
GROUP 22A

MANUAL TRANSMISSION (FF)

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GENERAL INFORMATION

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Item		Specification
Transmission model		F5M42-2-R7B5
Transmission type		5-speed forward, 1-speed reverse constant mesh
Transmission gear ratio	1st	3.583
	2nd	1.947
	3rd	1.379
	4th	1.030
	5th	0.820
	Reverse	3.363
Final reduction ratio (Differential gear ratio)		4.058
Speedometer gear ratio		30/36

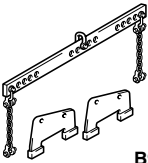
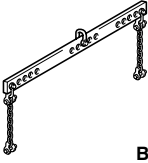
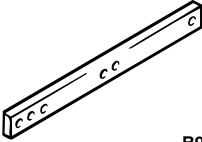
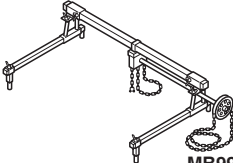
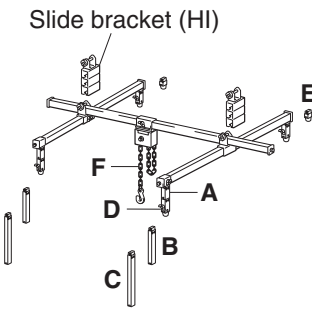
LUBRICANT

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Item	Specified lubricant	Quantity L
Transmission oil	MITSUBISHI MOTORS Genuine MTF	2.2

SPECIAL TOOLS

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Tool	Number	Name	Use
 <p>B991453</p>	MB991453	Engine hanger assembly	<p>When the engine hanger is used: Supporting the engine assembly during removal and installation of the transmission assembly</p> <p><i>NOTE: Special tool MB991454 is a part of engine hanger attachment set MB991453.</i></p>
 <p>B991454</p>	MB991454	Engine hanger balancer	
 <p>B991527</p>	MB991527	Engine hanger	
 <p>MB991895</p>	MB991895	Engine hanger	
<p>Slide bracket (HI)</p>  <p>B991928</p>	<p>MB991928</p> <p>A: MB991929</p> <p>B: MB991930</p> <p>C: MB991931</p> <p>D: MB991932</p> <p>E: MB991933</p> <p>F: MB991934</p>	<p>Engine hanger</p> <p>A: Joint (50) × 2</p> <p>B: Joint (90) × 2</p> <p>C: Joint (140) × 2</p> <p>D: Foot (standard) × 4</p> <p>E: Foot (short) × 2</p> <p>F: Chain and hook assembly</p>	

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	P.22A-4
Oil Leaks	2	P.22A-5
Hard Shifting	3	P.22A-6
Jumps Out of Gear	4	P.22A-6

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 11A, On-vehicle Service – Idle Speed Check P.11A-13.

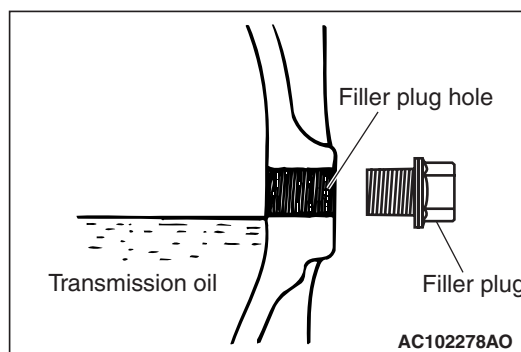
STEP 2. Check whether the transmission and engine mount is loose or damaged.

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 MITSUBISHI MOTORS Genuine MTF. Then go to Step 7.

STEP 4. Check for the specified oil.

Q: Is the specified oil refill MITSUBISHI MOTORS Genuine MTF?
YES : Go to Step 5.
NO : If in doubt, replace the oil. Refer to [P.22A-7](#). 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.

INSPECTION PROCEDURE 2: Oil Leaks

DIAGNOSIS

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.

STEP 2. Visual check at the clutch housing.

Q: Do oil leaks appear around the joint between the engine and the clutch housing?
YES : Remove the transmission. Check the input shaft oil seal, and replace if necessary. Then go to Step 4.
NO : Go to Step 3.

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.

STEP 4. Retest the system.

