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## GROUP 22A

# MANUAL TRANSMISSION (FF)

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**GENERAL INFORMATION**

The manual transmission come in the models, namely, F5M42.

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Item	Specification	
Transmission model	F5M42	
Engine model	4G69-SOHC-MIVEC	
Transmission type	5-speed forward, 1-speed reverse constant mesh	
Transmission gear ratio	1st	3.583
	2nd	1.947
	3rd	1.266
	4th	0.970
	5th	0.767
	Reverse	3.363
Final reduction ration (Differential gear ratio)	4.312	
Speedometer gear ratio	27/36	

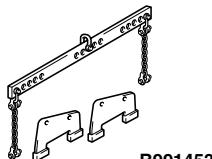
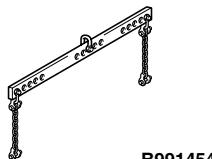
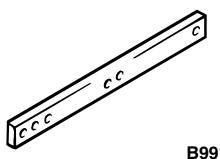
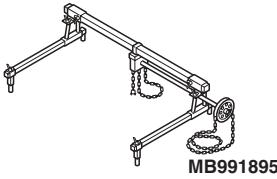
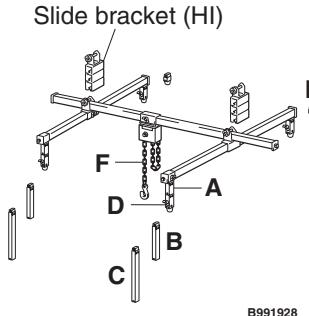
**LUBRICANT**

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Item	Specified lubricant	Quantity L
Transmission oil	Gear oil API classification GL-4 SAE 75W-85W or 75W-90	2.2

## SPECIAL TOOLS

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Tool	Number	Name	Use
 B991453	MB991453	Engine hanger assembly	When the engine hanger is used: Supporting the engine assembly during removal and installation of the transmission assembly <i>NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.</i>
 B991454	MB991454	Engine hanger balancer	
 B991527	MB991527	Engine hanger	
 MB991895	MB991895	Engine hanger	
 B991928	MB991928 A: MB991929 B: MB991930 C: MB991931 D: MB991932 E: MB991933 F: MB991934	Engine hanger A: Joint (50) x2 B: Joint (90) x2 C: Joint (140) x2 D: Foot (standard) x4 E: Foot (short) x2 F: Chain and hook assembly	

## TROUBLESHOOTING

### INTRODUCTION

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The manual transmission can exhibit any of the following symptoms: noise or vibration is generated, oil leaks, shifting gears is hard or troublesome, or the transmission jumps out of gear.

The causes of these symptoms could come from: incorrect mounting, the oil level may be low, or a component of the transmission may be faulty.

### TROUBLESHOOTING STRATEGY

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Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find a manual transmission fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.

3. Find the malfunction by following the Symptom Chart.  
4. Verify malfunction is eliminated.

## SYMPTOM CHART

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Symptom	Inspection procedure	Reference page
Noise, Vibration	1	<a href="#">P.22A-4</a>
Oil Leaks	2	<a href="#">P.22A-5</a>
Hard Shifting	3	<a href="#">P.22A-5</a>
Jumps Out of Gear	4	<a href="#">P.22A-6</a>

## SYMPTOM PROCEDURES

## INSPECTION PROCEDURE 1: Noise, Vibration

## DIAGNOSIS

## STEP 1. Check the idle speed.

Q: Does the idle speed meet the standard values?

YES : Go to Step 2 .

NO : Refer to GROUP 11AP.[P.11A-12](#), On-vehicle Service – Idle Speed Check.

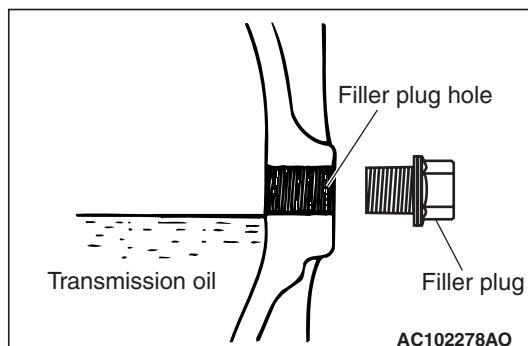
## STEP 2. Check whether the transmission and engine mount is loose or damaged.

Q: Are the transmission and engine mount loose or damaged?

YES : Tighten or replace the part. Then go to Step 7 .

NO : Go to Step 3 .

## STEP 3. Check that the oil level is up to the lower edge of the filler plug hole.



Q: Is the oil level up to the lower edge of the filler plug hole?

YES : Go to Step 4 .

NO : Refill gear oil API classification GL-4 SAE 75W-85W or 75W-90. Then go to Step 7 .

## STEP 4. Check for the specified oil.

Q: Is the specified oil gear oil API classification GL-4 SAE 75W-85W or 75W-90?

YES : Go to Step 5 .

NO : If in doubt, replace the oil. Refer to [P.22A-6](#). Then go to Step 7 .

