		GROUP	NUMBER
		BRAKES	20-BR-001H
		DATE	MODEL(S)
Techni	cal Service Bulletin	FEBRUARY, 2020	loniq Electric/Hybrid/Plug-in (AE EV/HEV/PHEV) Sonata Hybrid/Plug-in (LF HEV/PHEV)
SUBJECT:	SONATA HEV/PHEV AN BRAKE BLEEDING F	D IONIQ EV/ PROCEDURE	HEV/PHEV

This bulletin supersedes TSB 18-BR-003 to include noise diagnostic and repair information.

Description: This bulletin describes the procedure to properly bleed the brakes on Sonata HEV/PHEV (LF) and Ioniq EV/HEV/PHEV (AE) vehicles. This procedure applies when any air is introduced into the Active Hydraulic Boost (AHB) system, which consists of the pressure supply unit (PSU), and the integrated brake actuation unit (IBAU). Improper bleeding of the brake system can result in the presence of air, which may reduce braking effectiveness.



Applicable Vehicles:

- All Sonata Hybrid (LF HEV) and Plug-In Hybrid (LF PHEV) vehicles.
- All Ioniq Hybrid (AE HEV), Plug-In Hybrid (AE PHEV), and Electric (AE EV) vehicles.



NOTE: The special service tools listed above are available for order through Bosch: 1-866-539-4248.

Warranty Information:

Model	Op Code	Operation	Op Time	Causal Part #	Nature Code	Cause Code
Refer to the Applicable	58700A00	BRAKE FLUID REPLACEMENT OR AIR BLEED- ADJUSTMENT	Refer to WEBLTS for	58500*	N32	C26
on page 1	e 1 58700AH1 ADDITIONAL TIME 58700AH1 FOR HYBRID BRAKE BLEEDING		current LTS time	00000		

*Refer to the applicable parts catalog for full causal part numbers

AHB System Noise



Noise Type	Cause	Image	Repair
1. Honking/Hissing https://www.youtube.com/watch?v=_3zQy9Ohzwl	Presence of fine air bubbles in the system	'honk'	Perform brake bleeding procedure described in this TSB.
2. Click/Snap/Tok <u>https://www.youtube.com/watch?v=Qkmz10w4Dgl</u>	Noise when high pressure fluid passes through the valve	Elec, Valve	No repair
3. Beep/Squeal <u>https://www.youtube.com/watch?v=Fl40nnDDJyY</u>	Coil vibration noise when operating This is not a brake squeal from the pad/rotor interface.	Coll on/off Coll Coll Elec. Valve "Beep" "Beep"	necessary, these are normal system operation noises.
4. Groan <u>https://www.youtube.com/watch?v=Y9iGJ8Suoqk</u>	PSU motor operation noise when charging pressure		

Service Procedure Brake Bleeding:

* NOTE

The brake system consists of 3 distinct hydraulic sections: low pressure, high pressure, and brake simulator sections. Because of this, the air bleeding procedure must be performed in the sequence described below.



Air Bleeding Sequence:

Step 1: AHB System Bleeding (IBAU ECU OFF)

Step 2: AHB System Bleeding (IBAU ECU ON)

- Step 3: GDS Fluid Circulation Mode
- Step 4: GDS Pedal Travel Sensor Calibration

Service Procedure Brake Bleeding Step 1: AHB System Bleeding (IBAU ECU OFF)

1. Ensure brake fluid reservoir level never drops below the halfway point between <u>MIN and MAX.</u> If the level drops below this point, there is a risk of air being introduced into the system, and the bleeding procedure must be started over.





2. Disconnect the IBAU connector (A).





3. With the air flow valve closed (as shown in image below), connect the pressurized brake bleeder tool (09580-3D100) to the brake fluid reservoir using the adapter (0K585-E8100).



4. With the air flow valve closed, connect a compressed air source. Regulate the air pressure to 50 psi. Open the air flow valve to pressurize the brake system.

After the system is pressurized, inspect the integrated brake actuation unit (IBAU) and pressure source unit (PSU) fittings for leaks. Repair any leaks found before continuing with bleeding procedure.



Always keep the air flow valve closed when connecting to a compressed air source. Open the valve as the last step.

When removing pressure from the system, close the valve first before removing the compressed air source.



5. With the brake system pressurized, begin the bleeding procedure starting at the bleeder located at the PSU.

Bleed the fitting until no air bubbles appear in the fluid.





- 6. After bleeding the PSU, move to the IBAU.
 - 1. Start bleeding at the LOWER port. Bleed until no air appears in the fluid.
 - 2. Then, move onto the UPPER port. Bleed until no air appears in the fluid.



Starting at the rear right wheel, attach a clear hose to the brake bleeding nipple. The other side of the hose should be immersed in a bottle partially filled with clean brake fluid.



Front Right () Rear Right
 Front Left (3) Rear Left

While pressurized with compressed air, bleed the brakes at each wheel in the correct sequence:

- 1. Rear Right
- 2. Front Left
- 3. Rear Left
- 4. Front Right

Do not pump the brake pedal during this procedure.

