



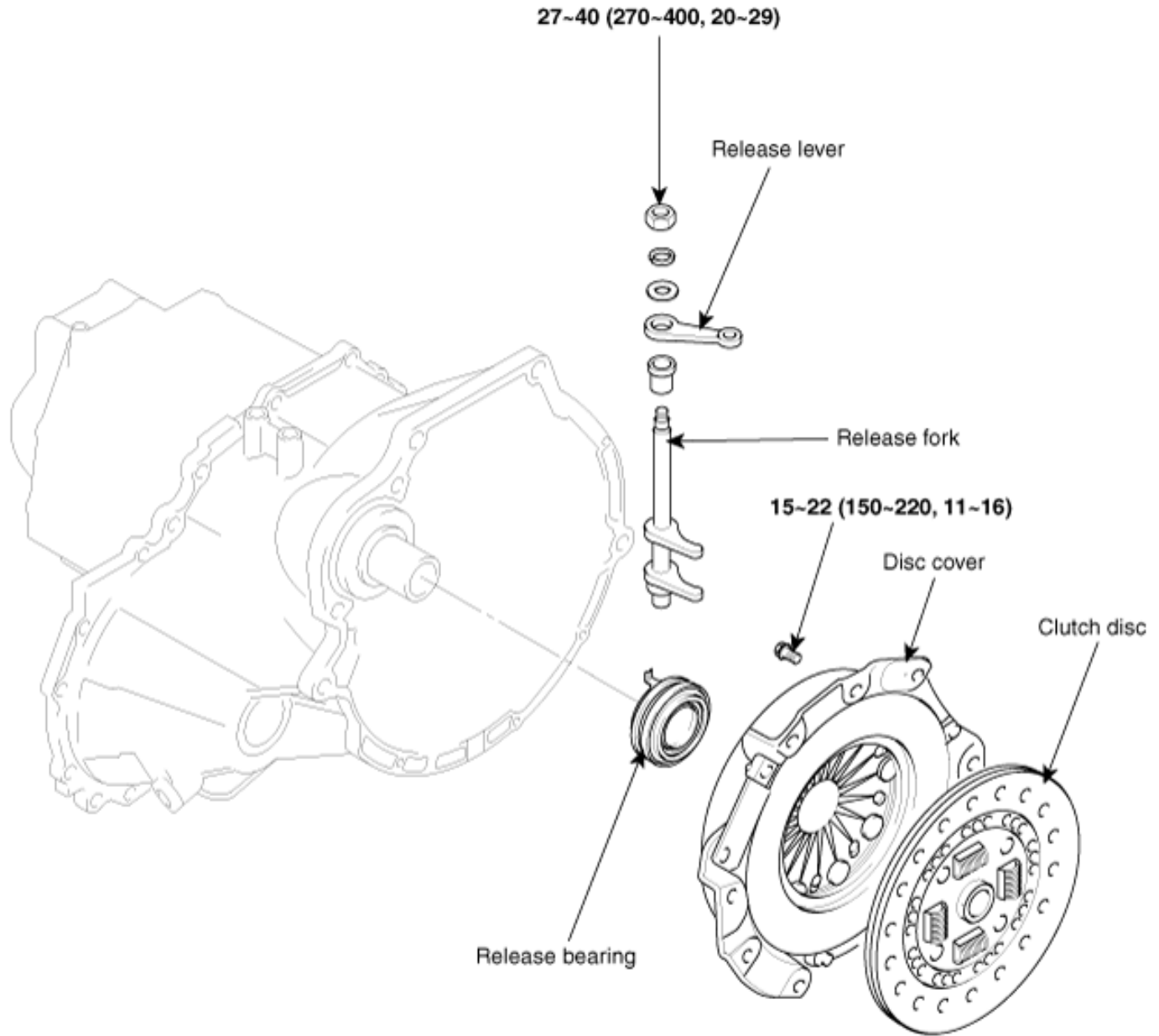
HYUNDAI

Elantra



Workshop Manual
2001 - 2006

COMPONENTS



TORQUE: Nm (kg-cm, lb-ft)

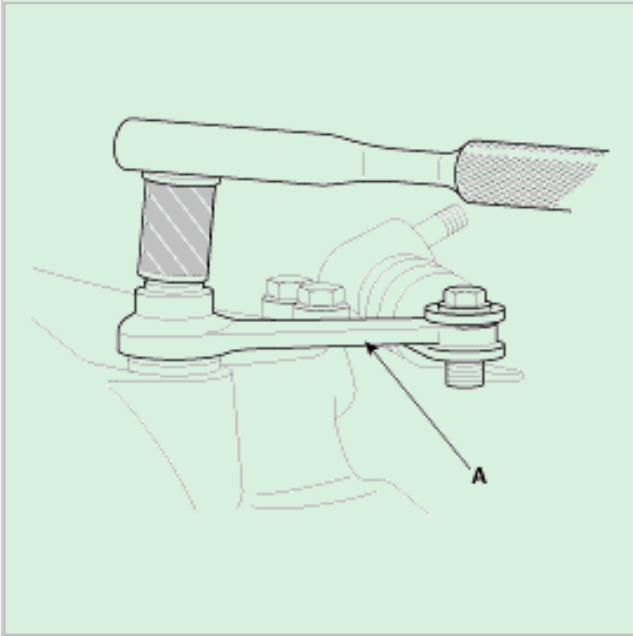


ROMOVAL

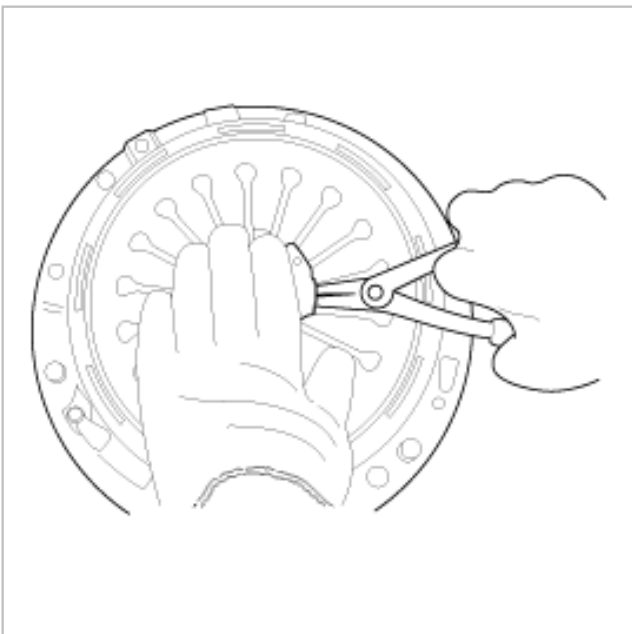
1. To remove the transaxle assembly, first drain the clutch fluid and transaxle gear oil, then remove the air cleaner joint and the mounting bracket etc.
2. Remove the clutch release lever (A).
 - (1) Loosen the release lever nut and washer.
 - (2) Remove the clevis pin and snap ring from the release cylinder.
 - (3) Remove the release lever (A).

NOTE

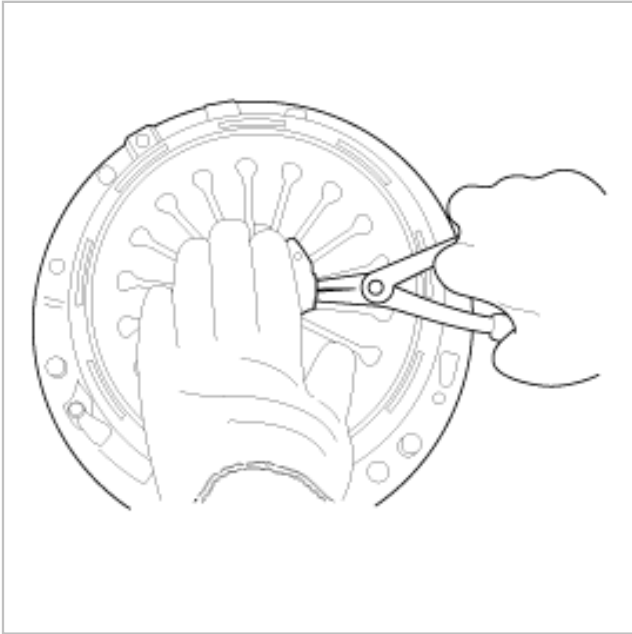
It is impossible to remove the transaxle assembly without performing this step because the clutch cover assembly, release bearing and release fork are held together.



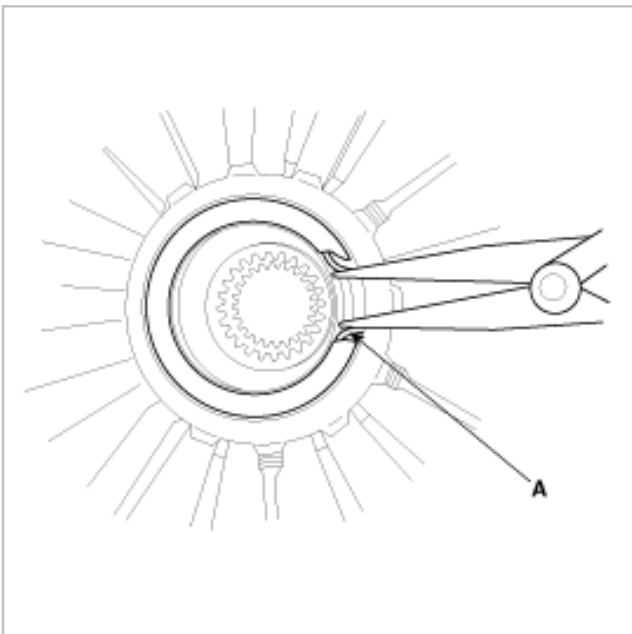
3. Loosen the bolts attached to the release cylinder and remove the release cylinder.



4. Remove the transaxle assembly, after removing each bolt which connects the transaxle assembly and engine.
5. If the clutch cover is attached to the flywheel, remove the release bearing using snap-ring pliers.
 - (1) Rotate the release bearing in an easy direction in order to examine the snap ring.
 - (2) Insert the pliers under the wave washer as shown in the illustration and place it in the center of the snap ring.
 - (3) Spread the snap ring by pushing down on the bearing as shown in the illustration.