## STEP 5. Remove the transmission. Check the axial play of the input and output shafts.

Q: Does the axial play of the input and output shafts meet the standard value?

YES : Go to Step 6 .

NO : Adjust the axial play of the input and output shafts. Then go to Step 7 .

## STEP 6. Disassemble the transmission. Check the gears for wear and damage.

Q: Are the gears worn or damaged?

YES : Replace the gears. Go to Step 7 .

NO : Go to Step 7 .

## STEP 7. Retest the systems.

Q: Is the noise or vibration still there?

YES : Return to Step 1 .

NO : The procedure is complete.

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## INSPECTION PROCEDURE 2: Oil Leaks

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### DIAGNOSIS

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#### STEP 1. Visual check.

Raise the vehicle, and check for oil leaks. If oil leak is difficult to locate, steam clean the transmission and drive the vehicle for at 10 minutes. Then check the leak again.

Q: Is the oil leak(s) found?

YES : Go to Step 2 .

NO : Check for the oil leaks around the engine.  
Then go to Step 4 .

YES : Remove the transmission. Check the input shaft oil seal, and replace if necessary.  
Then go to Step 4 .

NO : Go to Step 3 .

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#### STEP 3. Check the oil seal or O-ring for damage.

Q: Is the oil seal or O-ring damaged?

YES : Replace the oil seal or the O-ring. Then go to Step 4 .

NO : Go to Step 4 .

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#### STEP 2. Visual check at the clutch housing.

Q: Do oil leaks appear around the joint between the engine and the clutch housing?

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#### STEP 4. Retest the system.

Q: Is the oil still leaking?

YES : Return to Step 1 .

NO : The procedure is complete.

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## INSPECTION PROCEDURE 3: Hard Shifting

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### DIAGNOSIS

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#### STEP 1. Check the transmission control

Q: Are the shift cable and the select cable in good condition?

YES : Go to Step 2 .

NO : Repair or replace the shift cable and the select cable. Refer to [P.22A-7](#). Then go to Step 7 .

YES : Go to Step 5 .

NO : Repair or replace the control housing. Refer to GROUP 22B, Transmission [P.22B-10](#).  
Then go to Step 7 .

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#### STEP 2. Check the transmission oil.

Q: Is the oil dirty?

YES : Replace the oil. Refer to [P.22A-6](#). Then go to Step 7 .

NO : Go to Step 3 .

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#### STEP 5. Check for poor meshing of worn synchronizer ring and gear cone.

Q: Is poor meshing or worn synchronizer ring and gear cone found?

YES : Repair or replace the synchronizer ring and gear cone. Then go to Step 7 .

NO : Go to Step 6 .

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#### STEP 3. Check the clutch system.

Q: Is the clutch system normal?

YES : Go to Step 4 .

NO : Repair or replace the clutch system. Refer to [P.21B-3](#). Then go to Step 7 .

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#### STEP 6. Check the synchronizer spring for weakness.

Q: Is the synchronizer spring weak?

YES : Replace the synchronizer spring. Then go to Step 7 .

NO : Go to Step 7 .

---

#### STEP 4. Remove and disassemble the transmission. Check the control housing.

Q: Is the control housing in good condition?

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#### STEP 7. Retest the system.

Q: Is the shifting of the gears still hard?

YES : Return to Step 1 .

NO : The procedure is complete.

## INSPECTION PROCEDURE 4: Jumps Out of Gear

## DIAGNOSIS

## STEP 1. Check the transmission control

Q: Are the shift cable and the select cable in good condition?

YES : Go to Step 2 .

NO : Repair or replace the shift cable and the select cable. Refer to [P.22A-7](#). Then go to Step 6 .

## STEP 2. Remove and disassemble the transmission. Check the poppet spring for breakage.

Q: Is the poppet spring broken?

YES : Replace the poppet spring. Refer to GROUP 22B, Transmission [P.22B-10](#). Then go to Step 6 .

NO : Go to Step 3 .

## STEP 3. Check the control housing.

Q: Is the control housing in good condition?

YES : Go to Step 4 .

NO : Repair or replace the control housing. Refer to GROUP 22B, Transmission [P.22B-10](#). Then go to Step 6 .

## STEP 4. Check the gear shift forks for wear.

Q: Is the gear shift forks worn?

YES : Replace the gear shift fork. Refer to GROUP 22B, Transmission [P.22B-10](#). Then go to Step 6 .

NO : Go to Step 5 .

## STEP 5. Check the clearance.

Q: Is the clearance between the synchronizer hub and sleeve excessive?

YES : Replace the synchronizer hub or sleeve. Refer to GROUP 22B, Input Shaft [P.22B-17](#), Output Shaft [P.22B-23](#). Then go to Step 6 .

NO : Go to Step 6 .

## STEP 6. Retest the system.

Q: Does the transmission still jump out of gear?

