

Brake Squawk/Knock Noise

Service Category Brake

Section Brake Control/Dynamic Control System

Market USA

Lexus Supports
ASE Certification 

Applicability

YEAR(S)	MODEL(S)	ADDITIONAL INFORMATION
2018 - 2020	LS500, LS500H	

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

OP CODE	MODEL	DESCRIPTION	TIME	OFP	T1	T2
BR1910	LS 500	R & R Actuator/Brake Master w/Simulator Cylinder Assembly and Brake Bleed	5.9	44050-11010	91	99
BR1911	LS 500h	R & R Actuator/Brake Master w/Simulator Cylinder Assembly and Brake Bleed	6.1			

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

BODY NO.	PART NUMBER		PART NAME	QTY
	PREVIOUS	NEW		
GVF5#L, VXFA5#L w/ AP Package	44050-11010		Actuator Assy, Brake	1
	47201-50381	47210-50140	Cylinder Sub-Assy, Brake Master	1
	47070-50070		Pump Assy, Brake Booster W/ Accumulator	1
	47207-11010		Cylinder Sub-Assy, Brake Stroke Simulator	1
	31478-30010		Cap Bleeder Plugs	11
	44518-12020		Plug Brake Actuator	1
	44511-58010		Plugs Brake Actuator	2

Required Tools & Equipment

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER	QTY
Techstream ADVi*	ADE	TSADVUNIT	1
Techstream 2.0		TS2UNIT	
Techstream Lite		TSLITEPDLR01	
Techstream Lite (Green Cable)		TSLP2DLR01	

*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.

SPECIAL SERVICE TOOLS (SST)	PART NUMBER	QTY
Battery Diagnostic Tool*	DCA-8000P T	1
Hose Plugs	09053-1C220	2

*Essential SST.

NOTE

Additional SSTs may be ordered by calling 1-800-933-8335.

Brake Squawk/Knock Noise

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.

Brake Squawk/Knock Noise

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

Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

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

PARTS TO BE REPLACED/OPERATIONS	REQUIRED OPERATIONS	PHENOMENON WHEN THE OP IS NOT PERFORMED/FUNCTIONS THAT WOULD NOT OPERATE
Brake Actuator Assembly (Including Attachment/ Detachment)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Brake Feel Would Change VSC and ABS Would Not Function
	Perform Air Bleeding	<ul style="list-style-type: none"> Brake Effectiveness Would Decline DTCs Would be Detected
	Storing Steering Sensor Steering Angle Neutral Point	Parking Support Brake System* ¹ Panoramic View Monitor System* ²
Auxiliary Battery (-) Terminal Disconnection	Rear Door Sunshade System Initialization	Rear Door Sunshade System

*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.

Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

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

*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”

PHENOMENON WHEN NOT PERFORMED/FUNCTIONS THAT WILL NOT WORK	LEARNING CONDITIONS
Servomotor	Servomotor Reference Position Recognition by Attaching/Detaching the Battery Terminal
Power Trunk Lid System	Manually, Fully Open the Luggage Compartment Door

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.

Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

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”

Brake Squawk/Knock Noise

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:

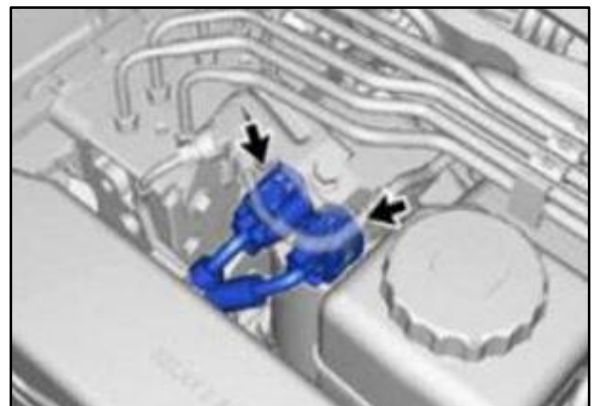
- [2018](#) / [2019](#) / [2020](#) LS 500:
Vehicle Exterior – Wiper/Washer – “Wiper / Washer: Front Wiper Motor: Removal”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Vehicle Exterior – Wiper/Washer – “Wiper / Washer: Front Wiper Motor: Removal”

9. Under “IG-OFF,” disconnect the two brake booster pump connectors.

NOTE

This step will prevent fluid from contacting the connector and protect the connector on the vehicle side.

Figure 1.



Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

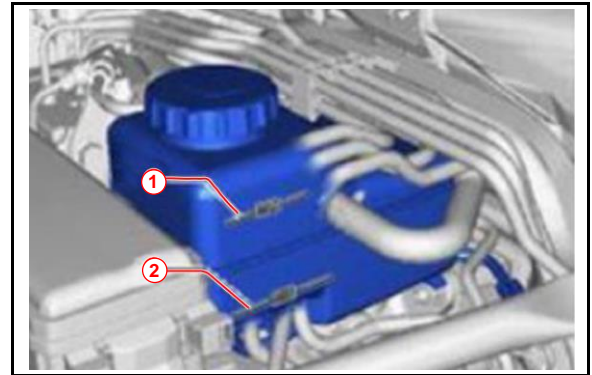
10. Perform accumulator 0 down (depressurize the accumulator).

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

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.

Figure 2.



1	MAX Line
2	MIN Line

- 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:
Chassis – ABS-VSC-TRC – Operation Support – Electronic Control Brake Support – Select Perform Accumulator 0 Down and perform Chassis – ABS-VSC-TRC – Operation Support

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

Perform Repair Manual steps 2 – 14.

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

- [2018](#) / [2019](#) / [2020](#) LS 500h:
Engine/Hybrid System – Emission Control – “8GR-FXS Emission Control: EGR Cooler: Removal”

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:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Brake Actuator: Removal”

Brake Squawk/Knock Noise

Repair Procedure (continued)

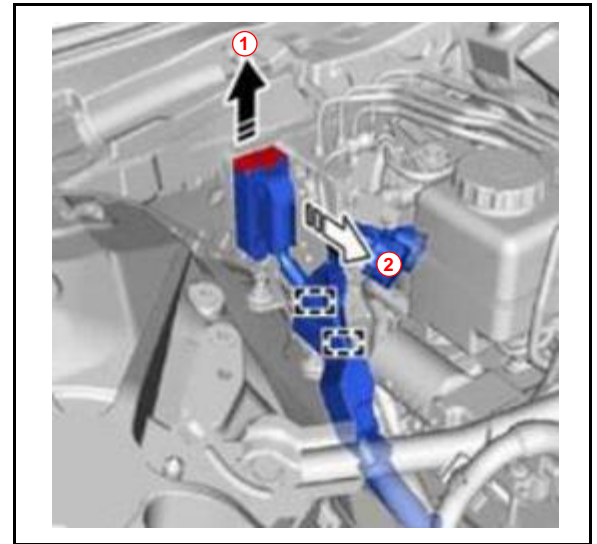
Removal (continued)

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.

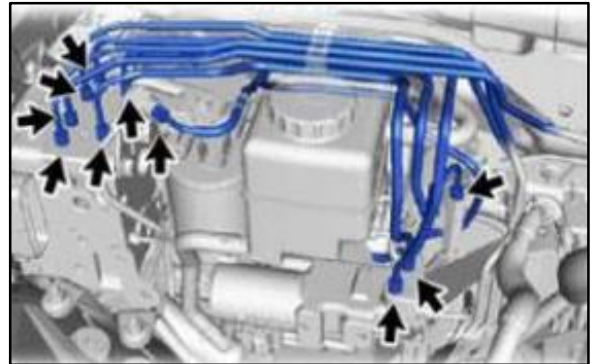
Brake Squawk/Knock Noise

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.

Figure 4.



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

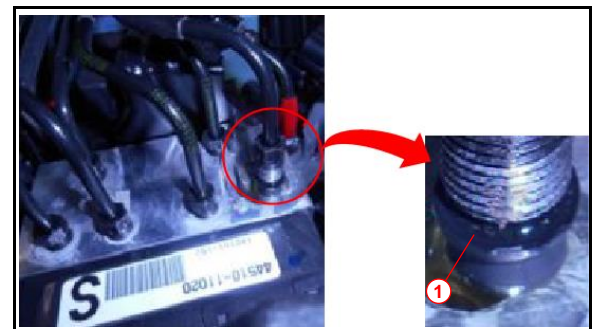
NOTICE

- 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.

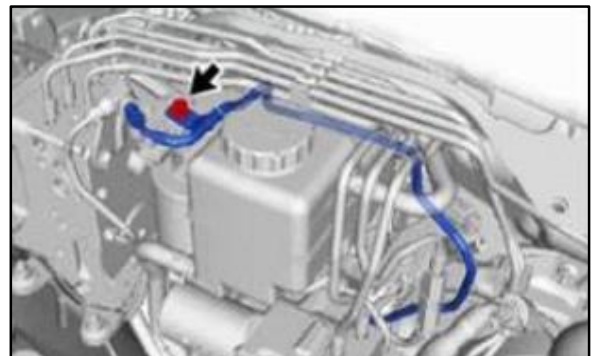
Figure 5. Cap



1	Cap
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- C. Remove one bolt and disconnect the brake actuator tube No. 2.

Figure 6.



Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

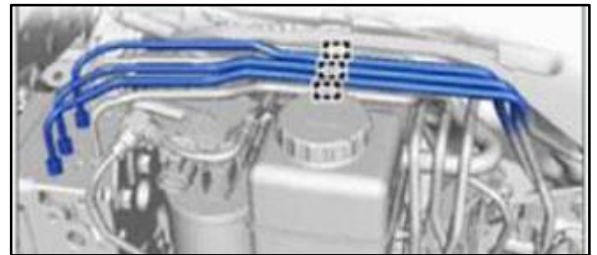
- D. While the brake tube is mounted in the vehicle, attach the plug onto the brake actuator way.

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.

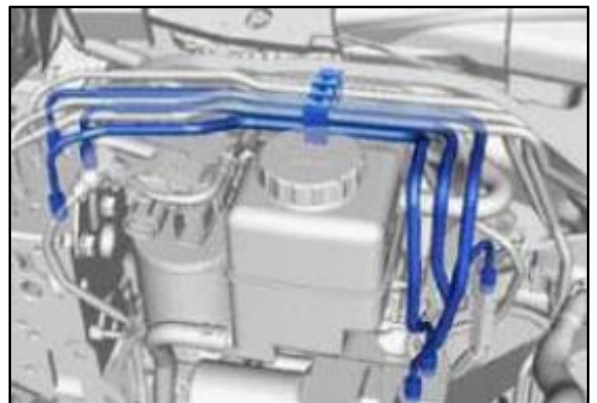
NOTE

- 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.



Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

- C. Disengage the fitting of the claw parts and detach three brake tubes from the clamp.

Figure 10.

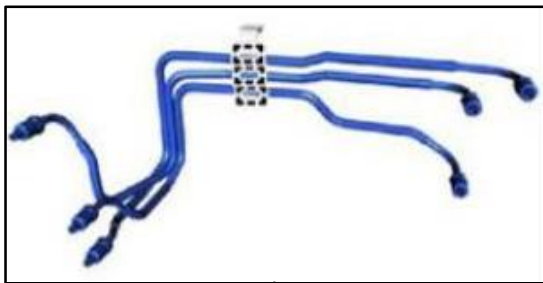
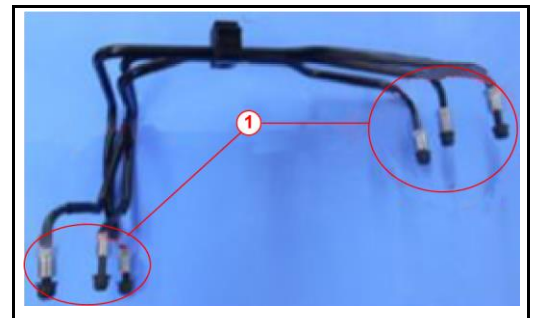


Figure 11.



1	Cap
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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.

Figure 12.

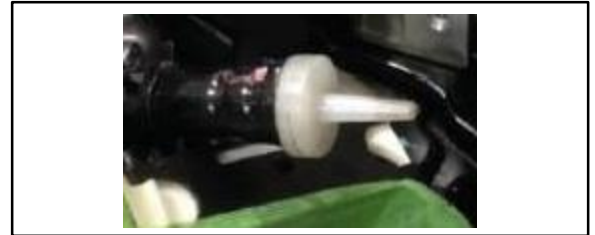


- B. AFTER the hose is disconnected, quickly attach the hose plug.

NOTE

This step prevents air from mixing into the hose.

Figure 13.

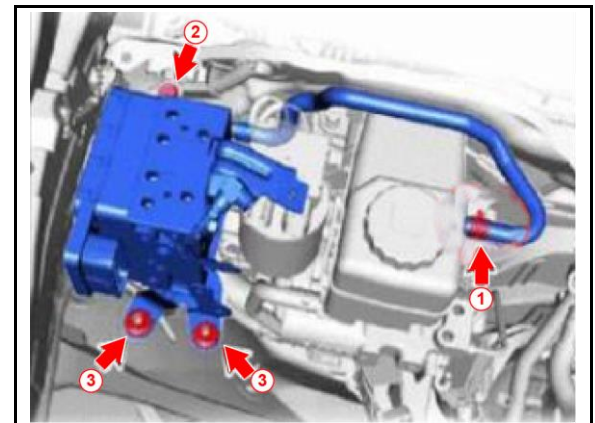


- C. Avoiding the brake tubes, remove the bolt and two nuts, then remove the brake actuator assembly with bracket.

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.

Figure 14.



1	Clamp
2	Bolt
3	Nut

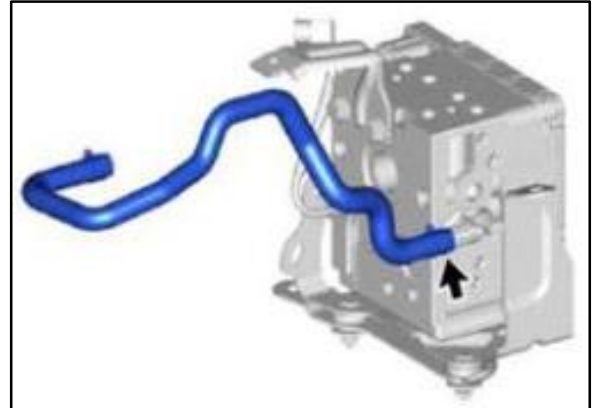
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

17. Disconnect the brake actuator hose.
Move the hose clamp and remove the "Brake Actuator Hose" from the "Actuator Assembly."

Figure 15. Brake Actuator Hose



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

NOTE

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

Figure 16.

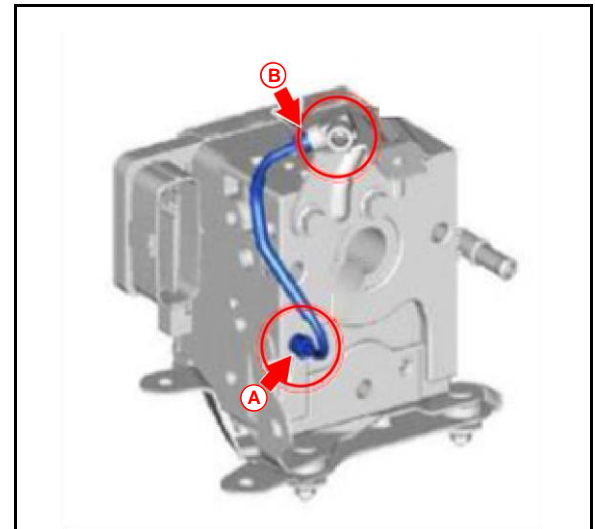


19. Using a union-nut wrench, disconnect the brake actuator tube No. 3 from the brake actuator assembly.

NOTE

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

Figure 17.



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.

Brake Squawk/Knock Noise

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

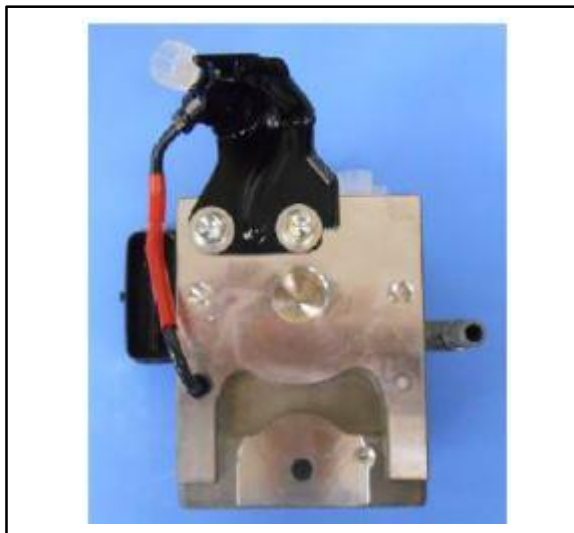


Figure 19. Brake Actuator Tube No. 3 and Brake Actuator Way in the Form of Assembly



Brake Squawk/Knock Noise

Repair Procedure (continued)

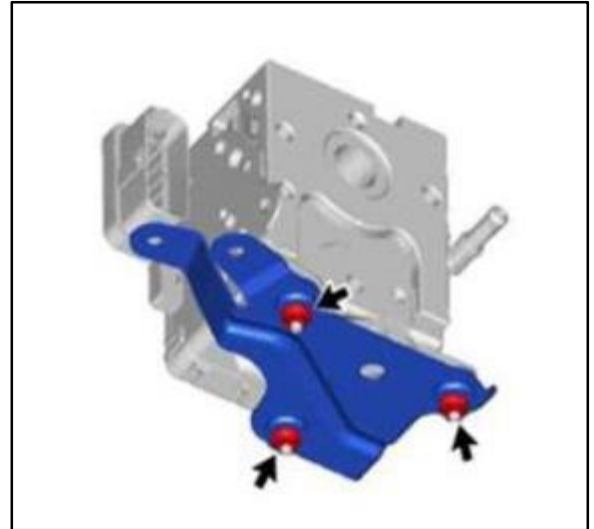
Removal (continued)

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

NOTE

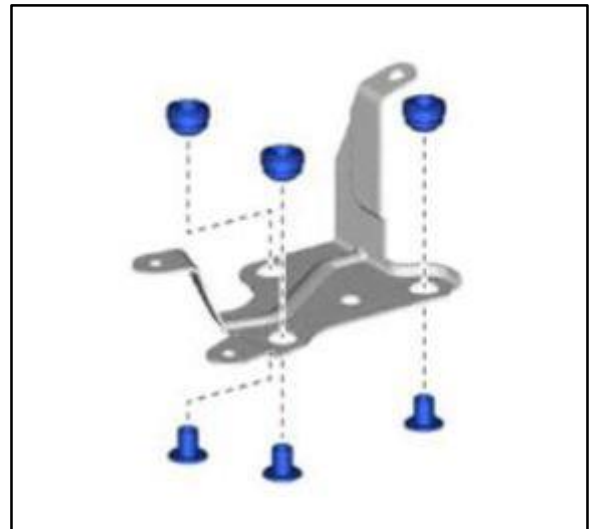
The removed brake actuator bracket No. 2 will be reused.

Figure 20.



23. Remove the brake actuator bracket spacers from the brake actuator bracket cushions.
Remove the three brake actuator bracket cushions from the bracket actuator No. 2.

Figure 21.



Brake Squawk/Knock Noise

Repair Procedure (continued)

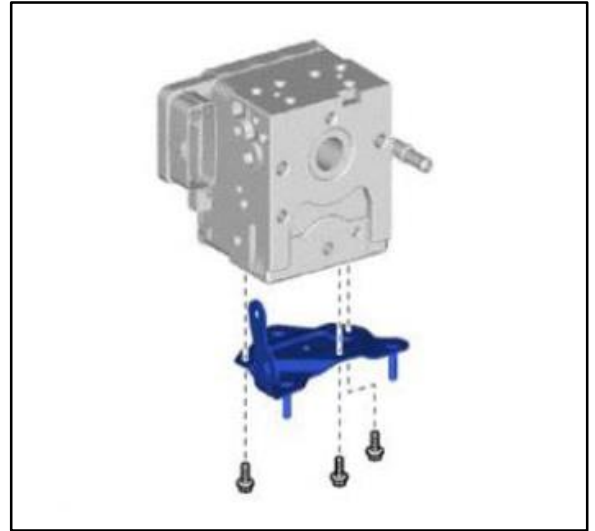
Removal (continued)

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.

