The Pressure Plate can best be described as a large round metal plate with a notched ring or ram around it whose main job is to squeeze the individual Clutch Rings together.

It does this by receiving a high pressure supply of fluid through its inlet connection (bottom left corner of picture) from the accumulator assembly in the engine bay. This high pressure fluid (5,200 kPa) pushes the ram towards the Clutch Rings with enough force to squeeze the individual Clutch Rings together so that they become one unit.

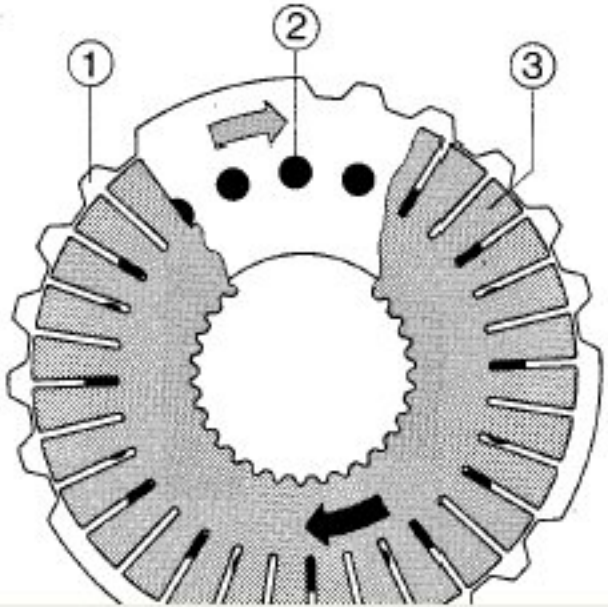
When this happens, the front Clutch Rings are no longer able to spin with the Ring Gear as the rear rings are preventing this. This in turn prevents the Ring Gear from being able to spin as it is locked to the front Clutch Rings. The knock on effect is that the 3 smaller Planetary Gears are also locked off by the Ring Gear not moving and this means that, instead of all the energy of the Planetary Gears being used to spin the Ring Gear and then front Clutch Rings, the Planetary Gears spin the previously stationary Sun Gear instead which in turn transmits the power to the Viscous Coupling.

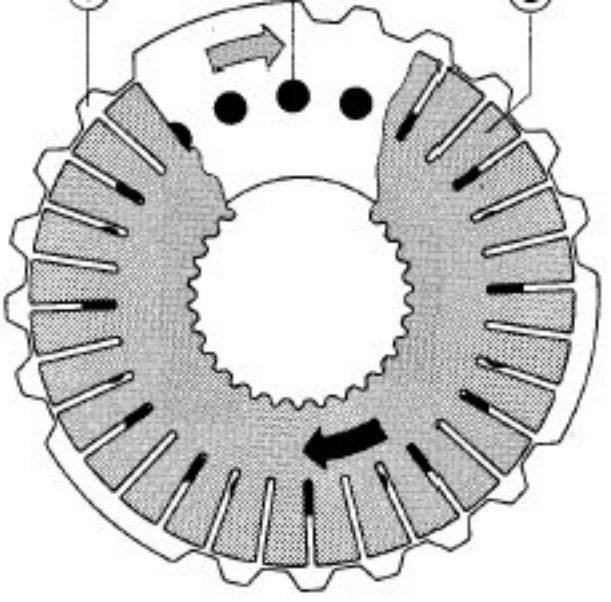
Under normal conditions, the drive is split so that 75% of the power is driven to the front wheels and 25% is driven to the rear wheels. The secret of the Viscous Coupling is based in the silicone fluid it contains.

When driving normally, the difference in RPM (rotational speed) of the front wheels and the rear wheels is minimal. That is they are travelling at virtually identical speeds. This also means that the internal discs and the external discs are also turning at the same speed as these are connected to the corresponding axles.

If the speed of one set of wheels were to be more than the other, for example the front wheels lose grip so spin faster than the rear, then the difference in speeds of the corresponding disc's in the Viscous Coupling will also increase proportionally. In this case the inner discs would spin faster than the rest as these are connected to the front wheels.

This difference in speed of the discs means that the silicone fluid can no longer flow freely between the plates. This would cause a "cutting" action within the silicone fluid as it is sliced between the slits of the interior discs and the holes of the exterior discs resulting in the silicone fluid heating up instantly -





1. External Disc
2. Silicone Fluid
3. Internal Disc

The properties of the silicone fluid are such that as the temperature increases so does the viscosity or thickness of the fluid. This results in the previously freely spinning plates to become increasingly locked together allowing more of the power to be transferred to the rear axle via the external discs.

In extreme cases, the power transfer can be as much as 100% to the rear wheels.

This is the basis of the Viscous Coupling system within the Vauxhall Cavalier/Calibra 4WD system