CH-2 Clutch System

General Information

Specifications

Item	Specification
Clutch operation method	Hydraulic type
Clutch disc Type Facing diameter (outside x inside)mm (in)	 Single dry with diaphragm • Gasoline 1.4 / 1.6 : Ø215 × Ø145 (Ø8.5 × Ø5.7) • Gasoline 2.0 : Ø225 × Ø150 (Ø8.9 × Ø5.9) • Diesel 1.6 / 2.0 : Ø240 × Ø155 (Ø9.4 × Ø6.1)
Clutch cover assembly Type	 Diaphragm spring strap
Clutch release cylinder [M5CF only] * 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]	Diesel 1.6 : 8.7 ± 0.3 mm (0.343 ± 0.012 in) Diesel 2.0 : 8.5 ± 0.3 mm (0.334 ± 0.012 in)
Clutch pedal height [Without carpet]	Gasoline : 8.55 ± 0.3 mm (0.335 ±0.012 in)
Clutch pedal free play	182.8 mm (7.19 in)
Clutch pedal stroke	6 ~ 13 mm (0.24 ~ 0.51 in)
	Gasoline : 140 ± 3mm (5.5 ± 0.12 in) Diesel : 150 ± 3mm (5.9 ± 0.12 in)
Limit	
Clutch disc rivet depth	Gasoline 1.4 / 1.6 : 1.4 mm (0.055 in) Gasoline 2.0 : 1.2 mm (0.047 in) Diesel 1.6 : 1.3 mm (0.051 in) Diesel 2.0 : 1.0 mm (0.0394 in)
Diaphragm spring end height difference	Diesel 1.6 / Gasoline : 0.5 mm (0.02 in) Diesel 2.0 : 0.8 mm (0.0315 in)
Clutch master cylinder clearance to piston	0.15 mm (0.006 in)

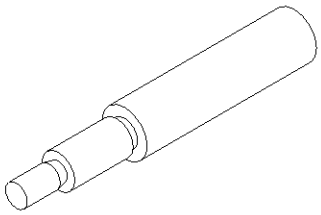
Tightening Tightening torques

Items		N.m	kgf.m	lb-ft
Clutch pedal to pedal support member (Clutch pedal bracket)		17 ~ 26	1.7 ~ 2.6	12.3~ 18.8
Clutch pedal support member to master cylinder		6 ~ 8	0.6 ~ 0.8	4.3 ~ 5.8
Clutch tube flare nut		13 ~ 17	1.3 ~ 1.7	9.4 ~ 12.4
Clutch tube bracket		8~ 10	0.8 ~ 1.0	5.8 ~ 7.24
Clutch release cylinder		15 ~ 22	1.5 ~ 2.2	10.9 ~ 16.0
Clutch release cylinder union bolt		25 ~ 35	2.5 ~ 3.5	18.1 ~ 25.5
Clutch cover assembly	Gasoline(6ea)	15 ~ 22	1.5 ~ 2.2	10.9 ~ 16.0
	Disesel 1.6(9ea)	12 ~ 15	1.2 ~ 1.5	8.7 ~ 10.9
	Disesel 2.0(6ea)	25 ~ 36	2.5 ~ 3.6	18.1 ~ 26.0
Ignition lock switch nut		8 ~ 10	0.8 ~ 1.0	5.8 ~ 7.3

Lubricants

Items	Specified lubricants	Quantity
Contact surface of release bearing and fulcrum of clutch release fork	CASMOLY L9508	As required
Inner surface of clutch release bearing	CASMOLY L9508	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 L9508	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.2V	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 L9508	As required
Input shaft spline	CASMOLY L9508	As required

Special Service Tools

Tool (Number and name)	Illustration	Use
09411-11000 Clutch disc guide	 EOKD001A	Installation of the clutch disc.

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 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
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 burned	Repair as necessary
		Faulty of the clutch pressure plate	Replace the clutch cover

Trouble symptom	Suspect area	Remedy (See page)
Clutch slips	Insufficient clutch pedal free play	Adjust the pedal free play
	Clogged of the hydraulic system	Repair or replace parts
	Clutch disc lining oily or worn out	Inspect the clutch disc
	Faulty 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 clutch diaphragm spring	Replace the clutch cover
	Worn or broken torsion spring	Replace the clutch disc
	Engine mounts loose	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

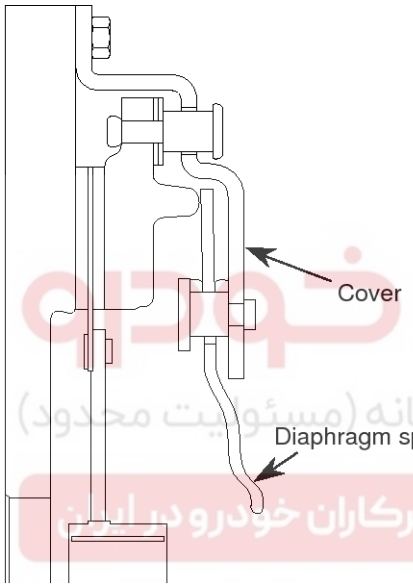
Clutch System

Description

SELF ADJUSTING CLutch(S.A.C.) Cover

- As a clutch disc facing is worn away according to its durability, a cover weight is increasing and a clutch pedal pressure can be more needed.
- To make up for this defect, the self adjusting clutch system makes the requsted pedal pressure minimized so that makes the maintenance cycle longer.

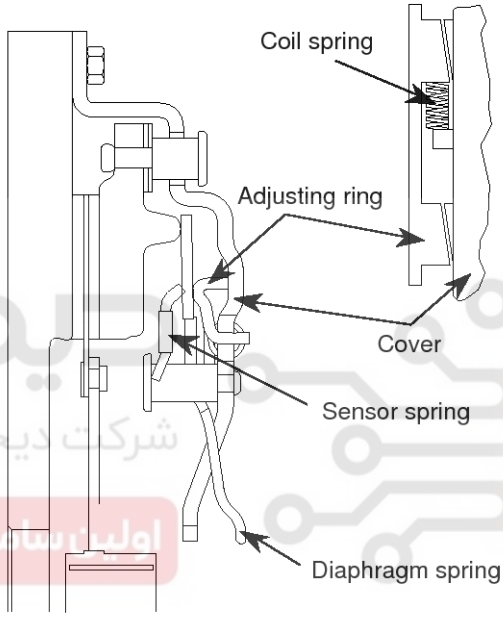
GENERAL CLUTCH COVER



· In a general clutch cover, the diaphragm spring increases the weight to the disc in proportion to abrasion.

[M5CF]

SELF ADJUSTING CLUTCH COVER



· In a self adjusting clutch, the adjusting ring prevents the diaphragm spring from being raised to the transmission side in spite of abrasion.

[M6GF2]

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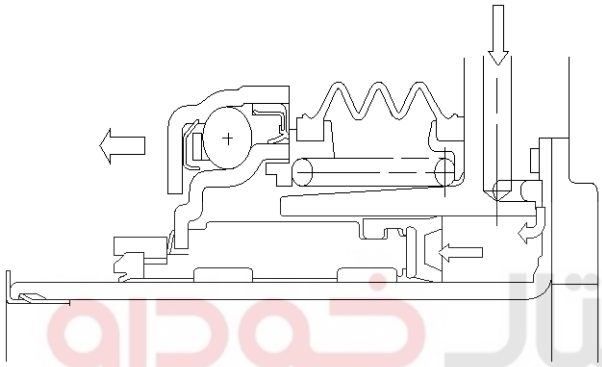
Concentric Slave Cylinder-C.S.C.

It improves working efficiency and lowers the number and the weight of part by unifing clutch release control parts(clutch release bearing ~ clutch release cylinder) in a manual transaxle.

Operation

Concentric Slave Cylinder-C.S.C

When the clutch pedal is pressed, oil pressure is transmitted along the arrow directions shown below and that moves the clutch slave cylinder and the diaphragm spring of the clutch cover.



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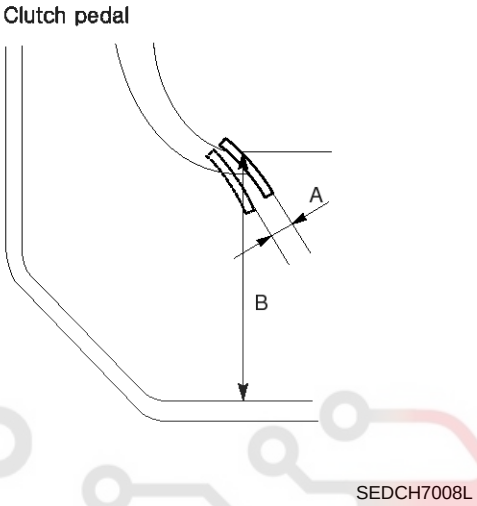
Service Adjustment Procedure

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) : 6 ~ 13 mm (0.24~0.51 in)
(B) : 182.8 mm (7.19 in)



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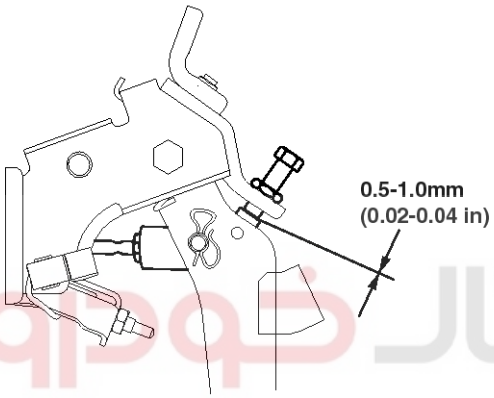
2. If the clutch pedal freeplay and height is not within the standard value range, adjust as follows:
   1) Turn and adjust the bolt within the standard value, then secure by tightening the lock nut.