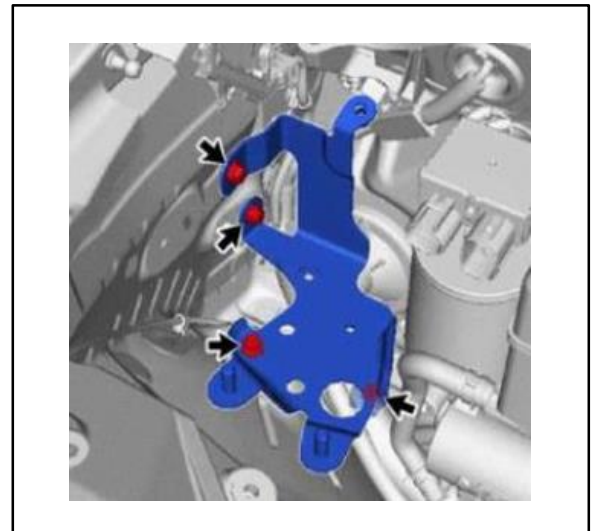


25. Remove the four bolts and remove the brake actuator bracket No. 3 from the vehicle body.

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

Parts To Be Replaced/Operations	Required Operations	Phenomenon When the Op Is Not Performed/Functions That Would Not Operate
Auxiliary Battery Terminal Attachment/Detachment	Storing Steering Sensor Steering Angle Neutral Point	Parking Support Brake System*
	Rear Door Sunshade System Initialization	Panoramic View Monitor System **
Brake Pedal (Including the Attachment/Detachment)	<ul style="list-style-type: none"> 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)	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Brake feel would change VSC and ABS would not function
	Perform Air Bleeding	<ul style="list-style-type: none"> 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.”

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
Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Airbag System: Precaution”
- [2018](#) / [2019](#) / [2020](#) LS 500h
Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Airbag System: Precaution”



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.

HINT

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

Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

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

*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

PHENOMENON WHEN NOT PERFORMED/FUNCTIONS THAT WILL NOT WORK	LEARNING CONDITIONS
Servomotor	Servomotor Reference Position Recognition by Attaching/Detaching the Battery Terminal
Power Trunk Lid System	Manually, Fully Open the Luggage Compartment Door

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”

Brake Squawk/Knock Noise

Repair Procedure (continued)

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:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Brake Actuator(w/o Vacuum Brake Booster): Removal”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Brake Actuator: Removal”

27. Disconnect the brake tube.

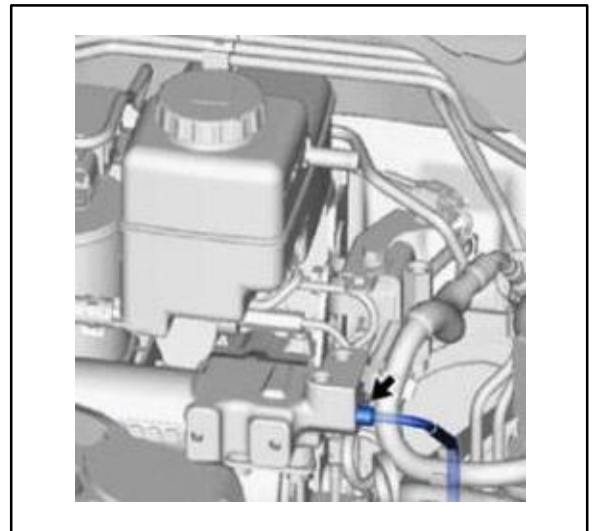
Using a union-nut wrench, remove the flare nut on the brake tube.

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

NOTE

This step prevents air from mixing into the tubes

Figure 24.



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:

Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Knee Airbag Assembly(for Driver Side): Removal”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Knee Airbag Assembly(for Driver Side): Removal”

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:
Vehicle Exterior – Lighting (ext) – “Lighting (ext): Stop Light Switch: Removal”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Vehicle Exterior – Lighting (ext) – “Lighting (ext): Stop Light Switch: Removal”

33. Remove the push rod pin.

NOTE

Perform Repair Manual step 8.

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”

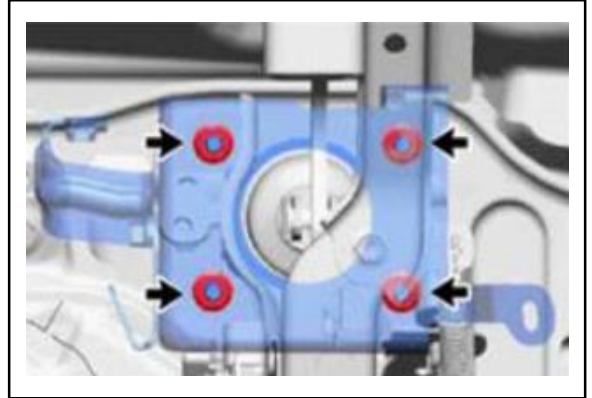
Brake Squawk/Knock Noise

Repair Procedure (continued)

Removal (continued)

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

Figure 25.



- B. Disconnect the brake fluid level warning switch connector.
 - C. Remove the wire harness clamp.

Figure 26.

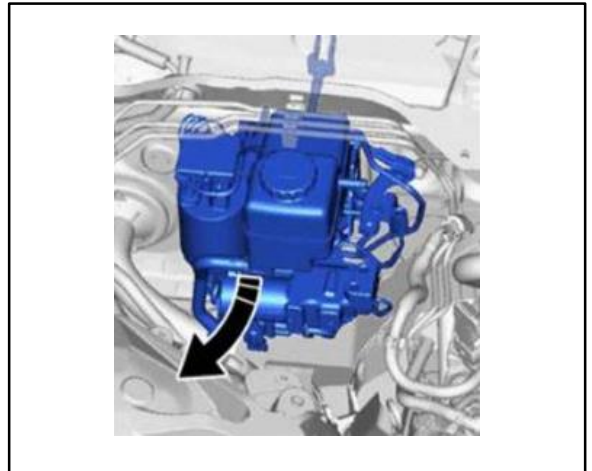


HINT

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.

Figure 27.



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.

Brake Squawk/Knock Noise

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



Brake Squawk/Knock Noise

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.

Figure 30.

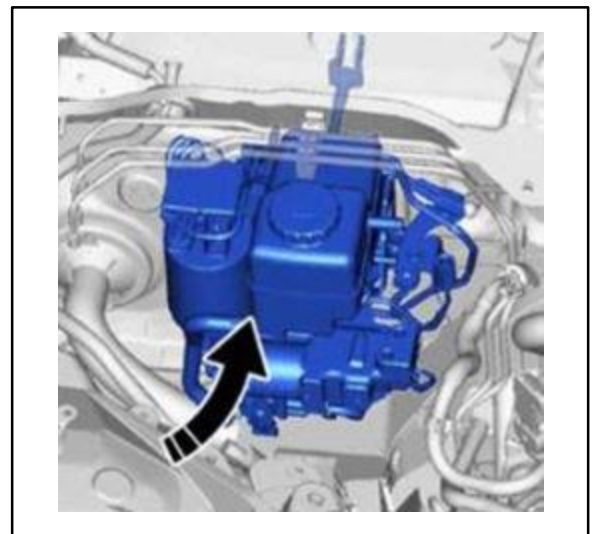
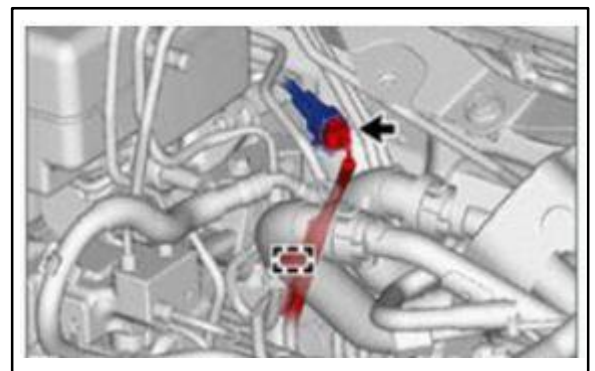


Figure 31.



Brake Squawk/Knock Noise

Repair Procedure (continued)

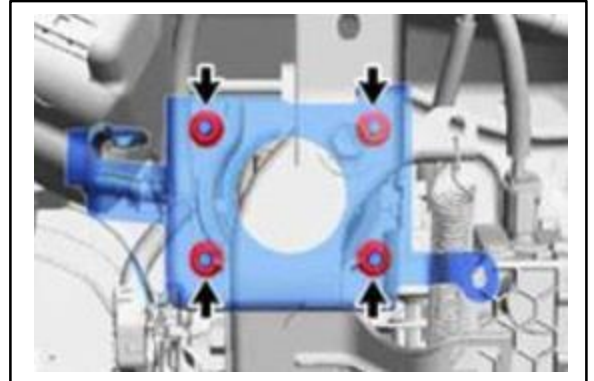
Installation (continued)

- 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

Perform Repair Manual step 3.

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:
Vehicle Exterior – Lighting (ext) – “Lighting (ext): Stop Light Switch: Installation”
- [2018](#) / [2019](#) / [2020](#) LS500h:
Vehicle Exterior – Lighting (ext) – “Lighting (ext): Stop Light Switch: Installation”

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

5. Install the brake pedal return spring.

NOTE

Perform Repair Manual step 6.

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

- [2018](#) / [2019](#) / [2020](#) LS 500:
Brake – Brake System (Other) – “Brake System (Other): Brake Pedal(w/o Vacuum Brake Booster): Installation”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
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:
Steering – Steering Column – “Steering Column: Steering Column Assembly: Installation”
 - [2018](#) / [2019](#) / [2020](#) LS 500h:
Steering – Steering Column – “Steering Column: Steering Column Assembly: Installation”
8. Mount the instrument panel air bag assembly LWR No. 1.

NOTE

Perform Repair Manual steps 1 – 7.

