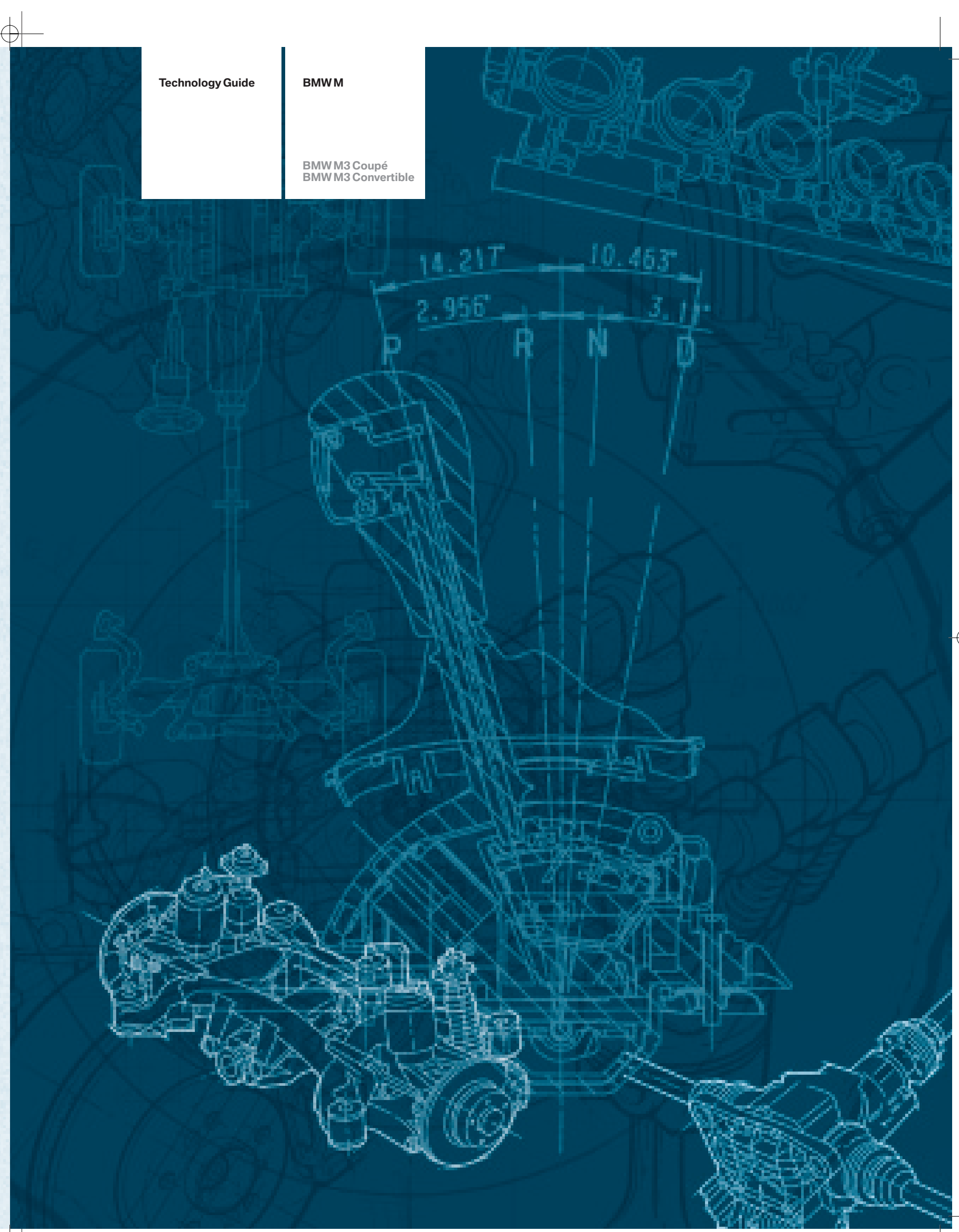
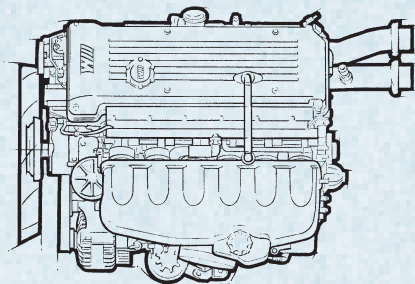


