GROUP 21

CLUTCH

CONTENTS

GROUP 21A

CLUTCH

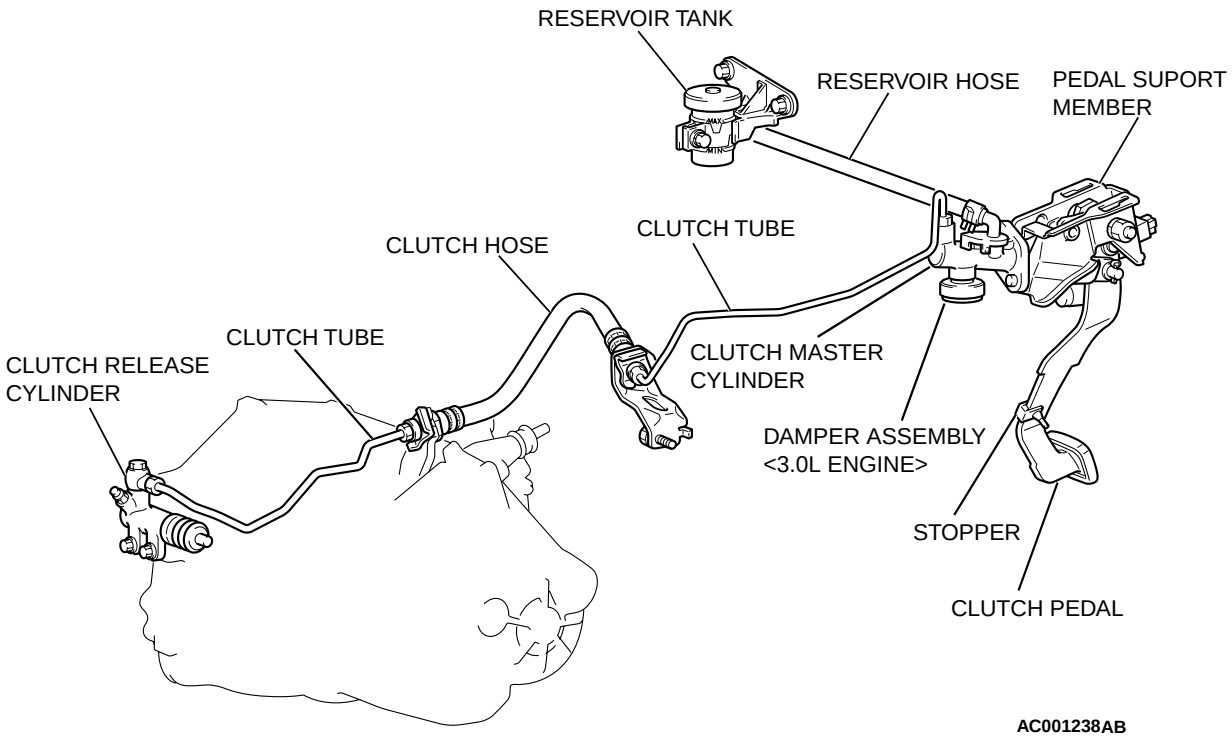
CONTENTS

GENERAL DESCRIPTION

M1211000100041

The clutch is a dry single-disc, diaphragm type; hydraulic pressure is used for the clutch control.

CONSTRUCTION DIAGRAM



CLUTCH DIAGNOSIS

INTROCUCTION TO CLUTCH DIAGNOSIS

M1211003400052

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

CLUTCH DIAGNOSIS TROUBLESHOOTING STRATEGY

M1211003500048

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.

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SYMPTOM CHART

M1211003600045

SYMPTOMS	INSPECTION PROCEDURE	REFERENCE PAGE
Clutch slips	1	P.21A-4
Gear shift malfunction	2	P.21A-4
Clutch noise	3	P.21A-5
Clutch pedal feels "heavy"	4	P.21A-6
Worn or damaged clutch disc facing	5	P.21A-6

SYMPTOM PROCEDURES

M1211004100021

INSPECTION PROCEDURE 1: Clutch slips

DIAGNOSIS

Step 1. Check insufficient clutch pedal play.
Refer to P.21A-7.

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 disc facing for excessive wear.

Q: Is the clutch disc facing worn excessively?
YES : Replace the clutch disc. Then go to Step 7.
NO : Go to Step 3.

Step 3. 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 4.