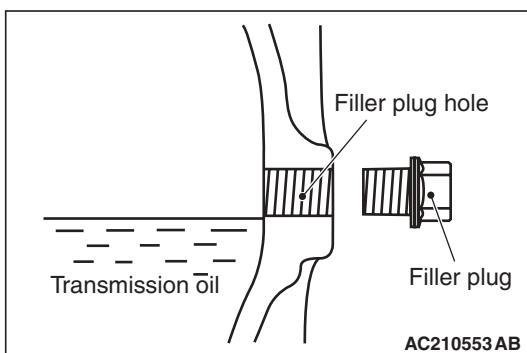
YES : Return to Step 1 .

NO : The procedure is complete.

## ON-VEHICLE SERVICE

## TRANSMISSION OIL LEVEL CHECK

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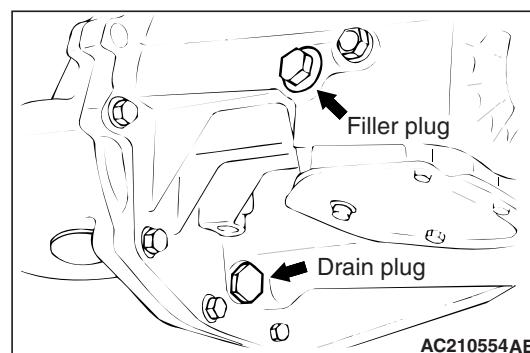


1. Remove the filler plug.
2. Check that the oil level is up to the lower edge of the filler plug hole.
3. Check that the oil is not noticeably dirty.
4. Tighten the filler plug to the specified torque.

**Tightening torque:  $32 \pm 2 \text{ N}\cdot\text{m}$**

## TRANSMISSION OIL REPLACEMENT

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1. Remove the filler plug.
2. Remove the drain plug and drain the oil.
3. Tighten the drain plug to the specified torque.  
**Tightening torque:  $32 \pm 2 \text{ N}\cdot\text{m}$**
4. Fill with gear oil API classification GL-4 SAE 75W-85W or 75W-90 until the level comes to the lower portion of filler plug hole.

Quantity: 2.2 L

Tightening torque:  $32 \pm 2 \text{ N}\cdot\text{m}$

5. Tighten the filler plug to the specified torque.

## TRANSMISSION CONTROL

### REMOVAL AND INSTALLATION

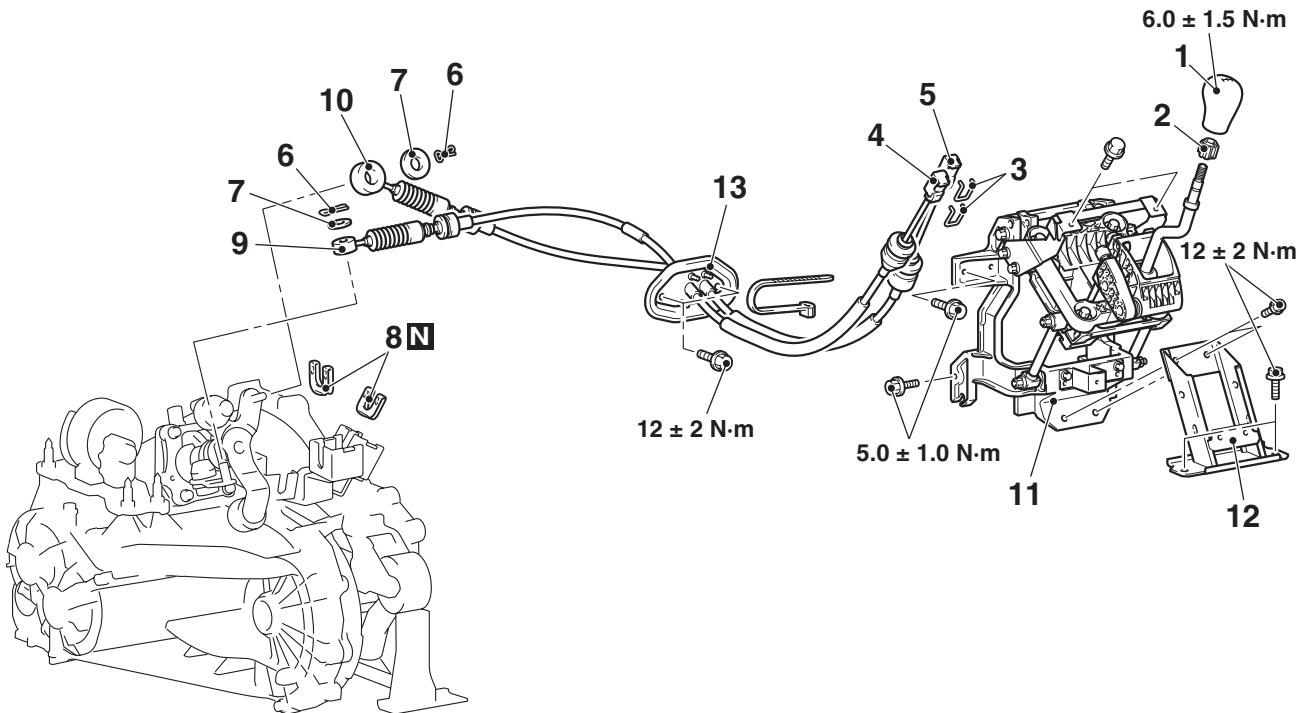
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#### WARNING

**Be careful not to subject the SRS-ECU to any shocks during removal and installation of the shift cable and select cable assembly.**

#### Pre-removal and Post-installation Operation

- Air Cleaner Assembly Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-3).
- Battery and Battery Tray Removal and Installation.



