

Model: Model S, Model X

Vehicle System: 33 - Brakes

Region: All

Tech Note: Clean and Lubricate Brake Calipers Exposed to Road Salt: Model S and X With Separate Parking Brake Calipers

Tech Notes are announcements that help to communicate and track new information about Tesla Service concerns. Such concerns may or may not be VIN specific. These instructions assume knowledge of motor vehicle and high voltage electrical component repairs, and should only be executed by trained professionals. Tesla assumes no liability for injury or property damage due to a failure to properly follow these instructions or for repairs attempted by unqualified individuals.

This document, TN-19-33-003, is for Model S and Model X vehicles with separate parking brakes.

- For Model S and Model X vehicles with integrated parking brakes, see [TN-19-33-004](#)
- For Model 3 vehicles with performance brakes, see [TN-19-33-002](#).
- For Model 3 vehicles with non-performance brakes, see [TN-19-33-004](#)

Background Information

Electric vehicles rely heavily on regenerative braking, so in light driving, their friction brake assemblies are used less and produce less heat than a vehicle without regenerative braking. Consequently, it might take longer for an electric vehicle to dry accumulated moisture or water off of its friction brake assemblies.

In regions where roads are salted in Winter, prolonged exposure to salt and mud corrodes brake components and accelerates wear. After driving in wet, muddy, or corrosive conditions, the vehicle should be washed of dirt and salt, especially in the wheel, brake, suspension, and underbody areas. Follow washing with a cautious short drive comprised of multiple firm brake pedal applications to dry the brake pads and rotors.

Annual cleaning and lubrication of brake calipers extends their service life and ensures optimal functionality. As part of regular maintenance, perform the procedure described in this document to clean and lubricate brake caliper components. This procedure can be performed by Tesla or any qualified shop specializing in brake service.

Important Guidelines

⚠️ WARNING: Wear respiratory protective equipment in addition to standard personal protective equipment when servicing brake components.

⚠️ CAUTION: Do not mix brake pads, as they have worn specifically to their respective position within the caliper. Keep the inboard pad and the outboard pad separate and organized.

⚠️ CAUTION: Apply lubricants sparingly and do not permit lubricants to contact rotors, brake pad friction surfaces, or rubber brake components, especially piston seals. Use a Tesla-approved brake cleaner and clean shop towels to remove mis-applied lubricants.

Perform these procedures in a manner that will be the least aggressive, considering the corrosion (Figures 1 and 2). Only when those steps are not effective, escalate the action to be more aggressive.

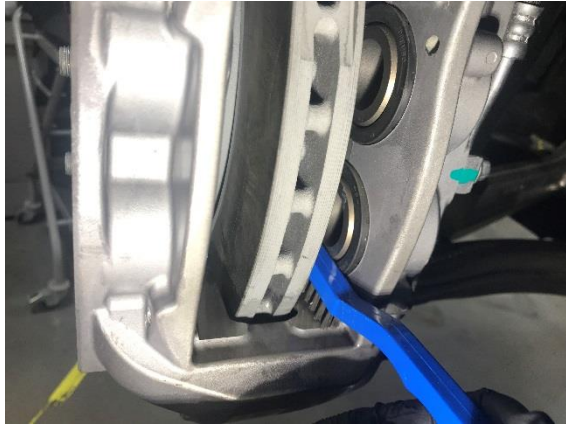


Figure 1 (Minimal corrosion, least aggressive to be effective)



Figure 2 (Maximum corrosion, escalate to most aggressive to be effective)

For example:

- First use a nylon brush to remove corrosion build-up from brake caliper abutment flats (Figure 1). If that is ineffective, escalate to a wire brush, and if that is still ineffective, escalate to a brake file.

! CAUTION: Use the brake file in single, forward strokes. Do not apply so much force as to remove any coating or metal from the caliper or carrier. 3 to 4 firm strokes of the file should smooth out the surface.

- First use a manual hammer and pin punch to remove retaining pins from the calipers before escalating to an air hammer.
- First use a brake pad puller to remove stuck brake pads before escalating to an air hammer with blunt chisel tip to break the pads free from the caliper (Figure 2).