BMW Technology Guide

The terms innovative technology and BMW are inextricably linked. A BMW automobile is not just very stylish, it is also an embodiment of cutting-edge technology. Just take a look at our Technology Guide to see why. But remember – only a BMW drives like a BMW. So to find out for yourself, contact your BMW Dealer for a test-drive. ■



Straight-six power unit

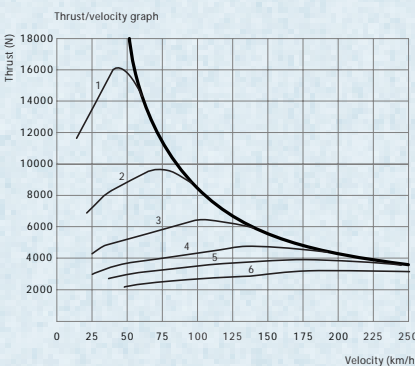
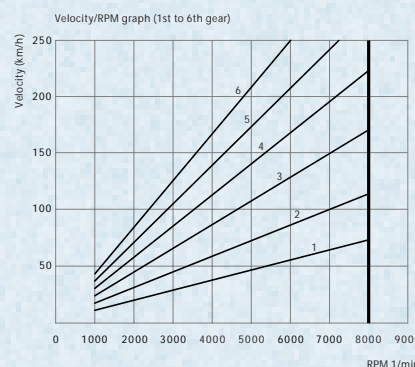


Straight six naturally aspirated power units are one of BMW's outstanding strongholds. In all M3 models, engines of this type combine supreme output and performance with excellent refinement and spontaneous power from low engine speeds extending all the way up to the electronically controlled engine speed limit. And all this is then enhanced by equally outstanding fuel economy and emission management. Apart from more than 30 years of experience in the design and construction of straight-six power units, we see many other good reasons in favour of this particular engine configuration: The crank drive of a straight-six power unit, for example, offers perfect compensation of masses, with neither free mass forces nor mass momentum causing any imbalance and, as a result, any undue vibration within the drive system. Thanks to its slender shape, the straight-six also offers an excellent starting point for the optimum design of the intake and exhaust system. And since the straight-six is fitted longitudinally crosswise across the front axle, a BMW can never be top-heavy – an advantage you will feel in all steering manoeuvres, in bends, and, indeed, wherever you go. An advantage which, quite simply, means agile handling at its best.

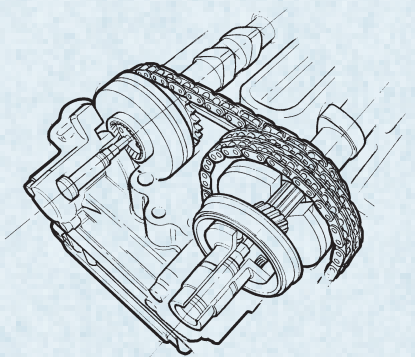
(M3 Coupé / M3 Convertible)

BMW M sports cars are renowned for their high-revving, naturally aspirated straight six cylinder engines. They have been developed according to a potent philosophy: the "M high-rev concept." The 252kW (343bhp) engine in the M3 Coupé and M3 Convertible with its rocker-arm valvetrain spins effortlessly right up to 7900 rpm, delivering its enormous power with the spontaneity that only a high-revving naturally aspirated engine can provide. You might say, "The engine really responds." This concept represents the pinnacle of naturally aspirated engine design. The engines stand for high specific power output and outstanding flexibility, providing at least 80% of maximum torque across a range of almost 5000 rpm. This free-revving capability and solid torque delivery enable the use of an optimal rear axle ratio, resulting in enormous thrust throughout the entire rev range (see diagram), and thus guaranteeing the classic M driving experience in every situation. The high-revving straight six, with its relatively low capacity (3.2 litre), provides low weight and low consumption figures with maximum usable performance, and offers a long lifespan even under intensive use.

