

## GROUP 21A

# CLUTCH

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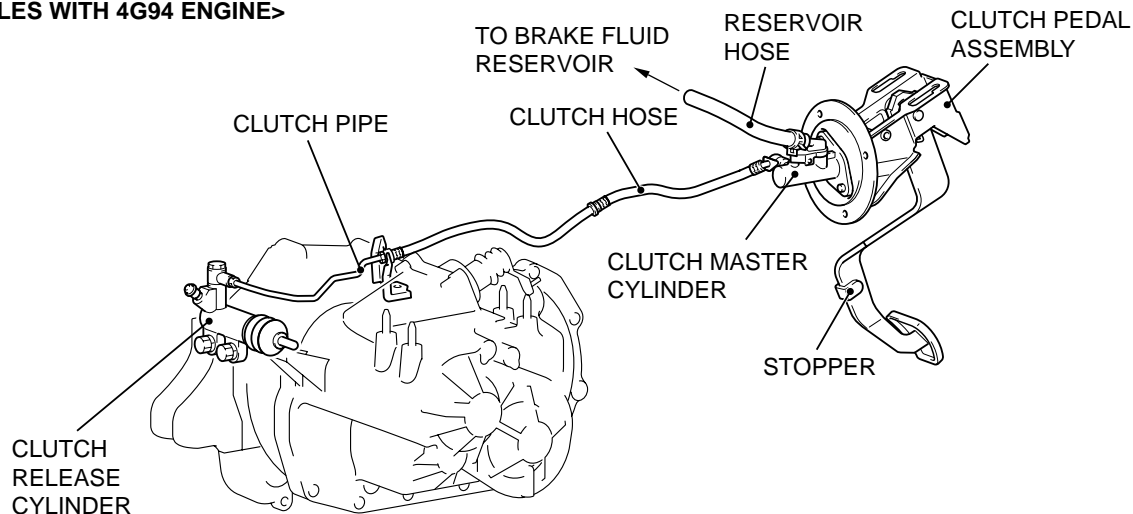
## GENERAL DESCRIPTION

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The clutch is a dry single-disc, diaphragm type; hydraulic pressure is used for the clutch control. The clutch shares a brake fluid reservoir with the brake system.

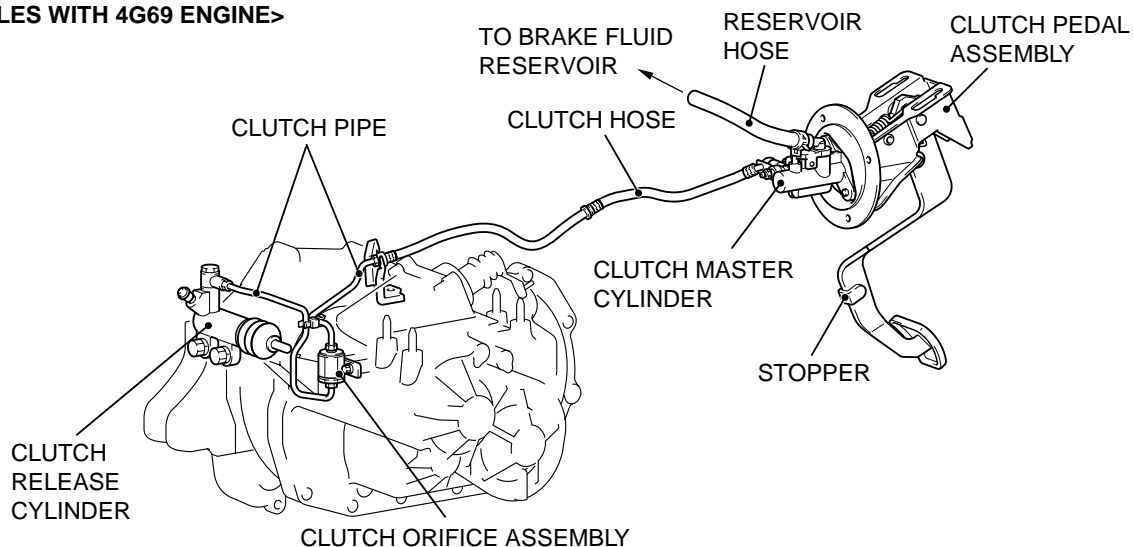
## CONSTRUCTION DIAGRAM

## &lt;VEHICLES WITH 4G94 ENGINE&gt;



AC303549 AC

## &lt;VEHICLES WITH 4G69 ENGINE&gt;



AC306346 AB

# CLUTCH DIAGNOSIS

## INTRODUCTION TO CLUTCH DIAGNOSIS

M1211003400148

A defective clutch causes clutch slippage resulting in poor performance. The causes for this problem may be a faulty clutch line or disc, or a maladjustment of the clutch pedal.

