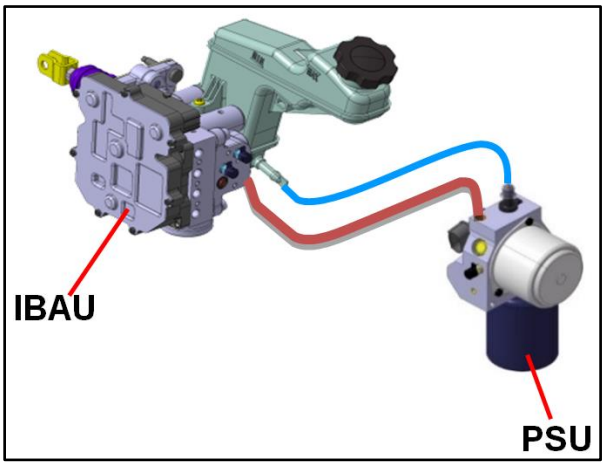
	GROUP	NUMBER
HYUNDAI **Technical Service Bulletin**	**BRAKES**	**20-BR-001H**
	DATE **FEBRUARY, 2020**	MODEL(S) **Ioniq Electric/Hybrid/Plug-in (AE EV/HEV/PHEV) Sonata Hybrid/Plug-in (LF HEV/PHEV)**

SUBJECT: SONATA HEV/PHEV AND IONIQ EV/HEV/PHEV BRAKE BLEEDING PROCEDURE

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

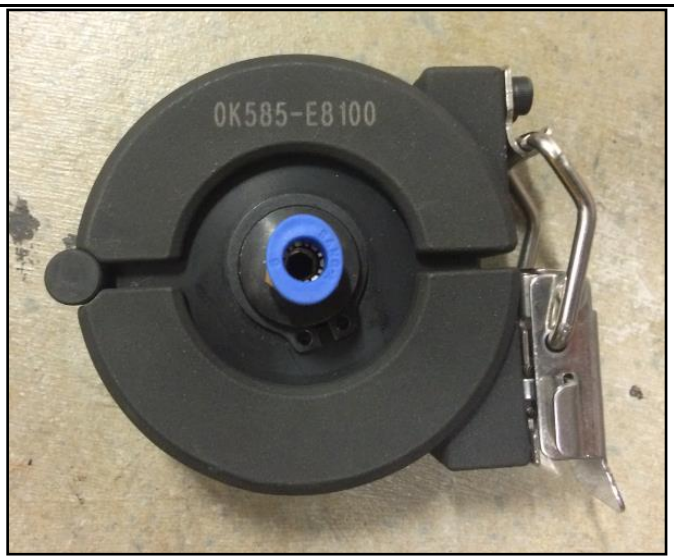
Description: This bulletin describes the procedure to properly bleed the brakes on Sonata HEV/PHEV (LF) and Ioniq EV/HEV/PHEV (AE) vehicles. This procedure applies when any air is introduced into the Active Hydraulic Boost (AHB) system, which consists of the pressure supply unit (PSU), and the integrated 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.

SST Information

Description	Picture
Active Hydraulic Boost (AHB) Brake Air Bleeding Tool	 Part Number: 09580-3D100
Active Hydraulic Boost (AHB) Brake Air Bleeding Tool Adapter	 Part Number: 0K585-E8100

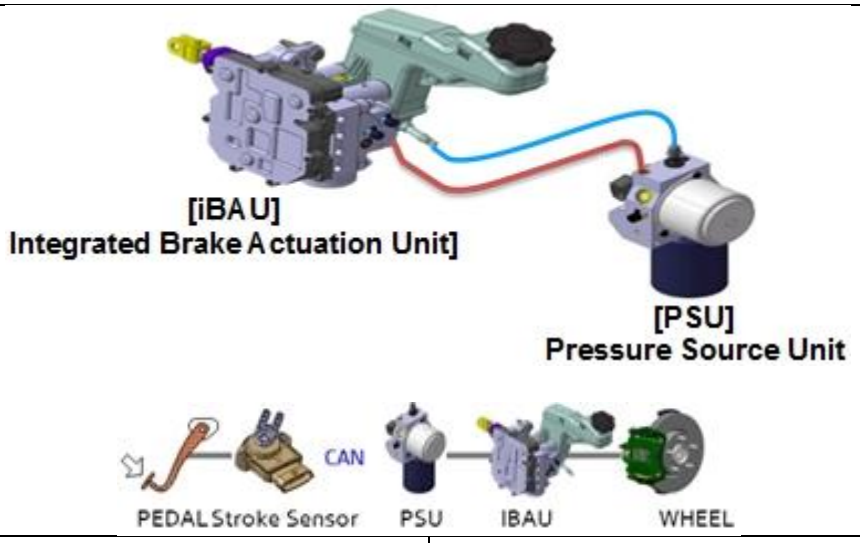
NOTE: The special service tools listed above are available for order through Bosch: 1-866-539-4248.