- (4) The snap ring (A) at expanded state is shown in the figure.



- (5) In the snap ring expanded, pull out the release bearing and remove it.
6. Insert the special tool (09411-25000) in the clutch disc to prevent the disc from shifting.
7. Loosen the bolts which attach the clutch cover to the flywheel in a star pattern. Loosen the bolts in succession, one or two turns at a time, to avoid bending the cover.

NOTE

Do not clean the clutch disc or the release bearing with cleaning solvent.

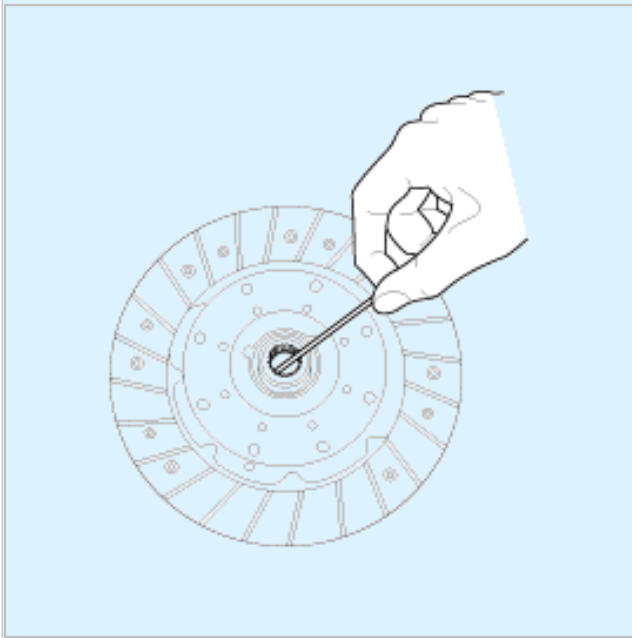
Installation

1. Apply multipurpose grease to the spline of the disc.

Grease: CASMOLY L 9508

CAUTION

When installing the clutch, apply grease to each part, but be careful not to apply excessive grease. It can cause clutch slippage and judder.

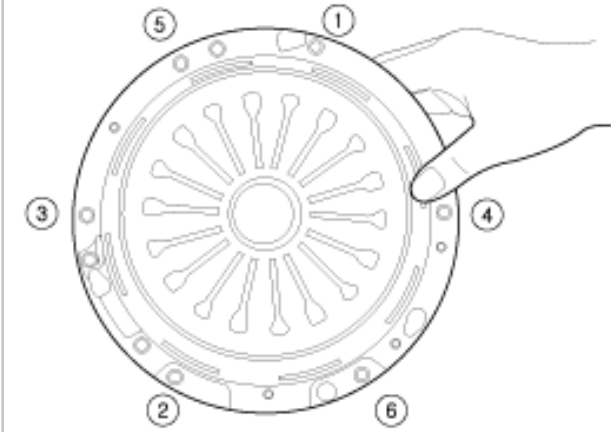


2. Install the clutch disc assembly to the flywheel using the special tool (09411-25000).
3. Install the clutch cover assembly to the flywheel and temporarily tighten the bolts one or two steps at a time in a star pattern.

Tightening torque

Clutch cover bolt:

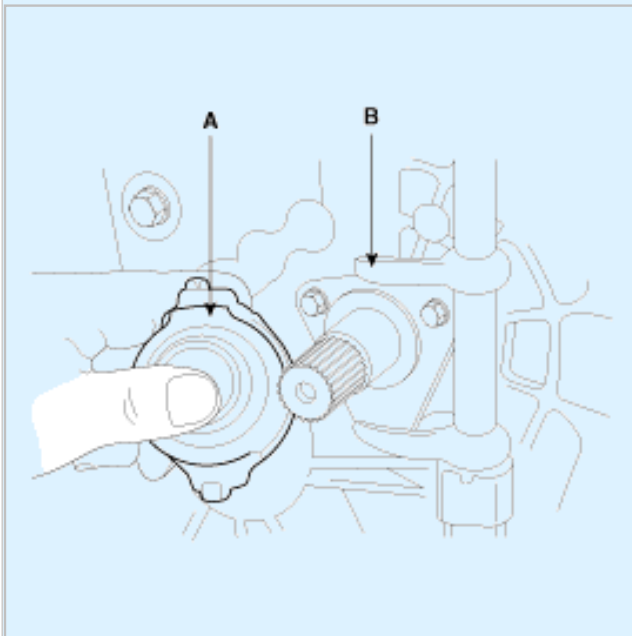
15 ~ 22 Nm (150~220 kg-cm, 11~16 lb-ft)



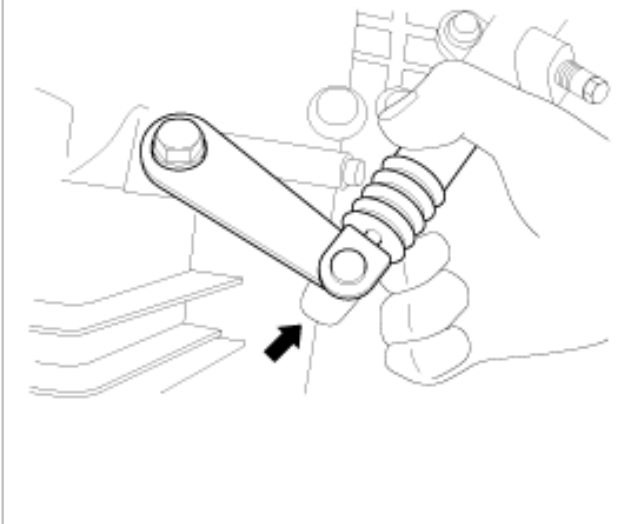
4. Align the bearing (A) to the release fork (B) and then install it to the sleeve of the housing.

CAUTION

Apply multipurpose grease (CASMOly L9508) to the bearing sleeve and contact point of the release fork.



5. Install the release lever to the release fork.

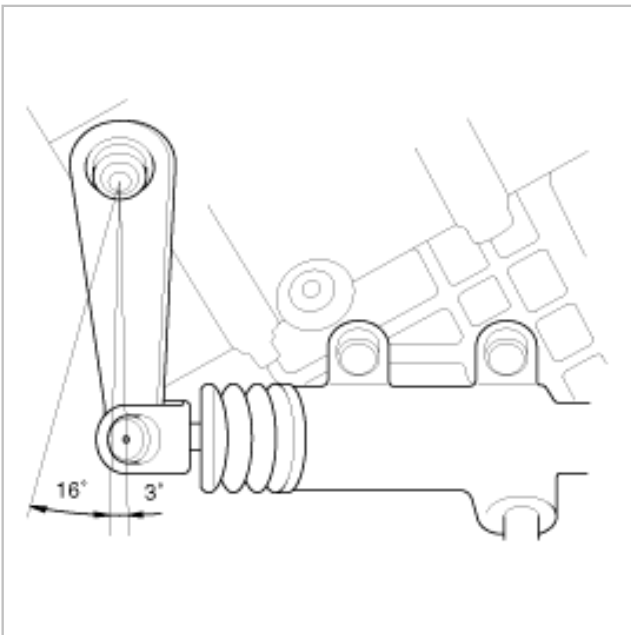


6. Install the transaxle assembly to the engine.

CAUTION

If the transaxle assembly is installed to the engine without performing this step, the release bearing can be separated, as the release fork rotates freely.

7. After finishing step 6, push the release lever to the arrow mark. If there is a click sound, the release bearing and clutch cover are aligned correctly. If the assembly does not snap into place, start with step 1 again. Release lever operating range is 3° or less. If the range is over 3° , the release bearing and clutch cover are not aligned correctly. Push the release lever to the arrow mark one more time.



INSPECTION

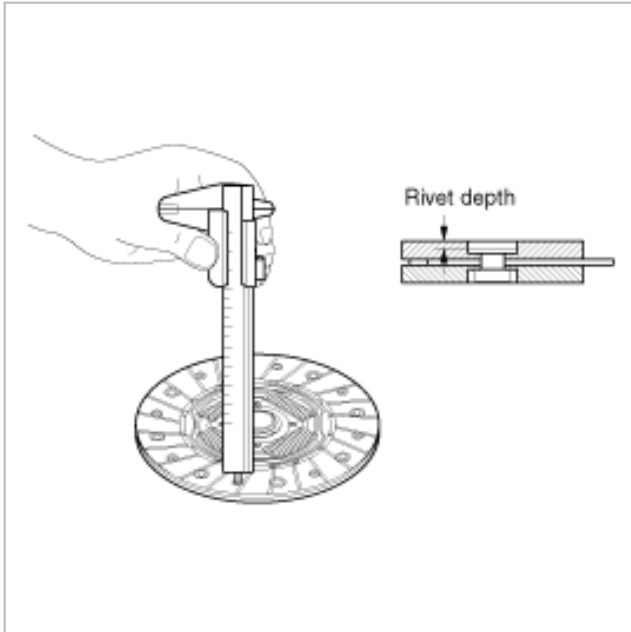
Clutch cover assembly

1. Check the diaphragm spring end for wear and uneven height.
2. Check the pressure plate surface for wear, cracks and color change.

3. Check the rivets for looseness and replace the clutch cover assembly if necessary.

Clutch disc

1. Check the clutch facing for loose rivets, uneven contact, deterioration due to seizure, adhesion of oil, or grease, and replace the clutch disc if defective.
2. Measure the thickness of the disc when free.



3. Check for the torsion spring play and damage and if defective, replace the clutch disc.
4. Clean the splines on the input shaft and install the clutch disc.

If the disc does not slide smoothly or if play is excessive, replace the clutch disc and/or the input shaft.