NOTE: On severely corroded brake calipers, the rapid vibration of an air hammer can help break up the corrosion and loosen retaining pins and brake pads stuck within the caliper. Apply the blunt tip of the air hammer to the locations where the retaining pins pass through the brake pads (Figure 3).



Figure 3 (Model S caliper shown, Model X and Model 3 calipers similar)

NOTE: If the brake pads have worn to the point of replacement, or the condition of the pad is such that braking safety is affected, Tesla recommends to replace the pads. Clean and lubricate other brake components as originally intended.

NOTE: Tesla recommends to replace retaining pins, anti-rattle springs, abutment springs/clips, shims, and bolts that are excessively corroded (Figure 3).

Procedure

1. If the vehicle has an air suspension, on the vehicle touchscreen, touch Controls (vehicle icon), touch Suspension, press and hold the brake pedal and touch Jack to set Jack Mode (Figure 4).

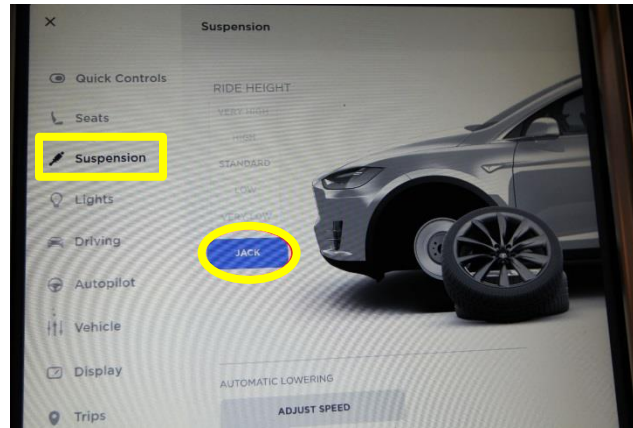


Figure 4 (Set Jack mode)

2. Loosen the wheel lugnuts.
3. Raise the vehicle on a 2-post lift only enough that the wheels no longer contact the floor.
4. Press and hold the brake pedal, then on the vehicle touchscreen, touch Controls (vehicle icon), touch Service, touch Towing, and then touch and hold the Transport Mode button until it turns blue to activate Transport Mode (Figure 5).

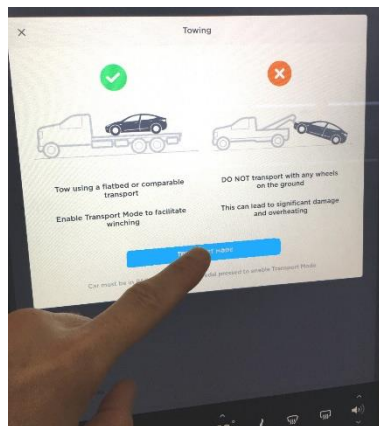


Figure 5 (Activate Transport Mode)

5. Raise the vehicle to a working height.
6. Remove all four wheels.
7. Turn the front wheel hubs to point fully right.

- Use a 4mm pin punch to remove the retaining pins and anti-rattle spring from the front LH caliper (Figure 6).



Figure 6 (Front caliper shown, rear caliper similar)

- Use a caliper spreader to expand the brake pads and compress the pistons back into the front LH caliper (Figure 7).

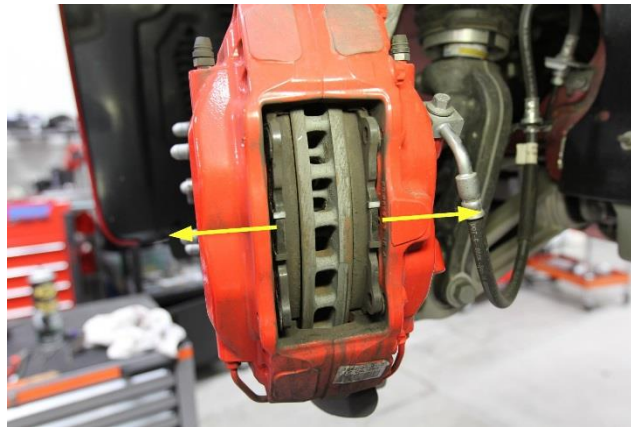


Figure 7 (Front caliper shown, rear caliper similar)

- Remove the brake pads from the front LH caliper (Figure 8).