Step 4. Check the clutch release fork for catching.

Q: Is the clutch release fork stuck?
YES : Repair or replace the clutch release fork. Then go to Step 7.
NO : Go to Step 5.

Step 5. Check the diaphragm spring for weakness and damage.

Q: Is the diaphragm spring weaken or damaged?
YES : Replace the clutch cover assembly. Then go to Step 7.
NO : Go to Step 6.

Step 6. Check the hydraulic system for clogging.

Q: Is the hydraulic system clogged?
YES : Repair or replace the hydraulic system. 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 : This diagnosis is complete.

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INSPECTION PROCEDURE 2: Gear shift malfunction

DIAGNOSIS

Step 1. Check the excessive clutch pedal play.
Refer to P.21A-7.

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 clutch disc for distortion and excessive oscillation.

Q: Is the clutch disc distorted or oscillated?
YES : Replace the clutch disc. Then go to Step 9.
NO : Go to Step 3.

Step 3. Check the clutch cover assembly for wear.

Q: Is the clutch cover assembly worn?
YES : Replace the clutch cover assembly. Then go to Step 9.
NO : Go to Step 4.

Step 4. Check the clutch disc spline for wear and corrosion.

Q: Is the clutch disc spline worn or corroded?
YES : Replace the clutch disc. Then go to Step 9.
NO : Go to Step 5.

Step 5. Check the clutch disc facing for peeling.

Q: Is clutch disc facing peeled?
YES : Replace the clutch disc. Then go to Step 9.
NO : Go to Step 6.

Step 6. Check the clutch release bearing for wear.

Q: Is the clutch release bearing worn?
YES : Replace the clutch release bearing. Then go to Step 9.
NO : Go to Step 7.

Step 7. 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 8.

Step 8. Check the hydraulic system for leakage, air mix and clogging.

Q: Is there a leakage, air mix or clogging on the hydraulic system?
YES : Repair or replace the hydraulic system. 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 : This diagnosis is complete.

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INSPECTION PROCEDURE 3: Clutch noise

DIAGNOSIS

Step 1. Check insufficient clutch pedal play.
Refer to P.21A-7.

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 clutch cover assembly for improper installation.

Q: Is the clutch cover assembly installed properly?
YES : Go to Step 3.
NO : Replace the clutch cover assembly. Then go to Step 9.

Step 3. Check the clutch disc facing for excessive wear.

Q: Is the clutch disc facing assembly worn excessively?
YES : Replace the clutch disc. Then go to Step 9.
NO : Go to Step 4.

Step 4. Check the clutch release fork for catching.

Q: Is the clutch release fork stuck?
YES : Replace the clutch release fork. Then go to Step 9.
NO : Go to Step 5.

Step 5. Check the clutch release bearing for wear.

Q: Is the clutch release bearing worn?
YES : Replace the clutch release bearing. Then go to Step 9.
NO : Go to Step 6.

Step 6. Check the torsion spring for wear and damage.

Q: Is the torsion spring worn or damaged?
YES : Replace the clutch disc. Then go to Step 9.
NO : Go to Step 7.

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Step 7. Check the pilot bushing for damage.

Q: Is the pilot bushing damaged?
YES : Replace the pilot bushing. Then go to Step 9.
NO : Go to Step 8.

Step 8. Check the bearing sleeve sliding surface for insufficient lubrication.

Q: Is the lubrication of the bearing sleeve sliding surface sufficient?
YES : Go to Step 9.
NO : Repair the bearing sleeve sliding surface. Then go to Step 9.

Step 9. Check the symptom.

Q: Is the symptom reproduced?
YES : Return to Step 1.
NO : This diagnosis is complete.

M1211004400022

INSPECTION PROCEDURE 4: Clutch pedal feels "heavy"

DIAGNOSIS

Step 1. Check the clutch pedal for insufficient lubrication.

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

Step 2. Check the clutch disc spline for insufficient lubrication.

Q: Is the lubrication of the clutch disc spline sufficient?
YES : Go to Step 3.
NO : Replace the clutch disc. Then go to Step 5.

Step 3. Check the clutch release fork for catching.

Q: Is the clutch release fork stuck?
YES : Replace the clutch release fork. Then go to Step 5.
NO : Go to Step 4.

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 : This diagnosis is complete.

