Mercedes-Benz E63 AMG Comprehensive Product Information

Seven gears, four drive modes, rev-matching and Race Start function – the power transfer on the new E63 AMG promises superb emotion and pure driving pleasure. At the same time, the AMG SPEEDSHIFT MCT 7-speed sports transmission contributes substantially to reducing fuel consumption.

The AMG SPEEDSHIFT MCT 7-speed sports transmission is an innovative power transfer system that made its debut in the high-performance 2009 SL63 AMG Roadster. It combines the sporty, direct and agile feedback of a manual transmission and the maximum convenience of an automatic transmission. Fitted with seven speeds, four drive modes, a rev-matching and Race Start function, the AMG SPEEDSHIFT MCT 7-speed sports transmission offers superb versatility. MCT stands for Multi-Clutch Technology and only employs clutch elements to perform gearshifts.

A wet start-up clutch, which runs in an oil bath, replaces the conventional torque converter. Thanks to its low rotational inertia, the transmission responds instantaneously and dynamically without the losses typical of a torque converter transmission – thereby helping to save fuel. The AMG sports transmission also impresses with its low weight of just 176 pounds, which has been made possible through the use of lightweight magnesium for the transmission housing. Vibrations are effectively eliminated by a new, two-stage torsion damper, with resulting benefits in perceived passenger comfort.

Consumption-optimized drive mode "C" (Controlled Efficiency)

During development of the E63 AMG the AMG engineers paid special attention to the new drive mode "C" (Controlled Efficiency). The emphasis was on delivering minimum engine speed coupled with a reduced number of gearshifts in all driving situations. When moving off in "C", the MCT transmission always selects second gear and shifts decidedly early to next higher gears if the driving style permits. At 37 mph for instance, sixth gear will already be engaged – not only improving fuel consumption but noise levels, too. Controlled Efficiency also means convenient gearshifts and a "soft" accelerator response set-up for outstandingly smooth power transfer.
The powerful electronic control unit and the integrated 80 MHz processor ensure spontaneous downshifts at the same time – say when approaching traffic lights or if the driver suddenly needs power for dynamic acceleration.

Drive modes "S", "S+" and "M" for even more driving pleasure and dynamism

The engine and transmission come across as much more agile in the "S" (Sport) mode. Accelerator pedal

movements trigger a more direct traction response, making the downshifts more spontaneous. The engine speed is allowed to reach a higher level in each gear, while the gearshifts are around 25 percent faster than in "C". Turning the rotary switch in the AMG DRIVE UNIT a notch further to the right activates "S+" mode. Sport plus shifts the gears another 25 percent faster than in "S". The same applies to the manual shift mode "M". In "S+" and "M" modes, gearshifts at full throttle take just 100 milliseconds.

The engine management system partially suppresses cylinders in "S", "S+" and "M" modes: precisely interrupting ignition and injection under full load for brief periods leads to even faster gearshifts than before. The highly emotional vocals are an appealing side effect of this lightning-fast process.
Ultra-fast, spontaneous multiple downshifts are another forte of the AMG SPEEDSHIFT MCT 7-speed sports transmission. For instance, kickdown lets you move straight from seventh down to fourth gear or from fifth to second. In the Sport, Sport plus and Manual modes the automatic rev-matching function is active. Every manual or automatic downshift is accompanied by precisely metered rev-matching – from “S” through “S+” to “M” incrementally. And this not only adds to the driver's emotional experience: the load-free downshift minimizes load-change reactions, which pays dividends particularly when braking into a bend on the racetrack and also enhances safety in the wet or on ice.

In manual “M” mode the driver also benefits from the high torque of the V8 engine, as there is no automatic downshift under full load and kickdown; the transmission remains steadfastly in the selected gear. Moreover, the AMG MCT sports transmission does not perform an automatic upshift in manual mode when the rev limit is reached. In “M” mode the AMG instrument cluster displays the current gear and alerts the driver to the need for an upshift just before the needle reaches the red zone. This means that a particularly sporty driver can use the superior performance potential to its fullest extent. When approaching the lower rev limit, e.g. when braking the vehicle, there is an automatic downshift to the next lower gear.

