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# The BMW M5: State-of-the-art driving dynamics.

## The systematic evolution of the high-performance concept.



The all-new BMW M5 (fuel consumption combined: 9.52 km/l; CO<sub>2</sub> emissions combined: 241 g/km\*) takes driving dynamics into a new dimension. Making its debut in the sixth generation of the high-performance sedan is the new M-specific all-wheel-drive system M xDrive. Not only does this drive system enable the M5 to reach new heights of dynamic performance, it means that it excels in terms of everyday practicality and delivers supreme poise in all driving conditions as well.

Frank van Meel, Chairman of the Board of Management at BMW M GmbH, explains the benefits of the pioneering drivetrain technology aboard the all-new BMW M5: "Thanks to M xDrive, the all-new BMW M5 can be piloted with the familiar blend of sportiness and unerring accuracy both on the race track and out on the open road, while also delighting drivers with its significantly enhanced directional stability and controllability right up to the limits of performance when driving in adverse conditions such as in the wet or snow."

The car's ability to juggle complete suitability for everyday use on the one hand and sheer driving pleasure and superb track performance on the other is down to the M xDrive system's central intelligent control capability. When the engine is first started, the all-new BMW M5 will be in all-wheel-drive mode (4WD) with Dynamic Stability Control (DSC) switched on. The driver is then able to vary the handling characteristics of the M5 by activating various driving dynamics modes, including a rear-wheel-drive mode with no DSC. In this 2WD mode, the all-new BMW M5 allows accomplished drivers to enjoy a pure-bred form of driving pleasure.

Hard at work under the bonnet of the all-new BMW M5 is the latest and most advanced version of the 4.4-litre V8 engine featuring M TwinPower Turbo technology. Output of 441 kW/600 hp and peak torque of 750 Nm promise supreme propulsive power and formidable performance. The twin-turbo V8 unit propels the new M5 from 0 to 100 km/h in a mere 3.4 seconds, for instance. The task of relaying the drive power falls to the new eight-speed M Steptronic transmission with Drivelogic, which teams up with the M xDrive system to transfer the high-revving engine's turbocharged might

to the road to optimum effect in all driving conditions. The upshot of all this is that the all-new BMW M5 is not just the fastest of all the M5 models built since 1984, but the most nimble too.

# **M TwinPower Turbo, M xDrive and the eight-speed M Steptronic transmission.**

## **Sublime drive power and supreme shift comfort.**



Following a thorough overhaul, the 4.4-litre V8 engine with M TwinPower Turbo technology is now more potent than ever. The high-revving power unit in the all-new BMW M5 delivers its exceptional output of 441 kW/600 hp at 5,600 – 6,700 rpm, while the tremendous peak torque of 750 Nm is on tap from just 1,800 rpm and remains constant all the way up to 5,600 rpm. The engine characteristics can be changed at the push of a button from the basic Efficient setting to either Sport or Sport Plus, resulting in even more willing response to movements of the accelerator.

The M engineers have implemented a raft of enhancements to endow the twin-turbo V8 with its phenomenal performance capabilities. These include newly developed turbochargers and a higher maximum injection pressure of 350 bar. This allows shorter injection times and improved atomisation of the fuel for sharper engine response as well as more efficient mixture preparation. Improvements have also been made to the lubrication and cooling systems, including an oil pan with a small front sump and indirect charge air cooling, which is more effective than the predecessor's equivalents despite taking up less space. The oil supply system uses a fully variable, map-controlled pump and has been designed for outings on the race track, where it can handle very high levels of longitudinal and lateral acceleration.

Modifications have likewise been made to the cross-bank exhaust manifolds for the all-new BMW M5. This has the effect of optimising the transmission of energy from the exhaust gas flows to the turbine wheels of the two turbochargers and ensuring the best possible gas-exchange cycle. By fitting a Helmholtz resonator between the two silencers of the dual-branch exhaust system, the M engineers have succeeded in reducing its weight. The sound from the flap-controlled exhaust system varies depending on the selected mode for the engine characteristics, while the M Sound Control button also allows drivers of the all-new BMW M5 to soften its acoustic presence.