Warranty Information:

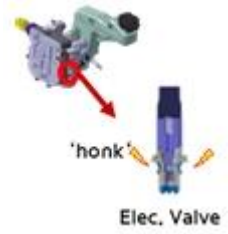
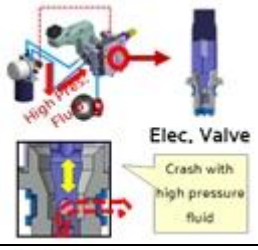
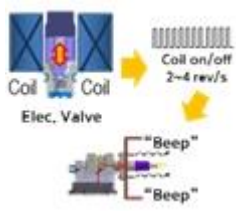
Model	Op Code	Operation	Op Time	Causal Part #	Nature Code	Cause Code
Refer to the Applicable Vehicles list on page 1	58700A00	BRAKE FLUID REPLACEMENT OR AIR BLEED-ADJUSTMENT	Refer to WEBLTS for current LTS time	58500*	N32	C26
	58700AH1	ADDITIONAL TIME FOR HYBRID BRAKE BLEEDING				

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

AHB System Noise



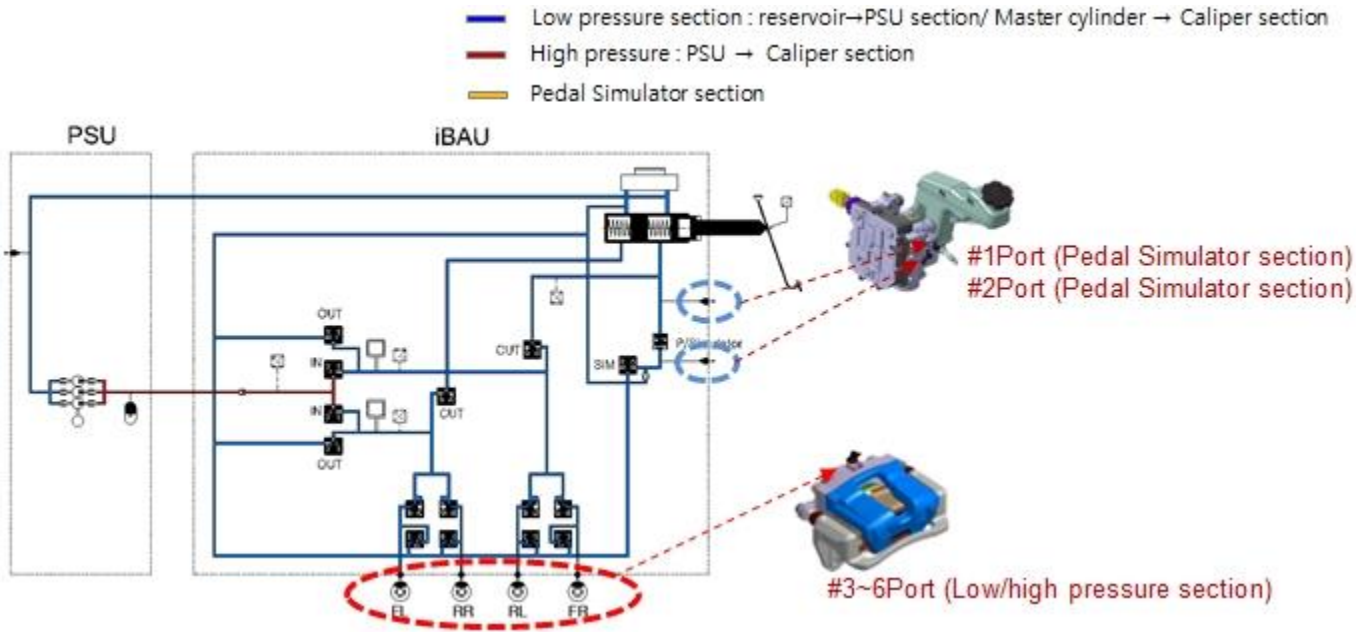
IBAU: When the driver depresses the brake pedal, the IBAU opens a valve to transfer brake fluid pressure from PSU to the brake calipers. During this operation, some system noises can be heard. Most of these noises are normal. See below table for more information.	**PSU**: Maintains brake fluid pressure between 160~180 bar using an electric motor. The operation of the electric motor may cause a normal noise to be heard during hydraulic pressure charging.

Noise Type	Cause	Image	Repair
1. Honking/Hissing https://www.youtube.com/watch?v=_3zQy9Ohzwl	Presence of fine air bubbles in the system		Perform brake bleeding procedure described in this TSB.
2. Click/Snap/Tok https://www.youtube.com/watch?v=Qkmz10w4DgI	Noise when high pressure fluid passes through the valve		No repair necessary, these are normal system operation noises.
3. Beep/Squeal https://www.youtube.com/watch?v=Fl40nnDDJyY	Coil vibration noise when operating This is not a brake squeal from the pad/rotor interface.		
4. Groan https://www.youtube.com/watch?v=Y9iGJ8Suoqk	PSU motor operation noise when charging pressure		

Service Procedure Brake Bleeding:

✶ NOTE

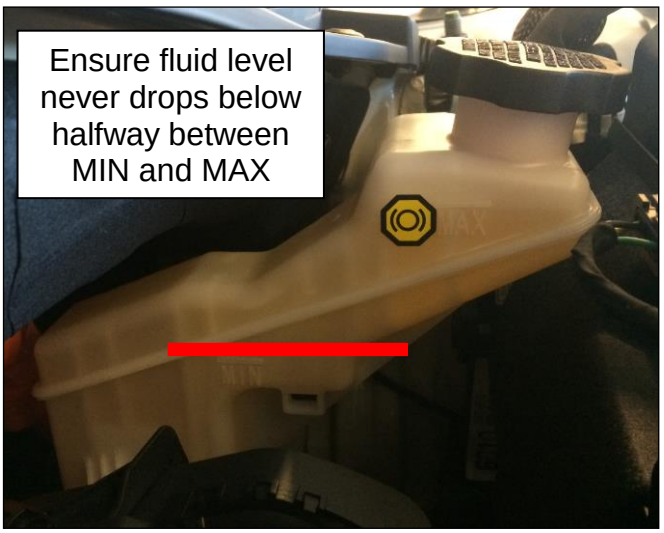
The brake system consists of 3 distinct hydraulic sections: low pressure, high pressure, and brake simulator sections. Because of this, the air bleeding procedure must be performed in the sequence described below.



