

MT -2

MANUAL TRANSAXLE(M5CF3)

**GENERAL****SPECIFICATIONS** EC997A4A

Transaxle type		M5CF3
Engine type		U1.6 Diesel
Gear ratio	1st	3.636
	2nd	1.962
	3rd	1.189
	4th	0.844
	5th	0.660
	Reverse	3.583
Final gear ratio		3.941

**SERVICE STANDARD**

Items	Standard value [in(mm)]
Input shaft rear bearing end play	0.00-0.0019L(0.00-0.05L)
Output shaft bearing end play (At 70kgf load)	0.00-0.0019L(0.00-0.05L)
Input shaft front bearing end play	0.00-0.0019L(0.00-0.05L)
Differential bearing end play (At 70kgf load)	0.0059T-0.0078T(0.15T-0.20T)
Differential pinion backlash	0.001L-0.006L(0.025L-0.150L)

T: Indicate tightening of -(minus) direction of end play

L: Indicate loosening of +(plus) direction of end play

## GENERAL

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## TIGHTENING TORQUE

Standard value	Nm	kgf.cm	lb-ft
Release cylinder tube nut	13-17	130-170	9-12
Release cylinder tube bracket	15-22	150-220	10-16
Release cylinder bolt	15-22	150-220	10-16
Control shift complete bolt	30-35	300-350	21-25
Oil drain plug	60-80	600-800	43-58
Oil filler plug	60-80	600-800	43-58
Poppet ball	30-35	300-350	21-25
Clutch housing to transmission case	43-55	430-550	32-40
Speedometer driven gear	3-5	30-50	2-4
Reverse idler bolt	43-55	430-550	32-40
Reverse shift lever assembly bolt	15-22	150-220	10-16
Input shaft bearing retainer	15-22	150-220	10-16
Shift control cable bracket on transaxle side	15-22	150-220	10-16
Rear roll support bracket bolt	50-65	500-650	36-47
Rear roll stopper insulator bolt and nut	50-65	500-650	36-47
Front roll stopper insulator bolt and nut	50-65	500-650	36-47
Front roll support bracket bolt	50-65	500-650	36-47
Transaxle mounting bracket bolts	50-65	500-650	36-47
Transaxle mounting insulator bolt and nut	90-110	900-1100	65-80
Differential drive gear seal bolt	130-140	1300-1400	94-101
Clutch release lever fulcrum bolt	55-60	550-600	40-43

**⊗ WARNING**

Always follow torque tightening levels. Failure to follow such levels can result in parts breaking if over-tightened or loosening if under-tightened. In either case, serious personal injury or death could result to vehicle occupants.

## MT -4

## MANUAL TRANSAXLE(M5CF3)

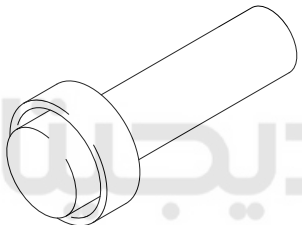
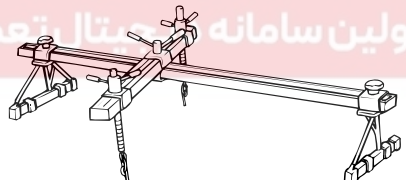
## LUBRICATIONS

EA4A75C2

Items	Recommend lubricant	Quantity
Transaxle gear oil	SAE 75W/85 API GL-4 TGO-7(MS517-14) ZIC G-F TOP 75W/85 HD GEAR OIL XLS 75W/85	2.0L(2.1US qt, 1.76Imp qt)
Air bleeder	MS721-38	As required
Transaxle housing	MS721-40 or MS721-38	As required
Surface of release fork and bearing	Grease (CASMOLY L9508)	As required

## SPECIAL TOOL

ED3D1515

TOOL (Number and Name)	Illustration	Use
09453-2F300 Oil seal installer	 AKGF020D	Installation of differential oil seal
09200-38001 Engine support fixture	 LKGF001M	Removal and installation of the transaxle

## GENERAL

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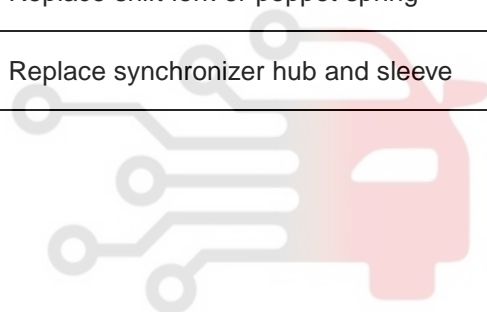
## TROUBLESHOOTING

E9178B14

Symptom	Probable cause	Remedy
Vibration, noise	Loose or damaged transaxle and engine mounts	Tighten or replace mounts
	Inadequate shaft end play	Correct end play
	Worn or damaged gears	Replace gears
	Inadequate grade of oil	Replace with specified oil
	Low oil level	Replenish
	Inadequate engine idle speed	Adjust idle speed
Oil leakage	Broken or damaged, oil seal or O-ring	Replace control cable oil seal or O-ring
Hard shift	Faulty control cable	Replace control cable
	Poor contact or wear of synchronizer ring and gear cone	Correct or replace
	Weakened synchronizer spring	Replace synchronizer spring
	Inadequate grade of oil	Replace with specified oil
Jumps out of gear	Worn gear shift fork or broken poppet spring	Replace shift fork or poppet spring
	Synchronizer hub-to-sleeve spline clearance too large	Replace synchronizer hub and sleeve

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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MANUAL TRANSAXLE(M5CF3)

# MANUAL TRANSAXLE SYSTEM

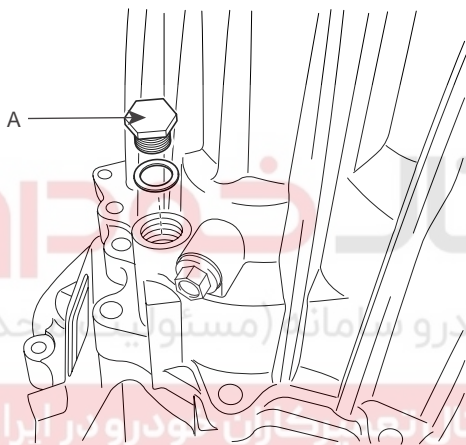
## SERVICE ADJUSTMENT PROCEDURE EE3DF67E

### TRANSAXLE GEAR OIL LEVEL

#### INSPECTION

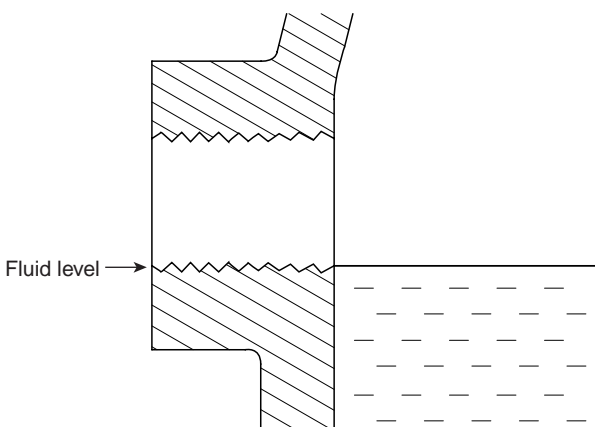
Inspect each component for evidence of leakage. Check the gear oil level by removing the filler plug. If the oil is contaminated, it is necessary to replace it with new oil.

1. Remove oil filler plug(A).



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2. Check level with finger. Oil level must be up to fill the hole, add oil until it runs over.



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3. Install filler plug.

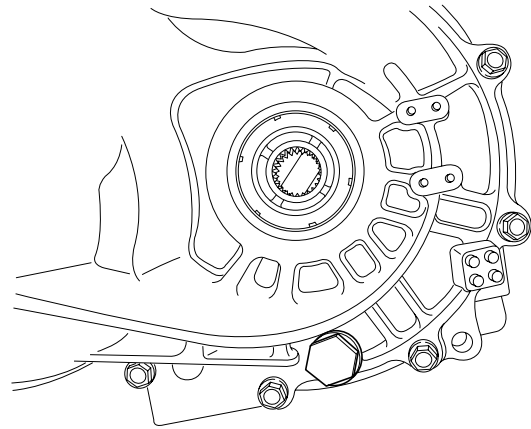
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Filler plug tightening torque :  
60-80 Nm (600-800 kgf.cm, 43-58 lb-ft)

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#### REPLACEMENT

1. With the vehicle parked on a level surface, remove the drain plug.
2. Drain the transaxle oil.



LKGF002B

3. Install the drain plug with new washer.

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Drain plug tightening torque:  
60-80 Nm (600-800 kgf.cm, 43-58 lb-ft)

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4. Add new oil through the filler plug hole and, fill it ot just below the plug opening.

