Overview of innovations/ changes
Model 213 with engine 177

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Model 213 with engine 177

Contents

The Mercedes AMG E 63 from the model series 213 is presented in this document. New features in this model, the technical highlights and the differences compared with the Mercedes AMG C 63 from model series 205 are described.

The content of the document is structured as follows:

- **Introduction**
- **177 AMG LS2 engine**
- **AMG SPEEDSHIFT MCT 9-speed sport transmission**
- **All-wheel drive AMG Performance 4MATIC+**
- **Electric differential lock**
- **AMG sports suspension with AIR BODY CONTROL**
- **Exterior**
- **Interior**
- **Special tools**
- **Technical data**
- **Overview of major assemblies**

Introduction

The new Mercedes AMG E 63 (model 213) will be launched on the market in March 2017. The M177 engine known from the Mercedes AMG C 63 (model 205) with power level 1 (LS1) has been revised in various important points and will be used in the Mercedes AMG E 63 (model 213) with power level 2 (LS2).

View of engine compartment from above

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177 AMG LS2 engine

The 177 AMG LS2 engine has direct injection with dual turbocharging in the "hot inner V". Compared with the 177 AMG LS1 engine, two twin-scroll turbochargers are used. The use of the twin-scroll turbochargers contributes to a reduction in exhaust back pressure and to improved gas exchange.

Charge air cooling takes place via a low temperature circuit that is separated from the cooling circuit. The ME-SFI [ME] control unit (N3/10) (control unit for engine management) is also integrated into the low temperature circuit because of the thermal load caused by the "hot inner V".

A CSO is used in this engine as an important ecological element for saving fuel. In partial load operation, this allows

four cylinders to be shut off depending on the characteristics map (half-engine operation).

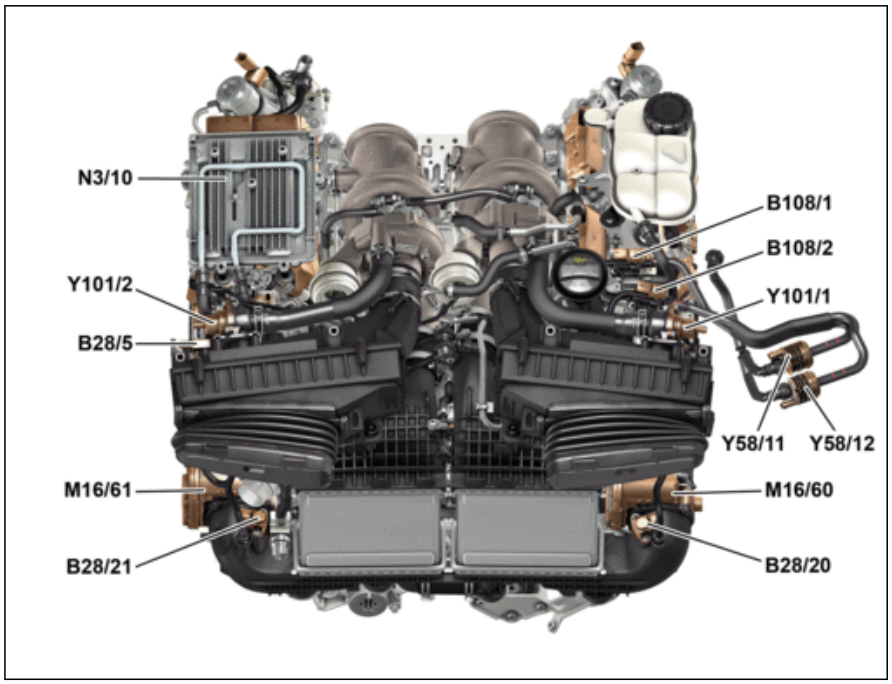
Overview of the following important special features:

- Motor
  - CSO "AMG Cylinder Management"
  - Twin-scroll turbochargers with flow-separated exhaust manifolds
  - Use of new pistons for lower compression
  - Crankcase, identical design but conversion to chill cast method
  - Two-mass flywheel with centrifugal pendulum
  - Oil pump with increased delivery rate
  - Oil separator, adapted to modified installation space
  - Design of the engine cover adapted to the modified overall look and realization of a new engine compartment flow concept
- Fuel injection
  - Optimized high pressure fuel pumps with higher delivery rate and modified fuel high-pressure lines (rails)
- Air intake/charging
  - Charge air distributor, adapted to modified flow pattern
  - Air filter, tailored to increased output
  - Charge air cooler, rearranged and adapted to increased output
- Cooling
  - ME-SFI [ME] control unit at top and cooled via low temperature circuit
  - Larger volume and altered position of the coolant expansion reservoir (left cylinder head cover)

Engine views

View of engine from top front

B28/5	*Pressure sensor downstream of air filter, right cylinder bank*
B28/20	*Left pressure sensor upstream of throttle valve*
B28/21	*Right pressure sensor upstream of throttle valve*
B108/1	*Left purging pressure sensor (for code 494 (USA version))*
B108/2	*Right purging pressure sensor (for code 494 (USA version))*
M16/60	*Left throttle valve actuator*
M16/61	*Right throttle valve actuator*
N3/10	*ME-SFI [ME] control unit*
Y58/11	*Left purge control valve*
Y58/12	*Right purge control valve*
Y101/1	*Left bypass air switchover valve*
Y101/2	*Right bypass air switchover valve*



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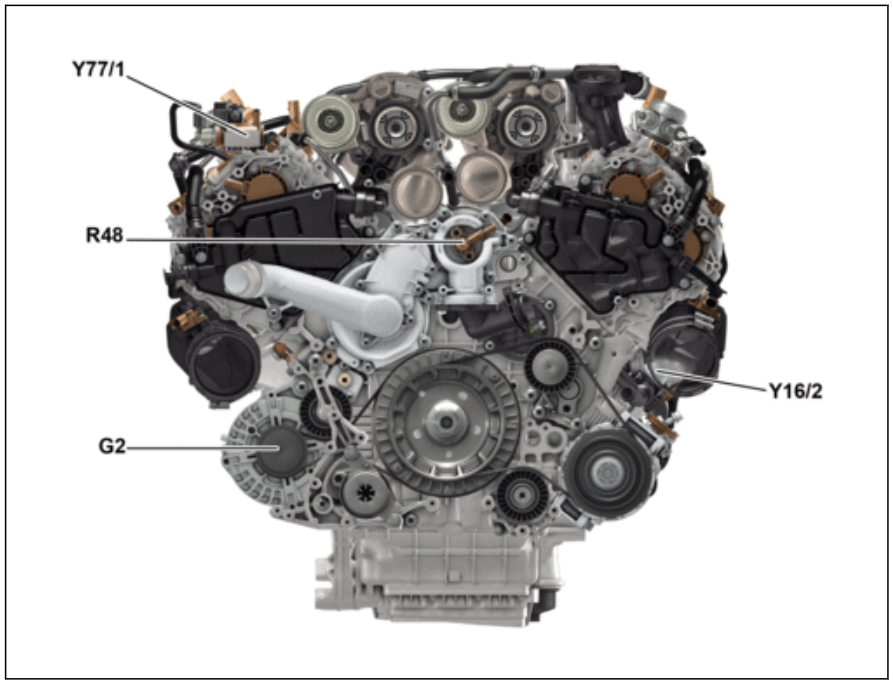
Front view of engine

G2	*Alternator*
R48	*Coolant thermostat heating element*
Y16/2	*Heating system shutoff valve*
Y77/1	*Boost pressure control pressure transducer*



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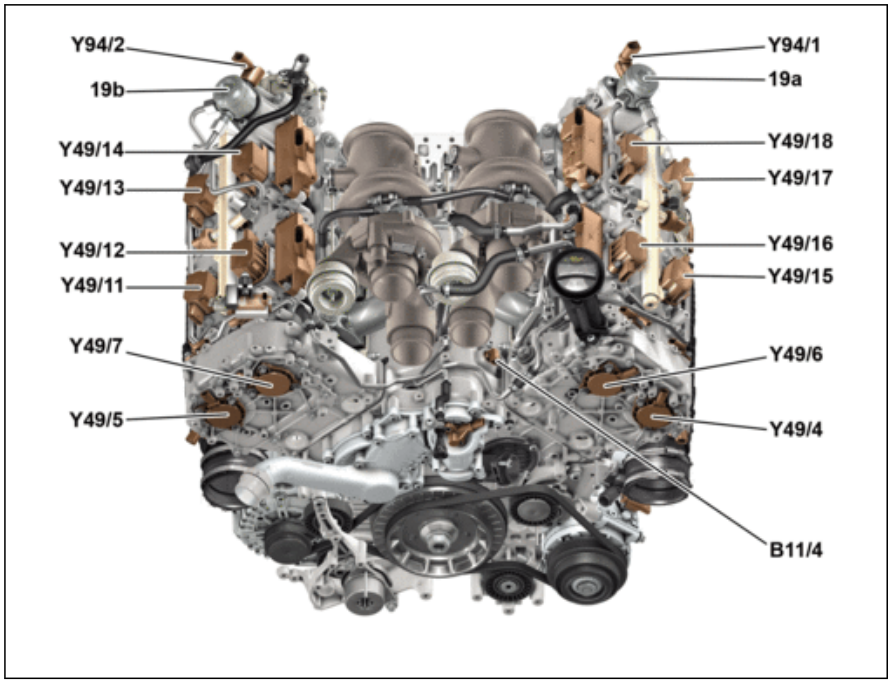
View of engine from top front

19a	*Fuel system high pressure pump on the left*
19b	*Fuel system high pressure pump on the right*
B11/4	*Coolant temperature sensor*
Y49/4	*Left intake camshaft solenoid*
Y49/5	*Right intake camshaft solenoid*
Y49/6	*Left exhaust camshaft solenoid*
Y49/7	*Right exhaust camshaft solenoid*
Y49/11	*Cylinder 2 intake CAMTRONIC actuator*
Y49/12	*Cylinder 2 exhaust CAMTRONIC actuator*
Y49/13	*Cylinder 3 intake CAMTRONIC actuator*
Y49/14	*Cylinder 3 exhaust CAMTRONIC actuator*
Y49/15	*Cylinder 5 intake CAMTRONIC actuator*
Y49/16	*Cylinder 5 exhaust CAMTRONIC actuator*
Y49/17	*Cylinder 8 intake CAMTRONIC actuator*
Y49/18	*Cylinder 8 exhaust CAMTRONIC actuator*
Y94/1	*Left quantity control valve*
Y94/2	*Right quantity control valve*



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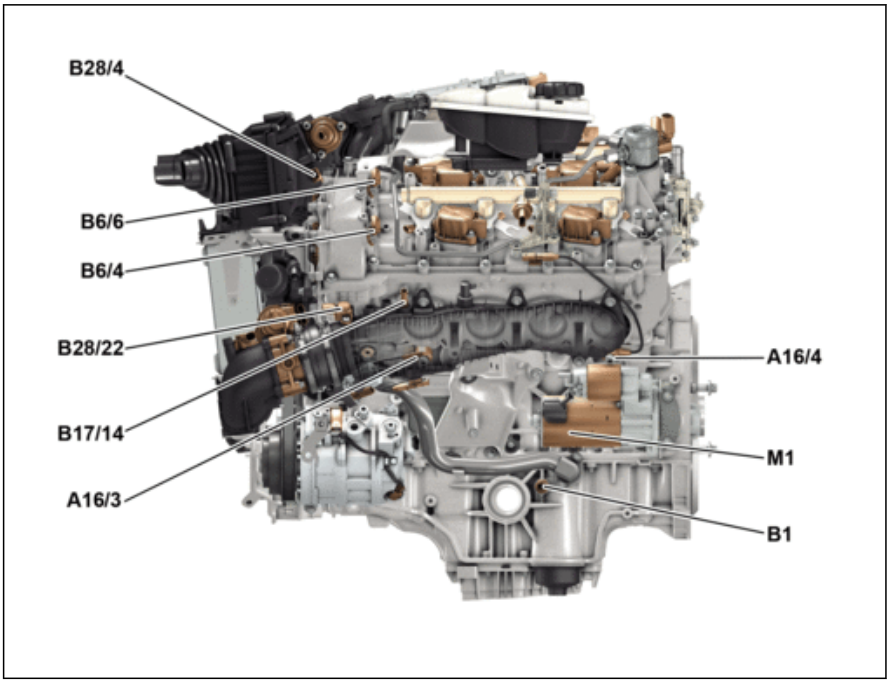
View of engine from left

A16/3	*Knock sensor 3*
A16/4	*Knock sensor 4*
B1	*Engine oil temperature sensor*
B6/4	*Left intake camshaft Hall sensor*
B6/6	*Left exhaust camshaft Hall sensor*
B17/14	*Left charge air temperature sensor*
B28/4	*Pressure sensor downstream air filter, left cylinder bank*
B28/22	*Left pressure sensor downstream of throttle valve*
M1	*Starter*