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#### Gearshift cable and select cable assembly removal steps

1. Gearshift lever knob
2. Sleeve
- Centre lever panel, Console side cover, Centre console (Refer to GROUP 52A P.52A-9).
- Harness clamp (ashtray illumination lamp, hazard warning switch)
- >>B<< 3. Gearshift cable clip
4. Select cable connection (Gearshift lever side)
5. Gearshift cable connection (Gearshift lever side)
6. Snap pin

<<A>> >>A<<

<<A>> >>A<<

<<A>> >>A<<

>>A<<

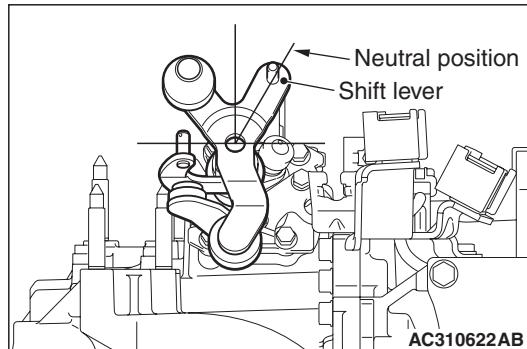
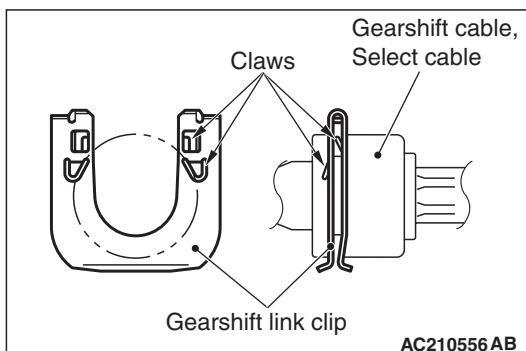
#### Gearshift cable and select cable assembly removal steps

7. Washer
8. Gearshift link clip
9. Select cable connection (Transmission side)
10. Gearshift cable connection (Transmission side)
11. Gearshift lever assembly
- Rear heater duct (Refer to GROUP 55, ducts P.55-228).
12. Gearshift link mounting bracket
13. Gearshift cable and select cable assembly

**Gearshift lever assembly  
removal steps**

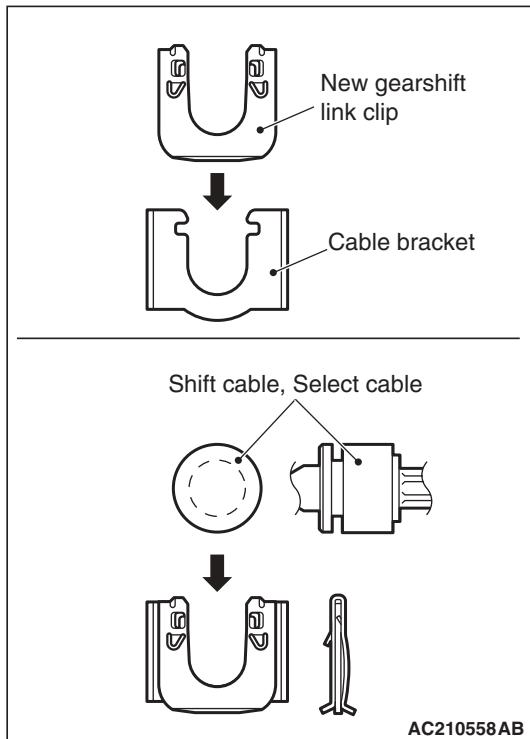
1. Gearshift lever knob
2. Sleeve
  - Centre lever panel, Console side cover, Centre console (Refer to GROUP 52A [P.52A-9](#)).
- >>B<< 3. Gearshift cable clip
4. Select cable connection (Gearshift lever side)
5. Gearshift cable connection (Gearshift lever side)
11. Gearshift lever assembly
  - Rear heater duct (Refer to GROUP 55, ducts [P.55-228](#)).
12. Gearshift link mounting bracket

Push up the claws of the gearshift link clip using a screwdriver, etc., and then remove the gearshift link clip from the bracket together with the cables.