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**Standard oil SAE 75W/85, API GL-4**  
**Oil capacity: 2.0 liter (2.1 US qt, 1.76 Imp qt)**

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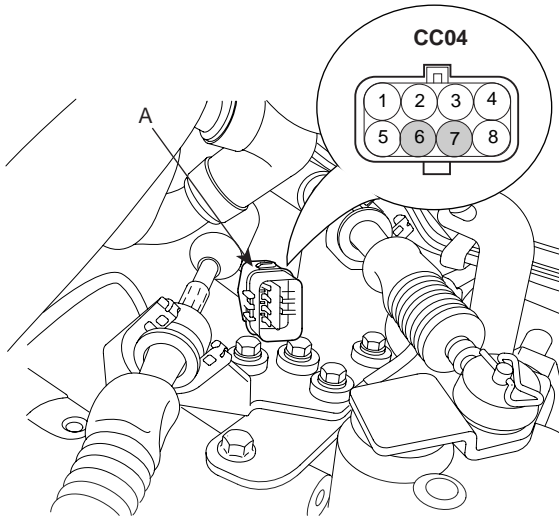
**MANUAL TRANSAXLE SYSTEM**

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**BACKUP LAMP SWITCH**

**INSPECTION**

1. Disconnect the common connector(A).

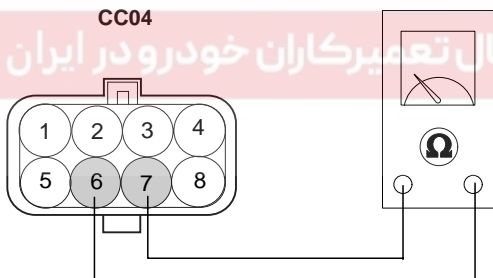


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2. Check the continuity between no. 6 and 7 terminals when the shift lever is in reverse. If there isn't continuity, go to next step.

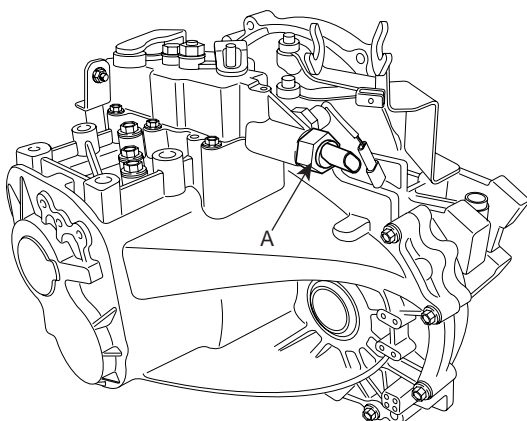
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ANJF002B

3. Disconnect the backup lamp switch(A).

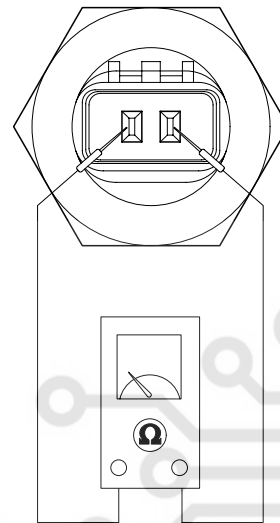


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4. Check the continuity between no. 1 and 2 terminals of backup lamp switch. When the shift lever is in reverse, there should be continuity.

Condition	1	2
R Range	●	●
Other		

\*The back up Lamp "ON" shall keep over 0.5mm(0.02in) from ON-OFF point.



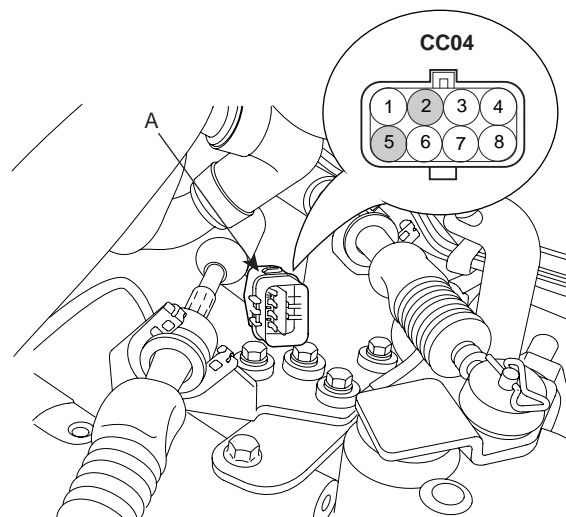
LMJF100A

5. If necessary, repair or replace the backup lamp switch.

**NEUTRAL SWITCH**

**INSPECTION**

1. Disconnect the common connector (A).

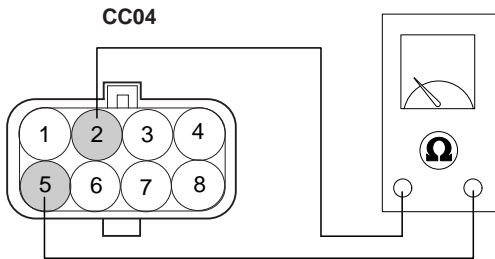


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MT -8

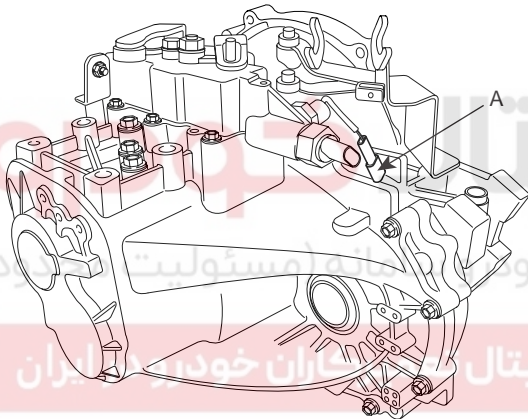
MANUAL TRANSAXLE(M5CF3)

- Check the continuity between no. 2 and 5 terminals when the shift lever is in neutral position. If there isn't continuity, go to next step.



ANJF003A

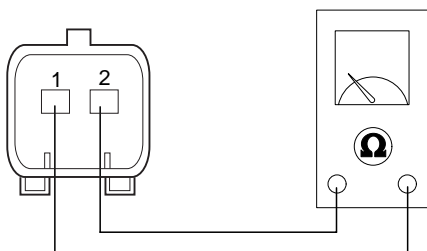
- Disconnect the neutral switch connector (A).



SLDMT6002D

- Check the continuity between no. 1 and 2 terminals of neutral switch, when the shift lever is in neutral position, there should be continuity.

Condition	1	2
Neutral	●	●
Other		



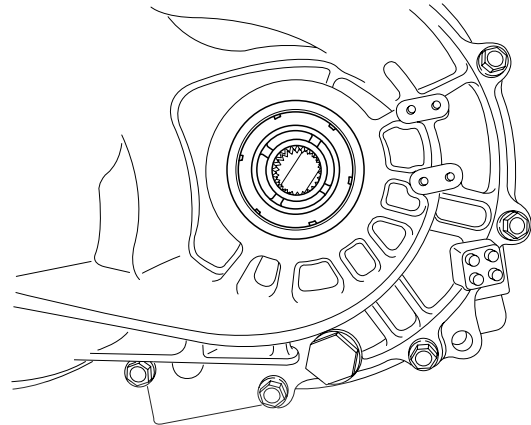
LMJF100B

- If necessary, repair or replace the neutral switch.

DRIVE SHAFT OIL SEAL

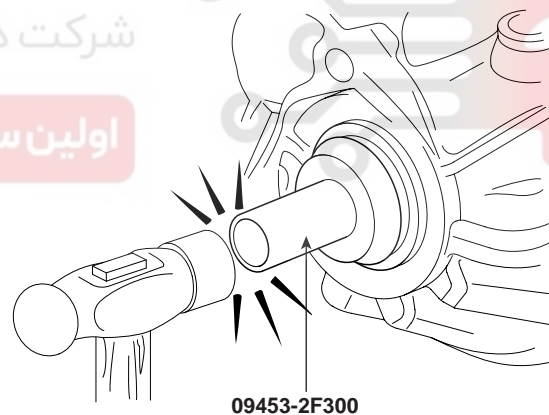
REPLACEMENT

- Disconnect the drive shaft from the transaxle. (see "DS" group)
- Using a flat-tip screwdriver, remove the oil seal.