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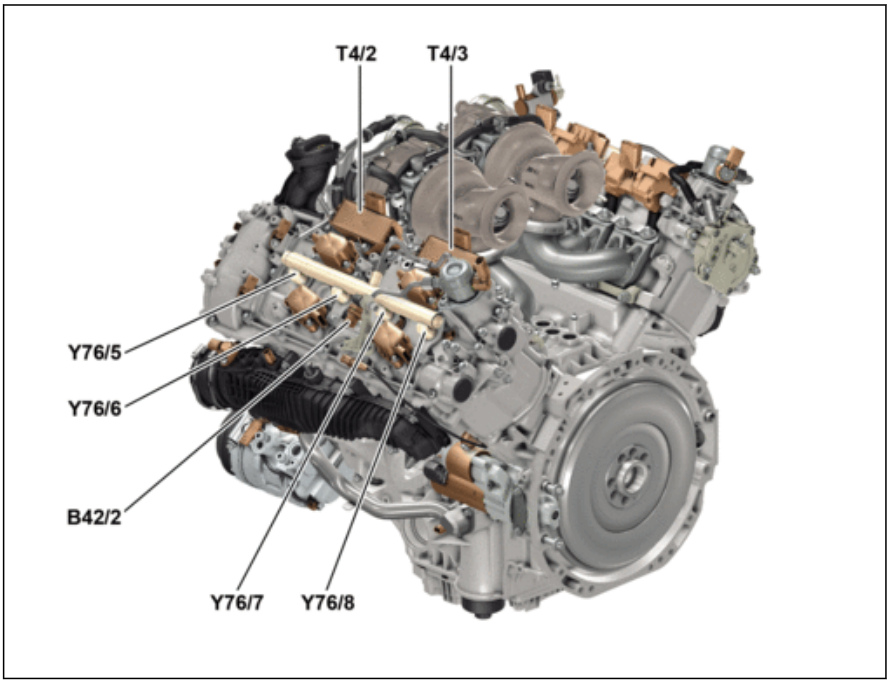
View of engine from left rear

B42/2	*Left fuel pressure and temperature sensor*
T4/2	*Cylinders 5+6 ignition coil*
T4/3	*Cylinders 7+8 ignition coil*
Y76/5	*Cylinder 5 fuel injector*
Y76/6	*Cylinder 6 fuel injector*
Y76/7	*Cylinder 7 fuel injector*
Y76/8	*Cylinder 8 fuel injector*



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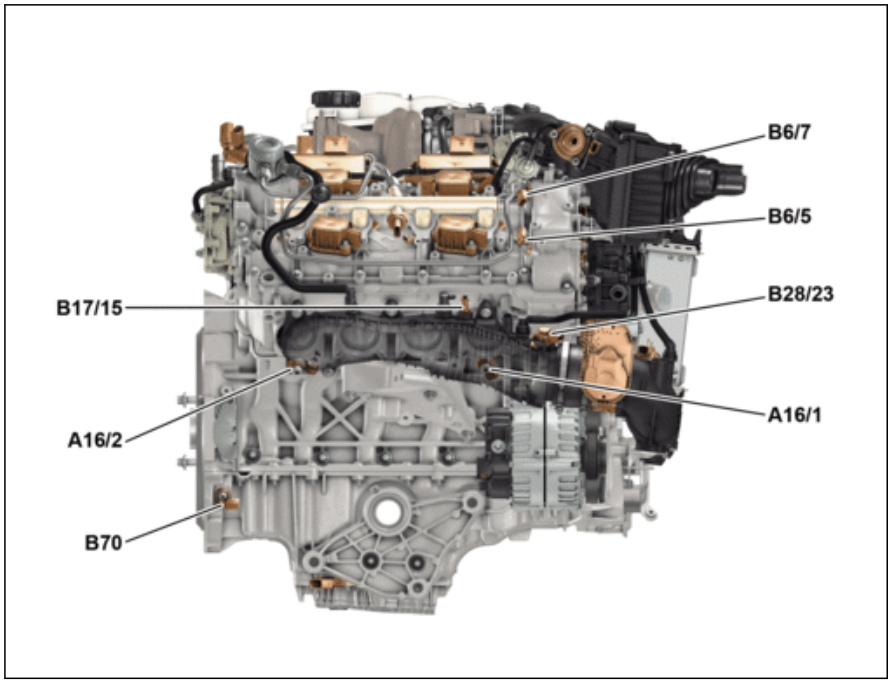
View of engine from right

A16/1	*Knock sensor 1*
A16/2	*Knock sensor 2*
B6/5	*Right intake camshaft Hall sensor*
B6/7	*Right exhaust camshaft Hall sensor*
B17/15	*Right charge air temperature sensor*
B28/23	*Right pressure sensor downstream of throttle valve*
B70	*Crankshaft Hall sensor*



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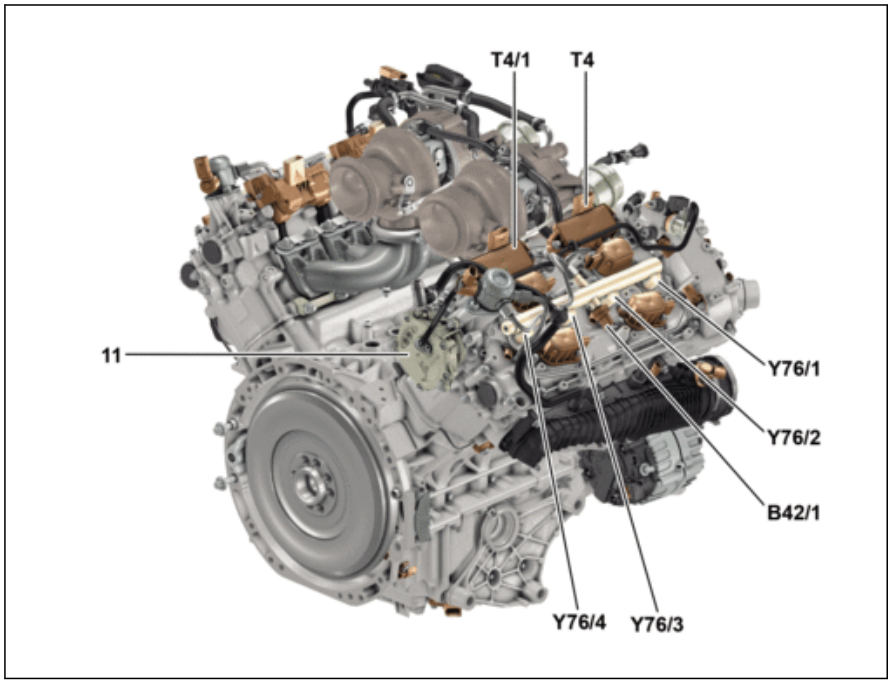
View of engine from right rear

11	*Vacuum pump*
B42/1	*Right fuel pressure and temperature sensor*
T4	*Cylinders 1+2 ignition coil*
T4/1	*Cylinder 3+4 ignition coil*
Y76/1	*Cylinder 1 fuel injector*
Y76/2	*Cylinder 2 fuel injector*
Y76/3	*Cylinder 3 fuel injector*
Y76/4	*Cylinder 4 fuel injector*



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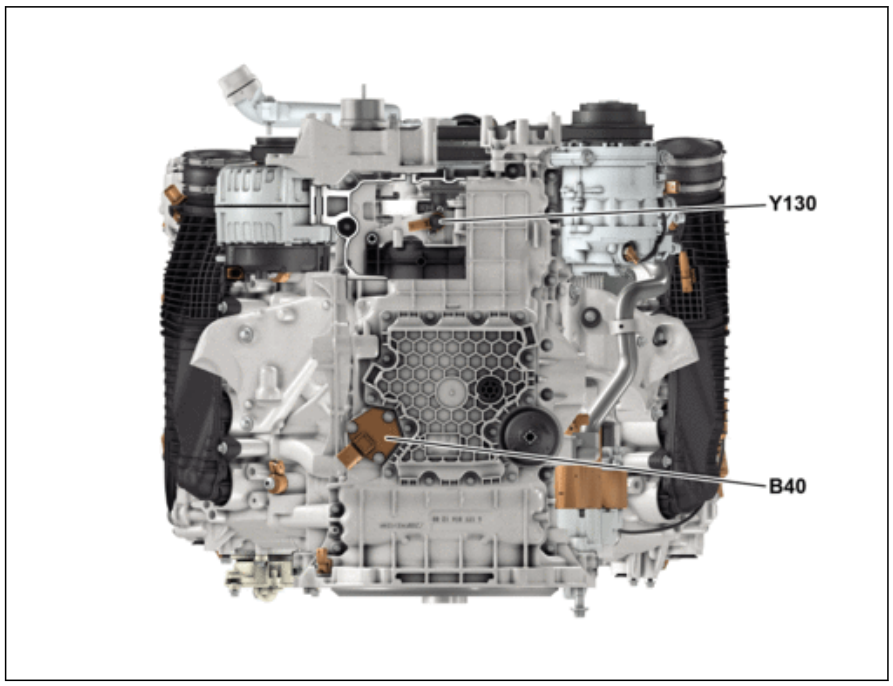
View of engine from below

B40	*Oil sensor (oil level, temperature and quality)*
Y130	*Engine oil pump valve*



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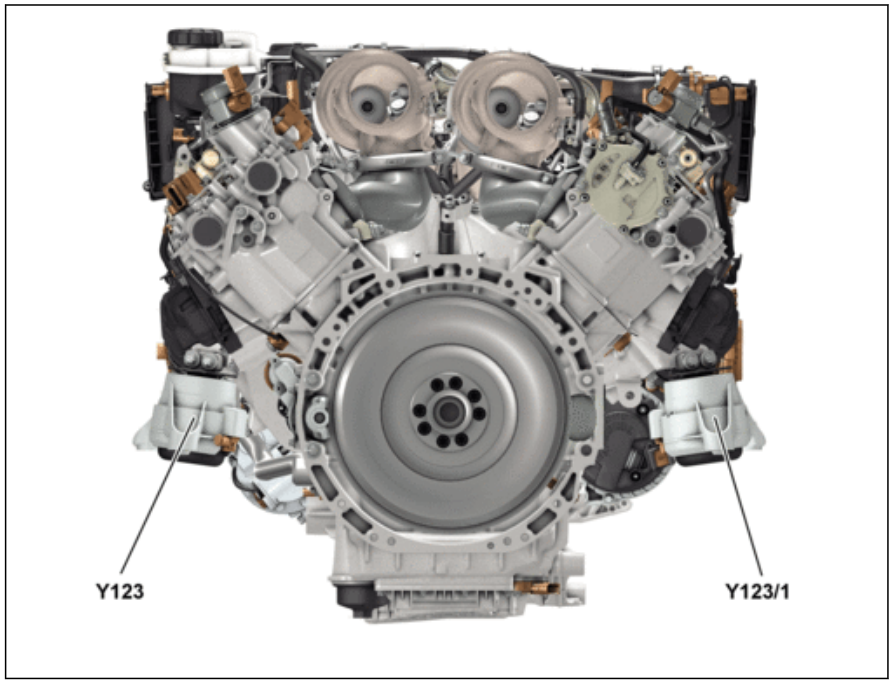
Active engine mount

The active engine mounts help to resolve the conflict of objectives between having a connection for the drivetrain that is as soft as possible for high comfort and having a connection that is as stiff as possible for optimum vehicle dynamics. The dynamic mounts can adjust their rigidity to the respective driving conditions and requirements continuously and swiftly.

The mounts are uncompromisingly stiff on the race track, which further reduces the inertia effect of the major assembly. On the other hand, comfort is noticeably improved with a soft mount connection, for example on poorly surfaced stretches of road. In the case of surface undulations, the drivetrain is calmed swiftly by a higher level of damping.



