

Model: Model S, Model X,
Model 3

Vehicle System: 33 - Brakes

Region: All

Tech Note: Clean and Lubricate Brake Calipers Exposed to Road Salt: Model 3 Base, and Model S and X With Integrated Parking Brakes

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-19-33-004, is for Model 3 vehicles with non-performance brakes, and Model S and Model X vehicles with integrated parking brakes.

- For Model 3 vehicles with performance brakes, see [TN-19-33-002](#).
- For Model S and Model X vehicles with separate parking brakes, see [TN-19-33-003](#)

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.

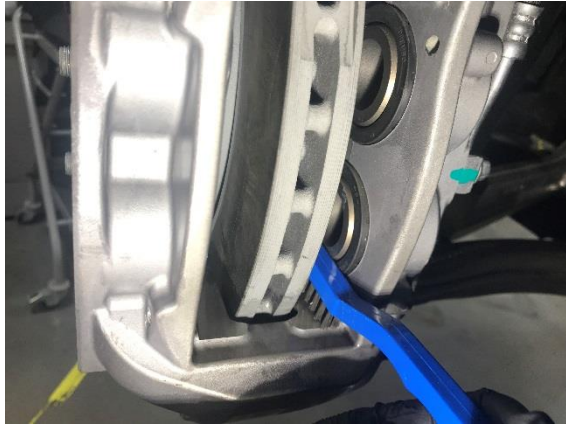


Figure 1 (Minimal corrosion, least aggressive to be effective)



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).

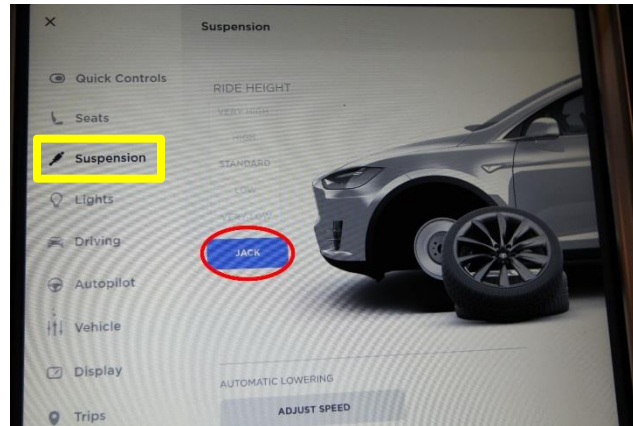


Figure 4 (Set Jack mode, Model S and Model X)

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).

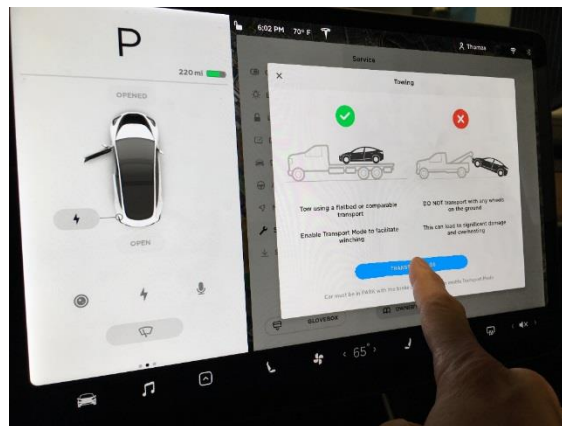


Figure 5 (Activate Transport Mode, Model 3, other models similar)

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

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

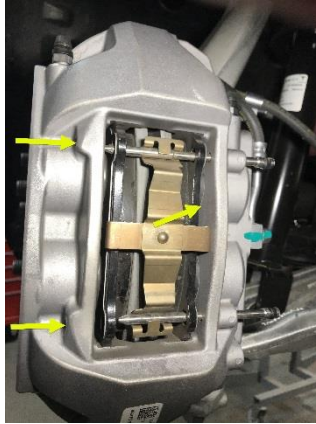


Figure 6 (Model 3 shown, other models similar)