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- Using the special tool(09453-2F300), tap the drive shaft oil seal into the transaxle.



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## MANUAL TRANSAXLE SYSTEM

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## MANUAL TRANSAXLE

DESCRIPTION ED908EEF

This manual transmission (M5CF3) is a reinforced model of M5CF2 for the diesel engine (U-1.6).

## IMPROVEMENT (M5CF3)

Segment	Parts	Improvement
Gear & Shaft	1st gear	Improving intensity
	4th output gear	Change of material to high strength steel
	Output shaft	- Increasing 1st gear diameter - Increasing width and length of gear's teeth
	Snap ring for 5th gear	Type change to semicircle
Bearings	Input shaft front ball bearing	Increasing size (Dia. 4mm, Width 1mm)
	Output shaft front taper bearing	Increasing size (Dia. 7mm)
	1st needle bearing	Increasing size (Dia. 4mm, Width 3mm)
Cases	Clutch housing & transaxle case	Change of layout by - where contacting input shaft front ball bearing - where contacting output shaft front taper bearing Adding a groove for better lubricating - where contacting differential bearing

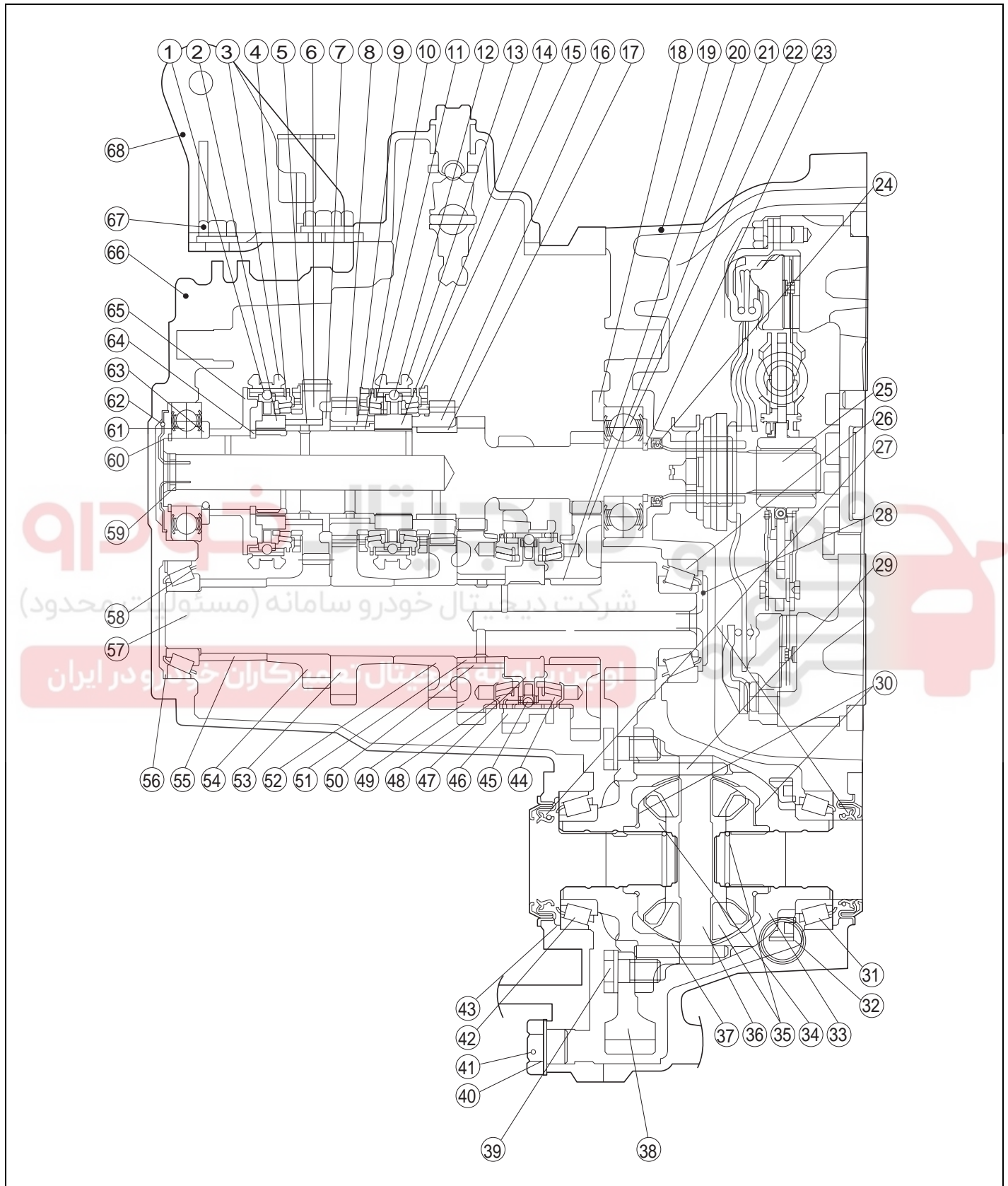
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MANUAL TRANSAXLE(M5CF3)

