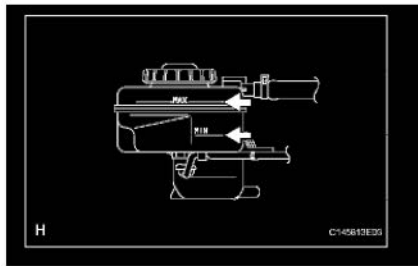


Brake Fluid: Testing and Inspection

ON-VEHICLE INSPECTION



1. CHECK FLUID LEVEL IN RESERVOIR

- (a) Check the fluid level. If the brake fluid level is between the MAX and MIN lines, the level is normal. If brake fluid level is below line, check for leakage and inspect the disc brake pad. If necessary, refill the reservoir with brake fluid after repair and replacement adding brake fluid, refer to "CHECK AND ADJUST BRAKE FLUID LEVEL IN RESERVOIR".

Brake fluid:

SAE J1703 or FMVSS No. 116 DOT 3

Brake Fluid: Service and Repair

REPLACEMENT

CAUTION: The intelligent tester or Techstream must be used with air bleeding and fluid replacement. If not used, the air bleeding replacement will be incomplete, which is hazardous and may lead to an accident.

NOTICE:

- ^ Perform fluid replacement with the shift lever on P and the parking brake set.
- ^ Perform fluid replacement while maintaining the brake fluid level between the MIN/MAX level on the brake fluid reservoir.
- ^ As brake fluid may overflow when bleeding air, do not place the fluid can on the reservoir filler opening.
- ^ Air bleeding will be difficult if the following occurs: 1) the brake fluid reservoir's No. 2 brake actuator hose (the hose between the brake accumulator pump and brake fluid reservoir) is lowered into the fluid and air enters the hose; and 2) during the fluid replacement procedure enters the brake accumulator pump while operating the pump motor.
- ^ While performing fluid replacement, the accumulator pressure drop may cause a buzzer to sound. As there is no problem, continue with replacement.
- ^ During fluid replacement, DTCs for pressure sensor malfunctions, etc. may be stored. After fluid replacement and if instructed in the procedure, clear the DTCs.
- ^ Do not allow brake fluid to contact the vehicle's paint surfaces. If contact occurs, clean it off immediately.

HINT:

- ^ Air bleeding with the intelligent tester or Techstream cannot be performed when the engine switch is on (IG) or when the parking brake is operating (electric parking brake operation signal is not input into skid control ECU).
- ^ While performing air bleeding, a display and navigation assembly (with HDD navigation system) or multi-display (without HDD navigation system) malfunction warning is displayed. However, there is no malfunction. After performing air bleeding, erase the warning using the procedure.

1. REPLACE BRAKE FLUID OF FRONT BRAKE SYSTEM

CAUTION: The intelligent tester or Techstream must be used during fluid replacement. If not used, the fluid replacement will be incomplete, which is hazardous and may lead to an accident.

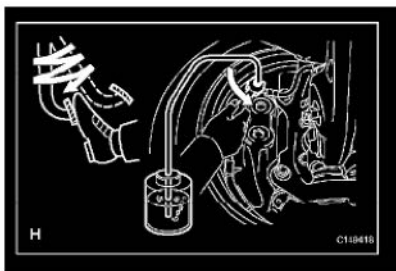
NOTICE:

- ^ Perform fluid replacement while maintaining the brake fluid level between the MIN/MAX level on the brake fluid reservoir.
- ^ As brake fluid may overflow, do not place the fluid can on the reservoir filler opening.

(a) DISABLE BRAKE CONTROL

HINT: Using the intelligent tester or Techstream to disable brake control causes the master pressure cut solenoid to turn OFF at the master cylinder to the front disc brake caliper to open.

- (1) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.
- (2) Check that the parking brake is set, and turn the engine switch on (IG).
- (3) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID" on the intelligent tester or Techstream.

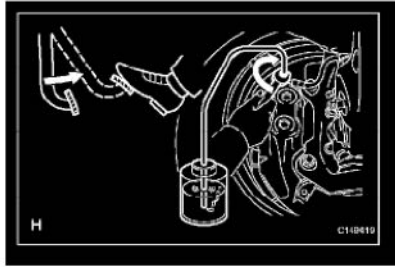


(b) REPLACE BRAKE FLUID OF FRONT BRAKE SYSTEM

- (1) Connect a vinyl tube to the bleeder plug.
- (2) Depress the brake pedal several times and loosen the bleeder plug. With the brake pedal depressed, bleed fluid from the front caliper RH and LH.

NOTICE: Add fluid to the brake fluid reservoir as necessary so that the fluid does not decrease below the MIN level.

