Brake Squawk/Knock Noise

Service Category: Brake
Section: Brake Control/Dynamic Control System
Market: USA

Applicability

<table>
<thead>
<tr>
<th>YEAR(S)</th>
<th>MODEL(S)</th>
<th>ADDITIONAL INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018 - 2020</td>
<td>LS500, LS500h</td>
<td></td>
</tr>
</tbody>
</table>

Introduction

Some 2018 – 2020 model year LS 500 and LS 500h vehicles may exhibit a squawk/knock noise from the engine compartment when depressing and/or releasing the brake pedal at stationary or driving. Follow the Repair Procedure in this bulletin to address this condition.

NOTE
This Service Bulletin applies ONLY to vehicles equipped WITHOUT the vacuum booster option.

Warranty Information

<table>
<thead>
<tr>
<th>OP CODE</th>
<th>MODEL</th>
<th>DESCRIPTION</th>
<th>TIME</th>
<th>OP</th>
<th>T1</th>
<th>T2</th>
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<tbody>
<tr>
<td>BR1910</td>
<td>LS 500</td>
<td>R &amp; R Actuator/Brake Master w/Simulator Cylinder Assembly and Brake Bleed</td>
<td>5.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BR1911</td>
<td>LS 500h</td>
<td>R &amp; R Actuator/Brake Master w/Simulator Cylinder Assembly and Brake Bleed</td>
<td>6.1</td>
<td>44050-11010</td>
<td>91</td>
<td>99</td>
</tr>
</tbody>
</table>

APPLICABLE WARRANTY

- This repair is covered under the Lexus Basic Warranty. This warranty is in effect for 48 months or 50,000 miles, whichever occurs first, from the vehicle’s in-service date.
- Warranty application is limited to occurrence of the specified condition described in this bulletin.
Brake Squawk/Knock Noise

Parts Information

<table>
<thead>
<tr>
<th>BODY NO.</th>
<th>PART NUMBER</th>
<th>PART NAME</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PREVIOUS</td>
<td>NEW</td>
<td></td>
</tr>
<tr>
<td>GVF5#L,</td>
<td>44050-11010</td>
<td>Actuator Assy, Brake</td>
<td>1</td>
</tr>
<tr>
<td>VXFA5#L w/ AP Package</td>
<td>47201-50381</td>
<td>Cylinder Sub-Assy, Brake Master</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>47070-50070</td>
<td>Pump Assy, Brake Booster W/ Accumulator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>47207-11010</td>
<td>Cylinder Sub-Assy, Brake Stroke Simulator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>31478-30010</td>
<td>Cap Bleeder Plugs</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>44518-12020</td>
<td>Plug Brake Actuator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>44511-58010</td>
<td>Plugs Brake Actuator</td>
<td>2</td>
</tr>
</tbody>
</table>

Required Tools & Equipment

<table>
<thead>
<tr>
<th>REQUIRED EQUIPMENT</th>
<th>SUPPLIER</th>
<th>PART NUMBER</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Techstream ADVi*</td>
<td>ADE</td>
<td>TSADVUNIT</td>
<td></td>
</tr>
<tr>
<td>Techstream 2.0</td>
<td>ADE</td>
<td>TS2UNIT</td>
<td>1</td>
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<tr>
<td>Techstream Lite</td>
<td>ADE</td>
<td>TSLITEPDLR01</td>
<td></td>
</tr>
<tr>
<td>Techstream Lite (Green Cable)</td>
<td></td>
<td>TSLP2DLR01</td>
<td></td>
</tr>
</tbody>
</table>

*Essential SST.

**NOTE**
- Only ONE of the Techstream units listed above is required.
- Software version 15.00.028 or later is required.
- Additional Techstream units may be ordered by calling Approved Dealer Equipment (ADE) at 1-800-368-6787.

<table>
<thead>
<tr>
<th>SPECIAL SERVICE TOOLS (SST)</th>
<th>PART NUMBER</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Diagnostic Tool*</td>
<td>DCA-8000P T</td>
<td>1</td>
</tr>
<tr>
<td>Hose Plugs</td>
<td>09053-1C220</td>
<td>2</td>
</tr>
</tbody>
</table>

*Essential SST.

**NOTE**
Additional SSTs may be ordered by calling 1-800-933-8335.
Repair Procedure

Removal

1. Confirm the condition exists.
   Is there a squawk/knock noise from the engine compartment when depressing and/or releasing the brake pedal at stationary or driving?
   • YES — Continue to step 2.
   • NO — This bulletin does NOT apply. Continue diagnosis using the applicable Repair Manual.

2. Are ANY DTCs stored related to a noise present during brake application?
   • YES — This bulletin does NOT apply. Continue diagnosis using the applicable Repair Manual.
   • NO — Continue to the Removal section.
Repair Procedure (continued)

Removal (continued)

3. Replace the brake component assemblies that apply.
   Refer to TIS, applicable model and model year Repair Manual when directed.

   **NOTICE**
   ONLY the hose plugs are reusable under the conditions noted below.

   The hose plugs may be reused under the following conditions.
   • There is no debris on the hose plugs BEFORE use.
   • The hose plugs are ONLY used for brake fluid.
   • The hose plugs are thoroughly washed AFTER use and stored once completely dry.

   The following parts may be reused. Handle them with care.

   **NOTE**
   Details are noted in the following pages when applicable.

   • Three brake tubes
   • Hose
   • Brake actuator tube No. 3
   • Brake actuator way No. 1
   • Brake actuator bracket No. 1
   • Brake actuator bracket No. 2
   • Brake actuator bracket No. 3
   • Tube clamp bracket
   • Bolts and nuts
4. Disassemble the brake control actuator assembly.

### NOTICE
The following list shows adjustments/initializations/registrations required AFTER parts attachment/detachment, AND parts replacement when assembling/disassembling the brake actuator assembly.

**Table 1. Required Operations**

<table>
<thead>
<tr>
<th>PARTS TO BE REPLACED/OPERATIONS</th>
<th>REQUIRED OPERATIONS</th>
<th>PHENOMENON WHEN THE OP IS NOT PERFORMED/FUNCTIONS THAT WOULD NOT OPERATE</th>
</tr>
</thead>
</table>
| Brake Actuator Assembly (Including Attachment/Detachment) | • Delete Linear Valve Offset Learning Memory and Brake Pedal Stroke Sensor Zero-point Learning Value Memory  
• Perform Linear Valve Offset Learning and Brake Pedal Stroke Sensor Zero-point Learning  
• Perform Air Bleeding | • Brake Feel Would Change  
• VSC and ABS Would Not Function  
• Brake Effectiveness Would Decline  
• DTCs Would be Detected |
| Auxiliary Battery (–) Terminal Disconnection | Storing Steering Sensor Steering Angle Neutral Point  
Rear Door Sunshade System Initialization | Parking Support Brake System\(^1\)  
Panoramic View Monitor System\(^2\) |

*1: The following auto learning methods (stereo and mono camera type) are also learned while driving. Refer to TIS, applicable model and model year Repair Manual:

- 2018 – 2020 LS 500  
  *Vehicle Interior – Pre-Collision Safety* – “Pre-Collision: Pre-Collision System(for Stereo Camera Type / for Mono Camera Type): Initialization”

- 2018 – 2020 LS 500h  
  *Vehicle Interior – Pre-Collision Safety* – “Pre-Collision: Pre-Collision System(for Stereo Camera Type / for Mono Camera Type): Initialization”

*2: When “!” is displayed in the panoramic view monitor screen, store the steering sensor’s steering angle neutral point.

