DIAGNOSIS AND TESTING

Brake System Diagnosis

Diagnosis of mechanical and hydraulic concerns associated with the brake system is covered in this Section.

In addition to the Brake System Diagnosis charts, further specific diagnosis charts are furnished for the master cylinder, brake control valve and the vacuum brake booster.

Always check the fluid level in the master cylinder before performing the test procedures. If the fluid level is not at the MAX line to 4.0mm (0.16 inch) below on the master cylinder reservoirs, add Heavy-Duty Brake Fluid C6AZ-19542-AA (ESA-M6C25-A) or DOT-3 equivalent.

CAUTION: Use of any other than the approved DOT-3® brake fluid will cause permanent damage to brake components and will render the brakes inoperative.

If a brake is locked and the vehicle must be moved, open the bleeder screw on both front wheels to let out enough fluid to relieve the pressure. Close the bleeder screws. This bleeding operation will release the brakes but will not correct the cause of trouble.

Hydraulic System

Two major concerns can occur in hydraulic brake systems: external leaks, and master cylinder bypass (internal leak). Hydraulic brake systems and their components, the master cylinder and valves, do not cause the vehicle to vibrate or pull, the brakes to grab or squeal, or the brake pedal to pulse, except during ABS operation. In most cases, they will not even make the brakes drag. The sources of these concerns are found elsewhere in the brake system, but it is always a good policy to first check the entire hydraulic system for leaks before continuing to diagnose any other brake concerns.

Master Cylinder

Normal Conditions

The following conditions are considered normal and are not indications that the master cylinder is in need of service:

Condition 1: New brake systems are not designed to produce as hard a pedal effort as in the past. Complaints of light pedal efforts should be compared to pedal efforts on another vehicle, same model and year.

Condition 2: A trace of brake fluid existing on the booster shell below the master cylinder mounting flange. This results from the normal lubricating action of the master cylinder bore end seal.

Condition 3: Fluid level will decrease with front lining wear.

Abnormal Conditions

Changes in brake pedal feel or travel are indicators that something could be wrong in the brake system. The following conditions use brake pedal feel and the warning indicator along with reservoir fluid level, as indicators in diagnosing brake system concerns.

Condition 1: Pedal goes down fast. This could be caused by an external leak or internal leak.

Condition 2: Pedal eases down slowly. This could be caused by an external leak or internal leak.

Condition 3: Pedal is low and / or feels spongy. This condition may be caused by: no fluid in the reservoir, reservoir cap vent holes clogged, rear brakes out of adjustment, or air in the hydraulic system.

Condition 4: Pedal effort excessive. This may be caused by a bind or obstruction in pedal / linkage or insufficient booster vacuum.

Condition 5: Rear brake lockup during light pedal force. This may be caused by wrong tire pressure, grease or fluid on linings / damaged linings, improperly adjusted parking brakes, or damaged / contaminated pressure control valve(s).

Condition 6: Erratic pedal effort. This condition could be caused by brake booster malfunction, or extreme caliper piston knock back or improperly installed disc brake shoe and lining.

Condition 7: Brake warning indicator ON. This may be caused by low fluid level, ignition wire routing too close to fluid level indicator assembly, or float assembly damage.

NOTE: Prior to performing any diagnosis, ensure that the brake system warning indicator is functional.

The diagnosis techniques and service procedures are referenced in the Brake Master Cylinder Diagnosis charts. Refer to these charts for proper use of diagnosis techniques in diagnosing brake hydraulic system concerns.

Diagnostic Technique No. 1

External Fluid Leaks—Check

It is possible that all evidence of fluid leakage may have washed off, if the vehicle has been operated in rain or snow, as brake fluid is water soluble. Refill system, bleed, and apply the brakes several times. Examine the system to verify that the reservoir fluid level is actually dropping. Locate and correct the external leak. If fluid level drops and no external leak can be found, check for a master cylinder bore end seal leak.

Diagnostic Technique No. 2

Master Cylinder Bypass Condition Check

1. Check fluid in master cylinder. Fill reservoir if low or empty.