AMG DRIVE UNIT with Race Start function

The AMG DRIVE UNIT is the central control unit for the AMG SPEEDSHIFT MCT 7-speed sports transmission and all driving dynamics functions. The driver can change gears either using the new AMG E-SELECT selector lever or via the AMG steering-wheel shift paddles. On the left next to the selector lever is the electronic rotary switch to select the four drive modes including activation of the Race Start function. Underneath are three buttons for additional functions: the first controls the ESP® function, the second the adaptive AMG sports suspension. The third adorned with AMG lettering is used to store the personal set-up. Briefly pressing the AMG button brings up the configuration options, whilst holding down the button allows you to program the required set-ups - this is confirmed by an acoustic signal. The current settings may be viewed in the AMG instrument cluster by pressing the AMG button at any time.

The Race Start function delivers maximum dynamism: while the vehicle is at a standstill, the driver needs to activate the “ESP® SPORT” function and press the brake pedal with their left foot. Having preselected the Race Start program using the rotary switch, a confirmation message comes up on the AMG central display. The driver then simply needs to confirm the Race Start function by pulling the “Up” shift paddle once, fully depressing the accelerator and taking his foot off the brake. The optimum start-up engine speed is set fully

automatically and the E63 AMG accelerates away with flawless traction – all the way up to top speed, if so required. The driver does not need to shift gear manually; the AMG transmission changes gear with lightning-fast shift times.

Chassis and braking system
Innovative new features for superlative driving dynamics

High cornering speeds, exhilarating driving dynamics coupled with typical Mercedes long-distance comfort – when it comes to the chassis and braking system, AMG has developed innovative systems that ensure the new E63 AMG consolidates its leading position in the high-performance sedan segment.

The sophisticated adaptive AMG sports suspension on the E63 AMG combines steel suspension at the front, while an all-air suspension system is used at the rear. This exclusive solution guarantees a sensitive response from the front springs while the vehicle is kept at a constant height thanks to the automatic level control system – irrespective of the load. The top-of-the-line AMG model differs from the other E-Class variants with its newly developed three-link front suspension with wider track – 2.2-inch wider than the E550. In conjunction with new hub carriers for more negative camber at the front, this provides much more grip when taking bends at high speed.

Another feature of the adaptive AMG sports suspension is the electronically controlled damping system: the system varies the damping characteristics instantly according to the driving situation, road speed and load status, reducing the roll angle of the body. For the driver this means instant, continuously variable adjustment between the greatest possible agility and optimum ride comfort – depending on the driving style and route. The damping can also be individually adjusted by pressing the appropriate button in the AMG DRIVE UNIT.

A push of a button is all it takes for the electronics to switch from "Comfort" to "Sport" or "Sport +." The selected mode is displayed in the AMG instrument cluster. "Comfort" delivers a sensitive response with soft damping characteristics, while the shock absorber response is firmer in "Sport". "Sport +" is ideal for challenging laps on private racing circuits; here the shock absorbers are even firmer. The E63 AMG can be dynamically enhanced even further ex factory, with the optional AMG Performance Package: This Package includes the adaptive AMG Performance suspension with its even firmer set-up, 19” AMG twin 5-spoke forged light alloy wheels, raised top speed of 186 mph, and a limited slip rear differential with 40 percent locking action.

Eleven sensors for electronic damper control

The electronic damper control utilizes four sensors to permanently monitor the drive and brake torque along with steering angle and lateral acceleration. Four position sensors are also used to determine the ride height and to ascertain the direction of motion. Three acceleration sensors help identify the absolute body roll.

Powerful control electronics that interact constantly with the engine and transmission control units instantly adjust the forces at the four shock absorbers.

New axle components and more direct steering

The high-grade axle components provide further testimony to the painstakingly redesigned adaptive AMG sports suspension. New steering knuckles, wishbones, torque strut bearings and head bearings at the front provide extra stability and improved road contact. A weight-optimized, thicker tubular stabilizer reduces body roll on fast S-shaped bends. The rear suspension has also been substantially reworked in the interests of enhanced handling stability: new track rods, push-pull rods and far more rigid mountings for the subframe – on which the rear axle is mounted –, translate into enhanced dynamics when cornering.

The AMG-specific kinematics and the new elastokinematics on both axles also noticeably increase precision during cornering – a solution that has already proven itself on the C 63 AMG.