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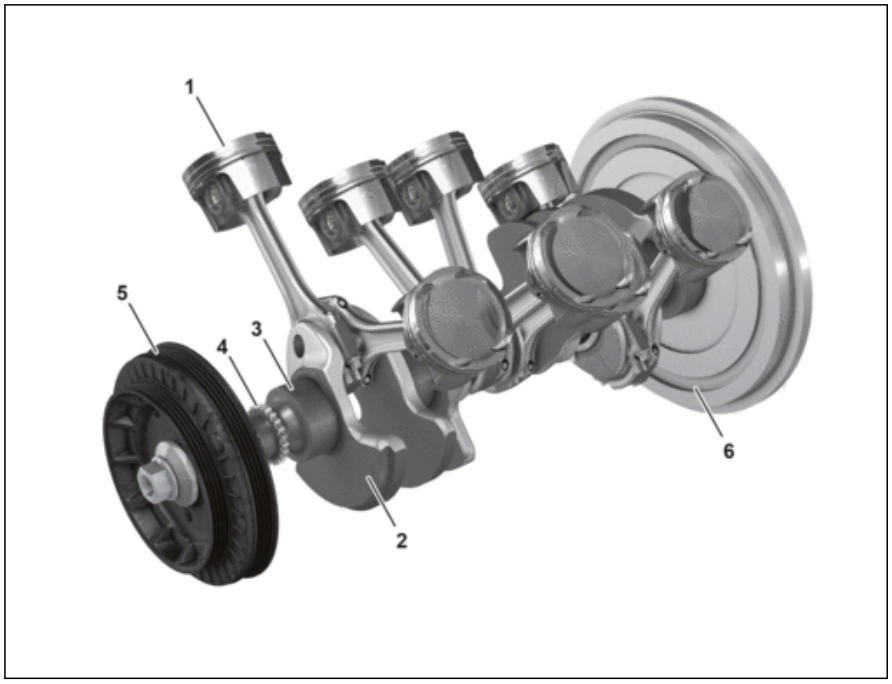
View of engine from rear (for S model)

Y123	*Left active engine mount*
Y123/1	*Right active engine mount*

Crank assembly

Analogously to the 177 AMG LS1 engine, the crank assembly is equipped with forged pistons that have been adapted to the combustion process and the arrangement of the fuel injectors. The design of the pistons allows an ignition pressure load of up to 140 bar. The crankshaft is also forged to optimize the strength. An aluminum viscous vibration damper enables the required vibration reduction to be achieved in the very limited installation space available.

A new addition is a two-mass flywheel that reduces the rotational irregularities of the crankshaft in half-engine operation when the CSO is activated. Unfavorable torsional vibrations in the following drivetrain are thereby reduced.



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View of the crankshaft with pistons from front left

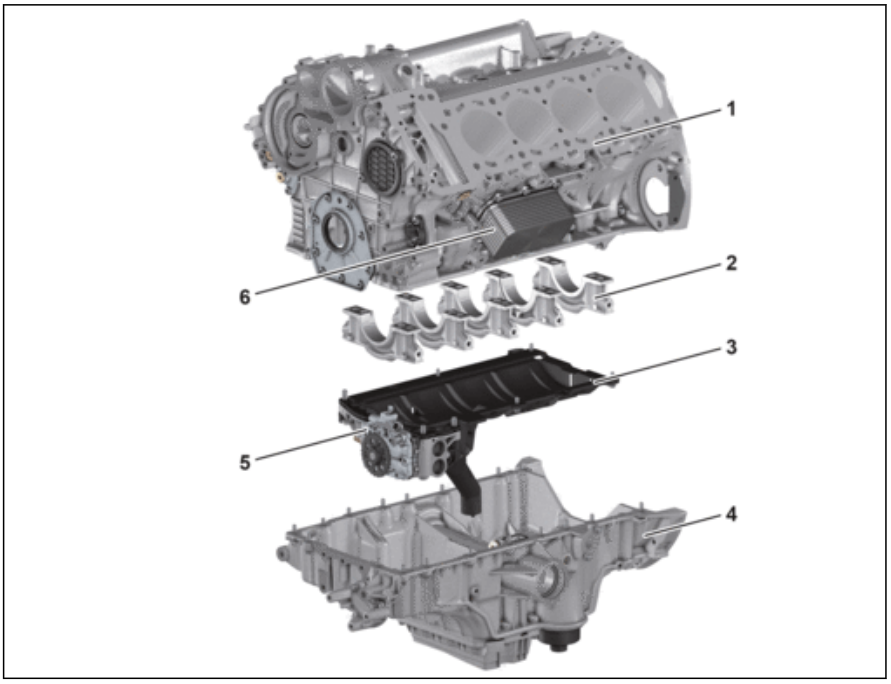
1 Piston
2 Counterweight
3 Crankshaft bearing
4 Drive pinion for timing chain
5 Vibration damper/belt pulley
6 Two-mass flywheel with centrifugal pendulum

Crankcase for 177 AMG LS2 engine

The engine crankcase is made of aluminum chill cast and it has a closed deck design. The hardness of the cylinder barrels is improved in comparison with conventional cast iron cylinder linings due to the optimized TWAS coating (NANOSLIDE®).

Several cross and longitudinal struts give the crankcase an extremely high degree of rigidity. Cross ventilation bores between the crank chambers of the individual cylinder banks enable a reduction in friction loss. The air that is sucked or pressed into the crank chamber during the compression/ expansion phase of the piston circulates through these bores. This ensures effective pressure compensation between the individual crank chambers.

The oil filter element is bolted with the oil filter housing cover in the oil pan. The engine oil supply is provided by a regulated engine oil pump, that is driven by a bush chain from the crankshaft. A valve in the engine oil pump regulates the oil pressure, which is switched by the ME-SFI [ME] control unit between two pressure stages (2 and 4 bar) depending on the characteristics map and depending on need.



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View of crankcase with oil pan

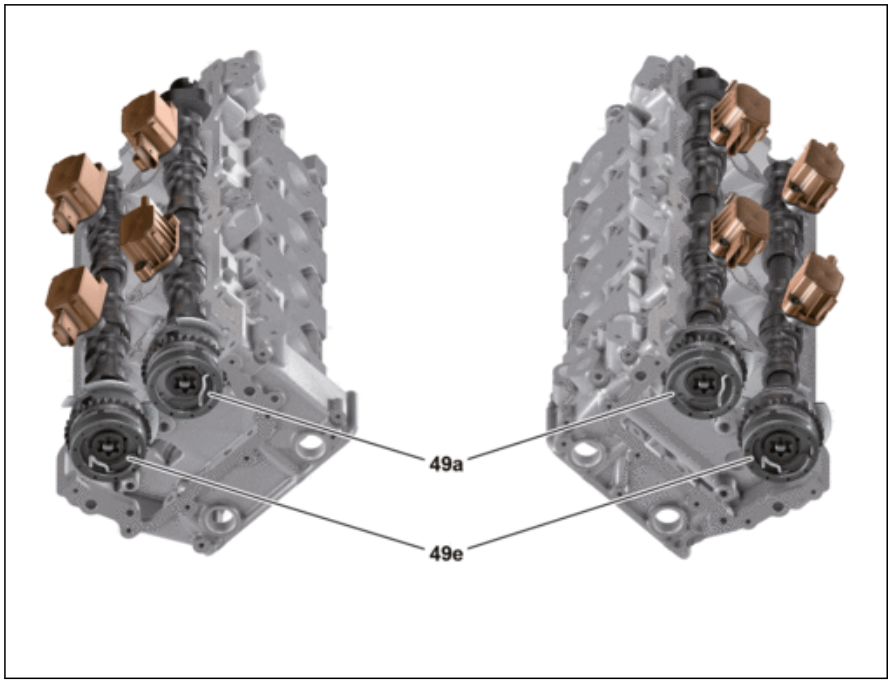
1 Crankcase
2 Crankshaft bearing cap
3 Oil deflector
4 Oil pan with oil filter element
5 Oil pump
6 Engine oil heat exchanger

Cylinder head

The flow- and oil-throughput-optimized cylinder heads made from zircon alloy are designed for maximum temperature and thermal conductivity. This enables the engine to achieve maximum performance, even when at critical limits.

The engine is equipped with oil-throughput-optimized adjustment of the camshafts on the intake and exhaust camshaft. This enables a very good response and optimization of the gas exchange process with the aim of having low fuel consumption and low exhaust emissions.

The "AMG Cylinder Management" CSO is also used in the 177 AMG LS2 engine.



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View of the cylinder heads from the front with CAMTRONIC actuators

49a	*Camshaft positioner of exhaust camshafts*
49e	*Camshaft positioner of intake camshafts*

"AMG Cylinder Management" CSO using CAMTRONIC

The CSO has the task of reducing the fuel consumption in partial load operation by shutting off cylinders 2, 3, 5, and 8. It is available in a wide rpm range from 1,000 to 3,250 rpm if the driver has selected the "Comfort" transmission mode. The shutoff is carried out by the ME-SFI [ME] control unit depending on the characteristics map. The following effects thereby reduce the fuel consumption:

- Increase in the effectiveness by means of operating point shifting of further driven cylinder at higher loads
- Reduction of the gas cycle losses through closing of the valves of the switched off cylinder

To activate the CSO, the actuation of the intake and exhaust valves of cylinders 2, 3, 5, and 8 is interrupted by the roller-type cam followers and the camshafts. The fuel injectors and the ignition coils are also switched off.

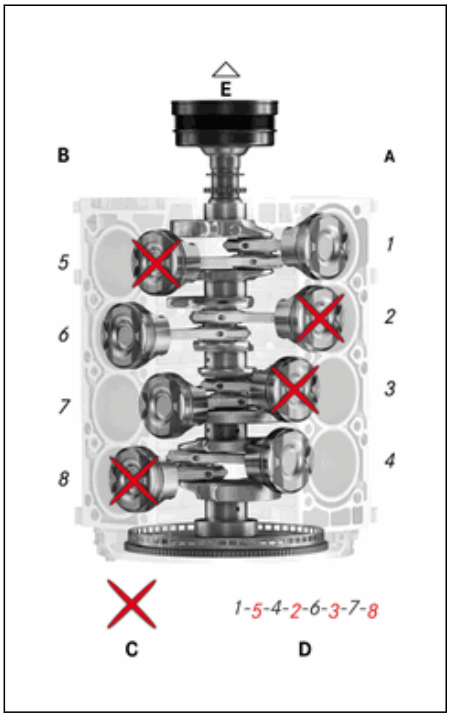

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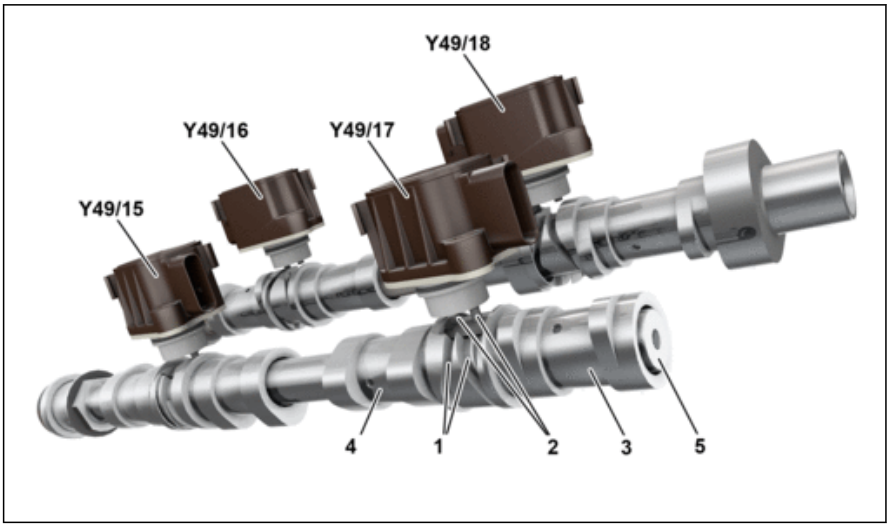
Diagram of CSO and firing order

A	*Right cylinder bank*
B	*Left cylinder bank*
C	*Cylinder which be switched off*
D	*Firing order*
E	*Direction of travel*

View of the left cylinder bank intake and exhaust camshaft

1	*Curved tracks*
2	*Tappet*
3	*Cam sleeve with split cam*
4	*Cam sleeve with complete cam*
5	*Camshaft*
Y49/15	*Cylinder 5 intake CAMTRONIC actuator*
Y49/16	*Cylinder 5 exhaust CAMTRONIC actuator*
Y49/17	*Cylinder 8 intake CAMTRONIC actuator*
Y49/18	*Cylinder 8 exhaust CAMTRONIC actuator*



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The CAMTRONIC actuators are actuated by the ME-SFI [ME] control unit with a pulse width modulated signal. In doing so, a coil is energized in the corresponding actuator and a tappet moves into a corresponding curved track on the cam sleeve. Due to the turning of the camshaft and the design of the curved track, the cam sleeve is shifted axially on the camshaft. The roller-type cam follower is decoupled from the camshaft by the axial shifting and the valve remains closed due to the spring force of the valve spring.