M1211004500029

INSPECTION PROCEDURE 5: Worn or damaged clutch disc facing

DIAGNOSIS

Step 1. Check the clutch disc facing for wear and damage.

Q: Is the clutch disc facing worn or damaged?
YES : Replace the clutch disc. Then go to Step 7.
NO : Go to Step 2.

Step 2. Check for oil on the clutch disc facing.

Q: Is there oil on the clutch disc facing?
YES : Replace it. Then go to Step 7.
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 7.

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Step 4. Check the torsion spring for weak and damage.

Q: Is the torsion spring worn or damaged?
YES : Replace the clutch disc. Then go to Step 7.
NO : Go to Step 5.

Step 5. 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 7.
NO : Go to Step 6.

Step 6. Check the mounting for loosening and damage.

Q: Is the mounting loosened or damaged?
YES : Tighten or replace the mounting. Then go to Step 7.
NO : Go to Step 7.

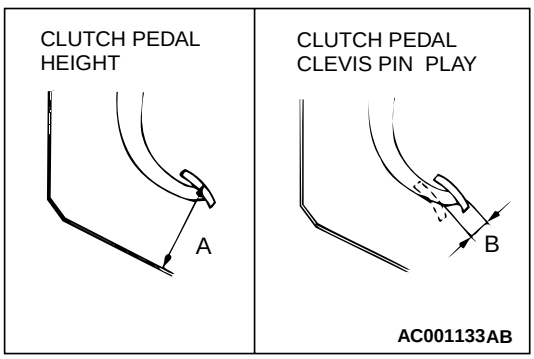
Step 7. Check the symptom.

Q: Is the symptom reproduced?
YES : Return to Step 1.
NO : This diagnosis is complete.

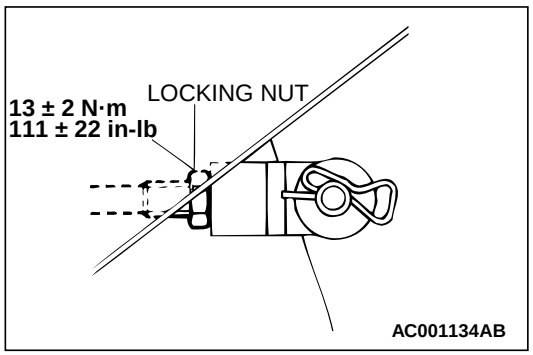
ON-VEHICLE SERVICE

CLUTCH PEDAL CHECK AND ADJUSTMENT

M1211000900047



1. Turn back the carpet etc. under the clutch pedal.
2. Measure the clutch pedal height and the clutch pedal clevis pin play.
   Standard value (A): 175.3 – 178.3 mm (6.90 – 7.02 inches) [From the surface of melting sheet (Floor board shield) to the face of pedal pad]
   Standard value (B): 1 – 3 mm (0.04 – 0.12 inch)



3. If the height of the clutch pedal is not within the standard value, loosen the locking nut and adjust the pedal height to the standard value using the adjusting bolt or push rod.

⚠ CAUTION
Do not push in the master cylinder push rod at this time.