Added to which is the newly developed rack-and-pinion steering: the selected steering ratio which is 22 percent more direct (14 : 1), together with the reconfigured characteristic mapping of the speed-sensitive servo assistance conveys more agile cornering. More feedback in all driving situations comes courtesy of the Hardy disc made out of a rubber compound that is 33 percent harder; it sits between the steering shaft and steering coupling.

3-stage ESP® with Sport function as in the SL63 AMG

The 3-stage ESP® is also consistently tailored to the superb dynamic qualities of the E63 AMG: familiar from the SL63 AMG and C63 AMG, the Electronic Stability Program supports three individual control strategies at the push of a button: the ESP® button in the AMG DRIVE UNIT allows the driver to choose between "ESP ON", "ESP SPORT" and "ESP OFF" – with the currently active mode shown in the display of the AMG instrument cluster. In "ESP ON", the onset of handling instability leads to braking intervention at one or more of the wheels, accompanied by a reduction in engine torque.

Briefly pressing the ESP® button activates "ESP SPORT". In this mode the braking intervention to counter oversteer or understeer, as well as the accompanying reduction in engine torque, allows a higher dynamic threshold and, for instance, corresponding drift angles – providing the driver with the benefit of far greater driving pleasure. Operating the brake pedal restores all the normal ESP® functions. Prolonged pressure on the ESP® button activates "ESP OFF". There is no intervention to control the handling dynamics and generally no reduction in engine torque – thus increasing driving enjoyment even further. "ESP OFF" should only be used by experienced drivers on dedicated racetracks. In this mode too, operating the brake pedal restores all the normal functions of ESP®.

The system's traction logic is active in all three ESP® modes. If one of the drive wheels starts to spin, specific brake pressure is applied to virtually create the effect of a mechanical differential lock. This means that the engine power is transferred to the road even more effectively.

New AMG compound brakes as an option

As you would expect from an AMG high-performance car, the new E63 AMG also comes with an ultra-powerful braking system. Internally ventilated and perforated brake discs with their generous 14.2-inch dimensions are fitted front and rear. The highly stressed front discs featuring compound technology (two-piece steel/aluminum construction) that has been tried and tested in motorsports help offset temperature peaks more effectively. Silver-painted brake callipers with white AMG lettering and six-piston (front) and four-piston (rear) technology provide spontaneous, fade-resistant deceleration and extremely short stopping distances.

Numerous functions of the AMG high-performance braking system enhance comfort and safety. Take the practical HOLD function: if the E63 AMG has come to a stop, the driver simply needs to press the brake pedal a little bit firmer. The vehicle is now held by the brake – even if the driver takes their foot off the brake pedal. This prevents the vehicle from unintentionally rolling forward in stop-and-go traffic or inadvertently rolling back on an uphill slope. The HOLD function is automatically disengaged once the vehicle is driven forward. Another useful feature comes in the shape of the hill-start assist. If the sensor technology detects that the driver has stopped on an incline, the brake pressure is automatically maintained constant for a short period. This means the E63 AMG will not roll back and the driver has sufficient time to switch their right foot from the brake to the accelerator pedal without having to use the parking brake.

If the driver of the AMG sedan suddenly switches from the accelerator to the brake pedal prior to emergency braking, the braking system increases the pressure in the brake lines and applies the pads to the brake discs, so that they can grip instantly with full force when the brake pedal is pressed. The system supports the standard Brake Assist by means of this 'priming'. Further standard features include the brake-drying function, which uses brief braking impulses to ensure the film of water on the brake discs is removed in the wet, thus considerably improving the responsiveness of the brakes.

AMG 18 or 19-inch light-alloy wheels

The AMG light-alloy wheels in an 18 or 19-inch design play a major part in the d ynamic, stable handling of the new E63 AMG. The sedan comes as standard with titanium grey, high-sheen five-spoke wheels measuring 9.0 x 18 or 9.5 x 18 and 255/40 R 18 tires at the front and 285/35 R 18 at the rear. As an option, the AMG Performance Package includes forged 19-inch AMG twin 5-spoke light-alloy wheels painted titanium grey with a mirror finish, shod with 255/35 R 19 (front) and 285/30 R 19 (rear) wide-base tires.