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)

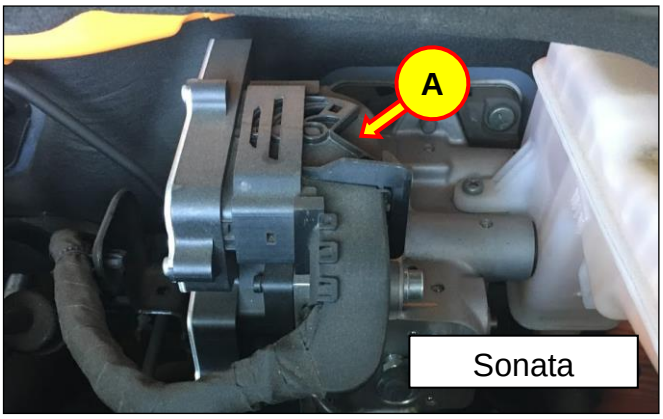
1. **<u>Ensure brake fluid reservoir level never drops below the halfway point between MIN and MAX.</u>** If the level drops below this point, there is a risk of air being introduced into the system, and the bleeding procedure must be started over.

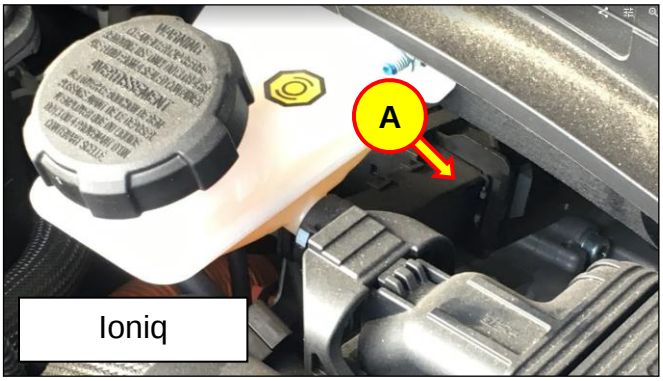


✶ NOTE

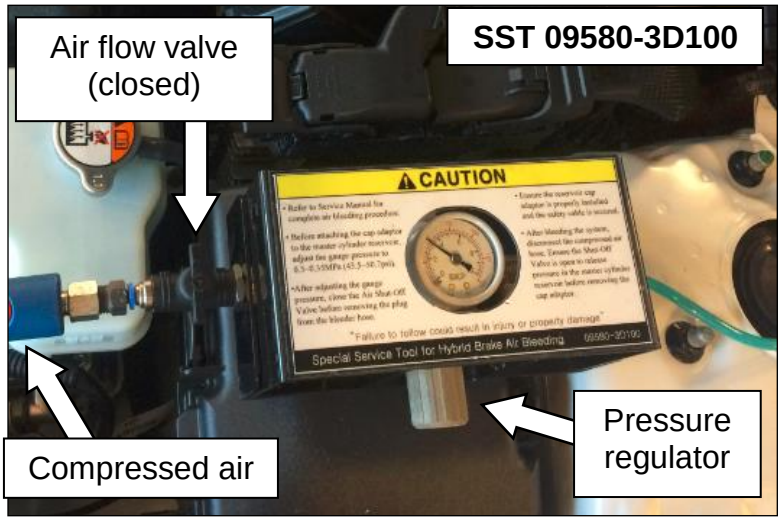
Use DOT 3 or DOT 4 brake fluid.

2. Disconnect the IBAU connector (A).



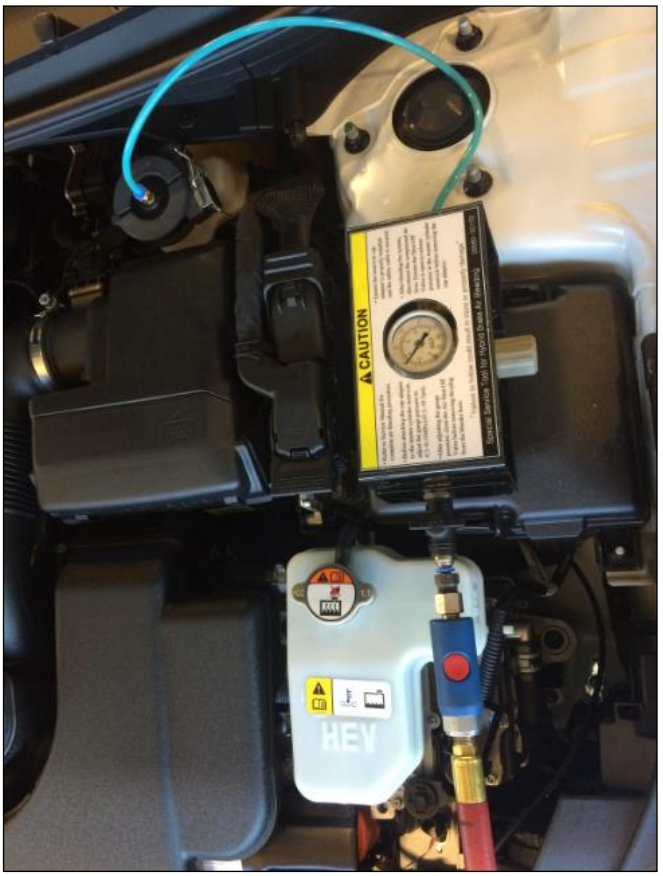


3. With the air flow valve closed (as shown in image below), connect the pressurized brake bleeder tool (09580-3D100) to the brake fluid reservoir using the adapter (0K585-E8100).