COMPONENTS (1) E7E950AA



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## MANUAL TRANSAXLE SYSTEM

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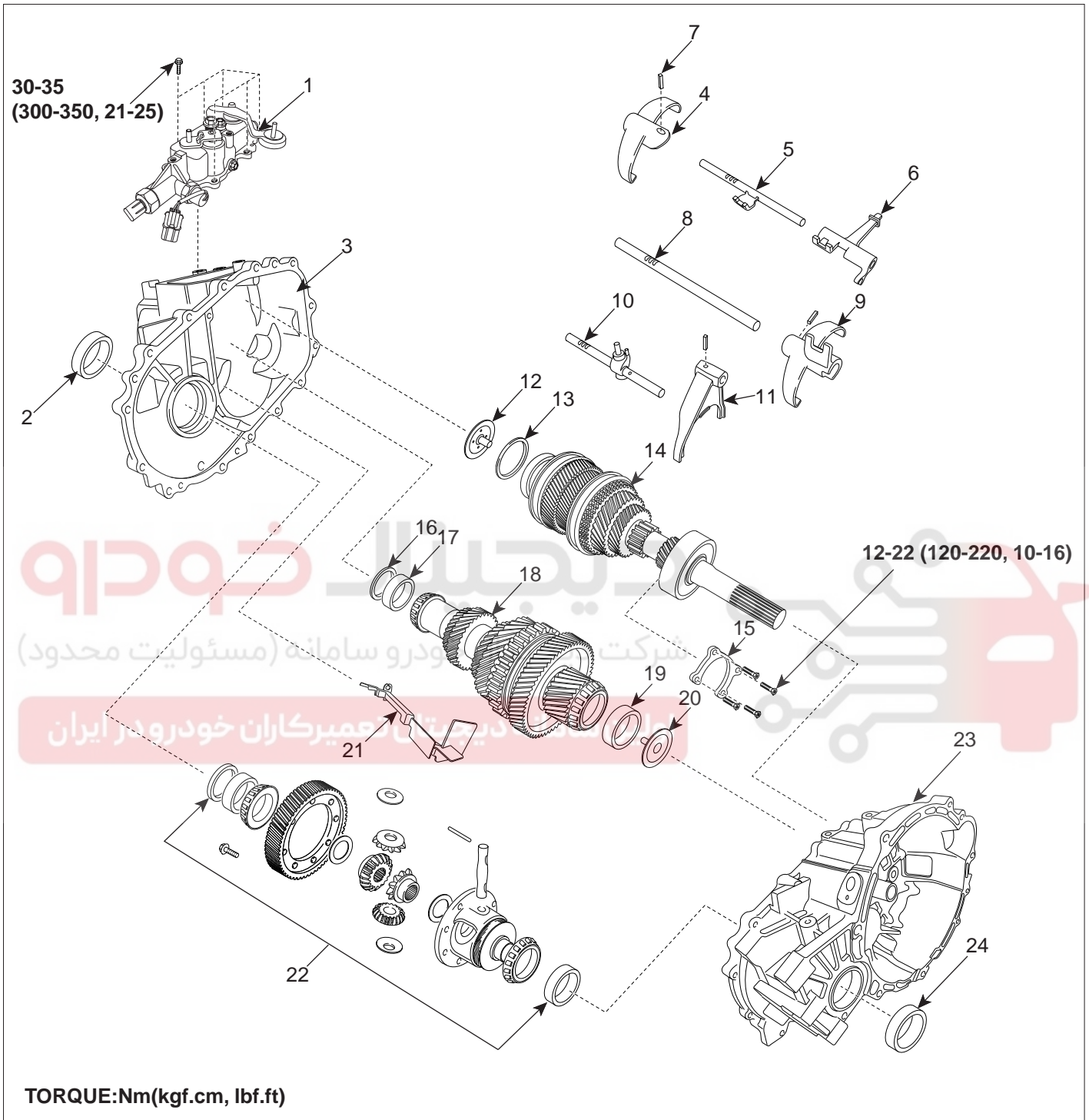
- |   |  |
|---|--|
| 1. 5th synchronizer key assembly            | 36. Pinion shaft                           |
| 2. 5th synchronizer hub                     | 37. Washer                                 |
| 3. 5th synchronizer sleeve                  | 38. Differential drive gear                |
| 4. 5th double cone assembly                 | 39. Differential gear seal bolt            |
| 5. Needle roller bearing                    | 40. Gasket                                 |
| 6. 5th speed gear                           | 41. Drain plug                             |
| 7. 5th speed gear sleeve                    | 42. Differential taper roller bearing      |
| 8. 4th speed gear                           | 43. Spacer                                 |
| 9. Needle roller bearing                    | 44. 1st tripple cone assembly              |
| 10. 4th speed gear sleeve                   | 45. 1st synchronizer key                   |
| 11. 4th double cone assembly                | 46. 1st & 2nd synchronizer sleeve          |
| 12. 4th synchronizer key assembly           | 47. 1st & 2nd synchronizer hub             |
| 13. 3rd & 4th synchronizer sleeve           | 48. 2nd tripple cone assembly              |
| 14. 3rd & 4th synchronizer hub              | 49. 2nd speed gear                         |
| 15. 3rd double cone assembly                | 50. Needle roller bearing                  |
| 16. 3rd speed gear                          | 51. 2nd speed gear sleeve                  |
| 17. Needle roller bearing                   | 52. 3rd speed output gear                  |
| 18. Input shaft bearing retainer            | 53. 4th speed output gear                  |
| 19. Clutch housing                          | 54. 5th speed output gear                  |
| 20. Needle roller bearing                   | 55. Spacer                                 |
| 21. 1st speed gear                          | 56. Output bearing spacer                  |
| 22. Input shaft front ball bearing          | 57. Output shaft                           |
| 23. Input shaft front snap ring             | 58. Output shaft rear taper roller bearing |
| 24. Input shaft front oil seal              | 59. Oil guide ring                         |
| 25. Input shaft                             | 60. Input shaft rear snap ring             |
| 26. Output shaft front taper roller bearing | 61. Input shaft rear ball bearing          |
| 27. Differential oil seal                   | 62. Input shaft oil guide                  |
| 28. Output shaft oil guide                  | 63. Thrust washer                          |
| 29. Lock pin                                | 64. Input shaft 5th snap ring              |
| 30. Differential gear spacer                | 65. Spacer                                 |
| 31. Differential taper roller bearing       | 66. Transaxle case                         |
| 32. Speedometer drive gear                  | 67. Transaxle support bracket bolt         |
| 33. Differential case                       | 68. Transaxle support bracket              |
| 34. Differential side gear                  |  |
| 35. Differential pinion gear                |  |

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MANUAL TRANSAXLE(M5CF3)

COMPONENTS (2)



- 1. Control shift complete
- 2. Oil seal
- 3. Transaxle case
- 4. 5th shift fork
- 5. 5th shift rail
- 6. Reverse shift lug
- 7. Spring pin
- 8. 3rd & 4th shift rail

- 9. 3rd & 4th shift lug and fork
- 10. 1st & 2nd shift rail
- 11. 1st & 2nd shift fork
- 12. Input shaft oil guide
- 13. Snap ring
- 14. Input shaft assembly
- 15. Input shaft bearing retainer
- 16. Spacer

- 17. Output shaft rear outer racer
- 18. Output shaft assembly
- 19. Output shaft front outer racer
- 20. Output shaft oil guide
- 21. Oil guide
- 22. Differential assembly
- 23. Clutch housing
- 24. Oil seal

LKGF003C

## MANUAL TRANSAXLE SYSTEM

MT -13

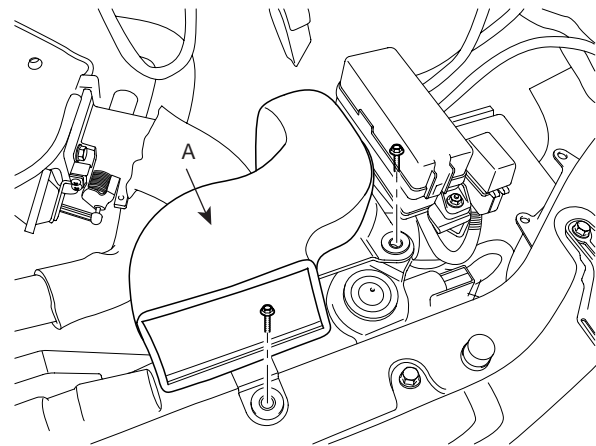
## REMOVAL E96DAFC4

**CAUTION**

- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

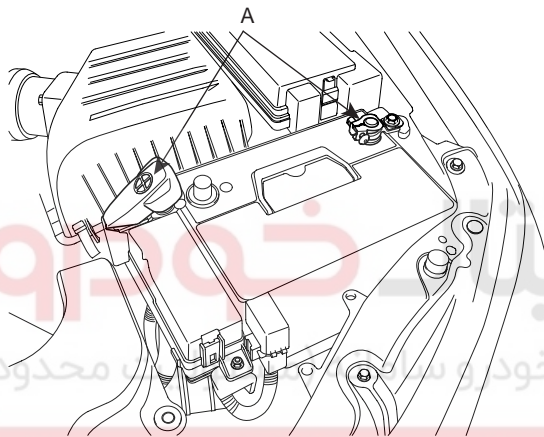
**NOTE**

- Mark all wiring and hoses to avoid misconnection.



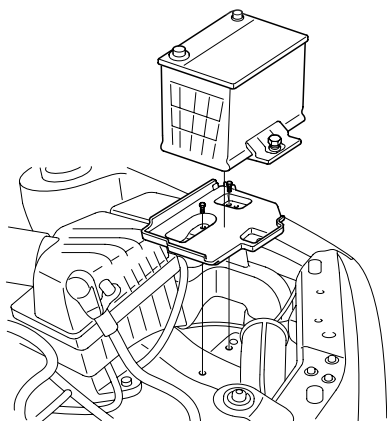
LKGF018C

1. Disconnect the battery terminals(A).



LKGF018A

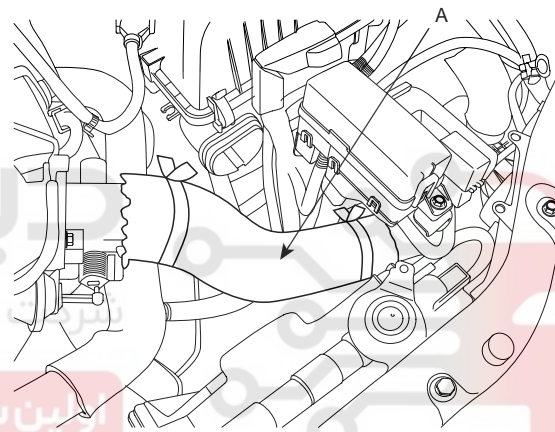
2. Remove the battery and battery tray.



LKGF018B

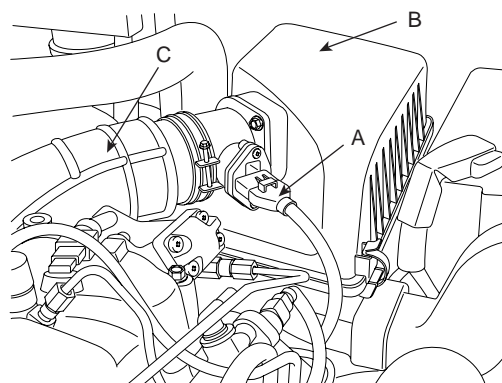
3. Remove the air duct(A).