The twin-turbo V8's power is channelled to the road via the newly developed M xDrive all-wheel-drive system. The wonderfully nimble rear-biased set-up is achieved by the M xDrive system only bringing the front wheels into play when the rear wheels aren't able to transmit any more power to the road and additional tractive force is required. Even when it is being driven in a particularly sporty manner and unleashing high levels of power, the all-new

BMW M5 with M xDrive behaves predictably and can be controlled with ease by the driver, paving the way for an even more intense experience of the business sedan's phenomenal performance.

The principal hardware components of M xDrive are based on the BMW xDrive intelligent all-wheel-drive system and the Active M Differential, while the central M-specific driving dynamics control software takes care of orchestrating the various components to extremely innovative effect. The drivetrain has been reinforced for greater rigidity and strength to make allowance for the high torque, the rear-biased configuration and the 2WD option. While the transfer case splits a portion of the drive torque between the front and rear wheels in a smoothly adjustable ratio depending on requirements, the Active M Differential is responsible for then distributing the drive torque between the rear wheels. In the case of the active control element within the M xDrive system's scope of functions, the locking effect is varied as the situation demands. This thereby ensures enhanced traction, agility and directional stability when the car is being driven in a very sporty manner or on roads with differing levels of grip – i.e. exactly when it is needed. With M xDrive, stabilising interventions from the DSC system are only required in extreme situations, enabling the engine's tremendous power to be converted into propulsive force with virtually zero losses. The result of all this is that the all-new BMW M5 can be piloted with even greater precision and directional accuracy, responds sensitively and directly to the driver's inputs and thus requires few steering corrections when driving at the limit.

More ambitious drivers can configure M xDrive at any time to suit their needs. Even in the default setting with both DSC and 4WD activated, the all-new BMW M5 allows a certain amount of slip at the rear wheels when accelerating out of corners to produce the agility for which M models are renowned. But the M5 also remains perfectly controllable at all times. The all-wheel drive's superior traction helps to produce acceleration times that are simply phenomenal by sports sedan standards and would be worthy of a super-sports car: 0 to 100 km/h in a breathtaking 3.4 seconds.

Switching to the M Dynamic mode (MDM, 4WD Sport) gives a further major boost to the car's handling agility. Yet more drive torque is now directed to the rear axle, while the amount of permissible rear wheel slip is increased. This lets drivers put the M5 into controlled drifts and enjoy its playful handling. While doing so, the onset of oversteer is noticeable in good time and the linear increase of the sideslip angle means that the vehicle remains stable even when driving at the limit.

The three modes available with the DSC system switched off have been configured chiefly for driving on race tracks. The 4WD mode is set up for the greatest possible controllability and traction, and already offers plenty of scope for exploring the dynamic performance capabilities of the all-new BMW M5. The 4WD Sport mode, meanwhile, with its blend of supreme steering precision, delightful handling and reassuring traction, offers a sure-fire guarantee of unadulterated driving pleasure. The pure rear-wheel-drive mode (2WD) has been designed with the experienced and highly adept driver in mind. This opens up the same thrilling experience already offered by past generations of the M5, that of a high-performance sedan devoted to the art of generating driving pleasure with no control systems to hold it back.

The new eight-speed M Steptronic transmission with Drivelogic has also been strictly geared towards sporty performance. The incredibly short shift times and optimal ratio spacing will keep even the most demanding driver happy. What's more, the wide ratio spread of the eight-speed M Steptronic unit helps to optimise fuel efficiency, too.

The M Steptronic transmission allows both fully automatic shifting and sequential gear shifts – using either the new short gear selector on the centre console of the all-new BMW M5 or the M shift paddles on the steering wheel. The transmission has been engineered for instantaneous response and lightning-fast gear changes in classic M style. The torque converter lock-up clutch is already fully engaged once the car has pulled away.

The transmission's shift mapping can be modified using the Drivelogic rocker switch on the gear selector. Drivelogic mode 1 corresponds to efficient driving. Mode 2 lends itself to quick driving with its shortened shift times. And Drivelogic mode 3 is optimised for sporty driving on the track thanks to its extremely short shift times. Those preferring to shift gear manually can also execute sporty multiple downshifts to the lowest available gear, for instance when braking into tight corners. There are no automatic upshifts when the engine is revved to the limit either. A transmission oil cooler ensures flawless transmission operation even when the car is put through its paces on the track.

# Superior chassis technology. A new dimension in driving dynamics.



Unbeatable driving dynamics with maximum directional stability – that was the goal of the team responsible for tuning the all-new BMW M5 chassis. As is usual for BMW M GmbH, the tuning took place in part on the company's own race circuit at Miramas in the south of France, as well as on the world's toughest test track, the Nürburgring Nordschleife.