**INSTALLATION SERVICE POINTS****>>A<< GEARSHIFT CABLE AND SELECT CABLE ASSEMBLY/GEARSHIFT CABLE CONNECTION (TRANSMISSION SIDE)/SELECT CABLE CONECTION (TRANSMISSION SIDE)/GEARSHIFT LINK CLIP INSTALLATION****REMOVAL SERVICE POINTS****<<A>> GEARSHIFT LINK CLIP/SELECT CABLE CONNECTION (TRANSMISSION SIDE)/GEAR SHIFT CABLE CONNECTION (TRANSMISSION SIDE) REMOVAL**

1. Set the transmission side shift lever and the passenger compartment side shift lever to the neutral position.
2. Install the painted part of the shift cable end (transmission side) and painted part of the select cable (transmission side) facing the snap pin.

**CAUTION**



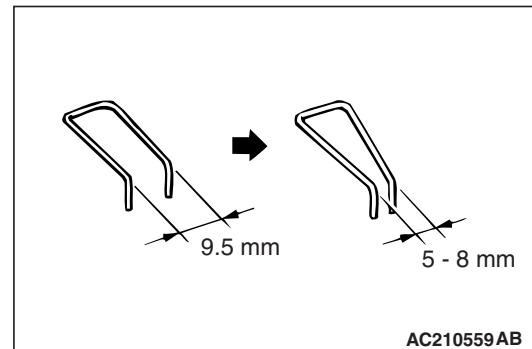
**Insert thoroughly the gearshift link clip, shift cable and select cable until they click in place.**

3. After installing the new gearshift link clip to the cable bracket of the transmission, install the shift cable and select cable to the cable bracket.

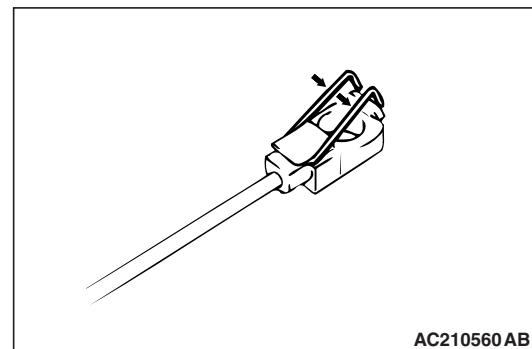
*NOTE: The clip is reversible.*

4. Move the shift lever to all positions and check that the operation is smooth.

**>>B<< GEARSHIFT CABLE CLIP  
INSTALLATION**



1. Make sure that there is no excessive play at the shift cable end gearshift cable clip. If there is excessive play or the gearshift cable clip is disengaged from the shift cable end, check the clip opening gap. If the gap is more than 9.5 mm, squeeze the gearshift cable clip until the relaxed gap reaches 5 to 8 mm.

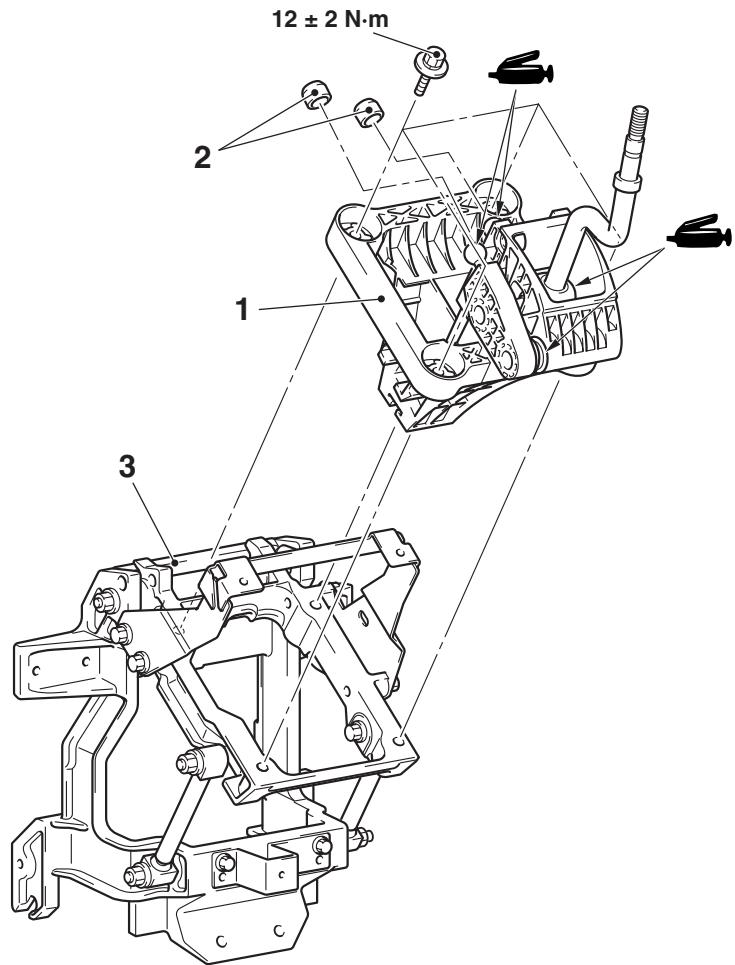


2. Engage the gearshift cable clip with the shift cable hook securely, and push the gearshift cable clip with your thumbs until it clicks in place.
3. Install the shift cable to the shift lever.

