
V6

HISTORY

- Introduced in 2004
- Based on the M112 V6 introduced in 1998.
- 3.5 litre V6 develops a peak power of 200kW (272hp) at 6000 rpm and torque of 350Nm from 2500 – 5000 rpm.
- 87 per cent of this peak torque is available from just 1500 rpm
- Developed at the Stuttgart-Unterturkheim facilities where a team of around 500 engineers, technicians and mechanics developed the new design.
- Approximately 400 prototype engines were built for testing

OBJECTIVES

The key development objectives for the engine were:

- Power output
- Torque output
- Fuel consumption
- Comfort
- Exhaust emissions

New design include variable camshaft timing, a two-stage intake manifold, tumble flaps, heat management and lightweight engine

SPECIFICATION

E25

- Displacement - 2.5 L (2496 cc)
- Bore dimension - 88 mm
- Stroke - 68.4 mm
- Output - 201 hp (150 kW) @ 6100 rpm
- Torque - 245 Nm @ 2900-5500 rpm.

SPECIFICATION

E30

- Displacement - 3.0 L (2996 cc)
- Bore dimension - 88 mm
- Stroke - 82 mm
- Output - 228 hp (170 kW) @ 6000 rpm
- Torque - 300 Nm @2500-5000 rpm

SPECIFICATION

E35

- Displacement - 3.5 L (3498 cc)
- Bore dimension - 92.6 mm
- Stroke - 86 mm
- Output - 268 hp(200 kW) @ 6000 rpm
- Torque - 350 Nm @ 3500 rpm

SPECIFICATION

CGI Variant

- Direct injected variant introduced in 2006
- Stratified-Charged Gasoline Injection (CGI).
- Output -288 hp(215 kW)
- Torque - 365 Nm

SPECIFICATION

Non CGI

- Update to non-CGI in 2008.
- Output - 232 kW @ 6500 rpm
- Torque - 360 Nm @ 4900 rpm.
- Rev-limit raised to 7200 rpm, increase in compression ratio and modifications to the valve train.