      NOTICE

      If the clutch pedal height is lower than the standard value, loosen the bolt and adjust the push rod.

      After adjustment, tighten the bolt so that the clearance with pedal stopper becomes 0.5mm(0.02 in) to 1.0mm (0.04 in) and secure with lock nut.



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   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 play, be careful not to push the push rod toward the master cylinder.

3. 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 clutch master cylinder. Bleed the air or disassemble and inspect the master cylinder or clutch.

Bleeding

Whenever the clutch tube, the clutch hose, and/or the clutch master cylinder have been removed, or if the clutch pedal is spongy, bleed the system.

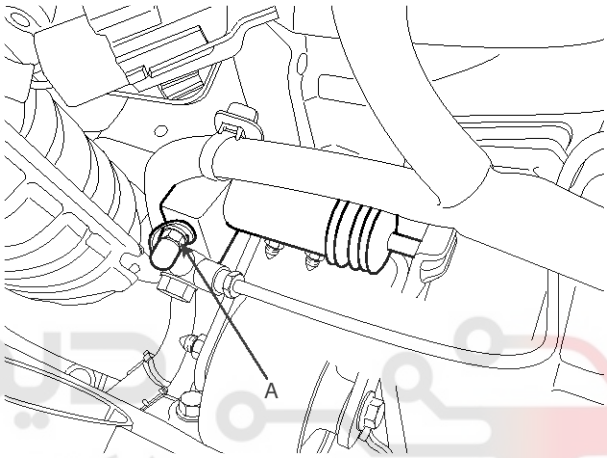
CAUTION

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

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

[M5CF]

1. Loosen the bleeder screw(A) at the clutch release cylinder.



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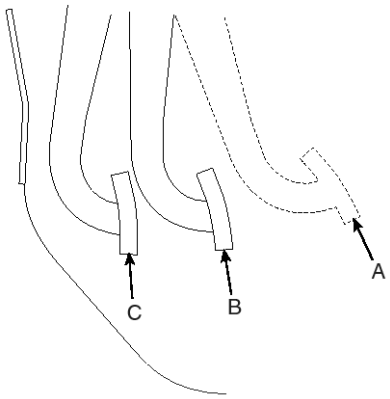
2. Depress the clutch pedal slowly until all air is expelled.
3. Hold the clutch pedal down until the bleeder is retightened.

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.



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[M6GF2]

Concentric Slave Cylinder Air Bleeding Procedure

1. After disconnecting a cap from the concentric slave cylinder air bleeder, insert a vinyl hose in the plug.
2. Loosening the plug screw, press and release the clutch pedal about 10 times.

NOTICE

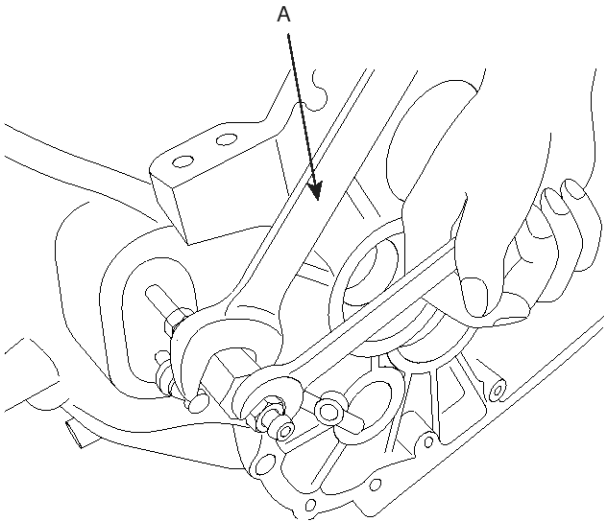
Hold the air bleeder body not to rotate with a spanner(A). The holding is needed when the plug loosened or tightened.

3. Tighten the plug during the clutch pedal pressed. Afterwards, raise the pedal with a hand.

Tightening Tightening torque :
25~29N.m (2.5~2.9Kgf.m, 18~21lb-ft)

4. After pressing the clutch pedal 3 times more, loosen the plug and retighten it with the pedal pressed. Raise it again, then.

5. Repeat the step 4 two or three times. (until there is no bubble in the fluid)



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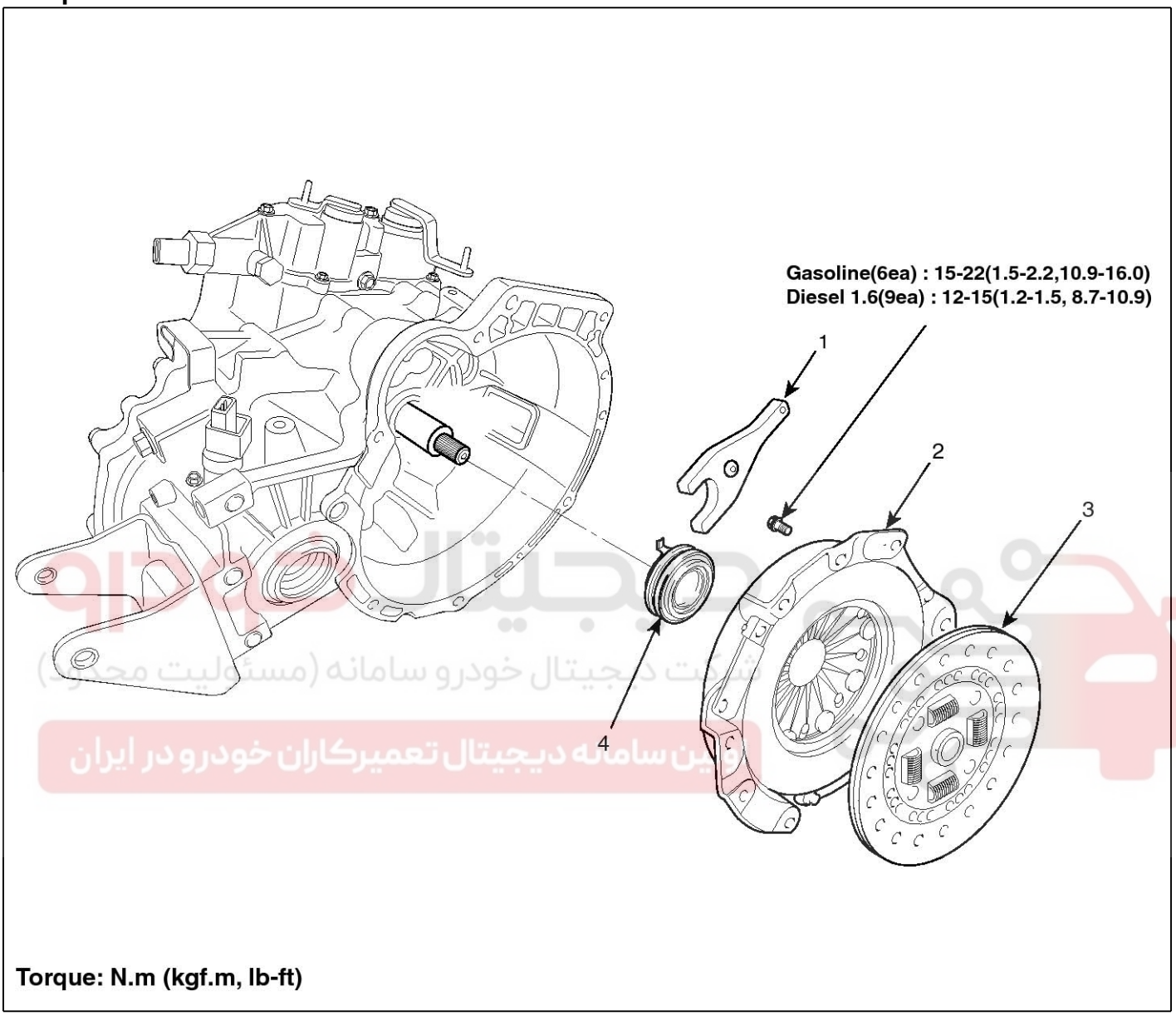
CAUTION

1. **Do not clamp the pipe of a concentric slave cylinder.**
2. **Be careful not to damage O-rings.**

Clutch Cover And Disc

Components



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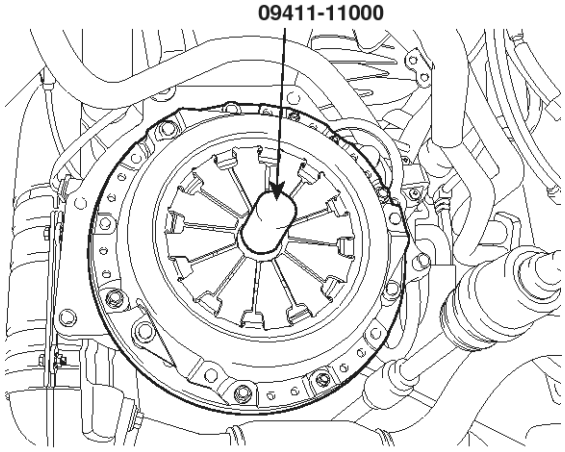
1. Clutch release fork
2. Clutch disc cover
3. Clutch disc
4. Clutch release bearing (Gasoline & Diesel U1.6)

Removal

1. Remove the transaxle assembly. (Refer to Manual transaxle's removal in MT group)
2. Insert the special tool (09411-11000) in the clutch disc to prevent the disc from shifting.



