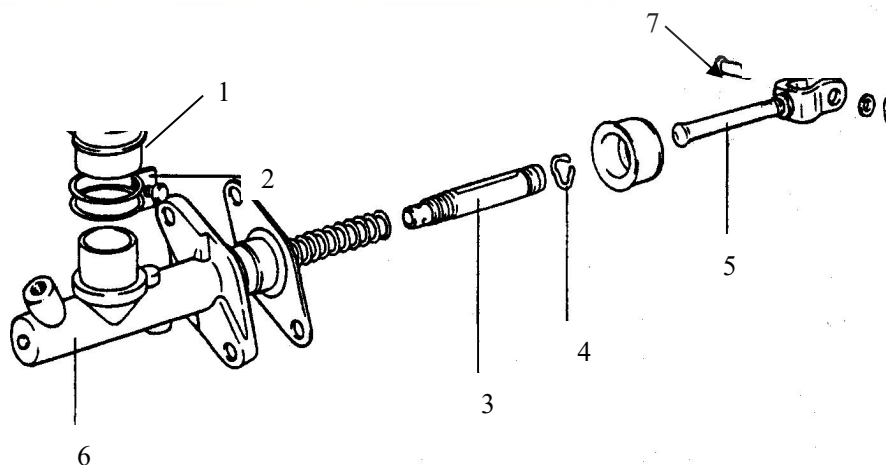
- 1) Loosen the bleed screw of clutch cylinder.
- 2) Press clutch pedal slowly until air is exhausted.
- 3) Completely step on the pedal and keep it and then tighten the bleed screw.
- 4) Supplement hydraulic fluid to the clutch hydraulic system.

**Caution:**

- Always keep the reservoir level between the MIN and MAX.
- 5) Repeat the above steps until the clutch hydraulic oil discharged from the system is clean without any blister.
  - 6) Ensure clutch works soundly.
  - ① Start the engine, press clutch pedal and switch carefully to Reverse about 2s later. If there is large noise when choosing a gear, press the clutch pedal to the end 5 times to discharge air from the system.
  - ② Check the clutch performance about 30s later. If there is large noise still, please discharge air again.

**Clutch master cylinder**

## 1. Components



Exploded View of Clutch Master pump

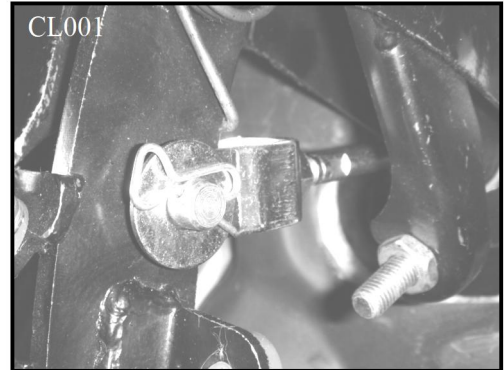
- |                   |         |          |               |               |                    |
|-------------------|---------|----------|---------------|---------------|--------------------|
| 1-Fluid reservoir | 2-Clamp | 3-Piston | 4-Snap ring   | 5-Pushing rod | 6-Master pump body |
|                   |         |          | 7-Locking pin |               |                    |

## Clutch System

## 2. Removal and installation

## 1) Removal

- ① Drain hydraulic oil from clutch air exhaust bolt in front of clutch.
- ② Disconnect the lock pin of clutch master cylinder push rod with clutch pedal.



- ③ Disconnect the hose from clutch master cylinder to brake master cylinder.



- ④ Disassemble the clutch master cylinder oil pipe and unscrew off the fixing bolts of the cylinder.

- ⑤ Take out master pump of clutch.



## 2) Inspection after removal

- Check if clutch pipeline is blocked.
- Check if clutch hose and pipe are damaged or rusted.

## 3) Installation

Pay attention to the following cautions and install it in the reverse order of removal.

- Apply the specified hydraulic oil onto the inner wall of pump and the surface of piston assembly (brake hydraulic oil DOT4).
- Make system bleed air. Please see “Hydraulic oil of clutch “.
- Adjust clutch free stroke. Please see “Inspection and adjustment on vehicle”.
- Tightening torque refers to “tightening torque table”.