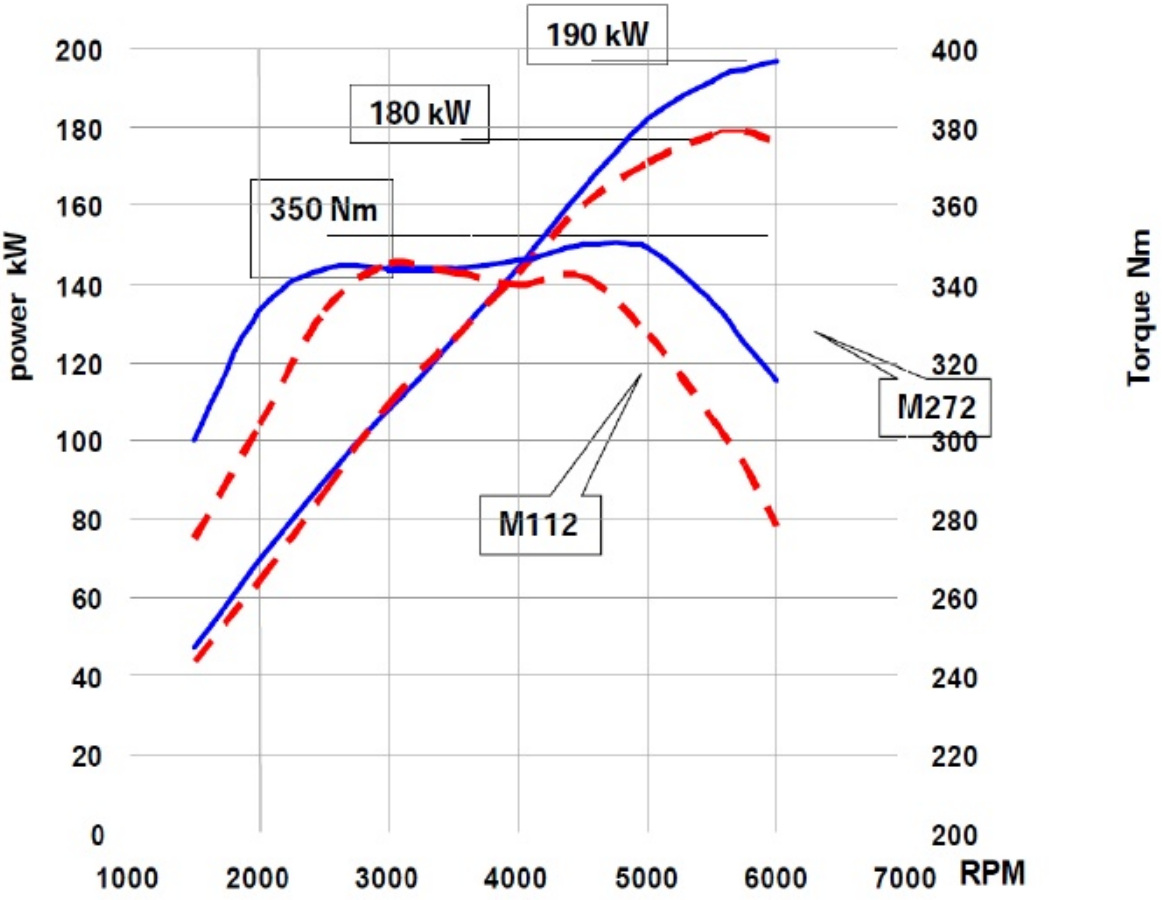
COMPARISON

M272 3.5 litre	M112 3.2 litre
268 hp @ 6000 rpm	214 hp @ 5700 rpm
349 Nm @ 2500 to 5000 rpm	309 Nm @ 5700 rpm
Compression Ratio 10.7 : 1	Compression Ratio 10.0 : 1
Sparkplugs per cylinder 1	Sparkplugs per cylinder 2
ME 9.7	ME 2.8
Coil On Plug	Double ignition coils

COMPARISON

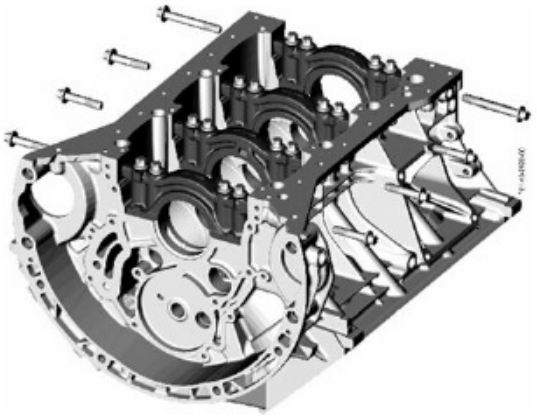
Red line (Dash) =
M112 3 valve

Blue line (solid) =
M272 4 valve



FEATURES

- 90 degree V6 configuration
- Lighter engines components
- Aluminum crank case and iron coated pistons
- Lighter one piece crankshaft