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3. Loosen the bolts(Gasoline : 6ea, Diesel 1.6 : 9ea, Diesel 2.0 : 6ea) 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.

NOTICE

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

Installation

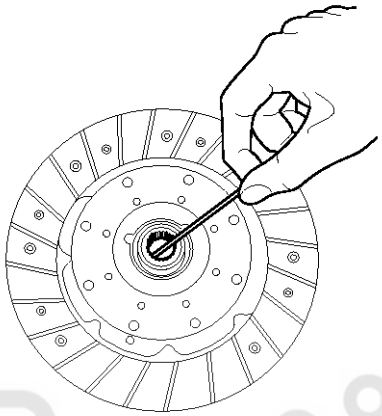
1. Apply multipurpose grease to the spline of the disc.

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 vibration (shudder).



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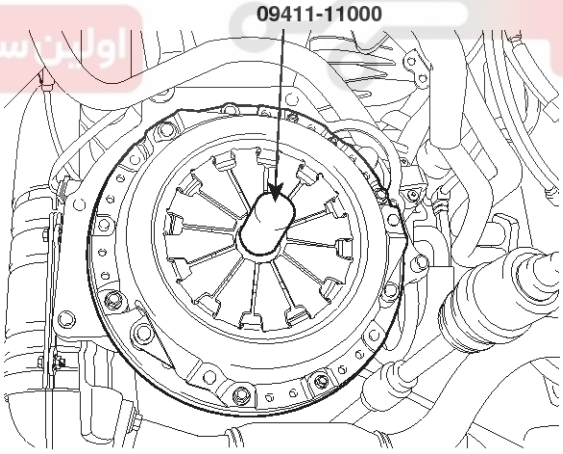
2. Temporarily install the clutch disc assembly to the flywheel using the special tool (09411-11000).



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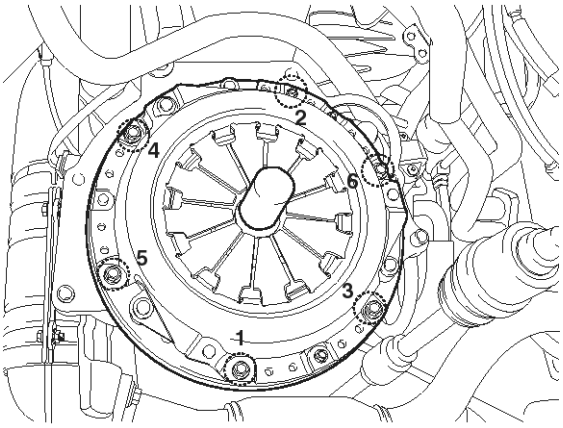
3. Tighten the bolts one or two steps at a time in a star pattern.

[GASOLINE]

Tightening torque :
15 ~ 22 N.m (1.5 ~ 2.2 kgf.m, 10.9 ~ 16.0 lb-ft)



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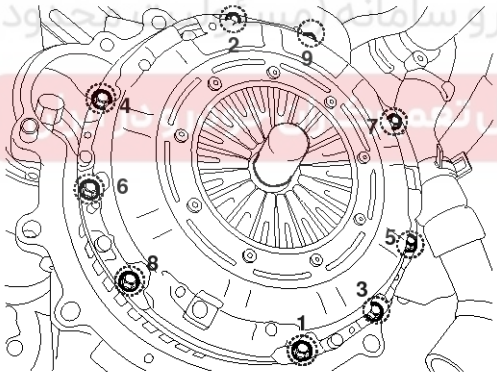
[DIESEL 1.6]

Tightening torque :
12 ~ 15 N.m (1.2 ~ 1.5 kgf.m, 8.7 ~ 10.9 lb-ft)



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[DIESEL 2.0]

Tightening torque :
25 ~ 36 N.m (2.5 ~ 3.6 kgf.m, 18.1 ~ 26.0 lb-ft)

4. Remove the clutch disc guide (09411-11000).
5. Install the transaxle assembly to the engine. (Refer to Manual transaxle's installation in MT group)

Inspection

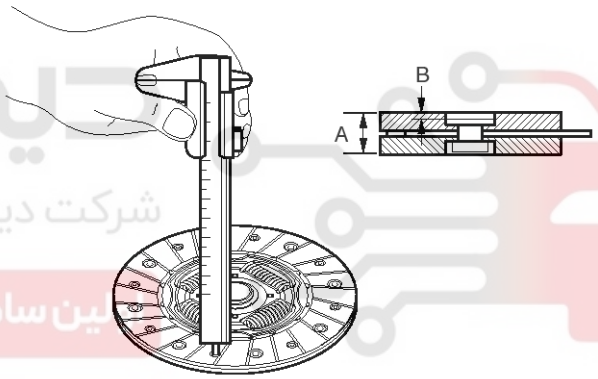
Clutch Cover Assembly

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.

Standard value
Clutch disc thickness(A)[when free]
Clutch disc rivet depth(B)
: refer to 'SERVICE STANDARD' in GENERAL section.



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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.

Standard grease : CASMOLY L9508

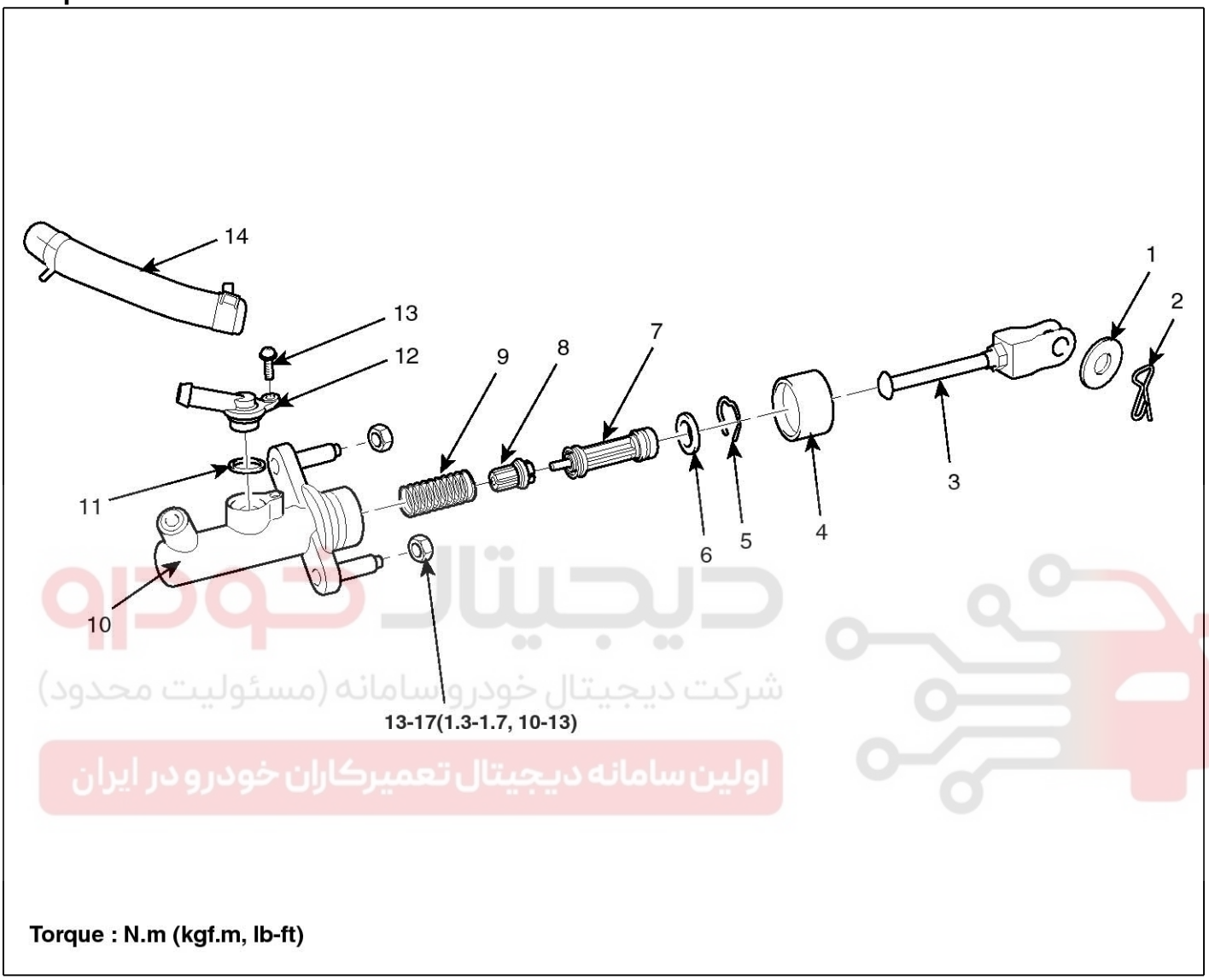
1. Check the bearing for seizure, damage or abnormal noise. Also check the diaphragm spring contacting points for wear.
2. Replace the bearing if the release fork contacting points are worn abnormally.

Clutch release fork

If there is abnormal wear at the point of contact with the bearing, replace the release fork assembly.