(M3 Coupé / M3 Convertible)



M Double-VANOS

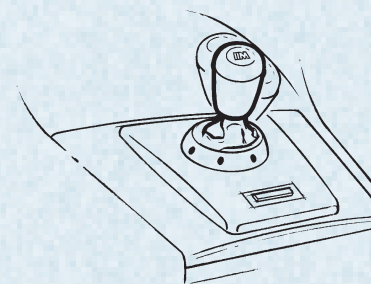
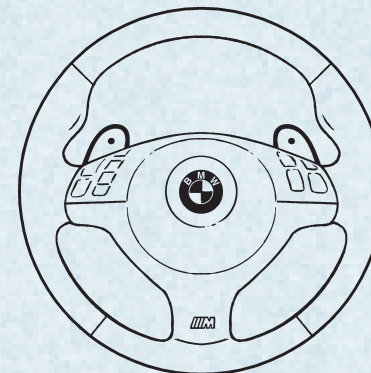


M Double-VANOS (double-variable camshaft control) significantly improves the torque curve of the six-cylinder petrol engine. Valve timing both on the intake and outlet camshaft is adjusted to the power and torque required of the engine as a function of gas pedal position (load-related) and engine speed. And all this is done with infinite, map-controlled precision. M Double-VANOS requires very high oil pressure in order to adjust the camshafts as quickly and precisely as possible. To express this in figures, our high-precision M double-VANOS works at a very high pressure of 80 – 120 bar, ensuring supreme torque at low engine speeds and equally supreme output at high speeds. The engine's idling qualities, in turn, are improved by the reduction of unburnt residual gases. Special engine management maps for the warm-up period enhance the efficiency of the catalytic converter. And the simple fact that BMW M engines provide

their outstanding power and performance in an economic, fuel-efficient process proves the unparalleled leadership in technology of BMW's engineers.

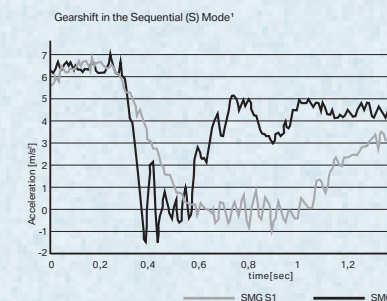
(M3 Coupé / M3 Convertible)

SMG Drivelogic



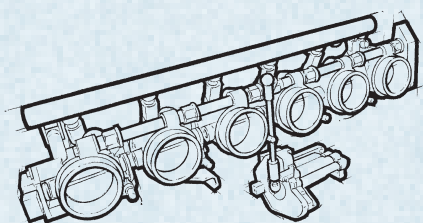
The new **SMG Drivelogic**, allows you to shift gears just like a racing driver. DRIVELOGIC control offers you up to 11 driving programs (sequential and automatic). Rocker switches on the steering wheel then enable you to shift gears in less than 80 milliseconds – the rocker switch on the left is for shifting down, the switch on the right for shifting up – and the flow of power is interrupted for less than 150 milliseconds. The shift signal is transmitted electrically (by wire) and in redundant form (dual parallel transmission just like control functions in aerospace), the actual mechanical process of shifting gears is ensured by a hydraulic system replacing the clutch pedal and shifting gears on one level. Every time you shift gears the electronic control unit activates a solenoid valve allowing hydraulic fluid to flow into the clutch master cylinder and operating the clutch in the process. Two other solenoid valves activate two hydraulic cylinders turning the main gearshift lever in the gearbox into the appropriate shift lane and choosing one of the six gears. Operating at a pressure of up to 85 bar, this hydraulic system ensures an extremely fast and absolutely precise gearshift. Even under the toughest conditions there is absolutely no risk of making mistakes while shifting gears and over-revving the engine in the process. And there are no load change reactions when shifting down. Incorporating numerous special functions such as the uphill gradient and acceleration assistant as well as the shift-up display, finally, our new SMG Drivelogic meets nearly all requirements in sports motoring at the highest, most wonderful level.

(M3 Coupé / M3 Convertible)



*From first to second gear under full load at 4000 rpm.