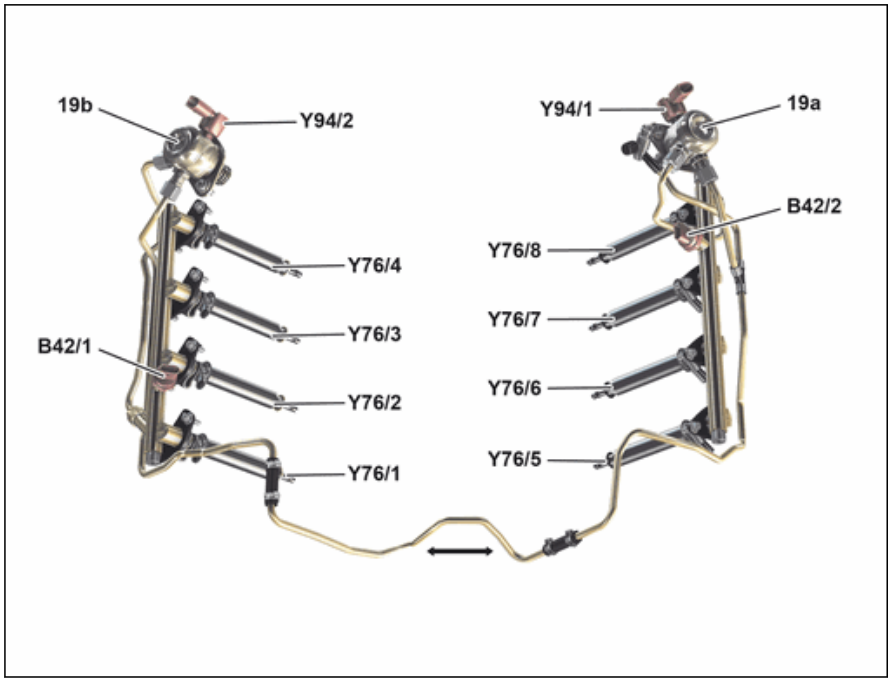
A bump in the curved track has the effect of bringing the tappet back to the default position. To reset the cam sleeve, a second tappet moves into the relevant curved track and the reset occurs accordingly.

The position of the tappets is determined using an integrated Hall sensor.

Fuel injection

New noise- and throughput-optimized high pressure fuel pumps with a quantity control valve that is integrated in the pump module are used for fuel high pressure generation. The maximum delivery pressure is 200 bar. As before, they are located at the top on the cylinder heads. The high-pressure pumps are driven mechanically via a triple cam from the exhaust camshaft. The delivery rate is thus rpm-dependent.

The fuel is routed via comparatively larger high pressure fuel lines (rails) to the more robust fuel injectors, which are centrally arranged and lead into the combustion chamber. The fuel injectors can issue up to five extremely accurate injections per cycle.



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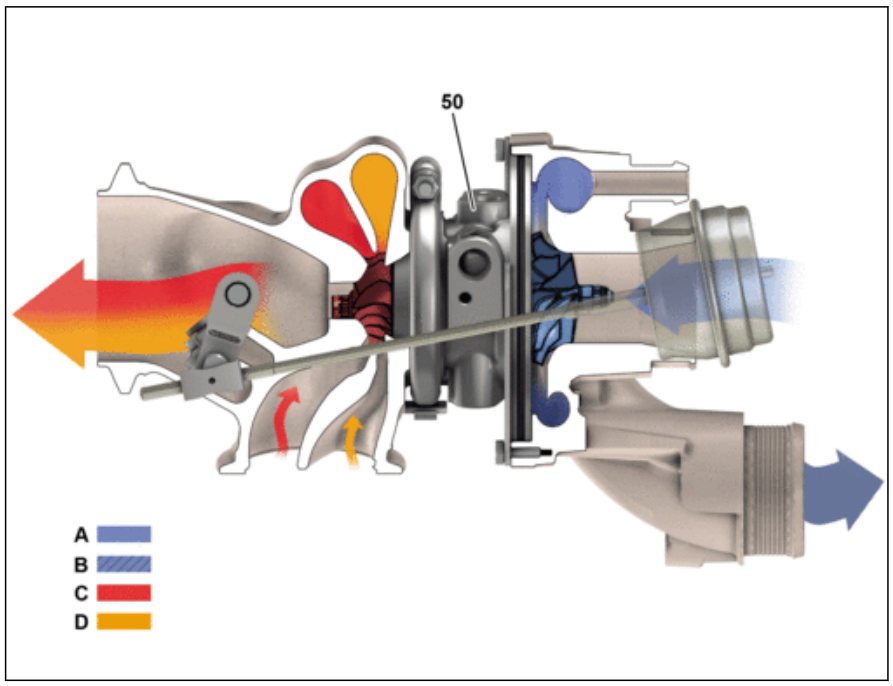
View of the fuel high-pressure circuit

B42/1	*Right fuel pressure and temperature sensor*
B42/2	*Left fuel pressure and temperature sensor*
Y76/1	*Cylinder 1 fuel injector*
Y76/2	*Cylinder 2 fuel injector*
Y76/3	*Cylinder 3 fuel injector*
Y76/4	*Cylinder 4 fuel injector*
Y76/5	*Cylinder 5 fuel injector*
Y76/6	*Cylinder 6 fuel injector*
Y76/7	*Cylinder 7 fuel injector*
Y76/8	*Cylinder 8 fuel injector*
Y94/1	*Left quantity control valve*
Y94/2	*Right quantity control valve*

Charging via twin-scroll system

What are known as twin-scroll turbochargers are used in the 177 AMG LS2 engine. Separation of the exhaust flows downstream of the cylinder outlet allows more energy (pulsed energy and kinetic energy) to be transported to the respective turbine wheel. In order to maximize utilization of this energy, the manifold pipe diameters and the manifold pipe lengths need to be adapted to the twin-scroll turbochargers. For this reason, fan-type exhaust pipes are used that combine the cylinder pipes 1 + 4 and 2 + 3 or 5 + 8 and 6 + 7. A comparatively lower exhaust back pressure and improved gas exchange are achieved using these measures.



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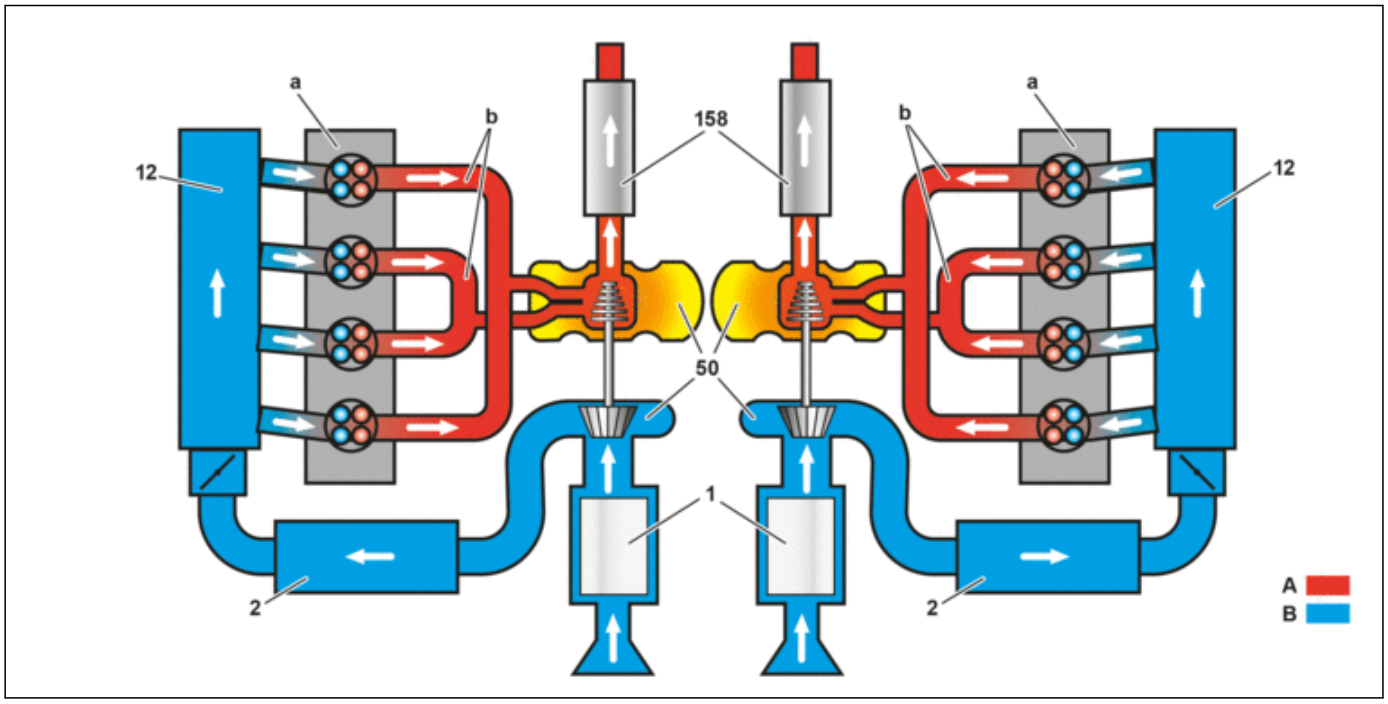
Sectional view of left twin-scroll turbocharger

50	*Turbocharger*
A	*Intake air*
B	*Charge air*
C	*Exhaust flow of cylinders 5 and 8*
D	*Exhaust flow of cylinders 6 and 7*



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Charging with twin-scroll system, shown schematically

1	*Air filter*	*a*	*Cylinder head*
2	*Charge air cooler*	*b*	*Separation of exhaust flows*
12	*Charge air distributor*	*A*	*Exhaust*
50	*Turbocharger*	*B*	*Fresh air*
158	*Three-way catalytic converters*		

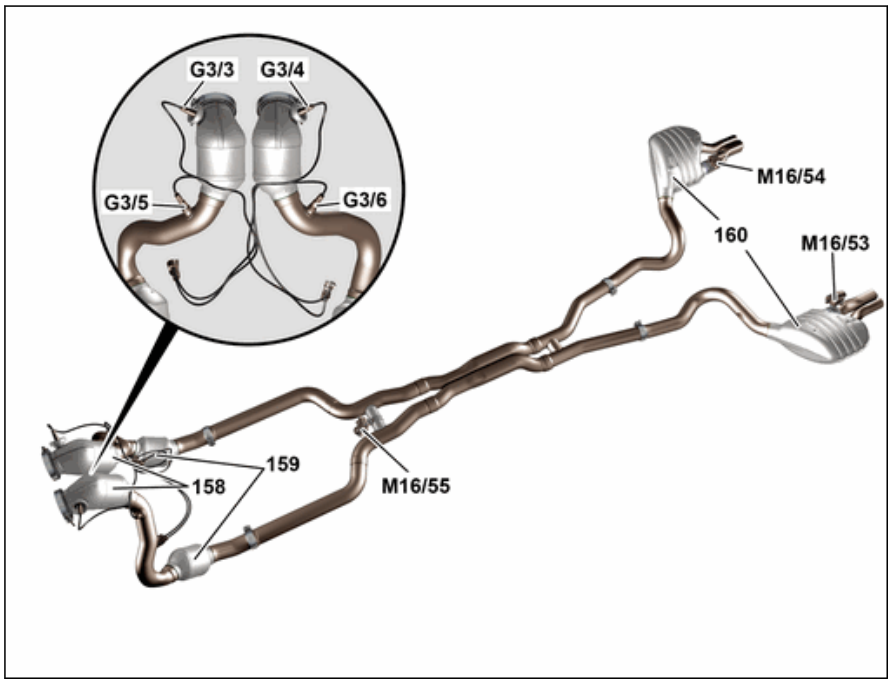
Exhaust system with exhaust flaps

The acoustics of the AMG sports exhaust system are adapted to the selected transmission mode using a variably adjustable exhaust flap.

The switchable AMG Performance exhaust system with flap control is also available as optional equipment. The sound is adapted to the selected transmission mode using three variably adjustable exhaust flaps. The driver can also alter the sound characteristics at the touch of a button.