Design and equipment
Effortless superiority with decidedly sporty character

The 2010 Mercedes-Benz E63 AMG fulfils its role as the powerful, top-of-the-line E-Class model with effortless superiority. The exterior design conveys presence, precision and typical Mercedes dynamism. Functional sportiness, top quality and consummate business class comfort combine in the interior. In short: it comes across as sporty without being showy.
Dominant, masculine, dynamic – take a look at the new E63 AMG and you instantly get a sense of these

three attributes. The distinctive fenders immediately catch the eye in the front section of the high-performance sedan. They are 0.67 inches wider on each side to accommodate the new front axle with its larger track width and the 255/40 front tires.

The striking AMG front apron is an integral part of the characteristic AMG bodystyling. A central air intake and two side apertures provide an efficient supply of fresh air to the cooling module placed behind. The side air vents in the front apron serve to expel the hot air from the oil coolers. The AMG-specific LED daytime driving lights are another eye-catching detail.
From the side, the eye is drawn to the 18 or 19-inch AMG light-alloy wheels as well as the "6.3 AMG" lettering integrated stylishly into the fenders; this lettering is testimony to the powerful eight-cylinder powerpack under the hood. The side sill panels pick up the sweeping line of the spoiler edges on the front apron, extending it through to the AMG rear apron – the same line also emphasizes the sedan's width: the two newly designed chrome-plated twin tailpipes of the AMG sports exhaust system, the characteristically black insert and the overlying light-catching contour provide further visual highlights on the muscular rear section.

Sporty and high-grade interior ambience

Luxurious quality, high-grade materials, consummate business class comfort combined with a noticeable degree of dynamism and sportiness – the interior of the E63 AMG in a nutshell. Dedicated, newly developed electrically adjustable, heated AMG sports seats and AMG badges await the driver and front passenger. All the seats, armrests and door center panels are trimmed in exquisite leather, the seat center panels with perforated leather.

The AMG sports steering wheel in a four-spoke design with a 385-millimeter rim is trimmed with perforated leather in the specially molded grip areas. Gear selection can be performed manually by means of the AMG aluminum shift paddles with "up" and "down".

AMG main menu and AMG DRIVE UNIT

Behind the steering wheel lies the equally new AMG instrument cluster with a 200 mph speedometer scale and silver-colored backplate. The five classic dial instruments come with a new look, red needles and all-new lettering. AMG lettering adorns the speedometer while "6.3 V8" lettering adds a special touch to the rev counter. The AMG main menu is integrated into the central display of the speedometer, which can be operated conveniently using the multifunction buttons on the AMG sports steering wheel. The three modes "Warm Up", "Set Up" and "RACE" keep the driver well informed: "Warm Up" indicates the engine oil and coolant temperature, "Set Up" indicates the current ESP® mode, the suspension setting "Comfort", "Sport" or "Sport Plus" and the transmission mode "C", "S", "S+" or "M". In "RACE" the RACETIMER is ready; this allows the driver to record lap times on private racing circuits.

The AMG DRIVE UNIT, which is familiar from the SL63 AMG, is angled towards the driver and enables individual settings to be selected for the MCT sports transmission, the ESP functions, the suspension set-up and the AMG drive modes. A completely new feature for the DRIVE UNIT comes in the shape of the AMG

E-SELECT selector lever in the centre console. The driver can shift directly between R, N and D simply by nudging the lever, all thanks to drive-by-wire. Briefly pressing the P button is sufficient to activate the parking lock.

Even more individuality with tailor-made AMG extras

The E63 AMG can be dynamically enhanced even further ex factory, with the optional AMG Performance Package. This includes the following:
• Lightweight, forged 19-inch AMG light-alloy wheels with size 255/35 R 19 tires at the front and 285/30 R 19 at the rear
• Adaptive AMG Performance suspension with a stiffer set-up
• AMG rear axle locking differential with 40 percent locking action
• AMG Performance steering wheel (365 mm) in a three-spoke design
• Top speed raised to 186 mph

Safety
"Intelligent" partner thanks to unique combination of assistance and protection systems

For more than 50 years, the E-Class Sedans and their predecessors have been the acknowledged trendsetters in the field of automotive safety. The new top-of-the-line E63 AMG model continues this tradition with an unrivalled combination of the very latest assistance and protection systems whose concept and development are based on what actually happens during accidents.