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.



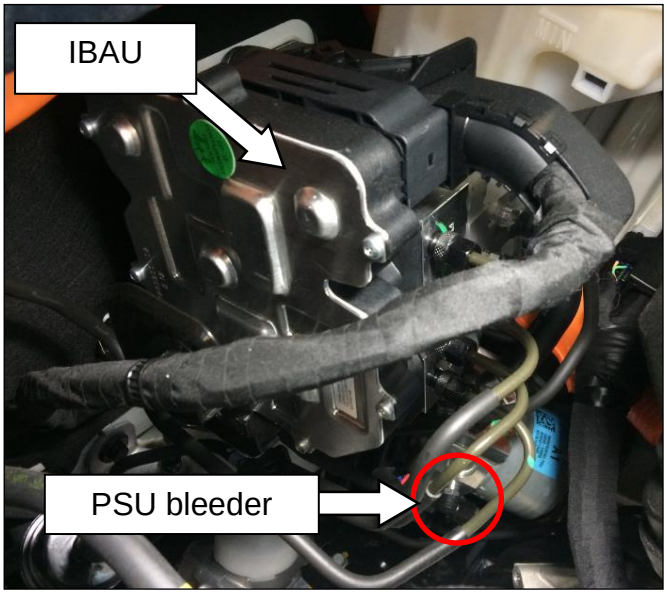
✶ NOTE

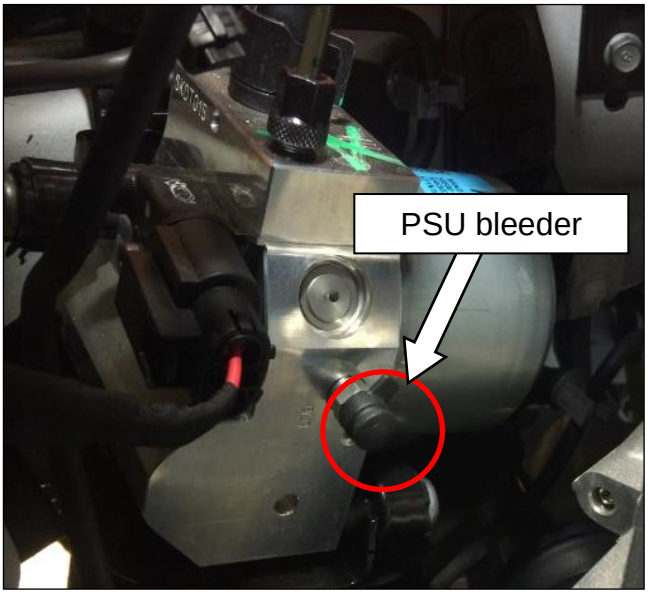
Always keep the air flow valve closed when connecting to a compressed air source. Open the valve as the last step.

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.

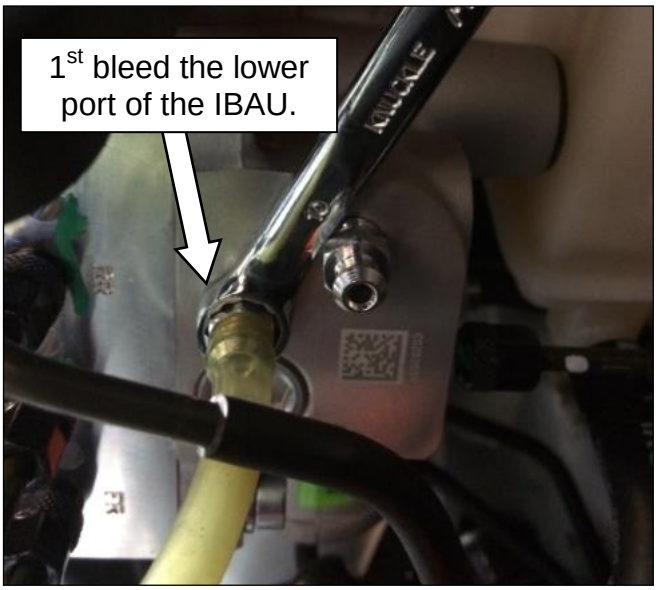
Bleed the fitting until no air bubbles appear in the fluid.