The precise, agile handling that drivers have come to expect from previous generations of the M5 has been further optimised for the new car. Individual driver needs are met by the wide range of options for configuring the vehicle, including: M xDrive, the eight-speed M Steptronic with Drivelogic, the M-specific Variable Damper Control (incl. three driving modes: Comfort, Sport and Sport Plus) with electronically controlled shock absorbers and M Servotronic steering (incl. three driving modes: Comfort, Sport and Sport Plus). A top priority when tuning the chassis of the all-new BMW M5 was to achieve neutral steering behaviour, even at the dynamic limits. An important factor here is linear build-up of transverse loads across the full range of lateral acceleration. Whatever the driving situation, the electromechanical M Servotronic steering delivers exactly the right amount of steering torque. This ensures that the all-new BMW M5 has superbly accurate steering and always delivers clear feedback. What's more, the car is great for long-distance driving, as well as being a joy in the city and on short journeys thanks to the low steering force required for manoeuvring and parking.

The familiar double-wishbone suspension from the front axle of the BMW 5 series has been reworked from the ground up for the all-new BMW M5 with M xDrive. M engineers have redesigned every component to factor in M-specific kinematic and elastokinematic characteristics. Directional stability is greater than ever thanks to the increased track width. The five-link rear suspension has also been modified to meet M-specific requirements. New toe links featuring stiffer rubber mounts help accommodate the increased demands on the driving dynamics and steering precision, as do firmer anti-roll bars and lower wishbones that have been optimised for stiffness. Specially developed for the M5, the elastomer bearings on the rear axle mounts ensure that there is no delay in transferring chassis forces, which makes for superbly direct handling. An additional steel X-brace and an aluminium transverse strut increase the stiffness of the chassis linkages at the rear axle, resulting in improved response. Further chassis modifications not visible externally

perform functions that are no less important. For example, an aluminium tower-to-bulkhead stiffening profile and two tower-to-frontend struts enhance stiffness at the front of the car.

The complete chassis and powertrain package put together by the BMW M engineers is so good that even experienced racers like ex-Formula One star and BMW works driver Timo Glock are impressed: "Thanks to M xDrive, the all-new BMW M5 goes beyond the precise, agile drive that we've come to expect – it also serves up a noticeable boost in traction and controllability, both in everyday situations and at the dynamic limit."

The tyres fitted as standard on the BMW M5 (275/40 R 19 at the front and 285/40 R 19 at the rear) have been specially selected. They are mounted on five-double-spoke cast light-alloy wheels in polished Orbit Grey (front: 9.5 J x 19, rear: 10.5 J x 19). 20-inch seven-double-spoke wheels in black or polished black are available as an option (front: 275/35 R 20, at rear: 285/35 R 20).

The all-new BMW M5 comes with M compound brakes fitted as standard. Being significantly lighter than conventional cast iron items, these have the distinct benefit of reducing unsprung mass. At the front, the braking force is applied to perforated, inner-vented brake discs by blue-painted six-piston fixed callipers featuring the M logo. Deceleration at the rear is provided by single-piston floating calliper brakes, also in blue, with integrated parking brake. M carbon-ceramic brakes are also available as an option on the all-new BMW M5. These are instantly recognisable from the gold-coloured callipers with M logo (six-piston fixed callipers at front, single-piston floating callipers at rear) and are 23 kilograms lighter, which means a further reduction in unsprung and rotating masses. This offers many benefits, including improved driving dynamics and increased suspension comfort. The M carbon-ceramic brakes provide even better braking performance than M compound brakes, as well as further improved fade resistance and even higher thermal stability. What is more, they withstand wear exceptionally well.



## **Sporting M design with distinction. Form driven by function.**



“The BMW M5 has always embodied the perfect blend of mature business sedan and high-performance components. So you can think of the BMW M5 as the world’s fastest-moving tailored suit.” These are the words chosen by Domagoj Dukec, Vice President of Design BMW i and BMW M, to sum up the brief for the new M5. Like all the models to come out of BMW M GmbH HQ in Garching, its design is M-specific and driven by function. For example, the newly designed front bumper trim, with its larger air intakes, has the task of keeping the cooling systems and brakes sufficiently supplied with cooling air – even in exacting use on the race track. The car has a wider track than its predecessor, and the front side panels (made from aluminium to save weight) bear the signature M gills.