HINT: Bleed the RH side first, and then bleed the LH side.



(3) After bleeding the fluid, depress and hold the brake pedal, and tighten the bleeder plug.

Torque: **11 N*m (110 kgf*cm, 8 ft.*lbf)**

(c) CANCEL DISABLING OF BRAKE CONTROL

(1) Follow the intelligent tester or Techstream screens to cancel the disabling of the brake control.

(d) CLEAR DTC

(1) Clear the DTCs.

2. REPLACE BRAKE FLUID OF REAR BRAKE SYSTEM

CAUTION: The intelligent tester or Techstream must be used during fluid replacement. If not used, the fluid replacement will be incomplete, which is hazardous and may lead to an accident.

NOTICE:

^ Perform fluid replacement while maintaining the brake fluid level between the MIN/MAX level on the brake fluid reservoir.

^ As brake fluid may overflow, do not place the fluid can on the reservoir filler opening.

(a) DISABLE BRAKE CONTROL

HINT: Using the intelligent tester or Techstream to disable brake control and loosening the rear disc brake caliper's bleeder plug (brake pedal depressed) causes the pump motor and solenoid to operate and pressurize the rear brake line.

(1) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.

(2) Check that the parking brake is set, and turn the engine switch on (IG).

(3) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID intelligent tester or Techstream.



(b) REPLACE BRAKE FLUID OF REAR BRAKE SYSTEM

(1) Connect a vinyl tube to the bleeder plug.

(2) While depressing the brake pedal, loosen the bleeder plug of the rear disc brake caliper LH. While the pump motor and solenoid operating, bleed fluid.

NOTICE: Add fluid to the brake fluid reservoir as necessary so that the fluid does not decrease below the MIN level.

HINT:

^ Depress and hold the brake pedal. Maintain this position.

^ Operate the solenoid for **approximately 30 seconds** at a time. Release the pedal to stop operation of the solenoid.

^ During fluid replacement, the brake warning light illuminates and the buzzer sounds. However, there is no malfunction.

(3) Bleed fluid from the rear disc brake caliper RH using the same procedures as the LH side.



(4) After bleeding the fluid, tighten the bleeder plug and release the brake pedal.

Torque: **11 N*m (110 kgf*cm, 8 ft.*lbf)**

HINT: The fluid amount adjustment is easier to perform if fuel bleeding is completed with the brake fluid reservoir's fluid **approximately 5 mm (0.20 in.)** below the MAX level.

(c) CANCEL DISABLING OF BRAKE CONTROL

(1) Follow the intelligent tester or Techstream screens to cancel the disabling of the brake control.

3. CHECK AND ADJUST BRAKE FLUID LEVEL IN RESERVOIR

(a) PERFORM ACCUMULATOR ZERO DOWN

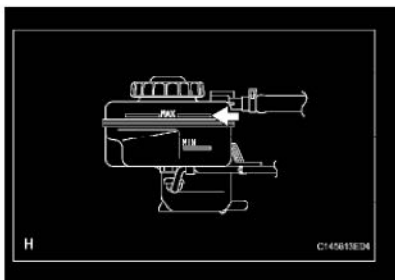
HINT: Using the intelligent tester or Techstream to perform accumulator zero down causes the pressurized fluid in the accumulator returned to the brake fluid reservoir.

(1) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.

(2) Check that the parking brake is set, and turn the engine switch on (IG).

(3) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ZERO DOWN" on the intelligent tester or Techstream.

(4) When the buzzer sounds, turn the engine switch off.



(b) INSPECT AND ADJUST BRAKE FLUID LEVEL IN RESERVOIR

(1) After performing accumulator zero down (fluid that was inside accumulator has been returned to brake fluid reservoir), adjust amount so that it is at the brake fluid reservoir's MAX level.

NOTICE: If using a dropper to adjust the fluid amount, make sure the dropper has not been used with mineral oils, water deteriorated brake fluid. Sealed areas may deteriorate and lead to fluid leaks, or the fluid may deteriorate and lead to decrease efficiency.

HINT: After performing accumulator zero down, turning the engine switch on (IG) causes fluid to enter the accumulator, decrease in the fluid level.

(2) After turning the engine switch on (IG), check that the fluid level in the brake fluid reservoir is slightly lower than the MAX

4. CLEAR DTC

(a) Clear the DTCs.

5. CHECK AND BLEED BRAKE SYSTEM

- (a) If the following malfunction symptoms occur, air may have entered the brake fluid line. Perform the following air bleed procedure:
 - ^ Low pedal or spongy pedal
 - ^ Brake pedal is depressed firmly but brake is insufficient.