4. Remove the intake hose(A).



LKGF018D

5. Disconnect the AFS(Air Flow Sensor) connector (A).



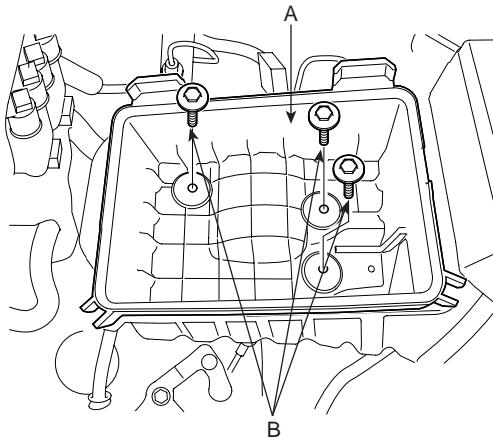
LKGF018E

6. Remove the air cleaner upper cover (B).
7. Remove the air hose (C).
8. Remove the air cleaner element.

MT -14

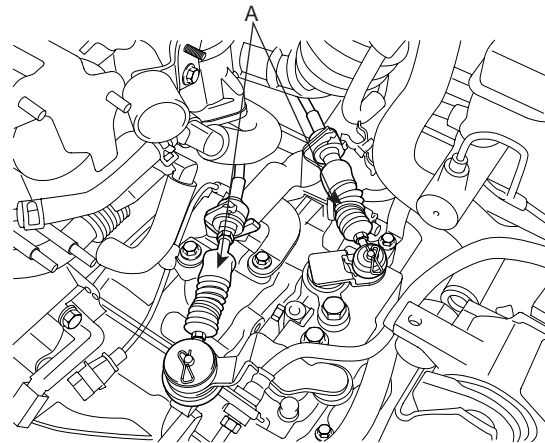
MANUAL TRANSAXLE(M5CF3)

9. Remove the bolts(B) and air cleaner lower cover(A).



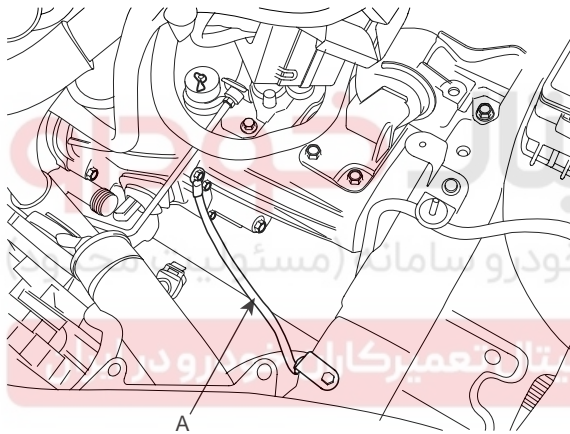
LKGF018F

12. Remove the transaxle control cable (A).



LKGF018I

10. Remove the ground cable from transaxle(A).

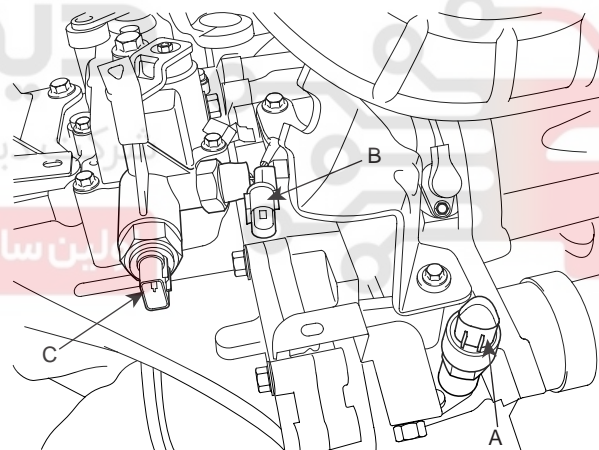


LKGF018G

13. Disconnect the vehicle speed sensor connector (A).

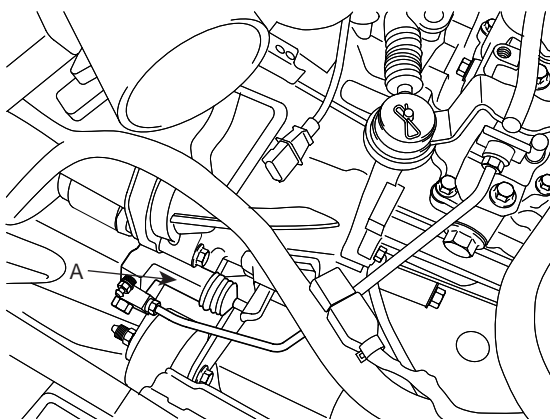
14. Disconnect the back lamp switch connector (B).

15. Disconnect the neutral switch connector (C).



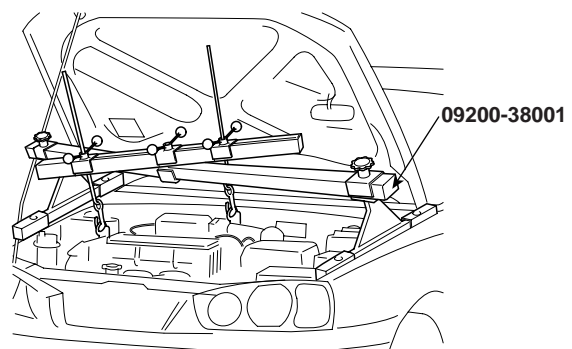
LKGF018J

11. Remove the clutch release cylinder (A).



LKGF018H

16. Install the special tool(09200-38001), the engine support fixture and the adapter, on the engine and transaxle assembly.

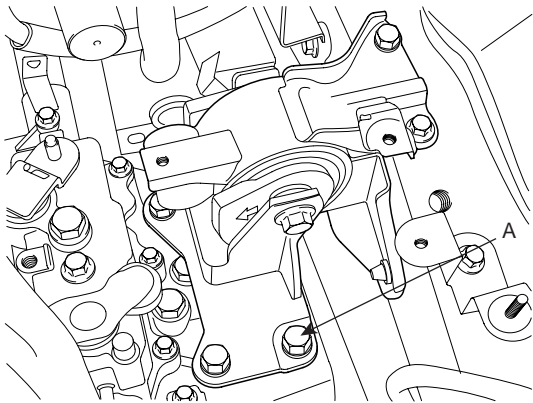


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**MANUAL TRANSAXLE SYSTEM**

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17. Remove the transaxle mounting bracket(A).

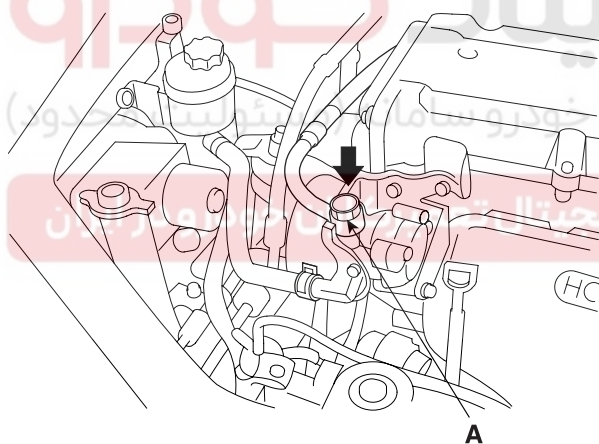


SLDMT6004D

18. Remove the front tires.

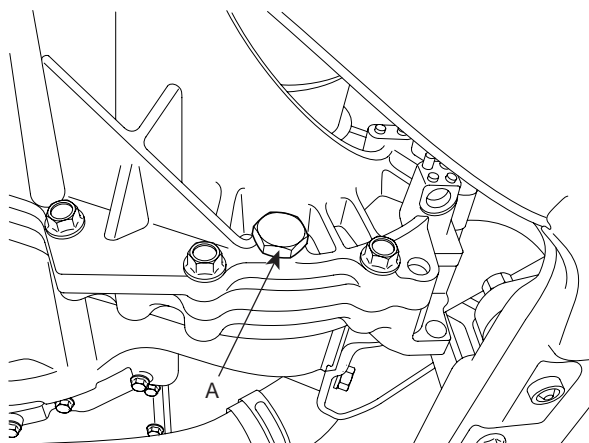
19. Drain the power steering fluid by disconnecting the return hose. (see ST group).