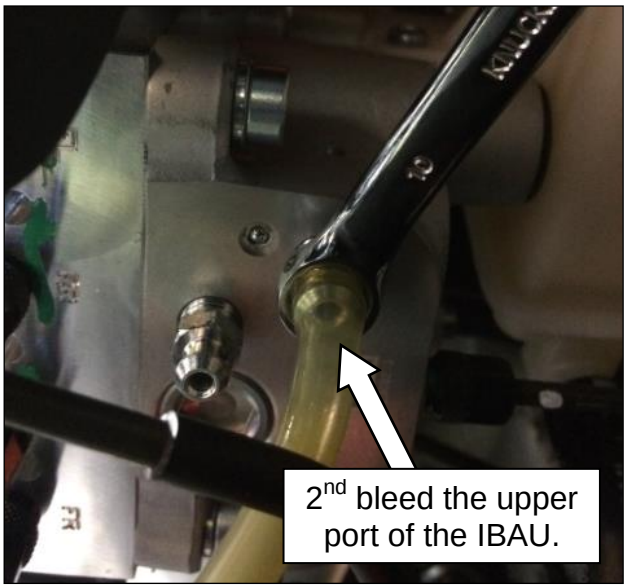




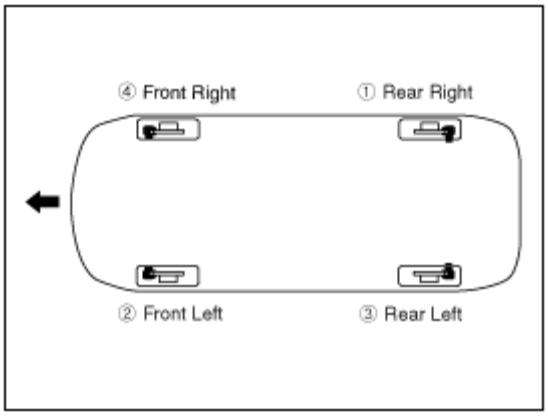
6. After bleeding the PSU, move to the IBAU.

   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.



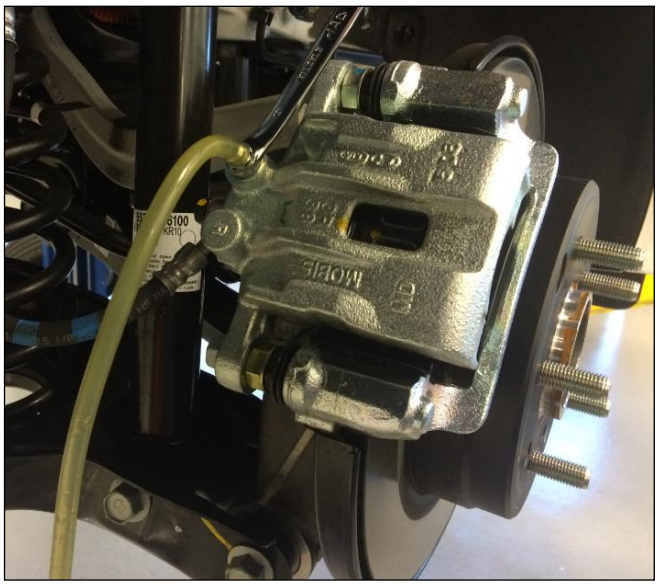


7. Starting at the rear right wheel, attach a clear hose to the brake bleeding nipple. The other side of the hose should be immersed in a bottle partially filled with clean brake fluid.



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

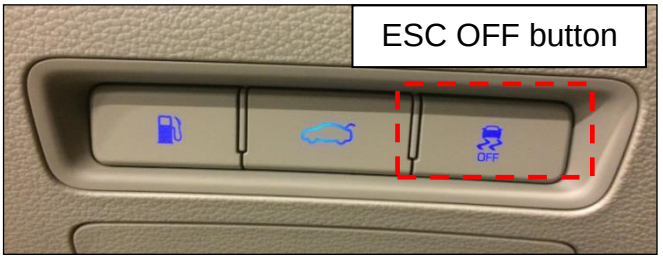
Bleeder screw tightening torque: 6.9~12.7 N.m (0.7~1.3 kgf.m, 5.1~9.4 lb-ft)

8. 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:

1. 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. Close the bleeder before removing brake pedal pressure.
2. Repeat the above procedure 10 times.
3. 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.
2. 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.
3. 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.
7. Press and hold the ESC OFF button until "***Traction & Stability Control disabled***" is displayed.

IBAU ECU Air Bleeding Mode is established when the ABS and ((!)) lamps are illuminated.

8. 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:

- **All doors, the hood, and the trunk 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.

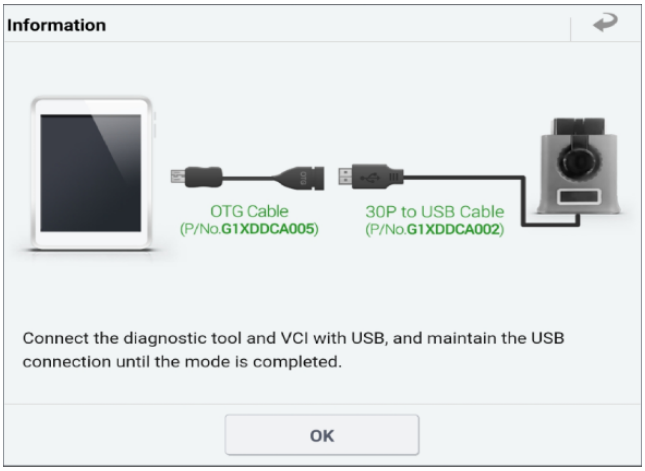
5. Gently tap the rear caliper with a rubber mallet to release any potential trapped air bubbles.
6. Open the bleeder screw to bleed the line.
7. Close the bleeder screw, then release the brake pedal.
8. Repeat steps 3 through 7 at least ten times, until no bubbles appear.
9. Move to the next caliper 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