Q: Is the oil still leaking?
YES : Return to Step 1.
NO : The procedure is complete.

INSPECTION PROCEDURE 3: Hard Shifting

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-8](#). Then go to Step 7.

STEP 2. Check the transmission oil.

Q: Is the oil dirty?

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

NO : Go to Step 3.

STEP 3. Check the clutch system.

Q: Is the clutch system normal?

YES : Go to Step 4.

NO : Repair or replace the clutch system. Then go to Step 7.

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

Q: Is the control housing in good condition?

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.

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.

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 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-8](#). 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-18, Output Shaft P.22B-25. Then go to Step 6.

NO : Go to Step 6.

STEP 6. Retest the system.

Q: Does the transmission still jump out of gear?

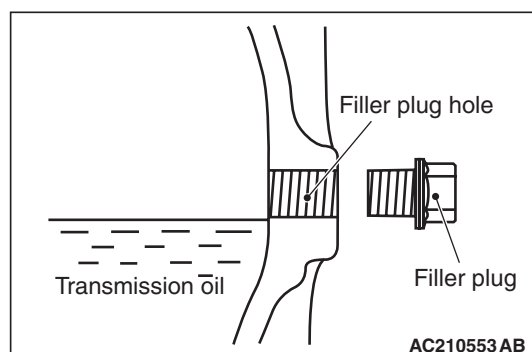
YES : Return to Step 1.

NO : The procedure is complete.

ON-VEHICLE SERVICE

TRANSMISSION OIL LEVEL CHECK

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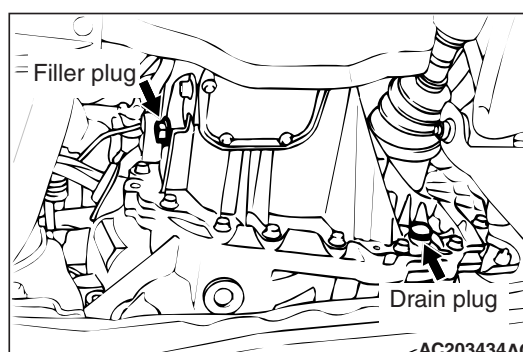


1. Remove the filler plug.
2. Check that the oil level is up to the lower edge of the filler plug hole.
3. Check that the oil is not noticeably dirty.
4. Tighten the filler plug to the specified torque.

Tightening torque: 32 ± 2 N·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 ± 2 N·m
4. Fill with MITSUBISHI MOTORS Genuine MTF until the level comes to the lower portion of filler plug hole.
Quantity: 2.2 L
5. Tighten the filler plug to the specified torque.
Tightening torque: 32 ± 2 N·m

TRANSMISSION CONTROL

REMOVAL AND INSTALLATION

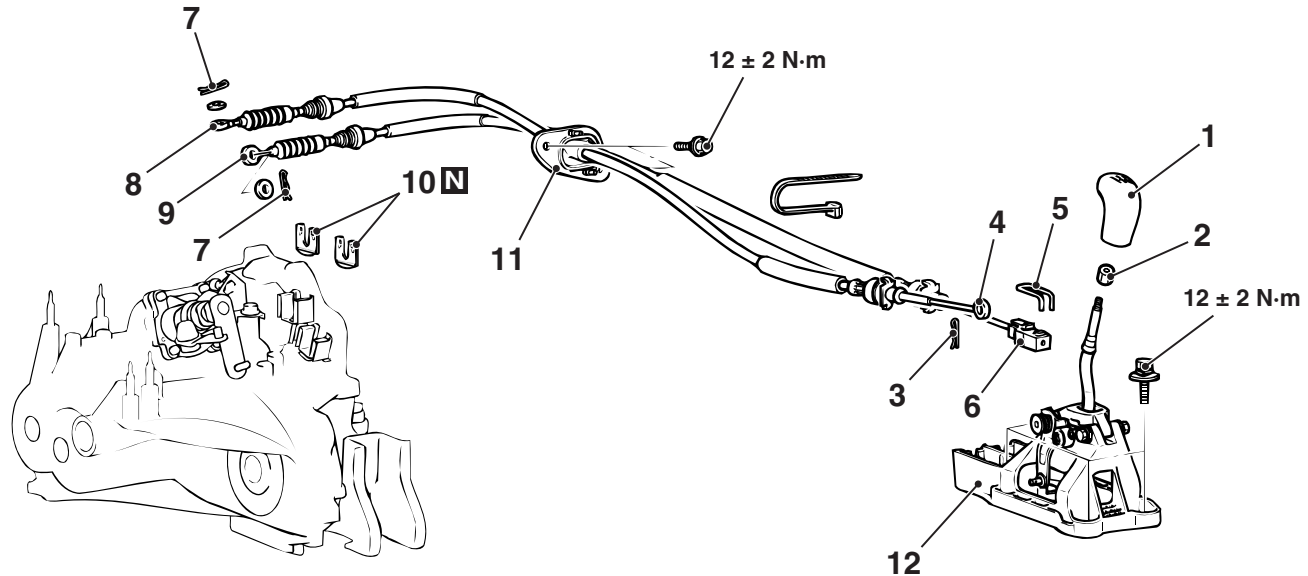
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⚠ WARNING