Engine technology



Electronic throttle butterfly control replaces the mechanical cable connecting the gas pedal and throttle butterflies by an electrical signal sent to the engine management with every movement of the accelerator. Then, working through an electrical actuator, the engine management adjusts the six individual throttle butterflies. The system requires a mere 120 milliseconds to open the throttle butterflies in full, about the same time it will take a skilled driver to press down the accelerator pedal. This allows the driver to apply engine power much more sensitively, ensuring particularly smooth, vibration free driving conditions above all at low engine speeds. Optimum choice of the ignition timing, valve opening times, the throttle butterfly position and the injection volume also serves to optimise fuel economy and emission management. A further important point is that electronic throttle butterfly control enhances driving safety by applying a fail-safe program activated automatically in the event of a dangerous mechanical defect such as the throttle butterflies inadvertently being set to full load. Pressing a button, finally, the driver can choose between a normal and a sports response from the electronic throttle butterfly control, tuning the engine to his specific requirements.

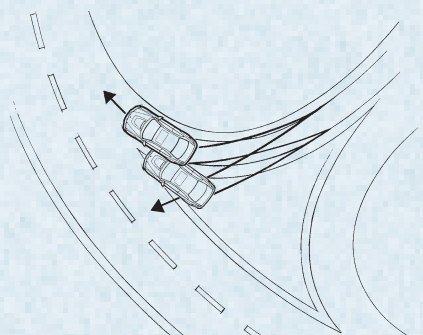
(M3 Coupé / M3 Convertible)

Digital Motor Electronics (DME) is a highly sophisticated engine management system tailored specifically to these high-performance power units and guaranteeing absolutely safe and efficient command of this complex technology. The current-generation DME for the M engines excels in particular through the use of a Torque Manager providing exactly the right torque for the respective engine speed as a function of external conditions (outside temperature, ambient pressure, etc). This allows the driver to rely at all times on absolutely smooth and consistent engine conditions and running qualities.

DME in the M models also comes with its own, high-speed software, and the operating capacity of this system alone proves that DME is one of the most efficient, high-performance electronic engine management systems, processing up to 25 million instructions per second. This electronic system masterminds all significant engine functions such as electronic throttle butterfly control (ETC), the variable pre-warning lights in the rev counter, and the map-controlled M double-VANOS, at the same time providing data for other control systems such as M Servotronic or DSC.

(M3 Coupé / M3 Convertible)

Dynamic Stability Control (DSC)

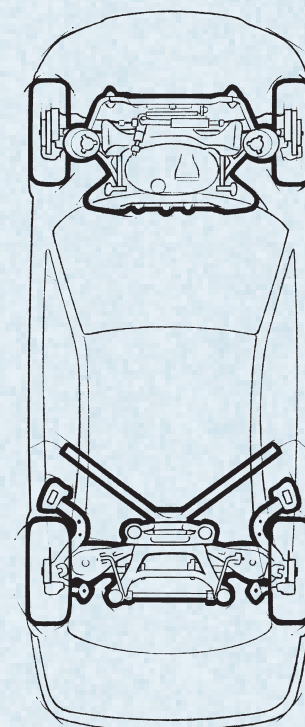


Dynamic Stability Control (DSC) is a complex suspension control system specifically geared to the M series. The first step in developing this system is to render the weight and mass of the car, its dimensions, the suspension set-up, the wheels and tyres in a computer-aided model. Then these individual features are coordinated to one another, DSC thus serving, together with all existing suspension control systems such as ABS and ASC+T, to recognise the risk of the car swerving right from the start and to prevent any such uncontrolled behaviour before it can even occur. To do this, the system needs a permanent supply of data on the movement of the steering wheel, road speed, lateral acceleration, and lateral motion of the car. Unlike ASC+T, the brakes also intervene on the front wheels, intervention in engine management, in turn, depending on whether the car is understeering or oversteering. The fact remains, however, that even

this system cannot override the laws of physics, requiring the driver to maintain a reasonable style of motoring appropriate under the prevailing conditions.