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

- [2018](#) / [2019](#) / [2020](#) LS 500:
Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Knee Airbag Assembly(for Driver Side): Installation”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Vehicle Interior – Supplemental Restraint Systems – “Supplemental Restraint Systems: Knee Airbag Assembly(for Driver Side): Installation”

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

9. Connect the brake tube.

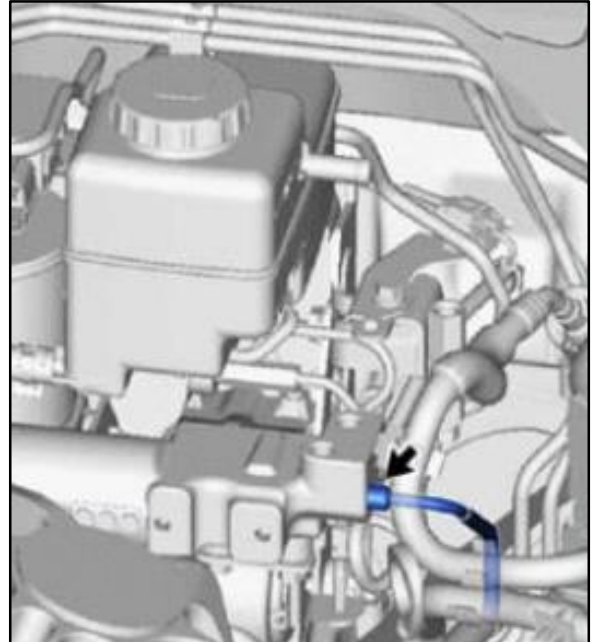
Using a union-nut wrench, connect one flare nut on the brake tube.

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.

Figure 33.



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:
General – Introduction – “Introduction: Repair Instruction: Precaution”
 - [2018 / 2019 / 2020](#) LS 500h:
General – Introduction – “Introduction: Repair Instruction: Precaution”
- 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)

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

Brake Control Brake Actuator Assembly Installation

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. During service operations of the brake system component, do NOT open/close doors, or do NOT conduct the brake pedal operation while the auxiliary battery is connected.

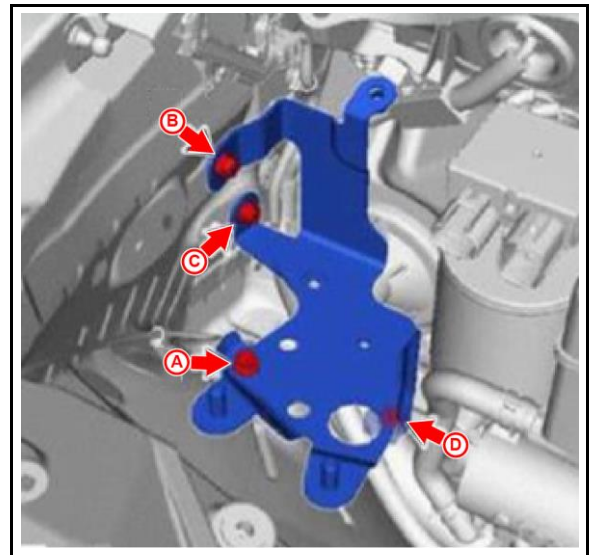
10. Mount the brake actuator bracket No. 3.

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*m (112 kgf*cm, 97 in*lb)
- B. Referencing Figure 34, fasten bolts in the following order: A, B, C, D.

Figure 34.



Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

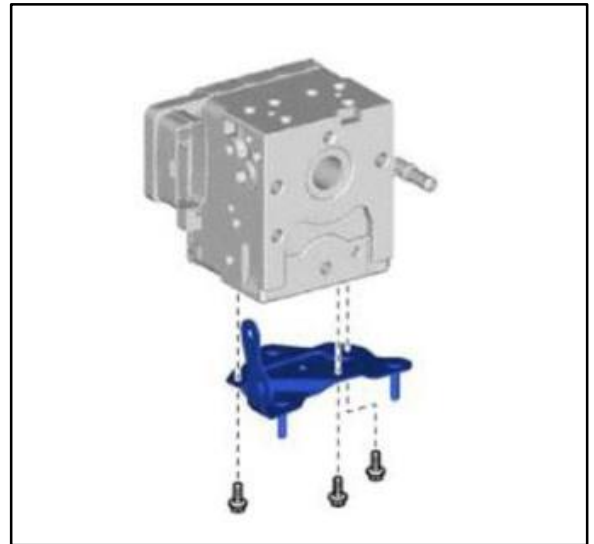
11. Mount the brake actuator bracket No. 1.
Using three bolts, mount the brake actuator bracket No. 1 onto the brake actuator assembly.

Torque: 9.3 N*m (95 kgf*cm, 82 in*lbf)

NOTE

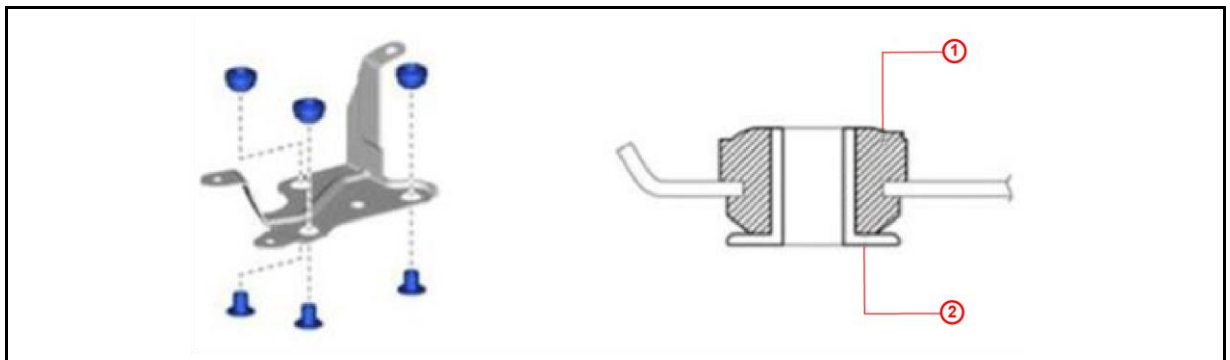
- The bracket will be mounted onto a NEW brake actuator.
- The brake actuator bracket No. 1 is a reused part.

Figure 35.



12. Attach the brake actuator bracket No. 2.
 - A. Attach three brake actuator bracket cushions onto the brake actuator bracket No. 2.

Figure 36.



1	Brake Actuator Bracket Cushion
2	Brake Actuator Bracket Space

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

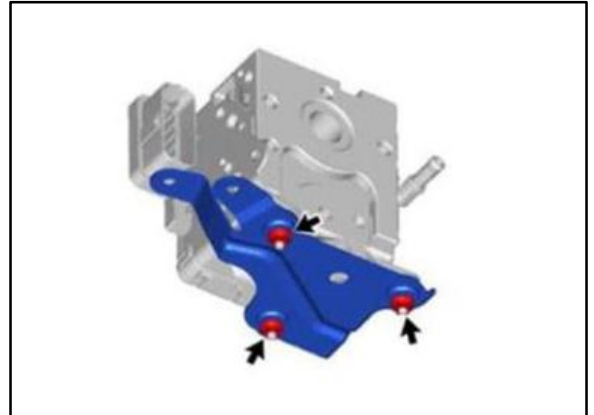
- B. Attach three bracket actuator bracket spacers to the brake actuator bracket cushions.
- C. Using three nuts, mount the brake actuator bracket No. 2 onto the brake actuator assembly.

Torque: 9.3 N*m (95 kgf*cm, 82 in*lbf)

NOTE

The bracket actuator bracket No. 2 is a reused part.

Figure 37.



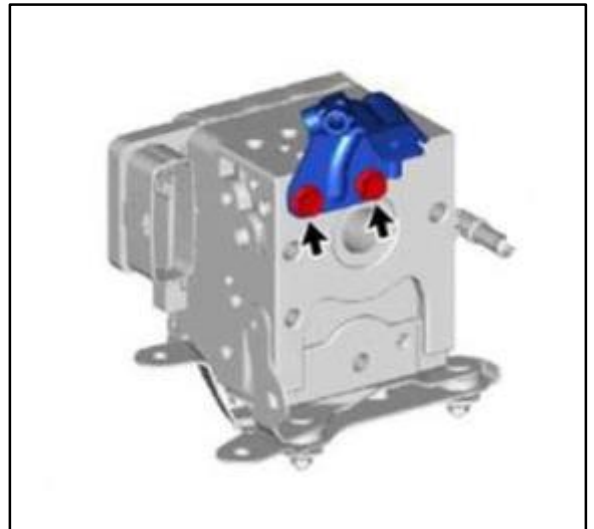
- 13. Attach the brake actuator way No. 1. Using two bolts, mount the brake actuator way No. 1 onto the brake actuator assembly.

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.

Figure 38.



Brake Squawk/Knock Noise

Repair Procedure (continued)

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.

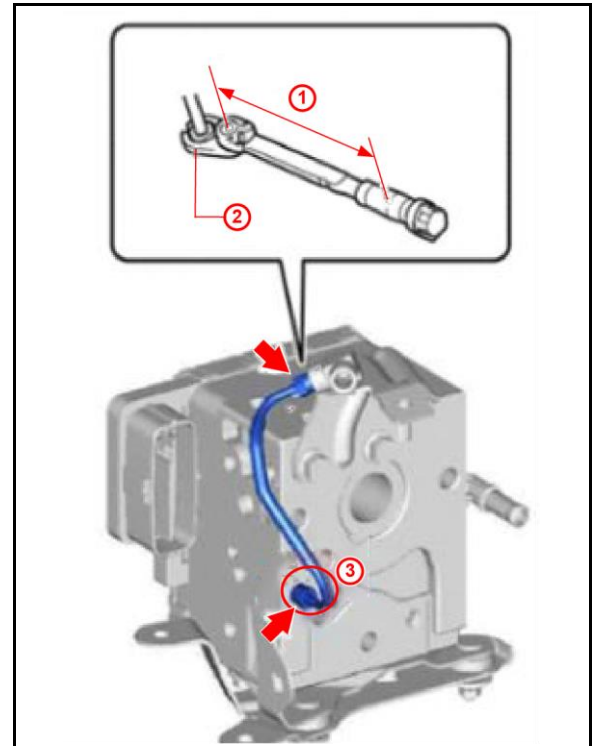
Torque: 15.2 N*m (155 kgf*cm, 135 in*lbf)

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.