## CLUTCH DIAGNOSIS TROUBLESHOOTING STRATEGY

M1211003500145

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 clutch 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

M1211003600120

SYMPTOM	INSPECTION PROCEDURE	REFERENCE PAGE
Clutch slips	1	P.21A-3
Gear shift malfunction	2	P.21A-4
Clutch noise	3	P.21A-5
Clutch pedal feels "heavy"	4	P.21A-6
When the clutch is engaged, abnormal vibration occurs.	5	P.21A-6

## SYMPTOM PROCEDURES

### INSPECTION PROCEDURE 1: Clutch Slips

#### DIAGNOSIS

##### Step 1. Check insufficient clutch pedal play.

Refer to P.21A-8.

**Q: Does the clutch pedal play meet the standard value?**

**YES :** Go to Step 2.

**NO :** Adjust the clutch pedal play. Then go to Step 7.

##### Step 2. Check the hydraulic system for clogging.

Refer to P.21A-13.

**Q: Is the hydraulic system clogged?**

**YES :** Repair or replace the hydraulic system.  
Then go to Step 7.

**NO :** Go to Step 3.

##### Step 3. Check the clutch release cylinder for oil leaks or deformation.

Refer to GROUP 21B, Clutch P.21B-5.

**Q: Is oil leak or deformation found on clutch release cylinder?**

**YES :** Replace the clutch release cylinder. Then go to Step 7.

**NO :** Go to Step 4.

##### Step 4. Check the clutch disc facing for excessive wear.

Refer to GROUP 21B, Clutch P.21B-5.

**Q: Is the clutch disc facing worn excessively?**

**YES :** Replace the clutch disc. Then go to Step 7.

**NO :** Go to Step 5.

**Step 5. Check the clutch disc facing for hardening and adhesion of oil.**

**Q: Is the clutch disc facing hardened or contaminated with oil?**

**YES :** Replace the clutch disc. Then go to Step 7.

**NO :** Go to Step 6.

**Step 6. Check the diaphragm spring for weakness and damage.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the diaphragm spring weakened or damaged?**

**YES :** Replace the clutch cover assembly. Then go to Step 7.

**NO :** Go to Step 7.

**Step 7. Check the symptom.**

**Q: Is the symptom reproduced?**

**YES :** Return to Step 1.

**NO :** The procedure is complete.

**INSPECTION PROCEDURE 2: Gear Shift Malfunction****DIAGNOSIS****Step 1. Check the excessive clutch pedal play.**

Refer to [P.21A-8](#).

**Q: Does the clutch pedal play meet the standard value?**

**YES :** Go to Step 2.

**NO :** Adjust the clutch pedal play. Then go to Step 9.

**Step 2. Check the hydraulic system for air mix.**

**Q: Is there a leakage air mix on the hydraulic system?**

**YES :** Bleed the system (Refer to [P.21A-9](#)). Then go to Step 9.

**NO :** Go to Step 3.

**Step 3. Check the hydraulic system for leakage and clogging.**

Refer to [P.21A-13](#).

**Q: Is there a leakage or clogging on the hydraulic system?**

**YES :** Check the oil line and clutch master cylinder, and repair if necessary. Then go to Step 9.

**NO :** Go to Step 4.

**Step 4. Check the clutch release cylinder for oil leaks or deformation.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is oil leak or deformation found on clutch release cylinder?**

**YES :** Replace the clutch release cylinder. Then go to Step 9.

**NO :** Go to Step 5.

**Step 5. Check the clutch disc for distortion and wear.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the clutch disc distorted or worn?**

**YES :** Replace the clutch disc. Then go to Step 9.

**NO :** Go to Step 6.

**Step 6. Check the clutch disc spline for wear and corrosion.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the clutch disc and input shaft spline worn or corroded?**

**YES :** Replace the clutch disc or input shaft. Then go to Step 9.

**NO :** Go to Step 7.

**Step 7. Check the clutch cover assembly for damage.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the clutch cover assembly damaged?**

**YES :** Replace the clutch cover assembly. Then go to Step 9.

**NO :** Go to Step 8.

---

**Step 8. Check the pressure plate and the flywheel for damage.**

**Q: Is the pressure plate or the flywheel damaged?**  
**YES :** Replace the clutch cover assembly or the flywheel. Then go to Step 9.  
**NO :** Go to Step 9.

---

**Step 9. Check the symptom.**

**Q: Is the symptom reproduced?**  
**YES :** Return to Step 1.  
**NO :** The procedure is complete.

---

### INSPECTION PROCEDURE 3: Clutch Noise

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#### DIAGNOSIS

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**Step 1. Check insufficient clutch pedal play.**  
Refer to [P.21A-8](#).

**Q: Does the clutch pedal play meet the standard value?**  
**YES :** Go to Step 2.  
**NO :** Adjust the clutch pedal play. Then go to Step 7.

---

**Step 2. Check the clutch release bearing for wear.**

**Q: Is the clutch release bearing worn?**  
**YES :** Replace the clutch release bearing. Then go to Step 7.  
**NO :** Go to Step 3.

---

**Step 3. Check the bearing sleeve sliding surface for insufficient lubrication.**

**Q: Is the lubrication of the bearing sleeve sliding surface sufficient?**  
**YES :** Go to Step 4.  
**NO :** Repair the bearing sleeve sliding surface. Then go to Step 7.