⚠ CAUTION: Keep the inboard pad and the outboard pad separate and organized.

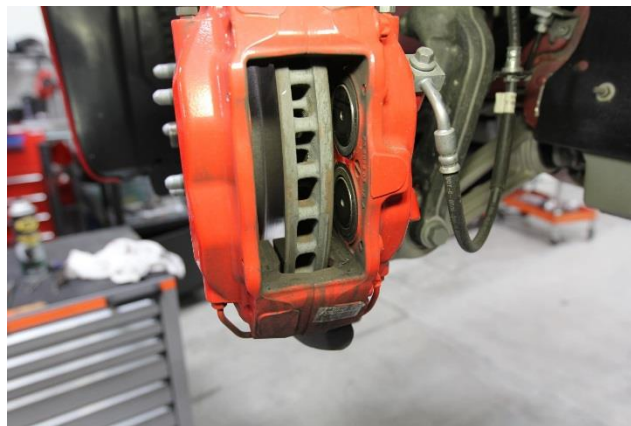


Figure 8 (Front caliper shown, rear caliper similar)

11. Remove the shim(s) from the back of each brake pad, and then wipe the shim(s) and back of each pad with a clean shop towel (Figures 9 and 10).

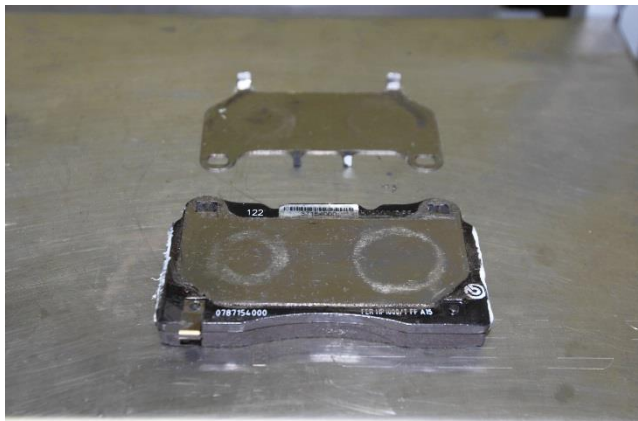


Figure 9 (Front caliper 2 shims)



Figure 10 (Rear caliper 1 shim)

12. Use a brush and Tesla-approved brake cleaner to clean the abutment flats, the piston faces, the inner surfaces of the front LH caliper, the retaining pins, the anti-rattle springs, the brake pad shims, and the brake pad edges and surfaces that contact the caliper (Figure 11).

! CAUTION: Make sure not to contaminate the friction material.



Figure 11 (Front caliper shown, rear caliper similar)

13. Apply a thin layer of Tesla-approved brake caliper lubricant to the abutment flats in the front LH caliper.

! CAUTION: Make sure not to contaminate the piston seals or any rubber components of the caliper

14. **Front Brake Pads Only** - Apply a thin layer of Tesla-approved brake caliper lubricant between the two shims that attach to the back of each front brake pad.

15. Install the shim(s) onto the back of each brake pad (Figures 9 and 10).

16. Apply a thin layer of Tesla-approved brake caliper lubricant to the brake pad edges that contact the abutment flats (Figures 12 and 13).

⚠ CAUTION: Do not apply any lubricant to the back of the brake pads, and make sure not to contaminate the friction material.



Figure 12 (Front caliper brake pads)



Figure 13 (Rear caliper brake pads)

17. Install the brake pads into the front LH caliper (Figure 14).

⚠ CAUTION: Do not mix brake pads, as they have worn specifically to their respective position within the caliper.