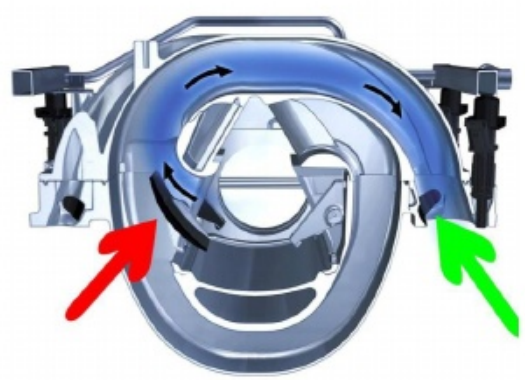


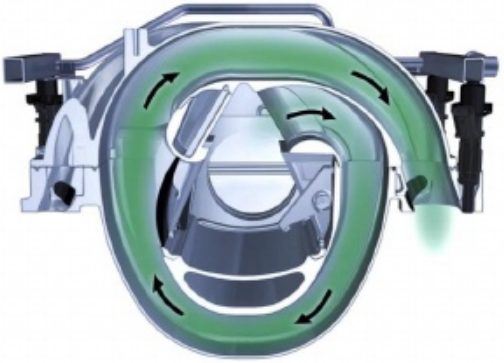
- Forged steel connecting rods
- Counter rotating balance shaft
- Silicon /aluminum lined cylinders
- Magnesium intake manifolds.
- 4 valves per cylinder and DOHC

- Continuous VVT on both intake and exhaust camshafts
- Nickel coated high strength exhaust valves
- 40° advanced for intake (from 4° BTDC to up to 36° ATDC)
- 40° retard for exhaust (from 30° BTDC to up to 10° ATDC)
- 4 hall effect sensors, capable of detecting cam position during stationary.

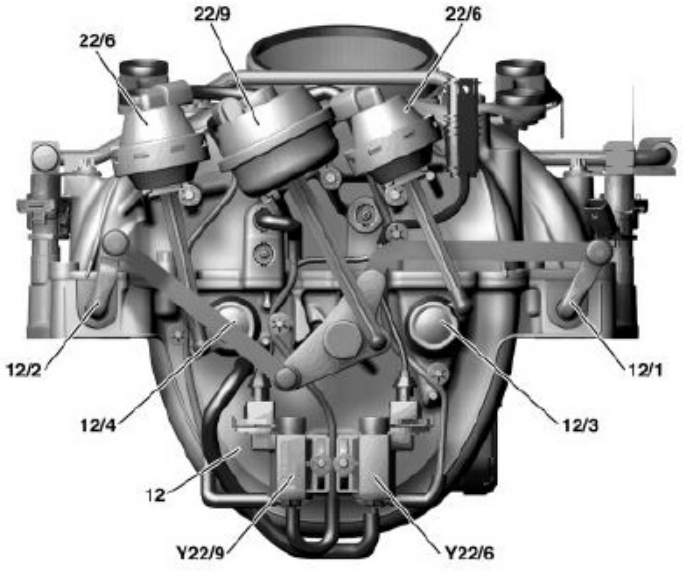
VARIABLE LENGTH INTAKE MANIFOLD

- Magnesium intake manifold with integrated vacuum reservoir
- Variable intake runner
  - Short runner for higher RPM
  - Long runner for lower RPM

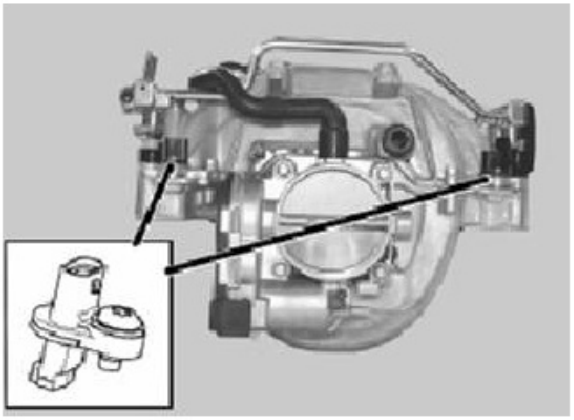


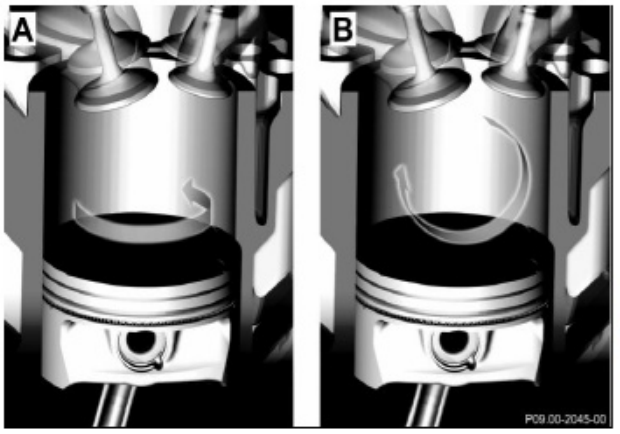


- Engine load over 50% from approx. 1750 RPM intake flaps closed (long runner)
- Above 3900 RPM switchover solenoid deactivated via ME intake flaps open (short runner)



