



Visco clutch

General points

The Visco clutch is part of the Visco fan. It has the task of creating the frictional connection between the drive and the fan wheel depending on temperature, and thus influencing its speed. There is a plastic fan attached to the clutch which generates the air flow as required.

Visco fans are mainly used in cars with longitudinally-mounted large-capacity engines and in trucks.

Design/Function

The Visco clutch is usually driven directly by the engine via a shaft (Fig. 1). If no cooling air is required, the Visco clutch switches off and continues to run at a lower speed. As requirements increase, silicone oil flows from the storage area into the working area. There, the drive torque is transferred to the fan, the continuously variable speed of which is set automatically on the basis of the operating conditions by means of wear-free viscous friction. The switching point is around 80 °C. In the case of conventional Visco clutches, the air expelled by the fan meets bi-metal (Fig. 2), the thermal deformation of which has the effect of opening and closing a valve via a pin and valve lever.

Depending on the valve position and thus the amount of oil in the working area, the transferred torques and fan speeds are set. The amount of oil required is 30 - 50 ml (passenger car). Even with the working area completely full there is a difference between the speed of the drive and that of the fan (slip). The heat produced is dissipated to the surrounding air via the cooling ribs.

In the case of the electrically triggered Visco clutch, control takes place directly via sensors. A regulator processes the values and a pulsed control current carries these to the integrated electromagnet. The defined guided magnetic field regulates the valve which controls the internal oil flow via an

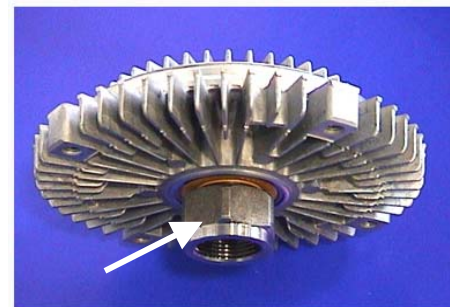


Fig. 1

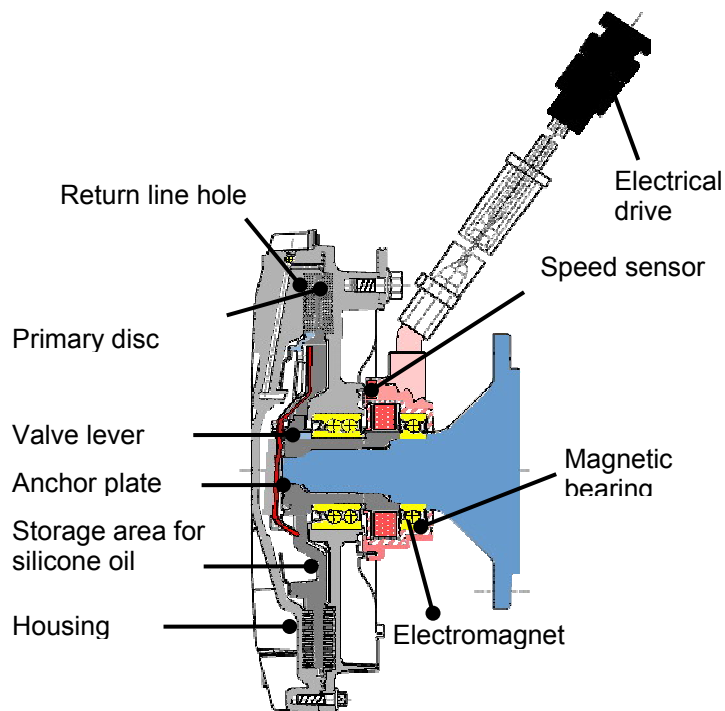


Fig. 2



armature. An additional sensor for fan speed completes the regulator circuit.

Electronically-controlled Visco clutch:



Effects of failure

A faulty Visco clutch can become noticeable as follows:

- Increased engine temperature or coolant temperature
- Heavy noise development
- Fan wheel continues to run at full speed under all operating conditions

The following can be considered as possible causes:

- Lack of frictional connection through leaking oil
- Loss of oil due to leak
- Soiling of the cooling area or bi-metal
- Internal damage (e.g. control valve)
- Bearing damage
- Damaged fan wheel
- Permanent full frictional connection due to faulty clutch



Troubleshooting

Test steps towards recognising faults:

- Check the level of coolant and the antifreeze content
- Check the Visco clutch with regard to outer soiling and damage
- Check the bearing for play and noises
- Make sure no oil is leaking
- Check the Visco clutch by turning it by hand with the engine switched off. With the engine cold, the fan wheel should be easy to turn and with the engine hot it should be hard to turn.
- If possible check the slip of the clutch using speed comparison between the speeds of the fan and the drive shaft. With full frictional connection, the difference may only be max. 5% for directly driven fans. An optical speed measuring device with reflective strips is suitable for this purpose (Fig. 3)
- Check the electrical connection (electronically-triggered Visco clutch)
- Check air cover/air baffle plates
- Make sure there is enough air flowing through the fan



Fig. 3