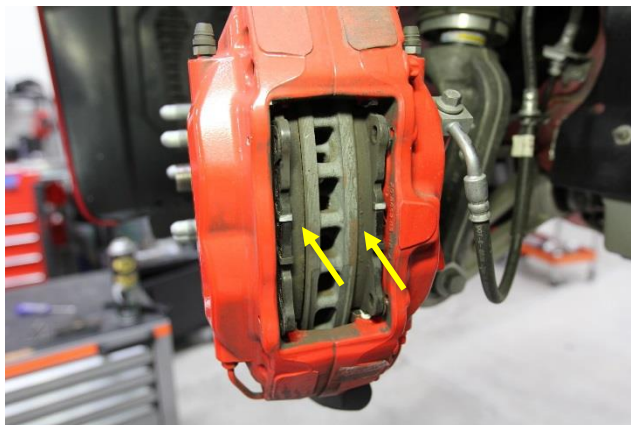


Figure 14 (Front caliper shown, rear caliper similar)

18. Use the 4mm pin punch to install the anti-rattle spring and retaining pins into the front LH caliper (Figure 15).

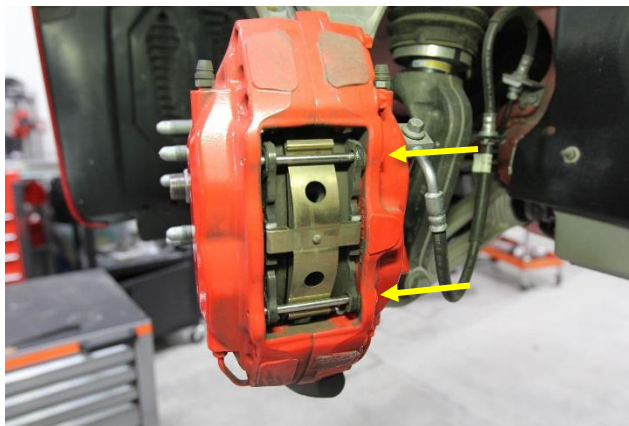


Figure 15 (Front caliper shown, rear caliper similar)

19. Rotate the front LH rotor 180 degrees, and then use the brush and Tesla-approved brake cleaner to clean any lubricant or debris from the rotor. Repeat.

20. Turn the front wheel hubs to point fully left, and then repeat step 8 through 19 for the front RH caliper.

21. Point the front wheel hubs to center, and then repeat step 8 through 19 for the rear LH caliper.

22. Repeat step 8 through 19 for the rear RH caliper.

23. Use a brush and Tesla-approved brake cleaner to clean dirt and debris from the outside of the LH parking brake caliper connector and harness at the LH rear wheel.

24. Release the red retaining tab and disconnect the electrical harness from the LH parking brake caliper connector (Figure 16).

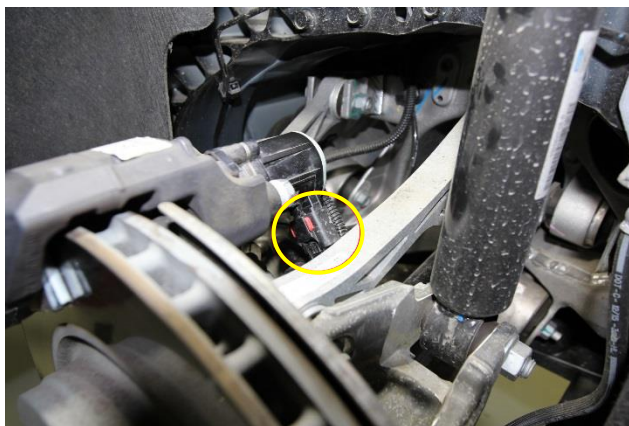


Figure 16

25. Remove and discard the bolts (x2) that attach the LH parking brake caliper to the rear LH knuckle, and then remove the caliper from the vehicle (Figure 17).

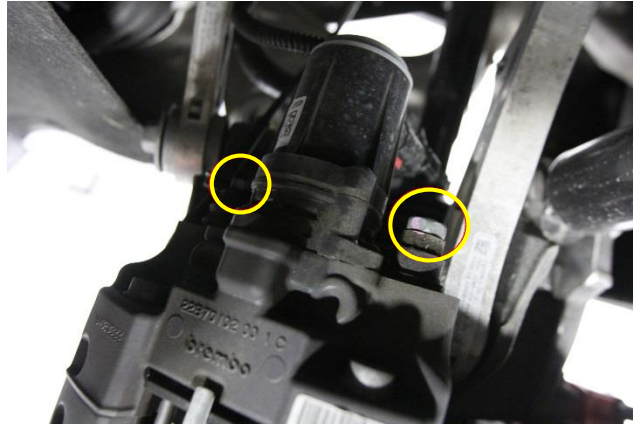


Figure 17

26. Use a 10 mm x 1.5mm tap to chase the parking brake caliper mounting hole threads in the rear LH knuckle.
27. Use a 3mm pin punch to remove the retaining pins and anti-rattle spring from the LH parking brake caliper (Figure 18).