---

**Step 4. Check the clutch cover assembly for improper installation.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the clutch cover assembly installed properly?**  
**YES :** Go to Step 5.  
**NO :** Replace the clutch cover assembly. Then go to Step 7.

---

**Step 5. Check the clutch disc facing for excessive wear.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is the clutch disc facing assembly worn excessively?**  
**YES :** Replace the clutch disc assembly. Then go to Step 7.  
**NO :** Go to Step 6.

---

**Step 6. Check the pilot bushing for damage.**

**Q: Is the pilot bushing damaged?**  
**YES :** Replace the pilot bushing. Then go to Step 7.  
**NO :** Go to Step 7.

---

**Step 7. Check the symptom.**

**Q: Is the symptom reproduced?**  
**YES :** Return to Step 1.  
**NO :** The procedure is complete.

---

**INSPECTION PROCEDURE 4: Clutch Pedal Feels "Heavy"**

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**DIAGNOSIS**

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**Step 1. Check the clutch pedal clevis pin for insufficient lubrication.**

- Q: Is the lubrication of the clutch pedal clevis pin sufficient?**  
**YES :** Go to Step 2.  
**NO :** Repair the clutch pedal. Then go to Step 5.

---

**Step 2. Check clutch release cylinder for oil leak or deformation.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

- Q: Is oil leak or deformation found on clutch release cylinder?**  
**YES :** Replace the clutch release cylinder. Then go to Step 5.  
**NO :** Go to Step 3.

---

**Step 3. Check the clutch disc spline for insufficient lubrication.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

- Q: Is the lubrication of the clutch disc spline sufficient?**  
**YES :** Go to Step 4.  
**NO :** Replace the clutch disc. Then go to Step 5.

---

**Step 4. Check the insufficient lubrication of bearing sleeve sliding surface.**

- Q: Is the lubrication of the bearing sleeve sliding surface sufficient?**  
**YES :** Go to Step 5.  
**NO :** Repair the bearing sleeve sliding surface. Then go to Step 5.

---

**Step 5. Check the symptom.**

- Q: Is the symptom reproduced?**  
**YES :** Return to Step 1.  
**NO :** The procedure is complete.

---

**INSPECTION PROCEDURE 5: When the clutch is engaged, abnormal vibration occurs.**

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**DIAGNOSIS**

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**Step 1. Check the engine and transaxle mounting for loosening and damage.**

- Q: Is the engine and transaxle mounting loosened or damaged?**  
**YES :** Tighten or replace the engine and transaxle mounting. Then go to Step 7.  
**NO :** Go to Step 2.

---

**Step 2. Check clutch release cylinder for oil leaks or deformation.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

- Q: Is oil leak or deformation found on the clutch release cylinder?**  
**YES :** Replace the clutch release cylinder. Then go to Step 3.  
**NO :** Go to Step 3.

---

**Step 3. Check the diaphragm spring for uneven height.**

- Q: Is the diaphragm spring even height?**  
**YES :** Go to Step 4.  
**NO :** Replace the clutch cover assembly. Then go to Step 4.

---

**Step 4. Check the pressure plate and flywheel for damage.**

- Q: Is the pressure plate or flywheel damaged?**  
**YES :** Repair the clutch cover assembly or flywheel. Then go to Step 5.  
**NO :** Go to Step 5.

---

**Step 5. Check the clutch disc facing for wear and damage.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

- Q: Is the clutch disc facing worn or damaged?**  
**YES :** Replace the clutch disc. Then go to Step 7.  
**NO :** Go to Step 6.

---

**Step 6. Check for grease or oil on the clutch disc facing.**

Refer to GROUP 21B, Clutch [P.21B-5](#).

**Q: Is there grease or oil on the clutch disc facing?**

**YES :** If the clutch disc facing is contaminated with grease or oil, check that greases is applied to the clutch disc spline (Refer to GROUP 21B, Clutch [P.21B-5](#)). Then check the clutch housing input shaft oil seal (Refer to GROUP 21B, Clutch Housing [P.21B-2](#)) and the crank shaft rear oil seal (Refer to GROUP 11A, Crankshaft Oil Seal [P.11A-36](#)) for leakage, and replace the oil seal(s).  
Replace the clutch disc. Then go to Step 7.