Clutch Master Cylinder

Components



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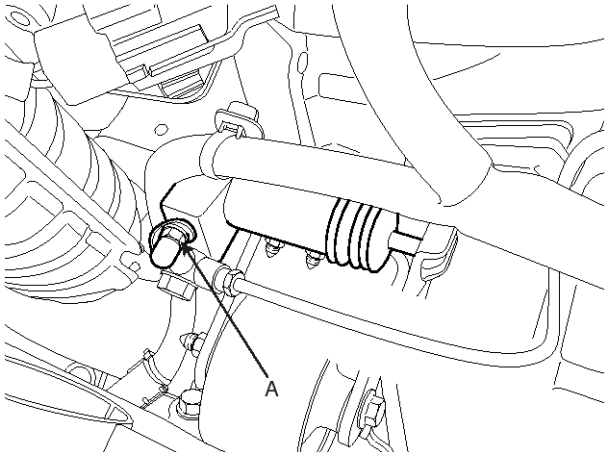
1. Washer
2. Snap pin
3. Rod assembly
4. Boot
5. Key
6. Plate
7. Piston assembly
8. Spring seat
9. Spring
10. Body assembly
11. O-ring
12. Nipple
13. Bolt
14. Flexible hose

Removal

1. Drain the brake fluid through the bleeding plug (A).



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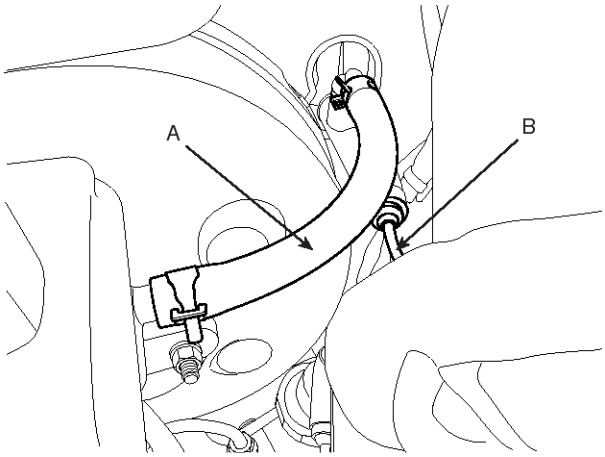
2. Remove the flexible hose (A) connected to brake reserve tank from the master cylinder.

[LHD]



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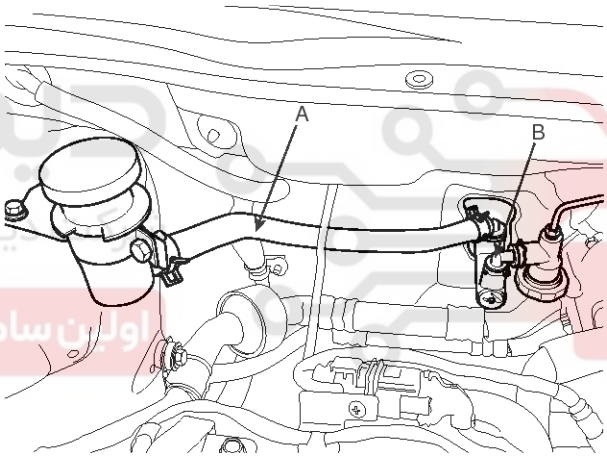
[RHD]



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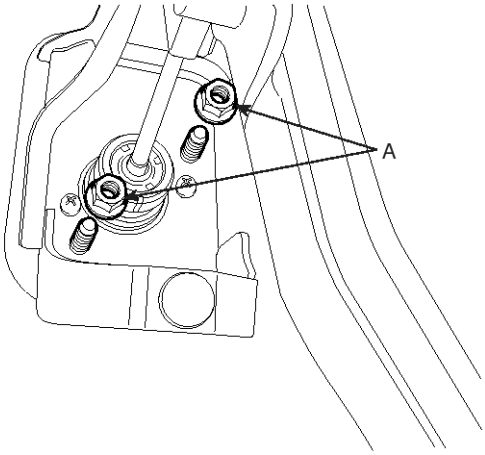
3. Disconnect the clutch tube (B) from the master cylinder.
4. Disconnect the two ignition lock switch connectors.

5. Remove the clutch pedal mounting nuts(A-2ea) and the bracket mounting nut.

[LHD]



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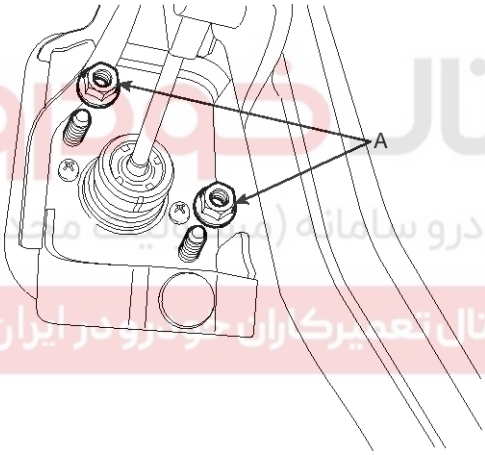
[RHD]



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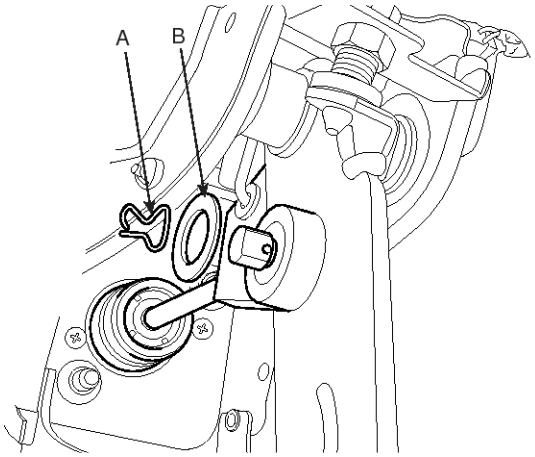
6. Disconnect the push rod from the master cylinder by removing the snap pin (A) and washer (B).

[LHD]



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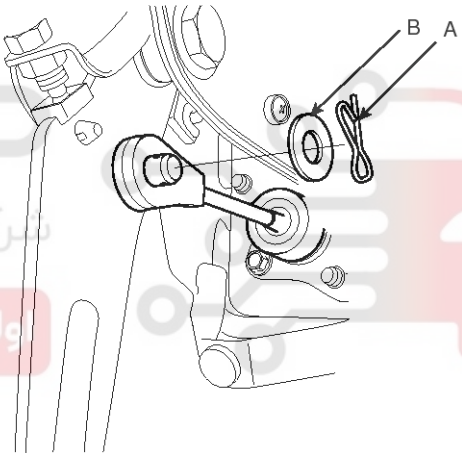

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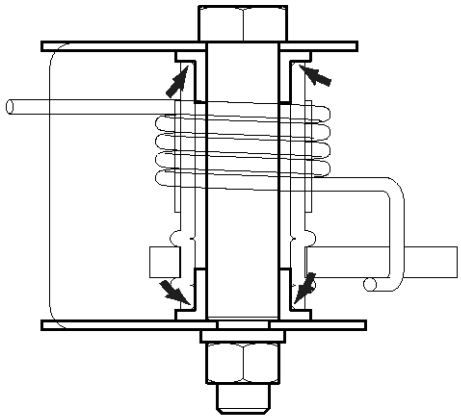
7. Remove the screws mounting the master cylinder to the clutch pedal assembly.

Installation

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

Chassis grease: SAE J310a, NLGI No.1



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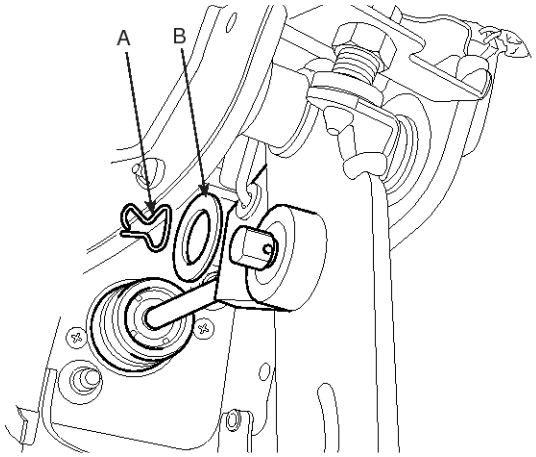
2. Install the screws or nut mounting the master cylinder to the clutch pedal assembly.
3. Apply the specified grease to the snap pin(A) and washer.

Wheel bearing grease: SAE J310, NLGI No.2

4. Connect the push rod to the clutch pedal by installing the snap pin (A) and washer (B).

[LHD]



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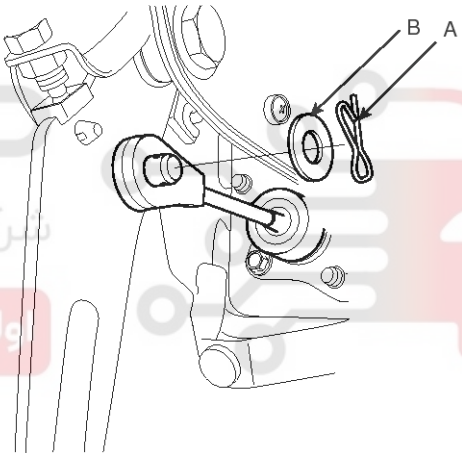

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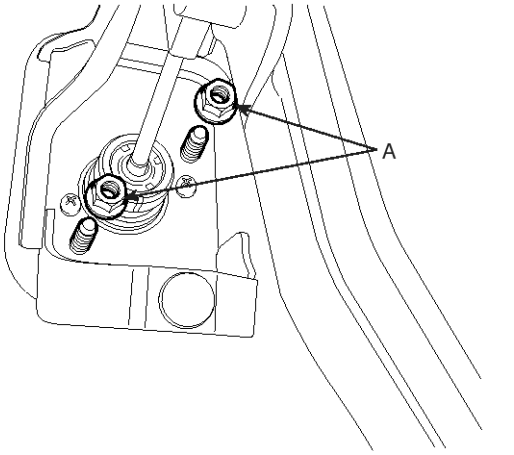
5. Install the clutch pedal mounting nuts (A-2ea).