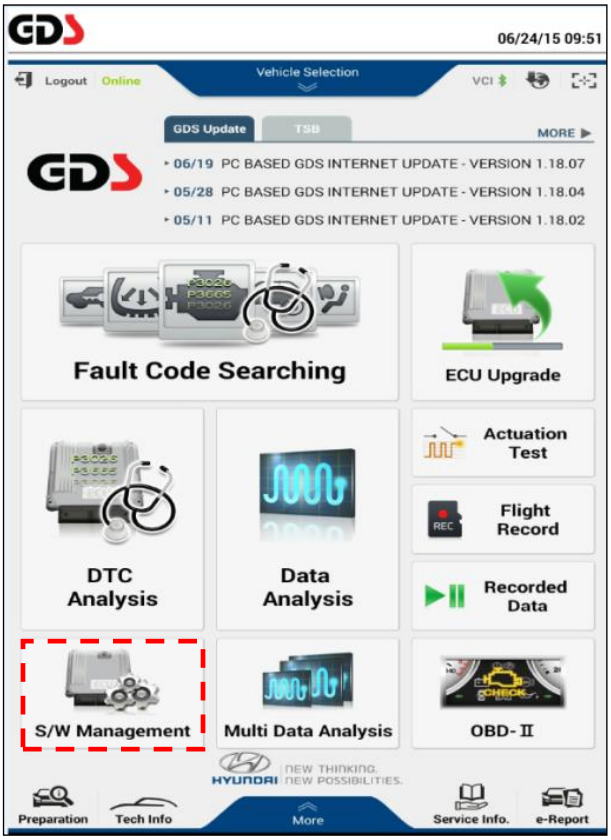
Before attempting to perform the Fluid Circulation Mode, ensure that the auxiliary battery is fully charged (higher than 12V). If the battery is not fully charged, connect it to a charger as needed.

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.***

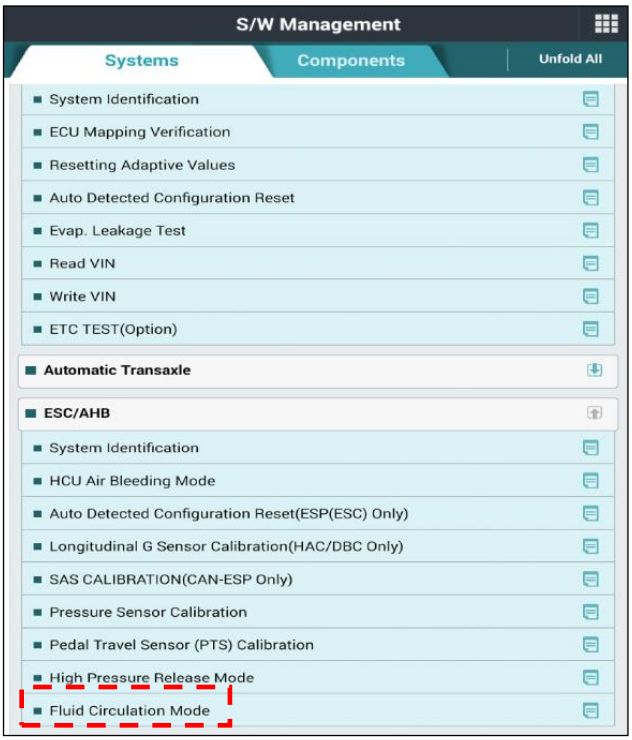


Perform the Fluid Circulation Mode, as follows:

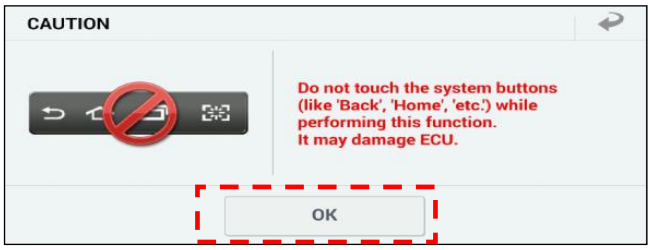
1. Select S/W Management.



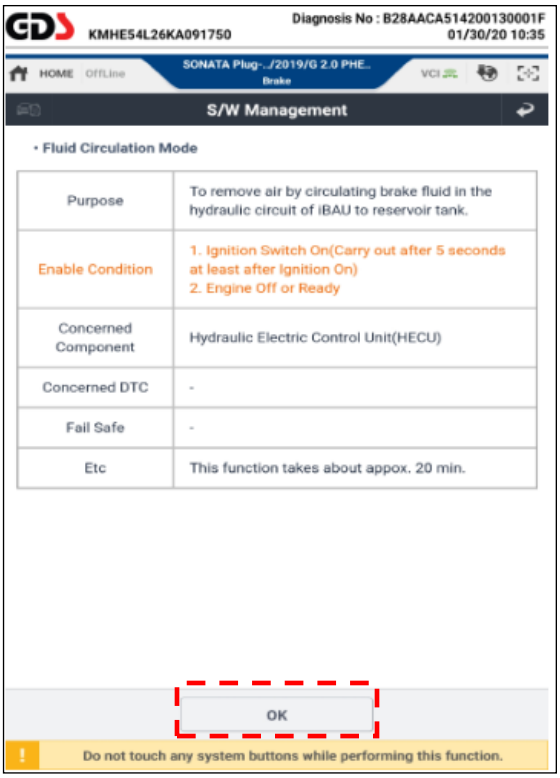
2. Select Fluid Circulation Mode.