The systems turn the E-Class into an "intelligent" partner that is able to see, feel, respond reflexively in dangerous situations and act autonomously to prevent accidents or mitigate their effects. With this concept the new E63 AMG not only protects its own occupants, but also contributes greatly to the safety of other road users.

The new E-Class is the first car in the world to be equipped with headlamps which adapt to the traffic situation and respond automatically to provide the best possible road illumination in a given situation and avoid dazzling other road users. The optional Adaptive Highbeam Assist uses a camera on the windscreen to recognize oncoming traffic and vehicles in front and to control the headlamps so their beams do not reach the other vehicle. The range of the dipped headlamp beams can be extended from the current 200 to as much as 984 feet. If the road ahead is clear, the system performs a gentle transition to high beam. Mercedes-Benz offers this new system in the Driver Assistance Package, which also includes Blind Spot Assist familiar from the S-Class, and as a new development, Lane Keeping Assist which seeks to prevent the vehicle from leaving the road unintentionally. When the system recognizes that the car is drifting from its lane, the driver is prompted to take countersteering action by three brief but unmistakable vibrations of the steering wheel.

Night View Assist Plus is now also available as an optional extra for the E63 AMG

Mercedes-Benz has improved this system with a special pedestrian detection function: as soon as Night View Assist Plus recognizes pedestrians ahead of the car, they are highlighted in the onboard display to provide a

greatly enhanced warning effect.

Detection of drowsiness based on 70 parameters as standard

Thanks to an innovative technology, the new E63 AMG is very sensitive to its driver's attention level, and warns him or her of drowsiness in good time. This new ATTENTION ASSIST drowsiness detection system, which is standard equipment, is equipped with highly sensitive sensors that continuously monitor more than 70 different parameters. Observing the driver's steering behavior has proved to be a particularly strong indicator: several years of practical research by

Mercedes engineers have shown that drowsy drivers make minor steering errors which they often correct very rapidly in characteristic ways. These corrections are recognized by a highly sensitive steering angle sensor.
Automatic emergency braking when a collision is imminent

The well-proven, radar-based assistance systems from the S-Class are now also optionally available to E-Class customers. An enhanced long-range radar sensor now has a range of 656 feet (previously 492 feet), and is able to monitor the mid-distance so that dynamic events such as a vehicle ahead suddenly pulling out to overtake can be detected even more effectively. The two wide-angle short-range radar sensors, which have a range of around 98 feet, continue to be included in the system.

The radar-supported systems are able to assist the driver with emergency braking. Their sensors are linked to the BAS PLUS system, which automatically calculates the braking pressure to prevent a collision in critical situations. The driver is given an audible and visual warning at the same time. When the brake pedal is pressed, the system immediately provides the calculated level of braking assistance.

If the driver fails to respond to the warnings, the radar system first initiates partial braking action. As a second stage, if there is still no driver response and a collision is unavoidable, emergency braking is initiated. This can reduce the severity of an impact considerably as the system can be regarded as a kind of "electronic crumple zone".

Nine airbags and PRE-SAFE® as standard

During the course of its development, the new E-Class was subjected to more than 150 high-speed crash tests. The crumple zone principle invented by Mercedes safety pioneer Béla Barényi has been continuously honed by the engineers in Sindelfingen. The front-end deformation zone of the E-Class acts on four independent levels, and is even more effective than before. The increased use of extra-high-strength steel alloys also helps to ensure that the bodyshell is able to withstand high impact forces. Around 72 percent of all the body panels are made from these high-tech steels – yet another unrivalled figure in passenger car development.

With nine airbags as standard, belt tensioners, belt force limiters, crash-responsive head restraints and ISOFIX child seat attachments, the E63 AMG has even more extensive safety features than the preceding model. Another standard feature is the unrivalled anticipatory occupant protection system PRE-SAFE®. In

potentially hazardous situations this reflexively activates precautionary protective measures for the vehicle occupants, so that the seat belts and airbags are able to fulfill their protective function to the full during an impact.

Development and testing
Meeting the toughest of requirements – extreme "accelerated" testing

High speed in South Africa, high-temperature test in Arizona, cold shock in the Arctic Circle, chassis and suspension testing on the Nürburgring Nordschleife (North Loop) – the development phases for the new Mercedes-Benz E63 AMG were as diversified as they were unforgiving. Over a period of 19 months and a distance of 780,000 test miles, the new-generation dynamic sports sedan offering everyday practicality was made ready for series production – and ambitious targets were achieved in terms of efficiency.