**NO :** Go to Step 7.

---

**Step 7. Check the symptom.**

**Q: Is the symptom reproduced?**

**YES :** Return to Step 1.

**NO :** The procedure is complete.

## ON-VEHICLE SERVICE

## CLUTCH PEDAL CHECK AND ADJUSTMENT

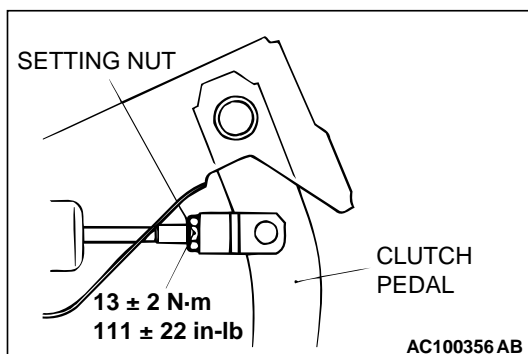
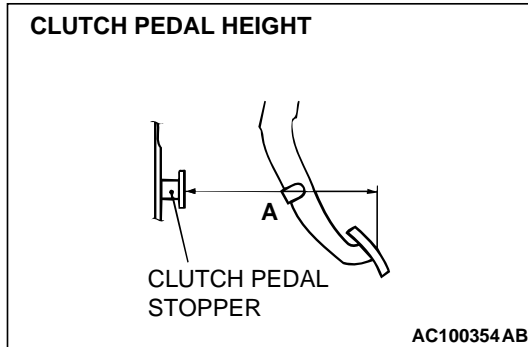
M1211000900207

1. Turn up the carpet etc. under the clutch pedal.
2. Measure the clutch pedal height.

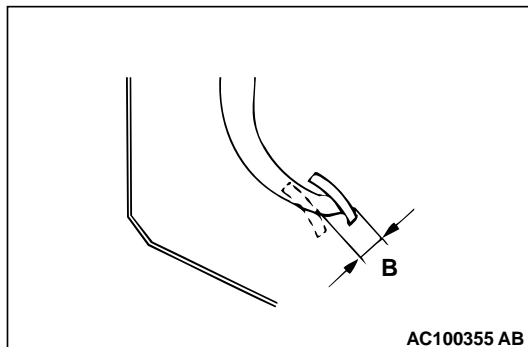
**Standard value (A): 206.6 – 210.6 mm (8.13 – 8.29 inch)**

**⚠ CAUTION**

**Do not push in the master cylinder pushrod at this time, otherwise the clutch will not operate properly.**



3. If the height of the clutch pedal is outside the standard value, loosen the setting nut to adjust the pedal height to the standard value by pushing the clutch pedal position switch.

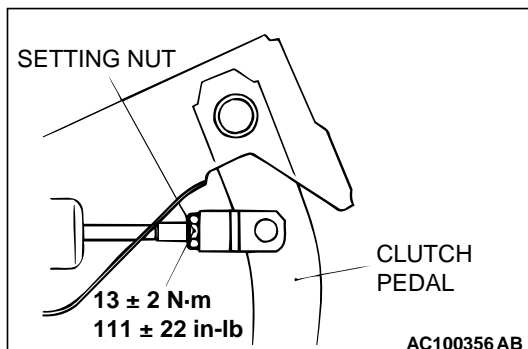


4. Measure the clutch pedal clevis pin play.

**Standard value (B): 1 – 3 mm (0.04 – 0.12 inch)**

**⚠ CAUTION**

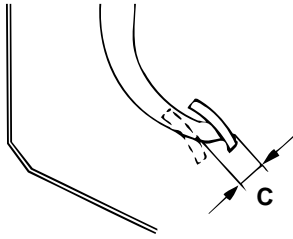
**Do not push in the master cylinder pushrod at this time, otherwise the clutch will not operate properly.**



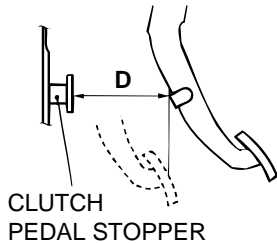
5. If the clutch pedal clevis pin play is not within the standard value, loosen the setting nut and move the pushrod to adjust.



CLUTCH PEDAL FREE PLAY



AC100355 AC



CLUTCH  
PEDAL STOPPER

AC100357 AB

6. After completing the adjustments, confirm that the clutch pedal free play (measured at the face of the pedal pad) and the distance between the clutch pedal (the face of the pedal pad) and the clutch pedal stopper when the clutch is disengaged are within the standard value ranges.

**Standard value (C): 4 – 13 mm (0.16 – 0.51 inch)**

**Standard value (D): 105 mm (4.1 inches) or more**

7. If the clutch pedal free play and the distance between the clutch pedal and the clutch pedal stopper when the clutch is disengaged do not agree with the standard values, it is probably the result of either air in the hydraulic system or a faulty master cylinder, clutch cylinder or clutch. Bleed the air, or disassemble and inspect the master cylinder, clutch cylinder or clutch.
8. Turn back the carpet, etc.

CLUTCH BLEEDING

M1211001400186

CLUTCH MASTER CYLINDER BLEEDING  
<VEHICLES WITH 4G69 ENGINE>

**⚠ CAUTION**

Use the specified brake fluid. Do not mix brake fluids.