Tightening torque :
17 ~ 26N.m (1.7 ~ 2.6kgf.m, 12.3 ~ 18.8lb-ft)

[LHD]



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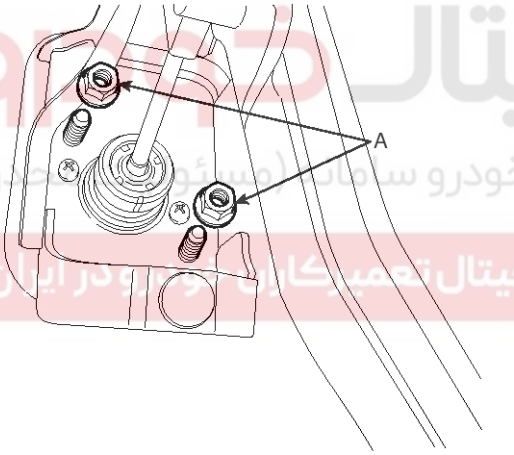
[RHD]



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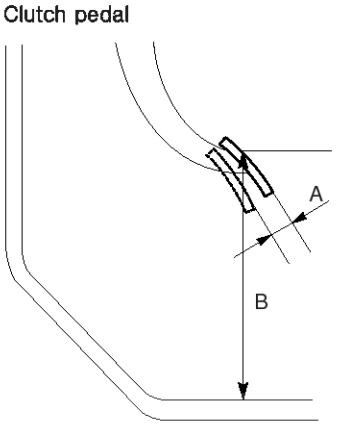
6. Adjust the clutch pedal within the standard value, then secure by tightening the lock nut.

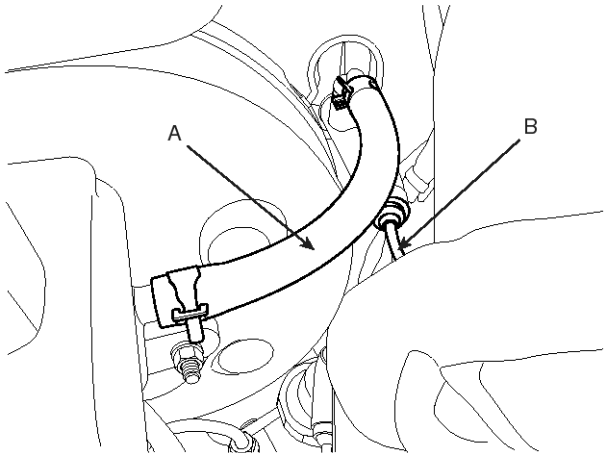
Standard value
Free play (A)
6~13mm (0.24~0.51 in)
Height (B)
182.8mm (7.19 in)



SEDCH7008L

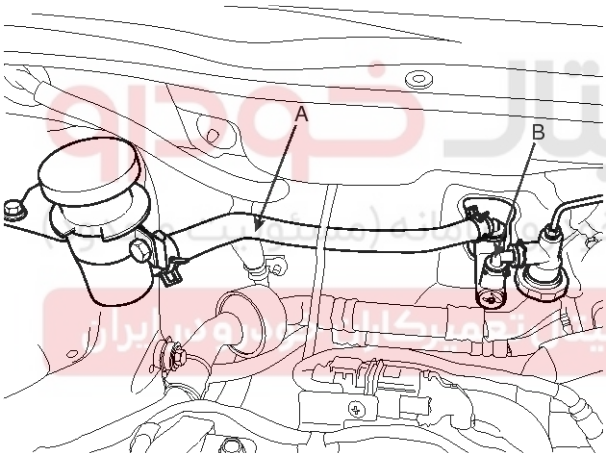
7. Connect the flexible hose of the brake reserve tank to the master cylinder.

[LHD]



SHDCH6010D

[RHD]



SHDCH6007L

8. Connect the clutch tube(B) to the master cylinder.
9. Refill the brake fluid.
10. Bleed the air in the clutch system.(refer to Bleeding in Serive Adjustment Procedure)

Disassembly

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

NOTICE

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

Inspection

1. Check the inside of the cylinder body for rust, pitting or scoring.
2. Check the piston cup for wear or distortion.
3. Check the piston for rust, pitting or scoring.
4. Check to make sure the clutch line tube is not clogged or restricted in any way.
5. Measure the master cylinder inside diameter and the piston outside diameter with a cylinder gauge micrometer.

NOTICE

Measure the inside diameter of the master cylinder at three places (bottom, middle, and top) in a perpendicular direction.

6. If the master cylinder-to-piston clearance exceeds the limit, replace the master cylinder and/or piston assembly.

Limit : 0.15 mm (0.006 in)

Reassembly

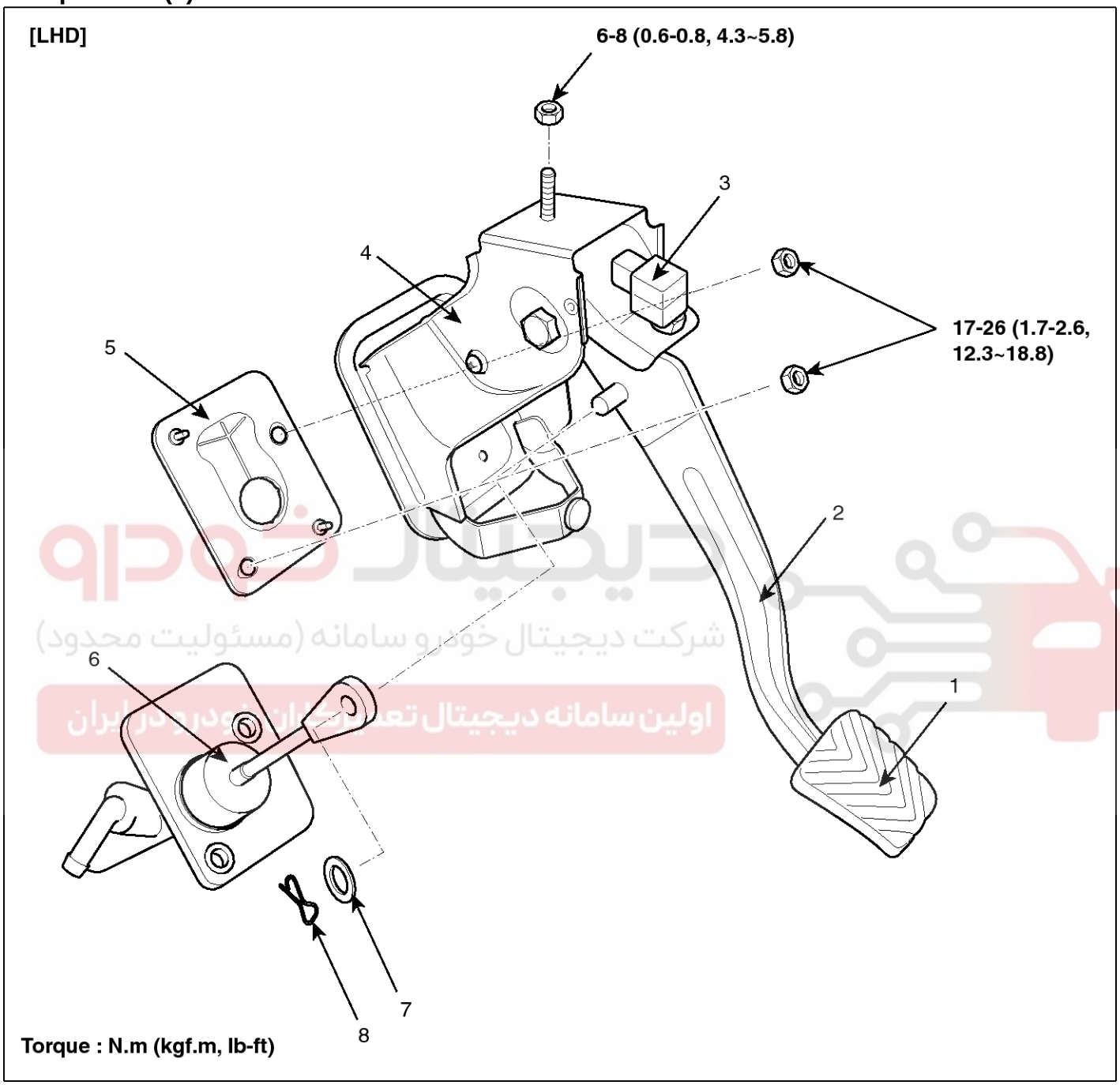
1. Apply the specified fluid to the inner surface of the master cylinder body (A) and to the entire periphery of the piston assembly (B).

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.