Clutch release bearing

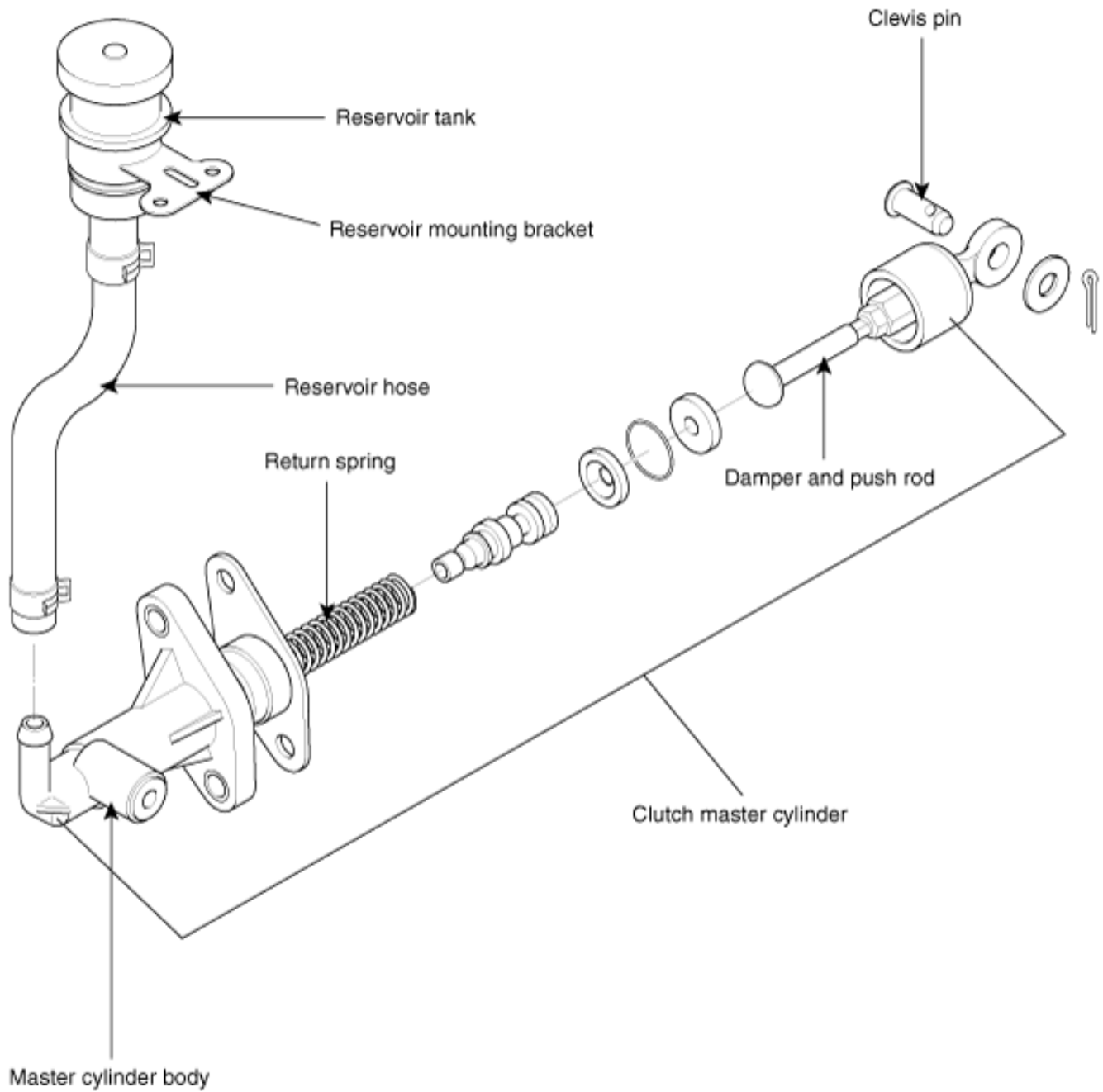
CAUTION

The release bearing is packed with grease. Do not use cleaning solvent or oil.

1. Check the bearing for seizure, damage or abnormal noise. Also check the diaphragm spring contacting points for wear.
2. Replace the bearing if the release fork contacting points are worn abnormally.

Clutch release fork

COMPONENTS

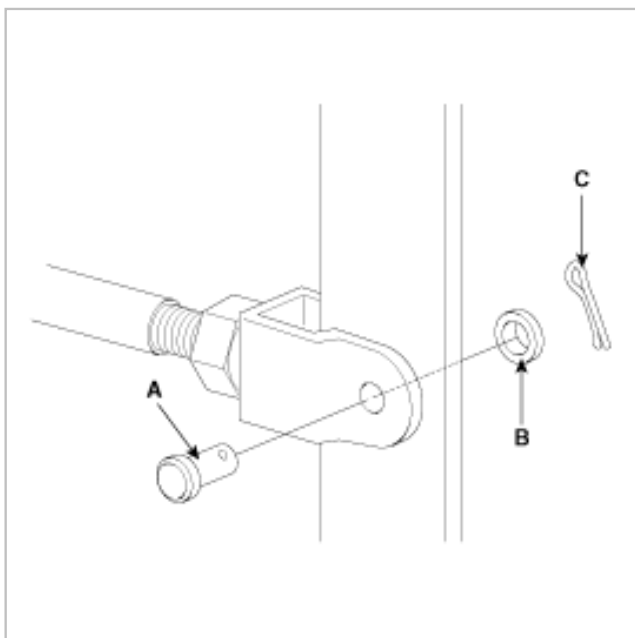


REMOVAL

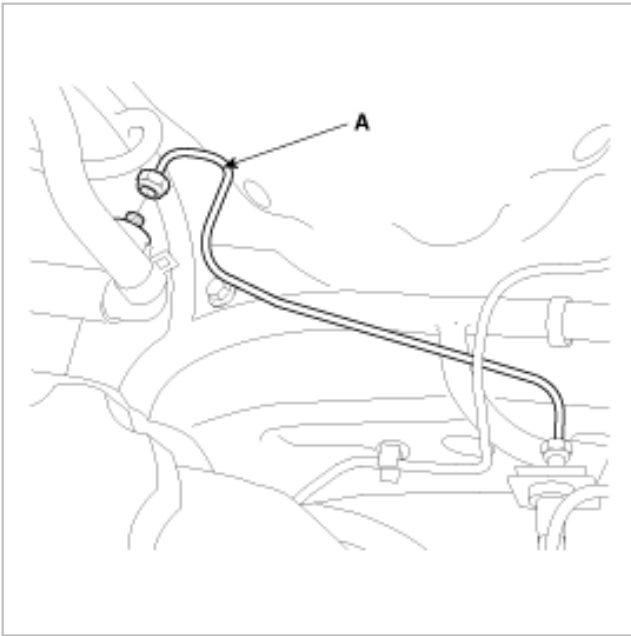
1. Drain the clutch fluid through the bleed plug (A).



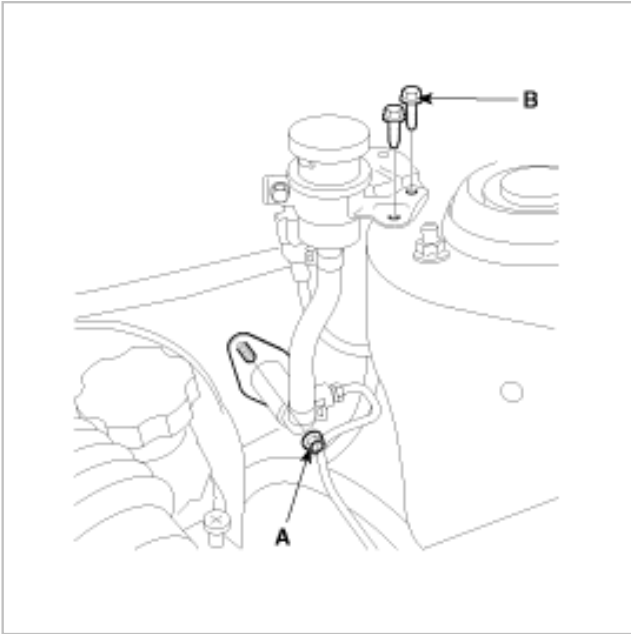
2. Remove clevis pin (A), split pin (cotter pin) (C) and washer (B).