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
 - Front floor console (Refer to GROUP 52A [P.52A-7](#)).
2. Sleeve
3. Snap pin
4. Select cable connection (Gearshift lever side)
5. Gearshift cable clip
6. Gearshift cable connection (Gearshift lever side)
 - SRS-ECU (Refer to GROUP 52B [P.52B-155](#)).
7. Snap pin
8. Select cable connection (Transmission side)
9. Gearshift cable connection (Transmission side)

Gearshift cable and select cable assembly removal steps

10. Gearshift link clip
 11. Gearshift cable and select cable assembly
- Gearshift lever assembly removal steps**
1. Gearshift lever knob
 - Front floor console (Refer to GROUP 52A [P.52A-7](#)).
 2. Sleeve
 3. Snap pin
 4. Select cable connection (Gearshift lever side)
 5. Gearshift cable clip
 6. Gearshift cable connection (Gearshift lever side)
 12. Gearshift lever assembly

<<A>> >>A<<

>>B<<

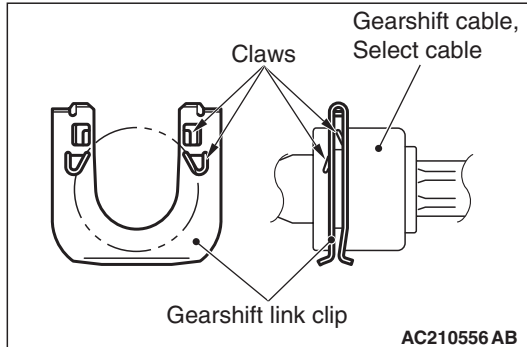
<<A>> >>A<<

<<A>> >>A<<

>>B<<

REMOVAL SERVICE POINT

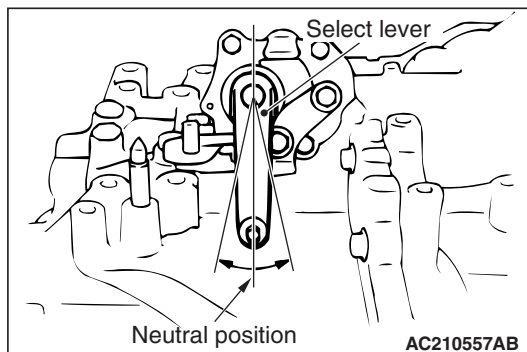
<<A>> SELECT CABLE CONNECTION (TRANSMISSION SIDE)/GEAR SHIFT CABLE CONNECTION (TRANSMISSION SIDE) GEARSHIFT LINK CLIP REMOVAL



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.