View of the exhaust system from top left

158	*Three-way catalytic converter (firewall)*
159	*Three-way catalytic converter (underfloor)*
160	*Rear muffler*
G3/3	*Left oxygen sensor upstream of catalytic converter*
G3/4	*Right oxygen sensor upstream of catalytic converter*
G3/5	*Left oxygen sensor downstream of catalytic converter*
G3/6	*Right oxygen sensor downstream of catalytic converter*
M16/53	*Left exhaust flap actuator motor*
M16/54	*Right exhaust flap actuator motor*
M16/55	*Center exhaust flap actuator motor*



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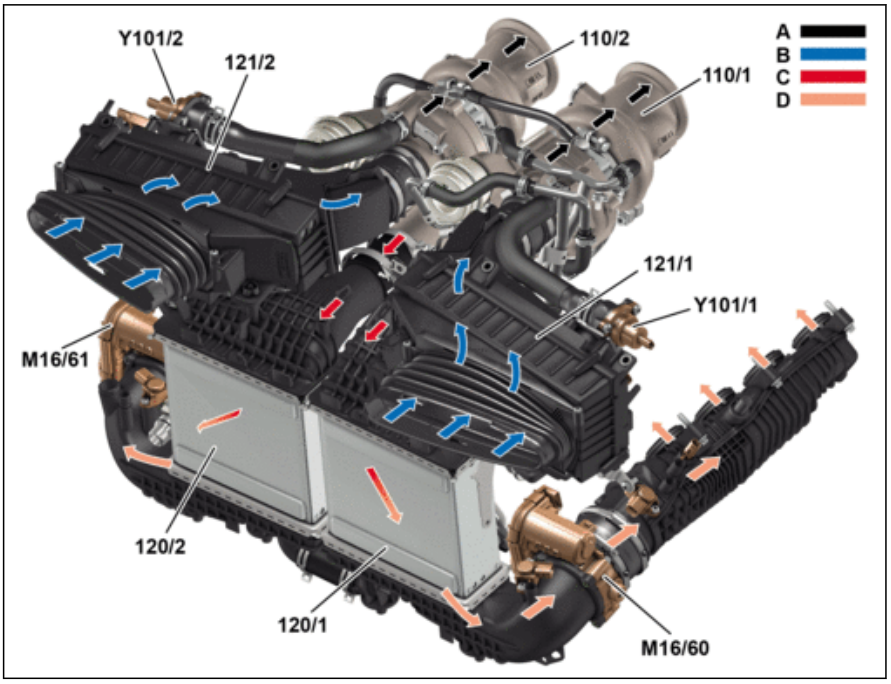
Air supply

The intake air is routed directly through the respective air duct segments from the front of the vehicle to the air filters. The air filters are connected directly to the turbochargers. The charge-air pressure hoses route the compressed charge air to the charge air coolers. To achieve the shortest possible route for the charge air, the two throttle valve actuators establish the connection between the charge air coolers and the charge air distributors. The charge air distributors are located directly on the intake ports of the respective cylinder heads.



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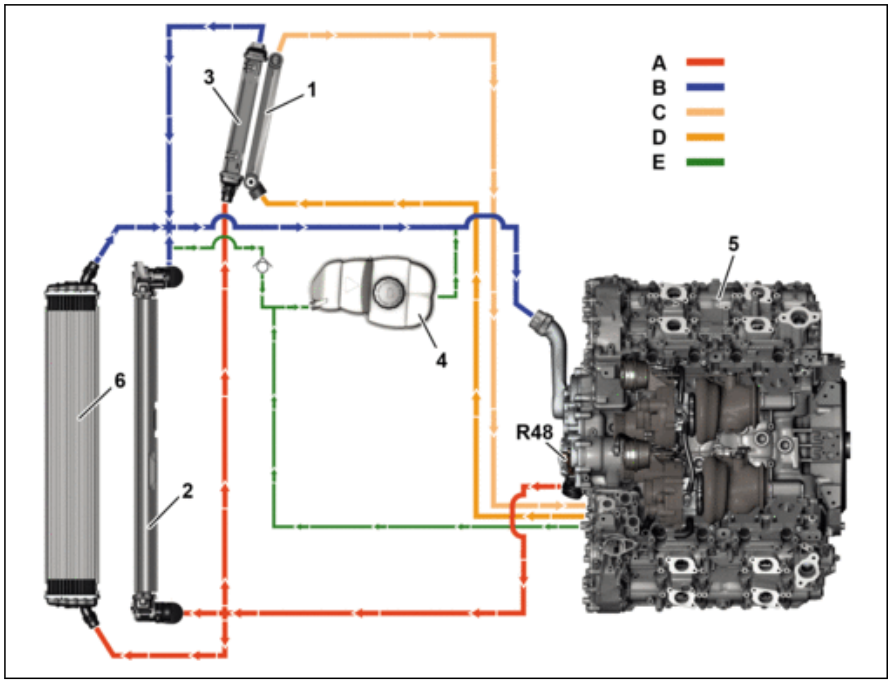
Shown: flow pattern of the charge air

110/1	*Left turbocharger*
110/2	*Right turbocharger*
120/1	*Left charge air cooler*
120/2	*Right charge air cooler*
121/1	*Left air filter housing*
121/2	*Right air filter housing*
M16/60	*Left throttle valve actuator*
M16/61	*Right throttle valve actuator*
Y101/1	*Left bypass air switchover valve*
Y101/2	*Right bypass air switchover valve*
A	*Exhaust gases*
B	*Intake air*
C	*Charge air uncooled*
D	*Charge air cooled*

Engine cooling

The thermal management follows the same principle as in engine 177 LS1. However, the effective cooling output has been increased by an additional nose radiator in order to take into account the higher engine performance. A newly developed fan motor with an output of approx. 1000 W, set in a radiator shroud with back pressure valves, ensures the fresh air supply to the radiators and the engine compartment. The engine oil is cooled by an individual wheel arch oil cooler on the right-hand side.



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Schematic diagram of the high-temperature circuit with an oil cooling system

1	*Wheel arch oil cooler*
2	*Radiator*
3	*Wheel arch engine radiator*
4	*Expansion reservoir*
5	*Engine 177*
6	*Nose radiator*
R48	*Coolant thermostat heating element*
A	*Coolant return to the radiator*
B	*Engine coolant feed*
C	*Engine oil feed*
D	*Oil return to the radiator*
E	*Coolant circuit compensation/ventilation*

Charge air cooling and low temperature circuit

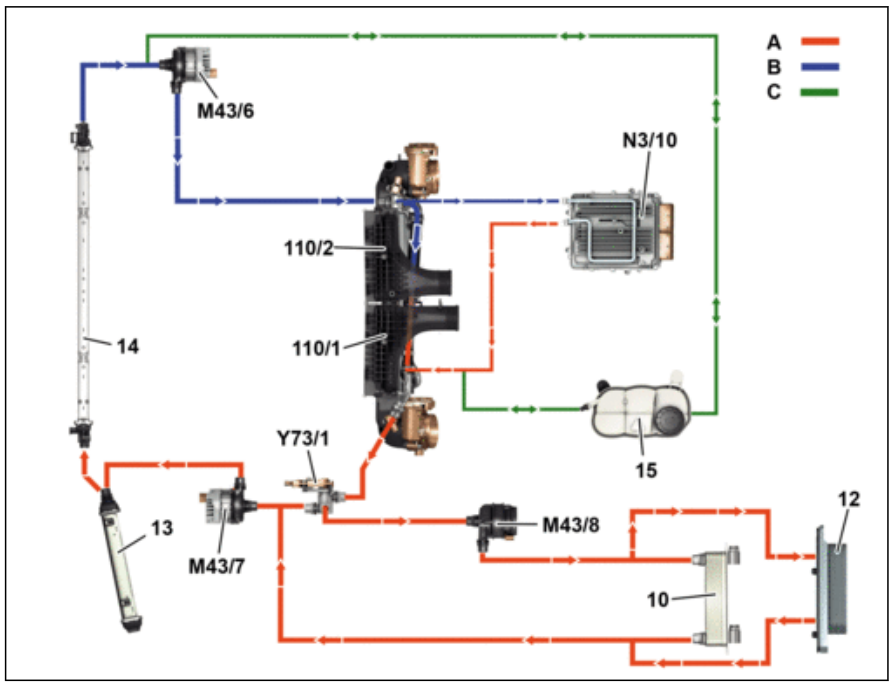
Three electrical circulation pumps are used in a characteristics-map-controlled and needs-based manner in the low temperature circuit, in order to ensure optimum charge air cooling and cooling of the other components connected to the low temperature circuit in all driving situations.

The low temperature circuit switchover valve distributes the volumetric flow rate of the coolant in a needs-based manner to the transmission oil heat exchanger for the automatic transmission and the transfer case.

The circulation pumps deliver the coolant in a needs-based manner through the low temperature circuit during the postheating phase when the engine is turned off, thus guaranteeing compliance with the limit temperature of the ME-SFI [ME] control unit. The location of the control unit near the turbocharger results in a borderline thermal load on the electronic components. The control unit is thus actively cooled with coolant in the 177 AMG LS2 engine. Despite its raised position in the low temperature circuit, the control unit can be dynamically ventilated within a very short time due to the good flow conditions.

Schematic diagram of the low temperature circuit (except S model)

10	*Transmission oil heat exchanger of automatic transmission*
12	*Transmission oil heat exchanger of transfer case*
13	*Wheel arch cooler*
14	*Low-pressure cooler*
15	*Expansion reservoir*
110/1	*Left charge air cooler*
110/2	*Right charge air cooler*
M43/6	*Low temperature circuit circulation pump 1*
M43/7	*Low-temperature circuit circulation pump 2*
M43/8	*Low-temperature circuit circulation pump 3*
N3/10	*ME-SFI [ME] control unit*
Y73/1	*Low-temperature circuit switchover valve*
A	*Coolant return flow*
B	*Coolant feed*
C	*Coolant circuit compensation/ ventilation*



P20.10-2475-76

Purging of the activated charcoal canister and leak test of the fuel tank (with code 494 (USA version))

The aeration and ventilation of the fuel tank occurs as before. The fuel vapors are first stored in the fuel tank and then in the activated charcoal canister. If the activated charcoal canister is fully loaded, the fuel vapors are suctioned off at regular intervals out of the engine and fed to the combustion (purging).

In vehicles with code 494 (USA version), the purge system is also monitored with the left and right purging pressure sensors.

Leak test

The leak test of the purge system and the fuel tank takes place in two stages (function chain) and must detect the following leaks:

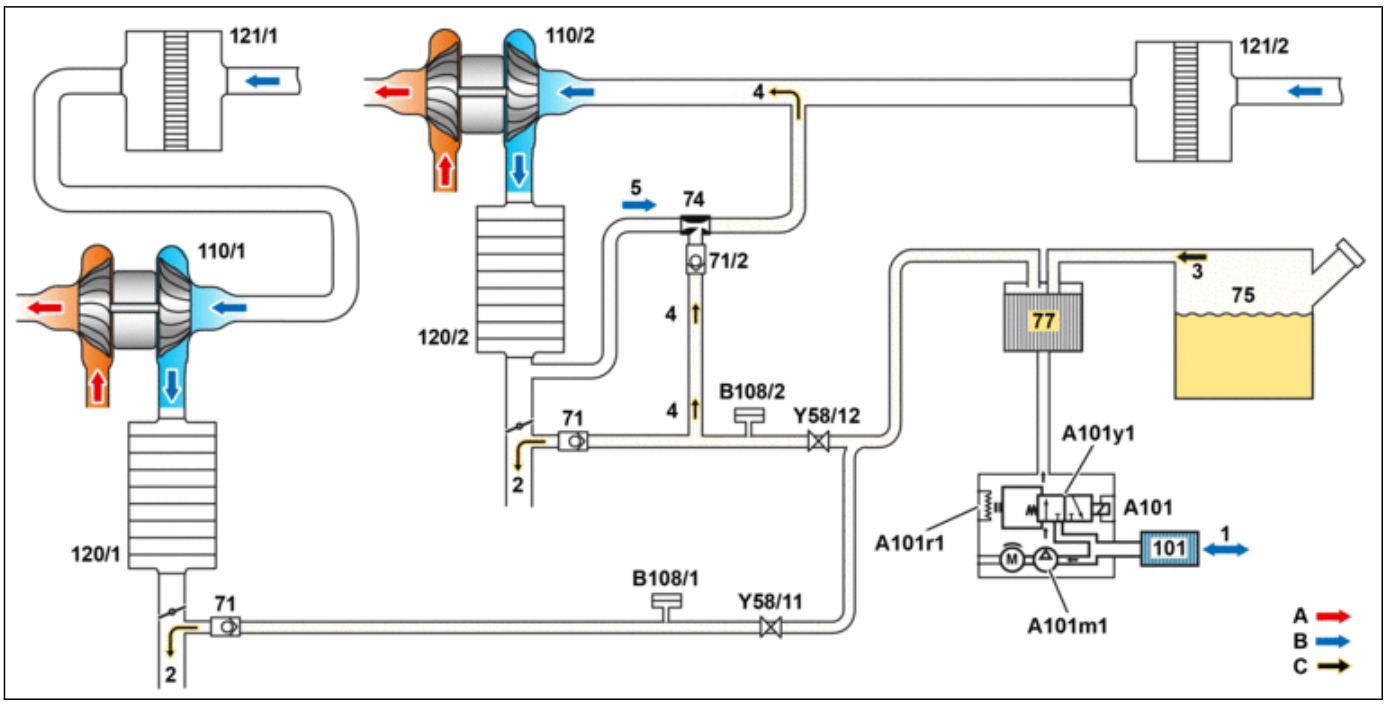
- Leak equal to or greater than Ø 1 mm
- Leak equal to or greater than Ø 0.5 mm

The leaktightness is checked by the ME-SFI [ME] control unit by comparing the power consumption during generation of an overpressure in the fuel tank with and without use of a reference leak point in the fuel tank diagnostic module.

i

In order to avoid false measurements caused by condensation or ice formation, the channel that acts as a reference leak point is heated by the fuel tank diagnostic module heating element.