Use only air pressure to bleed. Repeat this sequence until no air bubbles appear in the fluid.

Remember to maintain proper brake fluid level in the reservoir at all times.

* NOTE

Bleeder screw tightening torque: 6.9~12.7 N.m (0.7~1.3 kgf.m, 5.1~9.4 lb-ft)



7.

- Perform a second cycle of bleeding, this time with an assistant pressing on the brake pedal (and the SST still applying air pressure), as follows:
 - Starting at the IBAU lower port, depress the brake pedal five times and hold. Open the bleeder to bleed out any remaining air in the system. <u>Close the bleeder before removing</u> <u>brake pedal pressure.</u>
 - 2. Repeat the above procedure 10 times.
 - Move onto the upper port, and bleed 10 times in the same fashion (applying brake pedal pressure).
 - 4. After completing the IBAU bleeding, move to the calipers. Start at the right rear caliper, and bleed 10 times in the same fashion (applying brake pedal pressure).
 - 5. Repeat this for the rest of the calipers in the order previously described.
 - 6. Remove the SST and top off the brake fluid reservoir.



Service Procedure Brake Bleeding Step 2: AHB System Bleeding (IBAU ECU ON)

9. Reconnect the IBAU connector.

Enable the IBAU ECU Air Bleeding Mode according to the following:

- 1. Turn the ignition ON.
- Press and hold the ESC OFF button. Wait for the "*Traction & Stability Control disabled*" message to be displayed, and continue holding the ESC OFF button.
- While still holding the ESC OFF button, depress and release the brake pedal from rest position to fully applied (40mm or more) 10 times.
- 4. Release the ESC OFF button.
- 5. Turn the vehicle ignition OFF.
- 6. Turn the vehicle ignition back ON.
- Press and hold the ESC OFF button until "*Traction & Stability Control disabled*" is displayed.





 The IBAU ECU Air Bleeding Mode should now be enabled. Verify by observing that the ABS and ((!)) lamps are illuminated on the gauge cluster.

***** NOTES

The IBAU Air Bleeding Mode can only be enabled under the following conditions:

- <u>All doors, the hood, and the trunk</u> or hatch must be closed.
- The procedure to enter bleeding mode must be completed within 30 seconds.
- **10**. With the IBAU Air Bleeding Mode enabled, perform the following:

For vehicles equipped with standard parking brake (non electric parking brake EPB):

- 1. Connect the SST and apply air pressure, as previously described.
- 2. Have an assistant press the brake pedal about half the stroke and hold.
- 3. Starting at the right rear caliper, open the bleeder screw to bleed the line.
- 4. Close the bleeder screw, then release the brake pedal.
- 5. Repeat steps 2 through 4 at least ten times, until no bubbles appear.
- 6. Move onto the next calipers in the correct bleeding order, and repeat the same procedure until all four calipers have been bled.
- 7. Remove the SST, top off the brake fluid, and replace the reservoir cap.
- 8. Cycle the ignition OFF, then ON again to disable the IBAU ECU Air Bleeding Mode.

For vehicles equipped with electric parking brake (EPB):

- 1. Connect the SST and apply air pressure, as previously described.
- 2. Start at the right rear caliper.
- 3. Have an assistant press the brake pedal about half the stroke and hold.
- 4. While holding the brake pedal, have the assistant apply and release the EPB using the switch in the vehicle.



- 5. Gently tap the rear caliper with a rubber mallet to release any potential trapped air bubbles.
- 6. Open the bleeder screw to bleed the line.
- 7. Close the bleeder screw, then release the brake pedal.
- 8. Repeat steps 3 through 7 at least ten times, until no bubbles appear.
- 9. Move to the next caliper and repeat steps 3-8 (skipping 4 and 5, which only apply to EPB rear calipers).
- 10. Move onto the next caliper in the correct bleeding order, and repeat the same procedure until all four calipers have been bled.
- 11. Remove the SST, top off the brake fluid, and replace the reservoir cap.
- 12. Cycle the ignition OFF, then ON again to disable the IBAU ECU Air Bleeding Mode.

Service Procedure Brake Bleeding Step 3: GDS Fluid Circulation Mode

*** IMPORTANT**

Before attempting to perform the Fluid Circulation Mode, ensure that the auxiliary battery is fully charged (higher than 12V). If the battery is not fully charged, connect it to a charger as needed.

11. Connect a tablet-based GDS to the vehicle as per the installation instructions found in TSB 15-GI-001. Connect the VCI to the tablet using the USB cable.