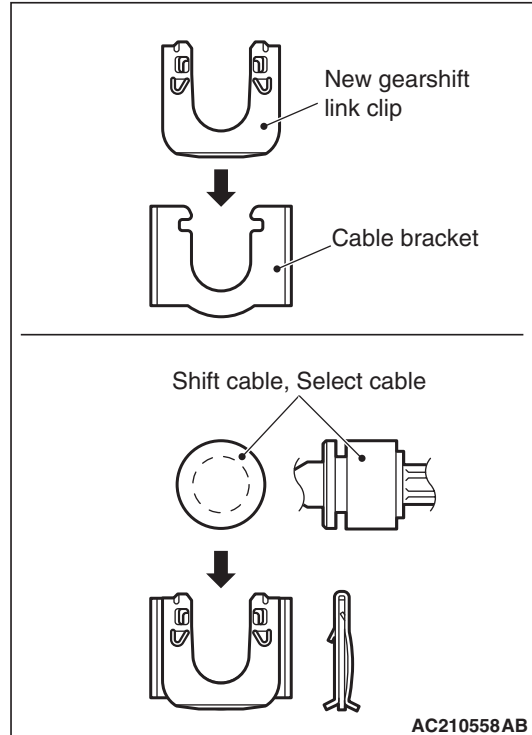
INSTALLATION SERVICE POINTS

>>A<< GEARSHIFT LINK CLIP/GEAR- SHIFT CABLE CONNECTION (TRANSMIS- SION SIDE)/SELECT CABLE CONECTION (TRANSMISSION SIDE) INSTALLATION



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



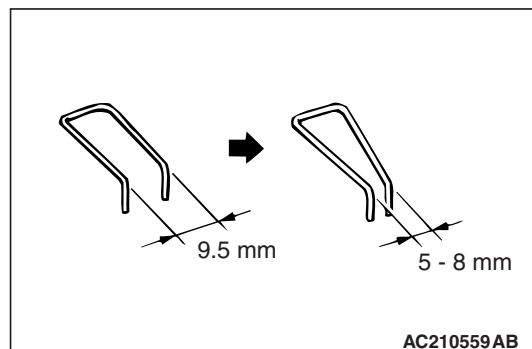
Insert thoroughly the gearshift link clip, shift cable and select cable until they click in place.

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.

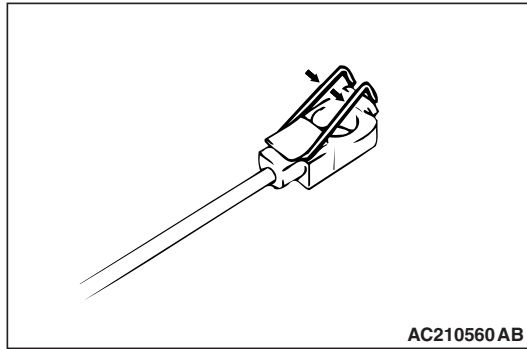
NOTE: The clip is reversible.

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.



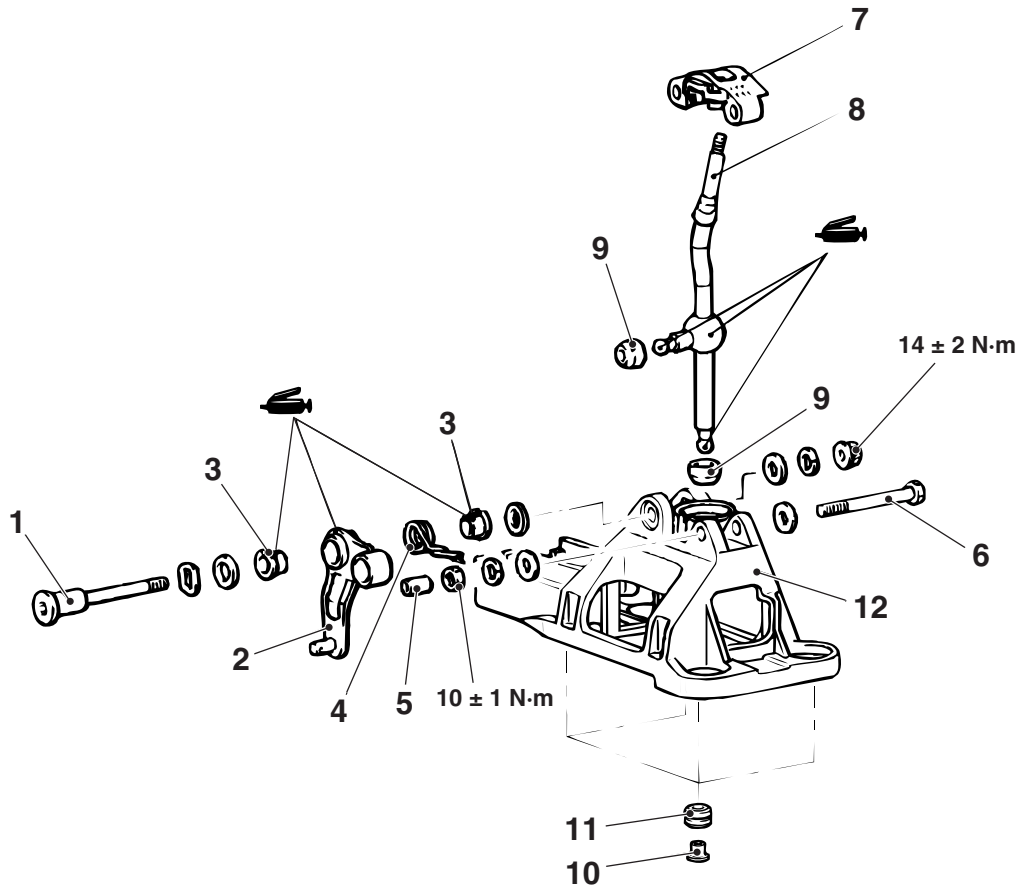
3. Install the shift cable to the shift lever.