Clutch Pedal

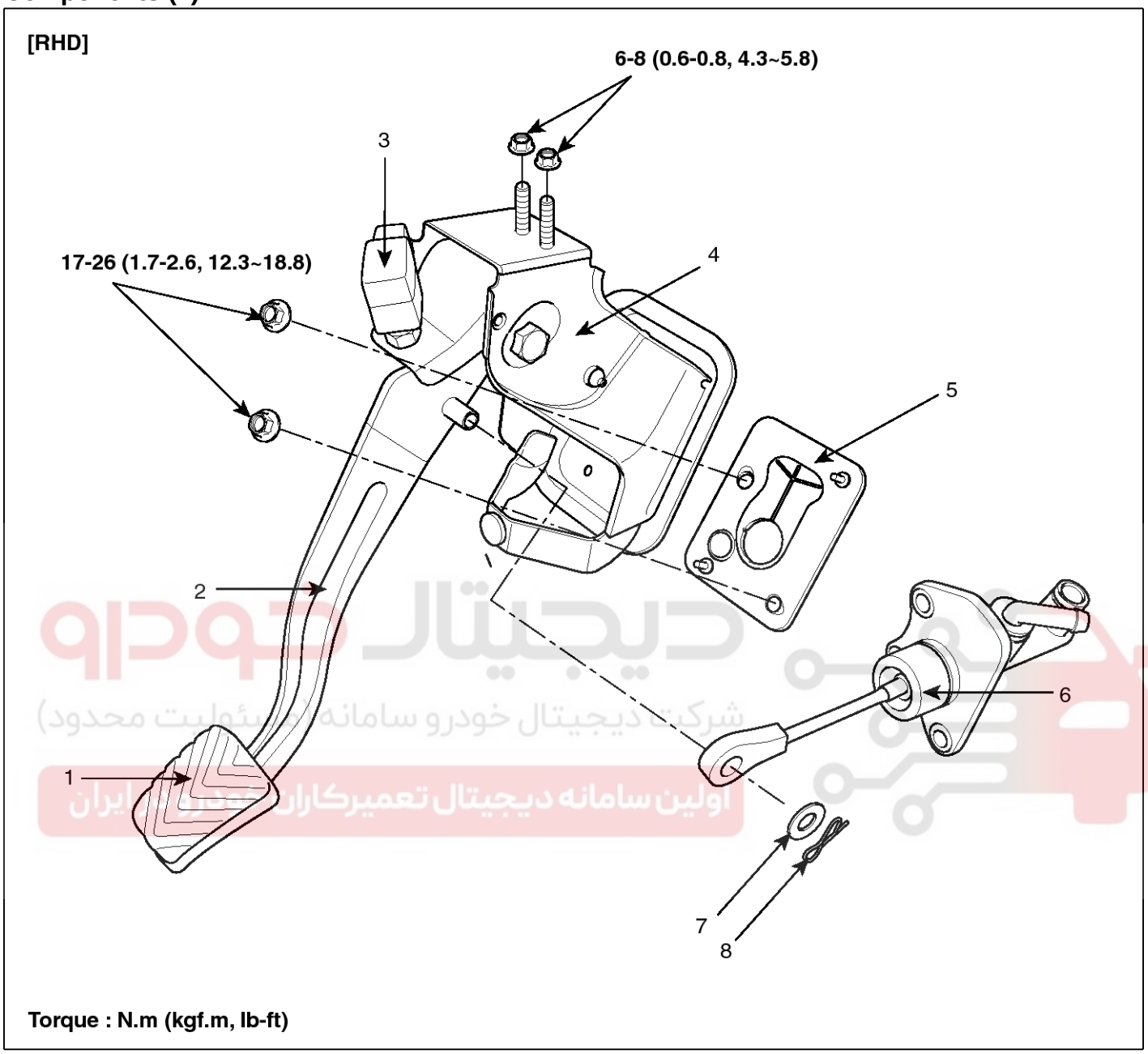
Components (1)



SFDCH8002L

1. Pedal pad
2. Clutch arm assembly
3. Ignition lock switch
4. Clutch member assembly
5. Dust cover
6. Master cylinder assembly
7. Washer
8. Snap pin

Components (2)

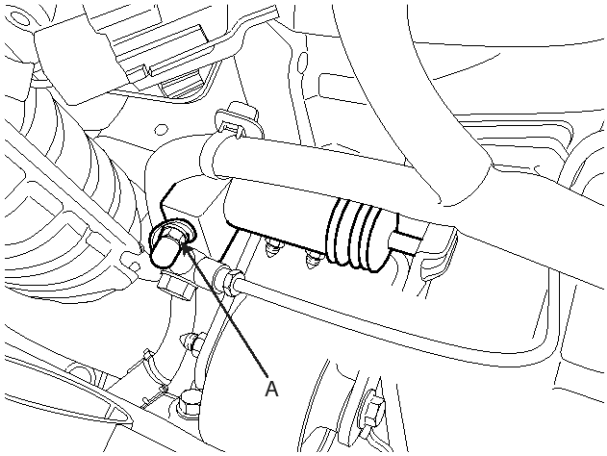


SFDCH8003L

1. Pedal pad
2. Clutch arm assembly
3. Ignition lock switch
4. Clutch member assembly
5. Dust cover
6. Master cylinder assembly
7. Washer
8. Snap pin

Removal

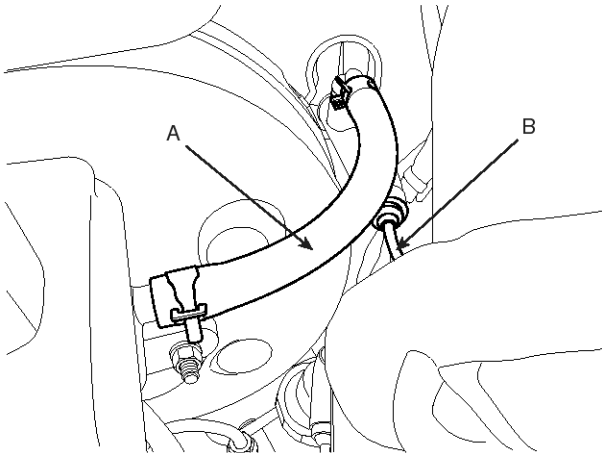
1. Drain the brake fluid through the bleeding plug (A).



SLDCH7002D

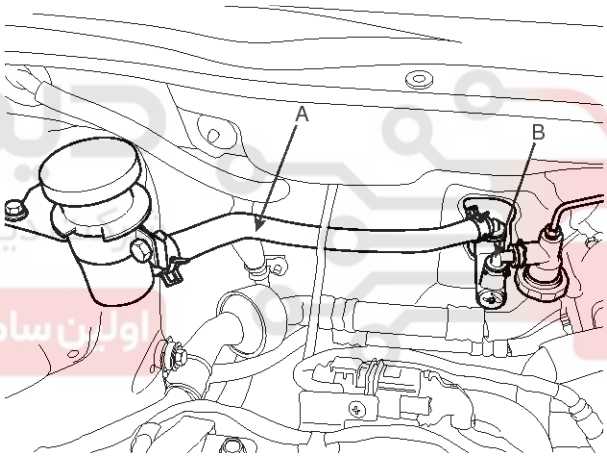
2. Remove the flexible hose (A) connected to brake reserve tank from the master cylinder.

[LHD]



SHDCH6010D

[RHD]

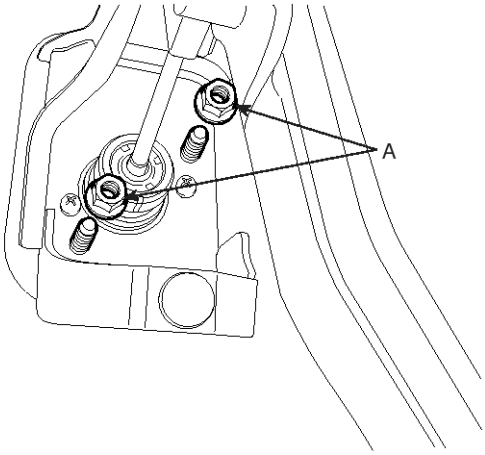


SHDCH6007L

3. Disconnect the clutch tube (B) from the master cylinder.
4. Disconnect the two ignition lock switch connectors.

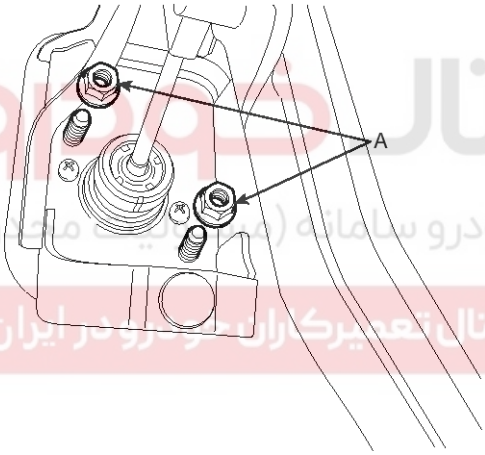
5. Remove the clutch pedal mounting nuts(A-2ea) and the bracket mounting nut.

[LHD]



SEDCH7005L

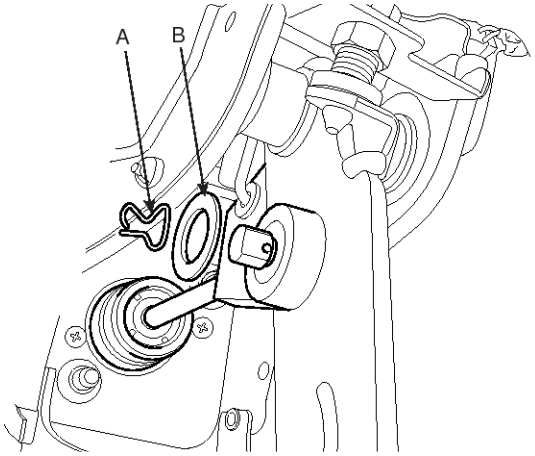
[RHD]



SEDCH7006L

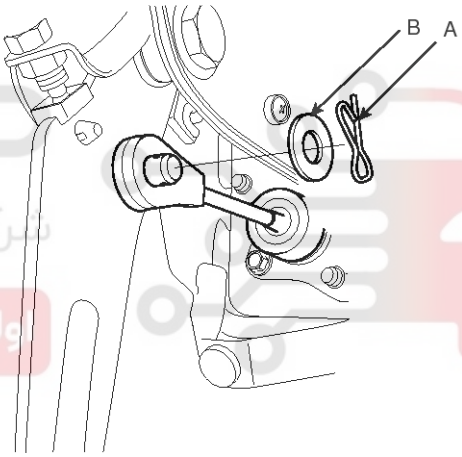
6. Disconnect the push rod from the master cylinder by removing the snap pin (A) and washer (B).