## Clutch System

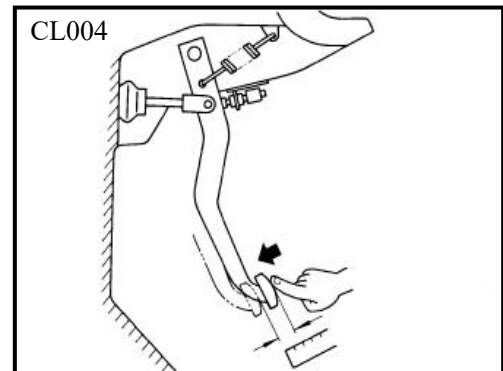
**Clutch pedal**

## 1. Personalized inspection and adjustment

Free stroke inspection:

- Press clutch pedal by hands until you feel some resistance, and then use a scale to measure whether the free stroke is within the specified range.

Pedal free stroke: 6-13 mm



## 2. Removal and installation

## 1. Components

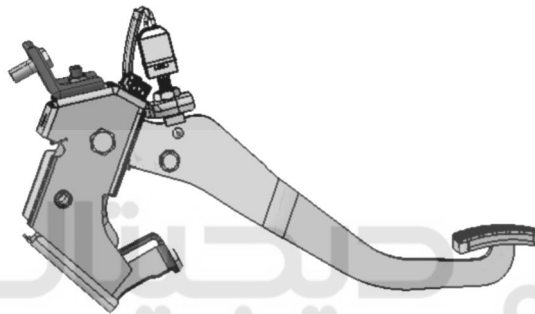


Diagram of Clutch Pedal

## 2. Removal

- ① Remove clutch pedal lock pin, disconnect pushing rod connecting with master pump of clutch.



- ② Remove clutch pedal fixing bolt, take out clutch pedal.



## Clutch System

## 3) Inspection after removal

Check if clutch pedal is distorted, damaged or there is a crack welding cut. If any of the above conditions occurs, please replace clutch pedal assembly.

## 4) Installation

Install in the order opposite to that of dismantling.

- Tightening torque: 20-30 N•m

**Caution:**

- When adjusted clutch pedal height, do not push pulling rod into the master pump of clutch.
- After adjustment, check if the stroke and free stroke of clutch pedal are within specified range.
- If the free stroke of clutch isn't within the specified range, there must have air in hydraulic pipe of the clutch and fault in clutch master cylinder. It is necessary to discharge air from the system, and dismantle and check master cylinder or clutch.

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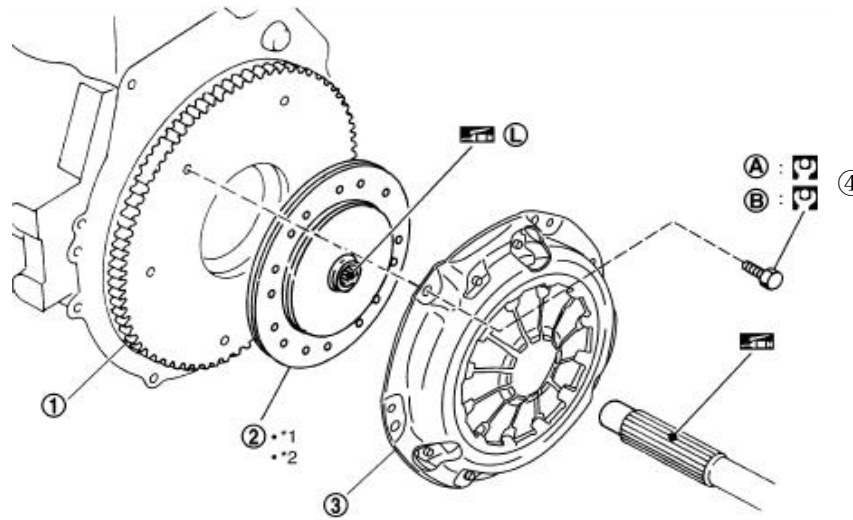


## Clutch System

**Clutch pressure plate, friction plate of clutch and flywheel**

## 1. Removal and installation

## 1) Components



Clutch Exploded View

1-Flywheel    2-Clutchfriction plate    3- Clutch pressure plate    4- Fixing bolt

**Caution:**

- Do not make the surface of clutch friction plate, disc and flywheel stained with any grease.