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.

SHIFT LEVER ASSEMBLY

DISASSEMBLY AND REASSEMBLY

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Disassembly steps

1. Gearshift link bolt
2. Gearshift select lever
3. Gearshift link bushing
4. Gearshift lever spring
5. Gearshift link collar
6. Bolt
7. Gearshift lever retainer

Disassembly steps (Continued)

8. Gearshift lever
9. Gearshift link bushing
10. Gearshift lever bracket distance piece
11. Gearshift link bushing
12. Gearshift lever bracket

TRANSMISSION ASSEMBLY

REMOVAL AND INSTALLATION

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CAUTION

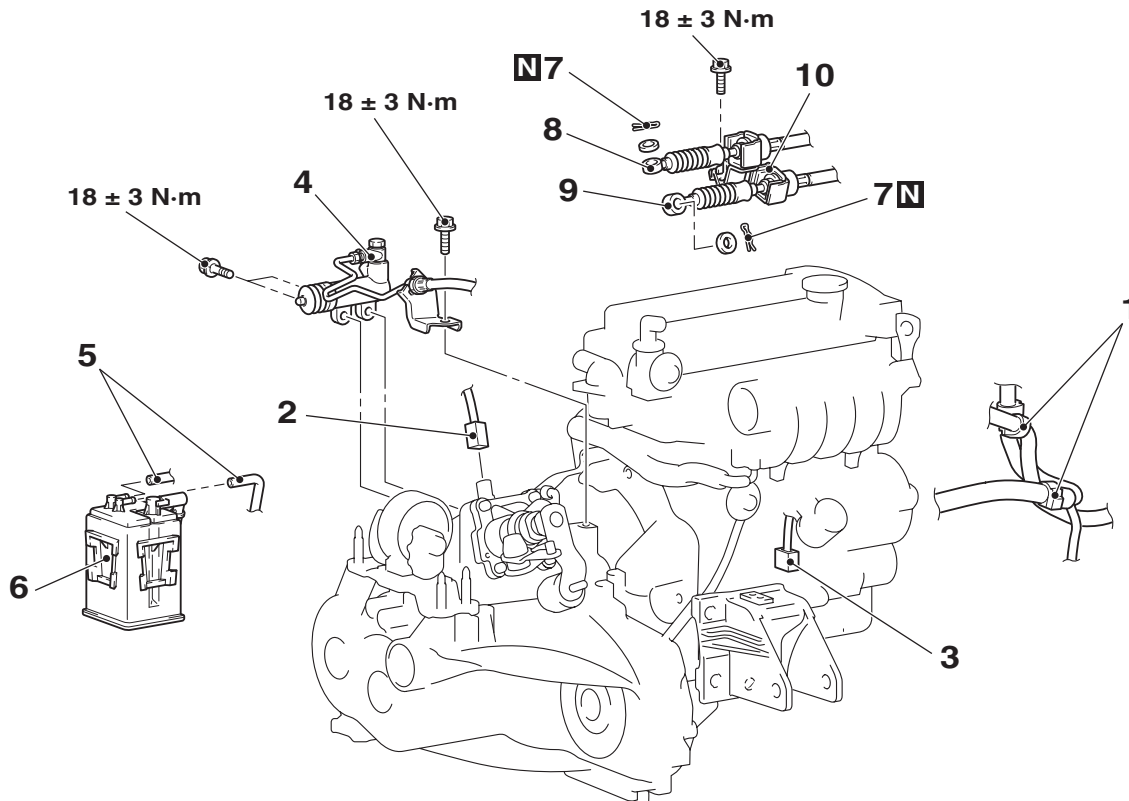
∗: Indicates parts which should be temporarily tightened, and then fully tightened after installing the engine into the vehicle.