3. Disconnect the clutch tube (A) (master cylinder side) Ebay User ID: reveleus1

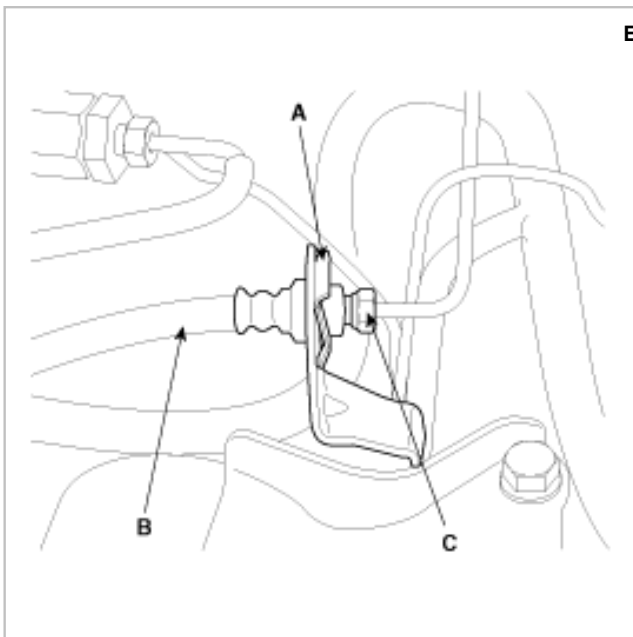


4. Remove the master cylinder mounting nuts (A) and clutch reservoir mounting bolts (B).

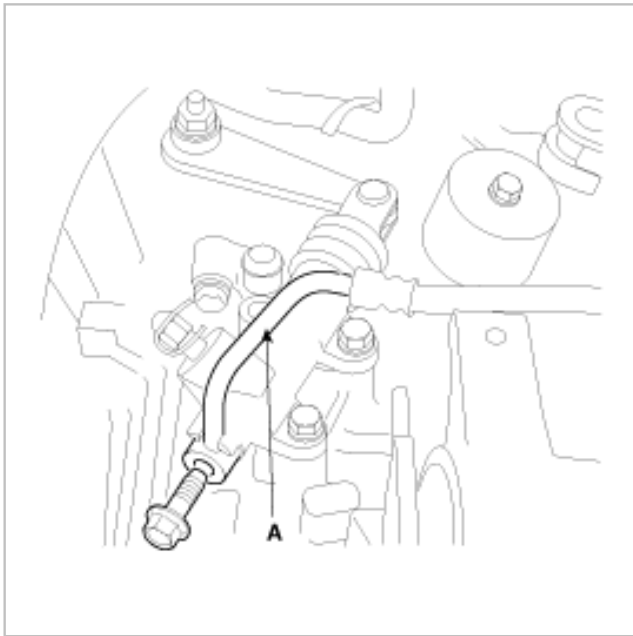


5. Remove the clutch line clips (A).

6. Hold the nut on the clutch hose (B) and loosen the flare nut (C) on the clutch tube.

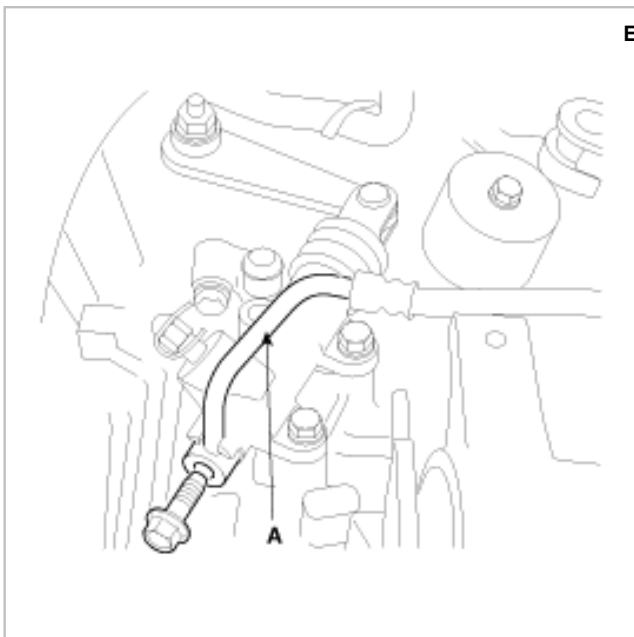


7. Remove the clutch tube.
8. Disconnect the clutch hose (A) (release cylinder side).

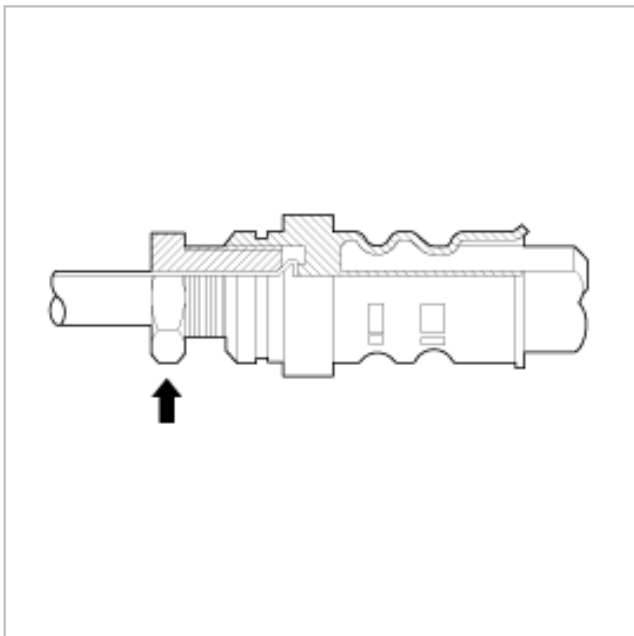


INSTALLATION

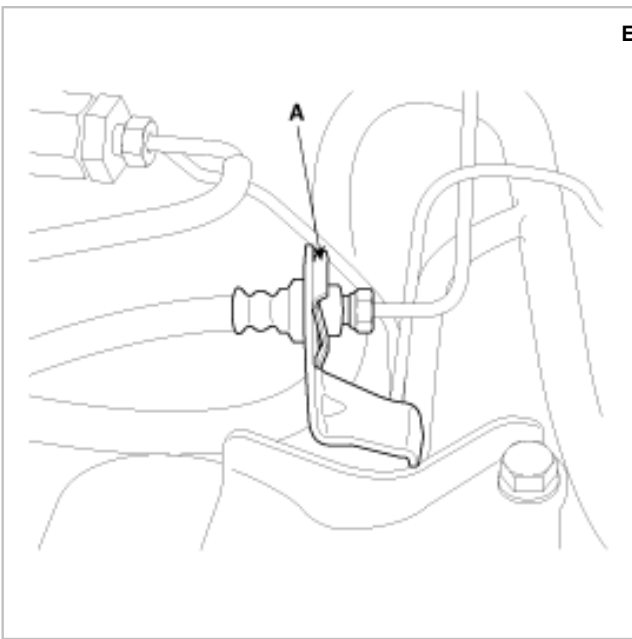
1. Connect the clutch tube (A) (release cylinder side).



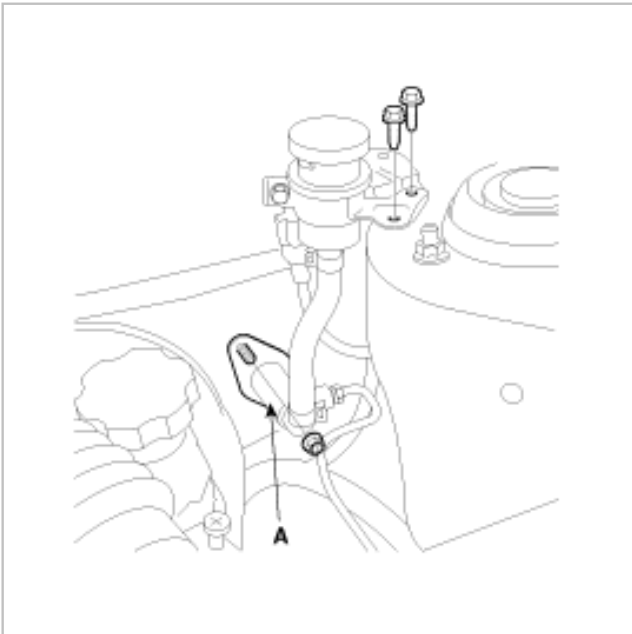
2. Temporarily tighten the flare nut by hand, then tighten it to the specified torque, being careful that the clutch hose does not become twisted.



3. Install the clutch tube and clips (A).

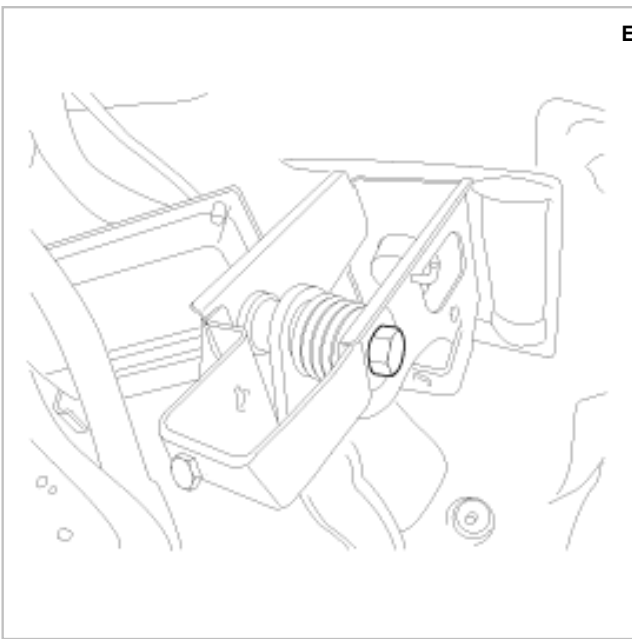


4. Install the master cylinder (A).



5. Apply the specified grease to the clevis pin and washer.

Wheel bearing grease: SAE J310a, NLGI NO. 2



6. Install the push rod to the clutch pedal.
7. Pour the clutch fluid into the clutch master cylinder.
8. Bleed the clutch system.

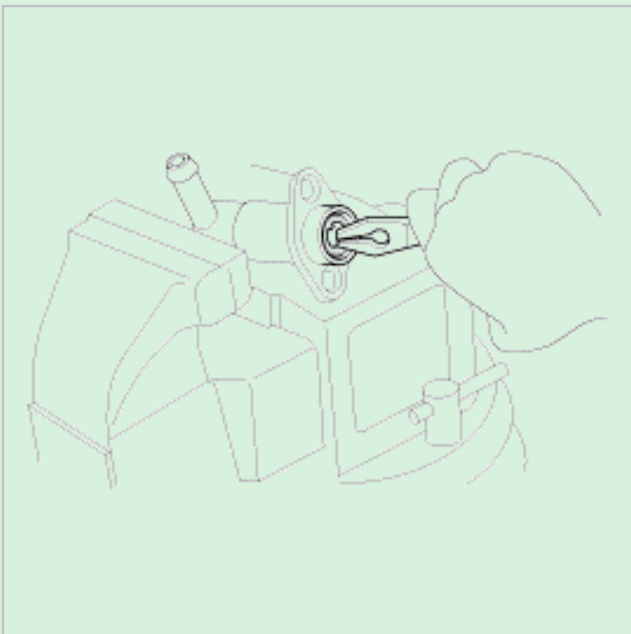
INSPECTION

DISASSEMBLY

1. Remove the piston stop ring.
2. Pull out the push rod and piston assembly.
3. Remove the reservoir band, reservoir cap, and reservoir.

NOTE

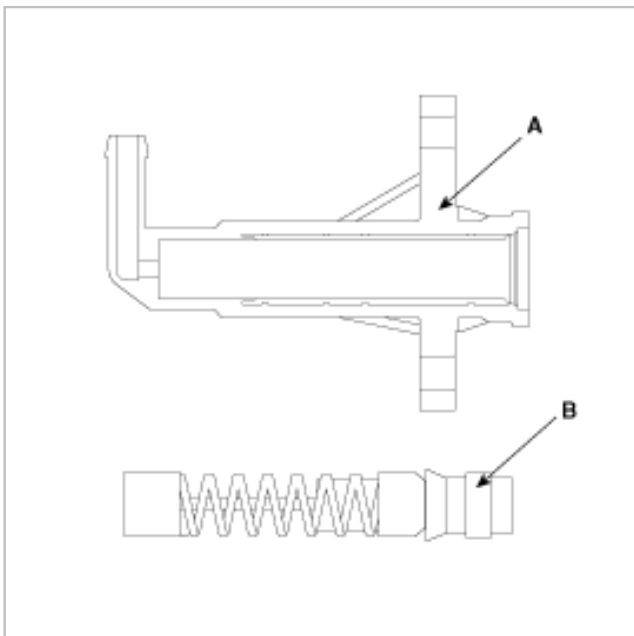
1. Use care not to damage the master cylinder body and piston assembly.
2. Do not disassemble the piston assembly.