6. BLEEDING PRECAUTION

CAUTION: Be sure to read the "PRECAUTION" thoroughly before bleeding.

7. DISCONNECT BRAKE ACCUMULATOR PUMP CONNECTORS

NOTICE: If the brake accumulator pump operates while air remains inside the No. 2 brake actuator hose, air will enter the brake accumulator pump, resulting in difficulty in bleeding. Keep the 2 brake accumulator pump connectors disconnected before bleeding.

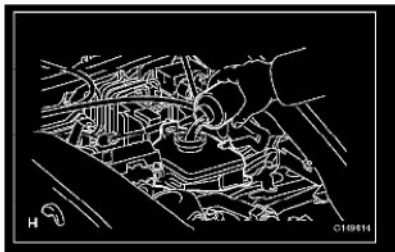


- (a) Disconnect the 2 brake accumulator pump connectors.

8. FILL RESERVOIR WITH BRAKE FLUID

NOTICE:

- ^ As brake fluid may overflow when bleeding air, do not place the fluid can on the reservoir filler opening.
- ^ If brake fluid leaks onto any painted surface, clean it off completely.



- (a) Add brake fluid into the reservoir.
Fluid:
SAE J1703 or FMVSS No. 116 DOT 3

9. DISABLE BRAKE CONTROL

HINT: Using the intelligent tester or Techstream to disable brake control causes the master pressure cut solenoid to turn OFF and from the master cylinder to the front disc brake caliper to open.

- (a) Check that the parking brake is set.
- (b) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.
- (c) Turn the engine switch on (IG).

NOTICE: Do not start the engine.

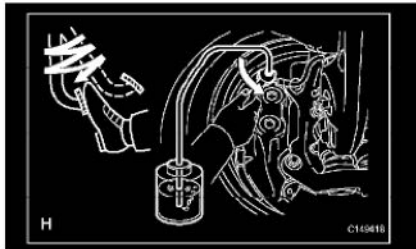
- (d) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID" on the intelligent tester Techstream.

10. BLEED AIR FROM FRONT BRAKE SYSTEM

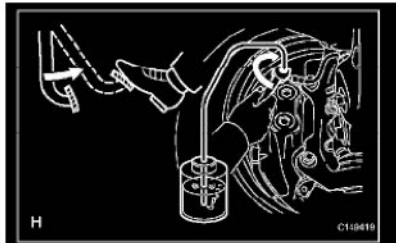
HINT: After replacing the brake master cylinder with simulator assembly, perform air bleeding on it (same as for common master cyl that bleeding air from the front brake system is easier.

NOTICE:

- ^ Bleed air from the wheel furthest from the master cylinder.
- ^ Repeat the bleeding procedures until all the air in the fluid is completely bled out.



- (a) Connect a vinyl tube to the bleeder plug on the front disc brake caliper LH and RH.
- (b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal depressed.



- (c) When fluid stops coming out, temporarily tighten the bleeder plug, then release the brake pedal.
- (d) Repeat the above procedures until all the air in the fluid is completely bled out.
- (e) Tighten the bleeder plug.

Torque: **11 N*m (110 kgf*cm, 8 ft.*lbf)**

11. CANCEL DISABLE BRAKE CONTROL

- (a) Cancel "DISABLE BRAKE CONTROL" on the intelligent tester or Techstream.

12. CONNECT BRAKE ACCUMULATOR PUMP CONNECTORS

- (a) Turn the engine switch off.
- (b) Connect the 2 brake accumulator pump connectors.



- (c) Turn the engine switch on (IG).

13. BLEED AIR FROM PUMP SUCTION SYSTEM (RR)

HINT: Loosening the rear disc brake caliper's RH bleeder plug and using the intelligent tester or Techstream to select "BLEED PUMP SUCTION SYSTEM (RR)" causes the pump motor and solenoid to operate and pressurize the rear brake line.

- (a) Check that the parking brake is set.
- (b) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.
- (c) Turn the engine switch on (IG).

NOTICE: Do not start the engine.

- (d) Connect a vinyl tube to the bleeder plug on the rear disc brake caliper RH.
- (e) Loosen the bleeder plug.
- (f) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "BLEED PUMP SUCTION SYSTEM (RR)" on the intelligent tester or Techstream.

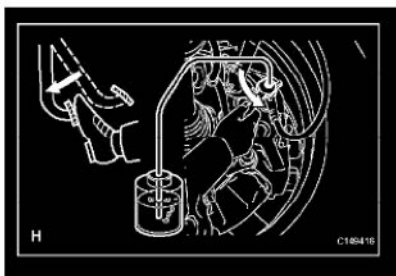
NOTICE: Do not depress the brake pedal.