1	Torque Wrench Effective Length
2	Union-nut Wrench
3	Tube No. 3

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:
General – Introduction – “Introduction: Repair Procedure: Precaution”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
General – Introduction – “Introduction: Repair Procedure: Precaution”
- 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)

Figure 40. Brake Actuator Assembled

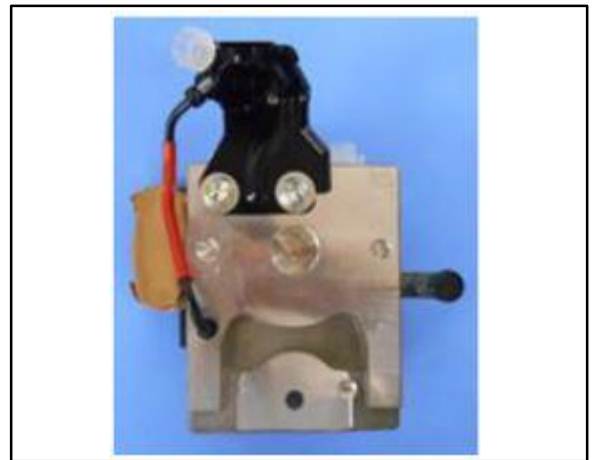


1	Brake Actuator Tube No. 3
----------	---------------------------

Figure 41. New Brake Actuator



Figure 42. New Brake Actuator Assembly



Brake Squawk/Knock Noise

Repair Procedure (continued)

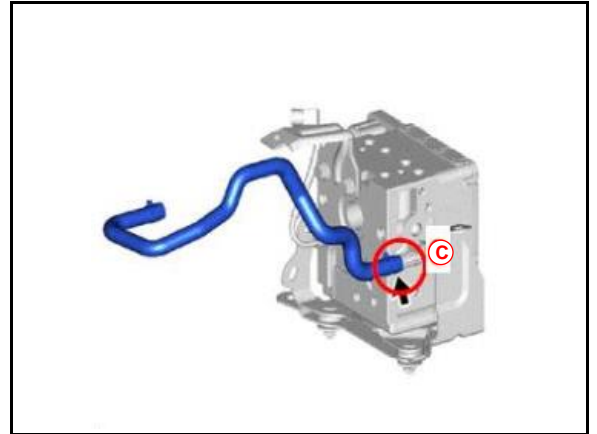
Installation (continued)

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.



Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

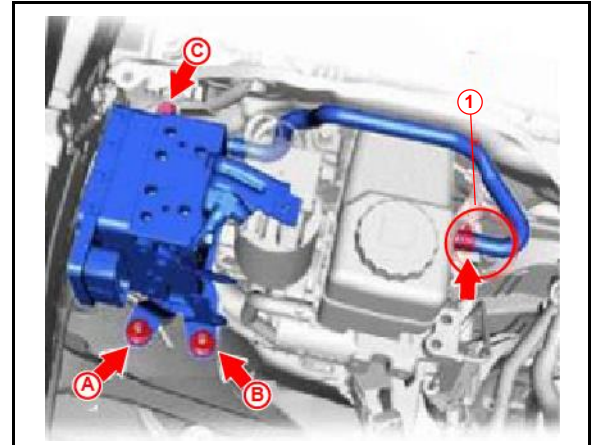
16. Mount the brake actuator assembly with bracket.
 - A. Using one bolt and two nuts, mount the brake actuator assembly with bracket.

Torque: 19 N*m (194 kgf*cm, 168 in*lbf)

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.

Figure 44.



1

Area to Rub When Discharging Air (Root of Connecting Part)

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.

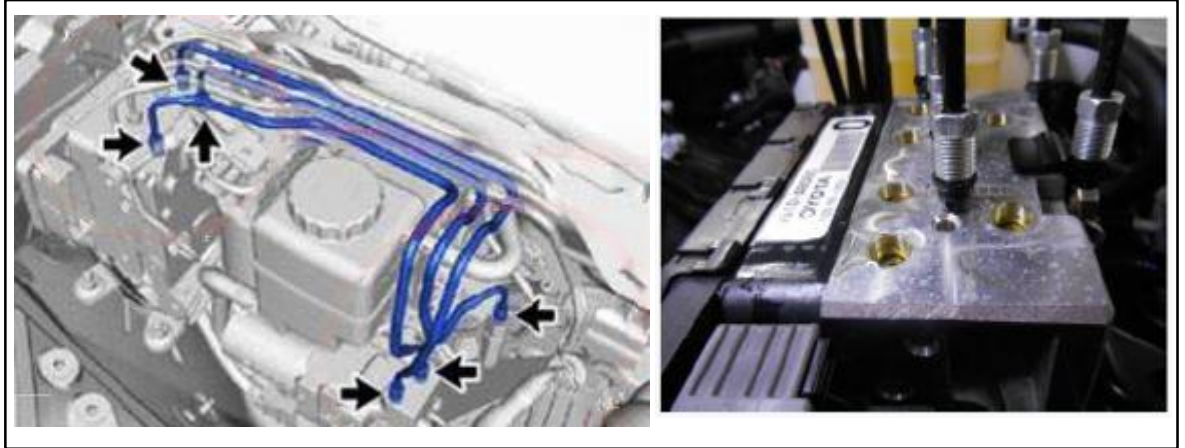
Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

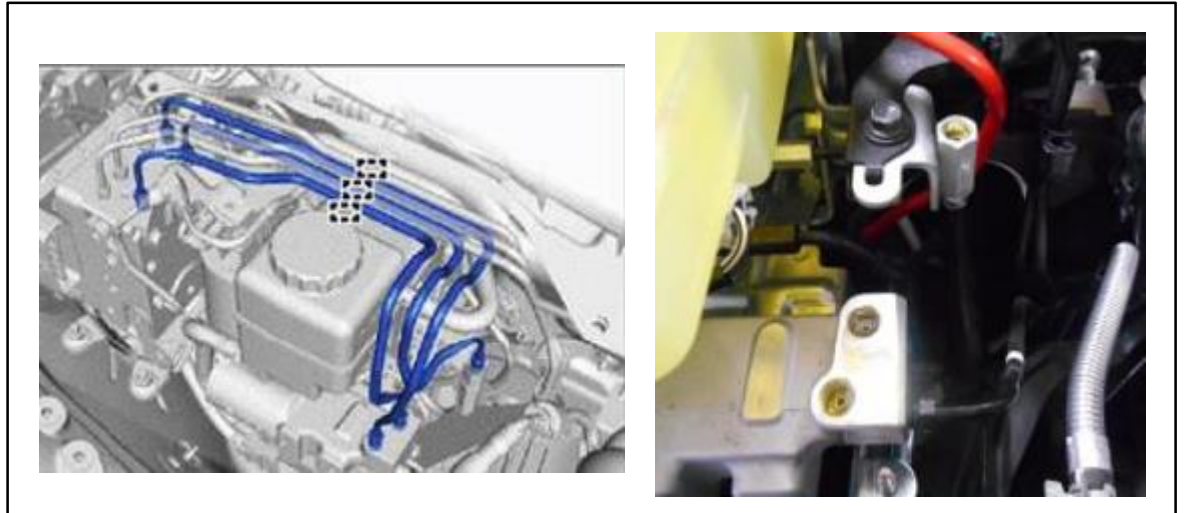
17. Install the brake tube.
 - A. Remove the rubber caps and connect the tubes.

Figure 45.



- B. Temporarily tighten the six flare nuts on the brake tube.

Figure 46. Before Fluid Is Poured Into Each Port



Brake Squawk/Knock Noise

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.

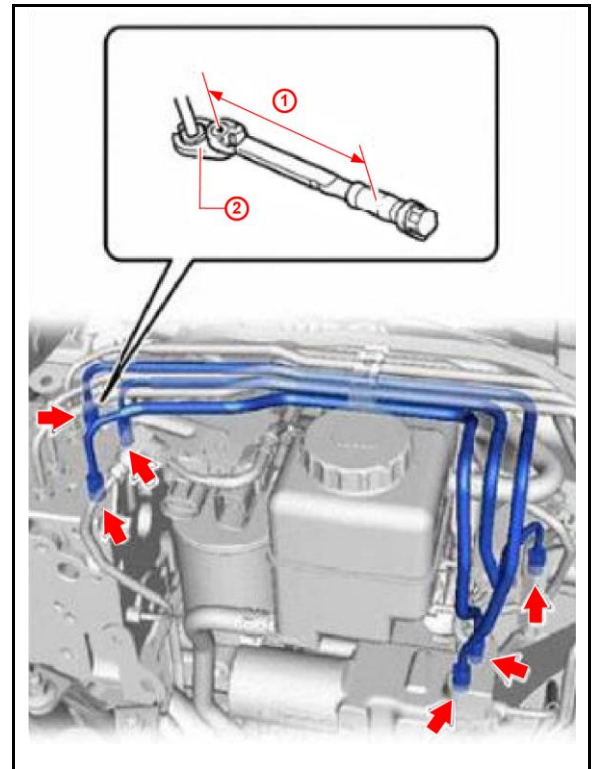
- D. Using a union-nut wrench, permanently tighten the six flare nuts on the brake tube.

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:
 - [2018 / 2019 / 2020 LS 500: General – Introduction – “Introduction: Repair Procedure: Precaution”](#)
 - [2018 / 2019 / 2020 LS 500h: General – Introduction – “Introduction: Repair Procedure: Precaution”](#)
- 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)

Figure 47.



1	Torque Wrench's Effective Length
2	Union-nut Wrench

Brake Squawk/Knock Noise

Repair Procedure (continued)

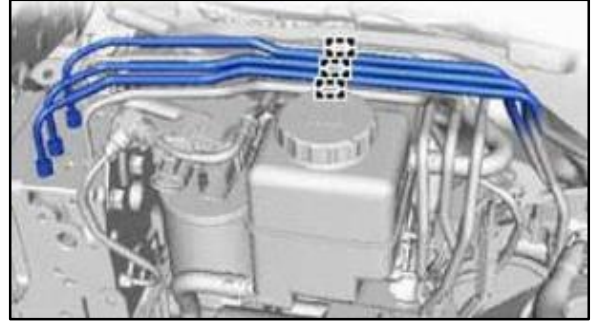
Installation (continued)

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.

Figure 48.



- 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:
General – Introduction – “Introduction: Repair Procedure: Precaution”
 - [2018](#) / [2019](#) / [2020](#) LS 500h:
General – Introduction – “Introduction: Repair Procedure: Precaution”
- 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)

Figure 49.