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



Figure 7 (Model 3 shown, other models similar)

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

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

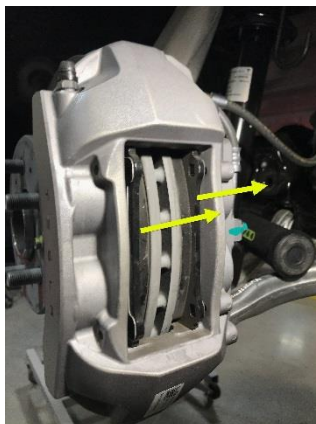


Figure 8 (Model 3 shown, other models similar)

11. **Models S and X** - Remove the two shims from the back of each brake pad, and then wipe the shims and back of each pad with a clean shop towel (Figure 9).

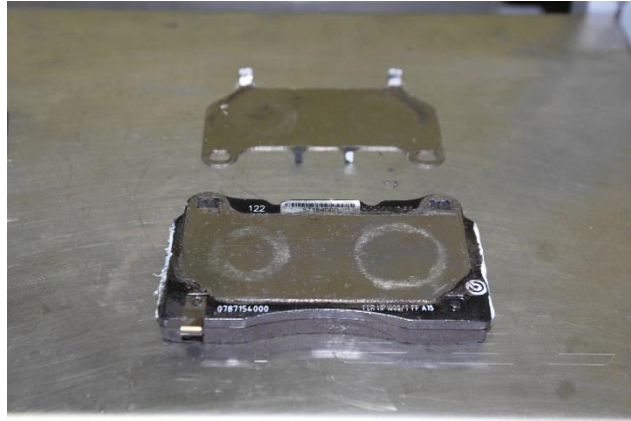


Figure 9 (Models S and X)

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 abutment springs/clips, the brake pad shims, and the brake pad edges and surfaces that contact the caliper (as applicable) (Figures 10 and 11).

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



Figure 10 (Model 3 shown, other models similar)



Figure 11 (Model 3 shown, other models 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. **Models S and X** - Apply a thin layer of Tesla-approved brake caliper lubricant between the two shims that attach to the back of each brake pad.

15. **Models S and X** - Install the shims onto the back of each brake pad (Figure 9).

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

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



Figure 12 (Model 3 shown, other models similar)

17. Install the brake pads into the front LH caliper (Figure 13).

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

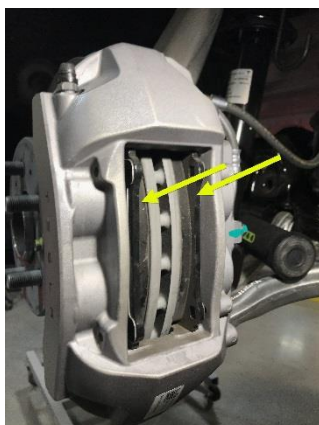


Figure 13 (Model 3 shown, other models similar)

18. Use the appropriate pin punch to install the anti-rattle spring and retaining pins into the front LH caliper (Figure 14).



Figure 14 (Model 3 shown, other models 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.

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

23. Release the red retaining tab and disconnect the electrical harness from the rear LH caliper connector (Figure 15).



Figure 15 (Model 3 shown, other models similar)

24. Move the rear LH caliper outward to partially compress the caliper piston.

25. Remove the bolts (x2) that attach the rear LH caliper to the rear LH carrier (Figure 16), remove the caliper from the carrier, and then hang the caliper from an S-hook (Figure 17).

⚠ CAUTION: Make sure not to strain or kink the brake jounce hose.