## SHIFT LEVER ASSEMBLY

## DISASSEMBLY AND REASSEMBLY

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## Disassembly steps

1. Gearshift control lever assembly

## Disassembly steps (Continued)

2. Gearshift link bushing
3. Gearshift link bracket

## TRANSMISSION ASSEMBLY

## REMOVAL AND INSTALLATION

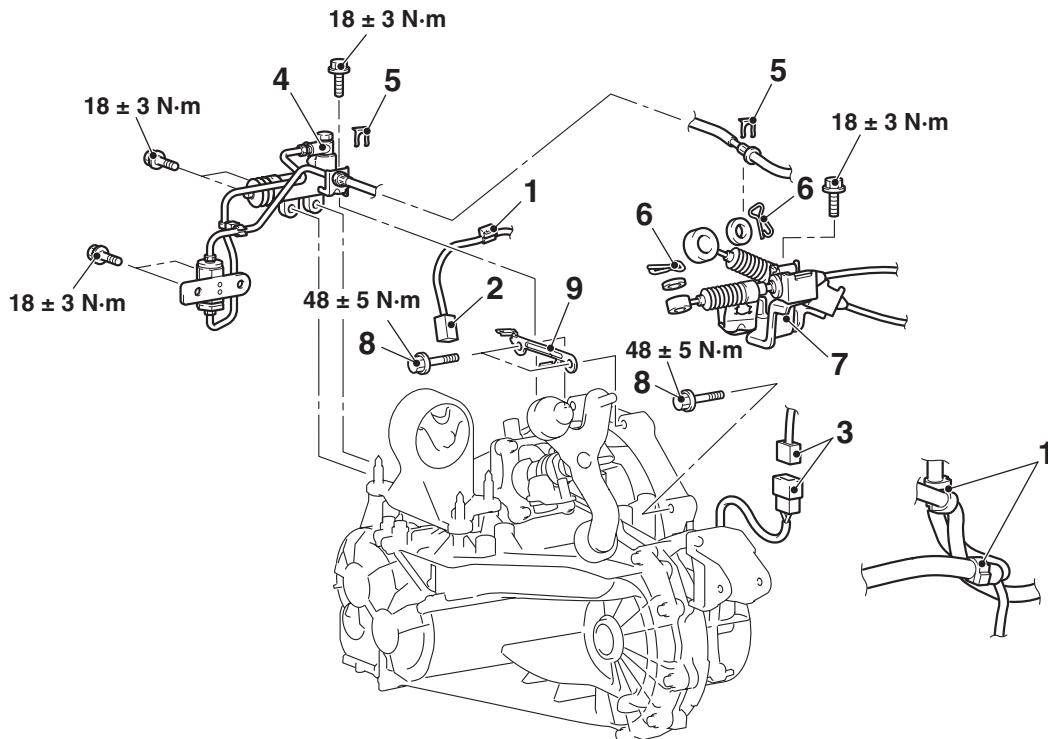
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**CAUTION**

\*: Indicates parts which should be temporarily tightened, and then fully tightened after installing the engine into the vehicle.

**Pre-removal and Post-installation Operation**

- Air Cleaner assembly, Air Cleaner Bracket Removal and Installation (Refer to GROUP 15, Air Cleaner P.15-3).
- Battery and Battery Tray Removal and Installation.
- Transmission Oil Draining and Refilling (Refer to P.22A-6).
- Under Cover Removal and Installation (Refer to GROUP 51, Front Bumper P.51-3). <LHD>
- Drive Shaft Removal and Installation (Refer to GROUP 26 P.26-11).
- Stator Motor Assembly Removal and Installation (Refer to GROUP 16, Stator Motor Assembly P.16-18).