20. Remove the power steering pressure hose.



APGE009A

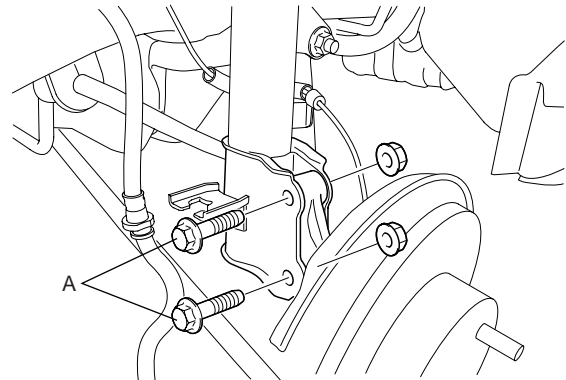
21. Drain the transaxle fluid.



ANJF001G

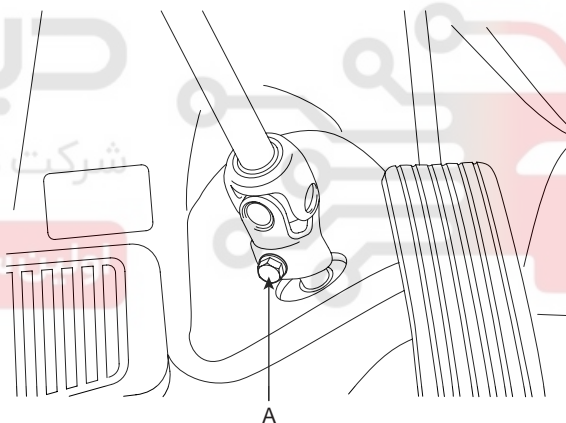
22. Remove both the lower arm and the tie rod end from the front knuckle. (see SS group)

23. Remove the knuckle mounting bolts(A).



LKGF018P

24. Remove the steering u-joint mounting bolt(A).



LKGF018Q

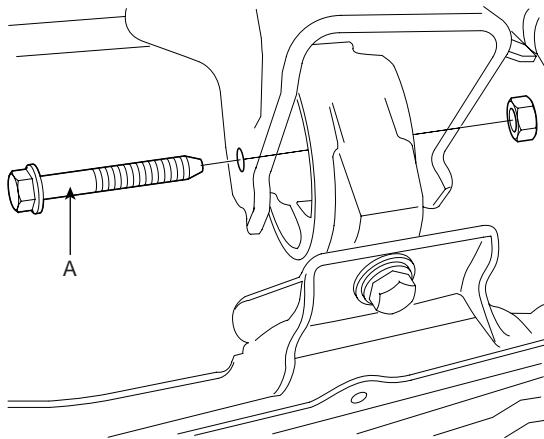
25. Remove the front muffler (see EM group).

26. Remove both the drive shafts from the transaxle assembly. (see DS group)

MT -16

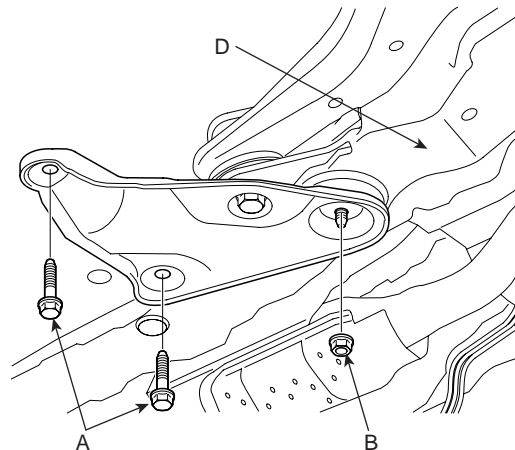
MANUAL TRANSAXLE(M5CF3)

27. Remove the front roll stopper bolt(A).



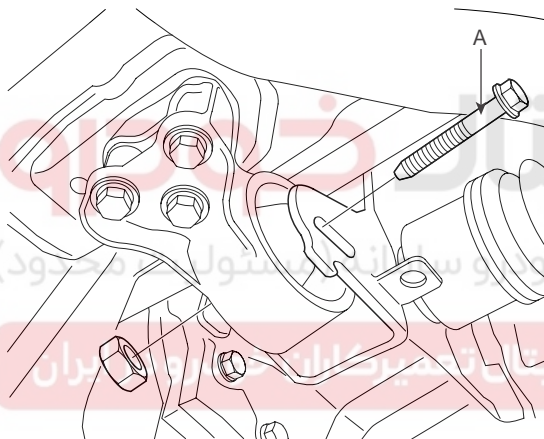
LKGF018U

30. Remove the sub frame(D).

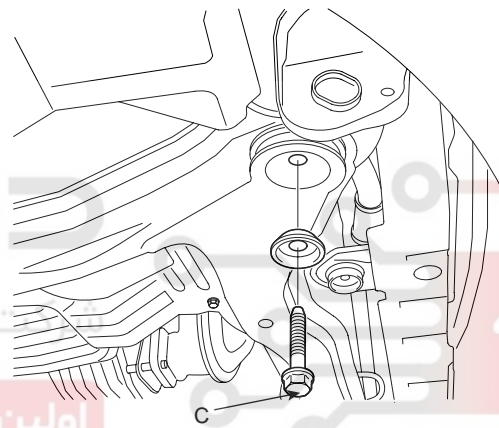


LKGF018S

28. Remove the rear roll stopper bolt(A).



LKGF018V



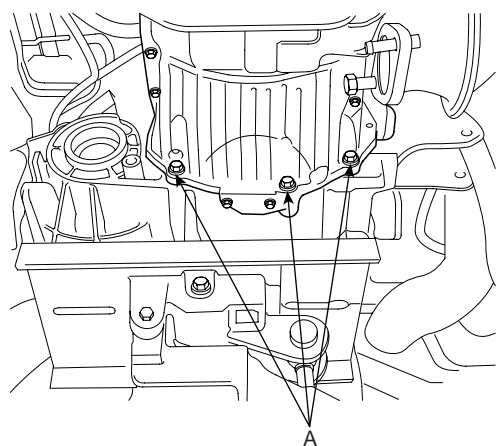
LKGF018T

29. Using a floor jack, support the transaxle assembly.

**NOTE**

After removing the sub frame mounting bolt , the transaxle assembly may fall downward, and so support them securely with floor jack.  
Verify that the hoses and connectors are disconnected before removing the transaxle assembly.

31. Remove the transaxle lower mounting bolts(A).



LKGF018W

32. Remove the engine support fixture and the adapter.

## MANUAL TRANSAXLE SYSTEM

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33. Remove the engine and transaxle assembly by lifting vehicle.

 **NOTE**

When remove the transaxle assembly, be careful not to damage any surrounding parts or body components.

**INSTALLATION** E7C0C6AB

Perform the following :

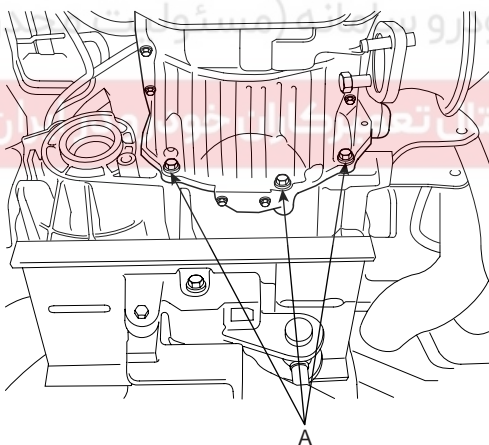
- Adjust the shift cable.
- Refill the transaxle fluid.
- Refill the power steering fluid.
- Clean the battery posts and cable terminals with sand paper assemble them, then apply grease to prevent corrosion.

1. Install the transaxle assembly by using a floor jack.

 **NOTE**

Be careful not to damage any surrounding parts or body components.