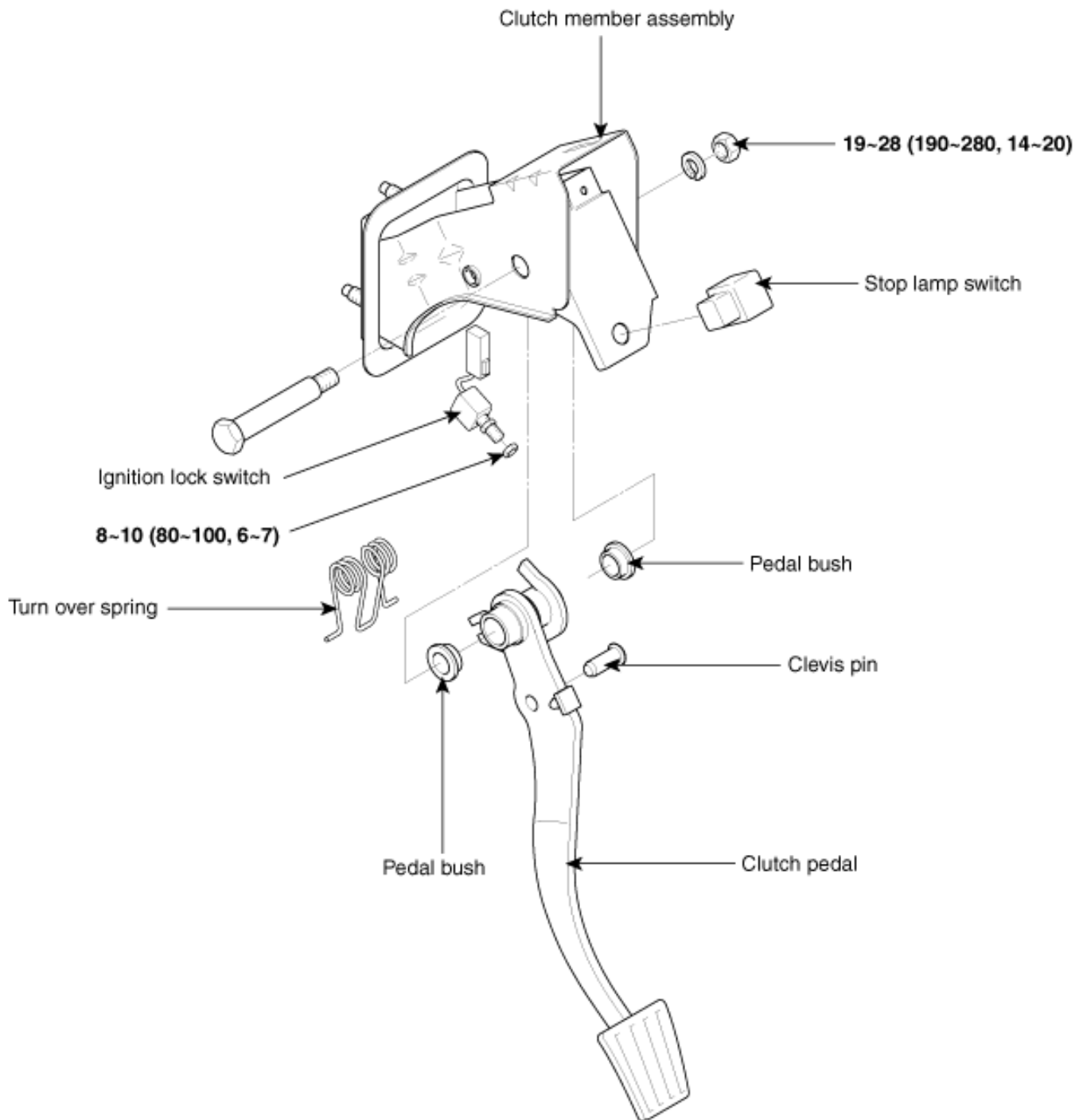
1. Apply the specified fluid to the inner surface of the master cylinder body (A) and to the entire periphery of the piston assembly (B).

Specified fluid: Brake fluid DOT 3 or DOT 4

2. Install the piston assembly.
3. Install the piston snap ring.
4. Install the push rod assembly.

**INSPECTION**

COMPONENTS



TORQUE: Nm (kg-cm, lb-ft)

Purchased
from Ebay seller
Reveleus1

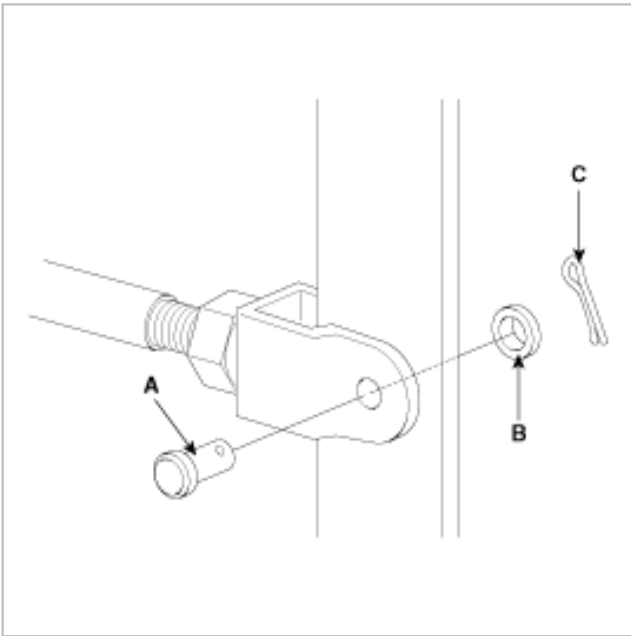
Thank-you for purchasing from me, it
is much appreciated.

To contact me please email
suzlever@gmail.com



REMOVAL

1. Remove the cotter pin (A), washer (B), and clevis pin (C).



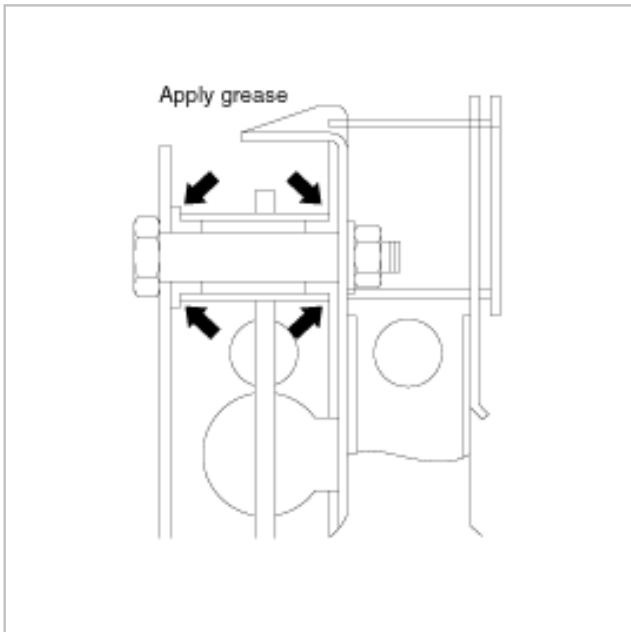
2. Remove the clutch pedal mounting bolts.

INSTALLATION

1. Apply the specified grease to the clutch pedal and bushings.

Chassis grease: SAE J310a, NLGI No.1

2. Install the clutch pedal mounting bolt.



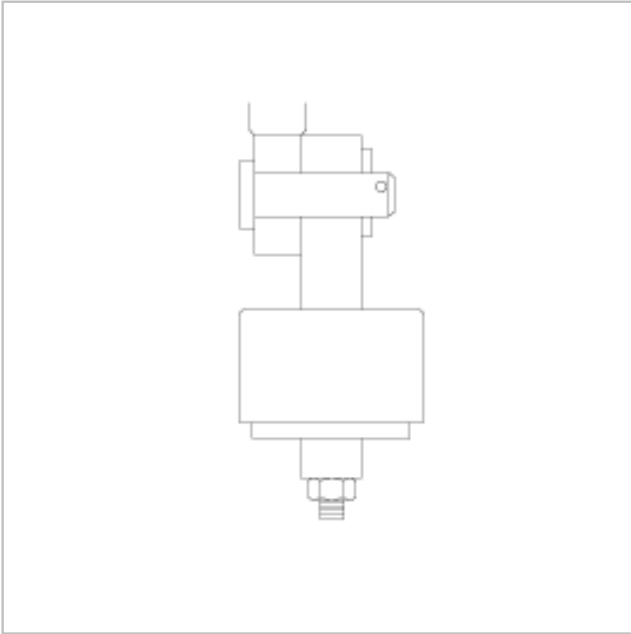
3. Apply the specified grease to the clevis pin and washer.