### NOTE
There are functions that complete learning by using each system, although these functions stop functioning temporarily when detaching/attaching the auxiliary battery terminal.
Repair Procedure (continued)

Removal (continued)

<table>
<thead>
<tr>
<th>PHENOMENON WHEN NOT PERFORMED/FUNCTIONS THAT WILL NOT WORK</th>
<th>LEARNING CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Keeping Assist System (Monocular Camera Type)</td>
<td>Drive straight for 5 seconds or more with 25 mph or faster displayed on the meter display.</td>
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<td></td>
</tr>
<tr>
<td>Parking Support Brake System*</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pre-Crash Safety System (Monocular Camera Type)</td>
<td></td>
</tr>
<tr>
<td>Lighting System</td>
<td></td>
</tr>
<tr>
<td>VGRS System</td>
<td></td>
</tr>
</tbody>
</table>

*Refer to the learning method in Techstream settings: Engine/Hybrid System – Cruise Control.

Items that complete learning during regular vehicle operations.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 LS 500**
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System(for Stereo Camera Type / for Mono Camera Type): Utility”

- **2019 – 2020 LS 500**
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System(for Stereo Camera Type / for Mono Camera Type): Utility”

- **2018 LS 500h**
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System(for Stereo Camera Type / for Mono Camera Type): Utility”

- **2019 – 2020 LS 500h**
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System(for Stereo Camera Type / for Mono Camera Type): Utility”

<table>
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<th>LEARNING CONDITIONS</th>
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<tbody>
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<td>Servomotor Reference Position Recognition by Attaching/Detaching the Battery Terminal</td>
</tr>
<tr>
<td>Power Trunk Lid System</td>
<td>Manually, Fully Open the Luggage Compartment Door</td>
</tr>
</tbody>
</table>

**NOTICE**

BEFORE removing the brake actuator and the brake booster pump assembly, make sure to perform the Accumulator 0 Down (depressurize the accumulator) by using Techstream.

**HINT**

When the auxiliary battery is connected, even when the ignition is OFF, “the door courtesy switch ON” and “the brake pedal operation” will make the brake control system start. Do NOT open/close doors or conduct the brake pedal operation while the auxiliary battery is connected during service operations of the brake system component.
CAUTION

AFTER the ignition is turned OFF, a waiting period may occur BEFORE detaching the auxiliary battery (–) terminal. BEFORE performing this operation, confirm the cautionary notes regarding auxiliary battery (–) terminal detachment.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500:**
  General – Maintenance – “Maintenance: Battery: Removal”

- **2018 / 2019 / 2020 LS 500h:**
  General – Maintenance – “Maintenance: Battery: Removal”

5. Perform air suspension control prohibition.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500:**
  Suspension – Suspension Control System – “Suspension Control: Suspension Control System: Precaution”

- **2018 / 2019 / 2020 LS 500h:**
  Suspension – Suspension Control System – “Suspension Control: Suspension Control System: Precaution”

6. Remove the luggage compartment mat sub-assembly.

NOTE

- This step ONLY applies to LS 500h vehicles.
- Perform Repair Manual steps 1, 2, and 6 – 18.
- Do NOT perform steps 3 – 5 (Removing the Auxiliary Battery Terminal) in the Repair Manual. The battery will be removed AFTER step 7 (Perform the Accumulator Down) in this Service Bulletin.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500h:**
  Power Source/Network – Battery/Charging – “8GR-FXS Battery / Charging: Sub Battery: Removal”
Repair Procedure (continued)

Removal (continued)

7. Remove the radiator cover plate.

NOTE
- This step ONLY applies to LS 500h vehicles.
- Perform Repair Manual steps 1 – 3.

Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500h:
  Engine/Hybrid System – Intake/Exhaust – “8GR-FXS Intake/Exhaust Manifold: Removal”

8. Remove the cowl top ventilator louver sub-assembly.

Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500:
- 2018 / 2019 / 2020 LS 500h:


NOTE
This step will prevent fluid from contacting the connector and protect the connector on the vehicle side.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

10. Perform accumulator 0 down (depressurize the accumulator).

Adjust the brake fluid surface of the brake master cylinder reservoir to the MIN Line.

![Figure 2]

**NOTICE**

Do NOT drop brake fluid onto coated vehicle body surfaces. If fluid gets on ANY coated vehicle body surface, wipe the brake fluid off the vehicle body surface and wash the surface with water.

A. Under “IG-OFF,” connect Techstream to the DLC3.
B. Turn “IG-ON” and confirm that the parking brake is functioning.
C. Turn the Techstream power switch ON.
D. Go to the following from the Techstream Menu:
   
   
   **HINT**
   
   Perform the Accumulator 0 Down by using Techstream will return pressure accumulated brake fluid in the accumulator back to the brake master cylinder reservoir assembly.

E. Confirm the buzzer sound and turn “IG-OFF.”

**NOTE**

The battery will be disconnected AFTER performing accumulator 0 down.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

11. Disconnect the auxiliary battery (–) terminal.

   **NOTE**
   Perform Repair Manual steps 3 and 4.

Refer to TIS, applicable model and model year Repair Manual:
   - **2018 / 2019 / 2020** LS 500:
     - Maintenance – Auxiliary Battery – “Maintenance: Auxiliary Battery: Removal”
   - **2018 / 2019 / 2020** LS 500h:
     - Maintenance – Auxiliary Battery – “Maintenance: Auxiliary Battery: Removal”

12. Detach the fender apron brace sub-assembly RH.

   **NOTE**

Refer to TIS, applicable model and model year Repair Manual:
   - **2018 / 2019 / 2020** LS 500h:

   **NOTE**
   - This step ONLY applies to LS 500h vehicles.
   - Perform Repair Manual steps 8 – 12.

Refer to TIS, applicable model and model year Repair Manual:
   - **2019 – 2020** LS 500h:
Repair Procedure (continued)

Removal (continued)

13. Detach the wire harness.
   A. Pull the lock lever of the brake actuator connector up toward the vehicle top and unlock.