Pre-removal Operation

- Under Cover Removal
- Transmission Oil Draining (Refer to [P.22A-7.](#))
- Battery and Battery Tray Removal
- Air Cleaner Assembly Removal (Refer to GROUP 15, Air Cleaner [P.15-3.](#))
- Front Exhaust Pipe Removal (Refer to GROUP 15, Exhaust Pipe and Main Muffler [P.15-8.](#))
- Driveshaft Removal (Refer to GROUP 26, Driveshaft Assembly [P.26-14.](#))

Post-installation Operation

- Driveshaft Installation (Refer to GROUP 26, Driveshaft Assembly [P.26-14.](#))
- Front Exhaust Pipe Installation (Refer to GROUP 15, Exhaust Pipe and Main Muffler [P.15-8.](#))
- Air Cleaner Assembly Installation (Refer to GROUP 15, Air Cleaner [P.15-3.](#))
- Battery and Battery Tray Installation
- Transmission Oil Filling (Refer to [P.22A-7.](#))
- Under Cover Installation



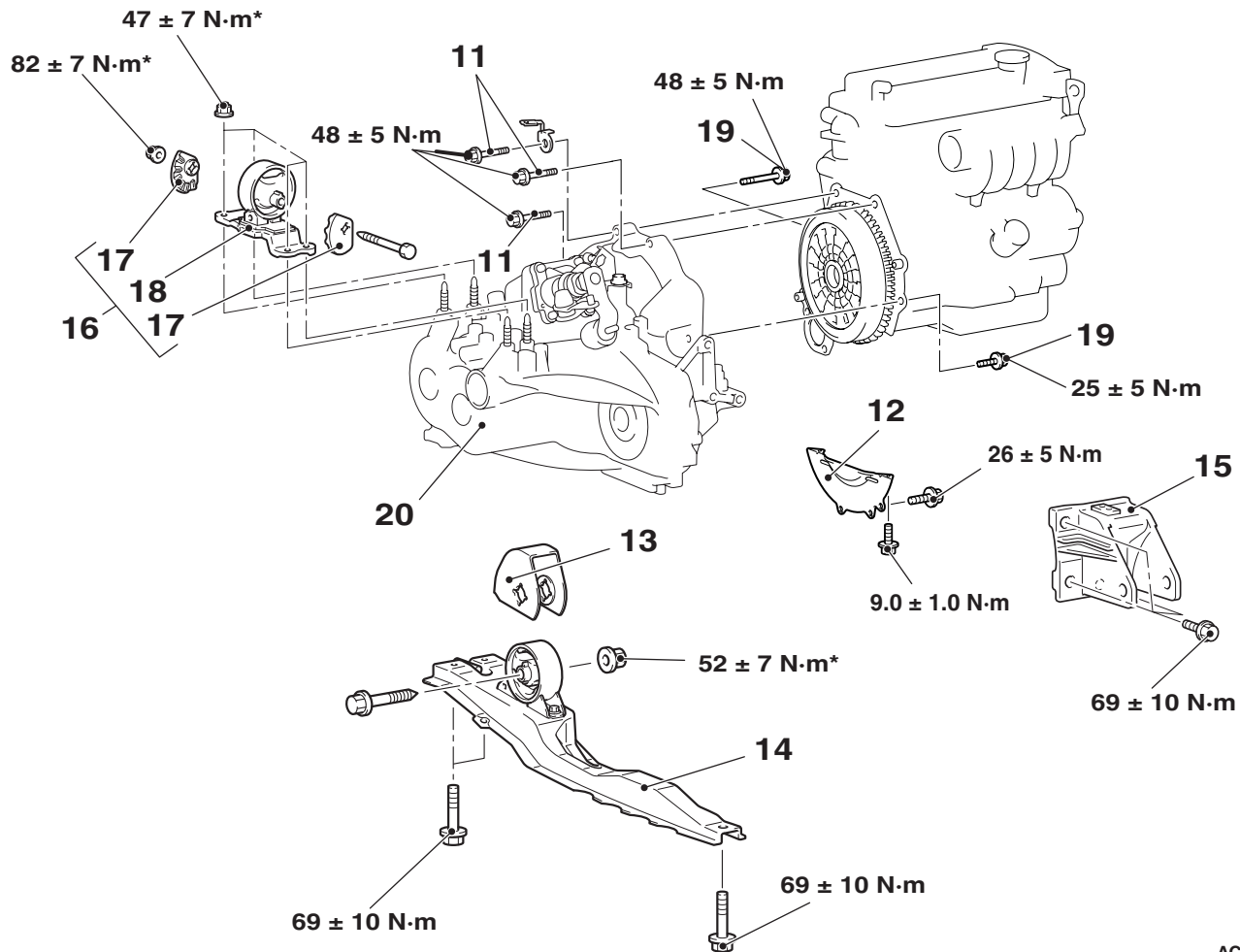
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Removal steps