Also hewn from aluminium is the bonnet, whose precise lines carve an eye-catching sculpture and extend visually into the shaping of the roof. In an M5 first, the roof itself is made from extremely lightweight, high-strength carbon fibre-reinforced plastic (CFRP).

The rear diffuser has likewise been redesigned. Together with the side skirts, the M rear apron and M rear spoiler play their part in giving the M5 its powerfully sporting appearance, and the exterior mirrors have a dynamic, M-specific design. The hexagonal central air intake in the front end not only separates itself sculpturally from the side air intakes, in another example of form following function it also incorporates the oil cooler.

The interior focuses squarely on the driver; absolute control in all driving situations is the motto here. At the same time, the BMW M5 offers space for up to four passengers, a large boot and excellent ride comfort. As a high-performance sports car and business sedan in one, it blends the best of both worlds.

## **Equipment without compromise.** **The driver is at the heart of the action.**



When it comes to the equipment on board the all-new BMW M5, the dynamic driving experience is always king. The centre-point is the driver's seat, from where all switches and buttons can be operated with optimum ergonomic convenience. All of the car's functions are sited directly in the driver's eye line. The large digital instrument cluster from the BMW 5 Series has an M-specific design and keeps the driver informed on the driving dynamic mode, M xDrive all-wheel-drive system's setting and Drivelogic option currently engaged. Key elements here for the sporty driver are the variable rpm pre-warning field and shift lights that show the best time to change gears when in manual shift mode. This data can also be reflected into the M-specific Head-Up Display.

Virtually all of the driving dynamic systems can be configured using the central touch display, buttons on the centre console or M sports steering wheel, and the central information display offers gesture control. The M5's engine is stirred into life by pressing the red starter button. Among the essential features for drivers with sporting aspirations are the two red-painted M1 and M2 buttons next to the gearshift paddles on the M multifunction steering wheel, which allow drivers to configure two individual set-ups for the M5. These include their choice of M xDrive, DSC, engine, transmission, damper and steering characteristics, as well as the appearance of M view in the Head-Up Display.

The all-new BMW M5 is trimmed with Merino leather as standard. The driver and front passenger settle into M sports seats with electric adjustment, seat heating and an embossed M logo in the head restraints. As well as electric adjustment for the seat depth, there is also pneumatic backrest width adjustment to deliver optimum lateral support, which is particularly important when the driver is pushing on. The driver's seat also has a memory function. Available as an option are M multifunction seats with integral head restraints providing even better support in the shoulder area, an illuminated M5 logo and extended functions. With their racing-style bucket shape and the thicker side bolsters of the seat surface and backrest, the M multifunction seats offer even greater lateral support. For the first time, the all-new BMW M5 is now also available with all the driver assistance systems and features familiar from the new BMW 5 Series.

The all-new BMW M5 can be ordered in a variety of exterior colours, some of which are reserved exclusively for the M5. New additions to the spectrum include Marina Bay Blue Metallic, an intense shade of blue. Matt finishes such as Frozen Dark Silver and Frozen Arctic Grey can be specified as an option. Inside the car, exclusive aluminium applications with a carbon-structure provide a special sporting flourish.



# In the best of company: Previous generations of the BMW M5. The M5 has been the quintessential sports sedan for over 30 years.

Since 1984 the BMW M5 has been a standard-bearer for fast high-performance sedans preferring not to shout about their sporting potential. The various generations of the BMW M5 have always possessed pure-bred racing genes and acquitted themselves impressively on the race track as well as on the road. The all-new BMW M5 represents the sixth generation of the super-powered 5 Series. And, like those that have gone before it, the new model promises to continue BMW M GmbH's record of building distinctive sports cars that really can be used every day. Below is a brief look back at the five generations of the BMW M5 that have gone before.

## **1984: The E28S BMW M5.**

BMW Motorsport GmbH had already presented the M535i – a particularly sporty 5 Series – back in 1979 and followed it up with another M535i based on the E12's successor (the E28) in 1984, before the first generation of the BMW M5 (the E28S) arrived on the scene in autumn that year. It was powered by the celebrated four-valve six-cylinder in-line engine with 3.5-litre displacement and 286 hp, which had also proved itself in race competition and was familiar from the mid-engined M1 sports car. Equipped with individual throttle butterflies, the engine powered the original M5 from 0 – 100 km/h in just 6.5 seconds and gave it a top speed of 245 km/h. That made the first BMW M5 the fastest four-door series-produced sedan of its time.