   **NOTE**
   This step prevents fluid from contacting the vehicle side connector and prevents debris intrusion.

   **Figure 3.**

   1. Direction to Unlock
   2. Direction to Detach

   B. Disconnect the brake actuator connector from the actuator assembly.

   **NOTICE**
   Protect the connector surface to prevent brake fluid from contacting it.

   C. Remove the two clips.
Brake Squawk/Knock Noise

Repair Procedure (continued)
Removal (continued)

14. Disconnect the brake tube.
   A. Using a union-nut wrench, remove the 10 flare nuts from the brake tube.

B. AFTER each tube is disconnected, quickly attach the cap.

**NOTICE**
- Do NOT bend or damage the brake tubes.
- Do NOT allow debris, such as dust, to contact the brake tube connecting part.

**NOTE**
This step prevents air from mixing into the tubes.

C. Remove one bolt and disconnect the brake actuator tube No. 2.
Repair Procedure (continued)

Removal (continued)

D. While the brake tube is mounted in the vehicle, attach the plug onto the brake actuator way.

Figure 7.

15. Remove the brake tube.
A. Disengage the fitting of the claw parts and remove the upper three brake tubes from the clamp.

Figure 8.

B. Remove the lower three brake tubes with the clamp still attached on them.

NOTE
• The three removed brake tubes will be reused.
• This step prevents air from mixing into the tubes.

NOTE
Leave the caps on AFTER removing the three brake tubes.

Figure 9.
C. Disengage the fitting of the claw parts and detach three brake tubes from the clamp.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

16. Remove the brake actuator assembly with bracket.

   A. Move the clamp and disconnect the brake actuator hose from the brake master cylinder reservoir assembly.

      NOTE
      • This step prevents air from mixing into the hose.
      • Attach the plug to the reservoir tank.

   B. AFTER the hose is disconnected, quickly attach the hose plug.

      NOTE
      This step prevents air from mixing into the hose.

   C. Avoiding the brake tubes, remove the bolt and two nuts, then remove the brake actuator assembly with bracket.

      NOTICE
      • Do NOT bend or damage the brake tubes.
      • Do NOT allow debris, such as dust, to get on the brake tube connection part.
      • Do NOT hold the brake actuator assembly by its connector part.
17. Disconnect the brake actuator hose. Move the hose clamp and remove the “Brake Actuator Hose” from the “Actuator Assembly.”

18. AFTER the hose is disconnected, quickly attach the hose plug.

   NOTE
   The disconnected hose will be reused to prevent air from mixing into the hose.

19. Using a union-nut wrench, disconnect the brake actuator tube No. 3 from the brake actuator assembly.

   NOTE
   The disconnected brake actuator tube No. 3 and brake actuator way No. 1 will be reused.

20. AFTER the tube is disconnected, quickly put the cap on “A” as shown. “B” already has a cap. (See Figure ## on pg. #.)

   NOTE
   This step prevents air from mixing into the tubes.
Repair Procedure (continued)

Removal (continued)

NOTE
Do NOT separate the brake actuator tube No. 3 and the brake actuator way No. 1.

21. With the brake actuator tube No. 3 and the brake actuator way No. 1 attached, disconnect them from the brake actuator assembly. (See Figure 18.)

NOTICE
- Do NOT bend or damage the brake actuator tube No. 3.
- Do NOT allow debris, such as dust, to get on the connection part of the brake actuator tube No. 3.

Figure 18. Removed Actuator in the Form of Assembly

Figure 19. Brake Actuator Tube No. 3 and Brake Actuator Way in the Form of Assembly
Repair Procedure (continued)

Removal (continued)

22. Remove the three nuts and remove the brake actuator bracket No. 2 from the brake actuator assembly.

   NOTE
   The removed brake actuator bracket No. 2 will be reused.

23. Remove the brake actuator bracket spacers from the brake actuator bracket cushions.
   Remove the three brake actuator bracket cushions from the bracket actuator bracket No. 2.
Repair Procedure (continued)

Removal (continued)

24. Remove the three bolts and remove the brake actuator bracket No. 1 from the brake actuator assembly.

   NOTE
   The removed brake actuator bracket No. 1 will be reused.

   Figure 22.

25. Remove the four bolts and remove the brake actuator bracket No. 3 from the vehicle body.

   NOTE
   The removed brake actuator bracket No. 3 will be reused.

   Figure 23.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

Brake System/Pedal/Brake Booster Master Cylinder Assembly Removal Procedure

**NOTICE**
The following list shows adjustments/initializations/registrations required after parts attachment/detachment, and parts replacement when assembling/disassembling the brake master cylinder sub-assembly.

**Table 2. Required Operations**

<table>
<thead>
<tr>
<th>Parts To Be Replaced/Operations</th>
<th>Required Operations</th>
<th>Phenomenon When the Op Is Not Performed/Functions That Would Not Operate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auxiliary Battery Terminal Attachment/Detachment</td>
<td>Storing Steering Sensor Steering Angle Neutral Point</td>
<td>Parking Support Brake System*</td>
</tr>
<tr>
<td></td>
<td>Rear Door Sunshade System Initialization</td>
<td>Panoramic View Monitor System **</td>
</tr>
</tbody>
</table>
| Brake Pedal (Including the Attachment/Detachment) | • Delete Linear Valve Offset Learning memory and brake pedal stroke sensor zero-point learning value memory  
 |                                  | • Perform Linear Valve Offset Learning and brake pedal stroke sensor zero-point learning | Rear Door Sunshade System |
| Brake Actuator Assembly (Including the Attachment/Detachment) | • Delete Linear Valve Offset Learning memory and brake pedal stroke sensor zero-point learning value memory.  
 |                                  | • Perform Linear Valve Offset Learning and brake pedal stroke sensor zero-point learning | • Brake feel would change  
 |                                  | Perform Air Bleeding | • VSC and ABS would not function  
 |                                  |                      | • Brake effectiveness would decline  
 |                                  |                      | • DTCs would be detected |

*Auto learning methods learned while driving:

Refer to TIS, applicable model and model year Repair Manual:

- 2018 LS 500
  
  *Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System (for Stereo Camera Type / for Mono Camera Type): Utility”*

- 2019 – 2020 LS 500
  
  *Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System (for Stereo Camera Type / for Mono Camera Type): Utility”*
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

- 2018 LS 500h
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System
  (for Stereo Camera Type / for Mono Camera Type): Utility”
- 2019 – 2020 LS 500h
  Engine/Hybrid System – Cruise Control – “Cruise Control: Front Camera System
  (for Stereo Camera Type / for Mono Camera Type): Utility”

**When an ‘!’ is displayed in the panoramic view monitor screen, store the “steering sensor’s steering angle neutral point.”

