



Auxiliary Retarders

What are they?

Many heavy vehicles have auxiliary retarders to assist the service brakes. They help to control speed on down grades and preserve the service brakes for emergency stopping. Engine brakes help control speeds when properly used, but are not intended for emergency braking. Auxiliary retarders provide additional braking control, but do not meet sudden or large braking demands.

How do they work?

There are four types of auxiliary retarders: Engine compression release, Exhaust back pressure, Hydraulic driveline, and Electric drive line.

Engine Retarders change the exhaust valve timing by opening the exhaust valve at the top of the compression stroke, essentially turning the engine into an air compressor. Compressing combustion chambers without the rebound of compressed air and diesel combustion, works against the driveline. This technique is common in North American engines.

Exhaust Retarders can be thought of as a stovepipe damper closing the exhaust pipe. Exhaust can be retarded by either a butterfly type valve or a sliding gate valve. Retarding increases back pressure in the exhaust, making it harder to push the spent combustion gasses from the cylinder. This increases the crank's resistance as it pushes the rods up into the increased back pressure. Limiting this is the strength of the exhaust valve springs. If the back pressure is too high, the exhaust valves start to float open, causing them to hit the piston tops at the top of their stroke. The exhaust retarders need to be adjusted so the back pressure stays within the engine's back pressure capacity.

Hydraulic Driveline Retarders are similar to torque converters. The rotor vanes pump oil into the housing vanes, which puts resistance into the driveline. Drivers need to be mindful of engine oil temperature and turn the retarder off when the engine oil becomes too hot.

Electric Driveline Retarder is an electromagnet designed to retard drive shaft rotation. All the heat generated is vented out through the rotor vanes and housing. These can be found on all types of vehicles, but are primarily installed on transit buses, emergency vehicles and waste disposal vehicles. They are activated by service brake applications unlike the operation of the previous three retarders.



How do they apply to my driving?

Auxiliary retarders work best with lower speeds, and with the engine just under the rated RPM. Gear selection is important because engine retarders are most efficient at higher engine rpm. When using auxiliary retarders, select the appropriate gear before starting down hills. Be cautious on slippery roads as they can overpower available traction causing loss of control. Be aware of excessively loud retarders in urban areas. In many urban areas they are prohibited.