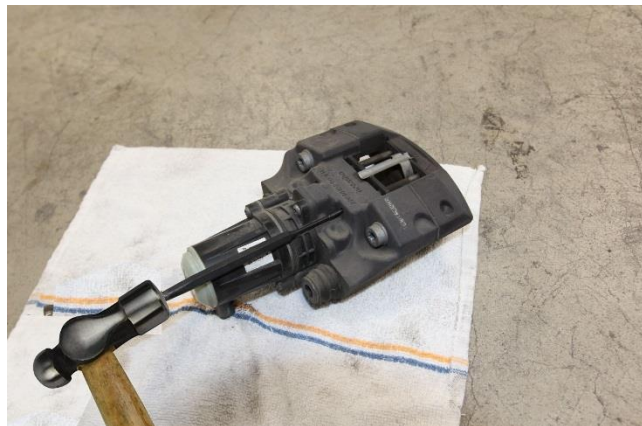


Figure 18

28. Remove the brake pads from the LH parking brake caliper.

! **CAUTION:** Keep the inboard pad and the outboard pad separate and organized.

29. Remove the upper sliding pin from the LH parking brake caliper, and then inspect for corrosion (Figure 19).

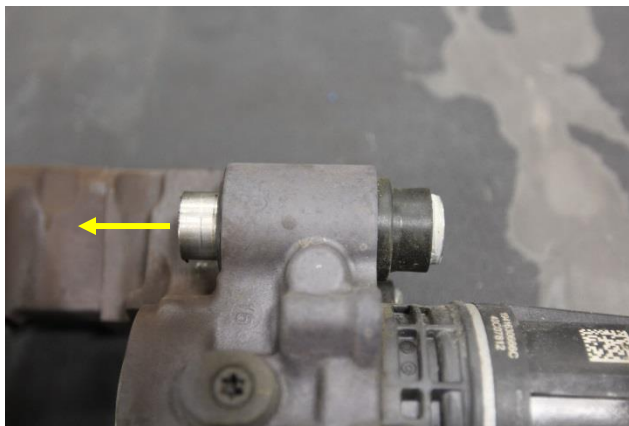


Figure 19

30. If corroded, use the brush and Tesla–approved brake cleaner to clean the upper sliding pin, and then wipe with a clean shop towel (Figure 20).



Figure 20

31. Lightly coat the upper sliding pin with Klueber GLK 1PF lubricant (Figure 21), and then reinstall the pin into the LH parking brake caliper.



Figure 21

32. Use a pick or tiny screwdriver to release the outer boot of the lower sliding pin, and then move the pin partially outboard of the LH parking brake caliper (Figure 22).

⚠ CAUTION: Do not remove the pin from the caliper.