(M3 Coupé / M3 Convertible)

Suspension technology



As a reflection of their supreme performance, all M Cars feature an elaborately modified axle system. A typical example in this context is the **front and rear axle configuration** in the BMW M3 enhanced to an even higher standard for even more precise driving characteristics and control particularly in bends. The single-joint spring strut front axle with anti-dive excels in particular through its very strong connection to the car's body, not only the new spring strut supports, but also the extremely stable aluminium track control arms being reinforced once again. A new feature is the aluminium thrust plate conveying forces into the body of the car even more consistently over a large surface. This enhances body stiffness and significantly improves both steering behaviour and driving stability. The modified central arm rear axle, in turn, rests on two track control arms and one longitudinal arm fitted at a central point on the body of the car. An additional V-arm leads down from the rear axle to the floorpan, again providing an even stiffer connection of the rear axle and the bodyshell. All these features together ensure the outstanding steering precision offered by the M3.

(M3 Coupé / M3 Convertible)

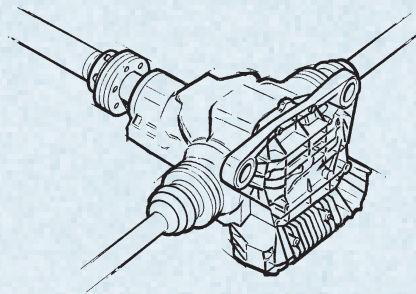
The **tyre defect indicator** monitors the air pressure in the tyres of the M series at all road speeds. This system is therefore able to detect a possible loss of air as a function of the wheels' speed of rotation. With the roll radius of the tyres changing as pressure decreases, wheel rotation speed changes accordingly and is precisely determined by the ABS sensors on the wheels. A loss of pressure is then displayed by a warning light in the instrument panel, a warning buzzer coming on additionally in the event of a significant pressure loss.

(M3 Coupé / M3 Convertible)

A particularly fascinating feature of the M models is their combination of superior practical value and truly outstanding performance. Inter alia, this also means very high **lateral acceleration** on the road. Generating forces which try to pull the car out of a bend, lateral acceleration increases with road speed and with the radius of a bend becoming tighter. Lateral acceleration is strictly limited by the frictional coefficient between the tyres and the road. Benefitting from the outstanding set-up of all suspension components, a skilled driver in a BMW M Car can achieve an exceptionally high level of lateral acceleration. BMW therefore offers various driver and safety training courses enabling you to practise and enhance your driving skills. Just contact your BMW partner for detailed information.

(M3 Coupé / M3 Convertible)

Variable M Differential Lock

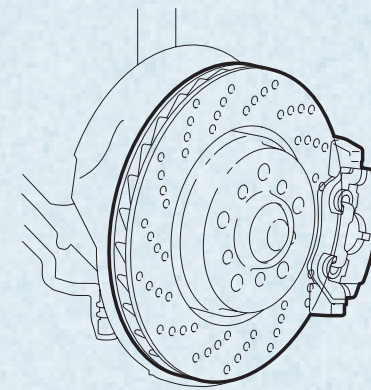


One of the technological highlights of the M3 models is the variable M differential lock. In order to understand the advantage of this differential lock, it is crucial to understand precisely what this system does. When cornering, the two drive wheels of a car travel different distances: the inner wheel does not have to travel as far as the outer wheel. The axle differential compensates for this difference. A differential lock also has the task of improving the car's starting-off traction on slippery surfaces, by building up a locking power when needed, for example if one of the two drive wheels threatens to spin. This is where the variable M differential lock comes into use. Its advantage over a conventional system is that if the difference in speed of the drive wheels is rising, increasing locking power is also set up immediately between the two drive wheels. Because of this the driving torque can no longer completely "give way" even on snow, gravel or even sheet ice and the forward thrust is maintained. Contrary to a conventional torque-sensitive differential lock, which only measures the difference in torque of the two drive wheels, this system uses the difference in speed between the drive wheels to spontaneously build up pressure in an integrated axial piston pump. This pressure is passed on via the piston to very sensitively close a multi-plate clutch, which connects the two half shafts to the exact degree required to maintain optimal drive wheel traction. In extreme cases – and coefficient of friction permitting – the entire driving torque can be shifted onto the drive wheel with the better friction coefficient. Thus the variable M differential lock is no longer dependent on the drive wheel with less road-holding to stick to the road and so a considerably greater degree of traction is available than is the case with conventional differential locks. The resulting advantages for a rear-wheel drive sports car include excellent winter attributes, problem-free starting-off even on surfaces with different friction coefficients, continuous forward thrust even in sharp curves at high speeds, as well

as improved handling and greater driving stability. In addition the system is self-regulating and maintenance-free.