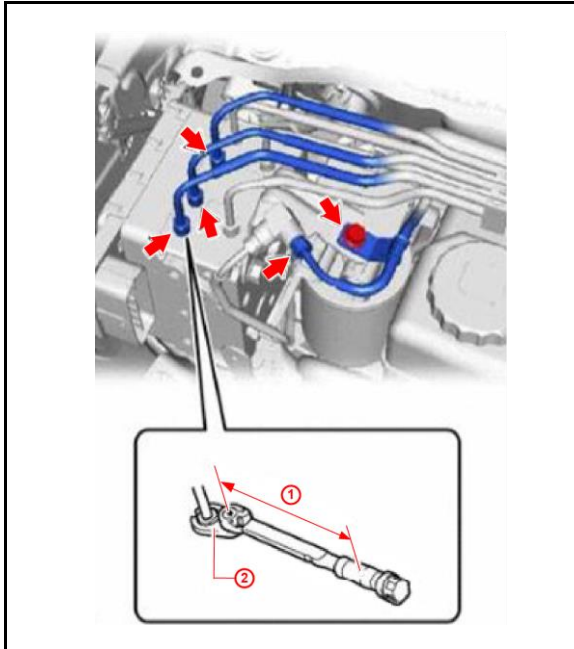
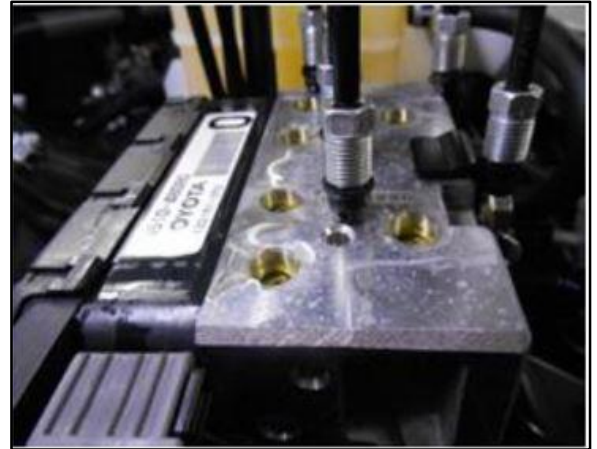


Figure 50.



1	Torque Wrench's Effective Length
2	Union-nut Wrench
3	Flare Nut

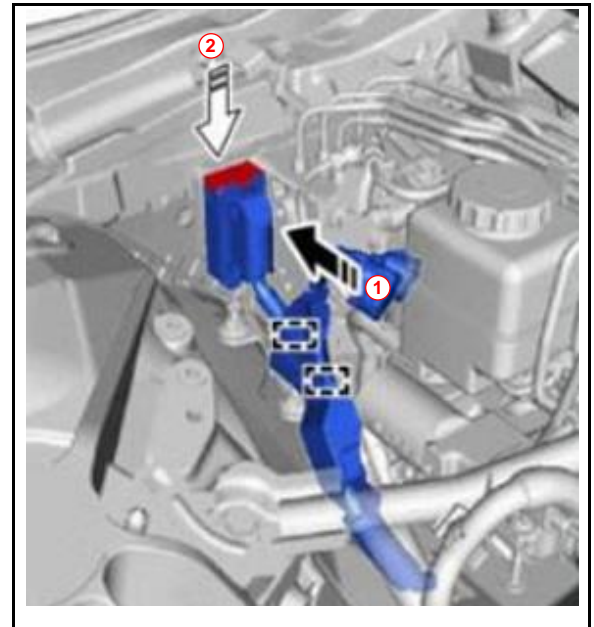
Brake Squawk/Knock Noise

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:
Engine/Hybrid System – Emission Control – “8GR-FXS Emission Control: EGR Cooler: Installation”

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

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

- [2018](#) / [2019](#) / [2020](#) LS 500:
Vehicle Exterior – Wiper/Washer – “Wiper / Washer: Front Wiper Motor: Installation”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Vehicle Exterior – Wiper/Washer – “Wiper / Washer: Front Wiper Motor: Installation”

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:
*Engine/Hybrid System – Intake/Exhaust – “8GR-FXS Intake / Exhaust:
Exhaust Manifold: Installation”*

23. Connect the auxiliary battery (–) terminal.

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”

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:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control System: Electronically Controlled Brake System: Initialization”

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

28. Delete the DTCs.

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 Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): DTC Check / Clear”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: DTC Check / Clear”

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:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): Diagnostic Trouble Code Chart”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: Diagnostic Trouble Code Chart”

Brake Squawk/Knock Noise

Repair Procedure (continued)

Installation (continued)

30. Attach the brake actuator assembly with bracket.

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 Systems: Brake Actuator(w/o Vacuum Brake Booster): Installation”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Brake Actuator: Installation”

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.

ITEM NAME	ITEM NAME COMMENT	INSPECTION CONDITION	REFERENCE VALUE	INSPECT ITEMS WHEN ABNORMAL
Accumulator Pressure Sensor	It indicates Accumulator Pressure Sensor Output Value.	Depress the brake pedal four or five times, start the pump motor, then stop the motor and do NOT depress the brake.	2.6 to 3.8V	Actuator System

Brake Squawk/Knock Noise

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:

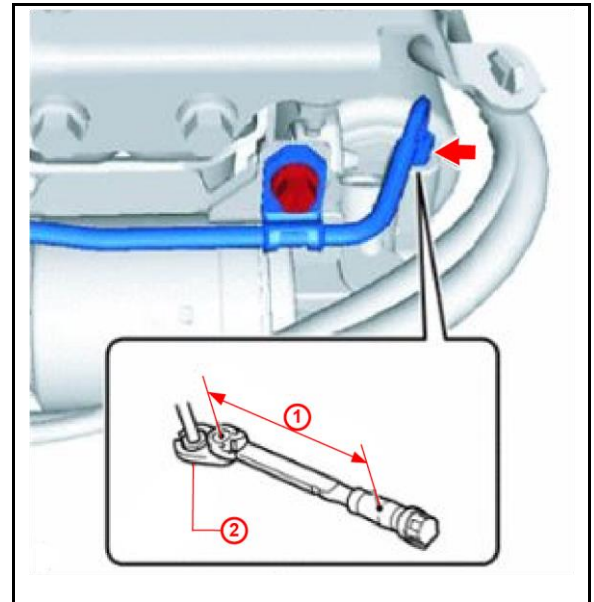
Accumulator pressure sensor's output voltage drops 0.2V or less for 30 seconds.

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.



1	Torque Wrench's Effective Length
2	Union-nut Wrench

Brake Squawk/Knock Noise

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:
General – Specifications – “Specifications: Brake Control / Dynamic Control Systems: Torque Specifications”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
General – Specifications – “Specifications: Brake Control / Dynamic Control Systems: Torque Specifications”
- 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:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): Check for Intermittent Problems”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: Check for Intermittent Problems”

38. Master Cylinder Pressure Sensor Check

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 Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): Test Mode Procedure”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: Test Mode Procedure”

Brake Squawk/Knock Noise

Repair Procedure (continued)

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

Table 5.

PARTS TO REPLACE/ATTACH/DETACH	PROCEDURE TO REFER TO
Flexible Hose (Front and Back)	Brake Line Air Bleeding
Disk Brake Cylinder Assembly (Front and Back)	
Brake Actuator Assembly	Brake System Air Bleeding
Brake Master Cylinder Reservoir Assembly	
Brake Stroke Simulator Cylinder Assembly	
Brake Master Cylinder Sub-assembly	

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.

Brake Squawk/Knock Noise

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:

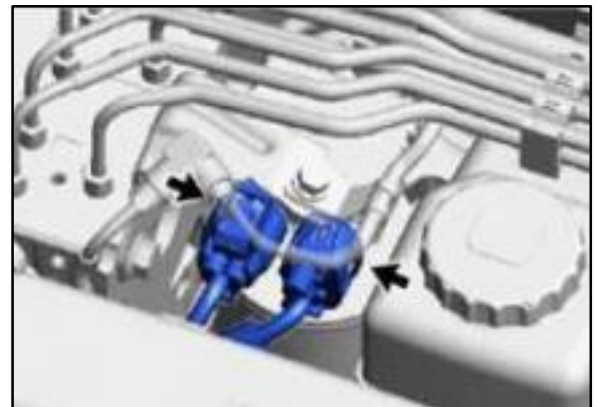
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Engine/Hybrid System – Intake/Exhaust – “8GR-FXS Intake/Exhaust: Exhaust Manifold: Removal”

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.



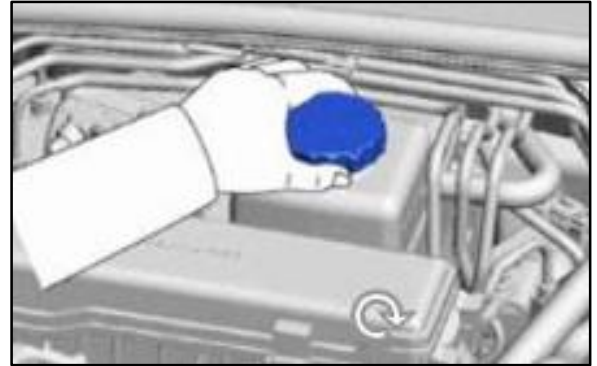
Brake Squawk/Knock Noise

Repair Procedure (continued)

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

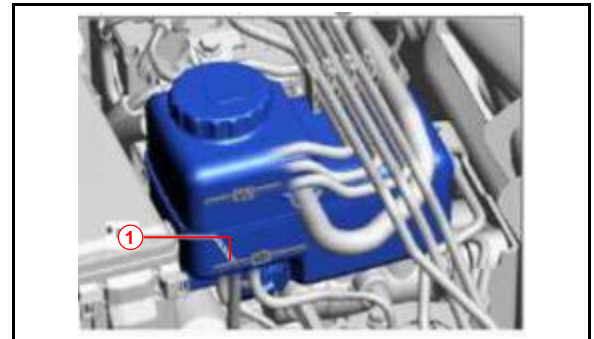
- D. Remove the brake master cylinder reservoir filler cap assembly.

Figure 54.