Perform the Fluid Circulation Mode, as follows:

1. Select S/W Management.



2. Select Fluid Circulation Mode.

S/W Management	
Systems Components	Unfold All
System Identification	
ECU Mapping Verification	
Resetting Adaptive Values	
 Auto Detected Configuration Reset 	
Evap. Leakage Test	
Read VIN	
Write VIN	
ETC TEST(Option)	
Automatic Transaxle	۲
ESC/AHB	Ð
System Identification	
HCU Air Bleeding Mode	
Auto Detected Configuration Reset(ESP(ESC) Only)	
Longitudinal G Sensor Calibration(HAC/DBC Only)	8
SAS CALIBRATION(CAN-ESP Only)	
Pressure Sensor Calibration	
Pedal Travel Sensor (PTS) Calibration	
High Pressure Release Mode	
Fluid Circulation Mode	

3. Read the caution statement and click OK to continue.



4. Read the summary of the process and click OK to continue.

С кмне54L26	Diagnosis No : B28AACA51420013 KA091750 01/30/20	0001 10:3
HOME OffLine	SONATA Plug/2019/G 2.0 PHE. VCI 📖 😽	202
3	S/W Management	P
Fluid Circulation N	lode	
Purpose	To remove air by circulating brake fluid in the hydraulic circuit of iBAU to reservoir tank.	
Enable Condition	I. Ignition Switch On(Carry out after 5 seconds at least after Ignition On) 2. Engine Off or Ready	
Concerned Component	Hydraulic Electric Control Unit(HECU)	
Concerned DTC		
Fail Safe		
Etc	This function takes about appox. 20 min.	
	ок	
Do not touch	any system buttons while performing this function.	

- 5. Read the description of the process and click OK to continue.
- Fluid Circulation Mode
 - Fluid Circulation Mode]

[Purpose and Period of Implementation]

This function removes residual air from the inside by circulating brake fluid in the hydraulic circuit inside of iBAU to the reservoir tank.

Implement the fluid circulation mode when replacing IBAU & PSU units or air breathing is necessary.

Press the [OK] button to continue.



6. Read the conditions and cautions, then click OK to continue.

[Fluid Circulation	Mode]			
•[Condition]				
1. Ignition ON (2. Engine Stop	Carry out after 5	seconds at	east after Igniti	on ON)
3. A pressurize	r should not be i	installed in th	e fluid inlet of b	rake
4. Battery statu	s normal			
A[Caution]				
1. After carrying o	ut the mode, car	ncel the DTC	from the self-di	agnosis.
2. The operation t	akes approxima	tely 20 minu	es. No continuo	ous operation
(Hisk of battery th	scharge)			
Press the [OK] but	ton to continue.			

- The fluid circulation process will begin. Chattering and clunking noises are normal. The process lasts about 20 minutes. Click OK when finished.
- 8. Check and clear any DTC(s).

FI	u	d	Ci	rcu	lat	ior	n M	ode	ý.

Fluid Circulation Mode]

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*** Valve chattering ***
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If you want to can	icel, please click [Cancel] button.	
Time : Ominutes	4seconds	
	Cancel	

Service Procedure Brake Bleeding Step 4: GDS Pedal Travel Sensor Calibration

12. Connect a tablet-based GDS to the vehicle as per the installation instructions found in TSB 15-GI-001. Connect the VCI to the tablet using the USB cable.

Perform the Pedal Travel Sensor (PTS) Calibration as follows:

1. From the S/W Management screen, select Pedal Travel Sensor (PTS) Calibration.

S/W Management	
Systems Components	Unfold All
System Identification	
ECU Mapping Verification	
Resetting Adaptive Values	
 Auto Detected Configuration Reset 	
Evap. Leakage Test	
Read VIN	
Write VIN	
ETC TEST(Option)	
Automatic Transaxle	۲
ESC/AHB	(f)
System Identification	
HCU Air Bleeding Mode	
 Auto Detected Configuration Reset(ESP(ESC) Only) 	
Longitudinal G Sensor Calibration(HAC/DBC Only)	
SAS CALIBRATION(CAN-ESP Only)	
Pressure Sensor Calibration	
Pedal Travel Sensor (PTS) Calibration	
High Pressure Release Mode	
Fluid Circulation Mode	

2. Read the summary of the process and click OK to continue.

Pedal Travel Sensor (PTS) Calibration			
Purpose	To calibrate offset of Brake Pedal Travel Sensor.			
Enable Condition	 Engine Off Ignition Switch On Do not press down brake pedal Vehicle Stopped Place vehicle on the flat ground No external force is given to vehicle 			
Concerned Component	Active Hydraulic Boost(AHB) ECU, Hydraulic Electronic Control Unit(HECU)			
Concerned DTC	C1380			
Fail Safe	Warning Lamp On			
Etc	Monitor DTC after the reset. Perform this function when AHB or ABS/ESC related work is done.			
	ок			
Pedal Travel Ser	nsor (PTS) Calibration			
 [Pedal Travel Sense This function is to This function shou 	sor(PTS) Calibration] initialize offset value of the brake pedal travel sensor. Id be performed when the pressure sensor or ECU is			
replaced.				
• [Condition] 1. Don't press th 2. Vehicle stand 3. Vehicle stays 4. Don't make ar 5. IG ON	e brake pedal. s still. on a flat ground. ny vibration			
* While calibration	is in progress, AHB is prohibited temperately.			
0	K Cancel			
Information				
Complete !!!				
Turn IG off for 10 s	econds and then back on.			
Click the [OK] butto	n to continue.			

3. Read the description of the process and click OK to continue.

4. Turn the ignition OFF for 10 seconds, then ON again. Click OK to complete

the PTS calibration.