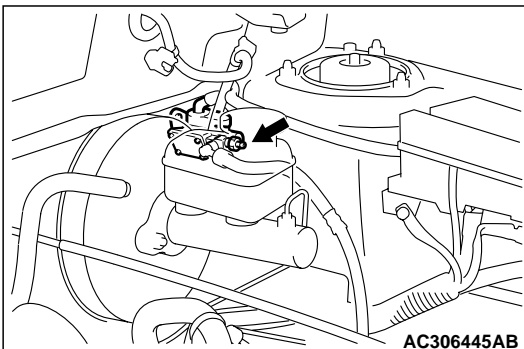
**Specified fluid: Brake fluid DOT 3 or DOT 4**

1. Connect a hose with a bottle to the bleeder screw.
2. Open the bleed nipple.

**⚠ CAUTION**

**For bleeding, never "pump" the clutch pedal. This may cause an oil leak at the clutch cylinder.**

3. Depress the clutch pedal slowly. Open the bleeder screw to let air and brake fluid out. Close the bleeder screw. Release the clutch pedal. Repeat until only brake fluid and no air comes out.
4. Check that the brake fluid reservoir level stays between "MAX" and "MIN" marks throughout the clutch bleeding process.

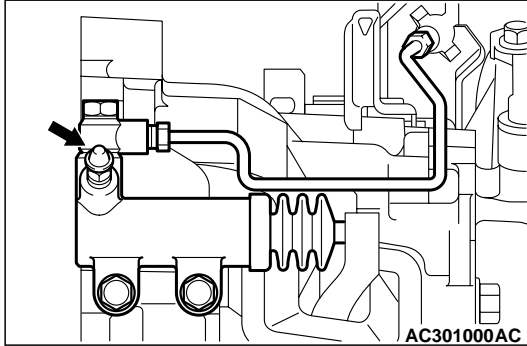


AC306445 AB

**CLUTCH RELEASE CYLINDER BLEEDING****⚠ CAUTION**

Use the specified brake fluid. Do not mix brake fluids.

**Specified fluid: Brake fluid DOT 3 or DOT 4**



1. Remove the under cover.
2. Connect a hose with a bottle to the bleeder screw.
3. Open the bleed nipple.
4. Depress the clutch pedal slowly. Open the bleeder screw to let air and brake fluid out. Close the bleeder screw. Release the clutch pedal. Repeat until only brake fluid and no air comes out.
5. Check that the brake fluid reservoir level stays between "MAX" and "MIN" marks throughout the clutch bleeding process.

**CLUTCH PEDAL POSITION SWITCH CHECK**

M1211003100051

Refer to GROUP 17, Auto-cruise Control [P.17-117](#).

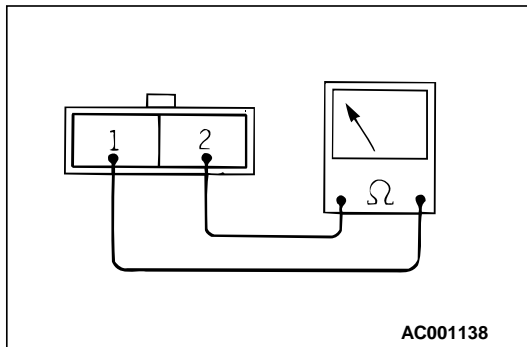
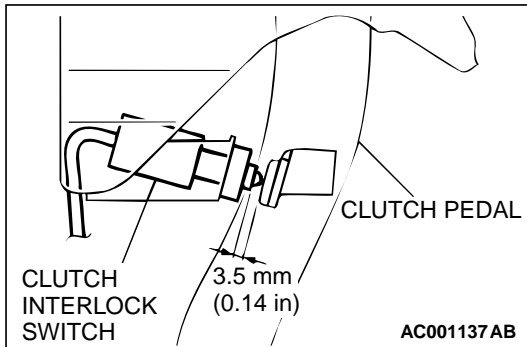
**INTERLOCK SWITCH OPERATING CHECK**

M1211001000144

1. Chock the front wheels, apply the parking brake.
2. After normally adjusting the clutch pedal, check the interlock switch operation as follows:
  - (1) The engine should not start even if the ignition switch is turned to the "START" position with the clutch pedal released. If the engine should start, check the interlock switch and the harness.
  - (2) The engine should start after the clutch pedal is depressed and the ignition switch turned to the "START" position. If the engine should start before the clutch is disengaged or the engine does not start even if the clutch pedal is depressed, check and adjust the interlock switch.

**CLUTCH INTERLOCK SWITCH CHECK AND  
ADJUSTMENT**

M1211001100174



1. Check to be sure that the interlock switch is as shown in the illustration when the clutch pedal is depressed at its full stroke 133 mm (5.2 inches). If not at the specified dimension, loosen the clutch interlock switch 1/4 turn counterclockwise. Then slide the switch to the specified dimension, and turn the switch 1/4 turn clockwise to lock.

2. Connect an ohmmeter to the interlock switch connector, and then check for continuity when the clutch pedal is fully depressed and when it is released outward.