## 2. Dismantle

- ① Remove manual transmission assembly on the vehicle. Please see “manual transmission assembly”.
- ② Uniformly release fixing bolts of clutch disc. And then dismantle clutch disc and clutch friction plate.

**Caution:**

- Loosen 1 to 2 cycles of each bolt each time, to avoid damage of flange of clutch housing.
- ③ Dismantle fixing bolts of flywheel from the rear of cylinder block, and then remove flywheel.
- ④ Remove hydraulic release bearing on the transmission housing.

## 3) Inspection after removal

## ① Friction plate of clutch

- Check if the surface has degradation and grease stain caused by rivet loosening, single surface contact and burning. If yes, please replace clutch friction plate.

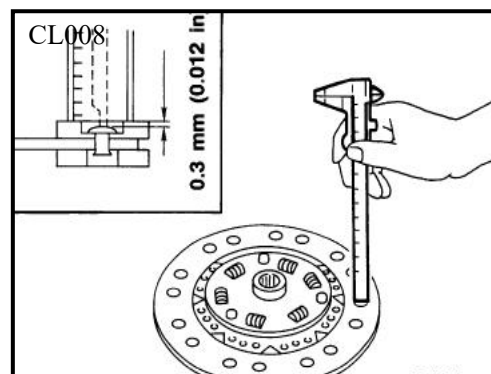


## Clutch System

- Measure the sinking depth of rivet. If it exceeds limit value, please replace clutch friction plate.

Limiting value: 0.3 mm

- Check if return spring is loosened or damaged; if so, please replace clutch friction plate.
- Install clutch friction plate onto the input shaft, and Check sliding condition and loosening of rotation. If the sliding operation is bad, clean it. If the fault still exists after assembly, please replace it. If the loosening is obvious, please replace clutch friction plate or input shaft, or replace both of them at the same time.



## ② Clutch pressure plate

- Check if the end of diaphragm spring is worn and if there is any height difference. If there is obvious abrasion or the height exceeds limit value, replace clutch friction plate.

Limiting value: 0.5 mm

## ② Check if pressure plate surface is worn, cracked or discolored.

- Check if clutch cover rivets are loose. If so, replace the plate.

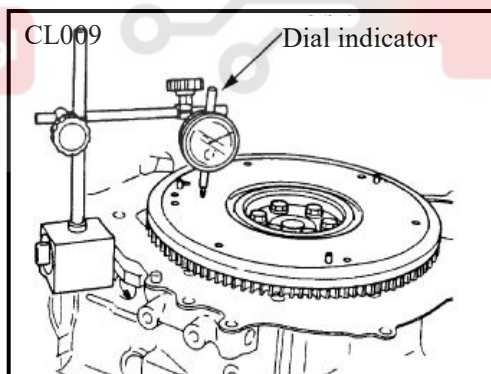
## ③ Hydraulic separate bearing

Check if bearing is burnt or damaged, has abnormal sound, or rotates unsmoothly, etc.

- Check if the diaphragm spring of hydraulic bearing has abrasion. Replace it if any.

## ④ Flywheel

- Use a dial indicator to measure the levelness of the contact surface between flywheel and clutch friction plate. If it doesn't meet requirement, please replace flywheel.
- If the contact surface between clutch disc and clutch friction plate has burning or discolor sign, please grind it with sand paper.



### Caution:

- Please measure the levelness on the exterior surface of flywheel (do not measure it on the fixing pin).

## 4) Installation

- ① Clean clutch friction plate and the spline slot of input shaft, and remove grease and worn metal scraps.
- ② Apply grease onto the spline slot of input shaft.