- Swirl-Flaps also added providing better fuel mixture
- Intake air is swirled via swirl flap for improved mixture process
- Vacuum diaphragm driven by ME controls flap position
- Swirl flap position sensors (hall sensors) located at rear of intake manifold





IGNITION COIL

- Individual coil on plug
- Driver located inside coil not in ME 9.7
- Each coil controlled separately
- Diagnostic information sent back to ME
- Bi-directional communication with ME

ME CONTROLLED THERMOSTAT

- Coolant Temperature is regulated via Me 9.7
- 3 plate thermostat
- Regulates temperature from 185°F to 221°F (85°C to 105°C)
- 4 operating modes dependent on engine temperature and load
- Improved engine warm-up and optimum control of engine temperature

SENSORS IN M272

Camshaft Hall Sensor

- Located at the front of the cylinder head in front of respective camshaft
- Detect the camshaft position in a contactless manner using pulse wheel on camshaft
- Ensures camshaft position even at engine off
- Reduces exhaust emission and ensures optimal injection quantity

Crankshaft Hall Sensor

- Behind the left cylinder bank on the transmission flange
- Detects position and rotational speed of the crankshaft in a contactless manner using incremental wheel of perforated plate

Knock Sensor

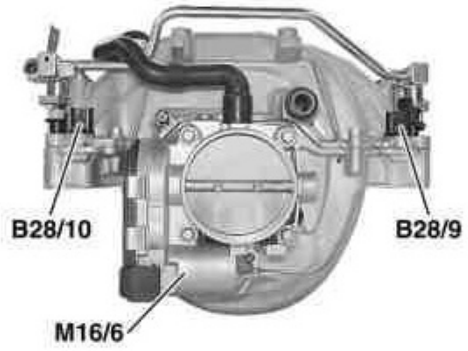
- Located under the variable intake manifold on crankcase
- Detects vibrations on crankcase for knock control
- Vibration converted by internally mounted piezoelectric material to electrical signal

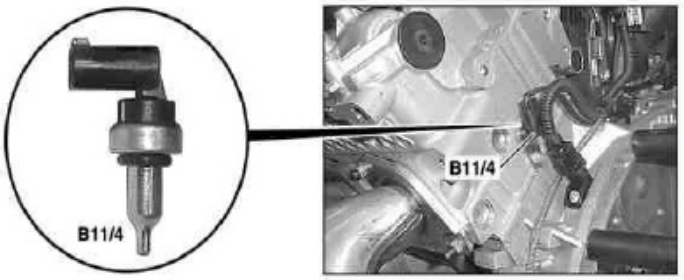
Coolant Temperature Sensor

- Located at the rear of left cylinder head
- Detect coolant temperature and produce corresponding voltage
- Uses a negative temperature coefficient resistor

Intake Manifold Tumble Flap Position Sensor

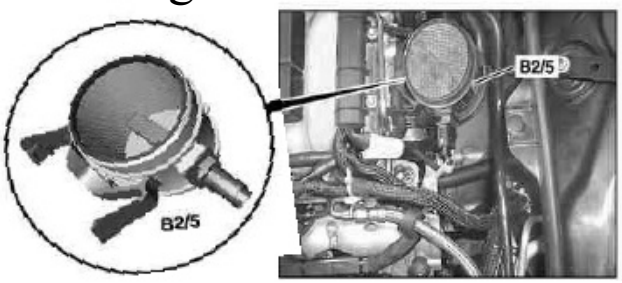
- Located at rear end of variable intake manifold above tumble flap shaft
- Detect the manual end positions of tumble flap shafts