## **1988: The E34S/E34/5S BMW M5.**

The introduction of the second-generation M5 (the E34S) in 1988 saw BMW Motorsport GmbH raise the power stakes by a clear margin once again. The new car developed 315 hp from its straight-six engine, whose displacement had been increased to 3.6 litres. That was enough to propel the M5 to 250 km/h for the first time. An update in 1992 (known as the E34/5S) took displacement to 3.8 litres and output to 340 hp. And from 1992 the über-5 Series was also available in a Touring estate version, whose rarity (just under 900 units were produced) has made it a highly prized young classic.

## **1998: The E39S BMW M5.**

The sports-focused branch of BMW AG – rechristened BMW M GmbH in 1993 – remained true to its heritage with the third generation of the M5 unveiled in 1998. The E39S M5 shared all the stylistic understatement of its

predecessors. However, under the bonnet of the new car was a five-litre four-valve V8, which sent a full 400 hp and 500 Nm (369 lb-ft) of peak torque to the rear wheels via a six-speed manual gearbox. The top speed of this new M5 was once again electronically limited to 250 km/h, while 0 to 100 km/h took 5.3 seconds.

### **2005: The E60/E61 BMW M5.**

For the fourth BMW M5 (the E60), M GmbH put its faith in a newly developed, high-revving V10 engine with five-litre displacement, which generated its maximum output of 507 hp at an eyebrow-raising 7,750 rpm. The four-valve power unit whisked the fourth-generation M5 from 0 to 100 km/h in only 4.7 seconds. For the first time, M5 drivers could have the car's speed limiter raised by specifying the M Driver's Package – and that turned the M5 into a 305 km/h car. Another new addition was the automated sequential M gearbox (SMG) with seven gears and Launch Control for maximum acceleration off the line. This BMW M5 was also available in Touring (E61) guise – from 2007.

### **2011: The F10M BMW M5.**

The fifth-generation BMW M5 (the F10M) took to the stage in 2011. Replacing the V10 engine was a 4.4-litre bi-turbo V8 that fired the M5 into new dimensions. The new M5 now developed almost double the power (560 hp) of the original M5. Its 680 Nm (501 lb-ft) of peak torque also represented virtually twice what the E28S could offer (340 Nm / 251 lb-ft). M TwinPower Turbo technology enabled the latest M5 with a seven-speed M Double Clutch Transmission to sprint from 0 – 100 km/h in a mere 4.3 seconds and on to a maximum 315 km/h. This was followed in 2013 by the M5 with Competition Package, which packed a 575 hp punch. And in 2014 came the “30 Jahre M5” (30 years of the M5) special-edition model producing 600 hp, which paid tribute to the original E28S M5 and was limited to 300 units.

### **2017: The F90 BMW M5.**

The all-new BMW M5 (the F90) sees BMW M GmbH writing the next chapter in a success story which began over 30 years ago and is based on an apparently simple recipe: unbeatable sports performance and unimpeachable everyday usability brought together into one supreme package.

# **The BMW M5 First Edition.**

## **Limited-run special edition with exclusive specification.**



First come, first served is the motto as BMW M GmbH launches the all-new BMW M5 with the option of a “First Edition” special-edition model limited to a worldwide run of 400 examples and available from the start of sales in autumn 2017. Deliveries of the BMW M5 First Edition will begin in spring 2018 and production will continue until June 2018 at the latest.

The all-new BMW M5 First Edition has exclusive Frozen Dark Red Metallic paintwork and also includes BMW Individual high-gloss Shadow Line trim with extended features. This means that the kidney grille, the M gills and the four tailpipes of the sports exhaust all come in high-gloss black. The M5 First Edition is fitted as standard with 20-inch seven-double-spoke light-alloy wheels in black.

The BMW M5 First Edition also has a very individual flavour inside. The Piano Finish Black applications are complemented by a plaque on the centre console indicating the car’s production number (“M5 First Edition 1/400”) and pointing to the exclusivity of this BMW M5. The M5 First Edition comes as standard with high-quality M multifunction seats. It is also available with full-leather upholstery in Smoke White with red contrast stitching.