Before the first disguised test vehicles rolled through the factory gates at Affalterbach, the concept phase had to be completed. The purpose of the packaging tests which commenced in November 2005 was to test the entire car for functioning and feasibility. Whether it was the suspension tuning, radiator and cooler efficiency, the airflow through the engine compartment or the durability of all the components – everything had to be analyzed in advance by the AMG experts using a computer-based digital prototype (DPT). At the same time, the first engines and transmissions had to prove their performance capability and durability on various test rigs. Permanent stress in "accelerated" tests: full throttle from a standstill at a simulated 86 degrees F below zero, racetrack profiles with a high proportion of driving under full load and stop-and-go traffic in the city at 113 degrees F in the shade. Only once the precisely predefined development stages had been negotiated was the coveted go-ahead given.

At the same time, inconspicuous E63 AMG models from the current W 211 series were on the road as component carriers or "mules". Equipped with numerous components from the successor model – such as the 6.2-liter V8 engine, SPEEDSHIFT MCT 7-speed sports transmission and RIDE CONTROL sports suspension – they help ensure effective testing of the new technologies before the new models (in-house code W 212) are even available. State-of-the-art measuring techniques provide the AMG engineers with invaluable data, with the focus on the temperatures of the coolant, transmission fluid and brake discs as well as the lap times on the handling course at the test track in Idiada, Spain and at the Nürburgring Nordschleife (North Loop), for example.

Concept approval in autumn 2007 signals the start for the "real" prototypes

In this preliminary stage, the specialist departments define every aspect of the new E63 AMG: bit by bit, they narrow down the choice of axle kinematics, radiator and cooler dimensions, springing and damping rates, and tire compounds for further testing – not forgetting the crucial interaction between the different control units for the engine, transmission and dynamic handling control systems as well as their respective software versions.

Following this concept approval, granted in autumn 2007, the first "real" AMG prototypes of the E63 AMG

were built – signaling the start of the extensive, standardized AMG development and testing program.

This is when things get really serious for the 20 disguised test vehicles: tests in all of the world's climatic regions, from 279 feet below sea level in Death Valley in the US right up to Pikes Peak at an altitude of over 14,000 feet. And from a bone-chilling minus 104 degrees in Swedish Lapland to plus 104 degrees in Arizona, USA. "We deliberately go to the extremes. It greatly helps us to save time and deal with the various aspects efficiently," says Tobias Moers, Head of Overall Vehicle Development at Mercedes-AMG.

AMG-specific test routes for loads that take it to the limit and beyond

It is simply not enough to consider the individual criteria such as heat, altitude and driving dynamics in isolation. It's rather a question of finding test routes that offer an opportunity to depict a combination of these three parameters. "We therefore take it to the limit and beyond, subjecting the car to far more load than any AMG customer ever will. And the new E63 AMG has to overcome these tortures without a murmur of discontent," reports Oliver Wiech, Head of Overall E-Class Development.

High-speed test runs on a country road in South Africa, stretching for several miles and as straight as a die, are just as much part of the test procedure as driving at full throttle for many hours on the circular course in Nardo, southern Italy or at the proving ground in Arizona, USA. The E63 AMG prototypes have to prove that the oil and water temperatures can stay in the green and that all of the seals and hose clamps are capable of withstanding the immense loads and stresses. The toughest test of all is saved for last: here the sedan has to race across the proving ground at top speed in temperatures of some 113 degrees plus before going straight into a garage where there is no draught and no wind – the engine's only relief being provided by the fan motor. Highly-sensitive electronic measuring systems with up to 500 measuring points per vehicle reveal even the most minor problems, which the AMG experts are able to pinpoint and put right immediately.

The high-temperature tests in Death Valley, USA are similarly extreme – albeit far less spectacular at first glance. Here, too, the summer temperatures approach the magical 122-degree mark, but slow cruising rather than hurtling at top speed is the order of the day here. Oliver Wiech: "We drive at an average of 22 mph with maximum payload, climbing a steady ascent to the Daylight Pass – in the blazing sunshine and with a tarmac