

Top Tips

Modern Brake System Diagnostics & Service

Disc brake replacement and service is just one part of the full range of brake services that technicians can offer in an automotive repair shop. The diagnostic procedures listed below for anti-lock brakes (ABS), rusted or corroded brake lines, and failures related to advanced electronics in newer-model vehicles' braking systems are useful to technicians who embrace the challenge of complex customer complaints. These tips can help guide those who can perform a basic brake service but may be intimidated to take their skills to the next level.

By following the tips below, you'll gain a better understanding of how an ABS system's sensors affect overall operation, proper brake bleeding procedures, and advanced diagnostics for brake component failures. They also reinforce that inspections on the front end can save time on the back end of brake service.

1

Perform a high-quality brake service

Performing a brake service with accuracy, precision, and attention to detail makes a world of difference to a customer. Ensuring the service is done correctly the first time reduces repeat failures and increases bay turnover rate in the long term. When servicing disc brakes, clean or replace the caliper slide pins and grease them properly so the installed brake pads do not wear out before their expected service life. Remember to reinstall all brake hardware that supports and secures the brake pads. Duralast Gold brake pads include the recommended original equipment (OE) hardware specified by manufacturers to ensure the highest quality brake services are performed.

2

Follow brake bleeding procedures

Following brake bleeding procedures after replacing a caliper, wheel cylinder, brake line, or hose is imperative to ensure successful replacement of these components. The brake bleeding procedure will vary depending on the vehicle's make and model and the brake system configuration. In some cases, depending on the weather conditions a vehicle is exposed to, a bleeder screw may become corroded and may not open properly when bleeding brakes. This would require a technician to either free the frozen bleeder screw or replace the corroded caliper or wheel cylinder. Make sure to identify which type of brake fluid the vehicle being serviced uses. Most

modern vehicles use DOT 4, while older model vehicles use DOT 3. High-performance vehicles use a silicone-based DOT 5 fluid. No brake fluid types should ever be mixed to prevent damage to the system.

3

Diagnose faulty brake calipers

It is not uncommon for a brake caliper to fail, causing a variety of braking issues for a customer. Calipers can fail in many ways, and some are easy to identify: a caliper piston seizing and a wheel locking in place, or a piston seal failing and the vehicle losing braking ability. These are extreme examples, but there are other ways to identify a caliper that is starting to fail. When completing a normal brake service, feel how the piston retracts. A piston that has rough spots or resists more while retracting should be replaced to prevent catastrophic failure. Other indicators of a faulty caliper can be uneven brake pad wear or ripped caliper dust seals.

4

Do not overlook drum brakes

Drum brakes are no longer standard equipment for most vehicles currently produced, but are still equipped on many vehicles being serviced today. If you service electric vehicles, you might encounter them as vehicle manufacturers look for more cost and weight savings. Drum brake systems are more complex in design than disc brakes and require more tools to service. Drum brake systems use wheel cylinders to push brake shoes outward against a drum. Like calipers, wheel cylinders can leak and should be inspected during regular service. Drum brake shoes are also more difficult to inspect and may require removing the brake drum completely to properly identify their thickness. Make sure drum brakes are adjusted properly to prevent drag or a soft brake pedal during normal braking operation.



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5

Identify anti-lock braking system (ABS) issues

The anti-lock braking system (ABS) has been a great feature used in vehicles for decades, but when a system malfunctions, the key is knowing where to start your diagnosis. If the ABS light is illuminated, check the vehicle's wheel speed sensors, which transmit data to the ABS module to help identify potential wheel slip. The ABS module can then decide to apply braking force to a specific wheel to minimize wheel slip. If a wheel speed sensor is malfunctioning, this can result in either the system disabling and a warning light illuminating, or the ABS function enacting at the wrong time. Other ABS failures include module and communication issues that need electrical system diagnostics, and ABS pump failures, which would require replacing the entire ABS module.

6

Replace brake lines and hoses

As vehicles are exposed to corrosion, salt, and road conditions, hoses and brake lines may begin to degrade. If a brake line corrodes to the point that it starts to leak, it must be replaced. Some vehicles have pre-bent lines available, which can be an efficient way to replace corroded lines. Most lines need to be constructed by hand and require patience to bend and route properly. Lines also need to be flared for proper fit, and they can be either an SAE (double) flare or an ISO (bubble) flare. These will vary by manufacturer and must match the brake line fittings to ensure a secure seal. Remember, oftentimes a hose can look fine on the outside, but an issue could lurk on the inside. And sometimes brake hoses collapse, creating a restriction in the system that can cause the vehicle to pull to one side while braking or a wheel to lock completely. Be sure to verify that a brake hose has collapsed by opening the suspected wheel's brake bleeder and checking if the wheel releases and spins freely.



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