The switchover valves for purging at the left and right must be closed here (switchover valves not actuated = purging blocked).



P47.30-2318-79

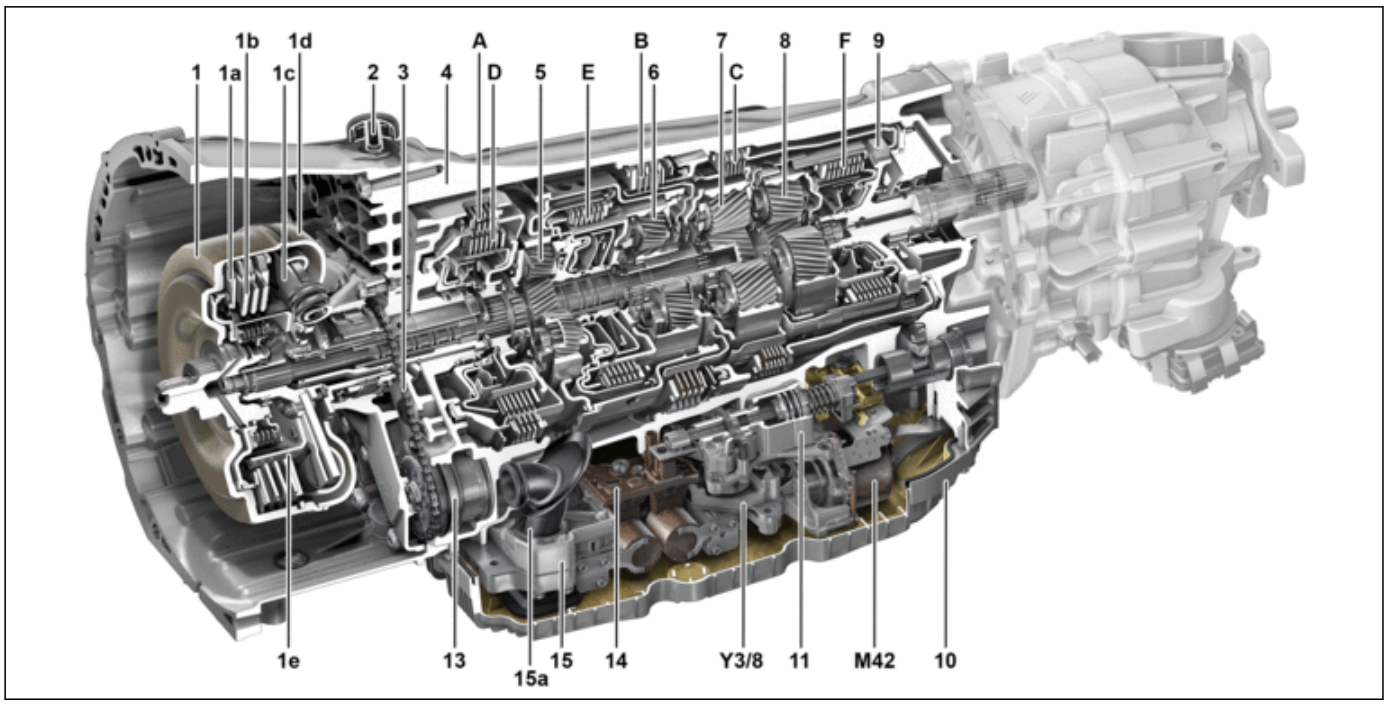
Schematic diagram of purge system (for code 494 (USA version))

1	*Ventilation of fuel tank*	*120/2*	*Right charge air cooler*
2	*Fuel vapors suction in neutral*	*121/1*	*Left air filter*
3	*Pressure in fuel tank*	*121/2*	*Right air filter*
4	*Fuel vapors suction in wide open throttle operation*	*A101*	*Fuel tank diagnostic module*
5	*Boost pressure*	*A101m1*	*Fuel tank diagnostic module pump*
71	*Neutral check valve*	*A101r1*	*Fuel tank diagnostic module heating element*
71/2	*Wide open throttle operation check valve*	*A101y1*	*Fuel tank diagnostic module solenoid valve*
74	*Venturi nozzle*	*B108/1*	*Left purge pressure sensor*
75	*Fuel tank*	*B108/2*	*Right purge pressure sensor*
77	*Activated charcoal canister*	*Y58/11*	*Left purge control valve*
101	*Air filter for fuel tank diagnostic module*	*Y58/12*	*Right purge control valve*
110/1	*Left turbocharger*	*A*	*Exhaust gases*
110/2	*Right turbocharger*	*B*	*Intake air/charge air*
120/1	*Left charge air cooler*	*C*	*Fuel vapors*

AMG SPEEDSHIFT MCT 9-speed sport transmission

The AMG SPEEDSHIFT MCT 9-speed sport transmission (725.0) is a completely new, electronically controlled automatic transmission with 9 forward gears and a reverse gear. The gear ratios for the gear ranges are achieved by planetary gear sets. All the transmission functions and components for this automatic transmission are combined in one assembly module.

The software has also been newly developed. It ensures extremely fast shifting times, quick multiple downshifts and a double-clutching function for an emotional gearshifting experience. The wet clutch replaces the torque converter. It saves weight and optimizes the response to the driver's accelerator pedal commands, particularly during bursts of speed and throttle changes.



P27.10-2595-79

Sectional view of automatic transmission with wet clutch

1	*Wet clutch*	*10*	*Oil pan*
1a	*Externally toothed plates*	*11*	*Piston housing of electrohydraulic parking lock actuator*
1b	*Internal plates*	*13*	*Oil pump*
1c	*Hub plate*	*14*	*Supporting body of fully integrated transmission control*
1d	*Coupling cover*	*15*	*Cover/shift valve body*
1e	*Internal plate carrier with torsional damper*	*15a*	*Pressure pipe and intake manifold*
2	*Transmission housing ventilation*	*M42*	*Electric auxiliary oil pump*
3	*Oil pump chain drive*	*Y3/8*	*Fully integrated transmission control controller unit*
4	*Transmission housing*	*A*	*Multidisk brake B08*
5	*Planetary gear set 1*	*B*	*Multidisk brake B05*
6	*Planetary gear system 2*	*C*	*Multidisk brake B06*
7	*Planetary gear set 3*	*D*	*Multidisk clutch K81*
8	*Planetary gear set 4*	*E*	*Multidisk clutch K38*
9	*Park pawl gear*	*F*	*Multidisk clutch K27*

The following points were redesigned in comparison with predecessor transmissions:

- A new transmission concept with 9 gears and gear ratio spread of 9
- Wet clutch with 2-stage torsional damper
- New actuatorics concept with two oil pumps (primary pump and electrical auxiliary oil pump)
- New oil pump (primary pump) in off-axis version for generating the necessary oil pressure and for reliable lubrication of the shift elements and bearing points
- Electrical auxiliary oil pump for generating required oil pressure, for guaranteeing lubrication of shift elements and bearing points at engine OFF and for supporting the primary pump

All-wheel drive AMG Performance 4MATIC+

The automatically controlled all-wheel drive is a permanent all-wheel drive with interaxle differential. The intelligent system combines the advantages of various drive concepts:

The drive torque distribution on the front and rear axle, which is fully variable for the first time, not only ensures optimum traction at the physical limit. The driver can also rely on high driving stability and driving safety, both when the road surface is dry or wet or on snow.

The overlap of rear wheel drive to all-wheel drive and vice versa occurs continually due to the integration of the intelligent control into the whole vehicle system architecture. An electro-mechanically controlled clutch in the single-speed transfer case variably connects the continuously driven rear axle with the front axle. The best possible torque distribution is continuously calculated depending on the driving situation and driver wishes. The vehicle can be driven continuously variably from traction-oriented all-wheel drive to just rear wheel drive. Alongside traction and lateral dynamics, all-wheel drive improves longitudinal dynamics for even more powerful acceleration.

- -

<u>RACE START</u>

The advanced RACE START is available in the "SPORT", "SPORT+", and "RACE" transmission modes. This allows extreme acceleration from a standstill, without particular demands being placed on the driver.

The networking of all relevant systems (engine, transmission, suspension and ESP®) and the implementation of an all-wheel slip control in the AMG-specific transmission software enable optimal realization of the drive torques during acceleration at the physical limit, significantly above the "1 G" limit.

The operating logic has also been simplified. The driver now only needs to firmly press the brake pedal and then press the accelerator pedal as far as it will go.

- -

<u>Drift mode (in the S model)</u>

Activating drift mode deactivates the electronically controlled drive torque distribution. Drifting is hereby enabled.

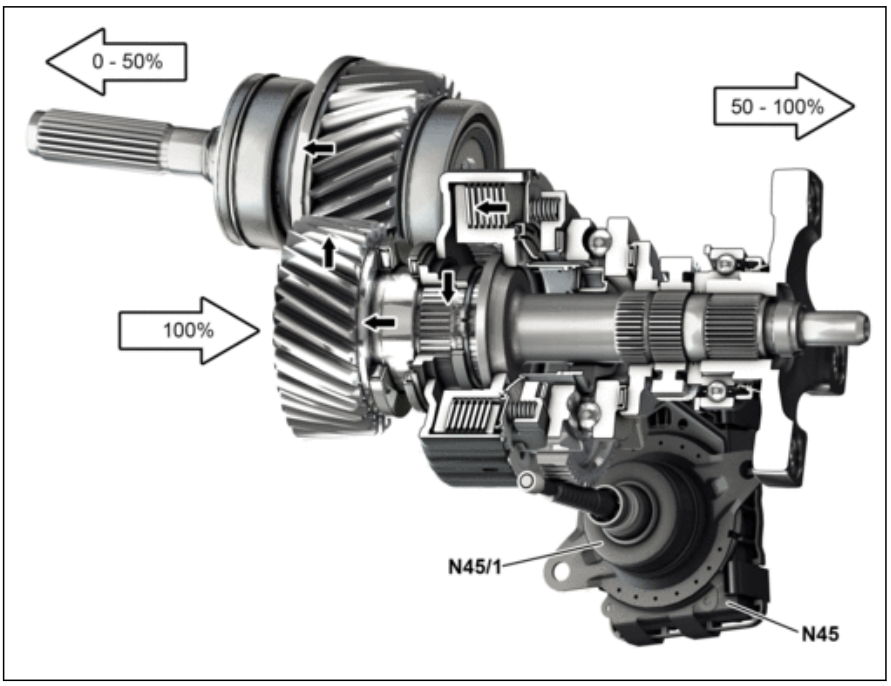
The drift mode can be activated in the "RACE" transmission mode using the shift paddles if ESP® is deactivated and the transmission is in manual mode.

When activating drift mode, the system will switch to rear wheel drive only. If the vehicle is driven in a higher speed range in drift mode, the electronically controlled drive torque distribution is slowly switched on in order to be able to ensure stable driving. Once the vehicle leaves the higher speed range, the electronic intervention reduces again accordingly.

The drift mode remains active until it is deactivated by the driver.

Drive torque distribution occurs variably on both drive axles depending on the driving situation and driver activity. In doing so, the rear axle is driven continuously via the transfer case in direct frictional connection. The portion that is to be transfered to the front axle is defined by the all-wheel drive control unit. This activates a multidisk lock by means of the all-wheel drive actuator and thus sets the ideal torque distribution, sliding between 0 and 50 % as needed.

A locking force torque of 40 Nm ensures the fastest system reaction speeds as no free travel has to be bridged during activation. It also always slightly pre-stresses the drivetrain and thus optimizes its smooth running.

