MERCEDES BENZ 722.9

PRELIMINARY INFORMATION

Mercedes Benz has produced a new 5th generation electronically controlled gearbox with seven forward and two reverse speeds.

Vehicle Application/Transmission Designation

The W7A 700 is the only model size 722.9 being produced at the time of this written material, a smaller model the W7A 400 will be introduced at a later time.

This transmission is referred to as:

NAG 2 (Neues Automatische Getriebe 2)

New Automatic Gearbox 2 or 7G- Tronic

Vehicle Applications:

Select non 4MATIC (2WD) MY 2004 vehicles w/M113 engine.

S340, S/CL/E/SL500

Optional:

SLK (R171-09/04)

Standard Equipment:

CLS 350 (late 2004)
E350 (late 2004)
M Class (W164-2005)
R Class (W251-2005)
G Class (X164-2006)

End of production models that will unlikely receive the 722.9 would be W163, R170 & V463.

722.9 for W164/W251/X164 will be equipped with shift by wire (no shifter rod or cable). An electronic control module on the left rear side of the transmission just above the pan rail which operates a shift control valve and its position is monitored by a position sensor.

The 722.6 (NAG 1 or V) will continue production until approximately MY 2012 and installed in:

4 cyl models
Maybach
M275 vehicles
some select manufacturer's contract vehicles

Fluid Type

Newly developed suggested use "only" transmission fluid, referred to as "ATF 3353 with ***higher*** friction consistency, thermal stability and temperature rating. Can also be used on previous model 722.3/.4/.5/.6 transmissions. No scheduled maintenance required (fill for life) and available at Shell & Fuchs Europe oil suppliers in 1 liter bottles under Mercedes Benz part number ***A001 989 45 03 10.***

Electronic Control Components

The Transmission Control Module (Y3/8n4) which is flash capable, along with the following components:

Eight Solenoids:

Working Pressure Control Solenoid (Y3/8y1)
K1 Clutch Solenoid (Y3/8y2)
K2 Clutch Solenoid (Y3/8y3)
K3 Clutch Solenoid (Y3/8y4)
B1 Brake Clutch Solenoid (Y3/8y5)
B2 Brake Clutch Solenoid (Y3/8y6)
B3 Brake Clutch Solenoid (Y3/8y7)
Torque Converter Lock Up Solenoid (Y3/8y8)

Two Oil Floats

Oil Control Float 1 (31)
Oil Control Float 2 (32)

Three Speed Sensors

Turbine RPM Sensor (Y3/8n1)
Internal RPM Sensor (Y3/8n2)
Output RPM Sensor (Y3/8n3)

Selection Range Sensor (Y3/8s1)

are all integrated into the valve body assembly.

Shift Strategy

The shift strategy improvements include:

- Shorter computer reaction time by 0.1 second
- Downshifts shortened by up to 0.2 seconds
- Coasting downshifts shortened by 0.4/2.5 seconds
- 37-47 MPH acceleration times shortened by 23-28% (model dependant)
- Fuel consumption reduced by up to 4%
- Noise levels reduced, due to lower engine speed in 5th, 6th & 7th gear at constant vehicle speed
- Flexible adaptation to vehicle and engine

Variable Shift Programing

Two basic shift programs can be varied by customer (same as 722.6) using the S/C button on the Electronic Shifter Module (ESM)

"S" (Sport)

1st gear starts
Normal shift points
Reverse gear 1 (-3.416:1)

"C" (Comfort)

2nd gear starts
Earlier up-shifts and later downshifts
Reverse gear 2 (-2.231:1)

Note: Transmission will start in first gear if any of the following conditions apply:

1st gear is manually selected
3/4 to full throttle acceleration from start
Cold engine temp (pre catalytic warm up)

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Shift Optimal Gear (SOG)

Shift into Optimal Gear software as known in previous models.

Up shifts and downshifts based on driving style and engine load (similar to 722.6)

Shift interlock controlled by Electronic Shifter Module (ESM) same as previous models

Emergency function/Limp-home mode:

There are a variety of failsafe modes; if a solenoid is defective the gear affected is blocked (example solenoid Y3/8y7-B3 clutch is defective: no 1st, 7th or Reverse in "S" mode) If hydraulic fault prevents a gear from engaging then the previous gear will be applied. If the computer defaults while driving, all solenoids will be turned off. Solenoids that are normally open will allow full pressure to selected clutches and the transmission will be in 6th gear. After shifting to "P" oil pressure from K2 solenoid is redirected to B2/BR solenoid via emergency operation valves and the transmission will now achieve 2nd in "D" and Reverse.

Gear Ratio

The gear ratios are achieved with four multi-disc brakes and three multi-disc clutches, no free wheels units (sprags)

There are three planetary gear sets:

- Two simple
- One Ravigneaux

Torque Converter (same used in some 722.6)

Torque converter operates in open or slip mode in all seven forward gears.

Lock up converter is never fully locked.

Converter is open in 1st & 2nd gear if throttle and output shaft speed are in "Zone A"

Converter is in slip-control in all 7 forward gear if throttle and output shaft speed are in "Zone B". Oil feed pressure to the converter is varied depending on the amount of desired slip.

- Open: High flow
- Slip Control: Lower flow

Lock up clutch will turn off and transmission will shift to a lower gear at oil temperatures of 140C or higher.

Holds = 4 liters of fluid

Incorporates damper springs integral to lock up clutch to reduce vibration.

Vehicle Towing

If vehicle must be towed it should be transported by use of a flat bed trailer type of tow truck.

Alternate towing with vehicle drive axle lifted.

If either fore mentioned options are not available a tow bar (preferred) will suffice under the following conditions/limitations:

1. Turn key to position 2
2. Selector lever to"N" position
3. Max. towing speed 31 mph
4. Max. towing distance 31 miles

Note: If towing distance or speed exceeds pre mentioned values damage may occur to transmission.

Clutch Clearances	no. of disc	722.9 (mm)	722.93 (mm)
B1 Brake	3	2.0-2.4	
	4	2.2-2.6	2.2-2.6
	5		2.3-2.7
B2 Brake (internal tooth)	4	1.7-2.1	1.7-2.1
	5	1.8-2.2	1.8-2.2
(external tooth)	5	1.7-2.1	1.7-2.1
	6	1.8-2.2	1.8-2.2
B3 Brake	3	2.0-2.4	2.0-2.4
	4	2.2-2.6	2.2-2.6
	5	2.3-2.7	2.3-2.7
Br Brake	N/A	1.0-1.4	1.0-1.4
K1 Clutch	3	2.0-2.4	
	4	2.2-2.6	
	5	2.4-2.8	2.4-2.8
	6	2.4-2.8	
K2 Clutch	3	1.7-2.1	
	4	1.9-2.3	
	5	2.1-2.5	
	6	2.2-2.6	1.9-2.3
	7		2.0-2.4
	8		2.1-2.5
K3 Clutch	3		2.4-2.8
	4	2.2-2.6	
	5	2.4-2.8	

All clutch clearances are measured between the Flange and retainer ring, while applying the amount of hand pressure listed below.

B1 = N 600 B2 = N 1000 B3 = N 600
BR = N/A K1 = N 800 K2 = N1200
K3 = N 600

Note: B2 Brake multi disc clutches use single sided plates at this point in time other clutch members may use single sided plates at a future date.