4. If the clutch pedal play is not within the standard value, loosen the locking nut and move the push rod to adjust.

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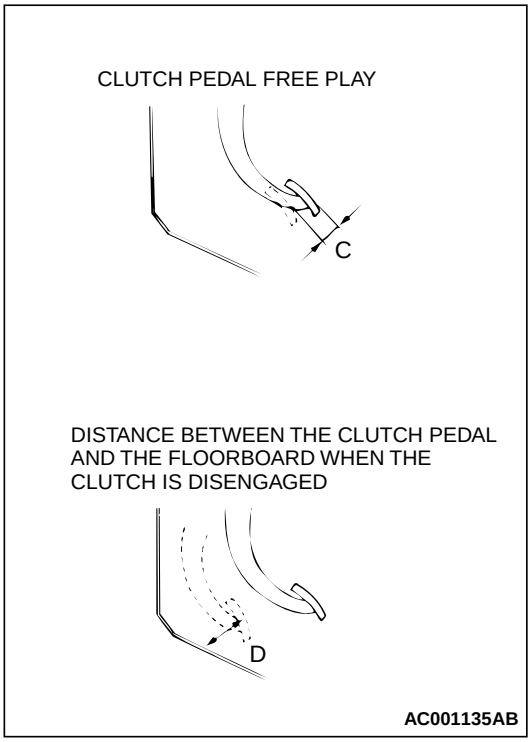
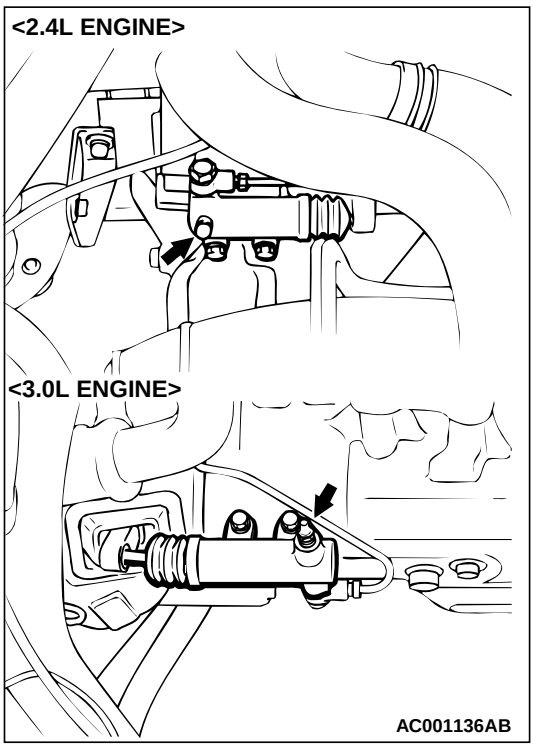


5. After the adjustments, confirm that the clutch pedal free play (measured at the face of the pedal pad) and the distance between the clutch pedal (the face of the pedal pad) and the floorboard when the clutch is disengaged are within the standard value ranges.
   Standard value (C): 6 – 13 mm (0.2 – 0.5 inch)
   Standard value (D): 76.4 mm (3.0 inches) or more
6. If the measured free play and distance do not agree with the standard value ranges, it is probably the result of either air in the hydraulic system or a faulty master cylinder or clutch. Bleed the air, or disassemble and inspect the master cylinder or clutch.
7. Reinstall the carpet, etc.

CLUTCH BLEEDING

M1211001400045

⚠ CAUTION
Use the specified brake fluid. Avoid using a mixture of the specified fluid and other fluid.
Specified fluid: Brake Fluid DOT 3 or DOT 4



CLUTCH PEDAL POSITION SWITCH CHECK

M1211003100040

Refer to GROUP 17, Auto-cruise Control System – On-vehicle Service – Auto-cruise Control Component Check P.17-78.

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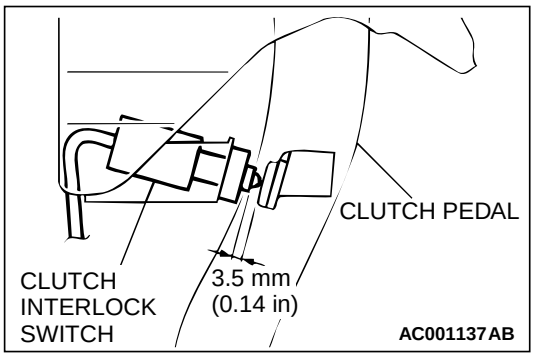
CLUTCH INTERLOCK SWITCH OPERATING CHECK

M1211001000047

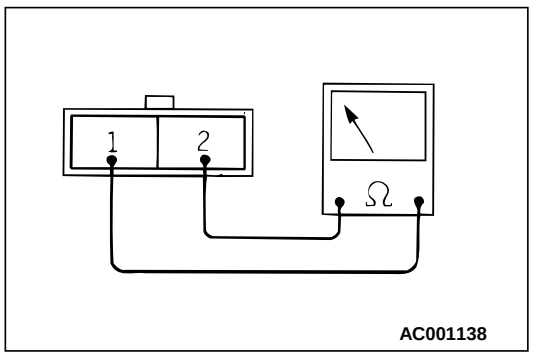
1. Lock the front wheels, apply the parking brake.
2. After normally adjusting the clutch pedal, check the interlock switch operation as follows:
   (1) The engine should not start even if the ignition switch is turned to the "START" position with the clutch pedal not depressed. If the engine should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