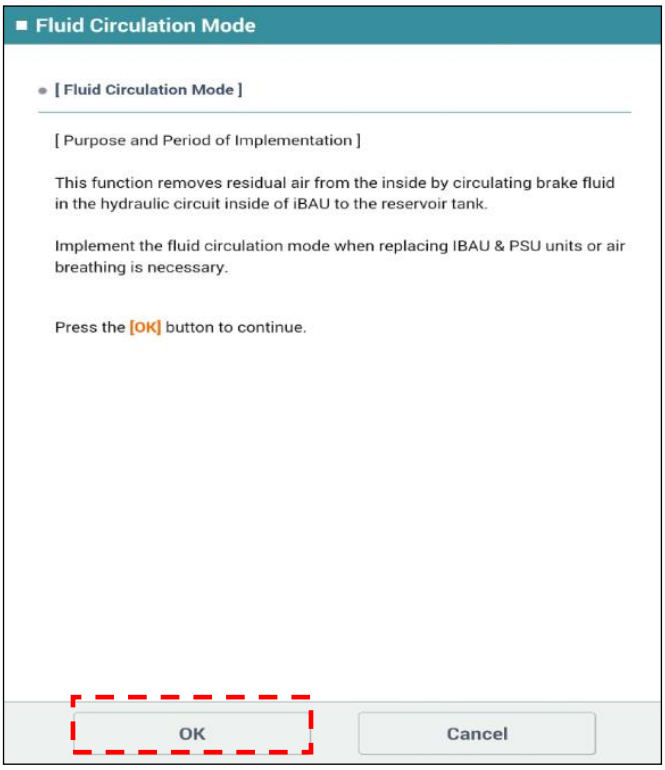
3. Read the caution statement and click OK to continue.



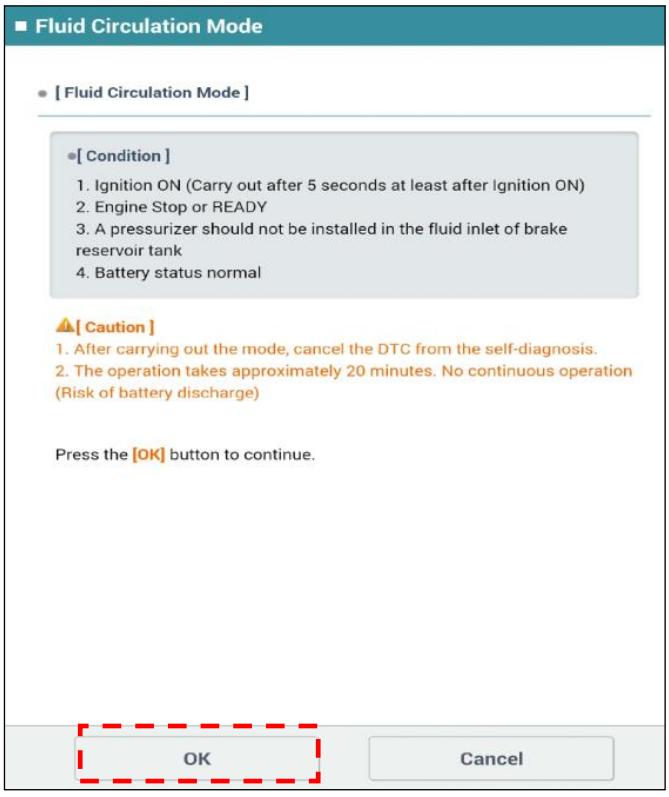
4. Read the summary of the process and click OK to continue.



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

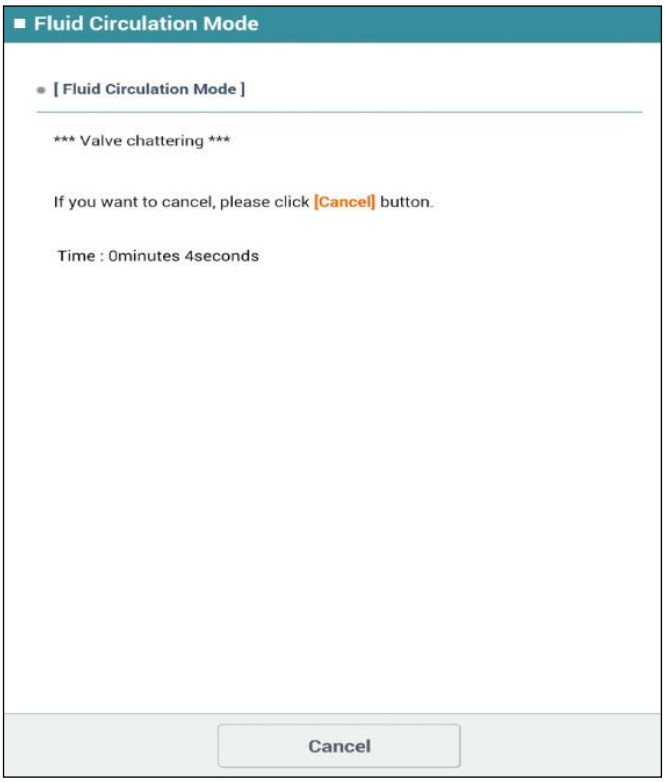


6. Read the conditions and cautions, then click OK to continue.



7. 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).