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**WARNING**

This maintenance operation consists of operations that affect the SRS air bag system. BEFORE this operation, confirm the SRS air bag system cautionary notes.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500**
- **2018 / 2019 / 2020 LS 500h**

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**CAUTION**

When the auxiliary battery is connected, even when the ignition is OFF, “the door courtesy switch ON,” and “the brake pedal operation” will make the brake control system start. Therefore, during the replacement, do NOT open/close doors and do NOT conduct the brake pedal operation while the auxiliary battery terminal is connected.

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**HINT**

There are functions that complete learning by using each system, although these functions stop functioning temporarily when attaching/detaching the auxiliary battery terminal.
Repair Procedure (continued)

Removal (continued)

<table>
<thead>
<tr>
<th>PHENOMENON WHEN NOT PERFORMED/FUNCTIONS THAT WILL NOT WORK</th>
<th>LEARNING CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Keeping Assist System (Monocular Camera Type)</td>
<td></td>
</tr>
<tr>
<td>Lane Control System (Stereo Camera Type)</td>
<td></td>
</tr>
<tr>
<td>Parking Support Brake System*</td>
<td>Drive straight for 5 seconds or more with 25 km/h or faster displayed on the meter display.</td>
</tr>
<tr>
<td>Pre-Crash Safety System (Stereo Camera Type)</td>
<td></td>
</tr>
<tr>
<td>Pre-Crash Safety System (Monocular Camera Type)</td>
<td></td>
</tr>
<tr>
<td>Adaptive Hi-beam System</td>
<td></td>
</tr>
<tr>
<td>Lighting System (Exterior) Cornering Lamp</td>
<td></td>
</tr>
<tr>
<td>VGRS System</td>
<td></td>
</tr>
</tbody>
</table>

The following auto learning methods (stereo and mono camera type) are also learned while driving.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 – 2020 LS 500**
  - Vehicle Interior – Pre-Collision Safety – “Pre-Collision: Pre-Collision System(for Stereo Camera Type / for Mono Camera Type): Initialization”

- **2018 – 2020 LS 500h**
  - Vehicle Interior – Pre-Collision Safety – “Pre-Collision: Pre-Collision System(for Stereo Camera Type / for Mono Camera Type): Initialization”

**Table 3. Items That Complete Learning During Regular Vehicle Operations**

<table>
<thead>
<tr>
<th>PHENOMENON WHEN NOT PERFORMED/FUNCTIONS THAT WILL NOT WORK</th>
<th>LEARNING CONDITIONS</th>
</tr>
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<tbody>
<tr>
<td>Servomotor</td>
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</tr>
<tr>
<td>Power Trunk Lid System</td>
<td>Manually, Fully Open the Luggage Compartment Door</td>
</tr>
</tbody>
</table>

**CAUTION**

After the ignition is turned OFF, a waiting period may occur before detaching the auxiliary battery terminal. BEFORE beginning this operation, confirm the cautionary notes regarding auxiliary battery terminal detachment.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500**
  - General – Maintenance – “Maintenance: Battery: Removal”

- **2018 / 2019 / 2020 LS 500h**
  - General – Maintenance – “Maintenance: Battery: Removal”
Removal (continued)

26. Use the applicable Repair Manual link below to complete the following procedures.
   Remove the brake actuator assembly with bracket.
   
   Refer to TIS, applicable model and model year Repair Manual:
   
   • 2018 / 2019 / 2020 LS 500:
   
   • 2018 / 2019 / 2020 LS 500h:

27. Disconnect the brake tube.
   Using a union-nut wrench, remove the flare nut on the brake tube.

28. AFTER the tube is disconnected, quickly put the cap on.

   **NOTE**
   This step prevents air from mixing into the tubes
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

29. Remove the instrument panel air bag assembly LWR No. 1.
    Refer to TIS, applicable model and model year Repair Manual:
    - 2018 / 2019 / 2020 LS 500:
    - 2018 / 2019 / 2020 LS 500h:

30. Follow Repair Manual steps 11 and 12 to complete the following procedures.
    A. Remove the air duct sub-assembly No. 1.
    B. Remove the heater to register duct No. 1.
    Refer to TIS, applicable model and model year Repair Manual:
    - 2018 / 2019 / 2020 LS 500:
      Steering – Steering Column – “Steering Column: Steering Column Assembly: Removal”
    - 2018 / 2019 / 2020 LS 500h:
      Steering – Steering Column – “Steering Column: Steering Column Assembly: Removal”
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

31. Remove the brake pedal return spring.

NOTE
Perform Repair Manual step 5.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500:
  Brake – Brake System – “Brake System (Other): Brake Pedal(w/o Vacuum Brake Booster): Removal”
- **2018 / 2019 / 2020** LS 500h:
  Brake – Brake System – “Brake System (Other): Brake Pedal: Removal”

32. Remove the stop light switch assembly.

NOTE
Perform Repair Manual steps 5 and 6.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500:
- **2018 / 2019 / 2020** LS 500h:

33. Remove the push rod pin.

NOTE

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500:
  Brake – Brake System – “Brake System (Other): Brake Pedal(w/o Vacuum Brake Booster): Removal”
- **2018 / 2019 / 2020** LS 500h:
  Brake – Brake System – “Brake System (Other): Brake Pedal: Removal”
Repair Procedure (continued)

Removal (continued)

34. Remove the brake master with simulator cylinder assembly.
   A. Remove the four nuts.

   B. Disconnect the brake fluid level warning switch connector.
   C. Remove the wire harness clamp.
      HINT
      Slightly pull out the brake master with the simulator cylinder assembly, then remove the wire harness clamp.

35. Remove the brake master with simulator cylinder assembly.
      NOTICE
      • Do NOT bend or damage the brake actuator tube No. 2.
      • Protect the surface of the relay block during removal to ensure the relay block is not scratched.
Repair Procedure (continued)
Removal (continued)

36. Disconnect the brake tube.
   A. Remove the brake master cylinder gasket from the brake master with simulator cylinder assembly.

   **NOTICE**
   Remove the tube clamp bracket (see Figure 28) from the brake actuator tube No. 2 in the removed brake master cylinder assembly.

   **HINT**
   The removed tube clamp bracket will be reused.

---

**Figure 28. In-Vehicle Tube Clamp Bracket**

**Figure 29. Tube Clamp Bracket**
Repair Procedure (continued)

Installation

Brake System/Pedal/Brake Booster Brake Master Cylinder Assembly Installation

1. Install the brake cylinder gasket.
   Mount a NEW brake master cylinder gasket on to the brake master with simulator cylinder assembly.

2. Mount the brake master with simulator cylinder assembly.
   A. Temporarily mount the brake master with simulator cylinder assembly onto the vehicle.

   **NOTE**
   Use the tube clamp bracket removed from the brake actuator tube No. 2 for the NEW brake master cylinder assembly.

   **CAUTION**
   - Do NOT bend or damage the brake actuator tube No. 2.
   - Protect the surface of the relay block during removal of the brake master with the simulator cylinder assembly to ensure the relay block is not scratched.