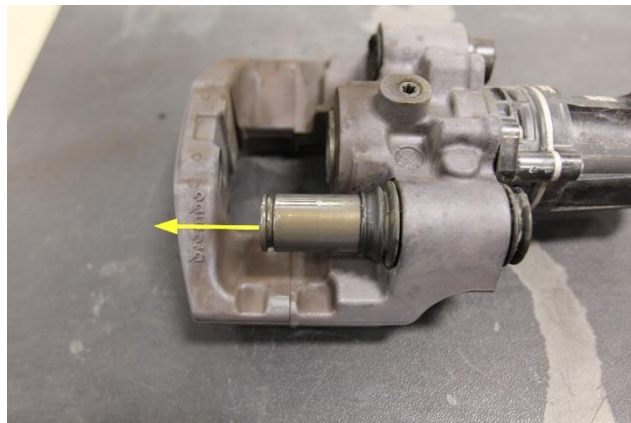


Figure 22

33. Apply Klueber GLK 1PF lubricant to the exposed surface of the lower sliding pin (Figure 23).

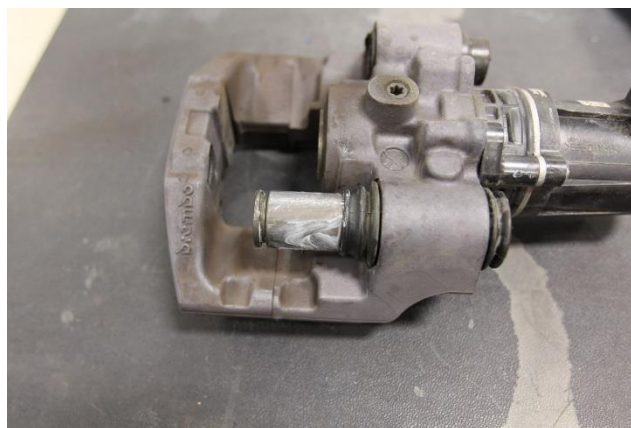


Figure 23

34. Move the lower sliding pin back into the LH parking brake caliper, use a pick or tiny screwdriver to release the inner boot of the lower sliding pin, and then move the pin partially inboard of the caliper (Figure 24).

⚠ CAUTION: Do not remove the pin from the caliper.

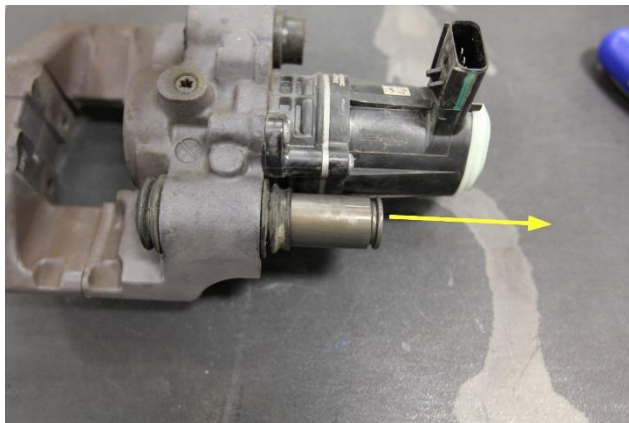


Figure 24

35. Apply Klueber GLK 1PF lubricant to the exposed surface of the lower sliding pin (Figure 25).

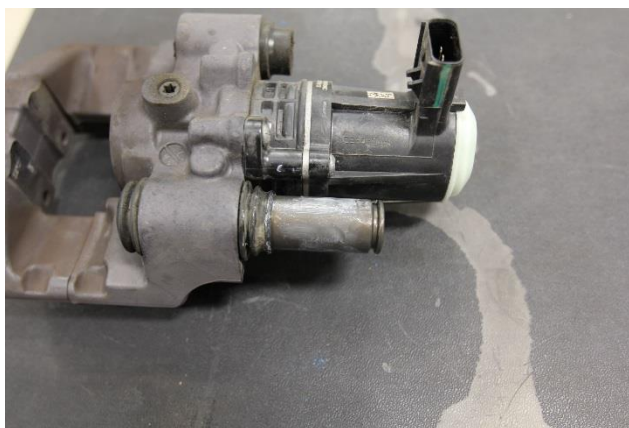


Figure 25

36. Move the lower sliding pin back into the LH parking brake caliper and fasten the boots to the pin.

37. Use the brush and Tesla-approved brake cleaner to clean the abutment flats, the piston faces, the inner surfaces of the LH parking brake caliper, the retaining pins, the anti-rattle springs, and the brake pad edges and surfaces that contact the caliper (Figure 26).

⚠ CAUTION: Make sure not to contaminate the friction material.



Figure 26

38. Apply a thin layer of Tesla-approved brake caliper lubricant to the abutment flats in the caliper.

⚠ CAUTION: Make sure not to contaminate any rubber components of the caliper

39. Install the LH parking brake caliper to the rear LH knuckle, and then install new bolts (x2) to attach the caliper to the knuckle (torque 57 Nm) (Figure 27).