CLUTCH INTERLOCK SWITCH CHECK AND ADJUSTMENT

M1211001100044



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 130 mm (5.1 inches). If the specified dimension is not met, loosen the clutch interlock switch 1/4 turns counterclockwise. Then slide the switch to the specified dimension, and turn the switch 1/4 turns 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	No Continuity
	RELEASED	Continuity

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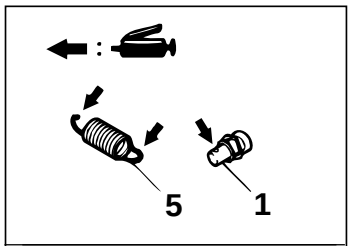
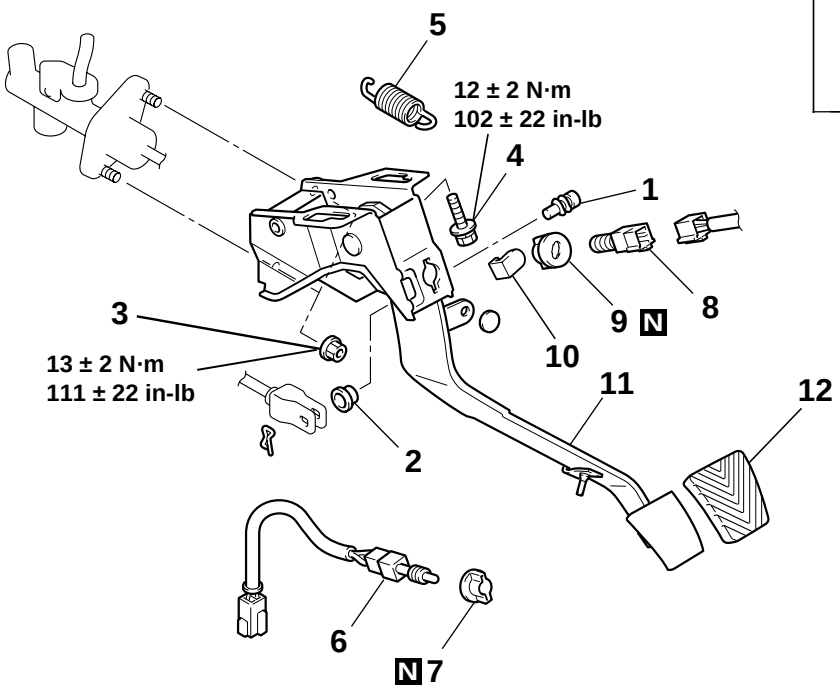
CLUTCH PEDAL

REMOVAL AND INSTALLATION

M1211001600049

Post-installation Operation
- Clutch Pedal Adjustment (Refer to P.21A-7.)
- Clutch Interlock Switch Adjustment (Refer to P.21A-9.)





AC001615 AC

REMOVAL STEPS
1. CLEVIS PIN
2. BUSHING
3. NUT
4. BOLT
5. RETURN SPRING
6. CLUTCH INTERLOCK SWITCH
7. CLIP

REMOVAL STEPS (Continued)
8. CLUTCH PEDAL POSITION SWITCH
9. CLIP
10. PEDAL STOPPER
11. CLUTCH PEDAL AND PEDAL SUPPORT MEMBER
12. PEDAL PAD