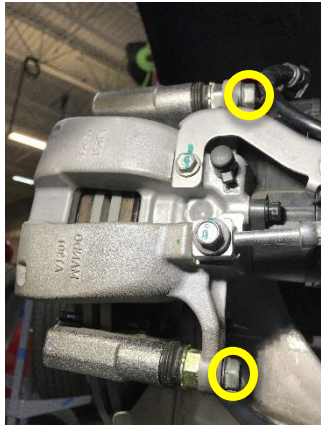


Figure 16 (Model 3 shown, other models similar)

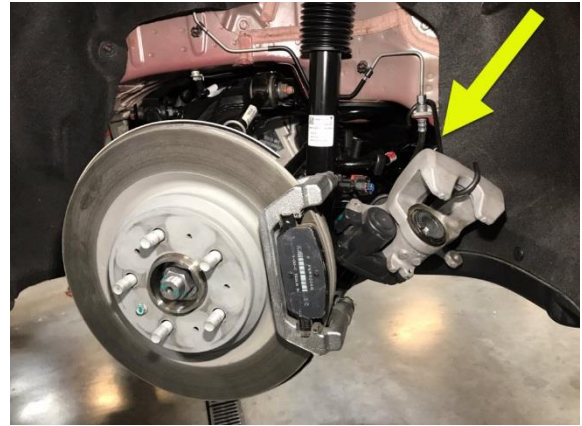


Figure 17 (Model 3 shown, other models similar)

26. Use the caliper spreader to compress the piston into the rear LH caliper (Figure 18).

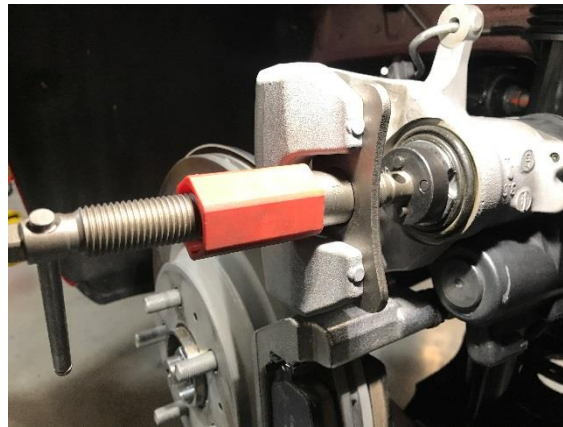


Figure 18 (Model 3 shown, other models similar)

27. Remove the brake pads from the rear LH carrier (Figure 19).

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

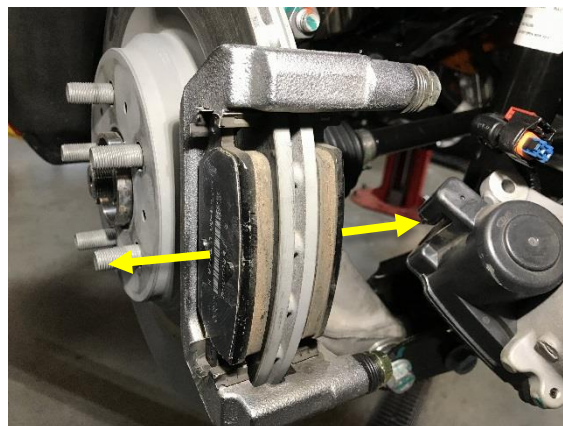


Figure 19 (Model 3 shown, other models similar)

28. Remove the abutment springs/clips or shims (as applicable) from the rear LH carrier (Figures 20 and 21).



Figure 20 (Model 3 abutment springs)

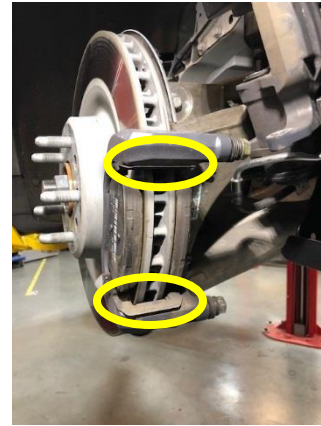


Figure 21 (Model X and Model S shims)

29. Use the brush and Tesla-approved brake cleaner to clean the abutment flats, the piston faces, the inner surfaces of the rear LH caliper and rear LH carrier, and the brake pad edges and surfaces that contact the caliper or carrier (as applicable) (Figure 22).