[LHD]



SHDCH6011L

[RHD]



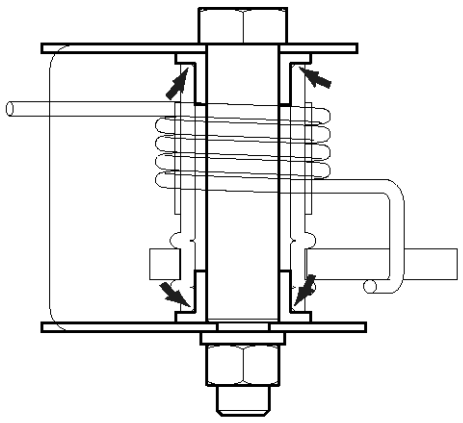
SHDCH6012L

7. Remove the screws or nut mounting the master cylinder to the clutch pedal assembly.

Installation

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

Chassis grease: SAE J310a, NLGI No.1



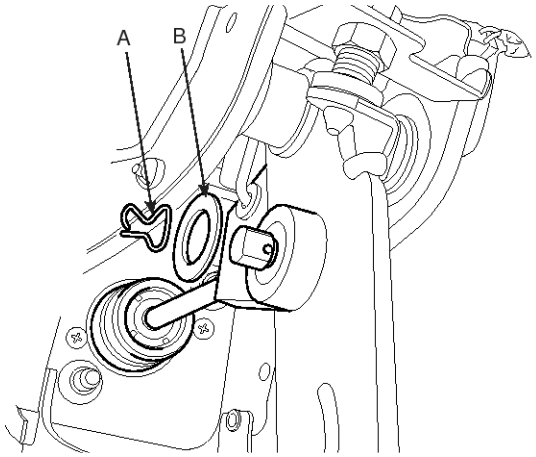
AOJF221A

2. Install the screws or nut mounting the master cylinder to the clutch pedal assembly.
3. Apply the specified grease to the snap pin(A) and washer.

Wheel bearing grease: SAE J310, NLGI No.2

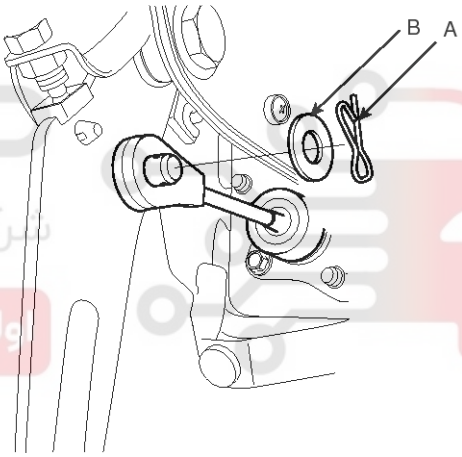
4. Connect the push rod to the clutch pedal by installing the snap pin (A) and washer (B).

[LHD]



SHDCH6011L

[RHD]

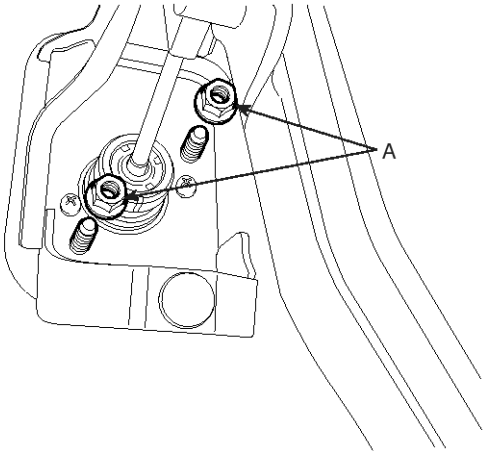


SHDCH6012L

5. Install the clutch pedal mounting nuts (A-2ea).

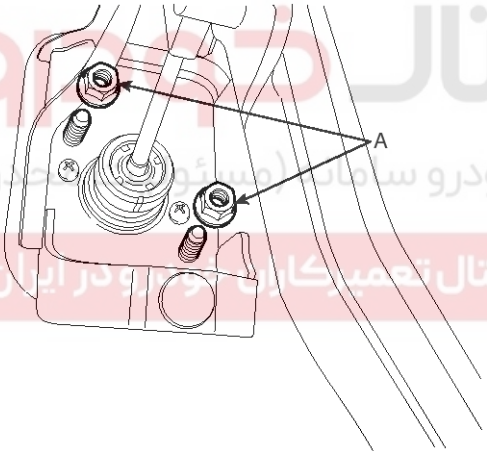
Tightening torque :
17 ~ 26N.m (1.7 ~ 2.6kgf.m, 12.3 ~ 18.8lb-ft)

[LHD]



SEDCH7005L

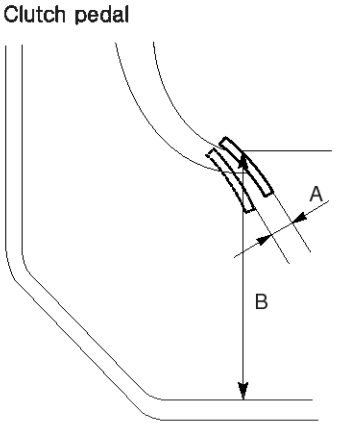
[RHD]



SEDCH7006L

6. Adjust the clutch pedal within the standard value, then secure by tightening the lock nut.

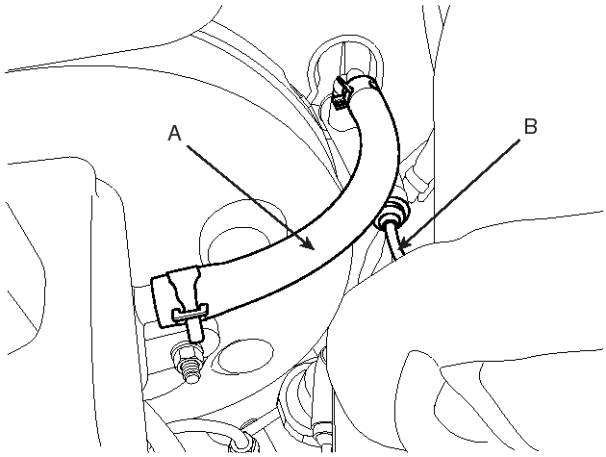
Standard value
Free play (A)
6~13mm (0.24~0.51 in)
Height (B)
182.8mm (7.19 in)



SEDCH7008L

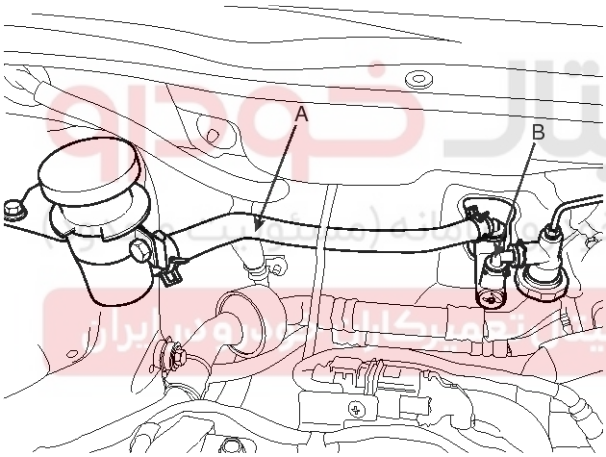
7. Connect the flexible hose of the brake reserve tank to the master cylinder.

[LHD]



SHDCH6010D

[RHD]



SHDCH6007L

8. Connect the clutch tube(B) to the master cylinder.
9. Refill the brake fluid.
10. Bleed the air in the clutch system.(refer to Bleeding in Serive Adjustment Procedure)

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.

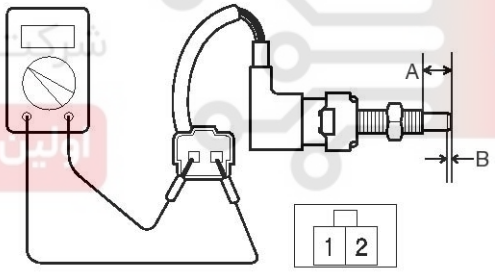
Ignition lock switch inspection

Remove the ignition lock switch and check for continuity between the terminals. If the continuity is not as specified, replace the switch.