TESTER CONNECTION	PEDAL POSITION	SPECIFIED CONDITION
1-2	FULLY DEPRESSED	Less than 2 ohms
	RELEASED	Open circuit

3. If the interlock switch is not as it should be, replace it.

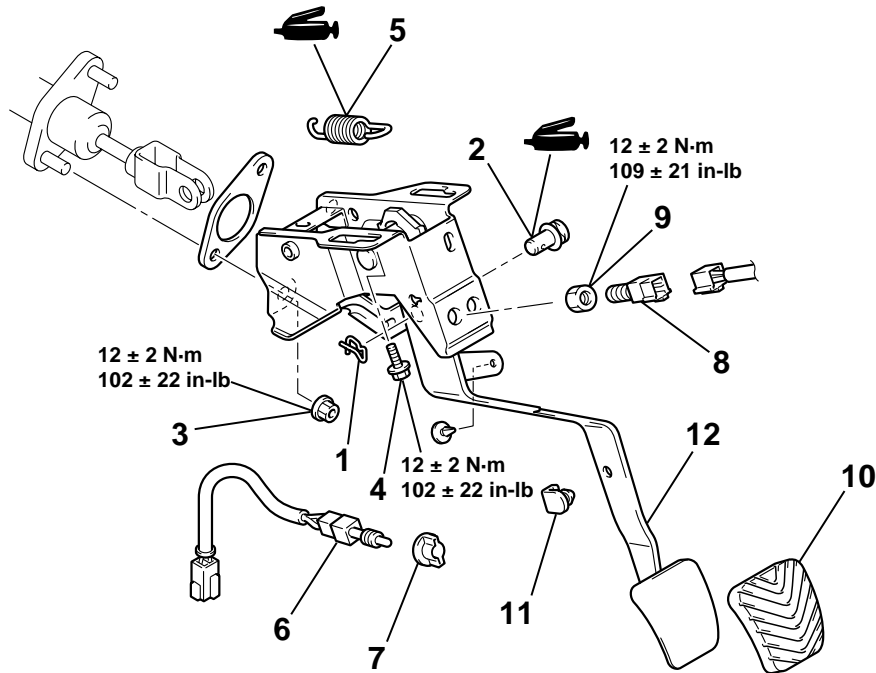
## CLUTCH PEDAL

## REMOVAL AND INSTALLATION

M1211001600191

**Post-installation Operation**

- Clutch Pedal Adjustment (Refer to [P.21A-8.](#))
- Clutch Interlock Switch Adjustment (Refer to [P.21A-11.](#))



AC100359AB

**REMOVAL STEPS**

- INSTRUMENT PANEL UNDER COVER (REFER TO GROUP 52A, INSTRUMENT PANEL [P.52A-3.](#))
1. SNAP PIN
  2. CLEVIS PIN
  3. CLUTCH MASTER CYLINDER MOUNTING NUT
  4. CLUTCH PEDAL ASSEMBLY MOUNTING BOLT
  5. RETURN SPRING <VEHICLES WITH AUTO-CRUISE CONTROL>

**REMOVAL STEPS (Continued)**

6. CLUTCH INTERLOCK SWITCH
7. CLIP
8. CLUTCH PEDAL POSITION SWITCH <VEHICLES WITH AUTO-CRUISE CONTROL>
9. NUT <VEHICLES WITH AUTO-CRUISE CONTROL>
10. PEDAL PAD
11. PEDAL STOPPER
12. PEDAL ASSEMBLY

**INSPECTION**

M1211001700057

- Check the clutch pedal for bending or twisting.
- Check the return spring for damage or deterioration.
- Check the pedal pad for damage or wear.