INSPECTION

M1211001700046

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

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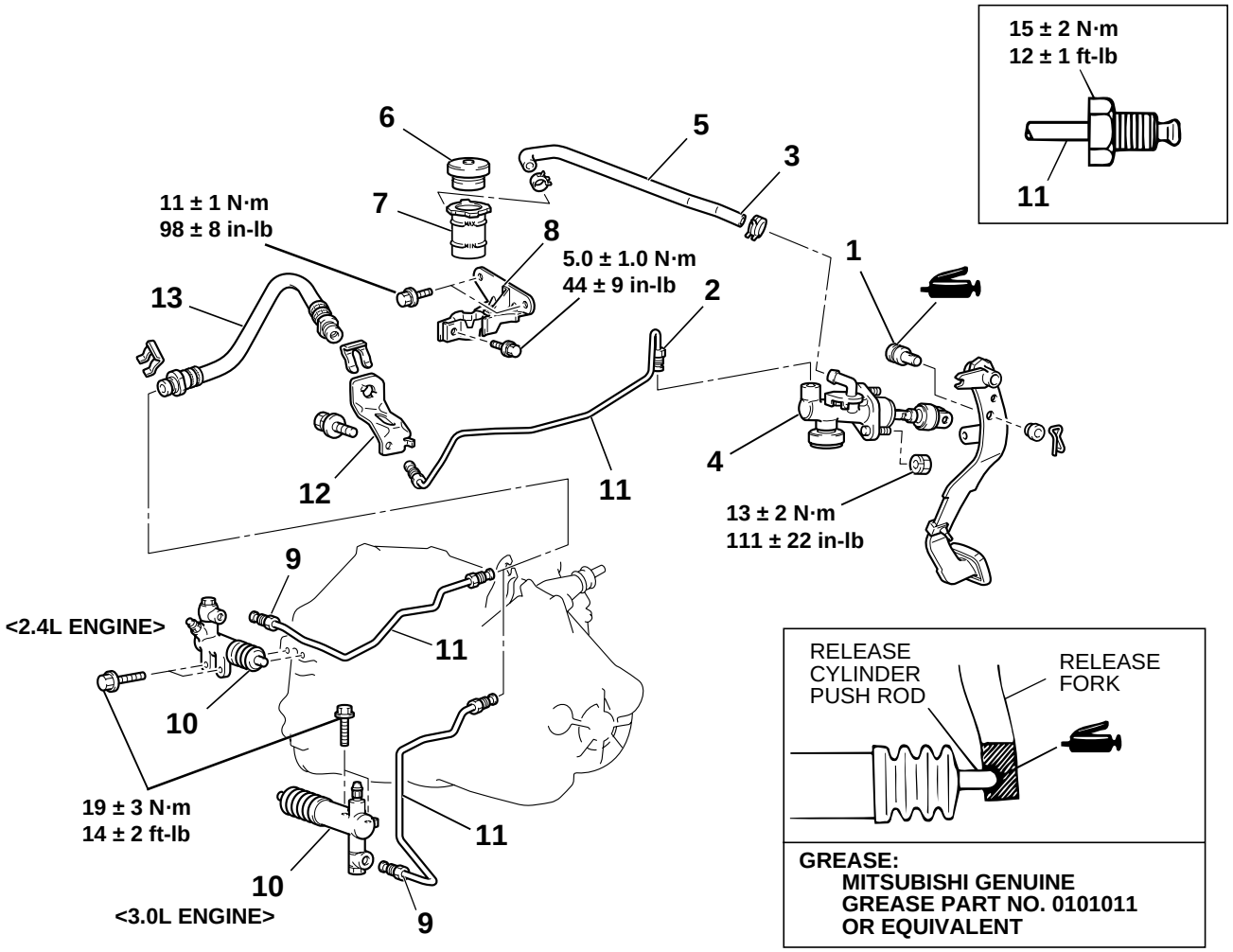
CLUTCH CONTROL

REMOVAL AND INSTALLATION

M1211001900040

Pre-removal Operation	Post-installation Operation
Clutch Fluid Draining	• Clutch Fluid Supplying • Clutch Line Bleeding (Refer to P.21A-8.) • Clutch Pedal Adjustment (Refer to P.21A-7.)



AC001614AC

CLUTCH MASTER CYLINDER REMOVAL STEPS
1. CLEVIS PIN
2. CLUTCH TUBE CONNECTION
3. RESERVOIR HOSE CONNECTION
4. CLUTCH MASTER CYLINDER