Buy Use ID: reveleus1

Wheel bearing grease: SAE J310, NLGI No.2

4. Install the push rod to the clutch pedal.

5. Adjust the clutch pedal clevis pin play.

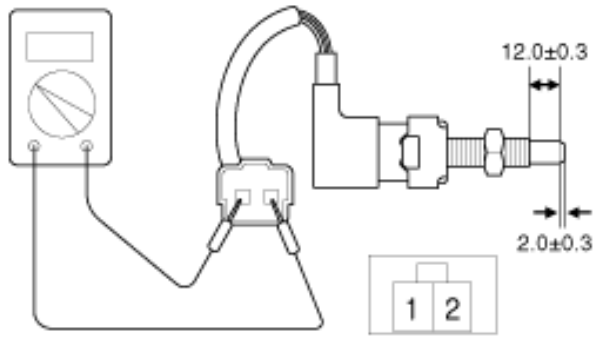


INSPECTION

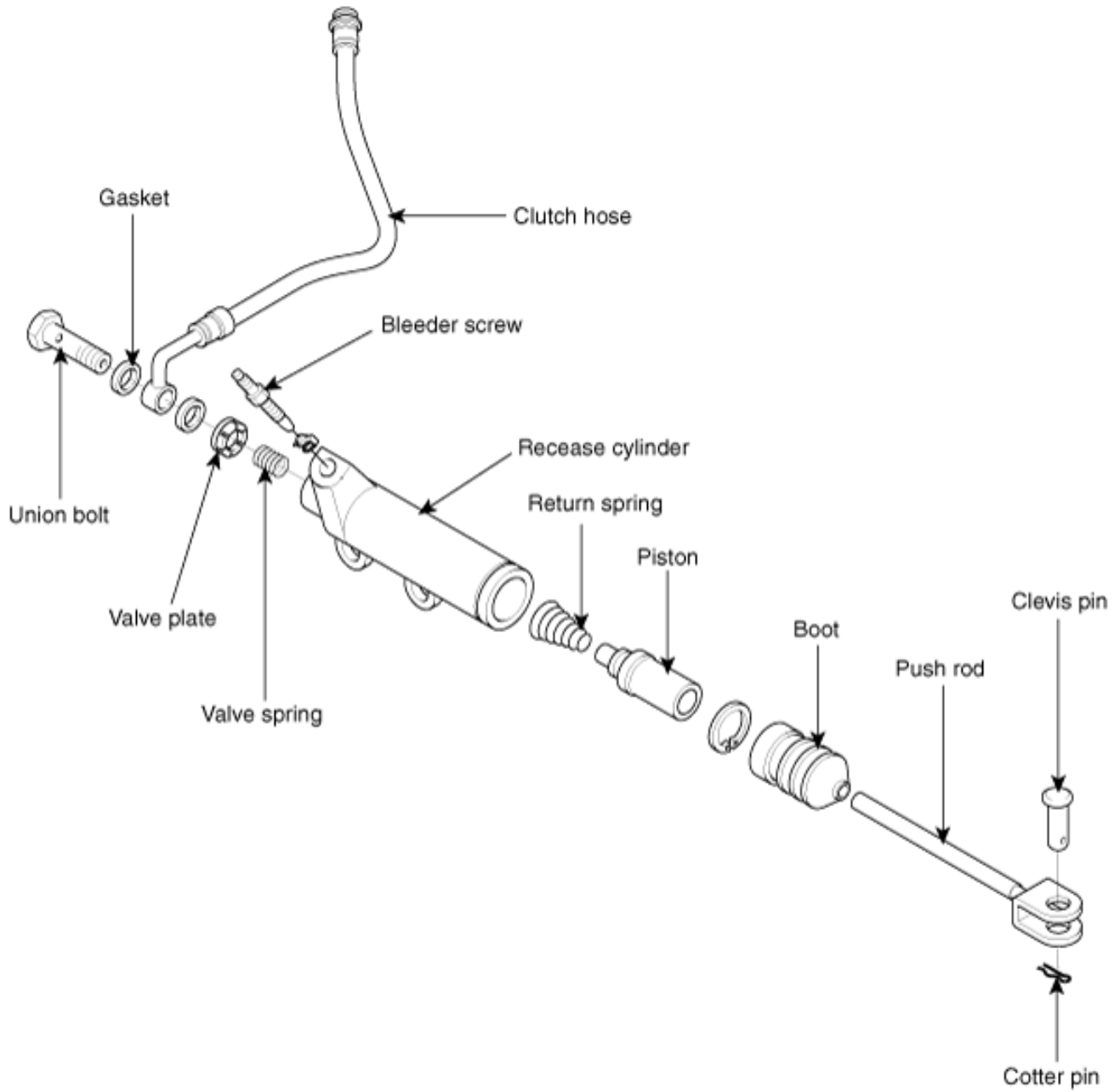
1. Check the pedal shaft and bushing for wear.
2. Check the clutch pedal for bending or torsion.
3. Check the return spring for damage or deterioration.
4. Check the pedal pad for damage or wear.

Ignition lock switch inspection

Terminal	1	2
Condition		
Pushed	●—————●	
Free		



COMPONENTS





REMOVAL

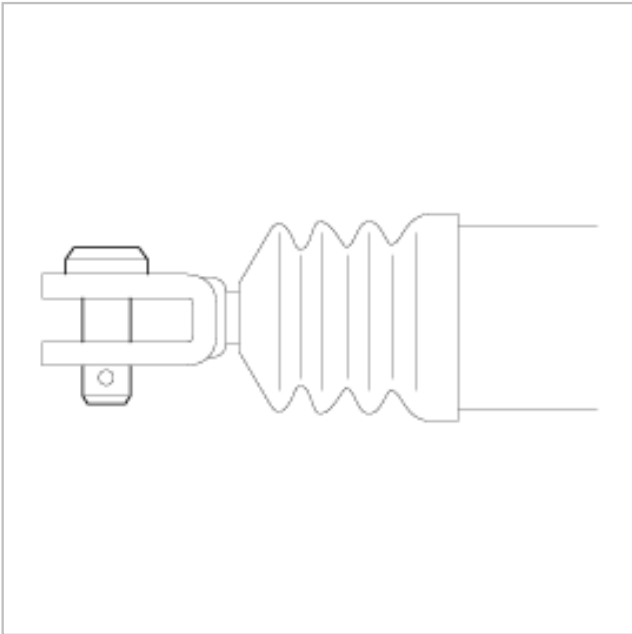
1. Disconnect the clutch tube.
2. Remove the clutch release cylinder mounting bolt.

INSTALLATION

1. Coat the clevis pin with specified grease. Align the hose at the end of the release cylinder push rod with that of the clutch release fork shaft, and insert the clevis pin into the holes.

Specified grease: CASMOLY L9508

2. Install the clutch release cylinder and the clutch tube.



INSPECTION

1. Check the clutch release cylinder for fluid leakage.
2. Check the clutch release cylinder boots for damage.

DISASSEMBLY

1. Remove the clutch hose, valve plate, spring, push rod, and boot.
2. Remove any dirt from the piston bore opening of the release cylinder.

3. Remove the piston from the release cylinder using compressed air.

Buyer ID: 167451

CAUTION

- Use rags to prevent the piston from popping out and causing injury.
- Apply compressed air slowly. Keep the fluid from splashing in your eyes or on your skin.



REASSEMBLY

1. Apply specified brake fluid to the release cylinder bore and the outer surface of the piston and piston cup, and push the piston cup assembly into the cylinder.

Use the specified fluid: Brake fluid DOT 3 or DOT 4

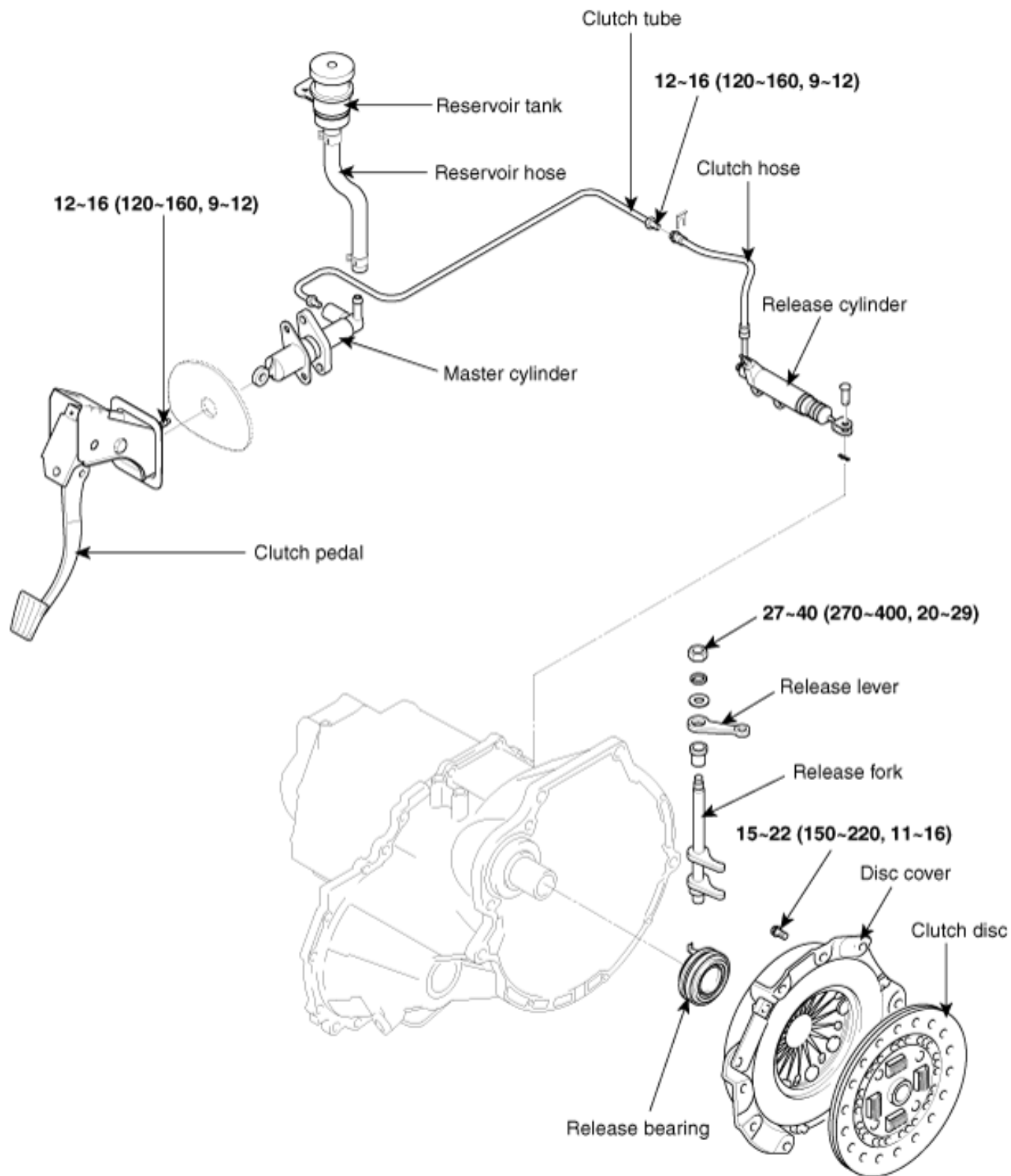
2. Install the valve plate, push rod and boot.