2. Install the transaxle rower mounting bolts(A).



LKGF018W

3. Install the sub frame(D).

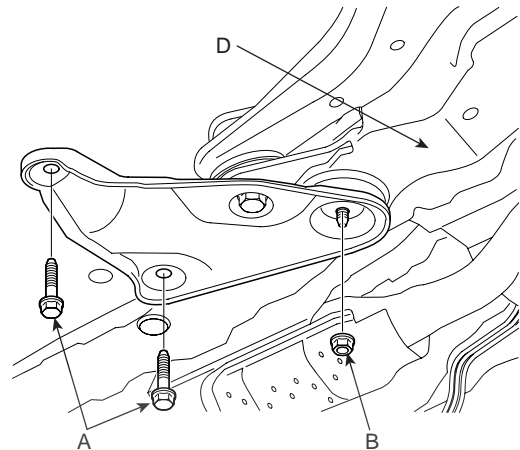
TORQUE :

Bolt(A) :

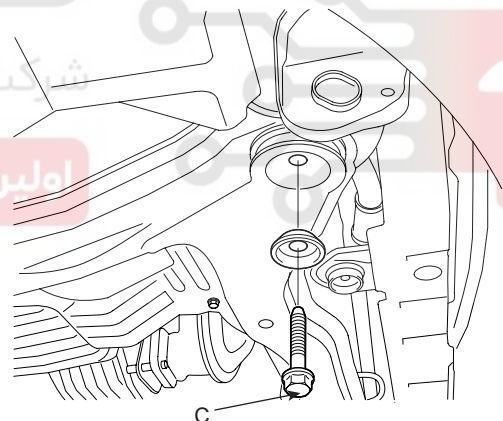
40 ~ 55Nm (4.0 ~ 5.5kgf.m, 28.9 ~ 39.8lb-ft)

Nut(B), Bolt(C) :

160 ~ 180Nm (16.0 ~ 18.0kgf.m, 115.7 ~ 130.2lb-ft)



LKGF018S



LKGF018T

4. Install the power steering return hose. (see ST group)

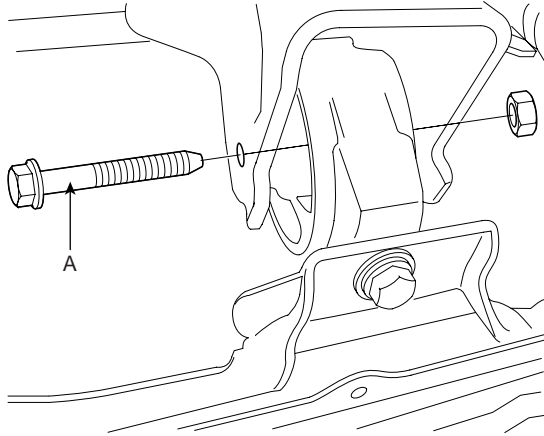


**MT -18**

**MANUAL TRANSAXLE(M5CF3)**

5. Install the front roll stopper bolt(A).

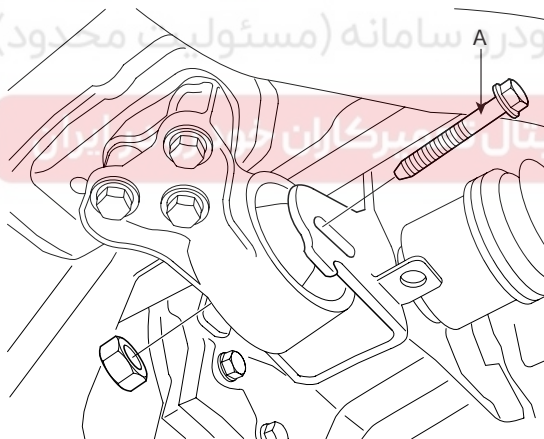
**TORQUE:**  
50 ~ 65Nm (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)



LKGF018U

6. Install the rear roll stopper bolt(A).

**TORQUE:**  
50 ~ 65Nm (5.0 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)



LKGF018V

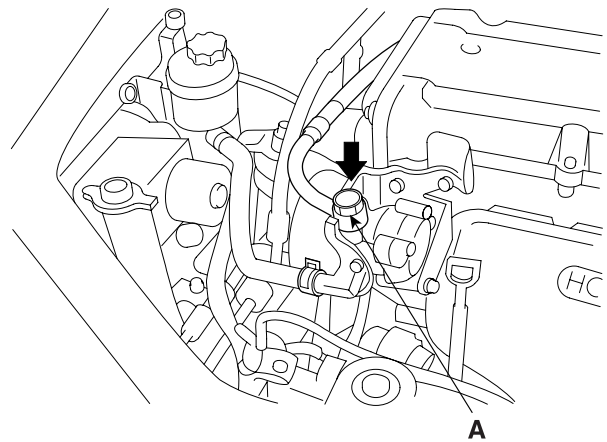
7. Install both the drive shafts to the transaxle assembly. (see DS group)
8. Install the front muffler. (see EM group)
9. Install the lower arm and the tie rod end to the front knuckle, and the stabilizer link to the front strut. (see SS group)
10. Install the front tires.

**TORQUE:** 90 ~ 110Nm (9 ~ 11kgf.m, 65.1 ~ 79.6 lb-ft)

11. Install the power steering pressure hose (A).

SLDMT6001L

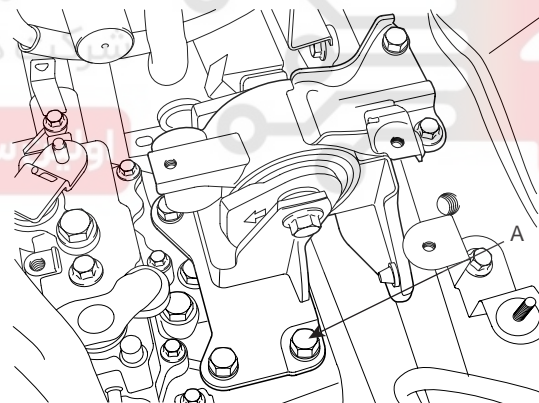
**TORQUE:**  
55 ~ 65Nm (5.5 ~ 6.5 kgf.m, 36.2 ~ 47.0 lb-ft)



APGE009A

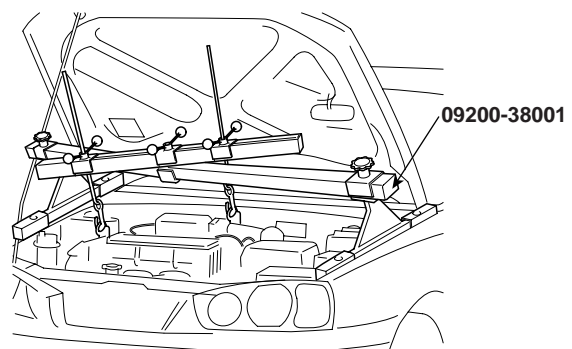
12. Install the transaxle mounting bracket (A).

**TORQUE : Bolt(B):**  
90 ~ 110Nm (9.0 ~ 11.0kgf.m, 65.1 ~ 79.6lb-ft)



SLDMT6004D

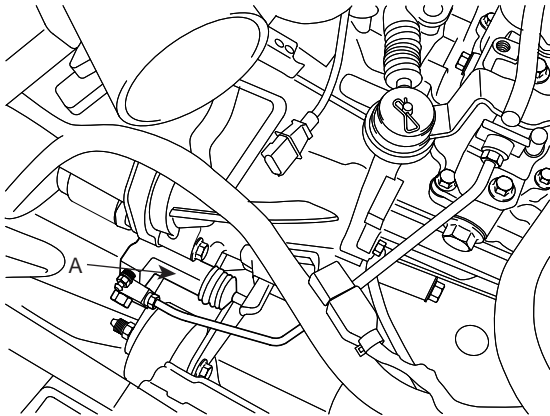
13. Remove the special tool (09200-38001).



**MANUAL TRANSAXLE SYSTEM**

**MT -19**

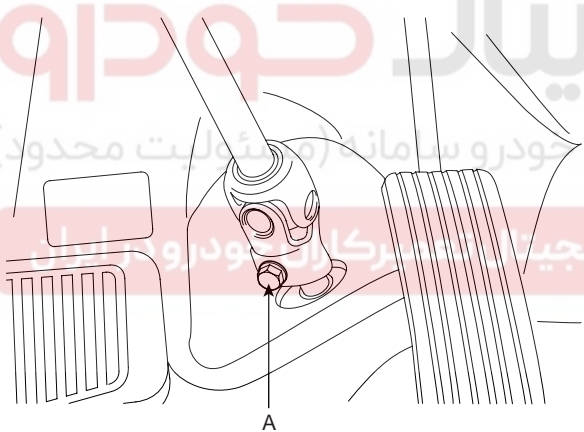
14. Install the clutch release cylinder (A).