## CLUTCH CONTROL

## REMOVAL AND INSTALLATION

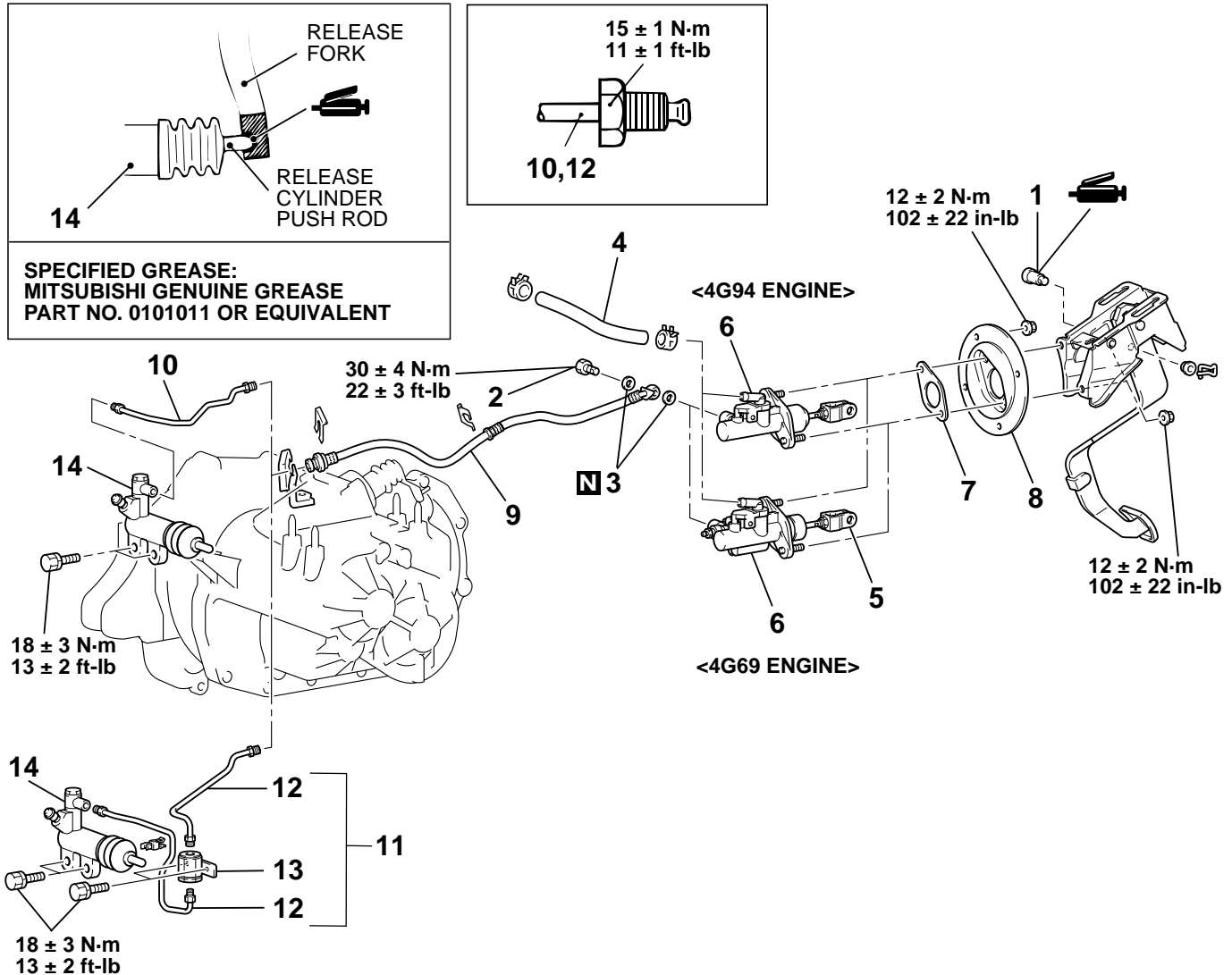
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**Pre-removal Operation**

Clutch Fluid Draining

**Post-installation Operation**

- Clutch Fluid Supplying
- Clutch Line Bleeding (Refer to P.21A-9.)
- Clutch Pedal Adjustment (Refer to P.21A-8.)



AC306682AB

INSPECTION

M1211002000051

- Check the master cylinder or clutch hose for fluid leakage.
- Check the clutch hose or tube for cracks or clogging.

DISASSEMBLY AND ASSEMBLY

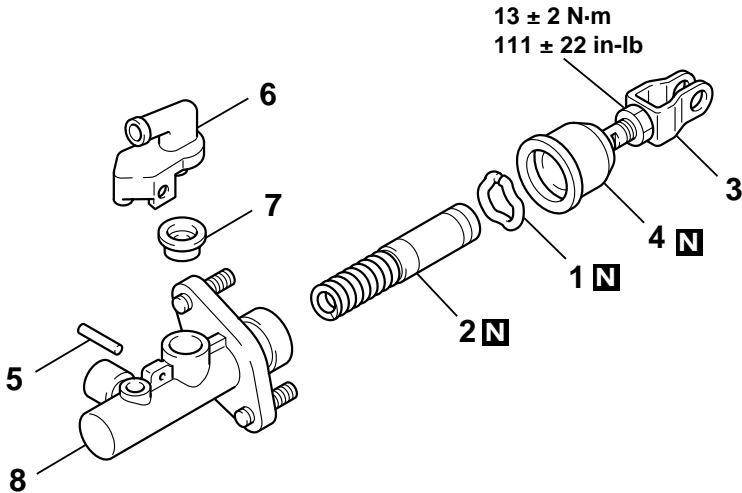
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CLUTCH MASTER CYLINDER

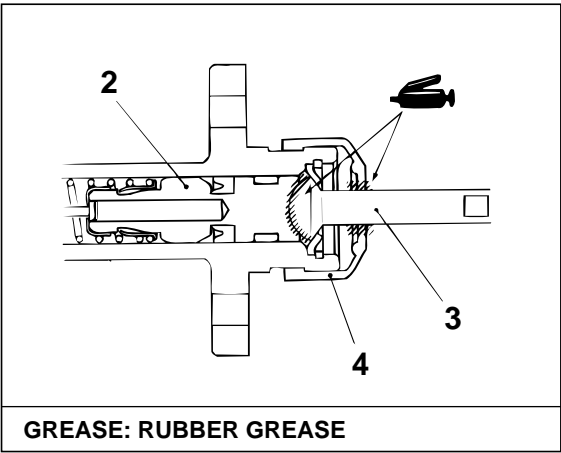
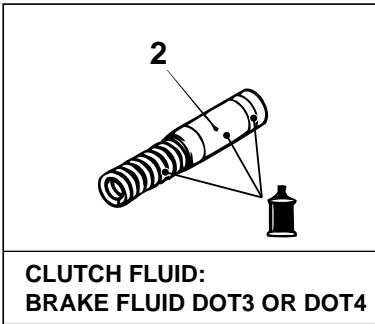
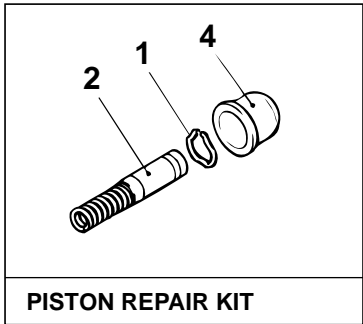
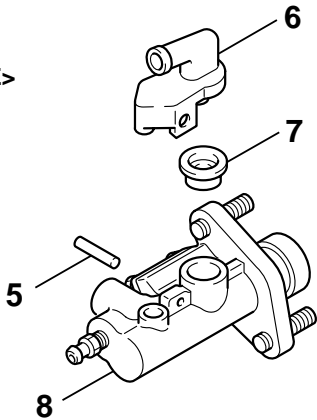
**CAUTION**