- E. Adjust the brake fluid amount so that the brake fluid level in the brake master cylinder reservoir assembly reaches the MIN level.

Figure 55.



1	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.

From the Techstream menu, select *Chassis – ABS-VSC-TRC – Operation Support – Electronic Control Brake Support – Perform Accumulator 0 Down* and perform.

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.

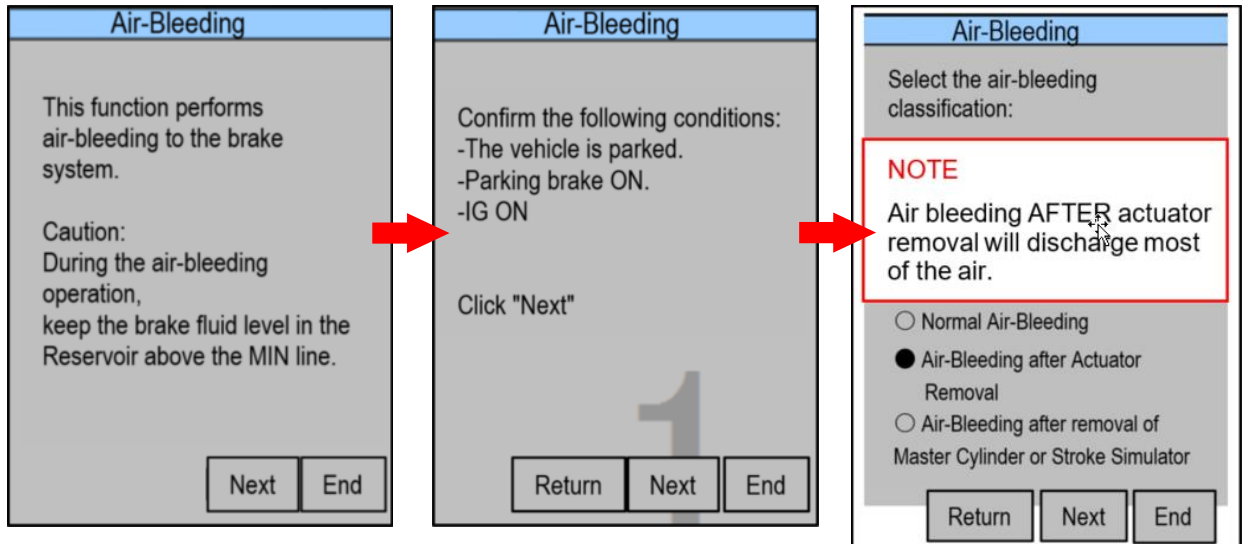
Brake Squawk/Knock Noise

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.

Air-Bleeding

[work name]

Conduct the following:

1. Turn IG OFF.
2. Disconnect 2 Brake Booster Pump Connectors.

Reference:
If the connectors are already disconnected, this procedure is not necessary.

3. Turn IG ON.

Click "Next"

Return
Next
End

Air-Bleeding

[work name]

Conduct the following:

1. Connect a vinyl tube to the bleeder plug in the front right wheel.
2. After depressing the brake pedal a few times, loosen the bleeder plug while the brake pedal is depressed.

2

Click "Next"
Procedure 3 will be displayed.

Return
Next
End

Air-Bleeding

[work name]

3. Once the brake fluid stops flowing,

NOTE

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

Return
Next
End

Brake Squawk/Knock Noise

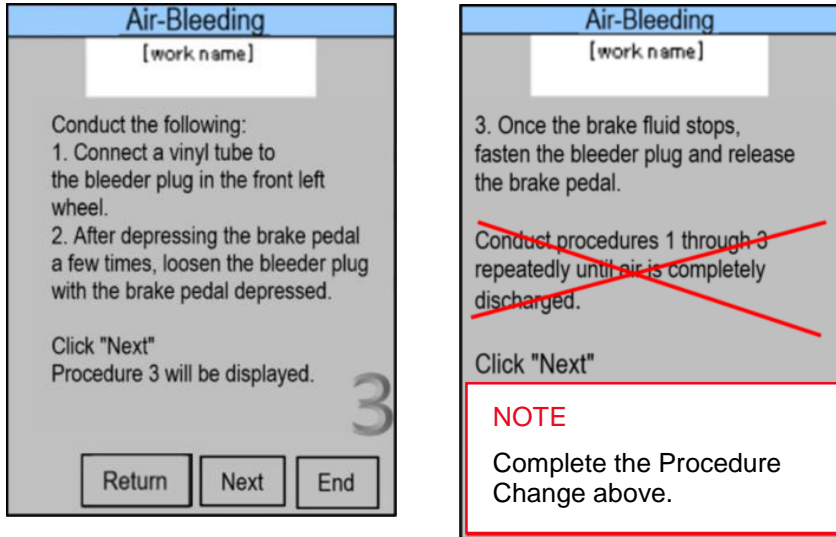
Repair Procedure (continued)

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

Procedure Change (Refer to Figure 58)

Steps 1 – 3 MUST be repeated 20 times.

Figure 58.



Brake Squawk/Knock Noise

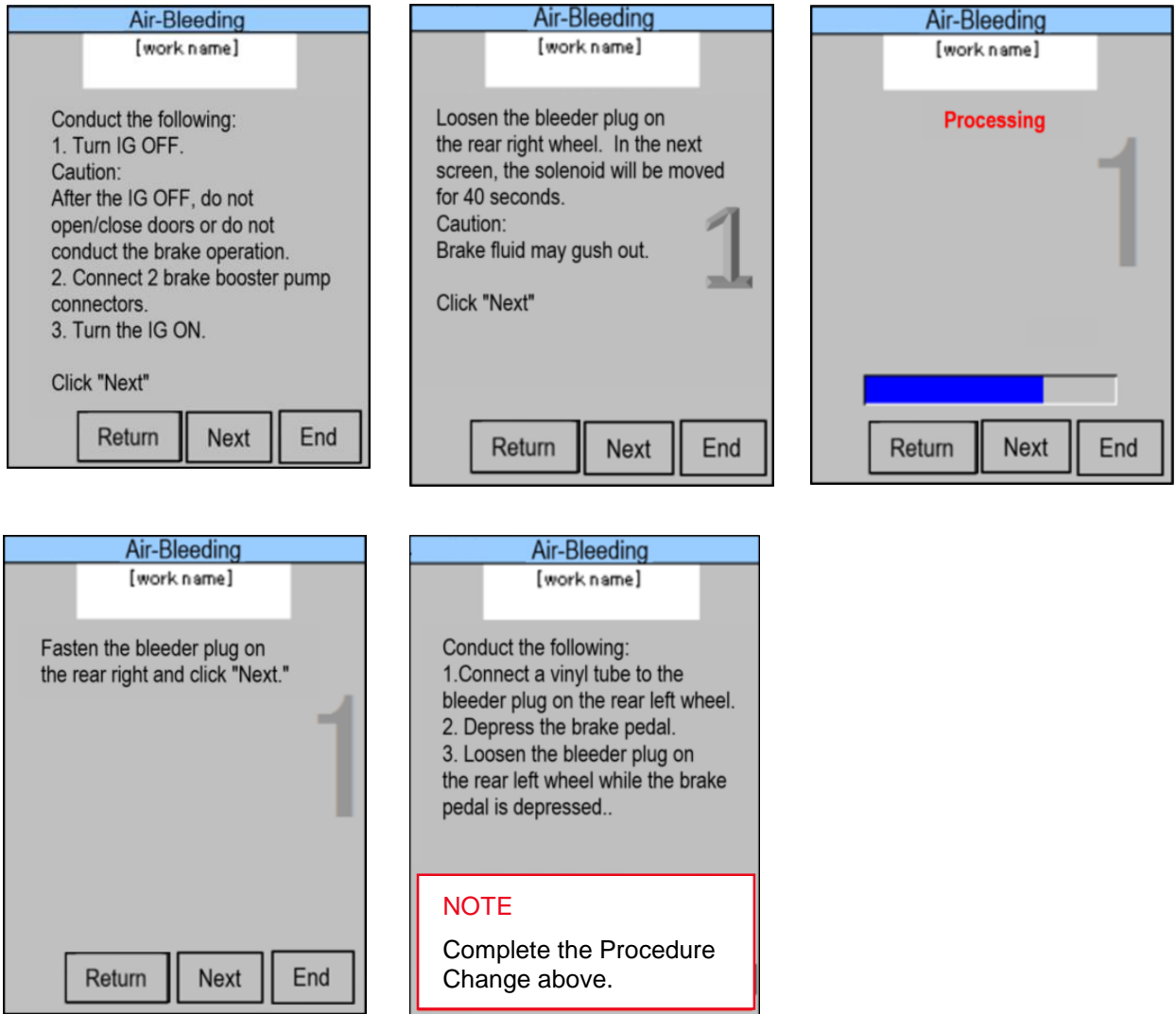
Repair Procedure (continued)

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.



Brake Squawk/Knock Noise

Repair Procedure (continued)

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

Figure 59 (continued)



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)

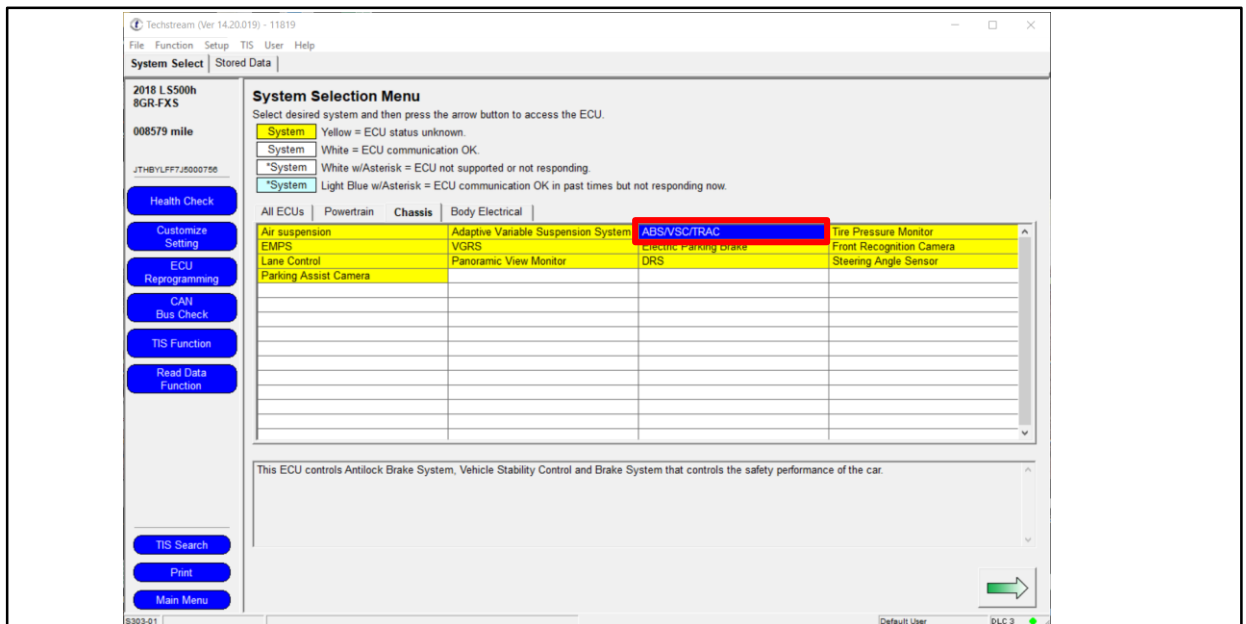
- Perform the Techstream Active Test to forcefully move the valve in the actuator to complete air-bleeding.