INSPECTION

1. Check the clutch release cylinder for fluid leakage.
2. Check the clutch release cylinder boots for damage.



COMPONENTS



TORQUE: Nm (kg-cm, lb-ft)



SERVICE ADJUSTMENT PROCEDURE

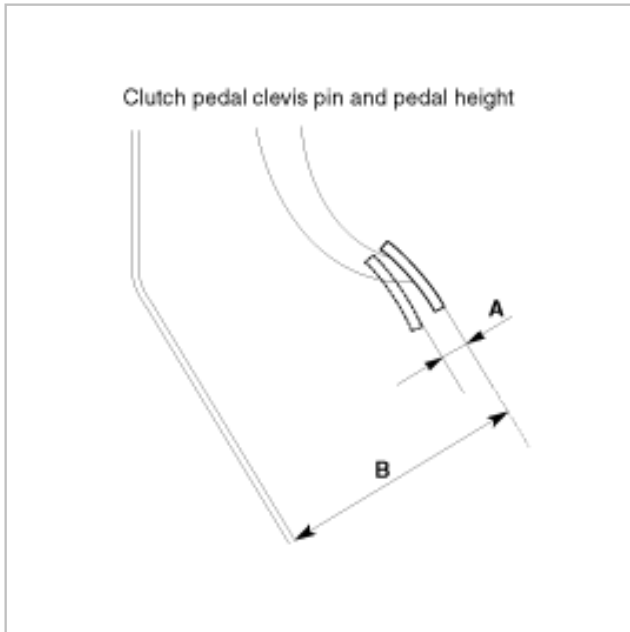
CLUTCH PEDAL INSPECTION AND ADJUSTMENT

1. Measure the clutch pedal height (From the face of the pedal pad to the floorboard) and the clutch pedal clevis pin play (measured at the face of the pedal pad.)

Standard value:

(A) 1 ~ 3 mm (0.04~0.11 in.)

(B) 166.9 mm



2. If the clutch pedal clevis pin free-play is not within the standard value range, adjust as follows:
 - (1) Turn and adjust the bolt, then secure by tightening the lock nut.

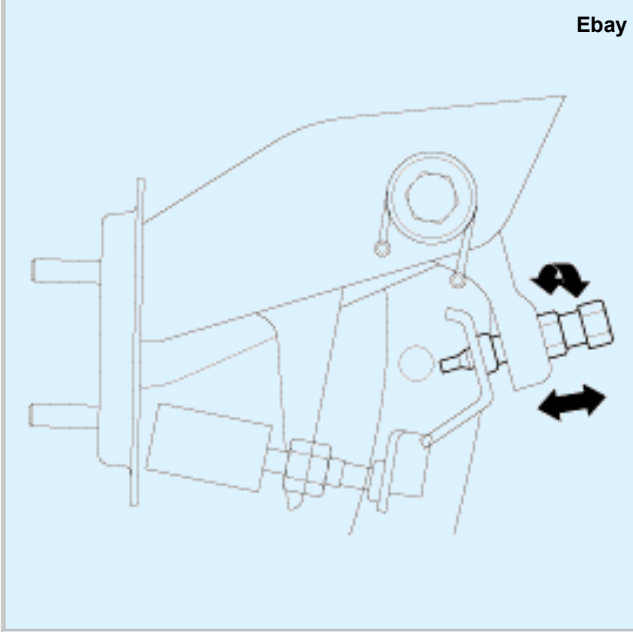
NOTE

After the adjustment, tighten the bolt until it reaches the pedal stopper, and then tighten the lock nut.

- (2) Turn the push rod to agree with the standard value and then secure the push rod with the lock nut.

CAUTION

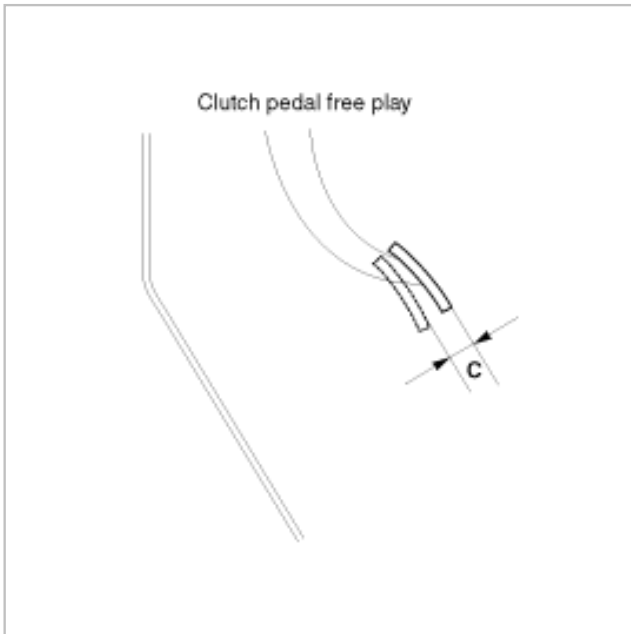
When adjusting the clutch pedal height or the clutch pedal clevis pin play, be careful not to push the push rod toward the master cylinder.



3. After completing the adjustments, check that the clutch pedal free play (measured at the face of the pedal pad) is within the standard value ranges.

Standard value: (C) 6 ~ 13 mm (0.24~0.52 in.)

4. If the clutch pedal free play and the distance between the clutch pedal and the floor board when the clutch is disengaged, do not meet with the standard values, it may be the result of either air in the hydraulic system or a faulty the clutch master cylinder. Bleed the air or disassemble and inspect the master cylinder or clutch.



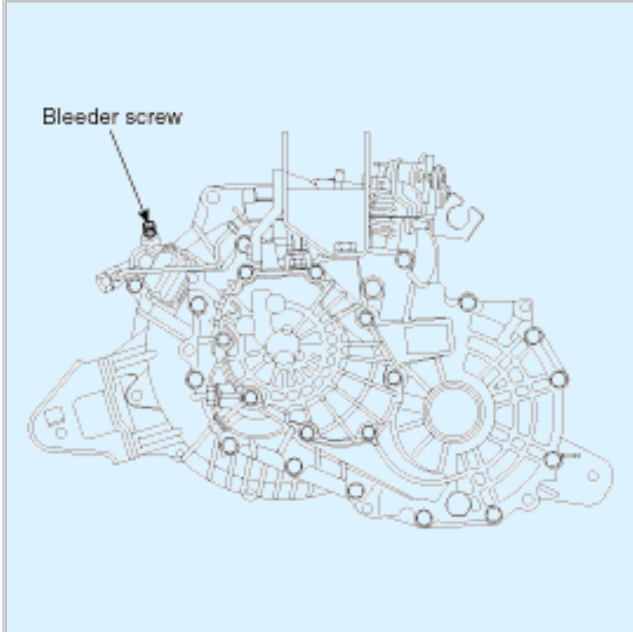
BLEEDING

CAUTION

Ebay User ID: reveleus1

Use the specified fluid. Avoid mixing different brands of fluid.

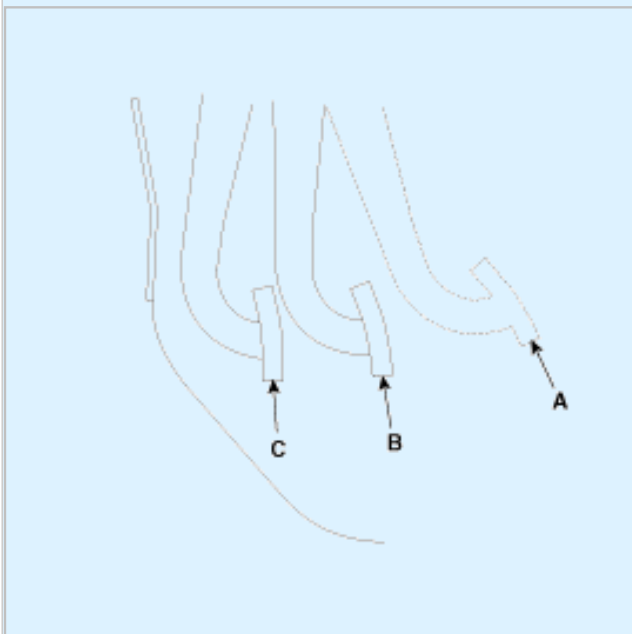
Specified fluid: SAE J1703 (DOT 3 or DOT 4)



1. Loosen the bleeder screw at the clutch release cylinder.
2. Pump the clutch pedal slowly until all air is expelled.
3. Hold the clutch pedal down until the bleeder is retightened.
4. Refill the clutch master cylinder with the specified fluid.

CAUTION

The rapidly-repeated operation of the clutch pedal in B-C range may disrupt the release cylinder's position. During the bleeding operation, press the clutch pedal to the floor after it returns to the "A" point.





SPECIFICATIONS

Clutch operation method	Hydraulic type
Clutch disc Type	Single dry with diaphragm
Facing diameter (outside x inside)mm (in.)	215 x 145 (8.5 x 5.7)
Clutch cover assembly Type	Diaphragm spring strap
Clutch release cylinder * I.D. mm (in.)	20.64 (0.81)
Clutch master cylinder * I.D. mm(in.)	15.87 (0.62)

* I.D: Inside diameter

SERVICE STANDARD

Standard value	
Clutch disc thickness [When free]	8.5 ± 0.3 mm (0.326 ~ 0.350 in.)
Clutch pedal height	166.9 mm
Clutch pedal free play	6 ~ 13 mm (0.24 ~ 0.51 in.)
Clutch pedal stroke	145 mm (5.7 in.)
Limit	
Clutch disc rivet sink	1.1 mm (0.044 in.)
Diaphragm spring end height difference	0.5 mm (0.02 in.)
Clutch release cylinder clearance to piston	0.15 mm (0.006 in.)
Clutch master cylinder clearance to piston	0.15 mm (0.006 in.)