   B. Connect the wire harness clamp.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

C. Connect the brake fluid level warning switch connector.
   Using four nuts, mount the brake master with simulator cylinder assembly.
   Torque: 12.7 N*m (130 kgf*cm, 113 in*lbf)

Figure 32.

3. Install the push rod pin.

   NOTE

Refer to TIS, applicable model and model year Repair Manual:

- 2018 / 2019 / 2020 LS500:
  Brake – Brake System (Other) – “Brake System (Other): Brake Pedal(w/o Vacuum Brake Booster): Installation”

- 2018 / 2019 / 2020 LS500h:
  Brake – Brake System (Other) – “Brake System (Other): Brake Pedal: Installation”

4. Mount the stop lamp switch assembly.

   NOTE
   Perform Repair Manual steps 1 and 2.

Refer to TIS, applicable model and model year Repair Manual:

- 2018 / 2019 / 2020 LS500:

- 2018 / 2019 / 2020 LS500h:
Repair Procedure (continued)

Installation (continued)

5. Install the brake pedal return spring.

NOTE

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  
  \textit{Brake – Brake System (Other)} – “Brake System (Other): Brake Pedal(w/o Vacuum Brake Booster): Installation”

- **2018 / 2019 / 2020** LS 500h:
  
  \textit{Brake – Brake System (Other)} – “Brake System (Other): Brake Pedal: Installation”

NOTE
Perform Repair Manual steps 10 and 11 to complete the following procedures.

6. Install the heater to register duct No. 1.

7. Mount the air duct sub-assembly No. 1.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  
  \textit{Steering – Steering Column} – “Steering Column: Steering Column Assembly: Installation”

- **2018 / 2019 / 2020** LS 500h:
  
  \textit{Steering – Steering Column} – “Steering Column: Steering Column Assembly: Installation”

8. Mount the instrument panel air bag assembly LWR No. 1.

NOTE

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  

- **2018 / 2019 / 2020** LS 500h:
  
9. Connect the brake tube.
   Using a union-nut wrench, connect one flare nut on the brake tube.
   Torque: 15.2 N*m (155 kgf*cm, 135 in*lbf)

**NOTICE**
- This step prevents air from mixing into the tubes and keeps it to a minimum.
- Quickly connect AFTER removing the cap.
- Do NOT bend or damage the brake tubes.
- Do NOT allow debris, such as dust, to contact the brake tube connecting part.

**NOTE**
Procedures 10 – 15 in the Repair Manual for Brake Master Cylinder Installation MUST be performed AFTER actuator assembly installation.

**HINT**
- When using a torque wrench with effective length changed, determine the read value from the torque wrench.
  Refer to TIS, applicable model and model year Repair Manual:
  - **2018 / 2019 / 2020** LS 500:
  - **2018 / 2019 / 2020** LS 500h:
  - When using a union-nut wrench (effective length 22 mm) + a torque wrench (effective length 162 mm):
    - 13.4 N*m (137 kgf*cm, 119 in*lbf)

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10. Mount the brake actuator bracket No. 3.

   **NOTE**
   The brake actuator bracket No. 3 is a reused part.

   A. Using four bolts, mount the brake actuator bracket No. 3 onto the body.
   **Torque:** 11 N\(\text{m}\) (112 kgf\(\text{cm}\), 97 in\(\text{lb}\)f)

   B. Referencing Figure 34, fasten bolts in the following order: A, B, C, D.
Brake Actuator Bracket Cushion

Brake Actuator Bracket Space

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Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

B. Attach three bracket actuator bracket spacers to the brake actuator bracket cushions.

C. Using three nuts, mount the brake actuator bracket No. 2 onto the brake actuator assembly.
   Torque: 9.3 N*m (95 kgf*cm, 82 in*lbf)
   
   NOTE
   The bracket actuator bracket No. 2 is a reused part.

13. Attach the brake actuator way No. 1.
   Using two bolts, mount the brake actuator way No. 1 onto the brake actuator assembly.
   Torque: 19 N*m (194 kgf*cm, 168 in*lbf)
   
   NOTE
   The actuator way No. 1 and brake actuator tube No. 3 were removed earlier as they were attached to each other. Therefore, please see more explanations in the following pages.
Installation (continued)

14. Connect the brake actuator tube No. 3.
   Using a union-nut wrench, connect the brake actuator tube No. 3 to the brake actuator assembly, as well as the brake actuator way No. 1.
   Torque: 15.2 N*m (155 kgf*cm, 135 in*lbf)

   **NOTICE**
   - Do NOT bend or damage the brake actuator tube No. 3.
   - Do NOT allow debris, such as dust, to get in on the brake actuator tube No. 3 connecting part.

In order to eliminate as much air from remaining in the tube and connecting parts, fill the tube No. 3 and connecting parts with fluid in advance, then connect.

**Figure 39.**

<table>
<thead>
<tr>
<th>1</th>
<th>Torque Wrench Effective Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Union-nut Wrench</td>
</tr>
<tr>
<td>3</td>
<td>Tube No. 3</td>
</tr>
</tbody>
</table>

**NOTE**
- This step protects the brake actuator assembly by preventing fluid from contacting the connector.
- The brake actuator tube No. 3 and the brake actuator way No. 1 are reused parts.
- When using a torque wrench with the effective length changed, find out the read value from the torque wrench.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020 LS 500:**
- **2018 / 2019 / 2020 LS 500h:**
- When using a union-nut wrench (effective length 22 mm) and a torque wrench (effective length 162 mm):
  Torque: 13.4 N*m (137 kgf*cm, 119 in*lbf)
Repair Procedure (continued)
Installation (continued)

Figure 40. Brake Actuator Assembled

Figure 41. New Brake Actuator

1 Brake Actuator Tube No. 3

Figure 42. New Brake Actuator Assembly
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

15. Connect the brake actuator hose.

   Connect the brake actuator hose to the brake actuator assembly and secure with a clamp.

   **NOTE**
   - The brake actuator hose is a reused part.
   - Prevent air from mixing into the tube (keeping it to a minimum).
   - Quickly connect the tube to the assembly as soon as the cap is removed.

![Figure 43.](image)
Repair Procedure (continued)

Installation (continued)

16. Mount the brake actuator assembly with bracket.
   A. Using one bolt and two nuts, mount the brake actuator assembly with bracket.
      
      Torque: 19 N*m (194 kgf*cm, 168 in*lbf)

      ![Figure 44](image)
      
      Area to Rub When Discharging Air (Root of Connecting Part)

      **NOTE**
      - Make sure to avoid the brake tubes.
      - This step prevents air from mixing into the hose (keeping to a minimum). If the fluid surface of the reservoir tank is low, there is a possibility that air could go into the hose.
      - When a NEW brake master cylinder assembly is delivered, the fluid level inside the reservoir tank may be low; therefore, until the procedure to rub the hose, add fluid and maintain a level that is higher than the port.