Do not disassemble the piston assembly.

<4G94 ENGINE>



<4G69 ENGINE>



AC306469AB

DISASSEMBLY STEPS

- >>A<<
1. PISTON STOPPER RING
  2. PISTON ASSEMBLY
  3. PUSHROD ASSEMBLY

DISASSEMBLY STEPS

4. BOOT
5. SPRING PIN
6. RESERVOIR TANK

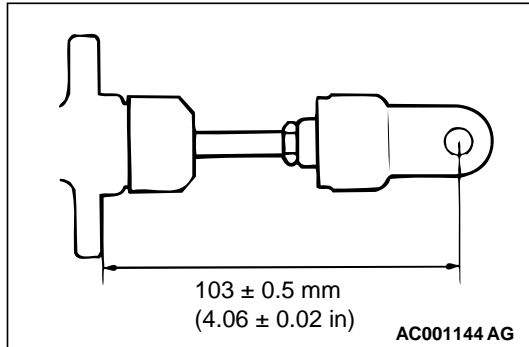
**DISASSEMBLY STEPS**

7. SEAL
8. MASTER CYLINDER BODY

**ASSEMBLY SERVICE POINT**

**>>A<< PUSHROD ASSEMBLY INSTALLATION**

Set the length of the pushrod assembly to the dimension shown to make the adjustment of the clutch pedal easier.



**INSPECTION**

M1211002200055

- Check inside the cylinder body for rust and scars.
- Check the piston cup for wear and deformation.
- Check the piston for rust and scars.
- Check the pipe connection for clogging.

**SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS**

M1211003300163

ITEM		SPECIFICATION
Clutch control	Clutch release cylinder mounting bolt	$18 \pm 3$ N·m ( $13 \pm 2$ ft-lb)
	Clutch orifice assembly mounting bolt	$18 \pm 3$ N·m ( $13 \pm 2$ ft-lb)
	Clutch master cylinder mounting nut	$12 \pm 2$ N·m ( $102 \pm 22$ in-lb)
	Clutch pipe flare nut	$15 \pm 1$ N·m ( $11 \pm 1$ ft-lb)
	Eye bolt	$30 \pm 4$ N·m ( $22 \pm 3$ ft-lb)
	Pushrod jam nut	$13 \pm 2$ N·m ( $111 \pm 22$ in-lb)
	Retainer plate nut	$12 \pm 2$ N·m ( $102 \pm 22$ in-lb)
Clutch pedal	Clutch master cylinder mounting nut	$12 \pm 2$ N·m ( $102 \pm 22$ in-lb)
	Clutch pedal assembly mounting bolt	$12 \pm 2$ N·m ( $102 \pm 22$ in-lb)
	Clutch pedal position switch setting nut	$12 \pm 2$ N·m ( $109 \pm 21$ in-lb)

**GENERAL SPECIFICATION**

M1211000200167

ITEM		SPECIFICATION
Clutch release cylinder I.D. mm (in)	4G94 Engine	20.64 (0.81)
	4G69 Engine	19.05 (0.75)
Clutch master cylinder I.D. mm (in)		15.87 (5/8)

**SERVICE SPECIFICATIONS**

M1211000300186

ITEM	STANDARD VALUE
Clutch pedal height mm (in)	206.6 – 210.6 (8.13 – 8.29)
Clutch pedal clevis pin play mm (in)	1 – 3 (0.04 – 0.12)
Clutch pedal free play mm (in)	4 – 13 (0.16 – 0.51)
Distance between the clutch pedal and the toeboard when the clutch pedal is released mm (in)	105 (4.1) or more

**LUBRICANTS**

M1211000400172

ITEM	SPECIFIED LUBRICANT	QUANTITY
Clutch fluid	Brake Fluid DOT 3 or DOT 4	As required
Pushrod assembly	Rubber grease	As required
Boot	Rubber grease	As required
Release cylinder push rod	mitsubishi genuine grease Part No. 0101011 or equivalent	As required