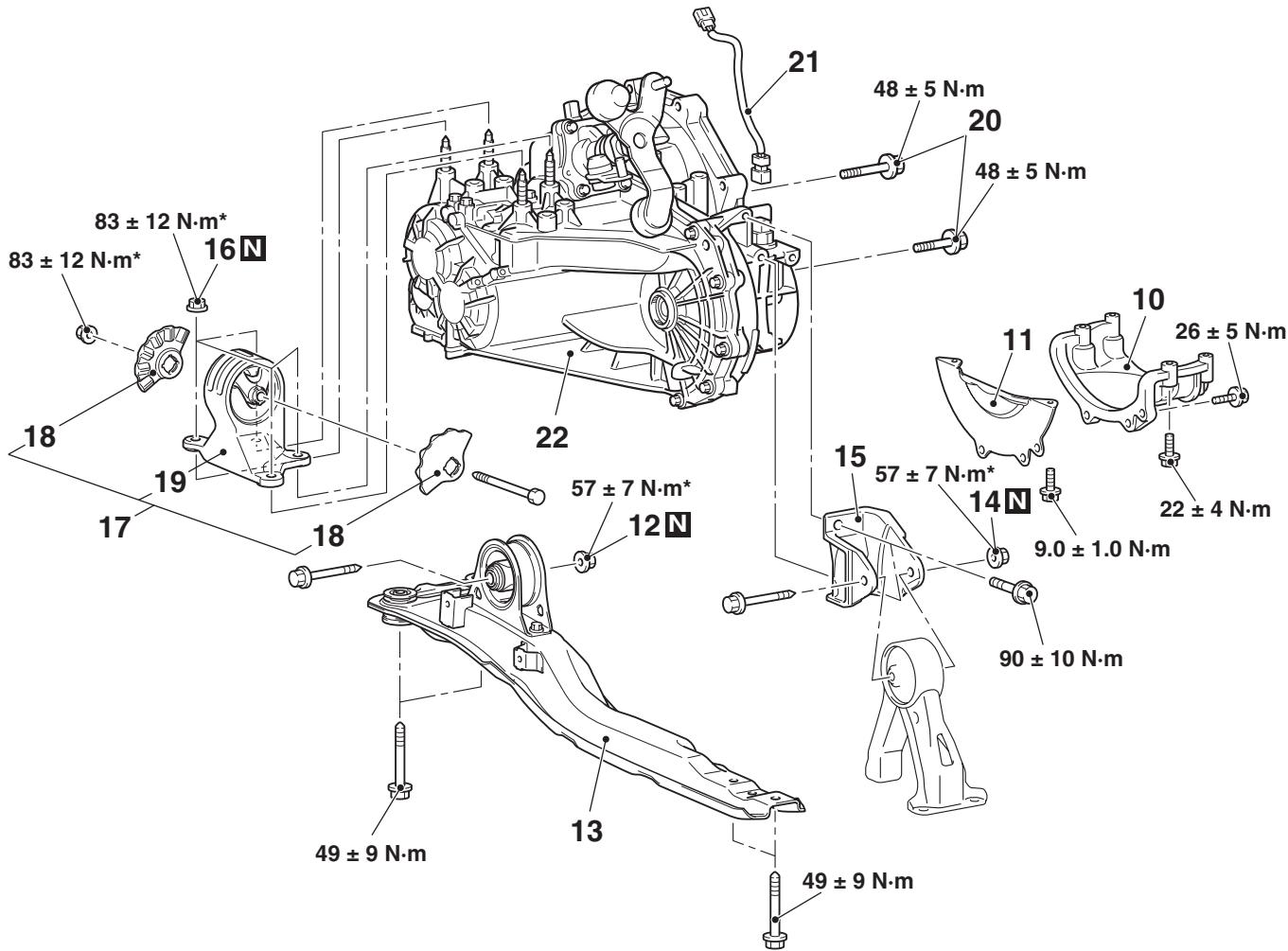
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**Removal steps**

1. Transmission harness clamp
2. Back-up lamp switch connector connection
3. Vehicle speed sensor harness connector connection
4. Clutch release cylinder and clutch oil pipe
5. Clip

**Removal steps (Continued)**

<ol style="list-style-type: none"> <li>6. Snap pin</li> <li>7. Cable bracket and cable assembly &lt;Transmission side&gt;</li> </ol>	<ol style="list-style-type: none"> <li>&gt;&gt;B&lt;&lt;</li> <li>8. Transmission assembly upper part coupling bolts</li> <li>9. Harness clamp bracket</li> </ol>
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**Removal steps**

- Front exhaust pipe, Catalytic converter connection (Refer to GROUP 15, Exhaust pipe and main muffler P.15-9).
- 10. Transmission stay
- 11. Flywheel housing front lower cover
- 12. Self locking nut
- 13. Centremember assembly
- 14. Self locking nut
- 15. Rear roll mount bracket
  - Engine and transmission assembly supporting
- 16. Self locking nut
- 17. Transmission mounting bracket assembly
- >>A<< 18. Transmission mounting stopper
- 19. Transmission mounting body side bracket
  - Engine assembly supporting
- 20. Transmission assembly lower part coupling bolts

&lt;&lt;A&gt;&gt;

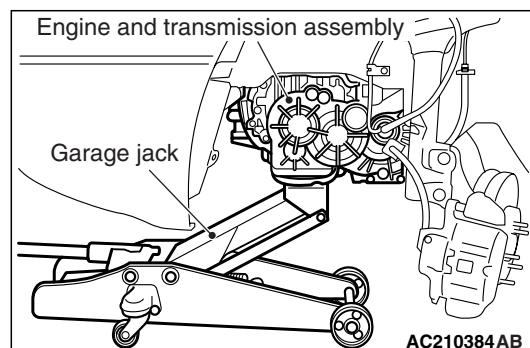
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&gt;&gt;A&lt;&lt;

&lt;&lt;B&gt;&gt;

**Removal steps (Continued)**

21. Vehicle speed sensor sub harness
22. Transmission assembly

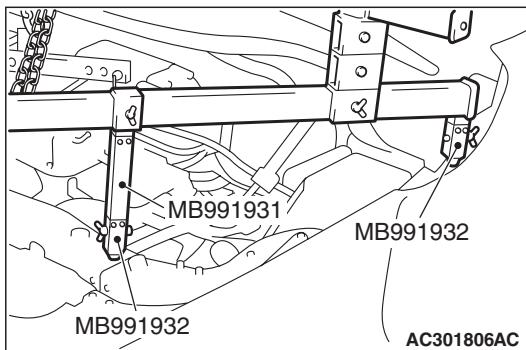
**REMOVAL SERVICE POINTS****<<A>> ENGINE AND TRANSMISSION ASSEMBLY SUPPORTING/TRANSMISSION MOUNTING BRACKET ASSEMBLY REMOVAL**

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While supporting the engine and transmission assembly with a garage jack, remove the transmission mount assembly.