(M3 Coupé / M3 Convertible)

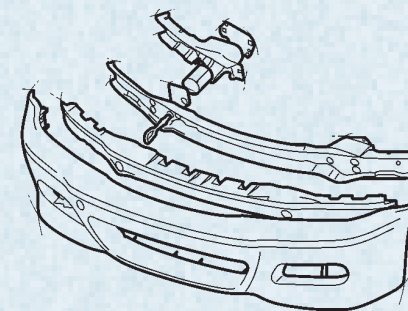
Compound brakes



To safely master their staggering power and performance, BMW's M models come with a particularly large and efficient high-performance brake system featuring **compound brake discs**. The big difference versus conventional brake discs is that compound brake discs feature a radial anti-friction bearing for the brake disc ring. This floating system allows free thermal expansion of the brake disc rings, thus providing the option to use different materials with the best properties in each case for specific purposes. This, in turn, means that each component within the brake system is able to do a perfect job according to its specific requirements. The result is not only outstanding stopping power, but also a considerable reduction in weight versus conventional brake systems, a significantly higher standard of driving comfort, and a much longer service life.

(M3 Coupé / M3 Convertible)

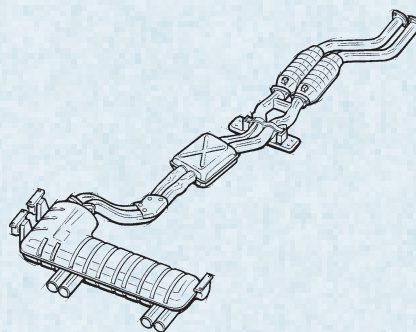
Lightweight bumpers



The M3 and M3 Convertible come as standard with the world's first lightweight bumpers made of extremely light, highly advanced composite plastic. These high-tech components offer an enormous potential in innovation, reducing weight on each car by up to 10.2 kg (approximately 60 per cent lighter than conventional bumpers). First, this improves the power-to-weight ratio in the interest of even more dynamic performance. Second, this supreme material gives the bumpers enhanced functions and superiority, with the bumpers being able to absorb even more kinetic energy. This material was originally developed for aerospace applications and motorsport, and is used in particular for aircraft wings or in Formula 1.

(M3 Coupé / M3 Convertible)

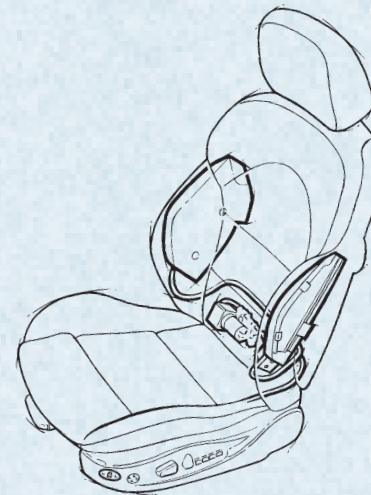
M exhaust system



The **M exhaust system** is an important component ensuring optimum power and torque as well as engine speed management with an M engine. It also serves to give each M car its very special, characteristic sound. This is one of the reasons why all M models come with a large silencer providing that special sound of power and muscle. The double-chamber stainless-steel exhaust system is dominated by four powerful-looking tailpipes not only as a sign of superiority on BMW M Cars, but also as a further element contributing to these cars' special sound and performance.

(M3 Coupé / M3 Convertible)

Seat backrest width adjustment



The BMW M3 Coupé is perfectly equipped for both a very sporting and a very comfortable style of motoring: **Seat backrest width adjustment** incorporates air cushions in the seat side elements on both sides at waist level. Pumped up electrically to any desired position, these air cushions support the driver's and front passenger's body particularly in fast bends and at high speeds by providing a very high standard of side support. In the interest of greater comfort, in turn, all you have to do is press a button to reduce the amount of air in the side cushions until you have exactly the level of body support you require.

(M3 Coupé)