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)

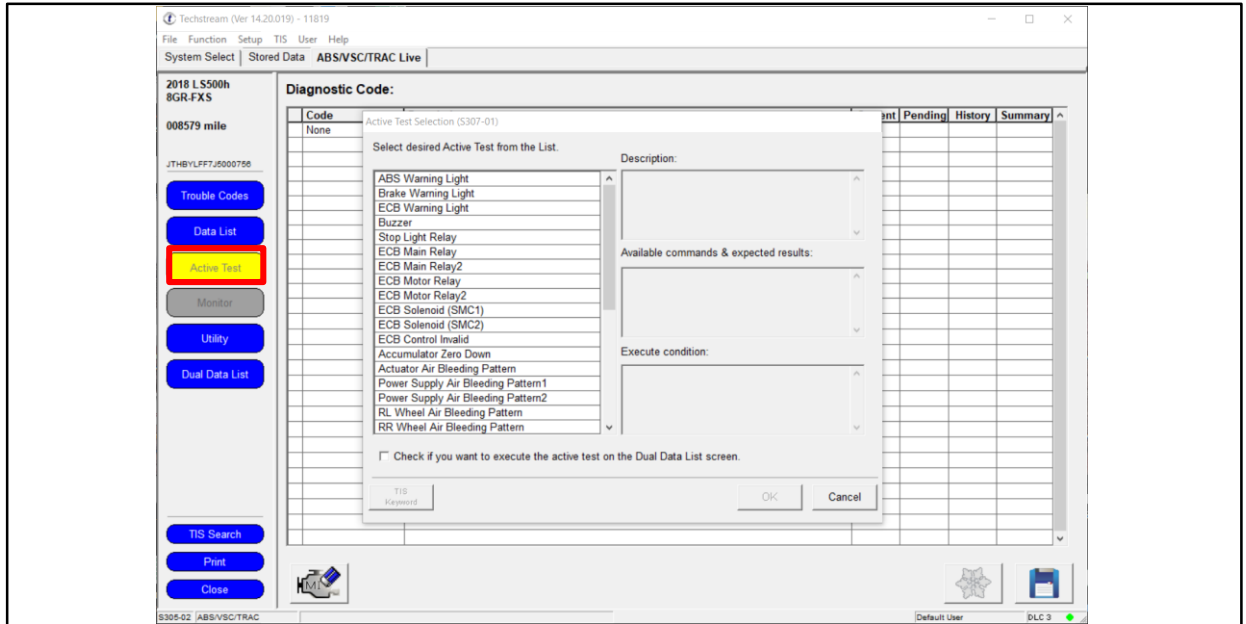


Brake Squawk/Knock Noise

Repair Procedure (continued)

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

Figure 61. Techstream Screen Image (Active Test)



Brake Squawk/Knock Noise

Repair Procedure (continued)

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

Figure 62. Techstream Screen Image (Perform Actuator Pattern)

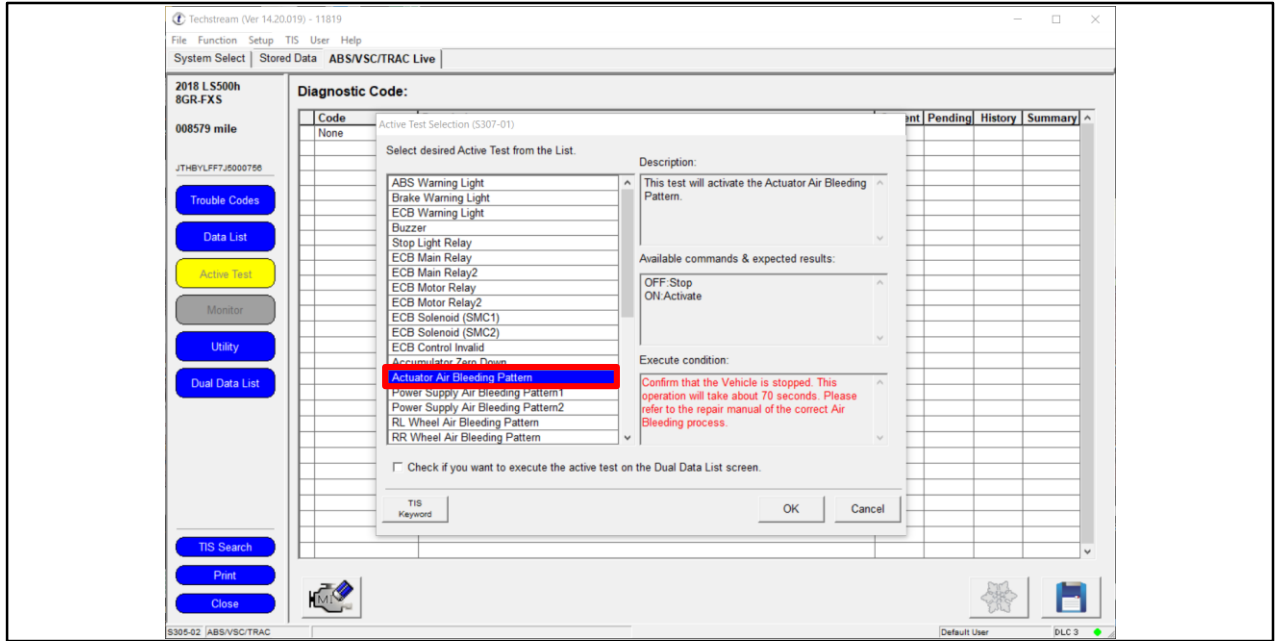
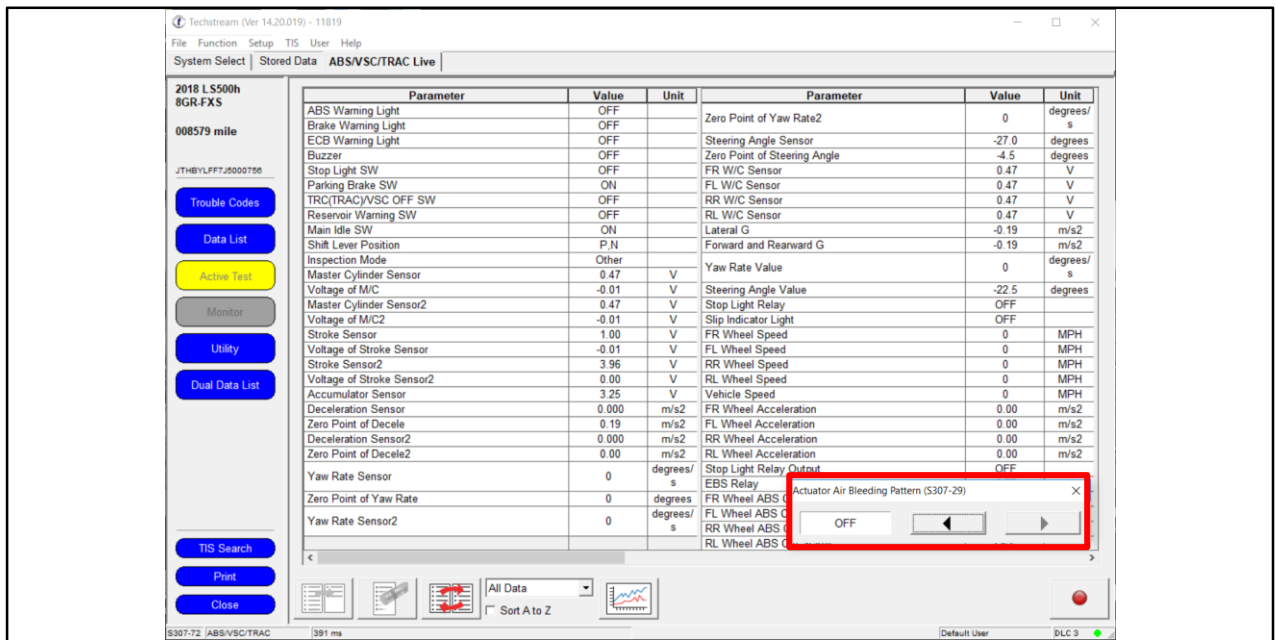


Figure 63. Techstream Screen Image (Execute)



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:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): DTC Check / Clear”

- [2018](#) / [2019](#) / [2020](#) LS 500h:

Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: DTC Check / Clear”

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:

Engine/Hybrid System – Intake/Exhaust – “8GR-FXS Intake / Exhaust: Exhaust Manifold: Installation”

Brake Squawk/Knock Noise

Repair Procedure (continued)

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

14. Perform the linear valve offset learning and the brake pedal stroke sensor zero-point learning.

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:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): Initialization”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: Initialization”

15. Perform the initialization procedure AFTER brake component replacement.

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 Systems: Electronically Controlled Brake System(w/o Vacuum Brake Booster): Initialization”
- [2018](#) / [2019](#) / [2020](#) LS 500h:
Brake – Brake Control/Dynamic Control System – “Brake Control / Dynamic Control Systems: Electronically Controlled Brake System: Initialization”

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

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