

GF27.20-P-3002AHZ	Torque converter lockup clutch control, function	5.5.08
TRANSMISSION	722.902 /903 /904 /906 /907 in MODEL 164.1 as of Model Year 09 /Modification year 08 Model refinement package	
TRANSMISSION	722.902 /903 /904 in MODEL 164.8 as of Model Year 09 /Modification Year 08	
TRANSMISSION	722.902 /904 /906 /999 in MODEL 251.0 as of Model Year 09 /Modification year 08	
TRANSMISSION	722.902 /904 /906 /999 in MODEL 251.1 as of Model Year 09 /Modification year 08	

**Function requirements for torque converter lockup clutch control, general**

- Circuit 87 ON
- Circuit 61 (engine running)

**Control of torque converter lockup clutch, general**

The torque converter lockup is a slip-controlled system. The fully integrated transmission control unit (VGS) (Y3/8n4) compares the actual slip with the specified slip. The actual slip is calculated from the difference between engine speed and transmission input speed. The specified slip is a function of transmission input speed and engine load. The fully integrated transmission control unit (VGS) generates a pressure/current specification for the corresponding control solenoid valve depending on the calculated deviation between specified and actual slip and on different variables (e.g. engine torque).

**Control of torque converter lockup clutch, function sequence**

The function sequence is subdivided into the following steps:

- "OPEN" function sequence
- "OPEN-SLIP" function sequence
- "SLIP" function sequence
- "SLIP-OPEN" function sequence

The shifting strategy for the status transitions is based on the engine load and vehicle speed or vehicle acceleration.

**"SLIP" function sequence**

The required slip (specified slip) is stored in the fully integrated transmission-control control unit (VGS). This calculates the required control current and actuates the torque converter lockup clutch control solenoid valve (VGS) which influences the position of the torque converter lockup clutch regulating valve (precontrol). The clutch pressure in the torque converter lockup clutch depends on the regulating valve position and thus on the regulating valve geometry.

The actual slip is determined by the comparison of engine speed with turbine speed. If necessary an aftercontrol is introduced by the fully integrated transmission control unit (VGS). The clutch pressure in the torque converter lockup clutch can be increased or reduced by the aftercontrol.

In addition, there are special strategies for calculation of specified slip/pressure for the following operating conditions:

Clutch filling (corresponds to OPEN-SLIP state), load change phases, gear changes.

The clutch pressure in the torque converter lockup clutch is drawn from the working pressure by means of the torque converter lockup clutch regulating valve. The regulating valve position is influenced by the torque converter lockup clutch control solenoid valve (VGS) (Y3/8y8). The clutch pressure in the torque converter lockup clutch depends on the regulating valve position and thus on the geometry of the torque converter lockup clutch regulating valve.

**"OPEN" function sequence**

The regulating valve of the torque converter lockup clutch is located in the basic position. The working pressure acts on the converter regulating valve via a connecting line between the torque converter lockup clutch regulating valve and the converter regulating valve. Lubrication pressure is applied to the converter as a result. The torque converter lockup clutch is in the unpressurized condition.

**"OPEN-SLIP" function sequence**

The torque converter lockup clutch regulating valve is no longer in the basic position and as a result interrupts the connection between the torque converter lockup clutch regulating valve and the converter regulating valve. The torque converter lockup clutch is filled.

**"SLIP-OPEN" function sequence**

In this control state the clutch pressure in the torque converter lockup clutch is reduced in stages until it is eliminated.

** Emergency running**

The torque converter lockup clutch is not actuated in limp-home mode. Protection and adaptation functions are deployed to continuously monitor the transmission oil temperature and the frictional energy entering the clutch. Aging effects in the hydraulic components and mechanical components are compensated for by the fully integrated transmission control unit (VGS).

Fully integrated transmission control unit, component description	Y3/8n4	GF27.60-P-5165AHZ
---	--------	-------------------