

## AIR BRAKE SYSTEMS

*This month's article is contributed by our chassis-engineering group and explains the essential function of the air brake systems in our diesel vehicles. We hope this will be helpful to those of you who own a diesel coach, and interesting to those of you who don't.*

Air pressure is produced by an engine driven air compressor. The compressor is controlled by a governor which senses reservoir pressure and activates pumping below approximately 100 # P.S.I. and stops pumping at 120 – 125 # P.S.I.

A high temperature flexible line moves air from the compressor through a check valve and into the air dryer. The air dryer, with heated drain, automatically purges collected moisture each time the compressor reaches maximum pressure.

Air from the air dryer enters the first, small, chamber of the primary reservoir. This chamber is sometimes referred to as a wet tank. As the hot compressed air cools, it loses more moisture which can be collected in this chamber. A drain valve is located in the bottom of this chamber to drain the moisture. This chamber also provides pressure control signal to the compressor governor and an excess pressure relief valve.

Air leaving the wet tank now goes through two separate check valves to two separate reservoirs, the large chamber of the primary reservoir and the large chamber of the secondary reservoir creating a "split system". The primary system controls the rear (powered) axle and the secondary system controls the front axle. Both chambers have drain valves.

Drain valves are either manual or automatic. It is the operator's responsibility to operate the manual valves to drain moisture.

Accessory (non air brake function) air for air suspension, air horns, and customer access air station (quick connect) exits the secondary

reservoir through a pressure protection valve. If the pressure in the reservoir is less than the protection valve set point (approximately 65 # P.S.I.), it will shut off air to the accessories and keep it in the reservoir for the brakes.

From the two independent reservoirs, the air goes to two independent valves operated by the brake pedal. When the driver steps on the pedal, the pedal movement controls the air through the two independent valves; one to the front axle, and one to the rear axle.

Air controlled by the brake pedal arrives at the brake chambers (two for each axle, one for each wheel). Mechanical movement from the brake chambers through mechanical components in the end of the axle move either the brake shoes outboard to contact the brake drums or disc brake pads inboard to contact the rotor. Normal service brake functions on both axles use air pressure controlled by the brake pedal to apply the brakes.

The rear brake chambers are a double diaphragm with two chambers that serve two different functions. One is normal service brake operation as described above, the other is park brake or low air spring brake apply.

When the brake system has normal pressure and the park brake is NOT applied, system air pressure present in each spring brake chamber moves the diaphragm and compresses a heavy spring. The hiss during park brake application is air being released from the chambers, allowing the strong springs to expand within the chamber and the brake shoes to contact the brake drums. In the event system air pressure is inadvertently lost, these springs will also apply the rear brakes. If the compressor will not rebuild sufficient system air pressure, corrective repair must be done to release the brakes before the vehicle can be moved.

During the 1999 chassis model year, ABS (Anti-Lock Brake System) became standard.