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

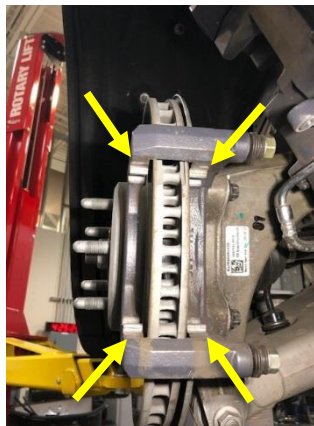


Figure 22 (Abutment flats, Model X shown, other models similar)

30. Install new abutment springs/clips or shims (as applicable) into the rear LH carrier (Figures 23 and 24).

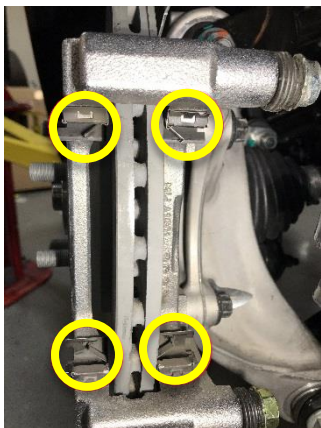


Figure 23 (Model 3 abutment springs)

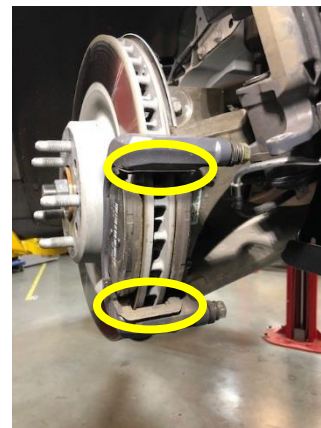


Figure 24 (Model X and Model S shims)

31. Install the brake pads into the rear LH carrier (Figure 25).

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

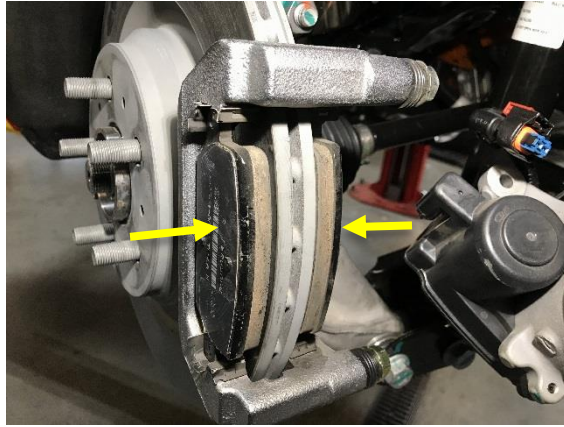


Figure 25 (Model 3 shown, other models similar)

32. Install the rear LH caliper onto the rear LH carrier, and then install the bolts (x2) that attach the caliper to the carrier (torque 26 Nm)(Figure 26):

NOTE: If the bolt heads have become deformed, replace the bolts.

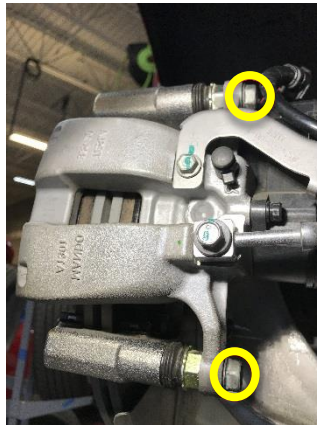


Figure 26 (Model 3 shown, other models similar)

33. Connect the electrical harness to the rear LH caliper connector, fasten the red retaining tab, and then perform a push-pull-push check of the connection (Figure 27).



Figure 27 (Model 3 shown, other models similar)

34. 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.
35. Repeat step 22 through 34 for the rear RH caliper.
36. 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.
37. 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.
38. Lower the vehicle completely.
39. Final torque all wheel lugnuts to 175 Nm.
40. Pump the brake pedal until firm.
41. Rinse the braking components at each wheel with clean water.
42. 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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