      **NOTICE**
      - Fasten the bolt and nuts in the following order: A, B, C.
      - Do NOT bend or damage the brake tubes.
      - Do NOT allow debris, such as dust, to get on the brake tube connecting part.
      - Do NOT hold the brake actuator assembly by its connector part.

B. Connect the “Brake Actuator Hose” to the “Brake Master Cylinder Reservoir Assembly” and secure it with a hose clamp.

      **NOTE**
      This step eliminates as much air from remaining in the tube and connecting part.

C. AFTER connecting the brake actuator hose to the brake master cylinder reservoir assembly, discharge air from the hose.

D. AFTER connecting the hose, firmly rub the hose 50 times and discharge air from the connecting part to the reservoir tank.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

17. Install the brake tube.
   A. Remove the rubber caps and connect the tubes.
   
   Figure 45.

   B. Temporarily tighten the six flare nuts on the brake tube.
   
   Figure 46. Before Fluid Is Poured Into Each Port
Repair Procedure (continued)

Installation (continued)

C. Engage the lower three brake tubes using the clamp.

**NOTE**
- This step eliminates as much air from remaining in the tube and connecting part.
- When installing the brake tubes, connect them with the fluid filled in the ports on the brake master cylinder with simulator cylinder assembly side, as well as in the ports on the brake actuator assembly.
- Removed the rubber caps of the tubes one at a time when each tube is connected.

D. Using a union-nut wrench, permanently tighten the six flare nuts on the brake tube.

**Torque:** 15.2 N·m (155 kgf·cm, 135 in*lbf)

**NOTE**
- When using a torque wrench with the effective length changed, find out the read value from the torque wrench. Refer to TIS, applicable model and model year Repair Manual:
  - When using a union-nut wrench (effective length 22 mm) and a torque wrench (effective length 162 mm):
    **Torque:** 13.4 N·m (137 kgf·cm, 119 in*lbf)
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

18. Connect the brake tube.
   A. Engage the upper three brake tubes with a clamp.

   **NOTE**
   - This step eliminates as much air from remaining in the tubes and connecting parts and fills the actuator with brake fluid.
   - When installing the brake tubes, connect them with the fluid filled in the port on the brake actuator assembly side.

   B. Using one bolt, connect the brake actuator tube no. 2.
   **Torque:** 15.2 N*m (155 kgf*cm, 135 in*lbf)

   C. Using a union-nut wrench, permanently tighten the four flare nuts on the brake tubes.
   **Torque:** 15.2 N*m (155 kgf*cm, 135 in*lbf)

   **NOTICE**
   - Do NOT bend or damage the brake tubes.
   - Do NOT allow debris, such as dust, to get on the brake tube connecting parts.

   **NOTE**
   - When using a torque wrench with the effective length changed, determine the read value from the torque wrench.
   Refer to TIS, applicable model and model year Repair Manual:
   - 2018 / 2019 / 2020 LS 500:
   - 2018 / 2019 / 2020 LS 500h:
   - When using a union-nut wrench (effective length 22 mm) and a torque wrench (effective length 162 mm):
     **Torque:** 13.4 N*m (137 kgf*cm, 119 in*lbf)

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Repair Procedure (continued)

Installation (continued)

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Torque Wrench’s Effective Length</td>
</tr>
<tr>
<td>2</td>
<td>Union-nut Wrench</td>
</tr>
<tr>
<td>3</td>
<td>Flare Nut</td>
</tr>
</tbody>
</table>

Figure 49.

Figure 50.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

19. Connect the wire harness.
   A. Put two clips on the wire harness.
   B. Connect the brake actuator connector to the actuator assembly.
   C. Press down the lock lever of the brake actuator connector and lock.

   Figure 51.

   1 Direction to Connect
   2 Direction to Lock

20. Attach the fender apron brace sub-assembly RH.

   NOTE
   This step ONLY applies to LS 500h vehicles.

   Refer to TIS, applicable model and model year Repair Manual:
   • 2018 / 2019 / 2020 LS 500h:

21. Attach the cowl top ventilator louver sub-assembly.

   Refer to TIS, applicable model and model year Repair Manual:
   • 2018 / 2019 / 2020 LS 500:
   • 2018 / 2019 / 2020 LS 500h:
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

22. Attach the radiator cover plate.

**NOTE**
This step ONLY applies to LS 500h vehicles.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500h:

23. Connect the auxiliary battery (–) terminal.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500:
- **2018 / 2019 / 2020** LS 500h:

24. Attach the luggage compartment mat sub-assembly.

**NOTE**
This step ONLY applies to LS 500h vehicles.

Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020** LS 500h:
  - *Power Source/Network – Battery/Charging – “8GR-FXS Battery / Charging: Sub Battery: Installation”*
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

25. Perform brake system air bleeding.
Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020 LS 500:**
  
  *Brake – Brake System – “Brake System (Other): Brake Fluid (w/o Vacuum Brake Booster): Bleeding”*
  
- **2018 / 2019 / 2020 LS 500h:**
  
  *Brake – Brake System – “Brake System (Other): Brake Fluid: Bleeding”*

26. Inspect/adjust the brake fluid amount.
Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020 LS 500:**
  
  *Brake – Brake System – “Brake System (Other): Brake Fluid (w/o Vacuum Brake Booster): On-Vehicle Inspection”*
  
- **2018 / 2019 / 2020 LS 500h:**
  
  *Brake – Brake System – “Brake System (Other): Brake Fluid: On-Vehicle Inspection”*

27. Perform the Linear Valve Offset Learning.
When the brake actuator assembly is replaced, perform the Linear Valve Offset Learning.
Refer to TIS, applicable model and model year Repair Manual:
- **2018 / 2019 / 2020 LS 500:**
  
  *Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control System (w/o Vacuum Brake Booster): Torque Specifications”*
  
- **2018 / 2019 / 2020 LS 500h:**
  
28. Delete the DTCs.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  

- **2018 / 2019 / 2020** LS 500h:
  

**NOTE**

When attaching/ detaching the auxiliary battery terminal, there are functions that complete learning by using each system.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  
  *General – Maintenance* – “Maintenance: Battery: Installation”

- **2018 / 2019 / 2020** LS 500h:
  
  *General – Maintenance* – “Maintenance: Battery: Installation”

29. Inspect DTC outputs.

When a DTC is output, perform troubleshooting of the applicable DTC.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  

- **2018 / 2019 / 2020** LS 500h:
  
30. Attach the brake actuator assembly with bracket.
Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500:
- 2018 / 2019 / 2020 LS 500h:

31. Perform brake system air bleeding.
Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500:
  Brake – Brake System – “Brake System (Other): Brake Fluid (w/o Vacuum Brake Booster): Bleeding”
- 2018 / 2019 / 2020 LS 500h:
  Brake – Brake System – “Brake System (Other): Brake Fluid: Bleeding”

32. Inspect the brake pedal.
Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500:
  Brake – Brake System – “Brake System (Other): Brake Pedal (w/o Vacuum Brake Booster): Adjustment”
- 2018 / 2019 / 2020 LS 500h:
  Brake – Brake System – “Brake System (Other): Brake Pedal: Adjustment”

33. Inspect Brake Fluid Leakage
Refer to TIS, applicable model and model year Repair Manual:
- 2018 / 2019 / 2020 LS 500:
  Brake – Brake System – “Brake System (Other): Brake Fluid (w/o Vacuum Brake Booster): On-Vehicle Inspection”
- 2018 / 2019 / 2020 LS 500h:
  Brake – Brake System – “Brake System (Other): Brake Fluid: On-Vehicle Inspection”
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

34. ECU data reading.

NOTE

When connecting/disconnecting the brake actuator tube No. 2, check and confirm if the brake fluid leaks from the connecting part of the brake actuator tube No. 2 by monitoring the accumulator pressure sensor output value in the brake actuator assembly. It is difficult to check the brake fluid leakage at the connecting part of the brake actuator tube No. 2 while it is mounted.

A. While the ignition is OFF, connect the Techstream to the DLG3.
B. Turn the ignition ON.
C. Turn Techstream ON.

From the Techstream menu, select System Select Menu – Chassis – ABS-VSC-TRC – Data Monitor and monitor the accumulator pressure sensor.

D. Read the value of accumulator pressure sensor in the data monitor.

Table 4.

<table>
<thead>
<tr>
<th>ITEM NAME</th>
<th>ITEM NAME COMMENT</th>
<th>INSPECTION CONDITION</th>
<th>REFERENCE VALUE</th>
<th>INSPECT ITEMS WHEN ABNORMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accumulator Pressure Sensor</td>
<td>It indicates Accumulator Pressure Sensor Output Value.</td>
<td>Depress the brake pedal four or five times, start the pump motor, then stop the motor and do NOT depress the brake.</td>
<td>2.6 to 3.8V</td>
<td>Actuator System</td>
</tr>
</tbody>
</table>
Repair Procedure (continued)

Installation (continued)

35. Wait for 30 seconds without operating the brake pedal and confirm that there is no decrease in the accumulator pressure sensor output value.

**Standard:**

*Accumulator pressure sensor's output voltage drops 0.2V or less for 30 seconds.*

If the accumulator pressure sensor value decreases more than the standard value, it is suspected that there is brake fluid leakage from the connection part of the brake actuator tube No. 2; therefore, remove the brake actuator and brake booster pump assembly once again, then remove the brake actuator tube No. 2 and inspect the connection part, and re-install.

Is the accumulator pressure sensor value decreased below the standard value?

- **YES** — Continue to step 36.
- **NO** — Check for any leaks correct and reconfirm accumulator pressure repeating step 37.

---

**Figure 52.**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Torque Wrench's Effective Length</td>
</tr>
<tr>
<td>2</td>
<td>Union-nut Wrench</td>
</tr>
</tbody>
</table>
36. Remove the brake actuator and the brake booster assembly.

Then, remove the brake actuator tube No. 2 again, inspect the connection part, and reinstall tube No. 2.

**Torque: 15.2 N*m (155 kgf*cm, 135 in*lbf)**

**NOTE**

When using a torque wrench with the effective length changed, determine a read value from the torque wrench.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500:**

- **2018 / 2019 / 2020 LS 500h:**

- When using a union-nut wrench (effective length 22 mm) and a torque wrench (effective length 162 mm): 13.4 N*m (137 kgf*cm, 119 in*lbf)
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

37. Inspect the brake master cylinder.
   Refer to TIS, applicable model and model year Repair Manual:
   • **2018 / 2019 / 2020** LS 500:
   • **2018 / 2019 / 2020** LS 500h:

38. Master Cylinder Pressure Sensor Check
   Refer to TIS, applicable model and model year Repair Manual:
   • **2018 / 2019 / 2020** LS 500:
   • **2018 / 2019 / 2020** LS 500h:
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding

Table 5.

<table>
<thead>
<tr>
<th>PARTS TO REPLACE/ATTACH/DETACH</th>
<th>PROCEDURE TO REFERR TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Hose (Front and Back)</td>
<td>Brake Line Air Bleeding</td>
</tr>
<tr>
<td>Disk Brake Cylinder Assembly (Front and Back)</td>
<td></td>
</tr>
<tr>
<td>Brake Actuator Assembly</td>
<td></td>
</tr>
<tr>
<td>Brake Master Cylinder Reservoir Assembly</td>
<td>Brake System Air Bleeding</td>
</tr>
<tr>
<td>Brake Stroke Simulator Cylinder Assembly</td>
<td></td>
</tr>
<tr>
<td>Brake Master Cylinder Sub-assembly</td>
<td></td>
</tr>
</tbody>
</table>

1. Perform the following air bleeding operation.

NOTICE

- During the air bleeding operation, make sure to keep the shift in the “P” position and ensure the parking brake is activated.
- Brake fluid may overflow due to brake fluid released from the brake actuator assembly. Do NOT pour by holding the brake fluid bottle straight above the reservoir filling port.
- During the air bleeding operation, constantly add the brake fluid to the brake master cylinder reservoir assembly to maintain fluid level between MIN and MAX.
- If the pump motor starts with air mixed in the brake actuator hose (the hose between the brake master cylinder reservoir assembly and brake booster pump assembly), the air could get caught in the brake booster pump assembly, and consequently, air bleeding will be difficult. When the auxiliary battery is connected, even when the ignition is OFF, ‘the door courtesy switch ON’ and ‘the brake pedal operation’ will make the brake control system start; therefore, when conducting any operations that could possibly mix air into the brake actuator hose, make sure to disconnect two brake booster pump connectors in advance.
- While air bleeding the brake fluid, a buzzer may sound due to the accumulator pressure reduction, however, it is not abnormal, therefore, continue the operation.
- DTCs such as ABS Motor Relay Malfunction or Pressure Sensor Malfunction may be stored when air bleeding the brake fluid. When there are instructions during or after the air bleeding, delete the DTC(s).
- Do NOT allow the brake fluid to contact ANY coated surfaces, such as the vehicle body. If fluid contacts a coated surface, wipe off immediately and wash off with water.
- Do NOT perform air bleeding under negative pressure using a device such as a Vacula.*
- Make sure to bleed air from the brake system as the following attachment, detachment, or replacement procedures include actuator assembly attachment/detachment.
  - Brake stroke stimulator cylinder assembly
  - Brake master cylinder sub-assembly
- When turning the ignition ON to prevent a dead battery, connect the battery charger to the auxiliary battery and make it to a charging state.
Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

NOTE
*An ECB (Electronic Control Brake System) has a complicated oil passage. There is a risk that gas dissolved into the brake fluid may vaporize due to a pressure reduction and consequently generate air bubbles.