Hot Film Mass Air Flow Sensor

- Located behind the variable intake manifold
- Detect mass flow rate of air and temperature at intake
- Electronically regulates the MAF using changeable voltage at heating resistor

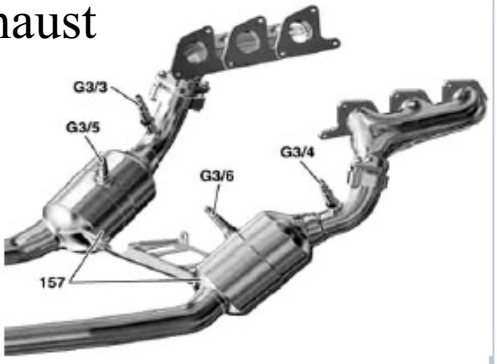


Intake Manifold Pressure Sensor

- Located above the left cylinder head
- Detects the absolute pressure at the variable intake manifold
- Intake manifold pressure deforms a membrane which acts on a potentiometer

Oxygen Sensor

- **Downstream of catalytic converter**
  - Screwed on to the side of firewall catalytic converter
  - Detects the residual oxygen content in exhaust gas from catalytic convertor
  - Consists of the sensor element (Nernst concentration cell)



- **Upstream of catalytic converter**
  - Screwed on to upstream of firewall catalytic converter
  - Detects the residual oxygen content in exhaust gas to catalytic convertor
  - Consists of the sensor element (Nernst concentration cell with O_2 pump cell)

Fuel Pressure sensor

- Located above the left closing plate of the fuel tank
- Detect fuel pressure for injection system
- It uses a membrane which deforms by fuel pressure which acts on a potentiometer changing resistance

Accelerator pedal sensor

- Located behind accelerator pedal module
- Coverts mechanical movement of accelerator pedal into electrical voltage
- Consists of rotating ring magnet in a printed circuit board

VEHICLES USING 272 ENGINES

2004- 2010:

- C 230 (E25)
- SLK 350 (E35)
- CLS 350 (E35)
- E 230 (E25)

2005- 2010:

- CLS 280 (E30)
- CLK 280 (E30)
- C 280 (E30)
- E 280 (E30)
- SL 280 (E30)
- C 350 (E35)
- E 350 (E35)
- S 350 (E35)
- SL 350 (E35)
- Viano (E35)

2006-2010:

- R 280 (E30)
- R 350 (E35)
- ML 250 (E35)
- Sprinter (E35)

2007-2010:

- S 280 (E30)

2008-2010:

- CLC 230 (E25)
- CLC 350 (E35)

ENGINE DIAGNOSTICS

Compression Test

- Pressure in the cylinder checked by a compression gauge
- Pressure is indicated in pounds per square inch(psi) or metric kilopascals(kPa)
- Wet compression test allows you to identify if it is caused by worn or damaged piston rings

Cylinder Leakage Test

- To measure the percentage of compression lost and to help locate the source of leakage
- Applies compressed air to a cylinder through the spark plug hole
- Gauge registers the percentage of air pressure lost when the compressed air is applied to the cylinder, typically reads 0% to 100%

Cylinder Power Balance Test

- Used to check if all of the engine's cylinders are producing the same amount of power
- Each cylinder is disabled, one at a time, and the change in engine speed is recorded
- If all of the cylinders are producing the same amount of power, engine speed will drop the same amount as each cylinder is disabled

Vacuum Test

- Manifold vacuum is tested with a vacuum gauge, the gauge's hose is connected to a vacuum fitting on the intake manifold
- The intensity of the fluctuation indicates the severity of the problem

CONCLUSION

Perhaps the most impressive aspect of the engine is its ability to provide such a wide and high torque plateau with an excellent specific power figure. That combination should make for a very drivable design that also retains plenty of punch when the throttle is floored.