Terminal / Condition	1	2
Pushed(ON)	●	●
Free(OFF)		

LOJF012A

Standard value
Full stroke(A) : 12.0 ± 0.3mm (0.472 ± 0.012 in.)
ON-OFF point (B) : 2.0 ± 0.3mm (0.078 ± 0.012 in)

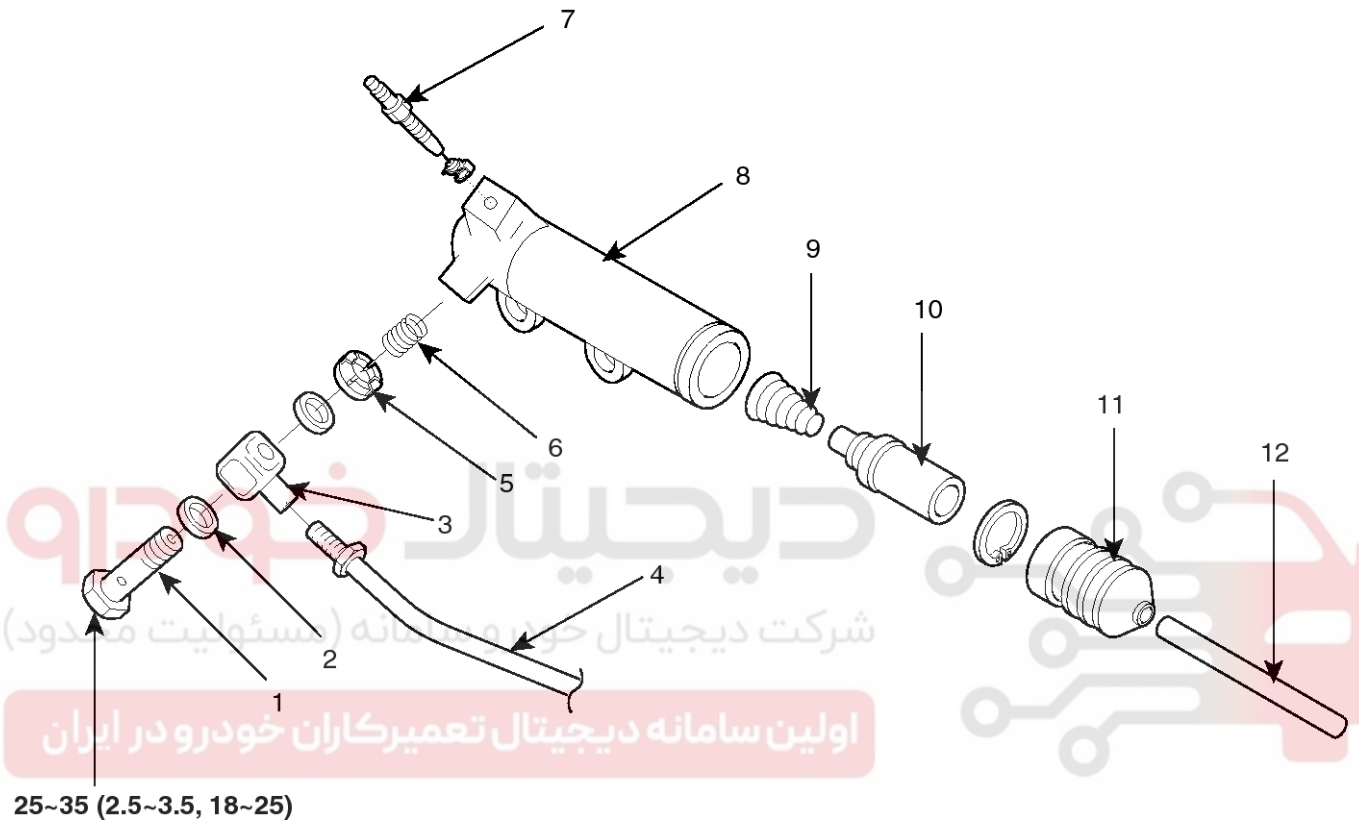


LOJF002B

Clutch Release Cylinder

Components

[M5CF only]



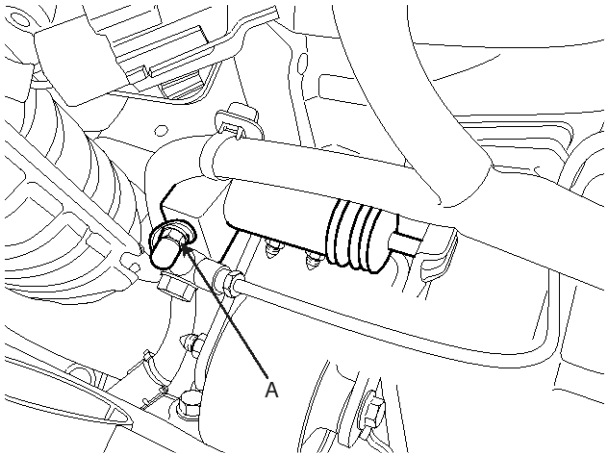
Torque: N.m (kgf.m, lb-ft)

SFDCH8004L

1. Union bolt
2. Gasket
3. Tube joint
4. Clutch tube
5. Valve plate
6. Valve spring
7. Bleeder screw
8. Release cylinder
9. Return spring
10. Piston
11. Boot
12. Push rod

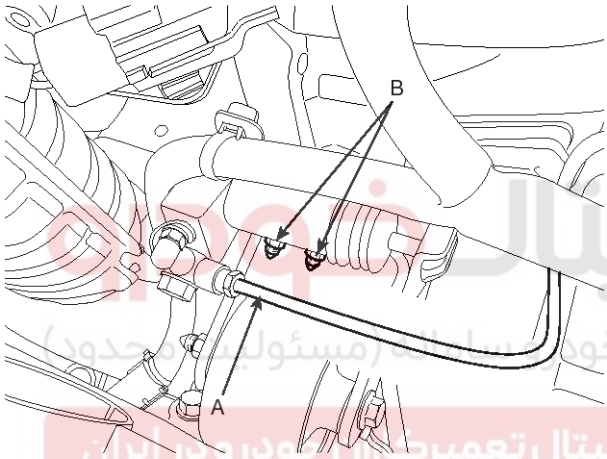
Removal

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



SLDCH7002D

2. Disconnect the clutch tube(A).



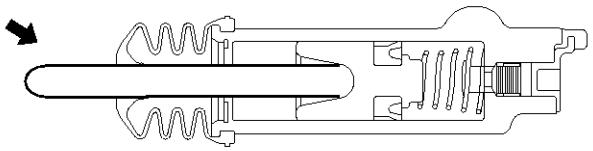
SEDCH7010L

3. Remove the two clutch release cylinder mounting nuts(B-2ea).

Installation

1. Coat the clutch clevis push rod specified grease.

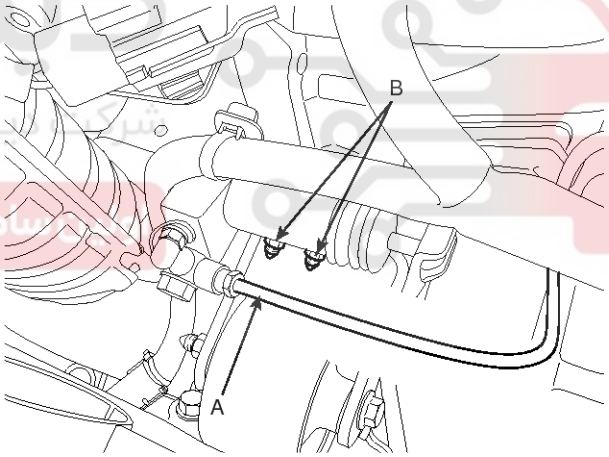
Specified grease: CASMOLY L9508



LOGF006B

2. Install the release cylinder mounting nuts(B-2ea).

Tightening torque :
15 ~ 22N.m (150 ~220 kgf.cm, 11 ~ 16 lb-ft)



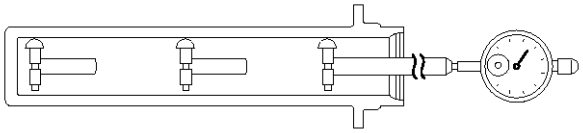
SEDCH7010L

3. Install the clutch tube(A).
4. Refill the brake fluid.
5. Bleed the air in the clutch system.
   (refer to Bleeding in Service Adjustment Procedure)

Inspection

1. Check the release cylinder bore for rust and damage.
2. Measure the release cylinder bore at three locations (bottom, middle, and top) with a cylinder gauge and replace the release cylinder assembly if the bore-to-piston clearance exceeds the limit.

Limit clearance to piston: 0.25mm (0.0098 in)



EOKD025A

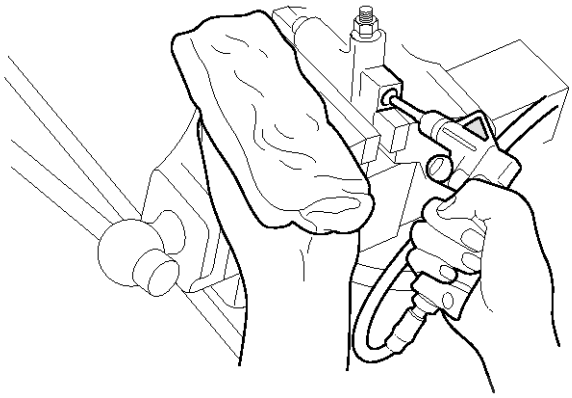
3. Check the clutch release cylinder for fluid leakage.
4. Check the clutch release cylinder boots for damage.

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.

⚠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.**



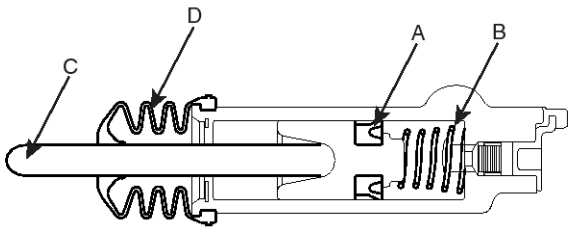
EOKD024A

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.

Specified fluid: Brake fluid DOT 3 or DOT 4

2. Install the valve plate(A), Spring(B), push rod(C) and boot(D).



LOJF003B