A. The brake actuator assembly is replaced. Initialize the correction value of the linear valve.
B. Turn the ignition ON.
C. Shift to the “P” position.
D. Turn the parking brake ON.
E. Turn the ignition OFF.
F. Connect Techstream to the DLC3 and turn the ignition ON.
G. From the Techstream screen, select [chassis]→[ABS-VSC-TRC]→[UTILITY]→[RESET MEMORY]
H. Select [delete the back-up memory] and perform.

Chassis – ABS-VSC-TRC – Utility – Reset Memory

NOTICE
- Once “Delete the Back-Up Memory” is performed, the 0-point memory for the yaw-rate sensor and G sensor will also be deleted. Make sure to perform a 0-point acquisition for the yaw-rate sensor and G sensor.
- After the 0-point memory for the yaw-rate sensor and G sensor is deleted, and if 15 seconds passes while the shift position is at "P" and the ignition is ON, only the yaw-rate sensor 0-point will be stored. If a vehicle is operated under this condition, Non-Corrected G Sensor 0-point Malfunction will be stored, and its DTC will be output.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

2. Brake System Air Bleeding.

NOTE
Techstream MUST be used for brake system air bleeding. If air bleeding is performed without Techstream, the operation will be incomplete and may lead to failures and accidents.

A. Remove the four tires.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500:**
  General – Maintenance – “Maintenance: Tire and Wheel: Removal”
- **2018 / 2019 / 2020 LS 500h:**
  General – Maintenance – “Maintenance: Tire and Wheel: Removal”

B. Remove the radiator cover plate.

NOTE
- This step ONLY applies to LS 500h vehicles.
- Perform Repair Manual steps 2 and 3.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020 LS 500h:**

C. While the ignition is OFF, disconnect two brake booster pump connectors.

NOTE
If the connectors are already disconnected, this step is NOT necessary.

Figure 53.
Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

D. Remove the brake master cylinder reservoir filler cap assembly.

E. Adjust the brake fluid amount so that the brake fluid level in the brake master cylinder reservoir assembly reaches the MIN level.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

F. Once the ignition is OFF, connect the Techstream to the DLC 3 Connector.
G. Turn the ignition ON.
H. Turn Techstream ON.
   Chassis – ABS-VSC-TRC – Operation Support

   NOTE
   Performing the accumulator 0 down by using Techstream will return the pressure-accumulated brake fluid in the accumulator back to the brake master cylinder reservoir assembly.

I. Confirm the buzzer sound, then turn the ignition OFF.
J. Add brake fluid to the brake master cylinder reservoir assembly to the level between MIN and MAX.
K. Turn the ignition ON.
L. Turn Techstream ON.
   From the Techstream menu, select System Selection Menu – Chassis – ABS-VSC-TRC – Operation Support – Air-Bleeding
   Chassis – ABS-VSC-TRC – Operation Support
M. Select Air-Bleeding after the Actuator Removal among the air bleeding classification selection, then perform.
N. Perform air bleeding the brake fluid by following the Techstream instruction.

   CAUTION
   Add the brake fluid so that the fluid level in the brake master cylinder reservoir assembly does NOT go below the MIN level.
Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

3. Perform air bleeding after actuator removal.
   Follow the Techstream instructions to complete this procedure.

Figure 56.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

Procedure Change (Refer to Figure 57)

A. Drain the fluid until the fluid level in the reservoir tank reaches MIN level. (Conduct pedaling while the bleeder plug is open.)

B. Fasten the bleeder plug and add the fluid until the fluid level in the reservoir tank reaches MAX level. Repeat substeps A and B twice.

C. Discharge the brake fluid by pedaling (depress the pedal a few times) and loosen the bleeder plug with the brake pedal depressed and release the pedal after the plug is fastened. Repeat substep C 20 times.

Figure 57.

NOTE
Do NOT complete procedures 2 and 3. Complete the Procedure Change above.

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Procedure Change (Refer to Figure 58)
Steps 1 – 3 MUST be repeated 20 times.

Figure 58.

NOTE
Complete the Procedure Change above.
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

Procedure Change (Refer to Figure 59)

AFTER discharging brake fluid for 30 seconds continuously, fasten the bleeder plug and release the brake pedal.

**Figure 59.**

**NOTE**
Complete the Procedure Change above.
4. Tighten the bleeder plugs once the air-bleeding is completed.

Torque: 10.8 N*m (110 kgf*cm, 95 in*lbf)
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

5. Perform the Techstream Active Test to forcefully move the valve in the actuator to complete air-bleeding.

From the Techstream screen, select Chassis – ABS-VSC-TRC – Active Test – [Perform Actuator Pattern] and perform.

NOTE

- Perform the above operation five times.
- The Techstream screen images are shown in the following pages.

Figure 60. Techstream Screen Image (Chassis – ABS-VSC-TRC)
Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

Figure 61. Techstream Screen Image (Active Test)
Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

Figure 62. Techstream Screen Image (Perform Actuator Pattern)

Figure 63. Techstream Screen Image (Execute)
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)

6. Delete DTCs.
   Refer to TIS, applicable model and model year Repair Manual:
   - 2018 / 2019 / 2020 LS 500:
   - 2018 / 2019 / 2020 LS 500h:

7. Turn the Techstream power OFF.

8. Turn the IG OFF.

9. Disconnect the Techstream from the DLC3.

10. Inspect for brake fluid leakage.

11. Inspect and adjust the amount of the brake fluid.

12. Install the brake master cylinder reservoir filler cap assembly.

13. Mount the radiator cover plate.

   NOTE
   - This step ONLY applies to LS 500h vehicles.
   - Perform Repair Manual step 45.

Refer to TIS, applicable model and model year Repair Manual:
   - 2018 / 2019 / 2020 LS 500h:
Brake Squawk/Knock Noise

Repair Procedure (continued)

Brake System/Pedal/Brake Booster/Brake Fluid/Air Bleeding (continued)


**NOTE**

BEFORE air-bleeding, the linear valve offset learning and brake pedal stroke sensor zero-point value memories were deleted. ONLY the linear valve offset learning and brake pedal stroke sensor zero-point learning should be performed.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  

- **2018 / 2019 / 2020** LS 500h:
  

15. Perform the initialization procedure AFTER brake component replacement.

Refer to TIS, applicable model and model year Repair Manual:

- **2018 / 2019 / 2020** LS 500:
  

- **2018 / 2019 / 2020** LS 500h:
  

16. Start the engine and warm it up to normal operating temperature.

17. Test-drive the vehicle to confirm proper operation.