CLUTCH RESERVOIR TANK REMOVAL STEPS
5. RESERVOIR HOSE
6. RESERVOIR CAP
7. RESERVOIR TANK
8. RESERVOIR BRACKET

CLUTCH RELEASE CYLINDER REMOVAL STEPS
9. CLUTCH TUBE CONNECTION
10. CLUTCH RELEASE CYLINDER

CLUTCH LINE REMOVAL STEPS

>>A<< 11. CLUTCH TUBE
12. BRACKET
<<A>> >>A<< 13. CLUTCH HOSE

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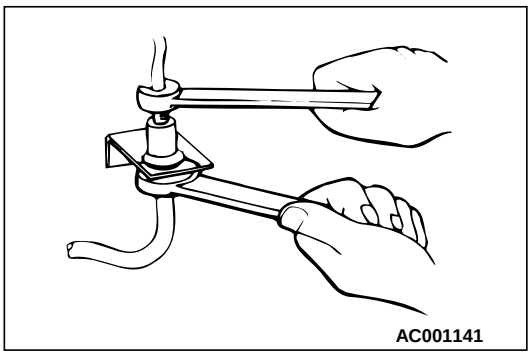
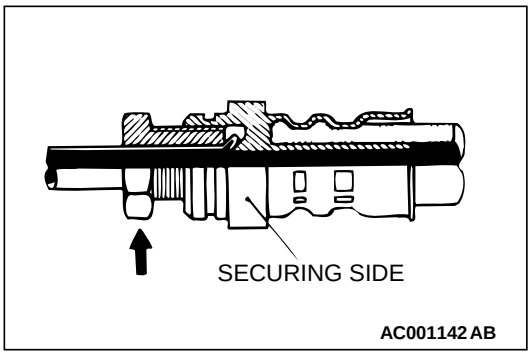
REMOVAL SERVICE POINT


AC001141

<<A>> CLUTCH HOSE REMOVAL

Holding the nut at the clutch hose side, loosen the flare nut on the clutch tube.

INSTALLATION SERVICE POINT



AC001142 AB

>>A<< CLUTCH HOSE/CLUTCH TUBE INSTALLATION

1. Temporarily tighten the clutch tube flare nut by hand, and then tighten it to the specified torque, being careful that the clutch hose does not become twisted.

   Tightening torque: 15 ± 2 N·m (12 ± 1 ft-lb)

2. After tightening the clutch tube flare nut, check to be sure there is no leakage of the clutch fluid.

INSPECTION

M1211002000040

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

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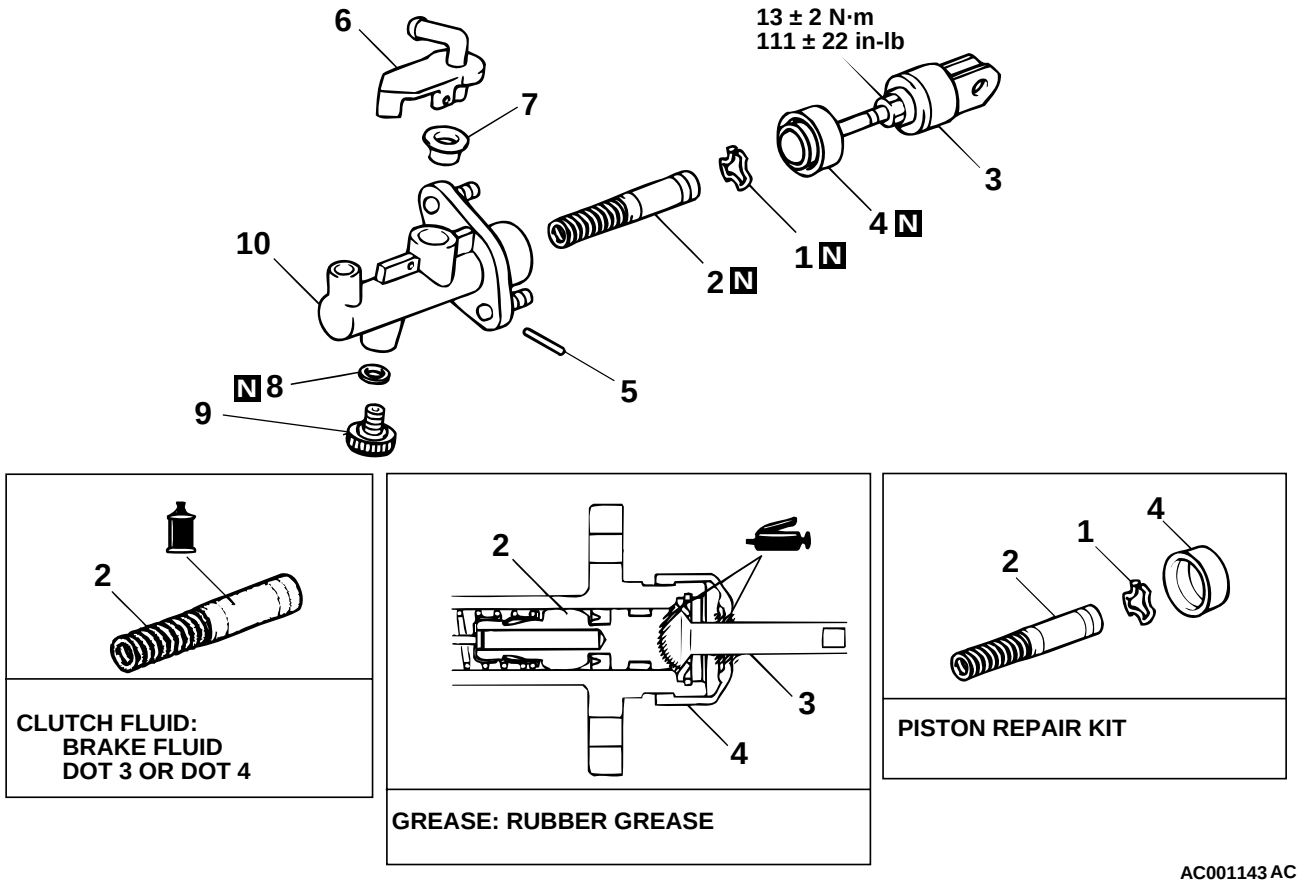
CLUTCH MASTER CYLINDER