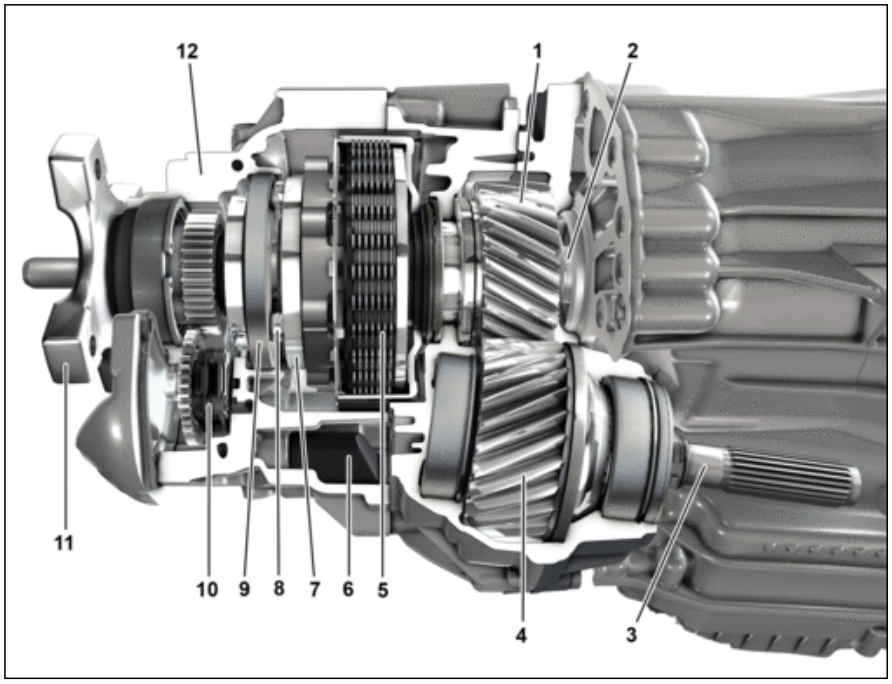


P28.10-2313-76

Drive torque distribution in the transfer case

N45	*All-wheel drive control unit*
N45/1	*All-wheel drive actuator*

The separate transfer case is fitted to the transmission housing. Thanks to the single-speed design of the front axle transmission output with integrated universal joint (3), a spur gear set with bearing is not required. This acts positively on efficiency, weight and the noise characteristics of the drive train.

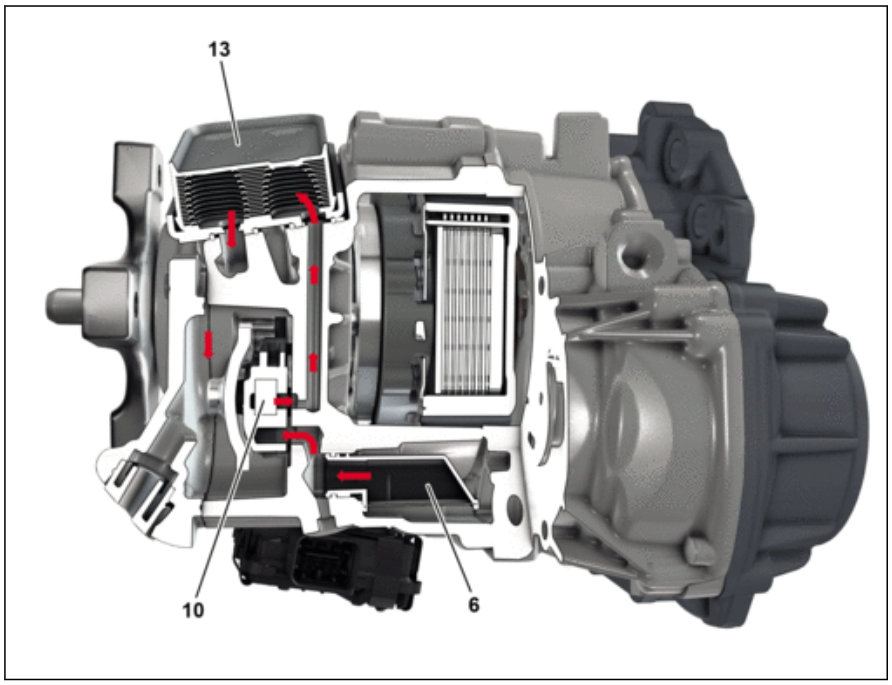


P28.10-2312-76

Sectional view of transfer case

1	*Drive gear for front axle transmission output*
2	*Transmission input shaft*
3	*Front axle transmission output with integrated universal joint*
4	*Driven gear for front axle transmission output*
5	*Multidisk clutch*
6	*Intake of the transmission oil with oil filter*
7	*Ramp disk with quadrant*
8	*Ball*
9	*Thrust piece*
10	*Oil pump*
11	*Rear axle output*
12	*Transmission housing*

The design of the transfer case has the advantage that, due to separate oil circuits (for the automatic transmission and the transfer case), there is no mutual impairment due to debris (e.g. due to metal abrasion). The oil circuit of the transfer case is cooled by an integrated mechanical oil pump and a separate transmission oil heat exchanger that is located externally on the housing. This is connected to the low temperature circuit of the coolant.



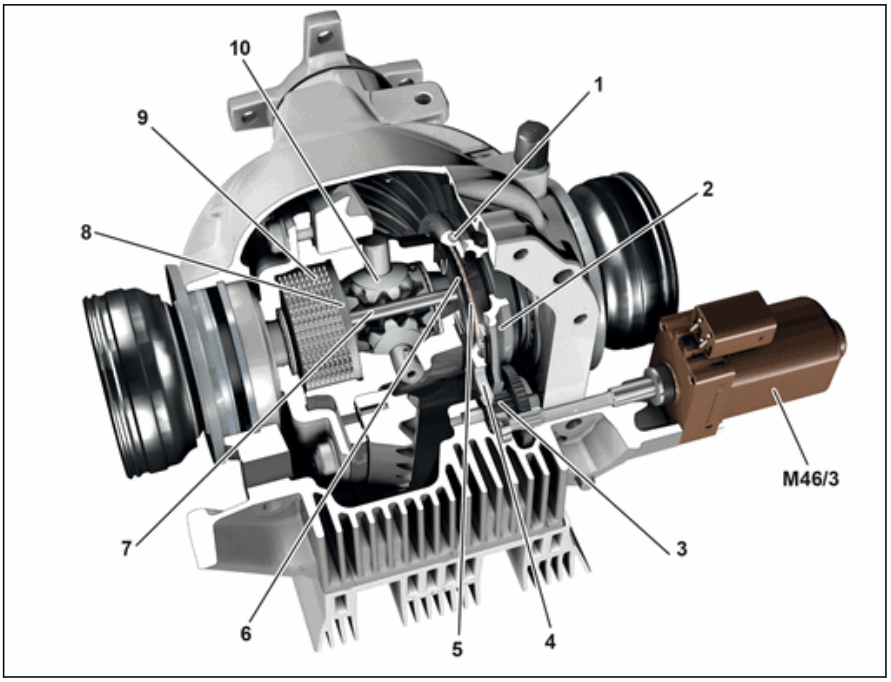
P28.55-2037-76

Sectional view of transfer case internal oil cooling system

6	*Intake with oil filter*
10	*Oil pump*
13	*Transmission oil heat exchanger*

Electric differential lock

The electric differential lock is integrated into the rear axle differential. It improves traction and also increases driving stability when accelerating from stationary, while cornering or when changing lanes quickly. This guarantees greater responsiveness and more accurate handling. A multidisk clutch, which is operated by actuating the differential lock actuator, is used to reduce the differences in speed due to wheel slip. As a result, the locking effect can always be adapted to suit the current driving situation.



P35.40-2071-76

Sectional view of differential lock

1	*Ball*
2	*Adjustment ring*
3	*Sprocket*
4	*Ramp disk*
5	*Needle roller bearing*
6	*Thrust ring*
7	*Thrust piece*
8	*Pressure plate*
9	*Multidisk clutch*
10	*Differential*
M46/3	*Differential lock actuator*

AMG sports suspension with AIR BODY CONTROL

The Mercedes AMG E 63 is equipped with sports suspension with AIR BODY CONTROL. AIR BODY CONTROL is a combination of multi-chamber air suspension and continuous damper adjustment, with which the damping and the suspension are adapted for each individual wheel. The system has been adopted from model series 213. However, the air springs, the dampers and the stabilizer bars for the front and rear axle are manufactured according to AMG-specific requirements.

The suspension characteristics can by changed using the DYNAMIC SELECT switch. The following suspension programs are available: "Comfort", "Sport", "Sport +", "Race", and "Individual".

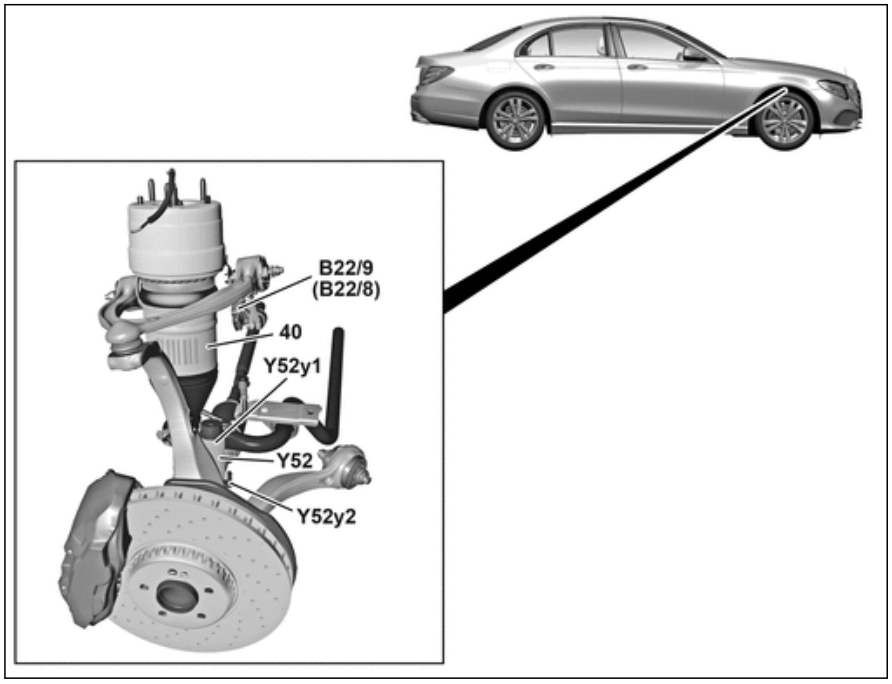
P54.26-0760-11

View of lower control panel

N72/4	*Left lower control panel*
N72/4s1	*DYNAMIC SELECT switch*
N72/4s12	*Manual shift mode button*
N72/4s13	*Comfort/Sport button*
N72/4s14	*AMG ESP® Sport OFF button*
N72/5s1	*Volume control button*
N72/5s3	*ECO start/stop function button*
N72/5s10	*Parking system button (with code 235 (Parking Pilot) or with code P44 (Parking package))*
N72/5s11	*Sport exhaust system button (with CODE U78 (AMG sport exhaust system))*

Adjustment damping

The electronically regulated, continuous damping system operates fully automatically. In comparison to the conventional suspension, it provides improved driving comfort and driving safety. Damping is set harder or softer by the electronics of the AIR BODY CONTROL control unit depending on the driving situation. If the sensor system records a sporty driving style for example, the comfortable basic damping becomes harder automatically.



P32.32-2210-06

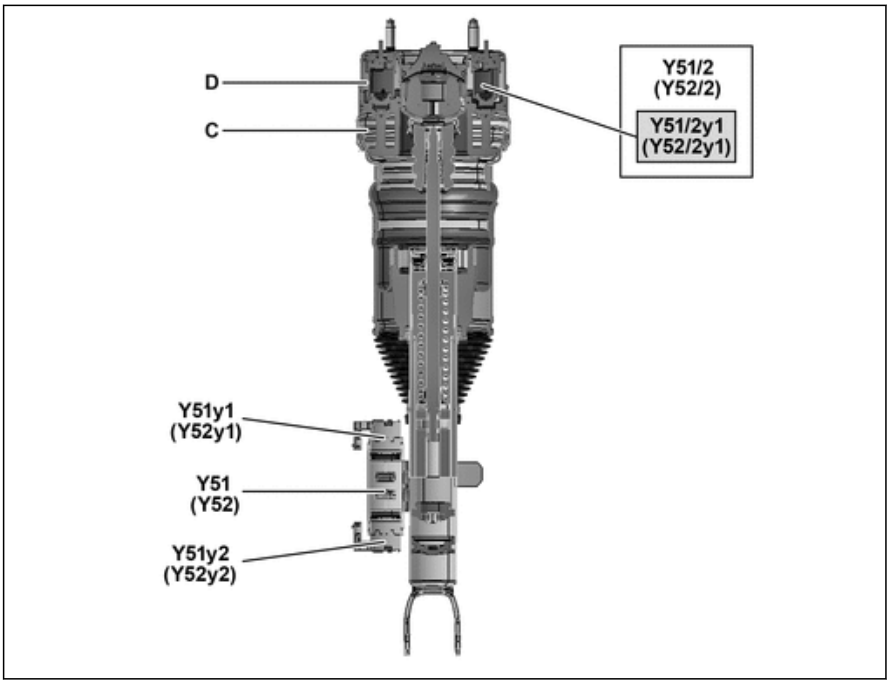
Front axle on right shown

40	*Front axle suspension strut*

Air suspension

The level control of the air suspension is realized by 4 multiple-chamber air suspension bellows. The multiple-chamber air suspension bellows each consist of several air chambers, which are connected to or disconnected from each other by switching the air suspension valves. This makes it possible to switch between different spring characteristics.