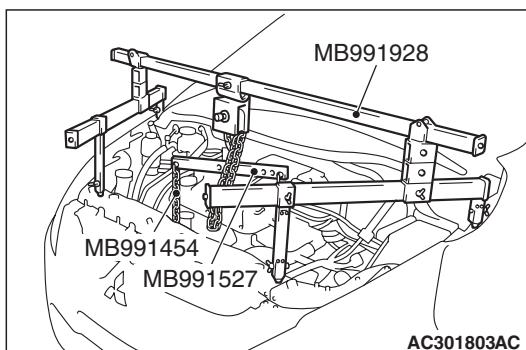
### <<B>> ENGINE ASSEMBLY SUPPORTING

1. After removing the transmission mounting assembly, install a special tool MB991928 or MB991895.
2. <Engine hanger (special tool MB991928) is used>
  - (1) Assemble special tool MB991928. (Set the components below to the base hanger.)
  - Slide bracket (HI)
  - Special tool MB991931: Joint (140) × 2
  - Special tool MB991932: Foot (standard) × 2

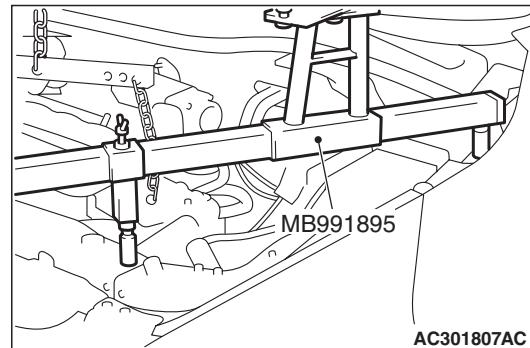


- (2) Set the foot (standard) MB991932 of assembled special tool MB991928 to the front fender assembling bolts as shown. <rear side>
- (3) Set the joint (140) MB991931 and foot (standard) MB991932 of assembled special tool MB991928 to the front end upper bar assembling bolts as shown.

*NOTE: Slide the slide bracket (HI) to balance the engine hanger.*

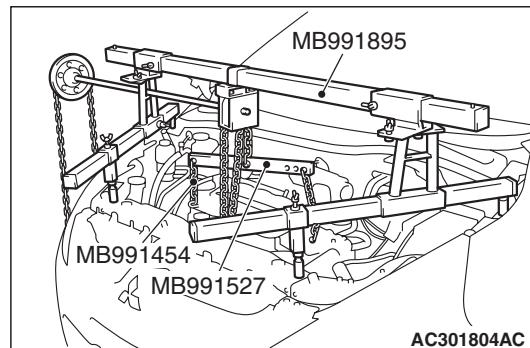


- (4) Set the chains of special tools MB991527 and MB991454 to hold the engine assembly.
3. <Engine hanger (special tool MB991895) is used>
  - (1) Set a special tool MB991895.



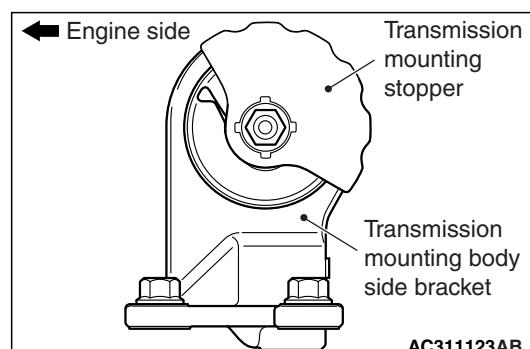
- (2) Set the rear foot of special tool MB991895 to the front fender assembling bolts as shown.
- (3) Set the front foot of special tool MB991895 to the front end upper bar assembling bolts as shown.

*NOTE: Slide the front foot of special tool MB991895 to balance the engine hanger.*



- (4) Set the chains of special tools MB991527 and MB991454 to hold the engine assembly.
4. Remove the garage jack and raise the vehicle.
5. Hold the transmission assembly with a transmission jack.

### INSTALLATION SERVICE POINTS >>A<< TRANSMISSION MOUNTING STOPPER INSTALLATION



Install the transmission mounting stopper as shown in the illustration.

>>B<< TRANSMISSION ASSEMBLY  
UPPER PART COUPLING BOLTS

Tighten the harness clamp bracket towards the direction shown to the transmission assembly upper part coupling bolts.