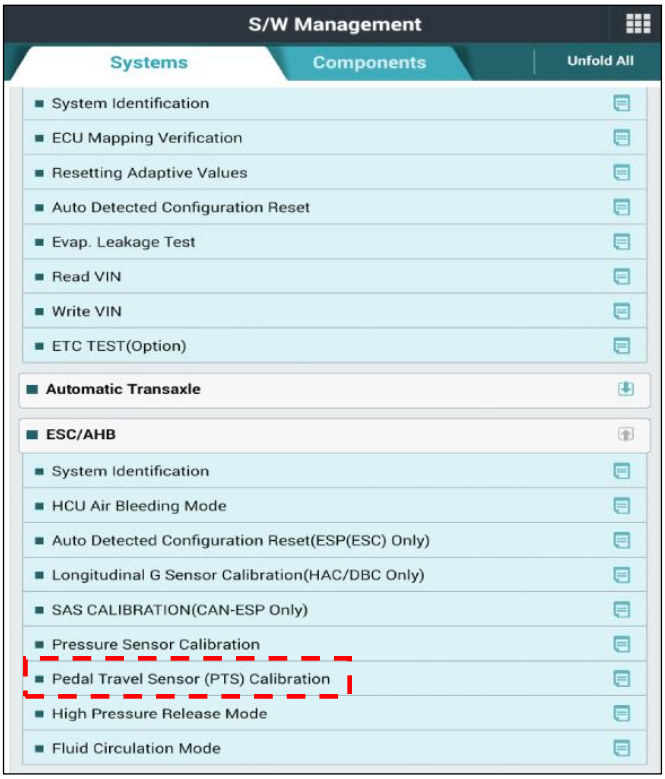


Service Procedure Brake Bleeding Step 4: GDS Pedal Travel Sensor Calibration

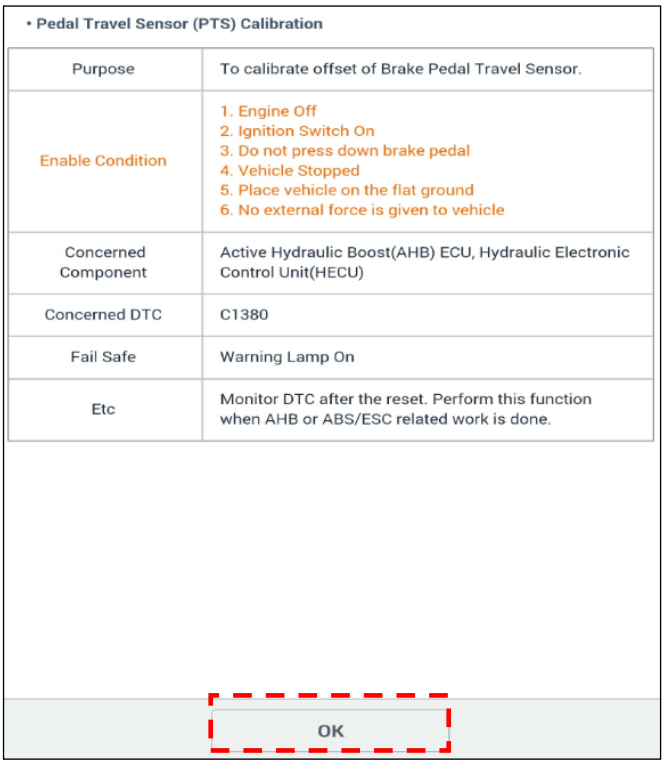
12. Connect a tablet-based GDS to the vehicle as per the installation instructions found in TSB 15-GI-001. Connect the VCI to the tablet using the USB cable.

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

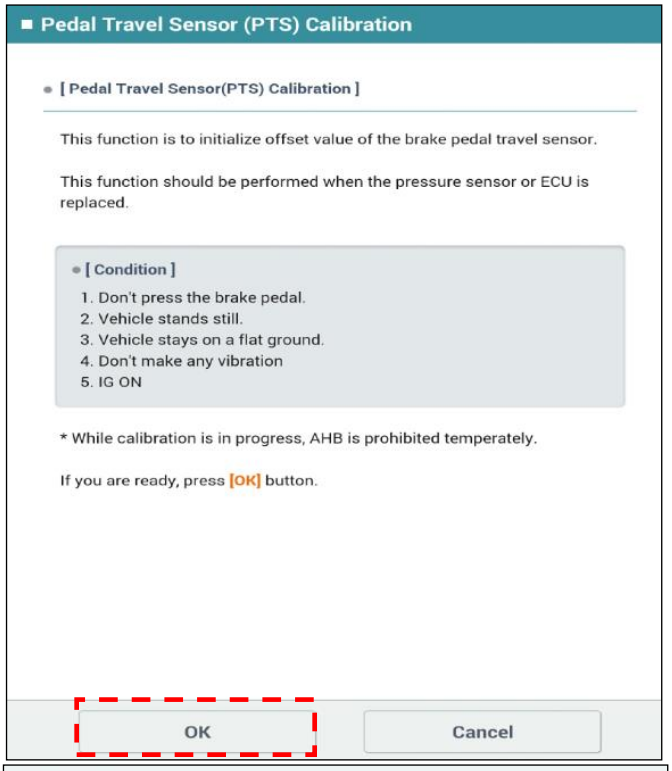
    1. From the S/W Management screen, select Pedal Travel Sensor (PTS) Calibration.



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