The vehicle level can also be manually raised or lowered by the driver in 4 stages using the vehicle level button.



P32.25-2369-06

Sectional view of left front axle shock absorber

C	*Air chamber*
D	*Air chamber*
Y51	*Left front axle damping valve unit*
Y51y1	*Solenoid valve 1, front left*
Y51y2	*Solenoid valve 2, front left*
Y51/2	*Left front axle air suspension valve unit*
Y51/2y1	*Air suspension valve 1, left front*
Y52	*Right front axle damping valve unit*
Y52y1	*Solenoid valve 1, front right*
Y52y2	*Solenoid valve 2, front right*
Y52/2	*Right front axle air suspension valve unit*
Y52/2y1	*Air suspension valve 1, right front*

P00.00-5786-79

Vehicle view from left front

Exterior

In comparison with series production vehicles, the front from the A-pillar onward is a completely independent design. As in a coupe, the engine hood is embedded between the fender and bumper, which results in a new, more dynamic joint system.

The new radiator grille with a silver-chrome double slat, vertical black struts, and "AMG" lettering is recessed in the wide front skirt. This is constructed in a jet wing design, with black flics and a large front splitter.

Silver-chrome three-dimensional lettering "V8 BITURBO 4MATIC+" adorns the fenders.

The 17 mm wider wheel arches create space for the wider track width and the larger wheels on the front axle.

P00.00-5787-79

View of the Mercedes AMG E 63 S from right rear

In the upper rear area, the trunk lid has been provided with an edge that is visually sharply cut and is designed in the vehicle's color. In the lower area, the rear apron features an insert with diffuser look and the two high-gloss chrome-plated double exhaust tips of the engageable sports exhaust system.

A trim piece in silver chrome is also mounted on the rear apron in the S model.

Wheels / tires

- For Mercedes AMG E 63: 19 inch AMG light alloy wheels in 10-spoke design, painted in titanium gray and polished

  Front axle: 265/40 ZR 19 on 9.5 J x 19, rear axle: 295/35 ZR 19 on 10 J x 19
- For Mercedes AMG E 63 S: 20 inch AMG light alloy wheels in 5-spoke design, painted in matt titanium gray and polished

  Front axle: 265/35 ZR 20 on 9.5 J x 20, rear axle: 295/30 ZR 20 on 10 J x 20

A newly designed 20-inch forged wheel with cross-spoke design and central badge look is available as an option.

P68.00-8416-79

View of the vehicle interior in the Mercedes AMG E 63 S

Interior

The AMG Performance steering wheel has been enhanced by Touch Control and electroplated shift paddles.

The upholstery is available in nappa leather/micro fiber DINAMICA in black, in nappa leather nut brown or nappa leather macchiato. The door center panels are designed to match the seat design. AMG Performance seats with integrated head restraints can optionally be ordered.

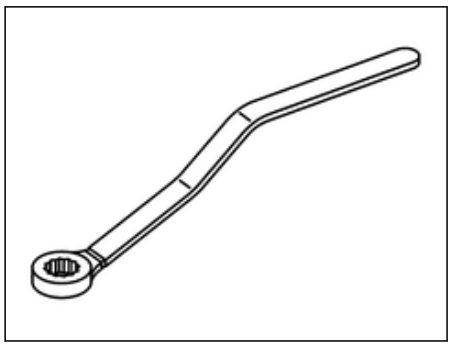
In the Mercedes AMG E 63 S, the interior has been supplemented by the following points:

- Cover of the instrument panel and the beltlines in nappa leather
- Sport steering wheel with crystal-gray "12 o'clock mark" and contrast stitching
- AMG emblems in the front head restraints
- Analog clock in IWC design
- Seat belts in crystal gray

In the instrument cluster, the dials feature a checkered flag look and the striking typography in the large, easy-to-read displays appears in a sporty design. The multifunction display with two monitors is installed as standard in the S model and is optionally available in the standard model.

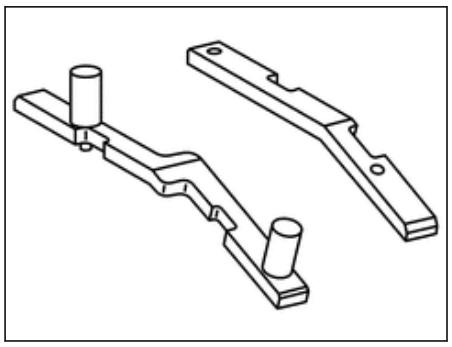
Special tools

The following special tools are now available for the 177 AMG LS2 engine:



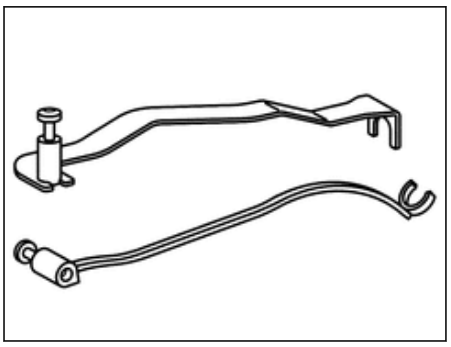
P01.00-3701-01

Bezeichnung	*Box wrench for cranking the engine*
MB-Nummer	*W177 589 00 03 00*



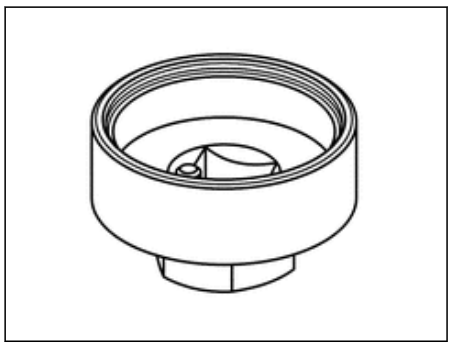
P09.40-2577-01

Bezeichnung	*Turbocharger template*
MB-Nummer	*W177 589 00 23 00*



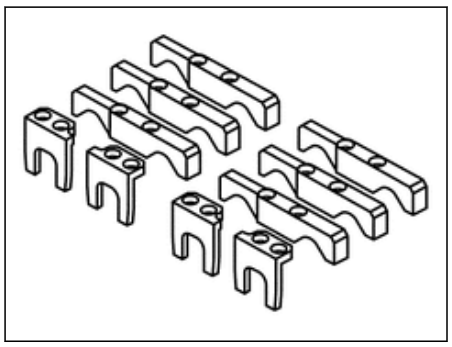
P09.40-2578-01

Bezeichnung	*Turbocharger oil line assembly tool*
MB-Nummer	*W177 589 00 61 00*



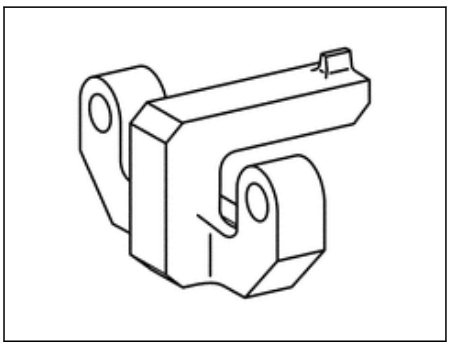
P05.20-2485-01

Bezeichnung	*Camshaft socket wrench bit*
MB-Nummer	*W177 589 01 09 00*



P05.20-2486-01

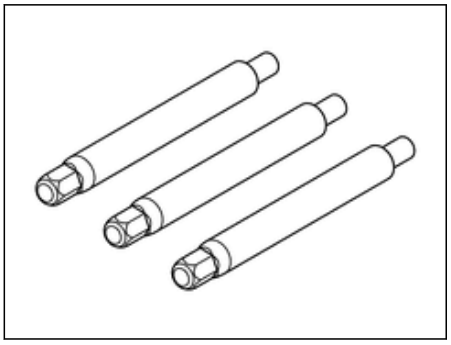
Bezeichnung	*CAMTRONIC holding device*
MB-Nummer	*W177 589 02 40 00*



P03.30-2221-01

Bezeichnung	*Starter ring gear retaining lock*
MB-Nummer	*W177 589 03 40 00*

Bezeichnung	*Guide pins*
MB-Nummer	*W936 589 02 61 00*



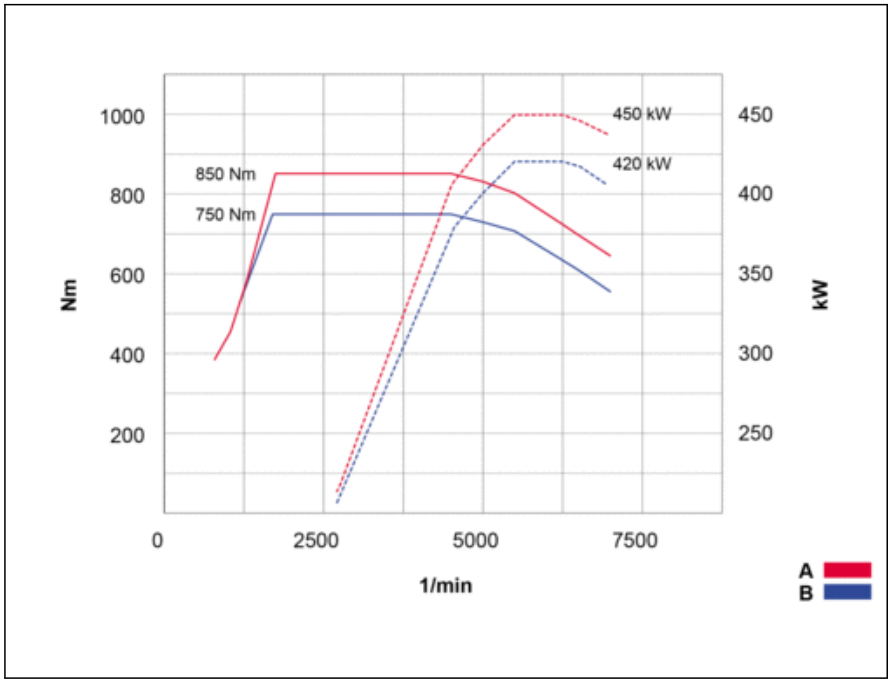
P27.00-2481-01

Technical data

Torque and power curve for 177 AMG LS2 engine

A Mercedes AMG E 63 S

B Mercedes AMG E 63



P01.00-3683-76

Engine data		M 177 LS1	M 177 LS1 S model	M 177 LS2	M 177 LS2 S model
Displacement	cm^3	3982			
Rated output	kW at	350	375	420	450
	1 rpm	5500 - 6250	5500 - 6250	5750 - 6500	5750 - 6500
Rated torque	Nm at	650	700	750	850
	1 rpm	1750 - 4500	1750 - 4500	2250 - 4500	2500 - 4500
Compression ratio	ε	10,5 : 1		8,6 : 1	
Cylinder arrangement/number		V8			
Valves/cylinders		4			
Bore x stroke	mm	83 x 92			
Charging		Two mono-scroll turbochargers with boost pressure control and liquid-cooled charge air cooling		Two twin-scroll turbochargers with boost pressure control and liquid-cooled charge air cooling	
Maximum boost pressure, absolute	bar	1,9	2,1	2,3	2,5
Fuel consumption, combined	l/100 km	8,4 - 8,2		9,2 - 8,9	
Emissions standard		Euro 6 Standard			

Transmission data	Unit	725.092
Designation	-	K9Y 900
Shift	-	9-speed, automatic and manual
Number of ratios	-	9 + R
Steering axis inclination	-	9
Weight of the automatic transmission (including wet clutch and transmission oil, without transfer case)	kg	87
ATF transmission oil (yellow/gold) gas-to-liquids (GTL)	L	approx. 7
Max. rpm, 1st - 7th gear	1 rpm	7000
Maximum rpm, 8th gear	1 rpm	5900
Maximum rpm, 9th gear	1 rpm	5000
Overall length	mm	828
Starting device	-	Wet clutch
Maximum input torque	Nm	900

Overview of major assemblies for model 213

Sales designation	Model	Motor	Transmission	Engine management	Notes
Mercedes AMG E 63 4MATIC+	213.088 (sedan)	177.980	725.092	MED 17.7.4	
Mercedes AMG E 63 S 4MATIC+	213.089 (sedan)				
Mercedes AMG E 63 4MATIC+	213.288 (wagon)				
Mercedes AMG E 63 S 4MATIC+	213.289 (wagon)				