1. Transmission harness clamp
2. Back-up lamp switch connector
3. Vehicle speed sensor connector
4. Clutch release cylinder and clutch oil pipe
5. Vapour hose connection
6. Canister
7. Snap pin

Removal steps (Continued)

8. Select cable connection
<Transmission side>
 9. Gearshift cable connection
<Transmission side>
 10. Cable bracket and cable assembly
<Transmission side>
- Starter motor assembly (Refer to GROUP 16 [P.16-17.](#))



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Removal steps

<<A>>

11. Transmission assembly upper part coupling bolts
 - Rear roll stopper connecting bolt (Refer to GROUP 32, Engine roll stopper P.32-7.)

>>B<<

12. Cover
13. Engine front mounting cushion stopper
14. Centremember assembly
15. Rear roll mount bracket

<>

>>A<<

<<C>>

Removal steps (Continued)

16. Transmission mounting insulator assembly
17. Transmission mounting insulator stopper
18. Transmission mounting insulator
 - Engine assembly support
 - Support the transmission with a transmission jack
19. Transmission assembly lower part coupling bolts
20. Transmission assembly

REMOVAL SERVICE POINTS

<<A>> TRANSMISSION ASSEMBLY UPPER PART COUPLING BOLTS REMOVAL

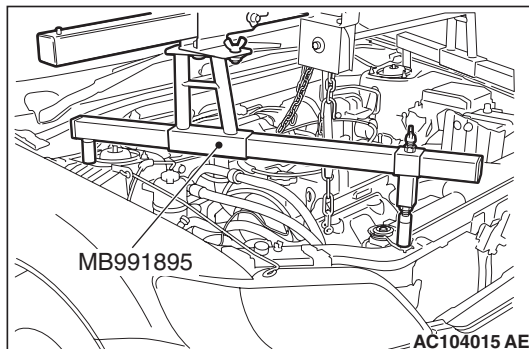
Do not fully unscrew the bolts from the engine and transmission assembly. Only loosen the bolts.

<> TRANSMISSION MOUNTING INSULATOR ASSEMBLY REMOVAL

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

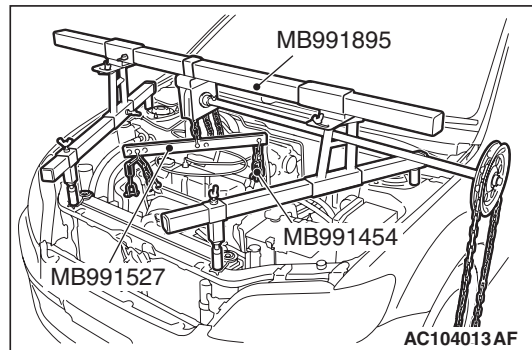
<<C>> ENGINE ASSEMBLY SUPPORT

1. Support the engine and transmission assembly with a garage jack and remove the transmission mounting insulator, then install the engine hanger (special tool MB991895 or MB991928).