### Caution:

- Recommended grease: SAE J310 or equivalent.

## Clutch System

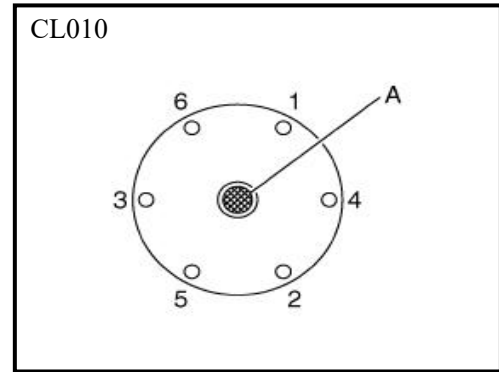
- Make sure that the grease is applied to the specified position; otherwise, it may cause clutch producing noise, bad release effect or damage. Excessive grease may also cause sliding or vibration.
- ③ Install flywheel and tighten it with specified tightening torque. Use a special tool to install clutch friction plate and clutch disc.
- ④ Perform it by steps in the order shown as in the figure and evenly tighten the fixing screws of clutch in turn.

**Caution:**

- Tight 1-2 cycles for each bolt and gradually tighten it well.

Tightening torque: 15-2 N•m

- ⑤ Install hydraulic release bearing.
- ⑥ Install manual transmission on the vehicle. Installing process, Please see "Manual transmission".



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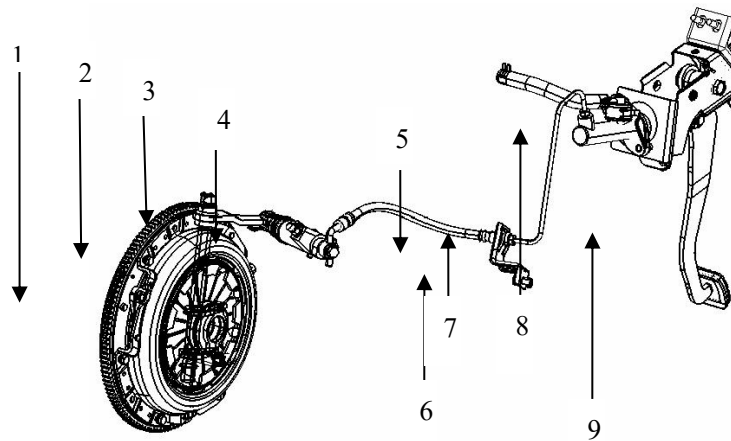
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## Clutch System

## Hydraulic pipeline



Hydraulic Pipeline Diagram

- 1-Clutch pressure plate and clutch drive plate    2-Rocker arm    3-Pushing rod  
 4-Clutch work cylinder and hose assembly    5-Spring clip disc    6-Support    7-Hard pipe  
 8- Clutch master cylinder    9- Clutch pedal

Pay attention to the following precautions when dismantling and installation of hydraulic pipe of clutch.

**Caution:**

- Do not spray hydraulic oil of the clutch onto the vehicle body paint and other parts. If hydraulic oil of the clutch sprays onto the paint of vehicle body and other parts, immediately wipe it with dry cloth.
- When installing clutch pipe on the hydraulic release bearing, three-way valve, clutch pipe, please insert it completely to the bottom and Check if the clamp is installed to proper position.
- Use oil pipe wrench to tighten the pipe joints.
- After installation, please discharge air from clutch hydraulic system. Please see "Air exhaust".

## Clutch System

## Service Parameters

## 1. Technical parameters

Technical Parameter Table

Clutch free stroke	6-20 mm
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## 2. Grease

Lubricating Grease Table

Master pin of main pump	Kunlun No.2 low temperature grease
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## 3. Tightening torque

Fastening Torque Table

Item	Torque (N•m)
Master pump of clutch fixing bolt	20-28
Master pump of clutch fixing nut	20-28
Oil pipe fixing support	20-28
Air exhaust bolt	8-12
Clutch pressure plate mounting bolt	20-28

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