M1211002100047

DISASSEMBLY AND ASSEMBLY

⚠ CAUTION
Do not disassemble the piston assembly.



AC001143 AC

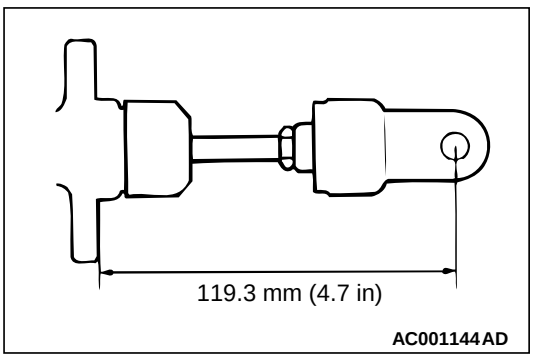
DISASSEMBLY STEPS

1. PISTON STOPPER RING
2. PISTON ASSEMBLY
>>A<< 3. DAMPER AND PUSHROD
4. BOOT
5. SPRING PIN
6. NIPPLE

DISASSEMBLY STEPS

7. RESERVOIR SEAL
8. GASKET <3.0L ENGINE>
9. DAMPER ASSEMBLY <3.0L ENGINE>
10. CLUTCH MASTER CYLINDER ASSEMBLY

ASSEMBLY SERVICE POINT



AC001144 AD

>>A<< DAMPER AND PUSHROD INSTALLATION

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

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INSPECTION

M1211002200044

- Check the inside 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

M1211003300055

ITEMS		SPECIFICATIONS
Clutch control	Clutch master cylinder mounting nut	13 ± 2 N·m (111 ± 22 in-lb)
	Clutch release cylinder mounting bolt	19 ± 3 N·m (14 ± 2 ft-lb)
	Clutch tube flare nut	15 ± 2 N·m (12 ± 1 ft-lb)
	Push rod jam nut	13 ± 2 N·m (111 ± 22 in-lb)
	Reservoir bracket bolt	5.0 ± 1.0 N·m (44 ± 9 in-lb)
	Reservoir bracket mounting bolt	11 ± 1 N·m (98 ± 8 in-lb)
Clutch pedal	Clutch master cylinder mounting nut	13 ± 2 N·m (111 ± 22 in-lb)
	Pedal support member mounting bolt	12 ± 2 N·m (102 ± 22 in-lb)

GENERAL SPECIFICATION

M1211000200059

ITEM	SPECIFICATION
Clutch master cylinder ID mm (in)	15.87 (5/8)

SERVICE SPECIFICATIONS

M1211000300045

ITEMS	STANDARD VALUE
Clutch pedal height mm (in)	175.3 – 178.3 (6.90 – 7.02)
Clutch pedal clevis pin play mm (in)	1 – 3 (0.04 – 0.12)
Clutch pedal free play mm (in)	6 – 13 (0.2 – 0.5)
Distance between the clutch pedal and the floorboard when the clutch is disengaged mm (in)	76.4 (3.0) or more

LUBRICANTS

M1211000400031

ITEMS	SPECIFIED LUBRICANTS	QUANTITY
Clutch fluid	Brake Fluid DOT 3 or DOT 4	As required
Push rod assembly	Rubber grease	As required
Boot	Rubber grease	As required
Release cylinder push rod	MITSUBISHI genuine grease Part No. 0101011 or equivalent	As required

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