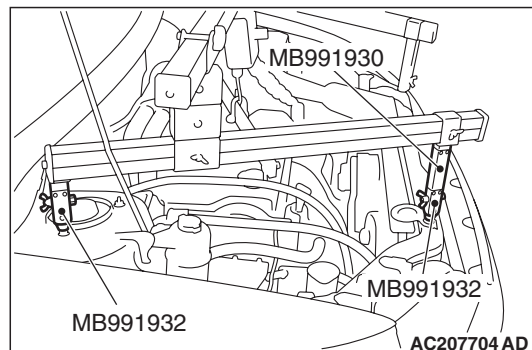


2. <Engine hanger (special tool MB991895) is used>
 - (1) Set special tool MB991895 to the strut mounting nuts and the radiator support upper insulator mounting bolts, which are located in the engine compartment, as shown.

NOTE: Adjust the engine hanger balance by sliding the front side foot of the engine hanger (special tool MB991895).

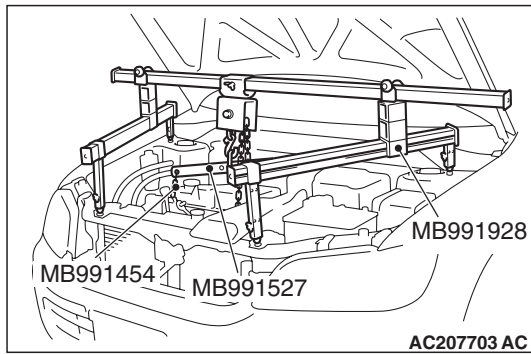


- (2) Set the chains of engine hanger (special tool MB991527) and engine hanger balancer (special tool MB991454), support the engine and transmission assembly and remove the garage jack, and unscrew the transmission assembly upper part coupling bolts that were priorly loosened.
3. <Engine hanger (special tool MB991928) is used>
 - (1) Assemble the engine hanger (special tool MB991928). Set following parts to the base hanger.
 - Slide bracket (HI)
 - Foot (standard) (MB991932)
 - Joint (90) (MB991930)



- (2) Set the engine hanger (special tool MB991928) to the strut mounting nuts and the radiator support upper insulator mounting bolts, which are located in the engine compartment, as shown.

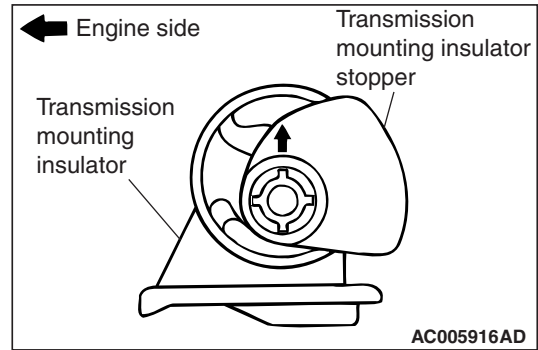
NOTE: Adjust the engine hanger balance by sliding the slide bracket (HI).



- (3) Set the chains of engine hanger (special tool MB991527) and engine hanger balancer (special tool MB991454), support the engine and transmission assembly and remove the garage jack, and unscrew the transmission assembly upper part coupling bolts that were priorly loosened.

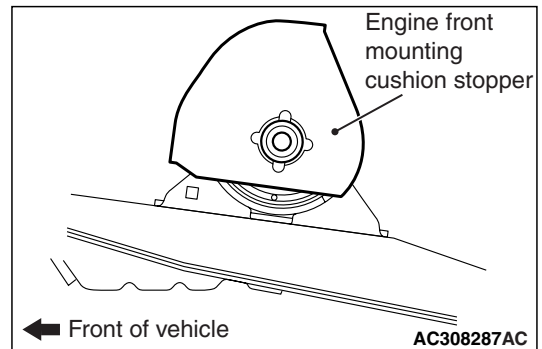
INSTALLATION SERVICE POINTS

>>A<< TRANSMISSION MOUNTING INSULATOR STOPPER INSTALLATION



Install the transmission mounting insulator stopper so that the arrow points as shown in the illustration.

>>B<< ENGINE FRONT MOUNTING CUSHION STOPPER INSTALLATION



Install the engine front mounting cushion stopper as shown.