TIGHTENING TORQUE

Item	Nm	kg·cm	lb·ft
Clutch pedal to pedal support member (Clutch pedal bracket)	19 ~ 28	190 ~ 280	14 ~ 20
Clutch pedal support member to master cylinder	8 ~ 10	80 ~ 100	6 ~ 7
Clutch tube flare nut	13 ~ 17	130 ~ 170	9 ~ 13
Clutch tube bracket	4 ~ 6	40 ~ 60	3 ~ 4
Reservoir band	13 ~ 17	130 ~ 170	9 ~ 13
Clutch release cylinder	13 ~ 17	130 ~ 170	9 ~ 13

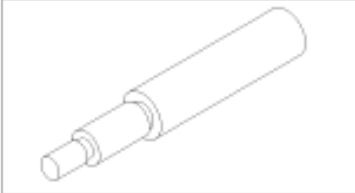
Clutch release cylinder union bolt	Ebay User ID: reveleus1	20 ~ 25	200 ~ 250	15 ~ 18
Clutch cover assembly		15 ~ 22	150 ~ 220	11 ~ 16

LUBRICANTS

Items	Specified lubricants	Quantity
Contact surface of release bearing and fulcrum of clutch release fork	CASMOLY L 9508	As required
Inner surface of clutch release bearing	CASMOLY L 9508	As required
Inner surface of clutch release cylinder and outer circumference of piston and cup	Brake fluid DOT 3 or DOT 4	As required
Inner surface of clutch disc spline	CASMOLY L 9508	As required
Inner surface of clutch master cylinder and outer circumference of piston assembly	Brake fluid DOT 3 or DOT 4	As required
Clutch master cylinder push rod, clevis pin and washer	Wheel bearing grease SAE J310, NLGI No.2	As required
Clutch pedal shaft and bushings	Chassis grease SAE J310a, NLGI No.1	As required
Contact portion of release fork to release cylinder push rod	CASMOLY L 9508	As required
Input shaft spline	CASMOLY L 9508	As required



SPECIAL TOOLS

Tool (Number and name)	Illustraion	Use
09411-11000 Clutch disc guide		Installation of the clutch disc.



p

DTC

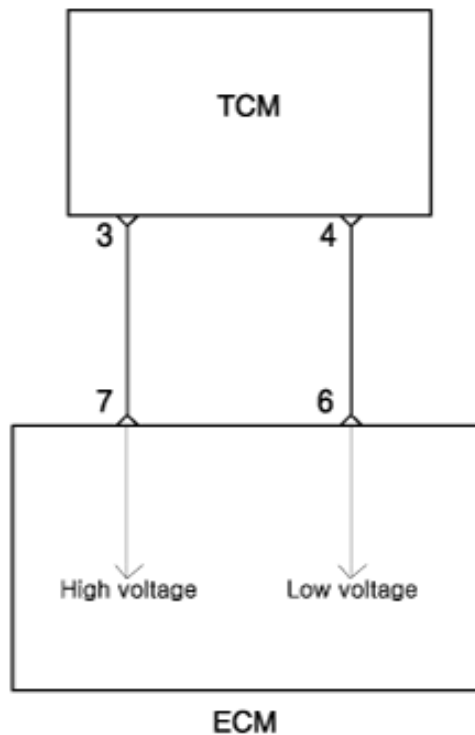
P1602

Serial Communication Problem with TCM (Time out)

DTC DETECTING CONDITION

DTC No	Detecting Condition & Limp Home	Suspected area
P1602	<p>Detecting Condition No message is received from TCM, after activation of the CAN-diagnosis.</p> <p>Enable Condition</p> <ul style="list-style-type: none"> - Battery voltage > 10V - Engine speed > 32rpm <p>Limp Home None</p>	<ul style="list-style-type: none"> - Open or short in serial communication circuit - TCM - ECM

SCHEMATIC DIAGRAM



INSPECTION PROCEDURES

1. CHECK ECM AND TCM CONNECTORS

1. Thoroughly check the connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

Are all connectors good?

Yes

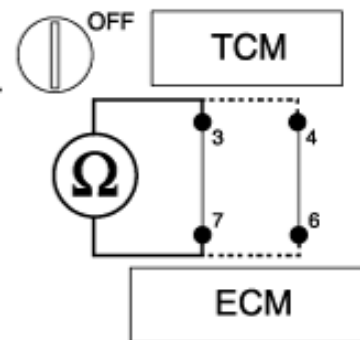
No Repair or replace it.

2. CHECK FOR OPEN IN HARNESS

1. Turn ignition switch to OFF position and disconnect the ECM and TCM connectors.
2. Measure the resistance between terminal 7 of the ECM harness connector and 3 of the TCM harness connector.
3. Measure the resistance between terminal 6 of the ECM harness connector and 4 of the TCM harness connector.

• **Specification: below 1Ω**

Does each resistance indicate continuity?



Yes

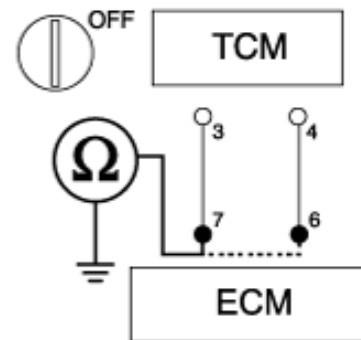
No Repair open in harness.

3. CHECK FOR SHORT TO GROUND IN HARNESS

1. Keep the ECM and TCM connectors disconnected.
2. Measure the resistance between terminal 7 of the ECM harness connector and chassis ground.
3. Measure the resistance between terminal 6 of the ECM harness connector and chassis ground.

• **Specification: infinite**

Does each resistance indicate open?



Yes

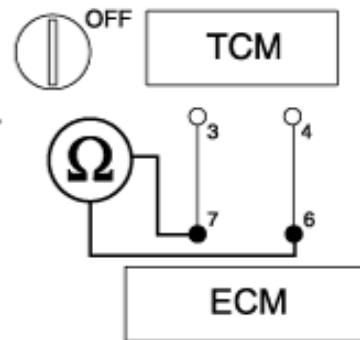
No Repair short to chassis ground in harness.

4. CHECK FOR SHORT IN HARNESS

1. Keep the ECM and TCM connectors disconnected.
2. Measure the resistance between terminals 6 and 7 of the ECM harness connector.

• **Specification: infinite**

Does resistance indicate open circuit?



Yes

No

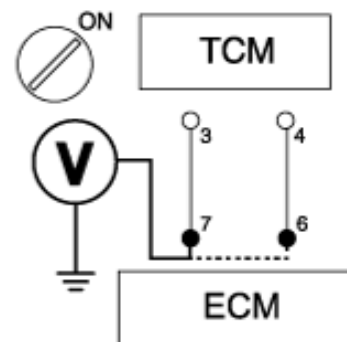
Repair short in harness.

5. CHECK FOR SHORT TO POWER IN HARNESS

1. Keep the ECM and TCM connectors disconnected.
2. Turn ignition switch to ON position.
3. Measure the voltage between terminal 7 of the ECM harness connector and chassis ground.
4. Measure the voltage between terminal 6 of the ECM harness connector and chassis ground.

• **Specification: below 0.5V**

Is voltage within specifications?



Yes

No

Repair short to power in harness.

Check the fault code related to the TCM and proceed with the ECM problem procedure.



TROUBLESHOOTING

Trouble symptom		Suspect area	Remedy (See page)
Clutch slipping •Car will not respond to engine speed during acceleration •Insufficient vehicle speed •Lack of power during uphill driving		Insufficient pedal free play	Adjust
		Clogged hydraulic system	Correct or replace parts
		Excessive wear of clutch disc facing	Replace
		Hardened clutch disc facing, or oil on surface	Replace
		Damaged pressure plate or flywheel	Replace
		Weak or broken pressure spring	Replace
Difficult gear shifting (gear noise during shifting)		Excessive pedal free play	Adjust
		Hydraulic system fluid leaks, air trapping or clogging	Repair or replace parts
		Unusual wear or corrosion of the clutch disc spline	Replace
		Excessive vibration (distortion) of the clutch disc	Replace
Clutch noisy	When the clutch is not used	Insufficient play of the clutch pedal	Adjust
		Excessive wear of the clutch disc facing	Replace
	A noise is heard after the clutch is disengaged	Unusual wear and/ or damage of the release bearing	Replace
	A noise is heard when the clutch is disengaged	Insufficient grease on the sliding surface of the bearing sleeve	Repair
		Improperly installed the clutch assembly or bearing	Repair
A noise is heard when the car suddenly rolled up with the clutch partially engaged	Damaged pilot bushing	Replace	
Hard pedal effort		Insufficient lubrication of the clutch pedal	Repair

	Insufficient lubrication of the spline part of clutch disc	Repair
	Insufficient lubrication of the clutch release lever shaft	Repair
	Insufficient lubrication of the front bearing retainer	Repair
Hard to shift or will not shift	Excessive clutch pedal free play	Adjust the pedal free play
	Faulty of the clutch release cylinder	Repair the release cylinder
	Clutch disc out of place, runout is excessive or lining broken	Inspect the clutch disc
	Spline on the input shaft or clutch disc dirty or burred	Repair as necessary
	Faulty of the clutch pressure plate	Replace the clutch cover
Clutch slips	Insufficient of the clutch pedal free play	Adjust the pdal free play
	Clogged of the hydraulic system	Repair or replace parts
	Clutch disc lining oily or worn out	Inspect the clutch disc
	Faulty of the pressure plate	Replace the clutch cover
	Binding of the release fork	Inspect the release fork
Clutch grabs/chatters	Clutch disc lining oily or worn out	Inspect the clutch disc
	Faulty the pressure plate	Replace the clutch cover
	Bent the clutch diaphragm spring	Replace the clutch cover
	Worn or broken torsion spring	Replace the clutch disc
	Loose the engine mounts	Repair as necessary
Clutch noisy	Damaged the clutch pedal bushing	Replace the clutch pedal bushing
	Loose part inside housing	Repair as necessary
	Worn or dirty release bearing	Replace the replease bearing
	Sticking release fork or linkage	Repair as necessary