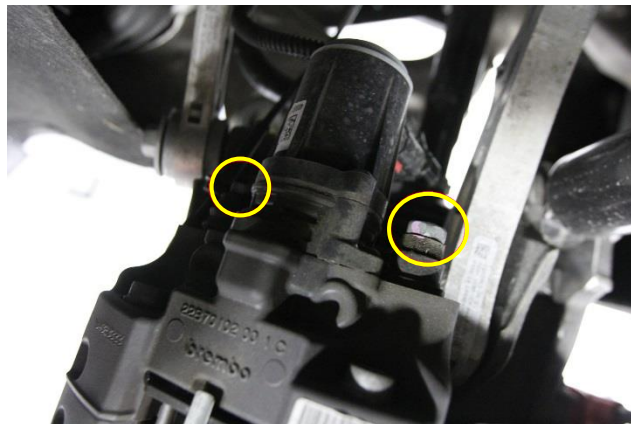


Figure 27

40. Apply a thin layer of Tesla-approved brake caliper lubricant to the brake pad edges that contact the abutment flats (Figure 28).

⚠ CAUTION: Do not apply any lubricant to the back of the brake pads, and make sure not to contaminate the friction material.

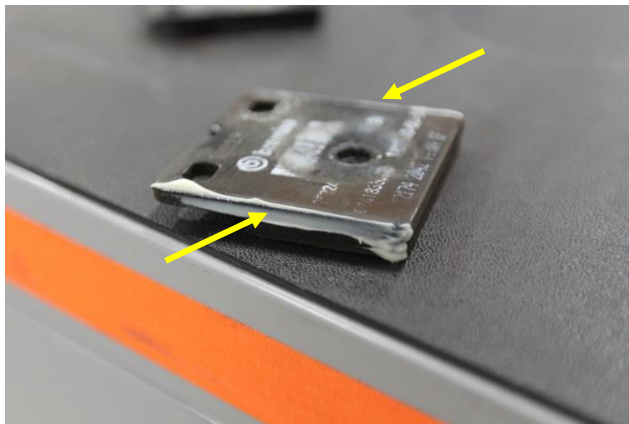


Figure 28

41. Install the brake pads into the LH parking brake caliper.

⚠ CAUTION: Do not mix brake pads, as they have worn specifically to their respective position within the caliper.

42. Use the appropriate pin punch to install the anti-rattle spring and retaining pins into the LH parking brake caliper (Figure 29).



Figure 29

43. Connect the electrical harness to the LH parking brake caliper connector, fasten the red retaining tab, and then perform a push-pull-push check of the connection (Figure 30).

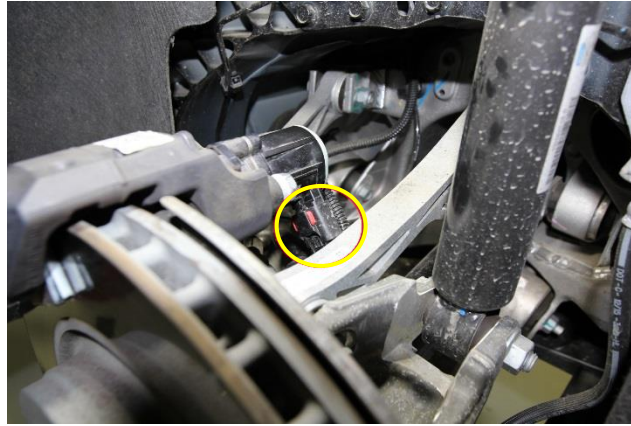


Figure 30

44. Rotate the rear LH rotor 180 degrees, and then use the brush and Tesla-approved brake cleaner to clean any debris from the rotor. Repeat.
45. Repeat step 23 through 44 for the RH parking brake caliper at the RH rear wheel.
46. Install all four wheels, and then lower the vehicle so that the wheels just contact the floor but do not support the weight of the vehicle.
47. Press the button on the end of the steering column RH stalk to put the vehicle into Park, activate the electronic parking brake, and deactivate Transport Mode.
48. Lower the vehicle completely.
49. Final torque all wheel lugnuts to 175 Nm.
50. Pump the brake pedal until firm.
51. Rinse the braking components at each wheel with clean water.
52. Perform a cautious short drive comprised of multiple firm brake pedal applications to dry the brake pads and rotors, and to verify braking performance.

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