HINT: The solenoid operates for **approximately 30 seconds**.

- (g) Tighten the bleeder plug.
Torque: **11 N*m (110 kgf*cm, 8 ft.*lbf)**

14. DISABLE BRAKE CONTROL

- (a) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM INVALID" on the intelligent tester or Techstream.



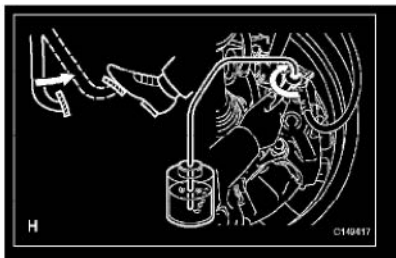
15. BLEED AIR FROM REAR BRAKE SYSTEM

- (a) Connect a vinyl tube to the bleeder plug on the rear disc brake caliper LH and RH.
- (b) With the brake pedal depressed, loosen the bleeder plug.

NOTICE: Keep the fluid inside the reservoir above the MIN line by replenishing.

HINT:

- ^ Depress and hold the brake pedal.
- ^ After the solenoid operates for **approximately 30 seconds**, release the brake pedal to stop the solenoid.
- ^ Repeat the above procedures until air is completely bled from the rear brake system.
- ^ The brake control warning light comes on and the buzzer sounds while bleeding, but they do not indicate a malfunction.



- (c) Tighten the bleeder plug after bleeding.

Torque: **11 N*m (110 kgf*cm, 8 ft.*lbf)**

HINT: The fluid amount adjustment is easier to perform if fuel bleeding is completed with the brake fluid reservoir's fluid level **approximately 5 mm (0.20 in.)** below the MAX level.

16. CANCEL DISABLE BRAKE CONTROL

- (a) Cancel "DISABLE BRAKE CONTROL" on the intelligent tester or Techstream.

17. PERFORM ACCUMULATOR ZERO DOWN

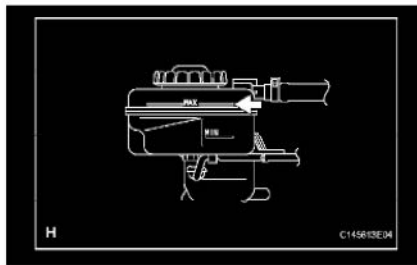
- (a) Connect the intelligent tester or Techstream to the DLC3 with the engine switch off.
- (b) Perform the accumulator pressure zero down as follows:
 - (1) Check that the parking brake is set, and turn the engine switch on (IG).
 - (2) Turn the intelligent tester or Techstream on and select "DIAGNOSTIC MENU" -> "ABS/VSC" -> "ELECTRONICALLY CONTROLLED BRAKE SYSTEM UTILITY" -> "ZERO DOWN" on the intelligent tester or Techstream.

HINT: Using the intelligent tester or Techstream to perform accumulator zero down causes the pressurized fluid in the accumulator to be returned to the brake fluid reservoir.

- (3) When the buzzer sounds, turn the engine switch off.
- (c) Perform the accumulator fluid circulation as follows:
 - (1) Perform the accumulator pressure zero down 5 times repeatedly.

HINT:

- ^ Accumulator pressure is released and accumulated repeatedly, which circulates the fluid inside the accumulator every accumulator zero down (accumulator depressurizing) is performed.
- ^ The pump motor rotates and accumulator is pressurized every time the engine switch is turned from off to on (IG).



18. CHECK AND ADJUST BRAKE FLUID LEVEL IN RESERVOIR

- (a) After performing accumulator zero down (accumulator depressurizing), adjust the fluid level in the master cylinder reservoir to the level.

NOTICE: If using a dropper to adjust the fluid amount, make sure the dropper has not been used with mineral oils, water or del brake fluid. Sealed areas may deteriorate and lead to fluid leaks, or the fluid may deteriorate and lead to decreased efficiency.

HINT:

- ^ After performing accumulator zero down (accumulator depressurizing), if the engine switch is turned on (IG), the fluid level accumulator increases, and the fluid level in the reservoir decreases.
 - ^ If the fluid level is adjusted without performing accumulator zero down (accumulator depressurizing), fluid is sent from the to the reservoir. The fluid level may exceed the MAX level, but it is normal.
- (b) After turning the engine switch on (IG), check that the fluid level in the brake fluid reservoir is slightly lower than the MAX level.

19. CLEAR DTC

- (a) Clear the DTCs.

20. PERFORM LINEAR VALVE OFFSET LEARNING

- (a) When the brake actuator is replaced, perform linear valve offset learning.

21. CHECK DTC

- (a) If any DTC is set, perform the troubleshooting for the DTC.