LKGF018H

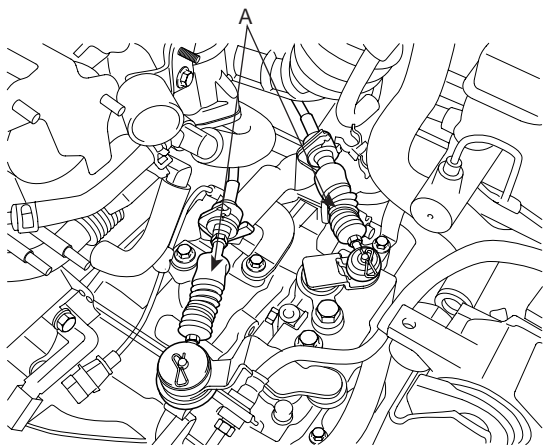
15. Install the steering u-joint mounting bolt(A).

**TORQUE: 15 ~ 20Nm (1.5 ~ 2.0kgf.m, 10.8 ~14.5 lb-ft)**



LKGF018Q

16. Install the transaxle control cable (A).

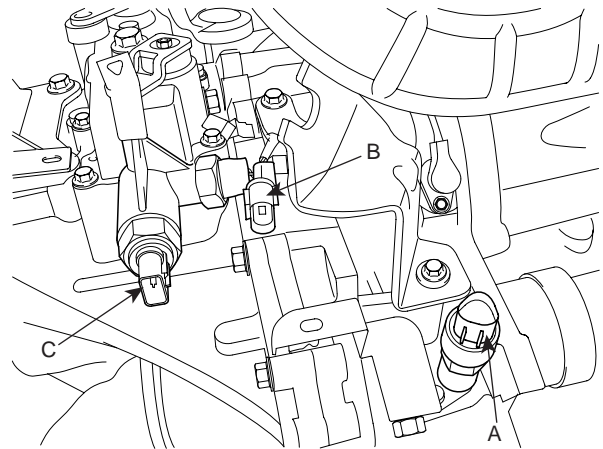


LKGF018I

17. Connect the vehicle speed sensor connector(A).

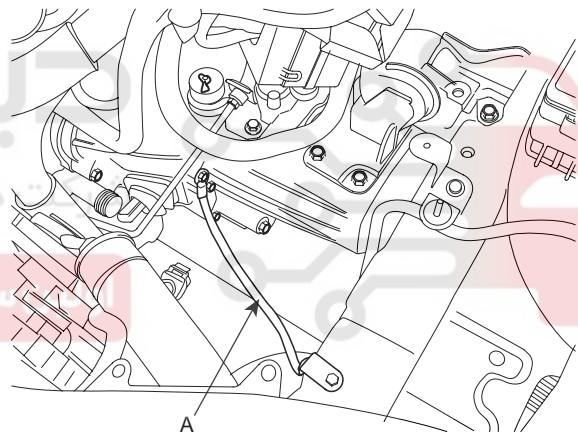
18. Connect the back lamp switch connector (B).

19. Connect the neutral switch connector (C).



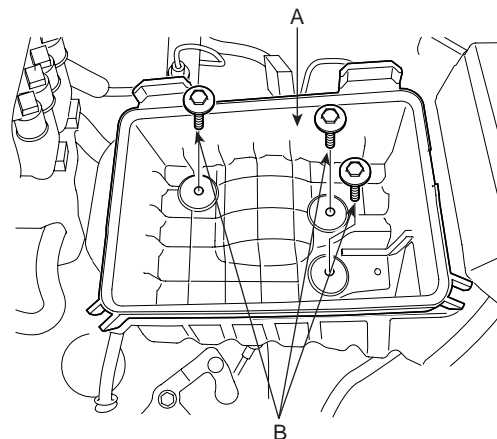
LKGF018J

20. Install the ground cable(A) from transaxle.



LKGF018G

21. Install the bolts(B) and air cleaner lower cover(A).



LKGF018F

22. Install the air cleaner element.

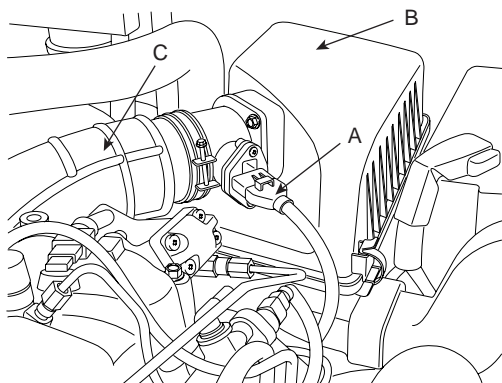
23. Install the air hose (C).

**MT -20**

**MANUAL TRANSAXLE(M5CF3)**

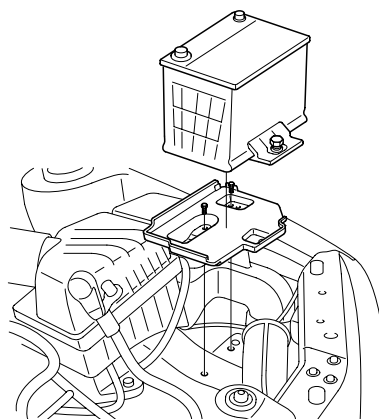
24. Install the air cleaner upper cover (B).

25. Connect the AFS(Air Flow Sensor) connector(A).



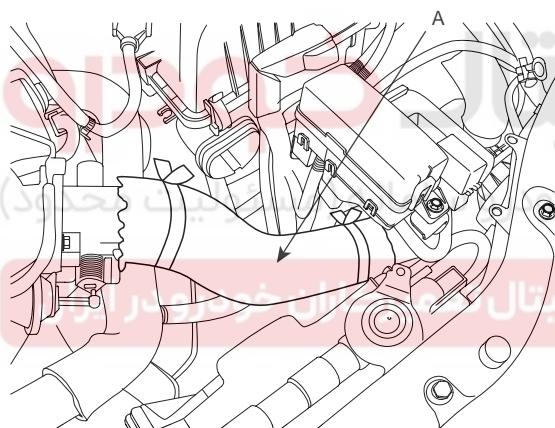
LKGF018E

28. Install the battery and battery tray.



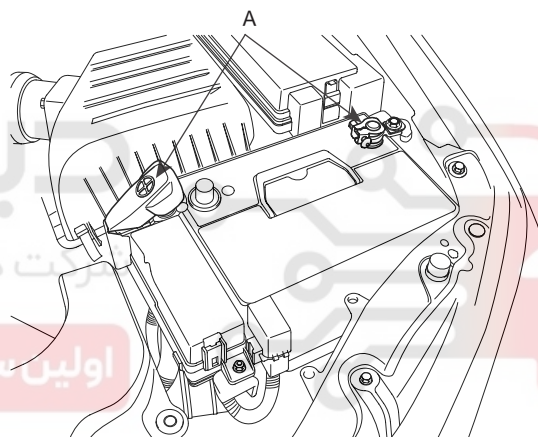
LKGF018B

26. Install the intake hose(A).



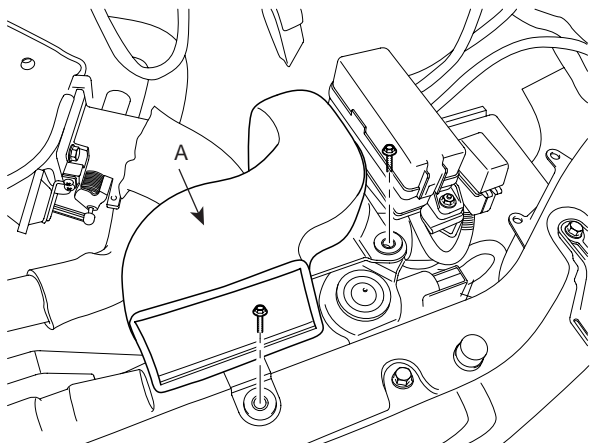
LKGF018D

29. Connect the battery terminals(A).



LKGF018A

27. Install the air duct(A).



LKGF018C